Developer Manual

Develop DHIS core version master

DHIS2 Documentation Team

dhis2

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Overview

The Web API is a component which makes it possible for external systems to access and manipulate data stored in an instance of DHIS2. More precisely, it provides a programmatic interface to a wide range of exposed data and service methods for applications such as third-party software clients, web portals and internal DHIS2 modules.

Introduction

The Web API adheres to many of the principles behind the REST architectural style. To mention some important ones:

1. The fundamental building blocks are referred to as *resources*. A resource can be anything exposed to the Web, from a document to a business process - anything a client might want to interact with. The information aspects of a resource can be retrieved or exchanged through resource *representations*. A representation is a view of a resource's state at any given time. For instance, the *visualizations* resource in DHIS2 represents visualizations of aggregated data for a certain set of parameters. This resource can be retrieved in a variety of representation formats including JSON and CSV.
2. All resources can be uniquely identified by a *URI* (also referred to as *URL*). All resources have a default representation. You can indicate that you are interested in a specific representation by supplying an *Accept* HTTP header, a file extension or a *format* query parameter. So in order to retrieve a CSV representation of an analytics data response you can supply an *Accept: application/csv* header or append *.csv* or *?format=csv* to your request URL.
3. Interactions with the API requires the correct use of HTTP *methods* or *verbs*. This implies that for a resource you must issue a *GET* request when you want to retrieve it, *POST* request when you want to create one, *PUT* when you want to update it and *DELETE* when you want to remove it.

Authentication

The DHIS2 Web API supports three protocols for authentication:

- Basic Authentication
- Personal Access Tokens (PAT)
- OAuth 2

You can verify and get information about the currently authenticated user by making a GET request to the following URL:

```
/api/33/me
```

And more information about authorities (and if a user has a certain authority) by using the endpoints:

```
/api/33/me/authorities
/api/33/me/authorities/ALL
```

Basic Authentication

The DHIS2 Web API supports *Basic authentication*. Basic authentication is a technique for clients to send login credentials over HTTP to a web server. Technically speaking, the username is appended with a colon and the password, Base64-encoded, prefixed Basic and supplied as the value of the *Authorization* HTTP header. More formally that is:

```
Authorization: Basic base64encode(username:password)
```

Most network-aware development environments provide support for Basic authentication, such as *Apache HttpClient* and *Spring RestTemplate*. An important note is that this authentication scheme provides no security since the username and password are sent in plain text and can be easily observed by an attacker. Using Basic is recommended only if the server is using SSL/TLS (HTTPS) to encrypt communication with clients. Consider this a hard requirement in order to provide secure interactions with the Web API.

Two-factor authentication

DHIS2 supports two-factor authentication. This can be enabled per user. When enabled, users will be asked to enter a 2FA code when logging in. You can read more about 2FA here.

Personal Access Token

Personal access tokens (PATs) are an alternative to using passwords for authentication to DHIS2 when using the API.

PATs can be a more secure alternative to HTTP Basic Authentication, and should be your preferred choice when creating a new app/script etc.

HTTP Basic Authentication is considered insecure because, among other things, it sends your username and password in clear text. It may be deprecated in future DHIS2 versions or made opt-in, meaning that basic authentication would need to be explicitly enabled in the configuration.

Important security concerns!

Your PATs will automatically inherit all the permissions and authorizations your user has. It is therefore extremely important that you limit the access granted to your token depending on how you intend to use it, see **Configuring your token**.

If you only want the token to have access to a narrow and specific part of the server, it is advised to rather create a new special user that you assign only the roles/authorities you want it to have access to.

Creating a token

To create a new PAT, you have two choices: * A. Create a token in the UI on your account's profile page. * B. Create a token via the API.

A. Creating a token on the account's page

Log in with your username and password, go to your profile page (Click top right corner, and chose "Edit profile" from the dropdown). On your user profile page, choose "Personal access tokens" from the left side menu. You should now be on the "Manage personal access tokens" page and see the text: "You don't have any active personal access tokens". Click "Generate new token" to make a new token. A "Generate new token" popup will be shown and present you with two choices:

1. Server/script context:

"This type is used for integrations and scripts that won't be accessed by a browser".

If you plan to use the token in an application, a script or similar, this type should be your choice.

2. Browser context:

"This type us used for applications, like public portals, that will be accessed with a web browser".

If you need to link to DHIS2 on a webpage, or e.g. embed in an iframe, this is probably the type of token you want.

Configuring your token

After choosing what token type you want, you can configure different access constraints on your token. By constraint, we mean how to limit and narrow down how your token can be used. This can be of crucial importance if you plan on using the token in a public environment, e.g. on a public dashboard on another site, embedded in an iframe. Since tokens always have the same access/ authorities that your user currently has, taking special care is needed if you intend to use it in any environment you don't have 100% control over.

NB: If anyone else gets their hands on your token, they can do anything your user can do. It is not possible to distinguish between actions performed using the token and other actions performed by your user.

Important: It is strongly advised that you create a separate unique user with only the roles/authorities you want the token to have if you plan on using PAT tokens in a non-secure and/or public environment, e.g. on a PC or server, you don't have 100% control over, or "embedded" in a webpage on another server.

The different constraint types are as follows:

- Expiry time
- Allowed UP addresses
- Allowed HTTP methods
- Allowed HTTP referrers

Expiry time

Expiry time simply sets for how long you want your token to be usable, the default is 30 days. After the expiry time, the token will simply return a 401 (Unauthorized) message. You can set any expiry time you want, but it is strongly advised that you set an expiry time that is reasonable for your use case.

Allowed IP addresses

This is a comma-separated list of IP addresses you want to limit where the token requests can come from.

Important: IP address validation relies on the X-Forwarded-For header, which can be spoofed. For security, make sure a load balancer or reverse proxy overwrites this header.

Allowed HTTP methods

A comma-separated list of HTTP methods you want your token to be able to use. If you only need your token to view data, not modify or delete, selecting only the GET HTTP method makes sense.

Allowed HTTP referrers

HTTP referer is a header added to the request, when you click on a link, this says which site/page you were on when you clicked the link. Read more about the HTTP referer header here: https://en.wikipedia.org/wiki/HTTP_referer

This can be used to limit the use of a "public" token embedded on another page on another site. Making sure that the referer header match the site hostname in should come from, can help avoid abuse of the token, e.g. if someone posts it on a public forum.

Important: this is not a security feature. The `referer` header can easily be spoofed. This setting is intended to discourage unauthorized third-party developers from connecting to public access instances.

Saving your token:

When you are done configuring your token, you can save it by clicking the "Generate new token" button, on the bottom right of the pop-up. When doing so the token will be saved and a secret token key will be generated on the server. The new secret token key will be shown on the bottom of the PAT token list with a green background, and the text "Newly created token". The secret token key will look similar to this:

```
d2pat_5xVA12xyUbWNedQxy4ohH77WlxRGVvZZ1151814092
```

Important: This generated secret token key will only be shown once, so it is important that you copy the token key now and save it in a secure place for use later. The secret token key will be securely hashed on the server, and only the hash of this secret token key will be saved to the database. This is done to minimize the security impact if someone gets unauthorized access to the database, similar to the way passwords are handled.

B. Creating a token via the API

Example of how to create a new Personal Access Token with the API:

```
POST https://play.dhis2.org/dev/api/apiToken
Content-Type: application/json
Authorization: Basic admin district

{}
```

NB: Remember the empty JSON body (`{}`) in the payload!

This will return a response containing a token similar to this:

```
{
  "httpStatus": "Created",
  "httpStatusCode": 201,
  "status": "OK",
  "response": {
     "responseType": "ApiTokenCreationResponse",
     "key": "d2pat_5xVA12xyUbWNedQxy4ohH77WlxRGVvZZ1151814092",
     "uid": "jJYrtIVP7qU",
     "klass": "org.hisp.dhis.security.apikey.ApiToken",
     "errorReports": []
  }
}
```

Important: The token key will only be shown once here in this response. You need to copy and save this is in a secure place for use later!

The token itself consists of three parts: 1. Prefix: (`d2pat_`) indicates what type of token this is. 2. Random bytes Base64 encoded: (`5xVA12xyUbWNedQxy4ohH77WlxRGVvZZ`) 3. CRC32 checksum: (`1151814092`) the checksum part is padded with 0 so that it always stays ten characters long.

Configure your token via the API:

To change any of the constraints on your token, you can issue the following HTTP API request.

NB: Only the constraints are possible to modify after the token is created!

```
PUT https://play.dhis2.org/dev/api/apiToken/jJYrtIVP7qU
Content-Type: application/json
Authorization: Basic admin district
```

```
{
  "version": 1,
  "type": "PERSONAL_ACCESS_TOKEN",
  "expire": 163465349603200,
  "attributes": [
      {
        "type": "IpAllowedList",
        "allowedIps": ["192.168.0.1"]
      },
      {
        "type": "MethodAllowedList",
        "allowedMethods": ["GET"]
      }
  ]
}
```

Using your Personal Access Token

To issue a request with your newly created token, use the Authorization header accordingly. The Authorization header format is:

```
Authorization: ApiToken [YOUR_SECRET_API_TOKEN_KEY]
```

Example:

```
GET https://play.dhis2.org/dev/api/apiToken/jJYrtIVP7qU
Content-Type: application/json
Authorization: ApiToken d2pat_5xVA12xyUbWNedQxy4ohH77WlxRGVvZZ1151814092
```

Deleting your Personal Access Token

You can delete your PATs either in the UI on your profile page where you created it, or via the API like this:

```
DELETE https://play.dhis2.org/dev/api/apiToken/jJYrtIVP7qU
Content-Type: application/json
Authorization: ApiToken d2pat_5xVA12xyUbWNedQxy4ohH77WlxRGVvZZ1151814092
```

OAuth2

DHIS2 supports the *OAuth2* authentication protocol. OAuth2 is an open standard for authorization which allows third-party clients to connect on behalf of a DHIS2 user and get a reusable *bearer token* for subsequent requests to the Web API. DHIS2 does not support fine-grained OAuth2 roles but rather provides applications access based on user roles of the DHIS2 user.

Each client for which you want to allow OAuth 2 authentication must be registered in DHIS2. To add a new OAuth2 client go to `Apps > Settings > OAuth2 Clients` in the user interface, click *Add new* and enter the desired client name and the grant types.

Adding a client using the Web API

An OAuth2 client can be added through the Web API. As an example, we can send a payload like this:

```
{
  "name": "OAuth2 Demo Client",
  "cid": "demo",
  "secret": "1e6db50c-0fee-11e5-98d0-3c15c2c6caf6",
  "grantTypes": [
    "password",
    "refresh_token",
    "authorization_code"
  ],
  "redirectUris": [
    "http://www.example.org"
  ]
}
```

The payload can be sent with the following command:

```
SERVER="https://play.dhis2.org/dev"
curl -X POST -H "Content-Type: application/json" -d @client.json
  -u admin:district "$SERVER/api/oAuth2Clients"
```

We will use this client as the basis for our next grant type examples.

Grant type password

The simplest of all grant types is the *password* grant type. This grant type is similar to basic authentication in the sense that it requires the client to collect the user's username and password. As an example we can use our demo server:

```
SERVER="https://play.dhis2.org/dev"
SECRET="1e6db50c-0fee-11e5-98d0-3c15c2c6caf6"

curl -X POST -H "Accept: application/json" -u demo:$SECRET "$SERVER/uaa/oauth/token"
  -d grant_type=password -d username=admin -d password=district
```

This will give you a response similar to this:

```
{
  "expires_in": 43175,
  "scope": "ALL",
  "access_token": "07fc551c-806c-41a4-9a8c-10658bd15435",
```

```
  "refresh_token": "a4e4de45-4743-481d-9345-2cfe34732fcc",
  "token_type": "bearer"
}
```

For now, we will concentrate on the `access_token`, which is what we will use as our authentication (bearer) token. As an example, we will get all data elements using our token:

```
SERVER="https://play.dhis2.org/dev"
curl -H "Authorization: Bearer 07fc551c-806c-41a4-9a8c-10658bd15435" "$SERVER/api/33/
dataElements.json"
```

Grant type refresh_token

In general the access tokens have limited validity. You can have a look at the `expires_in` property of the response in the previous example to understand when a token expires. To get a fresh `access_token` you can make another round trip to the server and use `refresh_token` which allows you to get an updated token without needing to ask for the user credentials one more time.

```
SERVER="https://play.dhis2.org/dev"
SECRET="1e6db50c-0fee-11e5-98d0-3c15c2c6caf6"
REFRESH_TOKEN="a4e4de45-4743-481d-9345-2cfe34732fcc"

curl -X POST -H "Accept: application/json" -u demo:$SECRET "$SERVER/uaa/oauth/token"
  -d "grant_type=refresh_token" -d "refresh_token=$REFRESH_TOKEN"
```

The response will be exactly the same as when you get a token to start with.

Grant type authorization_code

Authorized code grant type is the recommended approach if you don't want to store the user credentials externally. It allows DHIS2 to collect the username/password directly from the user instead of the client collecting them and then authenticating on behalf of the user. Please be aware that this approach uses the `redirectUris` part of the client payload.

Step 1: Visit the following URL using a web browser. If you have more than one redirect URIs, you might want to add `&redirect_uri=http://www.example.org` to the URL:

```
SERVER="https://play.dhis2.org/dev"
$SERVER/uaa/oauth/authorize?client_id=demo&response_type=code
```

Step 2: After the user has successfully logged in and accepted your client access, it will redirect back to your redirect uri like this:

```
http://www.example.org/?code=XYZ
```

Step 3: This step is similar to what we did in the password grant type, using the given code, we will now ask for an access token:

```
SERVER="https://play.dhis2.org/dev"
SECRET="1e6db50c-0fee-11e5-98d0-3c15c2c6caf6"
```

```
curl -X POST -u demo:$SECRET -H "Accept: application/json" $SERVER/uaa/oauth/token
-d "grant_type=authorization_code" -d "code=XYZ"
```

Error and info messages

The Web API uses a consistent format for all error/warning and informational messages:

```
{
  "httpStatus": "Forbidden",
  "message": "You don't have the proper permissions to read objects of this type.",
  "httpStatusCode": 403,
  "status": "ERROR"
}
```

Here we can see from the message that the user tried to access a resource I did not have access to. It uses the http status code 403, the HTTP status message *forbidden* and a descriptive message.

WebMessage properties

Name	Description
httpStatus	HTTP Status message for this response, see RFC 2616 (Section 10) for more information.
httpStatusCode	HTTP Status code for this response, see RFC 2616 (Section 10) for more information.
status	DHIS2 status, possible values are *OK* | *WARNING* | *ERROR*, where `OK` means everything was successful, `ERROR` means that operation did not complete and `WARNING` means the operation was partially successful, if the message contains a `response` property, please look there for more information.
message	A user-friendly message telling whether the operation was a success or not.
devMessage	A more technical, developer-friendly message (not currently in use).
response	Extension point for future extensions of the `WebMessage` format.

Date and period format

Throughout the Web API, we refer to dates and periods. The date format is:

```
yyyy-MM-dd
```

For instance, if you want to express March 20, 2014, you must use *2014-03-20*.

The period format is described in the following table (also available on the API endpoint `/api/periodTypes`)

Period format

Interval	Format	Example	Description
Day	yyyyMMdd	20040315	March 15, 2004
Week	yyyyWn	2004W10	Week 10 2004
Week Wednesday	yyyyWedWn	2015WedW5	Week 5 with start Wednesday
Week Thursday	yyyyThuWn	2015ThuW6	Week 6 with start Thursday
Week Saturday	yyyySatWn	2015SatW7	Week 7 with start Saturday
Week Sunday	yyyySunWn	2015SunW8	Week 8 with start Sunday
Bi-week	yyyyBiWn	2015BiW1	Week 1-2 20015
Month	yyyyMM	200403	March 2004
Bi-month	yyyyMMB	200401B	January-February 2004
Quarter	yyyyQn	2004Q1	January-March 2004
Six-month	yyyySn	2004S1	January-June 2004
Six-month April	yyyyAprilSn	2004AprilS1	April-September 2004
Year	yyyy	2004	2004
Financial Year April	yyyyApril	2004April	Apr 2004-Mar 2005
Financial Year July	yyyyJuly	2004July	July 2004-June 2005
Financial Year Oct	yyyyOct	2004Oct	Oct 2004-Sep 2005

Relative Periods

In some parts of the API, like for the analytics resource, you can utilize relative periods in addition to fixed periods (defined above). The relative periods are relative to the current date and allow e.g. for creating dynamic reports. The available relative period values are:

```
THIS_WEEK, LAST_WEEK, LAST_4_WEEKS, LAST_12_WEEKS, LAST_52_WEEKS,
THIS_MONTH, LAST_MONTH, THIS_BIMONTH, LAST_BIMONTH, THIS_QUARTER, LAST_QUARTER,
THIS_SIX_MONTH, LAST_SIX_MONTH, MONTHS_THIS_YEAR, QUARTERS_THIS_YEAR,
THIS_YEAR, MONTHS_LAST_YEAR, QUARTERS_LAST_YEAR, LAST_YEAR, LAST_5_YEARS, LAST_10_YEARS,
LAST_10_FINANCIAL_YEARS, LAST_12_MONTHS,
LAST_3_MONTHS, LAST_6_BIMONTHS, LAST_4_QUARTERS, LAST_2_SIXMONTHS, THIS_FINANCIAL_YEAR,
LAST_FINANCIAL_YEAR, LAST_5_FINANCIAL_YEARS
```

Custom date periods

Analytics `query` resources support extra parameters to express periods.

Default `pe` dimension will fall back to:

- `eventDate` for `/analytics/events/query`
- `enrollmentDate` for `/analytics/enrollments/query`

Adding conditions on one or more date fields and combining them are allowed.

Usage of custom date periods

In resources supporting custom date periods, there are extra query parameters that will be combined to express conditions on the time dimension.

custom date period	events query resource	enrollment query resource
`eventDate`	[x]	[ ]
`enrollmentDate`	[x]	[x]
`scheduledDate`	[x]	[ ]
`incidentDate`	[x]	[x]
`lastUpdated`	[x]	[x]

Conditions can be expressed in the following form:

`analytics/events/query/...?...&eventDate=2021&...`

It's possible to combine more time fields in the same query:

`analytics/events/query/...?...&eventDate=2021&incidentDate=202102&...`

All of these conditions can be combined with `pe` dimension:

```
analytics/events/
query/...?...&dimension=pe:TODAY&enrollmentDate=2021&incidentDate=202102&...
```

Supported formats are described in "date and period format" above. An extra format is provided to express a range of dates: `yyyyMMdd_yyyyMMdd` and `yyyy-MM-dd_yyyy-MM-dd`.

In the example bellow, the endpoint will return events that are scheduled to happen between 20210101 and 20210104:

```
analytics/events/
query/...?...&dimension=pe:TODAY&enrollmentDate=2021&incidentDate=202102&scheduledDate
```

Authorities

System authority ids and names can be listed using:

```
/api/authorities
```

It returns the following format:

```
{
  "systemAuthorities": [
    {
      "id": "ALL",
      "name": "ALL"
    },
    {
      "id": "F_ACCEPT_DATA_LOWER_LEVELS",
      "name": "Accept data at lower levels"
    }
  ]
}
```

Metadata

Identifier schemes

This section provides an explanation of the identifier scheme concept. Identifier schemes are used to map metadata objects to other metadata during import, and to render metadata as part of exports. Note that not all schemes work for all API calls, and not all schemes can be used for both input and output. This is outlined in the sections explaining the various API endpoints.

The full set of identifier scheme object types available are listed below, using the name of the property to use in queries:

- idScheme
- dataElementIdScheme
- categoryOptionComboIdScheme
- orgUnitIdScheme
- programIdScheme
- programStageIdScheme
- trackedEntityIdScheme
- trackedEntityAttributeIdScheme

The general idScheme applies to all types of objects. It can be overridden by specific object types.

The default scheme for all parameters is UID (stable DHIS2 identifiers). The supported identifier schemes are described in the table below.

Scheme Values

Scheme	Description
ID, UID	Match on DHIS2 stable Identifier, this is the default id scheme.
CODE	Match on DHIS2 Code, mainly used to exchange data with an external system.
NAME	Match on DHIS2 Name, please note that this uses what is available as *object.name*, and not the translated name. Also note that names are not always unique, and in that case, they can not be used.
ATTRIBUTE:ID	Match on metadata attribute, this attribute needs to be assigned to the type you are matching on, and also that the unique property is set to *true*. The main usage of this is also to exchange data with external systems, it has some advantages over *CODE* since multiple attributes can be added, so it can be used to synchronize with more than one system.

Note that identifier schemes is not an independent feature but needs to be used in combination with resources such as data value import, metadata import and GeoJson import.

As an example, to specify CODE as the general id scheme and override with UID for organisation unit id scheme you can use these query parameters:

```
?idScheme=CODE&orgUnitIdScheme=UID
```

As another example, to specify an attribute for the organisation unit id scheme, code for the data element id scheme and use the default UID id scheme for all other objects you can use these parameters:

```
?orgUnitIdScheme=ATTRIBUTE:j38fk2dKFsG&dataElementIdScheme=CODE
```

Browsing the Web API

The entry point for browsing the Web API is `/api`. This resource provides links to all available resources. Four resource representation formats are consistently available for all resources: HTML, XML, JSON, and JSONP. Some resources will have other formats available, like MS Excel, PDF, CSV, and PNG. To explore the API from a web browser, navigate to the `/api` entry point and follow the links to your desired resource, for instance `/api/dataElements`. For all resources which return a list of elements certain query parameters can be used to modify the response:

Query parameters

Parameter	Option values	Default option	Description
paging	true | false	true	Indicates whether to return lists of elements in pages.
page	number	1	Defines which page number to return.
pageSize	number	50	Defines the number of elements to return for each page.
order	property:asc/iasc/desc/idesc		Order the output using a specified order, only properties that are both persisted and simple (no collections, idObjects etc) are supported. iasc and idesc are case insensitive sorting.

An example of how these parameters can be used to get a full list of data element groups in XML response format is:

```
/api/dataElementGroups.xml?links=false&paging=false
```

You can query for elements on the name property instead of returning a full list of elements using the *query* query variable. In this example we query for all data elements with the word "anaemia" in the name:

```
/api/dataElements?query=anaemia
```

You can get specific pages and page sizes of objects like this:

```
/api/dataElements.json?page=2&pageSize=20
```

You can completely disable paging like this:

```
/api/indicatorGroups.json?paging=false
```

To order the result based on a specific property:

```
/api/indicators.json?order=shortName:desc
```

You can find an object based on its ID across all object types through the *identifiableObjects* resource:

```
/api/identifiableObjects/<id>
```

Translation

DHIS2 supports translations of database content, such as data elements, indicators, and programs. All metadata objects in the Web API have properties meant to be used for display / UI purposes, which include *displayName*, *displayShortName*, *displayDescription* and *displayFormName* (for data elements and tracked entity attributes).

Translate options

Parameter	Values	Description
translate	true | false	Translate display* properties in metadata output (displayName, displayShortName, displayDescription, and displayFormName for data elements and tracked entity attributes). Default value is true.
locale	Locale to use	Translate metadata output using a specified locale (requires translate=true).

Translation API

The translations for an object is rendered as part of the object itself in the *translations* array. Note that the *translations* array in the JSON/XML payloads is normally pre-filtered for you, which means they can not directly be used to import/export translations (as that would normally overwrite locales other than current users).

Example of data element with translation array filtered on user locale:

```
{
  "id": "FTRrcoaog83",
  "displayName": "Accute French",
  "translations": [
    {
      "property": "SHORT_NAME",
      "locale": "fr",
      "value": "Accute French"
    },
    {
      "property": "NAME",
      "locale": "fr",
      "value": "Accute French"
    }
  ]
}
```

Example of data element with translations turned off:

```
{
  "id": "FTRrcoaog83",
  "displayName": "Accute Flaccid Paralysis (Deaths < 5 yrs)",
  "translations": [
    {
      "property": "FORM_NAME",
      "locale": "en_FK",
      "value": "aa"
    },
    {
      "property": "SHORT_NAME",
      "locale": "en_GB",
      "value": "Accute Flaccid Paral"
    },
    {
      "property": "SHORT_NAME",
      "locale": "fr",
      "value": "Accute French"
    },
    {
      "property": "NAME",
      "locale": "fr",
      "value": "Accute French"
    },
    {
      "property": "NAME",
      "locale": "en_FK",
      "value": "aa"
    },
    {
      "property": "DESCRIPTION",
      "locale": "en_FK",
      "value": "aa"
    }
  ]
}
```

Note that even if you get the unfiltered result, and are using the appropriate type endpoint i..e `/api/dataElements` we do not allow updates, as it would be too easy to make mistakes and overwrite the other available locales.

To read and update translations you can use the special translations endpoint for each object resource. These can be accessed by *GET* or *PUT* on the appropriate `/api/<object-type>/<object-id>/translations` endpoint.

As an example, for a data element with identifier `FTRrcoaog83`, you could use `/api/dataElements/FTRrcoaog83/translations` to get and update translations. The fields available are `property` with options *NAME*, *SHORT_NAME*, *FORM_NAME*, *DESCRIPTION*, `locale` which supports any valid locale ID and the translated property `value`.

Example of NAME property for French locale:

```
{
  "property": "NAME",
  "locale": "fr",
  "value": "Paralysie Flasque Aiguë (Décès <5 ans)"
}
```

This payload would then be added to a translation array, and sent back to the appropriate endpoint:

```
{
  "translations": [
    {
      "property": "NAME",
      "locale": "fr",
      "value": "Paralysie Flasque Aiguë (Décès <5 ans)"
    }
  ]
}
```

For a data element with ID *FTRrcoaog83* you can *PUT* this to `/api/dataElements/FTRrcoaog83/translations`. Make sure to send all translations for the specific object and not just for a single locale (if not you will potentially overwrite existing locales for other locales).

The status code will be `204 No Content` if the data value was successfully saved or updated, or `404 Not Found` if there was a validation error (e.g. more than one `SHORT_NAME` for the same `locale`).

Web API versions

The Web API is versioned starting from DHIS 2.25. The API versioning follows the DHIS2 major version numbering. As an example, the API version for DHIS 2.33 is `33`.

You can access a specific API version by including the version number after the `/api` component, as an example like this:

```
/api/33/dataElements
```

If you omit the version part of the URL, the system will use the current API version. As an example, for DHIS 2.25, when omitting the API part, the system will use API version 25. When developing API clients it is recommended to use explicit API versions (rather than omitting the API version), as this will protect the client from unforeseen API changes.

The last three API versions will be supported. As an example, DHIS version 2.27 will support API version 27, 26 and 25.

Note that the metadata model is not versioned and that you might experience changes e.g. in associations between objects. These changes will be documented in the DHIS2 major version release notes.

Metadata object filter

To filter the metadata there are several filter operations that can be applied to the returned list of metadata. The format of the filter itself is straight-forward and follows the pattern *property:operator:value*, where *property* is the property on the metadata you want to filter on, *operator* is the comparison operator you want to perform and *value* is the value to check against (not all operators require value).

Please see the *schema* section to discover which properties are available. In addition to the listed properties filters can apply to custom attribute values by using the attribute's ID as property name.

Recursive filtering, ie. filtering on associated objects or collection of objects, is supported as well.

Available Operators

Operator	Types	Value required	Description
eq	string | boolean | integer | float | enum | collection (checks for size) | date	true	Equality
!eq	string | boolean | integer | float | enum | collection (checks for size) | date	true	Inequality
ieq	string	true	Case insensitive string, match exact
ne	string | boolean | integer | float | enum | collection (checks for size) | date	true	Inequality
like	string	true	Case sensitive string, match anywhere
!like	string	true	Case sensitive string, not match anywhere
$like	string	true	Case sensitive string, match start
!$like	string	true	Case sensitive string, not match start
like$	string	true	Case sensitive string, match end
!like$	string	true	Case sensitive string, not match end
ilike	string	true	Case insensitive string, match anywhere
!ilike	string	true	Case insensitive string, not match anywhere
$ilike	string	true	Case insensitive string, match start
!$ilike	string	true	Case insensitive string, not match start

Operator	Types	Value required	Description
ilike$	string	true	Case insensitive string, match end
!ilike$	string	true	Case insensitive string, not match end
gt	string | boolean | integer | float | collection (checks for size) | date	true	Greater than
ge	string | boolean | integer | float | collection (checks for size) | date	true	Greater than or equal
lt	string | boolean | integer | float | collection (checks for size) | date	true	Less than
le	string | boolean | integer | float | collection (checks for size) | date	true	Less than or equal
null	all	false	Property is null
!null	all	false	Property is not null
empty	collection	false	Collection is empty
token	string	true	Match on multiple tokens in search property
!token	string	true	Not match on multiple tokens in search property
in	string | boolean | integer | float | date	true	Find objects matching 1 or more values
!in	string | boolean | integer | float | date	true	Find objects not matching 1 or more values

Operators will be applied as logical *and* query. If you need a *or* query, you can have a look at the *in* filter and the section below. The filtering mechanism allows for recursion. See below for some examples.

Get data elements with id property ID1 or ID2:

```
/api/dataElements?filter=id:eq:ID1&filter=id:eq:ID2
```

Get data elements, ignoring case, with name property MyDataElement:

```
/api/dataElements?filter=name:ieq:mydataelement
```

Get all data elements which have a data set with id ID1:

```
/api/dataElements?filter=dataSetElements.dataSet.id:eq:ID1
```

Get all data elements with aggregation operator *sum* and value type *int*:

```
/api/dataElements.json?filter=aggregationOperator:eq:sum&filter=type:eq:int
```

You can do filtering within collections, e.g. to get data elements which are members of the *ANC* data element group you can use the following query using the id property of the associated data element groups:

```
/api/dataElements.json?filter=dataElementGroups.id:eq:qfxEYY9xAl6
```

To get data elements with a particular attribute value for a metadata attribute, a filter for the attribute ID and the attribute value can be specified using the same collection query syntax:

```
/api/dataElements.json?
filter=attributeValues.attribute.id:eq:n2xYlNbsfko&filter=attributeValues.value:eq:AFP
```

Get data elements which have any option set:

```
/api/dataElements?filter=optionSet:!null
```

Since all operators are *and* by default, you can't find a data element matching more than one id, for that purpose you can use the *in* operator.

```
/api/dataElements.json?filter=id:in:[fbfJHSPpUQD,cYeuwXTCPkU]
```

Logical operators

As mentioned in the section before, the default logical operator applied to the filters is *AND* which means that all object filters must be matched. There are however cases where you want to match on one of several filters (maybe id and code field) and in those cases, it is possible to switch the root logical operator from *AND* to *OR* using the *rootJunction* parameter.

Example: Normal filtering where both id and code must match to have a result returned

```
/api/dataElements.json?filter=id:in:[id1,id2]&filter=code:eq:code1
```

Example: Filtering where the logical operator has been switched to OR and now only one of the filters must match to have a result returned

```
/api/dataElements.json?filter=id:in:[id1,id2]&filter=code:eq:code1&rootJunction=OR
```

Identifiable token filter

In addition to the specific property based filtering mentioned above, we also have *token* based *AND* filtering across a set of properties: id, code, and name (also shortName if available). These properties are commonly referred to as *identifiable*. The idea is to filter metadata whose id, name, code or short name containing something.

Example: Filter all data elements containing *2nd* in any of the following: id,name,code, shortName

```
/api/dataElements.json?filter=identifiable:token:2nd
```

It is also possible to specify multiple filtering values.

Example: Get all data elements where *ANC visit* is found in any of the *identifiable* properties. The system returns all data elements where both tokens (ANC and visit) are found anywhere in identifiable properties.

```
/api/dataElements.json?filter=identifiable:token:ANC visit
```

It is also possible to combine the identifiable filter with property-based filter and expect the *rootJunction* to be applied.

```
/api/dataElements.json?filter=identifiable:token:ANC visit&filter=displayName:ilike:tt1

/api/dataElements.json?filter=identifiable:token:ANC visit
  &filter=displayName:ilike:tt1&rootJunction=OR
```

Indexable only filter for tracked entity attributes

For tracked entity attributes, there is a special filter in addition to the previous mentioned filtering capabilities. Some of the tracked entity attributes are candidates for creating a trigram index for better lookup performance. Using the *indexableOnly* parameter set to true, the results can be filtered to include only the attributes that are trigram indexable.

Example: Get all tracked entity attributes that are indexable.

```
/api/trackedEntityAttributtes.json?indexableOnly=true
```

Additional filters along with the `indexableOnly` parameter can be specified.

Example: Get all tracked entity attributes where *ANC* is found in any of the *name* property. The system returns the tracked entity attributes where the name matches the provided keyword as well as if the attribute is indexable.

```
/api/trackedEntityAttributtes.json?filter=name:like:ANC&indexableOnly=true
```

Metadata field filter

In many situations, the default views of the metadata can be too verbose. A client might only need a few fields from each object and want to remove unnecessary fields from the response. To discover which fields are available for each object please see the *schema* section. In addition to the listed properties custom attributes can be included for top level objects by using the attribute's ID as property name.

The format for include/exclude allows for infinite recursion. To filter at the "root" level you can just use the name of the field, i.e. `?fields=id,name` which would only display the `id` and `name` fields for every object. For objects that are either collections or complex objects with properties on their own, you can use the format `?fields=id,name,dataSets[id,name]` which would return `id`, `name` of

the root, and the `id` and `name` of every data set on that object. Negation can be done with the exclamation operator, and we have a set of presets of field select. Both XML and JSON formats are supported.

Example: Get `id` and `name` on the indicators resource:

```
/api/indicators?fields=id,name
```

Example: Get `id` and `name` from data elements, and `id` and `name` from the associated data sets:

```
/api/dataElements?fields=id,name,dataSets[id,name]
```

Example: Get `id`, `name` and the value of a user defined attribute with ID `DnrLSdo4hMl` for organisation units:

```
/api/organisationUnits?fields=id,name,DnrLSdo4hMl
```

The attribute is then included as property `DnrLSdo4hMl` of each matching object in the response. This can be renamed using the `rename` transformer as shown in the next section.

To exclude a field from the output you can use the exclamation `!` operator. This is allowed anywhere in the query and will simply not include that property as it might have been inserted in some of the presets.

A few presets (selected fields groups) are available and can be applied using the `:` operator.

Property operators

Operator	Description
<field-name>	Include property with name, if it exists.
<object>[<field-name>, ...]	Includes a field within either a collection (will be applied to every object in that collection), or just on a single object.
!<field-name>, <object>[!<field-name>	Do not include this field name, it also works inside objects/collections. Useful when you use a preset to include fields.
*, <object>[*]	Include all fields on a certain object, if applied to a collection, it will include all fields on all objects on that collection.
:<preset>	Alias to select multiple fields. Three presets are currently available, see the table below for descriptions.

Field presets

Preset	Description
all	All fields of the object
*	Alias for all

Preset	Description
identifiable	Includes id, name, code, created and lastUpdated fields
nameable	Includes id, name, shortName, code, description, created and lastUpdated fields
persisted	Returns all persisted property on an object, does not take into consideration if the object is the owner of the relation.
owner	Returns all persisted property on an object where the object is the owner of all properties, this payload can be used to update through the API.

Example: Include all fields from data sets except organisation units:

```
/api/dataSets?fields=:all,!organisationUnits
```

Example: Include only id, name and the collection of organisation units from a data set, but exclude the id from organisation units:

```
/api/dataSets/BfMAe6Itzgt?fields=id,name,organisationUnits[:all,!id]
```

Example: Include nameable properties from all indicators:

```
/api/indicators.json?fields=:nameable
```

Field transformers

Field transforms can be used to transform properties. The syntax is described below.

```
/api/dataElements/ID?fields=id~rename(i),name~rename(n)
```

This will rename the *id* property to *i* and *name* property to *n*.

Multiple transformers can be applied to a single property by repeating the transformer operator:

```
/api/dataElementGroups.json?
fields=id,displayName,dataElements~isNotEmpty~rename(haveDataElements)
```

The supported transformer operators are described in the table below.

Available Transformers

Name	Arguments	Description
size		Gives sizes of strings (length) and collections
isEmpty		Is string or collection empty
isNotEmpty		Is string or collection not empty

Name	Arguments	Description
rename	Arg1: name	Renames the property name
paging	Arg1: page,Arg2: pageSize	Pages a collection, default pageSize is 50.
pluck	Optional Arg1: fieldName	Converts an array of objects to an array of a selected field of that object. By default, the first field that is returned by the collection is used (normally the ID).
keyBy	Optional Arg1: fieldName	Converts an array of objects to an object where the fieldName (default id) is used as the key. This can be useful for quick lookups in JavaScript for example

Examples

Examples of transformer usage are found below.

Get the size of a collection:

```
/api/dataElements?fields=dataSets~size
```

Test if a collection is empty:

```
/api/dataElements?fields=dataSets~isEmpty
```

Test if a collection is not empty:

```
/api/dataElements?fields=dataSets~isNotEmpty
```

Rename properties:

```
/api/dataElements/ID?fields=id~rename(i),name~rename(n)
```

Apply paging to a collection:

```
/api/dataElementGroups?fields=id,displayName,dataElements~paging(1;20)
```

Get array with IDs of organisation units:

```
/api/categoryOptions.json?fields=id,organisationUnits~pluck
```

Get array with names of organisation units:

```
/api/categoryOptions.json?fields=id,organisationUnits~pluck[name]
```

Key the dataElements array by the `id` field:

```
/api/dataElementGroups.json?fields=id,name,dataElements~keyBy[id,name,valueType]
```

Key the dataElements array by the `valueType` field, since multiple hits this will results in arrays (of data elements):

```
/api/dataElementGroups.json?fields=id,name,dataElements~keyBy(valueType)[id,name,valueType]
```

Metadata create, read, update, delete, validate

All metadata entities in DHIS2 have their own API endpoint which supports *CRUD* operations (create, read, update and delete). The endpoint URLs follows this format:

```
/api/<entityName>
```

The *entityName* uses the camel-case notation. As an example, the endpoint for *data elements* is:

```
/api/dataElements
```

> ***NOTE:*** When updating objects, all existing property values will be overwritten, even if the new value is null. Please use JSON Patch API in case you want do partial update to an object.

Create / update parameters

The following request query parameters are available across all metadata endpoints.

Available Query Filters

Param	Type	Required	Options (default first)	Description
preheatCache	boolean	false	true | false	Turn cache-map preheating on/off. This is on by default, turning this off will make initial load time for importer much shorter (but will make the import itself slower). This is mostly used for cases where you have a small XML/JSON file you want to import, and don't want to wait for cache-map preheating.
importStrategy	enum	false	CREATE_AND_UPDATE | CREATE | UPDATE | DELETE	Import strategy to use, see below for more information.

Creating and updating objects

For creating new objects you will need to know the endpoint, the type format, and make sure that you have the required authorities. As an example, we will create and update a *constant*. To figure out the format, we can use the new *schema* endpoint for getting format description. So we will start with getting that info:

```
http://<server>/api/schemas/constant.json
```

From the output, you can see that the required authorities for create are `F_CONSTANT_ADD`, and the important properties are: *name* and *value*. From this, we can create a JSON payload and save it as a file called constant.json:

```
{
  "name": "PI",
  "value": "3.14159265359"
}
```

The same content as an XML payload:

```
<constant name="PI" xmlns="http://dhis2.org/schema/dxf/2.0">
  <value>3.14159265359</value>
</constant>
```

We are now ready to create the new *constant* by sending a POST request to the `constants` endpoint with the JSON payload using curl:

```
curl -d @constant.json "http://server/api/constants" -X POST
  -H "Content-Type: application/json" -u user:password
```

A specific example of posting the constant to the demo server:

```
curl -d @constant.json "https://play.dhis2.org/api/constants" -X POST
  -H "Content-Type: application/json" -u admin:district
```

If everything went well, you should see an output similar to:

```
{
  "status": "SUCCESS",
  "importCount": {
    "imported": 1,
    "updated": 0,
    "ignored": 0,
    "deleted": 0
  },
  "type": "Constant"
}
```

The process will be exactly the same for updating, you make your changes to the JSON/XML payload, find out the *ID* of the constant, and then send a PUT request to the endpoint including ID:

```
curl -X PUT -d @pi.json -H "Content-Type: application/json"
  -u user:password "http://server/api/constants/ID"
```

Deleting objects

Deleting objects is very straight forward, you will need to know the *ID* and the endpoint of the type you want to delete, let's continue our example from the last section and use a *constant*. Let's assume that the id is *abc123*, then all you need to do is the send the DELETE request to the endpoint + id:

```
curl -X DELETE -u user:password "http://server/api/constants/ID"
```

A successful delete should return HTTP status 204 (no content).

Adding and removing objects in collections

The collections resource lets you modify collections of objects.

Adding or removing single objects

In order to add or remove objects to or from a collection of objects you can use the following pattern:

```
/api/{collection-object}/{collection-object-id}/{collection-name}/{object-id}
```

You should use the POST method to add, and the DELETE method to remove an object. When there is a many-to-many relationship between objects, you must first determine which object owns the relationship. If it isn't clear which object this is, try the call both ways to see which works.

The components of the pattern are:

- collection object: The type of objects that owns the collection you want to modify.
- collection object id: The identifier of the object that owns the collection you want to modify.
- collection name: The name of the collection you want to modify.
- object id: The identifier of the object you want to add or remove from the collection.

As an example, in order to remove a data element with identifier IDB from a data element group with identifier IDA you can do a DELETE request:

```
DELETE /api/dataElementGroups/IDA/dataElements/IDB
```

To add a category option with identifier IDB to a category with identifier IDA you can do a POST request:

```
POST /api/categories/IDA/categoryOptions/IDB
```

Adding or removing multiple objects

You can add or remove multiple objects from a collection in one request with a payload like this:

```
{
  "identifiableObjects": [{
      "id": "IDA"
    }, {
      "id": "IDB"
    }, {
      "id": "IDC"
    }
  ]
}
```

Using this payload you can add, replace or delete items:

Adding Items:

```
POST /api/categories/IDA/categoryOptions
```

Replacing Items:

```
PUT /api/categories/IDA/categoryOptions
```

Delete Items:

```
DELETE /api/categories/IDA/categoryOptions
```

Adding and removing objects in a single request

You can both add and remove objects from a collection in a single POST request to the following URL:

```
POST /api/categories/IDA/categoryOptions
```

The payload format is:

```
{
  "additions": [{
      "id": "IDA"
    }, {
      "id": "IDB"
    }, {
      "id": "IDC"
    }
  ],
  "deletions": [{
      "id": "IDD"
    }, {
      "id": "IDE"
    }, {
      "id": "IDF"
    }
  ]
}
```

Validating payloads

DHIS 2 supports system wide validation of metadata payloads, which means that create and update operations on the API endpoints will be checked for valid payload before allowing changes to be made. To find out what validations are in place for a specific endpoint, have a look at the `/api/schemas` endpoint, i.e. to figure out which constraints a data element have, you would go to `/api/schemas/dataElement`.

You can also validate your payload manually by sending it to the proper schema endpoint. If you wanted to validate the constant from the create section before, you would send it like this:

```
POST /api/schemas/constant
```

A simple (non-validating) example would be:

```
curl -X POST -d "{\"name\": \"some name\"}" -H "Content-Type: application/json"
  -u admin:district "https://play.dhis2.org/dev/api/schemas/dataElement"
```

Which will yield the result:

```
[
   {
      "message" : "Required property missing.",
```

```
      "property" : "type"
   },
   {
      "property" : "aggregationOperator",
      "message" : "Required property missing."
   },
   {
      "property" : "domainType",
      "message" : "Required property missing."
   },
   {
      "property" : "shortName",
      "message" : "Required property missing."
   }
]
```

Partial updates

For our API endpoints that deal with metadata, we support partial updates (PATCH) using the JSON patch standard. The payload basically outlines a set of operation you want applied to a existing metadata object. For JSON patch details and examples, see jsonpatch.com. Three operators are supported: `add`, `remove` and `replace`.

Below is a few examples relevant to DHIS2. Note that any update to a payload should be thought of as a HTTP PUT operation, i.e. any mutation must result in a valid PUT metadata payload.

The default `importReportMode` for JSON patch is `ERRORS_NOT_OWNER` which implies that when updating any property which is not owned by that particular object (for example trying to add a indicator group directly to an indicator) you will get an error.

As per the JSON patch specification you must always use the mimetype `application/json-patch+json` when sending patches.

Examples

Update name and value type of data element

```
PATCH /api/dataElements/{id}
```

```
[
  {"op": "add", "path": "/name", "value": "New Name"},
  {"op": "add", "path": "/valueType", "value": "INTEGER"}
]
```

Add new data element to a data element group

```
PATCH /api/dataElementGroups/{id}
```

```
[
  {"op": "add", "path": "/dataElements/-", "value": {"id": "data-element-id"}}
]
```

Remove all data element associations from a data element group

```
PATCH /api/dataElementGroups/{id}
```

```
[
  {"op": "remove", "path": "/dataElements"}
]
```

Change domain and value type of a data element

```
PATCH /api/dataElements/{id}
```

```
[
    {"op": "add", "path": "/domainType", "value": "TRACKER"},
    {"op": "add", "path": "/valueType", "value": "INTEGER"}
]
```

Remove a specific orgUnit from an orgUnit group

```
PATCH /api/organisationUnitGroups/{id}
```

```
[
  {"op": "remove", "path": "/organisationUnits/1"}
]
```

Blocked add dataElementGroup to dataElement

```
PATCH /api/dataElements/{id}?importReportMode=ERRORS_NOT_OWNER
```

```
[
    {"op": "add", "path": "/dataElementGroups/-", "value": {"id": "data-element-group-id"}}
]
```

Blocked update name of dataElementGroup in dataElement

```
PATCH /api/dataElements/{id}?importReportMode=ERRORS_NOT_OWNER
```

```
[
    {"op": "add", "path": "/dataElementGroups/0", "value": {"name": "new-name"}}
]
```

Remove collection item by id

```
PATCH /api/dataSets/{id}?importReportMode=ERRORS_NOT_OWNER
```

```
[
    {"op": "remove-by-id", "path": "/organisationUnits", "id": "u6CvKyF0Db5"}
]
```

Patch request with invalid path

If `path` property is invalid or does not exist the patch service will return an error as below

```
PATCH /api/dataSets/{id}?importReportMode=ERRORS_NOT_OWNER
```

```
[
    {"op": "remove-by-id", "path": "/test", "id": "u6CvKyF0Db5"}
]
```

Response

```
{
    "httpStatus": "Bad Request",
    "httpStatusCode": 400,
    "status": "ERROR",
    "message": "Invalid path /test"
}
```

Metadata CSV export

Field filtering works almost the same for CSV (please note that using CSV on the `/api/metadata` endpoint is not supported), but not that field fransformations are not yet supported.

For endpoints that support CSV (our metadata endpoints like `/api/dataElements` `/api/organisationUnits`) you can either use the `Accept` header with value `text/csv` or you can use the extension `.csv`. Be aware that complex objects are not supported, and we only support id-object collections (so a list of UIDs will be returned).

Name	Options	Description
fields	Same as metadata field filter (with the caveats mentioned above)	Default filter is `id,displayName`
skipHeader	false/true	Should the header (with column names) be included or not
separator	Default: `.`	Column separator
arraySeparator	Default: `;`	If one of the field is a collection of id-objects this separator will separate all the UIDs

Examples

Get all data elements including their group associations

```
/api/dataElements.csv?fields=id,displayName,dataElementGroups
```

Get all org units including geometry (which will get ignored)

```
/api/organisationUnits.csv?fields=id,displayName,organisationUnitGroups,geometry
```

Metadata export

This section explains the metatada API which is available at `/api/metadata`. XML and JSON resource representations are supported.

```
/api/metadata
```

The most common parameters are described below in the "Export Parameter" table. You can also apply this to all available types by using `type:fields=<filter>` and `type:filter=<filter>`. You can also enable/disable the export of certain types by setting `type=true|false`.

Export Parameter

Name	Options	Description
fields	Same as metadata field filter	Default field filter to apply for all types, default is `:owner`.
filter	Same as metadata object filter	Default object filter to apply for all types, default is `none`.
order	Same as metadata order	Default order to apply to all types, default is `name` if available, or `created` if not.
translate	false/true	Enable translations. Be aware that this is turned off by default (in other endpoints this is on by default).
locale	<locale>	Change from user locale, to your own custom locale.
defaults	INCLUDE/EXCLUDE	Should auto-generated category object be included or not in the payload. If you are moving metadata between 2 non-synced instances, it might make sense to set this to EXCLUDE to ease the handling of these generated objects.
skipSharing	false/true	Enabling this will strip the sharing properties from the exported objects. This includes *user*, *publicAccess*, *userGroupAccesses*, *userAccesses*, and *externalAccess*.
download	false/true	Enabling this will add HTTP header Content-Disposition that specifies that the data should be handled as an attachment and will be offered by web browsers as a download.

Metadata export examples

Export all metadata. Be careful as the response might be very large depending on your metadata configuration:

```
/api/metadata
```

Export all metadata ordered by lastUpdated descending:

```
/api/metadata?defaultOrder=lastUpdated:desc
```

Export metadata only including indicators and indicator groups:

```
/api/metadata?indicators=true&indicatorGroups=true
```

Export id and displayName for all data elements, ordered by displayName:

```
/api/metadata?dataElements:fields=id,name&dataElements:order=displayName:desc
```

Export data elements and indicators where name starts with "ANC":

```
/api/metadata?filter=name:^like:ANC&dataElements=true&indicators=true
```

Metadata export with dependencies

When you want to exchange metadata for a data set, program, category combo, dashboard, option set or data element group from one DHIS2 instance to another instance there are six dedicated endpoints available:

```
/api/dataSets/{id}/metadata.json

/api/programs/{id}/metadata.json

/api/categoryCombos/{id}/metadata.json

/api/dashboards/{id}/metadata.json

/api/optionSets/{id}/metadata.json

/api/dataElementGroups/{id}/metadata.json
```

These exports can then be imported using `/api/metadata`.

These endpoints also support the following parameters:

Export Parameter

Name	Options	Description
skipSharing	false/true	Enabling this will strip the sharing properties from the exported objects. This includes *user*, *publicAccess*, *userGroupAccesses*, *userAccesses*, and *externalAccess*.
download	false/true	Enabling this will add HTTP header Content-Disposition that specifies that the data should be handled as an attachment and will be offered by web browsers as a download.

Metadata import

This section explains the metadata import API. XML and JSON resource representations are supported. Metadata can be imported using a *POST* request.

```
/api/metadata
```

The importer allows you to import metadata payloads which may include many different entities and any number of objects per entity. The metadata export generated by the metadata export API can be imported directly.

The metadata import endpoint support a variety of parameters, which are listed below.

Import Parameter

Name	Options (first is default)	Description
importMode	COMMIT, VALIDATE	Sets overall import mode, decides whether or not to only `VALIDATE` or also `COMMIT` the metadata, this has similar functionality as our old dryRun flag.
identifier	UID, CODE, AUTO	Sets the identifier scheme to use for reference matching. `AUTO` means try `UID` first, then `CODE`.
importReportMode	ERRORS, FULL, DEBUG	Sets the `ImportReport` mode, controls how much is reported back after the import is done. `ERRORS` only includes *ObjectReports* for object which has errors. `FULL` returns an *ObjectReport* for all objects imported, and `DEBUG` returns the same plus a name for the object (if available).

Name	Options (first is default)	Description
preheatMode	REFERENCE, ALL, NONE	Sets the preheater mode, used to signal if preheating should be done for `ALL` (as it was before with *preheatCache=true*) or do a more intelligent scan of the objects to see what to preheat (now the default), setting this to `NONE` is not recommended.
importStrategy	CREATE_AND_UPDATE, CREATE, UPDATE, DELETE	Sets import strategy, `CREATE_AND_UPDATE` will try and match on identifier, if it doesn't exist, it will create the object.
atomicMode	ALL, NONE	Sets atomic mode, in the old importer we always did a *best effort* import, which means that even if some references did not exist, we would still import (i.e. missing data elements on a data element group import). Default for new importer is to not allow this, and similar reject any validation errors. Setting the `NONE` mode emulated the old behavior.
flushMode	AUTO, OBJECT	Sets the flush mode, which controls when to flush the internal cache. It is *strongly* recommended to keep this to `AUTO` (which is the default). Only use `OBJECT` for debugging purposes, where you are seeing hibernate exceptions and want to pinpoint the exact place where the stack happens (hibernate will only throw when flushing, so it can be hard to know which object had issues).
skipSharing	false, true	Skip sharing properties, does not merge sharing when doing updates, and does not add user group access when creating new objects.
skipValidation	false, true	Skip validation for import. `NOT RECOMMENDED`.
async	false, true	Asynchronous import, returns immediately with a *Location* header pointing to the location of the *importReport*. The payload also contains a json object of the job created.

Name	Options (first is default)	Description
inclusionStrategy	NON_NULL, ALWAYS, NON_EMPTY	*NON_NULL* includes properties which are not null, *ALWAYS* include all properties, *NON_EMPTY* includes non empty properties (will not include strings of 0 length, collections of size 0, etc.)
userOverrideMode	NONE, CURRENT, SELECTED	Allows you to override the user property of every object you are importing, the options are NONE (do nothing), CURRENT (use import user), SELECTED (select a specific user using overrideUser=X)
overrideUser	User ID	If userOverrideMode is SELECTED, use this parameter to select the user you want override with.

> **NOTE** When updating objects, all property values will be overwritten even if the new values are `null`. Please use JSON Patch API in case you want do partial update to an object.

An example of a metadata payload to be imported looks like this. Note how each entity type have their own property with an array of objects:

```
{
  "dataElements": [
    {
      "name": "EPI - IPV 3 doses given",
      "shortName": "EPI - IPV 3 doses given",
      "aggregationType": "SUM",
      "domainType": "AGGREGATE",
      "valueType": "INTEGER_ZERO_OR_POSITIVE"
    },
    {
      "name": "EPI - IPV 4 doses given",
      "shortName": "EPI - IPV 4 doses given",
      "aggregationType": "SUM",
      "domainType": "AGGREGATE",
      "valueType": "INTEGER_ZERO_OR_POSITIVE"
    }
  ],
  "indicators": [
    {
      "name": "EPI - ADS stock used",
      "shortName": "ADS stock used",
      "numerator": "#{LTb8XeeqeqI}+#{Fs28ZQJET6V}-#{A3mHIZd2tPg}",
      "numeratorDescription": "ADS 0.05 ml used",
      "denominator": "1",
      "denominatorDescription": "1",
      "annualized": false,
      "indicatorType": {
        "id": "kHy61PbChXr"
      }
```

```
    }
  ]
}
```

When posting this payload to the metadata endpoint, the response will contain information about the parameters used during the import and a summary per entity type including how many objects were created, updated, deleted and ignored:

```
{
  "importParams": {
    "userOverrideMode": "NONE",
    "importMode": "COMMIT",
    "identifier": "UID",
    "preheatMode": "REFERENCE",
    "importStrategy": "CREATE_AND_UPDATE",
    "atomicMode": "ALL",
    "flushMode": "AUTO",
    "skipSharing": false,
    "skipTranslation": false,
    "skipValidation": false,
    "metadataSyncImport": false,
    "firstRowIsHeader": true,
    "username": "UNICEF_admin"
  },
  "status": "OK",
  "typeReports": [
    {
      "klass": "org.hisp.dhis.dataelement.DataElement",
      "stats": {
        "created": 2,
        "updated": 0,
        "deleted": 0,
        "ignored": 0,
        "total": 2
      }
    },
    {
      "klass": "org.hisp.dhis.indicator.Indicator",
      "stats": {
        "created": 1,
        "updated": 0,
        "deleted": 0,
        "ignored": 0,
        "total": 1
      }
    }
  ],
  "stats": {
    "created": 3,
    "updated": 0,
    "deleted": 0,
    "ignored": 0,
    "total": 3
  }
}
```

GeoJSON import

The GeoJSON import is used to attach geometry data to organisation units.

For a bulk import a GeoJSON file with a feature collection is expected. Each feature in the collection requires a reference to the organisation unit it should be linked to.

By default, the geometry from the file is stored as the `geometry` property of an organisation unit. To store additional geometries attributes of type `GEOJSON` can be created. When attributes are use all geometries from a file are stored for the same attribute which is provided with an additional parameter `attributeId`.

GeoJSON Bulk Data Import

Import Parameters

Name	Type	Default	Description
`geoJsonId`	`boolean`	`true`	When `true` the `id` property of the GeoJSON features is expected to hold the organisation unit identifier
`geoJsonProperty`	`String`	*undefined*	If `geoJsonId` is `false` this parameter names the property in the GeoJSON feature's `properties` that holds the organisation unit identifier
`orgUnitProperty`	`enum`: [`id`, `code`, `name`]	`id`	The property of the organisation unit that is referred to by the identifiers used in the GeoJSON file
`attributeId`	`String`	*undefined*	When set the geometry is stored as value of the attribute referenced by ID
`dryRun`	`boolean`	`false`	When `true` the import is processed without actually updating the organisation units
`async`	`boolean`	`false`	When `true` the import is processed asnychronously

Uasge:

```
POST /api/organisationUnits/geometry
```

The post body is the GeoJSON file. Content type should be `application/json` or `application/geo+json`. The file may be `.zip` or `.gzip` compressed.

For example, a default file where `id` is used to refer to an organisation unit id has this structure:

```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "id": "O6uvpzGd5pu",
      "geometry": { ... }
    },
    ...
  ]
}
```

A file where a feature property is used to refer to the organisation unit code would have this structure:

```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "properties": { "code": "OU1_CODE" },
      "geometry": { ... }
    },
    ...
  ]
}
```

The `coordinates` in a `geometry` may be pairs or triplets. If a third dimension is present it is stripped during the import.

A `geometry` may also be `null` to effectively clear or delete the geometry for specific organisation units. There is a special bulk deletion API that is described in the next section.

When run synchronously an import report is returned directly. The HTTP status code is always `OK`, the `status` in the message payload indicates if all rows were imported successfully. The import counts statistics contained in the report give further information:

- `imported`: number of organisation units that were successfully updated with a geometry that did not have one before for the updated property
- `updated`: number of organisation units that were successfully updated with a geometry that did have value for the updated property already
- `ignored`: number of organisation units that failed to update
- `deleted`: number of organisation units that where successfully update with a *empty* geometry

When the import is run asynchronous the request returns immediately with status `OK` and job configuration response that contains a relative reference to the task endpoint that allows to track the status of the asynchronous import. For example:

```
/api/system/tasks/GEOJSON_IMPORT/{job-id}
```

The summary that is returned directly for synchronous execution is available at

```
/api/system/taskSummaries/GEOJSON_IMPORT/{job-id}
```

once the import is finished.

GeoJSON Bulk Data Deletion

To clear or unset the `geometry` data for all organisation units use:

```
DELETE /api/organisationUnits/geometry
```

To clear or unset the geometry data for a specific `GEOJSON` attribute for all organisation units use:

```
DELETE /api/organisationUnits/geometry?attributeId={attr-id}
```

Clearing is always synchronous and returns a similar report as the bulk import. It does not support any other parameters. No `dry-run` can be performed. Bulk clearing requires the `F_PERFORM_MAINTENANCE` authority.

GeoJSON Single Data Import

The single import allows to update the geometry of a single organisation unit.

```
POST /api/organisationUnits/{id}/geometry
```

The post body only contains the GeoJSON `geometry` value, for example:

```
{
  "type": "Polygon",
  "coordinates": [...]
}
```

Single import only supports `attributeId` and `dryRun` parameters.

GeoJSON Single Data Deletion

To clear the `geometry` GeoJSON data of an individual organisation unit use:

```
DELETE /api/organisationUnits/{id}/geometry
```

Similarly to clear a `GEOJSON` attribute value for an individual organisation unit use:

```
DELETE /api/organisationUnits/{id}/geometry?attributeId={attr-id}
```

Clearing is always synchronous returns a similar report as single import. The `dry-run` parameter is supported as well. The performing user requires authority to modify the target organisation unit.

Schema

A resource which can be used to introspect all available DXF 2 objects can be found on `/api/schemas`. For specific resources you can have a look at `/api/schemas/<type>`.

To get all available schemas in XML:

```
GET /api/schemas.xml
```

To get all available schemas in JSON:

```
GET /api/schemas.json
```

To get JSON schema for a specific class:

```
GET /api/schemas/dataElement.json
```

Icons

DHIS2 includes a collection of icons that can be used to give visual context to metadata. There are two different kind of icons: - Default icons: they are pre-installed in the application and are not possible to modify nor delete. - Custom icons: can be created, updated and deleted at will.

Both of them be accessed through the icons resource.

```
GET /api/icons
```

This endpoint returns a list of information about the available icons. In case of default icons, each entry contains the icon's metadata, and a reference to the actual file resource.

```
{
  key: "mosquito_outline",
  description: "Mosquito outline",
  keywords: [
    "malaria",
    "mosquito",
    "dengue"
  ],
  href: "<dhis server>/api/icons/mosquito_outline/icon.svg"
}
```

When it comes to custom icons, the response also includes the referenced file resource and the user who created the icon:

```
{
  key: "custom key",
  description: "description",
  keywords: [
    "keyword 1",
    "keyword 2"
  ],
  fileResourceUid: "ohUVXsOZ8qp",
  userUid: "AIK2aQOJIbj",
  href: "<dhis server>/api/fileResources/ohUVXsOZ8qp/data"
}
```

It's also possible to get a particular icon directly by filtering by its key, in the example below, the key is mosquito_outline.

```
GET /api/icons/mosquito_outline
```

Keywords can be used to filter which icons to return. Passing a list of keywords with the request will only return icons (both default and custom) that match all the keywords:

```
GET /api/icons?keywords=shape,small
```

A list of all unique keywords can be found at the keywords resource:

```
GET /api/icons/keywords
```

Custom icon operations

A custom icon resource can be downloaded by providing the icon key:

```
GET /api/icons/{key}/icon
```

Custom icons can be created, modified and deleted. To create a custom icon, use the resource below.

```
POST /api/icons
```

It expects a payload containing the icon key, description, list of keywords and the file resource uid to be linked to the data.

```
{
    "key": "iconKey",
    "description": "description",
    "keywords": ["keyword 1","keyword 2"],
    "fileResourceUid": "ARsqBjfB2cf"
}
```

Two of these properties are possible to update, they are the description and keywords, using the resource below.

```
PUT /api/icons
```

With the following payload, the icon's description and keywords would be updated.

```
{
    "key": "iconKey",
    "description": "new description",
    "keywords": ["new keyword 1", "new keyword 2"]
}
```

Please notice that's also possible to just update one of the two. That means in case we would like to update the description while keeping the keywords, we would just need to provide the icon key and the descripton json field. Same would work the other way around, to update the keywords and leave the original description untouched.

To delete a custom icon we use the resource

```
DELETE /api/icons/{icon_key}
```

Render type

Some metadata types have a property named *renderType*. The render type property is a map between a *device* and a *renderingType*. Applications can use this information as a hint on how the object should be rendered on a specific device. For example, a mobile device might want to render a data element differently than a desktop computer.

There is currently two different kinds of renderingTypes available:

1. Value type rendering
2. Program stage section rendering

There is also 2 device types available:

1. MOBILE
2. DESKTOP

The following table lists the metadata and rendering types available. The value type rendering has addition constraints based on the metadata configuration, which will be shown in a second table.

Metadata and RenderingType overview

Metadata type	Available RenderingTypes
Program Stage Section	* LISTING (default) * SEQUENTIAL * MATRIX
Data element	* DEFAULT * DROPDOWN * VERTICAL_RADIOBUTTONS * HORIZONTAL_RADIOBUTTONS * VERTICAL_CHECKBOXES * HORIZONTAL_CHECKBOXES * SHARED_HEADER_RADIOBUTTONS * ICONS_AS_BUTTONS * SPINNER * ICON * TOGGLE * VALUE * SLIDER * LINEAR_SCALE * AUTOCOMPLETE * QR_CODE * BAR_CODE * GS1_DATAMATRIX

Since handling the default rendering of data elements and tracked entity attributes are depending on the value type of the object, there is also a DEFAULT type to tell the client it should be handled as normal. Program Stage Section is LISTING as default.

RenderingTypes allowed based on value types

Value type	Is object an optionset?	RenderingTypes allowed
TRUE_ONLY	No	DEFAULT, VERTICAL_RADIOBUTTONS, HORIZONTAL_RADIOBUTTONS, VERTICAL_CHECKBOXES, HORIZONTAL_CHECKBOXES, TOGGLE
BOOLEAN	No	
-	Yes	DEFAULT, DROPDOWN, VERTICAL_RADIOBUTTONS, HORIZONTAL_RADIOBUTTONS, VERTICAL_CHECKBOXES, HORIZONTAL_CHECKBOXES, SHARED_HEADER_RADIOBUTTONS, ICONS_AS_BUTTONS, SPINNER, ICON
INTEGER	No	DEFAULT, VALUE, SLIDER, LINEAR_SCALE, SPINNER
TEXT	No	DEFAULT, VALUE, AUTOCOMPLETE, QR_CODE, BAR_CODE, GS1_DATAMATRIX
INTEGER_POSITIVE	No	
INTEGER_NEGATIVE	No	
INTEGER_ZERO_OR_POSITIVE	No	
NUMBER	No	
UNIT_INTERVAL	No	
PERCENTAGE	No	

A complete reference of the previous table can also be retrieved using the following endpoint:

```
GET /api/staticConfiguration/renderingOptions
```

Value type rendering also has some additional properties that can be set, which is usually needed when rendering some of the specific types:

renderType object properties

Property	Description	Type
type	The RenderingType of the object, as seen in the first table. This property is the same for both value type and program stage section, but is the only property available for program stage section.	Enum (See list in the Metadata and Rendering Type table)
min	Only for value type rendering. Represents the minimum value this field can have.	Integer
max	Only for value type rendering. Represents the maximum value this field can have.	Integer
step	Only for value type rendering. Represents the size of the steps the value should increase, for example for SLIDER og LINEAR_SCALE	Integer
decimalPoints	Only for value type rendering. Represents the number of decimal points the value should use.	Integer

The *renderingType* can be set when creating or updating the metadata listed in the first table. An example payload for the rendering type for program stage section looks like this:

```
{
  "renderingType": {
    "type": "MATRIX"
  }
}
```

For data element and tracked entity attribute:

```
{
  "renderingType": {
    "type": "SLIDER",
    "min": 0,
    "max": 1000,
    "step": 50,
    "decimalPoints": 0
  }
}
```

Object Style

Most metadata have a property names "style". This property can be used by clients to represent the object in a certain way. The properties currently supported by style is as follows:

Style properties

Property	Description	Type
color	A color, represented by a hexadecimal.	String (#000000)
icon	An icon, represented by a icon-name.	String

Currently, there is no official list or support for icon-libraries, so this is currently up to the client to provide. The following list shows all objects that support style:

- Data element
- Data element category option
- Data set
- Indicator
- Option
- Program
- Program Indicator
- Program Section
- Program Stage
- Program Stage Section
- Relationship (Tracker)
- Tracked Entity Attribute
- Tracked Entity Type

When creating or updating any of these objects, you can include the following payload to change the style:

```
{
  "style": {
    "color": "#ffffff",
    "icon": "my-beautiful-icon"
  }
}
```

Indicators

This section describes indicators and indicator expressions.

Aggregate indicators

To retrieve indicators you can make a GET request to the indicators resource like this:

```
/api/indicators
```

Indicators represent expressions which can be calculated and presented as a result. The indicator expressions are split into a numerator and denominator. The numerators and denominators are mathematical expressions which can contain references to data elements, other indicators, constants and organisation unit groups. The variables will be substituted with data values when used e.g. in reports. Variables which are allowed in expressions are described in the following table.

Indicator variables

Variable	Object	Description
#{<data-element-id>.<category-option-combo-id>.<attribute-option-combo-id>}	Data element operand	Refers to a combination of an aggregate data element and a category option combination. Both category and attribute option combo ids are optional, and a wildcard "*" symbol can be used to indicate any value.
#{<dataelement-id>.<category-option-group-id>.<attribute-option-combo-id>}	Category Option Group	Refers to an aggregate data element and a category option group, containing multiple category option combinations.
#{<data-element-id>}	Aggregate data element	Refers to the total value of an aggregate data element across all category option combinations.
D{<program-id>.<data-element-id>}	Program data element	Refers to the value of a tracker data element within a program.
A{<program-id>.<attribute-id>}	Program tracked entity attribute	Refers to the value of a tracked entity attribute within a program.
I{<program-indicator-id>}	Program indicator	Refers to the value of a program indicator.
R{<dataset-id>.<metric>}	Reporting rate	Refers to a reporting rate metric. The metric can be REPORTING_RATE, REPORTING_RATE_ON_TIME, ACTUAL_REPORTS, ACTUAL_REPORTS_ON_TIME, EXPECTED_REPORTS.
C{<constant-id>}	Constant	Refers to a constant value.
N{<indicator-id>}	Indicator	Refers to an existing Indicator.
OUG{<orgunitgroup-id>}	Organisation unit group	Refers to the count of organisation units within an organisation unit group.

Within a Data element operand or an Aggregate data element, the following substitutions may be made:

Item	Value	Description
data-element-id	data-element-id	An aggregate data element
data-element-id	deGroup:data-element-group-id	All the aggregate data elements in a data element group
category-option-combo-id	category-option-combo-id	A category option combination

Item	Value	Description
category-option-combo-id	co:category-option-id	All the category option combinations in a category option
category-option-combo-id	coGroup:category-option-group-id	All the category option combinations in a category option group
category-option-combo-id	coGroup:co-group-id1&co-group-id2...	All the category option combinations that are members of multiple category option groups

The syntax looks like this:

```
#{<dataelement-id>.<catoptcombo-id>} + C{<constant-id>} + OUG{<orgunitgroup-id>}
```

A corresponding example looks like this:

```
#{P3jJH5Tu5VC.S34ULMcHMca} + C{Gfd3ppDfq8E} + OUG{CXw2yu5fodb}
```

Note that for data element variables the category option combo identifier can be omitted. The variable will then represent the total for the data element, e.g. across all category option combos. Example:

```
#{P3jJH5Tu5VC} + 2
```

Data element operands can include any of category option combination and attribute option combination, and use wildcards to indicate any value:

```
#{P3jJH5Tu5VC.S34ULMcHMca} + #{P3jJH5Tu5VC.*.j8vBiBqGf6O} + #{P3jJH5Tu5VC.S34ULMcHMca.*}
```

An example using a data element group:

```
#{deGroup:oDkJh5Ddh7d} + #{deGroup:GBHN1a1Jddh.j8vBiBqGf6O}
```

An example using a category option, data element group, and a category option group:

```
#{P3jJH5Tu5VC.co:FbLZS3ueWbQ} + #{deGroup:GBHN1a1Jddh.coGroup:OK2Nr4wdfrZ.j8vBiBqGf6O}
```

An example using multiple category option groups:

```
#{P3jJH5Tu5VC.coGroup:OK2Nr4wdfrZ&j3C417uW6J7&ddAo6zmIHOk}
```

An example using a program data element and a program attribute:

```
( D{eBAyeGv0exc.vV9UWAZohSf} * A{IpHINAT79UW.cejWyOfXge6} ) / D{eBAyeGv0exc.GieVkTxp4HH}
```

An example combining program indicators and aggregate indicators:

```
I{EMOt6Fwhs1n} * 1000 / #{WUg3MYWQ7pt}
```

An example using a reporting rate:

```
R{BfMAe6Itzgt.REPORTING_RATE} * #{P3jJH5Tu5VC.S34ULMcHMca}
```

Another reporting rate example using actual data set reports and expected reports:

```
R{BfMAe6Itzgt.ACTUAL_REPORTS} / R{BfMAe6Itzgt.EXPECTED_REPORTS}
```

An example using an existing indicator:

```
N{Rigf2d2Zbjp} * #{P3jJH5Tu5VC.S34ULMcHMca}
```

Expressions can be any kind of valid mathematical expression, as an example:

```
( 2 * #{P3jJH5Tu5VC.S34ULMcHMca} ) / ( #{FQ2o8UBlcrS.S34ULMcHMca} - 200 ) * 25
```

Program indicators

To retrieve program indicators you can make a GET request to the program indicators resource like this:

```
/api/programIndicators
```

Program indicators can contain information collected in a program. Indicators have an expression which can contain references to data elements, attributes, constants and program variables. Variables which are allowed in expressions are described in the following table.

Program indicator variables

Variable	Description
#{<programstage-id>.<dataelement-id>}	Refers to a combination of program stage and data element id.
A{<attribute-id>}	Refers to a tracked entity attribute.
V{<variable-id>}	Refers to a program variable.
C{<constant-id>}	Refers to a constant.

The syntax looks like this:

```
#{<programstage-id>.<dataelement-id>} + #{<attribute-id>} + V{<varible-id>} + C{<constant-id>}
```

A corresponding example looks like this:

```
#{A03MvHHogjR.a3kGcGDCuk6} + A{OvY4VVhSDeJ} + V{incident_date} + C{bCqvfPR02Im}
```

Expressions

Expressions are mathematical formulas which can contain references to data elements, constants and organisation unit groups. To validate and get the textual description of an expression, you can make a GET request to the expressions resource:

```
/api/expressions/description?expression=<expression-string>
```

The response follows the standard JSON web message format. The *status* property indicates the outcome of the validation and will be "OK" if successful and "ERROR" if failed. The *message* property will be "Valid" if successful and provide a textual description of the reason why the validation failed if not. The *description* provides a textual description of the expression.

```
{
  "httpStatus": "OK",
  "httpStatusCode": 200,
  "status": "OK",
  "message": "Valid",
  "description": "Acute Flaccid Paralysis"
}
```

Merge indicators

The indicator merge endpoint allows you to merge a number of indicators (sources) into a target indicator.

Authorisation

The authority `F_INDICATOR_MERGE` is required to perform indicator merges.

Request

Merge indicators with a POST request:

```
POST /api/indicators/merge
```

The payload in JSON format looks like the following:

```
{
  "sources": [
    "jNb63DIHuwU",
    "WAjjFMDJKcx"
  ],
  "target": "V9rfpjwHbYg",
  "deleteSources": true
}
```

The JSON properties are described in the following table.

Merge payload fields

Field	Required	Value
sources	Yes	Array of identifiers of the indicators to merge (the source indicators)
target	Yes	Identifier of the indicator to merge the sources into (the target indicator)
deleteSources	No	Whether to delete the source indicators after the operation. Default is false

The merge operation will merge the source indicators into the target indicator. One or many source indicators can be specified. Only one target should be specified.

The merge operation will transfer all source indicator metadata associations to the target indicator. The following metadata get updated:

Metadata	Property	Action taken
IndicatorGroup	members	Source indicator removed, target indicator added
DataSet	indicators	Source indicator removed, target indicator added
DataDimensionalItem	n/a	Any linked data items with sources will be linked with the target
Section	indicators	Source indicator removed, target indicator added
Configuration	infrastructuralIndicators (IndicatorGroup)	Source indicator removed, target indicator added
Indicator	numerator / denominator	Replace any source reference with the target reference
DataEntryForm	htmlCode	Replace any source reference with the target reference
Visualization	sorting	Replace any source reference with the target reference as Sorting dimension

Validation

The following constraints and error codes apply.

Constraints and error codes

Error code	Description
E1540	At least one source indicator must be specified
E1541	Target indicator must be specified
E1542	Target indicator cannot be a source indicator
E1543	Source/Target indicator does not exist: `{uid}`

Response

Success

Sample success response looks like:

```
{
    "httpStatus": "OK",
    "httpStatusCode": 200,
    "status": "OK",
    "response": {
        "mergeReport": {
            "mergeErrors": [],
            "mergeType": "INDICATOR",
            "sourcesDeleted": [
                "vQ0dGV9EDrw"
            ],
            "message": "INDICATOR merge complete"
        }
    }
}
```

Sample error response looks like:

```
{
    "httpStatus": "Conflict",
    "httpStatusCode": 409,
    "status": "WARNING",
    "message": "One or more errors occurred, please see full details in merge report.",
    "response": {
        "mergeReport": {
            "mergeErrors": [
                {
                    "message": "At least one source indicator must be specified",
                    "errorCode": "E1540",
                    "args": []
                },
                {
                    "message": "Target indicator does not exist: `abcdefg1221`",
                    "errorCode": "E1543",
                    "args": [
                        "Target",
                        "abcdefg1221"
                    ]
                }
            ],
            "mergeType": "INDICATOR",
            "sourcesDeleted": [],
            "message": "INDICATOR merge has errors"
        }
    }
}
```

Indicator Types

Merge indicator types

The indicator type merge endpoint allows you to merge a number of indicator types into a target indicator type.

Authorisation

The authority `F_INDICATOR_TYPE_MERGE` is required to perform indicator type merges.

Request

Merge indicator types with a POST request:

```
POST /api/indicatorTypes/merge
```

The payload in JSON format looks like the following:

```
{
  "sources": [
    "jNb63DIHuwU",
    "WAjjFMDJKcx"
  ],
  "target": "V9rfpjwHbYg",
  "deleteSources": true
}
```

The JSON properties are described in the following table.

Merge payload fields

Field	Required	Value
sources	Yes	Array of identifiers of the indicator types to merge (the source indicator types).
target	Yes	Identifier of the indicator type to merge the sources into (the target indicator type).
deleteSources	No	Whether to delete the source indicator types after the operation. Default is false.

The merge operation will merge the source indicator types into the target indicator type. One or many source indicator types can be specified. Only one target should be specified.

The merge operation will transfer all of the indicator metadata associations to the source indicator types over to the target indicator type.

Validation

The following constraints and error codes apply.

Constraints and error codes

Error code	Description
E1530	At least one source indicator type must be specified
E1531	Target indicator type must be specified
E1532	Target indicator type cannot be a source indicator type
E1533	Source/Target indicator type does not exist: `{uid}`

Response

Success

Sample success response looks like:

```
{
    "httpStatus": "OK",
    "httpStatusCode": 200,
    "status": "OK",
    "response": {
        "mergeReport": {
            "mergeErrors": [],
            "mergeType": "INDICATOR_TYPE",
            "sourcesDeleted": [
                "vQ0dGV9EDrw"
            ],
            "message": "INDICATOR_TYPE merge complete"
        }
    }
}
```

Sample error response looks like:

```
{
    "httpStatus": "Conflict",
    "httpStatusCode": 409,
    "status": "WARNING",
    "message": "One or more errors occurred, please see full details in merge report.",
    "response": {
        "mergeReport": {
            "mergeErrors": [
                {
                    "message": "At least one source indicator type must be specified",
                    "errorCode": "E1530",
                    "args": []
                },
                {
                    "message": "Target indicator type does not exist: `abcdefg1221`",
                    "errorCode": "E1533",
                    "args": [
                        "Target",
                        "abcdefg1221"
                    ]
                }
            ],
            "mergeType": "INDICATOR_TYPE",
            "sourcesDeleted": [],
            "message": "INDICATOR_TYPE merge has errors"
```

```
        }
    }
}
```

Organisation units

The *organisationUnits* resource follows the standard conventions as other metadata resources in DHIS2. This resource supports some additional query parameters.

Get list of organisation units

To get a list of organisation units you can use the following resource.

```
/api/33/organisationUnits
```

Organisation units query parameters

Query parameter	Options	Description
userOnly	false | true	Data capture organisation units associated with current user only.
userDataViewOnly	false | true	Data view organisation units associated with current user only.
userDataViewFallback	false | true	Data view organisation units associated with current user only with fallback to data capture organisation units.
query	string	Query against the name, code and ID properties.
level	integer	Organisation units at the given level in the hierarchy.
maxLevel	integer	Organisation units at the given max level or levels higher up in the hierarchy.
withinUserHierarchy	false | true	Limits search and retrieval to organisation units that are within the users data capture scope.
withinUserSearchHierarchy	false | true	Limits search and retrieval to organisation units that are within the current users search scope. Note: "withinUserHierarchy", if true, takes higher precedence.
memberCollection	string	For displaying count of members within a collection, refers to the name of the collection associated with organisation units.
memberObject	UID	For displaying count of members within a collection, refers to the identifier of the object member of the collection.

Get organisation unit with sub-hierarchy

To get an organisation unit including organisation units in its sub-hierarchy you can use the following resource.

```
/api/33/organisationUnits/{id}
```

Organisation unit parameters

Query parameter	Options	Description
includeChildren	false | true	Include immediate children of the specified organisation unit, i.e. the units at the immediate level below in the subhierarchy.
includeDescendants	false | true	Include all children of the specified organisation unit, i.e. all units in the sub-hierarchy.
includeAncestors	false | true	Include all parents of the specified organisation unit.
level	integer	Include children of the specified organisation unit at the given level of the sub-hierarchy. This is relative to the organisation unit, starting on 1 for the level immediately below the org unit.

Get organisation units by category option

Purpose-built endpoint to retrieve associations between category options and organisation units. This endpoint is the preferred way to retrieve program organisation unit associations.

```
/api/33/categoryOptions/orgUnits?categoryOptions={categoryOptionIdA},{categoryOptionIdB}
```

responses will have the following format:

```
{
  "<categoryOptionIdA>": [
    "<orgUnitUid>",
    "<orgUnitUid>"
  ],
  "<categoryOptionIdB>": [
    "<orgUnitUid>",
    "<orgUnitUid>"
  ],
  "<categoryOptionIdC>": []
}
```

Category options that are accessible by all organisation units are returned with an empty array ([ ]) of organisation units.

Get organisation units by programs

Purpose-built endpoint to retrieve associations between programs and organisation units. This endpoint is the preferred way to retrieve program organisation unit associations.

```
/api/33/programs/orgUnits?programs={programIdA},{programIdB}
```

responses will have the following format:

```
{
  "<programIdA>": [
    "<orgUnitUid>",
    "<orgUnitUid>"
  ],
  "<programIdB>": [
    "<orgUnitUid>",
    "<orgUnitUid>"
  ],
  "<programIdC>": []
}
```

Programs which are accessible by all organisation units are returned with an empty array (`[]`) of organisation units.

Split organisation unit

The organisation unit split endpoint allows you to split organisation units into a number of target organisation units.

Request

Split organisation units with a POST request:

```
POST /api/organisationUnits/split
```

The payload in JSON format looks like the following:

```
{
  "source": "rspjJHg4WY1",
  "targets": [
    "HT0w9YLMLyn",
    "rEpnzuNpRKM"
  ],
  "primaryTarget": "HT0w9YLMLyn",
  "deleteSource": true
}
```

The JSON properties are described in the following table.

Split payload fields

Field	Required	Value
source	Yes	Identifier of the organisation unit to split (the source organisation unit).
targets	Yes	Array of identifiers of the organisation units to split the source into (the target organisation units).
primaryTarget	No	Identifier of the organisation unit to transfer the aggregate data, events and tracked entities associated with the source over to. If not specified, the first target will be used.
deleteSource	No	Whether to delete the source organisation unit after the operation. Default is `true`.

The split operation will split the source org unit into the target org units. It is recommended to first create new target org units before performing the split, and at a minimum ensure that no aggregate data exists for the target org units. Any number of target org units can be specified.

The split operation will transfer all of the metadata associations of the source org unit over to the target org units. This includes data sets, programs, org unit groups, category options, users, visualizations, maps and event reports.

The operation will transfer all data records of the source org unit over to the org unit specified as the primary target, or if not specified, the first specified target org unit. This includes aggregate data values, data approval records, events, tracked entities and more.

Validation

The following constraints and error codes apply.

Constraints and error codes

Error code	Description
E1510	Source org unit must be specified
E1511	At least two target org units must be specified
E1512	Source org unit cannot be a target org unit
E1513	Primary target must be specified
E1514	Primary target must be a target org unit
E1515	Target org unit does not exist

Merge organisation units

The organisation unit merge endpoint allows you to merge a number of organisation units into a target organisation unit.

Request

Merge organisation units with a POST request:

```
POST /api/organisationUnits/merge
```

The payload in JSON format looks like the following:

```
{
  "sources": [
    "jNb63DIHuwU",
    "WAjjFMDJKcx"
  ],
  "target": "V9rfpjwHbYg",
  "dataValueMergeStrategy": "LAST_UPDATED",
  "dataApprovalMergeStrategy": "LAST_UPDATED",
  "deleteSources": true
}
```

The JSON properties are described in the following table.

Merge payload fields

Field	Required	Value
sources	Yes	Array of identifiers of the organisation units to merge (the source organisation units).
target	Yes	Identifier of the organisation unit to merge the sources into (the target organisation unit).
dataValueMergeStrategy	No	Strategy for merging data values. Options: `LAST_UPDATED` (default), `DISCARD`.
dataApprovalMergeStrategy	No	Strategy for merging data approval records. Options: `LAST_UPDATED` (default), `DISCARD`.
deleteSources	No	Whether to delete the source organisation units after the operation. Default is true.

The merge operation will merge the source org units into the target org unit. It is recommended to first create a new target org unit before performing the merge, and at a minimum ensure that no aggregate data exists for the target org unit. Any number of source org units can be specified.

The merge operation will transfer all of the metadata associations of the source org units over to the target org unit. This includes data sets, programs, org unit groups, category options, users, visualizations, maps and event reports. The operation will also transfer all event and tracker data, such as events, enrollments, ownership history, program ownership and tracked entities, over to the target org unit.

The specified data value merge strategy defines how data values are handled. For strategy `LAST_UPDATED`, data values for all source org units are transferred over to the target org unit, and in situation where data values exist for the same parameters, the last updated or created data value will be used. This is done to avoid duplication of data. For strategy `DISCARD`, data values are not transferred over to the target org unit, and simply deleted. The specified data approval merge strategy defines how data approval records are handled, and follows the same logic as data values.

Validation

The following constraints and error codes apply.

Constraints and error codes

Error code	Description
E1500	At least two source orgs unit must be specified
E1501	Target org unit must be specified
E1502	Target org unit cannot be a source org unit
E1503	Source org unit does not exist

Data sets

The *dataSets* resource follows the standard conventions as other metadata resources in DHIS2. This resource supports some additional query parameters.

```
/api/33/dataSets
```

To retrieve the version of a data set you can issue a GET request:

```
GET /api/33/dataSets/<uid>/version
```

To bump (increase by one) the version of a data set you can issue a POST request:

```
POST /api/33/dataSets/<uid>/version
```

Data set notification template

The *dataset notification templates* resource follows the standard conventions as other metadata resources in DHIS2.

```
GET /api/33/dataSetNotficationTemplates
```

To retrieve data set notification template you can issue a GET request:

```
GET /api/33/dataSetNotficationTemplates/<uid>
```

To add data set notification template you can issue a POST request:

```
POST /api/33/dataSetNotficationTemplates
```

To delete data set notification template you can issue a DELETE request:

```
DELETE /api/33/dataSetNotficationTemplates/<uid>
```

JSON payload sample is given below:

```
{
  "name": "dataSetNotificationTemplate1",
  "dataSetNotificationTrigger": "DATA_SET_COMPLETION",
  "relativeScheduledDays": 0,
  "notificationRecipient": "ORGANISATION_UNIT_CONTACT",
  "dataSets": [{
    "id": "eZDhcZi6FLP"
  }],
  "deliveryChannels": ["SMS","EMAIL"],
  "subjectTemplate": "V{data_set_name}",
  "messageTemplate": "V{data_set_name}V{registration_period}",
  "sendStrategy": "SINGLE_NOTIFICATION"
}
```

`notificationRecipient` can be one of: - `USER_GROUP` for internal messages - `ORGANISATION_UNIT_CONTACT` for external messages

Filled organisation unit levels

The *filledOrganisationUnitLevels* resource provides an ordered list of organisation unit levels, where generated levels are injected into the list to fill positions for which it does not exist a persisted level.

```
GET /api/33/filledOrganisationUnitLevels
```

To set the organisation unit levels you can issue a POST request with a JSON payload and content type `application/json` looking like this:

```
{
  "organisationUnitLevels": [{
    "name": "National",
    "level": 1,
    "offlineLevels": 3
  }, {
    "name": "District",
    "level": 2
  }, {
    "name": "Chiefdom",
    "level": 3
  }, {
    "name": "Facility",
    "level": 4
  }]
}
```

Predictors

A predictor allows you to generate data values based on an expression. This can be used for example to generate targets, thresholds, or estimated values.

To retrieve predictors you can make a GET request to the predictors resource like this:

```
/api/predictors
```

Creating a predictor

You can create a predictor with a POST request to the predictors resource:

```
POST /api/predictors
```

A sample payload looks like this:

```
{
  "id": "AG10KUJCrRk",
  "name": "Malaria Outbreak Threshold Predictor",
  "shortName": "Malaria Outbreak Predictor",
  "description": "Computes the threshold for potential malaria outbreaks based on the mean plus
1.5x the std dev",
  "output": {
    "id": "nXJJZNVAy0Y"
  },
  "generator": {
    "expression": "AVG(#{r6nrJANOqMw})+1.5*STDDEV(#{r6nrJANOqMw})",
    "description": "Maximum normal malaria case count",
    "missingValueStrategy": "NEVER_SKIP",
    "slidingWindow": false
  },
  "periodType": "Monthly",
  "sequentialSampleCount": 4,
  "sequentialSkipCount": 1,
  "annualSampleCount": 3,
  "organisationUnitLevels": [4]
}
```

The output element refers to the identifier of the data element for which to saved predicted data values. The generator element refers to the expression to use when calculating the predicted values.

Predictor expressions

A predictor always has a generator expression that describes how the predicted value is calculated. A predictor may also have a skip test expression returning a boolean value. When the skip test expression is present, it is evaluated in each of the sampled periods to tell whether values from that period should be skipped.

The following variables may be used in either a generator expression or a skip test expression:

Variable	Object	Description
#{}	Aggregate data element	Refers to the total value of an aggregate data element across all category option combinations.
#{.	Data element operand	Refers to a combination of an aggregate data element and a category option combination.
D{.}	Program data element	Refers to the value of a tracker data element within a program.
A{.}	Program tracked entity attribute	Refers to the value of a tracked entity attribute within a program.

Variable	Object	Description
I{}	Program indicator	Refers to the value of a program indicator.
R{.}	Reporting rate	Refers to a reporting rate metric. The metric can be REPORTING_RATE, REPORTING_RATE_ON_TIME, ACTUAL_REPORTS, ACTUAL_REPORTS_ON_TIME, EXPECTED_REPORTS.
C{}	Constant	Refers to a constant value.
OUG{}	Organisation unit group	Refers to the count of organisation units within an organisation unit group.
[days]	Number of days	The number of days in the current period.

Generating predicted values

To run all predictors (generating predicted values) you can make a POST request to the run resource:

```
POST /api/predictors/run
```

To run a single predictor you can make a POST request to the run resource for a predictor:

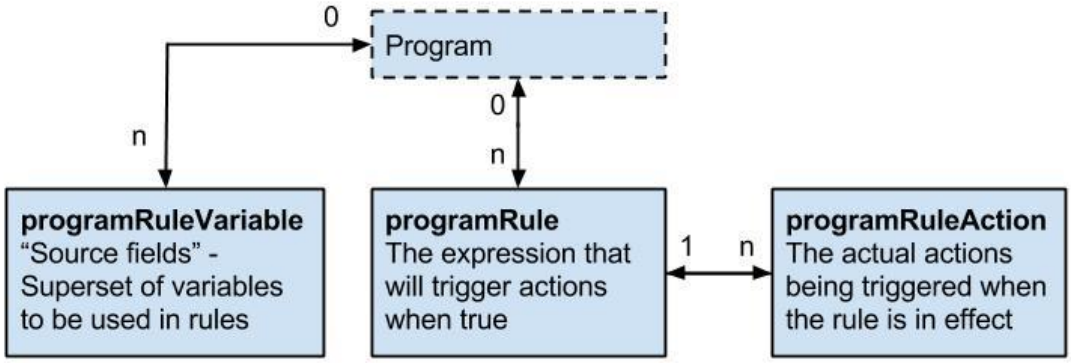
```
POST /api/predictors/AG10KUJCrRk/run
```

Program rules

This section is about sending and reading program rules, and explains the program rules data model. The program rules give functionality to configure dynamic behaviour in the programs in DHIS2.

Program rule model

The program rules data model consists of programRuleVariables, programRules and programRuleActions. The programRule contains an expression - when this expression is true, the child programRuleActions is triggered. The programRuleVariables is used to address data elements, tracked entity data values and other data values needed to run the expressions. All programRules in a program share the same library of programRuleVariables, and one programRuleVariable can be used in several programRules' expressions.



Program rule model details

The following table gives a detailed overview over the programRule model.

programRule

name	description	Compulsory
program	The program of which the programRule is executed in.	Compulsory
name	The name with which the program rule will be displayed to dhis2 configurators. Not visible to the end user of the program.	Compulsory
description	The description of the program rule, can be used by configurators to describe the rule. Not visible to the end user of the program.	Compulsory
programStage	If a programStage is set for a program rule, the rule will only be evaluated inside the specified program stage.	optional
condition	The expression that needs to be evaluated to true in order for the program rule to trigger its child actions. The expression is written using operators, function calls, hard coded values, constants and program rule variables. `d2:hasValue('hemoglobin') && #{hemoglobin} <= 7`	Compulsory

name	description	Compulsory
priority	The priority to run the rule in cases where the order of the rules matters. In most cases the rules does not depend on being run before or after other rules, and in these cases the priority can be omitted. If no priority is set, the rule will be run after any rules that has a priority defined. If a priority(integer) is set, the rule with the lowest priority will be run before rules with higher priority.	optional

Program rule action model details

The following table gives a detailed overview over the programRuleAction model.

programRuleAction

name	description	Compulsory
programRule	The programRule that is the parent of this action.	Compulsory

programRule- ActionType	The type of action that is to be performed. * `DISPLAYTEXT` - Displays a text in a given widget. * `DISPLAYKEYVALUEPAIR` - Displays a key and value pair(like a program indicator) in a given widget. * `HIDEFIELD` - Hide a specified dataElement or trackedEntityAttribute. - *content* - if defined, the text in *content* will be displayed to the end user in the instance where a value is previously entered into a field that is now about to be hidden (and therefore blanked). If *content* is not defined, a standard message will be shown to the user in this instance. - *dataElement* - if defined, the HIDEFIELD action will hide this dataElement when the rule is effective. - *trackedEntityDataValue* - if defined, the HIDEFIELD action will hide this trackedEntityDataValue when the rule is effective. * `HIDESECTION` - Hide a specified section. - *programStageSection* - must be defined. This is the programStageSection that will be hidden in case the parent rule is effective. * `ASSIGN` - Assign a dataElement a value(help the user calculate something or fill in an obvious value somewhere) - *content* - if defined, the value in *data* is assigned to this variable. If content id defined, and thus a variable is assigned for use in other rules, it is important to also assign a *programRule.priority* to make sure the rule with an ASSIGN action runs before the rule that will in turn evaluate the assigned variable. - *data* - must be defined, data forms an expression that is evaluated and assigned to either a variable(#{myVariable}), a dataElement, or both. - *dataElement* - if defined, the value in *data* is assigned to this	Compulsory

name	description	Compulsory
location	Used for actionType DISPLAYKEYVALUEPAIR and DISPLAYTEXT to designate which widget to display the text or keyvaluepair in. Compulsory for DISPLAYKEYVALUEPAIR and DISPLAYTEXT.	See description
content	Used for user messages in the different actions. See the actionType overview for a detailed explanation for how it is used in each of the action types. Compulsory for SHOWWARNING, SHOWERROR, WARNINGONCOMPLETE, ERRORONCOMPLETE, DISPLAYTEXT and DISPLAYKEYVALUEPAIR. Optional for HIDEFIELD and ASSIGN.	See description
data	Used for expressions in the different actions. See the actionType overview for a detailed explanation for how it is used in each of the action types. Compulsory for ASSIGN. Optional for SHOWWARNING, SHOWERROR, WARNINGONCOMPLETE, ERRORONCOMPLETE, DISPLAYTEXT, CREATEEVENT and DISPLAYKEYVALUEPAIR	See description
dataElement	Used for linking rule actions to dataElements. See the actionType overview for a detailed explanation for how it is used in each of the action types. Optional for SHOWWARNING, SHOWERROR, WARNINGONCOMPLETE, ERRORONCOMPLETE, ASSIGN and HIDEFIELD	See description
trackedEntity- Attribute	Used for linking rule actions to trackedEntityAttributes. See the actionType overview for a detailed explanation for how it is used in each of the action types. Optional for SHOWWARNING, SHOWERROR and HIDEFIELD.	See description

name	description	Compulsory
option	Used for linking rule actions to options. See the actionType overview for a detailed explanation for how it is used in each of the action types. Optional for HIDEOPTION	See description
optionGroup	Used for linking rule actions to optionGroups. See the actionType overview for a detailed explanation for how it is used in each of the action types. Compulsory for SHOWOPTIONGROUP, HIDEOPTIONGROUP.	See description
programStage	Only used for CREATEEVENT rule actions. Compulsory for CREATEEEVENT.	See description
programStage- Section	Only used for HIDESECTION rule actions. Compulsory for HIDESECTION	See description

ProgramRuleAction Validation

There are certain validations added to ProgramRuleAction model in 2.37. Main purpose was to keep user from creating erroneous ProgramRules in order to keep the database consistent. These validations depends on program rule action type. Each action type has its own respective validation.

ProgramRuleAction Validations

name	validation check for id existence
SENDMESSAGE	Notification template id
SCHEDULEMESSAGE	Notification template id
HIDESECTION	ProgramStage section id
HIDEPROGRAMSTAGE	ProgramStage id
HIDEFIELD	DataElement or TrackedEntityAttribute id
HIDEOPTION	Option id
HIDEOPTIONGROUP	Option group id
SHOWOPTIONGROUP	Option group id
SETMANDATORYFIELD	DataElement or TrackedEntityAttribute id
SHOWERROR	Always valid
SHOWWARNING	Always valid
DISPLAYTEXT	DataElement or TrackedEntityAttribute id
DISPLAYKEYVALUEPAIR	
ASSIGN	DataElement or TrackedEntityAttribute id
WARNINGONCOMPLETE	DataElement or TrackedEntityAttribute id
ERRORONCOMPLETE	DataElement or TrackedEntityAttribute id

Apart from above validations, `data` field in program rule action which normally contains expression can also be evaluated using below api endpoint.

```
POST /api/programRuleActions/data/expression/description?programId=<uid>
```

```
{
  "condition": "1 + 1"
}
```

Program rule variable model details

The following table gives a detailed overview over the programRuleVariable model.

programRuleVariable

name	description	Compulsory
name	the name for the programRuleVariable - this name is used in expressions. #{myVariable} > 5	Compulsory

name	description	Compulsory
sourceType	Defines how this variable is populated with data from the enrollment and events. * DATAELEMENT_NEWEST_EVENT_PROGRAM_STAGE - In tracker capture, gets the newest value that exists for a data element, within the events of a given program stage in the current enrollment. In event capture, gets the newest value among the 10 newest events on the organisation unit. * DATAELEMENT_NEWEST_EVENT_PROGRAM - In tracker capture, get the newest value that exists for a data element across the whole enrollment. In event capture, gets the newest value among the 10 newest events on the organisation unit. * DATAELEMENT_CURRENT_EVENT - Gets the value of the given data element in the current event only. * DATAELEMENT_PREVIOUS_EVENT - In tracker capture, gets the newest value that exists among events in the program that precedes the current event. In event capture, gets the newvest value among the 10 preceeding events registered on the organisation unit. * CALCULATED_VALUE - Used to reserve a variable name that will be assigned by a ASSIGN program rule action * TEI_ATTRIBUTE - Gets the value of a given tracked entity attribute	Compulsory

name	description	Compulsory
valueType	valueType parameter defines the type of the value that this ProgramRuleVariable can contain. Its value is dependent on sourceType parameter. If source is DataElement or TrackedEntityAttribute then valueType will be derived from valueType of the source. When the sourceType is CALCULATED_VALUE, then valueType should be provided by the user otherwise it will default to ValueType.TEXT	Compulsory
dataElement	Used for linking the programRuleVariable to a dataElement. Compulsory for all sourceTypes that starts with DATAELEMENT_.	See description
trackedEntity- Attribute	Used for linking the programRuleVariable to a trackedEntityAttribute. Compulsory for sourceType TEI_ATTRIBUTE.	See description
useCodeFor- OptionSet	If checked, the variable will be populated with the code - not the name - from any linked option set. Default is unchecked, meaning that the name of the option is populated.	
programStage	Used for specifying a specific program stage to retreive the programRuleVariable value from. Compulsory for DATAELEMENT_NEWEST_EVENT_PROGRAM_STAGE.	See description

Creating program rules

- To perform crud operations, `programRules` resource is available in API.

To retrieve list of programRules you can do a GET request like this:

```
/api/programRules
```

To retrieve single programRule you can do a GET request like this:

```
/api/programRules/<program_rule_uid>
```

To save/add single programRule you can do a POST request like this:

```
/api/programRules/<program_rule_uid>
```

To update single programRule you can do a PUT request like this:

```
/api/programRules/<program_rule_uid>
```

To delete single programRule you can do a DELETE request like this:

```
/api/programRules/<program_rule_uid>
```

To retrieve description of programRule condition you can use POST and provide condition string in the POST body.

```
/api/programRules/condition/description?<program_rule_uid>
```

Forms

To retrieve information about a form (which corresponds to a data set and its sections) you can interact with the `form` resource. The form response is accessible as XML and JSON and will provide information about each section (group) in the form as well as each field in the sections, including labels and identifiers. By supplying period and organisation unit identifiers the form response will be populated with data values.

Form query parameters

Parameter	Option	Description
pe	ISO period	Period for which to populate form data values.
ou	UID	Organisation unit for which to populate form data values.
metaData	false | true	Whether to include metadata about each data element of form sections.

To retrieve the form for a data set you can do a GET request like this:

```
/api/dataSets/<dataset-id>/form.json
```

To retrieve the form for the data set with identifier "BfMAe6Itzgt" in XML:

```
/api/dataSets/BfMAe6Itzgt/form
```

To retrieve the form including metadata in JSON:

```
/api/dataSets/BfMAe6Itzgt/form.json?metaData=true
```

To retrieve the form filled with data values for a specific period and organisation unit in XML:

```
/api/dataSets/BfMAe6Itzgt/form.xml?ou=DiszpKrYNg8&pe=201401
```

When it comes to custom data entry forms, this resource also allows for creating such forms directly for a data set. This can be done through a POST or PUT request with content type text/html where the payload is the custom form markup such as:

```
curl -d @form.html "localhost/api/dataSets/BfMAe6Itzgt/form"
  -H "Content-Type:text/html" -u admin:district -X PUT
```

Documents

References to files can be stored with the document resource.

Document fields

Field name	Description
name	unique name of document
external	flag identifying the location of the document. TRUE for external files, FALSE for internal ones
url	the location of the file. URL for external files. File resource id for internal ones (see File resources)

A GET request to the documents endpoint will return all documents:

```
/api/documents
```

A POST request to the documents endpoint will create a new document:

```
curl -X POST -d @document.json -H "Content-type: application/json"
  "http://dhis.domain/api/documents"
```

```
{
  "name": "dhis home",
  "external": true,
  "url": "https://www.dhis2.org"
}
```

A GET request with the id of a document appended will return information about the document. A PUT request to the same endpoint will update the fields of the document:

```
/api/documents/<documentId>
```

Appending */data* to the GET request will return the actual file content of the document:

```
/api/documents/<documentId>/data
```

CSV metadata import

DHIS2 supports import of metadata in the CSV format, such as data elements, organisation units and validation rules. Properties for the various metadata objects are identified based on the column order/ column index (see below for details). You can omit non-required object properties/columns, but since the column order is significant, an empty column must be included. In other words, if you would like to specify properties/columns which appear late in the column order but not specify certain columns which appear early in the order you can include empty/blank columns for them.

The first row of the CSV file is considered to be a header and is ignored during import. The *comma* character should be used as a text delimiter. Text which contains commas must be enclosed in *double quotes*.

To upload metadata in CSV format you can make a POST request to the metadata endpoint:

```
POST /api/metadata?classKey=CLASS-KEY
```

The following object types are supported. The `classKey` query parameter is mandatory and can be found next to each object type in the table below.

Object types and keys

Object type	Class key
Data elements	DATA_ELEMENT
Data element groups	DATA_ELEMENT_GROUP
Category options	CATEGORY_OPTION
Category option groups	CATEGORY_OPTION_GROUP
Organisation units	ORGANISATION_UNIT
Organisation unit groups	ORGANISATION_UNIT_GROUP
Validation rules	VALIDATION_RULE
Option sets	OPTION_SET
Translations	TRANSLATION

> **Tip**
>
> If using *curl*, the `--data-binary` option should be used as it preserves line breaks and newlines, which is essential for CSV data.

As an example, to upload a file of data elements in CSV format with `curl` you can use the following command:

```
curl --data-binary @data_elements.csv "http://localhost/api/metadata?classKey=DATA_ELEMENT"
  -H "Content-Type:application/csv" -u admin:district
```

The formats for the currently supported object types for CSV import are listed in the following sections.

Data elements

Data Element CSV Format

Index	Column	Required	Value (default first)	Description
1	Name	Yes		Name. Max 230 char. Unique.
2	UID	No	UID	Stable identifier. Exactly 11 alpha-numeric characters, beginning with a letter. Will be generated by system if not specified.
3	Code	No		Stable code. Max 50 char.
4	Short name	No	50 first char of name	Will fall back to first 50 characters of name if unspecified. Max 50 char. Unique.
5	Description	No		Free text description.
6	Form name	No		Max 230 char.
7	Domain type	No	AGGREGATE | TRACKER	Domain type for data element, can be aggregate or tracker. Max 16 char.

Index	Column	Required	Value (default first)	Description
8	Value type	No	INTEGER | NUMBER | UNIT_INTERVAL | PERCENTAGE | INTEGER_POSITIVE | INTEGER_NEGATIVE | INTEGER_ZERO_OR_POSITIVE | FILE_RESOURCE | COORDINATE |TEXT | LONG_TEXT | LETTER | PHONE_NUMBER | EMAIL | BOOLEAN | TRUE_ONLY | DATE | DATETIME	Value type. Max 16 char.
9	Aggregation type	No	SUM | AVERAGE | AVERAGE_SUM_ORG_UNIT | COUNT | STDDEV | VARIANCE | MIN | MAX | NONE	Aggregation type indicating how to aggregate data in various dimensions. Max 16 char.
10	Category combination	No	UID	UID of category combination. Will default to default category combination if not specified.
11	Url	No		URL to data element resource. Max 255 char.
12	Zero is significant	No	false | true	Indicates whether zero values will be stored for this data element.
13	Option set	No	UID	UID of option set to use for data.
14	Comment option set	No	UID	UID of option set to use for comments.

An example of a CSV file for data elements can be seen below. The first row will always be ignored. Note how you can skip columns and rely on default values to be used by the system. You can also skip columns which you do not use which appear to the right of the ones

```
name,uid,code,shortname,description
"Women participated skill development training",,"D0001","Women participated in training"
"Women participated community organizations",,"D0002","Women participated in organizations"
```

Organisation units

Organisation Unit CSV Format

Index	Column	Required	Value (default first)	Description
1	Name	Yes		Name. Max 230 characters. Unique.
2	UID	No	UID	Stable identifier. Max 11 char. Will be generated by system if not specified.
3	Code	No		Stable code. Max 50 char.
4	Parent	No	UID	UID of parent organisation unit.
5	Short name	No	50 first char of name	Will fall back to first 50 characters of name if unspecified. Max 50 characters. Unique.
6	Description	No		Free text description.
7	Opening date	No	1970-01-01	Opening date of organisation unit in YYYY-MM-DD format.
8	Closed date	No		Closed date of organisation unit in YYYY-MM-DD format, skip if currently open.
9	Comment	No		Free text comment for organisation unit.
10	Feature type	No	NONE | MULTI_POLYGON | POLYGON | POINT | SYMBOL	Geospatial feature type.

Index	Column	Required	Value (default first)	Description
11	Coordinates	No		Coordinates used for geospatial analysis in Geo JSON format.
12	URL	No		URL to organisation unit resource. Max 255 char.
13	Contact person	No		Contact person for organisation unit. Max 255 char.
14	Address	No		Address for organisation unit. Max 255 char.
15	Email	No		Email for organisation unit. Max 150 char.
16	Phone number	No		Phone number for organisation unit. Max 150 char.

A minimal example for importing organisation units with a parent unit looks like this:

```
name,uid,code,parent
"West province",,"WESTP","ImspTQPwCqd"
"East province",,"EASTP","ImspTQPwCqd"
```

Validation rules

Validation Rule CSV Format

Index	Column	Required	Value (default first)	Description
1	Name	Yes		Name. Max 230 characters. Unique.
2	UID	No	UID	Stable identifier. Max 11 char. Will be generated by system if not specified.
3	Code	No		Stable code. Max 50
4	Description	No		Free text description.
5	Instruction	No		Free text instruction.

Index	Column	Required	Value (default first)	Description
6	Importance	No	MEDIUM | HIGH | LOW	Importance of validation rule.
7	Rule type (ignored)	No	VALIDATION | SURVEILLANCE	Type of validation rule.
8	Operator	No	equal_to | not_equal_to | greater_than | greater_than_or_equal_to | less_than | less_than_or_equal_to | compulsory_pair | exclusive_pair	Expression operator.
9	Period type	No	Monthly | Daily | Weekly | Quarterly | SixMontly | Yearly	Period type.
10	Left side expression	Yes		Mathematical formula based on data element and option combo UIDs.
11	Left side expression description	Yes		Free text.
12	Left side missing value strategy	No	SKIP_IF_ANY_VALUE_MISSING | SKIP_IF_ALL_VALUES_MISSING | NEVER_SKIP	Behavior in case of missing values in left side expression.
13	Right side expression	Yes		Mathematical formula based on data element and option combo UIDs.
14	Right side expression description	Yes		Free text.
15	Right side missing value strategy	No	SKIP_IF_ANY_VALUE_MISSING | SKIP_IF_ALL_VALUES_MISSING | NEVER_SKIP	Behavior in case of missing values in right side expression.

Option sets

Option Set CSV Format

Index	Column	Required	Value (default first)	Description
1	OptionSetName	Yes		Name. Max 230 characters. Unique. Should be repeated for each option.
2	OptionSetUID	No	UID	Stable identifier. Max 11 char. Will be generated by system if not specified. Should be repeated for each option.
3	OptionSetCode	No		Stable code. Max 50 char. Should be repeated for each option.
4	OptionName	Yes		Option name. Max 230 characters.
5	OptionUID	No	UID	Stable identifier. Max 11 char. Will be generated by system if not specified.
6	OptionCode	Yes		Stable code. Max 50 char.

The format for option sets is special. The three first values represent an option set. The three last values represent an option. The first three values representing the option set should be repeated for each option.

```
optionsetname,optionsetuid,optionsetcode,optionname,optionuid,optioncode
"Color",,"COLOR","Blue",,"BLUE"
"Color",,"COLOR","Green",,"GREEN"
"Color",,"COLOR","Yellow",,"YELLOW"
"Sex",,,"Male",,"MALE"
"Sex",,,"Female",,"FEMALE"
"Sex",,,"Unknown",,"UNKNOWN"
"Result",,,"High",,"HIGH"
"Result",,,"Medium",,"MEDIUM"
"Result",,,"Low",,"LOW"
"Impact","cJ82jd8sd32","IMPACT","Great",,"GREAT"
"Impact","cJ82jd8sd32","IMPACT","Medium",,"MEDIUM"
"Impact","cJ82jd8sd32","IMPACT","Poor",,"POOR"
```

Option group

Option Group CSV Format

Index	Column	Required	Value (default first)	Description
1	OptionGroupName	Yes		Name. Max 230 characters. Unique. Should be repeated for each option.
2	OptionGroupUid	No		Stable identifier. Max 11 char. Will be generated by system if not specified. Should be repeated for each option.
3	OptionGroupCode	No		Stable code. Max 50 char. Should be repeated for each option.
4	OptionGroupShortName	Yes		Short Name. Max 50 characters. Unique. Should be repeated for each option.
5	OptionSetUid	Yes		Stable identifier. Max 11 char. Should be repeated for each option.
6	OptionUid	No		Stable identifier. Max 11 char.
7	OptionCode	No		Stable code. Max 50 char.

Sample OptionGroup CSV payload

```
optionGroupName,optionGroupUid,optionGroupCode,optionGroupShortName,optionSetUid,optionUid,optionCode
optionGroupA,,,groupA,xmRubJIhmaK,,OptionA
optionGroupA,,,groupA,xmRubJIhmaK,,OptionB
optionGroupB,,,groupB,QYDAByFgTr1,,OptionC
```

Option Group Set

Option Group Set CSV Format

Index	Column	Required	Value (default first)	Description
1	OptionGroupSetName	Yes		Name. Max 230 characters. Unique. Should be repeated for each option.

Index	Column	Required	Value (default first)	Description
2	OptionGroupSet Uid	No		Stable identifier. Max 11 char. Will be generated by system if not specified. Should be repeated for each option.
3	OptionGroupSet Code	No		Stable code. Max 50 char. Should be repeated for each option.
4	OptionGroupSet Description	No		Description. Should be repeated for each option.
5	DataDimension	No		TRUE, FALSE
6	OptionSetUid	No		OptionSet UID. Stable identifier. Max 11 char.

Sample OptionGroupSet CSV payload

```
name,uid,code,description,datadimension,optionsetuid
optiongroupsetA,,,,,xmRubJIhmaK
optiongroupsetB,,,,false,QYDAByFgTrl
```

To add OptionGroups to an imported OptionGroupSet, follow the steps as importing collection membership

Indicators

Indicator CSV Format

Index	Column	Required	Value (default first)	Description
1	Name	Yes		Name. Max 230 char. Unique.
2	UID	No	UID	Stable identifier. Exactly 11 alpha-numeric characters, beginning with a letter. Will be generated by system if not specified.
3	Code	No		Stable code. Max 50 char.

Index	Column	Required	Value (default first)	Description
4	Short name	Yes	50 first char of name	Will fall back to first 50 characters of name if unspecified. Max 50 char. Unique.
5	denominator	Yes		Indicator expression.
6	denominatorDescription	No		Max 230 char.
5	numerator	Yes		Indicator expression.
6	numeratorDescription	No		Max 230 char.
6	annualized	Yes		TRUE, FALSE
6	decimals	No		Number of decimals to use for indicator value, null implies default.
6	Indicator Type	Yes		UID

An example of a CSV file for Indicators can be seen below. The first row will always be ignored. Note how you can skip columns and rely on default values to be used by the system. You can also skip columns which you do not use which appear to the right of the ones

```
Name,UID,Code,Description,shortName,denominator,denominatorDescription,numerator,numeratorDescription,annualized,
Indicator A,yiAKjiZVoOU,CodeA,Indicator A description,Indicator A
shortname,#{fbfJHSPpUQD},denominatorDescription,#{h0xKKjijTdI},numeratorDescription,false,
2,sqGRzCziswD
Indicator B,Uvn6LCg7dVU,CodeB,Indicator B description,Indicator B
shortname,#{fbfJHSPpUQD},denominatorDescription,#{h0xKKjijTdI},numeratorDescription,false,
2,sqGRzCziswD
```

Collection membership

In addition to importing objects, you can also choose to only import the group-member relationship between an object and a group. Currently, the following group and object pairs are supported

- Organisation Unit Group - Organisation Unit
- Data Element Group - Data Element
- Indicator Group - Indicator
- Option Group Set - Option Group

The CSV format for these imports are the same

Collection membership CSV Format

Index	Column	Required	Value (default first)	Description
1	UID	Yes	UID	The UID of the collection to add an object to
2	UID	Yes	UID	The UID of the object to add to the collection

Category Option Group

Index	Column	Required	Value (default first)	Description
1	Name	Yes		Name. Max 230 characters. Unique.
2	UID	No	UID	Stable identifier. Max 11 chars. Will be generated by system if not specified.
3	Code	No		Stable code. Max 50 char.
4	Short name	No		Short name. Max 50 characters.
5	Data Dimension Type	Yes		Data Dimension Type, can be either DISAGGREGATION or ATTRIBUTE

Other objects

Data Element Group, Category Option, Organisation Unit Group CSV Format

Index	Column	Required	Value (default first)	Description
1	Name	Yes		Name. Max 230 characters. Unique.
2	UID	No	UID	Stable identifier. Max 11 chars. Will be generated by system if not specified.
3	Code	No		Stable code. Max 50 char.
4	Short name	No		Short name. Max 50 characters.

An example of category options looks like this:

```
name,uid,code,shortname
"Male",,"MALE"
"Female",,"FEMALE"
```

Deleted objects

The deleted objects resource provides a log of metadata objects being deleted.

```
/api/deletedObjects
```

Whenever an object of type metadata is deleted, a log is being kept of the uid, code, the type and the time of when it was deleted. This API is available at `/api/deletedObjects` field filtering and object filtering works similarly to other metadata resources.

Get deleted objects of type data elements:

```
GET /api/deletedObjects.json?klass=DataElement
```

Get deleted object of type indicator which was deleted in 2015 and forward:

```
GET /api/deletedObjects.json?klass=Indicator&deletedAt=2015-01-01
```

Favorites

Certain types of metadata objects can be marked as favorites for the currently logged in user. This applies currently for dashboards.

```
/api/dashboards/<uid>/favorite
```

To make a dashboard a favorite you can make a *POST* request (no content type required) to a URL like this:

```
/api/dashboards/iMnYyBfSxmM/favorite
```

To remove a dashboard as a favorite you can make a *DELETE* request using the same URL as above.

The favorite status will appear as a boolean *favorite* field on the object (e.g. the dashboard) in the metadata response.

Subscriptions

A logged user can subscribe to certain types of objects. Currently subscribable objects are those of type EventChart, EventReport, Map, Visualization and EventVisualization.

> **Note**
>
> The EventChart and EventReport objects are deprecated. Use EventVisualization instead.

To get the subscribers of an object (return an array of user IDs) you can make a *GET* request:

```
/api/<object-type>/<object-id>/subscribers
```

See example as follows:

```
/api/visualizations/DkPKc1EUmC2/subscribers
```

To check whether the current user is subscribed to an object (returns a boolean) you can perform a *GET* call:

```
/api/<object-type>/<object-id>/subscribed
```

See example as follows:

```
/api/visualizations/DkPKc1EUmC2/subscribed
```

To subscribe/de-subscribe to an object you perform a *POST/DELETE* request (no content type required):

```
/api/<object-type>/<object-id>/subscriber
```

File resources

File resources are objects used to represent and store binary content. The *FileResource* object itself contains the file meta-data (name, Content-Type, size, etc.) as well as a key allowing retrieval of the contents from a database-external file store. The *FileResource* object is stored in the database like any other but the content (file) is stored elsewhere and is retrievable using the contained reference *(storageKey)*.

```
/api/fileResources
```

The contents of file resources are not directly accessible but are referenced from other objects (such as data values) to store binary content of virtually unlimited size.

To create a file resource that does not require a corresponding data value, POST to the endpoint `/api/fileResources` with a multipart upload:

```
curl "https://server/api/fileResources" -X POST
  -F "file=@/path/to/file/name-of-file.png"
```

The `uid` of a file resource can be provided when it is created, for example:

```
curl "https://server/api/fileResources?uid=0123456789x" -X POST
  -F "file=@/path/to/file/name-of-file.png"
```

To create both a file resource and a data value that references the file, POST to the `/api/dataValues/file` endpoint in DHIS 2.36 or later:

```
curl "https://server/api/dataValues/file?de=xPTAT98T2Jd
  &pe=201301&ou=DiszpKrYNg8&co=Prlt0C1RF0s" -X POST
  -F "file=@/path/to/file/name-of-file.png"
```

For the `api/fileResources` endpoint, the only form parameter required is *file*, which is the file to upload. For the `api/dataValues/file` endpoint, the parameters required are the same as for a post to `api/dataValues`, with the addition of *file*.

The filename and content-type should also be included in the request but will be replaced with defaults when not supplied.

On successfully creating a file resource the returned data will contain a `response` field which in turn contains the `fileResource` like this:

```
{
  "httpStatus": "Accepted",
  "httpStatusCode": 202,
  "status": "OK",
  "response": {
    "responseType": "FileResource",
    "fileResource": {
      "name": "name-of-file.png",
      "created": "2015-10-16T16:34:20.654+0000",
      "lastUpdated": "2015-10-16T16:34:20.667+0000",
      "externalAccess": false,
      "publicAccess": "--------",
      "user": { ... },
      "displayName": "name-of-file.png",
      "contentType": "image/png",
      "contentLength": 512571,
      "contentMd5": "4e1fc1c3f999e5aa3228d531e4adde58",
      "storageStatus": "PENDING",
      "id": "xm4JwRwke0i"
    }
  }
}
```

Note that the response is a *202 Accepted*, indicating that the returned resource has been submitted for background processing (persisting to the external file store in this case). Also, note the `storageStatus` field which indicates whether the contents have been stored or not. At this point, the persistence to the external store is not yet finished (it is likely being uploaded to a cloud-based store somewhere) as seen by the `PENDING` status.

Even though the content has not been fully stored yet the file resource can now be used, for example as referenced content in a data value (see Working with file data values). If we need to check the updated *storageStatus* or otherwise retrieve the metadata of the file, the `fileResources` endpoint can be queried.

```
curl "https://server/api/fileResources/xm4JwRwke0i" -H "Accept: application/json"
```

This request will return the `FileResource` object as seen in the response of the above example.

File resource constraints

- File resources *must* be referenced (assigned) from another object in order to be persisted in the long term. A file resource which is created but not referenced by another object such as a data value is considered to be in *staging*. Any file resources which are in this state and are older than *two hours* will be marked for deletion and will eventually be purged from the system.
- The ID returned by the initial creation of the file resource is not retrievable from any other location unless the file resource has been referenced (in which the ID will be stored as the reference), so losing it will require the POST request to be repeated and a new object to be created. The *orphaned* file resource will be cleaned up automatically.
- File resource objects are *immutable*, meaning modification is not allowed and requires creating a completely new resource instead.

File resource blocklist

Certain types of files are blocked from being uploaded for security reasons.

The following content types are blocked.

Content type	Content type
text/html	application/x-ms-dos-executable
text/css	application/vnd.microsoft.portable-executable
text/javascript	application/vnd.apple.installer+xml
font/otf	application/vnd.mozilla.xul+xml
application/x-shockwave-flash	application/x-httpd-php
application/vnd.debian.binary-package	application/x-sh
application/x-rpm	application/x-csh
application/java-archive	

The following file extensions are blocked.

File extension	File extension	File extension
html	deb	xul
htm	rpm	php
css	jar	bin
js	jsp	sh
mjs	exe	csh
otf	msi	bat
swf	mpkg	

Metadata versioning

This section explains the metadata versioning APIs.

- `/api/metadata/version`: This endpoint will return the current metadata version of the system on which it is invoked.

Query Parameters

Name	Required	Description
versionName	false	If this parameter is not specified, it will return the current version of the system or otherwise it will return the details of the versionName passed as parameter. (versionName is of the syntax "Version_<id>"

Get metadata version examples

Example: Get the current metadata version of this system

Request:

```
/api/metadata/version
```

Response:

```
{
  "name": "Version_4",
  "created": "2016-06-30T06:01:28.684+0000",
  "lastUpdated": "2016-06-30T06:01:28.685+0000",
  "externalAccess": false,
  "displayName": "Version_4",
  "type": "BEST_EFFORT",
  "hashCode": "848bf6edbaf4faeb7d1a1169445357b0",
  "id": "Ayz2AEMB6ry"
}
```

Example: Get the details of version with name "Version_2"

Request:

```
/api/metadata/version?versionName=Version_2
```

Response:

```
{
  "name": "Version_2",
  "created": "2016-06-30T05:59:33.238+0000",
  "lastUpdated": "2016-06-30T05:59:33.239+0000",
  "externalAccess": false,
  "displayName": "Version_2",
  "type": "BEST_EFFORT",
```

```
  "hashCode": "8050fb1a604e29d5566675c86d02d10b",
  "id": "SaNyhusVxBG"
}
```

- `/api/metadata/version/history`: This endpoint will return the list of all metadata versions of the system on which it is invoked.

Query Parameters

Name	Required	Description
baseline	false	If this parameter is not specified, it will return list of all metadata versions. Otherwise we need to pass a versionName parameter of the form "Version_<id>". It will then return the list of versions present in the system which were created after the version name supplied as the query parameter.

Get the list of all metadata versions

Example: Get the list of all versions in this system

Request:

```
/api/metadata/version/history
```

Response:

```
{
  "metadataversions": [{
    "name": "Version_1",
    "type": "BEST_EFFORT",
    "created": "2016-06-30T05:54:41.139+0000",
    "id": "SjnhUp6r4hG",
    "hashCode": "fd1398ff7ec9fcfd5b59d523c8680798"
  }, {
    "name": "Version_2",
    "type": "BEST_EFFORT",
    "created": "2016-06-30T05:59:33.238+0000",
    "id": "SaNyhusVxBG",
    "hashCode": "8050fb1a604e29d5566675c86d02d10b"
  }, {
    "name": "Version_3",
    "type": "BEST_EFFORT",
    "created": "2016-06-30T06:01:23.680+0000",
    "id": "FVkGzSjAAYg",
    "hashCode": "70b779ea448b0da23d8ae0bd59af6333"
  }]
}
```

Example: Get the list of all versions in this system created after "Version_2"

Request:

```
/api/metadata/version/history?baseline=Version_2
```

Response:

```
{
  "metadataversions": [{
    "name": "Version_3",
    "type": "BEST_EFFORT",
    "created": "2016-06-30T06:01:23.680+0000",
    "id": "FVkGzSjAAYg",
    "hashCode": "70b779ea448b0da23d8ae0bd59af6333"
  }, {
    "name": "Version_4",
    "type": "BEST_EFFORT",
    "created": "2016-06-30T06:01:28.684+0000",
    "id": "Ayz2AEMB6ry",
    "hashCode": "848bf6edbaf4faeb7d1a1169445357b0"
  }]
 }
```

- `/api/metadata/version/create`: This endpoint will create the metadata version for the version type as specified in the parameter.

Query Parameters

Name	Required	Description
type	true	The type of metadata version which needs to be created. * BEST_EFFORT * ATOMIC

Users can select the type of metadata which needs to be created. Metadata Version type governs how the importer should treat the given version. This type will be used while importing the metadata. There are two types of metadata.

- *BEST_EFFORT*: This type suggests that missing references can be ignored and the importer can continue importing the metadata (e.g. missing data elements on a data element group import).
- *ATOMIC*: This type ensures a strict type checking of the metadata references and the metadata import will fail if any of the references do not exist.

> **Note**
>
> It's recommended to have an ATOMIC type of versions to ensure that all systems (central and local) have the same metadata. Any missing reference is caught in the validation phase itself. Please see the importer details for a full explanation.

Create metadata version

Example: Create metadata version of type `BEST_EFFORT`

Request:

```
curl -X POST -u admin:district "https://play.dhis2.org/dev/api/metadata/version/create?
type=BEST_EFFORT"
```

Response:


```
{
  "name": "Version_1",
  "created": "2016-06-30T05:54:41.139+0000",
  "lastUpdated": "2016-06-30T05:54:41.333+0000",
  "externalAccess": false,
  "publicAccess": "--------",
  "user": {
    "name": "John Traore",
    "created": "2013-04-18T17:15:08.407+0000",
    "lastUpdated": "2016-04-06T00:06:06.571+0000",
    "externalAccess": false,
    "displayName": "John Traore",
    "id": "xE7jOejl9FI"
  },
  "displayName": "Version_1",
  "type": "BEST_EFFORT",
  "hashCode": "fd1398ff7ec9fcfd5b59d523c8680798",
  "id": "SjnhUp6r4hG"
}
```


- `/api/metadata/version/{versionName}/data`: This endpoint will download the actual metadata specific to the version name passed as path parameter.
- `/api/metadata/version/{versionName}/data.gz`: This endpoint will download the actual metadata specific to the version name passed as path parameter in a compressed format (gzipped).

Path parameters

Name	Required	Description
versionName	true	Path parameter of the form "Version_<id>" so that the API downloads the specific version

Download version metadata

Example: Get the actual metadata for "Version 5"

Request:

```
curl -u admin:district "https://play.dhis2.org/dev/api/metadata/version/Version_5/data"
```

Response:


```
{
  "date": "2016-06-30T06:10:23.120+0000",
  "dataElements": [
    {
      "code": "ANC 5th Visit",
```

```
      "created": "2016-06-30T06:10:09.870+0000",
      "lastUpdated": "2016-06-30T06:10:09.870+0000",
      "name": "ANC 5th Visit",
      "id": "sCuZKDsix7Y",
      "shortName": "ANC 5th Visit ",
      "aggregationType": "SUM",
      "domainType": "AGGREGATE",
      "zeroIsSignificant": false,
      "valueType": "NUMBER",
      "categoryCombo": {
        "id": "p0KPaWEg3cf"
      },
      "user": {
        "id": "xE7jOejl9FI"
      }
    }
  ]
}
```


Metadata synchronization

This section explains the Metadata Synchronization API available starting 2.24

- `/api/metadata/sync`: This endpoint performs metadata sync of the version name passed in the query parameter by downloading and importing the specified version from the remote server as defined in the settings app.

Query parameters

Name	Required	Description
versionName	true	versionName query parameter of the form "Version_<id>" . The api downloads this version from the remote server and imports it in the local system.

- This API should be used with utmost care. Please note that there is an alternate way to achieve sync in a completely automated manner by leveraging the Metadata Sync Task from the "Data Administration" app. See Chapter 22, Section 22.17 of User Manual for more details regarding Metadata Sync Task.
- This sync API can alternatively be used to sync metadata for the versions which have failed from the metadata sync scheduler. Due to its dependence on the given metadata version number, care should be taken for the order in which this gets invoked. E.g. If this api is used to sync some higher version from the central instance, then the sync might fail as the metadata dependencies are not present in the local instance.
- Assume the local instance is at `Version_12` and if this endpoint is used to sync `Version_15` (of type `BEST_EFFORT`) from the central instance, the scheduler will start syncing metadata from `Version_16`. So the local instance will not have the metadata versions between `Version_12` and `Version_15`. You need to manually sync the missing versions using these endpoints only.

Sync metadata version

Example: Sync Version_6 from central system to this system

Request:

```
curl -u admin:district "https://play.dhis2.org/dev/api/metadata/sync?versionName=Version_6"
```

Metadata repository

DHIS2 provides a metadata repository containing metadata packages with various content. A metadata package is a DHIS2-compliant JSON document which describes a set of metadata objects.

To retrieve an index over available metadata packages you can issue a GET request to the *metadataRepo* resource:

```
GET /api/synchronization/metadataRepo
```

A metadata package entry contains information about the package and a URL to the relevant package. An index could look like this:

```
{
  "packages": [
    {
      "id": "sierre-leone-demo",
      "name": "Sierra Leone demo",
      "description": "Sierra Leone demo database",
      "version": "0.1",
      "href": "https://dhis2.org/metadata-repo/221/sierra-leone-demo/metadata.json"
    },
    {
      "id": "trainingland-org-units",
      "name": "Trainingland organisation units",
      "description": "Trainingland organisation units with four levels",
      "version": "0.1",
      "href": "https://dhis2.org/metadata-repo/221/trainingland-org-units/metadata.json"
    }
  ]
}
```

A client can follow the URLs and install a metadata package through a POST request with content type *text/plain* with the metadata package URL as the payload to the *metadataPull* resource:

```
POST /api/synchronization/metadataPull
```

An example curl command looks like this:

```
curl "localhost:8080/api/synchronization/metadataPull" -X POST
  -d "https://dhis2.org/metadata-repo/221/trainingland-org-units/metadata.json"
  -H "Content-Type:text/plain" -u admin:district
```

> **Note**
>
> The supplied URL will be checked against the config property `system.remote_servers_allowed` in the `dhis.conf` file. If the base URL is not one of the configured servers allowed then the operation will not be allowed. See failure example below.
> Some examples where the config set is

`system.remote_servers_allowed=https://server1.org/,https://server2.org/` - supply `https://server1.org/path/to/resource` -> this will be accepted - supply `https://server2.org/resource/path` -> this will be accepted - supply `https://oldserver.org/resource/path` -> this will be rejected

Sample failure response

```
 {
  "httpStatus": "Conflict",
  "httpStatusCode": 409,
  "status": "ERROR",
  "message": "Provided URL is not in the remote servers allowed list",
  "errorCode": "E1004"
}
```

Reference to created by user

Each object created in DHIS2 will have a property named `user` which is linked to `User` who created the object.

From version 2.36 we have changed the name of this property to `createdBy` to avoid confusion.

However, in order to keep the backwards compability, the legacy `user` property is still included in the payload and works normally as before.

```
{
  "createdBy": {
      "displayName": "John Kamara",
      "name": "John Kamara",
      "id": "N3PZBUlN8vq",
      "username": "district"
  },
  "user": {
      "displayName": "John Kamara",
      "name": "John Kamara",
      "id": "N3PZBUlN8vq",
      "username": "district"
  }
}
```

Metadata proposal workflow

The metadata proposal workflow endpoint allows for a workflow of proposing and accepting changes to metadata.

```
/api/metadata/proposals
```

Propose a metadata change

A proposal always targets a single metadata object using:

```
POST /api/metadata/proposals
```

Depending on the payload the proposal could:

- Add a new metadata object.
- Update an existing metadata object references by ID.
- Remove an existing metadata object referenced by ID.

To propose adding a new metadata object send a JSON payload like the following:

```
{
  "type": "ADD",
  "target": "ORGANISATION_UNIT",
  "change": {"name":"My Unit", "shortName":"MyOU", "openingDate": "2020-01-01"}
}
```

The `change` property contains the same JSON object that could directly be posted to the corresponding endpoint to create the object.

To propose updating an existing metadata object send a JSON payload like in the below example:

```
{
  "type": "UPDATE",
  "target": "ORGANISATION_UNIT",
  "targetId": "<id>",
  "change": [
    {"op": "replace", "path": "/name", "value": "New name"}
  ]
}
```

The `targetId` refers to the object by its ID which should be updated. The `change` property here contains a JSON patch payload. This is the same patch payload that could be posted to the corresponding endpoint to directly apply the update.

To propose the removal of an existing object send a payload like in the last example:

```
{
  "type": "REMOVE",
  "target": "ORGANISATION_UNIT",
  "targetId": "<id>"
}
```

The `targetId` refers to the object by its ID which should be removed. A free text `comment` can be added to any type of comment.

Only `target` type `ORGANISATION_UNIT` is supported currently.

Accept a metadata change proposal

To accept an open proposal use `POST` on the proposal resource

```
POST /api/metadata/proposals/<uid>
```

When successful the status of the proposal changes to status `ACCEPTED`. Once accepted the proposal can no longer be rejected.

Should a proposal fail to apply it changes to status `NEEDS_UPDATE`. The `reason` field contains a summary of the failures when this information is available.

Oppose a metadata change proposal

If a proposal isn't quite right and needs adjustment this can be indicated by opposing the proposal by sending a `PATCH` for the proposal resource

```
PATCH /api/metadata/proposals/<uid>
```

Optionally a plain text body can be added to this to give a `reason` why the proposal got opposed.

A opposed proposal must be in state `PROPOSED` and will change to state `NEEDS_UPDATE`.

Adjust a metadata change proposal

A proposal in state `NEEDS_UPDATE` needs to be adjusted before it can be accepted. To adjust the proposal a `PUT` request is made for the proposal's resource

```
PUT /api/metadata/proposals/<uid>
```

Such an adjustment can either be made without a body or with a JSON body containing an object with the updated `change` and `targetId` for the adjustment:

```
{
  "targetId": "<id>",
  "change": ...
}
```

The JSON type of the `change` value depends on the proposal `type` analogous to when a proposal is initially made.

Reject a metadata change proposal

To reject an open proposal use `DELETE` on the proposal resource

```
DELETE /api/metadata/proposals/<uid>
```

This changes the status of the proposal conclusively to `REJECTED`. No further changes can be made to this proposal. It is kept as a documentation of the events.

List metadata change proposals

All proposals can be listed:

```
GET /api/metadata/proposals/
```

The result list can be filtered using the `filter` parameter. For example, to list only accepted proposals use:

```
GET /api/metadata/proposals?filter=status:eq:ACCEPTED
```

Similarly to only show open proposals use:

```
GET /api/metadata/proposals?filter=status:eq:PROPOSED
```

Filters can also be applied to any field except `change`. Supported filter operators are those described in the Gist Metadata API. This also includes property transformers described for Gist API.

List of available fields are:

Field	Description
id	unique identifier of the proposal
type	`ADD` a new object, `UPDATE` an existing object, `REMOVE` an existing object
status	`PROPOSED` (open proposal), `ACCEPTED` (successful), `NEEDS_UPDATE` (accepting caused error or opposed), `REJECTED`
target	type of metadata object to add/update/remove; currently only `ORGANISATION_UNIT`
targetId	UID of the updated or removed object, not defined for `ADD`
createdBy	the user that created the proposal
created	the date time when the proposal was created
finalisedBy	the user that accepted or rejected the proposal
finalised	the date time when the proposal changed to a conclusive state of either accepted or rejected
comment	optional plain text comment given for the initial proposal
reason	optional plain text given when the proposal was opposed or the errors occurring when accepting a proposal failed
change	JSON object for `ADD` proposal, JSON array for `UPDATE` proposal, nothing for `REMOVE` proposal

Viewing metadata change proposals

Individual change proposals can be viewed using

```
GET /api/metadata/proposals/<uid>
```

The `fields` parameter can be used to narrow the fields included for the shown object. For example:

```
GET /api/metadata/proposals/<uid>?fields=id,type,status,change
```

Metadata Attribute Value Type and validations

Type	Validation
TEXT	None

Type	Validation
LONG_TEXT	None
LETTER	Value length = 1 AND is a letter
PHONE_NUMBER	Validation is based on this regex `^[0-9+\\(\\)#\\.\\s\\/ext-]{6,50}$`. Max length is 50. Examples: +4733987937, (+47) 3398 7937, (47) 3398 7937.123
EMAIL	General email format abc@email.com
BOOLEAN	`true` or `false`
TRUE_ONLY	Only accept `true`
DATE	Use format `yyyy-MM-dd`
DATETIME	Use format `yyyy-MM-dd HH:mm:ssZ` or `yyyy-MM-dd'T'HH:mm:ss`
TIME	Use fornat `HH:mm`
NUMBER	Value must be numberic with max length = 250
UNIT_INTERVAL	Value is numeric and inclusive between 0 and 1
PERCENTAGE	Value is a number in the inclusive range of 0 to 100
INTEGER	Value is an integer
INTEGER_POSITIVE	Value is a positive integer
INTEGER_NEGATIVE	Value is a negative integer
INTEGER_ZERO_OR_POSITIVE	Value is an positive or zero integer
TRACKER_ASSOCIATE	None
USERNAME	Value is a username of an existing `User`
COORDINATE	None
ORGANISATION_UNIT	Value is a valid UID of an existing `OrganisationUnit`
REFERENCE	None
AGE	Value is date of birth. Use format as in DATE type.
URL	Value is a valid URL
FILE_RESOURCE	Value is a valid UID of existing `FileResource`
IMAGE	Value is a valid UID of existing `FileResource`
GEOJSON	Follow GeoJson Specification
MULTI_TEXT	None

Copy Program

Introduction

A user will often want to create many `Programs` which share many of the same characteristics, and instead of having to create a new `Program` from scratch, it is efficient and beneficial to copy an existing `Program` and make modifications to it.
A template `Program` could theoretically be setup as a base to copy from, which may help with the consistency of `Program` setups also.

API info

Endpoint

```
POST /api/programs/{uid}/copy
```

Example with a `Program` with a `UID` of `Program123a`

```
POST /api/programs/Program123a/copy
```

Successful response will include the new `Program` `UID` and will look like this:

```
{
    "httpStatus": "Created",
    "httpStatusCode": 201,
    "status": "OK",
    "message": "Program created: 'Program456b'"
}
```

The response will also contain a `Location` header with a link to the newly-created `Program`. e.g. when run locally the `Location` value would be `http://localhost:9090/api/programs/Program456b`

Copy options

The API does allow the optional supplying of a custom prefix, which will be prefixed to the following properties.

Object	Property	Info
Program	name	Help identify the new Program
ProgramIndicator	name	Database constraint - needs to be unique
ProgramIndicator	shortName	Database constraint - needs to be unique

In this example when a custom prefix is supplied, an original `Program` with a name of `My Simple Program` would be copied to a new `Program` with the name `my prefix My Simple Program`

If no copy options are sent in the API call then the default `Copy of` prefix will be used for the above properties.
To send a custom prefix just add a HTTP request param `prefix` like so:

```
POST /api/programs/{uid}/copy?prefix=my prefix
```

> **Note**
>
> The database does have limits for the number of characters allowed for properties. At the time of writing these limits are noted in the table below. Bear these in mind.

Property	character limit
name	230
shortName	50

If a property has exceeded its character limit, then an error will be returned like so:

```
{
    "httpStatus": "Conflict",
    "httpStatusCode": 409,
    "status": "ERROR",
    "message": "ERROR: value too long for type character varying(230)",
    "errorCode": "E1004"
}
```

If trying to copy a Program that is not found, a response like this will be returned:

```
{
    "httpStatus": "Not Found",
    "httpStatusCode": 404,
    "status": "ERROR",
    "message": "Program with id {uid} could not be found.",
    "errorCode": "E1005"
}
```

Authorisation

Authorities

A `User` will need the following authorities to be able to copy a `Program`:

- F_PROGRAM_PUBLIC_ADD
- F_PROGRAM_INDICATOR_PUBLIC_ADD

Access

A `Program` needs one of the following states for it to be able to be copied:

- Public `read` & `write` access
- A specific `User` to have sharing `read` & `write` access
- A `User` is part of a `UserGroup` that has sharing `read` & `write` access

If a `User` does not have the correct permissions, a `Forbidden` response is returned like so:

```
{
    "httpStatus": "Forbidden",
    "httpStatusCode": 403,
    "status": "ERROR",
    "message": "You don't have write permissions for Program Program123a",
    "errorCode": "E1006"
}
```

Points to note

Deep and shallow copy

When a `Program` is copied, certain properties of the `Program` need different kinds of copying. It is important to be aware of what has been deep-copied and what has been shallow-copied.
First of all let's explain the difference between deep and shallow copying in this context.

Deep copy

A deep copy in this context means that a completely new instance of a `Program` or `Program` property has been created with its own unique identifiers. These include amongst others:

- id
- uid

Deep copies of `Program` properties will all belong to the newly-created `Program` copy.

Shallow copy

A shallow copy in this context means that an existing `Program` property will be reused by the newly-created `Program` or `Program` property.

Properties that get deep copied

All properties below have been deep copied. Anything not in included in this table means that it has been shallow copied.

Object	Property of
Program	
ProgramSection	Program
ProgramIndicator	Program
ProgramRuleVariable	Program
ProgramStage	Program
ProgramStageSection	ProgramStage
ProgramStageSectionDataElement	ProgramStage
Enrollment	

> **Note**
> The following properties have been set as empty as an initial approach. This approach should keep things simple to start off with.

Object	Property
ProgramIndicator	groups
ProgramStageSection	programIndicators
Enrollment	events

Metadata Gist API

The Metadata Gist API is a RESTful read-only JSON API to fetch and browse metadata. Items in this API contain the gist of the same item in the Metadata API.

The API is specifically designed to avoid:

- Large response payloads because of the inclusion of partial nested object graphs.
- Resource intensive in memory processing of requests (e.g. in memory filtering or object graph traversal).
- *n + 1* database queries as a result of object graph traversal while rendering the response.

Comparison with Metadata API

The standard Metadata API is a flexible and powerful API built to serve any and every use case. The downside of this is that not all features and combinations can scale while keeping good performance in the presence of huge numbers of items. In particular lists with items where each item itself has a property which is a large collection of complex objects have proven problematic as they quickly reference a large part of the entire object graph.

The `/gist` API was added to provide a metadata API where scaling well is our first priority. The downside of this is that there are more distinct limits to what features are technically reasonable, which means not all features of the standard Metadata API exist for the Gist API.

The Gist API uses a divide and conquer strategy to avoid responses with large partial object graphs. Instead of including nested objects or lists it provides a `/gist` endpoint URI where this object or list can be viewed in isolation.

The `/gist` API refers to nested data using URIs rather than including it. This means if a client is interested in this nested information more requests are required but each of them is kept reasonable small and will scale well in context of huge number of potential items.

Known Differences:

- items only includes fields of referenced identifiable objects if these do not have an endpoint on their own
- it never includes identifiable collections of objects directly
- items by default do not include all available fields, but a subset that depends on context and parameters
- lists cannot be used without pager (therefore there is no `pager` parameter)
- fields with collections are not paged using the `pager`-transformer but through a paged API endpoint for the particular collection property
- items in a list, a collection property size or boolean transformer result always considers object sharing (the set of considered items is always the set visible to the user)
- Gist offers `member(<id>)` and `not-member(<id>)` collection field transformers
- Gist offers `canRead` and `canWrite` access check filter instead of filtering on the `access` property
- Gist offers using attribute UIDs as field and filter property names to allow listing or filtering based on custom attribute values
- Gist offers filter grouping
- Gist offers renaming the enrty list in a paged response using `pageListName`
- Gist offers to pluck multiple simple properties

Known Limitations:

- by default only persisted are included; a handful of special non-persistent fields (synthetic fields) can be added explicitly; other non-persistent fields might be possible to extract using `from` transformation
- filters can only be applied to persisted fields
- orders can only be applied to persisted fields
- token filters are not available
- order is always case-sensitive
- `pluck` transformer limited to text properties (or simple properties for multi-pluck)
- fields which hold collections of simple (non-identifiable) items cannot always be included depending on how they are stored

Where possible to use the `/gist` API should be considered the preferable way of fetching metadata information.

Endpoints

The `/gist` API has 3 kinds of endpoints:

- `/api/<object-type>/**gist**`: paged list of all known and visible objects of the type (implicit `auto=S`)
- `/api/<object-type>/<object-id>/**gist**`: view single object by ID (implicit `auto=L`)
- `/api/<object-type>/<object-id>/<field-name>/**gist**`: paged list of all known and visible items in the collection of owner object's field (implicit `auto=M`; in case this is a simple field just the field value)

These endpoints correspond to the endpoints of the standard metadata API without the `/gist` suffix and share the majority of parameters and their options with that API.

Browsing Data

Since `/gist` API avoids deeply nested data structures in the response the details of referenced complex objects or list of objects is instead provided in form of a URI to the gist endpoint that only returns the complex object or list of objects. These URIs are provided by the `apiEndpoints` field of an item which is automatically added to an item when such references exist. The item property itself might contain a transformation result on the object or collection such as its size, emptiness, non-emptiness, id(s) or plucked property such as its name.

To manually browse data it can be handy to use the `absoluteUrls=true` parameter. Linkage between parts of the gist can now be followed directly in browsers that render JSON responses.

Parameters

All endpoints of the `/gist` API accept the same set of parameters. Parameters and their options that do not make sense in the endpoint context are ignored.

Overview

Parameters in alphabetical order:

Parameter	Options	Default	Description
`absoluteUrls`	`true` or `false`	`false`	`true` use relative paths in links, `false` use absolute URLs in links
`auto`	`XS`, `S`, `M`, `L`, `XL`	(context dependent)	extent of fields selected by * field selector

Parameter	Options	Default	Description
`fields`	(depends on endpoint)	*	comma separated list of fields or presets to include
`filter`	`<field>:<operator>` or `<field>:<operator>:<value>`		comma separated list of query field filters (can be used more than once)
`headless`	`true` or `false`	`false`	`true` skip wrapping result in a pager (ignores `total`), `false` use a pager wrapper object around the result list
`inverse`	`true` or `false`	`false`	`true` return items **not** in the list, `false` return items in the list
`locale`		(user account configured language)	translation language override
`order`	`<field>` or `<field>:asc` or `<field>:desc`	`:asc`	comma separated list of query order fields (can be used more than once)
`page`	1-n	1	page number
`pageSize`	1-1000	50	number of items on a page
`pageListName`	`<text>`	(object type plural)	overrides the property name of the result entry list
`rootJunction`	`AND` or `OR`	`AND`	logical combination of `filters`, `AND`= all must match, `OR`= at least one must match
`total`	`true` or `false`	`false`	`true` add total number of matches to the pager, `false` skip counting total number of matches
`translate`	`true` or `false`	`true`	`true` translate all translatable properties, `false` skip translation of translatable properties (no effect on synthetic display names)

The `absoluteUrls` Parameter

By default, URIs in `apiEndpoints`, `href` and the `pager` `prev` and `next` members are relative, starting with `/<object-type>/` path.

The URIs can be changed to absolute URLs using the `absoluteUrls` parameter.

For example, `/api/users/rWLrZL8rP3K/gist?fields=id,href` returns:

```
{
  "id": "rWLrZL8rP3K",
  "href": "/users/rWLrZL8rP3K/gist"
}
```

whereas `/api/users/rWLrZL8rP3K/gist?fields=id,href&absoluteUrls=true` returns:

```
{
  "id": "rWLrZL8rP3K",
  "href": "http://localhost:8080/api/users/rWLrZL8rP3K/gist?absoluteUrls=true"
}
```

As the example shows the `absoluteUrls` parameter is also forwarded or carried over to the included URLs so allowing to browse the responses by following the provided URLs.

The `auto` Parameter

Each endpoint implicitly sets a default for the extent of fields matched by the `*` / `:all` fields selector:

- `/api/<object-type>/gist`: implies `auto=S`
- `/api/<object-type>/<object-id>/gist`: implies `auto=L`
- `/api/<object-type>/<object-id>/<field-name>/gist`: implies `auto=M`

The `auto` parameter is used to manually override the default to make list items include more or less fields. This setting again acts as a default which can be further overridden on a per field basis using an explicit transformation.

Possible options for `auto` are ("t-shirt sizes"):

- XS: includes only IDs and textual properties
- S: excludes complex (object) properties, collection are only linked (not counted)
- M: complex included as reference URL, references and collections as count and reference URL
- L: like M but references and collections included as IDs (OBS! unbound in size)
- XL: like L but references and collections included as ID objects: `{ "id": <id> }`

For example, `/api/users/gist` would list items with fields `id`, `surname`, `firstName`, `phoneNumber`, `email`, `lastUpdated` whereas `/api/users/gist?auto=XS` only lists `id`, `surname`, `firstName`, `phoneNumber`, `email`. Using `/api/users/gist?auto=L` would also include `organisationUnits`, `dataViewOrganisationUnits`, `teiSearchOrganisationUnits` and `userGroups` each with the list of IDs of the members in the lists/sets.

The `fields` Parameter

Specifies the list of fields to include for each list item.

Fields are included in the result JSON objects for an item in the provided order. A preset in the list of fields is expanded to the fields it contains at the position in the `fields` list it appears. Fields within the preset are ordered from simple to complex.

If no `fields` parameter is provided `fields=*` is assumed. Note that the fields of the `*` preset also depend on the `auto` parameter

To remove a field use either `!<name>` or `-<name>` in the list of fields. For example to remove the userGroups from a user, use:

```
/api/users/gist?fields=*,!userGroups
```

The same principle can also be used to specify the transformer to use for a field. For example, to include the IDs of the user's user groups use:

```
/api/users/gist?fields=*,userGroups::ids
```

The `fields` parameter does allow listing fields of nested objects. For example to add `userCredentials` with `id` and `name` of a user use:

```
/api/users/gist?fields=*,userCredentials[id,username]
```

This creates items of the form:

```
{
  ...
  "userCredentials": {
    "id": "Z9oOHPi3FHB",
    "username": "guest"
  }
}
```

When including nested fields of collections the nested field must be a text property.

For example to include all `names` of a user's `userGroups` by:

```
/api/users/gist?fields=*,userGroups[name]
```

This lists the `userGroups` as:

```
{
  "userGroups": {
    "name": [
      "_PROGRAM_Inpatient program",
      "_PROGRAM_TB program",
      "_DATASET_Superuser",
      "_PROGRAM_Superuser",
      "_DATASET_Data entry clerk",
      "_DATASET_M and E Officer"
    ]
  }
}
```

The above is functional identical to:

```
/api/users/gist?fields=*,userGroups::pluck(name)~rename(userGroups.name)
```

When requesting a single field, like `/api/users/gist?fields=surname` the response is a (still paged) list of simple values:

```
{
  "pager": {
    "page": 1,
    "pageSize": 50
  },
  "users": [
    "Kamara",
    "Wakiki",
    "Nana",
    "Malai",
    ...
  ]
}
```

When requesting a single field of a specific owner object which has a simple (non collection) value, like for example `/api/users/rWLrZL8rP3K/gist?fields=surname` the response only include the plain JSON value:

```
"Wakiki"
```

Further details on field presets can be found in section Fields.

The `filter` Parameter

To filter the list of returned items add one or more `filter` parameters.

Multiple filters can either be specified as comma-separated list of a single `filter` parameter or as multiple `filter` parameters each with a single filter.

There are two types of filters:

- unary: `<field>:<operator>`
- binary: `<field>:<operator>:<value>`

A field can be:

- a persisted field of the listed item type
- a persisted field of a directly referenced object (1:1 relation)
- a UID of an attribute

Available unary operators are:

Unary Operator	Description
`null`	field is *null* (undefined)
`!null`	field is *not null* (defined)
`empty`	field is a *empty* collection or string
`!empty`	field is a *non-empty* collection or string

Available binary operators are:

Binary Operator	Description
`eq`	field *equals* value
`ieq`	field *equals* value (case insensitive)
`!eq`, `neq`, `ne`	field is *not equal* value
`lt`	field is *less than* value
`le`, `lte`	field is *less than or equal to* value
`gt`	field is *greater than* value
`ge`, `gte`	field is *greater than or equal to* value
`in`	field is a collection and value is an item *contained in* the collection
`!in`	field is a collection and value is an item *not contained in* the collection

If the <value> of an `in` or `!in` filter is a list it is given in the form `[value1,value2,...]`, for example: `userGroups:in:[fbfJHSPpUQD,cYeuwXTCPkU]`.

Any >, >=, < <=, == or != comparison applied to a collection field with a numeric value will compare the size of the collection to the value, for example: `userGroups:gt:0`.

Any >, >=, < <=, == or != comparison applied to a text field with a integer number value will compare the text length to the value, for example: `name:eq:4` (name has length 4).

Available binary pattern matching operators are:

Binary Operator	Description
`like`, `ilike`	field *contains* <value> or field *matches* pattern <value> (when wildcards * or ? in value)
`!like`, `!ilike`	field does *not contain* <value> or field does *not match* pattern <value> (when wildcards * or ? in value)
`$like`, `$ilike`, `startsWith`	field *starts with* <value>
`!$like`, `!$ilike`, `!startsWith`	field does *not start with* <value>
`like$`, `ilike$`, `endsWith`	field *ends with* <value>
`!like$`, `!ilike$`, `!endsWith`	field does *not end with* <value>

The `like` and `!like` operators can be used by either providing a search term in which case a match is any value where the term occurs anywhere, or they can be used by providing the search pattern using * as *any number of characters* and ? as *any single character*.

All pattern matching operators named `like` are case-sensitive. All others are case-insensitive.

Note that filters on attribute values use text based comparison which means all text filters are supported.

For example, to only list organisations on second level use

```
/api/organisationUnits/gist?filter=level:eq:2
```

Similarly, when listing the `children` of a particular organisation unit the collection can be filtered. To only list those children that are connected to a program one would use:

```
/api/organisationUnits/rZxk3S0qN63/children/gist?filter=programs:gt:0
```

Binary operators for access (sharing) based filtering:

Binary Operator	Description
`canRead`	Has user `<value>` metadata read permission to the object
`canWrite`	Has user `<value>` metadata write permission to the object
`canDataRead`	Has user `<value>` data read permission to the object
`canDataWrite`	Has user `<value>` data write permission to the object
`canAccess`	Has user `<value0>` permission `<value1>` to the object

When the user ID `<value>` is omitted the check is performed for the currently logged-in user. Similarly, if `<value0>` is ommitted for `canAccess` filter the check is performed for the currently logged-in user.

When applied to a simple value property, here `code`, the filter restricts the response to those data elements (owner object) the user can read/write:

```
/api/dataElements/gist?filter=code:canWrite:OYLGMiazHtW
```

When applied to a reference property, here `categoryCombo`, the filter restricts the response to those data elements having a category combo that the user can read/write:

```
/api/dataElements/gist?filter=categoryCombo:canWrite:OYLGMiazHtW
```

When applied to a reference collection property, here `dataElementGroups`, the filter restricts the response to those data elements where a data element group exists in the collection property and which the user can read/write:

```
/api/dataElements/gist?filter=dataElementGroups:canWrite:OYLGMiazHtW
```

The `canAccess` expects two arguments, 1st is user ID, 2nd the access pattern, for example to check metadata read and write access the pattern is `rw%`:

```
/api/dataElements/gist?filter=code:canAccess:[OYLGMiazHtW,rw%]
```

In addition, filter can be grouped to allow combining selected filters with logical OR when the general filter combinator is logical AND, or vice-versa with logical AND when the general combinator is logical OR.

For groups the filter pattern is extended as following:

- unary: `<group>:<field>:<operator>`
- binary: `<group>:<field>:<operator>:<value>`

The group is an arbitrary number between `0` and `9` (when omitted `0` is assumed).

The behaviour is best explained with a small example for an imaginary object type with an `age` and `name` property.

```
?filter=1:age:eq:50&filter=2:name:eq:foo&filter=2:name:eq:bar
```

The above filter has two groups `1` and `2`, and the `2` group has 2 members. This is equivalent to the SQL (note the `and` and `or` as well as the grouping braces):

```
e.age = 50 and (e.name = 'foo' or e.name = 'bar')
```

Now, if the same `filters` would be used in combination with `rootJunction=OR`

```
?filter=1:age:eq:50&filter=2:name:eq:foo&filter=2:name:eq:bar&rootJunction=OR
```

the effect would be equivalent to the following SQL instead:

```
e.age = 50 or (e.name = 'foo' and e.name = 'bar')
```

The `headless` Parameter

Endpoints returning a list by default wrap the items with an envelope containing the `pager` and the list, which is named according to the type of object listed.

For example `/api/organisationUnits/gist` returns:

```
{
  "pager": {
    "page": 1,
    "pageSize": 50,
    "nextPage": "/organisationUnits/gist?page=2"
  },
  "organisationUnits": [
    ...
  ]
}
```

With `headless=true` the response to `/api/organisationUnits/gist?headless=true` is just the `[...]` list part in above example.

The `inverse` Parameter

The `inverse` can be used in context of a collection field gist of the form `/api/<object-type>/<object-id>/<field-name>/gist` to not list all items that are contained in the member collection but all items that are **not** contained in the member collection.

For example, while

```
/api/organisationUnits/rZxk3S0qN63/children/gist
```

would list all organisation units that are children of `rZxk3S0qN63` the inverse

```
/api/organisationUnits/rZxk3S0qN63/children/gist?inverse=true
```

would list all organisation units that are not children of `rZxk3S0qN63`. This would e.g. be used to compose a list of all units that can be made a child of a particular unit.

Filters and orders do apply normally, meaning they filter or order the items not contained in the member collection.

The `locale` Parameter

The `locale` parameter is usually used for testing purposes to ad-hoc switch translation language of display names.

If not specified the translation language is the one configured in the users account settings.

Examples:

```
/api/organisationUnits/gist?locale=en
/api/organisationUnits/gist?locale=en_GB
```

The `order` Parameter

To sort the list of items one or more order expressions can be given.

An order expression is either just a field name of a persisted field, or a field name followed by `:asc` (ascending order - the default) or `:desc` (descending order).

For example, to sort organisation units alphabetically by name use:

```
/api/organisationUnits/gist?order=name
```

Reverse alphabetical order would use:

```
/api/organisationUnits/gist?order=name:desc
```

To sort organisation units first by level, then by name use:

```
/api/organisationUnits/gist?order=level,name
```

This would start with root(s) at level 1. To start with the leaf units use:

```
/api/organisationUnits/gist?order=level:desc,name
```

If no order is specified the result list will have a stable order based on internal data organisation.

The `page` Parameter

Refers to the viewed page in paged list starting with `1` for the first page.

If no `page` parameter is present this is equal to `page=1`.

The `page` is always in relation to the `pageSize`. If a `page` is given beyond the number of existing matches an empty item list is returned.

The `pageSize` Parameter

Refers to the number of items on a `page`. Maximum is 1000 items.

If no `pageSize` parameter is present this is equal to `pageSize=50`.

The `rootJunction` Parameter

The `rootJunction` parameter can be used to explicitly set the logic junction used between filters. Possible are:

- `AND`: all filters have to match an entry for it to be included in the results
- `OR`: any of the filters matches an entry for it to be included in the results

Default is `AND`.

The `pageListName` Parameter

The array property in a paged response that contains the matching entry list is named after the object type contained in the list. For `/api/organisationUnits/gist` it would be named `organisationUnits`.

This default naming can be customized using the `pageListName` parameter. For example, `/api/organisationUnits/gist?pageListName=matches` returns a response root object with the format:

```
{
  "pager": {},
  "matches": []
}
```

(details of the pager and matches are omitted here)

The `total` Parameter

By default, a gist query will **not** count the total number of matches should those exceed the `pageSize` limit. Instead, we opt-in to the additional costs the total count implicates.

When not counting the total matches (`total=false`) the response `pager` will assume that there is a `next` page in case `pageSize` items were found. This could however turn out to be false when browsing to the page. Also, the `total` field stating the number of total matches is not included in the `pager`.

For example, `/api/organisationUnits/gist` returns a `pager`:

```
{
  "pager": {
```

```
    "page": 1,
    "pageSize": 50,
    "nextPage": "/organisationUnits/gist?page=2"
  }
}
```

When counting the total matches (`total=true`) the response `pager` will contain the `total` field with the actual number of total matches at the cost of an additional database operation.

The response to `/api/organisationUnits/gist?total=true` now returns this `pager`:

```
{
  "pager": {
    "page": 1,
    "pageSize": 50,
    "total": 1332,
    "nextPage": "/organisationUnits/gist?total=true&page=2",
    "pageCount": 27
  }
}
```

The `translate` Parameter

Fields like `name` or `shortName` can be translated (internationalised).

By default, any translatable field that has a translation is returned translated given that the user requesting the gist has an interface language configured.

To return the plain non-translated field use `translate=false`.

For example, `/api/organisationUnits/gist` returns items like this:

```
{
  "name": "A translated name",
  ...
}
```

Whereas `/api/organisationUnits/gist?translate=false` would return items like:

```
{
  "name"
  "Plain field name",
  ...
}
```

Note that synthetic fields `displayName` and `displayShortName` are always returning the translated value independent of the `translate` parameter.

Fields

The fields included by default (without `fields` parameter) correspond to `fields=*`. This means the list of fields shown depends on object type, endpoint context as well as the `auto` parameter.

Note that the `/gist` API always excludes certain fields that usually are of no interest to clients, like for example the `translations` or `sharing` fields. These can be added explicitly.

When not explicitly provided by name in the `fields` parameters the list of fields is computed from a preset. A preset can be used in the list of fields like a field name. It expands to zero, one or many fields depending on the object type, used endpoint and selector.

Field Presets

- `*` / `:all`: default fields depend on the context and `auto` parameter
- `:identifiable`: all persisted fields of the `IdentifiableObject` interface
- `:owner`: all persisted fields where the listed type is the owner
- `:nameable`: all persisted fields of the `NameableObject` interface
- `:persisted`: literally all persisted fields

Field Transformers

A transformer or transformation can be applied to a field by appending any of the indicators `::`, `~` or `@` followed by the transformer expression.

Available transformer expressions are:

Transformer	JSON Result Type	Description
`rename(<name>)`	-	renames the field in the response to `<name>`
`size`	`number`	number of items in the collection field
`isEmpty`	`boolean`	emptiness of a collection field
`isNotEmpty`	`boolean`	non-emptiness of a collection field
`ids`	`string` or `[string]`	ID of an object or IDs of collection items
`id-objects`	`[{ "id": <id> }]`	IDs of collection items as object
`member(<id>)`	`boolean`	has member with `<id>` for collection field
`not-member(<id>)`	`boolean`	not has member with `<id>` for collection field
`pluck(<field>,...)`	`string` or `[string]`	extract single text property or multiple simple properties from the object or of each collection item
`from(<field>,...)`	depends on bean type	extracts a non-persistent field from one or more persistent ones

A field can receive both the `rename` transformer and one of the other transformers, for example:

```
/api/organisationUnits/gist?fields=*,children::size~rename(child-count)
```

The returned items now no longer have a `children` member but a `child-count` member instead. Note that `rename` also affects the member name of the URI reference given in `apiEndpoints`.

The `from` transformation can be used with one or more persistent fields as parameter. These will be loaded from the database, set in an instance of the listed element object before the non-persistent property transformed with `from` is extracted from that instance by calling the getter. This allows to extract derived fields while using the same logic that is used in usual metadata API.

For example, a user's (non-persistent property) `name` is composed of the persistent property `firstName` and `surname`. It can be fetched like this:

```
/api/users/gist?fields=id,name~from(firstName,surname)
```

Since a user's name is such a common case an auto-detection was added so that in this special case the `from` transformation is added automatically to `name`. We are allowed to just use the following which internally adds the `from` transformation:

```
/api/users/gist?fields=id,name
```

While this makes non-persistent properties accessible in general these always have to be included in the `fields` explicitly. For a user this could be done using the following:

```
/api/users/gist?fields=*,name
```

Synthetic Fields

The `/gist` API is tightly coupled to properties that exist the database. This means properties that aren't stored in the database usually aren't available. The exception to this are the "synthetic" properties which are dynamically computed on the basis of one or more database stored properties.

Synthetic properties are available for all endpoints where the persisted properties needed to compute the synthetic property exist.

Except for the `apiEndpoints` property which is automatically added when needed all other synthetic properties are not included by default and have to be requested explicitly in the list of `fields`.

Overview

Synthetic fields in alphabetical order:

Field	Description
`apiEndpoints`	contains links to browse nested complex objects or collections
`href`	link to the list item itself (single item view)
`displayName`	translated `name` (always translated)
`displayShortName`	translated `shortName` (always translated)
`access`	summary on ability of current user to read/write/ modify the entry

The `href` Field

Each item in a `/gist` response can link to itself. This link is given in the `href` property.

To add the `href` field use (for example):

```
/api/<object-type>/gist?fields=*,href
```

The `displayName` and `displayShortName` Field

By definition the `displayName` is the translated `name` and the `displayShortName` is the translated `shortName`.

To add `displayName` or `displayShortName` add it to the list use (for example):

```
/api/<object-type>/gist?fields=*,displayName
/api/<object-type>/gist?fields=*,displayShortName
```

Note that by default all translatable properties like `name` and `shortName` would also be translated. When `translate=false` is used to disable this `displayName` and `displayShortName` stay translated.

The `apiEndpoints` Field

This property provides the links to further browse complex objects or list of items that are included in the `/gist` response in form of a transformed simple value like an item count.

The `apiEndpoints` object will have a member of the same name for every member in the item that was transformed to a simple value.

For example,

```
/api/users/gist?fields=id,userGroups::size,organisationUnits::size
```

returns items in the form:

```
{
  "id": "rWLrZL8rP3K",
  "userGroups": 0,
  "organisationUnits": 1,
  "apiEndpoints": {
    "organisationUnits": "/users/rWLrZL8rP3K/organisationUnits/gist",
    "userGroups": "/users/rWLrZL8rP3K/userGroups/gist"
  }
}
```

The list of `userGroups` and `organisationUnits` are included as their `size`. Each has a corresponding member in `apiEndpoints` with the path to browse the list.

The paths can be changed to URLs by using the `absoluteUrls` parameter.

```
/api/users/gist?fields=id,userGroups::size,organisationUnits::size&absoluteUrls=true
```

returns items in the form:

```
{
  "id": "rWLrZL8rP3K",
  "userGroups": 0,
```

```
  "organisationUnits": 1,
  "apiEndpoints": {
    "organisationUnits": "http://{host}/api/users/rWLrZL8rP3K/organisationUnits/gist?
absoluteUrls=true",
    "userGroups": "http://{host}/api/users/rWLrZL8rP3K/userGroups/gist?absoluteUrls=true"
  }
}
```

The `access` Field

The `access` summary is based on the `sharing` and the current user. This means it is only applicable for objects that have a `sharing` property.

For example, when listing data elements with `access` field

```
/api/dataElements/gist?fields=*,access
```

the returned data element items contain a `"access"` member like the one below:

```
"access": {
  "manage": false,
  "externalize": false,
  "write": false,
  "read": true,
  "update": false,
  "delete": false
}
```

Attributes as Fields

DHIS2 allows creating and adding custom attributes to metadata objects. Their values are contained in the `attributeValues` property of a metadata object in form of a map with the attribute UID as the map's key.

To directly list one or more specific attribute values from this map as if they were usual fields of the metadata object the attribute UID can be used as if it was a name of a usual field.

For example, to include the value of the attribute with UID `Y1LUDU8sWBR` as the property `unit-of-measure` in the list use:

```
/api/dataElements/gist?fields=id,name,Y1LUDU8sWBR::rename(unit-of-measure)
```

This results in list items of the form:

```
{
  "id": "qrur9Dvnyt5",
  "name": "Age in years",
  "unit-of-measure": "years"
}
```

By default, the values are fetched as JSON and extracted from the map of attribute values. This means the listing will contain the proper JSON type for the type of attribute value. This comes at the overhead of fetching all attribute values. To single out the value within the database the `PLUCK` transformation can be used.

```
/api/dataElements/gist?fields=id,name,Y1LUDU8sWBR::rename(unit-of-measure)~pluck
```

The result will look the same but now the value is extracted as text in the database turning any JSON value to a string in the property output.

Examples

A few examples starting from simple listings moving on to very specific use cases.

It is preferable to always supply an explicit list of `fields` so this section will do so.

List organisation units with id and name:

```
/api/organisationUnits/gist?fields=id,name
```

List organisation units with id and name and total count:

```
/api/organisationUnits/gist?fields=id,name&total=true
```

List users with id and username:

```
/api/users/gist?fields=id,userCredentials.username
```

List users with id, username and last login date:

```
/api/users/gist?fields=id,userCredentials[username,lastLogin]
```

List only organisation units on second level with id, name and level:

```
/api/organisationUnits/gist?fields=id,name,level&filter=level:eq:2
```

List only organisation units that have more than 1 child with id, name and number of children:

```
/api/organisationUnits/gist?fields=id,name,children::size&filter=children:gt:1
```

List only organisation units that are not yet a children of another unit `zFDYIgyGmXG`:

```
/api/organisationUnits/zFDYIgyGmXG/children/gist?fields=id,name&inverse=true
```

List users and flag whether they are a member of a specific user group `NTC8GjJ7p8P` and name that field `is-member` in the response:

```
/api/users/gist?fields=id,userCredentials.username,userGroups::member(NTC8GjJ7p8P)~rename(is-member)
```

List links to all users in pages of 10 items:

```
/api/users/gist?fields=href&absoluteUrls&pageSize=10
```

Data

Data values

This section is about sending and reading data values.

```
/api/dataValueSets
```

Sending data values

To send data values you can make a POST request to the following resource.

```
POST /api/dataValueSets
```

A common use-case for system integration is the need to send a set of data values from a third-party system into DHIS. In this example, we will use the DHIS2 demo on `http://play.dhis2.org/demo` as basis. We assume that we have collected case-based data using a simple software client running on mobile phones for the *Mortality <5 years* data set in the community of *Ngelehun CHC* (in *Badjia* chiefdom, *Bo* district) for the month of January 2014. We have now aggregated our data into a statistical report and want to send that data to the DHIS2 instance. The base URL to the demo API is `http://play.dhis2.org/demo/api`. The following links are relative to the base URL.

The resource which is most appropriate for our purpose of sending data values is the `/api/dataValueSets` resource. A data value set represents a set of data values which have a relationship, usually from being captured off the same data entry form. The format looks like this:

```
<dataValueSet xmlns="http://dhis2.org/schema/dxf/2.0" dataSet="dataSetID"
  completeDate="date" period="period" orgUnit="orgUnitID" attributeOptionCombo="aocID">
  <dataValue dataElement="dataElementID"
    categoryOptionCombo="cocID" value="1" comment="comment1"/>
  <dataValue dataElement="dataElementID"
    categoryOptionCombo="cocID" value="2" comment="comment2"/>
  <dataValue dataElement="dataElementID"
    categoryOptionCombo="cocID" value="3" comment="comment3"/>
</dataValueSet>
```

JSON is supported in this format:

```
{
  "dataSet": "dataSetID",
  "completeDate": "date",
  "period": "period",
  "orgUnit": "orgUnitID",
  "attributeOptionCombo": "aocID",
  "dataValues": [
    {
      "dataElement": "dataElementID",
      "categoryOptionCombo": "cocID",
      "value": "1",
      "comment": "comment1"
    },
    {
      "dataElement": "dataElementID",
      "categoryOptionCombo": "cocID",
```

```
      "value": "2",
      "comment": "comment2"
    },
    {
      "dataElement": "dataElementID",
      "categoryOptionCombo": "cocID",
      "value": "3",
      "comment": "comment3"
    }
  ]
}
```

CSV is supported in this format:

```
"dataelement","period","orgunit","catoptcombo","attroptcombo","value","strby","lstupd","cmt"
"dataElementID","period","orgUnitID","cocID","aocID","1","username","2015-04-01","comment1"
"dataElementID","period","orgUnitID","cocID","aocID","2","username","2015-04-01","comment2"
"dataElementID","period","orgUnitID","cocID","aocID","3","username","2015-04-01","comment3"
```

> **Note**
>
> Please refer to the date and period section above for time formats.

> **Note**
>
> Any imported data value which is seen as unchanged will be ignored and the import summary will reflect this. An unchanged data value is classed as one which has the same value for all 3 of these properties: - value - comment - followUp

From the example, we can see that we need to identify the period, the data set, the org unit (facility) and the data elements for which to report.

To obtain the identifier for the data set we make a request to the `/api/dataSets` resource. From there we find and follow the link to the *Mortality < 5 years* data set which leads us to `/api/dataSets/pBOMPrpg1QX`. The resource representation for the *Mortality < 5 years* data set conveniently advertises links to the data elements which are members of it. From here we can follow these links and obtain the identifiers of the data elements. For brevity we will only report on three data elements: *Measles* with id `f7n9E0hX8qk`, *Dysentery* with id `Ix2HsbDMLea` and *Cholera* with id `eY5ehpbEsB7`.

What remains is to get hold of the identifier of the organisation unit. The *dataSet* representation conveniently provides a link to organisation units which report on it so we search for *Ngelehun CHC* and follow the link to the HTML representation at `/api/organisationUnits/DiszpKrYNg8`, which tells us that the identifier of this org unit is `DiszpKrYNg8`.

From our case-based data, we assume that we have 12 cases of measles, 14 cases of dysentery and 16 cases of cholera. We have now gathered enough information to be able to put together the XML data value set message:

```
<dataValueSet xmlns="http://dhis2.org/schema/dxf/2.0" dataSet="pBOMPrpg1QX"
  completeDate="2014-02-03" period="201401" orgUnit="DiszpKrYNg8">
  <dataValue dataElement="f7n9E0hX8qk" value="12"/>
  <dataValue dataElement="Ix2HsbDMLea" value="14"/>
```

```
  <dataValue dataElement="eY5ehpbEsB7" value="16"/>
</dataValueSet>
```

In JSON format:

```
{
  "dataSet": "pBOMPrpg1QX",
  "completeDate": "2014-02-03",
  "period": "201401",
  "orgUnit": "DiszpKrYNg8",
  "dataValues": [
    {
      "dataElement": "f7n9E0hX8qk",
      "value": "1"
    },
    {
      "dataElement": "Ix2HsbDMLea",
      "value": "2"
    },
    {
      "dataElement": "eY5ehpbEsB7",
      "value": "3"
    }
  ]
}
```

To perform functional testing we will use the *curl* tool which provides an easy way of transferring data using HTTP. First, we save the data value set XML content in a file called `datavalueset.xml`. From the directory where this file resides we invoke the following from the command line:

```
curl -d @datavalueset.xml "https://play.dhis2.org/demo/api/dataValueSets"
  -H "Content-Type:application/xml" -u admin:district
```

For sending JSON content you must set the content-type header accordingly:

```
curl -d @datavalueset.json "https://play.dhis2.org/demo/api/dataValueSets"
  -H "Content-Type:application/json" -u admin:district
```

The command will dispatch a request to the demo Web API, set `application/xml` as the content-type and authenticate using `admin/district` as username/password. If all goes well this will return a `200 OK` HTTP status code. You can verify that the data has been received by opening the data entry module in DHIS2 and select the org unit, data set and period used in this example.

The API follows normal semantics for error handling and HTTP status codes. If you supply an invalid username or password, `401 Unauthorized` is returned. If you supply a content-type other than `application/xml`, `415 Unsupported Media Type` is returned. If the XML content is invalid according to the DXF namespace, `400 Bad Request` is returned. If you provide an invalid identifier in the XML content, `409 Conflict` is returned together with a descriptive message.

Sending bulks of data values

The previous example showed us how to send a set of related data values sharing the same period and organisation unit. This example will show us how to send large bulks of data values which don't necessarily are logically related.

Again we will interact with the `/api/dataValueSets` resource. This time we will not specify the `dataSet` and `completeDate` attributes. Also, we will specify the `period` and `orgUnit` attributes on the individual data value elements instead of on the outer data value set element. This will enable us to send data values for various periods and organisation units:

```
<dataValueSet xmlns="http://dhis2.org/schema/dxf/2.0">
  <dataValue dataElement="f7n9E0hX8qk"
    period="201401" orgUnit="DiszpKrYNg8" value="12"/>
  <dataValue dataElement="f7n9E0hX8qk"
    period="201401" orgUnit="FNnj3jKGS7i" value="14"/>
  <dataValue dataElement="f7n9E0hX8qk"
    period="201402" orgUnit="DiszpKrYNg8" value="16"/>
  <dataValue dataElement="f7n9E0hX8qk"
    period="201402" orgUnit="Jkhdsf8sdf4" value="18"/>
</dataValueSet>
```

In JSON format:

```
{
  "dataValues": [
    {
      "dataElement": "f7n9E0hX8qk",
      "period": "201401",
      "orgUnit": "DiszpKrYNg8",
      "value": "12"
    },
    {
      "dataElement": "f7n9E0hX8qk",
      "period": "201401",
      "orgUnit": "FNnj3jKGS7i",
      "value": "14"
    },
    {
      "dataElement": "f7n9E0hX8qk",
      "period": "201402",
      "orgUnit": "DiszpKrYNg8",
      "value": "16"
    },
    {
      "dataElement": "f7n9E0hX8qk",
      "period": "201402",
      "orgUnit": "Jkhdsf8sdf4",
      "value": "18"
    }
  ]
}
```

In CSV format:

```
"dataelement","period","orgunit","categoryoptioncombo","attributeoptioncombo","value"
"f7n9E0hX8qk","201401","DiszpKrYNg8","bRowv6yZOF2","bRowv6yZOF2","1"
"Ix2HsbDMLea","201401","DiszpKrYNg8","bRowv6yZOF2","bRowv6yZOF2","2"
"eY5ehpbEsB7","201401","DiszpKrYNg8","bRowv6yZOF2","bRowv6yZOF2","3"
```

We test by using curl to send the data values in XML format:

```
curl -d @datavalueset.xml "https://play.dhis2.org/demo/api/dataValueSets"
  -H "Content-Type:application/xml" -u admin:district
```

Note that when using CSV format you must use the binary data option to preserve the line-breaks in the CSV file:

```
curl --data-binary @datavalueset.csv "https://play.dhis2.org/demo/24/api/dataValueSets"
  -H "Content-Type:application/csv" -u admin:district
```

The data value set resource provides an XML response which is useful when you want to verify the impact your request had. The first time we send the data value set request above the server will respond with the following import summary:

```
<importSummary>
  <dataValueCount imported="2" updated="1" ignored="1"/>
  <dataSetComplete>false</dataSetComplete>
</importSummary>
```

This message tells us that 3 data values were imported, 1 data value was updated while zero data values were ignored. The single update comes as a result of us sending that data value in the previous example. A data value will be ignored if it references a non-existing data element, period, org unit or data set. In our case, this single ignored value was caused by the last data value having an invalid reference to org unit. The data set complete element will display the date of which the data value set was completed, or false if no data element attribute was supplied.

Import parameters

The import process can be customized using a set of import parameters:

Import parameters

Parameter	Values (default first)	Description
dataElementIdScheme	uid | name | code | attribute:ID	Property of the data element object to use to map the data values.
orgUnitIdScheme	uid | name | code | attribute:ID	Property of the org unit object to use to map the data values.
attributeOptionComboIdScheme	uid | name | code| attribute:ID	Property of the attribute option combo object to use to map the data values.
categoryOptionComboIdScheme	uid | name | code | attribute:ID	Property of the category option combo object to use to map the data values.
dataSetIdScheme	uid | name | code| attribute:ID	Property of the data set object to use to map the data values.
categoryIdScheme	uid | name | code| attribute:ID	Property of the category object to use to map the data values (ADX only).

Parameter	Values (default first)	Description
categoryOptionIdScheme	uid | name | code| attribute:ID	Property of the category option object to use to map the data values (ADX only).
idScheme	uid | name | code| attribute:ID	Property of any of the above objects if they are not specified, to use to map the data values.
preheatCache	false | true	Indicates whether to preload metadata caches before starting to import data values, will speed up large import payloads with high metadata cardinality.
dryRun	false | true	Whether to save changes on the server or just return the import summary.
importStrategy	CREATE | UPDATE | CREATE_AND_UPDATE | DELETE	Save objects of all, new or update import status on the server.
skipExistingCheck	false | true	Skip checks for existing data values. Improves performance. Only use for empty databases or when the data values to import do not exist already.
skipAudit	false | true	Skip audit, meaning audit values will not be generated. Improves performance at the cost of ability to audit changes. Requires authority "F_SKIP_DATA_IMPORT_AUDIT".
async	false | true	Indicates whether the import should be done asynchronous or synchronous. The former is suitable for very large imports as it ensures that the request does not time out, although it has a significant performance overhead. The latter is faster but requires the connection to persist until the process is finished.
force	false | true	Indicates whether the import should be forced. Data import could be rejected for various reasons of data set locking for example due to approval, data input period, expiry days, etc. In order to override such locks and force data input one can use data import with force=true. However, one needs to be a *superuser* for this parameter to work.

Parameter	Values (default first)	Description
dataSet	uid	Provide the data set ID for CSV import where the ID cannot be provided in the file itself

All parameters are optional and can be supplied as query parameters in the request URL like this:

```
/api/dataValueSets?dataElementIdScheme=code&orgUnitIdScheme=name
  &dryRun=true&importStrategy=CREATE
```

They can also be supplied as XML attributes on the data value set element like below. XML attributes will override query string parameters.

```
<dataValueSet xmlns="http://dhis2.org/schema/dxf/2.0" dataElementIdScheme="code"
  orgUnitIdScheme="name" dryRun="true" importStrategy="CREATE">
</dataValueSet>
```

Note that the `preheatCache` parameter can have a huge impact on performance. For small import files, leaving it to false will be fast. For large import files which contain a large number of distinct data elements and organisation units, setting it to true will be orders of magnitude faster.

Data value requirements

Data value import supports a set of value types. For each value type, there is a special requirement. The following table lists the edge cases for value types.

Value type requirements

Value type	Requirements	Comment
BOOLEAN	true | True | TRUE | false | False | FALSE | 1 | 0 | t | f |	Used when the value is a boolean, true or false value. The import service does not care if the input begins with an uppercase or lowercase letter, or if it's all uppercase.

Identifier schemes

Regarding the id schemes, by default the identifiers used in the XML messages use the DHIS2 stable object identifiers referred to as `UID`. In certain interoperability situations we might experience that an external system decides the identifiers of the objects. In that case we can use the `code` property of the organisation units and other objects to set fixed identifiers. When importing data values we hence need to reference the code property instead of the identifier property of these metadata objects. Identifier schemes can be specified in the XML message as well as in the request as query parameters. To specify it in the XML payload you can do this:

```
<dataValueSet xmlns="http://dhis2.org/schema/dxf/2.0"
  dataElementIdScheme="CODE" orgUnitIdScheme="UID" idScheme="CODE">
</dataValueSet>
```

The parameter table above explains how the id schemes can be specified as query parameters. The following rules apply for what takes precedence:

- Id schemes defined in the XML or JSON payload take precedence over id schemes defined as URL query parameters.
- Specific id schemes such as dataElementIdScheme or orgUnitIdScheme take precedence over the general idScheme.
- If no explicit id scheme is defined, the default id scheme is `code` for ADX format, and `uid` for all other formats.

The following identifier schemes are available.

- uid
- code
- name
- attribute (followed by UID of attribute)

The attribute option is special and refers to meta-data attributes which have been marked as *unique*. When using this option, `attribute` must be immediately followed by the identifier of the attribute, e.g. "attribute:DnrLSdo4hMl".

Async data value import

Data values can be sent and imported in an asynchronous fashion by supplying an `async` query parameter set to *true*:

```
/api/dataValueSets?async=true
```

This will initiate an asynchronous import job for which you can monitor the status at the task summaries API. The API response indicates the unique identifier of the job, type of job and the URL you can use to monitor the import job status. The response will look similar to this:

```
{
  "httpStatus": "OK",
  "httpStatusCode": 200,
  "status": "OK",
  "message": "Initiated dataValueImport",
  "response": {
    "name": "dataValueImport",
    "id": "YR1UxOUXmzT",
    "created": "2018-08-20T14:17:28.429",
    "jobType": "DATAVALUE_IMPORT",
    "relativeNotifierEndpoint": "/api/system/tasks/DATAVALUE_IMPORT/YR1UxOUXmzT"
  }
}
```

Please read the section on *asynchronous task status* for more information.

CSV data value format

The following section describes the CSV format used in DHIS2. The first row is assumed to be a header row and will be ignored during import.

CSV format of DHIS2

Column	Required	Description
Data element	Yes	Refers to ID by default, can also be name and code based on selected id scheme
Period	Yes	In ISO format
Org unit	Yes	Refers to ID by default, can also be name and code based on selected id scheme
Category option combo	No	Refers to ID
Attribute option combo	No	Refers to ID (from version 2.16)
Value	No	Data value
Stored by	No	Refers to username of user who entered the value
Last updated	No	Date in ISO format
Comment	No	Free text comment
Follow up	No	true or false

An example of a CSV file which can be imported into DHIS2 is seen below.

```
"dataelement","period","orgunit","catoptcombo","attroptcombo","value","storedby","timestamp"
"DUSpd8Jq3M7","201202","gP6hn503KUX","Prlt0C1RF0s",,"7","bombali","2010-04-17"
"DUSpd8Jq3M7","201202","gP6hn503KUX","V6L425pT3A0",,"10","bombali","2010-04-17"
"DUSpd8Jq3M7","201202","OjTS752GbZE","V6L425pT3A0",,"9","bombali","2010-04-06"
```

Generating data value set template

To generate a data value set template for a certain data set you can use the `/api/dataSets/<id>/dataValueSet` resource. XML and JSON response formats are supported. Example:

```
/api/dataSets/BfMAe6Itzgt/dataValueSet
```

The parameters you can use to further adjust the output are described below:

Data values query parameters

Query parameter	Required	Description
period	No	Period to use, will be included without any checks.
orgUnit	No	Organisation unit to use, supports multiple orgUnits, both id and code can be used.
comment	No	Should comments be include, default: Yes.
orgUnitIdScheme	No	Organisation unit scheme to use, supports id | code.

Query parameter	Required	Description
dataElementIdScheme	No	Data-element scheme to use, supports id | code.

Reading data values

To read data values you can make a GET request to the following resource.

```
GET /api/dataValueSets
```

Data values can be retrieved in *XML*, *JSON*, *CSV*, and *ADX* format. Since we want to read data we will use the *GET* HTTP verb. We will also specify that we are interested in the XML resource representation by including an `Accept` HTTP header with our request. The following query parameters are accepted:

Data value set query parameters

Parameter	Description
dataSet	Data set identifier. Can be repeated any number of times.
dataElementGroup	Data element group identifier. Can be repeated any number of times (Not supported for ADX).
dataElement	Data element identifier. Can be repeated any number of times.
period	Period identifier in ISO format. Can be repeated any number of times.
startDate	Start date for the time span of the values to export.
endDate	End date for the time span of the values to export.
orgUnit	Organisation unit identifier. Can be repeated any number of times.
children	Whether to include the children in the hierarchy of the organisation units.
orgUnitGroup	Organisation unit group identifier. Can be repeated any number of times.
attributeOptionCombo	Attribute option combo identifier. Can be repeated any number of times.
includeDeleted	Whether to include deleted data values.
lastUpdated	Include only data values which are updated since the given time stamp.
lastUpdatedDuration	Include only data values which are updated within the given duration. The format is <value><time-unit>, where the supported time units are "d" (days), "h" (hours), "m" (minutes) and "s" (seconds).
limit	The max number of results in the response.
dataElementIdScheme	Property of the data element object to use for data values in response.
orgUnitIdScheme	Property of the org unit object to use for data values in response.

Parameter	Description
categoryOptionComboIdScheme	Property of the category option combo to use for data values in response.
attributeOptionComboIdScheme	Property of the attribute option combo objects to use for data values in response.
dataSetIdScheme	Property of the data set object to use in the response.
categoryIdScheme	Property of the category object to use in the response (ADX only).
categoryOptionIdScheme	Property of the category option object to use in the response (ADX only).
idScheme	Property of any of the above objects if they are not specified, to use in the response. If not specified, the default idScheme for ADX is code, and for all other formats is uid.
inputOrgUnitIdScheme	Identification property used for the provided `orgUnit` parameter values; `id` or `code`
inputDataSetIdScheme	Identification property used for the provided `dataSet` parameter values; `id` or `code`
inputDataElementGroupIdScheme	Identification property used for the provided `dataElementGroup` parameter values; `id` or `code`
inputDataElementIdScheme	Identification property used for the provided `dataElement` parameter values; `id` or `code`
inputIdScheme	Identification property used for any of the provided `dataSet`, `dataElementGroup`, `orgUnit`, `orgUnitGroup`, `attributeOptionCombo` parameter values unless any of the three schemes above explicitly overrides this input default; `id` or `code`

The following parameters from the list above are required: - either dataSet or dataElementGroup (for ADX this must be dataSet) - either period, both startDate and endDate, lastUpdated, or lastUpdatedDuration - either orgUnit or orgUnitGroup

The following response formats are supported:

- xml (application/xml)
- json (application/json)
- csv (application/csv)
- adx (application/adx+xml)

Assuming that we have posted data values to DHIS2 according to the previous section called *Sending data values* we can now put together our request for a single data value set and request it using cURL:

```
curl "https://play.dhis2.org/demo/api/dataValueSets?
dataSet=pBOMPrpg1QX&period=201401&orgUnit=DiszpKrYNg8"
  -H "Accept:application/xml" -u admin:district
```

We can also use the start and end dates query parameters to request a larger bulk of data values. I.e. you can also request data values for multiple data sets and org units and a time span in order to export larger chunks of data. Note that the period query parameter takes precedence over the start and end date parameters. An example looks like this:

```
curl "https://play.dhis2.org/demo/api/dataValueSets?dataSet=pBOMPrpg1QX&dataSet=BfMAe6Itzgt

&startDate=2013-01-01&endDate=2013-01-31&orgUnit=YuQRtpLP10I&orgUnit=vWbkYPRmKyS&children=true"
  -H "Accept:application/xml" -u admin:district
```

To retrieve data values which have been created or updated within the last 10 days you can make a request like this:

```
/api/dataValueSets?dataSet=pBOMPrpg1QX&orgUnit=DiszpKrYNg8&lastUpdatedDuration=10d
```

The response will look like this:

```
<?xml version='1.0' encoding='UTF-8'?>
<dataValueSet xmlns="http://dhis2.org/schema/dxf/2.0" dataSet="pBOMPrpg1QX"
  completeDate="2014-01-02" period="201401" orgUnit="DiszpKrYNg8">
<dataValue dataElement="eY5ehpbEsB7" period="201401" orgUnit="DiszpKrYNg8"
  categoryOptionCombo="bRowv6yZOF2" value="10003"/>
<dataValue dataElement="Ix2HsbDMLea" period="201401" orgUnit="DiszpKrYNg8"
  categoryOptionCombo="bRowv6yZOF2" value="10002"/>
<dataValue dataElement="f7n9E0hX8qk" period="201401" orgUnit="DiszpKrYNg8"
  categoryOptionCombo="bRowv6yZOF2" value="10001"/>
</dataValueSet>
```

You can request the data in JSON format like this:

```
/api/dataValueSets.json?dataSet=pBOMPrpg1QX&period=201401&orgUnit=DiszpKrYNg8
```

The response will look something like this:

```
{
  "dataSet": "pBOMPrpg1QX",
  "completeDate": "2014-02-03",
  "period": "201401",
  "orgUnit": "DiszpKrYNg8",
  "dataValues": [
    {
      "dataElement": "eY5ehpbEsB7",
      "categoryOptionCombo": "bRowv6yZOF2",
      "period": "201401",
      "orgUnit": "DiszpKrYNg8",
      "value": "10003"
    },
    {
      "dataElement": "Ix2HsbDMLea",
      "categoryOptionCombo": "bRowv6yZOF2",
      "period": "201401",
      "orgUnit": "DiszpKrYNg8",
      "value": "10002"
    },
```

```
    {
      "dataElement": "f7n9E0hX8qk",
      "categoryOptionCombo": "bRowv6yZOF2",
      "period": "201401",
      "orgUnit": "DiszpKrYNg8",
      "value": "10001"
    }
  ]
}
```

Note that data values are softly deleted, i.e. a deleted value has the `deleted` property set to true instead of being permanently deleted. This is useful when integrating multiple systems in order to communicate deletions. You can include deleted values in the response like this:

```
/api/dataValueSets.json?dataSet=pBOMPrpg1QX&period=201401
  &orgUnit=DiszpKrYNg8&includeDeleted=true
```

You can also request data in CSV format like this:

```
/api/dataValueSets.csv?dataSet=pBOMPrpg1QX&period=201401
  &orgUnit=DiszpKrYNg8
```

The response will look like this:

```
dataelement,period,orgunit,catoptcombo,attroptcombo,value,storedby,lastupdated,comment,flwup
f7n9E0hX8qk,201401,DiszpKrYNg8,bRowv6yZOF2,bRowv6yZOF2,12,system,
2015-04-05T19:58:12.000,comment1,false
Ix2HsbDMLea,201401,DiszpKrYNg8,bRowv6yZOF2,bRowv6yZOF2,14,system,
2015-04-05T19:58:12.000,comment2,false
eY5ehpbEsB7,201401,DiszpKrYNg8,bRowv6yZOF2,bRowv6yZOF2,16,system,
2015-04-05T19:58:12.000,comment3,false
FTRrcoaog83,201401,DiszpKrYNg8,bRowv6yZOF2,bRowv6yZOF2,12,system,
2014-03-02T21:45:05.519,comment4,false
```

The following constraints apply to the data value sets resource:

- At least one data set must be specified.
- Either at least one period or a start date and end date must be specified.
- At least one organisation unit must be specified.
- Organisation units must be within the hierarchy of the organisation units of the authenticated user.
- Limit cannot be less than zero.

Sending, reading and deleting individual data values

This example will show how to send individual data values to be saved in a request. This can be achieved by sending a *POST* request to the `dataValues` resource:

```
POST /api/dataValues
```

The following query parameters are supported for this resource:

Data values query parameters

Query parameter	Required	Description
de	Yes	Data element identifier
pe	Yes	Period identifier
ou	Yes	Organisation unit identifier
co	No	Category option combo identifier, default will be used if omitted
cc	No (must be combined with cp)	Attribute category combo identifier
cp	No (must be combined with cc)	Attribute category option identifiers, separated with ; for multiple values
ds	No	Data set, to check if POST or DELETE is allowed for period and organisation unit. If specified, the data element must be assigned to this data set. If not specified, a data set containing the data element will be chosen to check if the operation is allowed.
value	No	Data value. For boolean values, the following will be accepted: true | True | TRUE | false | False | FALSE | 1 | 0 | t | f |
comment	No	Data comment
followUp	No	Follow up on data value, will toggle the current boolean value

If any of the identifiers given are invalid, if the data value or comment is invalid or if the data is locked, the response will contain the *409 Conflict* status code and descriptive text message. If the operation leads to a saved or updated value, *200 OK* will be returned. An example of a request looks like this:

```
curl "https://play.dhis2.org/demo/api/dataValues?de=s46m5MS0hxu
  &pe=201301&ou=DiszpKrYNg8&co=Prlt0C1RF0s&value=12"
  -X POST -u admin:district
```

This resource also allows a special syntax for associating the value to an attribute option combination. This can be done by sending the identifier of the attribute category combination, together with the identifiers of the attribute category options which the value represents within the combination. The category combination is specified with the `cc` parameter, while the category options are specified as a semi-colon separated string with the `cp` parameter. It is necessary to ensure that the category options are all part of the category combination. An example looks like this:

```
curl "https://play.dhis2.org/demo/api/dataValues?de=s46m5MS0hxu&ou=DiszpKrYNg8
  &pe=201308&cc=dzjKKQq0cSO&cp=wbrDrL2aYEc;btOyqprQ9e8&value=26"
  -X POST -u admin:district
```

You can retrieve a data value with a request using the *GET* method. The value, comment and followUp params are not applicable in this regard:

```
curl "https://play.dhis2.org/demo/api/dataValues?de=s46m5MS0hxu
  &pe=201301&ou=DiszpKrYNg8&co=Prlt0C1RF0s"
  -u admin:district
```

You can delete a data value with a request using the *DELETE* method.

Sending individual data values as payload

You can send individual data values as a JSON payload using the following resource using `Content-Type: application/json`.

```
POST /api/dataValues
```

The resource will create a new data value or update a data value if it already exists. The JSON payload format is defined below.

```
{
  "dataElement": "fbfJHSPpUQD",
  "categoryOptionCombo": "PT59n8BQbqM",
  "period": "202201",
  "orgUnit": "DiszpKrYNg8",
  "value": "10",
  "comment": "OK"
}
```

The endpoint supports specifying attribute option combos in a nested structure.

```
{
  "dataElement": "BOSZApCrBni",
  "categoryOptionCombo": "TkDhg29x18A",
  "attribute": {
    "combo": "O4VaNks6tta",
    "options": [
      "C6nZpLKjEJr", "i4Nbp8S2G6A"
    ]
  },
  "dataSet": "lyLU2wR22tC",
  "period": "202201",
  "orgUnit": "DiszpKrYNg8",
  "value": "15",
  "comment": "Good"
}
```

The status code will be `201 Created` if the data value was successfully saved or updated, or `409 Conflict` if there was a validation error.

Working with file data values

When dealing with data values which have a data element of type *file* there is some deviation from the method described above. These data values are special in that the contents of the value is a UID reference to a *FileResource* object instead of a self-contained constant. These data values will behave

just like other data values which store text content, but should be handled differently in order to produce meaningful input and output.

There are two methods of storing file resource data values.

- Upload the file to the `/api/dataValues/file` endpoint as described in the file resource section. This works on versions 2.36 and later.
- If you are writing code that needs to be compatible with versions of DHIS2 before 2.36, then the process is:
- Upload the file to the `/api/fileResources` endpoint as described in the file resource section.
- Retrieve the `id` property of the returned file resource.
- Store the retrieved identifier using the `value` property of the data value using any of the methods described above.

Only one-to-one relationships between data values and file resources are allowed. This is enforced internally so that saving a file resource id in several data values is not allowed and will return an error. Deleting the data value will delete the referenced file resource. Direct deletion of file resources are not possible.

The data value can now be retrieved as any other but the returned data will be the UID of the file resource. In order to retrieve the actual contents (meaning the file which is stored in the file resource mapped to the data value) a GET request must be made to `/api/dataValues/files` mirroring the query parameters as they would be for the data value itself. The `/api/dataValues/files` endpoint only supports GET requests.

It is worth noting that due to the underlying storage mechanism working asynchronously the file content might not be immediately ready for download from the `/api/dataValues/files` endpoint. This is especially true for large files which might require time consuming uploads happening in the background to an external file store (depending on the system configuration). Retrieving the file resource meta-data from the `/api/fileResources/<id>` endpoint allows checking the `storageStatus` of the content before attempting to download it.

ADX data format

From version 2.20 we have included support for an international standard for aggregate data exchange called ADX. ADX is developed and maintained by the Quality Research and Public Health committee of the IHE (Integrating the HealthCare Enterprise). The wiki page detailing QRPH activity can be found at wiki.ihe.net. ADX is still under active development and has now been published for trial implementation. Note that what is implemented currently in DHIS2 is the functionality to read and write ADX formatted data, i.e. what is described as Content Consumer and Content Producer actors in the ADX profile.

The structure of an ADX data message is quite similar to what you might already be familiar with from DXF 2 data described earlier. There are a few important differences. We will describe these differences with reference to a small example:

```
<adx xmlns="urn:ihe:qrph:adx:2015" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:ihe:qrph:adx:2015 ../schema/adx_loose.xsd"
  exported="2015-02-08T19:30:00Z">
  <group orgUnit="OU_559" period="2015-06-01/P1M"
    completeDate="2015-07-01" dataSet="(TB/HIV)VCCT">
    <dataValue dataElement="VCCT_0" GENDER="FMLE" HIV_AGE="AGE0-14" value="32"/>
    <dataValue dataElement="VCCT_1" GENDER="FMLE" HIV_AGE="AGE0-14" value="20"/>
```

```
    <dataValue dataElement="VCCT_2" GENDER="FMLE" HIV_AGE="AGE0-14" value="10"/>
    <dataValue dataElement="PLHIV_TB_0" GENDER="FMLE" HIV_AGE="AGE0-14" value="10"/>
    <dataValue dataElement="PLHIV_TB_1" GENDER="FMLE" HIV_AGE="AGE0-14" value="10"/>

    <dataValue dataElement="VCCT_0" GENDER="MLE" HIV_AGE="AGE0-14" value="32"/>
    <dataValue dataElement="VCCT_1" GENDER="MLE" HIV_AGE="AGE0-14" value="20"/>
    <dataValue dataElement="VCCT_2" GENDER="MLE" HIV_AGE="AGE0-14" value="10"/>
    <dataValue dataElement="PLHIV_TB_0" GENDER="MLE" HIV_AGE="AGE0-14" value="10"/>
    <dataValue dataElement="PLHIV_TB_1" GENDER="MLE" HIV_AGE="AGE0-14" value="10"/>

    <dataValue dataElement="VCCT_0" GENDER="FMLE" HIV_AGE="AGE15-24" value="32"/>
    <dataValue dataElement="VCCT_1" GENDER="FMLE" HIV_AGE="AGE15-24" value="20"/>
    <dataValue dataElement="VCCT_2" GENDER="FMLE" HIV_AGE="AGE15-24" value="10"/>
    <dataValue dataElement="PLHIV_TB_0" GENDER="FMLE" HIV_AGE="AGE15-24" value="10"/>
    <dataValue dataElement="PLHIV_TB_1" GENDER="FMLE" HIV_AGE="AGE15-24" value="10"/>

    <dataValue dataElement="VCCT_0" GENDER="MLE" HIV_AGE="AGE15-24" value="32"/>
    <dataValue dataElement="VCCT_1" GENDER="MLE" HIV_AGE="AGE15-24" value="20"/>
    <dataValue dataElement="VCCT_2" GENDER="MLE" HIV_AGE="AGE15-24" value="10"/>
    <dataValue dataElement="PLHIV_TB_0" GENDER="MLE" HIV_AGE="AGE15-24" value="10"/>
    <dataValue dataElement="PLHIV_TB_1" GENDER="MLE" HIV_AGE="AGE15-24" value="10"/>
  </group>
</adx>
```

The ADX root element

The ADX root element has only one mandatory attribute, which is the *exported* timestamp. In common with other ADX elements, the schema is extensible in that it does not restrict additional application specific attributes.

The ADX group element

Unlike dxf2, ADX requires that the datavalues are grouped according to orgUnit, period and dataSet. The example above shows a data report for the "(TB/HIV) VCCT" dataset from the online demo database. This example is using codes as identifiers instead of dhis2 uids. Codes are the preferred form of identifier when using ADX.

The orgUnit, period and dataSet attributes are mandatory in ADX. The group element may contain additional attributes. In our DHIS2 implementation any additional attributes are simply passed through to the underlying importer. This means that all attributes which currently have meaning in dxf2 (such as completeDate in the example above) can continue to be used in ADX and they will be processed in the same way.

A significant difference between ADX and dxf2 is in the way that periods are encoded. ADX makes strict use of ISO8601 and encodes the reporting period as (date|datetime)/(duration). So the period in the example above is a period of 1 month (P1M) starting on 2015-06-01. So it is the data for June 2015. The notation is a bit more verbose, but it is very flexible and allows us to support all existing period types in DHIS2

ADX period definitions

Periods begin with the date in which the duration begins, followed by a "/" and then the duration notation as noted in the table. The following table details all of the DHIS2 period types and how they are represented in ADX, along with examples.

ADX Periods

Period type	Duration notation	Example(s)	Duration(s)
Daily	P1D	2017-10-01/P1M	Oct 01 2017

Period type	Duration notation	Example(s)	Duration(s)
Weekly	P7D	2017-10-02/P7D	Oct 02 2017-Oct 08-2017
Weekly Wednesday	P7D	2017-10-04/P7D	Oct 04 2017-Oct 10-2017
Weekly Thursday	P7D	2017-10-05/P7D	Oct 05 2017-Oct 011-2017
Weekly Saturday	P7D	2017-10-07/P7D	Oct 07 2017-Oct 13-2017
Weekly Sunday	P7D	2017-10-01/P7D	Oct 01 2017-Oct 07-2017
Bi-weekly	P14D	2017-10-02/P14D	Oct 02 2017-Oct 15 2017
Monthly	P1M	2017-10-01/P1M	Oct 01 2017-Oct 31 2017
Bi-monthly	P2M	2017-11-01/P2M	Nov 01 2017-Dec 31 2017
Quarterly	P3M	2017-09-01/P3M	Sep 01 2017-Dec 31 2017
Six-monthly	P6M	2017-01-01/P6M 2017-07-01/P6M	Jan 01 2017-Jun 30 2017 Jul 01 2017-Dec 31 2017
Six-monthly April	P6M	2017-04-01/P6M 2017-10-01/P6M	Apr 01 2017-Sep 30 2017 Oct 01 2017-Mar 31 2018
Six-monthly November	P6M	2017-10-01/P6M 2018-05-01/P6M	Nov 01 2017-Apr 30 2018 May 01 2018-Oct 31 2018
Yearly	P1Y	2017-01-01/P1Y	Jan 01 2017-Dec 31 2017
Financial April	P1Y	2017-04-01/P1Y	April 1 2017-Mar 31 2018
Financial July	P1Y	2017-07-01/P1Y	July 1 2017-June 30 2018
Financial October	P1Y	2017-10-01/P1Y	Oct 01 2017-Sep 30 2018
Financial November	P1Y	2017-11-01/P1Y	Nov 01 2017-Oct 31 2018

ADX Data values

The dataValue element in ADX is very similar to its equivalent in DXF. The mandatory attributes are *dataElement* and *value*. The *orgUnit* and *period* attributes don't appear in the dataValue as they are required at the *group* level.

The most significant difference is the way that disaggregation is represented. DXF uses the categoryOptionCombo to indicate the disaggregation of data. In ADX the disaggregations (e.g. AGE_GROUP and SEX) are expressed explicitly as attributes. If you use `code` as the id scheme for `category`, not that you must assign a code to all the categories used for dataElements in the dataSet, and further, that code must be of a form which is suitable for use as an XML attribute. The exact constraint on an XML attribute name is described in the W3C XML standard - in practice, this means no spaces, no non-alphanumeric characters other than '_' and it may not start with a letter. The example above shows examples of 'good' category codes ('GENDER' and 'HIV_AGE'). The same restrictions apply if you use `name` or `attribute` as id schemes.

In ADX, only category identifiers are used as XML attributes; identifiers for other metadata types do not have to be usalbe as XML attributes. Note that this syntax is not enforced by DHIS2 when you are assigning names, codes, or DHIS2 attributes, but you will get an informative error message if you try to import ADX data and the category identifiers are either not assigned or not suitable.

The main benefits of using explicit dimensions of disaggregated data are that

- The system producing the data does not have to be synchronised with the categoryOptionCombo within DHIS2.
- The producer and consumer can match their codes to a 3rd party authoritative source, such as a vterminology service. Note that in the example above the Gender and AgeGroup codes are using code lists from the WHO Global Health Observatory.

Note that this feature may be extremely useful, for example when producing disaggregated data from an EMR system, but there may be cases where a *categoryOptionCombo* mapping is easier or more desirable. The DHIS2 implementation of ADX will check for the existence of a *categoryOptionCombo* attribute and, if it exists, it will use that in preference to exploded dimension attributes. Similarly, an *attributeOptionCombo* attribute on the *group* element will be processed in the legacy way. Otherwise, the attributeOptionCombo can be treated as exploded categories just as on the *dataValue*.

In the simple example above, each of the dataElements in the dataSet have the same dimensionality (categorycombo) so the data is neatly rectangular. This need not be the case. dataSets may contain dataElements with different categoryCombos, resulting in a *ragged-right* ADX data message (i.e. values for different dataElements may have different numbers of categories.)

Importing ADX data

DHIS2 exposes an endpoint for POST ADX data at `/api/dataValueSets` using *application/xml+adx* as content type. So, for example, the following curl command can be used to POST the example data above to the DHIS2 demo server:

```
curl -u admin:district -X POST -H "Content-Type: application/adx+xml"
  -d @data.xml "https://play.dhis2.org/demo/api/dataValueSets?
dataElementIdScheme=code&orgUnitIdScheme=code"
```

Note the query parameters are the same as are used with DXF data. The ADX endpoint should interpret all the existing DXF parameters with the same semantics as DXF.

Exporting ADX data

DHIS2 exposes an endpoint to GET ADX data sets at `/api/dataValueSets` using *application/xml+adx* as the accepted content type. So, for example, the following curl command can be used to retrieve the ADX data:

```
curl -u admin:district -H "Accept: application/adx+xml"
 "https://play.dhis2.org/demo/api/dataValueSets?dataValueSets?
orgUnit=M_CLINIC&dataSet=MALARIA&period=201501"
```

Note the query parameters are the same as are used with DXF data. An important difference is that the identifiers for dataSet and orgUnit may be either uids or codes.

Follow-up

This section covers marking data for follow-up.

Data value follow-up

The data value follow-up endpoint allows for marking data values for follow-up.

```
PUT /api/36/dataValues/followup
```

The payload in `JSON` format looks like this:

```
{
  "dataElement": "s46m5MS0hxu",
  "period": "202005",
  "orgUnit": "DiszpKrYNg8",
  "categoryOptionCombo": "psbwp3CQEhs",
  "attributeOptionCombo": "HllvX50cXC0",
  "followup": true
}
```

The `categoryOptionCombo` and `attributeOptionCombo` fields are optional. A minimal `JSON` payload looks like this:

```
{
  "dataElement": "s46m5MS0hxu",
  "period": "202005",
  "orgUnit": "DiszpKrYNg8",
  "followup": false
}
```

The `followup` field should be set to `true` to mark a data value for follow-up, and `false` to remove the mark.

The response status code will be `200 OK` if the operation was successful, and `409 Conflict` in case of an error with the request.

To bulk update data values for follow-up use:

```
PUT /api/dataValues/followups
```

with `JSON` payload:

```
{
  "values": [
```

```
    {
      "dataElement": "s46m5MS0hxu",
      "period": "202005",
      "orgUnit": "DiszpKrYNg8",
      "categoryOptionCombo": "psbwp3CQEhs",
      "attributeOptionCombo": "HllvX50cXC0",
      "followup": true
    }
  ]
}
```

Each item of the bulk update has the same fields and requirements as the single update endpoint.

Bulk update equally confirms with a `200 OK` on success or returns a `409 Conflict` in case of input errors.

Data validation

Validation

To generate a data validation summary you can interact with the validation resource. The dataSet resource is optimized for data entry clients for validating a data set / form, and can be accessed like this:

```
GET /api/33/validation/dataSet/QX4ZTUbOt3a.json?pe=201501&ou=DiszpKrYNg8
```

In addition to validate rules based on data set, there are two additional methods for performing validation: Custom validation and Scheduled validation.

The first path variable is an identifier referring to the data set to validate. XML and JSON resource representations are supported. The response contains violations of validation rules. This will be extended with more validation types in the coming versions.

To retrieve validation rules which are relevant for a specific data set, meaning validation rules with formulas where all data elements are part of the specific data set, you can make a GET request to to `validationRules` resource like this:

```
GET /api/validationRules?dataSet=<dataset-id>
```

The validation rules have a left side and a right side, which is compared for validity according to an operator. The valid operator values are found in the table below.

Operators

Value	Description
equal_to	Equal to
not_equal_to	Not equal to
greater_than	Greater than
greater_than_or_equal_to	Greater than or equal to
less_than	Less than
less_than_or_equal_to	Less than or equal to
compulsory_pair	If either side is present, the other must also be
exclusive_pair	If either side is present, the other must not be

The left side and right side expressions are mathematical expressions which can contain references to data elements and category option combinations on the following format:

```
${<dataelement-id>.<catoptcombo-id>}
```

The left side and right side expressions have a *missing value strategy*. This refers to how the system should treat data values which are missing for data elements / category option combination references in the formula in terms of whether the validation rule should be checked for validity or skipped. The valid missing value strategies are found in the table below.

Missing value strategies

Value	Description
SKIP_IF_ANY_VALUE_MISSING	Skip validation rule if any data value is missing
SKIP_IF_ALL_VALUES_MISSING	Skip validation rule if all data values are missing
NEVER_SKIP	Never skip validation rule irrespective of missing data values

Validation results

Validation results are persisted results of violations found during a validation analysis. If you choose "persist results" when starting or scheduling a validation analysis, any violations found will be stored in the database. When a result is stored in the database it will be used for 3 things:

1. Generating analytics based on the stored results.
2. Persisted results that have not generated a notification, will do so, once.
3. Keeping track of whether or not the result has generated a notification.
4. Skipping rules that have been already checked when running validation analysis.

This means if you don't persist your results, you will be unable to generate analytics for validation results, if checked, results will generate notifications every time it's found and running validation analysis might be slower.

Query validation results

The validation results persisted can be viewed at the following endpoint:

```
GET /api/33/validationResults
```

You can also inspect an individual result using the validation result id in this endpoint:

```
GET /api/33/validationResults/<id>
```

Validation results can also be filtered by following properties:

- Organisation Unit: `ou=<UID>`
- Validation Rule: `vr=<UID>`
- Period: `pe=<ISO-expression>`

Each of the above filter properties can occur multiple times, for example:

```
GET /api/36/validationResults?ou=jNb63DIHuwU&ou=RzgSFJ9E46G
```

Multiple values for the same filter are combined with OR, results have to match one of the given values.

If more then one filter properties is used these are combined with AND, results have to match one of the values for each of the properties.

For the period filter matching results have to overlap with any of the specified periods.

In addition the validation results can also be filtered on their creation date:

```
GET /api/36/validationResults?createdDate=<date>
```

This filter can be combined with any of the other filters.

Trigger validation result notifications

Validation results are sent out to the appropriate users once every day, but can also be manually triggered to run on demand using the following API endpoint:

```
POST /api/33/validation/sendNotifications
```

Only unsent results are sent using this endpoint.

Delete validation results

Validation results can be manually deleted by ID,

```
DELETE /api/36/validationResults/<id>
```

or using filters

```
DELETE /api/36/validationResults?<filters>
```

Supported filter parameters include:

- `ou=<UID>` to match all validation results of an organisation unit; multiple units combine OR when the parameter is provided more than once
- `vr=<UID>` to match all validation results of a validation rule; multiple rules combine OR when the parameter is provided more than once
- `pe=<ISO-expression>` to match all validation results related to a period that overlaps with the specified period
- `created=<ISO-expression>` to match all validation results that were created within the provided period
- `notificationSent=<boolean>` to match either only validation results for which a notification was or wasn't sent

If filters are combined all conditions have to be true (AND logic).

Some examples:

To delete all validation results related the organisation unit with UID `NqwvaQC1ni4` for Q1 of 2020 use:

```
DELETE /api/36/validationResults?ou=NqwvaQC1ni4&pe=2020Q1
```

To delete all validation results that were created in week 1 of 2019 and for which notification has been sent use:

```
DELETE /api/36/validationResults?created=2019W1&notificationSent=true
```

Any delete operation will require the authority *Perform maintenance tasks*.

Outlier detection

The outlier detection endpoint allows for detecting outliers in aggregate data values.

```
GET /api/36/outlierDetection
```

This endpoint supports two algorithms for detecting outliers:

- **Z-score:** The z-score is defined as the absolute deviation between the score and mean divided by the standard deviation. A threshold parameter referring to the number of standard deviations from the mean must be specified with the z-score algorithm to define the upper and lower boundaries for what is considered an outlier value.
- **Modified Z-score:** Same as z-score except it uses the median instead of the mean as measure of central tendency. Parameters are same as for Z-score.
- **Min-max:** Min-max data element values refers to custom boundaries which can be inserted in DHIS 2 based on data element, org unit and category option combination.

The outlier values will be *ordered according to significance*, by default by the absolute deviation from the mean, with the most significant value first. This is helpful to quickly identify the outlier values which have the biggest impact on data quality and data analytics.

Request query parameters

The following query parameters are supported.

Query parameter	Description	Mandatory	Options (default first)
ds	Data set, can be specified multiple times.	No [*]	Data set identifier.
de	Data element, can be specified multiple times.	No [*]	Data element identifier.
startDate	Start date for interval to check for outliers.	Yes	Date (yyyy-MM-dd).
endDate	End date for interval to check for outliers.	Yes	Date (yyyy-MM-dd).
ou	Organisation unit, can be specified multiple times.	Yes	Organisation unit identifier.
algorithm	Algorithm to use for outlier detection.	No	`Z_SCORE`, `MIN_MAX`, `MOD_Z_SCORE`
threshold	Threshold for outlier values. `Z_SCORE` and `MOD_Z_SCORE` algorithm only.	No	Numeric, greater than zero. Default: 3.0.
dataStartDate	Start date for interval for mean and std dev calculation. `Z_SCORE` and `MOD_Z_SCORE` algorithm only.	No	Date (yyyy-MM-dd).

Query parameter	Description	Mandatory	Options (default first)
dataEndDate	End date for interval for mean and std dev calculation. `Z_SCORE` and `MOD_Z_SCORE` algorithm only.	No	Date (yyyy-MM-dd).
orderBy	Field to order by. `Z_SCORE` and `MOD_Z_SCORE`algorithm only.	No	`MEAN_ABS_DEV`, `Z_SCORE`
maxResults	Max limit for the output.	No	Integer, greater than zero. Default: 500.

[*] You must specify either data sets with the `ds` parameter, which will include all data elements in the data sets, *or* specify data elements with the `de` parameter.

At least one data set or data element, start date and end date, and at least one organisation unit must be defined.

The `startDate` and `endDate` parameters are mandatory and refer to the time interval for which you want to detect outliers. The `dataStartDate` and `dataEndDate` parameters are optional and refer to the time interval for the data to use when calculating the mean and std dev, which are used to eventually calculate the z-score.

Usage and examples

Get outlier values using the default z-score algorithm:

```
GET /api/36/outlierDetection?ds=BfMAe6Itzgt&ds=QX4ZTUbOt3a
  &ou=O6uvpzGd5pu&ou=fdc6uOvgoji&startDate=2020-01-01&endDate=2020-12-31
```

Get outlier values using a specific algorithm and a specific threshold:

```
GET /api/36/outlierDetection?ds=BfMAe6Itzgt&ds=QX4ZTUbOt3a
  &ou=O6uvpzGd5pu&startDate=2020-01-01&endDate=2020-12-31
  &algorithm=Z_SCORE&threshold=2.5
```

Get outlier values ordered by z-score:

```
GET /api/36/outlierDetection?ds=BfMAe6Itzgt
  &ou=O6uvpzGd5pu&startDate=2020-01-01&endDate=2020-12-31
  &orderBy=Z_SCORE
```

Get the top 10 outlier values:

```
GET /api/36/outlierDetection?ds=BfMAe6Itzgt
  &ou=O6uvpzGd5pu&startDate=2020-01-01&endDate=2020-12-31
  &maxResults=10
```

Get outlier values with a defined interval for data to use when calculating the mean and std dev:

```
GET /api/36/outlierDetection?ds=BfMAe6Itzgt
  &ou=O6uvpzGd5pu&startDate=2020-01-01&endDate=2020-12-31
  &dataStartDate=2018-01-01&dataEndDate=2020-12-31
```

Get outlier values using the min-max algorithm:

```
GET /api/36/outlierDetection?ds=BfMAe6Itzgt&ds=QX4ZTUbOt3a
  &ou=O6uvpzGd5pu&ou=fdc6uOvgoji&startDate=2020-01-01&endDate=2020-12-31
  &algorithm=MIN_MAX
```

Response format

The following response formats are supported.

Format	API format
JSON	`/api/36/outlierDetection.json` or `Accept: application/json` (default format)
CSV	`/api/36/outlierDetection.csv` or `Accept: application/csv`

The response contains the following fields:

Field	Description
de	Data element identifier.
deName	Data element name.
pe	Period ISO identifier.
ou	Organisation unit identifier.
ouName	Organisation unit name.
coc	Category option combination identifier.
cocName	Category option combination name.
aoc	Attribute option combination identifier.
aocName	Attribute option combination name.
value	Data value.
mean	Mean of data values in the time dimension.
stdDev	Standard deviation.
absDev	For z-score, absolute deviation from the mean. For min-max, absolute deviation from the min or max boundary.
zScore	The z-score. Z-score algorithm only.
lowerBound	The lower boundary.
upperBound	The upper boundary.
followUp	Whether data value is marked for follow-up.

The `mean`, `stdDev` and `zScore` fields are only present when `algorithm` is `Z_SCORE`.

The response will look similar to this. The `metadata` section contains metadata for the request and response. The `outlierValues` section contains the outlier values.

```
{
  "metadata": {
    "algorithm": "Z_SCORE",
    "threshold": 2.5,
    "orderBy": "MEAN_ABS_DEV",
    "maxResults": 10,
    "count": 10
  },
  "outlierValues": [
    {
      "de": "rbkr8PL0rwM",
      "deName": "Iron Folate given at ANC 3rd",
      "pe": "202011",
      "ou": "Pae8DR7VmcL",
      "ouName": "MCH (Kakua) Static",
      "coc": "pq2XI5kz2BY",
      "cocName": "Fixed",
      "aoc": "HllvX50cXC0",
      "aocName": "default",
      "value": 9000.0,
      "mean": 1524.5555,
      "stdDev": 2654.4661,
      "absDev": 7475.4444,
      "zScore": 2.8161,
      "lowerBound": -5111.6097,
      "upperBound": 8160.7208,
      "followUp": false
    },
    {
      "de": "rbkr8PL0rwM",
      "deName": "Iron Folate given at ANC 3rd",
      "pe": "202010",
      "ou": "vELbGdEphPd",
      "ouName": "Jimmi CHC",
      "coc": "pq2XI5kz2BY",
      "cocName": "Fixed",
      "aoc": "HllvX50cXC0",
      "aocName": "default",
      "value": 8764.0,
      "mean": 1448.0833,
      "stdDev": 2502.3031,
      "absDev": 7315.9166,
      "zScore": 2.9236,
      "lowerBound": -4807.6745,
      "upperBound": 7703.8412,
      "followUp": false
    }
  ]
}
```


Constraints and validation

The following constraints apply during query validation. Each validation error has a corresponding error code.

Error code	Message
E2200	At least one data element must be specified
E2201	Start date and end date must be specified
E2202	Start date must be before end date

Error code	Message
E2203	At least one organisation unit must be specified
E2204	Threshold must be a positive number
E2205	Max results must be a positive number
E2206	Max results exceeds the allowed max limit: {d}
E2207	Data start date must be before data end date
E2208	Non-numeric data values encountered during outlier value detection

Data analysis

Several resources for performing data analysis and finding data quality and validation issues are provided.

Note: This endpoint is deprecated and will be removed in 2.38. Use the `outlierAnalysis` endpoint instead.

Validation rule analysis

To run validation rules and retrieve violations:

```
GET /api/dataAnalysis/validationRules
```

The following query parameters are supported:

Validation rule analysis query parameters

Query parameter	Description	Option
vrg	Validation rule group	ID
ou	Organisation unit	ID
startDate	Start date for the timespan	Date
endDate	End date for the timespan	Date
persist	Whether to persist violations in the system	false | true
notification	Whether to send notifications about violations	false | true

Sample output:


```
[{
    "validationRuleId": "kgh54Xb9LSE",
    "validationRuleDescription": "Malaria outbreak",
    "organisationUnitId": "DiszpKrYNg8",
    "organisationUnitDisplayName": "Ngelehun CHC",
    "organisationUnitPath": "/ImspTQPwCqd/O6uvpzGd5pu/YuQRtpLP10I/DiszpKrYNg8",
    "organisationUnitAncestorNames": "Sierra Leone / Bo / Badjia / ",
    "periodId": "201901",
    "periodDisplayName": "January 2019",
    "attributeOptionComboId": "HllvX50cXC0",
    "attributeOptionComboDisplayName": "default",
    "importance": "MEDIUM",
```

```
    "leftSideValue": 10.0,
    "operator": ">",
    "rightSideValue": 14.0
}, {
    "validationRuleId": "ZoG4yXZi3c3",
    "validationRuleDescription": "ANC 2 cannot be higher than ANC 1",
    "organisationUnitId": "DiszpKrYNg8",
    "organisationUnitDisplayName": "Ngelehun CHC",
    "organisationUnitPath": "/ImspTQPwCqd/O6uvpzGd5pu/YuQRtpLP10I/DiszpKrYNg8",
    "organisationUnitAncestorNames": "Sierra Leone / Bo / Badjia / ",
    "periodId": "201901",
    "periodDisplayName": "January 2019",
    "attributeOptionComboId": "HllvX50cXC0",
    "attributeOptionComboDisplayName": "default",
    "importance": "MEDIUM",
    "leftSideValue": 22.0,
    "operator": "<=",
    "rightSideValue": 19.0
}]
```


Standard deviation based outlier analysis

To identify data outliers based on standard deviations of the average value:

```
GET /api/dataAnalysis/stdDevOutlier
```

The following query parameters are supported:

Standard deviation outlier analysis query parameters

Query parameter	Description	Option
ou	Organisation unit	ID
startDate	Start date for the timespan	Date
endDate	End date for the timespan	Date
ds	Data sets, parameter can be repeated	ID
standardDeviation	Number of standard deviations from the average	Numeric value

Min/max value based outlier analysis

To identify data outliers based on min/max values:

```
GET /api/dataAnalysis/minMaxOutlier
```

The supported query parameters are equal to the *std dev based outlier analysis* resource described above.

Follow-up data analysis

To identify data marked for follow-up:

```
GET /api/dataAnalysis/followup
```

At least one data set or data element, start date and end date or period, and at least one organisation unit must be defined.

The following query parameters are supported.

Parameter	Description	Mandatory	Options (default first)
ou	Organisation unit, can be specified multiple times.	Yes	Organisation unit identifier.
ds	Data set, can be specified multiple times.	No [*]	Data set identifier.
de	Data element, can be specified multiple times.	No [*]	Data element identifier.
startDate	Start date for interval to check for outliers.	No [*]	Date (yyyy-MM-dd).
endDate	End date for interval to check for outliers.	No [*]	Date (yyyy-MM-dd).
pe	ISO period ID.	No [*]	Period ISO ID.
peType	ISO period.	No [*]	Period ISO string.
coc	Category option combos, can be specified multiple times.	No	Category option combo identifier.
maxResults	Max limit for the output.	No	Integer, greater than zero. Default: 50.

[*] You must specify either data sets with the `ds` parameter, which will include all data elements in the data sets, *or* specify data elements with the `de` parameter. Equally, either `startDate` and `endDate` *or* `period` must be specified.

The `startDate` and `endDate` parameters refer to the time interval for which you want to detect outliers. If a period `pe` is provided instead the interval start and end is that of the period.

If no option combos `coc` are provided all data elements of numeric value type are considered.

Data integrity

The data integrity capabilities of the data administration module are available through the web API. This section describes how to run the data integrity process and retrieve the results. The specific details regarding each check are described in the user manual.

Listing the available data integrity checks

A description of the available checks is returned by a request to:

```
GET /api/dataIntegrity
```

```
[
    {
        "name": "data_elements_without_groups",
        "displayName": "Data elements lacking groups",
        "section": "Data Elements",
        "severity": "WARNING",
```

```
        "description": "Lists all data elements that have no data element groups",
        "issuesIdType": "dataElements",
        "isSlow": false
    }
]
```

The `name` member of the returned check elements is the identifier used for the `checks` parameter to declare the set of checks to run.

> **Note**
>
> Each check will indicate whether it may require significant time and resources to complete with the `isSlow` field. Users should be cautious about running these checks on production systems as they could lead to decreased performance. These checks can be run individually, but will not be run unless specifically requested.

Checks are grouped semantically by the `section` member and categorised in one of four `severity` levels:

Severity	Description
INFO	Indicates that this is for information only.
WARNING	A warning indicates that this may be a problem, but not necessarily an error. It is however recommended to triage these issues.
SEVERE	An error that should be fixed but which may not necessarily lead to the system not functioning.
CRITICAL	An error that must be fixed and which may lead to end-user error or system crashes.

The available checks can be filtered using the `checks` parameter.

```
GET /api/dataIntegrity?checks=<pattern1>,<pattern2>
```

One or more exact names or patterns using * as a wildcard can be provided.

Additional results can be filtered using a `section` parameter.

```
GET /api/dataIntegrity?section=Categories
```

The `section` filter will return all exact matches which have the specified section.

Furthermore, to filter (select) only checks marked as `isSlow` use `slow=true`,

```
GET /api/dataIntegrity?slow=true
```

or to filter (select) only checks that are not performed via database query (programmed checks) use `programmatic=true`:

```
GET /api/dataIntegrity?programmatic=true
```

The `slow`, `programmatic` and `section` filters can be combined in which case all conditions must be met.

Running data integrity summaries

Since version 2.38, data integrity checks have two levels of specificity: - a `summary` level that provides an overview of the number of issues - a `details` level that provides a list of issues pointing to individual data integrity violations.

To trigger a summary analysis for a set of checks run:

```
POST /api/dataIntegrity/summary?checks=<name1>,<name2>
```

This triggers a job that runs the check(s) asynchronously. Individual check results will be returned to the application cache as soon as the check has completed.

Alternatively the list of checks can also be given as BODY of the POST request. This can be useful if the list becomes to long to be used in the URL.

To fetch the data integrity summary of the triggered check(s) use:

```
GET /api/dataIntegrity/summary?checks=<name1>,<name2>
```

When the `checks` parameter is omitted, all checks are fetched from the server cache.

The response is a "map" of check results, one for each check that has completed already. This information is cached for one hour or until the check is rerun.

To wait for the summary to be available in the cache a `timeout` in milliseconds can be added:

```
GET /api/dataIntegrity/summary?checks=<name1>,<name2>&timeout=500
```

An example of a summary response could look like:

```
{
  "<name1>": {
    "name": "<name1>",
    "displayName": "<displayName1>",
    "startTime": "2023-01-11T06:12:56.436",
    "finishedTime": "2023-01-11T06:12:57.021",
    "section": "...",
    "severity": "WARNING",
    "description": "...",
    "count": 12,
    "percentage": 2.3
  },
  "<name2>": {
    "name": "<name2>",
    "displayName": "<displayName2>",
    "startTime": "2023-01-11T06:12:57.345",
    "finishedTime": "2023-01-11T06:12:58.007",
    "section": "...",
```

```
    "severity": "WARNING",
    "description": "...",
    "count": 4,
    "percentage": 5.1
  }
}
```

Each summary response will contain the `name`, `section`, `severity`, `description` and optionally an `introduction` and `recommendation`.
Each summary contains the number of issues found in the `count` field. When possible, an optional `percentage` field will provide the percentage of objects with data integrity issues when compared to all objects of the same type. The `startTime` field indicates when the check was initiated. Using the `finishedTime` the duration which was required to execute the check can be calculated.

Should a check analysis fail due to programming error or unforeseen data inconsistencies both the summary and the details will have an `error` field describing the error that occurred. The `count` of any checks which failed will be set to -1. No `percentage` will be returned in such cases.

```
{
  "<name1>": {
    "name": "<name1>",
    "displayName": "<displayName1>",
    "finishedTime": "2022-02-15 14:55",
    "section": "...",
    "severity": "WARNING",
    "description": "...",
    "error": "what has happened",
    "issues": []
  }
}
```

> **Note**
>
> Each metadata check is run asynchronously on the server. Results will be returned as soon as each check completes. The safest way to ensure that you have retrieved the latest set of results which has been requested is to compare the timestamp of when the request was made with the `finishedTime` in the response.

To get a list of the names of checks that are currently being performed by the server use:

```
GET /api/dataIntegrity/summary/running
```

To get a list of the names of checks for which results are available already use:

```
GET /api/dataIntegrity/summary/completed
```

Running data integrity details

To run a selection of details checks first trigger them using a `POST` request:

```
POST /api/dataIntegrity/details?checks=<name1>,<name2>
```

Similar to the summary the list of checks can also be given as the POST body.

Then fetch the results from the cache using:

```
GET /api/dataIntegrity/details?checks=<name1>,<name2>&timeout=500
```

When the `checks` parameter is not provided, all checks which have not been marked as `isSlow` will be scheduled to be run on the server.

Omitting the `timeout` will not wait for results to be found in the cache, but instead not have a result for the requested check.

The `/details` response returns a map similar to the `summary`, but does not contain a `count` or `percentage`. Instead, a list of `issues` is returned.

```
{
  "<name1>": {
    "name": "<name1>",
    "displayName": "<displayName1>",
    "startTime": "2023-01-11T06:12:56.436",
    "finishedTime": "2023-01-11T06:12:57.021",
    "section": "...",
    "severity": "WARNING",
    "description": "...",
    "issuesIdType": "<object-type-plural>",
    "isSlow": false,
    "issues": [{
      "id": "<id-or-other-identifier>",
      "name": "<name-of-the-id-obj>",
      "comment": "optional plain text description or hint of the issue",
      "refs": ["<id1>", "<id2>"]
    }]
  },
  "<name2>": {
    "name": "<name2>",
    "displayName": "<displayName2>",
    "startTime": "2023-01-11T06:12:57.345",
    "finishedTime": "2023-01-11T06:12:58.007",
    "section": "...",
    "severity": "WARNING",
    "description": "...",
    "issuesIdType": "<object-type-plural>",
    "isSlow": false,
    "issues": []
  }
}
```

Each issue will always have `id` and `name` members. Often the `issuesIdType` is available to indicate the type of objects the `id` refers to. If the `issuesIdType` is not available, the `id` often is not available either and the `name` is used for an aggregate key of an issue that has no object equivalent.

The `comment` and `refs` fields are optional for each issue. A `comment` may provide more context or insight into why this particular issue is regarded to be a data integrity problem. The `refs` list may also give the identifiers of other objects that contributed to the violation. The `finishedTime` field shows when the particular check finished processing on the server. The cache will store the result of each completed check for one hour.

> **Tip**
>
> A set of checks can also be specified using wild-cards. To include all checks with *element* in the name use `checks=*element*`. Like full names such patterns can be used in a comma-separated list and be mixed with full names as well. Duplicates will be eliminated. Also a check can be given by its code. A code consists of the first letters of each word in the name as upper case letter. For example, `orgunits_invalid_geometry` has the code `OIG`.

Similar to the summary a set of names of the currently performed and the already completed details checks can be obtained using:

```
GET /api/dataIntegrity/details/running
GET /api/dataIntegrity/details/completed
```

Custom Data Integrity Checks

Users of DHIS2 can now create and supply their own Data Integrity Checks. This can be useful if users want to avail of this functionality and extend upon the supplied set of core data integrity checks.

> **Tip**
>
> Users are also encouraged to share their custom checks with others by opening a pull request in the dhis2-core repository containing their `.yaml` file(s). Please select `platform-backend` as reviewer to put the PR on our radar early on. The team will take care of checking and linking the check correctly, so it becomes part of the provided suite of checks with the next release.

An example of a custom check could be for determining if certain users are members of specific user groups. This type of check would be very specific to an implementation, and not generally applicable across all installs. These types of metadata checks can be used to extend the default checks which are included with DHIS2.

Custom checks can be implemented by satisfying the following requirements, each of which we will go into detail: - Supplying your own list of custom data integrity checks in a list file named `custom-data-integrity-checks.yaml` in your `DHIS2_HOME` directory - Having a directory named `custom-data-integrity-checks` in your `DHIS2_HOME` directory - Supplying your valid custom data integrity check yaml files

Custom Data Integrity Check List File

DHIS2 will only try to load data integrity files when they are needed. e.g. when making a call to view all data integrity checks:

```
GET /api/dataIntegrity
```

DHIS2 will look for a file named `custom-data-integrity-checks.yaml` in your `DHIS2_HOME` directory when loading data integrity files. If you are not using custom checks and the file is not present, a warning log like this will be present:

```
08:29:57.729  WARN o.h.d.d.DataIntegrityYamlReader: Failed to load data integrity check from
YAML. Error message `{DHIS2_HOME}/custom-data-integrity-checks.yaml (No such file or directory)
```

If you are implementing custom data integrity checks then this file must be present. To see what the core data integrity checks file looks like as an example, check out this file.

The `custom-data-integrity-checks.yaml` file should list all of your custom data integrity checks. As an example, it could look something like this:

```
checks:
  - categories/my_custom_check.yaml
  - users/my_user_group_check.yaml
  - base_check.yaml
```

Check names in this file can be preceded with a directory name for logical grouping. From the 3 example checks listed above, the directory structure should look like this:

```
├── DHIS2_HOME
│   ├── dhis.conf
│   ├── custom-data-integrity-checks.yaml
│   ├── custom-data-integrity-checks
│   │   ├── categories
│   │   │   ├── my_custom_check.yaml
│   │   ├── users
│   │   │   ├── my_user_group_check.yaml
│   │   ├── base_check.yaml
```

Name and Code constraints

Each data integrity check `name` and `code` must be unique. If there are any clashes then the violating custom check will not be loaded.

> **Note**
>
> System data integrity checks are always loaded first. Any name or code clashes resulting from custom checks will not affect these core system checks.

An example data integrity check yaml file is located here for reference. Note the `name` property.

The data integrity `code` is calculated dynamically by using the first letter of each word in the `name`. Some examples:

Name	Code
my_custom_check	MCC
my_second_custom_check	MSCC
another_custom_check	ACC

If there is a `name` clash, a warning log like this will be present:

```
09:48:43.138  WARN o.h.d.d.DefaultDataIntegrityService: Data Integrity Check `my_custom_check` not added as a check with that name already exists
```

If there is a `code` clash, a warning log like this will be present:

```
09:48:43.138  WARN o.h.d.d.DefaultDataIntegrityService: Data Integrity Check `my_custom_check` not added as a check with the code `MCC` already exists
```

Data Integrity Check Schema

A data integrity check file must comply with this JSON schema. If a check does not comply with the schema then a warning like this will be present:

```
09:48:43.136  WARN o.h.d.d.DataIntegrityYamlReader: JsonSchema validation errors found for Data Integrity Check `categories/my_custom_check.yaml`. Errors: [$.name: is missing but it is required]
```

Any schema violations must be fixed before that check can be loaded and used.

If a data integrity check file contains invalid yaml then a warning log like this could be present:

```
10:30:37.858  WARN o.h.d.d.DataIntegrityYamlReader: JsonSchema validation errors found for Data Integrity Check `my_custom_check.yaml`. Errors: [$: string found, object expected]
```

To view and use the custom checks please refer to the main Data Integrity section

> **Note**
>
> It is recommended to follow any naming and format conventions seen in the provided examples above when implementing your own custom checks to help avoid any issues

Data Integrity File

Details of the data integrity check yaml file, taken from the JSON schema file

property	required	info
name	yes	unique name of the check
description	yes	description
section	yes	used for logical grouping of checks e.g. categories, users
section_order	yes	the order of the check when displayed in the UI
summary_sql	yes	an SQL query which should return a single result which represents the total count of issues

property	required	info
details_sql	yes	an SQL query which should return a list of identified objects from this particular issue. Should return at least uid and name
details_id_type	yes	a short string which identifies the section of the details SQL
severity	yes	level of severity of the issue. One of [INFO, WARNING, SEVERE, CRITICAL]
introduction	yes	outlining the objective of the check
recommendation	yes	outlining how to resolve identified issues

Example custom data integrity check

An example of a custom check could be for determining if users have an email. Emails are useful to be able to communicate with users and sent them notifications, as well as password recovery. So, in some instllations of DHIS2, it could be a policy that all users should have emails. An example of this type of custom check is shown below.

```
---
name: users_should_have_emails
description: Users should have emails.
section: Users
section_order: 6
summary_sql: >-
  WITH users_no_email as (
  SELECT uid,username from
  userinfo where email IS NULL)
  SELECT COUNT(*) as value,
  100*COUNT(*) / NULLIF( ( select COUNT(*) from userinfo), 0) as percent
  from users_no_email;
details_sql: >-
  WITH users_no_email as (
  SELECT uid,username from
  userinfo where email IS NULL)
  SELECT uid,username as from users_no_email;
severity: WARNING
introduction: >
  Users should have defined emails. This is important for password recovery and to be able
  to send notifications to users.
recommendation: >
  Make sure that all users have defined emails.
details_id_type: users
```

More examples of different types of metadata integrity checks can be found in the DHIS2 source code here.

Complete data set registrations

This section is about complete data set registrations for data sets. A registration marks as a data set as completely captured.

Completing data sets

This section explains how to register data sets as complete. This is achieved by interacting with the *completeDataSetRegistrations* resource:

```
GET /api/33/completeDataSetRegistrations
```

The endpoint supports the *POST* method for registering data set completions. The endpoint is functionally very similar to the *dataValueSets* endpoint, with support for bulk import of complete registrations.

Importing both *XML* and *JSON* formatted payloads are supported. The basic format of this payload, given as *XML* in this example, is like so:

```
<completeDataSetRegistrations xmlns="http://dhis2.org/schema/dxf/2.0">
  <completeDataSetRegistration period="200810" dataSet="eZDhcZi6FLP"
    organisationUnit="qhqAxPSTUXp" attributeOptionCombo="bRowv6yZOF2" storedBy="imported"/>
  <completeDataSetRegistration period="200811" dataSet="eZDhcZi6FLP"
    organisationUnit="qhqAxPSTUXp" attributeOptionCombo="bRowv6yZOF2" storedBy="imported"/>
</completeDataSetRegistrations>
```

The *storedBy* attribute is optional (as it is a nullable property on the complete registration object). You can also optionally set the *date* property (time of registration) as an attribute. It the time is not set, the current time will be used.

The import process supports the following query parameters:

Complete data set registrations query parameters

Parameter	Values	Description
dataSetIdScheme	id | name | code | attribute:ID	Property of the data set to use to map the complete registrations.
orgUnitIdScheme	id | name | code | attribute:ID	Property of the organisation unit to use to map the complete registrations.
attributeOptionComboIdScheme	id | name | code | attribute:ID	Property of the attribute option combos to use to map the complete registrations.
idScheme	id | name | code | attribute:ID	Property of all objects including data sets, org units and attribute option combos, to use to map the complete registrations.
preheatCache	false | true	Whether to save changes on the server or just return the import summary.
dryRun	false | true	Whether registration applies to sub units
importStrategy	CREATE | UPDATE | CREATE_AND_UPDATE | DELETE	Save objects of all, new or update import status on the server.

Parameter	Values	Description
skipExistingCheck	false | true	Skip checks for existing complete registrations. Improves performance. Only use for empty databases or when the registrations to import do not exist already.
async	false | true	Indicates whether the import should be done asynchronous or synchronous. The former is suitable for very large imports as it ensures that the request does not time out, although it has a significant performance overhead. The latter is faster but requires the connection to persist until the process is finished.

The `idScheme`, `dataSetIdScheme`, `orgUnitIdScheme`, `attributeOptionComboIdScheme`, `dryRun` and `strategy` (note the dissimilar naming to parameter `importStrategy`) can also be set as part of the payload. In case of XML these are attributes, in case of JSON these are members in the `completeDataSetRegistrations` node.

For example:

```
<completeDataSetRegistrations xmlns="http://dhis2.org/schema/dxf/2.0"
      orgUnitIdScheme="CODE">
    <completeDataSetRegistration period="200810" dataSet="eZDhcZi6FLP"
    organisationUnit="OU_559" attributeOptionCombo="bRowv6yZOF2" storedBy="imported"/>
</completeDataSetRegistrations>
```

Should both URL parameter and payload set a scheme the payload takes precedence.

Reading complete data set registrations

This section explains how to retrieve data set completeness registrations. We will be using the *completeDataSetRegistrations* resource. The query parameters to use are these:

Data value set query parameters

Parameter	Description
dataSet	Data set identifier, multiple data sets are allowed
period	Period identifier in ISO format. Multiple periods are allowed.
startDate	Start date for the time span of the values to export
endDate	End date for the time span of the values to export
created	Include only registrations which were created since the given timestamp

Parameter	Description
createdDuration	Include only registrations which were created within the given duration. The format is <value><time-unit>, where the supported time units are "d", "h", "m", "s" *(days, hours, minutes, seconds).* The time unit is relative to the current time.
orgUnit	Organisation unit identifier, can be specified multiple times. Not applicable if orgUnitGroup is given.
orgUnitGroup	Organisation unit group identifier, can be specified multiple times. Not applicable if orgUnit is given.
children	Whether to include the children in the hierarchy of the organisation units
limit	The maximum number of registrations to include in the response.
idScheme	Identifier property used for meta data objects in the response.
dataSetIdScheme	Identifier property used for data sets in the response. Overrides idScheme.
orgUnitIdScheme	Identifier property used for organisation units in the response. Overrides idScheme.
attributeOptionComboIdScheme	Identifier property used for attribute option combos in the response. Overrides idScheme.
The `dataSet` and `orgUnit` parameters can be repeated in order to include multiple data sets and organisation units.	

The `period`, `startDate`, `endDate`, `created` and `createdDuration` parameters provide multiple ways to set the time dimension for the request, thus only one can be used. For example, it doesn't make sense to both set the start/end date and to set the periods.

An example request looks like this:

```
GET /api/33/completeDataSetRegistrations?dataSet=pBOMPrpg1QX
  &startDate=2014-01-01&endDate=2014-01-31&orgUnit=YuQRtpLP10I
  &orgUnit=vWbkYPRmKyS&children=true
```

You can get the response in *xml* and *json* format. You can indicate which response format you prefer through the *Accept* HTTP header like in the example above. For xml you use *application/xml*; for json you use *application/json*.

Un-completing data sets

This section explains how you can un-register the completeness of a data set. To un-complete a data set you will interact with the completeDataSetRegistrations resource:

```
GET /api/33/completeDataSetRegistrations
```

This resource supports *DELETE* for un-registration. The following query parameters are supported:

Complete data set registrations query parameters

Query parameter	Required	Description
ds	Yes	Data set identifier
pe	Yes	Period identifier
ou	Yes	Organisation unit identifier
cc	No (must combine with cp)	Attribute combo identifier (for locking check)
cp	No (must combine with cp)	Attribute option identifiers, separated with ; for multiple values (for locking check)
multiOu	No (default false)	Whether registration applies to sub units

Data approval

Data approval

This section explains how to approve, unapprove and check approval status using the *dataApprovals* resource. Approval is done per data approval workflow, period, organisation unit and attribute option combo.

```
/api/33/dataApprovals
```

A data approval workflow is associated with several entities:

- A period type which defines the frequency of approval
- An optional category combination
- One or many data approval levels which are part of the workflow
- One or many data sets which are used for data collection

Get approval status

To get approval information for a data set you can issue a GET request:

```
/api/dataApprovals?wf=rIUL3hYOjJc&pe=201801&ou=YuQRtpLP10I
```

Data approval query parameters

Query parameter	Required	Description
wf	Yes	Data approval workflow identifier
pe	Yes	Period identifier
ou	Yes	Organisation unit identifier
aoc	No	Attribute option combination identifier

> **Note**
>
> For backward compatibility, the parameter `ds` for data set may be given instead of `wf` for workflow in this and other data approval requests as described below. If the data set is given, the workflow associated with that data set will be used.

This will produce a response similar to this:

```
{
  "mayApprove": false,
  "mayUnapprove": false,
  "mayAccept": false,
  "mayUnaccept": false,
  "state": "APPROVED_HERE",
  "approvedBy": "User A",
  "approvedAt": "2022-01-13T12:56:07.005",
  "acceptedBy": "User A",
  "acceptedAt": "2022-01-13T12:56:07.005"
}
```


The returned parameters are:

Data approval returned parameters

Return Parameter	Description
mayApprove	Whether the current user may approve this data selection.
mayUnapprove	Whether the current user may unapprove this data selection.
mayAccept	Whether the current user may accept this data selection.
mayUnaccept	Whether the current user may unaccept this data selection.
state	One of the data approval states from the table below.
approvedBy	If the selection is approved, and if present (not always needed), the user's name who made this approval.
approvedAt	If the selection is approved, and if present (not always needed), the date and time at which the highest level of approval was created.
acceptedBy	If the selection is approved, and if present (not always needed), the user's name who made the last update.
acceptedAt	If the selection is approved, and if present (not always needed), the date and time at which the highest level of approval was last updated.

Data approval states

State	Description
UNAPPROVABLE	Data approval does not apply to this selection. (Data is neither approved nor unapproved.)
UNAPPROVED_WAITING	Data could be approved for this selection, but is waiting for some lower-level approval before it is ready to be approved.
UNAPPROVED_ELSEWHERE	Data is unapproved, and is waiting for approval somewhere else (not approvable here.)
UNAPPROVED_READY	Data is unapproved, and is ready to be approved for this selection.

State	Description
APPROVED_HERE	Data is approved, and was approved here (so could be unapproved here.)
APPROVED_ELSEWHERE	Data is approved, but was not approved here (so cannot be unapproved here.) This covers the following cases: * Data is approved at a higher level. * Data is approved for wider scope of category options. * Data is approved for all sub-periods in selected period. In the first two cases, there is a single data approval object that covers the selection. In the third case there is not.
ACCEPTED_HERE	Data is approved and accepted here (so could be unapproved here.)
ACCEPTED_ELSEWHERE	Data is approved and accepted, but elsewhere.

Note that when querying for the status of data approval, you may specify any combination of the query parameters. The combination you specify does not need to describe the place where data is to be approved at one of the approval levels. For example:

- The organisation unit might not be at an approval level. The approval status is determined by whether data is approved at an approval level for an ancestor of the organisation unit.
- You may specify individual attribute category options. The approval status is determined by whether data is approved for an attribute category option combination that includes one or more of these options.
- You may specify a time period that is longer than the period for the data set at which the data is entered and approved. The approval status is determined by whether the data is approved for all the data set periods within the period you specify.

For data sets which are associated with a category combo you might want to fetch data approval records for individual attribute option combos from the following resource with a GET request:

```
/api/dataApprovals/categoryOptionCombos?wf=rIUL3hYOjJc&pe=201801&ou=YuQRtpLP10I
```

Bulk get approval status

To get a list of multiple approval statuses, you can issue a GET request similar to this:

```
/api/dataApprovals/approvals?wf=rIUL3hYOjJc&pe=201801,201802&ou=YuQRtpLP10I
```

The parameters `wf`, `pe`, `ou`, and `aoc` are the same as for getting a single approval status, except that you can provide a comma-separated list of one or more values for each parameter.

This will give you a response containing a list of approval parameters and statuses, something like this:

```
[
  {
```

```
    "aoc": "HllvX50cXC0",
    "pe": "201801",
    "level": "KaTJLhGmU95",
    "ou": "YuQRtpLP10I",
    "permissions": {
      "mayApprove": false,
      "mayUnapprove": true,
      "mayAccept": true,
      "mayUnaccept": false,
      "mayReadData": true,
      "approvedBy": "User A",
      "approvedAt": "2022-01-13T12:56:07.005",
      "acceptedBy": "User A",
      "acceptedAt": "2022-01-13T12:56:07.005"
    },
    "state": "APPROVED_HERE",
    "wf": "rIUL3hYOjJc"
  },
  {
    "aoc": "HllvX50cXC0",
    "pe": "201802",
    "ou": "YuQRtpLP10I",
    "permissions": {
      "mayApprove": true,
      "mayUnapprove": false,
      "mayAccept": false,
      "mayUnaccept": false,
      "mayReadData": true
    },
    "state": "UNAPPROVED_READY",
    "wf": "rIUL3hYOjJc"
  }
]
```


The returned fields are described in the table below.

Field	Description
aoc	Attribute option combination identifier
pe	Period identifier
ou	Organisation Unit identifier
permissions	The permissions: same definitions as for get single approval status (see table *Data approval returned parameters*) .
state	One of the data approval states (same as for get single approval status.)
wf	Data approval workflow identifier

Approve data

To approve data you can issue a *POST* request to the *dataApprovals* resource. To un-approve data, you can issue a *DELETE* request to the dataApprovals resource.

```
POST DELETE /api/33/dataApprovals
```

To accept data that is already approved you can issue a *POST* request to the *dataAcceptances* resource. To un-accept data, you can issue a *DELETE* request to the *dataAcceptances* resource.

```
POST DELETE /api/33/dataAcceptances
```

These requests contain the following parameters:

Data approval action parameters

Action parameter	Required	Description
wf	Yes	Data approval workflow identifier
pe	Yes	Period identifier
ou	Yes	Organisation unit identifier
aoc	No	Attribute option combination identifier

Note that, unlike querying the data approval status, you must specify parameters that correspond to a selection of data that could be approved. In particular, both of the following must be true:

- The organisation unit's level must be specified by an approval level in the workflow.
- The time period specified must match the period type of the workflow.

Bulk approve data

You can approve a bulk of data records by posting to the `/api/dataApprovals/approvals` resource.

```
POST /api/33/dataApprovals/approvals
```

You can unapprove a bulk of data records by posting to the `/api/dataApprovals/unapprovals` resource.

```
POST /api/33/dataApprovals/unapprovals
```

You can accept a bulk of records by posting to the `/api/dataAcceptances/acceptances` resource.

```
POST /api/33/dataAcceptances/acceptances
```

You can unaccept a bulk of records by posting to the `/api/dataAcceptances/unacceptances` resource.

```
POST /api/33/dataAcceptances/unacceptances
```

The approval payload is supported as JSON and looks like this:

```
{
  "wf": [
    "pBOMPrpg1QX", "lyLU2wR22tC"
  ],
  "pe": [
    "201601", "201602"
  ],
  "approvals": [
    {
      "ou": "cDw53Ej8rju",
      "aoc": "ranftQIH5M9"
    },
    {
      "ou": "cDw53Ej8rju",
      "aoc": "fC3z1lcAW5x"
    }
  ]
}
```

Get data approval levels

To retrieve data approval workflows and their data approval levels you can make a GET request similar to this:

```
/api/dataApprovalWorkflows?
  fields=id,name,periodType,dataApprovalLevels[id,name,level,orgUnitLevel]
```

Authorities for data approval

- `F_DATA_APPROVAL_WORKFLOW` : allow user to Add/Update Data Approval Workflow
- `F_DATA_APPROVAL_LEVEL` : allow user to Add/Update Data Approval Level

Sharing

Sharing

The sharing solution allows you to share most objects in the system with specific user groups and to define whether objects should be publicly accessible or private. To get and set sharing status for objects you can interact with the *sharing* resource.

```
/api/33/sharing
```

Get sharing status

To request the sharing status for an object use a GET request to:

```
/api/33/sharing?type=dataElement&id=fbfJHSPpUQD
```

The response looks like the below.

```
{
  "meta": {
    "allowPublicAccess": true,
    "allowExternalAccess": false
  },
  "object": {
    "id": "fbfJHSPpUQD",
    "name": "ANC 1st visit",
    "publicAccess": "rw------",
    "externalAccess": false,
    "user": {},
    "userGroupAccesses": [
      {
        "id": "hj0nnsVsPLU",
        "access": "rw------"
      },
      {
        "id": "qMjBflJMOfB",
        "access": "r-------"
      }
    ]
  }
}
```

Set sharing status

You can define the sharing status for an object using the same URL with a POST request, where the payload in JSON format looks like this:

```
{
  "object": {
    "publicAccess": "rw------",
    "externalAccess": false,
    "user": {},
    "userGroupAccesses": [
      {
        "id": "hj0nnsVsPLU",
```

```
        "access": "rw------"
      },
      {
        "id": "qMjBflJMOfB",
        "access": "r-------"
      }
    ]
  }
}
```

In this example, the payload defines the object to have read-write public access, no external access (without login), read-write access to one user group and read-only access to another user group. You can submit this to the sharing resource using curl:

```
curl -d @sharing.json "localhost/api/33/sharing?type=dataElement&id=fbfJHSPpUQD"
  -H "Content-Type:application/json" -u admin:district
```

Note

> It is possible to create surprising sharing combinations. For instance, if `externalAccess` is set to `true` but `publicAccess` is set to `--------`, then users will have access to the object only when they are logged out.

New Sharing object

From 2.36 a new `sharing` property has been introduced in order to replace the old sharing properties `userAccesses`, `userGroupAccesses`, `publicAccess`, `externalAccess` in all metadata classes that have sharing enabled. This `Sharing` object is saved as a JSONB column in database. However, in order make it backward compatible the old sharing objects still work normally as before, for both import and export. In backend sharing data will be saved to new JSONb `sharing` column instead of the old `*accesses` tables.

The format looks like this:

```
{
  "name": "ANC 1st visit",
  "publicAccess": "rw------",
  "externalAccess": false,
  "userGroupAccesses": [
      {
          "access": "r-r-----",
          "userGroupUid": "Rg8wusV7QYi",
          "displayName": "HIV Program Coordinators",
          "id": "Rg8wusV7QYi"
      }
  ],
  "userAccesses": [],
  "user": {
      "displayName": "Tom Wakiki",
      "name": "Tom Wakiki",
      "id": "GOLswS44mh8",
      "username": "system"
  },
  "sharing": {
      "owner": "GOLswS44mh8",
      "external": false,
      "users": {},
```

```
      "userGroups": {
          "Rg8wusV7QYi": {
              "access": "r-r-----",
              "id": "Rg8wusV7QYi"
          }
      },
      "public": "rw------"
  }
}
```

Set sharing status using new JSON Patch Api

You can use JSON Patch API to update sharing for an object by sending a `PATCH` request to this endpoint with header `Content-Type: application/json-patch+json`

```
api/dataElements/fbfJHSPpUQD
```

Please note that this function ***only supports*** new `sharing` format. The payload in JSON format looks like this:

```
[
  {
    "op": "replace",
    "path": "/sharing/users",
    "value": {
      "NOOF56dveaZ": {
        "access": "rw------",
        "id": "NOOF56dveaZ"
      },
      "Kh68cDMwZsg": {
        "access": "rw------",
        "id": "Kh68cDMwZsg"
      }
    }
  }
]
```

You can add users to `sharing` property of an object like this

```
[
  {
    "op": "add",
    "path": "/sharing/users",
    "value": {
      "NOOF56dveaZ": {
        "access": "rw------",
        "id": "NOOF56dveaZ"
      },
      "Kh68cDMwZsg": {
        "access": "rw------",
        "id": "Kh68cDMwZsg"
      }
    }
  }
]
```

You can add one user to `sharing` like this

```
[
  {
    "op": "add",
    "path": "/sharing/users/NOOF56dveaZ",
    "value": {
      "access": "rw------",
      "id": "NOOF56dveaZ"
    }
  }
]
```

You can remove one user from `sharing` like this

```
[
  {
    "op": "remove",
    "path": "/sharing/users/N3PZBUlN8vq"
  }
]
```

Cascade Sharing for Dashboard

Overview

- `cascadeSharing` is available for Dashboards. This function copies the `userAccesses` and `userGroupAccesses` of a Dashboard to all of the objects in its `DashboardItems`, including `Map`, `EventReport`, `EventChart`, `Visualization`.
- This function will not copy `METADATA_WRITE` access. The copied `UserAccess` and `UserGroupAccess` will **only** receive the `METADATA_READ` permission.
- The `publicAccess` setting of the Dashboard is not copied.
- If any target object has `publicAccess` enabled, then it will be skipped and will not receive the `UserAccesses` or `UserGroupAccesses` from the Dashboard.
- The current user must have `METADATA_READ` sharing permission to all target objects. If the user does not, error `E5001` is thrown.
- The current user must have `METADATA_WRITE` sharing permission to update any target objects. If a target object should be updated and the user does not have this permission, error `E3001` is thrown.

Sample use case

- DashboardA is shared to userA with `METADATA_READ_WRITE` permission.
- DashboardA has VisualizationA which has DataElementA.
- VisualizationA, DataElementA have `publicAccess` *disabled* and are *not shared* to userA.
- After executing cascade sharing for DashboardA, userA will have `METADATA_READ` access to VisualizationA and DataElementA.

API endpoint

- Send `POST` request to endpoint

```
api/dashboards/cascadeSharing/{dashboardUID}
```

API Parameters

Name	Default	Description
dryRun	false	If this is set to `true`, then cascade sharing function will proceed without updating any objects. The response will includes errors if any and all objects which will be updated. This helps user to know the result before actually executing the cascade sharing function.
atomic	false	If this is set to `true`, then the cascade sharing function will stop and not updating any objects if there is an error. Otherwise, if this is `false` then the function will try to proceed with best effort mode.

Sample response:


```
{
  "errorReports": [
    {
      "message": "No matching object for reference. Identifier was s46m5MS0hxu, and object was
DataElement.",
      "mainKlass": "org.hisp.dhis.dataelement.DataElement",
      "errorCode": "E5001",
      "errorProperties": [
        "s46m5MS0hxu",
        "DataElement"
      ]
    }
  ],
  "countUpdatedDashBoardItems": 1,
  "updateObjects": {
    "dataElements": [
      {
        "id": "YtbsuPPo010",
        "name": "Measles doses given"
      },
      {
        "id": "l6byfWFUGaP",
        "name": "Yellow Fever doses given"
      }
    ]
  }
}
```


Response properties:

- `errorReports`: includes all errors during cascade sharing process.
- `countUpdatedDashBoardItems`: Number of `DashboardItem` will be or has been updated depends on `dryRun` mode.
- `updateObjects`: List of all objects which will be or has been updated depends on `dryRun` mode.

Bulk Sharing patch API

- The bulk sharing API allow you to apply sharing settings to multiple metadata objects. This means the ability to add or remove many users and user groups to many objects in one API operation.
- This API should not support keeping metadata objects in sync over time, and instead treat it as a one-time operation.
- The API needs to respect the sharing access control, in that the current user must have access to edit the sharing of the objects being updated.
- There are two new api endpoints introduced from 2.38 that allow bulk sharing patch update as described below.
- Please note that those `PATCH` request must use header `Content-type:application/json-patch+json`

Using `/api/{object-type}/sharing` with `PATCH` request

- This endpoint allows user to apply one set of Sharing settings for multiple metadata objects of *one object-type*.
- Note that we still support JsonPatch request for one object with endpoint `api/{object-type}/{uid}`. For instance, you can still update sharing of a DataElement by sending PATCH request to `api/dataElements/cYeuwXTCPkU/sharing`

Example:

```
curl -X PATCH -d @payload.json -H "Content-Type: application/json-patch+json" "https://play.dhis2.org/dev/api/dataElements/sharing"
```

Using `/api/metadata/sharing` with `PATCH` request

- This endpoint allows user to apply Sharing settings for *multiple object-types* in one payload.

Example:

```
curl -X PATCH -d @payload.json -H "Content-Type: application/json-patch+json" "https://play.dhis2.org/dev/api/metadata/sharing"
```

Parameters

- Both patch api endpoints have same parameter:

Name	Default	Description
atomic	false	If this is set to true, then the batch function will stop and not updating any objects if there is an error Otherwise, if this is false then the function will try to proceed with best effort mode.

Validation

- All object ID will be validated for existence.
- Current User need to have metadata READ/WRITE permission on updating objects.
- All existing validations from metadata import service will also be applied.

Response

- Response format should be same as from `/api/metadata` api.

Payload formats

- Payload for single object type using `/api/{object-type}/sharing` looks like this

```
{
  "dataSets":[
    "cYeuwXTCPkU",
    "aYeuwXTCPkU"
  ],
  "patch":[
    {
      "op":"add",
      "path":"/sharing/users/DXyJmlo9rge",
      "value":{
        "access":"rw------",
        "id":"DXyJmlo9rge"
      }
    },
    {
      "op":"remove",
      "path":"/sharing/users/N3PZBUlN8vq"
    }
  ]
}
```

- Payload for multiple object types in one payload using `api/metadata/sharing`

```
{
  "dataElements": {
    "fbfJHSPpUQD": [
      {
        "op": "replace",
        "path": "/sharing/users",
        "value": {
          "NOOF56dveaZ": {
            "access": "rw------",
            "id": "CotVI2NX0rI"
          },
          "Kh68cDMwZsg": {
            "access": "rw------",
            "id": "DLjZWMsVsq2"
          }
        }
      }
    ]
  },
  "dataSets": {
    "cYeuwXTCPkA": [
      {
        "op": "remove",
        "path": "/sharing/users/N3PZBUlN8vq"
      }
    ],
    "cYeuwXTCPkU": [
      {
        "op": "add",
```

```
        "path": "/sharing/users/DXyJmlo9rge",
        "value": {
          "access": "rw------",
          "id": "DXyJmlo9rge"
        }
      }
    ]
  },
  "programs": {
    "GOLswS44mh8": [
      {
        "op": "add",
        "path": "/sharing/userGroups",
        "value": {
          "NOOF56dveaZ": {
            "access": "rw------",
            "id": "NOOF56dveaZ"
          },
          "Kh68cDMwZsg": {
            "access": "rw------",
            "id": "Kh68cDMwZsg"
          }
        }
      }
    ]
  }
}
```

Scheduling

Get available job types

To get a list of all available job types you can use the following endpoint:

```
GET /api/jobConfigurations/jobTypes
```

The response contains information about each job type including name, job type, key, scheduling type and available parameters. The scheduling type can either be `CRON`, meaning jobs can be scheduled using a cron expression with the `cronExpression` field, or `FIXED_DELAY`, meaning jobs can be scheduled to run with a fixed delay in between with the `delay` field. The field delay is given in seconds.

A response will look similar to this:

```
{
  "jobTypes": [
    {
      "name": "Data integrity",
      "jobType": "DATA_INTEGRITY",
      "key": "dataIntegrityJob",
      "schedulingType": "CRON"
    }, {
      "name": "Resource table",
      "jobType": "RESOURCE_TABLE",
      "key": "resourceTableJob",
      "schedulingType": "CRON"
    }, {
      "name": "Continuous analytics table",
      "jobType": "CONTINUOUS_ANALYTICS_TABLE",
      "key": "continuousAnalyticsTableJob",
      "schedulingType": "FIXED_DELAY"
    }
  ]
}
```

Job Configurations

DHIS2 allows for scheduling of jobs of various types. Each type of job has different properties for configuration, giving you finer control over how jobs are run. In addition, you can configure the same job to run with different configurations and at different intervals if required.

Main properties

Property	Description	Type
name	Name of the job.	String
cronExpression	The cron expression which defines the interval for when the job should run.	String (Cron expression)

Property	Description	Type
jobType	The job type represent which task is run. In the next table, you can get an overview of existing job types. Each job type can have a specific set of parameters for job configuration.	String (Enum)
jobParameters	Job parameters, if applicable for job type.	(See list of job types)
enabled	A job can be added to the system without it being scheduled by setting `enabled` to false in the JSON payload. Use this if you want to temporarily stop scheduling for a job, or if a job configuration is not complete yet.	Boolean

Job Parameters

`DATA_INTEGRITY` job parameters

Name	Type	Default	Description
`checks`	array of string	`[]` = all	names of the checks to run in order of execution
`type`	enum	`REPORT`	REPORT, SUMMARY or DETAILS

`ANALYTICS_TABLE` job parameters

Name	Type	Default	Description
`lastYears`	int	0	Number of years back to include
`skipTableTypes`	array of enum	`[]`	Skip generation of tables; Possible values: `DATA_VALUE`, `COMPLETENESS`, `COMPLETENESS_TARGET`, `ORG_UNIT_TARGET`, `EVENT`, `ENROLLMENT`, `VALIDATION_RESULT`
`skipResourceTables`	boolean	`false`	Skip generation of resource tables
`skipPrograms`	array of string	`[]`	Optional list of programs (IDs) that should be skipped

`CONTINUOUS_ANALYTICS_TABLE` job parameters

Name	Type	Default	Description
`lastYears`	int	`0`	Number of years back to include
`skipTableTypes`	array of enum	`[]`	Skip generation of tables; Possible values: `DATA_VALUE`, `COMPLETENESS`, `COMPLETENESS_TARGET`, `ORG_UNIT_TARGET`, `EVENT`, `ENROLLMENT`, `VALIDATION_RESULT`
`fullUpdateHourOfDay`	int	`0`	Hour of day for full update of analytics tables (0-23)

`DATA_SYNC` job parameters

Name	Type	Default	Description
`pageSize`	int	`10000`	number of data values processed as a unit

`META_DATA_SYNC` job parameters

Name	Type	Default	Description
`trackerProgramPageSize`	int	`20`	number of tracked entities processed as a unit
`eventProgramPageSize`	int	`60`	number of events processed as a unit
`dataValuesPageSize`	int	`10000`	number of data values processed as a unit

`MONITORING` (Validation rule analysis) job parameters

Name	Type	Default	Description
`relativeStart`	int	`0`	A number related to date of execution which resembles the start of the period to monitor
`relativeEnd`	int	`0`	A number related to date of execution which resembles the end of the period to monitor
`validationRuleGroups`	array of string	`[]`	Validation rule groups (UIDs) to include in job
`sendNotification`	boolean	`false`	Set `true` if job should send notifications based on validation rule groups

Name	Type	Default	Description
`persistsResults`	boolean	`false`	Set `true` if job should persist validation results

`PUSH_ANALYSIS` job parameters

Name	Type	Default	Description
`pushAnalysis`	array of string	`[]`	The UIDs of the push analysis you want to run

`PREDICTOR` job parameters

Name	Type	Default	Description
`relativeStart`	int	`0`	A number related to date of execution which resembles the start of the period to monitor
`relativeEnd`	int	`0`	A number related to date of execution which resembles the start of the period to monitor
`predictors`	array of string	`[]`	Predictors (UIDs) to include in job
`predictorGroups`	array of string	`[]`	Predictor groups (UIDs) to include in job

`MATERIALIZED_SQL_VIEW_UPDATE` job parameters

Name	Type	Default	Description
`sqlViews`	array of string	`[]`	The UIDs of the SQL views that are updated by the job

Create a Job Configuration

To configure jobs you can do a POST request to the following resource:

```
/api/jobConfigurations
```

A job without parameters in JSON format looks like this :

```
{
  "name": "",
  "jobType": "JOBTYPE",
  "cronExpression": "0 * * ? * *",
}
```

An example of an analytics table job with parameters in JSON format:

```
{
  "name": "Analytics tables last two years",
  "jobType": "ANALYTICS_TABLE",
  "cronExpression": "0 * * ? * *",
  "jobParameters": {
    "lastYears": "2",
    "skipTableTypes": [],
    "skipResourceTables": false
  }
}
```

As example of a push analysis job with parameters in JSON format:

```
{
   "name": "Push anlysis charts",
   "jobType": "PUSH_ANALYSIS",
   "cronExpression": "0 * * ? * *",
   "jobParameters": {
     "pushAnalysis": [
       "jtcMAKhWwnc"
     ]
    }
 }
```

An example of a job with scheduling type `FIXED_DELAY` and 120 seconds delay:

```
{
  "name": "Continuous analytics table",
  "jobType": "CONTINUOUS_ANALYTICS_TABLE",
  "delay": "120",
  "jobParameters": {
    "fullUpdateHourOfDay": 4
  }
}
```

Get Job Configurations

List all job configurations:

```
GET /api/jobConfigurations
```

Retrieve a job:

```
GET /api/jobConfigurations/{id}
```

The response payload looks like this:

```
{
  "lastUpdated": "2018-02-22T15:15:34.067",
  "id": "KBcP6Qw37gT",
  "href": "http://localhost:8080/api/jobConfigurations/KBcP6Qw37gT",
  "created": "2018-02-22T15:15:34.067",
  "name": "analytics last two years",
```

```
  "jobStatus": "SCHEDULED",
  "displayName": "analytics last two years",
  "enabled": true,
  "externalAccess": false,
  "jobType": "ANALYTICS_TABLE",
  "nextExecutionTime": "2018-02-26T03:00:00.000",
  "cronExpression": "0 0 3 ? * MON",
  "jobParameters": {
    "lastYears": 2,
    "skipTableTypes": [],
    "skipResourceTables": false
  },
  "favorite": false,
  "configurable": true,
  "access": {
    "read": true,
    "update": true,
    "externalize": true,
    "delete": true,
    "write": true,
    "manage": true
  },
  "lastUpdatedBy": {
    "id": "GOLswS44mh8"
  },
  "favorites": [],
  "translations": [],
  "userGroupAccesses": [],
  "attributeValues": [],
  "userAccesses": []
}
```


Update a Job Configuration

Update a job with parameters using the following endpoint and JSON payload format:

```
PUT /api/jobConfiguration/{id}
```

```
{
  "name": "analytics last two years",
  "enabled": true,
  "cronExpression": "0 0 3 ? * MON",
  "jobType": "ANALYTICS_TABLE",
  "jobParameters": {
    "lastYears": "3",
    "skipTableTypes": [],
    "skipResourceTables": false
  }
}
```

Delete a Job Configuration

Delete a job using:

```
DELETE /api/jobConfiguration/{id}
```

Note that some jobs with custom configuration parameters may not be added if the required system settings are not configured. An example of this is data synchronization, which requires remote server configuration.

Run Jobs Manually

Jobs can be run manually using:

```
POST /api/jobConfiguration/{id}/execute
```

Scheduler API

While `/api/jobConfigurations` is centered around the job configuration objects the `/api/scheduler` API reflects the state of the scheduler and the `/api/scheduling` API provides job progress tracking information.

Observe Running Jobs

The execution steps and state can be observed while the job is running. A list of all types of jobs that are currently running is provided by:

```
GET /api/scheduling/running/types
```

To get an overview of all running jobs by job type use:

```
GET /api/scheduling/running
```

As there only can be one job running for each type at a time the status of a running job can be viewed in details using:

```
GET /api/scheduling/running/{type}
```

For example, to see status of a running `ANALYTICS_TABLE` job use

```
GET /api/scheduling/running/ANALYTICS_TABLE
```

A job is a sequence of processes. Each process has a sequence of `stages`. Within each stage there might be zero, one or many `items`. Items could be processed strictly sequential or parallel, n items at a time. Often the number of `totalItems` is known up-front.

In general the stages in a process and the items in a stage are "discovered" as a "side effect" of processing the data. While most processes have a fixed sequence of stages some processed might have varying stages depending on the data processed. Items are usually data dependent. Most jobs just include a single process.

Each of the nodes in the process-stage-item tree has a status that is either * `RUNNING`: is currently processed (not yet finished) * `SUCCESS`: when completed successful * `ERROR`: when completed with errors or when an exception has occurred * `CANCELLED`: when cancellation was requested and the item will not complete

See Completed Job Runs

Once a job has completed successful or with a failure as a consequence of an exception or cancellation the status moves from the set of running states to the completed job states. This set keeps only the most recent execution state for each job type. The overview is available at:

```
GET /api/scheduling/completed
```

Details on a particular job type are accordingly provided at:

```
GET /api/scheduling/completed/{type}
```

In case of the `ANALYTICS_TABLE` job this would be:

```
GET /api/scheduling/completed/ANALYTICS_TABLE
```

Request Cancelling a Running Jobs

Once a job is started it works through a sequence of steps. Each step might in turn have collections of items that are processed. While jobs usually cannot be stopped at any point in time we can request cancellation and the process gives up cooperatively once it has completed an item or step and recognises that a cancellation was requested. This means jobs do not stop immediately and leave at an unknown point right in the middle of some processing. Instead, they give up when there is an opportunity to skip to the end. This still means that the overall process is unfinished and is not rolled back. It might just have done a number of steps and skipped others at the end.

To cancel a running job use:

```
POST /api/scheduling/cancel/{type}
```

For example, to cancel the `ANALYTICS_TABLE` job run:

```
POST /api/scheduling/cancel/ANALYTICS_TABLE
```

Depending on the current step and item performed this can take from milliseconds to minutes before the cancellation becomes effective. However, the status of the overall process will be shown as `CANCELLED` immediately when check using

```
GET /api/scheduling/running/ANALYTICS_TABLE
```

Only jobs that have been split into processes, stages and items can be cancelled effectively. Not all jobs have been split yet. These will run till completion even if cancellation has been requested.

Job Queues

Sequences of jobs (configurations) can be created using job queues. The queue always uses a unique name and a CRON expression trigger. Once a queue is started it runs all jobs in the queue in the given sequence. The second in sequence starts when the first is finished and so forth.

List Names of Job Queues

To list the unique names of existing queues use:

```
GET /api/scheduler/queues
```

The response is a array of the names:

```
["queue_a", "queue_b"]
```

Get A Job Queue

To get all details of a specific queue use:

```
GET /api/scheduler/queues/{name}
```

The details include its name, CRON expression and job sequence:

```
{
  "name": "myQ",
  "cronExpression": "0 0 1 ? * *",
  "sequence": ["FgAxa6eRSzQ", "BeclVERfWbg" ]
}
```

Create a new Job Queue

To create a new queue send a POST request with a payload object having name, CRON expression and the job sequence:

```
POST /api/scheduler/queues/{name}
```

To create a queue with name `myQ` use a POST to `/api/scheduler/queues/myQ`:

```
{
  "cronExpression": "0 0 1 ? * *",
  "sequence": ["FgAxa6eRSzQ", "BeclVERfWbg" ]
}
```

A `name` can be present in the payload as well but name specified in the URL path takes precedence.

> **NOTE**
>
> The cron expression of all job configurations but the first in a queue is cleared as they do not have a trigger on their own any longer. It needs to be restored manually once a job is removed from a queue.

Update a Job Queue

To update an existing queue CRON expression or sequence use a PUT request

```
PUT /api/scheduler/queues/{name}
```

The payload has to state both new CRON expression and job sequence like in the example above to create a new queue.

To rename a queue the new name can be stated in the payload, while the old name is used in the URL path.

Delete a Job Queue

To delete a job queue send a DELETE request to its resource URL:

```
DELETE /api/scheduler/queues/{name}
```

> **NOTE**
>
> Deleting a queue does not delete any referenced job configurations. Any job configuration that is removed from a queue either by changing the sequence or deleting the queue is disabled. To use it individually supply a CRON expression and enable the configuration again.

Job Scheduler

The schedule within the scheduler is a list that is based on job configurations and job queues. Either an entry in the schedule is a simple job configuration, or it is a job queue. Both are represented using the same entry format.

To get the scheduler listing use:

```
GET /api/scheduler
```

A job configuration in this list looks like this:

```
{
  "name": "User account expiry alert",
  "type": "ACCOUNT_EXPIRY_ALERT",
  "cronExpression": "0 0 2 ? * *",
  "nextExecutionTime": "2023-03-15T02:00:00.000",
  "status": "SCHEDULED",
  "enabled": true,
  "configurable": false,
  "sequence": [
    {
      "id": "fUWM1At1TUx",
      "name": "User account expiry alert",
      "type": "ACCOUNT_EXPIRY_ALERT",
      "cronExpression": "0 0 2 ? * *",
      "nextExecutionTime": "2023-03-15T02:00:00.000",
      "status": "SCHEDULED"
    }
  ]
}
```

Most notably the `sequence` has only a single item. Information on top level object and the object in the `sequence` both originate from the job configuration.

A job queue in the list looks like this:

```
{
  "name": "myQ",
  "type": "Sequence",
  "cronExpression": "0 0 1 ? * *",
  "nextExecutionTime": "2023-03-15T01:00:00.000",
  "status": "SCHEDULED",
  "enabled": true,
  "configurable": true,
  "sequence": [
    {
      "id": "FgAxa6eRSzQ",
      "name": "test Q1",
      "type": "ANALYTICS_TABLE",
      "cronExpression": "0 0 1 ? * *",
      "nextExecutionTime": "2023-03-15T01:00:00.000",
      "status": "SCHEDULED"
    },
    {
      "id": "BeclVERfWbg",
      "name": "est Q2",
      "type": "DATA_INTEGRITY",
      "status": "SCHEDULED"
    }
  ]
}
```

The top level object originates from the queue and aggregate information. The objects within the sequence originate from the job configurations that are part of the sequence.

List Jobs Entries addable to a Job Queue

Not all jon configurations can be added to a queue. System jobs and jobs that are already part of a queue cannot be used in another queue. To list job configurations that can be part of any queue use:

```
GET /api/scheduler/queueable
```

To list job configurations that can be part of a particular queue use:

```
GET /api/scheduler/queueable?name={queue}
```

This will also exclude all jobs that are already part the named queue.

Synchronization

This section covers pull and push of data and metadata.

Data value push

To initiate a data value push to a remote server one must first configure the URL and credentials for the relevant server from System settings > Synchronization, then make a POST request to the following resource:

```
/api/33/synchronization/dataPush
```

Metadata pull

To initiate a metadata pull from a remote JSON document you can make a POST request with a *url* as request payload to the following resource:

```
/api/33/synchronization/metadataPull
```

> **Note**
>
> The supplied URL will be checked against the config property `system.remote_servers_allowed` in the `dhis.conf` file. If the base URL is not one of the configured servers allowed then the operation will not be allowed. See failure example below.
> Some examples where the config set is `system.remote_servers_allowed=https://server1.org/,https://server2.org/` - supply `https://server1.org/path/to/resource` -> this will be accepted - supply `https://server2.org/resource/path` -> this will be accepted - supply `https://oldserver.org/resource/path` -> this will be rejected
>
> Sample failure response

```
 {
  "httpStatus": "Conflict",
  "httpStatusCode": 409,
  "status": "ERROR",
  "message": "Provided URL is not in the remote servers allowed list",
  "errorCode": "E1004"
}
```

Availability check

To check the availability of the remote data server and verify user credentials you can make a GET request to the following resource:

```
/api/33/synchronization/availability
```

Audit

Auditing

DHIS2 will audit updates and deletions of aggregate data values, tracked entity data values, tracked entity attribute values and data approval records. This section explains how to retrieve audit records for the mentioned entities. Note that several of the query parameters can be repeated any number of times.

Aggregate data value audits

The endpoint for aggregate data value audits is located at:

```
/api/audits/dataValue
```

Aggregate data value query parameters

Parameter	Option	Description
ds	Data set ID	One or more data set identifiers to get data elements from
de	Data element ID	One or more data element identifiers
pe	ISO period	One or more period ISO identifiers
ou	Organisation unit ID	One or more org unit identifiers
auditType	UPDATE | DELETE	Filter by one or more audit types
skipPaging	false | true	Turn paging on / off
paging	false | true	Enable or disable paging
page	Number	Page number (default 1)
pageSize	Number	Page size (default 50)

Example: Get audits for a data set `lyLU2wR22tC` and audit type `CREATE` or `UPDATE`:

```
/api/33/audits/dataValue?ds=lyLU2wR22tC&auditType=CREATE,UPDATE
```

Example: Get audits for data element `BOSZApCrBni`, org unit `DiszpKrYNg8` and category option combination `TkDhg29x18A`:

```
/api/33/audits/dataValue?de=BOSZApCrBni&ou=DiszpKrYNg8&co=TkDhg29x18A
```

Tracked entity data value audits

The endpoint for tracked entity data value audits is located at:

```
/api/audits/trackedEntityDataValue
```

Tracked entity data value query parameters

Parameter	Option	Description
de	Data element ID	One or more data element identifiers
ou	Organisation unit ID	One or more organisation unit identifiers of the audited event
events	Events ID	One or more event identifiers of the audited event (comma separated)
ps	Program stage ID	One or more program sages of the audit event program
startDate	Start date	Return only audit records created after date
endDate	End date	Return only audit records created before date
ouMode	Organisation unit selection mode	SELECTED | DESCENDANTS
auditType	UPDATE | DELETE	Filter by one or more audit types
skipPaging	false | true	Turn paging on / off
paging	false | true	Whether to enable or disable paging
page	Number	Page number (default 1)
pageSize	Number	Page size (default 50)

Example: Get audits for data elements `eMyVanycQSC` and `qrur9Dvnyt5`:

```
/api/33/audits/trackedEntityDataValue?de=eMyVanycQSC&de=qrur9Dvnyt5
```

Example: Get audits for org unit `O6uvpzGd5pu` including descendant org units in the org unit hierarchy:

```
/api/audits/trackedEntityDataValue?ou=O6uvpzGd5pu&ouMode=DESCENDANTS
```

Tracked entity attribute value audits

The endpoint for tracked entity attribute value audits is located at:

```
/api/audits/trackedEntityAttributeValue
```

Tracked entity attribute value query parameters

Parameter	Option	Description
tea	Tracked entity attribute ID	One or more tracked entity attribute identifiers
trackedEntities	Tracked entity ID	One or more tracked entity identifiers (comma separated)
auditType	UPDATE | DELETE	Filter by one or more audit types
skipPaging	false | true	Turn paging on / off

Parameter	Option	Description
paging	false | true	Whether to enable or disable paging
page	Number	Page number (default 1)
pageSize	Number	Page size (default 50)

Example: Get audits for tracked entity attribute `VqEFza8wbwA`:

```
/api/33/audits/trackedEntityAttributeValue?tea=VqEFza8wbwA
```

Example: Get audits for tracked entity instance `wNiQ2coVZ39` and audit type `DELETE`:

```
/api/33/audits/trackedEntityAttributeValue?trackedEntities=wNiQ2coVZ39&auditType=DELETE
```

Tracked entity instance audits

Once auditing is enabled for tracked entities (by setting `allowAuditLog` of tracked entity types to `true`), all read and search operations are logged. The endpoint for accessing audit logs is located at:

```
/api/audits/trackedEntity
```

Tracked entity audit query parameters

Parameter	Option	Description
trackedEntities	Tracked Entity UIDS	One or more tracked entity identifiers (comma separated)
user	User	One or more user identifiers
auditType	SEARCH | READ	Filter by one or more audit types
startDate	Start date	Start date for audits in `yyyy-mm-dd` format
endDate	End date	End date for audits in `yyyy-mm-dd` format
skipPaging	false | true	Turn paging on / off.
paging	false | true	Whether to enable or disable paging
page	Number	Page number (default 1)
pageSize	Number	Page size (default 50)

Example: Get audits of audit type `READ` with `startDate` 2018-03-01 and `endDate` 2018-04-24 with a page size of 5:

```
/api/33/audits/trackedEntity.json?
startDate=2021-03-01&endDate=2022-04-24&auditType=READ&pageSize=5
```

Example: Get audits for tracked entity `wNiQ2coVZ39`:

```
/api/33/audits/trackedEntity.json?trackedEntities=wNiQ2coVZ39
```

DEPRECATED Tracked entity instance audits

Once auditing is enabled for tracked entity instances (by setting `allowAuditLog` of tracked entity types to `true`), all read and search operations are logged. The endpoint for accessing audit logs is located at:

```
/api/audits/trackedEntityInstance
```

Tracked entity instance audit query parameters

Parameter	Option	Description
trackedEntities	Tracked Entity UIDS	One or more tracked entity identifiers (comma separated)
user	User	One or more user identifiers
auditType	SEARCH | READ	Filter by one or more audit types
startDate	Start date	Start date for audits in `yyyy-mm-dd` format
endDate	End date	End date for audits in `yyyy-mm-dd` format
skipPaging	false | true	Turn paging on / off.
paging	false | true	Whether to enable or disable paging
page	Number	Page number (default 1)
pageSize	Number	Page size (default 50)

Example: Get audits of audit type `READ` with `startDate` 2018-03-01 and `endDate` 2018-04-24 with a page size of 5:

```
/api/33/audits/trackedEntityInstance.json?
startDate=2021-03-01&endDate=2022-04-24&auditType=READ&pageSize=5
```

Example: Get audits for tracked entity `wNiQ2coVZ39`:

```
/api/33/audits/trackedEntityInstance.json?trackedEntities=wNiQ2coVZ39
```

Data approval audits

The endpoint for data approval audits is located at:

```
/api/audits/dataApproval
```

Data approval query parameters

Parameter	Option	Description
dal	Data approval level ID	One or more data approval level identifiers
wf	Data approval workflow ID	One or more data approval workflow identifiers
ou	Organisation unit ID	One or more organisation unit identifiers
aoc	Attribute option combo ID	One or more attribute option combination identifiers
startDate	Start date	Start date for approvals in `yyyy-mm-dd` format
endDate	End date	End date for approvals in `yyyy-mm-dd` format
skipPaging	false | true	Turn paging on / off
page	Number	Page number (default 1)
pageSize	Number	Page size (default 50)

Example: Get audits for data approval workflow `i5m0JPw4DQi`:

```
/api/33/audits/dataApproval?wf=i5m0JPw4DQi
```

Exaple: Get audits between `2021-01-01` and `2022-01-01` for org unit `DiszpKrYNg8`:

```
/api/33/audits/dataApproval?ou=DiszpKrYNg8&startDate=2021-01-01&endDate=2022-01-01
```

Messaging

Message conversations

DHIS2 features a mechanism for sending messages for purposes such as user feedback, notifications, and general information to users. Messages are grouped into conversations. To interact with message conversations you can send POST and GET request to the *messageConversations* resource.

```
/api/33/messageConversations
```

Messages are delivered to the DHIS2 message inbox but can also be sent to the user's email addresses and mobile phones as SMS. In this example, we will see how we can utilize the Web API to send, read and manage messages. We will pretend to be the *DHIS2 Administrator* user and send a message to the *Mobile* user. We will then pretend to be the mobile user and read our new message. Following this, we will manage the admin user inbox by marking and removing messages.

Writing and reading messages

The resource we need to interact with when sending and reading messages is the *messageConversations* resource. We start by visiting the Web API entry point at http://play.dhis2.org/demo/api where we find and follow the link to the *messageConversations* resource at http://play.dhis2.org/demo/api/messageConversations. The description tells us that we can use a POST request to create a new message using the following XML format for sending to multiple users:

```
<message xmlns="http://dhis2.org/schema/dxf/2.0">
  <subject>This is the subject</subject>
  <text>This is the text</text>
  <users>
    <user id="user1ID" />
    <user id="user2ID" />
    <user id="user3ID" />
  </users>
</message>
```

For sending to all users contained in one or more user groups, we can use:

```
<message xmlns="http://dhis2.org/schema/dxf/2.0">
  <subject>This is the subject</subject>
  <text>This is the text</text>
  <userGroups>
    <userGroup id="userGroup1ID" />
    <userGroup id="userGroup2ID" />
    <userGroup id="userGroup3ID" />
  </userGroups>
</message>
```

For sending to all users connected to one or more organisation units, we can use:

```
<message xmlns="http://dhis2.org/schema/dxf/2.0">
  <subject>This is the subject</subject>
  <text>This is the text</text>
  <organisationUnits>
    <organisationUnit id="ou1ID" />
```

```
    <organisationUnit id="ou2ID" />
    <organisationUnit id="ou3ID" />
  </organisationUnits>
</message>
```

Since we want to send a message to our friend the mobile user we need to look up her identifier. We do so by going to the Web API entry point and follow the link to the *users* resource at `/api/users`. We continue by following link to the mobile user at `/api/users/PhzytPW3g2J` where we learn that her identifier is *PhzytPW3g2J*. We are now ready to put our XML message together to form a message where we want to ask the mobile user whether she has reported data for January 2014:

```
<message xmlns="http://dhis2.org/schema/dxf/2.0">
  <subject>Mortality data reporting</subject>
  <text>Have you reported data for the Mortality data set for January 2014?</text>
  <users>
    <user id="PhzytPW3g2J" />
  </users>
</message>
```

To test this we save the XML content into a file called *message.xml*. We use cURL to dispatch the message the DHIS2 demo instance where we indicate that the content-type is XML and authenticate as the *admin* user:

```
curl -d @message.xml "https://play.dhis2.org/demo/api/messageConversations"
  -H "Content-Type:application/xml" -u admin:district -X POST
```

A corresponding payload in JSON and POST command looks like this:

```
{
  "subject": "Hey",
  "text": "How are you?",
  "users": [
    {
      "id": "OYLGMiazHtW"
    },
    {
      "id": "N3PZBUlN8vq"
    }
  ],
  "userGroups": [
    {
      "id": "ZoHNWQajIoe"
    }
  ],
  "organisationUnits": [
    {
      "id": "DiszpKrYNg8"
    }
  ]
}
```

```
curl -d @message.json "https://play.dhis2.org/demo/api/33/messageConversations"
  -H "Content-Type:application/json" -u admin:district -X POST
```

If all is well we receive a *201 Created* HTTP status code. Also, note that we receive a *Location* HTTP header which value informs us of the URL of the newly created message conversation resource - this can be used by a consumer to perform further action.

We will now pretend to be the mobile user and read the message which was just sent by dispatching a GET request to the *messageConversations* resource. We supply an *Accept* header with *application/xml* as the value to indicate that we are interested in the XML resource representation and we authenticate as the *mobile* user:

```
curl "https://play.dhis2.org/demo/api/33/messageConversations"
  -H "Accept:application/xml" -u mobile:district
```

In response we get the following XML:

```
<messageConversations xmlns="http://dhis2.org/schema/dxf/2.0"
  link="https://play.dhis2.org/demo/api/messageConversations">
  <messageConversation name="Mortality data reporting" id="ZjHHSjyyeJ2"
    link="https://play.dhis2.org/demo/api/messageConversations/ZjHHSjyyeJ2"/>
  <messageConversation name="DHIS2 version 2.7 is deployed" id="GDBqVfkmnp2"
    link="https://play.dhis2.org/demo/api/messageConversations/GDBqVfkmnp2"/>
</messageConversations>
```

From the response, we are able to read the identifier of the newly sent message which is *ZjHHSjyyeJ2*. Note that the link to the specific resource is embedded and can be followed in order to read the full message. We can reply directly to an existing message conversation once we know the URL by including the message text as the request payload. We are now able to construct a URL for sending our reply:

```
curl -d "Yes the Mortality data set has been reported"
  "https://play.dhis2.org/demo/api/messageConversations/ZjHHSjyyeJ2"
  -H "Content-Type:text/plain" -u mobile:district -X POST
```

If all went according to plan you will receive a *200 OK* status code.

In 2.30 we added an URL search parameter:

```
queryString=?&queryOperator=?
```

The filter searches for matches in subject, text, and senders for message conversations. The default query operator is *token*, however other operators can be defined in the query.

Managing messages

As users receive and send messages, conversations will start to pile up in their inboxes, eventually becoming laborious to track. We will now have a look at managing a user's messages inbox by removing and marking conversations through the Web-API. We will do so by performing some maintenance in the inbox of the "DHIS Administrator" user.

First, let's have a look at removing a few messages from the inbox. Be sure to note that all removal operations described here only remove the relation between a user and a message conversation. In practical terms this means that we are not deleting the messages themselves (or any content for that matter) but are simply removing the message thread from the user such that it is no longer listed in the `/api/messageConversations` resource.

To remove a message conversation from a users inbox we need to issue a *DELETE* request to the resource identified by the id of the message conversation and the participating user. For example, to remove the user with id `xE7jOejl9FI` from the conversation with id `jMe43trzrdi`:

```
curl "https://play.dhis2.org/demo/api/33/messageConversations/jMe43trzrdi
```

If the request was successful the server will reply with a *200 OK*. The response body contains an XML or JSON object (according to the accept header of the request) containing the id of the removed user.

```
{
  "removed" : ["xE7jOejl9FI"]
}
```

On failure the returned object will contain a message payload which describes the error.

```
{
  "message" : "No user with uid: dMV6G0tPAEa"
}
```

The observant reader will already have noticed that the object returned on success in our example is actually a list of ids (containing a single entry). This is due to the endpoint also supporting batch removals. The request is made to the same *messageConversations* resource but follows slightly different semantics. For batch operations, the conversation ids are given as query string parameters. The following example removes two separate message conversations for the current user:

```
curl "https://play.dhis2.org/demo/api/messageConversations?mc=WzMRrCosqc0&mc=lxCjiigqrJm"
  -X DELETE -u admin:district
```

If you have sufficient permissions, conversations can be removed on behalf of another user by giving an optional user id parameter.

```
curl "https://play.dhis2.org/demo/api/messageConversations?
mc=WzMRrCosqc0&mc=lxCjiigqrJm&user=PhzytPW3g2J"
  -X DELETE -u admin:district
```

As indicated, batch removals will return the same message format as for single operations. The list of removed objects will reflect successful removals performed. Partially erroneous requests (i.e. non-existing id) will therefore not cancel the entire batch operation.

Messages carry a boolean *read* property. This allows tracking whether a user has seen (opened) a message or not. In a typical application scenario (e.g. the DHIS2 web portal) a message will be marked read as soon as the user opens it for the first time. However, users might want to manage the read or unread status of their messages in order to keep track of certain conversations.

Marking messages read or unread follows similar semantics as batch removals, and also supports batch operations. To mark messages as read we issue a *POST* to the `messageConversations/read` resource with a request body containing one or more message ids. To mark messages as unread we issue an identical request to the `messageConversations/unread` resource. As is the case for removals, an optional *user* request parameter can be given.

Let's mark a couple of messages as read by the current user:

```
curl "https://play.dhis2.org/dev/api/messageConversations/read"
  -d '["ZrKML5WiyFm","Gc03smoTm6q"]' -X POST
  -H "Content-Type: application/json" -u admin:district
```

The response is a *200 OK* with the following JSON body:

```
{
  "markedRead": ["ZrKML5WiyFm", "Gc03smoTm6q"]
}
```

You can add recipients to an existing message conversation. The resource is located at:

```
/api/33/messageConversations/id/recipients
```

The options for this resource is a list of users, user groups and organisation units. The request should look like this:

```
{
  "users": [
    {
      "id": "OYLGMiazHtW"
    },
    {
      "id": "N3PZBUlN8vq"
    }
  ],
  "userGroups": [
    {
      "id": "DiszpKrYNg8"
    }
  ],
  "organisationUnits": [
    {
      "id": "DiszpKrYNg8"
    }
  ]
}
```

Message Attachments

Creating messages with attachments is done in two steps: uploading the file to the *attachments* resource, and then including one or several of the attachment IDs when creating a new message.

A POST request to the *attachments* resource will upload the file to the server.

```
curl -F file=@attachment.png "https://play.dhis2.org/demo/api/messageConversations/attachments"
  -u admin:district
```

The request returns an object that represents the attachment. The id of this object must be used when creating a message in order to link the attachment with the message.

```
{
  "created": "2018-07-20T16:54:18.210",
  "lastUpdated": "2018-07-20T16:54:18.212",
  "externalAccess": false,
  "publicAccess": "--------",
  "user": {
    "name": "John Traore",
    "created": "2013-04-18T17:15:08.407",
    "lastUpdated": "2018-03-09T23:06:54.512",
    "externalAccess": false,
    "displayName": "John Traore",
    "favorite": false,
    "id": "xE7jOejl9FI"
  },
  "lastUpdatedBy": {
    "id": "xE7jOejl9FI",
    "name": "John Traore"
  },
  "favorite": false,
  "id": "fTpI4GOmujz"
}
```

When creating a new message, the ids can be passed in the request body to link the uploaded files to the message being created.

```
{
  "subject": "Hey",
  "text": "How are you?",
  "users": [
    {
      "id": "OYLGMiazHtW"
    },
    {
      "id": "N3PZBUlN8vq"
    }
  ],
  "userGroups": [
    {
      "id": "ZoHNWQajIoe"
    }
  ],
  "organisationUnits": [
    {
      "id": "DiszpKrYNg8"
    }
  ],
  "attachments": [
    "fTpI4GOmujz",
    "h2ZsOxMFMfq"
  ]
}
```

When replying to a message, the ids can be passed as a request parameter.

```
curl -d "Yes the Mortality data set has been reported"
  "https://play.dhis2.org/demo/api/33/messageConversations/ZjHHSjyyeJ2?
attachments=fTpI4GOmujz,h2ZsOxMFMfq"
  -H "Content-Type:text/plain" -u mobile:district -X POST
```

Once a message with an attachment has been created, the attached file can be accessed with a GET request to the following URL:

```
/api/messageConversations/<mcv-id>/<msg-id>/attachments/<attachment-id>
```

Where is the *message conversation* ID, is the ID of the *message* that contains the attachment and is the ID of the specific *message attachment*.

Tickets and Validation Result Notifications

You can use the "write feedback" tool to create tickets and messages. The only difference between a ticket and a message is that you can give a status and a priority to a ticket. To set the status:

```
POST /api/messageConversations/<uid>/status
```

To set the priority:

```
POST /api/messageConversations/<uid>/priority
```

In 2.29, messages generated by validation analysis now also be used in the status and priority properties. By default, messages generated by validation analysis will inherit the priority of the validation rule in question, or the highest importance if the message contains multiple rules.

In 2.30, validation rules can be assigned to any user while tickets still need to be assigned to a user in the system's feedback recipient group.

A list of valid status and priority values

Status	Priority
OPEN	LOW
PENDING	MEDIUM
INVALID	HIGH
SOLVED	

You can also add an internal message to a ticket, which can only be seen by users who have "Manage tickets" permissions. To create an internal reply, include the "internal" parameter, and set it to

```
curl -d "This is an internal message"
  "https://play.dhis2.org/demo/api/33/messageConversations/ZjHHSjyyeJ2?internal=true"
  -H "Content-Type:text/plain" -u admin:district -X POST
```

Visualizations

Dashboard

The dashboard is designed to give you an overview of multiple analytical items like maps, charts, pivot tables and reports which together can provide a comprehensive overview of your data. Dashboards are available in the Web API through the *dashboards* resource. A dashboard contains a list of dashboard *items*. An item can represent a single resource, like a chart, map or report table, or represent a list of links to analytical resources, like reports, resources, tabular reports and users. A dashboard item can contain up to eight links. Typically, a dashboard client could choose to visualize the single-object items directly in a user interface, while rendering the multi-object items as clickable links.

```
/api/dashboards
```

Browsing dashboards

To get a list of your dashboards with basic information including identifier, name and link in JSON format you can make a *GET* request to the following URL:

```
/api/dashboards.json
```

The dashboards resource will provide a list of dashboards. Remember that the dashboard object is shared so the list will be affected by the currently authenticated user. You can retrieve more information about a specific dashboard by following its link, similar to this:

```
/api/dashboards/vQFhmLJU5sK.json
```

A dashboard contains information like name and creation date and an array of dashboard items. The response in JSON format will look similar to this response (certain information has been removed for the sake of brevity).


```
{
  "lastUpdated" : "2013-10-15T18:17:34.084+0000",
  "id": "vQFhmLJU5sK",
  "created": "2013-09-08T20:55:58.060+0000",
  "name": "Mother and Child Health",
  "href": "https://play.dhis2.org/demo/api/dashboards/vQFhmLJU5sK",
  "publicAccess": "--------",
  "restrictFilters": false,
  "externalAccess": false,
  "itemCount": 17,
  "displayName": "Mother and Child Health",
  "access": {
    "update": true,
    "externalize": true,
    "delete": true,
    "write": true,
    "read": true,
    "manage": true
  },
  "user": {
    "id": "xE7jOejl9FI",
    "name": "John Traore",
```

```
    "created": "2013-04-18T15:15:08.407+0000",
    "lastUpdated": "2014-12-05T03:50:04.148+0000",
    "href": "https://play.dhis2.org/demo/api/users/xE7jOejl9FI"
  },
  "dashboardItems": [{
    "id": "bu1IAnPFa9H",
    "created": "2013-09-09T12:12:58.095+0000",
    "lastUpdated": "2013-09-09T12:12:58.095+0000"
    }, {
    "id": "ppFEJmWWDa1",
    "created": "2013-09-10T13:57:02.480+0000",
    "lastUpdated": "2013-09-10T13:57:02.480+0000"
  }],
  "layout": {
    "spacing": {
      "column": 5,
      "row": 5
    },
    "columns": [{
      "index": 0,
      "span": 2
    }, {
      "index": 1,
      "span": 1
    }]
  },
  "userGroupAccesses": []
}
```


A more tailored response can be obtained by specifying specific fields in the request. An example is provided below, which would return more detailed information about each object on a users dashboard.

```
/api/dashboards/vQFhmLJU5sK/?fields=:all,dashboardItems[:all]
```

Searching dashboards

When a user is building a dashboard it is convenient to be able to search for various analytical resources using the */dashboards/q* or */dashboards/search* resources. These resources let you search for matches on the name property of the following objects: visualizations, eventVisualizations maps, users, reports and resources. You can do a search by making a *GET* request on the following resource URL pattern, where my-query should be replaced by the preferred search query:

```
/api/dashboards/q/my-query.json
/api/dashboards/search?q=my-query
```

For example, this query:

```
/api/dashboards/q/ma?count=6&maxCount=20&max=REPORT&max=MAP
/api/dashboards/search?q=ma?count=6&maxCount=20&max=REPORT&max=MAP
```

Will search for the following:

- Analytical object name contains the string "ma"
- Return up to 6 of each type

- For REPORT and MAP types, return up to 20 items

dashboards/q and dashboards/search query parameters

Query parameter	Description	Type	Default
count	The number of items of each type to return	Positive integer	6
maxCount	The number of items of max types to return	Positive integer	25
max	The type to return the maxCount for	String [MAP|USER|REPORT|RESOURCE|VISUALIZATION#124;EVENT_VISUALIZATION,EVENT_CHART,EVENT_REPORT]	N/A

JSON and XML response formats are supported. The response in JSON format will contain references to matching resources and counts of how many matches were found in total and for each type of resource. It will look similar to this:


```
{
  "visualizations": [{
    "name": "ANC: ANC 3 Visits Cumulative Numbers",
    "id": "arf9OiyV7df",
    "type": "LINE"
  }, {
    "name": "ANC: 1st and 2rd trends Monthly",
    "id": "jkf6OiyV7el",
    "type": "PIVOT_TABLE"
  }],
  "eventVisualizations": [{
    "name": "Inpatient: Cases 5 to 15 years this year (case)",
    "id": "TIuOzZ0ID0V",
    "type": "LINE_LIST"
  }, {
    "name": "Inpatient: Cases last quarter (case)",
    "id": "R4wAb2yMLik",
    "type": "LINE_LIST"
  }],
  "maps": [{
    "name": "ANC: 1st visit at facility (fixed) 2013",
    "id": "YOEGBvxjAY0"
  }, {
    "name": "ANC: 3rd visit coverage 2014 by district",
    "id": "ytkZY3ChM6J"
  }],
  "reports": [{
    "name": "ANC: 1st Visit Cumulative Chart",
    "id": "Kvg1AhYHM8Q"
  }, {
    "name": "ANC: Coverages This Year",
    "id": "qYVNH1wkZR0"
  }],
  "searchCount": 8,
  "visualizationCount": 2,
  "eventVisualizationCount": 2,
  "mapCount": 2,
  "reportCount": 2,
```

```
  "userCount": 0,
  "eventReports": 0,
  "eventCharts" :0,
  "resourceCount": 0
}
```

Creating, updating and removing dashboards

Creating, updating and deleting dashboards follow standard REST semantics. In order to create a new dashboard you can make a *POST* request to the `/api/dashboards` resource. From a consumer perspective it might be convenient to first create a dashboard and later add items to it. JSON and XML formats are supported for the request payload. To create a dashboard with the name "My dashboard" you can use a payload in JSON like this:

```
{
  "name": "My dashboard"
}
```

To update, e.g. rename, a dashboard, you can make a *PUT* request with a similar request payload the same api/dashboards resource.

To remove a dashboard, you can make a *DELETE* request to the specific dashboard resource similar to this:

```
/api/dashboards/vQFhmLJU5sK
```

Adding, moving and removing dashboard items and content

In order to add dashboard items a consumer can use the `/api/dashboards/<dashboard-id>/items/content` resource, where <dashboard-id> should be replaced by the relevant dashboard identifier. The request must use the *POST* method. The URL syntax and parameters are described in detail in the following table.

Items content parameters

Query parameter	Description	Options
type	Type of the resource to be represented by the dashboard item	visualization | map | eventVisualization | users | reports | resources | app
id	Identifier of the resource to be represented by the dashboard item	Resource identifier

A *POST* request URL for adding a visualization to a specific dashboard could look like this, where the last id query parameter value is the chart resource identifier:

```
/api/dashboards/vQFhmLJU5sK/items/content?type=visualization&id=LW0O27b7TdD
```

When adding resource of type map, visualization and app, the API will create and add a new item to the dashboard. When adding a resource of type users, reports and resources, the API will try to add the resource to an existing dashboard item of the same type. If no item of same type or no item of same type with less than eight resources associated with it exists, the API will create a new dashboard item and add the resource to it.

In order to move a dashboard item to a new position within the list of items in a dashboard, a consumer can make a *POST* request to the following resource URL, where `<dashboard-id>` should be replaced by the identifier of the dashboard, `<item-id>` should be replaced by the identifier of the dashboard item and `<index>` should be replaced by the new position of the item in the dashboard, where the index is zero-based:

```
/api/dashboards/<dashboard-id>/items/<item-id>/position/<index>
```

To remove a dashboard item completely from a specific dashboard a consumer can make a *DELETE* request to the below resource URL, where `<dashboard-id>` should be replaced by the identifier of the dashboard and `<item-id>` should be replaced by the identifier of the dashboard item. The dashboard item identifiers can be retrieved through a GET request to the dashboard resource URL.

```
/api/dashboards/<dashboard-id>/items/<item-id>
```

To remove a specific content resource within a dashboard item a consumer can make a *DELETE* request to the below resource URL, where `<content-resource-id>` should be replaced by the identifier of a resource associated with the dashboard item; e.g. the identifier of a report or a user. For instance, this can be used to remove a single report from a dashboard item of type reports, as opposed to removing the dashboard item completely:

```
/api/dashboards/<dashboard-id>/items/<item-id>/content/<content-resource-id>
```

Defining a dashboard layout

You can define and save a layout for each dashboard. The following object is responsible to hold this setting.

```
{
  "layout": {
    "spacing": {
      "column": 5,
      "row": 5
    },
    "columns": [{
      "index": 0,
      "span": 2
    }, {
      "index": 1,
      "span": 1
    }]
  }
}
```

The layout definition will be applied for all dashboard items related to the given dashboard, respecting layout attributes like spacing, columns, span and so on. See, below, a brief description of each attribute.

Layout attributes

Attribute	Description	Type
layout	This is the root object	Object
spacing	Defines the spacing for specific layout components. Currently, it supports columns and rows.	Object
columns	Stores specific parameters related to columns (at the moment, index and span)	Array of objects

Visualization

The Visualization API is designed to help clients to interact with charts and pivot/report tables. The endpoints of this API are used by the Data Visualization application which allows the creation, configuration and management of charts and pivot tables based on the client's definitions. The main idea is to enable clients and users to have a unique and centralized API providing all types of charts and pivot tables as well as specific parameters and configuration for each type of visualization.

This API was introduced to unify both `charts` and `reportTables` APIs and entirely replace them by the `visualizations` API.

A Visualization object is composed of many attributes (some of them related to charts and others related to pivot tables), but the most important ones responsible to reflect the core information of the object are: *"id", "name", "type", "dataDimensionItems", "columns", "rows" and "filters".*

The root endpoint of the API is `/api/visualizations`, and the list of current attributes and elements are described in the table below.

Visualization attributes

Field	Description
id	The unique identifier.
code	A custom code to identify the Visualization.
name	The name of the Visualization
type	The type of the Visualization. The valid types are: COLUMN, STACKED_COLUMN, BAR, STACKED_BAR, LINE, AREA, PIE, RADAR, GAUGE, YEAR_OVER_YEAR_LINE YEAR_OVER_YEAR_COLUMN, SINGLE_VALUE, PIVOT_TABLE.
title	A custom title.
subtitle	A custom subtitle.
description	Defines a custom description for the Visualization.
created	The date/time of the Visualization creation.
startDate	The beginning date used during the filtering.
endDate	The ending date used during the filtering.

Field	Description
sortOrder	The sorting order of this Visualization. Integer value.
user	An object representing the creator of the Visualization.
publicAccess	Sets the permissions for public access.
displayDensity	The display density of the text.
fontSize	The font size of the text.
fontStyle	Custom font styles for: visualizationTitle, visualizationSubtitle, horizontalAxisTitle, verticalAxisTitle, targetLineLabel, baseLineLabel, seriesAxisLabel, categoryAxisLabel, legend.
relativePeriods	An object representing the relative periods used in the analytics query.
legendSet	An object representing the definitions for the legend.
legendDisplayStyle	The legend's display style. It can be: FILL or TEXT.
legendDisplayStrategy	The legend's display style. It can be: FIXED or BY_DATA_ITEM.
aggregationType	Determines how the values in the pivot table are aggregated. Valid options: SUM, AVERAGE, AVERAGE_SUM_ORG_UNIT, LAST, LAST_AVERAGE_ORG_UNIT, FIRST, FIRST_AVERAGE_ORG_UNIT, COUNT, STDDEV, VARIANCE, MIN, MAX, NONE, CUSTOM or DEFAULT.
regressionType	A valid regression type: NONE, LINEAR, POLYNOMIAL or LOESS.
targetLineValue	The chart target line. Accepts a Double type.
targetLineLabel	The chart target line label.
rangeAxisLabel	The chart vertical axis (y) label/title.
domainAxisLabel	The chart horizontal axis (x) label/title.
rangeAxisMaxValue	The chart axis maximum value. Values outside of the range will not be displayed.
rangeAxisMinValue	The chart axis minimum value. Values outside of the range will not be displayed.
rangeAxisSteps	The number of axis steps between the minimum and maximum values.
rangeAxisDecimals	The number of decimals for the axes values.
baseLineValue	A chart baseline value.
baseLineLabel	A chart baseline label.
digitGroupSeparator	The digit group separator. Valid values: COMMA, SPACE or NONE.
topLimit	The top limit set for the Pivot table.
measureCriteria	Describes the criteria applied to this measure.
percentStackedValues	Uses stacked values or not. More likely to be applied for graphics/charts. Boolean value.
noSpaceBetweenColumns	Show/hide space between columns. Boolean value.

Field	Description
regression	Indicates whether the Visualization contains regression columns. More likely to be applicable to Pivot/Report. Boolean value.
externalAccess	Indicates whether the Visualization is available as external read-only. Only applies when no user is logged in. Boolean value.
userOrganisationUnit	Indicates if the user has an organisation unit. Boolean value.
userOrganisationUnitChildren	Indicates if the user has a children organisation unit. Boolean value.
userOrganisationUnitGrandChildren	Indicates if the user has a grand children organisation unit . Boolean value.
reportingParams	Object used to define boolean attributes related to reporting.
rowTotals	Displays (or not) the row totals. Boolean value.
colTotals	Displays (or not) the columns totals. Boolean value.
rowSubTotals	Displays (or not) the row sub-totals. Boolean value.
colSubTotals	Displays (or not) the columns sub-totals. Boolean value.
cumulativeValues	Indicates whether the visualization is using cumulative values. Boolean value.
hideEmptyColumns	Indicates whether to hide columns with no data values. Boolean value.
hideEmptyRows	Indicates whether to hide rows with no data values. Boolean value.
fixColumnHeaders	Keeps the columns' headers fixed (or not) in a Pivot Table. Boolean value.
fixRowHeaders	Keeps the rows' headers fixed (or not) in a Pivot Table. Boolean value.
completedOnly	Flag used in analytics requests. If true, only completed events/enrollments will be taken into consideration. Boolean value.
skipRounding	Apply or not rounding. Boolean value.
showDimensionLabels	Shows the dimension labels or not. Boolean value.
hideTitle	Hides the title or not. Boolean value.
hideSubtitle	Hides the subtitle or not. Boolean value.
hideLegend	Show/hide the legend. Very likely to be used by charts. Boolean value.
showHierarchy	Displays (or not) the organisation unit hierarchy names. Boolean value.
showData	Used by charts to hide or not data/values within the rendered model. Boolean value.
lastUpdatedBy	Object that represents the user that applied the last changes to the Visualization.

Field	Description
lastUpdated	The date/time of the last time the Visualization was changed.
favorites	List of user ids who have marked this object as a favorite.
subscribers	List of user ids who have subscribed to this Visualization.
translations	Set of available object translation, normally filtered by locale.
outlierAnalysis	Object responsible to keep settings related to outlier analysis. The internal attribute 'outlierMethod' supports: IQR, STANDARD_Z_SCORE, MODIFIED_Z_SCORE. The 'normalizationMethod' accepts only Y_RESIDUALS_LINEAR for now.
seriesKey	Styling options for and whether or not to display the series key.
legend	Options for and whether or not to apply legend colors to the chart series.

Retrieving visualizations

To retrieve a list of all existing visualizations, in JSON format, with some basic information (including identifier, name and pagination) you can make a GET request to the URL below. You should see a list of all public/shared visualizations plus your private ones.

```
GET /api/visualizations.json
```

If you want to retrieve the JSON definition of a specific Visualization you can add its respective identifier to the URL:

```
GET /api/visualizations/hQxZGXqnLS9.json
```

The following representation is an example of a response in JSON format (for brevity, certain information has been removed). For the complete schema, please use `GET /api/schemas/visualization`.

```
{
  "lastUpdated": "2020-02-06T11:57:09.678",
  "href": "http://my-domain/dhis/api/visualizations/hQxZGXqnLS9",
  "id": "hQxZGXqnLS9",
  "created": "2017-05-19T17:22:00.785",
  "name": "ANC: ANC 1st visits last 12 months cumulative values",
  "publicAccess": "rw------",
  "userOrganisationUnitChildren": false,
  "type": "LINE",
  "access": {},
  "reportingParams": {
    "parentOrganisationUnit": false,
    "reportingPeriod": false,
    "organisationUnit": false,
    "grandParentOrganisationUnit": false
```

```
  },
  "dataElementGroupSetDimensions": [],
  "attributeDimensions": [],
  "yearlySeries": [],
  "axes": [
    {
      "index": 0,
      "type": "RANGE",
      "title": {
        "textMode": "CUSTOM",
        "text": "Any Title"
      }
    }
  ],
  "filterDimensions": [
    "dx"
  ],
  "columns": [
    {
      "id": "ou"
    }
  ],
  "dataElementDimensions": [],
  "categoryDimensions": [],
  "rowDimensions": [
    "pe"
  ],
  "columnDimensions": [
    "ou"
  ],
  "dataDimensionItems": [
    {
      "dataDimensionItemType": "DATA_ELEMENT",
      "dataElement": {
        "id": "fbfJHSPpUQD"
      }
    }
  ],
  "filters": [
    {
      "id": "dx"
    }
  ],
  "rows": [
    {
      "id": "pe"
    }
  ]
}
```


A more tailored response can be obtained by specifying, in the URL, the fields you want to extract. Ie.:

```
GET /api/visualizations/hQxZGXqnLS9.json?fields=interpretations
```

will return


```
{
  "interpretations": [
    {
```

```
      "id": "Lfr8I2RPU0C"
    },
    {
      "id": "JuwgdJlJPGb"
    },
    {
      "id": "WAoU2rSpyZp"
    }
  ]
}
```

As seen, the GET above will return only the interpretations related to the given identifier (in this case hQxZGXqnLS9).

Creating, updating and removing visualizations

These operations follow the standard *REST* semantics. A new Visualization can be created through a POST request to the `/api/visualizations` resource with a valid JSON payload. An example of payload could be:

```
{
  "columns": [
    {
      "dimension": "J5jldMd8OHv",
      "items": [
        {
          "name": "CHP",
          "id": "uYxK4wmcPqA",
          "displayName": "CHP",
          "displayShortName": "CHP",
          "dimensionItemType": "ORGANISATION_UNIT_GROUP"
        },
        {
          "name": "Hospital",
          "id": "tDZVQ1WtwpA",
          "displayName": "Hospital",
          "displayShortName": "Hospital",
          "dimensionItemType": "ORGANISATION_UNIT_GROUP"
        }
      ]
    }
  ],
  "rows": [
    {
      "dimension": "SooXFOUnciJ",
      "items": [
        {
          "name": "DOD",
          "id": "B0bjKC0szQX",
          "displayName": "DOD",
          "displayShortName": "DOD",
          "dimensionItemType": "CATEGORY_OPTION_GROUP"
        },
        {
          "name": "CDC",
          "id": "OK2Nr4wdfrZ",
          "displayName": "CDC",
          "displayShortName": "CDC",
          "dimensionItemType": "CATEGORY_OPTION_GROUP"
        }
      ]
```

```
    }
  ],
  "filters": [
    {
      "dimension": "ou",
      "items": [
        {
          "name": "Sierra Leone",
          "id": "ImspTQPwCqd",
          "displayName": "Sierra Leone",
          "displayShortName": "Sierra Leone",
          "dimensionItemType": "ORGANISATION_UNIT"
        },
        {
          "name": "LEVEL-1",
          "id": "LEVEL-H1KlN4QIauv",
          "displayName": "LEVEL-1"
        }
      ]
    }
  ],
  "name": "HIV Cases Monthly",
  "description": "Cases of HIV across the months",
  "category": "XY1vwCQskjX",
  "showDimensionLabels": true,
  "hideEmptyRows": true,
  "hideEmptyColumns": true,
  "skipRounding": true,
  "aggregationType": "SUM",
  "regressionType": "LINEAR",
  "type": "PIVOT_TABLE",
  "numberType": "VALUE",
  "measureCriteria": "Some criteria",
  "showHierarchy": true,
  "completedOnly": true,
  "displayDensity": "NORMAL",
  "fontSize": "NORMAL",
  "digitGroupSeparator": "SPACE",
  "legendDisplayStyle": "FILL",
  "legendDisplayStrategy": "FIXED",
  "hideEmptyRowItems": "BEFORE_FIRST_AFTER_LAST",
  "fixColumnHeaders": true,
  "fixRowHeaders": false,
  "regression": false,
  "cumulative": true,
  "sortOrder": 1,
  "topLimit": 2,
  "rowTotals": true,
  "colTotals": true,
  "hideTitle": true,
  "hideSubtitle": true,
  "hideLegend": true,
  "showData": true,
  "percentStackedValues": true,
  "noSpaceBetweenColumns": true,
  "rowSubTotals": true,
  "colSubTotals": true,
  "userOrgUnitType": "TEI_SEARCH",
  "externalAccess": false,
  "publicAccess": "--------",
  "reportingParams": {
    "reportingPeriod": true,
    "organisationUnit": true,
```

```
    "parentOrganisationUnit": true,
    "grandParentOrganisationUnit": true
  },
  "parentGraphMap": {
    "ImspTQPwCqd": ""
  },
  "access": {
    "read": true,
    "update": true,
    "externalize": true,
    "delete": false,
    "write": true,
    "manage": false
  },
  "optionalAxes": [
    {
      "dimensionalItem": "fbfJHSPpUQD",
      "axis": 1
    },
    {
      "dimensionalItem": "cYeuwXTCPkU",
      "axis": 2
    }
  ],
  "relativePeriods": {
    "thisYear": false,
    "quartersLastYear": true,
    "last52Weeks": false,
    "thisWeek": false,
    "lastMonth": false,
    "last14Days": false,
    "biMonthsThisYear": false,
    "monthsThisYear": false,
    "last2SixMonths": false,
    "yesterday": false,
    "thisQuarter": false,
    "last12Months": false,
    "last5FinancialYears": false,
    "thisSixMonth": false,
    "lastQuarter": false,
    "thisFinancialYear": false,
    "last4Weeks": false,
    "last3Months": false,
    "thisDay": false,
    "thisMonth": false,
    "last5Years": false,
    "last6BiMonths": false,
    "last4BiWeeks": false,
    "lastFinancialYear": false,
    "lastBiWeek": false,
    "weeksThisYear": false,
    "last6Months": false,
    "last3Days": false,
    "quartersThisYear": false,
    "monthsLastYear": false,
    "lastWeek": false,
    "last7Days": false,
    "thisBimonth": false,
    "lastBimonth": false,
    "lastSixMonth": false,
    "thisBiWeek": false,
    "lastYear": false,
    "last12Weeks": false,
```

```
    "last4Quarters": false
  },
  "user": {},
  "yearlySeries": [
    "THIS_YEAR"
  ],
  "userGroupAccesses": [
    {
      "access": "rwx-----",
      "userGroupUid": "ZoHNWQajIoe",
      "displayName": "Bo District M&E officers",
      "id": "ZoHNWQajIoe"
    }
  ],
  "userAccesses": [
    {
      "access": "--------",
      "displayName": "John Barnes",
      "id": "DXyJmlo9rge",
      "userUid": "DXyJmlo9rge"
    }
  ],
  "legendSet": {
    "name": "Death rate up",
    "id": "ham2eIDJ9k6",
    "legends": [
      {
        "startValue": 1,
        "endValue": 2,
        "color": "red",
        "image": "some-image"
      },
      {
        "startValue": 2,
        "endValue": 3,
        "color": "blue",
        "image": "other-image"
      }
    ]
  },
  "outlierAnalysis": {
    "enabled": true,
    "outlierMethod": "IQR",
    "thresholdFactor": 1.5,
    "normalizationMethod": "Y_RESIDUALS_LINEAR",
    "extremeLines": {
      "enabled": true,
      "value": 3.5
    }
  },
  "legend": {
    "strategy": "FIXED",
    "style": "FILL",
    "set": {
      "id": "fqs276KXCXi",
      "displayName": "ANC Coverage"
    },
    "showKey": false
  },
  "seriesKey": {
    "hidden": true,
    "label": {
      "fontStyle": {
```

```
        "textColor": "#cccddd"
      }
    }
  },
  "axes": [
    {
      "index": 0,
      "type": "RANGE",
      "label": {
        "fontStyle": {
          "textColor": "#cccddd"
        }
      },
      "title": {
        "text": "Range axis title",
        "textMode": "CUSTOM",
        "fontStyle": {
          "textColor": "#000000"
        }
      },
      "decimals": 1,
      "maxValue": 100,
      "minValue": 20,
      "steps": 5,
      "baseLine": {
        "value": 50,
        "title": {
          "text": "My baseline",
          "fontStyle": {
            "textColor": "#000000"
          }
        }
      },
      "targetLine": {
        "value": 80,
        "title": {
          "text": "My targetline",
          "fontStyle": {
            "textColor": "#cccddd"
          }
        }
      }
    },
    {
      "index": 1,
      "type": "DOMAIN",
      "label": {
        "fontStyle": {
          "textColor": "#000000"
        }
      },
      "title": {
        "text": "Domain axis title",
        "textMode": "CUSTOM",
        "fontStyle": {
          "textColor": "#cccddd"
        }
      }
    }
  ],
  "axes": [
    {
      "index": 0,
```

```
      "type": "RANGE",
      "label": {
        "fontStyle": {
          "textColor": "#cccddd"
        }
      },
      "title": {
        "text": "Range axis title",
        "fontStyle": {
          "textColor": "#000000"
        }
      },
      "decimals": 1,
      "maxValue": 100,
      "minValue": 20,
      "steps": 5,
      "baseLine": {
        "value": 50,
        "title": {
          "text": "My baseline",
          "fontStyle": {
            "textColor": "#000000"
          }
        }
      },
      "targetLine": {
        "value": 80,
        "title": {
          "text": "My targetline",
          "fontStyle": {
            "textColor": "#cccddd"
          }
        }
      }
    },
    {
      "index": 1,
      "type": "DOMAIN",
      "label": {
        "fontStyle": {
          "textColor": "#000000"
        }
      },
      "title": {
        "text": "Domain axis title",
        "fontStyle": {
          "textColor": "#cccddd"
        }
      }
    }
  ]
}
```

To update a specific Visualization, you can send a PUT request to the same `/api/visualizations` resource with a similar payload PLUS the respective Visualization's identifier, ie.:

```
PUT /api/visualizations/hQxZGXqnLS9
```

Finally, to delete an existing Visualization, you can make a `DELETE` request specifying the identifier of the Visualization to be removed, as shown:

```
DELETE /api/visualizations/hQxZGXqnLS9
```

Event visualization

The EventVisualization API is designed to help clients to interact with event charts and reports. The endpoints of this API are used by the Event Visualization application which allows the creation, configuration and management of charts and reports based on the client's definitions. The main idea is to enable clients and users to have a unique and centralized API providing all types of event charts and reports as well as specific parameters and configuration for each type of event visualization. This API was introduced with the expectation to unify both `eventCharts` and `eventReports` APIs and entirely replace them in favour of the `eventVisualizations` API (which means that the usage of `eventCharts` and `eventReports` APIs should be avoided). In summary, the following resources/ APIs: /api/eventCharts, /api/eventReports *are being replaced by* /api/eventVisualizations

> **Note**
>
> New applications and clients should avoid using the `eventCharts` and `eventReports` APIs because they are deprecated. Use the `eventVisualizations` API instead.

An EventVisualization object is composed of many attributes (some of them related to charting and others related to reporting), but the most important ones responsible to reflect the core information of the object are: *"id", "name", "type", "dataDimensionItems", "columns", "rows" and "filters".* The root endpoint of the API is `/api/eventVisualizations`, and the list of current attributes and elements are described in the table below.

EventVisualization attributes

Field	Description
id	The unique identifier.
code	A custom code to identify the EventVisualiation.
name	The name of the EventVisualiation
type	The type of the EventVisualiation. The valid types are: COLUMN, STACKED_COLUMN, BAR, STACKED_BAR, LINE, LINE_LIST, AREA, STACKED_AREA, PIE, RADAR, GAUGE, YEAR_OVER_YEAR_LINE, YEAR_OVER_YEAR_COLUMN, SINGLE_VALUE, PIVOT_TABLE, SCATTER, BUBBLE.
title	A custom title.
subtitle	A custom subtitle.
description	Defines a custom description for the EventVisualiation.
created	The date/time of the EventVisualiation creation.
startDate	The beginning date used during the filtering.
endDate	The ending date used during the filtering.
sortOrder	The sorting order of this EventVisualiation. Integer value.
user	An object representing the creator of the Visualization.

Field	Description
publicAccess	Sets the permissions for public access.
displayDensity	The display density of the text.
fontSize	The font size of the text.
relativePeriods	An object representing the relative periods used in the analytics query.
legend	An object representing the definitions for the legend and legend set, display style (FILL or TEXT) and display strategy (FIXED or BY_DATA_ITEM).
aggregationType	Determines how the values are aggregated (if applicable). Valid options: SUM, AVERAGE, AVERAGE_SUM_ORG_UNIT, LAST, LAST_AVERAGE_ORG_UNIT, FIRST, FIRST_AVERAGE_ORG_UNIT, COUNT, STDDEV, VARIANCE, MIN, MAX, NONE, CUSTOM or DEFAULT.
regressionType	A valid regression type: NONE, LINEAR, POLYNOMIAL or LOESS.
targetLineValue	The chart target line. Accepts a Double type.
targetLineLabel	The chart target line label.
rangeAxisLabel	The chart vertical axis (y) label/title.
domainAxisLabel	The chart horizontal axis (x) label/title.
rangeAxisMaxValue	The chart axis maximum value. Values outside of the range will not be displayed.
rangeAxisMinValue	The chart axis minimum value. Values outside of the range will not be displayed.
rangeAxisSteps	The number of axis steps between the minimum and maximum values.
rangeAxisDecimals	The number of decimals for the axes values.
baseLineValue	A chart baseline value.
baseLineLabel	A chart baseline label.
digitGroupSeparator	The digit group separator. Valid values: COMMA, SPACE or NONE.
topLimit	The top limit set for the Pivot table.
measureCriteria	Describes the criteria applied to this measure.
percentStackedValues	Uses stacked values or not. More likely to be applied for graphics/charts. Boolean value.
noSpaceBetweenColumns	Show/hide space between columns. Boolean value.
externalAccess	Indicates whether the EventVisualization is available as external read-only. Boolean value.
userOrganisationUnit	Indicates if the user has an organisation unit. Boolean value.
userOrganisationUnitChildren	Indicates if the user has a children organisation unit. Boolean value.
userOrganisationUnitGrandChildren	Indicates if the user has a grand children organisation unit. Boolean value.

Field	Description
rowTotals	Displays (or not) the row totals. Boolean value.
colTotals	Displays (or not) the columns totals. Boolean value.
rowSubTotals	Displays (or not) the row sub-totals. Boolean value.
colSubTotals	Displays (or not) the columns sub-totals. Boolean value.
cumulativeValues	Indicates whether the EventVisualization is using cumulative values. Boolean value.
hideEmptyRows	Indicates whether to hide rows with no data values. Boolean value.
completedOnly	Flag used in analytics requests. If true, only completed events/enrollments will be taken into consideration. Boolean value.
showDimensionLabels	Shows the dimension labels or not. Boolean value.
hideTitle	Hides the title or not. Boolean value.
hideSubtitle	Hides the subtitle or not. Boolean value.
showHierarchy	Displays (or not) the organisation unit hierarchy names. Boolean value.
showData	Used by charts to hide or not data/values within the rendered model. Boolean value.
lastUpdatedBy	Object that represents the user that applied the last changes to the EventVisualization.
lastUpdated	The date/time of the last time the EventVisualization was changed.
favorites	List of user ids who have marked this object as a favorite.
subscribers	List of user ids who have subscribed to this EventVisualization.
translations	Set of available object translation, normally filtered by locale.
program	The program associated.
programStage	The program stage associated.
programStatus	The program status. It can be ACTIVE, COMPLETED, CANCELLED.
eventStatus	The event status. It can be ACTIVE, COMPLETED, VISITED, SCHEDULE, OVERDUE, SKIPPED.
dataType	The event data type. It can be AGGREGATED_VALUES or EVENTS.
columnDimensions	The dimensions defined for the columns.
rowDimensions	The dimensions defined for the rows.
filterDimensions	The dimensions defined for the filters.
outputType	Indicates output type of the EventVisualization. It can be EVENT, ENROLLMENT or TRACKED_ENTITY_INSTANCE.
collapseDataDimensions	Indicates whether to collapse all data dimensions into a single dimension. Boolean value.

Field	Description
hideNaData	Indicates whether to hide N/A data. Boolean value.

Retrieving event visualizations

To retrieve a list of all existing event visualizations, in JSON format, with some basic information (including identifier, name and pagination) you can make a GET request to the URL below. You should see a list of all public/shared event visualizations plus your private ones. GET /api/eventVisualizations.json If you want to retrieve the JSON definition of a specific EventVisualization you can add its respective identifier to the URL: GET /api/eventVisualizations/hQxZGXqnLS9.json The following representation is an example of a response in JSON format (for brevity, certain information has been removed). For the complete schema, please use `GET /api/schemas/eventVisualization`.


```
{
    "lastUpdated": "2021-11-25T17:18:03.834",
    "href": "http://localhost:8080/dhis/api/eventVisualizations/EZ5jbRTxRGh",
    "id": "EZ5jbRTxRGh",
    "created": "2021-11-25T17:18:03.834",
    "name": "Inpatient: Mode of discharge by facility type this year",
    "publicAccess": "rw------",
    "userOrganisationUnitChildren": false,
    "type": "STACKED_COLUMN",
    "subscribed": false,
    "userOrganisationUnit": false,
    "rowSubTotals": false,
    "cumulativeValues": false,
    "showDimensionLabels": false,
    "sortOrder": 0,
    "favorite": false,
    "topLimit": 0,
    "collapseDataDimensions": false,
    "userOrganisationUnitGrandChildren": false,
    "displayName": "Inpatient: Mode of discharge by facility type this year",
    "percentStackedValues": false,
    "noSpaceBetweenColumns": false,
    "showHierarchy": false,
    "hideTitle": false,
    "showData": true,
    "hideEmptyRows": false,
    "hideNaData": false,
    "regressionType": "NONE",
    "completedOnly": false,
    "colTotals": false,
    "sharing": {
      "owner": "GOLswS44mh8",
      "external": false,
      "users": {},
      "userGroups": {},
      "public": "rw------"
    },
    "programStatus": "CANCELLED",
    "hideEmptyRowItems": "NONE",
    "hideSubtitle": false,
    "outputType": "EVENT",
    "hideLegend": false,
    "externalAccess": false,
    "colSubTotals": false,
    "rowTotals": false,
```

```
  "digitGroupSeparator": "SPACE",
  "program": {
    "id": "IpHINAT79UW"
  },
  "access": {
    "read": true,
    "update": true,
    "externalize": true,
    "delete": true,
    "write": true,
    "manage": true
  },
  "lastUpdatedBy": {
    "displayName": "John Traore",
    "name": "John Traore",
    "id": "xE7jOejl9FI",
    "username": "admin"
  },
  "relativePeriods": {
    "thisYear": false,
    ...
  },
  "programStage": {
    "id": "A03MvHHogjR"
  },
  "createdBy": {
    "displayName": "Tom Wakiki",
    "name": "Tom Wakiki",
    "id": "GOLswS44mh8",
    "username": "system"
  },
  "user": {
    "displayName": "Tom Wakiki",
    "name": "Tom Wakiki",
    "id": "GOLswS44mh8",
    "username": "system"
  },
  "attributeDimensions": [],
  "translations": [],
  "legend": {
    "set": {
      "id": "gFJUXah1uRH"
    },
    "showKey": false,
    "style": "FILL",
    "strategy": "FIXED"
  },
  "filterDimensions": [
    "ou",
    "H6uSAMO5WLD"
  ],
  "interpretations": [],
  "userGroupAccesses": [],
  "subscribers": [],
  "columns": [
    {
      "id": "X8zyunlgUfM"
    }
  ]
  "periods": [],
  "categoryDimensions": [],
  "rowDimensions": [
    "pe"
```

```
    ],
    "itemOrganisationUnitGroups": [],
    "programIndicatorDimensions": [],
    "attributeValues": [],
    "columnDimensions": [
      "X8zyunlgUfM"
    ],
    "userAccesses": [],
    "favorites": [],
    "dataDimensionItems": [],
    "categoryOptionGroupSetDimensions": [],
    "organisationUnitGroupSetDimensions": [],
    "organisationUnitLevels": [],
    "organisationUnits": [
      {
        "id": "ImspTQPwCqd"
      }
    ],
    "filters": [
      {
        "id": "ou"
      },
      {
        "id": "H6uSAMO5WLD"
      }
    ],
    "rows": [
      {
        "id": "pe"
      }
    ]
}
```


A more tailored response can be obtained by specifying, in the URL, the fields you want to extract. Ie.: GET /api/eventVisualizations/hQxZGXqnLS9.json?fields=interpretations will return


```
{
  "interpretations": [
    {
      "id": "Lfr8I2RPU0C"
    },
    {
      "id": "JuwgdJlJPGb"
    },
    {
      "id": "WAoU2rSpyZp"
    }
  ]
}
```


As seen, the `GET` above will return only the interpretations related to the given identifier (in this case `hQxZGXqnLS9`).

Creating, updating and removing event visualizations

These operations follow the standard *REST* semantics. A new EventVisualization can be created through a `POST` request to the `/api/eventVisualizations` resource with a valid JSON payload. An example of payload could be:

```
{
    "name": "Inpatient: Cases under 10 years last 4 quarters",
    "publicAccess": "rw------",
    "userOrganisationUnitChildren": false,
    "type": "STACKED_COLUMN",
    "subscribed": false,
    "userOrganisationUnit": false,
    "rowSubTotals": false,
    "cumulativeValues": false,
    "showDimensionLabels": false,
    "sortOrder": 0,
    "favorite": false,
    "topLimit": 0,
    "collapseDataDimensions": false,
    "userOrganisationUnitGrandChildren": false,
    "displayName": "Inpatient: Cases under 10 years last 4 quarters",
    "percentStackedValues": false,
    "noSpaceBetweenColumns": false,
    "showHierarchy": false,
    "hideTitle": false,
    "showData": true,
    "hideEmptyRows": false,
    "userAccesses": [],
    "userGroupAccesses": [],
    "hideNaData": false,
    "regressionType": "NONE",
    "completedOnly": false,
    "colTotals": false,
    "programStatus": "CANCELLED",
    "sharing": {
      "owner": "GOLswS44mh8",
      "external": false,
      "users": {},
      "userGroups": {},
      "public": "rw------"
    },
    "displayFormName": "Inpatient: Cases under 10 years last 4 quarters",
    "hideEmptyRowItems": "NONE",
    "hideSubtitle": false,
    "outputType": "EVENT",
    "hideLegend": false,
    "externalAccess": false,
    "colSubTotals": false,
    "rowTotals": false,
    "digitGroupSeparator": "SPACE",
    "access": {
      "read": true,
      "update": true,
      "externalize": false,
      "delete": true,
      "write": true,
      "manage": true
    },
    "lastUpdatedBy": {
      "displayName": "Tom Wakiki",
      "name": "Tom Wakiki",
      "id": "GOLswS44mh8",
      "username": "system"
    },
    "legend": {
      "set": {
        "id": "gFJUXah1uRH"
      },
```

```
    "showKey": false,
    "style": "FILL",
    "strategy": "FIXED"
  },
  "relativePeriods": {
    "thisYear": false,
  ...
  },
  "program": {
    "id": "IpHINAT79UW",
    "enrollmentDateLabel": "Date of enrollment",
    "incidentDateLabel": "Date of birth",
    "name": "Child Programme"
  },
  "programStage": {
    "id": "A03MvHHogjR",
    "executionDateLabel": "Report date",
    "name": "Birth"
  },
  "createdBy": {
    "displayName": "Tom Wakiki",
    "name": "Tom Wakiki",
    "id": "GOLswS44mh8",
    "username": "system"
  },
  "user": {
    "displayName": "Tom Wakiki",
    "name": "Tom Wakiki",
    "id": "GOLswS44mh8",
    "username": "system"
  },
  "translations": [],
  "filterDimensions": [
    "ou"
  ],
  "interpretations": [],
  "dataElementDimensions": [
    {
      "filter": "LE:10",
      "dataElement": {
        "id": "qrur9Dvnyt5"
      }
    }
  ],
  "periods": [],
  "categoryDimensions": [],
  "rowDimensions": [
    "pe"
  ],
  "columnDimensions": [
    "qrur9Dvnyt5"
  ],
  "organisationUnits": [
    {
      "id": "ImspTQPwCqd"
    }
  ],
  "filters": [
    {
      "dimension": "ou",
      "items": [
        {
          "id": "ImspTQPwCqd"
```

```
          }
        ]
      },
      {
        "dimension": "H6uSAMO5WLD",
        "items": []
      }
    ],
    "columns": [
      {
        "dimension": "X8zyunlgUfM",
        "items": [],
        "repetition": {
          "indexes": [1, 2, 3, -2, -1, 0]
        }
      },
      {
        "dimension": "eventDate",
        "items": [
          {
            "id": "2021-07-21_2021-08-01"
          },
          {
            "id": "2021-01-21_2021-02-01"
          }
        ]
      },
      {
        "dimension": "incidentDate",
        "items": [
          {
            "id": "2021-10-01_2021-10-30"
          }
        ]
      },
      {
        "dimension": "eventStatus",
        "items": [
          {
            "id": "ACTIVE"
          },
          {
            "id": "COMPLETED"
          }
        ]
      },
      {
        "dimension": "createdBy",
        "items": [
          {
            "id": "userA"
          }
        ]
      },
      {
        "dimension": "lastUpdatedBy",
        "items": [
          {
            "id": "userB"
          }
        ]
      }
    ],
```

```
    "rows": [
      {
        "dimension": "pe",
        "items": [
          {
            "id": "LAST_12_MONTHS"
          }
        ]
      }
    ]
}
```

For multi-program support, the root `program` should not be specified. This will turn the `eventVisualization` into a multi-program. Consequently, we have to specify the `program` and `programStage` (when applicable) for each `dimension` in `rows`, `columns`, and `filters`.

Example:

```
"program": null,
"columns": [
  {
    "dimension": "ou",
    "items": [
        {
            "id": "O6uvpzGd5pu"
        }
    ],
    "program": {
        "id": "IpHINAT79UW"
    }
  },
  {
    "dimensionType": "CATEGORY_OPTION_GROUP_SET",
    "items": [
      {
          "id": "JLGV7lRQRAg"
      },
      {
          "id": "p916ZCVGNyq"
      }
    ],
    "dimension": "C31vHZqu0qU",
    "program": {
        "id": "kla3mAPgvCH"
    },
    "programStage": {
        "id": "aNLq9ZYoy9W"
    }
  }
]
```

> **Note**
>
> The `repetition` attribute (in `rows`, `columns` or `filters`) indicates the events indexes to be retrieved. Taking the example above (in the previous `json` payload), it can be read as follows:
>
> ```
> 1 = First event
> 2 = Second event
> ```

```
3 = Third event
...
-2 = Third latest event
-1 = Second latest event
0 = Latest event (default)
```

To update a specific EventVisualization, you can send a PUT request to the same `/api/eventVisualizations` resource with a similar payload PLUS the respective EventVisualization's identifier, ie.: PUT /api/eventVisualizations/hQxZGXqnLS9 Finally, to delete an existing EventVisualization, you can make a DELETE request specifying the identifier of the EventVisualization to be removed, as shown: DELETE /api/eventVisualizations/hQxZGXqnLS9

Interpretations

For resources related to data analysis in DHIS2, such as visualizations, maps, event reports, event charts and even visualizations you can write and share data interpretations. An interpretation can be a comment, question, observation or interpretation about a data report or visualization.

```
/api/interpretations
```

Reading interpretations

To read interpretations we will interact with the `/api/interpretations` resource. A typical GET request using field filtering can look like this:

```
GET /api/interpretations?fields=*,comments[id,text,user,mentions]
```

The output in JSON response format could look like below (additional fields omitted for brevity):

```
{
  "interpretations": [
    {
      "id": "XSHiFlHAhhh",
      "created": "2013-05-30T10:24:06.181+0000",
      "text": "Data looks suspicious, could be a data entry mistake.",
      "type": "MAP",
      "likes": 2,
      "user": {
        "id": "uk7diLujYif"
      },
      "reportTable": {
        "id": "LcSxnfeBxyi"
      },
      "visualization": {
        "id": "LcSxnfeBxyi"
      }
    }, {
      "id": "kr4AnZmYL43",
      "created": "2013-05-29T14:47:13.081+0000",
      "text": "Delivery rates in Bo looks high.",
      "type": "VISUALIZATION",
      "likes": 3,
      "user": {
        "id": "uk7diLujYif"
      },
      "visualization": {
```

```
        "id": "HDEDqV3yv3H"
      },
      "mentions": [
        {
          "created": "2018-06-25T10:25:54.498",
          "username": "boateng"
        }
      ],
      "comments": [
        {
          "id": "iB4Etq8yTE6",
          "text": "This report indicates a surge.",
          "user": {
            "id": "B4XIfwOcGyI"
          }
        },
        {
          "id": "iB4Etq8yTE6",
          "text": "Likely caused by heavy rainfall.",
          "user": {
            "id": "B4XIfwOcGyI"
          }
        },
        {
          "id": "SIjkdENan8p",
          "text": "Have a look at this @boateng.",
          "user": {
            "id": "xE7jOejl9FI"
          },
          "mentions": [
            {
              "created": "2018-06-25T10:03:52.316",
              "username": "boateng"
            }
          ]
        }
      ]
    }
  ]
}
```


Interpretation fields

Field	Description
id	The interpretation identifier.
created	The time of when the interpretation was created.
type	The type of analytical object being interpreted. Valid options: VISUALIZATION, MAP, EVENT_REPORT, EVENT_CHART, EVENT_VISUALIZATION, DATASET_REPORT.
user	Association to the user who created the interpretation.
visualization	Association to the visualization if type is VISUALIZATION
eventVisualization	Association to the event visualization if type is EVENT_VISUALIZATION
map	Association to the map if type is MAP.

Field	Description
eventReport	Association to the event report is type is EVENT_REPORT.
eventChart	Association to the event chart if type is EVENT_CHART.
dataSet	Association to the data set if type is DATASET_REPORT.
comments	Array of comments for the interpretation. The text field holds the actual comment.
mentions	Array of mentions for the interpretation. A list of users identifiers.

For all analytical objects you can append */data* to the URL to retrieve the data associated with the resource (as opposed to the metadata). As an example, by following the map link and appending /data one can retrieve a PNG (image) representation of the thematic map through the following URL:

```
https://play.dhis2.org/demo/api/maps/bhmHJ4ZCdCd/data
```

For all analytical objects you can filter by *mentions*. To retrieve all the interpretations/comments where a user has been mentioned you have three options. You can filter by the interpretation mentions (mentions in the interpretation description):

```
GET /api/interpretations?fields=*,comments[*]&filter=mentions.username:in:[boateng]
```

You can filter by the interpretation comments mentions (mentions in any comment):

```
GET /api/interpretations?fields=*,comments[*]
  &filter=comments.mentions.username:in:[boateng]
```

You can filter by intepretations which contains the mentions either in the interpretation or in any comment (OR junction):

```
GET /api/interpretations?fields=*,comments[*]&filter=mentions:in:[boateng]
```

Writing interpretations

When writing interpretations you will supply the interpretation text as the request body using a POST request with content type "text/plain". The URL pattern looks like the below, where {object-type} refers to the type of the object being interpreted and {object-id} refers to the identifier of the object being interpreted.

```
/api/interpretations/{object-type}/{object-id}
```

Valid options for object type are *visualization*, *map*, *eventReport*, *eventChart*, *eventVisualization* and *dataSetReport*.

Some valid examples for interpretations are listed below.

> **Note**
>
> The `eventCharts` and `eventReports` APIs are deprecated. We recommend using the `eventVisualizations` API instead.

```
/api/interpretations/visualization/hQxZGXqnLS9
/api/interpretations/map/FwLHSMCejFu
/api/interpretations/eventReport/xJmPLGP3Cde
/api/interpretations/eventChart/nEzXB2M9YBz
/api/interpretations/eventVisualization/nEzXB2M9YBz
/api/interpretations/dataSetReport/tL7eCjmDIgM
```

As an example, we will start by writing an interpretation for the visualization with identifier *EbRN2VIbPdV*. To write visualization interpretations we will interact with the `/api/interpretations/visualization/{visualizationId}` resource. The interpretation will be the request body. Based on this we can put together the following request using cURL:

```
curl -d "This visualization shows a significant ANC 1-3 dropout" -X POST
  "https://play.dhis2.org/demo/api/interpretations/visualization/EbRN2VIbPdV" -H "Content-
Type:text/plain" -u admin:district
```

Notice that the response provides a Location header with a value indicating the location of the created interpretation. This is useful from a client perspective when you would like to add a comment to the interpretation.

Updating and removing interpretations

To update an existing interpretation you can use a PUT request where the interpretation text is the request body using the following URL pattern, where {id} refers to the interpretation identifier:

```
/api/interpretations/{id}
```

Based on this we can use curl to update the interpretation:

```
curl -d "This visualization shows a high dropout" -X PUT
  "https://play.dhis2.org/demo/api/interpretations/visualization/EV08iI1cJRA" -H "Content-
Type:text/plain" -u admin:district
```

You can use the same URL pattern as above using a DELETE request to remove the interpretation.

Creating interpretation comments

When writing comments to interpretations you will supply the comment text as the request body using a POST request with content type "text/plain". The URL pattern looks like the below, where {interpretation-id} refers to the interpretation identifier.

```
/api/interpretations/{interpretation-id}/comments
```

Second, we will write a comment to the interpretation we wrote in the example above. By looking at the interpretation response you will see that a *Location* header is returned. This header tells us the URL of the newly created interpretation and from that, we can read its identifier. This identifier is

randomly generated so you will have to replace the one in the command below with your own. To write a comment we can interact with the `/api/interpretations/{id}/comments` resource like this:

```
curl -d "An intervention is needed" -X POST
  "https://play.dhis2.org/demo/api/interpretations/j8sjHLkK8uY/comments"
  -H "Content-Type:text/plain" -u admin:district
```

Updating and removing interpretation comments

To updating an interpretation comment you can use a PUT request where the comment text is the request body using the following URL pattern:

```
/api/interpretations/{interpretation-id}/comments/{comment-id}
```

Based on this we can use curl to update the comment:

```
curl "https://play.dhis2.org/demo/api/interpretations/j8sjHLkK8uY/comments/idAzzhVWvh2"
  -d "I agree with that." -X PUT -H "Content-Type:text/plain" -u admin:district
```

You can use the same URL pattern as above using a DELETE request to the remove the interpretation comment.

Liking interpretations

To like an interpretation you can use an empty POST request to the *like* resource:

```
POST /api/interpretations/{id}/like
```

A like will be added for the currently authenticated user. A user can only like an interpretation once.

To remove a like for an interpretation you can use a DELETE request to the same resource as for the like operation.

The like status of an interpretation can be viewed by looking at the regular Web API representation:

```
GET /api/interpretations/{id}
```

The like information is found in the *likes* field, which represents the number of likes, and the *likedBy* array, which enumerates the users who have liked the interpretation.

```
{
  "id": "XSHiFlHAhhh",
  "text": "Data looks suspicious, could be a data entry mistake.",
  "type": "VISUALIZATION",
  "likes": 2,
  "likedBy": [
    {
      "id": "k7Hg12fJ2f1"
    },
    {
      "id": "gYhf26fFkjFS"
    }
```

```
  ]
}
```

SQL views

The SQL views resource allows you to create and retrieve the result set of SQL views. The SQL views can be executed directly against the database and render the result set through the Web API resource.

```
/api/sqlViews
```

SQL views are useful for creating data views which may be more easily constructed with SQL compared combining the multiple objects of the Web API. As an example, lets assume we have been asked to provide a view of all organization units with their names, parent names, organization unit level and name, and the coordinates listed in the database. The view might look something like this:

```
select ou.name as orgunit, par.name as parent, ou.coordinates, ous.level, oul.name
from organisationunit ou
inner join _orgunitstructure ous on ou.organisationunitid = ous.organisationunitid
inner join organisationunit par on ou.parentid = par.organisationunitid
inner join orgunitlevel oul on ous.level = oul.level
where ou.coordinates is not null
order by oul.level, par.name, ou.name;
```

We will use *curl* to first execute the view on the DHIS2 server. This is essentially a materialization process, and ensures that we have the most recent data available through the SQL view when it is retrieved from the server. You can first look up the SQL view from the api/sqlViews resource, then POST using the following command:

```
curl "https://play.dhis2.org/demo/api/sqlViews/dI68mLkP1wN/execute" -X POST -u admin:district
```

The next step in the process is the retrieval of the data. The endpoint is available at:

```
/api/sqlViews/{id}/data(.csv)
```

The `id` path represents the SQL view identifier. The path extensions refers to the format of the data download. Append either `data` for JSON data or `data.csv` for comma separated values. Support response formats are json, xml, csv, xls, html and html+css.

As an example, the following command would retrieve CSV data for the SQL view defined above.

```
curl "https://play.dhis2.org/demo/api/sqlViews/dI68mLkP1wN/data.csv" -u admin:district
```

There are three types of SQL views:

- *SQL view:* Standard SQL views.
- *Materialized SQL view:* SQL views which are materialized, meaning written to disk. Needs to be updated to reflect changes in underlying tables. Supports criteria to filter result set.
- *SQL queries:* Plain SQL queries. Support inline variables for customized queries.

Criteria

You can do simple filtering on the columns in the result set by appending *criteria* query parameters to the URL, using the column names and filter values separated by columns as parameter values, on the following format:

```
/api/sqlViews/{id}/data?criteria=col1:value1&criteria=col2:value2
```

As an example, to filter the SQL view result set above to only return organisation units at level 4 you can use the following URL:

```
https://play.dhis2.org/demo/api/sqlViews/dI68mLkP1wN/data.csv?criteria=level:4
```

Variables

SQL views support variable substitution. Variable substitution is only available for SQL view of type *query*, meaning SQL views which are not created in the database but simply executed as regular SQL queries. Variables can be inserted directly into the SQL query and must be on this format:

```
${variable-key}
```

As an example, an SQL query that retrieves all data elements of a given value type where the value type is defined through a variable can look like this:

```
select * from dataelement where valuetype = '${valueType}';
```

These variables can then be supplied as part of the URL when requested through the *sqlViews* Web API resource. Variables can be supplied on the following format:

```
/api/sqlViews/{id}/data?var=key1:value1&var=key2:value2
```

An example query corresponding to the example above can look like this:

```
/api/sqlViews/dI68mLkP1wN/data.json?var=valueType:int
```

The *valueType* variable will be substituted with the *int* value, and the query will return data elements with int value type.

The variable parameter must contain alphanumeric characters only. The variables must contain alphanumeric, dash, underscore and whitespace characters only.

SQL Views of type *query* also support two system-defined variables that allow the query to access information about the user executing the view:

variable	means
${_current_user_id}	the user's database id
${_current_username}	the user's username

Values for these variables cannot be supplied as part of the URL. They are always filled with information about the user.

For example, the following SQL view of type *query* shows all the organisation units that are assigned to the user:

```
select ou.path, ou.name
from organisationunit ou_user
join organisationunit ou on ou.path like ou_user.path || '%'
join usermembership um on um.organisationunitid = ou_user.organisationunitid
where um.userinfoid = ${_current_user_id}
order by ou.path;
```

Filtering

The SQL view API supports data filtering, equal to the metadata object_filter. For a complete list of filter operators you can look at the documentation for metadata object_filter.

To use filters, simply add them as parameters at the end of the request URL for your SQL view like this. This request will return a result including org units with "bo" in the name at level 2 of the org unit hierarchy:

```
/api/sqlViews/w3UxFykyHFy/data.json?filter=orgunit_level:eq:2&filter=orgunit_name:ilike:bo
```

The following example will return all org units with `orgunit_level` 2 or 4:

```
/api/sqlViews/w3UxFykyHFy/data.json?filter=orgunit_level:in:[2,4]
```

And last, an example to return all org units that does not start with "Bo":

```
/api/sqlViews/w3UxFykyHFy/data.json?filter=orgunit_name:!like:Bo
```

Data items

This endpoint allows the user to query data related to a few different dimensional items. These items are: `INDICATOR`, `DATA_ELEMENT`, `DATA_SET`, `PROGRAM_INDICATOR`, `PROGRAM_DATA_ELEMENT`, `PROGRAM_ATTRIBUTE`. The endpoint supports only `GET` requests and, as other endpoints, can return responses in JSON or XML format.

The URL is `/api/dataItems` and as you can imagine, it is able to retrieve different objects through the same endpoint in the same `GET` request. For this reason, some queriable attributes available will differ depending on the dimensional item(s) being queried.

To understand the statement above let's have a look at the followings request examples:

1) `GET /api/dataItems?filter=dimensionItemType:eq:DATA_ELEMENT&filter=valueType:eq:TEXT` In this example the item type `DATA_ELEMENT` has a `valueType` attribute which can be used in the query.

2) `GET /api/dataItems?pageSize=50&order=displayName:asc&filter=dimensionItemType:eq:PROGRAM_INDICATOR&filter`

Here, the `PROGRAM_INDICATOR` allows filtering by `programId`.

So, based on the examples `1)` and `2)` if you try filtering a `DATA_ELEMENT` by `programId` or filter a `PROGRAM_INDICATOR` by `valueType`, you should get no results. In other words, the filter will be applied only when the attribute actually exists for the respective data item.

Another important aspect to be highlighted is that this endpoint does NOT follow the same querying standards as other existing endpoints, like Metadata object filter for example. As a consequence, it supports a smaller set of features and querying. The main reason for that is the need for querying multiple different items that have different relationships, which is not possible using the existing filtering components (used by the others endpoints).

Endpoint responses

Base on the `GET` request/query, the following status codes and responses are can be returned.

Results found (status code 200)


```
{
  "pager": {
    "page": 1,
    "pageCount": 27,
    "total": 1339,
    "pageSize": 50
  },
  "dataItems": [
    {
      "simplifiedValueType": "TEXT",
      "displayName": "TB program Gender",
      "displayShortName": "TB prog. Gen.",
      "valueType": "TEXT",
      "name": "TB program Gender",
      "shortName": "TB prog Gen",
      "id": "ur1Edk5Oe2n.cejWyOfXge6",
      "programId": "ur1Edk5Oe2n",
      "dimensionItemType": "PROGRAM_ATTRIBUTE"
    }
  ]
}
```


Results not found (status code 200)


```
{
  "pager": {
    "page": 1,
    "pageCount": 1,
    "total": 0,
    "pageSize": 50
  },
  "dataItems": [
  ]
}
```


Invalid query (status code 409)


```
{
  "httpStatus": "Conflict",
  "httpStatusCode": 409,
  "status": "ERROR",
```

```
  "message": "Unable to parse element `INVALID_TYPE` on filter dimensionItemType`. The values
available are: [INDICATOR, DATA_ELEMENT, DATA_ELEMENT_OPERAND, DATA_SET, PROGRAM_INDICATOR,
PROGRAM_DATA_ELEMENT, PROGRAM_ATTRIBUTE]",
  "errorCode": "E2016"
}
```

Pagination

This endpoint also supports pagination as a default option. If needed, you can disable pagination by adding `paging=false` to the `GET` request, i.e.: `/api/dataItems?filter=dimensionItemType:in:[INDICATOR]&paging=false`.

Here is an example of a payload when the pagination is enabled. Remember that pagination is the default option and does not need to be explicitly set.

```
{
  "pager": {
    "page": 1,
    "pageCount": 20,
    "total": 969,
    "pageSize": 50
  },
  "dataItems": [...]
}
```

> **Note**
>
> For elements where there is an associated Program, the program name should also be returned as part of the element name (as a prefix). The only exception is `Program Indicators`. We will not prefix the element name in this case, in order to keep the same behavior as existing endpoints.
>
> The /dataItems endpoint will bring only data items that are defined as aggregatable type. The current list of valid aggregatable types is: `TEXT`, `LONG_TEXT`, `LETTER`, `BOOLEAN`, `TRUE_ONLY`, `NUMBER`, `UNIT_INTERVAL`, `PERCENTAGE`, `INTEGER`, `INTEGER_POSITIVE`, `INTEGER_NEGATIVE`, `INTEGER_ZERO_OR_POSITIVE`, `COORDINATE`.
>
> Even though the response returns several different attributes, the filtering can only be applied to specific ones: `displayName`, `name`, `valueType`, `id`, `dimensionItemType`, `programId`.
>
> The `order` will be considered invalid if it is set on top of `name` (ie.: order=*name:asc*) and a `filter` is set to `displayName` (ie.: filter=*displayName:ilike:aName*), and vice-versa.

Response attributes

Now that we have a good idea of the main features and usage of this endpoint let's have a look in the list of attributes returned in the response.

Data items attributes

Field	Description
id	The unique identifier.
code	A custom code to identify the dimensional item.
name	The name given for the item.

Field	Description
displayName	The display name defined.
shortName	The short name given for the item.
displayShortName	The display short name defined.
dimensionItemType	The dimension type. Possible types: INDICATOR, DATA_ELEMENT, REPORTING_RATE, PROGRAM_INDICATOR, PROGRAM_DATA_ELEMENT, PROGRAM_ATTRIBUTE.
valueType	The item value type (more specific definition). Possitble types: TEXT, LONG_TEXT, LETTER, BOOLEAN, TRUE_ONLY, UNIT_INTERVAL, PERCENTAGE, INTEGER, INTEGER_POSITIVE, INTEGER_NEGATIVE, INTEGER_ZERO_OR_POSITIVE, COORDINATE
simplifiedValueType	The genereal representation of a value type. Valid values: NUMBER, BOOLEAN, DATE, FILE_RESOURCE, COORDINATE, TEXT
programId	The associated programId.

Viewing analytical resource representations

DHIS2 has several resources for data analysis. These resources include *maps*, *visualizations*, *eventVisualizations*, *reports* and *documents*. By visiting these resources you will retrieve information about the resource. For instance, by navigating to `/api/visualizations/R0DVGvXDUNP` the response will contain the name, last date of modification and so on for the chart. To retrieve the analytical representation, for instance, a PNG representation of the visualization, you can append */data* to all these resources. For instance, by visiting `/api/visualizations/R0DVGvXDUNP/data` the system will return a PNG image of the visualization.

Analytical resources

Resource	Description	Data URL	Resource representations
eventCharts	Event charts	/api/eventCharts/<identifier>/data	png
maps	Maps	/api/maps/<identifier>/data	png
visualizations	Pivot tables and charts	/api/visualizations/<identifier>/data	json | jsonp | html | xml | pdf | xls | csv
eventVisualizations	Event charts	/api/eventVisualizations/<identifier>/data	png
png			
reports	Standard reports	/api/reports/<identifier>/data	pdf | xls | html
documents	Resources	/api/documents/<identifier>/data	<follows document>

The data content of the analytical representations can be modified by providing a *date* query parameter. This requires that the analytical resource is set up for relative periods for the period dimension.

Data query parameters

Query parameter	Value	Description
date	Date in yyyy-MM-dd format	Basis for relative periods in report (requires relative periods)

Query parameters for png / image types (visualizations, maps)

Query parameter	Description
width	Width of image in pixels
height	Height of image in pixels

Some examples of valid URLs for retrieving various analytical representations are listed below.

```
/api/visualizations/R0DVGvXDUNP/data
/api/visualizations/R0DVGvXDUNP/data?date=2013-06-01

/api/visualizations/jIISuEWxmoI/data.html
/api/visualizations/jIISuEWxmoI/data.html?date=2013-01-01
/api/visualizations/FPmvWs7bn2P/data.xls
/api/visualizations/FPmvWs7bn2P/data.pdf

/api/eventVisualizations/x5FVFVt5CDI/data
/api/eventVisualizations/x5FVFVt5CDI/data.png

/api/maps/DHE98Gsynpr/data
/api/maps/DHE98Gsynpr/data?date=2013-07-01

/api/reports/OeJsA6K1Otx/data.pdf
/api/reports/OeJsA6K1Otx/data.pdf?date=2014-01-01
```

Analytics

Analytics

To access analytical, aggregated data in DHIS2 you can work with the *analytics* resource. The analytics resource is powerful as it lets you query and retrieve data aggregated along all available data dimensions. For instance, you can ask the analytics resource to provide the aggregated data values for a set of data elements, periods and organisation units. Also, you can retrieve the aggregated data for a combination of any number of dimensions based on data elements and organisation unit group sets.

```
/api/analytics
```

Request query parameters

The analytics resource lets you specify a range of query parameters:

Query parameters

Query parameter	Required	Description	Options (default first)
dimension	Yes	Dimensions and dimension items to be retrieved, repeated for each.	Any dimension
filter	No	Filters and filter items to apply to the query, repeated for each.	Any dimension
aggregationType	No	Aggregation type to use in the aggregation process.	SUM | AVERAGE | AVERAGE_SUM_ORG_UNIT | LAST | LAST_AVERAGE_ORG_UNIT | COUNT | STDDEV | VARIANCE | MIN | MAX
measureCriteria	No	Filters for the data/ measures.	EQ | GT | GE | LT | LE
preAggregationMeasureCriteria	No	Filters for the data/ measure, applied before aggregation is performed.	EQ | GT | GE | LT | LE
startDate	No	Start date for a date range. Will be applied as a filter. Can not be used together with a period dimension or filter.	Date
endDate	No	End date for date range. Will be applied as a filter. Can not be used together with a period dimension or filter.	Date

Query parameter	Required	Description	Options (default first)
skipMeta	No	Exclude the metadata part of the response (improves performance).	false | true
skipData	No	Exclude the data part of the response.	false | true
skipRounding	No	Skip rounding of data values, i.e. provide full precision.	false | true
hierarchyMeta	No	Include names of organisation unit ancestors and hierarchy paths of organisation units in the metadata.	false | true
ignoreLimit	No	Ignore limit on max 50 000 records in response - use with care.	false | true
tableLayout	No	Use plain data source or table layout for the response.	false | true
hideEmptyRows	No	Hides empty rows in response, applicable when table layout is true.	false | true
hideEmptyColumns	No	Hides empty columns in response, applicable when table layout is true.	false | true
showHierarchy	No	Display full org unit hierarchy path together with org unit name.	false | true
includeNumDen	No	Include the numerator and denominator used to calculate the value in the response.	false | true
includeMetadataDetails	No	Include metadata details to raw data response.	false | true
displayProperty	No	Property to display for metadata.	NAME | SHORTNAME
outputIdScheme	No	Identifier scheme used for metadata items in the query response. It accepts identifier, code or attributes.	UID | UUID | CODE | NAME | ATTRIBUTE:<ID>

Query parameter	Required	Description	Options (default first)
outputOrgUnitIdScheme	No	Identifier scheme used for metadata items in the query response. This parameter overrides the "outputIdScheme" specifically for for Org Units. It accepts identifier, code or attributes.	UUID | CODE | NAME | ATTRIBUTE:<ID>
outputDataElementIdScheme	No	Identifier scheme used for metadata items in the query response. This parameter overrides the "outputIdScheme" specifically for Data Elements. It accepts identifier, code or attributes.	UUID | CODE | NAME | ATTRIBUTE:<ID>
inputIdScheme	No	Identifier scheme to use for metadata items in the query request, can be an identifier, code or attributes.	UID | CODE | ATTRIBUTE:<ID>
approvalLevel	No	Include data which has been approved at least up to the given approval level, refers to identifier of approval level.	Identifier of approval level
relativePeriodDate	No	Date used as basis for relative periods.	Date.
userOrgUnit	No	Explicitly define the user org units to utilize, overrides organisation units associated with the current user, multiple identifiers can be separated by semicolon.	Organisation unit identifiers.
columns	No	Dimensions to use as columns for table layout.	Any dimension (must be query dimension)
rows	No	Dimensions to use as rows for table layout.	Any dimension (must be query dimension)
order	No	Specify the ordering of rows based on value.	ASC | DESC

Query parameter	Required	Description	Options (default first)
timeField	No	The time field to base event aggregation on. Applies to event data items only. Can be a predefined option or the ID of an attribute or data element with a time-based value type.	EVENT_DATE | ENROLLMENT_DATE | INCIDENT_DATE | DUE_DATE | COMPLETED_DATE | CREATED | LAST_UPDATED | <Attribute ID> | <Data element ID>
orgUnitField	No	The organisation unit field to base event aggregation on. Applies to event data items only. Can be the ID of an attribute or data element with the Organisation unit value type. The default option is specified as omitting the query parameter.	<Attribute ID> | <Data element ID> | REGISTRATION | ENROLLMENT | OWNER_AT_START | OWNER_AT_END
enhancedConditions	No	Enable enhanced conditions for dimensions/filters	false | true

The *dimension* query parameter defines which dimensions should be included in the analytics query. Any number of dimensions can be specified. The dimension parameter should be repeated for each dimension to include in the query response. The query response can potentially contain aggregated values for all combinations of the specified dimension items.

The *filter* parameter defines which dimensions should be used as filters for the data retrieved in the analytics query. Any number of filters can be specified. The filter parameter should be repeated for each filter to use in the query. A filter differs from a dimension in that the filter dimensions will not be part of the query response content, and that the aggregated values in the response will be collapsed on the filter dimensions. In other words, the data in the response will be aggregated on the filter dimensions, but the filters will not be included as dimensions in the actual response. As an example, to query for certain data elements filtered by the periods and organisation units you can use the following URL:

```
/api/analytics?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU&filter=pe:2014Q1;2014Q2
  &filter=ou:O6uvpzGd5pu;lc3eMKXaEfw
```

The *aggregationType* query parameter lets you define which aggregation operator should be used for the query. By default, the aggregation operator defined for data elements included in the query will be used. If your query does not contain any data elements but does include data element groups, the aggregation operator of the first data element in the first group will be used. The order of groups and data elements is undefined. This query parameter allows you to override the default and specify a specific aggregation operator. As an example, you can set the aggregation operator to "count" with the following URL:

```
/api/analytics?dimension=dx:fbfJHSPpUQD&dimension=pe:2014Q1&dimension=ou:O6uvpzGd5pu
  &aggregationType=COUNT
```

The *measureCriteria* query parameter lets you filter out ranges of data records to return. You can instruct the system to return only records where the aggregated data value is equal, greater than, greater or equal, less than or less or equal to certain values. You can specify any number of criteria on the following format, where *criteria* and *value* should be substituted with real values:

```
/api/analytics?measureCriteria=criteria:value;criteria:value
```

As an example, the following query will return only records where the data value is greater or equal to 6500 and less than 33000:

```
/api/analytics?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU&dimension=pe:2014
  &dimension=ou:O6uvpzGd5pu;lc3eMKXaEfw&measureCriteria=GE:6500;LT:33000
```

Similar to *measureCriteria*, the *preAggregationMeasureCriteria* query parameter lets you filter out data, only before aggregation is performed. For example, the following query only aggregates data where the original value is within the criteria defined:

```
/api/analytics?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU&dimension=pe:2014
  &dimension=ou:O6uvpzGd5pu;lc3eMKXaEfw&preAggregationMeasureCriteria=GE:10;LT:100
```

The *startDate* and *endDate* parameters can be used to specify a custom date range to aggregate over. When specifying a date range you can not specify relative nor fixed periods as dimension or filter. The date range will filter the analytics response. You can use it like this:

```
/api/analytics.json?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU
  &dimension=ou:ImspTQPwCqd&startDate=2018-01-01&endDate=2018-06-01
```

In order to have the analytics resource generate the data in the shape of a ready-made table, you can provide the *tableLayout* parameter with true as value. Instead of generating a plain, normalized data source, the analytics resource will now generate the data in a table layout. You can use the *columns* and *rows* parameters with dimension identifiers separated by semi-colons as values to indicate which ones to use as table columns and rows. The column and rows dimensions must be present as a data dimension in the query (not a filter). Such a request can look like this:

```
/api/analytics.html?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU&dimension=pe:2014Q1;2014Q2
  &dimension=ou:O6uvpzGd5pu&tableLayout=true&columns=dx;ou&rows=pe
```

The *order* parameter can be used for analytics resource to generate ordered data. The data will be ordered in ascending (or descending) order of values. An example request for ordering the values in descending order is:

```
/api/analytics?dimension=dx:fbfJHSPpUQD&dimension=pe:LAST_12_MONTHS
  &dimension=ou:O6uvpzGd5pu&order=DESC
```

Dimensions and items

DHIS2 features a multi-dimensional data model with several fixed and dynamic data dimensions. The fixed dimensions are the data element, period (time) and organisation unit dimension. You can dynamically add dimensions through categories, category option group sets, organisation unit group sets, data element group sets and organisation unit group sets. The table below displays the available data dimensions in DHIS2. Each data dimension has a corresponding *dimension identifier*, and each dimension can have a set of *dimension items*:

Dimensions and dimension items

Dimension	Dimension id	Dimension items
Data elements, indicators, data set reporting rate metrics, data element operands, program indicators, program data elements, program attributes, validation rules	dx	Data element, indicator, data set reporting rate metrics, data element operand, program indicator, program attribute identifiers, keyword DE_GROUP-<group-id>, IN_GROUP-<group-id>, use <dataelement-id>.<optioncombo-id> for data element operands, <program-id>.<dataelement-id> for program data elements, <program-id>.<attribute-id> for program attributes, <validationrule-id> for validation results.
Periods (time)	pe	ISO periods and relative periods, see "date and period format"
Organisation unit hierarchy	ou	Organisation unit identifiers, and keywords USER_ORGUNIT, USER_ORGUNIT_CHILDREN, USER_ORGUNIT_GRANDCHILDREN, LEVEL-<level> and OU_GROUP-<group-id>
Category option combinations	co	Category option combo identifiers (omit to get all items)
Attribute option combinations	ao	Category option combo identifiers (omit to get all items)
Categories	<category id>	Category option identifiers (omit to get all items)
Data element group sets	<group set id>	Data element group identifiers (omit to get all items)
Organisation unit group sets	<group set id>	Organisation unit group identifiers (omit to get all items)
Category option group sets	<group set id>	Category option group identifiers (omit to get all items)

It is not necessary to be aware of which objects are used for the various dynamic dimensions when designing analytics queries. You can get a complete list of dynamic dimensions by visiting this URL in the Web API:

```
/api/dimensions
```

If you want to retrieve only the dimensional items for a given dynamic dimension you can use the example below. Pagination is disabled by default. It can be enabled by adding the pagination parameter `paging=true` to the URL.

```
/api/dimensions/J5jldMd8OHv/items?paging=true
```

The `/dimensions` API also provides an endpoint where the clients can get the *recomendations* for a given set of *dimensions*. For example:

```
/api/33/dimensions/recommendations?fields=id&dimension=dx:fbfJHSPpUQD
```

In the example above, the client will receive back all the *Categories* that are configured as `Data dimensions` and associated (through data sets and category combos) with the data element `fbfJHSPpUQD`. In addition, all *Organization Unit Group Set*s that are configured as `Data dimensions` will also (and always) be returned as part of the response.

The endpoint supports multiple data elements. If one wishes to send multiple data elements, they should be separated by `;`. For example:

```
/api/33/dimensions/recommendations?fields=id&dimension=dx:fbfJHSPpUQD;JuTpJ2Ywq5b
```

> Note
>
> This endpoint returns only dimensions that can be read by the current logged user. It will check if the current user can read the data or the metadata of the respective recommended dimension. Non-authorized dimensions are omitted from the list.

The base URL to the analytics resource is `/api/analytics`. To request specific dimensions and dimension items you can use a query string on the following format, where `dim-id` and `dim-item` should be substituted with real values:

```
/api/analytics?dimension=dim-id:dim-item;dim-item&dimension=dim-id:dim-item;dim-item
```

As illustrated above, the dimension identifier is followed by a colon while the dimension items are separated by semi-colons. As an example, a query for two data elements, two periods and two organisation units can be done with the following URL:

```
/api/analytics?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU
  &dimension=pe:2016Q1;2016Q2&dimension=ou:O6uvpzGd5pu;lc3eMKXaEfw
```

To query for data broken down by category option combinations instead of data element totals you can include the category dimension in the query string, for instance like this:

```
/api/analytics?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU
  &dimension=co&dimension=pe:201601&dimension=ou:O6uvpzGd5pu;lc3eMKXaEfw
```

When selecting data elements you can also select all data elements in a group as items by using the `DE_GROUP-<id>` syntax:

```
/api/analytics?dimension=dx:DE_GROUP-h9cuJOkOwY2
  &dimension=pe:201601&dimension=ou:O6uvpzGd5pu
```

When selecting data set reporting rates, the syntax contains a data set identifier followed by a reporting rate metric:

```
/api/analytics?dimension=dx:BfMAe6Itzgt.REPORTING_RATE;BfMAe6Itzgt.ACTUAL_REPORTS
  &dimension=pe:201601&dimension=ou:O6uvpzGd5pu
```

To query for program data elements (of tracker domain type) you can get those by specifying the program for each data element using the `<program-id>.<dataelement-id>` syntax:

```
/api/analytics.json?dimension=dx:eBAyeGv0exc.qrur9Dvnyt5;eBAyeGv0exc.GieVkTxp4HH
  &dimension=pe:LAST_12_MONTHS&filter=ou:ImspTQPwCqd
```

To query for program attributes (tracked entity attributes) you can get those by specifying the program for each attribute using the `<program.id>.<attribute-id>` syntax:

```
/api/analytics.json?dimension=dx:IpHINAT79UW.a3kGcGDCuk6;IpHINAT79UW.UXz7xuGCEhU
  &dimension=pe:LAST_4_QUARTERS&dimension=ou:ImspTQPwCqd
```

To query for organisation unit group sets and data elements you can use the following URL. Notice how the group set identifier is used as a dimension identifier and the groups as dimension items:

```
/api/analytics?dimension=Bpx0589u8y0:oRVt7g429ZO;MAs88nJc9nL
  &dimension=pe:2016&dimension=ou:ImspTQPwCqd
```

To query for data elements and categories you can use this URL. Use the category identifier as a dimension identifier and the category options as dimension items:

```
/api/analytics?dimension=dx:s46m5MS0hxu;fClA2Erf6IO&dimension=pe:2016
  &dimension=YNZyaJHiHYq:btOyqprQ9e8;GEqzEKCHoGA&filter=ou:ImspTQPwCqd
```

To query using relative periods and organisation units associated with the current user you can use a URL like this:

```
/api/analytics?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU
  &dimension=pe:LAST_12_MONTHS&dimension=ou:USER_ORGUNIT
```

When selecting organisation units for a dimension you can select an entire level optionally constrained by any number of boundary organisation units with the `LEVEL-<level>` syntax. Boundary refers to a

top node in a sub-hierarchy, meaning that all organisation units at the given level below the given boundary organisation unit in the hierarchy will be included in the response, and is provided as regular organisation unit dimension items. The level value can either be a numerical level or refer to the identifier of the organisation unit level entity. A simple query for all org units at level three:

```
/api/analytics?dimension=dx:fbfJHSPpUQD&dimension=pe:2016&dimension=ou:LEVEL-3
```

A query for level three and four with two boundary org units can be specified like this:

```
/api/analytics?dimension=dx:fbfJHSPpUQD&dimension=pe:2016
  &dimension=ou:LEVEL-3;LEVEL-4;O6uvpzGd5pu;lc3eMKXaEf
```

When selecting organisation units you can also select all organisation units in an organisation unit group to be included as dimension items using the `OU_GROUP-<id>` syntax. The organisation units in the groups can optionally be constrained by any number of boundary organisation units. Both the level and the group items can be repeated any number of times:

```
/api/analytics?dimension=dx:fbfJHSPpUQD&dimension=pe:2016
  &dimension=ou:OU_GROUP-w0gFTTmsUcF;OU_GROUP-EYbopBOJWsW;O6uvpzGd5pu;lc3eMKXaEf
```

You can utilize identifier schemes for the metadata part of the analytics response with the outputIdScheme property like this. You can use ID, code and attributes as identifier scheme:

```
/api/analytics?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU
  &dimension=pe:2017Q1;2017Q2&dimension=ou:O6uvpzGd5pu&outputIdScheme=CODE
```

A few things to be aware of when using the analytics resource are listed below.

- Data elements, indicator, data set reporting rates, program data elements and program indicators are part of a common data dimension, identified as "dx". This means that you can use any of data elements, indicators and data set identifiers together with the "dx" dimension identifier in a query.
- For the category, data element group set and organisation unit group set dimensions, all dimension items will be used in the query if no dimension items are specified.
- For the period dimension, the dimension items are ISO period identifiers and/or relative periods. Please refer to the section above called "Date and period format" for the period format and available relative periods.
- For the organisation unit dimension, you can specify the items to be the organisation unit or sub-units of the organisation unit associated with the user currently authenticated for the request using the keys `USER_ORGUNIT` or `USER_ORGUNIT_CHILDREN` as items, respectively. You can also specify organisation unit identifiers directly, or a combination of both.
- For the organisation unit dimension, you can specify the organisation hierarchy level and the boundary unit to use for the request on the format `LEVEL-<level>-<boundary-id>`; as an example `LEVEL-3-ImspTQPwCqd` implies all organisation units below the given boundary unit at level 3 in the hierarchy.

- For the organisation unit dimension, the dimension items are the organisation units and their sub-hierarchy - data will be aggregated for all organisation units below the given organisation unit in the hierarchy.
- You cannot specify dimension items for the category option combination dimension. Instead, the response will contain the items which are linked to the data values.

The dx dimension

The dx dimension is a special dimension which can contain all of the following data types.

Data dx dimension types

Type	Syntax	Description	Data source
Indicator	<indicator-id>	Indicator identifier.	Aggregated data
Indicator grop	IN_GROUP-<indicatorgroup-id>	Keyword followed by an indicator group identifier. Will include all indicators in the group in the response.	Aggregated data
Data element	<dataelement-id>	Data element identifier.	Aggregated data
Data element group	DE_GROUP-<dataelementgroup-id>	Keyword followed by a data element group identifier. Will include all data elements in the group in the response.	Aggregated data
Data element operand	<dataelement-id>.<categoryoptcombo-id>.<attributeoptcombo-id>	Data element identifier followed by one or both of category option combination and attribute option combo identifier. Wildcard "*" symbol can be used to indicate any option combination value. The attribute option combination identifier can be completely left out.	Aggregate data
Data set	<dataset-id>.<reporting-rate-metric>	Data set identifier followed by reporting rate metric. Can be REPORTING_RATE | REPORTING_RATE_ON_TIME | ACTUAL_REPORTS | ACTUAL_REPORTS_ON_TIME | EXPECTED_REPORTS.	Data set completeness registrations

Type	Syntax	Description	Data source
Program data element	<program-id>.<dataelement-id>	Program identifier followed by data element identifier. Reads from events within the specified program.	Events from the given program
Program indicator	<programindicator-id>	Program indicator identifier. Reads from events from within the program associated with the program identifier.	Events from the program of the program indicator
Validation result	<validationrule-id>	Validation rule identifier. Will include validation rule violations for the validation rule, requires that validation results are generated and persisted.	Validation results

Items from all of the various dx types can be combined in an analytics request. An example looks like this:

```
/api/analytics.json
  ?dimension=dx:Uvn6LCg7dVU;BfMAe6Itzgt.REPORTING_RATE;IpHINAT79UW.a3kGcGDCuk6
  &dimension=pe:LAST_12_MONTHS&filter=ou:ImspTQPwCqd
```

The group syntax can be used together with any other item as well. An example looks like this:

```
/api/analytics.json
  ?dimension=dx:DE_GROUP-qfxEYY9xAl6;IN_GROUP-oehv9EO3vP7;BfMAe6Itzgt.REPORTING_RATE
  &dimension=pe:LAST_12_MONTHS&filter=ou:ImspTQPwCqd
```

Data element operands can optionally specify attribute option combinations and use wildcards e.g. to specify all category option combination values:

```
/api/analytics.json
  ?dimension=dx:Uvn6LCg7dVU.*.j8vBiBqGf6O;Uvn6LCg7dVU.Z4oQs46iTeR
  &dimension=pe:LAST_12_MONTHS&filter=ou:ImspTQPwCqd
```

> **Tip**
>
> A great way to learn how to use the analytics API is to use the DHIS2 Data Visualizer web app and create a pivot table. You can play around with pivot tables using the various dimensions and items and click **Download** > **Plain data source** > **JSON** to see the resulting analytics API calls in the address bar of your web browser.

Response formats

The analytics response containing aggregate data can be returned in various representation formats. As usual, you can indicate interest in a specific format by appending a file extension to the URL, through the `Accept` HTTP header or through the `format` query parameter. The default format is JSON. The available formats and content-types are listed below.

- json (application/json)
- jsonp (application/javascript)
- xml (application/xml)
- csv (application/csv)
- html (text/html)
- html+css (text/html)
- xls (application/vnd.ms-excel)

As an example, to request an analytics response in XML format you can use the following URL:

```
/api/analytics.xml?dimension=dx:fbfJHSPpUQD
  &dimension=pe:2016&dimension=ou:O6uvpzGd5pu;lc3eMKXaEfw
```

The JSON response will look like this:

```
{
  "headers": [
    {
      "name": "dx",
      "column": "Data",
      "meta": true,
      "type": "java.lang.String"
    },
    {
      "name": "pe",
      "column": "Period",
      "meta": true,
      "type": "java.lang.String"
    },
    {
      "name": "value",
      "column": "Value",
      "meta": false,
      "type": "java.lang.Double"
    }
  ],
  "height": 4,
  "metaData": {
    "pe": [
      "2016Q1",
      "2016Q2"
    ],
    "ou": [
      "ImspTQPwCqd"
    ],
    "names": {
      "2016Q1": "Jan to Mar 2016",
```

```
      "2016Q2": "Apr to Jun 2016",
      "FbKK4ofIv5R": "Measles Coverage <1 y",
      "ImspTQPwCqd": "Sierra Leone",
      "eTDtyyaSA7f": "Fully Immunized Coverage"
    }
  },
  "rows": [
    [
      "eTDtyyaSA7f",
      "2016Q2",
      "81.1"
    ],
    [
      "eTDtyyaSA7f",
      "2016Q1",
      "74.7"
    ],
    [
      "FbKK4ofIv5R",
      "2016Q2",
      "88.9"
    ],
    [
      "FbKK4ofIv5R",
      "2016Q1",
      "84.0"
    ]
  ],
  "width": 3
}
```


The response represents a table of dimensional data. The *headers* array gives an overview of which columns are included in the table and what the columns contain. The *column* property shows the column dimension identifier, or if the column contains measures, the word "Value". The *meta* property is *true* if the column contains dimension items or *false* if the column contains a measure (aggregated data values). The *name* property is similar to the column property, except it displays "value" in case the column contains a measure. The *type* property indicates the Java class type of column values.

The *height* and *width* properties indicate how many data columns and rows are contained in the response, respectively.

The *metaData periods* property contains a unique, ordered array of the periods included in the response. The *metaData ou* property contains an array of the identifiers of organisation units included in the response. The *metaData names* property contains a mapping between the identifiers used in the data response and the names of the objects they represent. It can be used by clients to substitute the identifiers within the data response with names in order to give a more meaningful view of the data table.

The *rows* array contains the dimensional data table. It contains columns with dimension items (object or period identifiers) and a column with aggregated data values. The example response above has a data/indicator column, a period column and a value column. The first column contains indicator identifiers, the second contains ISO period identifiers and the third contains aggregated data values.

Constraints and validation

There are several constraints to the input parameters you can provide to the analytics resource. If any of the constraints are violated, the API will return a *409 Conflict* response and a response message looking similar to this:

```
{
  "httpStatus": "Conflict",
  "httpStatusCode": 409,
  "status": "ERROR",
  "message": "Only a single indicator can be specified as filter",
  "errorCode": "E7108"
}
```

The `httpStatus` and `httpStatusCode` fields indicate the HTTP status and status code per the HTTP specification. The `messsage` field provides a human-readable description of the validation error. The `errorCode` field provides a machine-readable code which can be used by clients to handle validation errors. The possible validation errors for the aggregate analytics API are described in the table below.

Error code	Message
E7100	Query parameters cannot be null
E7101	At least one dimension must be specified
E7102	At least one data dimension item or data element group set dimension item must be specified
E7103	Dimensions cannot be specified as dimension and filter simultaneously
E7104	At least one period as dimension or filter, or start and dates, must be specified
E7105	Periods and start and end dates cannot be specified simultaneously
E7106	Start date cannot be after end date
E7107	Start and end dates cannot be specified for reporting rates
E7108	Only a single indicator can be specified as filter
E7109	Only a single reporting rate can be specified as filter
E7110	Category option combos cannot be specified as filter
E7111	Dimensions cannot be specified more than once
E7112	Reporting rates can only be specified together with dimensions of type
E7113	Assigned categories cannot be specified when data elements are not specified
E7114	Assigned categories can only be specified together with data elements, not indicators or reporting rates
E7115	Data elements must be of a value and aggregation type that allow aggregation
E7116	Indicator expressions cannot contain cyclic references
E7117	A data dimension 'dx' must be specified when output format is DATA_VALUE_SET
E7118	A period dimension 'pe' must be specified when output format is DATA_VALUE_SET
E7119	An organisation unit dimension 'ou' must be specified when output format is DATA_VALUE_SET

Error code	Message
E7120	User is not allowed to view org unit
E7121	User is not allowed to read data for object
E7122	Data approval level does not exist
E7123	Current user is constrained by a dimension but has access to no dimension items
E7124	Dimension is present in query without any valid dimension options
E7125	Dimension identifier does not reference any dimension
E7126	Column must be present as dimension in query
E7127	Row must be present as dimension in query
E7128	Query result set exceeded max limit
E7129	Program is specified but does not exist
E7130	Program stage is specified but does not exist
E7131	Query failed, likely because the query timed out

Data value set format

The analytics *dataValueSet* resource allows for returning aggregated data in the data value set format. This format represents raw data values, as opposed to data which has been aggregated along various dimensions. Exporting aggregated data as regular data values is useful for data exchange between systems when the target system contains data of finer granularity compared to what the destination system is storing.

As an example, one can specify an indicator in the target system to summarize data for multiple data elements and import this data for a single data element in the destination system. As another example, one can aggregate data collected at organisation unit level 4 in the target system to level 2 and import that data in the destination system.

You can retrieve data in the raw data value set format from the dataValueSet resource:

```
/api/analytics/dataValueSet
```

The following resource representations are supported:

- json (application/json)
- xml (application/xml)

When using the data value set format, exactly three dimensions must be specified as analytics dimensions with at least one dimension item each:

- Data (dx)
- Period (pe)
- Organisation unit (ou)

Any other dimension will be ignored. Filters will be applied as with regular analytics requests. Note that any data dimension type can be specified, including indicators, data elements, data element operands, data sets and program indicators.

An example request which aggregates data for specific indicators, periods and organisation units and returns it as regular data values in XML looks like this:

```
api/analytics/dataValueSet.xml?dimension=dx:Uvn6LCg7dVU;OdiHJayrsKo
  &dimension=pe:LAST_4_QUARTERS&dimension=ou:lc3eMKXaEfw;PMa2VCrupOd
```

A request which aggregates data for data element operands and uses CODE as output identifier scheme looks like the below. When defining the output identifier scheme, all metadata objects part of the response are affected:

```
api/analytics/dataValueSet.json?dimension=dx:fbfJHSPpUQD.pq2XI5kz2BY;fbfJHSPpUQD.PT59n8BQbqM
  &dimension=pe:LAST_12_MONTHS&dimension=ou:ImspTQPwCqd&outputIdScheme=CODE
```

When using attribute-based identifier schemes for export there is a risk of producing duplicate data values. The boolean query parameter duplicatesOnly can be used for debugging purposes to return only duplicates data values. This response can be used to clean up the duplicates:

```
api/analytics/dataValueSet.xml?dimension=dx:Uvn6LCg7dVU;OdiHJayrsKo
  &dimension=pe:LAST_4_QUARTERS&dimension=ou:lc3eMKXaEfw&duplicatesOnly=true
```

Raw data format

The analytics *rawData* resource allows for returning the data stored in the analytics data tables without any aggregation being performed. This is useful for clients which would like to perform aggregation and filtering on their own without having to denormalize data in the available data dimensions themselves.

```
/api/analytics/rawData
```

The following resource representations are supported:

- json (application/json)
- csv (application/csv)

This resource follows the syntax of the regular analytics resource. Only a subset of the query parameters are supported. Additionally, a *startDate* and *endDate* parameter are available. The supported parameters are listed in the table below.

Query parameters

Query parameter	Required / Notes
dimension	Yes
startDate	No / yyyy-MM-dd
endDate	No / yyyy-MM-dd
skipMeta	No
skipData	No
hierarchyMeta	No
showHierarchy	No

Query parameter	Required / Notes
displayProperty	No
outputIdScheme	No
outputOrgUnitIdScheme	No
outputDataElementIdScheme	No
inputIdScheme	No
userOrgUnit	No

The *dimension* query parameter defines which dimensions (table columns) should be included in the response. It can optionally be constrained with items. The *filter* query parameter defines which items and dimensions (table columns) should be used as a filter for the response.

For the organisation unit dimension, the response will contain data associated with the organisation unit and all organisation units in the sub-hierarchy (children in the tree). This is different compared to the regular analytics resource, where only the explicitly selected organisation units are included.

To retrieve a response with specific data elements, specific periods, specific organisation units and all data for two custom dimensions you can issue a request like this:

```
/api/analytics/rawData.json?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU;Jtf34kNZhzP
  &dimension=J5jldMd8OHv&dimension=Bpx0589u8y0
  &dimension=pe:LAST_12_MONTHS
  &dimension=ou:O6uvpzGd5pu;fdc6uOvgoji
```

The *startDate* and *endDate* parameters allow for fetching data linked to any period between those dates. This avoids the need for defining all periods explicitly in the request:

```
/api/analytics/rawData.json?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU;Jtf34kNZhzP
  &dimension=J5jldMd8OHv&dimension=Bpx0589u8y0
  &startDate=2015-01-01&endDate=2015-12-31
  &dimension=ou:O6uvpzGd5pu;fdc6uOvgoji
```

The *filter* parameter can be used to filter a response without including that dimension as part of the response, this time in CSV format:

```
/api/analytics/rawData.csv?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU;Jtf34kNZhzP
  &filter=J5jldMd8OHv:uYxK4wmcPqA;tDZVQ1WtwpA
  &startDate=2015-01-01&endDate=2015-12-31
  &dimension=ou:O6uvpzGd5pu
```

The *outputIdScheme* parameter is useful if you want human readable data responses as it can be set to *NAME* like this:

```
/api/analytics/rawData.csv?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU
  &filter=J5jldMd8OHv:uYxK4wmcPqA;tDZVQ1WtwpA
  &startDate=2017-01-01&endDate=2017-12-31
  &dimension=ou:O6uvpzGd5pu
  &outputIdScheme=NAME
```

The response from the *rawData* resource will look identical to the regular analytics resource; the difference is that the response contains raw, non-aggregated data, suitable for further aggregation by third-party systems.

Debugging

When debugging analytics requests it can be useful to examine the data value source of the aggregated analytics response. The *analytics/debug/sql* resource will provide an SQL statement that returns the relevant content of the datavalue table. You can produce this SQL by doing a GET request with content type "text/html" or "text/plain" like below. The dimension and filter syntax are identical to regular analytics queries:

```
/api/analytics/debug/sql?dimension=dx:fbfJHSPpUQD;cYeuwXTCPkU
  &filter=pe:2016Q1;2016Q2&filter=ou:O6uvpzGd5pu
```

Event analytics

The event analytics API lets you access aggregated event data and query *events* captured in DHIS2. This resource lets you retrieve events based on a program and optionally a program stage, and lets you retrieve and filter events on any event dimensions.

```
/api/analytics/events
```

Dimensions and items

Event dimensions include data elements, attributes, organisation units and periods. The aggregated event analytics resource will return aggregated information such as counts or averages. The query analytics resource will simply return events matching a set of criteria and does not perform any aggregation. You can specify dimension items in the form of options from option sets and legends from legend sets for data elements and attributes which are associated with such. The event dimensions are listed in the table below.

Event dimensions

Dimension	Dimension id	Description
Data elements	<id>	Data element identifiers
Attributes	<id>	Attribute identifiers
Periods	pe	ISO periods and relative periods, see "date and period format"
Organisation units	ou	Organisation unit identifiers and keywords USER_ORGUNIT, USER_ORGUNIT_CHILDREN, USER_ORGUNIT_GRANDCHILDREN, LEVEL-<level> and OU_GROUP-<group-id>
Organisation unit group sets	<org unit group set id>	Organisation unit group set identifiers
Categories	<category id>	Category identifiers (program attribute categories only)

Request query parameters

The analytics event API lets you specify a range of query parameters.

Query parameters for both event query and aggregate analytics

Query parameter	Required	Description	Options (default first)
program	Yes	Program identifier.	Any program identifier
stage	No	Program stage identifier.	Any program stage identifier
startDate	Yes	Start date for events.	Date in yyyy-MM-dd format
endDate	Yes	End date for events.	Date in yyyy-MM-dd format
dimension	Yes	Dimension identifier including data elements, attributes, program indicators, periods, organisation units and organisation unit group sets. Parameter can be repeated any number of times. Item filters can be applied to a dimension on the format <item-id>:<operator>:<filter>. Filter values are case-insensitive.	Operators can be EQ | GT | GE | LT | LE | NE | LIKE | IN
filter	No	Dimension identifier including data elements, attributes, periods, organisation units and organisation unit group sets. Parameter can be repeated any number of times. Item filters can be applied to a dimension on the format <item-id>:<operator>:<filter>. Filter values are case-insensitive.	
hierarchyMeta	No	Include names of organisation unit ancestors and hierarchy paths of organisation units in the metadata.	false | true

Query parameter	Required	Description	Options (default first)
eventStatus	No	Specify status of events to include.	ACTIVE | COMPLETED | SCHEDULE | OVERDUE | SKIPPED. Can be comma separated (*for query only*).
programStatus	No	Specify enrollment status of events to include.	ACTIVE | COMPLETED | CANCELLED. Can be comma separated (*for query only*).
relativePeriodDate	string	No	Date identifier e.g: "2016-01-01". Overrides the start date of the relative period
columns	No	Dimensions to use as columns for table layout.	Any dimension (must be query dimension)
rows	No	Dimensions to use as rows for table layout.	Any dimension (must be query dimension)
timeField	No	Time field used in aggregations/queries on events. Applies to event data items only. Can be a predefined option or the ID of an attribute or data element with a time-based value type. For "/analytics/events/" endpoints, the default "timeField" is EVENT_DATE.	EVENT_DATE | SCHEDULED_DATE | <Attribute ID> | <Data element ID>

Query parameters for event query analytics only

Query parameter	Required	Description	Options
ouMode	No	The mode of selecting organisation units. Default is DESCENDANTS, meaning all sub units in the hierarchy. CHILDREN refers to immediate children in the hierarchy; SELECTED refers to the selected organisation units only. More details [here].(https://docs.dhis2.org/en/develop/using-the-api/dhis-core-version-master/tracker.html#webapi_nti_ou_scope)	DESCENDANTS, CHILDREN, SELECTED
asc	No	Dimensions to be sorted ascending, can reference event date, org unit name and code and any item identifiers.	`ouname` | `programstatus` | `eventstatus` | `createdbydisplayname` | `lastupdatedbydisplayname` | `eventdate` | `enrollmentdate` | `incidentdate` | `lastupdated` | item identifier
desc	No	Dimensions to be sorted descending, can reference event date, org unit name and code and any item identifiers.	`ouname` | `programstatus` | `eventstatus` | `createdbydisplayname` | `lastupdatedbydisplayname` | `eventdate` | `enrollmentdate` | `incidentdate` | `lastupdated` | item identifier
coordinatesOnly	No	Whether to only return events which have coordinates.	false | true
coordinateOuFallback	No	Program instance geometry is applied whenever organization unit geometry is missing.	false | true

Query parameter	Required	Description	Options
dataIdScheme	No	Id scheme to be used for data, more specifically data elements and attributes which have an option set or legend set, e.g. return the name of the option instead of the code, or the name of the legend instead of the legend ID, in the data response.	NAME | CODE | UID
headers	No	The name of the headers to be returned as part of the response.	One or more headers name separated by comma
page	No	The page number. Default page is 1.	Numeric positive value
pageSize	No	The page size. Default size is 50 items per page.	Numeric zero or positive value
eventDate	no	(`events` resource only) Custom period on `eventDate` (see "custom date periods" section)	see "date and period format" section
enrollmentDate	no	Custom period on `enrollmentDate` (see "custom date periods" section)	see "date and period format" section
scheduledDate	no	(`events` resource only) Custom period on `scheduledDate` (see "custom date periods" section)	see "date and period format" section
incidentDate	no	Custom period on `incidentDate` (see "custom date periods" section)	see "date and period format" section
lastUpdated	no	Custom period on `lastUpdated` (see "custom date periods" section)	see "date and period format" section

Query parameters for aggregate event analytics only

Query parameter	Required	Description	Options
value	No	Value dimension identifier. Can be a data element or an attribute which must be of numeric value type.	Data element or attribute identifier

Query parameter	Required	Description	Options
aggregationType	No	Aggregation type for the value dimension. Default is AVERAGE.	SUM | AVERAGE | AVERAGE_SUM_ORG_UNIT | LAST | LAST_AVERAGE_ORG_UNIT | COUNT | STDDEV | VARIANCE | MIN | MAX
showHierarchy	No	Display full org unit hierarchy path together with org unit name.	false | true
displayProperty	No	Property to display for metadata.	NAME | SHORTNAME
sortOrder	No	Sort the records on the value column in ascending or descending order.	ASC | DESC
limit	No	The maximum number of records to return. Cannot be larger than 10 000.	Numeric positive value
outputType	No	Specify output type for analytical data which can be events, enrollments or tracked entity instances. The two last options apply to programs with registration only.	EVENT | ENROLLMENT | TRACKED_ENTITY_INSTANCE
collapseDataDimensions	No	Collapse all data dimensions (data elements and attributes) into a single dimension in the response.	false | true
skipMeta	No	Exclude the meta data part of the response (improves performance).	false | true
skipData	No	Exclude the data part of the response.	false | true
skipRounding	No	Skip rounding of aggregate data values.	false | true
aggregateData	No	Produce aggregate values for the data dimensions (as opposed to dimension items).	false | true

Query parameter	Required	Description	Options
orgUnitField	No	The organisation unit field to base event aggregation on. Applies to event data items only. Can be the ID of an attribute or data element with the Organisation unit value type. The default option is specified as omitting the query parameter.	<Attribute ID> | <Data element ID> | REGISTRATION | ENROLLMENT | OWNER_AT_START | OWNER_AT_END

Query parameters for cluster event analytics only

Query parameter	Required	Description	Options
clusterSize	Yes	Size of clusters in meters.	Numeric positive value
coordinateField	No	Field to base geospatial event analytics on. Default is event. Can be set to identifiers of attributes and data elements of value type coordinate.	EVENT | <attribute-id> | <dataelement-id>
bbox	Yes	Bounding box / area of events to include in the response on the format "min longitude, min latitude, max longitude , max latitude".	String
includeClusterPoints	No	Include information about underlying points for each cluster, be careful if cluster represent a very high number of points.	false | true

Event query analytics

The *analytics/events/query* resource lets you query for captured events. This resource does not perform any aggregation, rather it lets you query and filter for information about events.

```
/api/analytics/events/query
```

You can specify any number of dimensions and any number of filters in a query. Dimension item identifiers can refer to any of data elements, person attributes, person identifiers, fixed and relative periods and organisation units. Dimensions can optionally have a query operator and a filter. Event queries should be on the format described below.

```
/api/analytics/events/query/<program-id>?startDate=yyyy-MM-dd&endDate=yyyy-MM-dd
  &dimension=ou:<ou-id>;<ou-id>&dimension=<item-id>&dimension=<item-id>:<operator>:<filter>
```

For example, to retrieve events from the "Inpatient morbidity and mortality" program between January and October 2016, where the "Gender" and "Age" data elements are included and the "Age" dimension is filtered on "18", you can use the following query:

```
/api/analytics/events/query/eBAyeGv0exc?startDate=2016-01-01&endDate=2016-10-31
  &dimension=ou:O6uvpzGd5pu;fdc6uOvgoji&dimension=oZg33kd9taw&dimension=qrur9Dvnyt5:EQ:18
```

To retrieve events for the "Birth" program stage of the "Child programme" program between March and December 2016, where the "Weight" data element, filtered for values larger than 2000:

```
/api/analytics/events/query/IpHINAT79UW?stage=A03MvHHogjR&startDate=2016-03-01
  &endDate=2016-12-31&dimension=ou:O6uvpzGd5pu&dimension=UXz7xuGCEhU:GT:2000
```

Sorting can be applied to the query for the event date of the event and any dimensions. To sort descending on the event date and ascending on the "Age" data element dimension you can use:

```
/api/analytics/events/query/eBAyeGv0exc?startDate=2016-01-01&endDate=2016-10-31
  &dimension=ou:O6uvpzGd5pu&dimension=qrur9Dvnyt5&desc=EVENTDATE&asc=qrur9Dvnyt5
```

Paging can be applied to the query by specifying the page number and the page size parameters. If page number is specified but page size is not, a page size of 50 will be used. If page size is specified but page number is not, a page number of 1 will be used. To get the third page of the response with a page size of 20 you can use a query like this:

```
/api/analytics/events/query/eBAyeGv0exc?startDate=2016-01-01&endDate=2016-10-31
  &dimension=ou:O6uvpzGd5pu&dimension=qrur9Dvnyt5&page=3&pageSize=20
```

Filtering

Filters can be applied to data elements, person attributes and person identifiers. The filtering is done through the query parameter value on the following format:

```
&dimension=<item-id>:<operator>:<filter-value>
```

As an example, you can filter the "Weight" data element for values greater than 2000 and lower than 4000 like this:

```
&dimension=UXz7xuGCEhU:GT:2000&dimension=UXz7xuGCEhU:LT:4000
```

You can filter the "Age" data element for multiple, specific ages using the IN operator like this:

```
&dimension=qrur9Dvnyt5:IN:18;19;20
```

You can specify multiple filters for a given item by repeating the operator and filter components, all separated with semi-colons:

```
&dimension=qrur9Dvnyt5:GT:5:LT:15
```

The available operators are listed below.

Filter operators

Operator	Description
EQ	Equal to
!EQ	Not equal to
IEQ	Equal to, ignoring case
!IEQ	Not equal to, ignoring case
GT	Greater than
GE	Greater than or equal to
LT	Less than
LE	Less than or equal to
NE	Not equal to
LIKE	Like (free text match)
!LIKE	Not like (free text match)
ILIKE	Like, ignoring case (free text match)
!ILIKE	Not like, ignoring case (free text match)
IN	Equal to one of multiple values separated by ";"

Time Field Filtering

By default, the `query` endpoints filter periods based on `eventDate`. However, it is possible to filter entries based on `lastUpdated` or `schedule` instead, by using the `timeField` query parameter. For example:

```
&timeField=LAST_UPDATED
&timeField=SCHEDULED_DATE
```

Enhanced conditions

By default `enhancedConditions` flag is set to `false`. This means all conditions expressed in `dimension` and `filter` are meant as AND conditions. For example:

```
dimension=a:GT:20:LT:40&dimension=b:GT:1:LT:5
```

translates into the following logical condition:

```
a>20 and a<40 and b>1 and b<5
```

However, there are cases in which more control on conditions might be needed and can be enabled by setting `enhancedConditions` query parameter to `true`. By doing so, a client can use a special `_OR_` separator to join conditions using `OR` logical operator.

Example:

```
dimension=a:GT:20:LT:40_OR_b:GT:1:LT:5&dimension=c:EQ:test
```

translates into the following logical condition:

```
((a>20 and a<40) or (b>1 and b<5)) and c = "test"
```

Response formats

The default response representation format is JSON. The requests must be using the HTTP *GET* method. The following response formats are supported.

- json (application/json)
- jsonp (application/javascript)
- xls (application/vnd.ms-excel)

As an example, to get a response in Excel format you can use a file extension in the request URL like this:

```
/api/analytics/events/query/eBAyeGv0exc.xls?startDate=2016-01-01&endDate=2016-10-31
  &dimension=ou:O6uvpzGd5pu&dimension=oZg33kd9taw&dimension=qrur9Dvnyt5
```

You can set the hierarchyMeta query parameter to true in order to include names of all ancestor organisation units in the meta-section of the response:

```
/api/analytics/events/query/eBAyeGv0exc?startDate=2016-01-01&endDate=2016-10-31
  &dimension=ou:YuQRtpLP10I&dimension=qrur9Dvnyt5:EQ:50&hierarchyMeta=true
```

The default response JSON format will look similar to this:

```
{
  "headers": [
    {
      "name": "psi",
      "column": "Event",
      "type": "java.lang.String",
      "hidden": false,
      "meta": false
    },
    {
      "name": "ps",
      "column": "Program stage",
      "type": "java.lang.String",
      "hidden": false,
      "meta": false
    },
    {
```

```
      "name": "eventdate",
      "column": "Event date",
      "type": "java.lang.String",
      "hidden": false,
      "meta": false
    },
    {
      "name": "storedby",
      "column": "Stored by",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "lastupdated",
      "column": "Last Updated",
      "valueType": "DATE",
      "type": "java.time.LocalDate",
      "hidden": false,
      "meta": true
    },
    {
      "name": "createdbydisplayname",
      "column": "Created by (display name)",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "lastupdatedbydisplayname",
      "column": "Last updated by (display name)",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "coordinates",
      "column": "Coordinates",
      "type": "java.lang.String",
      "hidden": false,
      "meta": false
    },
    {
      "name": "ouname",
      "column": "Organisation unit name",
      "type": "java.lang.String",
      "hidden": false,
      "meta": false
    },
    {
      "name": "oucode",
      "column": "Organisation unit code",
      "type": "java.lang.String",
      "hidden": false,
      "meta": false
    },
    {
      "name": "ou",
      "column": "Organisation unit",
      "type": "java.lang.String",
```

```
      "hidden": false,
      "meta": false
    },
    {
      "name": "oZg33kd9taw",
      "column": "Gender",
      "type": "java.lang.String",
      "hidden": false,
      "meta": false
    },
    {
      "name": "qrur9Dvnyt5",
      "column": "Age",
      "type": "java.lang.String",
      "hidden": false,
      "meta": false
    }
  ],
  "metaData": {
    "names": {
      "qrur9Dvnyt5": "Age",
      "eBAyeGv0exc": "Inpatient morbidity and mortality",
      "ImspTQPwCqd": "Sierra Leone",
      "O6uvpzGd5pu": "Bo",
      "YuQRtpLP10I": "Badjia",
      "oZg33kd9taw": "Gender"
    },
    "ouHierarchy": {
      "YuQRtpLP10I": "/ImspTQPwCqd/O6uvpzGd5pu"
    }
  },
  "width": 8,
  "height": 4,
  "rows": [
    [
      "yx9IDINf82o",
      "Zj7UnCAulEk",
      "2016-08-05",
      "system",
      "2018-08-07",
      "[5.12, 1.23]",
      "Ngelehun",
      "OU_559",
      "YuQRtpLP10I",
      "Female",
      "50"
    ],
    [
      "IPNa7AsCyFt",
      "Zj7UnCAulEk",
      "2016-06-12",
      "system",
      "2018-08-07",
      "[5.22, 1.43]",
      "Ngelehun",
      "OU_559",
      "YuQRtpLP10I",
      "Female",
      "50"
    ],
    [
      "ZY9JL9dkhD2",
      "Zj7UnCAulEk",
```

```
      "2016-06-15",
      "system",
      "2018-08-07",
      "[5.42, 1.33]",
      "Ngelehun",
      "OU_559",
      "YuQRtpLP10I",
      "Female",
      "50"
    ],
    [
      "MYvh4WAUdWt",
      "Zj7UnCAulEk",
      "2016-06-16",
      "system",
      "2018-08-07",
      "[5.32, 1.53]",
      "Ngelehun",
      "OU_559",
      "YuQRtpLP10I",
      "Female",
      "50"
    ]
  ]
}
```

The *headers* section of the response describes the content of the query result. The event unique identifier, the program stage identifier, the event date, the organisation unit name, the organisation unit code and the organisation unit identifier appear as the first six dimensions in the response and will always be present. Next comes the data elements, person attributes and person identifiers which were specified as dimensions in the request, in this case, the "Gender" and "Age" data element dimensions. The header section contains the identifier of the dimension item in the "name" property and a readable dimension description in the "column" property.

The *metaData* section, *ou* object contains the identifiers of all organisation units present in the response mapped to a string representing the hierarchy. This hierarchy string lists the identifiers of the ancestors (parents) of the organisation unit starting from the root. The *names* object contains the identifiers of all items in the response mapped to their names.

The *rows* section contains the events produced by the query. Each row represents exactly one event.

In order to have the event analytics resource generate the data in the shape of a ready-made table, you can provide *rows* and *columns* parameters with requested dimension identifiers separated by semi-colons as values to indicate which ones to use as table columns and rows. Instead of generating a plain, normalized data source, the event analytics resource will now generate the data in table layout. The column and rows dimensions must be present as a data dimension in the query (not a filter). Such a request can look like this:

```
/api/analytics.html+css?dimension=dx:cYeuwXTCPkU;fbfJHSPpUQD&dimension=pe:WEEKS_THIS_YEAR
  &filter=ou:ImspTQPwCqd&displayProperty=SHORTNAME&columns=dx&rows=pe
```

Event aggregate analytics

The `/analytics/events/aggregate` resource lets you retrieve *aggregated numbers* of events captured in DHIS2. This resource lets you retrieve aggregate data based on a program and optionally a program stage, and lets you filter on any event dimension.

```
/api/analytics/events/aggregate
```

The events aggregate resource does not return the event information itself, rather the aggregate numbers of events matching the request query. Event dimensions include data elements, person attributes, person identifiers, periods and organisation units. Aggregate event queries should be on the format described below.

```
/api/analytics/events/aggregate/<program-id>?startDate=yyyy-MM-dd&endDate=yyyy-MM-dd
  &dimension=ou:<ou-id>;<ou-id>&dimension=<item-id>&dimension=<item-id>:<operator>:<filter>
```

For example, to retrieve aggregate numbers for events from the "Inpatient morbidity and mortality" program between January and October 2016, where the "Gender" and "Age" data elements are included, the "Age" dimension item is filtered on "18" and the "Gender" item is filtered on "Female", you can use the following query:

```
/api/analytics/events/aggregate/eBAyeGv0exc?startDate=2016-01-01&endDate=2016-10-31
  &dimension=ou:O6uvpzGd5pu&dimension=oZg33kd9taw:EQ:Female&dimension=qrur9Dvnyt5:GT:50
```

To retrieve data for fixed and relative periods instead of start and end date, in this case, May 2016 and last 12 months, and the organisation unit associated with the current user, you can use the following query:

```
/api/analytics/events/aggregate/eBAyeGv0exc?dimension=pe:201605;LAST_12_MONTHS
  &dimension=ou:USER_ORGUNIT;fdc6uOvgo7ji&dimension=oZg33kd9taw
```

In order to specify "Female" as a filter for "Gender" for the data response, meaning "Gender" will not be part of the response but will filter the aggregate numbers in it, you can use the following syntax:

```
/api/analytics/events/aggregate/eBAyeGv0exc?dimension=pe:2016;
  &dimension=ou:O6uvpzGd5pu&filter=oZg33kd9taw:EQ:Female
```

To specify the "Bo" organisation unit and the period "2016" as filters, and the "Mode of discharge" and Gender" as dimensions, where "Gender" is filtered on the "Male" item, you can use a query like this:

```
/api/analytics/events/aggregate/eBAyeGv0exc?filter=pe:2016&filter=ou:O6uvpzGd5pu
  &dimension=fWIAEtYVEGk&dimension=oZg33kd9taw:EQ:Male
```

To create a "Top 3 report" for *Mode of discharge* you can use the limit and sortOrder query parameters similar to this:

```
/api/analytics/events/aggregate/eBAyeGv0exc?filter=pe:2016&filter=ou:O6uvpzGd5pu
  &dimension=fWIAEtYVEGk&limit=3&sortOrder=DESC
```

To specify a value dimension with a corresponding aggregation type you can use the value and aggregationType query parameters. Specifying a value dimension will make the analytics engine return aggregate values for the values of that dimension in the response as opposed to counts of events.

```
/api/analytics/events/aggregate/eBAyeGv0exc.json?stage=Zj7UnCAulEk
  &dimension=ou:ImspTQPwCqd&dimension=pe:LAST_12_MONTHS&dimension=fWIAEtYVEGk
  &value=qrur9Dvnyt5&aggregationType=AVERAGE
```

To base event analytics aggregation on a specific data element or attribute of value type date or date time you can use the `timeField` parameter:

```
/api/analytics/events/aggregate/IpHINAT79UW.json?dimension=ou:ImspTQPwCqd
  &dimension=pe:LAST_12_MONTHS&dimension=cejWyOfXge6&stage=A03MvHHogjR
  &timeField=ENROLLMENT_DATE
```

To base event analytics aggregation on a specific data element or attribute of value type organisation unit you can use the `orgUnitField` parameter:

```
/api/analytics/events/aggregate/eBAyeGv0exc.json?dimension=ou:ImspTQPwCqd
  &dimension=pe:THIS_YEAR&dimension=oZg33kd9taw&stage=Zj7UnCAulEk
  &orgUnitField=S33cRBsnXPo
```

The `orgUnitField` parameter value may be one of the following:

orgUnitField	Description
<Attribute ID>	ID of an attribute with the organisation unit value type
<Data element ID>	ID of a data element with the organisation unit value type
REGISTRATION	The organization unit at which the tracked entity instance was registered (created)
ENROLLMENT	The organization unit at which the tracked entity instance was enrolled in the program
OWNER_AT_START	The tracked entity instance's owning organisation unit at the start of the reporting period
OWNER_AT_END	The tracked entity instance's owning organisation unit at the end of the reporting period

Ranges / legend sets

For aggregate queries, you can specify a range / legend set for numeric data element and attribute dimensions. The purpose is to group the numeric values into ranges. As an example, instead of generating data for an "Age" data element for distinct years, you can group the information into age groups. To achieve this, the data element or attribute must be associated with the legend set. The format is described below:

```
?dimension=<item-id>-<legend-set-id>
```

An example looks like this:

```
/api/analytics/events/aggregate/eBAyeGv0exc.json?stage=Zj7UnCAulEk
  &dimension=qrur9Dvnyt5-Yf6UHoPkdS6&dimension=ou:ImspTQPwCqd&dimension=pe:LAST_MONTH
```

Response formats

The default response representation format is JSON. The requests must be using the HTTP *GET* method. The response will look similar to this:


```
{
  "headers": [
    {
      "name": "oZg33kd9taw",
      "column": "Gender",
      "type": "java.lang.String",
      "meta": false
    },
    {
      "name": "qrur9Dvnyt5",
      "column": "Age",
      "type": "java.lang.String",
      "meta": false
    },
    {
      "name": "pe",
      "column": "Period",
      "type": "java.lang.String",
      "meta": false
    },
    {
      "name": "ou",
      "column": "Organisation unit",
      "type": "java.lang.String",
      "meta": false
    },
    {
      "name": "value",
      "column": "Value",
      "type": "java.lang.String",
      "meta": false
    }
  ],
  "metaData": {
    "names": {
      "eBAyeGv0exc": "Inpatient morbidity and mortality"
    }
  },
  "width": 5,
  "height": 39,
  "rows": [
    [
      "Female",
      "95",
      "201605",
      "O6uvpzGd5pu",
      "2"
    ],
    [
      "Female",
      "63",
      "201605",
      "O6uvpzGd5pu",
      "2"
    ],
    [
      "Female",
```

```
      "67",
      "201605",
      "O6uvpzGd5pu",
      "1"
    ],
    [
      "Female",
      "71",
      "201605",
      "O6uvpzGd5pu",
      "1"
    ],
    [
      "Female",
      "75",
      "201605",
      "O6uvpzGd5pu",
      "14"
    ],
    [
      "Female",
      "73",
      "201605",
      "O6uvpzGd5pu",
      "5"
    ]
  ]
}
```

Note that the max limit for rows to return in a single response is 10 000. If the query produces more than the max limit, a *409 Conflict* status code will be returned.

Event clustering analytics

The *analytics/events/cluster* resource provides clustered geospatial event data. A request looks like this:

```
/api/analytics/events/cluster/eBAyeGv0exc?startDate=2016-01-01&endDate=2016-10-31
  &dimension=ou:LEVEL-2&clusterSize=100000
  &bbox=-13.2682125,7.3721619,-10.4261178,9.904012&includeClusterPoints=false
```

The cluster response provides the count of underlying points, the center point and extent of each cluster. If the `includeClusterPoints` query parameter is set to true, a comma-separated string with the identifiers of the underlying events is included. A sample response looks like this:

```
{
  "headers": [
    {
      "name": "count",
      "column": "Count",
      "type": "java.lang.Long",
      "meta": false
    },
    {
      "name": "center",
      "column": "Center",
      "type": "java.lang.String",
      "meta": false
    },
```

```
    {
      "name": "extent",
      "column": "Extent",
      "type": "java.lang.String",
      "meta": false
    },
    {
      "name": "points",
      "column": "Points",
      "type": "java.lang.String",
      "meta": false
    }
  ],
  "width": 3,
  "height": 4,
  "rows": [
    [
      "3",
      "POINT(-13.15818 8.47567)",
      "BOX(-13.26821 8.4St7215,-13.08711 8.47807)",
      ""
    ],
    [
      "9",
      "POINT(-13.11184 8.66424)",
      "BOX(-13.24982 8.51961,-13.05816 8.87696)",
      ""
    ],
    [
      "1",
      "POINT(-12.46144 7.50597)",
      "BOX(-12.46144 7.50597,-12.46144 7.50597)",
      ""
    ],
    [
      "7",
      "POINT(-12.47964 8.21533)",
      "BOX(-12.91769 7.66775,-12.21011 8.49713)",
      ""
    ]
  ]
}
```

Event count and extent analytics

The *analytics/events/count* resource is suitable for geometry-related requests for retrieving the count and extent (bounding box) of events for a specific query. The query syntax is equal to the *events/query* resource. A request looks like this:

```
/api/analytics/events/count/eBAyeGv0exc?startDate=2016-01-01
  &endDate=2016-10-31&dimension=ou:O6uvpzGd5pu
```

The response will provide the count and extent in JSON format:

```
{
  extent: "BOX(-13.2682125910096 7.38679562779441,-10.4261178860988 9.90401290212795)",
  count: 59
}
```

Constraints and validation

There are several constraints to the input parameters you can provide to the event analytics resource. If any of the constraints are violated, the API will return a *409 Conflict* response and a response message looking similar to this:

```
{
  "httpStatus": "Conflict",
  "httpStatusCode": 409,
  "status": "ERROR",
  "message": "At least one organisation unit must be specified",
  "errorCode": "E7200"
}
```

The possible validation errors for the event analytics API are described in the table below.

Error code	Message
E7200	At least one organisation unit must be specified
E7201	Dimensions cannot be specified more than once
E7202	Query items cannot be specified more than once
E7203	Value dimension cannot also be specified as an item or item filter
E7204	Value dimension or aggregate data must be specified when aggregation type is specified
E7205	Start and end date or at least one period must be specified
E7206	Start date is after end date
E7207	Page number must be a positive number
E7208	Page size must be zero or a positive number
E7209	Limit is larger than max limit
E7210	Time field is invalid
E7211	Org unit field is invalid
E7212	Cluster size must be a positive number
E7213	Bbox is invalid, must be on format: 'min-lng,min-lat,max-lng,max-lat'
E7214	Cluster field must be specified when bbox or cluster size are specified
E7215	Query item cannot specify both legend set and option set
E7216	Query item must be aggregateable when used in aggregate query
E7217	User is not allowed to view event analytics data
E7218	Spatial database support is not enabled
E7219	Data element must be of value type coordinate in order to be used as coordinate field
E7220	Attribute must be of value type coordinate to in order to be used as coordinate field

Error code	Message
E7221	Coordinate field is invalid
E7222	Query item or filter is invalid
E7223	Value does not refer to a data element or attribute which are numeric and part of the program
E7224	Item identifier does not reference any data element, attribute or indicator part of the program
E7225	Program stage is mandatory for data element dimensions in enrollment analytics queries
E7226	Dimension is not a valid query item
E7227	Relationship entity type not supported
E7228	Fallback coordinate field is invalid
E7229	Operator does not allow missing value

Enrollment analytics

The enrollment analytics API lets you access aggregated event data and query *enrollments with their event data* captured in DHIS2. This resource lets you retrieve data for a program based on program stages and data elements - in addition to tracked entity attributes. When querying event data for a specific programstages within each enrollment, the data element values for each program stage will be returned as one row in the response from the api. If querying a data element in a program stage that is repeatable, the newest data element value will be used for that data element in the api response.

Dimensions and items

Enrollment dimensions include data elements, attributes, organisation units and periods. The query analytics resource will simply return enrollments matching a set of criteria and does not perform any aggregation.

Enrollment dimensions

Dimension	Dimension id	Description
Data elements in program stages	<program stage id>.<data element id>	Data element identifiers must include the program stage when querying data for enrollments. dimension=edqlbukwRfQ.vANAXwtLwcT
Attributes	<id>	Attribute identifiers
Periods	pe	ISO periods and relative periods, see "date and period format"
Organisation units	ou	Organisation unit identifiers and keywords USER_ORGUNIT, USER_ORGUNIT_CHILDREN, USER_ORGUNIT_GRANDCHILDREN, LEVEL-<level> and OU_GROUP-<group-id>

Repeatable stages

Data element identifier must include program stage. The program stage can be repeatable. For example the dimension edqlbukwRfQ.vANAXwtLwcT can refer to repeatable program stage. The data element of this stage is accessible via index parameters (enclosed with [ ]).

Possible indexing of repeatable stages

Dimension	Index parameters	DataElement value refers to
edqlbukwRfQ.vANAXwtLwcT	N/A	last execution date
edqlbukwRfQ[0].vANAXwtLwcT	0	last execution date
dqlbukwRfQ[-2].vANAXwtLwcT	-2	second from last execution date
dqlbukwRfQ[1].vANAXwtLwcT	1	first execution date
dqlbukwRfQ[3].vANAXwtLwcT	3	third execution date
edqlbukwRfQ[*].vANAXwtLwcT	*	all repetitions
edqlbukwRfQ[-1~3].vANAXwtLwcT	-1, 3	3 repetitions starting with -1 (first after last execution date)
edqlbukwRfQ[0~5,LAST_3_MONTHS].vANAXwtLwcT	0, 5, LAST_3_MONTHS	5 repetitions starting with last execution date down to the fifth one within last 3 months
edqlbukwRfQ[-1~3,2021-01-01~2022-05-31].vANAXwtLwcT	-1, 3, 2021-01-01,2022-05-31	3 repetitions starting with -1 (first after last execution date) within specified dates

Warning: Indexing of non-repeatable program stage leads to parameter validation error.

Enrollment query analytics

The `analytics/enrollments/query` resource lets you query for captured enrollments. This resource does not perform any aggregation, rather it lets you query and filter for information about enrollments.

```
/api/analytics/enrollments/query
```

You can specify any number of dimensions and any number of filters in a query. Dimension item identifiers can refer to any of the data elements in program stages, tracked entity attributes, fixed and relative periods and organisation units. Dimensions can optionally have a query operator and a filter. Enrollment queries should be on the format described below.

```
/api/analytics/enrollments/query/<program-id>?startDate=yyyy-MM-dd&endDate=yyyy-MM-dd
  &dimension=ou:<ou-id>;<ou-id>&dimension=<item-id>&dimension=<item-id>:<operator>:<filter>
```

For example, to retrieve enrollments in the from the "Antenatal care" program from January 2019, where the "First name" is picked up from attributes, "Chronic conditions" and "Smoking" data elements are included from the first program stage, and "Hemoglobin value" from the following program stage, and only women that have "Cronic conditions" would be included, you can use the following query:

```
/api/analytics/enrollments/query/WSGAb5XwJ3Y.json?dimension=ou:ImspTQPwCqd
  &dimension=w75KJ2mc4zz&dimension=WZbXY0S00lP.de0FEHSIoxh:eq:1&dimension=w75KJ2mc4zz
```

```
  &dimension=WZbXY0S00lP.sWoqcoByYmD&dimension=edqlbukwRfQ.vANAXwtLwcT
  &startDate=2019-01-01&endDate=2019-01-31
```

To retrieve enrollments in the from the "Antenatal care" program from last month (relative to the point in time the query is executed), where the "Chronic conditions" and "Smoking" data elements are included from the first program stage, and "Hemoglobin value" from the followup program stage, only including smoking women with hemoglobin less than 20:

```
/api/analytics/enrollments/query/WSGAb5XwJ3Y.json?dimension=ou:ImspTQPwCqd
  &dimension=WZbXY0S00lP.de0FEHSIoxh&dimension=w75KJ2mc4zz
  &dimension=WZbXY0S00lP.sWoqcoByYmD:eq:1&dimension=edqlbukwRfQ.vANAXwtLwcT:lt:20
  &dimension=pe:LAST_MONTH
```

Sorting can be applied to the query for the enrollment and incident dates of the enrollment:

```
/api/analytics/enrollments/query/WSGAb5XwJ3Y.xls?dimension=ou:ImspTQPwCqd
  &columns=w75KJ2mc4zz&dimension=WZbXY0S00lP.sWoqcoByYmD&dimension=pe:LAST_MONTH
  &stage=WZbXY0S00lP&pageSize=10&page=1&asc=ENROLLMENTDATE&ouMode=DESCENDANTS
```

Paging can be applied to the query by specifying the page number and the page size parameters. If page number is specified but page size is not, a page size of 50 will be used. If page size is specified but page number is not, a page number of 1 will be used. To get the second page of the response with a page size of 10 you can use a query like this:

```
/api/analytics/enrollments/query/WSGAb5XwJ3Y.json?dimension=ou:ImspTQPwCqd
  &dimension=WZbXY0S00lP.de0FEHSIoxh&dimension=w75KJ2mc4zz&dimension=pe:LAST_MONTH
  &dimension=WZbXY0S00lP.sWoqcoByYmD&pageSize=10&page=2
```

Filtering

Filters can be applied to data elements, person attributes and person identifiers. The filtering is done through the query parameter value on the following format:

```
&dimension=<item-id>:<operator>:<filter-value>
```

As an example, you can filter the "Weight" data element for values greater than 2000 and lower than 4000 like this:

```
&dimension=WZbXY0S00lP.UXz7xuGCEhU:GT:2000&dimension=WZbXY0S00lP.UXz7xuGCEhU:LT:4000
```

You can filter the "Age" attribute for multiple, specific ages using the IN operator like this:

```
&dimension=qrur9Dvnyt5:IN:18;19;20
```

You can specify multiple filters for a given item by repeating the operator and filter components, all separated with semi-colons:

```
&dimension=qrur9Dvnyt5:GT:5:LT:15
```

Time Field Filtering

By default, the `query` endpoints filter periods based on `enrollmentDate`. However, it is possible to filter entries based on `lastUpdated` instead, by using the `timeField` query parameter.

```
&timeField=LAST_UPDATED
```

NV keyword

A special keyword `NV` can be used to filter by `null` values

Filter by AGE is null

```
&dimension=qrur9Dvnyt5:EQ:NV
```

Filter by AGE is not null

```
&dimension=qrur9Dvnyt5:NE:NV
```

Filter by AGE is 18, 19 or is null

```
&dimension=qrur9Dvnyt5:IN:18;19;NV
```

`NV` can be used with `EQ`, `NE` and `IN` operators

Operators

The available operators are listed below.

Filter operators

Operator	Description
EQ	Equal to
GT	Greater than
GE	Greater than or equal to
LT	Less than
LE	Less than or equal to
NE	Not equal to
LIKE	Like (free text match)
IN	Equal to one of multiple values separated by ";"

Request query parameters

The analytics enrollment query API lets you specify a range of query parameters.

Query parameters for enrollment query endpoint

Query parameter	Required	Description	Options (default first)
program	Yes	Program identifier.	Any program identifier
startDate	No	Start date for enrollments.	Date in yyyy-MM-dd format
endDate	No	End date for enrollments.	Date in yyyy-MM-dd format
dimension	Yes	Dimension identifier including data elements, attributes, program indicators, periods, organisation units and organisation unit group sets. Parameter can be repeated any number of times. Item filters can be applied to a dimension on the format <item-id>:<operator>:<filter>. Filter values are case-insensitive.	Operators can be EQ | GT | GE | LT | LE | NE | LIKE | IN
filter	No	Dimension identifier including data elements, attributes, periods, organisation units and organisation unit group sets. Parameter can be repeated any number of times. Item filters can be applied to a dimension on the format <item-id>:<operator>:<filter>. Filter values are case-insensitive.	
programStatus	No	Specify enrollment status of enrollments to include.	ACTIVE | COMPLETED | CANCELLED
relativePeriodDate	string	No	Date identifier e.g: "2016-01-01". Overrides the start date of the relative period

Query parameter	Required	Description	Options (default first)
ouMode	No	The mode of selecting organisation units. Default is DESCENDANTS, meaning all sub units in the hierarchy. CHILDREN refers to immediate children in the hierarchy; SELECTED refers to the selected organisation units only. More details [here].(https://docs.dhis2.org/en/develop/using-the-api/dhis-core-version-master/tracker.html#webapi_nti_ou_scope)	DESCENDANTS, CHILDREN, SELECTED
asc	No	Dimensions to be sorted ascending, can reference enrollment date, incident date, org unit name and code.	`ouname` | `programstatus` | `createdbydisplayname` | `lastupdatedbydisplayname` | `enrollmentdate` | `incidentdate` | `lastupdated` | item identifier
desc	No	Dimensions to be sorted descending, can reference enrollment date, incident date, org unit name and code.	`ouname` | `programstatus` | `createdbydisplayname` | `lastupdatedbydisplayname` | `enrollmentdate` | `incidentdate` | `lastupdated` | item identifier
coordinatesOnly	No	Whether to only return enrollments which have coordinates.	false | true
headers	No	The name of the headers to be returned as part of the response.	One or more headers name separated by comma
page	No	The page number. Default page is 1.	Numeric positive value
pageSize	No	The page size. Default size is 50 items per page.	Numeric zero or positive value

Query parameter	Required	Description	Options (default first)
timeField	No	Time field used in aggregations/queries on enrollments. Applies to enrollment data items only. Can be a predefined option or the ID of an attribute or data element with a time-based value type. For "/analytics/enrollments/" endpoints, the default "timeField" is ENROLLMENT_DATE.	ENROLLMENT_DATE | LAST_UPDATED | <Attribute ID> | <Data element ID>

Response formats

The default response representation format is JSON. The requests must be using the HTTP *GET* method. The following response formats are supported.

- json (application/json)
- xml (application/xml)
- xls (application/vnd.ms-excel)
- csv (application/csv)
- html (text/html)
- html+css (text/html)

As an example, to get a response in Excel format you can use a file extension in the request URL like this:

```
/api/analytics/enrollments/query/WSGAb5XwJ3Y.xls?dimension=ou:ImspTQPwCqd
  &dimension=WZbXY0S00lP.de0FEHSIoxh&columns=w75KJ2mc4zz
  &dimension=WZbXY0S00lP.sWoqcoByYmD&dimension=pe:LAST_MONTH&stage=WZbXY0S00lP
  &pageSize=10&page=1&asc=ENROLLMENTDATE&ouMode=DESCENDANTS
```

The default response JSON format will look similar to this:

```
{
  "headers": [
    {
      "name": "pi",
      "column": "Enrollment",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "tei",
      "column": "Tracked entity instance",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
```

```
    {
      "name": "enrollmentdate",
      "column": "Enrollment date",
      "valueType": "DATE",
      "type": "java.util.Date",
      "hidden": false,
      "meta": true
    },
    {
      "name": "incidentdate",
      "column": "Incident date",
      "valueType": "DATE",
      "type": "java.util.Date",
      "hidden": false,
      "meta": true
    },
    {
      "name": "storedby",
      "column": "Stored by",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "lastupdated",
      "column": "Last Updated",
      "valueType": "DATE",
      "type": "java.time.LocalDate",
      "hidden": false,
      "meta": true
    },
    {
      "name": "storedby",
      "column": "Stored by",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "createdbydisplayname",
      "column": "Created by (display name)",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "lastupdatedbydisplayname",
      "column": "Last updated by (display name)",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "geometry",
      "column": "Geometry",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
```

```
    },
    {
      "name": "longitude",
      "column": "Longitude",
      "valueType": "NUMBER",
      "type": "java.lang.Double",
      "hidden": false,
      "meta": true
    },
    {
      "name": "latitude",
      "column": "Latitude",
      "valueType": "NUMBER",
      "type": "java.lang.Double",
      "hidden": false,
      "meta": true
    },
    {
      "name": "ouname",
      "column": "Organisation unit name",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "oucode",
      "column": "Organisation unit code",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "ou",
      "column": "Organisation unit",
      "valueType": "TEXT",
      "type": "java.lang.String",
      "hidden": false,
      "meta": true
    },
    {
      "name": "de0FEHSIoxh",
      "column": "WHOMCH Chronic conditions",
      "valueType": "BOOLEAN",
      "type": "java.lang.Boolean",
      "hidden": false,
      "meta": true
    },
    {
      "name": "sWoqcoByYmD",
      "column": "WHOMCH Smoking",
      "valueType": "BOOLEAN",
      "type": "java.lang.Boolean",
      "hidden": false,
      "meta": true
    }
  ],
  "metaData": {
    "pager": {
      "page": 2,
      "total": 163,
      "pageSize": 4,
```

```
      "pageCount": 41
    },
    "items": {
      "ImspTQPwCqd": {
        "name": "Sierra Leone"
      },
      "PFDfvmGpsR3": {
        "name": "Care at birth"
      },
      "bbKtnxRZKEP": {
        "name": "Postpartum care visit"
      },
      "ou": {
        "name": "Organisation unit"
      },
      "PUZaKR0Jh2k": {
        "name": "Previous deliveries"
      },
      "edqlbukwRfQ": {
        "name": "Antenatal care visit"
      },
      "WZbXY0S00lP": {
        "name": "First antenatal care visit"
      },
      "sWoqcoByYmD": {
        "name": "WHOMCH Smoking"
      },
      "WSGAb5XwJ3Y": {
        "name": "WHO RMNCH Tracker"
      },
      "de0FEHSIoxh": {
        "name": "WHOMCH Chronic conditions"
      }
    },
    "dimensions": {
      "pe": [],
      "ou": [
        "ImspTQPwCqd"
      ],
      "sWoqcoByYmD": [],
      "de0FEHSIoxh": []
    }
  },
  "width": 12,
  "rows": [
    [
      "A0cP533hIQv",
      "to8G9jAprnx",
      "2019-02-02 12:05:00.0",
      "2019-02-02 12:05:00.0",
      "system",
      "2020-08-06 21:20:52.0",
      "",
      "0.0",
      "0.0",
      "Tonkomba MCHP",
      "OU_193264",
      "xIMxph4NMP1",
      "0",
      "1"
    ],
    [
      "ZqiUn2uXmBi",
```

```
      "SJtv0WzoYki",
      "2019-02-02 12:05:00.0",
      "2019-02-02 12:05:00.0",
      "system",
      "2020-08-06 21:20:52.0",
      "",
      "0.0",
      "0.0",
      "Mawoma MCHP",
      "OU_254973",
      "Srnpwq8jKbp",
      "0",
      "0"
    ],
    [
      "lE747mUAtbz",
      "PGzTv2A1xzn",
      "2019-02-02 12:05:00.0",
      "2019-02-02 12:05:00.0",
      "system",
      "2020-08-06 21:20:52.0",
      "",
      "0.0",
      "0.0",
      "Kunsho CHP",
      "OU_193254",
      "tdhB1JXYBx2",
      "",
      "0"
    ],
    [
      "nmcqu9QF8ow",
      "pav3tGLjYuq",
      "2019-02-03 12:05:00.0",
      "2019-02-03 12:05:00.0",
      "system",
      "2020-08-06 21:20:52.0",
      "",
      "0.0",
      "0.0",
      "Korbu MCHP",
      "OU_678893",
      "m73lWmo5BDG",
      "",
      "1"
    ]
  ],
  "height": 4
}
```


The *headers* section of the response describes the content of the query result. The enrollment unique identifier, the tracked entity instance identifier, the enrollment date, the incident date, geometry, latitude, longitude, the organisation unit name and the organisation unit code appear as the first dimensions in the response and will always be present. Next comes the data elements, and tracked entity attributes which were specified as dimensions in the request, in this case, the "WHOMCH Chronic conditions" and "WHOMCH smoking" data element dimensions. The header section contains the identifier of the dimension item in the "name" property and a readable dimension description in the "column" property.

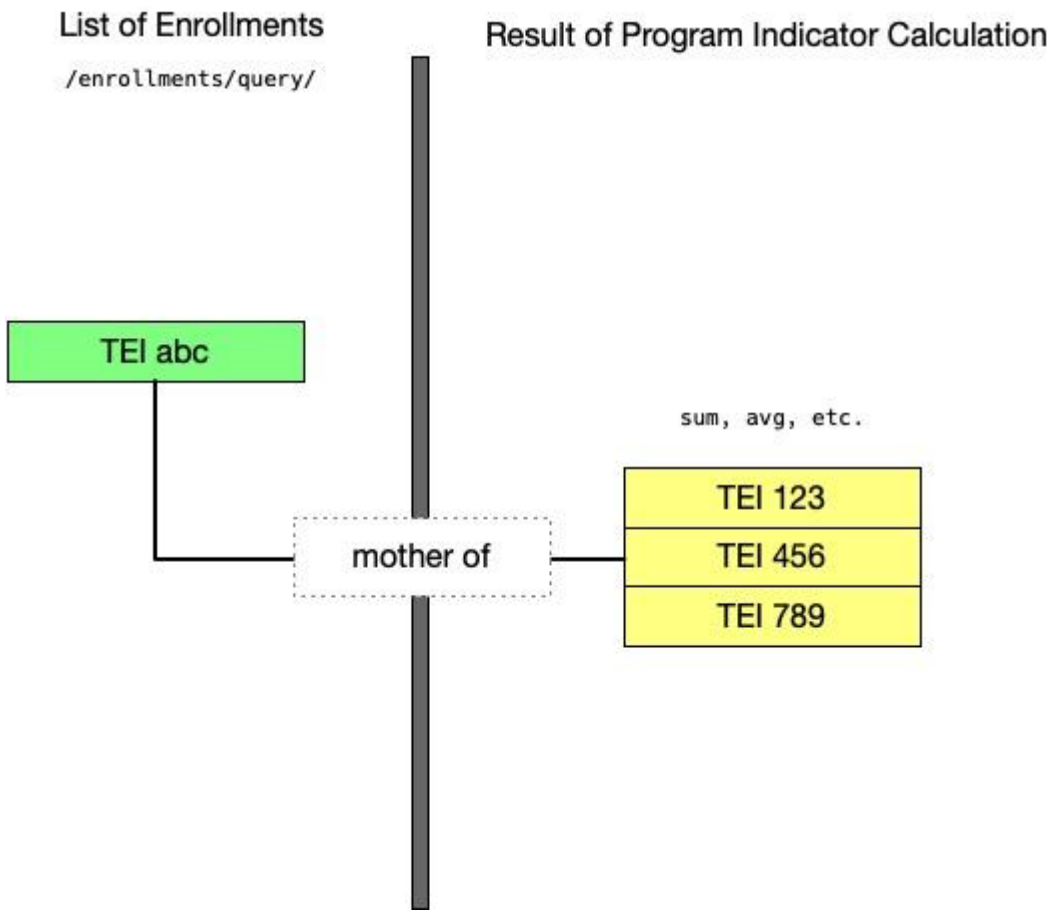
The *metaData* section, *ou* object contains the identifiers of all organisation units present in the response mapped to a string representing the hierarchy. This hierarchy string lists the identifiers of the

ancestors (parents) of the organisation unit starting from the root. The *names* object contains the identifiers of all items in the response mapped to their names.

The *rows* section contains the enrollments produced by the query. Each row represents exactly one enrollment.

Analytics across TEI relationships with program indicators

The non-aggregation enrollment analytics API also supports linking Program Indicators to Relationship Types, in order to show the result of a calculation of a specific Program Indicator applied to the related entities of the listed Tracked Entity Instance.



For the Program Indicator/Relationship Type link to work, the `/api/analytics/enrollments/query` API requires an additional dimension which must include the chosen Relationship Type UID and the chosen Program Indicator UID:

```
/api/analytics/enrollments/query/<program-id>
  ?dimension=<relationshiptype-id>.<programindicator-id>
```

For example, to retrieve a list of enrollments from the "WHO RMNCH Tracker" program for January 2019 and display the count of Malaria Cases linked to that Enrollment by "Malaria case linked to person" type of relationship, you can use the following query

```
/api/analytics/enrollments/query/WSGAb5XwJ3Y.json?dimension=mxZDvSZYxlw.nFICjJluo74
  &startDate=2019-01-01&endDate=2019-01-31
```

The API supports using program indicators which are not associated to the "main" program (that is the program ID specified after `/query/`).

Dimensions

Five resources allow to easily retrieve data dimensions:

- Event Query data dimensions`/analytics/events/query/dimensions`
- Event Aggregate data dimensions `/analytics/events/aggregate/dimensions`
- Enrollment Query data dimensions `/analytics/enrollments/query/dimensions`
- Enrollment Aggregate data dimensions `/analytics/enrollments/aggregate/dimensions`
- Tracked Entities query data dimensions) `/analytics/teis/query/dimensions`

Resources mentioned above share the following request parameter:

Query parameter	required	Description	Options
filter	no	Allows field value filtering on the format: `filter=field:OP:value&filter=field:OP:value&...`	See [dimension filters section]. (#webapi_analytics_dimension_filters)
fields	no	Allows field filtering	
page	no	Page number	Defaults to 1 (first page)
pageSize	no	Page size	Defaults to 50 elements per page
paging	no	Disables pagination when `false`	`true` or `false`, defaults to `true`
order	no	Allows sorting on the format: `order=field:direction`	Sortable fields: `created` (default), `lastUpdated`, `code`, `uid`, `id`, `name`, `displayName`, `dimensionType` Direction can be `ASC` (default) or `DESC`

Dimension filters

Dimensions endpoints support filtering the output to narrow down the response to desired elements. Filters are in the format `filter=field:op:value&filter=field:op:value&...&filter=field:op:value`.

Supported `field` values are:

- **id**/**uid** - dimension id
- **code** - dimension code
- **valueType** - dimension value type
- **name** - the name of the dimension
- **dimensionType** - the type of the dimension
  - `DATA_ELEMENT`
  - `PROGRAM_INDICATOR`
  - `PROGRAM_ATTRIBUTE`
  - `CATEGORY`

    - CATEGORY_OPTION_GROUP_SET
- **displayName** - displayName of the dimension
- **displayShortName** - displayShortName of the dimension

Supported opvalues are:

- startsWith - field starts with
- !startsWith - field does not start with
- endsWith - field ends with
- !endsWith - field does not end with-
- eq - equals
- ieq - equals ignoring case
- ne - not equals
- like - contains
- !like - does not contain
- ilike - contains ignoring case
- !ilike - does not contain ignoring case

Event analytics dimensions

Event query analytics dimensions

The /analytics/events/query/dimensions?programId={programId} &programStageId={programStageId} resource accepts:

- a tracker program
- a tracker programStage
- both program and programStage

There are constraints on the combination of program and programStage:

- If only program is specified, the resource returns data dimensions for each program stage in the provided program
- If only programStage is specified, the resource returns data dimensions for the provided programStage
- If both program and programStage are specified, the resource returns data dimensions for the provided programStage if it belongs to the provided program. Returns an error otherwise.

the returned data dimensions are:

- **Program indicators** associated with the program (derived from programStageId)
- **Data elements** of *supported types* in the program stage
- **Tracked entity attributes** of *supported types* associated with the program (derived from programStageId)
- **Categories** in category combo associated with the program (derived from programStageId)
- **Category option group sets** of type ATTRIBUTE

All value types for data elements and tracked entity attributes are considered *supported types*, except IMAGE, FILE_RESOURCE and TRACKER_ASSOCIATE.

Event aggregate dimensions

The /analytics/events/aggregate/dimensions?programStageId=... resource accepts a mandatory programStageId parameter and returns the following data dimensions:

- **Data elements** of *supported types* in the program stage

- **Tracked entity attributes** of *supported types* associated with the program (derived from programStageId)
- **Categories** in category combo associated with the program (derived from programStageId)
- **Category option group sets** of type `ATTRIBUTE` associated with program (derived from programStageId)

Data elements and tracked entity attributes are considered *supported types* if their value type is one of the following:

- `NUMBER`
- `UNIT_INTERVAL`
- `PERCENTAGE`
- `INTEGER`
- `INTEGER_POSITIVE`
- `INTEGER_NEGATIVE`
- `INTEGER_ZERO_OR_POSITIVE`
- `BOOLEAN`
- `TRUE_ONLY`

Enrollment analytics dimensions

Enrollment query analytics dimensions

The `/analytics/enrollments/query/dimensions?programId=...` resource accepts a mandatory id of a tracker program and returns the following data dimensions:

- **Program indicators** connected to the program
- **Data elements** of *supported types* in the program, with program stage for each data element
- **Tracked entity attributes** of *supported types* associated with the program that are not confidential

All value types for data elements and tracked entity attributes are considered *supported types*, except `IMAGE`, `FILE_RESOURCE` and `TRACKER_ASSOCIATE`.

Enrollment aggregate dimensions

The `/analytics/enrollments/aggregate/dimensions?programId=...` resource accepts a mandatory id of a tracker program, referring to a program with registration, and returns the following data dimensions:

- **Data elements** of *supported types* in the program, with program stage for each data element
- **Tracked entity attributes** of *supported types* associated with the program that are not confidential

Data elements and tracked entity attributes are considered *supported types* if their value type is one of the following:

- `NUMBER`
- `UNIT_INTERVAL`
- `PERCENTAGE`
- `INTEGER`
- `INTEGER_POSITIVE`
- `INTEGER_NEGATIVE`
- `INTEGER_ZERO_OR_POSITIVE`
- `BOOLEAN`
- `TRUE_ONLY`

Tracked Entities analytics dimensions

Tracked Entities query analytics dimensions

The `/analytics/teis/query/dimensions?trackedEntityType=TET` resource accepts a mandatory id of a tracked entity type TET and returns the following data dimensions:

for each program P associated with a tracked entity instance of type TET: - **Program indicators** associated to P - **Data elements** of *supported types* in P, with program stage for each data element - **Tracked entity attributes** of *supported types* associated with the program that are not confidential - **Program attributes** of P

All value types for data elements and tracked entity attributes are considered *supported types*, except `IMAGE`, `FILE_RESOURCE` and `TRACKER_ASSOCIATE`.

Sample request and response

```
GET /api/analytics/teis/query/dimensions?
programStageId=A03MvHHogjR&order=code&filter=name:ilike:weight
```


```
{
   "page":1,
   "total":5,
   "pageSize":50,
   "dimensions":[
      {
         "dimensionType":"PROGRAM_INDICATOR",
         "created":"2015-08-06T22:49:20.128",
         "lastUpdated":"2015-08-06T22:51:19.787",
         "name":"Measles + Yellow fever doses low infant weight",
         "displayName":"Measles + Yellow fever doses low infant weight",
         "id":"tt54DiKuQ9c",
         "uid":"tt54DiKuQ9c",
         "displayShortName":"Measles + Yellow fever doses low infant weight"
      },
      {
         "dimensionType":"PROGRAM_INDICATOR",
         "created":"2017-01-20T10:32:26.388",
         "lastUpdated":"2017-01-20T10:32:26.388",
         "name":"Weight gain(in g) between birth and last postnatal",
         "displayName":"Weight gain(in g) between birth and last postnatal",
         "id":"qhTkqwAJLMv",
         "uid":"qhTkqwAJLMv",
         "displayShortName":"Weight gain(g)"
      },
      {
         "dimensionType":"PROGRAM_INDICATOR",
         "created":"2015-09-14T20:25:55.543",
         "lastUpdated":"2018-08-28T12:22:47.857",
         "name":"Average weight (g)",
         "displayName":"Average weight (g)",
         "id":"GxdhnY5wmHq",
         "uid":"GxdhnY5wmHq",
         "displayShortName":"Average weight (g)"
      },
      {
         "dimensionType":"PROGRAM_INDICATOR",
         "created":"2015-08-06T22:35:40.391",
         "lastUpdated":"2015-08-06T22:35:40.391",
```

```
          "name":"BCG doses low birth weight",
          "displayName":"BCG doses low birth weight",
          "id":"hCYU0G5Ti2T",
          "uid":"hCYU0G5Ti2T",
          "displayShortName":"BCG doses low birth weight"
       },
       {
          "valueType":"NUMBER",
          "dimensionType":"DATA_ELEMENT",
          "created":"2012-09-20T17:37:45.474",
          "lastUpdated":"2014-11-11T21:56:05.418",
          "name":"MCH Weight (g)",
          "displayName":"MCH Weight (g)",
          "id":"A03MvHHogjR.UXz7xuGCEhU",
          "uid":"UXz7xuGCEhU",
          "code":"DE_2005736",
          "displayShortName":"Weight (g)"
       }
    ]
}
```


Org unit analytics

The org unit analytics API provides statistics on org units classified by org unit group sets, i.e. counts of org units per org unit group within org unit group sets.

```
GET /api/orgUnitAnalytics?ou=<org-unit-id>&ougs=<org-unit-group-set-id>
```

The API requires at least one organisation unit and at least one organisation unit group set. Multiple org units and group sets can be provided separated by a semicolon.

Request query parameters

The org unit analytics resource lets you specify a range of query parameters:

Org unit analytics query parameters

Property	Description	Required
ou	Org unit identifiers, potentially separated by a semicolon.	Yes
ougs	Org unit group set identifiers, potentially separated by a semicolon.	Yes
columns	Org unit group set identifiers, potentially separated by a semicolon. Defines which group sets are rendered as columns in a table layout.	No

The response will contain a column for the parent org unit, columns for each org unit group set part of the request and a column for the count. The statistics include the count of org units which are part of the sub-hierarchy of the org units specified in the request. The response contains a metadata section which specifies the name of each org unit and org unit group part of the response referenced by their identifiers.

The default response is normalized with a single `count` column. The response can be rendered in a table layout by specifying at least one org unit group set using the `columns` query parameter.

Response formats

The org unit analytics endpoint supports the following representation formats:

- json (application/json)
- csv (application/csv)
- xls (application/vnd.ms-excel)
- pdf (application/pdf)

Examples

To fetch org unit analytics for an org unit and org unit group set:

```
GET /api/orgUnitAnalytics?ou=lc3eMKXaEfw&ougs=J5jldMd8OHv
```

To fetch org unit analytics data for two org units and two org unit group sets:

```
GET /api/orgUnitAnalytics?ou=lc3eMKXaEfw;PMa2VCrupOd&ougs=J5jldMd8OHv;Bpx0589u8y0
```

To fetch org unit analytics data in table mode with one group set rendered as columns:

```
GET /api/orgUnitAnalytics?ou=fdc6uOvgoji;jUb8gELQApl;lc3eMKXaEfw;PMa2VCrupOd
  &ougs=J5jldMd8OHv&columns=J5jldMd8OHv
```

Constraints and validation

The possible validation errors specifically for the org unit analytics API are described in the table below. Some errors specified for the aggregate analytics API are also relevant.

Error code	Message
E7300	At least one organisation unit must be specified
E7301	At least one organisation unit group set must be specified

Data set report

Data set reports can be generated through the web api using the `/dataSetReport` resource. This resource generates reports on data set and returns the result in the form of an HTML table.

```
/api/dataSetReport
```

Request query parameters

The request supports the following parameters:

Data set report query parameters

Parameter	Description	Type	Required
ds	Data set to create the report from.	Data set UID	Yes
pe	Period(s) to create the report from. May be a comma-separated list.	ISO String	Yes
ou	Organisation unit to create the report from.	Organisation unit UID	Yes
filter	Filters to be used as filters for the report. Can be repeated any number of times. Follows the analytics API syntax.	One or more UIDs	No
selectedUnitOnly	Whether to use captured data only or aggregated data.	Boolean	No

The data set report resource accepts `GET` requests only. The response content type is `application/json` and returns data in a grid. This endpoint works for all types of data sets, including default, section and custom forms.

An example request to retrieve a report for a monthly data set and org unit for October 2018 looks like this:

```
GET /api/dataSetReport?ds=BfMAe6Itzgt&pe=201810&ou=ImspTQPwCqd&selectedUnitOnly=false
```

An example request to retrieve a report for a monthly data set and org unit for October, November, and December 2018 looks like this:

```
GET /api/dataSetReport?
ds=BfMAe6Itzgt&pe=201810,201811,201812&ou=ImspTQPwCqd&selectedUnitOnly=false
```

To get a data set report with a filter you can use the `filter` parameter. In this case, the filter is based on an org unit group set and two org unit groups:

```
GET /api/dataSetReport?ds=BfMAe6Itzgt&pe=201810&ou=ImspTQPwCqd
  &filter=J5jldMd8OHv:RXL3lPSK8oG;tDZVQ1WtwpA
```

Response formats

The data set report endpoint supports output in the following formats. You can retrieve a specific endpoint using the file extension or `Accept` HTTP header.

- json (application/json)
- pdf (application/pdf)
- xls (application/vnd.ms-excel)

Custom forms

A dedicated endpoint is available for data sets with custom HTML forms. This endpoint returns the HTML form content with content type `text/html` with data inserted into it. Note that you can use the general data set report endpoint also for data sets with custom forms; however, that will return the report in JSON format as a grid. This endpoint only works for data sets with custom HTML forms.

```
GET /api/dataSetReport/custom
```

The syntax for this endpoint is otherwise equal to the general data set report endpoint. To retrieve a custom HTML data set report you can issue a request like this:

```
GET /api/dataSetReport/custom?ds=lyLU2wR22tC&pe=201810&ou=ImspTQPwCqd
```

Push Analysis

The push analysis API includes endpoints for previewing a push analysis report for the logged in user and manually triggering the system to generate and send push analysis reports, in addition to the normal CRUD operations. When using the create and update endpoints for push analysis, the push analysis will be scheduled to run based on the properties of the push analysis. When deleting or updating a push analysis to be disabled, the job will also be stopped from running in the future.

To get an HTML preview of an existing push analysis, you can do a GET request to the following endpoint:

```
/api/pushAnalysis/<id>/render
```

To manually trigger a push analysis job, you can do a POST request to this endpoint:

```
/api/pushAnalysis/<id>/run
```

A push analysis consists of the following properties, where some are required to automatically run push analysis jobs:

Push analysis properties

Property	Description	Type	Required
dashboard	Dashboard on which reports are based	Dashboard UID	Yes
message	Appears after title in reports	String	No
recipientUserGroups	A set of user groups who should receive the reports	One or more user Group UID	No. Scheduled jobs without any recipient will be skipped.
enabled	Indicated whether this push analysis should be scheduled or not. False by default.	Boolean	Yes. Must be true to be scheduled.

Property	Description	Type	Required
schedulingFrequency	The frequency of which reports should be scheduled.	"DAILY", "WEEKLY", "MONTHLY"	No. Push analysis without a frequency will not be scheduled
schedulingDayOfFrequency	The day in the frequency the job should be scheduled.	Integer. Any value when frequency is "DAILY". 0-7 when frequency is "WEEKLY". 1-31 when frequency is "MONTHLY"	No. Push analysis without a valid day of frequency for the frequency set will not be scheduled.

Data usage analytics

The usage analytics API lets you access information about how people are using DHIS2 based on data analysis. When users access favorites, an event is recorded. The event consists of the user name, the UID of the favorite, when the event took place, and the type of event. The different types of events are listed in the table.

```
/api/dataStatistics
```

The usage analytics API lets you retrieve aggregated snapshots of usage analytics based on time intervals. The API captures user views (for example the number of times a chart or pivot table has been viewed by a user) and saved analysis favorites (for example favorite charts and pivot tables). DHIS2 will capture nightly snapshots which are then aggregated at request.

Request query parameters

The usage analytics (data statistics) API supports two operations:

- *POST:* creates a view event
- *GET:* retrieves aggregated statistics

Create view events (POST)

The usage analytics API lets you create event views. The dataStatisticsEventType parameter describes what type of item was viewed. The favorite parameter indicates the identifier of the relevant favorite.

URL that creates a new event view of charts:

```
POST /api/dataStatistics?eventType=CHART_VIEW&favorite=LW0O27b7TdD
```

A successful save operation returns an HTTP status code 201. The table below shows the supported types of events.

Supported event types

Key	Description
VISUALIZATION_VIEW	Visualization view
MAP_VIEW	Map view (GIS)
EVENT_REPORT_VIEW	Event report view

Key	Description
EVENT_CHART_VIEW	Event chart view
EVENT_VISUALIZATION_VIEW	Event visualization view
DASHBOARD_VIEW	Dashboard view
PASSIVE_DASHBOARD_VIEW	Dashboard view (when not explicitly selecting the dashboard)
DATA_SET_REPORT_VIEW	Data set report view

Retrieve aggregated usage analytics report (GET)

The usage analytics (data statistics) API lets you specify certain query parameters when asking for an aggregated report.

Query parameters for aggregated usage analytics (data statistics)

Query parameter	Required	Description	Options
startDate	Yes	Start date for period	Date in yyyy-MM-dd format
endDate	Yes	End date for period	Date in yyyy-MM-dd format
interval	Yes	Type of interval to be aggregated	DAY, WEEK, MONTH, YEAR

The startDate and endDate parameters specify the period for which snapshots are to be used in the aggregation. You must format the dates as shown above. If no snapshots are saved in the specified period, an empty list is sent back. The parameter called interval specifies what type of aggregation will be done.

API query that creates a query for a monthly aggregation:

```
GET /api/dataStatistics?startDate=2014-01-02&endDate=2016-01-01&interval=MONTH
```

Retrieve top favorites

The usage analytics API lets you retrieve the top favorites used in DHIS2, and by user.

Query parameters for top favorites

Query parameter	Required	Description	Options
eventType	Yes	The data statistics event type	See above table
pageSize	No	Size of the list returned	For example 5, 10, 25. Default is 25
sortOrder	No	Descending or ascending	ASC or DESC. Default is DESC.
username	No	If specified, the response will only contain favorites by this user.	For example 'admin'

The API query can be used without a username, and will then find the top favorites of the system.

```
/api/dataStatistics/favorites?eventType=CHART_VIEW&pageSize=25&sortOrder=ASC
```

If the username is specified, the response will only contain the top favorites of that user.

```
/api/dataStatistics/favorites?eventType=CHART_VIEW&pageSize=25
  &sortOrder=ASC&username=admin
```

Response format

You can return the aggregated data in a usage analytics response in several representation formats. The default format is JSON. The available formats and content types are:

- json (application/json)
- xml (application/xml)
- html (text/html)

API query that requests a usage analytics response in XML format:

```
/api/dataStatistics.xml?startDate=2014-01-01&endDate=2016-01-01&interval=WEEK
```

To get an usage analytics response in JSON format:

```
/api/dataStatistics?startDate=2016-02-01&endDate=2016-02-14&interval=WEEK
```

The JSON response looks like this:

```
[
  {
    "year": 2016,
    "week": 5,
    "mapViews": 2181,
    "chartViews": 2227,
    "reportTableViews": 5633,
    "eventReportViews": 6757,
    "eventChartViews": 9860,
    "eventVisualizationViews": 2387,
    "dashboardViews": 10082,
    "passiveDashboardViews": 0,
    "totalViews": 46346,
    "averageViews": 468,
    "averageMapViews": 22,
    "averageChartViews": 22,
    "averageReportTableViews": 56,
    "averageEventReportViews": 68,
    "averageEventChartViews": 99,
    "averageEventVisualizationViews": 10,
    "averageDashboardViews": 101,
    "averagePassiveDashboardViews": 0,
    "savedMaps": 1805,
    "savedCharts": 2205,
```

```
    "savedReportTables": 1995,
    "savedEventReports": 1679,
    "savedEventCharts": 1613,
    "savedEventVisualizations": 1231,
    "savedDashboards": 0,
    "savedIndicators": 1831,
    "activeUsers": 99,
    "users": 969
  },
  {
    "year": 2016,
    "week": 6,
    "mapViews": 2018,
    "chartViews": 2267,
    "reportTableViews": 4714,
    "eventReportViews": 6697,
    "eventChartViews": 9511,
    "dashboardViews": 12181,
    "passiveDashboardViews": 0,
    "totalViews": 47746,
    "averageViews": 497,
    "averageMapViews": 21,
    "averageChartViews": 23,
    "averageReportTableViews": 49,
    "averageEventReportViews": 69,
    "averageEventChartViews": 99,
    "averageDashboardViews": 126,
    "averagePassiveDashboardViews": 0,
    "savedMaps": 1643,
    "savedCharts": 1935,
    "savedReportTables": 1867,
    "savedEventReports": 1977,
    "savedEventCharts": 1714,
    "savedDashboards": 0,
    "savedIndicators": 1646,
    "activeUsers": 96,
    "users": 953
  }
]
```


Note that the number of `activeUsers` indicates the number of distinct users who had any events during the requested time period. The number of `users` represents the total number of users in the system (both enabled and disabled).

Retrieve statistics for a favorite

You can retrieve the number of view for a specific favorite by using the *favorites* resource, where *{favorite-id}* should be substituted with the identifier of the favorite of interest:

```
/api/dataStatistics/favorites/{favorite-id}.json
```

The response will contain the number of views for the given favorite and look like this:


```
{
  "views": 3
}
```

Geospatial features

The *geoFeatures* resource lets you retrieve geospatial information from DHIS2. Geospatial features are stored together with organisation units. The syntax for retrieving features is identical to the syntax used for the organisation unit dimension for the analytics resource. It is recommended to read up on the analytics api resource before continuing to read this section. You must use the GET request type, and only JSON response format is supported.

As an example, to retrieve geo features for all organisation units at level 3 in the organisation unit hierarchy you can use a GET request with the following URL:

```
/api/geoFeatures.json?ou=ou:LEVEL-3
```

To retrieve geo features for organisation units at a level within the boundary of an organisation unit (e.g. at level 2) you can use this URL:

```
/api/geoFeatures.json?ou=ou:LEVEL-4;O6uvpzGd5pu
```

The response coordinates value can be read from two properties which is decided by the parameter `coordinateField`. - The `geometry` property of the OrganisationUnit: this is the default behaviour which is applied when parameter `coordinateField` is not provided. - The OrgansationUnit attribute of value type GeoJSON: the api will use the provided `coordinateField={attributeId}` to get the GeoJSON coordinates from this attribute value.

For example, to retrieve geo features for all organisation units at level 3 as above but get the coordinates from OrganisationUnit attribute `tJqtSV4quLb`

```
/api/geoFeatures.json?ou=ou:LEVEL-3&coordinateField=tJqtSV4quLb
```

The semantics of the response properties are described in the following table.

Geo features response

Property	Description
id	Organisation unit / geo feature identifier
na	Organisation unit / geo feature name
hcd	Has coordinates down, indicating whether one or more children organisation units exist with coordinates (below in the hierarchy)
hcu	Has coordinates up, indicating whether the parent organisation unit has coordinates (above in the hierarchy)
le	Level of this organisation unit / geo feature.
pg	Parent graph, the graph of parent organisation unit identifiers up to the root in the hierarchy
pi	Parent identifier, the identifier of the parent of this organisation unit
pn	Parent name, the name of the parent of this organisation unit

Property	Description
ty	Geo feature type, 1 = point and 2 = polygon or multi-polygon
co	Coordinates of this geo feature

GeoJSON

To export GeoJSON, you can simply add *.geosjon* as an extension to the endpoint */api/organisationUnits*, or you can use the *Accept* header *application/json+geojson*.

Two parameters are supported: `level` (default is 1) and `parent` (default is root organisation units). Both can be included multiple times. Some examples:

Get all features at level 2 and 4:

```
/api/organisationUnits.geojson?level=2&level=4
```

Get all features at level 3 with a boundary organisation unit:

```
/api/organisationUnits.geojson?parent=fdc6uOvgoji&level=3
```

Analytics table hooks

Analytics table hooks provide a mechanism for invoking SQL scripts during different phases of the analytics table generation process. This is useful for customizing data in resource and analytics tables, e.g. in order to achieve specific logic for calculations and aggregation. Analytics table hooks can be manipulated at the following API endpoint:

```
/api/analyticsTableHooks
```

The analytics table hooks API supports the standard HTTP CRUD operations for creating (POST), updating (PUT), retrieving (GET) and deleting (DELETE) entities.

Hook fields

Analytics table hooks have the following fields:

Analytics table hook fields

Field	Options	Description
name	Text	Name of the hook.
phase	RESOURCE_TABLE_POPULATED, ANALYTICS_TABLE_POPULATED	The phase for when the SQL script should be invoked.
resourceTableType	See column "Table type" in table "Phases, table types and temporary tables" below	The type of resource table for which to invoke the SQL script. Applies only for hooks defined with the RESOURCE_TABLE_POPULATED phase.

Field	Options	Description
analyticsTableType	See column "Table type" in table "Phases, table types and temporary tables" below	The type of analytics table for which to invoke the SQL script. Applies only for hooks defined with the ANALYTICS_TABLE_POPULATED phase.
sql	Text	The SQL script to invoke.

The *ANALYTICS_TABLE_POPULATED* phase takes place after the analytics table has been populated, but before indexes have been created and the temp table has been swapped with the main table. As a result, the SQL script should refer to the analytics temp table, e.g. *analytics_temp*, *analytics_completeness_temp*, *analytics_event_temp_ebayegv0exc*.

This applies also to the *RESOURCE_TABLE_POPULATED* phase, which takes place after the resource table has been populated, but before indexes have been created and the temp table has been swapped with the main table. As a result, the SQL script should refer to the resource temp table, e.g. *_orgunitstructure_temp*, *_categorystructure_temp*.

You should define only one of the *resourceTableType* and *analyticsTableType* fields, depending on which *phase* is defined.

You can refer to the temporary database table which matches the specified hook table type only (other temporary tables will not be available). As an example, if you specify *ORG_UNIT_STRUCTURE* as the resource table type, you can refer to the *_orgunitstructure_temp* temporary database table only.

The following table shows the valid combinations of phases, table types and temporary tables.

Phases, table types and temporary tables

Phase	Table type	Temporary table
RESOURCE_TABLE_POPULATED	ORG_UNIT_STRUCTURE	_orgunitstructure_temp
	DATA_SET_ORG_UNIT_CATEGORY	_datasetorgunitcategory_temp
	CATEGORY_OPTION_COMBO_NAME	_categoryoptioncomboname_temp
	DATA_ELEMENT_GROUP_SET_STRUCTURE	_dataelementgroupsetstructure_temp
	INDICATOR_GROUP_SET_STRUCTURE	_indicatorgroupsetstructure_temp
	ORG_UNIT_GROUP_SET_STRUCTURE	_organisationunitgroupsetstructure_temp
	CATEGORY_STRUCTURE	_categorystructure_temp
	DATA_ELEMENT_STRUCTURE	_dataelementstructure_temp
	PERIOD_STRUCTURE	_periodstructure_temp
	DATE_PERIOD_STRUCTURE	_dateperiodstructure_temp
	DATA_ELEMENT_CATEGORY_OPTION_COMBO	_dataelementcategoryoptioncombo_temp
	DATA_APPROVAL_MIN_LEVEL	_dataapprovalminlevel_temp

Phase	Table type	Temporary table
ANALYTICS_TABLE_POPULATED	DATA_VALUE	analytics_temp
	COMPLETENESS	analytics_completeness_temp
	COMPLETENESS_TARGET	analytics_completenesstarget_temp
	ORG_UNIT_TARGET	analytics_orgunittarget_temp
	EVENT	analytics_event_temp_{program-uid}
	ENROLLMENT	analytics_enrollment_temp_{program-uid}
	VALIDATION_RESULT	analytics_validationresult_temp

Creating hooks

To create a hook which should run after the resource tables have been populated you can do a *POST* request like this using *JSON* as content type:

```
POST /api/analyticsTableHooks
```

```
{
  "name": "Update 'Area' in org unit group set resource table",
  "phase": "RESOURCE_TABLE_POPULATED",
  "resourceTableType": "ORG_UNIT_GROUP_SET_STRUCTURE",
  "sql": "update _organisationunitgroupsetstructure_temp set \"uIuxlbV1vRT\" = 'b0EsAxm8Nge'"
}
```

To create a hook which should run after the data value analytics table has been populated you can do a *POST* request like this using *JSON* format:

```
{
  "name": "Update 'Currently on treatment' data in analytics table",
  "phase": "ANALYTICS_TABLE_POPULATED",
  "analyticsTableType": "DATA_VALUE",
  "sql": "update analytics_temp set monthly = '200212' where monthly in ('200210', '200211')"
}
```

To create a hook which should run after the event analytics tables are populated you can do a *POST* request like this using *JSON* format:

```
{
  "name": "Delete data for a data element",
  "phase": "ANALYTICS_TABLE_POPULATED",
  "analyticsTableType": "EVENT",
  "sql": "delete from analytics_event_temp_lxaq7zs9vyr where dx = 'uDX9LKGRwaH'"
}
```

SVG conversion

The Web API provides a resource which can be used to convert SVG content into more widely used formats such as PNG and PDF. Ideally this conversion should happen on the client side, but not all client side technologies are capable of performing this task. Currently PNG and PDF output formats are supported. The SVG content itself should be passed with a *svg* query parameter, and an optional query parameter *filename* can be used to specify the filename of the response attachment file. Note that the file extension should be omitted. For PNG you can send a *POST* request to the following URL with Content-type `application/x-www-form-urlencoded`, identical to a regular HTML form submission.

```
api/svg.png
```

For PDF you can send a *POST* request to the following URL with content-type `application/x-www-form-urlencoded`.

```
api/svg.pdf
```

Query parameters

Query parameter	Required	Description
svg	Yes	The SVG content
filename	No	The file name for the returned attachment without file extension

Analytics outlier detection

The analytics outliert API provides endpoints for investigation of the data quality based on Z Score and Modified Z Score. Both scores are statistical measures that help analyze and interpret data in the context of deviations from the middle value. They are particularly useful in identifying outliers or extreme values in a dataset. The API is implemented as a single analytics endpoint:

- /api/analytics/outlierDetection

Request

Query parameters

Query parameter	Description	Required	Options (default first)
ds	Data set	Yes	Data set identifier
startDate	Start date for interval tocheck for outliers	No (relative date period is mandatory in this case)	Date (yyyy-MM-dd)
endDate	End date for interval to check for outliers	No (relative date period is mandatory in this case)	Date (yyyy-MM-dd)
pe	ISO periods and relative periods	No (start and end date is mandatory in this case)	see "date and period format"
relativePeriodDate	Date used as basis for relative periods.	No	Date (yyyy-MM-dd)

Query parameter	Description	Required	Options (default first)
ou	Organisation unit, organisation unit level or groups (can be combined)	No	Organisation unit (level, group) identifier
headers	The name of the headers to be returned as part of the response. One or more headers name separated by comma	No	(NULL), dx, dxname, pename, pe ...
orderBy	Sort the records on the value column	No	absdev, zscore, modifiedzscore, median, mean, stddev, medianabsdeviation, lowerbound, upperbound
sortOrder	Sort the records on the value column in ascending or descending order	No	ASC, DESC
algorithm	Algorithm to use for outlier detection	No	Z_SCORE, MODIFIED_Z_SCORE
threshold	Threshold for outlier values Z_SCORE or MODIFIED_Z_SCORE	No	Numeric, greater than zero. Default: 3.0
inputIdScheme	Identifier scheme to use for metadata items in the query request, can be an identifier, code or attributes.	No	UID, ID, CODE, NAME
maxResults	Maximum rows (responses)	No	500
skipRounding	Skip rounding of data values, i.e. provide fine precision (scale 10).	No	false, true

Request example

```
GET api/analytics/outlierDetection?
ds=BfMAe6Itzgt&ou=ImspTQPwCqd&startDate=2022-07-26&endDate=2022-10-26&algorithm=Z_SCORE&maxResults=30&orderBy=val
```

Response

Response is delivered in several representation formats. The default format is JSON. The available formats and content types are:

- json (application/json)
- xml (application/xml)
- xsl (application/vnd.ms-excel)

- csv (application/csv)
- html (text/html)
- html+css (text/html)

Response example


```
{
    "headers": [
        {
            "name": "dx",
            "column": "Data",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "dxname",
            "column": "Data name",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "pe",
            "column": "Period",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "pename",
            "column": "Period name",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "ou",
            "column": "Organisation unit",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "ouname",
            "column": "Organisation unit name",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "ounamehierarchy",
            "column": "Organisation unit name hierarchy",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
```

```
            "meta": false
        },
        {
            "name": "coc",
            "column": "Category option combo",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "cocname",
            "column": "Category option combo name",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "aoc",
            "column": "Attribute option combo",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "aocname",
            "column": "Attribute option combo name",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": false
        },
        {
            "name": "value",
            "column": "Value",
            "valueType": "NUMBER",
            "type": "java.lang.Double",
            "hidden": false,
            "meta": false
        },
        {
            "name": "mean",
            "column": "Mean",
            "valueType": "NUMBER",
            "type": "java.lang.Double",
            "hidden": false,
            "meta": false
        },
        {
            "name": "stddev",
            "column": "Standard deviation",
            "valueType": "NUMBER",
            "type": "java.lang.Double",
            "hidden": false,
            "meta": false
        },
        {
            "name": "absdev",
            "column": "Absolute deviation",
            "valueType": "NUMBER",
            "type": "java.lang.Double",
```

```
            "hidden": false,
            "meta": false
        },
        {
            "name": "zscore",
            "column": "zScore",
            "valueType": "NUMBER",
            "type": "java.lang.Double",
            "hidden": false,
            "meta": false
        },
        {
            "name": "lowerbound",
            "column": "Lower boundary",
            "valueType": "NUMBER",
            "type": "java.lang.Double",
            "hidden": false,
            "meta": false
        },
        {
            "name": "upperbound",
            "column": "Upper boundary",
            "valueType": "NUMBER",
            "type": "java.lang.Double",
            "hidden": false,
            "meta": false
        }
    ],
    "metaData": {
        "maxResults": 30,
        "count": 3,
        "orderBy": "VALUE",
        "threshold": 3.0,
        "algorithm": "Z_SCORE"
    },
    "rowContext": {},
    "width": 18,
    "rows": [
        [
            "DE_22",
            "Q_Early breastfeeding (within 1 hr after delivery) at BCG",
            "202209",
            "September 2022",
            "OU_204860",
            "Sandaru CHC",
            "/Sierra Leone/Kailahun/Penguia/Sandaru CHC",
            "COC_292",
            "Fixed, <1y",
            "default",
            "default",
            "105.0",
            "18.3",
            "28.7",
            "86.7",
            "3.0",
            "-67.9",
            "104.4"
        ],
        [
            "DE_359706",
            "BCG doses given",
            "202208",
            "August 2022",
```

```
            "OU_595",
            "Ngalu CHC",
            "/Sierra Leone/Bo/Bargbe/Ngalu CHC",
            "COC_292",
            "Fixed, <1y",
            "default",
            "default",
            "220.0",
            "41.6",
            "57.4",
            "178.3",
            "3.1",
            "-130.7",
            "213.9"
        ],
        [
            "DE_35",
            "Yellow Fever doses given",
            "202209",
            "September 2022",
            "OU_1027",
            "Yemoh Town CHC",
            "/Sierra Leone/Bo/Kakua/Yemoh Town CHC",
            "COC_292",
            "Fixed, <1y",
            "default",
            "default",
            "466.0",
            "48.1",
            "114.2",
            "417.8",
            "3.6",
            "-294.6",
            "391.0"
        ]
    ],
    "headerWidth": 18,
    "height": 3
}
```


Statistics in response

Statistical Measure	Header name	Description	Link
Value	value	The data set/ data element numeric value (Penta1 doses given, Measles doses given, etc.)	
Mean	mean	The average value of a set of numbers. Calculated by summing all values and dividing by the count.	https://www.khanacademy.org/math/statistics-probability/summarizing-quantitative-data

Statistical Measure	Header name	Description	Link
Standard Deviation	stddev	A measure of the amount of variation or dispersion in a set of values.	https://www.statisticshowto.com/probability-and-statistics/standard-deviation/
Absolute Deviation	absdev	The absolute difference between each data value and the middle value.	https://www.mathsisfun.com/data/mean-absolute-deviation.html
Z Score	zscore	A standardized score that represents how many standard deviations a data value is from the mean.	https://www.statisticshowto.com/probability-and-statistics/z-score/
Modified Z Score	modifiedzscore	Similar to the Z score but robust to outliers. It uses the median and median absolute deviation.	https://www.statisticshowto.com/modified-z-scores/
Median Absolute Deviation	medianabsdeviation	A robust measure of the spread of data values, calculated as the median of the absolute deviations from the median.	https://math.stackexchange.com/questions/2232309/median-absolute-deviation-mad-formula
Minimum	lowerbound	The minimum is the smallest value in a dataset. It represents the lowest observed value among all the data values.	
Maximum	upperbound	The maximum is the largest value in a dataset. It represents the highest observed value among all the data values.	

Error messages

NOTE: *All messages are delivered with http status code 409.*

Code	Message
E2200	At least one data element must be specified.
E2201	Start date and end date or relative period must be specified.
E2202	Start date must be before end date.
E2203	At least one organisation unit must be specified.
E2204	Threshold must be a positive number.

Code	Message
E2205	Max results must be a positive number.
E2206	Max results exceeds the allowed max limit: *500*.
E2207	Data start date must be before data end date.
E2208	Non-numeric data values encountered during outlier value detection.
E2209	Data start date not allowed.
E2210	Data end date not allowed.
E2211	Algorithm min-max values not allowed.
E2212	Specifying both a start date/end date and a relative period is not allowed.
E2213	Value of param orderBy is not compatible with algorithm *Z_SCORE*.
E7180	The analytics outliers data does not exist. Please ensure analytics job was run and did not skip the outliers.
E7181	Column *dxname* specified in orderBy, is not eligible for orderBy or does not exist.

NOTE: *The values in error messages are examples only*

Error message example

```
{
    "httpStatus": "Conflict",
    "httpStatusCode": 409,
    "status": "ERROR",
    "message": "Start date and end date or relative period must be specified",
    "errorCode": "E2201"
}
```

Analytics query execution plan and costs including execution time estimation

The analytics API provides endpoints for investigation of query performance issues. It is implemented as part of all analytics endpoints:

- analytics/explain
- analytics/event/explain
- analytics/enrollment/explain

Example

```
GET /api/analytics/explain?displayProperty=NAME
  &dimension=dx:Uvn6LCg7dVU;sB79w2hiLp8,ou:USER_ORGUNIT
  &filter=pe:THIS_YEAR&includeNumDen=false&skipMeta=false
  &skipData=true&includeMetadataDetails=true
```

The response looks like this.

```
{
    "headers": [
        {
            "name": "dx",
            "column": "Data",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": true
        },
        {
            "name": "ou",
            "column": "Organisation unit",
            "valueType": "TEXT",
            "type": "java.lang.String",
            "hidden": false,
            "meta": true
        },
        {
            "name": "value",
            "column": "Value",
            "valueType": "NUMBER",
            "type": "java.lang.Double",
            "hidden": false,
            "meta": false
        }
    ],
    "metaData": {
        "items": {
            "ImspTQPwCqd": {
                "uid": "ImspTQPwCqd",
                "code": "OU_525",
                "name": "Sierra Leone",
                "dimensionItemType": "ORGANISATION_UNIT",
                "valueType": "NUMBER",
                "totalAggregationType": "SUM"
            },
            "sB79w2hiLp8": {
                "uid": "sB79w2hiLp8",
                "name": "ANC 3 Coverage",
                "description": "Total 3rd ANC visits (Fixed and outreach) by expected number of
pregnant women.",
                "legendSet": "fqs276KXCXi",
                "dimensionItemType": "INDICATOR",
                "valueType": "NUMBER",
                "totalAggregationType": "AVERAGE",
                "indicatorType": {
                    "name": "Per cent",
                    "displayName": "Per cent",
                    "factor": 100,
                    "number": false
                }
            },
            "dx": {
                "uid": "dx",
                "name": "Data",
                "dimensionType": "DATA_X"
            },
            "pe": {
                "uid": "pe",
                "name": "Period",
                "dimensionType": "PERIOD"
            },
```

```
            "ou": {
                "uid": "ou",
                "name": "Organisation unit",
                "dimensionType": "ORGANISATION_UNIT"
            },
            "Uvn6LCg7dVU": {
                "uid": "Uvn6LCg7dVU",
                "code": "IN_52486",
                "name": "ANC 1 Coverage",
                "description": "Total 1st ANC visits (Fixed and outreach) by expected number of
pregnant women.",
                "legendSet": "fqs276KXCXi",
                "dimensionItemType": "INDICATOR",
                "valueType": "NUMBER",
                "totalAggregationType": "AVERAGE",
                "indicatorType": {
                    "name": "Per cent",
                    "displayName": "Per cent",
                    "factor": 100,
                    "number": false
                }
            },
            "THIS_YEAR": {
                "name": "This year"
            },
            "2022": {
                "uid": "2022",
                "code": "2022",
                "name": "2022",
                "dimensionItemType": "PERIOD",
                "valueType": "NUMBER",
                "totalAggregationType": "SUM",
                "startDate": "2022-01-01T00:00:00.000",
                "endDate": "2022-12-31T00:00:00.000"
            }
        },
        "dimensions": {
            "dx": [
                "Uvn6LCg7dVU",
                "sB79w2hiLp8"
            ],
            "pe": [
                "2022"
            ],
            "ou": [
                "ImspTQPwCqd"
            ],
            "co": []
        }
    },
    "performanceMetrics": {
        "totalTimeInMillis": 90.894,
        "executionPlans": [
            {
                "timeInMillis": 12.314,
                "planningTime": 6.801,
                "executionTime": 5.513,
                "query": "select ax.\"dx\",ax.\"uidlevel1\", sum(daysxvalue) / 365 as value
from analytics_2022 as ax where ax.\"dx\" in ('h0xKKjijTdI') and ax.\"uidlevel1\" in
('ImspTQPwCqd') and ( ax.\"yearly\" in ('2022') ) and ax.\"year\" in (2022) group by ax.
\"dx\",ax.\"uidlevel1\"",
                "plan": {
                    "Node Type": "Aggregate",
```

```
                    "Strategy": "Sorted",
                    "Partial Mode": "Simple",
                    "Parallel Aware": false,
                    "Async Capable": false,
                    "Startup Cost": 20.21,
                    "Total Cost": 5602.98,
                    "Plan Rows": 260,
                    "Plan Width": 32,
                    "Actual Startup Time": 5.448,
                    "Actual Total Time": 5.449,
                    "Actual Rows": 1,
                    "Actual Loops": 1,
                    "Group Key": [
                        "dx",
                        "uidlevel1"
                    ],
                    "Plans": [
                        {
                            "Node Type": "Bitmap Heap Scan",
                            "Parent Relationship": "Outer",
                            "Parallel Aware": false,
                            "Async Capable": false,
                            "Relation Name": "analytics_2022",
                            "Alias": "ax",
                            "Startup Cost": 20.21,
                            "Total Cost": 5588.33,
                            "Plan Rows": 1520,
                            "Plan Width": 32,
                            "Actual Startup Time": 0.446,
                            "Actual Total Time": 5.003,
                            "Actual Rows": 1032,
                            "Actual Loops": 1,
                            "Recheck Cond": "(dx = 'h0xKKjijTdI'::bpchar)",
                            "Rows Removed by Index Recheck": 0,
                            "Filter": "((uidlevel1 = 'ImspTQPwCqd'::bpchar) AND (yearly =
'2022'::text) AND (year = 2022))",
                            "Rows Removed by Filter": 0,
                            "Exact Heap Blocks": 46,
                            "Lossy Heap Blocks": 0,
                            "Plans": [
                                {
                                    "Node Type": "Bitmap Index Scan",
                                    "Parent Relationship": "Outer",
                                    "Parallel Aware": false,
                                    "Async Capable": false,
                                    "Index Name": "in_dx_ao_ax_2022_MClNI",
                                    "Startup Cost": 0.0,
                                    "Total Cost": 19.83,
                                    "Plan Rows": 1520,
                                    "Plan Width": 0,
                                    "Actual Startup Time": 0.406,
                                    "Actual Total Time": 0.407,
                                    "Actual Rows": 1032,
                                    "Actual Loops": 1,
                                    "Index Cond": "(dx = 'h0xKKjijTdI'::bpchar)"
                                }
                            ]
                        }
                    ]
                }
            },
            {
                "timeInMillis": 38.35,
```

```
                "planningTime": 0.627,
                "executionTime": 37.723,
                "query": "select ax.\"dx\",ax.\"uidlevel1\", sum(value) as value from
analytics_2022 as ax where ax.\"dx\" in ('Jtf34kNZhzP') and ax.\"uidlevel1\" in ('ImspTQPwCqd')
and ( ax.\"yearly\" in ('2022') ) and ax.\"year\" in (2022) group by ax.\"dx\",ax.
\"uidlevel1\"",
                "plan": {
                    "Node Type": "Aggregate",
                    "Strategy": "Sorted",
                    "Partial Mode": "Simple",
                    "Parallel Aware": false,
                    "Async Capable": false,
                    "Startup Cost": 193.57,
                    "Total Cost": 47322.83,
                    "Plan Rows": 261,
                    "Plan Width": 32,
                    "Actual Startup Time": 37.685,
                    "Actual Total Time": 37.685,
                    "Actual Rows": 1,
                    "Actual Loops": 1,
                    "Group Key": [
                        "dx",
                        "uidlevel1"
                    ],
                    "Plans": [
                        {
                            "Node Type": "Bitmap Heap Scan",
                            "Parent Relationship": "Outer",
                            "Parallel Aware": false,
                            "Async Capable": false,
                            "Relation Name": "analytics_2022",
                            "Alias": "ax",
                            "Startup Cost": 193.57,
                            "Total Cost": 47191.38,
                            "Plan Rows": 17179,
                            "Plan Width": 32,
                            "Actual Startup Time": 1.981,
                            "Actual Total Time": 32.332,
                            "Actual Rows": 17462,
                            "Actual Loops": 1,
                            "Recheck Cond": "(dx = 'Jtf34kNZhzP'::bpchar)",
                            "Rows Removed by Index Recheck": 0,
                            "Filter": "((uidlevel1 = 'ImspTQPwCqd'::bpchar) AND (yearly =
'2022'::text) AND (year = 2022))",
                            "Rows Removed by Filter": 0,
                            "Exact Heap Blocks": 1165,
                            "Lossy Heap Blocks": 0,
                            "Plans": [
                                {
                                    "Node Type": "Bitmap Index Scan",
                                    "Parent Relationship": "Outer",
                                    "Parallel Aware": false,
                                    "Async Capable": false,
                                    "Index Name": "in_dx_ax_2022_Eb64F",
                                    "Startup Cost": 0.0,
                                    "Total Cost": 189.27,
                                    "Plan Rows": 17179,
                                    "Plan Width": 0,
                                    "Actual Startup Time": 1.765,
                                    "Actual Total Time": 1.765,
                                    "Actual Rows": 17462,
                                    "Actual Loops": 1,
                                    "Index Cond": "(dx = 'Jtf34kNZhzP'::bpchar)"
```

```
                                }
                            ]
                        }
                    ]
                }
            }
        ]
    },
    "width": 0,
    "rows": [],
    "height": 0,
    "headerWidth": 2
}
```

This response displays the execution plan that the PostgreSQL planner generates for the supplied statement.

The execution plan shows how the table(s) referenced by the statement will be scanned: by plain sequential scan, index scan,and if multiple tables are referenced, what joins will be used to bring together the required rows from each input table.

The most critical part of the display is the estimated statement execution cost, which is the query planner's estimate at how long it will take to run the statement.

All entry points are secured by authorization. The `F_PERFORM_ANALYTICS_EXPLAIN` role is required.

Analytics explain

```
/api/analytics/explain
```

Event analytics explain

```
/api/analytics/event/aggregate/{program}/explain

/api/analytics/event/query/{program}/explain
```

Enrollment analytics explain

```
/api/analytics/enrollment/query/{program}/explain
```

Outliers analytics explain

```
/api/analytics/outlierDetection/explain
```

Maintenance

Resource and analytics tables

DHIS2 features a set of generated database tables which are used as a basis for various system functionality. These tables can be executed immediately or scheduled to be executed at regular intervals through the user interface. They can also be generated through the Web API as explained in this section. This task is typically one for a system administrator and not consuming clients.

The resource tables are used internally by the DHIS2 application for various analysis functions. These tables are also valuable for users writing advanced SQL reports. They can be generated with a POST or PUT request to the following URL:

```
/api/33/resourceTables
```

The analytics tables are optimized for data aggregation and used currently in DHIS2 for the pivot table module. The analytics tables can be generated with a POST or PUT request to:

```
/api/33/resourceTables/analytics
```

Analytics tables optional query parameters

Query parameter	Options	Description
skipResourceTables	false | true	Skip generation of resource tables
skipAggregate	false | true	Skip generation of aggregate data and completeness data
skipEvents	false | true	Skip generation of event data
skipEnrollment	false | true	Skip generation of enrollment data
skipOrgUnitOwnership	false | true	Skip generation of organization unit ownership data
lastYears	integer	Number of last years of data to include

> **Note**
>
> lastYears=0 means latest or continuous analytics, as defined in Continuous analytics table.

"Data Quality" and "Data Surveillance" can be run through the monitoring task, triggered with the following endpoint:

```
/api/33/resourceTables/monitoring
```

This task will analyse your validation rules, find any violations and persist them as validation results.

These requests will return immediately and initiate a server-side process.

Maintenance

To perform maintenance you can interact with the *maintenance* resource. You should use *POST* or *PUT* as a method for requests. The following methods are available.

Analytics tables clear will drop all analytics tables.

```
POST PUT /api/maintenance/analyticsTablesClear
```

Analytics table analyze will collects statistics about the contents of analytics tables in the database.

```
POST PUT /api/maintenance/analyticsTablesAnalyze
```

Expired invitations clear will remove all user account invitations which have expired.

```
POST PUT /api/maintenance/expiredInvitationsClear
```

Period pruning will remove periods which are not linked to any data values.

```
POST PUT /api/maintenance/periodPruning
```

Zero data value removal will delete zero data values linked to data elements where zero data is defined as not significant:

```
POST PUT /api/maintenance/zeroDataValueRemoval
```

Soft deleted data value removal will permanently delete soft deleted data values.

```
POST PUT /api/maintenance/softDeletedDataValueRemoval
```

Soft deleted program stage instance removal will permanently delete soft deleted events.

```
POST PUT /api/maintenance/softDeletedProgramStageInstanceRemoval
```

Soft deleted program instance removal will permanently delete soft deleted enrollments.

```
POST PUT /api/maintenance/softDeletedProgramInstanceRemoval
```

Soft deleted tracked entity instance removal will permanently delete soft deleted tracked entity instances.

```
POST PUT /api/maintenance/softDeletedTrackedEntityInstanceRemoval
```

Drop SQL views will drop all SQL views in the database. Note that it will not delete the DHIS2 SQL view entities.

```
POST PUT /api/maintenance/sqlViewsDrop
```

Create SQL views will recreate all SQL views in the database.

```
POST PUT /api/maintenance/sqlViewsCreate
```

Category option combo update will remove obsolete and generate missing category option combos for all category combinations.

```
POST PUT /api/maintenance/categoryOptionComboUpdate
```

It is also possible to update category option combos for a single category combo using the following endpoint.

```
POST PUT /api/maintenance/categoryOptionComboUpdate/categoryCombo/<category-combo-uid>
```

Cache clearing will clear the application Hibernate cache and the analytics partition caches.

```
POST PUT /api/maintenance/cacheClear
```

Org unit paths update will re-generate the organisation unit path property. This can be useful e.g. if you imported org units with SQL.

```
POST PUT /api/maintenance/ouPathsUpdate
```

Data pruning will remove complete data set registrations, data approvals, data value audits and data values, in this case for an organisation unit.

```
POST PUT /api/maintenance/dataPruning/organisationUnits/<org-unit-id>
```

Data pruning for data elements, which will remove data value audits and data values.

```
POST PUT /api/maintenance/dataPruning/dataElement/<data-element-uid>
```

Metadata validation will apply all metadata validation rules and return the result of the operation.

```
POST PUT /api/metadataValidation
```

App reload will refresh the DHIS2 managed cache of installed apps by reading from the file system.

```
POST PUT /api/appReload
```

Maintenance operations are supported in a batch style with a POST request to the api/maintenance resource where the operations are supplied as query parameters:

```
POST PUT /api/maintenance?analyticsTablesClear=true&expiredInvitationsClear=true
  &periodPruning=true&zeroDataValueRemoval=true&sqlViewsDrop=true&sqlViewsCreate=true
  &categoryOptionComboUpdate=true&cacheClear=true&ouPathsUpdate=true
```

System info

The system resource provides you with convenient information and functions. The system resource can be found at */api/system*.

Generate identifiers

To generate valid, random DHIS2 identifiers you can do a GET request to this resource:

```
/api/33/system/id?limit=3
```

The *limit* query parameter is optional and indicates how many identifiers you want to be returned with the response. The default is to return one identifier. The response will contain a JSON object with an array named codes, similar to this:

```
{
  "codes": [
    "Y0moqFplrX4",
    "WI0VHXuWQuV",
    "BRJNBBpu4ki"
  ]
}
```

The DHIS2 UID format has these requirements:

- 11 characters long.
- Alphanumeric characters only, ie. alphabetic or numeric characters (A-Za-z0-9).
- Start with an alphabetic character (A-Za-z).

View system information

To get information about the current system you can do a GET request to this URL:

```
/api/33/system/info
```

JSON and JSONP response formats are supported. The system info response currently includes the below properties.

```
{
  "contextPath": "http://yourdomain.com",
  "userAgent": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 Chrome/29.0.1547.62",
  "calendar": "iso8601",
  "dateFormat": "yyyy-mm-dd",
  "serverDate": "2021-01-05T09:16:03.548",
  "serverTimeZoneId": "Etc/UTC",
```

```
  "serverTimeZoneDisplayName": "Coordinated Universal Time",
  "version": "2.13-SNAPSHOT",
  "revision": "11852",
  "buildTime": "2013-09-01T21:36:21.000+0000",
  "serverDate": "2013-09-02T12:35:54.311+0000",
  "environmentVariable": "DHIS2_HOME",
  "javaVersion": "1.7.0_06",
  "javaVendor": "Oracle Corporation",
  "javaIoTmpDir": "/tmp",
  "javaOpts": "-Xms600m -Xmx1500m -XX:PermSize=400m -XX:MaxPermSize=500m",
  "osName": "Linux",
  "osArchitecture": "amd64",
  "osVersion": "3.2.0-52-generic",
  "externalDirectory": "/home/dhis/config/dhis2",
  "databaseInfo": {
    "type": "PostgreSQL",
    "name": "dhis2",
    "user": "dhis",
    "spatialSupport": false
  },
  "memoryInfo": "Mem Total in JVM: 848 Free in JVM: 581 Max Limit: 1333",
  "cpuCores": 8
}
```


> **Note**
>
> If the user requesting this resource does not have full authority then only properties which are not considered sensitive will be included.

To get information about the system context only, i.e. `contextPath` and `userAgent`, you can make a GET request to the below URL. JSON and JSONP response formats are supported:

```
/api/33/system/context
```

Check if username and password combination is correct

To check if some user credentials (a username and password combination) is correct you can make a *GET* request to the following resource using *basic authentication*:

```
/api/33/system/ping
```

You can detect the outcome of the authentication by inspecting the *HTTP status code* of the response header. The meanings of the possible status codes are listed below. Note that this applies to Web API requests in general.

HTTP Status codes

HTTP Status code	Description	Outcome
200	OK	Authentication was successful
302	Found	No credentials were supplied with the request - no authentication took place

HTTP Status code	Description	Outcome
401	Unauthorized	The username and password combination was incorrect - authentication failed

View asynchronous task status

Tasks which often take a long time to complete can be performed asynchronously. After initiating an async task you can poll the status through the `system/tasks` resource by supplying the task category and the task identifier of interest.

When polling for the task status you need to authenticate as the same user which initiated the task. The following task categories are supported:

Task categories

Identifier	Description
ANALYTICS_TABLE	Generation of the analytics tables.
RESOURCE_TABLE	Generation of the resource tables.
MONITORING	Processing of data surveillance/monitoring validation rules.
DATAVALUE_IMPORT	Import of data values.
EVENT_IMPORT	Import of events.
ENROLLMENT_IMPORT	Import of enrollments.
TEI_IMPORT	Import of tracked entity instances.
METADATA_IMPORT	Import of metadata.
DATA_INTEGRITY	Processing of data integrity checks.

Each asynchronous task is automatically assigned an identifier which can be used to monitor the status of the task. This task identifier is returned by the API when you initiate an async task through the various async-enabled endpoints.

Monitoring a task

You can poll the task status through a GET request to the system tasks resource like this:

```
/api/33/system/tasks/{task-category-id}/{task-id}
```

An example request may look like this:

```
/api/33/system/tasks/DATAVALUE_IMPORT/j8Ki6TgreFw
```

The response will provide information about the status, such as the notification level, category, time and status. The *completed* property indicates whether the process is considered to be complete.

```
[{
  "uid": "hpiaeMy7wFX",
  "level": "INFO",
  "category": "DATAVALUE_IMPORT",
```

```
  "time": "2015-09-02T07:43:14.595+0000",
  "message": "Import done",
  "completed": true
}]
```

Monitoring all tasks for a category

You can poll all tasks for a specific category through a GET request to the system tasks resource:

```
/api/33/system/tasks/{task-category-id}
```

An example request to poll for the status of data value import tasks looks like this:

```
/api/33/system/tasks/DATAVALUE_IMPORT
```

Monitor all tasks

You can request a list of all currently running tasks in the system with a GET request to the system tasks resource:

```
/api/33/system/tasks
```

The response will look similar to this:

```
[{
  "EVENT_IMPORT": {},
  "DATA_STATISTICS": {},
  "RESOURCE_TABLE": {},
  "FILE_RESOURCE_CLEANUP": {},
  "METADATA_IMPORT": {},
  "CREDENTIALS_EXPIRY_ALERT": {},
  "SMS_SEND": {},
  "MOCK": {},
  "ANALYTICSTABLE_UPDATE": {},
  "COMPLETE_DATA_SET_REGISTRATION_IMPORT": {},
  "DATAVALUE_IMPORT": {},
  "DATA_SET_NOTIFICATION": {},
  "DATA_INTEGRITY": {
    "OB1qGRlCzap": [{
      "uid": "LdHQK0PXZyF",
      "level": "INFO",
      "category": "DATA_INTEGRITY",
      "time": "2018-03-26T15:02:32.171",
      "message": "Data integrity checks completed in 38.31 seconds.",
      "completed": true
    }]
  },
  "PUSH_ANALYSIS": {},
  "MONITORING": {},
  "VALIDATION_RESULTS_NOTIFICATION": {},
  "REMOVE_EXPIRED_RESERVED_VALUES": {},
  "DATA_SYNC": {},
  "SEND_SCHEDULED_MESSAGE": {},
  "DATAVALUE_IMPORT_INTERNAL": {},
  "PROGRAM_NOTIFICATIONS": {},
```

```
  "META_DATA_SYNC": {},
  "ANALYTICS_TABLE": {},
  "PREDICTOR": {}
}]
```

View asynchronous task summaries

The task summaries resource allows you to retrieve a summary of an asynchronous task invocation. You need to specify the category and optionally the identifier of the task. The task identifier can be retrieved from the response of the API request which initiated the asynchronous task.

To retrieve the summary of a specific task you can issue a request to:

```
/api/33/system/taskSummaries/{task-category-id}/{task-id}
```

An example request might look like this:

```
/api/33/system/taskSummaries/DATAVALUE_IMPORT/k72jHfF13J1
```

The response will look similar to this:

```
{
  "responseType": "ImportSummary",
  "status": "SUCCESS",
  "importOptions": {
    "idSchemes": {},
    "dryRun": false,
    "async": true,
    "importStrategy": "CREATE_AND_UPDATE",
    "reportMode": "FULL",
    "skipExistingCheck": false,
    "sharing": false,
    "skipNotifications": false,
    "datasetAllowsPeriods": false,
    "strictPeriods": false,
    "strictCategoryOptionCombos": false,
    "strictAttributeOptionCombos": false,
    "strictOrganisationUnits": false,
    "requireCategoryOptionCombo": false,
    "requireAttributeOptionCombo": false,
    "skipPatternValidation": false
  },
  "description": "Import process completed successfully",
  "importCount": {
    "imported": 0,
    "updated": 431,
    "ignored": 0,
    "deleted": 0
  },
  "dataSetComplete": "false"
}
```

You might also retrieve import summaries for multiple tasks of a specific category with a request like this:

```
/api/33/system/taskSummaries/{task-category-id}
```

Get appearance information

You can retrieve the available flag icons in JSON format with a GET request:

```
/api/33/system/flags
```

You can retrieve the available UI styles in JSON format with a GET request:

```
/api/33/system/styles
```

Trigram Index Summary

Trigram indexes can be created using Tracker Search Optimization jobs. It is useful to know which tracked entity attributes are indexed and which ones are not. The following API can be used to get a summary of the trigram index status. The API supports field selection and filtering using the field query parameter.

The attributes corresponding to the property "indexedAttributes" are currently indexed in the system. The attributes corresponding to the property "indexableAttributes" are not indexed currently but are candidates for creating indexes if required. The attributes corresponding to the property "obsoleteIndexedAttributes" are indexed in the system, but those indexes are obsolete due to changes in the attribute configuration which do not qualify them as indexable anymore.

```
GET /api/39/trigramSummary
```

A sample JSON response looks like this:

```
{
    "indexedAttributes": [{
        "displayName": "First name",
        "id": "w75KJ2mc4zz"
    }, {
        "displayName": "Last name",
        "id": "zDhUuAYrxNC"
    }],
    "indexableAttributes": [{
        "displayName": "Phone number",
        "id": "P2cwLGskgxn"
    }],
    "obsoleteIndexedAttributes": [{
        "displayName": "TB identifier",
        "id": "xs8A6tQJY0s"
    }, {
        "displayName": "Provider ID",
        "id": "DODgdr5Oo2v"
    }]
}
```

Cluster info

When DHIS 2 is set up in a cluster configuration, it is useful to know which node in the cluster acts as the leader of the cluster. The following API can be used to get the details of the leader node instance. The API supports both JSON and XML formats.

```
GET /api/36/cluster/leader
```

A sample JSON response looks like this:

```
{
  "leaderNodeId": "play-dhis2-org-dev",
  "leaderNodeUuid": "d386e46b-26d4-4937-915c-025eb99c8cad",
  "currentNodeId": "play-dhis2-org-dev",
  "currentNodeUuid": "d386e46b-26d4-4937-915c-025eb99c8cad",
  "leader": true
}
```

Min-max data elements

The min-max data elements resource allows you to set minimum and maximum value ranges for data elements. It is unique by the combination of organisation unit, data element and category option combo.

```
/api/minMaxDataElements
```

Min-max data element data structure

Item	Description	Data type
source	Organisation unit identifier	String
dataElement	Data element identifier	String
optionCombo	Data element category option combo identifier	String
min	Minimum value	Integer
max	Maximum value	Integer
generated	Indicates whether this object is generated by the system (and not set manually).	Boolean

You can retrieve a list of all min-max data elements from the following resource:

```
GET /api/minMaxDataElements.json
```

You can filter the response like this:

```
GET /api/minMaxDataElements.json?filter=dataElement.id:eq:UOlfIjgN8X6

GET /api/minMaxDataElements.json?filter=dataElement.id:in:[UOlfIjgN8X6,xc8gmAKfO95]
```

The filter parameter for min-max data elements supports two operators: eq and in. You can also use the `fields` query parameter.

```
GET /api/minMaxDataElements.json?fields=:all,dataElement[id,name]
```

Add/update min-max data element

To add a new min-max data element, use POST request to:

```
POST /api/minMaxDataElements.json
```

The JSON content format looks like this:

```
{
  "min": 1,
  "generated": false,
  "max": 100,
  "dataElement": {
    "id": "UOlfIjgN8X6"
   },
  "source": {
    "id": "DiszpKrYNg8"
  },
  "optionCombo": {
    "id": "psbwp3CQEhs"
  }
}
```

If the combination of data element, organisation unit and category option combo exists, the min-max value will be updated.

Delete min-max data element

To delete a min-max data element, send a request with DELETE method:

```
DELETE /api/minMaxDataElements.json
```

The JSON content is in similar format as above:

```
{
  "min": 1,
  "generated": false,
  "max": 100,
  "dataElement": {
    "id": "UOlfIjgN8X6"
   },
  "source": {
    "id": "DiszpKrYNg8"
  },
  "optionCombo": {
    "id": "psbwp3CQEhs"
  }
}
```

Lock exceptions

The lock exceptions resource allows you to open otherwise locked data sets for data entry for a specific data set, period and organisation unit. You can read lock exceptions from the following resource:

```
/api/lockExceptions
```

To create a new lock exception you can use a POST request and specify the data set, period and organisation unit:

```
POST /api/lockExceptions?ds=BfMAe6Itzgt&pe=201709&ou=DiszpKrYNg8
```

To delete a lock exception you can use a similar request syntax with a DELETE request:

```
DELETE /api/lockExceptions?ds=BfMAe6Itzgt&pe=201709&ou=DiszpKrYNg8
```

Data exchange

Aggregate data exchange

This section describes the aggregate data exchange service and API.

Introduction

The aggregate data exchange service offers the ability to exchange data between instances of DHIS 2, and possibly other software which supports the DHIS 2 data value set JSON format. It also allows for data exchange within a single instance of DHIS 2, for instance for aggregation of tracker data and saving the result as aggregate data.

The aggregate data exchange service is suitable for use-cases such as:

- Data exchange between an HMIS instance to a data portal or data warehouse instance of DHIS 2.
- Data exchange between a DHIS 2 tracker instance with individual data to an aggregate HMIS instance.
- Precomputation of tracker data with program indicators saved as aggregate data values.
- Data reporting from a national HMIS to a global donor.

Overview

The aggregate data exchange service allows for data exchange between a *source* instance of DHIS 2 and a *target* instance of DHIS 2. A data exchange can be *external*, for which the target instance is different/external to the source instance. A data exchange can also be *internal*, for which the target instance is the same as the source instance. The aggregate data exchange source can contain multiple source requests, where a source request roughly corresponds to an analytics API request.

The data value will be retrieved and transformed into the *data value set* format, and then pushed to the target instance of DHIS 2. The aggregate data exchange service supports *identifier schemes* to allow for flexibility in mapping metadata between instances.

Data will be retrieved and aggregated from the source instance using the analytics engine. This implies that data elements, aggregate indicators, data set reporting rates and program indicators can be referenced in the request to the source instance. A source request also contains periods, where both fixed and relative periods are supported, and organisation units. Any number of *filters* can be applied to a source request.

A data exchange can be run as a scheduled job, where the data exchange can be set to run at a specific interval. A data exchange can also be run on demand through the API.

To create and manipulate aggregate data exchanges, the `F_AGGREGATE_DATA_EXCHANGE_PUBLIC_ADD` / `F_AGGREGATE_DATA_EXCHANGE_PRIVATE_ADD` and `F_AGGREGATE_DATA_EXCHANGE_DELETE` authorities are required.

The aggregate data exchange definitions are regular metadata in DHIS 2, meaning that the definitions can be imported and exported between instances of DHIS 2. The exception is credentials (usernames and access tokens) which will not be exposed in metadata exports. Credentials are encrypted in storage to provide an additional layer of security.

The aggregate data exchange service was introduced in version 2.39, which means that the source instance of DHIS 2 must be version 2.39 or later. The target instance of DHIS 2 must be version 2.38 or later.

Authentication

For data exchanges of type external, the base URL and authentication credentials for the target DHIS 2 instance must be specified. For authentication, basic authentication and personal access tokens (PAT) are supported.

It is recommended to either specify basic authentication or PAT authentication. If both are specified, PAT authentication takes precedence.

Note that PAT support was introduced in version 2.38.1, which means that in order to use PAT authentication, the target DHIS 2 instance must be version 2.38.1 or later.

API

The aggregate data exchange API is covered in the following section.

Create aggregate data exchange

```
POST /api/aggregateDataExchanges
```

```
Content-Type: application/json
```

Example internal data exchange payload, where event data is computed with program indicators and saved as aggregate data values:

```
{
  "name": "Internal data exchange",
  "source": {
    "params": {
      "periodTypes": [
        "MONTHLY",
        "QUARTERLY"
      ]
    },
    "requests": [
      {
        "name": "ANC",
        "visualization": null,
        "dx": [
          "fbfJHSPpUQD",
          "cYeuwXTCPkU",
          "Jtf34kNZhzP"
        ],
        "pe": [
          "LAST_12_MONTHS",
          "202201"
        ],
        "ou": [
          "ImspTQPwCqd"
        ],
        "filters": [
          {
            "dimension": "Bpx0589u8y0",
            "items": [
              "oRVt7g429ZO",
              "MAs88nJc9nL"
            ]
          }
```

```
        ],
        "inputIdScheme": "UID",
        "outputDataElementIdScheme": "UID",
        "outputOrgUnitIdScheme": "UID",
        "outputIdScheme": "UID"
      }
    ]
  },
  "target": {
    "type": "INTERNAL",
    "request": {
      "dataElementIdScheme": "UID",
      "orgUnitIdScheme": "UID",
      "categoryOptionComboIdScheme": "UID",
      "idScheme": "UID"
    }
  }
}
```

Example external data exchange payload with basic authentication and ID scheme *code*, where data is pushed to an external DHIS 2 instance:

```
{
  "name": "External data exchange with basic authentication",
  "source": {
    "requests": [
      {
        "name": "ANC",
        "visualization": null,
        "dx": [
          "fbfJHSPpUQD",
          "cYeuwXTCPkU",
          "Jtf34kNZhzP"
        ],
        "pe": [
          "LAST_12_MONTHS",
          "202201"
        ],
        "ou": [
          "ImspTQPwCqd"
        ],
        "inputIdScheme": "UID",
        "outputIdScheme": "CODE"
      }
    ]
  },
  "target": {
    "type": "EXTERNAL",
    "api": {
        "url": "https://play.dhis2.org/2.38.2.1",
        "username": "admin",
        "password": "district"
    },
    "request": {
      "idScheme": "CODE"
    }
  }
}
```

Example external data exchange payload with PAT authentication and ID scheme *code*, where data is pushed to an external DHIS 2 instance:

```
{
  "name": "External data exchange with PAT authentication",
  "source": {
    "requests": [
      {
        "name": "ANC",
        "dx": [
          "fbfJHSPpUQD",
          "cYeuwXTCPkU",
          "Jtf34kNZhzP"
        ],
        "pe": [
          "LAST_12_MONTHS",
          "202201"
        ],
        "ou": [
          "ImspTQPwCqd"
        ],
        "inputIdScheme": "UID",
        "outputIdScheme": "CODE"
      }
    ]
  },
  "target": {
    "type": "EXTERNAL",
    "api": {
        "url": "https://play.dhis2.org/2.38.2.1",
        "accessToken": "d2pat_XIrqgAGjW935LLPuSP2hXSZwpTxTW2pg3580716988"
    },
    "request": {
      "idScheme": "CODE"
    }
  }
}
```

The syntax for the source requests follow the analytics endpoint API syntax. This means that for the `dx` part, data elements, indicators, data set reporting rates, program data elements and program indicators are supported. Note that for program data elements, the data element must be prefixed with the program identifier. For the `pe` part, relative periods as well as fixed periods are supported. For the `ou` part, user org units, org unit levels and org unit groups as well as individual org units are supported. Consult the *Analytics* chapter > the *Dimensions and items* and *The dx dimension* sections for a full explanation.

Response

```
201 Created
```

```
{
  "httpStatus": "Created",
  "httpStatusCode": 201,
  "status": "OK",
  "response": {
    "responseType": "ObjectReport",
    "uid": "pG4bBTMiCqO",
```

```
    "klass": "org.hisp.dhis.dataexchange.aggregate.AggregateDataExchange",
    "errorReports": []
  }
}
```

Update aggregate data exchange

```
PUT /api/aggregateDataExchanges/{id}
```

```
Content-Type: application/json
```

The request payload is identical to the create operation.

Response

```
200 OK
```

```
{
  "httpStatus": "OK",
  "httpStatusCode": 200,
  "status": "OK",
  "response": {
    "responseType": "ObjectReport",
    "uid": "pG4bBTMiCqO",
    "klass": "org.hisp.dhis.dataexchange.aggregate.AggregateDataExchange",
    "errorReports": []
  }
}
```

Get aggregate data exchange

```
GET /api/aggregateDataExchanges/{id}
```

```
Accept: application/json
```

The retrieval endpoints follow the regular metadata endpoint field filtering and object filtering semantics. JSON is the only supported response format.

Response

```
200 OK
```

Delete aggregate data exchange

```
DELETE /api/aggregateDataExchanges/{id}
```

Response

```
204 No Content
```

```
{
  "httpStatus": "OK",
  "httpStatusCode": 200,
  "status": "OK",
  "response": {
    "responseType": "ObjectReport",
    "uid": "pG4bBTMiCqO",
    "klass": "org.hisp.dhis.dataexchange.aggregate.AggregateDataExchange",
    "errorReports": []
  }
}
```

Run aggregate data exchange

An aggregate data exchange can be run directly with a POST request to the following endpoint:

```
POST /api/aggregateDataExchanges/{id}/exchange
```

Response

```
200 OK
```

```
{
  "responseType": "ImportSummaries",
  "status": "SUCCESS",
  "imported": 36,
  "updated": 0,
  "deleted": 0,
  "ignored": 0,
  "importSummaries": ["<import summaries here>"]
}
```

An import summary describing the outcome of the data exchange will be returned, including the number of data values which were imported, updated, deleted and ignored.

Get source data

The aggregate data for the source request of an aggregated data exchange can be retrieved in the analytics data format with a GET request to the following endpoint:

```
GET /api/aggregateDataExchanges/{id}/sourceData
```

```
Accept: application/json
```

Response

```
200 OK
```

Query parameters

Query parameter	Required	Description	Options
outputIdScheme	No	Override the output identifier scheme for the data response.	UID | CODE | ATTRIBUTE:{ID}

The response payload format is identical with the analytics API endpoint. This endpoint is useful for debugging purposes. Consult the analytics API guide for additional details.

Get source data value sets

The aggregate data for the source request of an aggregated data exchange can be retrieved in the data value set format with a GET request to the following endpoint:

```
GET /api/aggregateDataExchanges/{id}/sourceDataValueSets
```

```
Accept: application/json
```

Response

```
200 OK
```

Query parameters

Query parameter	Required	Description	Options
outputIdScheme	No	Override the output identifier scheme for the data response.	UID | CODE | ATTRIBUTE:{ID}

The response payload format is identical with the data value sets API endpoint. This endpoint is useful for debugging purposes. Consult the data value sets API guide for additional details.

Data model

The aggregate data exchange data model / payload is described in the following section.

Field	Data type	Mandatory	Description
name	String	Yes	Name of aggregate data exchange. Unique.
source	Object	Yes	Source for aggregate data exchange.
source.params	Object	No	Parameters for source request.

Field	Data type	Mandatory	Description
source.params.periodTypes	Array/String	No	Allowed period types for overriding periods in source request.
source.requests	Array/Object	Yes	Source requests.
source.requests.name	String	Yes	Name of source request.
source.requests.visualization	String	No	Identifier of associated visualization object.
source.requests.dx	Array/String	Yes	Identifiers of data elements, indicators, data sets and program indicators for the source request.
source.requests.pe	Array/String	Yes	Identifiers of fixed and relative periods for the source request.
source.requests.ou	Array/String	Yes	Identifiers of organisation units for the source request.
source.requests.filters	Array (Object)	No	Filters for the source request.
source.requests.filters.dimension	String	No	Dimension identifier for the filter.
source.requests.filters.items	Array/String	No	Item identifiers for the filter.
source.requests.inputIdScheme	String	No	Input ID scheme, can be `UID`, `CODE`, `ATTRIBUTE:{ID}`.
source.requests.outputDataElementIdScheme	String	No	Output data element ID scheme, can be `UID`, `CODE`, `ATTRIBUTE:{ID}`.
source.requests.outputOrgUnitIdScheme	String	No	Output org unit ID scheme, can be `UID`, `CODE`, `ATTRIBUTE:{ID}`.
source.requests.outputIdScheme	String	No	Output general ID scheme, can be `UID`, `CODE`, `ATTRIBUTE:{ID}`.
source.target	Object	Yes	Target for aggregate data exchange.
source.target.type	String	Yes	Type of target, can be `EXTERNAL`, `INTERNAL`.
source.target.api	Object	Conditional	Target API information, only mandatory for type `EXTERNAL`.

Field	Data type	Mandatory	Description
source.target.api.url	String	Conditional	Base URL of target DHIS 2 instance, do not include the `/api` part.
source.target.api.accessToken	String	Conditional	Access token (PAT) for target DHIS 2 instance, used for PAT authentication.
source.target.api.username	String	Conditional	Username for target DHIS 2 instance, used for basic authentication.
source.target.api.password	String	Conditional	Password for target DHIS 2 instance, used for basic authentication.
source.target.request	Object	No	Target request information.
source.target.request.dataElementIdScheme	String	No	Input data element ID scheme, can be `UID`, `CODE`, `ATTRIBUTE:{ID}`.
source.target.request.orgUnitIdScheme	String	No	Input org unit ID scheme, can be `UID`, `CODE`, `ATTRIBUTE:{ID}`.
source.target.request.categoryOptionComboIdScheme	String	No	Input category option combo ID scheme, can be `UID`, `CODE`, `ATTRIBUTE:{ID}`.
source.target.request.idScheme	String	No	Input general ID scheme, can be `UID`, `CODE`, `ATTRIBUTE:{ID}`.

Error handling

When running a data exchange by identifier, information about the outcome of the operation will be available in the response payload. The response will contain a list of import summaries, i.e. one import summary per source request. The import summary will indicate any potential conflicts as a result of data retrieval from the source instance and data import in the target instance.

Examples

External data exchange with identifier scheme code

This example will demonstrate how to exchange data based on program indicators in the source DHIS 2 instance and data elements in the target instance. The `code` identifier scheme, which means the data exchange will use the `code` property on the metadata to reference the data. Using codes is useful when the ID properties don't match across DHIS 2 instances. The example will demonstrate how data can be aggregated in the source instance, including aggregation in time and the unit hierarchy, before being exchanged with the target instance.

The example will exchange data using the DHIS 2 play environment, and refer to the 2.39 version at `https://play.dhis2.org/2.39` as the *source instance*, and the 2.38 version at `https://play.dhis2.org/2.38.2.1` as the *target instance*. Note that the URLs will change over time as new patch versions are released, so make sure to update the target URLs.

- Log in to the **source** instance, navigate to the Maintenance app and observe that three program indicators exist.
- *BCG doses* with code `BCG_DOSE`
- *Measles doses* with code `MEASLES_DOSE`
- *Yellow fever doses* with code `YELLOW_FEVER_DOSE`
- Observe that the root org unit is `Sierra Leone` with code `OU_525`.
- Log in to the **target** instance and navigate to the *Maintenance* app. Create three data elements, where the codes match the previously mentioned program indicators:
- Name *BCG doses* and code `BCG_DOSE`
- Name *Measles doses* and code `MEASLES_DOSE`
- Name *Yellow fever doses* with code `YELLOW_FEVER_DOSE`
- In the **target** instance, create a new data set with any name, e.g. *Data exchange*, select the tree newly created data elements, and assign the data set to the root org unit *Sierra Leone*.
- Observe that the root org unit `Sierra Leone` has the code `OU_525`, which is equal to the source instance.
- Open an HTTP tool such as *Postman* and put together the following aggregate data exchange payload in JSON.

```
POST /api/aggregateDataExchanges
```

```
Content-Type: application/json
```

```
{
  "name": "Immunization doses program indicators to data elements",
  "source": {
    "requests": [
      {
        "name": "Immunization doses",
        "dx": [
          "BCG_DOSE",
          "MEASLES_DOSE",
          "YELLOW_FEVER_DOSE"
        ],
        "pe": [
          "202201"
        ],
        "ou": [
          "OU_525"
        ],
        "inputIdScheme": "code",
        "outputIdScheme": "code"
      }
```

```
    ]
  },
  "target": {
    "type": "EXTERNAL",
    "api": {
      "url": "https://play.dhis2.org/2.38.2.1",
      "username": "admin",
      "password": "district"
    },
    "request": {
      "idScheme": "code"
    }
  }
}
```

- In this payload, observe that for the source request, program indicators are referred to using codes. The `inputIdScheme` is set to `code`, which means that the DHIS 2 analytics engine will use the `code` property to reference metadata, such as program indicators. The `outputIdScheme` is set to `code`, which means that the `code` property will be used to reference metadata in the output. For the target request, the `idScheme` is also set to `code`, which means that the `code` property will be used to reference metadata during the data value import. Note that ID schemes can be specified per entity type, such as `dataElementIdScheme` and `orgUnitIdScheme`.
- Note that the period is `202201` or *January 2022*. Note that the period might have to be updated over time.
- Run the POST request to create the aggregate data exchange definition. Confirm that the API response status code is 201. Note that the name of the data exchange is unique. Take a note of the ID of the newly created object by looking at `response` > `uid` in the response body.
- Run the newly created data exchange with a POST request (replace `{id}` with the ID of the data exchange):

```
POST /api/aggregateDataExchanges/{id}/exchange
```

- Confirm that the API response indicates that three data values were successfully imported.

```
{
  "responseType": "ImportSummaries",
  "status": "SUCCESS",
  "imported": 3,
  "updated": 0,
  "deleted": 0,
  "ignored": 0
}
```

- In the **target** instance, navigate to the *Data entry* app, select org unit *Sierra Leone*, data set *Data exchange* and period *January 2022*. Observe that the exchanged data values are visible in the form.

To summarize, in this example, event data records were aggregated from the facility level to the national level in the org unit hierarchy and from event data to monthly data values using program indicators. The data values were exchanged with a target DHIS 2 instance by using the `code` property to reference metadata.

I18n

Locales

DHIS2 supports translations both for the user interface and for database content.

UI locales

You can retrieve the available locales for the user interface through the following resource with a GET request. XML and JSON resource representations are supported.

```
/api/33/locales/ui
```

Database content locales

You can retrieve and create locales for the database content with GET and POST requests through the `dbLocales` resource. XML and JSON resource representations are supported. To POST data, there are two required parameters: `country` and `language`.

```
/api/locales/dbLocales?country=US&language=en
```

Translations

DHIS2 allows for translations of database content. If a metadata is translatable, then it will have a `translations` property.

That means you can retrieve and update translations using metadata class resources such as `api/dataElements`, `api/organisationUnits`, `api/dataSets`, etc.

Get translations

You can get translations for a metadata object such as DataElement by sending a GET request to `api/dataElements/{dataElementUID}`

The response contains full details of the DataElement which also includes the `translations` property as below

```
{
  "id": "fbfJHSPpUQD",
  "href": "https://play.dhis2.org/dev/api/29/dataElements/fbfJHSPpUQD",
  "created": "2010-02-05T10:58:43.646",
  "name": "ANC 1st visit",
  "shortName": "ANC 1st visit",
  "translations":
  [
    {
      "property": "SHORT_NAME",
      "locale": "en_GB",
      "value": "ANC 1st visit"
    },
    {
      "property": "NAME",
      "locale": "fr",
      "value": "Soin prénatal 1"
    },
    {
      "property": "NAME",
```

```
      "locale": "en_GB",
      "value": "ANC 1st visit"
    }
  ]
}
```

You can also get only the `translations` property of an object by sending a GET request to `api/dataElements/{dataElementUID}/translations`

```
{
  "translations":
  [
    {
      "property": "SHORT_NAME",
      "locale": "en_GB",
      "value": "ANC 1st visit"
    },
    {
      "property": "NAME",
      "locale": "fr",
      "value": "Soin prénatal 1"
    },
    {
      "property": "NAME",
      "locale": "en_GB",
      "value": "ANC 1st visit"
    }
  ]
}
```

Create/Update translations

You can create translations by sending a PUT request with same JSON format to `api/dataElements/{dataElementUID}/translations`

```
{
  "translations":
  [
    {
      "property": "SHORT_NAME",
      "locale": "en_GB",
      "value": "ANC 1st visit"
    },
    {
      "property": "NAME",
      "locale": "fr",
      "value": "Soin prénatal 1"
    },
    {
      "property": "DESCRIPTION",
      "locale": "fr",
      "value": "description in french"
    },
    {
      "property": "FORM_NAME",
      "locale": "fr",
      "value": "name in french"
    }
```

```
  ]
}
```

Alternatively, you can also just update the object with payload including the `translations` property.

Send PUT request to `api/dataElements/{dataElementUID}` with full object payload as below:

```
{
  "id": "fbfJHSPpUQD",
  "created": "2010-02-05T10:58:43.646",
  "name": "ANC 1st visit",
  "shortName": "ANC 1st visit",
  "translations":
  [
    {
      "property": "SHORT_NAME",
      "locale": "en_GB",
      "value": "ANC 1st visit"
    },
    {
      "property": "NAME",
      "locale": "fr",
      "value": "Soin prénatal 1"
    },
    {
      "property": "NAME",
      "locale": "en_GB",
      "value": "ANC 1st visit"
    }
  ]
}
```

The status code will be `204 No Content` if the data value was successfully saved or updated, or `409 Conflict` if there was a validation error (e.g. more than one `SHORT_NAME` for the same `locale`).

The common properties which support translations are listed in the table below.

Property names

Property name	Description
name	Object name
shortName	Object short name
description	Object description

The classes which support translations are listed in the table below.

Class names

Class name	Description	Other translatable Properties
DataElementCategoryOption	Category option	
DataElementCategory	Category	
DataElementCategoryCombo	Category combination	
DataElement	Data element	
DataElementGroup	Data element group	

Class name	Description	Other translatable Properties
DataElementGroupSet	Data element group set	
Indicator	Indicator	numeratorDescription, denominatorDescription
IndicatorType	Indicator type	
IndicatorGroup	Indicator group	
IndicatorGroupSet	Indicator group set	
OrganisationUnit	Organisation unit	
OrganisationUnitGroup	Organisation unit group	
OrganisationUnitGroupSet	Organisation unit group set	
DataSet	Data set	
Section	Data set section	
ValidationRule	Validation rule	instruction
ValidationRuleGroup	Validation rule group	
Program	Program	enrollmentDateLabel, incidentDateLabel
ProgramStage	Program stage	executionDateLabel, dueDateLabel
TrackedEntityAttribute	Tracked entity attribute	
TrackedEntity	Tracked entity	
RelationshipType	Relationship type for tracked entity instances	fromToName, toFromName
OptionSet	Option set	
Attribute	Attribute for metadata	
ProgramNotificationTemplate	Program Notification template	subjectTemplate, messageTemplate
ValidationNotificationTemplate	Validation Notification template	subjectTemplate, messageTemplate
DataSetNotificationTemplate	DataSet Notification template	subjectTemplate, messageTemplate
Visualization	Visualization	title, subtitle, rangeAxisLabel, baseLineLabel, targetLineLabel, domainAxisLabel
ProgramRuleAction	Program Rule Actions	content
Predictor	Predictor	Name, ShortName, Description, Generator Description
ValidationRule	ValidationRule	Name, Description, Instruction, Leftside expression, Rightside expression

Internationalization

In order to retrieve key-value pairs for translated strings you can use the *i18n* resource.

```
/api/33/i18n
```

The endpoint is located at */api/i18n* and the request format is a simple array of the key-value pairs:

```
[
  "access_denied",
  "uploading_data_notification"
]
```

The request must be of type *POST* and use *application/json* as content-type. An example using curl, assuming the request data is saved as a file `keys.json`:

```
curl -d @keys.json "play.dhis2.org/demo/api/33/i18n" -X POST
  -H "Content-Type: application/json" -u admin:district
```

The result will look like this:

```
{
  "access_denied":"Access denied",
  "uploading_data_notification":"Uploading locally stored data to the server"
}
```

SMS

Short Message Service (SMS)

This section covers the SMS Web API for sending and receiving short text messages.

Outbound SMS service

The Web API supports sending outgoing SMS using the POST method. SMS can be sent to single or multiple destinations. One or more gateways need to be configured before using the service. An SMS will not be sent if there is no gateway configured. It needs a set of recipients and message text in JSON format as shown below.

```
/api/sms/outbound
```

```
{
  "message":"Sms Text",
  "recipients": [
    "004712341234",
    "004712341235"
  ]
}
```

> **Note**
>
> Recipients list will be partitioned if the size exceeds `MAX_ALLOWED_RECIPIENTS` limit of 200.

The Web API also supports a query parameter version, but the parameterized API can only be used for sending SMS to a single destination.

```
/api/sms/outbound?message=text&recipient=004712341234
```

Outbound messages can be fetched using GET resource.

```
GET /api/sms/outbound
GET /api/sms/outbound?filter=status:eq:SENT
GET /api/sms/outbound?filter=status:eq:SENT&fields=*
```

Outbound messages can be deleted using DELETE resource.

```
DELETE /api/sms/outbound/{uid}
DELETE /api/sms/outbound?ids=uid1,uid2
```

Gateway response codes

Gateway may response with following response codes.

Gateway response codes

Response code	Response Message	Detail Description
RESULT_CODE_0	success	Message has been sent successfully
RESULT_CODE_1	scheduled	Message has been scheduled successfully
RESULT_CODE_22	internal fatal error	Internal fatal error
RESULT_CODE_23	authentication failure	Authentication credentials are incorrect
RESULT_CODE_24	data validation failed	Parameters provided in request are incorrect
RESULT_CODE_25	insufficient credits	Credit is not enough to send message
RESULT_CODE_26	upstream credits not available	Upstream credits not available
RESULT_CODE_27	exceeded your daily quota	You have exceeded your daily quota
RESULT_CODE_40	temporarily unavailable	Service is temporarily down
RESULT_CODE_201	maximum batch size exceeded	Maximum batch size exceeded
RESULT_CODE_200	success	The request was successfully completed
RESULT_CODE_202	accepted	The message(s) will be processed
RESULT_CODE_207	multi-status	More than one message was submitted to the API; however, not all messages have the same status
RESULT_CODE_400	bad request	Validation failure (such as missing/invalid parameters or headers)
RESULT_CODE_401	unauthorized	Authentication failure. This can also be caused by IP lockdown settings
RESULT_CODE_402	payment required	Not enough credit to send message
RESULT_CODE_404	not found	Resource does not exist
RESULT_CODE_405	method not allowed	Http method is not support on the resource
RESULT_CODE_410	gone	Mobile number is blocked
RESULT_CODE_429	too many requests	Generic rate limiting error
RESULT_CODE_503	service unavailable	A temporary error has occurred on our platform - please retry

Inbound SMS service

The Web API supports collecting incoming SMS messages using the POST method. Incoming messages routed towards the DHIS2 Web API can be received using this API. The API collects inbound SMS messages and provides it to listeners for parsing, based on the SMS content (SMS Command). An example payload in JSON format is given below. Text, originator, received date and

sent date are mandatory parameters. The rest are optional but the system will use the default value for these parameters.

```
/api/sms/inbound
```

```
{
  "text": "sample text",
  "originator": "004712341234",
  "gatewayid": "unknown",
  "receiveddate": "2016-05-01",
  "sentdate":"2016-05-01",
  "smsencoding": "1",
  "smsstatus":"1"
}
```

Inbound messages can be fetched using GET resourcef

```
GET /api/sms/inbound
GET /api/sms/inbound?fields=*&filter=smsstatus=INCOMING
```

Inbound messages can be deleted using DELETE resource

```
DELETE /api/sms/inbound/{uid}
DELETE /api/sms/inbound?ids=uid1,uid2
```

To import all un parsed messages

```
POST /api/sms/inbound/import
```

User query parameters

Parameter	Type	Description
message	String	This is mandatory parameter which carries the actual text message.
originator	String	This is mandatory parameter which shows by whom this message was actually sent from.
gateway	String	This is an optional parameter which gives gateway id. If not present default text "UNKNOWN" will be stored
receiveTime	Date	This is an optional parameter. It is timestamp at which message was received at the gateway.

Gateway service administration

The Web API exposes resources which provide a way to configure and update SMS gateway configurations.

The list of different gateways configured can be retrieved using a GET method.

```
GET /api/33/gateways
```

Configurations can also be retrieved for a specific gateway type using GET method.

```
GET /api/33/gateways/{uid}
```

New gateway configurations can be added using POST. POST api requires type request parameter and currently its value can have either one *http,bulksms,clickatell,smpp*. First added gateway will be set to default. Only one gateway is allowed to be default at one time. Default gateway can only be changed through its api. If default gateway is removed then the next one the list will automatically becomes default.

```
POST /api/33/gateways
```

Configuration can be updated with by providing uid and gateway configurations as mentioned below

```
PUT /api/33/gateways/{uids}
```

Configurations can be removed for specific gateway type using DELETE method.

```
DELETE /api/33/gateways/{uid}
```

Default gateway can be retrieved and updated.

```
GET /api/33/gateways/default
```

Default gateway can be set using the PUT method.

```
PUT /api/33/gateways/default/{uid}
```

Gateway configuration

The Web API lets you create and update gateway configurations. For each type of gateway there are different parameters in the JSON payload. Sample JSON payloads for each gateway are given below. POST is used to create and PUT to update configurations. Header parameter can be used in case of GenericHttpGateway to send one or more parameter as http header.

Clickatell

```
{
  "type" : "clickatell",
  "name" : "clickatell",
  "username": "clickatelluser",
  "authToken": "XXXXXXXXXXXXXXXXXXXX",
  "urlTemplate": "https://platform.clickatell.com/messages"
}
```

Bulksms

```
{
  "type": "bulksms",
  "name": "bulkSMS",
  "username": "bulkuser",
  "password": "abc123"
}
```

SMPP Gateway

```
{
  "type": "smpp",
  "name": "smpp gateway2",
  "systemId": "smppclient1",
  "host": "localhost",
  "systemType": "cp",
  "numberPlanIndicator": "UNKNOWN",
  "typeOfNumber": "UNKNOWN",
  "bindType": "BIND_TX",
  "port": 2775,
  "password":"password",
  "compressed": false
}
```

Generic HTTP

```
{
  "type": "http",
  "name": "Generic",
  "configurationTemplate": "username=${username}&password=${password}&to=${recipients}
&countrycode=880&message=${text$}&messageid=0",
  "useGet": false,
  "sendUrlParameters":false,
  "contentType": "APPLICATION_JSON",
  "urlTemplate":"https://samplegateway.com/messages",
  "parameters": [
    {
      "header": true,
      "encode": false,
      "key": "username",
      "value": "user_uio",
      "confidential": true
    },
    {
      "header": true,
```

```
      "encode": false,
      "key": "password",
      "value": "123abcxyz",
      "confidential": true
    },
    {
      "header": false,
      "encode": false,
      "key": "deliveryReport",
      "value": "yes",
      "confidential": false
    }
  ],
  "isDefault": false
}
```

In generic http gateway any number of parameters can be added.

Generic SMS gateway parameters

Parameter	Type	Description
name	String	name of the gateway
configurationTemplate	String	Configuration template which get populated with parameter values. For example configuration template given above will be populated like this { "to": "+27001234567", "body": "Hello World!"}
useGet	Boolean	Http POST nethod will be used by default. In order to change it and Http GET, user can set useGet flag to true.
contentType	String	Content type specify what type of data is being sent. Supported types are APPLICATION_JSON, APPLICATION_XML, FORM_URL_ENCODED, TEXT_PLAIN
urlTemplate	String	Url template
header	Boolean	If parameter needs to be sent in Http headers
encode	Boolean	If parameter needs to be encoded
key	String	parameter key
value	String	parameter value
confidential	Boolean	If parameter is confidential. This parameter will not be exposed through API

Parameter	Type	Description
sendUrlParameters	Boolean	If this flag is checked then urlTemplate can be appended with query parameters. This is usefull if gateway API only support HTTP GET. Sample urlTemplate looks like this `"urlTemplate":"https://samplegateway.com/messages?apiKey={apiKey}&to={recipients},content={text},deliveryreport={dp}"`

HTTP.OK will be returned if configurations are saved successfully otherwise *Error*

SMS Commands

SMS commands are being used to collect data through SMS. These commands belong to specific parser type. Each parser has different functionality.

The list of commands can be retrieved using GET.

```
GET /api/smsCommands
```

One particular command can be retrieved using GET.

```
GET /api/smsCommands/uid
```

One particular command can be updated using PUT.

```
PUT /api/smsCommands/uid
```

Command can be created using POST.

```
POST /api/smsCommands
```

One particular command can be deleted using DELETE.

```
DELETE /api/smsCommands/uid
```

SMS command types

Type	Usage
KEY_VALUE_PARSER	For aggregate data collection.
ALERT_PARSER	To send alert messages.
UNREGISTERED_PARSER	For disease surveillance case reporting.

Type	Usage
TRACKED_ENTITY_REGISTRATION_PARSER	For tracker entity registration.
PROGRAM_STAGE_DATAENTRY_PARSER	Data collection for program stage. (TEI is identified based on phoneNumner)
EVENT_REGISTRATION_PARSER	Registration of single event. This is used for event programs.

SMS command types for Android

These command types can be used by the Android app for data submission via SMS when internet is unavailable. The SMS is composed by the Android app.

Type	Usage
AGGREGATE_DATASET	For aggregate data collection.
ENROLLMENT	For tracker entity registration.
TRACKER_EVENT	Event registration for tracker programs.
SIMPLE_EVENT	Event registration for event programs.
RELATIONSHIP	To create relationships.
DELETE	To delete event.

Users

Users

This section covers the user resource methods.

```
/api/users
```

User query

The *users* resource offers additional query parameters beyond the standard parameters (e.g. paging). To query for users at the users resource you can use the following parameters.

User query parameters

Parameter	Type	Description
query	Text	Query value for first name, surname, username and email, case in-sensitive.
phoneNumber	Text	Query for phone number.
canManage	false | true	Filter on whether the current user can manage the returned users through the managed user group relationships.
authSubset	false | true	Filter on whether the returned users have a subset of the authorities of the current user.
lastLogin	Date	Filter on users who have logged in later than the given date.
inactiveMonths	Number	Filter on users who have not logged in for the given number of months.
inactiveSince	Date	Filter on users who have not logged in later than the given date.
selfRegistered	false | true	Filter on users who have self-registered their user account.
invitationStatus	none | all | expired	Filter on user invitations, including all or expired invitations.
ou	Identifier	Filter on users who are associated with the organisation unit with the given identifier.
userOrgUnits	false | true	Filter on users who are associated with the organisation units linked to the currently logged in user.
includeChildren	false | true	Includes users from all children organisation units of the ou parameter.
page	Number	The page number.

Parameter	Type	Description
pageSize	Number	The page size.
orgUnitBoundary	data_capture | data_output | tei_search	Restrict search to users having a common organisation unit with the current user for the given boundary

A query for max 10 users with "konan" as first name or surname (case in-sensitive) who have a subset of authorities compared to the current user:

```
/api/users?query=konan&authSubset=true&pageSize=10
```

To retrieve all user accounts which were initially self-registered:

```
/api/users?selfRegistered=true
```

User query by identifier

You can retrieve full information about a user with a particular identifier with the following syntax.

```
/api/users/{id}
```

An example for a particular identifier looks like this:

```
/api/users/OYLGMiazHtW
```

User lookup

The user lookup API provides an endpoint for retrieving users where the response contains a minimal set of information. It does not require a specific authority and is suitable for allowing clients to look up information such as user first and surname, without exposing potentially sensitive user information.

```
/api/userLookup
```

The user lookup endpoint has two methods.

User lookup by identifier

You can do a user lookup by identifier using the following API request.

```
GET /api/userLookup/{id}
```

The user `id` will be matched against the following user properties in the specified order:

- UID
- UUID
- username

An example request looks like this:

```
/api/userLookup/QqvaU7JjkUV
```

The response will contain minimal information about a user.

```
{
  "id": "QqvaU7JjkUV",
  "username": "nkono",
  "firstName": "Thomas",
  "surname": "Nkono",
  "displayName": "Thomas Nkono"
}
```

User lookup query

You can make a query for users using the following API request.

```
GET /api/userLookup?query={string}
```

The `query` request parameter is mandatory. The query `string` will be matched against the following user properties:

- First name
- Surname
- Email
- Username

In addition to the `query` parameter the search can be restricted by the `orgUnitBoundary` parameter as described in table of parameters for users above.

An example request looks like this:

```
/api/userLookup?query=John
```

The response will contain information about the users matching the request.

```
{
  "users": [
    {
      "id": "DXyJmlo9rge",
      "username": "jbarnes",
      "firstName": "John",
      "surname": "Barnes",
      "displayName": "John Barnes"
    },
    {
      "id": "N3PZBUlN8vq",
      "username": "jkamara",
      "firstName": "John",
      "surname": "Kamara",
      "displayName": "John Kamara"
    }
```

```
  ]
}
```

User account create and update

Creating and updating users are supported through the API. A basic payload to create a user looks like the below example. Note that the password will be sent in plain text so remember to enable SSL/ HTTPS for network transport.

```
{
  "id": "Mj8balLULKp",
  "firstName": "John",
  "surname": "Doe",
  "email": "johndoe@mail.com",
  "userCredentials": {
    "id": "lWCkJ4etppc",
    "userInfo": {
    "id": "Mj8balLULKp"
  },
  "username": "johndoe123",
  "password": "Your-password-123",
  "skype": "john.doe",
  "telegram": "joh.doe",
  "whatsApp": "+1-541-754-3010",
  "facebookMessenger": "john.doe",
  "avatar": {
    "id": "<fileResource id>"
  },
  "userRoles": [
    {
      "id": "Ufph3mGRmMo"
    }
  ]
  },
  "organisationUnits": [
    {
      "id": "Rp268JB6Ne4"
    }
  ],
  "userGroups": [
    {
      "id": "wl5cDMuUhmF"
    }
  ]
}
```

```
curl -X POST -d @u.json "http://server/api/33/users" -u user:pass
  -H "Content-Type: application/json"
```

In the user creation payload, user groups are only supported when importing or *POSTing* a single user at a time. If you attempt to create more than one user while specifiying user groups, you will not recieve an error and the users will be created but no user groups will be assigned. This is by design and is limited because of the many-to-many relationship between users and user groups whereby user groups is the owner of the relationship. To update or create mulitple users and their user groups, consider a program to *POST* one at a time, or *POST* all users followed by another action to update their user groups while specifiying the new user's identifiers.

When creating a user the payload may also contain user settings. These are added as `settings` object to the root object. Each key-value pair becomes a member in the `settings` object, for example:

```
{
    "id": "Mj8balLULKp",
    "firstName": "John",
    "surname": "Doe",
    "settings": {
        "keyUiLocale": "de"
    },
    //...
}
```

After the user is created, a *Location* header is sent back with the newly generated ID (you can also provide your own using the `/api/system/id` endpoint). The same payload can then be used to do updates, but remember to then use *PUT* instead of *POST* and the endpoint is now `/api/users/ID`.

```
curl -X PUT -d @u.json "http://server/api/33/users/ID" -u user:pass
  -H "Content-Type: application/json"
```

For more info about the full payload available, please see `/api/schemas/user`.

For more info about uploading and retrieving user avatars, please see the `/fileResources` endpoint.

User account invitations

The Web API supports inviting people to create user accounts through the `invite` resource. To create an invitation you should POST a user in XML or JSON format to the invite resource. A specific username can be forced by defining the username in the posted entity. By omitting the username, the person will be able to specify it herself. The system will send out an invitation through email. This requires that email settings have been properly configured.

The invite resource is useful in order to securely allow people to create accounts without anyone else knowing the password or by transferring the password in plain text. The payload to use for the invite is the same as for creating users. An example payload in JSON looks like this:

```
{
  "firstName": "John",
  "surname": "Doe",
  "email": "johndoe@mail.com",
  "userCredentials": {
    "username": "johndoe",
    "userRoles": [{
      "id": "Euq3XfEIEbx"
    }]
  },
  "organisationUnits": [ {
    "id": "ImspTQPwCqd"
  } ],
  "userGroups": [ {
    "id": "vAvEltyXGbD"
  }]
}
```

The user invite entity can be posted like this:

```
curl -d @invite.json "localhost/api/33/users/invite" -u admin:district
  -H "Content-Type:application/json"
```

To send out invites for multiple users at the same time you must use a slightly different format. For JSON:

```
{
  "users": [ {
    "firstName": "John",
    "surname": "Doe",
    "email": "johndoe@mail.com",
    "userCredentials": {
      "username": "johndoe",
      "userRoles": [ {
        "id": "Euq3XfEIEbx"
      } ]
    },
    "organisationUnits": [ {
      "id": "ImspTQPwCqd"
      } ]
    }, {
    "firstName": "Tom",
    "surname": "Johnson",
    "email": "tomj@mail.com",
    "userCredentials": {
      "userRoles": [ {
        "id": "Euq3XfEIEbx"
      } ]
    },
    "organisationUnits": [ {
      "id": "ImspTQPwCqd"
      } ]
    }
  ]
}
```

To create multiple invites you can post the payload to the api/users/invites resource like this:

```
curl -d @invites.json "localhost/api/33/users/invites" -u admin:district
  -H "Content-Type:application/json"
```

There are certain requirements for user account invitations to be sent out:

- Email SMTP server must be configured properly on the server.
- The user to be invited must have specified a valid email.
- If username is specified it must not be already taken by another existing user.

If any of these requirements are not met the invite resource will return with a *409 Conflict* status code together with a descriptive message.

User account confirm invite (Experimental)

> **Important**
> Before confirming an invitation, an admin user should have set up the User and sent an invitation link. That prerequisite also adds some required data in the `userinfo` database table (`idToken`, `restoreToken`, `restoreExpiry`) for that user, in order to complete the invite.

A user can confirm an invitation through the following endpoint:
`POST /api/auth/invite`
with `JSON` body:

```
{
    "username": "TestUser",
    "firstName": "Test",
    "surname": "User",
    "password": "Test123!",
    "email": "test@test.com",
    "phoneNumber": "123456789",
    "g-recaptcha-response": "recaptchaResponse",
    "token": "aWRUb2tlbjpJRHJlc3RvcmVUb2tlbg=="
}
```

> **Note**
> The `g-recaptcha-response` value would be populated through the use of the core Login App UI normally.
> The `token` field expects a Base64-encoded value. In this example, decoded, it's `idToken:IDrestoreToken`. This would be sent by email to the invited user (it is actually created internally (and populated in the database) during the `/api/users/invite` operation).

Successful response looks like:

```
{
    "httpStatus": "OK",
    "httpStatusCode": 200,
    "status": "OK",
    "message": "Account updated"
}
```

User account registration (Experimental)

A user can register directly through the following endpoint:
`POST /api/auth/registration` with `JSON` body:

```
{
    "username": "testSelfReg",
    "firstName": "test",
    "surname": "selfReg",
    "password": "P@ssword123",
    "email": "test@test.com",
    "phoneNumber": "12345oooo",
```

```
    "g-recaptcha-response": "recap response"
}
```

A successful response looks like:

```
{
    "httpStatus": "Created",
    "httpStatusCode": 201,
    "status": "OK",
    "message": "Account created"
}
```

User forgot password (Experimental)

This endpoint is used to trigger the forgotten password flow. It can be triggered by supplying the username or email of the user whose password needs resetting.
`POST /api/auth/forgotPassword` with `JSON` body:

```
{
    "emailOrUsername": "testUsername1"
}
```

A successful response returns an empty `200 OK`. This should trigger an email to be sent to the user which allows them to reset their password.

User password reset (Experimental)

Once a user has received an email with a link to reset their password, it will contain a token which can be used to reset their password.
`POST /api/auth/passwordReset` with `JSON` body:

```
{
    "newPassword": "ChangeMe123!",
    "resetToken": "token-value-from-email-link"
}
```

A successful response returns an empty `200 OK`. The user should now be able to log in using the new password.

User replication

To replicate a user you can use the *replica* resource. Replicating a user can be useful when debugging or reproducing issues reported by a particular user. You need to provide a new username and password for the replicated user which you will use to authenticate later. Note that you need the ALL authority to perform this action. To replicate a user you can post a JSON payload looking like below:

```
{
  "username": "user_replica",
  "password": "SecretPassword"
}
```

This payload can be posted to the replica resource, where you provide the identifier of the user to replicate in the URL:

```
/api/33/users/<uid>/replica
```

An example of replicating a user using curl looks like this:

```
curl -d @replica.json "localhost/api/33/users/N3PZBUlN8vq/replica"
  -H "Content-Type:application/json" -u admin:district
```

Reset user password

User administrators (with appropriate rights) can reset another user's account by triggering password recovery. Once triggered an email is sent to the user containing a recovery link. Users following the link get to a form which allows to set a new password.

To trigger this workflow for user `tH7WIiIJ0O3` use:

```
POST /api/37/users/tH7WIiIJ0O3/reset
```

Disable and enable user accounts

User accounts can be marked disabled. A disabled user can no longer log in.

To mark a user with UID `tH7WIiIJ0O3` as disabled use (requires user with appropriate rights):

```
POST /api/36/users/tH7WIiIJ0O3/disabled
```

To enable a disabled user again use accordingly (requires user with appropriate rights):

```
POST /api/36/users/tH7WIiIJ0O3/enabled
```

User expiration

An expiration date can be set for an user account. It marks the point in time from which the user account has expired and can no longer be used. Expired user can no longer log in.

To update the expiration date of user with UID `tH7WIiIJ0O3` and set it to the date `2021-01-01` use (requires user with appropriate rights):

```
POST /api/36/users/tH7WIiIJ0O3/expired?date=2021-01-01
```

To unset the expiration date so that the account never expires use accordingly (requires user with appropriate rights):

```
POST /api/36/users/tH7WIiIJ0O3/unexpired
```

User data approval workflows

To see which data approval workflows and levels a user may access, you can use the *dataApprovalWorkflows* resource as follows:

```
GET /api/users/{id}/dataApprovalWorkflows
```

Switching between user accounts connected to the same identity provider account

If linked accounts are enabled in dhis.conf and a user has logged in via OIDC, then it is possible for the user to switch between DHIS2 accounts that are linked to the same identity provider account using this API call:

```
GET /dhis-web-commons-security/logout.action?current={current_username}
&switch={username_to_switch_to}
```

This has the effect of signing out the current user and signing in the new user. It looks seamless as it is happening, except that the new user ends up on the default page of the DHIS2 instance.

Note that this API call will likely change in the future, but its general function will remain the same.

To see a list of users that can be switched to, use this API call:

```
GET /api/account/linkedAccounts
```

Current user information

In order to get information about the currently authenticated user and its associations to other resources you can work with the *me* resource (you can also refer to it by its old name *currentUser*). The current user related resources gives your information which is useful when building clients for instance for data entry and user management. The following describes these resources and their purpose.

Provides basic information about the user that you are currently logged in as, including username, user credentials, assigned organisation units:

```
/api/me
```

Gives information about currently unread messages and interpretations:

```
/api/me/dashboard
```

In order to change password, this end point can be used to validate newly entered password. Password validation will be done based on PasswordValidationRules configured in the system. This end point support POST and password string should be sent in POST body.

```
/api/me/validatePassword
```

While changing password, this end point (support POST) can be used to verify old password. Password string should be sent in POST body.

```
/api/me/verifyPassword
```

Returns the set of authorities granted to the current user:

```
/api/me/authorization
```

Returns true or false, indicating whether the current user has been granted the given `<auth>` authorization:

```
/api/me/authorization/<auth>
```

Gives the data approval levels which are relevant to the current user:

```
/api/me/dataApprovalLevels
```

Gives the data approval workflows which are accessible to the current user. For each workflow, shows which data approval levels the user may see, and what permissions they have at each level:

```
/api/me/dataApprovalWorkflows
```

Settings and configuration

System settings

You can manipulate system settings by interacting with the *systemSettings* resource. A system setting is a simple key-value pair, where both the key and the value are plain text strings. To save or update a system setting you can make a *POST* request to the following URL:

```
/api/33/systemSettings/my-key?value=my-val
```

Alternatively, you can submit the setting value as the request body, where content type is set to "text/plain". As an example, you can use curl like this:

```
curl "play.dhis2.org/demo/api/33/systemSettings/my-key" -d "My long value"
  -H "Content-Type: text/plain" -u admin:district
```

To set system settings in bulk you can send a JSON object with a property and value for each system setting key-value pair using a POST request:

```
{
  "keyApplicationNotification": "Welcome",
  "keyApplicationIntro": "DHIS2",
  "keyApplicationFooter": "Read more at dhis2.org"
}
```

Translations for translatable Setting keys can be set by specifying locale as a query parameter and translated value which can be specified either as a query param or withing the body payload. See an example URL:

```
/api/33/systemSettings/<my-key>?locale=<my-locale>&value=<my-translated-value>
```

You should replace my-key with your real key and my-val with your real value. To retrieve the value for a given key (in JSON or plain text) you can make a *GET* request to the following URL:

```
/api/33/systemSettings/my-key
```

Alternatively, you can specify the key as a query parameter:

```
/api/33/systemSettings?key=my-key
```

If a key is not found or marked confidential then a `404` response will be returned like so:

```
{
    "httpStatus": "Not Found",
    "httpStatusCode": 404,
    "status": "ERROR",
    "message": "Setting does not exist or is marked as confidential",
    "errorCode": "E1005"
}
```

You can retrieve specific system settings as JSON by repeating the key query parameter:

```
curl "play.dhis2.org/demo/api/33/systemSettings?
key=keyApplicationNotification&key=keyApplicationIntro"
  -u admin:district
```

You can retrieve all system settings with a GET request:

```
/api/33/systemSettings
```

To retrieve a specific translation for a given translatable key you can specify a locale as query param:

```
/api/33/systemSettings/<my-key>?locale=<my-locale>
```

If present, the translation for the given locale is returned. Otherwise, a default value is returned. If no locale is specified for the translatable key, the user default UI locale is used to fetch the correct translation. If the given translation is not present, again, the default value is returned.

The priority for translatable keys is the following:

```
specified locale > user's default UI locale > defaut value
```

To delete a system setting, you can make a *DELETE* request to the URL similar to the one used above for retrieval. If a translatable key is used, all present translations will be deleted as well.

To delete only a specific translation of translatable key, the same URL as for adding a translation should be used and the empty value should be provided:

```
/api/33/systemSettings/<my-key>?locale=<my-locale>&value=
```

The available system settings are listed below.

System settings

Key	Description	Translatable
keyUiLocale	Locale for the user interface	No
keyDbLocale	Locale for the database	No
keyAnalysisDisplayProperty	The property to display in analysis. Default: "name"	No
keyAnalysisDigitGroupSeparator	The separator used to separate digit groups	No

Key	Description	Translatable
keyCurrentDomainType	Not yet in use	No
keyTrackerDashboardLayout	Used by tracker capture	No
applicationTitle	The application title. Default: "DHIS2"	Yes
keyApplicationIntro	The application introduction	Yes
keyApplicationNotification	Application notification	Yes
keyApplicationFooter	Application left footer	Yes
keyApplicationRightFooter	Application right footer	Yes
keyFlag	Application flag	No
keyFlagImage	Flag used in dashboard menu	No
startModule	The startpage of the application. Default: "dhis-web-dashboard-integration"	No
startModuleEnableLightweight	The starting page app to render a light-weight landing page. Default: "false"	No
factorDeviation	Data analysis standard deviation factor. Default: "2d"	No
keyEmailHostName	Email server hostname	No
keyEmailPort	Email server port	No
keyEmailTls	Use TLS. Default: "true"	No
keyEmailSender	Email sender	No
keyEmailUsername	Email server username	No
keyEmailPassword	Email server password	No
minPasswordLength	Minimum length of password	No
maxPasswordLength	Maximum length of password	No
keySmsSetting	SMS configuration	No
keyCacheStrategy	Cache strategy. Default: "CACHE_6AM_TOMORROW"	No
keyCacheability	PUBLIC or PRIVATE. Determines if proxy servers are allowed to cache data or not.	No
phoneNumberAreaCode	Phonenumber area code	No
multiOrganisationUnitForms	Enable multi-organisation unit forms. Default: "false"	No
keyConfig		No
keyAccountRecovery	Enable user account recovery. Default: "false"	No
keyLockMultipleFailedLogins	Enable locking access after multiple failed logins	No
googleAnalyticsUA	Google Analytic UA key for tracking site-usage	No
credentialsExpires	Require user account password change. Default: "0" (Never)	No

Key	Description	Translatable
credentialsExpiryAlert	Enable alert when credentials are close to expiration date	No
credentialsExpiresReminderInDays	Number of days the credential expiry alert should be send in advance of the actual expiry. Default: 28	No
accountExpiryAlert	Send an alert email to users whose account is about to expire due to expiry date being set. Default: "false"	No
accountExpiresInDays	Number of days the account expiry alert should be send in advance of the actual expiry. Default: 7	No
keySelfRegistrationNoRecaptcha	Do not require recaptcha for self registration. Default: "false"	No
recaptchaSecret	Google API recaptcha secret. Default: dhis2 play instance API secret, but this will only works on you local instance and not in production.	No
recaptchaSite	Google API recaptcha site. Default: dhis2 play instance API site, but this will only works on you local instance and not in production.	No
keyCanGrantOwnUserAuthorityGroups	Allow users to grant own user roles. Default: "false"	No
keySqlViewMaxLimit	Max limit for SQL view	No
keyRespectMetaDataStartEndDatesInAnalyticsTableExport	When "true", analytics will skip data not within category option's start and end dates. Default: "false"	No
keySkipDataTypeValidationInAnalyticsTableExport	Skips data type validation in analytics table export	No
keyCustomLoginPageLogo	Logo for custom login page	No
keyCustomTopMenuLogo	Logo for custom top menu	No
keyCacheAnalyticsDataYearThreshold	Analytics data older than this value (in years) will always be cached. "0" disabled this setting. Default: 0	No
analyticsFinancialYearStart	Set financial year start. Default: October	No
keyIgnoreAnalyticsApprovalYearThreshold	"0" check approval for all data. "-1" disable approval checking. "1" or higher checks approval for all data that is newer than "1" year.	No

Key	Description	Translatable
keyAnalyticsMaxLimit	Maximum number of analytics records. Default: "50000"	No
keyAnalyticsPeriodYearsOffset	Defines the years' offset to be used in the analytics export process. If the year of a respective date is out of the offset the system sends back a warning message during the process. At this point, the period generation step is skipped. ie.: suppose the system user sets the offset value to 5, and we are in the year 2023. It means that analytics will accept exporting dates from 2018 (inclusive) to 2028 (inclusive). Which translates to: [2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028]. NOTE: The offset will have a significant influence on resource usage. Higher values will trigger higher usage of memory RAM/HEAP and CPU. Setting negative numbers to this key will disable any kind of validation (which means no warnings) and the internal range of years will be used (1970 to current year plus 10) Default: 22	No
keyDatabaseServerCpus	Number of database server CPUs. Default: "0" (Automatic)	No
keyLastSuccessfulAnalyticsTablesRuntime	Keeps timestamp of last successful analytics tables run	No
keyLastSuccessfulLatestAnalyticsPartitionRuntime	Keeps timestamp of last successful latest analytics partition run	No
keyLastMonitoringRun	Keeps timestamp of last monitoring run	No
keyLastSuccessfulDataSynch	Keeps timestamp of last successful data values synchronization	No
keyLastSuccessfulEventsDataSynch	Keeps timestamp of last successful Event programs data synchronization	No
keyLastCompleteDataSetRegistrationSyncSuccess	Keeps timestamp of last successful completeness synchronization	No
syncSkipSyncForDataChangedBefore	Specifies timestamp used to skip synchronization of all the data changed before this point in time	No

Key	Description	Translatable
keyLastSuccessfulAnalyticsTablesUpdate	Keeps timestamp of last successful analytics tables update	No
keyLastSuccessfulLatestAnalyticsPartitionUpdate	Keeps timestamp of last successful latest analytics partition update	No
keyLastSuccessfulResourceTablesUpdate	Keeps timestamp of last successful resource tables update	No
keyLastSuccessfulSystemMonitoringPush	Keeps timestamp of last successful system monitoring push	No
keyLastSuccessfulMonitoring	Keeps timestamp of last successful monitoring	No
keyNextAnalyticsTableUpdate	Keeps timestamp of next analytics table update	No
helpPageLink	Link to help page. Default: "https://dhis2.github.io/dhis2-docs/master/en/user/html/dhis2_user_manual_en.html	No
keyAcceptanceRequiredForApproval	Acceptance required before approval. Default: "false"	No
keySystemNotificationsEmail	Where to email system notifications	No
keyAnalysisRelativePeriod	Default relative period for analysis. Default: "LAST_12_MONTHS"	No
keyRequireAddToView	Require authority to add to view object lists. Default: "false"	No
keyAllowObjectAssignment	Allow assigning object to related objects during add or update. Default: "false"	No
keyUseCustomLogoFront	Enables the usage of a custom logo on the front page. Default: "false"	No
keyUseCustomLogoBanner	Enables the usage of a custom banner on the website. Default: "false"	No
keyDataImportStrictPeriods		No
keyDataImportStrictPeriods	Require periods to match period type of data set. Default: "false"	No
keyDataImportStrictDataElements	Require data elements to be part of data set. Default: "false"	No
keyDataImportStrictCategoryOptionCombos	Require category option combos to match category combo of data element. Default: "false"	No

Key	Description	Translatable
keyDataImportStrictOrganisationUnits	Require organisation units to match assignment of data set. Default: "false"	No
keyDataImportStrictAttributeOptionsCombos	Require attribute option combis to match category combo of data set. Default: "false"	No
keyDataImportStrictDataSetApproval	true: If an already approved dataset exists for a given data value entry is not permitted; false: If a not yet approved dataset exists for a given data value entry is permitted. Default: "true"	No
keyDataImportStrictDataSetLocking	true: If a dataset exists for which entry expired without lock exception for a given data value entry is not permitted; false: If a dataset exists for which entry is not expired or a lock exception applies for a given data value entry is permitted. Default: "true"	No
keyDataImportStrictDataSetInputPeriods	true: If a dataset exists for which the input period is closed for a given data value entry is not permitted; false: If a dataset exists for which data the input period is open for a given data value entry is permitted. Default: "true"	No
keyDataImportRequireCategoryOptionCombo	Require category option combo to be specified. Default: "false"	No
keyDataImportRequireAttributeOptionCombo	Require attribute option combo to be specified. Default: "false"	No
keyCustomJs	Custom JavaScript to be used on the website	No
keyCustomCss	Custom CSS to be used on the website	No
keyCalendar	The calendar type. Default: "iso8601".	No
keyDateFormat	The format in which dates should be displayed. Default: "yyyy-MM-dd".	No
keyStyle	The style used on the DHIS2 webpages. Default: "light_blue/light_blue.css".	No
keyRemoteInstanceUrl	Url used to connect to remote instance	No
keyRemoteInstanceUsername	Username used to connect to remote DHIS2 instance	No

Key	Description	Translatable
keyRemoteInstancePassword	Password used to connect to remote DHIS2 instance	No
keyGoogleMapsApiKey	Google Maps API key	No
keyGoogleCloudApiKey	Google Cloud API key	No
keyLastMetaDataSyncSuccess	Keeps timestamp of last successful metadata synchronization	No
keyVersionEnabled	Enables metadata versioning	No
keyMetadataFailedVersion	Keeps details about failed metadata version sync	No
keyMetadataLastFailedTime	Keeps timestamp of last metadata synchronization failure	No
keyLastSuccessfulScheduledProgramNotifications		No
keyLastSuccessfulScheduledDataSetNotifications		No
keyRemoteMetadataVersion	Details about metadata version of remote instance	No
keySystemMetadataVersion	Details about metadata version of the system	No
keyStopMetadataSync	Flag to stop metadata synchronization	No
keyFileResourceRetentionStrategy	Determines how long file resources associated with deleted or updated values are kept. NONE, THREE_MONTHS, ONE_YEAR, or FOREVER.	No
syncMaxRemoteServerAvailabilityCheckAttempts	Specifies how many times the availability of remote server will be checked before synchronization jobs fail.	No
syncMaxAttempts	Specifies max attempts for synchronization jobs	No
syncDelayBetweenRemoteServerAvailabilityCheckAttempts	Delay between remote server availability checks	No
lastSuccessfulDataStatistics	Keeps timestamp of last successful data analytics	No
keyHideDailyPeriods	Not in use	No
keyHideWeeklyPeriods		No
keyHideBiWeeklyPeriods	Boolean flag used to hide/show bi-weekly periods	No
keyHideMonthlyPeriods		No
keyHideBiMonthlyPeriods		No
keyGatherAnalyticalObjectStatisticsInDashboardViews	Whether to gather analytical statistics on objects when they are viewed within a dashboard	No

Key	Description	Translatable
keyCountPassiveDashboardViewsInUsageAnalytics	Counts "passive" dashboard views (not selecting a particular dashboard) in usage analytics	No
keyDashboardContextMenuItemSwitchViewType	Allow users to switch dashboard favorites' view type	Yes
keyDashboardContextMenuItemOpenInRelevantApp	Allow users to open dashboard favorites in relevant apps	Yes
keyDashboardContextMenuItemShowInterpretationsAndDetails	Allow users to show dashboard favorites' interpretations and details	Yes
keyDashboardContextMenuItemViewFullscreen	Allow users to view dashboard favorites in fullscreen	Yes
jobsRescheduleAfterMinutes	If a job is in state `RUNNING` for this amount of minutes or longer without making progress in form of updating its `lastAlive` timestamp the job is considered stale and reset to `SCHEDULED` state	No
jobsCleanupAfterMinutes	A "run once" job is deleted when this amount of minutes has passed since it finished successful or unsuccessful	No
jobsMaxCronDelayHours	A CRON expression triggered job will only trigger in the window between its target time of the day and this amount of hours later. If it wasn't able to run in that window the execution is skipped and next execution according to the CRON expression is the next target execution	No
jobsLogDebugBelowSeconds	A job with an execution interval below this number of seconds logs its information on debug rather than info	No
keyParallelJobsInAnalyticsTableExport	Returns the number of parallel jobs to use for processing analytics tables. It takes priority over "keyDatabaseServerCpus". Default: -1	No

User settings

You can manipulate user settings by interacting with the *userSettings* resource. A user setting is a simple key-value pair, where both the key and the value are plain text strings. The user setting will be linked to the user who is authenticated for the Web API request. To return a list of all user settings, you can send a *GET* request to the following URL:

```
/api/33/userSettings
```

User settings not set by the user, will fall back to the equivalent system setting. To only return the values set explicitly by the user, you can append ?useFallback=false to the above URL, like this:

```
/api/33/userSettings?useFallback=false
```

To save or update a setting for the currently authenticated user you can make a *POST* request to the following URL:

```
/api/33/userSettings/my-key?value=my-val
```

You can specify the user for which to save the setting explicitly with this syntax:

```
/api/33/userSettings/my-key?user=username&value=my-val
```

Alternatively, you can submit the setting value as the request body, where content type is set to "text/plain". As an example, you can use curl like this:

```
curl "https://play.dhis2.org/demo/api/33/userSettings/my-key" -d "My long value"
  -H "Content-Type: text/plain" -u admin:district
```

As an example, to set the UI locale of the current user to French you can use the following command.

```
curl "https://play.dhis2.org/demo/api/33/userSettings/keyUiLocale?value=fr"
  -X POST -u admin:district
```

You should replace my-key with your real key and my-val with your real value. To retrieve the value for a given key in plain text you can make a *GET* request to the following URL:

```
/api/33/userSettings/my-key
```

To delete a user setting, you can make a *DELETE* request to the URL similar to the one used above for retrieval.

The available system settings are listed below.

User settings

Key	Options	Description
keyStyle	light_blue/light_blue.css | green/green.css | vietnam/vietnam.css	User interface stylesheet.
keyMessageEmailNotification	false | true	Whether to send email notifications.
keyMessageSmsNotification	false | true	Whether to send SMS notifications.

Key	Options	Description
keyUiLocale	Locale value	User interface locale.
keyDbLocale	Locale value	Database content locale.
keyAnalysisDisplayProperty	name | shortName	Property to display for metadata in analysis apps.
keyCurrentDomainType	all | aggregate | tracker	Data element domain type to display in lists.
keyAutoSaveCaseEntryForm	false | true	Save case entry forms periodically.
keyAutoSaveTrackedEntityForm	false | true	Save person registration forms periodically.
keyAutoSaveDataEntryForm	false | true	Save aggregate data entry forms periodically.
keyTrackerDashboardLayout	false | true	Tracker dasboard layout.

Configuration

To access configuration you can interact with the *configuration* resource. You can get XML and JSON responses through the *Accept* header or by using the .json or .xml extensions. You can *GET* all properties of the configuration from:

```
/api/33/configuration
```

You can send *GET* and *POST* requests to the following specific resources:

```
GET /api/33/configuration/systemId

GET POST DELETE /api/configuration/feedbackRecipients

GET POST DELETE /api/configuration/offlineOrganisationUnitLevel

GET POST /api/configuration/infrastructuralDataElements

GET POST /api/configuration/infrastructuralIndicators

GET POST /api/configuration/infrastructuralPeriodType

GET POST DELETE /api/configuration/selfRegistrationRole

GET POST DELETE /api/configuration/selfRegistrationOrgUnit

GET POST /api/facilityOrgUnitGroupSet

GET POST /api/facilityOrgUnitLevel
```

For the CORS allowlist configuration you can make a POST request with an array of URLs to allowlist as payload using "application/json" as content-type, for instance:

```
["www.google.com", "www.dhis2.org", "www.who.int"]
```

```
GET POST /api/33/configuration/corsAllowlist
```

For POST requests, the configuration value should be sent as the request payload as text. The following table shows appropriate configuration values for each property.

Configuration values

Configuration property	Value
feedbackRecipients	User group ID
offlineOrganisationUnitLevel	Organisation unit level ID
infrastructuralDataElements	Data element group ID
infrastructuralIndicators	Indicator group ID
infrastructuralPeriodType	Period type name (e.g. "Monthly")
selfRegistrationRole	User role ID
selfRegistrationOrgUnit	Organisation unit ID
smtpPassword	SMTP email server password
remoteServerUrl	URL to remote server
remoteServerUsername	Username for remote server authentication
remoteServerPassword	Password for remote server authentication
corsAllowlist	JSON list of URLs

As an example, to set the feedback recipients user group you can invoke the following curl command:

```
curl "localhost/api/33/configuration/feedbackRecipients" -d "wl5cDMuUhmF"
  -H "Content-Type:text/plain"-u admin:district
```

Read-only configuration

To access all configuration settings and properties you can use the read-only configuration endpoint. This will provide read-only access to *UserSettings, SystemSettings and DHIS2 server configurations* You can get XML and JSON responses through the *Accept* header. You can *GET* all settings from:

```
/api/33/configuration/settings
```

You can get filtered settings based on setting type:

```
GET /api/33/configuration/settings/filter?type=USER_SETTING

GET /api/33/configuration/settings/filter?type=CONFIGURATION
```

More than one type can be provided:

```
GET /api/33/configuration/settings/filter?type=USER_SETTING&type=SYSTEM_SETTING
```

SettingType values

Value	Description
USER_SETTING	To get user settings
SYSTEM_SETTING	To get system settings
CONFIGURATION	To get DHIS server settings

> **Note**
>
> Fields which are confidential will be provided in the output but without values.

Tokens

The *tokens* resource provides access tokens to various services.

Google Service Account

You can retrieve a Google service account OAuth 2.0 access token with a GET request to the following resource.

```
GET /api/tokens/google
```

The token will be valid for a certain amount of time, after which another token must be requested from this resource. The response contains a cache control header which matches the token expiration. The response will contain the following properties in JSON format.

Token response

Property	Description
access_token	The OAuth 2.0 access token to be used when authentication against Google services.
expires_in	The number of seconds until the access token expires, typically 3600 seconds (1 hour).
client_id	The Google service account client id.

This assumes that a Google service account has been set up and configured for DHIS2. Please consult the installation guide for more info.

Static content

The *staticContent* resource allows you to upload and retrieve custom logos used in DHIS2. The resource lets the user upload a file with an associated key, which can later be retrieved using the key. Only PNG files are supported and can only be uploaded to the `logo_banner` and `logo_front` keys.

```
/api/33/staticContent
```

Static content keys

Key	Description
logo_banner	Logo in the application top menu on the left side.
logo_front	Logo on the login-page above the login form.

To upload a file, send the file with a *POST* request to:

```
POST /api/33/staticContent/<key>
```

Example request to upload logo.png to the `logo_front` key:

```
curl -F "file=@logo.png;type=image/png" "https://play.dhis2.org/demo/api/33/staticContent/
logo_front"
  -X POST -H "Content-Type: multipart/form-data" -u admin:district
```

Uploading multiple files with the same key will overwrite the existing file. This way, retrieving a file for any given key will only return the latest file uploaded.

To retrieve a logo, you can *GET* the following:

```
GET /api/33/staticContent/<key>
```

Example of requests to retrieve the file stored for `logo_front`:

- Adding "Accept: text/html" to the HTTP header.*__ In this case, the endpoint will return a default image if nothing is defined. Will return an image stream when a custom or default image is found.

```
curl "https://play.dhis2.org/demo/api/33/staticContent/logo_front"
  -H "Accept: text/html" -L -u admin:district
```

- Adding "Accept: application/json" to the HTTP header.*__ With this parameter set, the endpoint will never return a default image if the custom logo is not found. Instead, an error message will be returned. When the custom image is found this endpoint will return a JSON response containing the path/URL to the respective image.

```
curl "https://play.dhis2.org/demo/api/33/staticContent/logo_front"
  -H "Accept: application/json" -L -u admin:district
```

Success and error messages will look like this:

```
{
  "images": {
    "png": "http://localhost:8080/dhis/api/staticContent/logo_front"
  }
}
```

```
{
  "httpStatus": "Not Found",
  "httpStatusCode": 404,
  "status": "ERROR",
  "message": "No custom file found."
}
```

To use custom logos, you need to enable the corresponding system settings by setting it to *true*. If the corresponding setting is false, the default logo will be served.

UI customization

To customize the UI of the DHIS2 application you can insert custom JavaScript and CSS styles through the *files* resource.

```
POST GET DELETE /api/33/files/script
POST GET DELETE /api/33/files/style
```

The JavaScript and CSS content inserted through this resource will be loaded by the DHIS2 web application. This can be particularly useful in certain situations:

- Overriding the CSS styles of the DHIS2 application, such as the login page or main page.
- Defining JavaScript functions which are common to several custom data entry forms and HTML-based reports.
- Including CSS styles which are used in custom data entry forms and HTML-based reports.

Login App customisation

The Settings App allows users to define a variety of elements (text, logo, flag) that can be used to customise the login page of DHIS2. Additionally, it is possible to choose between two preconfigured layouts (the default and a sidebar layout).

If needed, the login app's styling and layout can be further customised by uploading an HTML template (also definable in the settings app). This HTML template replaces certain elements (based on ID); the reserved IDs are listed in the table below. In this way, it is possible to combine custom styling (using css) and custom layout (using HTML) to change the look of the login app. The custom template does not support custom scripts, and script tags will be removed from any uploaded template.

To create a custom template, it is recommended to start with one of the existing templates (these are available for download from within the login app at the extension dhis-web-login/#download).

ID	Replaced by
login-box	The main login dialog, which prompts the user to enter their username/password. **This must be included for the login app to work as intended.**
application-title	Text for the application title.
application-introduction	Text for the application introduction.
flag	The selected flag.
logo	The logo (DHIS2 logo is used if custom logo is not defined).
powered-by	A link to DHIS2.org.
application-left-footer	Text for the left-side footer.
application-right-footer	Text for the right-side footer.
language-select	Selection to control the language of the login app.

The appearance of the login dialog can also be modified by defining css variables within the HTML template. The following css variables are available for customisation:

```
--form-container-margin-block-start
--form-container-margin-block-end
--form-container-margin-inline-start, auto
--form-container-margin-inline-end
--form-container-default-width
--form-container-padding
--form-container-background-color
--form-container-box-border-radius
--form-container-box-shadow
--form-container-font-color
--form-title-font-size
--form-title-font-weight
--form-container-title-color
```

Javascript

To insert Javascript from a file called *script.js* you can interact with the *files/script* resource with a POST request:

```
curl --data-binary @script.js "localhost/api/33/files/script"
  -H "Content-Type:application/javascript" -u admin:district
```

Note that we use the `--data-binary` option to preserve formatting of the file content. You can fetch the JavaScript content with a GET request:

```
/api/33/files/script
```

To remove the JavaScript content you can use a DELETE request.

CSS

To insert CSS from a file called *style.css* you can interact with the *files/style* resource with a POST-request:

```
curl --data-binary @style.css "localhost/api/33/files/style"
  -H "Content-Type:text/css" -u admin:district
```

You can fetch the CSS content with a GET-request:

```
/api/33/files/style
```

To remove the JavaScript content you can use a DELETE request.

Tracker

> **Caution**
>
> Tracker has been re-implemented in DHIS2 2.36. This document describes the new tracker endpoints
>
> - `POST /api/tracker`
> - `GET /api/tracker/trackedEntities`
> - `GET /api/tracker/enrollments`
> - `GET /api/tracker/events`
> - `GET /api/tracker/relationships`
>
> Tracker (deprecated) describes the deprecated endpoints
>
> - `GET/POST/PUT/DELETE /api/trackedEntityInstance`
> - `GET/POST/PUT/DELETE /api/enrollments`
> - `GET/POST/PUT/DELETE /api/events`
> - `GET/POST/PUT/DELETE /api/relationships`
>
> The deprecated endpoints will be removed in version **42**!
>
> Migrating to new tracker endpoints should help you get started with your migration. Reach out on the community of practice if you need further assistance.

Tracker Objects

Tracker consists of a few different types of objects that are nested together to represent the data. In this section, we will show and describe each of the objects used in the Tracker API.

Tracked Entities

`Tracked Entities` are the root object for the Tracker model.

Property	Description	Required	Immutable	Type	Example
trackedEntity	The identifier of the tracked entity. Generated if not supplied	No	Yes	String:Uid	ABCDEF12345
trackedEntityType	The type of tracked entity.	Yes	Yes	String:Uid	ABCDEF12345
createdAt	Timestamp when the user created the tracked entity. Set on the server.	No	No	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
createdAtClient	Timestamp when the user created the tracked entity on the client.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss

Property	Description	Required	Immutable	Type	Example
updatedAt	Timestamp when the object was last updated. Set on the server.	No	No	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
updatedAtClient	Timestamp when the object was last updated on the client.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
orgUnit	The organisation unit where the user created the tracked entity.	Yes	Yes	String:Uid	ABCDEF12345
inactive	Indicates whether the tracked entity is inactive or not.	No	Yes	Boolean	Default: false, true
deleted	Indicates whether the tracked entity has been deleted. It can only change when deleting.	No	No	Boolean	false until deleted
potentialDuplicate	Indicates whether the tracked entity is a potential duplicate.	No	No	Boolean	Default: false
geometry	A geographical representation of the tracked entity. Based on the "featureType" of the TrackedEntity Type.	No	Yes	GeoJson	{ "type": "POINT", "coordinates": [123.0, 123.0] }
storedBy	Client reference for who stored/ created the tracked entity.	No	Yes	String:Any	John Doe

Property	Description	Required	Immutable	Type	Example
createdBy	Only for reading data. User that created the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }
updatedBy	Only for reading data. User that last updated the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }
attributes	A list of tracked entity attribute values owned by the tracked entity.	No	Yes	List of TrackedEntityAttributeValue	See Attribute
enrollments	A list of enrollments owned by the tracked entity.	No	Yes	List of Enrollment	See Enrollment
relationships	A list of relationships connected to the tracked entity.	No	Yes	List of Relationship	See Relationship
programOwners	A list of organisation units that have access through specific programs to this tracked entity. See "Program Ownership" for more.	No	Yes	List of ProgramOwner	See section "Program Ownership"

> **Note**
>
> `Tracked Entities` "owns" all `Tracked Entity Attribute Values` (Or "attributes" as described in the previous table). However, `Tracked Entity Attributes` are either connected to a `Tracked Entity` through its `Tracked Entity Type` or a `Program`. We often refer to this separation as `Tracked Entity Type Attributes` and `Tracked Entity Program Attributes`. The importance of this separation is related to access control and limiting what information the user can see.
>
> The "attributes" referred to in the `Tracked Entity` are `Tracked Entity Type Attributes`.

Enrollments

`Tracked Entities` can enroll into `Programs` for which they are eligible. Tracked entities are eligible as long as the program is configured with the same `Tracked Entity Type` as the tracked entity. We represent the enrollment with the `Enrollment` object, which we describe in this section.

Property	Description	Required	Immutable	Type	Example
enrollment	The identifier of the enrollment. Generated if not supplied	No	Yes	String:Uid	ABCDEF12345
program	The program the enrollment represents.	Yes	No	String:Uid	ABCDEF12345
trackedEntity	A reference to the tracked entity enrolled.	Yes	Yes	String:Uid	ABCDEF12345
trackedEntityType	Only for reading data. The type of tracked entity enrolled	No	Yes	String:Uid	ABCDEF12345
status	Status of the enrollment. ACTIVE if not supplied.	No	No	Enum	ACTIVE, COMPLETED, CANCELLED
orgUnit	The organisation unit where the user enrolled the tracked entity.	Yes	No	String:Uid	ABCDEF12345
createdAt	Timestamp when the user created the object. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss

Property	Description	Required	Immutable	Type	Example
createdAtClient	Timestamp when the user created the object on client	No	No	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
updatedAt	Timestamp when the object was last updated. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
updatedAtClient	Timestamp when the object was last updated on client	No	No	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
enrolledAt	Timestamp when the user enrolled the tracked entity.	Yes	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
occurredAt	Timestamp when enrollment occurred.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
completedAt	Timestamp when the user completed the enrollment. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
completedBy	Reference to who completed the enrollment	No	No	String:any	John Doe
followUp	Indicates whether the enrollment requires follow-up. False if not supplied	No	No	Booelan	Default: False, True
deleted	Indicates whether the enrollment has been deleted. It can only change when deleting.	No	Yes	Boolean	False until deleted

Property	Description	Required	Immutable	Type	Example
geometry	A geographical representation of the enrollment. Based on the "featureType" of the Program	No	No	GeoJson	{ "type": "POINT", "coordinates": [123.0, 123.0] }
storedBy	Client reference for who stored/ created the enrollment.	No	No	String:Any	John Doe
createdBy	Only for reading data. User that created the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }
updatedBy	Only for reading data. User that last updated the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }
attributes	A list of tracked entity attribute values connected to the enrollment.	No	No	List of TrackedEntity AttributeValue	See Attribute
events	A list of events owned by the enrollment.	No	No	List of Event	See Event
relationships	A list of relationships connected to the enrollment.	No	No	List of Relationship	See Relationship

Property	Description	Required	Immutable	Type	Example
notes	Notes connected to the enrollment. It can only be created.	No	Yes	List of Note	See Note

> **Note**
>
> `Tracked Entities` "owns" all `Tracked Entity Attribute Values` (Or "attributes" as described in the previous table). However, `Tracked Entity Attributes` are either connected to a `Tracked Entity` through its `Tracked Entity Type` or a `Program`. We often refer to this separation as `Tracked Entity Type Attributes` and `Tracked Entity Program Attributes`. The importance of this separation is related to access control and limiting what information the user can see.
>
> The "attributes" referred to in the `Enrollment` are `Tracked Entity Program Attributes`.

Events

`Events` are either part of an `EVENT PROGRAM` or `TRACKER PROGRAM`. For `TRACKER PROGRAM`, events belong to an `Enrollment`, which again belongs to a `Tracked Entity`. On the other hand, `EVENT PROGRAM` is `Events` not connected to a specific `Enrollment` or `Tracked Entity`. The difference is related to whether we track a specific `Tracked Entity` or not. We sometimes refer to `EVENT PROGRAM` events as "anonymous events" or "single events" since they only represent themselves and not another `Tracked Entity`.

In the API, the significant difference is that all events are either connected to the same enrollment (`EVENT PROGRAM`) or different enrollments (`TRACKER PROGRAM`). The table below will point out any exceptional cases between these two.

Property	Description	Required	Immutable	Type	Example
event	The identifier of the event. Generated if not supplied	No	Yes	String:Uid	ABCDEF12345
programStage	The program stage the event represents.	Yes	No	String:Uid	ABCDEF12345
enrollment	A reference to the enrollment which owns the event. ***Not applicable for EVENT PROGRAM***	Yes	Yes	String:Uid	ABCDEF12345

Property	Description	Required	Immutable	Type	Example
program	Only for reading data. The type of program the enrollment which owns the event has.	No	Yes	String:Uid	ABCDEF12345
trackedEntity	Only for reading data. The tracked entity which owns the event. ***Not applicable for EVENT PROGRAM***	No	No	String:Uid	ABCDEF12345
status	Status of the event. ACTIVE if not supplied.	No	No	Enum	ACTIVE, COMPLETED, VISITED, SCHEDULE, OVERDUE, SKIPPED
enrollmentStatus	Only for reading data. The status of the enrollment which owns the event. ***Not applicable for EVENT PROGRAM***	No	No	Enum	ACTIVE, COMPLETED, CANCELLED
orgUnit	The organisation unit where the user registered the event.	Yes	No	String:Uid	ABCDEF12345
createdAt	Only for reading data. Timestamp when the user created the event. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
createdAtClient	Timestamp when the user created the event on client	No	No	Date:ISO 8601	YYYY-MM-DDThh:mm:ss

Property	Description	Required	Immutable	Type	Example
updatedAt	Only for reading data. Timestamp when the event was last updated. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
updatedAtClient	Timestamp when the event was last updated on client	No	No	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
scheduledAt	Timestamp when the event was scheduled for.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
occurredAt	Timestamp when something occurred.	Yes	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
completedAt	Timestamp when the user completed the event. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
completedBy	Reference to who completed the event	No	No	String:Any	John Doe
followUp	Only for reading data. Indicates whether the event has been flagged for follow-up.	No	No	Boolean	False, True
deleted	Only for reading data. Indicates whether the event has been deleted. It can only change when deleting.	No	Yes	Boolean	False until deleted

Property	Description	Required	Immutable	Type	Example
geometry	A geographical representation of the event. Based on the "featureType" of the Program Stage	No	No	GeoJson	{ "type": "POINT", "coordinates": [123.0, 123.0] }
storedBy	Client reference for who stored/ created the event.	No	No	String:Any	John Doe
createdBy	Only for reading data. User that created the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }
updatedBy	Only for reading data. User that last updated the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }
attributeOptionCombo	Attribute option combo for the event. Default if not supplied or configured.	No	No	String:Uid	ABCDEF12345
attributeCategoryOptions	Attribute category option for the event. Default if not supplied or configured.	No	No	String:Uid	ABCDEF12345

Property	Description	Required	Immutable	Type	Example
assignedUser	A reference to a user who has been assigned to the event.	No	No	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }
dataValues	A list of data values connected to the event.	No	No	List of TrackedEntityAttributeValue	See Attribute
relationships	A list of relationships connected to the event.	No	No	List of Relationship	See Relationship
notes	Notes connected to the event. It can only be created.	No	Yes	List of Note	See Note

Relationships

`Relationships` are objects that link together two other tracker objects. The constraints each side of the relationship must conform to are based on the `Relationship Type` of the `Relationship`.

Property	Description	Required	Immutable	Type	Example
relationship	The identifier of the relationship. Generated if not supplied.	No	Yes	String:Uid	ABCDEF12345
relationshipType	The type of the relationship. Decides what objects can be linked in a relationship.	Yes	Yes	String:Uid	ABCDEF12345
relationshipName	Only for reading data. The name of the relationship type of this relationship	No	No	String:Any	Sibling

Property	Description	Required	Immutable	Type	Example
createdAt	Timestamp when the user created the relationship. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
updatedAt	Timestamp when the relationship was last updated. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
createdAtClient	Timestamp when the user created the relationship on the client.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
bidirectional	Only for reading data. Indicated whether the relationship type is bidirectional or not.	No	No	Boolean	True or False
from, to	A reference to each side of the relationship. Must conform to the constraints set in the relationship type	Yes	Yes	RelationshipItem	{"trackedEntity": {"trackedEntity": "ABCEF12345"}}, {"enrollment": {"enrollment": "ABCDEF12345"}} or {"event": {"event": "ABCDEF12345" }}

Note

`Relationship item` represents a link to an object. Since a `relationship` can be between any tracker object like `tracked entity`, `enrollment`, and `event`, the value depends on the `relationship type`. For example, if a `relationship type` connects from an `event` to a `tracked entity`, the format is strict:

```
{
  "from": {
```

```
    "event": { "event": "ABCDEF12345" }
  },
  "to": {
    "trackedEntity": { "trackedEntity": "FEDCBA12345" }
  }
}
```

Attributes

`Attributes` are the actual values describing the `tracked entities`. They can either be connected through a `tracked entity type` or a `program`. Implicitly this means `attributes` can be part of both a `tracked entity` and an `enrollment`.

Property	Description	Required	Immutable	Type	Example
attribute	A reference to the tracked entity attribute represented.	Yes	Yes	String:Uid	ABCDEF12345
code	Only for reading data. The code of the tracked entity attribute.	No	No	String:Any	ABC
displayName	Only for reading data. The displayName of the tracked entity attribute.	No	No	String:Any	Name
createdAt	Timestamp when the value was added. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
updatedAt	Timestamp when the value was last updated. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
storedBy	Client reference for who stored/ created the value.	No	No	String:Any	John Doe
valueType	Only for reading data. The type of value the attribute represents.	No	No	Enum	TEXT, INTEGER, and more

Property	Description	Required	Immutable	Type	Example
value	The value of the tracked entity attribute.	No	No	String:Any	John Doe

> **Note**
>
> For `attributes` only the "attribute" and "value" properties are required when adding data. "value" can be null, which implies the user should remove the value.
>
> In the context of tracker objects, we refer to `Tracked Entity Attributes` and `Tracked Entity Attribute Values` as "attributes". However, attributes are also their own thing, related to metadata. Therefore, it's vital to separate Tracker attributes and metadata attributes. In the tracker API, it is possible to reference the metadata attributes when specifying `idScheme` (See request parameters for more information).

Data Values

While `Attributes` describes a `tracked entity` or an `enrollment`, `data values` describes an `event`. The major difference is that `attributes` can only have a single value for a given `tracked entity`. In contrast, `data values` can have many different values across different `events` - even if the `events` all belong to the same `enrollment` or `tracked entity`.

Property	Description	Required	Immutable	Type	Example
dataElement	The data element this value represents.	Yes	Yes	String:Uid	ABCDEF12345
value	The value of the data value.	No	No	String:Any	123
providedElsewhere	Indicates whether the user provided the value elsewhere or not. False if not supplied.	No	No	Boolean	False or True
createdAt	Timestamp when the user added the value. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss
updatedAt	Timestamp when the value was last updated. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss

Property	Description	Required	Immutable	Type	Example
storedBy	Client reference for who stored/ created the value.	No	No	String:Any	John Doe
createdBy	Only for reading data. User that created the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }
updatedBy	Only for reading data. User that last updated the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }

Note

For `data elements` only the "dataElement" and "value" properties are required when adding data. "value" can be null, which implies the user should remove the value.

Notes

DHIS2 tracker allows for capturing of data using data elements and tracked entity attributes. However, sometimes there could be a situation where it is necessary to record additional information or comment about the issue at hand. Such additional information can be captured using notes. Notes are equivalent to data value comments from the Aggregate DHIS2 side.

There are two types of notes - notes recorded at the event level and those recorded at the enrollment level. An enrollment can have one or more events. Comments about each of the events - for example, why an event was missed, rescheduled, or why only a few data elements were filled and the like - can be documented using event notes. Each of the events within an enrollment can have its own story/ notes. One can then record, for example, an overall observation of these events using the parent enrollment note. Enrollment notes are also helpful to document, for example, why an enrollment is canceled. It is the user's imagination and use-case when and how to use notes.

Both enrollment and event can have as many notes as needed - there is no limit. However, it is not possible to delete or update neither of these notes. They are like a logbook. If one wants to amend a note, one can do so by creating another note. The only way to delete a note is by deleting the parent object - either event or enrollment.

Notes do not have their dedicated endpoint; they are exchanged as part of the parent event and/or enrollment payload. Below is a sample payload.

```
{
  "trackedEntity": "oi3PMIGYJH8",
  "enrollments": [
    {
      "enrollment": "EbRsJr8LSSO",
      "notes": [
        {
          "note": "vxmCvYcPdaW",
          "value": "Enrollment note 2."
        },
        {
          "value": "Enrollment note 1"
        }
      ],
      "events": [
        {
          "event": "zfzS9WeO0uM",
          "notes": [
            {
              "note": "MAQFb7fAggS",
              "value": "Event Note 1."
            },
            {
              "value": "Event Note 2."
            }
          ]
        }
      ]
    }
  ]
}
```

Property	Description	Required	Immutable	Type	Example
note	The reference of the note. Generated if empty	No	Yes	String:Uid	ABCDEF12345
value	The content of the note.	Yes	Yes	String:Any	This is a note
storedAt	Timestamp when the user added the note. Set on the server.	No	Yes	Date:ISO 8601	YYYY-MM-DDThh:mm:ss

Property	Description	Required	Immutable	Type	Example
storedBy	Client reference for who stored/ created the note.	No	No	String:Any	John Doe
createdBy	Only for reading data. User that created the object. Set on the server	No	Yes	User	{ "uid": "ABCDEF12345", "username": "username", "firstName": "John", "surname": "Doe" }

Users

Property	Description	Required	Immutable	Type	Example
uid	The identifier of the user.	Yes*	Yes	String:Uid	ABCDEF12345
username	Username used by the user.	Yes*	Yes	String:Any	123
firstName	Only for reading data. First name of the user.	No	Yes	String:Any	John
surname	Only for reading data. Last name of the user.	No	Yes	String:Any	Doe

> One between `uid` or `username` field must be provided. If both are provided, only username is considered.

Program stage working lists

The program stage working lists feature within the Capture app is designed to display pre-established working lists relevant to a particular program stage. This functionality enables users to save filters and sorting preferences that are related to program stages, facilitating the organisation and management of their workflow. To interact with them, you'll need to use the */api/programStageWorkingLists* resource. These lists can be shared and follow the same sharing pattern as any other metadata. When using the */api/sharing* the type parameter will be *programStageWorkingLists*.

```
/api/40/programStageWorkingLists
```

Payload on CRUD operations to program stage working lists

The endpoint above can be used to get all program stage working lists. To get a single one, just add at the end the id of the one you are interested in. This is the same in case you want to delete it. On the other hand, if you are looking to create or update a program stage working list, besides the endpoint mentioned above, you'll need to provide a payload in the following format:

Payload

Payload values	Description	Example
name	Name of the working list. Required.	
description	A description of the working list.	
program	Object containing the id of the program. Required.	{"id" : "uy2gU8kTjF"}
programStage	Object containing the id of the program stage. Required.	{"id" : "oRySG82BKE6"}
programStageQueryCriteria	An object representing various possible filtering values. See *Program Stage Query Criteria* definition table below.	

Program Stage Query Criteria

Criteria values	Description	Example
status	The event status. Possible values are ACTIVE, COMPLETED, VISITED, SCHEDULE, OVERDUE, SKIPPED and VISITED	"status":"VISITED"
eventCreatedAt	DateFilterPeriod object filtering based on the event creation date.	{"type":"ABSOLUTE","startDate":"2020-03-01","endDate":"2022-12-30"}
scheduledAt	DateFilterPeriod object filtering based on the event scheduled date.	{"type":"RELATIVE","period":"TODAY"}
enrollmentStatus	Any valid ProgramStatus. Possible values are ACTIVE, COMPLETED and CANCELLED.	"enrollmentStatus": "COMPLETED"
followUp	Indicates whether to filter enrollments marked for follow up or not	"followUp":true
enrolledAt	DateFilterPeriod object filtering based on the event enrollment date.	"enrolledAt": {"type":"RELATIVE","period":"THIS_MONTH"}
enrollmentOccurredAt	DateFilterPeriod object filtering based on the event occurred date.	{"type":"RELATIVE","period":"THIS_MONTH"}
orgUnit	A valid organisation unit UID	"orgUnit": "Rp268JB6Ne4"
ouMode	A valid OU selection mode	"ouMode": "SELECTED"

Criteria values	Description	Example
assignedUserMode	A valid user selection mode for events. Possible values are CURRENT, PROVIDED, NONE, ANY and ALL. If PROVIDED (or null), non-empty assignedUsers in the payload will be expected.	"assignedUserMode":"PROVIDED"
assignedUsers	A list of assigned users for events. To be used along with PROVIDED assignedUserMode above.	"assignedUsers":["DXyJmlo9rge"]
order	List of fields and its directions in comma separated values, the results will be sorted according to it. A single item in order is of the form "orderDimension:direction".	"order": "w75KJ2mc4zz:asc"
displayColumnOrder	Output ordering of columns	"displayColumnOrder": ["w75KJ2mc4zz","zDhUuAYrxNC"]
dataFilters	A list of items that contains the filters to be used when querying events	"dataFilters":[{"dataItem": "GXNUsigphqK","ge": "10","le": "20"}]
attributeValueFilters	A list of attribute value filters. This is used to specify filters for attribute values when listing tracked entities	"attributeValueFilters": [{"attribute": "ruQQnf6rswq","eq": "15"}]

See an example payload below:

```
{
    "name":"Test WL",
    "program":{"id":"uy2gU8kT1jF"},
    "programStage":{"id":"oRySG82BKE6"},
    "description": "Test WL definition",
    "programStageQueryCriteria":
        {
            "status":"VISITED",
            "eventCreatedAt":
{"type":"ABSOLUTE","startDate":"2020-03-01","endDate":"2022-12-30"},
            "scheduledAt": {"type":"RELATIVE","period":"TODAY"},
            "enrollmentStatus": "COMPLETED",
            "followUp" : true,
            "enrolledAt": {"type":"RELATIVE","period":"THIS_MONTH"},
            "enrollmentOccurredAt": {"type":"RELATIVE","period":"THIS_MONTH"},
            "orgUnit": "Rp268JB6Ne4",
            "ouMode": "SELECTED",
            "assignedUserMode":"PROVIDED",
            "assignedUsers":["DXyJmlo9rge"],
            "order": "w75KJ2mc4zz:asc",
            "displayColumnOrder":["w75KJ2mc4zz","zDhUuAYrxNC"],
            "dataFilters":[{
                "dataItem": "GXNUsigphqK",
                "ge": "10",
                "le": "20"
            }],
```

```
            "attributeValueFilters":[{
                "attribute": "ruQQnf6rswq",
                "eq": "15"
            }]
        }
}
```

Tracker Import (`POST /api/tracker`)

The `POST /api/tracker` endpoint allows clients to import the following tracker objects

- **Tracked entities**
- **Enrollments**
- **Events**
- **Relationships**
- Data embedded in other tracker objects

Request parameters

Currently, the tracker import endpoint supports the following parameters:

Parameter name	Description	Type	Allowed values
async	Indicates whether the import should happen asynchronously or synchronously.	Boolean	`TRUE`, `FALSE`
reportMode	Only when performing synchronous import. See importSummary for more info.	Enum	`FULL`, `ERRORS`, `WARNINGS`
importMode	Can either be `VALIDATE` which will report errors in the payload without making changes to the database or `COMMIT` (default) which will validate the payload and make changes to the database.	Enum	`VALIDATE`, `COMMIT`
idScheme	Indicates the overall idScheme to use for metadata references when importing. Default is UID. Can be overridden for specific metadata (Listed below)	Enum	`UID`, `CODE`, `NAME`, `ATTRIBUTE`
dataElementIdScheme	Indicates the idScheme to use for data elements when importing.	Enum	`UID`, `CODE`, `NAME`, `ATTRIBUTE`
orgUnitIdScheme	Indicates the idScheme to use for organisation units when importing.	Enum	`UID`, `CODE`, `NAME`, `ATTRIBUTE`

Parameter name	Description	Type	Allowed values
programIdScheme	Indicates the idScheme to use for programs when importing.	Enum	`UID`, `CODE`, `NAME`, `ATTRIBUTE`
programStageIdScheme	Indicates the idScheme to use for program stages when importing.	Enum	`UID`, `CODE`, `NAME`, `ATTRIBUTE`
categoryOptionComboIdScheme	Indicates the idScheme to use for category option combos when importing.	Enum	`UID`, `CODE`, `NAME`, `ATTRIBUTE`
categoryOptionIdScheme	Indicates the idScheme to use for category options when importing.	Enum	`UID`, `CODE`, `NAME`, `ATTRIBUTE`
importStrategy	Indicates the effect the import should have. Can either be `CREATE`, `UPDATE`, `CREATE_AND_UPDATE` and `DELETE`, which respectively only allows importing new data, importing changes to existing data, importing any new or updates to existing data, and finally deleting data.	Enum	`CREATE`, `UPDATE`, `CREATE_AND_UPDATE`, `DELETE`
atomicMode	Indicates how the import responds to validation errors. If `ALL`, all data imported must be valid for any data to be committed. For `OBJECT`, only the data committed needs to be valid, while other data can be invalid.	Enum	`ALL`, `OBJECT`
flushMode	Indicates the frequency of flushing. This is related to how often data is pushed into the database during the import. Primarily used for debugging reasons, and should not be changed in a production setting	Enum	`AUTO`, `OBJECT`

Parameter name	Description	Type	Allowed values
validationMode	Indicates the completeness of the validation step. It can be skipped, set to fail fast (Return on the first error), or full(Default), which will return any errors found	Enum	`FULL`, `FAIL_FAST`, `SKIP`
skipPatternValidation	If true, it will skip validating the pattern of generated attributes.	Boolean	`TRUE`, `FALSE`
skipSideEffects	If true, it will skip running any side effects for the import	Boolean	`TRUE`, `FALSE`
skipRuleEngine	If true, it will skip running any program rules for the import	Boolean	`TRUE`, `FALSE`

NOTE: idScheme and its metadata specific idScheme parameters like orgUnitIdScheme, programIdScheme, ... used to allow and use the default `AUTO`. `AUTO` has been removed. The default idScheme has already been `UID`. Any requests sent with idScheme `AUTO` will see the same behavior as before, namely matching done using `UID`.

Flat and nested payloads

The importer support both flat and nested payloads.

Flat

The flat payload can contain collections for each of the core tracker objects we have at the top level. This works seamlessly with existing data, which already have UIDs assigned. However,
for new data, the client will have to provide new UIDs for any references between objects. For example, if you import a new tracked entity with a new enrollment, the tracked entity requires the client to provide a UID so that the enrollment can be linked to that UID.

Nested

Nested payloads are the most commonly used structure. Here, tracker objects are embedded within
their parent object. For example, an enrollment within a tracked entity. The advantage of this structure is that the client does not need to provide UIDs for these references as this is done automatically.

> **NOTE**
>
> While nested payloads might prove simpler for clients to deal with, the payload will always be flattened before the import. This means that for large imports, providing a flat structured payload will provide both more control and lower overhead for the import process itself.

Examples for the **FLAT** and the **NESTED** versions of the payload are listed below.

***FLAT* payload**


```
{
  "trackedEntities": [
    {
      "orgUnit": "y77LiPqLMoq",
      "trackedEntity": "Kj6vYde4LHh",
      "trackedEntityType": "nEenWmSyUEp"
    },
    {
      "orgUnit": "y77LiPqLMoq",
      "trackedEntity": "Gjaiu3ea38E",
      "trackedEntityType": "nEenWmSyUEp"
    }
  ],
  "enrollments": [
    {
      "enrolledAt": "2019-08-19T00:00:00.000",
      "enrollment": "MNWZ6hnuhSw",
      "occurredAt": "2019-08-19T00:00:00.000",
      "orgUnit": "y77LiPqLMoq",
      "program": "IpHINAT79UW",
      "status": "ACTIVE",
      "trackedEntity": "Kj6vYde4LHh",
      "trackedEntityType": "nEenWmSyUEp"
    }
  ],
  "events": [
    {
      "attributeCategoryOptions": "xYerKDKCefk",
      "attributeOptionCombo": "HllvX50cXC0",
      "dataValues": [
        {
          "dataElement": "bx6fsa0t90x",
          "value": "true"
        },
        {
          "dataElement": "UXz7xuGCEhU",
          "value": "5.7"
        }
      ],
      "enrollment": "MNWZ6hnuhSw",
      "enrollmentStatus": "ACTIVE",
      "event": "ZwwuwNp6gVd",
      "occurredAt": "2019-08-01T00:00:00.000",
      "orgUnit": "y77LiPqLMoq",
      "program": "IpHINAT79UW",
      "programStage": "A03MvHHogjR",
      "scheduledAt": "2019-08-19T13:59:13.688",
      "status": "ACTIVE",
      "trackedEntity": "Kj6vYde4LHh"
    },
    {
      "attributeCategoryOptions": "xYerKDKCefk",
      "attributeOptionCombo": "HllvX50cXC0",
      "enrollment": "MNWZ6hnuhSw",
      "enrollmentStatus": "ACTIVE",
      "event": "XwwuwNp6gVE",
      "occurredAt": "2019-08-01T00:00:00.000",
      "orgUnit": "y77LiPqLMoq",
      "program": "IpHINAT79UW",
      "programStage": "ZzYYXq4fJie",
```

```
      "scheduledAt": "2019-08-19T13:59:13.688",
      "status": "ACTIVE",
      "trackedEntity": "Kj6vYde4LHh"
    }
  ],
  "relationships": [
    {
      "from": {
        "trackedEntity": {
          "trackedEntity": "Kj6vYde4LHh"
        }
      },
      "relationshipType": "dDrh5UyCyvQ",
      "to": {
        "trackedEntity": {
          "trackedEntity": "Gjaiu3ea38E"
        }
      }
    }
  ]
}
```

***NESTED* payload**

```
{
  "trackedEntities": [
    {
      "enrollments": [
        {
          "attributes": [
            {
              "attribute": "zDhUuAYrxNC",
              "displayName": "Last name",
              "value": "Kelly"
            },
            {
              "attribute": "w75KJ2mc4zz",
              "displayName": "First name",
              "value": "John"
            }
          ],
          "enrolledAt": "2019-08-19T00:00:00.000",
          "events": [
            {
              "attributeCategoryOptions": "xYerKDKCefk",
              "attributeOptionCombo": "HllvX50cXC0",
              "dataValues": [
                {
                  "dataElement": "bx6fsa0t90x",
                  "value": "true"
                },
                {
                  "dataElement": "UXz7xuGCEhU",
                  "value": "5.7"
                }
              ],
              "enrollmentStatus": "ACTIVE",
              "notes": [
                {
                  "value": "need to follow up"
                }
```

```
            ],
            "occurredAt": "2019-08-01T00:00:00.000",
            "orgUnit": "y77LiPqLMoq",
            "program": "IpHINAT79UW",
            "programStage": "A03MvHHogjR",
            "scheduledAt": "2019-08-19T13:59:13.688",
            "status": "ACTIVE"
          }
        ],
        "occurredAt": "2019-08-19T00:00:00.000",
        "orgUnit": "y77LiPqLMoq",
        "program": "IpHINAT79UW",
        "status": "ACTIVE",
        "trackedEntityType": "nEenWmSyUEp"
      }
    ],
    "orgUnit": "y77LiPqLMoq",
    "trackedEntityType": "nEenWmSyUEp"
  }
 ]
}
```


SYNC and ASYNC

For the user, the main difference between importing synchronously rather than asynchronously is the immediate response from the API. For the synchronous import, the response will be returned as soon as the import finishes with the importSummary. However, for asynchronous imports, the response will be immediate and contain a reference where the client can poll for updates to the import.

For significant imports, it might be beneficial for the client to use the asynchronous import to avoid waiting too long for a response.

Examples of the **ASYNC** response is shown below. For **SYNC** response, look at the importSummary section.


```
{
  "httpStatus": "OK",
  "httpStatusCode": 200,
  "status": "OK",
  "message": "Tracker job added",
  "response": {
    "id": "cHh2OCTJvRw",
    "location": "https://play.im.dhis2.org/dev/api/tracker/jobs/cHh2OCTJvRw"
  }
}
```


CSV import

To import events using CSV make a `POST` request with CSV body file and the `Content-Type` set to ***application/csv*** or ***text/csv***.

Events

Every row of the CSV payload represents an event and a data value. So, for events with multiple data values, the CSV file will have `x` rows per event, where `x` is the number of data values in that event.

***CSV PAYLOAD* example**

Your CSV file can look like:

```
event,status,program,programStage,enrollment,orgUnit,occurredAt,scheduledAt,geometry,latitude,longitude,followUp,
A7rzcnZTe2T,ACTIVE,eBAyeGv0exc,Zj7UnCAulEk,RiLEKhWHlxZ,DwpbWkiqjMy,2023-02-12T23:00:00Z,
2023-02-12T23:00:00Z,"POINT (-11.468912037323042 7.515913998868316)",
7.515913998868316,-11.468912037323042,false,false,2017-09-08T19:40:22Z,,
2017-09-08T19:40:22Z,,,,,HllvX50cXC0,xYerKDKCefk,,F3ogKBuviRA,"[-11.4880220438585,7.50978830548003]",admin,false,
2016-12-06T17:22:34.438Z,2016-12-06T17:22:34.438Z
```

See Events CSV in the export section for a more detailed definition of the CSV fields.

Import Summary

The Tracker API has two primary endpoints for consumers to acquire feedback from their imports. These endpoints are most relevant for async import jobs but are available for sync jobs as well. These endpoints will return either the log related to the import or the import summary itself.

> **Note**
>
> These endpoints rely on information stored in the application memory. This means the information will be unavailable after certain cases, as an application restart or after a large number of import requests have started after this one.

After submitting a tracker import request, we can access the following endpoints in order to monitor the job progress based on logs:

`GET /tracker/jobs/{uid}`

Parameter	Description	Example
`{uid}`	The UID of an existing tracker import job	ABCDEF12345

***REQUEST* example**

`GET /tracker/jobs/PQK63sMwjQp`

***RESPONSE* example**


```
[
  {
    "uid": "PQK63sMwjQp",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:16.370",
    "message": "Import complete with status OK, 0 created, 0 updated, 0 deleted, 0 ignored",
    "completed": true,
    "id": "PQK63sMwjQp"
  },
  {
    "uid": "XIfTJ1UUNcd",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:16.369",
```

```
    "message": "PostCommit",
    "completed": false,
    "id": "XIfTJ1UUNcd"
  },
  {
    "uid": "uCG4FNJLLBJ",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:16.364",
    "message": "Commit Transaction",
    "completed": false,
    "id": "uCG4FNJLLBJ"
  },
  {
    "uid": "xfOUv2Lk2MC",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:16.361",
    "message": "Running Rule Engine Validation",
    "completed": false,
    "id": "xfOUv2Lk2MC"
  },
  {
    "uid": "cSPfA776obb",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:16.325",
    "message": "Running Rule Engine",
    "completed": false,
    "id": "cSPfA776obb"
  },
  {
    "uid": "mru3HJrFGKA",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:16.313",
    "message": "Running Validation",
    "completed": false,
    "id": "mru3HJrFGKA"
  },
  {
    "uid": "oTbCUJ2RnA6",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:16.312",
    "message": "Running PreProcess",
    "completed": false,
    "id": "oTbCUJ2RnA6"
  },
  {
    "uid": "lcUNbWTn6uh",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:16.312",
    "message": "Calculating Payload Size",
    "completed": false,
    "id": "lcUNbWTn6uh"
  },
  {
    "uid": "l4jQiSS9qdK",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:15.903",
```

```
    "message": "Running PreHeat",
    "completed": false,
    "id": "l4jQiSS9qdK"
  },
  {
    "uid": "qGbiuqgwPX5",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:15.850",
    "message": "Loading file content",
    "completed": false,
    "id": "qGbiuqgwPX5"
  },
  {
    "uid": "eWNHzVf7iAj",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:15.838",
    "message": "Loading file resource",
    "completed": false,
    "id": "eWNHzVf7iAj"
  },
  {
    "uid": "t9gOjotekQt",
    "level": "INFO",
    "category": "TRACKER_IMPORT_JOB",
    "time": "2024-03-19T13:18:15.837",
    "message": "Tracker import started",
    "completed": false,
    "dataType": "PARAMETERS",
    "data": {
      "userId": "xE7jOejl9FI",
      "importMode": "VALIDATE",
      "idSchemes": {
        "dataElementIdScheme": {
          "idScheme": "UID",
          "attributeUid": null
        },
        "orgUnitIdScheme": {
          "idScheme": "UID",
          "attributeUid": null
        },
        "programIdScheme": {
          "idScheme": "UID",
          "attributeUid": null
        },
        "programStageIdScheme": {
          "idScheme": "UID",
          "attributeUid": null
        },
        "idScheme": {
          "idScheme": "UID",
          "attributeUid": null
        },
        "categoryOptionComboIdScheme": {
          "idScheme": "UID",
          "attributeUid": null
        },
        "categoryOptionIdScheme": {
          "idScheme": "UID",
          "attributeUid": null
        }
      },
```

```
      "importStrategy": "CREATE_AND_UPDATE",
      "atomicMode": "ALL",
      "flushMode": "AUTO",
      "validationMode": "FULL",
      "skipPatternValidation": false,
      "skipSideEffects": false,
      "skipRuleEngine": false,
      "filename": null,
      "reportMode": "ERRORS"
    },
    "id": "t9gOjotekQt"
  }
]
```

Additionally, the following endpoint will return the import summary of the import job. This import summary will only be available after the import has completed:

`GET /tracker/jobs/{uid}/report`

Parameter	Description	Example
path `/{uid}`	The UID of an existing tracker import job.	ABCDEF12345
`reportMode`	The level of detail the report should have.	`FULL|ERRORS|WARNINGS`

REQUEST example

`GET /tracker/jobs/mEfEaFSCKCC/report`

RESPONSE example

The response payload is the same as the one returned after a sync import request.

> **Note**
>
> Both endpoints are used primarily for async import; however, `GET /tracker/jobs/{uid}` would also work for sync requests as it eventually uses the same import process and logging as async requests.

Import Summary Structure

Import summaries have the following overall structure, depending on the requested `reportMode`:

```
{
  "status": "OK",
  "validationReport": {
    "errorReports": [],
    "warningReports": []
  },
  "stats": {
    "created": 3,
    "updated": 0,
    "deleted": 0,
    "ignored": 0,
    "total": 3
  },
  "bundleReport": {
```

```
  "typeReportMap": {
    "EVENT": {
      "trackerType": "EVENT",
      "stats": {
        "created": 1,
        "updated": 0,
        "deleted": 0,
        "ignored": 0,
        "total": 1
      },
      "objectReports": [
        {
          "trackerType": "EVENT",
          "uid": "gTZBPT3Jq39",
          "errorReports": []
        }
      ]
    },
    "ENROLLMENT": {
      "trackerType": "ENROLLMENT",
      "stats": {
        "created": 1,
        "updated": 0,
        "deleted": 0,
        "ignored": 0,
        "total": 1
      },
      "objectReports": [
        {
          "trackerType": "ENROLLMENT",
          "uid": "ffcvJvWjiNZ",
          "errorReports": []
        }
      ]
    },
    "RELATIONSHIP": {
      "trackerType": "RELATIONSHIP",
      "stats": {
        "created": 0,
        "updated": 0,
        "deleted": 0,
        "ignored": 0,
        "total": 0
      },
      "objectReports": []
    },
    "TRACKED_ENTITY": {
      "trackerType": "TRACKED_ENTITY",
      "stats": {
        "created": 1,
        "updated": 0,
        "deleted": 0,
        "ignored": 0,
        "total": 1
      },
      "objectReports": [
        {
          "trackerType": "TRACKED_ENTITY",
          "uid": "aVcGf9iO8Xp",
          "errorReports": []
        }
      ]
    }
```

```
    }
  }
}
```

status

The property, `status`, of the import summary indicates the overall status of the import. If no errors or warnings were raised during the import, the `status` is reported as `OK`. The presence of any error or warnings in the import will result in a status of type `ERROR` or `WARNING`.

`status` is based on the presence of the most significant `validationReport`. `ERROR` has the highest significance, followed by `WARNING` and finally `OK`. This implies that `ERROR` is reported as long as a single error was found during the import, regardless of how many warnings occurred.

> **Note**
>
> If the import is performed using the AtomicMode "OBJECT", where the import will import any data without validation errors, the overall status will still be `ERROR` if any errors were found.

validationReport

The `validationReport` might include `errorReports` and `warningReports` if any errors or warnings were present during the import. When present, they provide a detailed list of any errors or warnings encountered.

For example, a validation error while importing a `TRACKED_ENTITY`:

```
{
  "validationReport": {
    "errorReports": [
      {
        "message": "Could not find TrackedEntityType: `Q9GufDoplCL`.",
        "errorCode": "E1005",
        "trackerType": "TRACKED_ENTITY",
        "uid": "Kj6vYde4LHh"
      },
      ...
    ],
    "warningReports" : [ ... ]
  }
}
```

The report contains a message and a code describing the actual error (See the error codes section for more information about errors). Additionally, the report includes the `trackerType` and `uid`, which aims to describe where in the data the error was found. In this case, there was a `TRACKED_ENTITY` with the uid `Kj6vYde4LHh`, which had a reference to a tracked entity type that was not found.

> **Note**
>
> When referring to the `uid` of tracker objects, they are labeled as their object names in the payload. For example, the `uid` of a tracked entity would in the payload have the name "trackedEntity". The same goes for "enrollment", "event" and "relationship" for enrollments, events, and relationships, respectively.

If no uid is provided in the payload, the import process will generate new uids. This means the error report might refer to a uid that does not exist in your payload.

Errors represent issues with the payload which the importer can not circumvent. Any errors will block that data from being imported. Warnings, on the other hand, are issues where it's safe to circumvent them, but the user should be made aware that it happened. Warnings will not block data from being imported.

stats

The stats provide a quick overview of the import. After an import is completed, these will be the actual counts representing how much data was created, updated, deleted, or ignored.

Example:

```
{
  "stats": {
    "created": 2,
    "updated": 2,
    "deleted": 1,
    "ignored": 5,
    "total": 10
  }
}
```

`created` refers to how many new objects were created. In general, objects without an existing uid in the payload will be treated as new objects.

`updated` refers to the number of objects updated. If an object has a uid set in the payload, it will be treated as an update as long as that same uid exists in the database.

`deleted` refers to the number of objects deleted during the import. Deletion only happens when the import is configured to delete data and only then when the objects in the payload have existing uids set.

`ignored` refers to objects that were not persisted. Objects can be ignored for several reasons, for example trying to create something that already exists. Ignores should always be safe, so if something was ignored, it was not necessary, or it was due to the configuration of the import.

bundleReport

When the import is completed, the `bundleReport` contains all the tracker objects imported.

For example, `TRACKED_ENTITY`:

```
{
  "bundleReport": {
    "typeReportMap": {
      "TRACKED_ENTITY": {
        "trackerType": "TRACKED_ENTITY",
        "stats": {
          "created": 1,
          "updated": 0,
          "deleted": 0,
          "ignored": 0,
          "total": 1
```

```
        },
        "objectReports": [
          {
            "trackerType": "TRACKED_ENTITY",
            "uid": "aVcGf9iO8Xp",
            "errorReports": []
          }
        ]
      }
    }
  }
}
```

As seen, each type of tracker object will be reported, and each has its own stats and `objectReports`. These `objectReports` will provide details about each imported object, like their type, their uid, and any error or warning reports is applicable.

message

If the import ended abruptly, the `message` would contain further information in relation to what happened.

Import Summary Report Level

As previously stated, `GET /tracker/jobs/{uid}/report` can be retrieved using a specific `reportMode` parameter. By default the endpoint will return an `importSummary` with `reportMode` `ERROR`.

Parameter	Description
`FULL`	Returns everything from `WARNINGS`, plus `timings` `Stats`
`WARNINGS`	Returns everything from `ERRORS`, plus `warningReports` in `validationReports`
`ERRORS` (default)	Returns only `errorReports` in `validationReports`

In addition, all `reportModes` will return `status`, `stats`, `bundleReport` and `message` when applicable.

Error Codes

There are various error codes for different error scenarios. The following table has the list of error codes thrown from the new Tracker API, along with the error messages and some additional descriptions. The placeholders in the error messages (`{0}`,`{1}`,`{2}`..) are usually uids unless otherwise specified.

Error Code	Error Message	Description
E1000	User: `{0}`, has no write access to OrganisationUnit: `{1}`.	This typically means that the OrganisationUnit `{1}` is not in the capture scope of the user `{0}` for the write operation to be authorized.

Error Code	Error Message	Description
E1001	User: {0}, has no data write access to TrackedEntityType: {1}.	The error occurs when the user is not authorized to create or modify data of the TrackedEntityType {1}
E1002	TrackedEntity: {0}, already exists.	This error is thrown when trying to create a new TrackedEntity with an already existing uid. Make sure a new uid is used when adding a new TrackedEntity.
E1003	OrganisationUnit: {0} of TrackedEntity is outside search scope of User: {1}.	
E1005	Could not find TrackedEntityType: {0}.	Error thrown when trying to fetch a non existing TrackedEntityType with uid {0} . This might also mean that the user does not have read access to the TrackedEntityType.
E1006	Attribute: {0}, does not exist.	Error thrown when the system was not able to find a matching TrackedEntityAttribute with uid {0}. This might also mean that the user does not have access to the TrackedEntityAttribute.
E1007	Error validating attribute value type: {0}; Error: {1}.	Mismatch between value type of a TrackedEntityAttribute and its provided attribute value. The actual validation error will be displayed in {1}.
E1008	Program stage {0} has no reference to a program. Check the program stage configuration	
E1009	File resource: {0}, has already been assigned to a different object.	The File resource uid {0} is already assigned to another object in the system.
E1010	Could not find Program: {0}, linked to Event.	The system was unable to find a Program with the uid {0} specified inside the Event payload. This might also mean that the specific Program is not accessible by the logged in user.
E1011	Could not find OrganisationUnit: {0}, linked to Event.	The system was unable to find a OrganisationUnit with uid {0} specified inside the Event payload.
E1012	Geometry does not conform to FeatureType: {0}.	FeatureType provided is either NONE or an incompatible one for the provided geometry value.

Error Code	Error Message	Description
E1013	Could not find ProgramStage: {0}, linked to Event.	The system was unable to find a ProgramStage with uid {0} specified inside the Event payload. This might also mean that the ProgramStage is not accessible to the logged in user.
E1014	Provided Program: {0}, is a Program without registration. An Enrollment cannot be created into Program without registration.	Enrollments can only be created for Programs with registration.
E1015	TrackedEntity: {0}, already has an active Enrollment in Program {1}.	Cannot enroll into a Program if another active enrollment already exists for the Program. The active enrollment will have to be completed first at least.
E1016	TrackedEntity: {0}, already has an active enrollment in Program: {1}, and this program only allows enrolling one time.	As per the Program {1} configuration, a TrackedEntity can only be enrolled into that Program once. It looks like the TrackedEntity {0} already has either an ACTIVE or COMPLETED enrollment in that Program. Hence another enrollment cannot be added.
E1018	Attribute: {0}, is mandatory in program {1} but not declared in enrollment {2}.	Attribute value is missing in payload, for an attribute that is defined as mandatory for a Program. Make sure that attribute values for mandatory attributes are provided in the payload.
E1019	Only Program attributes is allowed for enrollment; Non valid attribute: {0}.	Attribute uid {0} specified in the enrollment payload is not associated with the Program.
E1020	Enrollment date: {0}, can`t be future date.	Cannot enroll into a future date unless the Program allows for it in its configuration.
E1021	Incident date: {0}, can`t be future date.	Incident date cannot be a future date unless the Program allows for it in its configuration.
E1022	TrackedEntity: {0}, must have same TrackedEntityType as Program {1}.	The Program is configured to accept TrackedEntityType uid that is different from what is provided in the enrollment payload.
E1023	DisplayIncidentDate is true but property occurredAt is null or has an invalid format: {0}.	Program is configured with DisplayIncidentDate but its either null or an invalid date in the payload.

Error Code	Error Message	Description
E1025	Property enrolledAt is null or has an invalid format: {0}.	EnrolledAt Date is mandatory for an Enrollment. Make sure it is not null and has a valid date format.
E1029	Event OrganisationUnit: {0}, and Program: {1}, don't match.	The Event payload uses a Program {1} which is not configured to be accessible by OrganisationUnit {0}.
E1030	Event: {0}, already exists.	This error is thrown when trying to add a new Event with an already existing uid. Make sure a new uid is used when adding a new Event.
E1031	Event OccurredAt date is missing.	OccuredAt property is either null or has an invalidate date format in the payload.
E1032	Event: {0}, do not exist.	
E1033	Event: {0}, Enrollment value is NULL.	
E1035	Event: {0}, ProgramStage value is NULL.	
E1039	ProgramStage: {0}, is not repeatable and an event already exists.	An Event already exists for the ProgramStage for the specific Enrollment. Since the ProgramStage is configured to be non-repeatable, another Event for the same ProgramStage cannot be added.
E1041	Enrollment OrganisationUnit: {0}, and Program: {1}, don't match.	The Enrollment payload contains a Program {1} which is not configured to be accessible by the OrganisationUnit {0}.
E1042	Event: {0}, needs to have completed date.	If the program is configured to have completeExpiryDays, then CompletedDate is mandatory for a COMPLETED event payload. An Event with status as COMPLETED should have completedDate property as non-null and a valid date format.
E1043	Event: {0}, completeness date has expired. Not possible to make changes to this event.	A user without 'F_EDIT_EXPIRED' authority cannot update an Event that has passed its expiry days as configured in its Program.
E1045	Program: {0}, expiry date has passed. It is not possible to make changes to this event.	

Error Code	Error Message	Description
E1046	Event: {0}, needs to have at least one (event or schedule) date.	Either of occuredAt or scheduledAt property should be present in the Event payload.
E1047	Event: {0}, date belongs to an expired period. It is not possible to create such event.	Event occuredAt or scheduledAt has a value that is earlier than the PeriodType start date.
E1048	Object: {0}, uid: {1}, has an invalid uid format.	A valid uid has 11 characters. The first character has to be an alphabet (a-z or A-Z) and the remaining 10 characters can be alphanumeric (a-z or A-Z or 0-9).
E1049	Could not find OrganisationUnit: {0}, linked to Tracked Entity.	The system could not find an OrganisationUnit with uid {0}.
E1050	Event ScheduledAt date is missing.	ScheduledAt property in the Event payload is either missing or an invalid date format.
E1054	AttributeOptionCombo {0} is not in the event programs category combo {1}.	
E1055	Default AttributeOptionCombo is not allowed since program has non-default CategoryCombo.	The Program is configured to contain non-default CategoryCombo but the request uses the Default AttributeOptionCombo.
E1056	Event date: {0}, is before start date: {1}, for AttributeOption: {2}.	The CategoryOption has a start date configured , the Event date in the payload cannot be earlier than this start date.
E1057	Event date: {0}, is after end date: {1}, for AttributeOption; {2}.	The CategoryOption has an end date configured, the Event date in the payload cannot be later than this end date.
E1063	TrackedEntity: {0}, does not exist.	Error thrown when trying to fetch a non existing TrackedEntity with uid {0} . This might also mean that the user does not have read access to the TrackedEntity.
E1064	Non-unique attribute value {0} for attribute {1}	The attribute value has to be unique within the defined scope. The error indicates that the attribute value already exists for another TrackedEntity.
E1068	Could not find TrackedEntity: {0}, linked to Enrollment.	The system could not find the TrackedEntity specified in the Enrollment payload. This might also mean that the user does not have read access to the TrackedEntity.

Error Code	Error Message	Description
E1069	Could not find Program: {0}, linked to Enrollment.	The system could not find the Program specified in the Enrollment payload. This might also mean that the user does not have read access to the Program.
E1070	Could not find OrganisationUnit: {0}, linked to Enrollment.	The system could not find the OrganisationUnit specified in the Enrollment payload.
E1074	FeatureType is missing.	
E1075	Attribute: {0}, is missing uid.	
E1076	{0} {1} is mandatory and can't be null	
E1077	Attribute: {0}, text value exceed the maximum allowed length: {0}.	
E1079	Event: {0}, program: {1} is different from program defined in enrollment {2}.	
E1080	Enrollment: {0}, already exists.	This error is thrown when trying to create a new Enrollmentt with an already existing uid. Make sure a new uid is used when adding a new Enrollment.
E1081	Enrollment: {0}, do not exist.	Error thrown when trying to fetch a non existing Enrollment with uid {0} . This might also mean that the user does not have read access to the Enrollment.
E1082	Event: {0}, is already deleted and can't be modified.	If the event is soft deleted, no modifications on it are allowed.
E1083	User: {0}, is not authorized to modify completed events.	Only a super user or a user with the authority "F_UNCOMPLETE_EVENT" can modify completed events. Completed Events are those Events with status as COMPLETED.
E1084	File resource: {0}, reference could not be found.	
E1085	Attribute: {0}, value does not match value type: {1}.	Mismatch between value type of an attribute and its provided attribute value.
E1086	Event: {0}, has a program: {1}, that is a registration but its ProgramStage is not valid or missing.	

Error Code	Error Message	Description
E1087	Event: `{0}`, could not find DataElement: `{1}`, linked to a data value.	
E1088	Event: `{0}`, program: `{1}`, and ProgramStage: `{2}`, could not be found.	
E1089	Event: `{0}`, references a Program Stage `{1}` that does not belong to Program `{2}`.	The ProgramStage uid and Program uid in the Event payload is incompatible.
E1090	Attribute: `{0}`, is mandatory in tracked entity type `{1}` but not declared in tracked entity `{2}`.	The payload has missing values for mandatory TrackedEntityTypeAttributes.
E1091	User: `{0}`, has no data write access to Program: `{1}`.	The Program sharing configuration is such that, the user does not have write access for this Program.
E1094	Not allowed to update Enrollment: `{0}`, existing Program `{1}`.	The Enrollment payload for an existing Enrollment has a different Program uid than the one it was originally enrolled with.
E1095	User: `{0}`, has no data write access to ProgramStage: `{1}`.	The ProgramStage sharing configuration is such that, the user does not have write access for this ProgramStage.
E1096	User: `{0}`, has no data read access to Program: `{1}`.	The Program sharing configuration is such that, the user does not have read access for this Program.
E1099	User: `{0}`, has no write access to CategoryOption: `{1}`.	The CategoryOption sharing configuration is such that, the user does not have write access for this CategoryOption
E1100	User: `{0}`, is lacking 'F_TEI_CASCADE_DELETE' authority to delete TrackedEntity: `{1}`.	There exists undeleted Enrollments for this TrackedEntity. If the user does not have 'F_TEI_CASCADE_DELETE' authority, then these Enrollments has to be deleted first explicitly to be able to delete the TrackedEntity.

Error Code	Error Message	Description
E1102	User: `{0}`, does not have access to the tracked entity: `{1}`, Program: `{2}`, combination.	This error is thrown when the user's OrganisationUnit does not have the ownership of this TrackedEntity for this specific Program. The owning OrganisationUnit of the TrackedEntity-Program combination should fall into the capture scope (in some cases the search scope) of the user.
E1103	User: `{0}`, is lacking 'F_ENROLLMENT_CASCADE_DELETE' authority to delete Enrollment : `{1}`.	There exists undeleted Events for this Enrollment. If the user does not have 'F_ENROLLMENT_CASCADE_DELETE' authority, then these Events has to be deleted first explicitly to be able to delete the Enrollment.
E1104	User: `{0}`, has no data read access to program: `{1}`, TrackedEntityType: `{2}`.	The sharing configuration of the TrackedEntityType associated with the Program is such that, the user does not have data read access to it.
E1110	Not allowed to update Event: `{0}`, existing Program `{1}`.	The Event payload for an existing Event has a different Program uid than the one it was originally created with.
E1112	Attribute value: `{0}`, is set to confidential but system is not properly configured to encrypt data.	Either JCE files is missing or the configuration property `encryption.password` might be missing in `dhis.conf`.
E1113	Enrollment: `{0}`, is already deleted and can't be modified.	If the Enrollment is soft deleted, no modifications on it are allowed.
E1114	TrackedEntity: `{0}`, is already deleted and can't be modified.	If the TrackedEntity is soft deleted, no modifications on it are allowed.
E1115	Could not find CategoryOptionCombo: `{0}`.	
E1116	Could not find CategoryOption: `{0}`.	This might also mean the CategoryOption is not accessible to the user.
E1117	CategoryOptionCombo does not exist for given category combo and category options: `{0}`.	
E1118	Assigned user `{0}` is not a valid uid.	
E1119	A Tracker Note with uid `{0}` already exists.	

Error Code	Error Message	Description
E1120	ProgramStage {0} does not allow user assignment	Event payload has assignedUserId but the ProgramStage is not configured to allow user assignment.
E1121	Missing required tracked entity property: {0}.	
E1122	Missing required enrollment property: {0}.	
E1123	Missing required event property: {0}.	
E1124	Missing required relationship property: {0}.	
E1125	Value {0} is not a valid option code in option set {1}	
E1126	Not allowed to update Tracked Entity property: {0}.	
E1127	Not allowed to update Enrollment property: {0}.	
E1128	Not allowed to update Event property: {0}.	
E1300	Generated by program rule ({0}) - {1}	
E1301	Generated by program rule ({0}) - Mandatory DataElement {1} is not present	
E1302	Generated by program rule ({0}) - DataElement {1} is not valid: {2}	
E1303	Generated by program rule ({0}) - Mandatory DataElement {1} is not present	
E1304	Generated by program rule ({0}) - DataElement {1} is not a valid data element	
E1305	Generated by program rule ({0}) - DataElement {1} is not part of {2} program stage	
E1306	Generated by program rule ({0}) - Mandatory Attribute {1} is not present	
E1307	Generated by program rule ({0}) - Unable to assign value to data element {1}. The provided value must be empty or match the calculated value {2}	

Error Code	Error Message	Description
E1308	Generated by program rule ({0}) - DataElement {1} is being replaced in event {2}	
E1309	Generated by program rule ({0}) - Unable to assign value to attribute {1}. The provided value must be empty or match the calculated value {2}	
E1310	Generated by program rule ({0}) - Attribute {1} is being replaced in tei {2}	
E1311	Referral events need to have at least one complete relationship	
E1312	Referral events need to have both sides of a relationship	
E1313	Event {0} of an enrollment does not point to an existing tracked entity. The data in your system might be corrupted	Indicates an anomaly in the existing data whereby enrollments might not reference a tracked entity
E4000	Relationship: {0} cannot link to itself	
E4001	Relationship Item {0} for Relationship {1} is invalid: an Item can link only one Tracker entity.	
E4006	Could not find relationship Type: {0}.	
E4010	Relationship Type {0} constraint requires a {1} but a {2} was found.	
E4011	Relationship: {0} cannot be persisted because {1} {2} referenced by this relationship is not valid.	
E4012	Could not find {0}: {1}, linked to Relationship.	
E4014	Relationship type {0} constraint requires a tracked entity having type {1} but {2} was found.	
E4015	Relationship: {0}, already exists.	
E4016	Relationship: {0}, do not exist.	
E4017	Relationship: {0}, is already deleted and cannot be modified.	
E4018	Relationship: {0}, linking {1}: {2} to {3}: {4} already exists.	
E4019	User: {0}, has no data write access to relationship type: {1}.	

Error Code	Error Message	Description
E5000	"{0}" {1} cannot be persisted because "{2}" {3} referenced by it cannot be persisted.	The importer can't persist a tracker object because a reference cannot be persisted.
E5001	"{0}" {1} cannot be deleted because "{2}" {3} referenced by it cannot be deleted.	The importer can't deleted a tracker object because a reference cannot be deleted.
E9999	N/A	Undefined error message.

Validation

While importing data using the tracker importer, a series of validations are performed to ensure the validity of the data. This section will describe some of the different types of validation performed to provide a better understanding if validation fails for your import.

Required properties

Each of the tracker objects has a few required properties that need to be present when importing data. For an exhaustive list of required properties, have a look at the Tracker Object section.

When validating required properties, we are usually talking about references to other data or metadata. In these cases, there are three main criteria:

1. The reference is present and not null in the payload.
2. The reference points to the correct type of data and exists in the database
3. The user has access to see the reference

If the first condition fails, the import will fail with a message about a missing reference. However, suppose the reference points to something that doesn't exist or which the user cannot access. In that case, both cases will result in a message about the reference not being found.

Formats

Some of the properties of tracker objects require a specific format. When importing data, each of these properties is validated against the expected format and will return different errors depending on which property has a wrong format. Some examples of properties that are validated this way:

- UIDs (These cover all references to other data or metadata in DHIS2.)
- Dates
- Geometry (The coordinates must match the format as specified by its type)

User access

All data imported will be validated based on the metadata (Sharing) and the organisation units (Organisation Unit Scopes) referenced in the data. You can find more information about sharing and organisation unit scopes in the following sections.

Sharing is validated at the same time as references are looked up in the database. Metadata outside of the user's access will be treated as if it doesn't exist. The import will validate any metadata referenced in the data.

Organisation units, on the other hand, serve a dual purpose. It will primarily make sure that data can only be imported when imported for an organisation unit the user has within their "capture scope". Secondly, organisation units are also used to restrict what programs are available. That means if you are trying to import data for an organisation unit that does not have access to the Program you are importing, the import will be invalid.

Users with the `ALL` authority will ignore the limits of sharing and organisation unit scopes when they import data. However, they can not import enrollments in organisation units that do not have access to the enrollment program.

Attribute and Data values

Attributes and data values are part of a tracked entity and an event, respectively. However, attributes can be linked to a tracked entity either through its type (TrackedEntityType) or its Program (Program). Additionally, attributes can also be unique.

The initial validation done in the import is to make sure the value provided for an attribute or data element conforms to the type of value expected. For example, suppose you import a value for a data element with a numeric type. In that case, the value is expected to be numeric. Any errors related to a mismatch between a type and a value will result in the same error code but with a specific message related to the type of violation.

Mandatory attributes and data values are also checked. Currently, removing mandatory attributes is not allowed. Some use-cases require values to be sent separately, while others require all values to be sent as one. Programs can be configured to either validate mandatory attributes `ON_COMPLETE` or `ON_UPDATE_AND_INSERT` to accommodate these use-cases.

The import will validate unique attributes at the time of import. That means as long as the provided value is unique for the attribute in the whole system, it will pass. However, if the unique value is fpound used by any other tracked entity other than the one being imported, it will fail.

Configuration

The last part of validations in the importer are validations based on the user's configuration of relevant metadata. For more information about each configuration, check out the relevant sections. Some examples of configurable validations:

- Feature type (For geometry)
- User-assignable events
- Allow future dates
- Enroll once
- And more.

These configurations will further change how validation is performed during import.

Program Rules

Users can configure Program Rules, which adds conditional behavior to tracker forms. In addition to running these rules in the tracker apps, the tracker importer will also run a selection of these rules. Since the importer is also running these rules, we can ensure an additional level of validation.

Not all program rule actions are supported since they are only suitable for a frontend presentation. A complete list of the supported program rule actions is presented below.

Program Rule Action	Supported
DISPLAYTEXT	
DISPLAYKEYVALUEPAIR	

Program Rule Action	Supported
HIDEFIELD	
HIDESECTION	
ASSIGN	X
SHOWWARNING	X
SHOWERROR	X
WARNINGONCOMPLETION	X
ERRORONCOMPLETION	X
CREATEEVENT	
SETMANDATORYFIELD	X
SENDMESSAGE	X
SCHEDULEMESSAGE	X

Program rules are evaluated in the importer in the same way they are evaluated in the Tracker apps. To summarize, the following conditions are considered when enforcing the program rules:

- The program rule must be linked to the data being imported. For example, a program stage or a data element.
- The Program rule's condition must be evaluated to true

The results of the program rules depend on the actions defined in those rules:

- Program rule actions may end in 2 different results: Warnings or Errors.
- Errors will make the validation fail, while the warnings will be reported as a message in the import summary.
    - SHOWWARNING and WARNINGONCOMPLETION actions can generate only Warnings.
    - SHOWERROR, ERRORONCOMPLETION, and SETMANDATORYFIELD actions can generate only Errors.
    - ASSIGN action can generate both Warnings and Errors.
    - When the action is assigning a value to an empty attribute/data element, a warning is generated.
    - When the action is assigning a value to an attribute/data element that already has the same value to be assigned, a warning is generated.
    - When the action is assigning a value to an attribute/data element that already has a value and the value to be assigned is different, an error is generated unless the `RULE_ENGINE_ASSIGN_OVERWRITE` system setting is set to true.

Additionally, program rules can also result in side-effects, like send and schedule messages. More information about side effects can be found in the following section.

> **NOTE**
>
> Program rules can be skipped during import using the `skipProgramRules` parameter.

Side Effects

After an import has been completed, specific tasks might be triggered as a result of the import. These tasks are what we refer to as "Side effects". These tasks perform operations that do not affect the import itself.

Side effects are tasks running detached from the import but are always triggered by an import. Since side effects are detached from the import, they can fail even when the import is successful. Additionally, side effects are only run when the import is successful, so they cannot fail the other way around.

The following side effects are currently supported:

Side Effects	Supported	Description
Tracker Notification	**X**	Updates can trigger notifications. Updates which trigger notifications are **enrollment**, **event update**, **event or enrollment completion**.
ProgramRule Notification	**X**	Program rules can trigger notifications. Note that these notifications are part of program rule effects which are generated through the DHIS2 rule engine.

> **NOTE**
>
> Certain configurations can control the execution of side effects. `skipSideEffects` flag can be set during the import to skip side effects entirely. This parameter can be useful if you import something you don't want to trigger notifications for, as an example.

Assign user to events

Specific workflows benefit from treating events like tasks, and for this reason, you can assign a user to an event.

Assigning a user to an event will not change the access or permissions for users but will create a link between the Event and the user. When an event has a user assigned, you can query events from the API using the `assignedUser` field as a parameter.

When you want to assign a user to an event, you simply provide the UID of the user you want to assign in the `assignedUser` field. See the following example:

```
{
  ...
  "events": [
    {
      "event": "ZwwuwNp6gVd",
      "programStage": "nlXNK4b7LVr",
      "orgUnit": "O6uvpzGd5pu",
      "enrollment": "MNWZ6hnuhSw",
      "assignedUser" : "M0fCOxtkURr"
    }
  ],
  ...
}
```

In this example, the user with uid `M0fCOxtkURr` will be assigned to the Event with uid `ZwwuwNp6gVd`. Only one user can be assigned to a single event.

To use this feature, the relevant program stage needs to have user assignment enabled, and the uid provided for the user must refer to a valid, existing user.

Tracker Export

Tracker export endpoints allow you to retrieve the previously imported objects which are:

- **tracked entities**
- **events**
- **enrollments**
- **relationships**

> **NOTE**
>
> - All tracker export endpoints default to a `JSON` response content. `CSV` is only supported by tracked entities and events.
> - You can export a CSV file by adding the `Accept` header ***text/csv*** or ***application/csv*** to the request.
> - You can download in zip and gzip formats:
>   - CSV for Tracked entities
>   - JSON and CSV for Events
> - You can export a Gzip file by adding the `Accept` header ***application/csv+gzip*** for CSV or ***application/json+gzip*** for JSON.
> - You can export a Zip file by adding the `Accept` header ***application/csv+zip*** for CSV or ***application/json+zip*** for JSON.

Common request parameters

The following endpoint supports standard parameters for pagination.

- **Tracked entities** `GET /api/tracker/trackedEntities`
- **Events** `GET /api/tracker/events`
- **Enrollments** `GET /api/tracker/enrollments`
- **Relationships** `GET /api/tracker/relationships`

Request parameters for pagination

Request parameter	Type	Allowed values	Description
`page`	`Integer`	Any positive integer	Page number to return. Defaults to 1.
`pageSize`	`Integer`	Any positive integer	Page size. Defaults to 50.
`totalPages`	`Boolean`	`true|false`	Indicates whether to return the total number of elements and pages. Defaults to `false` as getting the totals is an expensive operation.

Request parameter	Type	Allowed values	Description
`paging`	`Boolean`	`true|false`	Indicates whether paging should be ignored and all rows should be returned. Defaults to `true`, meaning that by default all requests are paginated, unless `paging=false`.
`skipPaging` **deprecated for removal in version 42 use `paging`**	`Boolean`	`true|false`	Indicates whether paging should be ignored and all rows should be returned. Defaults to `false`, meaning that by default all requests are paginated, unless `skipPaging=true`.
`order`	`String`	Comma-separated list of property name and sort direction pairs in format `propName:sortDirection`. Example: `createdAt:desc` **Note:** `propName` is case sensitive. Valid `sortDirections` are `asc` and `desc`. `sortDirection` is case-insensitive. `sortDirection` defaults to `asc` for properties or UIDs without explicit `sortDirection`.	

> **Caution**
>
> Be aware that the performance is directly related to the amount of data requested. Larger pages will take more time to return.

Request parameters for Organisational Unit selection mode

The available organisation unit selection modes are `SELECTED`, `CHILDREN`, `DESCENDANTS`, `ACCESSIBLE`, `CAPTURE` and `ALL`. Each mode is explained in detail in [this section].

Request parameter to filter responses

All export endpoints accept a `fields` parameter which controls which fields will be returned in the JSON response. `fields` parameter accepts a comma separated list of field names or patterns. A few

possible `fields` filters are shown below. Refer to Metadata field filter for a more complete guide on how to use `fields`.

Examples

Parameter example	Meaning
`fields=*`	returns all fields
`fields=createdAt,uid`	only returns fields `createdAt` and `uid`
`fields=enrollments[*,!uid]`	returns all fields of `enrollments` except `uid`
`fields=enrollments[uid]`	only returns `enrollments` field `uid`
`fields=enrollments[uid,enrolledAt]`	only returns `enrollments` fields `uid` and `enrolledAt`

Tracked Entities (`GET /api/tracker/trackedEntities`)

Two endpoints are dedicated to tracked entities:

- `GET /api/tracker/trackedEntities`
- retrieves tracked entities matching given criteria
- `GET /api/tracker/trackedEntities/{id}`
- retrieves a tracked entity given the provided id

If not otherwise specified, JSON is the default response for the GET method. The API also supports CSV export for single and collection endpoints. Furthermore, compressed CSV types is an option for the collection endpoint.

CSV

In the case of CSV, the `fields` request parameter has no effect, and the response will always contain the following fields:

- trackedEntity (UID)
- trackedEntityType (UID)
- createdAt (Datetime)
- createdAtClient (Datetime)
- updatedAt (Datetime)
- updatedAtClient (Datetime)
- orgUnit (UID)
- inactive (boolean)
- deleted (boolean)
- potentialDuplicate (boolean)
- geometry (WKT, https://en.wikipedia.org/wiki/Well-known_text_representation_of_geometry. You can omit it in case of a `Point` type and with `latitude` and `longitude` provided)
- latitude (Latitude of a `Point` type of Geometry)
- longitude (Longitude of a `Point` type of Geometry)
- attribute (UID)
- displayName (String)
- attrCreatedAt (Attribute creation Datetime)
- attrUpdatedAt (Attribute last update Datetime)
- valueType (String)
- value (String)
- storedBy (String)
- createdBy (Username of user)

- updatedBy (Username of user)

See Tracked Entities and Attributes for more field descriptions.

GZIP

The response is file `trackedEntities.csv.gz` containing the `trackedEntities.csv` file.

ZIP

The response is file `trackedEntities.csv.zip` containing the `trackedEntities.csv` file.

Tracked Entities Collection endpoint `GET /api/tracker/trackedEntities`

The purpose of this endpoint is to retrieve tracked entities matching client-provided criteria.

The endpoint returns a list of tracked entities that match the request parameters.

Request parameter	Type	Allowed values	Description
`filter`	`String`	Comma-separated values of attribute filters.	Narrows response to TEIs matching given filters. A filter is a colon separated property or attribute UID with optional operator and value pairs. Example: `filter=H9IlTX2X6SL:sw:A` with operator starts with `sw` followed by a value. Special characters like + need to be percent-encoded so `%2B` instead of +. Characters such as `:` (colon) or `,` (comma), as part of the filter value, need to be escaped by `/` (slash). Likewise, `/` needs to be escaped. Multiple operator/value pairs for the same property/ attribute like `filter=AuPLng5hLbE:gt:438901703:lt:448901704` are allowed. Repeating the same attribute UID is not allowed. User needs access to the attribute to filter on it.
`orgUnits`	`String`	Comma-separated list of organisation unit `UID`s.	Only return tracked entities belonging to provided organisation units

Request parameter	Type	Allowed values	Description
`orgUnit` **deprecated for removal in version 42 use `orgUnits`**	`String`	Semicolon-separated list of organisation units `UID`s.	Only return tracked entities belonging to provided organisation units.
`orgUnitMode` see org UnitModes	`String`	`SELECTED|CHILDREN|DESCENDANTS|ACCESSIBLE|CAPTURE|ALL`	The mode of selecting organisation units, can be. Default is `SELECTED`, which refers to the selected organisation units only.
`ouMode` **deprecated for removal in version 42 use `orgUnitMode`** see orgUnitModes	`String`	`SELECTED|CHILDREN|DESCENDANTS|ACCESSIBLE|CAPTURE|ALL`	The mode of selecting organisation units, can be. Default is `SELECTED`, which refers to the selected organisation units only.
`program`	`String`	Program `UID`	A program `UID` for which tracked entities in the response must be enrolled into.
`programStatus`	`String`	`ACTIVE|COMPLETED|CANCELLED`	The program status of the tracked entity in the given program.
`programStage`	`String`	`UID`	A program stage `UID` for which tracked entities in the response must have events for.
`followUp`	`Boolean`	`true|false`	Indicates whether the tracked entity is marked for follow up for the specified program.
`updatedAfter`	`DateTime`	ISO-8601	Start date and time for last updated
`updatedBefore`	`DateTime`	ISO-8601	End date and time for last updated
`updatedWithin`	`Duration`	ISO-8601	Returns TEIs not older than specified Duration
`enrollmentEnrolledAfter`	`DateTime`	ISO-8601	Start date and time for enrollment in the given program
`enrollmentEnrolledBefore`	`DateTime`	ISO-8601	End date and time for enrollment in the given program
`enrollmentOccurredAfter`	`DateTime`	ISO-8601	Start date and time and time and time for occurred in the given program

Request parameter	Type	Allowed values	Description
`enrollmentOccurredBefore`	`DateTime`	ISO-8601	End date and time and time for occurred in the given program
`trackedEntityType`	`String`	UID of tracked entity type	Only returns tracked entities of given type.
`trackedEntities`	`String`	Comma-separated list of tracked entity `UIDs`.	Filter the result down to a limited set of tracked entities using explicit uids of the tracked entities by using `trackedEntity=id1,id2`. This parameter will, at the very least, create the outer boundary of the results, forming the list of all tracked entities using the uids provided. If other parameters/ filters from this table are used, they will further limit the results from the explicit outer boundary.
`trackedEntity` **deprecated for removal in version 42 use `trackedEntities`**	`String`	Semicolon-separated list of tracked entity `UIDs`.	Filter the result down to a limited set of tracked entities using explicit uids of the tracked entities by using `trackedEntity=id1;id2`. This parameter will, at the very least, create the outer boundary of the results, forming the list of all tracked entities using the uids provided. If other parameters/ filters from this table are used, they will further limit the results from the explicit outer boundary.
`assignedUserMode`	`String`	`CURRENT|PROVIDED|NONE|ANY`	Restricts result to tracked entities with events assigned based on the assigned user selection mode. See table below "Assigned user modes" for explanations.

Request parameter	Type	Allowed values	Description
`assignedUsers`	`String`	Comma-separated list of user UIDs to filter based on events assigned to the users.	Filter the result down to a limited set of tracked entities with events that are assigned to the given user IDs by using `assignedUser=id1,id2`. This parameter will only be considered if `assignedUserMode` is either `PROVIDED` or `null`. The API will error out, if for example, `assignedUserMode=CURRENT` and `assignedUser=someId`.
`assignedUser` **deprecated for removal in version 42 use `assignedUsers`**	`String`	Semicolon-separated list of user UIDs to filter based on events assigned to the users.	Filter the result down to a limited set of tracked entities with events that are assigned to the given user IDs by using `assignedUser=id1;id2`.This parameter will only be considered if assignedUserMode is either `PROVIDED` or `null`. The API will error out, if for example, `assignedUserMode=CURRENT` and `assignedUser=someId`
`order`	`String`	Comma-separated list of property name or attribute or UID and sort direction pairs in format `propName:sortDirection`.	Supported values are `createdAt`, `createdAtClient`, `enrolledAt`, `inactive`, `trackedEntity`, `updatedAt`, `updatedAtClient`.
`eventStatus`	`String`	`ACTIVE|COMPLETED|VISITED|SCHEDULE|OVERDUE|SKIPPED`	Status of any events in the specified program
`eventOccurredAfter`	`DateTime`	ISO-8601	Start date and time for Event for the given Program
`eventOccurredBefore`	`DateTime`	ISO-8601	End date and time for Event for the given Program
`includeDeleted`	`Boolean`	`true|false`	Indicates whether to include soft-deleted elements

Request parameter	Type	Allowed values	Description
`potentialDuplicate`	`Boolean`	`true|false`	Filter the result based on the fact that a TEI is a Potential Duplicate. true: return TEIs flagged as Potential Duplicates. false: return TEIs NOT flagged as Potential Duplicates. If omitted, we don't check whether a TEI is a Potential Duplicate or not.

The available assigned user modes are explained in the following table.

Assigned user modes

Mode	Description
CURRENT	Includes events assigned to the current logged in user.
PROVIDED	Includes events assigned to the user provided in the request.
NONE	Includes unassigned events only.
ANY	Includes all assigned events, doesn't matter who are they assigned to as long as they assigned to someone.

The query is case insensitive. The following rules apply to the query parameters.

- At least one organisation unit must be specified using the `orgUnit` parameter (one or many), or `orgUnitMode=ALL` must be specified.
- Only one of the `program` and `trackedEntity` parameters can be specified (zero or one).
- If `programStatus` is specified, then `program` must also be specified.
- If `followUp` is specified, then `program` must also be specified.
- If `enrollmentEnrolledAfter` or `enrollmentEnrolledBefore` is specified then `program` must also be specified.
- Filter items can only be specified once.

Example requests

A query for all tracked entities associated with a specific organisation unit and program can look like this:

```
GET /api/tracker/trackedEntities?program=IpHINAT79UW&orgUnits=DiszpKrYNg8
```

To query for tracked entities using one attribute with a filter and one attribute without a filter, with one organisation unit using the descendant organisation unit query mode:

```
GET /api/tracker/trackedEntities?
program=IpHINAT79UW&orgUnits=DiszpKrYNg8&filter=w75KJ2mc4zz:EQ:John
```

A query where multiple operand and filters are specified for a filter item:

```
GET /api/tracker/trackedEntities?orgUnits=DiszpKrYNg8&program=ur1Edk5Oe2n&filter=lw1SqmMlnfh:GT:
150&filter=lw1SqmMlnfh:LT:190
```

A query filter with a value that needs escaping and will be interpreted as `:,/`:

```
GET /api/tracker/trackedEntities?
orgUnits=DiszpKrYNg8&program=ur1Edk5Oe2n&filter=lw1SqmMlnfh:EQ:/:/,//
```

To specify program enrollment dates as part of the query:

```
GET /api/tracker/trackedEntities?
orgUnits=DiszpKrYNg8&program=IpHINAT79UW&fields=trackedEntity,enrollments[enrolledAt]&enrollmentEnrolledAfter=202
```

To query on an attribute using multiple values in an *IN* filter:

```
GET /api/tracker/trackedEntities?
trackedEntityType=nEenWmSyUEp&orgUnits=DiszpKrYNg8&filter=w75KJ2mc4zz:IN:Scott;Jimmy;Santiago
```

You can use a range of operators for the filtering:

Operator	Description
`EQ`	Equal to
`GE`	Greater than or equal to
`GT`	Greater than
`IN`	Equal to one of the multiple values separated by ";"
`LE`	Less than or equal to
`LIKE`	Like (free text match)
`LT`	Less than
`NE`	Not equal to

Tracked Entities response example

The API supports CSV and JSON response for `GET /api/tracker/trackedEntities`.

JSON

Responses can be filtered on desired fields, see Request parameter to filter responses

A JSON response can look like the following:

```
{
  "pager": {
    "page": 1,
    "pageSize": 1
  },
  "trackedEntities": [
    {
      "trackedEntity": "F8yKM85NbxW",
      "trackedEntityType": "Zy2SEgA61ys",
      "createdAt": "2019-08-21T13:25:38.022",
      "createdAtClient": "2019-03-19T01:12:16.624",
      "updatedAt": "2019-08-21T13:31:33.410",
      "updatedAtClient": "2019-03-19T01:12:16.624",
      "orgUnit": "DiszpKrYNg8",
      "inactive": false,
      "deleted": false,
      "potentialDuplicate": false,
      "geometry": {
        "type": "Point",
        "coordinates": [
          -11.7896,
          8.2593
        ]
      },
      "attributes": [
        {
          "attribute": "B6TnnFMgmCk",
          "displayName": "Age (years)",
          "createdAt": "2019-08-21T13:25:38.477",
          "updatedAt": "2019-08-21T13:25:38.477",
          "storedBy": "braimbault",
          "valueType": "INTEGER_ZERO_OR_POSITIVE",
          "value": "30"
        },
        {
          "attribute": "TfdH5KvFmMy",
          "displayName": "First Name",
          "createdAt": "2019-08-21T13:25:38.066",
          "updatedAt": "2019-08-21T13:25:38.067",
          "storedBy": "josemp10",
          "valueType": "TEXT",
          "value": "Sarah"
        },
        {
          "attribute": "aW66s2QSosT",
          "displayName": "Last Name",
          "createdAt": "2019-08-21T13:25:38.388",
          "updatedAt": "2019-08-21T13:25:38.388",
          "storedBy": "karoline",
          "valueType": "TEXT",
          "value": "Johnson"
        }
      ]
    }
  ]
}
```


CSV

A CSV response can look like the following:

```
trackedEntity,trackedEntityType,createdAt,createdAtClient,updatedAt,updatedAtClient,orgUnit,inactive,deleted,pote
F8yKM85NbxW,Zy2SEgA61ys,2019-08-21T11:25:38.022Z,2019-03-19T00:12:16.624Z,
2019-08-21T11:31:33.410Z,2019-03-19T00:12:16.624Z,DiszpKrYNg8,false,false,false,"POINT
(-11.7896 8.2593)",8.2593,-11.7896,,,,2019-08-21T11:25:38.477Z,
2019-08-21T11:25:38.477Z,B6TnnFMgmCk,"Age (years)",30,INTEGER_ZERO_OR_POSITIVE
F8yKM85NbxW,Zy2SEgA61ys,2019-08-21T11:25:38.022Z,2019-03-19T00:12:16.624Z,
2019-08-21T11:31:33.410Z,2019-03-19T00:12:16.624Z,DiszpKrYNg8,false,false,false,"POINT
(-11.7896 8.2593)",8.2593,-11.7896,,,,2019-08-21T11:25:38.066Z,
2019-08-21T11:25:38.067Z,TfdH5KvFmMy,"First Name",Sarah,TEXT
F8yKM85NbxW,Zy2SEgA61ys,2019-08-21T11:25:38.022Z,2019-03-19T00:12:16.624Z,
2019-08-21T11:31:33.410Z,2019-03-19T00:12:16.624Z,DiszpKrYNg8,false,false,false,"POINT
(-11.7896 8.2593)",8.2593,-11.7896,,,,2019-08-21T11:25:38.388Z,
2019-08-21T11:25:38.388Z,aW66s2QSosT,"Last Name",Johnson,TEXT
```

Tracked Entities single object endpoint `GET /api/tracker/trackedEntities/{uid}`

The purpose of this endpoint is to retrieve one tracked entity given its uid.

Request syntax

`GET /api/tracker/trackedEntities/{uid}?program={programUid}&fields={fields}`

Request parameter	Type	Allowed values	Description
`uid`	`String`	`uid`	Return the tracked entity with specified `uid`
`program`	`String`	`uid`	Include program attributes in the response (only the ones user has access to)
`fields`	`String`	Any valid field filter (default `*,!relationships,!enrollments,!events,!programOwners`)	Include specified sub-objects in the response

Example requests

A query for a tracked entity:

```
GET /api/tracker/trackedEntities/PQfMcpmXeFE
```

Tracked Entity response example

The API supports CSV and JSON response for `GET /api/tracker/trackedEntities/{uid}`

JSON

An example of a json response:

```
{
  "trackedEntity": "PQfMcpmXeFE",
  "trackedEntityType": "nEenWmSyUEp",
  "createdAt": "2014-03-06T05:49:28.256",
  "createdAtClient": "2014-03-06T05:49:28.256",
  "updatedAt": "2016-08-03T23:49:43.309",
  "orgUnit": "DiszpKrYNg8",
  "inactive": false,
  "deleted": false,
  "potentialDuplicate": false,
  "attributes": [
    {
      "attribute": "w75KJ2mc4zz",
      "code": "MMD_PER_NAM",
      "displayName": "First name",
      "createdAt": "2016-08-03T23:49:43.308",
      "updatedAt": "2016-08-03T23:49:43.308",
      "valueType": "TEXT",
      "value": "John"
    },
    {
      "attribute": "zDhUuAYrxNC",
      "displayName": "Last name",
      "createdAt": "2016-08-03T23:49:43.309",
      "updatedAt": "2016-08-03T23:49:43.309",
      "valueType": "TEXT",
      "value": "Kelly"
    }
  ],
  "enrollments": [
    {
      "enrollment": "JMgRZyeLWOo",
      "createdAt": "2017-03-06T05:49:28.340",
      "createdAtClient": "2016-03-06T05:49:28.340",
      "updatedAt": "2017-03-06T05:49:28.357",
      "trackedEntity": "PQfMcpmXeFE",
      "program": "IpHINAT79UW",
      "status": "ACTIVE",
      "orgUnit": "DiszpKrYNg8",
      "enrolledAt": "2024-03-06T00:00:00.000",
      "occurredAt": "2024-03-04T00:00:00.000",
      "followUp": false,
      "deleted": false,
      "events": [
        {
          "event": "Zq2dg6pTNoj",
          "status": "ACTIVE",
          "program": "IpHINAT79UW",
          "programStage": "ZzYYXq4fJie",
          "enrollment": "JMgRZyeLWOo",
          "trackedEntity": "PQfMcpmXeFE",
          "relationships": [],
          "scheduledAt": "2023-03-10T00:00:00.000",
          "followUp": false,
          "deleted": false,
          "createdAt": "2017-03-06T05:49:28.353",
          "createdAtClient": "2016-03-06T05:49:28.353",
          "updatedAt": "2017-03-06T05:49:28.353",
          "attributeOptionCombo": "HllvX50cXC0",
          "attributeCategoryOptions": "xYerKDKCefk",
          "dataValues": [],
          "notes": [],
          "followup": false
```

```
        }
      ],
      "relationships": [],
      "attributes": [
        {
          "attribute": "w75KJ2mc4zz",
          "code": "MMD_PER_NAM",
          "displayName": "First name",
          "createdAt": "2016-08-03T23:49:43.308",
          "updatedAt": "2016-08-03T23:49:43.308",
          "valueType": "TEXT",
          "value": "John"
        },
        {
          "attribute": "zDhUuAYrxNC",
          "displayName": "Last name",
          "createdAt": "2016-08-03T23:49:43.309",
          "updatedAt": "2016-08-03T23:49:43.309",
          "valueType": "TEXT",
          "value": "Kelly"
        },
        {
          "attribute": "AuPLng5hLbE",
          "code": "National identifier",
          "displayName": "National identifier",
          "createdAt": "2016-08-03T23:49:43.301",
          "updatedAt": "2016-08-03T23:49:43.301",
          "valueType": "TEXT",
          "value": "245435245"
        },
        {
          "attribute": "ruQQnf6rswq",
          "displayName": "TB number",
          "createdAt": "2016-08-03T23:49:43.308",
          "updatedAt": "2016-08-03T23:49:43.308",
          "valueType": "TEXT",
          "value": "1Z 1F2 A84 59 4464 173 6"
        },
        {
          "attribute": "cejWyOfXge6",
          "displayName": "Gender",
          "createdAt": "2016-08-03T23:49:43.307",
          "updatedAt": "2016-08-03T23:49:43.307",
          "valueType": "TEXT",
          "value": "Male"
        },
        {
          "attribute": "VqEFza8wbwA",
          "code": "MMD_PER_ADR1",
          "displayName": "Address",
          "createdAt": "2016-08-03T23:49:43.307",
          "updatedAt": "2016-08-03T23:49:43.307",
          "valueType": "TEXT",
          "value": "Main street 2"
        }
      ],
      "notes": []
    }
  ],
  "programOwners": [
    {
      "orgUnit": "DiszpKrYNg8",
      "trackedEntity": "PQfMcpmXeFE",
```

```
      "program": "ur1Edk5Oe2n"
    },
    {
      "orgUnit": "DiszpKrYNg8",
      "trackedEntity": "PQfMcpmXeFE",
      "program": "IpHINAT79UW"
    }
  ]
}
```


csv

The response will be the same as the collection endpoint but referring to a single tracked entity, although it might have multiple rows for each attribute.

Enrollments (`GET /api/tracker/enrollments`)

Two endpoints are dedicated to enrollments:

- `GET /api/tracker/enrollments`
  - retrieves enrollments matching given criteria
- `GET /api/tracker/enrollments/{id}`
  - retrieves an enrollment given the provided id

Enrollment Collection endpoint `GET /api/tracker/enrollments`

Returns a list of events based on filters.

Request parameter	Type	Allowed values	Description
`orgUnits`	`String`	Comma-separated list of organisation unit `UID`s.	Only return enrollments belonging to provided organisation units.
`orgUnit` **deprecated for removal in version 42 use `orgUnits`**	`String`	Semicolon-separated list of organisation units `UID`s.	Only return enrollments belonging to provided organisation units.
`orgUnitMode` see org UnitModes	`String`	`SELECTED|CHILDREN|DESCENDANTS|ACCESSIBLE|CAPTURE|ALL`	The mode of selecting organisation units, can be. Default is `SELECTED`, which refers to the selected organisation units only.
`ouMode` **deprecated for removal in version 42 use `orgUnitMode`** see orgUnitModes	`String`	`SELECTED|CHILDREN|DESCENDANTS|ACCESSIBLE|CAPTURE|ALL`	The mode of selecting organisation units, can be. Default is `SELECTED`, which refers to the selected organisation units only.
`program`	`String`	`uid`	Identifier of program
`programStatus`	`enum`	`ACTIVE|COMPLETED|CANCELLED`	Program Status
`followUp`	`boolean`	`true|false`	Follow up status of the tracked entity for the given program. Can be `true|false` or omitted.

Request parameter	Type	Allowed values	Description
`updatedAfter`	`DateTime`	ISO-8601	Only enrollments updated after this date
`updatedWithin`	`Duration`	ISO-8601	Only enrollments updated since given duration
`enrolledAfter`	`DateTime`	ISO-8601	Only enrollments newer than this date
`enrolledBefore`	`DateTime`	ISO-8601	Only enrollments older than this date
`trackedEntityType`	`String`	`uid`	Identifier of tracked entity type
`trackedEntity`	`String`	`uid`	Identifier of tracked entity
`order`	`String`	Comma-separated list of property name or attribute or UID and sort direction pairs in format `propName:sortDirection`.	Supported fields: `completedAt`, `createdAt`, `createdAtClient`, `enrolledAt`, `updatedAt`, `updatedAtClient`.
`enrollments`	`String`	Comma-separated list of enrollment `UIDs`.	Filter the result down to a limited set of IDs by using `enrollments=id1,id2`.
`enrollment` **deprecated for removal in version 42 use `enrollments`**	`String`	Semicolon-separated list of `uid`	Filter the result down to a limited set of IDs by using `enrollment=id1;id2`.
`includeDeleted`	`Boolean`		When true, soft deleted events will be included in your query result.

The query is case-insensitive. The following rules apply to the query parameters.

- At least one organisation unit must be specified using the `orgUnit` parameter (one or many), or *orgUnitMode=ALL* must be specified.
- Only one of the *program* and *trackedEntity* parameters can be specified (zero or one).
- If *programStatus* is specified, then *program* must also be specified.
- If *followUp* is specified, then *program* must also be specified.
- If *enrolledAfter* or *enrolledBefore* is specified, then *program* must also be specified.

Example requests

A query for all enrollments associated with a specific organisation unit can look like this:

```
GET /api/tracker/enrollments?orgUnits=DiszpKrYNg8
```

To constrain the response to enrollments which are part of a specific program you can include a program query parameter:

```
GET /api/tracker/enrollments?orgUnits=O6uvpzGd5pu&orgUnitMode=DESCENDANTS&program=ur1Edk5Oe2n
```

To specify program enrollment dates as part of the query:

```
GET /api/tracker/enrollments?
orgUnits=DiszpKrYNg8&program=M3xtLkYBlKI&enrolledAfter=2023-11-14&enrolledBefore=2024-02-07
```

To constrain the response to enrollments of a specific tracked entity you can include a tracked entity query parameter:

```
GET /api/tracker/enrollments?trackedEntity=ClJ3fn47c4s
```

To constrain the response to enrollments of a specific tracked entity you can include a tracked entity query parameter, in In this case, we have restricted it to available enrollments viewable for current user:

```
GET /api/tracker/enrollments?orgUnitMode=ACCESSIBLE&trackedEntity=tphfdyIiVL6
```

Response format

The JSON response can look like the following.

```
{
  "pager": {
    "page": 1,
    "pageSize": 1
  },
  "enrollments": [
    {
      "enrollment": "TRE0GT7eh7Q",
      "createdAt": "2019-08-21T13:28:00.056",
      "createdAtClient": "2018-11-13T15:06:49.009",
      "updatedAt": "2019-08-21T13:29:44.942",
      "updatedAtClient": "2019-08-21T13:29:44.942",
      "trackedEntity": "s4NfKOuayqG",
      "program": "M3xtLkYBlKI",
      "status": "COMPLETED",
      "orgUnit": "DiszpKrYNg8",
      "enrolledAt": "2023-11-13T00:00:00.000",
      "occurredAt": "2023-11-13T00:00:00.000",
      "followUp": false,
      "deleted": false,
      "storedBy": "healthworker1",
      "notes": []
    }
  ]
}
```

Enrollments single object endpoint `GET /api/tracker/enrollments/{uid}`

The purpose of this endpoint is to retrieve one Enrollment given its uid.

Request syntax

```
GET /api/tracker/enrollment/{uid}
```

Request parameter	Type	Allowed values	Description
`uid`	`String`	`uid`	Return the Enrollment with specified `uid`
`fields`	`String`	Any valid field filter (default `*,!relationships,!events,!attributes`)	Include
specified sub-objects in the response			

Example requests

A query for an enrollment:

```
GET /api/tracker/enrollments/JMgRZyeLWOo
```

Response format


```
{
  "enrollment": "JMgRZyeLWOo",
  "createdAt": "2017-03-06T05:49:28.340",
  "createdAtClient": "2016-03-06T05:49:28.340",
  "updatedAt": "2017-03-06T05:49:28.357",
  "trackedEntity": "PQfMcpmXeFE",
  "program": "IpHINAT79UW",
  "status": "ACTIVE",
  "orgUnit": "DiszpKrYNg8",
  "enrolledAt": "2024-03-06T00:00:00.000",
  "occurredAt": "2024-03-04T00:00:00.000",
  "followUp": false,
  "deleted": false,
  "notes": []
}
```


Events (`GET /api/tracker/events`)

Two endpoints are dedicated to events:

- `GET /api/tracker/events`
  - retrieves events matching given criteria
- `GET /api/tracker/events/{id}`
  - retrieves an event given the provided id

If not otherwise specified, JSON is the default response for the GET method. The API also supports CSV export for single and collection endpoints. Furthermore, it supports compressed JSON and CSV for the collection endpoint.

Events CSV

In the case of CSV, the `fields` request parameter has no effect, and the response will always contain the following fields:

- event (UID)
- status (String)
- program (UID)
- programStage (UID)
- enrollment (UID)
- orgUnit (UID)
- occurredAt (DateTime)
- scheduledAt (DateTime)
- geometry (WKT, https://en.wikipedia.org/wiki/Well-known_text_representation_of_geometry. You can omit it in case of a `Point` type and with `latitude` and `longitude` provided)
- latitude (Latitude of a `Point` type of Geometry)
- longitude (Longitude of a `Point` type of Geometry)
- followUp (boolean)
- deleted (boolean)
- createdAt (DateTime)
- createdAtClient (DateTime)
- updatedAt (DateTime)
- updatedAtClient (DateTime)
- completedBy (String)
- completedAt (DateTime)
- updatedBy (UserName of user)
- attributeOptionCombo (UID)
- attributeCategoryOptions (UID)
- assignedUser (UserName of user)
- dataElement (UID)
- value (String)
- storedBy (String)
- providedElsewhere (boolean)
- storedByDataValue (String)
- createAtDataValue (DateTime)
- updatedAtDataValue (DateTime)

See Events and Data Values for more field descriptions.

Events GZIP

The response is file `events.json.gz` or `events.csv.gzip` containing the `events.json` or `events.csv` file.

Events ZIP

The response is file`events.json.gz` or `events.json.zip` containing the `events.json` or `events.csv` file.

Events Collection endpoint `GET /api/tracker/events`

Returns a list of events based on the provided filters.

Request parameter	Type	Allowed values	Description
`program`	`String`	`uid`	Identifier of program
`programStage`	`String`	`uid`	Identifier of program stage
`programStatus`	`enum`	`ACTIVE|COMPLETED|CANCELLED`	Status of event in program
`filter`	`String`	Comma separated values of data element filters	Narrows response to events matching given filters. A filter is a colon separated property or data element UID with optional operator and value pairs. Example: `filter=fazCI2ygYkq:eq:PASSIVE` with operator starts with `eq` followed by a value. Characters such as `:` (colon) or `,` (comma), as part of the filter value, need to be escaped by `/` (slash). Likewise, `/` needs to be escaped. Multiple operator/value pairs for the same property/data element like `filter=qrur9Dvnyt5:gt:70:lt:80` are allowed. Repeating the same data element UID is not allowed. User needs access to the data element to filter on it.

Request parameter	Type	Allowed values	Description
`filterAttributes`	`String`	Comma separated values of attribute filters	Narrows response to TEIs matching given filters. A filter is a colon separated property or attribute UID with optional operator and value pairs. Example: `filter=H9IlTX2X6SL:sw:A` with operator starts with `sw` followed by a value. Special characters like + need to be percent-encoded so %2B instead of +. Characters such as `:` (colon) or `,` (comma), as part of the filter value, need to be escaped by `/` (slash). Likewise, `/` needs to be escaped. Multiple operator/value pairs for the same property/attribute like `filter=AuPLng5hLbE:gt:438901703:lt:448901704` are allowed. Repeating the same attribute UID is not allowed. User needs access to the attribute to filter on it.
`followUp`	`boolean`	`true|false`	Whether event is considered for follow up in program. Defaults to `true`
`trackedEntity`	`String`	`uid`	Identifier of tracked entity
`orgUnit`	`String`	`uid`	Identifier of organisation unit
`orgUnitMode` see org UnitModes	`String`	`SELECTED|CHILDREN|DESCENDANTS|ACCESSIBLE|CAPTURE|ALL`	The mode of selecting organisation units, can be. Default is `SELECTED`, which refers to the selected organisation units only.

Request parameter	Type	Allowed values	Description
ouMode **deprecated for removal in version 42 use orgUnitMode** see orgUnitModes	String	SELECTED|CHILDREN|DESCENDANTS|ACCESSIBLE|CAPTURE|ALL	The mode of selecting organisation units, can be. Default is SELECTED, which refers to the selected organisation units only.
status	String	ACTIVE|COMPLETED|VISITED|SCHEDULE|OVERDUE|SKIPPED	Status of event
occurredAfter	DateTime	ISO-8601	Filter for events which occurred after this date.
occurredBefore	DateTime	ISO-8601	Filter for events which occurred up until this date.
scheduledAfter	DateTime	ISO-8601	Filter for events which were scheduled after this date.
scheduledBefore	DateTime	ISO-8601	Filter for events which were scheduled before this date.
updatedAfter	DateTime	ISO-8601	Filter for events which were updated after this date. Cannot be used together with updatedWithin.
updatedBefore	DateTime	ISO-8601	Filter for events which were updated up until this date. Cannot be used together with updatedWithin.
updatedWithin	Duration	ISO-8601	Include only items which are updated within the given duration. The format is ISO-8601 #Duration
enrollmentEnrolledAfter	DateTime	ISO-8601	Start date and time for enrollment in the given program
enrollmentEnrolledBefore	DateTime	ISO-8601	End date and time for enrollment in the given program
enrollmentOccurredAfter	DateTime	ISO-8601	Start date and time for occurred in the given program
enrollmentOccurredBefore	DateTime	ISO-8601	End date and time for occurred in the given program

Request parameter	Type	Allowed values	Description
`dataElementIdScheme`	`String`	`UID|CODE|ATTRIBUTE:{ID}`	Data element ID scheme to use for export.
`categoryOptionComboIdScheme`	`String`	`UID|CODE|ATTRIBUTE:{ID}`	Category Option Combo ID scheme to use for export
`orgUnitIdScheme`	`String`	`UID|CODE|ATTRIBUTE:{ID}`	Organisation Unit ID scheme to use for export
`programIdScheme`	`String`	`UID|CODE|ATTRIBUTE:{ID}`	Program ID scheme to use for export
`programStageIdScheme`	`String`	`UID|CODE|ATTRIBUTE:{ID}`	Program Stage ID scheme to use for export
`idScheme`	`string`	`UID|CODE|ATTRIBUTE:{ID}`	Allows to set id scheme for data element, category option combo, orgUnit, program and program stage at once.
`order`	`String`	Comma-separated list of property name, attribute or data element UID and sort direction pairs in format `propName:sortDirection`.	Supported fields: `assignedUser`, `assignedUserDisplayName`, `attributeOptionCombo`, `completedAt`, `completedBy`, `createdAt`, `createdAtClient`, `createdBy`, `deleted`, `enrolledAt`, `enrollment`, `enrollmentStatus`, `event`, `followUp`, `followup (deprecated)`, `occurredAt`, `orgUnit`, `program`, `programStage`, `scheduledAt`, `status`, `storedBy`, `trackedEntity`, `updatedAt`, `updatedAtClient`, `updatedBy`.

Request parameter	Type	Allowed values	Description
`events`	`String`	Comma-separated list of event `UIDs`.	Filter the result down to a limited set of IDs by using `event=id1,id2`.
`event` **deprecated for removal in version 42 use `events`**	`String`	Semicolon-separated list of `uid`	Filter the result down to a limited set of IDs by using `event=id1;id2`.
`attributeCategoryCombo` (see note)	`String`	Attribute category combo identifier. Must be combined with `attributeCategoryOptions`.	
`attributeCc` **deprecated for removal in version 42 use `attributeCategoryCombo`**	`String`	Attribute category combo identifier (must be combined with attributeCos)	
`attributeCategoryOptions` (see note)	`String`	Comma-separated attribute category option identifiers. Must be combined with `attributeCategoryCombo`.	
`attributeCos` **deprecated for removal in version 42 use `attributeCategoryOptions`**	`String`	Semicolon-separated attribute category option identifiers. Must be combined with `attributeCc`.	
`includeDeleted`	`Boolean`		When true, soft deleted events will be included in your query result.
`assignedUserMode`	`String`	`CURRENT|PROVIDED|NONE|ANY`	Assigned user selection mode
`assignedUsers`	`String`	Comma-separated list of user UIDs to filter based on events assigned to the users.	Filter the result down to a limited set of tracked entities with events that are assigned to the given user IDs by using `assignedUser=id1,id2`.This parameter will only be considered if `assignedUserMode` is either `PROVIDED` or `null`. The API will error out, if for example, `assignedUserMode=CURRENT` and `assignedUser=someId`.

Request parameter	Type	Allowed values	Description
`assignedUser` **deprecated for removal in version 42 use** `assignedUsers`	`String`	Semicolon-separated list of user UIDs to filter based on events assigned to the users.	Filter the result down to a limited set of tracked entities with events that are assigned to the given user IDs by using `assignedUser=id1;id2`.This parameter will only be considered if assignedUserMode is either `PROVIDED` or `null`. The API will error out, if for example, `assignedUserMode=CURRENT` and `assignedUser=someId`

> **Note**
>
> If the query contains neither `attributeCategoryOptions` nor `attributeCategoryOptions`, the server returns events for all attribute option combos where the user has read access.

Example requests

The query for all events with children of a particular organisation unit:

```
GET /api/tracker/events?orgUnit=YuQRtpLP10I&orgUnitMode=CHILDREN
```

The query for all events with all descendants of a particular organisation unit, implying all organisation units in the sub-hierarchy:

```
GET /api/tracker/events?orgUnit=O6uvpzGd5pu&orgUnitMode=DESCENDANTS
```

Query for all events with a certain program and organisation unit:

```
GET /api/tracker/events?orgUnit=DiszpKrYNg8&program=eBAyeGv0exc
```

Query for all events with a certain program and organisation unit, sorting by scheduled date ascending:

```
GET /api/tracker/events?orgUnit=DiszpKrYNg8&program=eBAyeGv0exc&order=scheduledAt
```

Query for the 10 events with the newest occurred date in a certain program and organisation unit - by paging and ordering by occurred date descending:

```
GET /api/tracker/events?
orgUnit=DiszpKrYNg8&program=eBAyeGv0exc&order=occurredAt:desc&pageSize=10&page=1
```

Query for all events with a certain program and organisation unit for a specific tracked entity:

```
GET /api/tracker/events?orgUnit=DiszpKrYNg8&program=M3xtLkYBlKI&trackedEntity=dNpxRu1mWG5
```

Query for all events older or equal to 2024-02-03 and associated with a program and organisation unit:

```
GET /api/tracker/events?orgUnit=DiszpKrYNg8&program=eBAyeGv0exc&occurredBefore=2024-02-03
```

A query where multiple operand and filters are specified for a data element UID:

```
GET /api/tracker/events?orgUnit=g8upMTyEZGZ&program=M3xtLkYBlKI&filter=rFQNCGMYud2:GT:
35&filter=rFQNCGMYud2:LT:50
```

A query filter with a value that needs escaping and will be interpreted as `:,/`:

```
GET /api/tracker/events?orgUnit=DiszpKrYNg8&program=lxAQ7Zs9VYR&filter=DanTR5x0WDK:EQ:/:/,//
```

Events response example

The API supports CSV and JSON response for `GET /api/tracker/events`.

JSON

The JSON response can look like the following:


```
{
  "pager": {
    "page": 1,
    "pageSize": 1
  },
  "events": [
    {
      "event": "A7rzcnZTe2T",
      "status": "ACTIVE",
      "program": "eBAyeGv0exc",
      "programStage": "Zj7UnCAulEk",
      "enrollment": "RiLEKhWHlxZ",
      "orgUnit": "DwpbWkiqjMy",
      "occurredAt": "2023-02-13T00:00:00.000",
      "scheduledAt": "2023-02-13T00:00:00.000",
      "followUp": false,
      "deleted": false,
      "createdAt": "2017-09-08T21:40:22.000",
      "createdAtClient": "2016-09-08T21:40:22.000",
      "updatedAt": "2017-09-08T21:40:22.000",
      "attributeOptionCombo": "HllvX50cXC0",
      "attributeCategoryOptions": "xYerKDKCefk",
      "geometry": {
        "type": "Point",
```

```
        "coordinates": [
          -11.468912037323042,
          7.515913998868316
        ]
      },
      "dataValues": [
        {
          "createdAt": "2016-12-06T18:22:34.438",
          "updatedAt": "2016-12-06T18:22:34.438",
          "storedBy": "bjorn",
          "providedElsewhere": false,
          "dataElement": "F3ogKBuviRA",
          "value": "[-11.4880220438585,7.50978830548003]"
        },
        {
          "createdAt": "2013-12-30T14:23:57.423",
          "updatedAt": "2013-12-30T14:23:57.423",
          "storedBy": "lars",
          "providedElsewhere": false,
          "dataElement": "eMyVanycQSC",
          "value": "2018-02-07"
        },
        {
          "createdAt": "2013-12-30T14:23:57.382",
          "updatedAt": "2013-12-30T14:23:57.382",
          "storedBy": "lars",
          "providedElsewhere": false,
          "dataElement": "oZg33kd9taw",
          "value": "Male"
        }
      ],
      "notes": [],
      "followup": false
    }
  ]
}
```


csv

The CSV response can look like the following:


```
event,status,program,programStage,enrollment,orgUnit,occurredAt,scheduledAt,geometry,latitude,longitude,followUp,
A7rzcnZTe2T,ACTIVE,eBAyeGv0exc,Zj7UnCAulEk,RiLEKhWHlxZ,DwpbWkiqjMy,2023-02-12T23:00:00Z,
2023-02-12T23:00:00Z,"POINT (-11.468912037323042 7.515913998868316)",
7.515913998868316,-11.468912037323042,false,false,2017-09-08T19:40:22Z,,
2017-09-08T19:40:22Z,,,,,HllvX50cXC0,xYerKDKCefk,,F3ogKBuviRA,"[-11.4880220438585,7.50978830548003]",admin,false,
2016-12-06T17:22:34.438Z,2016-12-06T17:22:34.438Z
A7rzcnZTe2T,ACTIVE,eBAyeGv0exc,Zj7UnCAulEk,RiLEKhWHlxZ,DwpbWkiqjMy,2023-02-12T23:00:00Z,
2023-02-12T23:00:00Z,"POINT (-11.468912037323042 7.515913998868316)",
7.515913998868316,-11.468912037323042,false,false,2017-09-08T19:40:22Z,,
2017-09-08T19:40:22Z,,,,,HllvX50cXC0,xYerKDKCefk,,eMyVanycQSC,2018-02-07,admin,false,,
2013-12-30T13:23:57.423Z,2013-12-30T13:23:57.423Z
A7rzcnZTe2T,ACTIVE,eBAyeGv0exc,Zj7UnCAulEk,RiLEKhWHlxZ,DwpbWkiqjMy,2023-02-12T23:00:00Z,
2023-02-12T23:00:00Z,"POINT (-11.468912037323042 7.515913998868316)",
7.515913998868316,-11.468912037323042,false,false,2017-09-08T19:40:22Z,,
2017-09-08T19:40:22Z,,,,,HllvX50cXC0,xYerKDKCefk,,msodh3rEMJa,2018-02-13,admin,false,,
2013-12-30T13:23:57.467Z,2013-12-30T13:23:57.467Z
```

Events single object endpoint `GET /api/tracker/events/{uid}`

The purpose of this endpoint is to retrieve one Event given its uid.

Request syntax

`GET /api/tracker/events/{uid}?fields={fields}`

Request parameter	Type	Allowed values	Description
`uid`	`String`	`uid`	Return the Event with specified `uid`
`fields`	`String`	Any valid field filter (default `*,!relationships`)	Include specified sub-objects in the response

Example requests

A query for an Event:

```
GET /api/tracker/events/rgWr86qs0sI
```

Event response example

The API supports CSV and JSON response for `GET /api/tracker/trackedEntities`

JSON

```
{
  "event": "rgWr86qs0sI",
  "status": "ACTIVE",
  "program": "kla3mAPgvCH",
  "programStage": "aNLq9ZYoy9W",
  "enrollment": "Lo3SHzCnMSm",
  "orgUnit": "DiszpKrYNg8",
  "occurredAt": "2024-10-12T00:00:00.000",
  "followUp": false,
  "deleted": false,
  "createdAt": "2018-10-20T12:09:19.492",
  "createdAtClient": "2017-10-20T12:09:19.492",
  "updatedAt": "2018-10-20T12:09:19.492",
  "attributeOptionCombo": "amw2rQP6r6M",
  "attributeCategoryOptions": "RkbOhHwiOgW",
  "dataValues": [
    {
      "createdAt": "2015-10-20T12:09:19.640",
      "updatedAt": "2015-10-20T12:09:19.640",
      "storedBy": "system",
      "providedElsewhere": false,
      "dataElement": "HyJL2Lt37jN",
      "value": "12"
    }
  ],
  "notes": [],
  "followup": false
}
```

csv

The response will be the same as the collection endpoint but referring to a single event, although it might have multiple rows for each data element value.

Relationships (`GET /api/tracker/relationships`)

Relationships are links between two entities in the Tracker. These entities can be tracked entities, enrollments, and events.

The purpose of this endpoint is to retrieve relationships between objects.

Unlike other tracked objects endpoints, relationships only expose one endpoint:

- `GET /api/tracker/relationships?[trackedEntity={trackedEntityUid}|enrollment={enrollmentUid}|event={eventUid}]&fields=[fields]`

Request parameters

Request parameter	Type	Allowed values	Description
`trackedEntity`	`String`	`uid`	Identifier of a tracked entity
`enrollment`	`String`	`uid`	Identifier of an enrollment
`event`	`String`	`uid`	Identifier of an event
`fields`	`String`	Any valid field filter (default `relationship,relationshipType,createdAtClient,from[trackedEntity[trackedEntity],enrollment[enrollment],event[event]],to[trackedEntity[trackedEntity],enrollment[enrollment],event[event]]`)	Include specified sub-objects in the response
`order`	`String`	Comma-separated list of property name or attribute or UID and sort direction pairs in format `propName:sortDirection`.	Supported fields: `createdAt, createdAtClient`.
`includeDeleted`	`Boolean`	`true|false`	whether to include soft-deleted elements in your query result

The following rules apply to the query parameters.

- only one parameter among `trackedEntity`, `enrollment`, `event` can be passed

NOTE

Using tracked entity, enrollment or event params, will return any relationship where the trackedEntity, enrollment or event is part of the relationship (either from or to). As long as user has access, that is.

Example response


```
{
  "pager": {
    "page": 1,
    "pageSize": 2
  },
  "relationships": [
    {
      "relationship": "oGtgtJpp6fG",
      "relationshipType": "Mv8R4MPcNcX",
      "from": {
        "trackedEntity": {
          "trackedEntity": "neR4cmMY22o"
        }
      },
      "to": {
        "trackedEntity": {
          "trackedEntity": "DsSlC54GNXy"
        }
      }
    },
    {
      "relationship": "SSfIicJKbh5",
      "relationshipType": "Mv8R4MPcNcX",
      "from": {
        "trackedEntity": {
          "trackedEntity": "neR4cmMY22o"
        }
      },
      "to": {
        "trackedEntity": {
          "trackedEntity": "rEYUGH97Ssd"
        }
      }
    }
  ]
}
```


Tracker Access Control

Tracker has a few different concepts in regards to access control, like sharing, organisation unit scopes, ownership, and access levels. The following sections provide a short introduction to the different topics.

Metadata Sharing

Sharing setting is standard DHIS2 functionality that applies to both Tracker and Aggregate metadata/ data as well as dashboards and visualization items. At the core of sharing is the ability to define who can see/do what. In general, there are five possible sharing configurations – no access, metadata read, metadata write, data read, and data write. These access configurations can be granted at user and/or user group level (for more flexibility). With a focus on Tracker, the following metadata and their sharing setting is of particular importance: Data Element, Category Option, Program, Program Stage, Tracked Entity Type, Tracked Entity Attribute as well as Tracker related Dashboards and Dashboard Items.

How sharing setting works is straightforward – the settings are enforced during Tracker data import/ export processes. To read value, one needs to have data read access. If a user is expected to modify data, he/she needs to have data write access. Similarly, if a user is expected to modify metadata, it is essential to grant metadata write access.

One critical point with Tracker data is the need to have a holistic approach. For example, a user won't be able to see the Data Element value by having read access to just the Data Element. The user needs to have data read to access the parent Program Stage and Program where this Data Element belongs. It is the same with the category option combination. In Tracker, the Event is related to AttributeOptionCombo, which is made up of a combination of Category Options. Therefore, for a user to read data of an Event, he/she needs to have data read access to all Category Options and corresponding Categories that constitute the AttributeOptionCombo of the Event in question. If a user lacks access to just one Category Option or Category, then the user has no access to the entire Event.

When it comes to accessing Enrollment data, it is essential to have access to the Tracked Entity first. Access to a Tracked Entity is controlled through sharing setting of Program, Tracked Entity Type, and Tracked Entity Attribute. Once Enrollment is accessed, it is possible to access Event data, again depending on Program Stage and Data element sharing setting.

Another vital point to consider is how to map out access to different Program Stages of a Program. Sometimes we could be in a situation where we need to grant access to a specific stage – for example, "Lab Result" – to a specific group of users (Lab Technicians). In this situation, we can provide data write access to "Lab Result" stage, probably data read to one or more stages just in case we want Lab Technicians to read other medical results or no access if we think it not necessary for the Lab Technicians to see data other than lab related.

In summary, DHIS2 has a fine-grained sharing setting that we can use to implement access control mechanisms both at the data and metadata level. These sharing settings can be applied directly at the user level or user group level. How exactly to apply a sharing setting depends on the use-case at hand.

For more detailed information about data sharing, check out Data sharing.

Organisation Unit Scopes

Organisation units are one of the most fundamental objects in DHIS2. They define a universe under which a user is allowed to record and/or read data. There are three types of organisation units that can be assigned to a user. These are data capture, data view (not used in tracker), and tracker search. As the name implies, these organisation units define a scope under which a user is allowed to conduct the respective operations.

However, to further fine-tune the scope, DHIS2 Tracker introduces a concept that we call **OrganisationUnitSelectionMode**. Such a mode is often used at the time exporting tracker objects. For example, given that a user has a particular tracker search scope, does it mean that we have to use this scope every time a user tries to search for a tracker, Enrollment, or Event object? Or is the user interested in limiting the searching just to the selected org unit, or the entire capture org unit scope, and so on.

Users can do the fine-tuning by passing a specific value of `orgUnitMode` in their API request:

api/tracker/trackedEntities?orgUnit=UID&orgUnitMode=specific_organisation_unit_selection_mode

Currently, there are six selection modes available: *SELECTED, CHILDREN, DESCENDANTS, CAPTURE, ACCESSIBLE, and ALL*.

1. **SELECTED**: As the name implies, this mode narrows down all operations initiated by the requesting API to the specified organisation unit in the request.
2. **CHILDREN**: Under this mode, the organisation unit scope is constructed using the selected organisation unit and its immediate children, i.e., the organisation units at the level below.
3. **DESCENDANTS**: In this mode, the selected organisation unit and everything underneath it, encompassing not only the immediate children but all descendants, constitute the data operation universe.
4. **CAPTURE**: This mode includes the data capture organization units associated with the current user and all descendants. It encompasses all organization units in the sub-hierarchy.
5. **ACCESSIBLE**: This mode is designed to retrieve data within the user's search scope organization units. This encompasses everything visible to the user, including open and audited programs within its search scope, as well as data in protected and closed programs within the user's capture scope. If a user lacks search organization units, the system defaults to capture scope, ensuring that the user always has access to at least one universe. The capture scope, being mandatory, serves as a foundational element in guaranteeing a data environment for the user.
6. **ALL**: This mode is reserved for authorized users, specifically those with the authority ALL (super users). Users with the authority F_TRACKED_ENTITY_INSTANCE_SEARCH_IN_ALL_ORGUNITS can also search system-wide but need sharing access to the returned program, program stage, and/or tracked entity type. For non-authorized users, an exception will be raised.

The first three modes, *SELECTED*, *CHILDREN* and *DESCENDANTS* expect an organisation unit to be supplied in the request, while the last three, *CAPTURE*, *ACCESSIBLE* and *ALL* do not expect it and in fact the request will fail if an organisation unit is provided.

The organisation unit mode will be one of the ones listed above when it's explicitly provided in the API request. Since it's not a mandatory field, in case it's not specified, then the default value will be *SELECTED* if an organisation unit is present, and *ACCESSIBLE* otherwise.

It makes little sense to pass these modes at the time of tracker import operations. Because when writing tracker data, each of the objects needs to have a specific organisation unit attached to them. The system will then ensure if each of the mentioned organisation units falls under the CAPTURE scope. If not, the system will simply reject the write operation.

Note that there is 4 type of organisation unit associations relevant for Tracker objects. A TrackedEntity has an organisation unit, commonly referred to as the Registration Organisation unit. Enrollments have an organisation unit associated with them. Events also have an organisation unit associated with them. There is also an Owner organisation unit for a TrackedEntity-Program combination.

When fetching Tracker objects, depending on the context, the organisation unit scope is applied to one of the above four organisation unit associations.

For example, when retrieving TrackedEntities without the context of a program, the organisation unit scope is applied to the registration organisation unit of the TrackedEntity. Whereas, when retrieving TrackedEntities, including specific program data, the organisation unit scope is applied to the Owner organisation unit.

Tracker Program Ownership

A new concept called Tracker Ownership is introduced from 2.30. This introduces a new organisation unit association for a TrackedEntity - Program combination. We call this the Owner (or Owning) Organisation unit of a TrackedEntity in the context of a Program. The Owner organisation unit is used to decide access privileges when reading and writing tracker data related to a program. This, along with the Program's Access Level configuration, decides the access behavior for Program-related data (Enrollments and Events). A user can access a TrackedEntity's Program data if the corresponding Owner OrganisationUnit for that TrackedEntity-Program combination falls under the user's organisation unit scope (Search/Capture). For Programs that are configured with access level *OPEN* or *AUDITED* , the Owner OrganisationUnit has to be in the user's search scope. For Programs that are configured with access level *PROTECTED* or *CLOSED* , the Owner OrganisationUnit has to be in the user's capture scope to be able to access the corresponding program data for the specific tracked entity. Irrespective of the program access level, to access Tracker objects, the requested organisation unit must always be within the user's search scope. A user cannot request objects outside its search scope unless it's using the organisation unit mode ALL and has enough privileges to use that mode.

Tracker Ownership Override: Break the Glass

It is possible to temporarily override this ownership privilege for a program that is configured with an access level of *PROTECTED*. Any user will be able to temporarily gain access to the Program related data if the user specifies a reason for accessing the TrackedEntity-Program data. This act of temporarily gaining access is termed as *breaking the glass*. Currently, temporary access is granted for 3 hours. DHIS2 audits breaking the glass along with the reason specified by the user. It is not possible to gain temporary access to a program that has been configured with an access level of *CLOSED*. To break the glass for a TrackedEntity-Program combination, the following POST request can be used:

```
/api/tracker/ownership/override?
trackedEntity=DiszpKrYNg8&program=eBAyeGv0exc&reason=patient+showed+up+for+emergency+care
```

Tracker Ownership Transfer

It is possible to transfer the ownership of a TrackedEntity-Program from one organisation unit to another. This will be useful in case of patient referrals or migrations. Only a user who has Ownership access (or temporary access by breaking the glass) can transfer the ownership. To transfer ownership of a TrackedEntity-Program to another organisation unit, the following PUT request can be used:

```
/api/tracker/ownership/transfer?trackedEntity=DiszpKrYNg8&program=eBAyeGv0exc&ou=EJNxP3WreNP
```

Access Level

DHIS2 treats Tracker data with an extra level of protection. In addition to the standard feature of metadata and data protection through sharing settings, Tracker data are shielded with additional access level protection mechanisms. Currently, there are four access levels that can be configured for a Program: Open, Audited, Protected, and Closed.

These access levels are only triggered when users try to interact with program data, namely Enrollments and Events data. The different Access Level configuration for Program is a degree of openness (or closedness) of program data. Note that all other sharing settings are still respected, and

the access level is only an additional layer of access control. Here is a short description of the four access levels that can be configured for a Program.

Open

This access level is the least restricted among the access levels. Data inside an OPEN program can be accessed and modified by users if the Owner organisation unit falls under the user's search scope. With this access level, accessing and modifying data outside the capture scope is possible without any justification or consequence.

Audited

This is the same as the Open access level. The difference here is that the system will automatically add an audit log entry on the data being accessed by the specific user.

Protected

This access level is slightly more restricted. Data inside a PROTECTED program can only be accessed by users if the Owner organisation unit falls under the user's capture scope. However, a user who only has the Owner organisation unit in the search scope can gain temporary ownership by breaking the glass. The user has to provide a justification of why they are accessing the data at hand. The system will then put a log of both the justification and access audit and provide temporary access for 3 hours to the user. Note that when breaking the glass, the Owner Organisation Unit remains unchanged, and only the user who has broken the glass gains temporary access.

Closed

This is the most restricted access level. Data recorded under programs configured with access level CLOSED will not be accessible if the Owner Organisation Unit does not fall within the user's capture scope. It is also not possible to break the glass or gain temporary ownership in this configuration. Note that it is still possible to transfer the ownership to another organisation unit. Only a user who has access to the data can transfer the ownership of a TrackedEntity-Program combination to another Organisation Unit. If ownership is transferred, the Owner Organisation Unit is updated.

Tracker (deprecated APIs)

> **Caution**
>
> Tracker has been re-implemented in DHIS2 2.36. The new endpoints are documented at Tracker.
>
> Endpoints
>
> - `GET/POST/PUT/DELETE /api/trackedEntityInstance`
> - `GET/POST/PUT/DELETE /api/enrollments`
> - `GET/POST/PUT/DELETE /api/events`
> - `GET/POST/PUT/DELETE /api/relationships`
>
> will be removed in version **42**!
>
> - If you plan to use the tracker endpoints use the new endpoints described in Tracker
> - If you are still using the deprecated tracker endpoints in production, please migrate over to the new endpoints. Migrating to new tracker endpoints should help you get started. Reach out on the community of practice if you need further assistance.

Migrating to new tracker endpoints

The following sections highlight the important differences between the deprecated endpoints.

- `GET/POST/PUT/DELETE /api/trackedEntityInstance`
- `GET/POST/PUT/DELETE /api/enrollments`
- `GET/POST/PUT/DELETE /api/events`
- `GET/POST/PUT/DELETE /api/relationships`

and the newly introduced endpoints

- `POST /api/tracker`
- `GET /api/tracker/trackedEntities`
- `GET /api/tracker/enrollments`
- `GET /api/tracker/events`
- `GET /api/tracker/relationships`

Property names

API property names have changed so they are consistent across all the endpoints. The following table lists the old and new property names.

Tracker Object	Previously	Now
Attribute	`created` `lastUpdated`	`createdAt` `updatedAt`

DataValue	`created`
	`lastUpdated`
	`createByUserInfo`
	`lastUpdatedByUserInfo`
		`createdAt`
		`updatedAt`
		`createdBy`
		`updatedBy`

Tracker Object	Previously	Now

Enrollment	`created`
	`createdAtClient`
	`lastUpdated`
	`lastUpdatedAtClient`
	`trackedEntityInstance`
	`enrollmentDate`
	`incidentDate`
	`completedDate`
	`createByUserInfo`
	`lastUpdatedByUserInfo`
		`createdAt`
		`createdAtClient`
		`updatedAt`
		`updatedAtClient`
		`trackedEntity`
		`enrolledAt`
		`occurredAt`
		`completedAt`
		`createdBy`
		`updatedBy`

Event	`trackedEntityInstance`
	`eventDate`
	`dueDate`
	`created`
	`createdAtClient`
	`lastUpdated`
	`lastUpdatedAtClient`
	`completedDate`
	`createByUserInfo`
	`lastUpdatedByUserInfo`
	`assignedUser*`
		`trackedEntity`
		`occurredAt`
		`scheduledAt`
		`createdAt`
		`createdAtClient`
		`updatedAt`
		`updatedAtClient`
		`completedAt`
		`createdBy`
		`updatedBy`
		`assignedUser*`

Note	`storedDate` `lastUpdatedBy`	`storedAt` `createdBy`
ProgramOwner	`ownerOrgUnit` `trackedEntityInstance`	`orgUnit` `trackedEntity`

RelationshipItem	`trackedEntityInstance.t`
	`rackedEntityInstance`
	`enrollment.enrollment`
	`event.event`
		`trackedEntity`
		`enrollment`
		`event`

Relationship	`created` `lastUpdated`	`createdAt` `updatedAt`

TrackedEntity	`trackedEntityInstance`
	`created`
	`createdAtClient`
	`lastUpdated`
	`lastUpdatedAtClient`
	`createByUserInfo`
	`lastUpdatedByUserInfo`
		`trackedEntity`
		`createdAt`
		`createdAtClient`
		`updatedAt`
		`updatedAtClient`
		`createdBy`
		`updatedBy`

Note

Property `assignedUser` was a string before and is now an object of the following shape (type `User`):

```
{
   "assignedUser": {
     "uid": "ABCDEF12345",
     "username": "username",
     "firstName": "John",
     "surname": "Doe"
```

```
    }
}
```

Semicolon as separator for identifiers (UID)

Fields or query parameter accepting multiple values like UIDs are now consistently separated by comma instead of semicolon. This is to ensure UIDs are consistently separated by comma across all DHIS2 endpoints.

The following fields are affected

- `event.attributeCategoryOptions` (as well as an event returned as part of a relationship `from`/`to`)

Tracker import changelog (`POST`)

The previous tracker import endpoints

- `POST/PUT/DELETE /api/trackedEntityInstance`
- `POST/PUT/DELETE /api/enrollments`
- `POST/PUT/DELETE /api/events`
- `POST/PUT/DELETE /api/relationships`

are replaced by the new endpoint

- `POST /api/tracker`

Tracker Import describes how to use this new endpoint.

Tracker export changelog (`GET`)

In addition to the changed names shown in Property names some request parameters have been changed as well.

The following tables list the differences in old and new request parameters for `GET` endpoints.

Request parameter changes for `GET /api/tracker/trackedEntities`

Previously	Now
`assignedUser`	`assignedUsers` Values are now separated by comma instead of semicolon.
`attachment`	Removed
`attribute`	Removed - use `filter` instead
`eventStartDate` `eventEndDate`	`eventOccurredAfter` `eventOccurredBefore`
`includeAllAttributes`	Removed

`lastUpdatedStartDate`
`lastUpdatedEndDate`
`lastUpdatedDuration`
	`updatedAfter`
	`updatedBefore`
	`updatedWithin`

`ouMode`	`orgUnitMode`
`ou`	`orgUnits` Values are now separated by comma instead of semicolon.

Previously	Now
`programEnrollmentStartDate` `programEnrollmentEndDate`	`enrollmentEnrolledAfter` `enrollmentEnrolledBefore`
`programIncidentStartDate` `programIncidentEndDate`	`enrollmentOccurredAfter` `enrollmentOccurredBefore`
`programStartDate` `programEndDate`	Removed - obsolete, see • `enrollmentEnrolledAfter` • `enrollmentEnrolledBefore`
`query`	Removed - use `filter` instead
`skipMeta`	Removed
`skipPaging`	`paging` Is the inverse so `paging=false` replaces `skipPaging=true`.
`trackedEntityInstance`	`trackedEntities` Values are now separated by comma instead of semicolon.

Request parameter changes for `GET /api/tracker/enrollments`

Previously	Now
`enrollment`	`enrollments` Values are now separated by comma instead of semicolon.
`lastUpdated` `lastUpdatedDuration`	`updatedAfter` `updatedWithin`
`ouMode`	`orgUnitMode`
`ou`	`orgUnits` Values are now separated by comma instead of semicolon.
`programStartDate` `programEndDate`	`enrolledAfter` `enrolledBefore`
`skipPaging`	`paging` Is the inverse so `paging=false` replaces `skipPaging=true`.
`trackedEntityInstance`	`trackedEntity`

Request parameter changes for `GET /api/tracker/events`

Previously	Now
`assignedUser`	`assignedUsers` Values are now separated by comma instead of semicolon.
`attachment`	Removed
`attributeCc`	`attributeCategoryCombo`

Previously	Now
`attributeCos`	`attributeCategoryOptions` Values are now separated by comma instead of semicolon.
`dueDateStart` `dueDateEnd`	`scheduledAfter` `scheduledBefore`
`event`	`events` Values are now separated by comma instead of semicolon.

`lastUpdatedStartDate`
`lastUpdatedEndDate`
`lastUpdatedDuration`
	`updatedAfter`
	`updatedBefore`
	`updatedWithin`

`lastUpdated`	Removed - obsolete, see: • `updatedAfter` • `updatedBefore`
`ouMode`	`orgUnitMode`
`skipEventId`	Removed
`skipMeta`	Removed
`skipPaging`	`paging` Is the inverse so `paging=false` replaces `skipPaging=true`.
`startDate` `endDate`	`occurredAfter` `occurredBefore`
`startDate` `endDate`	`occurredAfter` `occurredBefore`
`trackedEntityInstance`	`trackedEntity`

Request parameter changes for `GET /api/tracker/relationships`

Previously	Now
`skipPaging`	`paging` Is the inverse so `paging=false` replaces `skipPaging=true`.
`tei`	`trackedEntity`

Tracker Web API

Tracker Web API consists of 3 endpoints that have full CRUD (create, read, update, delete) support. The 3 endpoints are `/api/trackedEntityInstances`, `/api/enrollments` and `/api/events` and they are responsible for tracked entity instance, enrollment and event items.

Tracked entity instance management

Tracked entity instances have full CRUD support in the API. Together with the API for enrollment most operations needed for working with tracked entity instances and programs are supported.

```
/api/33/trackedEntityInstances
```

Creating a new tracked entity instance

For creating a new person in the system, you will be working with the *trackedEntityInstances* resource. A template payload can be seen below:

```
{
  "trackedEntity": "tracked-entity-id",
  "orgUnit": "org-unit-id",
  "geometry": "<Geo JSON>",
  "attributes": [{
    "attribute": "attribute-id",
    "value": "attribute-value"
  }]
}
```

The field "geometry" accepts a GeoJson object, where the type of the GeoJson have to match the featureType of the TrackedEntityType definition. An example GeoJson object looks like this:

```
{
  "type": "Point",
  "coordinates": [1, 1]
}
```

The "coordinates" field was introduced in 2.29, and accepts a coordinate or a polygon as a value.

For getting the IDs for `relationship` and `attributes` you can have a look at the respective resources `relationshipTypes`, `trackedEntityAttributes`. To create a tracked entity instance you must use the HTTP *POST* method. You can post the payload the following URL:

```
/api/trackedEntityInstances
```

For example, let us create a new instance of a person tracked entity and specify its first name and last name attributes:

```
{
  "trackedEntity": "nEenWmSyUEp",
  "orgUnit": "DiszpKrYNg8",
  "attributes": [
    {
      "attribute": "w75KJ2mc4zz",
      "value": "Joe"
    },
    {
      "attribute": "zDhUuAYrxNC",
      "value": "Smith"
    }
  ]
}
```

To push this to the server you can use the cURL command like this:

```
curl -d @tei.json "https://play.dhis2.org/demo/api/trackedEntityInstances" -X POST
  -H "Content-Type: application/json" -u admin:district
```

To create multiple instances in one request you can wrap the payload in an outer array like this and POST to the same resource as above:

```
{
  "trackedEntityInstances": [
    {
      "trackedEntity": "nEenWmSyUEp",
      "orgUnit": "DiszpKrYNg8",
      "attributes": [
        {
          "attribute": "w75KJ2mc4zz",
          "value": "Joe"
        },
        {
          "attribute": "zDhUuAYrxNC",
          "value": "Smith"
        }
      ]
    },
    {
      "trackedEntity": "nEenWmSyUEp",
      "orgUnit": "DiszpKrYNg8",
      "attributes": [
        {
          "attribute": "w75KJ2mc4zz",
          "value": "Jennifer"
        },
        {
          "attribute": "zDhUuAYrxNC",
          "value": "Johnson"
        }
      ]
    }
  ]
}
```

The system does not allow the creation of a tracked entity instance (as well as enrollment and event) with a UID that was already used in the system. That means that UIDs cannot be reused.

Updating a tracked entity instance

For updating a tracked entity instance, the payload is equal to the previous section. The difference is that you must use the HTTP *PUT* method for the request when sending the payload. You will also need to append the person identifier to the *trackedEntityInstances* resource in the URL like this, where `<tracked-entity-instance-identifier>` should be replaced by the identifier of the tracked entity instance:

```
/api/trackedEntityInstances/<tracked-entity-instance-id>
```

The payload has to contain all, even non-modified, attributes and relationships. Attributes or relationships that were present before and are not present in the current payload any more will be removed from the system. This means that if attributes/relationships are empty in the current payload, all existing attributes/relationships will be deleted from the system. From 2.31, it is possible to ignore empty attributes/relationships in the current payload. A request parameter of `ignoreEmptyCollection` set to `true` can be used in case you do not wish to send in any attributes/relationships and also do not want them to be deleted from the system.

It is not allowed to update an already deleted tracked entity instance. Also, it is not allowed to mark a tracked entity instance as deleted via an update request. The same rules apply to enrollments and events.

Deleting a tracked entity instance

In order to delete a tracked entity instance, make a request to the URL identifying the tracked entity instance with the *DELETE* method. The URL is equal to the one above used for update.

Create and enroll tracked entity instances

It is also possible to both create (and update) a tracked entity instance and at the same time enroll into a program.

```
{
  "trackedEntity": "tracked-entity-id",
  "orgUnit": "org-unit-id",
  "attributes": [{
    "attribute": "attribute-id",
    "value": "attribute-value"
  }],
  "enrollments": [{
    "orgUnit": "org-unit-id",
    "program": "program-id",
    "enrollmentDate": "2013-09-17",
    "incidentDate": "2013-09-17"
   }, {
    "orgUnit": "org-unit-id",
    "program": "program-id",
    "enrollmentDate": "2013-09-17",
    "incidentDate": "2013-09-17"
   }]
}
```

You would send this to the server as you would normally when creating or updating a new tracked entity instance.

```
curl -X POST -d @tei.json -H "Content-Type: application/json"
  -u user:pass "http://server/api/33/trackedEntityInstances"
```

Complete example of payload including: tracked entity instance, enrollment and event

It is also possible to create (and update) a tracked entity instance, at the same time enroll into a program and create an event.

```
{
  "trackedEntityType": "nEenWmSyUEp",
  "orgUnit": "DiszpKrYNg8",
  "attributes": [
    {
      "attribute": "w75KJ2mc4zz",
      "value": "Joe"
    },
    {
      "attribute": "zDhUuAYrxNC",
      "value": "Rufus"
    },
```

```
    {
     "attribute":"cejWyOfXge6",
     "value":"Male"
    }
  ],
  "enrollments":[
    {
      "orgUnit":"DiszpKrYNg8",
      "program":"ur1Edk5Oe2n",
      "enrollmentDate":"2017-09-15",
      "incidentDate":"2017-09-15",
      "events":[
        {
          "program":"ur1Edk5Oe2n",
          "orgUnit":"DiszpKrYNg8",
          "eventDate":"2017-10-17",
          "status":"COMPLETED",
          "storedBy":"admin",
          "programStage":"EPEcjy3FWmI",
          "coordinate": {
            "latitude":"59.8",
            "longitude":"10.9"
          },
          "dataValues": [
            {
              "dataElement":"qrur9Dvnyt5",
              "value":"22"
            },
            {
              "dataElement":"oZg33kd9taw",
              "value":"Male"
            }
         ]
       },
       {
          "program":"ur1Edk5Oe2n",
          "orgUnit":"DiszpKrYNg8",
          "eventDate":"2017-10-17",
          "status":"COMPLETED",
          "storedBy":"admin",
          "programStage":"EPEcjy3FWmI",
          "coordinate": {
            "latitude":"59.8",
            "longitude":"10.9"
          },
          "dataValues":[
            {
              "dataElement":"qrur9Dvnyt5",
              "value":"26"
            },
            {
              "dataElement":"oZg33kd9taw",
              "value":"Female"
            }
          ]
        }
     ]
    }
  ]
}
```

You would send this to the server as you would normally when creating or updating a new tracked entity instance.

```
curl -X POST -d @tei.json -H "Content-Type: application/json"
  -u user:pass "http://server/api/33/trackedEntityInstances"
```

Generated tracked entity instance attributes

Tracked entity instance attributes that are using automatic generation of unique values have three endpoints that are used by apps. The endpoints are all used for generating and reserving values.

In 2.29 we introduced TextPattern for defining and generating these patterns. All existing patterns will be converted to a valid TextPattern when upgrading to 2.29.

> **Note**
>
> As of 2.29, all these endpoints will require you to include any variables reported by the `requiredValues` endpoint listed as required. Existing patterns, consisting of only #, will be upgraded to the new TextPattern syntax `RANDOM(<old-pattern>)`. The RANDOM segment of the TextPattern is not a required variable, so this endpoint will work as before for patterns defined before 2.29.

Finding required values

A TextPattern can contain variables that change based on different factors. Some of these factors will be unknown to the server, so the values for these variables have to be supplied when generating and reserving values.

This endpoint will return a map of required and optional values, that the server will inject into the TextPattern when generating new values. Required variables have to be supplied for the generation, but optional variables should only be supplied if you know what you are doing.

```
GET /api/33/trackedEntityAttributes/Gs1ICEQTPlG/requiredValues
```

```
{
  "REQUIRED": [
    "ORG_UNIT_CODE"
  ],
  "OPTIONAL": [
    "RANDOM"
  ]
}
```

Generate value endpoint

Online web apps and other clients that want to generate a value that will be used right away can use the simple generate endpoint. This endpoint will generate a value that is guaranteed to be unique at the time of generation. The value is also guaranteed not to be reserved. As of 2.29, this endpoint will also reserve the value generated for 3 days.

If your TextPattern includes required values, you can pass them as parameters like the example below:

The expiration time can also be overridden at the time of generation, by adding the ?`expiration=<number-of-days>` to the request.

```
GET /api/33/trackedEntityAttributes/Gs1ICEQTPlG/generate?ORG_UNIT_CODE=OSLO
```

```
{
  "ownerObject": "TRACKEDENTITYATTRIBUTE",
  "ownerUid": "Gs1ICEQTPlG",
  "key": "RANDOM(X)-OSL",
  "value": "C-OSL",
  "created": "2018-03-02T12:01:36.680",
  "expiryDate": "2018-03-05T12:01:36.678"
}
```

Generate and reserve value endpoint

The generate and reserve endpoint is used by offline clients that need to be able to register tracked entities with unique ids. They will reserve a number of unique ids that this device will then use when registering new tracked entity instances. The endpoint is called to retrieve a number of tracked entity instance reserved values. An optional parameter numberToReserve specifies how many ids to generate (default is 1).

If your TextPattern includes required values, you can pass them as parameters like the example below:

Similar to the /generate endpoint, this endpoint can also specify the expiration time in the same way. By adding the `?expiration=<number-of-days>` you can override the default 60 days.

```
GET /api/33/trackedEntityAttributes/Gs1ICEQTPlG/generateAndReserve?
numberToReserve=3&ORG_UNIT_CODE=OSLO
```

```
[
  {
    "ownerObject": "TRACKEDENTITYATTRIBUTE",
    "ownerUid": "Gs1ICEQTPlG",
    "key": "RANDOM(X)-OSL",
    "value": "B-OSL",
    "created": "2018-03-02T13:22:35.175",
    "expiryDate": "2018-05-01T13:22:35.174"
  },
  {
    "ownerObject": "TRACKEDENTITYATTRIBUTE",
    "ownerUid": "Gs1ICEQTPlG",
    "key": "RANDOM(X)-OSL",
    "value": "Q-OSL",
    "created": "2018-03-02T13:22:35.175",
    "expiryDate": "2018-05-01T13:22:35.174"
  },
  {
    "ownerObject": "TRACKEDENTITYATTRIBUTE",
    "ownerUid": "Gs1ICEQTPlG",
    "key": "RANDOM(X)-OSL",
    "value": "S-OSL",
    "created": "2018-03-02T13:22:35.175",
    "expiryDate": "2018-05-01T13:22:35.174"
```

```
  }
]
```

Reserved values

Reserved values are currently not accessible through the api, however, they are returned by the `generate` and `generateAndReserve` endpoints. The following table explains the properties of the reserved value object:

Reserved values

Property	Description
ownerObject	The metadata type referenced when generating and reserving the value. Currently only TRACKEDENTITYATTRIBUTE is supported.
ownerUid	The uid of the metadata object referenced when generating and reserving the value.
key	A partially generated value where generated segments are not yet added.
value	The fully resolved value reserved. This is the value you send to the server when storing data.
created	The timestamp when the reservation was made
expiryDate	The timestamp when the reservation will no longer be reserved

Expired reservations are removed daily. If a pattern changes, values that were already reserved will be accepted when storing data, even if they don't match the new pattern, as long as the reservation has not expired.

Image attributes

Working with image attributes is a lot like working with file data values. The value of an attribute with the image value type is the id of the associated file resource. A GET request to the `/api/trackedEntityInstances/<entityId>/<attributeId>/image` endpoint will return the actual image. The optional height and width parameters can be used to specify the dimensions of the image.

```
curl "http://server/api/33/trackedEntityInstances/ZRyCnJ1qUXS/zDhUuAYrxNC/image?
height=200&width=200"
  > image.jpg
```

The API also supports a *dimension* parameter. It can take three possible values (please note capital letters): `SMALL` (254x254), `MEDIUM` (512x512), `LARGE` (1024x1024) or `ORIGINAL`. Image type attributes will be stored in pre-generated sizes and will be furnished upon request based on the value of the `dimension` parameter.

```
curl "http://server/api/33/trackedEntityInstances/ZRyCnJ1qUXS/zDhUuAYrxNC/image?
dimension=MEDIUM"
```

File attributes

Working with file attributes is a lot like working with image data values. The value of an attribute with the file value type is the id of the associated file resource. A GET request to the `/api/trackedEntityInstances/<entityId>/<attributeId>/file` endpoint will return the actual file content.

```
curl "http://server/api/trackedEntityInstances/ZRyCnJ1qUXS/zDhUuAYrxNC/file
```

Tracked entity instance query

To query for tracked entity instances you can interact with the `/api/trackedEntityInstances` resource.

```
/api/33/trackedEntityInstances
```

Request syntax

Tracked entity instances query parameters

Query parameter	Description
filter	Attributes to use as a filter for the query. Param can be repeated any number of times. Filters can be applied to a dimension on the format <attribute-id>:<operator>:<filter>[:<operator>:<filter>]. Filter values are case-insensitive and can be repeated together with operator any number of times. Operators can be EQ | GT | GE | LT | LE | NE | LIKE | IN.
ou	Organisation unit identifiers, separated by ";".
ouMode	The mode of selecting organisation units, can be SELECTED | CHILDREN | DESCENDANTS | ACCESSIBLE | CAPTURE | ALL. Default is SELECTED, which refers to the selected selected organisation units only. See table below for explanations.
program	Program identifier. Restricts instances to being enrolled in the given program.
programStatus	Status of the instance for the given program. Can be ACTIVE | COMPLETED | CANCELLED.
followUp	Follow up status of the instance for the given program. Can be true | false or omitted.
programStartDate	Start date of enrollment in the given program for the tracked entity instance.
programEndDate	End date of enrollment in the given program for the tracked entity instance.
trackedEntity	Tracked entity identifier. Restricts instances to the given tracked instance type.
page	The page number. Default page is 1.

Query parameter	Description
pageSize	The page size. Default size is 50 rows per page.
totalPages	Indicates whether to include the total number of pages in the paging response (implies higher response time).
skipPaging	Indicates whether paging should be ignored and all rows should be returned.
lastUpdatedStartDate	Filter for teis which were updated after this date. Cannot be used together with *lastUpdatedDuration*.
lastUpdatedEndDate	Filter for teis which were updated up until this date. Cannot be used together with *lastUpdatedDuration*.
lastUpdatedDuration	Include only items which are updated within the given duration. The format is , where the supported time units are “d” (days), “h” (hours), “m” (minutes) and “s” (seconds). Cannot be used together with *lastUpdatedStartDate* and/or *lastUpdatedEndDate*.
assignedUserMode	Restricts result to tei with events assigned based on the assigned user selection mode, can be CURRENT | PROVIDED | NONE | ANY. See table below "Assigned user modes" for explanations.
assignedUser	Filter the result down to a limited set of teis with events that are assigned to the given user IDs by using *assignedUser=id1;id2*.This parameter will be considered only if assignedUserMode is either PROVIDED or null. The API will error out, if for example, assignedUserMode=CURRENT and assignedUser=someId
trackedEntityInstance	Filter the result down to a limited set of teis using explicit uids of the tracked entity instances by using *trackedEntityInstance=id1;id2*. This parameter will at the very least create the outer boundary of the results, forming the list of all teis using the uids provided. If other parameters/filters from this table are used, they will further limit the results from the explicit outer boundary.
includeDeleted	Indicates whether to include soft deleted teis or not. It is false by default.
potentialDuplicate	Filter the result based on the fact that a TEI is a Potential Duplicate. true: return TEIs flagged as Potential Duplicates. false: return TEIs NOT flagged as Potential Duplicates. If omitted, we don't check whether a TEI is a Potential Duplicate or not.

The available organisation unit selection modes are explained in the following table.

Organisation unit selection modes

Mode	Description
SELECTED	Organisation units defined in the request.

Mode	Description
CHILDREN	The selected organisation units and the immediate children, i.e. the organisation units at the level below.
DESCENDANTS	The selected organisation units and all children, i.e. all organisation units in the sub-hierarchy.
ACCESSIBLE	technically, returns everything in the user's tracker search organisation units. In practice, if a user lacks search organisation units, the system defaults to the data capture scope. As the capture scope is mandatory, we ensure that a user always has at least one universe.
CAPTURE	The data capture organisation units associated with the current user and all descendants, encompassing all organisation units in the sub-hierarchy.
ALL	The term "ALL" logically refers to the entire organisation unit available in the system for super users. However, for non-superusers, "ALL" is equivalent to "ACCESSIBLE" organisation units.

The available assigned user modes are explained in the following table.

Assigned user modes

Mode	Description
CURRENT	Includes events assigned to the current logged in user.
PROVIDED	Includes events assigned to the user provided in the request.
NONE	Includes unassigned events only.
ANY	Includes all assigned events, doesn't matter who are they assigned to as long as they assigned to someone.

The query is case insensitive. The following rules apply to the query parameters.

- At least one organisation unit must be specified using the *ou* parameter (one or many), or *ouMode=ALL* must be specified.
- Only one of the *program* and *trackedEntity* parameters can be specified (zero or one).
- If *programStatus* is specified then *program* must also be specified.
- If *followUp* is specified then *program* must also be specified.
- If *programStartDate* or *programEndDate* is specified then *program* must also be specified.
- Filter items can only be specified once.

A query for all instances associated with a specific organisation unit can look like this:

```
/api/33/trackedEntityInstances.json?ou=DiszpKrYNg8
```

To query for instances using one attribute with a filter and one attribute without a filter, with one organisation unit using the descendant organisation unit query mode:

```
/api/33/trackedEntityInstances.json?filter=zHXD5Ve1Efw:EQ:A
  &filter=AMpUYgxuCaE&ou=DiszpKrYNg8;yMCshbaVExv
```

A query for instances where one attribute is included in the response and one attribute is used as a filter:

```
/api/33/trackedEntityInstances.json?filter=zHXD5Ve1Efw:EQ:A
  &filter=AMpUYgxuCaE:LIKE:Road&ou=DiszpKrYNg8
```

A query where multiple operand and filters are specified for a filter item:

```
api/33/trackedEntityInstances.json?ou=DiszpKrYNg8&program=ur1Edk5Oe2n
  &filter=lw1SqmMlnfh:GT:150:LT:190
```

To query on an attribute using multiple values in an *IN* filter:

```
api/33/trackedEntityInstances.json?ou=DiszpKrYNg8
  &filter=dv3nChNSIxy:IN:Scott;Jimmy;Santiago
```

To constrain the response to instances which are part of a specific program you can include a program query parameter:

```
api/33/trackedEntityInstances.json?filter=zHXD5Ve1Efw:EQ:A&ou=O6uvpzGd5pu
  &ouMode=DESCENDANTS&program=ur1Edk5Oe2n
```

To specify program enrollment dates as part of the query:

```
api/33/trackedEntityInstances.json?filter=zHXD5Ve1Efw:EQ:A&ou=O6uvpzGd5pu
  &program=ur1Edk5Oe2n&programStartDate=2013-01-01&programEndDate=2013-09-01
```

To constrain the response to instances of a specific tracked entity you can include a tracked entity query parameter:

```
api/33/trackedEntityInstances.json?filter=zHXD5Ve1Efw:EQ:A&ou=O6uvpzGd5pu
  &ouMode=DESCENDANTS&trackedEntity=cyl5vuJ5ETQ
```

By default the instances are returned in pages of size 50, to change this you can use the page and pageSize query parameters:

```
api/33/trackedEntityInstances.json?filter=zHXD5Ve1Efw:EQ:A&ou=O6uvpzGd5pu
  &ouMode=DESCENDANTS&page=2&pageSize=3
```

You can use a range of operators for the filtering:

Filter operators

Operator	Description
EQ	Equal to
GT	Greater than
GE	Greater than or equal to
LT	Less than
LE	Less than or equal to
NE	Not equal to
LIKE	Free text match (Contains)
SW	Starts with
EW	Ends with
IN	Equal to one of multiple values separated by ";"

Response format

This resource supports JSON, JSONP, XLS and CSV resource representations.

- json (application/json)
- jsonp (application/javascript)
- xml (application/xml)

The response in JSON/XML is in object format and can look like the following. Please note that field filtering is supported, so if you want a full view, you might want to add `fields=*` to the query:


```
{
  "trackedEntityInstances": [
    {
      "lastUpdated": "2014-03-28 12:27:52.399",
      "trackedEntity": "cyl5vuJ5ETQ",
      "created": "2014-03-26 15:40:19.997",
      "orgUnit": "ueuQlqb8ccl",
      "trackedEntityInstance": "tphfdyIiVL6",
      "relationships": [],
      "attributes": [
        {
          "displayName": "Address",
          "attribute": "AMpUYgxuCaE",
          "type": "string",
          "value": "2033 Akasia St"
        },
        {
          "displayName": "TB number",
          "attribute": "ruQQnf6rswq",
          "type": "string",
          "value": "1Z 989 408 56 9356 521 9"
        },
        {
          "displayName": "Weight in kg",
          "attribute": "OvY4VVhSDeJ",
          "type": "number",
          "value": "68.1"
        },
```

```
        {
          "displayName": "Email",
          "attribute": "NDXw0cluzSw",
          "type": "string",
          "value": "LiyaEfrem@armyspy.com"
        },
        {
          "displayName": "Gender",
          "attribute": "cejWyOfXge6",
          "type": "optionSet",
          "value": "Female"
        },
        {
          "displayName": "Phone number",
          "attribute": "P2cwLGskgxn",
          "type": "phoneNumber",
          "value": "085 813 9447"
        },
        {
          "displayName": "First name",
          "attribute": "dv3nChNSIxy",
          "type": "string",
          "value": "Liya"
        },
        {
          "displayName": "Last name",
          "attribute": "hwlRTFIFSUq",
          "type": "string",
          "value": "Efrem"
        },
        {
          "code": "Height in cm",
          "displayName": "Height in cm",
          "attribute": "lw1SqmMlnfh",
          "type": "number",
          "value": "164"
        },
        {
          "code": "City",
          "displayName": "City",
          "attribute": "VUvgVao8Y5z",
          "type": "string",
          "value": "Kranskop"
        },
        {
          "code": "State",
          "displayName": "State",
          "attribute": "GUOBQt5K2WI",
          "type": "number",
          "value": "KwaZulu-Natal"
        },
        {
          "code": "Zip code",
          "displayName": "Zip code",
          "attribute": "n9nUvfpTsxQ",
          "type": "number",
          "value": "3282"
        },
        {
          "code": "National identifier",
          "displayName": "National identifier",
          "attribute": "AuPLng5hLbE",
          "type": "string",
```

```
          "value": "465700042"
        },
        {
          "code": "Blood type",
          "displayName": "Blood type",
          "attribute": "H9IlTX2X6SL",
          "type": "string",
          "value": "B-"
        },
        {
          "code": "Latitude",
          "displayName": "Latitude",
          "attribute": "Qo571yj6Zcn",
          "type": "string",
          "value": "-30.659626"
        },
        {
          "code": "Longitude",
          "displayName": "Longitude",
          "attribute": "RG7uGl4w5Jq",
          "type": "string",
          "value": "26.916172"
        }
      ]
    }
  ]
}
```


Tracked entity instance grid query

To query for tracked entity instances you can interact with the */api/trackedEntityInstances/grid* resource. There are two types of queries: One where a *query* query parameter and optionally *attribute* parameters are defined, and one where *attribute* and *filter* parameters are defined. This endpoint uses a more compact "grid" format, and is an alternative to the query in the previous section.

```
/api/33/trackedEntityInstances/query
```

Request syntax

Tracked entity instances query parameters

Query parameter	Description
query	Query string. Attribute query parameter can be used to define which attributes to include in the response. If no attributes but a program is defined, the attributes from the program will be used. If no program is defined, all attributes will be used. There are two formats. The first is a plan query string. The second is on the format <operator>:<query>. Operators can be EQ | LIKE. EQ implies exact matches on words, LIKE implies partial matches on words. The query will be split on space, where each word will form a logical AND query.

Query parameter	Description
attribute	Attributes to be included in the response. Can also be used as a filter for the query. Param can be repeated any number of times. Filters can be applied to a dimension on the format <attribute-id>:<operator>:<filter>[:<operator>:<filter>]. Filter values are case-insensitive and can be repeated together with operator any number of times. Operators can be EQ | GT | GE | LT | LE | NE | LIKE | IN. Filters can be omitted in order to simply include the attribute in the response without any constraints.
filter	Attributes to use as a filter for the query. Param can be repeated any number of times. Filters can be applied to a dimension on the format <attribute-id>:<operator>:<filter>[:<operator>:<filter>]. Filter values are case-insensitive and can be repeated together with operator any number of times. Operators can be EQ | GT | GE | LT | LE | NE | LIKE | IN.
ou	Organisation unit identifiers, separated by ";".
ouMode	The mode of selecting organisation units, can be SELECTED | CHILDREN | DESCENDANTS | ACCESSIBLE | ALL. Default is SELECTED, which refers to the selected organisation units only. See table below for explanations.
program	Program identifier. Restricts instances to being enrolled in the given program.
programStatus	Status of the instance for the given program. Can be ACTIVE | COMPLETED | CANCELLED.
followUp	Follow up status of the instance for the given program. Can be true | false or omitted.
programStartDate	Start date of enrollment in the given program for the tracked entity instance.
programEndDate	End date of enrollment in the given program for the tracked entity instance.
trackedEntity	Tracked entity identifier. Restricts instances to the given tracked instance type.
eventStatus	Status of any event associated with the given program and the tracked entity instance. Can be ACTIVE | COMPLETED | VISITED | SCHEDULE | OVERDUE | SKIPPED.
eventStartDate	Start date of event associated with the given program and event status.
eventEndDate	End date of event associated with the given program and event status.
programStage	The programStage for which the event related filters should be applied to. If not provided all stages will be considered.

Query parameter	Description
skipMeta	Indicates whether meta data for the response should be included.
page	The page number. Default page is 1.
pageSize	The page size. Default size is 50 rows per page.
totalPages	Indicates whether to include the total number of pages in the paging response (implies higher response time).
skipPaging	Indicates whether paging should be ignored and all rows should be returned.
assignedUserMode	Restricts result to tei with events assigned based on the assigned user selection mode, can be CURRENT | PROVIDED | NONE | ANY.
assignedUser	Filter the result down to a limited set of teis with events that are assigned to the given user IDs by using *assignedUser=id1;id2*.This parameter will be considered only if assignedUserMode is either PROVIDED or null. The API will error out, if for example, assignedUserMode=CURRENT and assignedUser=someId
trackedEntityInstance	Filter the result down to a limited set of teis using explicit uids of the tracked entity instances by using *trackedEntityInstance=id1;id2*. This parameter will at the very least create the outer boundary of the results, forming the list of all teis using the uids provided. If other parameters/filters from this table are used, they will further limit the results from the explicit outer boundary.
potentialDuplicate	Filter the result based on the fact that a TEI is a Potential Duplicate. true: return TEIs flagged as Potential Duplicates. false: return TEIs NOT flagged as Potential Duplicates. If omitted, we don't check whether a TEI is a Potential Duplicate or not.

The available organisation unit selection modes are explained in the following table.

Organisation unit selection modes

Mode	Description
SELECTED	Organisation units defined in the request.
CHILDREN	Immediate children, i.e. only the first level below, of the organisation units defined in the request.
DESCENDANTS	All children, i.e. at only levels below, e.g. including children of children, of the organisation units defined in the request.
ACCESSIBLE	All descendants of the data view organisation units associated with the current user. Will fall back to data capture organisation units associated with the current user if the former is not defined.

Mode	Description
CAPTURE	The data capture organisation units associated with the current user and all children, i.e. all organisation units in the sub-hierarchy.
ALL	All organisation units in the system. Requires authority.

Note that you can specify "attribute" with filters or directly using the "filter" params for constraining the instances to return.

Certain rules apply to which attributes are returned.

- If "query" is specified without any attributes or program, then all attributes that are marked as "Display in List without Program" is included in the response.
- If program is specified, all the attributes linked to the program will be included in the response.
- If tracked entity type is specified, then all tracked entity type attributes will be included in the response.

You can specify queries with words separated by space - in that situation the system will query for each word independently and return records where each word is contained in any attribute. A query item can be specified once as an attribute and once as a filter if needed. The query is case insensitive. The following rules apply to the query parameters.

- At least one organisation unit must be specified using the *ou* parameter (one or many), or *ouMode=ALL* must be specified.
- Only one of the *program* and *trackedEntity* parameters can be specified (zero or one).
- If *programStatus* is specified then *program* must also be specified.
- If *followUp* is specified then *program* must also be specified.
- If *programStartDate* or *programEndDate* is specified then *program* must also be specified.
- If *eventStatus* is specified then *eventStartDate* and *eventEndDate* must also be specified.
- A query cannot be specified together with filters.
- Attribute items can only be specified once.
- Filter items can only be specified once.

A query for all instances associated with a specific organisation unit can look like this:

```
/api/33/trackedEntityInstances/query.json?ou=DiszpKrYNg8
```

A query on all attributes for a specific value and organisation unit, using an exact word match:

```
/api/33/trackedEntityInstances/query.json?query=scott&ou=DiszpKrYNg8
```

A query on all attributes for a specific value, using a partial word match:

```
/api/33/trackedEntityInstances/query.json?query=LIKE:scott&ou=DiszpKrYNg8
```

You can query on multiple words separated by the URL character for space which is %20, will use a logical AND query for each word:

```
/api/33/trackedEntityInstances/query.json?query=isabel%20may&ou=DiszpKrYNg8
```

A query where the attributes to include in the response are specified:

```
/api/33/trackedEntityInstances/query.json?query=isabel
  &attribute=dv3nChNSIxy&attribute=AMpUYgxuCaE&ou=DiszpKrYNg8
```

To query for instances using one attribute with a filter and one attribute without a filter, with one organisation unit using the descendants organisation unit query mode:

```
/api/33/trackedEntityInstances/query.json?attribute=zHXD5Ve1Efw:EQ:A
  &attribute=AMpUYgxuCaE&ou=DiszpKrYNg8;yMCshbaVExv
```

A query for instances where one attribute is included in the response and one attribute is used as a filter:

```
/api/33/trackedEntityInstances/query.json?attribute=zHXD5Ve1Efw:EQ:A
  &filter=AMpUYgxuCaE:LIKE:Road&ou=DiszpKrYNg8
```

A query where multiple operand and filters are specified for a filter item:

```
/api/33/trackedEntityInstances/query.json?ou=DiszpKrYNg8&program=ur1Edk5Oe2n
  &filter=lw1SqmMlnfh:GT:150:LT:190
```

To query on an attribute using multiple values in an IN filter:

```
/api/33/trackedEntityInstances/query.json?ou=DiszpKrYNg8
  &attribute=dv3nChNSIxy:IN:Scott;Jimmy;Santiago
```

To constrain the response to instances which are part of a specific program you can include a program query parameter:

```
/api/33/trackedEntityInstances/query.json?filter=zHXD5Ve1Efw:EQ:A
  &ou=O6uvpzGd5pu&ouMode=DESCENDANTS&program=ur1Edk5Oe2n
```

To specify program enrollment dates as part of the query:

```
/api/33/trackedEntityInstances/query.json?filter=zHXD5Ve1Efw:EQ:A
  &ou=O6uvpzGd5pu&program=ur1Edk5Oe2n&programStartDate=2013-01-01
  &programEndDate=2013-09-01
```

To constrain the response to instances of a specific tracked entity you can include a tracked entity query parameter:

```
/api/33/trackedEntityInstances/query.json?attribute=zHXD5Ve1Efw:EQ:A
  &ou=O6uvpzGd5pu&ouMode=DESCENDANTS&trackedEntity=cyl5vuJ5ETQ
```

By default the instances are returned in pages of size 50, to change this you can use the page and pageSize query parameters:

```
/api/33/trackedEntityInstances/query.json?attribute=zHXD5Ve1Efw:EQ:A
  &ou=O6uvpzGd5pu&ouMode=DESCENDANTS&page=2&pageSize=3
```

To query for instances which have events of a given status within a given time span:

```
/api/33/trackedEntityInstances/query.json?ou=O6uvpzGd5pu
  &program=ur1Edk5Oe2n&eventStatus=COMPLETED
  &eventStartDate=2014-01-01&eventEndDate=2014-09-01
```

You can use a range of operators for the filtering:

Filter operators

Operator	Description
EQ	Equal to
GT	Greater than
GE	Greater than or equal to
LT	Less than
LE	Less than or equal to
NE	Not equal to
LIKE	Free text match (Contains)
SW	Starts with
EW	Ends with
IN	Equal to one of multiple values separated by ";"

Response format

This resource supports JSON, JSONP, XLS and CSV resource representations.

- json (application/json)
- jsonp (application/javascript)
- xml (application/xml)
- csv (application/csv)
- xls (application/vnd.ms-excel)

The response in JSON comes is in a tabular format and can look like the following. The *headers* section describes the content of each column. The instance, created, last updated, org unit and

tracked entity columns are always present. The following columns correspond to attributes specified in the query. The *rows* section contains one row per instance.


```
{
  "headers": [{
    "name": "instance",
    "column": "Instance",
    "type": "java.lang.String"
  }, {
    "name": "created",
    "column": "Created",
    "type": "java.lang.String"
  }, {
    "name": "lastupdated",
    "column": "Last updated",
    "type": "java.lang.String"
  }, {
    "name": "ou",
    "column": "Org unit",
    "type": "java.lang.String"
  }, {
    "name": "te",
    "column": "Tracked entity",
    "type": "java.lang.String"
  }, {
    "name": "zHXD5Ve1Efw",
    "column": "Date of birth type",
    "type": "java.lang.String"
  }, {
    "name": "AMpUYgxuCaE",
    "column": "Address",
    "type": "java.lang.String"
  }],
  "metaData": {
    "names": {
      "cyl5vuJ5ETQ": "Person"
    }
  },
  "width": 7,
  "height": 7,
  "rows": [
    ["yNCtJ6vhRJu", "2013-09-08 21:40:28.0", "2014-01-09 19:39:32.19", "DiszpKrYNg8",
"cyl5vuJ5ETQ", "A", "21 Kenyatta Road"],
    ["fSofnQR6lAU", "2013-09-08 21:40:28.0", "2014-01-09 19:40:19.62", "DiszpKrYNg8",
"cyl5vuJ5ETQ", "A", "56 Upper Road"],
    ["X5wZwS5lgm2", "2013-09-08 21:40:28.0", "2014-01-09 19:40:31.11", "DiszpKrYNg8",
"cyl5vuJ5ETQ", "A", "56 Main Road"],
    ["pCbogmlIXga", "2013-09-08 21:40:28.0", "2014-01-09 19:40:45.02", "DiszpKrYNg8",
"cyl5vuJ5ETQ", "A", "12 Lower Main Road"],
    ["WnUXrY4XBMM", "2013-09-08 21:40:28.0", "2014-01-09 19:41:06.97", "DiszpKrYNg8",
"cyl5vuJ5ETQ", "A", "13 Main Road"],
    ["xLNXbDs9uDF", "2013-09-08 21:40:28.0", "2014-01-09 19:42:25.66", "DiszpKrYNg8",
"cyl5vuJ5ETQ", "A", "14 Mombasa Road"],
    ["foc5zag6gbE", "2013-09-08 21:40:28.0", "2014-01-09 19:42:36.93", "DiszpKrYNg8",
"cyl5vuJ5ETQ", "A", "15 Upper Hill"]
  ]
}
```

Tracked entity instance filters

To create, read, update and delete tracked entity instance filters you can interact with the */api/trackedEntityInstanceFilters* resource. Tracked entity instance filters are shareable and follows the same pattern of sharing as any other metadata object. When using the */api/sharing* the type parameter will be *trackedEntityInstanceFilter*.

```
/api/33/trackedEntityInstanceFilters
```

Create and update a tracked entity instance filter definition

For creating and updating a tracked entity instance filter in the system, you will be working with the *trackedEntityInstanceFilters* resource. The tracked entity instance filter definitions are used in the Tracker Capture app to display relevant predefined "Working lists" in the tracker user interface.

Payload

Payload values	Description	Example
name	Name of the filter. Required.	
description	A description of the filter.	
sortOrder	The sort order of the filter. Used in Tracker Capture to order the filters in the program dashboard.	
style	Object containing css style.	("color": "blue", "icon": "fa fa-calendar"}
program	Object containing the id of the program. Required.	{ "id" : "uy2gU8kTjF"}
entityQueryCriteria	An object representing various possible filtering values. See *Entity Query Criteria* definition table below.	
eventFilters	A list of eventFilters. See *Event filters* definition table below.	[{"programStage": "eaDH9089uMp", "eventStatus": "OVERDUE", "eventCreatedPeriod": {"periodFrom": -15, "periodTo": 15}}]

Entity Query Criteria definition

attributeValueFilters	A list of attributeValueFilters. This is used to specify filters for attribute values when listing tracked entity instances	"attributeValueFilters"=[{ "attribute": "abcAttributeUid", "le": "20", "ge": "10", "lt": "20", "gt": "10", "in": ["India", "Norway"], "like": "abc", "sw": "abc", "ew": "abc", "dateFilter": { "startDate": "2014-05-01", "endDate": "2019-03-20", "startBuffer": -5, "endBuffer": 5, "period": "LAST_WEEK", "type": "RELATIVE" } }]

enrollmentStatus	The TEIs enrollment status. Can be none(any enrollmentstatus) or ACTIVE|COMPLETED| CANCELLED	
followup	When this parameter is true, the filter only returns TEIs that have an enrollment with status followup.	
organisationUnit	To specify the uid of the organisation unit	"organisationUnit": "a3kGcGDCuk7"
ouMode	To specify the OU selection mode. Possible values are SELECTED| CHILDREN| DESCENDANTS|ACCESSIBLE| CAPTURE|ALL	"ouMode": "SELECTED"
assignedUserMode	To specify the assigned user selection mode for events. Possible values are CURRENT| PROVIDED| NONE | ANY. See table below to understand what each value indicates. If PROVIDED (or null), non-empty assignedUsers in the payload will be considered.	"assignedUserMode": "PROVIDED"
assignedUsers	To specify a list of assigned users for events. To be used along with PROVIDED assignedUserMode above.	"assignedUsers": ["a3kGcGDCuk7", "a3kGcGDCuk8"]
displayColumnOrder	To specify the output ordering of columns	"displayOrderColumns": ["enrollmentDate", "program"]
order	To specify ordering/sorting of fields and its directions in comma separated values. A single item in order is of the form "orderDimension:direction". Note: Supported orderDimensions are trackedEntity, created, createdAt, createdAtClient, updatedAt, updatedAtClient, enrolledAt, inactive and the tracked entity attributes	"order"="a3kGcGDCuk6:desc"
eventStatus	Any valid EventStatus	"eventStatus": "COMPLETED"
programStage	To specify a programStage uid to filter on. TEIs will be filtered based on presence of enrollment in the specified program stage.	"programStage"="a3kGcGDCuk6"
trackedEntityType	To specify a trackedEntityType filter TEIs on.	"trackedEntityType"="a3kGcGDCuk6"

trackedEntityInstances	To specify a list of trackedEntityInstances to use when querying TEIs.	"trackedEntityInstances"=["a3kGcGDCuk6","b4jGcGDCuk7"]
enrollmentIncidentDate	DateFilterPeriod object date filtering based on enrollment incident date.	"enrollmentIncidentDate": { "startDate": "2014-05-01", "endDate": "2019-03-20", "startBuffer": -5, "endBuffer": 5, "period": "LAST_WEEK", "type": "RELATIVE" }
eventDate	DateFilterPeriod object date filtering based on event date.	"eventDate": { "startBuffer": -5, "endBuffer": 5, "type": "RELATIVE" }
enrollmentCreatedDate	DateFilterPeriod object date filtering based on enrollment created date.	"enrollmentCreatedDate": { "period": "LAST_WEEK", "type": "RELATIVE" }
lastUpdatedDate	DateFilterPeriod object date filtering based on last updated date.	"lastUpdatedDate": { "startDate": "2014-05-01", "endDate": "2019-03-20", "type": "ABSOLUTE" }

Event filters definition

programStage	Which programStage the TEI needs an event in to be returned.	"eaDH9089uMp"
eventStatus	The events status. Can be none(any event status) or ACTIVE|COMPLETED|SCHEDULE|OVERDUE	ACTIVE
eventCreatedPeriod	Period object containing a period in which the event must be created. See *Period* definition below.	{ "periodFrom": -15, "periodTo": 15}
assignedUserMode	To specify the assigned user selection mode for events. Possible values are CURRENT (events assigned to current user)| PROVIDED (events assigned to users provided in "assignedUsers" list) | NONE (events assigned to no one) | ANY (events assigned to anyone). If PROVIDED (or null), non-empty assignedUsers in the payload will be considered.	"assignedUserMode": "PROVIDED"
assignedUsers	To specify a list of assigned users for events. To be used along with PROVIDED assignedUserMode above.	"assignedUsers": ["a3kGcGDCuk7", "a3kGcGDCuk8"]

DateFilterPeriod object definition

type	Specify whether the date period type is ABSOLUTE | RELATIVE	"type" : "RELATIVE"
period	Specify if a relative system defined period is to be used. Applicable only when "type" is RELATIVE. (see Relative Periods for supported relative periods)	"period" : "THIS_WEEK"
startDate	Absolute start date. Applicable only when "type" is ABSOLUTE	"startDate":"2014-05-01"
endDate	Absolute end date. Applicable only when "type" is ABSOLUTE	"startDate":"2014-05-01"
startBuffer	Relative custom start date. Applicable only when "type" is RELATIVE	"startBuffer":-10
endBuffer	Relative custom end date. Applicable only when "type" is RELATIVE	"startDate":+10

Period definition

periodFrom	Number of days from current day. Can be positive or negative integer.	-15
periodTo	Number of days from current day. Must be bigger than periodFrom. Can be positive or negative integer.	15

Tracked entity instance filters query

To query for tracked entity instance filters in the system, you can interact with the */api/trackedEntityInstanceFilters* resource.

Tracked entity instance filters query parameters

Query parameter	Description
program	Program identifier. Restricts filters to the given program.

Enrollment management

Enrollments have full CRUD support in the API. Together with the API for tracked entity instances most operations needed for working with tracked entity instances and programs are supported.

```
/api/33/enrollments
```

Enrolling a tracked entity instance into a program

For enrolling persons into a program, you will need to first get the identifier of the person from the *trackedEntityInstances* resource. Then, you will need to get the program identifier from the *programs* resource. A template payload can be seen below:

```
{
  "trackedEntityInstance": "ZRyCnJ1qUXS",
  "orgUnit": "ImspTQPwCqd",
  "program": "S8uo8AlvYMz",
  "enrollmentDate": "2013-09-17",
  "incidentDate": "2013-09-17"
}
```

This payload should be used in a *POST* request to the enrollments resource identified by the following URL:

```
/api/33/enrollments
```

The different status of an enrollment are:

- **ACTIVE**: It is used meanwhile when the tracked entity participates on the program.
- **COMPLETED**: It is used when the tracked entity finished its participation on the program.
- **CANCELLED**: "Deactivated" in the web UI. It is used when the tracked entity cancelled its participation on the program.

For cancelling or completing an enrollment, you can make a *PUT* request to the `enrollments` resource, including the identifier and the action you want to perform. For cancelling an enrollment for a tracked entity instance:

```
/api/33/enrollments/<enrollment-id>/cancelled
```

For completing an enrollment for a tracked entity instance you can make a *PUT* request to the following URL:

```
/api/33/enrollments/<enrollment-id>/completed
```

For deleting an enrollment, you can make a *DELETE* request to the following URL:

```
/api/33/enrollments/<enrollment-id>
```

Enrollment instance query

To query for enrollments you can interact with the */api/enrollments* resource.

```
/api/33/enrollments
```

Request syntax

Enrollment query parameters

Query parameter	Description
ou	Organisation unit identifiers, separated by ";".
ouMode	The mode of selecting organisation units, can be SELECTED | CHILDREN | DESCENDANTS | ACCESSIBLE | CAPTURE | ALL. Default is SELECTED, which refers to the selected organisation units only. See table below for explanations.
program	Program identifier. Restricts instances to being enrolled in the given program.
programStatus	Status of the instance for the given program. Can be ACTIVE | COMPLETED | CANCELLED.
followUp	Follow up status of the instance for the given program. Can be true | false or omitted.
programStartDate	Start date of enrollment in the given program for the tracked entity instance.
programEndDate	End date of enrollment in the given program for the tracked entity instance.
lastUpdatedDuration	Include only items which are updated within the given duration. The format is , where the supported time units are “d” (days), “h” (hours), “m” (minutes) and “s” (seconds).
trackedEntity	Tracked entity identifier. Restricts instances to the given tracked instance type.
trackedEntityInstance	Tracked entity instance identifier. Should not be used together with trackedEntity.
page	The page number. Default page is 1.
pageSize	The page size. Default size is 50 rows per page.
totalPages	Indicates whether to include the total number of pages in the paging response (implies higher response time).
skipPaging	Indicates whether paging should be ignored and all rows should be returned.
includeDeleted	Indicates whether to include soft deleted enrollments or not. It is false by default.

The available organisation unit selection modes are explained in the following table.

Organisation unit selection modes

Mode	Description
SELECTED	Organisation units defined in the request (default).
CHILDREN	Immediate children, i.e. only the first level below, of the organisation units defined in the request.

Mode	Description
DESCENDANTS	All children, i.e. at only levels below, e.g. including children of children, of the organisation units defined in the request.
ACCESSIBLE	All descendants of the data view organisation units associated with the current user. Will fall back to data capture organisation units associated with the current user if the former is not defined.
ALL	All organisation units in the system. Requires authority.

The query is case insensitive. The following rules apply to the query parameters.

- At least one organisation unit must be specified using the *ou* parameter (one or many), or *ouMode=ALL* must be specified.
- Only one of the *program* and *trackedEntity* parameters can be specified (zero or one).
- If *programStatus* is specified then *program* must also be specified.
- If *followUp* is specified then *program* must also be specified.
- If *programStartDate* or *programEndDate* is specified then *program* must also be specified.

A query for all enrollments associated with a specific organisation unit can look like this:

```
/api/33/enrollments.json?ou=DiszpKrYNg8
```

To constrain the response to enrollments which are part of a specific program you can include a program query parameter:

```
/api/33/enrollments.json?ou=O6uvpzGd5pu&ouMode=DESCENDANTS&program=ur1Edk5Oe2n
```

To specify program enrollment dates as part of the query:

```
/api/33/enrollments.json?&ou=O6uvpzGd5pu&program=ur1Edk5Oe2n
  &programStartDate=2013-01-01&programEndDate=2013-09-01
```

To constrain the response to enrollments of a specific tracked entity you can include a tracked entity query parameter:

```
/api/33/enrollments.json?ou=O6uvpzGd5pu&ouMode=DESCENDANTS&trackedEntity=cyl5vuJ5ETQ
```

To constrain the response to enrollments of a specific tracked entity instance you can include a tracked entity instance query parameter, in this case we have restricted it to available enrollments viewable for current user:

```
/api/33/enrollments.json?ouMode=ACCESSIBLE&trackedEntityInstance=tphfdyIiVL6
```

By default the enrollments are returned in pages of size 50, to change this you can use the page and pageSize query parameters:

```
/api/33/enrollments.json?ou=O6uvpzGd5pu&ouMode=DESCENDANTS&page=2&pageSize=3
```

Response format

This resource supports JSON, JSONP, XLS and CSV resource representations.

- json (application/json)
- jsonp (application/javascript)
- xml (application/xml)

The response in JSON/XML is in object format and can look like the following. Please note that field filtering is supported, so if you want a full view, you might want to add `fields=*` to the query:

```
{
  "enrollments": [
    {
      "lastUpdated": "2014-03-28T05:27:48.512+0000",
      "trackedEntity": "cyl5vuJ5ETQ",
      "created": "2014-03-28T05:27:48.500+0000",
      "orgUnit": "DiszpKrYNg8",
      "program": "ur1Edk5Oe2n",
      "enrollment": "HLFOK0XThjr",
      "trackedEntityInstance": "qv0j4JBXQX0",
      "followup": false,
      "enrollmentDate": "2013-05-23T05:27:48.490+0000",
      "incidentDate": "2013-05-10T05:27:48.490+0000",
      "status": "ACTIVE"
    }
  ]
}
```

Events

This section is about sending and reading events.

```
/api/33/events
```

The different status of an event are:

- **ACTIVE**: If a event has ACTIVE status, it is possible to edit the event details. COMPLETED events can be turned ACTIVE again and vice versa.
- **COMPLETED**: An event change the status to COMPLETED only when a user clicks the complete button. If a event has COMPLETED status, it is not possible to edit the event details. ACTIVE events can be turned COMPLETED again and vice versa.
- **SKIPPED**: Scheduled events that no longer need to happen. In Tracker Capture, there is a button for that.
- **SCHEDULE**: If an event has no event date (but it has an due date) then the event status is saved as SCHEDULE.
- **OVERDUE**: If the due date of a scheduled event (no event date) has expired, it can be interpreted as OVERDUE.

- **VISITED**: (Removed since 2.38. VISITED migrate to ACTIVE). In Tracker Capture its possible to reach VISITED by adding a new event with an event date, and then leave before adding any data to the event - but it is not known to the tracker product team that anyone uses the status for anything. The VISITED status is not visible in the UI, and in all means treated in the same way as an ACTIVE event.

Sending events

DHIS2 supports three kinds of events: single events with no registration (also referred to as anonymous events), single event with registration and multiple events with registration. Registration implies that the data is linked to a tracked entity instance which is identified using some sort of identifier.

To send events to DHIS2 you must interact with the *events* resource. The approach to sending events is similar to sending aggregate data values. You will need a *program* which can be looked up using the *programs* resource, an *orgUnit* which can be looked up using the *organisationUnits* resource, and a list of valid data element identifiers which can be looked up using the *dataElements* resource. For events with registration, a *tracked entity instance* identifier is required, read about how to get this in the section about the *trackedEntityInstances* resource. For sending events to programs with multiple stages, you will need to also include the *programStage* identifier, the identifiers for programStages can be found in the *programStages* resource.

A simple single event with no registration example payload in XML format where we send events from the "Inpatient morbidity and mortality" program for the "Ngelehun CHC" facility in the demo database can be seen below:

```
<?xml version="1.0" encoding="utf-8"?>
<event program="eBAyeGv0exc" orgUnit="DiszpKrYNg8"
  eventDate="2013-05-17" status="COMPLETED" storedBy="admin">
  <coordinate latitude="59.8" longitude="10.9" />
  <dataValues>
    <dataValue dataElement="qrur9Dvnyt5" value="22" />
    <dataValue dataElement="oZg33kd9taw" value="Male" />
    <dataValue dataElement="msodh3rEMJa" value="2013-05-18" />
  </dataValues>
</event>
```

To perform some testing we can save the XML payload as a file called *event.xml* and send it as a POST request to the events resource in the API using curl with the following command:

```
curl -d @event.xml "https://play.dhis2.org/demo/api/33/events"
  -H "Content-Type:application/xml" -u admin:district
```

The same payload in JSON format looks like this:

```
{
  "program": "eBAyeGv0exc",
  "orgUnit": "DiszpKrYNg8",
  "eventDate": "2013-05-17",
  "status": "COMPLETED",
  "completedDate": "2013-05-18",
  "storedBy": "admin",
  "coordinate": {
    "latitude": 59.8,
    "longitude": 10.9
```

```
  },
  "dataValues": [
    {
      "dataElement": "qrur9Dvnyt5",
      "value": "22"
    },
    {
      "dataElement": "oZg33kd9taw",
      "value": "Male"
    },
    {
      "dataElement": "msodh3rEMJa",
      "value": "2013-05-18"
    }
  ]
}
```

To send this you can save it to a file called *event.json* and use curl like this:

```
curl -d @event.json "localhost/api/33/events" -H "Content-Type:application/json"
  -u admin:district
```

We also support sending multiple events at the same time. A payload in XML format might look like this:

```
<?xml version="1.0" encoding="utf-8"?>
<events>
  <event program="eBAyeGv0exc" orgUnit="DiszpKrYNg8"
    eventDate="2013-05-17" status="COMPLETED" storedBy="admin">
    <coordinate latitude="59.8" longitude="10.9" />
    <dataValues>
      <dataValue dataElement="qrur9Dvnyt5" value="22" />
      <dataValue dataElement="oZg33kd9taw" value="Male" />
    </dataValues>
  </event>
  <event program="eBAyeGv0exc" orgUnit="DiszpKrYNg8"
    eventDate="2013-05-17" status="COMPLETED" storedBy="admin">
    <coordinate latitude="59.8" longitude="10.9" />
    <dataValues>
      <dataValue dataElement="qrur9Dvnyt5" value="26" />
      <dataValue dataElement="oZg33kd9taw" value="Female" />
    </dataValues>
  </event>
</events>
```

You will receive an import summary with the response which can be inspected in order to get information about the outcome of the request, like how many values were imported successfully. The payload in JSON format looks like this:

```
{
  "events": [
  {
    "program": "eBAyeGv0exc",
    "orgUnit": "DiszpKrYNg8",
    "eventDate": "2013-05-17",
    "status": "COMPLETED",
    "storedBy": "admin",
```

```
    "coordinate": {
      "latitude": "59.8",
      "longitude": "10.9"
    },
    "dataValues": [
      {
        "dataElement": "qrur9Dvnyt5",
        "value": "22"
      },
      {
        "dataElement": "oZg33kd9taw",
        "value": "Male"
      }
    ]
  },
  {
    "program": "eBAyeGv0exc",
    "orgUnit": "DiszpKrYNg8",
    "eventDate": "2013-05-17",
    "status": "COMPLETED",
    "storedBy": "admin",
    "coordinate": {
      "latitude": "59.8",
      "longitude": "10.9"
    },
    "dataValues": [
      {
        "dataElement": "qrur9Dvnyt5",
        "value": "26"
      },
      {
        "dataElement": "oZg33kd9taw",
        "value": "Female"
      }
    ]
  } ]
}
```

You can also use GeoJson to store any kind of geometry on your event. An example payload using GeoJson instead of the former latitude and longitude properties can be seen here:

```
{
  "program": "eBAyeGv0exc",
  "orgUnit": "DiszpKrYNg8",
  "eventDate": "2013-05-17",
  "status": "COMPLETED",
  "storedBy": "admin",
  "geometry": {
    "type": "POINT",
    "coordinates": [59.8, 10.9]
  },
  "dataValues": [
    {
      "dataElement": "qrur9Dvnyt5",
      "value": "22"
    },
    {
      "dataElement": "oZg33kd9taw",
      "value": "Male"
    },
    {
```

```
      "dataElement": "msodh3rEMJa",
      "value": "2013-05-18"
    }
  ]
}
```

As part of the import summary you will also get the identifier *reference* to the event you just sent, together with a *href* element which points to the server location of this event. The table below describes the meaning of each element.

Events resource format

Parameter	Type	Required	Options (default first)	Description
program	string	true		Identifier of the single event with no registration program
orgUnit	string	true		Identifier of the organisation unit where the event took place
eventDate	date	true		The date of when the event occurred
completedDate	date	false		The date of when the event is completed. If not provided, the current date is selected as the event completed date
status	enum	false	ACTIVE | COMPLETED | VISITED | SCHEDULE | OVERDUE | SKIPPED	Whether the event is complete or not
storedBy	string	false	Defaults to current user	Who stored this event (can be username, system-name, etc)
coordinate	double	false		Refers to where the event took place geographically (latitude and longitude)
dataElement	string	true		Identifier of data element

Parameter	Type	Required	Options (default first)	Description
value	string	true		Data value or measure for this event

OrgUnit matching

By default the orgUnit parameter will match on the ID, you can also select the orgUnit id matching scheme by using the parameter orgUnitIdScheme=SCHEME, where the options are: *ID*, *UID*, *UUID*, *CODE*, and *NAME*. There is also the *ATTRIBUTE:* scheme, which matches on a *unique* metadata attribute value.

Updating events

To update an existing event, the format of the payload is the same, but the URL you are posting to must add the identifier to the end of the URL string and the request must be PUT.

The payload has to contain all, even non-modified, attributes. Attributes that were present before and are not present in the current payload any more will be removed by the system.

It is not allowed to update an already deleted event. The same applies to tracked entity instance and enrollment.

```
curl -X PUT -d @updated_event.xml "localhost/api/33/events/ID"
  -H "Content-Type: application/xml" -u admin:district
```

```
curl -X PUT -d @updated_event.json "localhost/api/33/events/ID"
  -H "Content-Type: application/json" -u admin:district
```

Deleting events

To delete an existing event, all you need is to send a DELETE request with an identifier reference to the server you are using.

```
curl -X DELETE "localhost/api/33/events/ID" -u admin:district
```

Assigning user to events

A user can be assigned to an event. This can be done by including the appropriate property in the payload when updating or creating the event.

```
  "assignedUser": "<id>"
```

The id refers to the if of the user. Only one user can be assigned to an event at a time.

User assignment must be enabled in the program stage before users can be assigned to events.

Getting events

To get an existing event you can issue a GET request including the identifier like this:

```
curl "http://localhost/api/33/events/ID" -H "Content-Type: application/xml" -u admin:district
```

Querying and reading events

This section explains how to read out the events that have been stored in the DHIS2 instance. For more advanced uses of the event data, please see the section on event analytics. The output format from the `/api/events` endpoint will match the format that is used to send events to it (which the analytics event api does not support). Both XML and JSON are supported, either through adding .json/.xml or by setting the appropriate *Accept* header. The query is paged by default and the default page size is 50 events, *field* filtering works as it does for metadata, add the *fields* parameter and include your wanted properties, i.e. *?fields=program,status*.

Events resource query parameters

Key	Type	Required	Description
program	identifier	true (if not programStage is provided)	Identifier of program
programStage	identifier	false	Identifier of program stage
programStatus	enum	false	Status of event in program, ca be ACTIVE | COMPLETED | CANCELLED
followUp	boolean	false	Whether event is considered for follow up in program, can be true | false or omitted.
trackedEntityInstance	identifier	false	Identifier of tracked entity instance
orgUnit	identifier	true	Identifier of organisation unit
ouMode	enum	false	Org unit selection mode, can be SELECTED | CHILDREN | DESCENDANTS
startDate	date	false	Only events newer than this date
endDate	date	false	Only events older than this date
status	enum	false	Status of event, can be ACTIVE | COMPLETED | VISITED | SCHEDULE | OVERDUE | SKIPPED
lastUpdatedStartDate	date	false	Filter for events which were updated after this date. Cannot be used together with *lastUpdatedDuration*.

Key	Type	Required	Description
lastUpdatedEndDate	date	false	Filter for events which were updated up until this date. Cannot be used together with *lastUpdatedDuration*.
lastUpdatedDuration	string	false	Include only items which are updated within the given duration. The format is , where the supported time units are “d” (days), “h” (hours), “m” (minutes) and “s” (seconds). Cannot be used together with *lastUpdatedStartDate* and/or *lastUpdatedEndDate*.
skipMeta	boolean	false	Exclude the meta data part of response (improves performance)
page	integer	false	Page number
pageSize	integer	false	Number of items in each page
totalPages	boolean	false	Indicates whether to include the total number of pages in the paging response.
skipPaging	boolean	false	Indicates whether to skip paging in the query and return all events.
dataElementIdScheme	string	false	Data element ID scheme to use for export, valid options are UID, CODE and ATTRIBUTE:{ID}
categoryOptionComboIdScheme	string	false	Category Option Combo ID scheme to use for export, valid options are UID, CODE and ATTRIBUTE:{ID}
orgUnitIdScheme	string	false	Organisation Unit ID scheme to use for export, valid options are UID, CODE and ATTRIBUTE:{ID}
programIdScheme	string	false	Program ID scheme to use for export, valid options are UID, CODE and ATTRIBUTE:{ID}

Key	Type	Required	Description
programStageIdScheme	string	false	Program Stage ID scheme to use for export, valid options are UID, CODE and ATTRIBUTE:{ID}
idScheme	string	false	Allows to set id scheme for data element, category option combo, orgUnit, program and program stage at once.
order	string	false	The order of which to retrieve the events from the API. Usage: order=<property>:asc/desc - Ascending order is default. Properties: event | program | programStage | enrollment | enrollmentStatus | orgUnit | orgUnitName | trackedEntityInstance | eventDate | followup | status | dueDate | storedBy | created | lastUpdated | completedBy | completedDate order=orgUnitName:DESC order=lastUpdated:ASC
event	comma delimited string	false	Filter the result down to a limited set of IDs by using *event=id1;id2*.
skipEventId	boolean	false	Skips event identifiers in the response
attributeCc (**)	string	false	Attribute category combo identifier (must be combined with *attributeCos*)
attributeCos (**)	string	false	Attribute category option identifiers, separated with ; (must be combined with *attributeCc*)
async	false | true	false	Indicates whether the import should be done asynchronous or synchronous.

Key	Type	Required	Description
includeDeleted	boolean	false	When true, soft deleted events will be included in your query result.
assignedUserMode	enum	false	Assigned user selection mode, can be CURRENT | PROVIDED | NONE | ANY.
assignedUser	comma delimited strings	false	Filter the result down to a limited set of events that are assigned to the given user IDs by using *assignedUser=id1;id2*. This parameter will be considered only if assignedUserMode is either PROVIDED or null. The API will error out, if for example, assignedUserMode=CURRENT and assignedUser=someId

> **Note**
>
> If the query contains neither `attributeCC` nor `attributeCos`, the server returns events for all attribute option combos where the user has read access.

Examples

Query for all events with children of a certain organisation unit:

```
/api/29/events.json?orgUnit=YuQRtpLP10I&ouMode=CHILDREN
```

Query for all events with all descendants of a certain organisation unit, implying all organisation units in the sub-hierarchy:

```
/api/33/events.json?orgUnit=O6uvpzGd5pu&ouMode=DESCENDANTS
```

Query for all events with a certain program and organisation unit:

```
/api/33/events.json?orgUnit=DiszpKrYNg8&program=eBAyeGv0exc
```

Query for all events with a certain program and organisation unit, sorting by due date ascending:

```
/api/33/events.json?orgUnit=DiszpKrYNg8&program=eBAyeGv0exc&order=dueDate
```

Query for the 10 events with the newest event date in a certain program and organisation unit - by paging and ordering by due date descending:

```
/api/33/events.json?orgUnit=DiszpKrYNg8&program=eBAyeGv0exc
  &order=eventDate:desc&pageSize=10&page=1
```

Query for all events with a certain program and organisation unit for a specific tracked entity instance:

```
/api/33/events.json?orgUnit=DiszpKrYNg8
  &program=eBAyeGv0exc&trackedEntityInstance=gfVxE3ALA9m
```

Query for all events with a certain program and organisation unit older or equal to 2014-02-03:

```
/api/33/events.json?orgUnit=DiszpKrYNg8&program=eBAyeGv0exc&endDate=2014-02-03
```

Query for all events with a certain program stage, organisation unit and tracked entity instance in the year 2014:

```
/api/33/events.json?orgUnit=DiszpKrYNg8&program=eBAyeGv0exc
  &trackedEntityInstance=gfVxE3ALA9m&startDate=2014-01-01&endDate=2014-12-31
```

Query files associated with event data values. In the specific case of fetching an image file an additional parameter can be provided to fetch the image with different dimensions. If dimension is not provided, the system will return the original image. The parameter will be ignored in case of fetching non-image files e.g pdf. Possible dimension values are *small(254 x 254), medium(512 x 512), large(1024 x 1024) or original*. Any value other than those mentioned will be discarded and the original image will be returned.

```
/api/33/events/files?eventUid=hcmcWlYkg9u&dataElementUid=C0W4aFuVm4P&dimension=small
```

Retrieve events with specified Organisation unit and Program, and use *Attribute:Gq0oWTf2DtN* as identifier scheme

```
/api/events?orgUnit=DiszpKrYNg8&program=lxAQ7Zs9VYR&idScheme=Attribute:Gq0oWTf2DtN
```

Retrieve events with specified Organisation unit and Program, and use UID as identifier scheme for orgUnits, Code as identifier scheme for Program stages, and *Attribute:Gq0oWTf2DtN* as identifier scheme for the rest of the metadata with assigned attribute.

```
api/events.json?orgUnit=DiszpKrYNg8&program=lxAQ7Zs9VYR&idScheme=Attribute:Gq0oWTf2DtN
  &orgUnitIdScheme=UID&programStageIdScheme=Code
```

Event grid query

In addition to the above event query end point, there is an event grid query end point where a more compact "grid" format of events are returned. This is possible by interacting with /api/events/query.json|xml|xls|csv endpoint.

```
/api/33/events/query
```

Most of the query parameters mentioned in event querying and reading section above are valid here. However, since the grid to be returned comes with specific set of columns that apply to all rows (events), it is mandatory to specify a program stage. It is not possible to mix events from different programs or program stages in the return.

Returning events from a single program stage, also opens up for new functionality - for example sorting and searching events based on their data element values. api/events/query has support for this. Below are some examples

A query to return an event grid containing only selected data elements for a program stage

```
/api/33/events/query.json?orgUnit=DiszpKrYNg8&programStage=Zj7UnCAulEk
  &dataElement=qrur9Dvnyt5,fWIAEtYVEGk,K6uUAvq500H&order=lastUpdated:desc
  &pageSize=50&page=1&totalPages=true
```

A query to return an event grid containing all data elements of a program stage

```
/api/33/events/query.json?orgUnit=DiszpKrYNg8&programStage=Zj7UnCAulEk
  &includeAllDataElements=true
```

A query to filter events based on data element value

```
/api/33/events/query.json?orgUnit=DiszpKrYNg8&programStage=Zj7UnCAulEk
  &filter=qrur9Dvnyt5:GT:20:LT:50
```

In addition to the filtering, the above example also illustrates one thing: the fact that there are no data elements mentioned to be returned in the grid. When this happens, the system defaults back to return only those data elements marked "Display in report" under program stage configuration.

We can also extend the above query to return us a grid sorted (asc|desc) based on data element value

```
/api/33/events/query.json?orgUnit=DiszpKrYNg8&programStage=Zj7UnCAulEk
  &filter=qrur9Dvnyt5:GT:20:LT:50&order=qrur9Dvnyt5:desc
```

Event filters

To create, read, update and delete event filters you can interact with the `/api/eventFilters` resource.

```
/api/33/eventFilters
```

Create and update an event filter definition

For creating and updating an event filter in the system, you will be working with the *eventFilters* resource. *POST* is used to create and *PUT* method is used to update. The event filter definitions are used in the Tracker Capture app to display relevant predefined "Working lists" in the tracker user interface.

Request Payload

Request Property	Description	Example
name	Name of the filter.	"name":"My working list"
description	A description of the filter.	"description":"for listing all events assigned to me".
program	The uid of the program.	"program" : "a3kGcGDCuk6"
programStage	The uid of the program stage.	"programStage" : "a3kGcGDCuk6"
eventQueryCriteria	Object containing parameters for querying, sorting and filtering events.	"eventQueryCriteria": { "organisationUnit":"a3kGcGDCuk6", "status": "COMPLETED", "createdDate": { "from": "2014-05-01", "to": "2019-03-20" }, "dataElements": ["a3kGcGDCuk6:EQ:1", "a3kGcGDCuk6"], "filters": ["a3kGcGDCuk6:EQ:1"], "programStatus": "ACTIVE", "ouMode": "SELECTED", "assignedUserMode": "PROVIDED", "assignedUsers" : ["a3kGcGDCuk7", "a3kGcGDCuk8"], "followUp": false, "trackedEntityInstance": "a3kGcGDCuk6", "events": ["a3kGcGDCuk7", "a3kGcGDCuk8"], "fields": "eventDate,dueDate", "order": "dueDate:asc,createdDate:desc" }

Event Query Criteria definition

followUp	Used to filter events based on enrollment followUp flag. Possible values are true|false.	"followUp": true
organisationUnit	To specify the uid of the organisation unit	"organisationUnit": "a3kGcGDCuk7"
ouMode	To specify the OU selection mode. Possible values are SELECTED| CHILDREN| DESCENDANTS|ACCESSIBLE| CAPTURE|ALL	"ouMode": "SELECTED"

assignedUserMode	To specify the assigned user selection mode for events. Possible values are CURRENT| PROVIDED| NONE | ANY. See table below to understand what each value indicates. If PROVIDED (or null), non-empty assignedUsers in the payload will be considered.	"assignedUserMode": "PROVIDED"
assignedUsers	To specify a list of assigned users for events. To be used along with PROVIDED assignedUserMode above.	"assignedUsers": ["a3kGcGDCuk7", "a3kGcGDCuk8"]
displayOrderColumns	To specify the output ordering of columns	"displayOrderColumns": ["eventDate", "dueDate", "program"]
order	To specify ordering/sorting of fields and its directions in comma separated values. A single item in order is of the form "dataItem:direction".	"order"="a3kGcGDCuk6:desc,eventDate:asc"
dataFilters	To specify filters to be applied when listing events	"dataFilters"=[{ "dataItem": "abcDataElementUid", "le": "20", "ge": "10", "lt": "20", "gt": "10", "in": ["India", "Norway"], "like": "abc", "dateFilter": { "startDate": "2014-05-01", "endDate": "2019-03-20", "startBuffer": -5, "endBuffer": 5, "period": "LAST_WEEK", "type": "RELATIVE" } }]
status	Any valid EventStatus	"eventStatus": "COMPLETED"
events	To specify list of events	"events"=["a3kGcGDCuk6"]
completedDate	DateFilterPeriod object date filtering based on completed date.	"completedDate": { "startDate": "2014-05-01", "endDate": "2019-03-20", "startBuffer": -5, "endBuffer": 5, "period": "LAST_WEEK", "type": "RELATIVE" }
eventDate	DateFilterPeriod object date filtering based on event date.	"eventDate": { "startBuffer": -5, "endBuffer": 5, "type": "RELATIVE" }
dueDate	DateFilterPeriod object date filtering based on due date.	"dueDate": { "period": "LAST_WEEK", "type": "RELATIVE" }
lastUpdatedDate	DateFilterPeriod object date filtering based on last updated date.	"lastUpdatedDate": { "startDate": "2014-05-01", "endDate": "2019-03-20", "type": "ABSOLUTE" }

DateFilterPeriod object definition

type	Specify whether the date period type is ABSOLUTE | RELATIVE	"type" : "RELATIVE"
period	Specify if a relative system defined period is to be used. Applicable only when "type" is RELATIVE. (see Relative Periods for supported relative periods)	"period" : "THIS_WEEK"
startDate	Absolute start date. Applicable only when "type" is ABSOLUTE	"startDate":"2014-05-01"
endDate	Absolute end date. Applicable only when "type" is ABSOLUTE	"startDate":"2014-05-01"
startBuffer	Relative custom start date. Applicable only when "type" is RELATIVE	"startBuffer":-10
endBuffer	Relative custom end date. Applicable only when "type" is RELATIVE	"startDate":+10

The available assigned user selection modes are explained in the following table.

Assigned user selection modes (event assignment)

Mode	Description
CURRENT	Assigned to the current logged in user
PROVIDED	Assigned to the users provided in the "assignedUser" parameter
NONE	Assigned to no users.
ANY	Assigned to any users.

A sample payload that can be used to create/update an eventFilter is shown below.

```
{
  "program": "ur1Edk5Oe2n",
  "description": "Simple Filter for TB events",
  "name": "TB events",
  "eventQueryCriteria": {
    "organisationUnit":"DiszpKrYNg8",
    "eventStatus": "COMPLETED",
    "eventDate": {
      "startDate": "2014-05-01",
      "endDate": "2019-03-20",
      "startBuffer": -5,
      "endBuffer": 5,
      "period": "LAST_WEEK",
      "type": "RELATIVE"
    },
    "dataFilters": [{
      "dataItem": "abcDataElementUid",
      "le": "20",
      "ge": "10",
      "lt": "20",
```

```
      "gt": "10",
      "in": ["India", "Norway"],
      "like": "abc"
    },
    {
      "dataItem": "dateDataElementUid",
      "dateFilter": {
        "startDate": "2014-05-01",
        "endDate": "2019-03-20",
        "type": "ABSOLUTE"
      }
    },
    {
      "dataItem": "anotherDateDataElementUid",
      "dateFilter": {
        "startBuffer": -5,
        "endBuffer": 5,
        "type": "RELATIVE"
      }
    },
    {
      "dataItem": "yetAnotherDateDataElementUid",
      "dateFilter": {
        "period": "LAST_WEEK",
        "type": "RELATIVE"
      }
    }],
    "programStatus": "ACTIVE"
  }
}
```

Retrieving and deleting event filters

A specific event filter can be retrieved by using the following api

```
GET /api/33/eventFilters/{uid}
```

All event filters can be retrieved by using the following api.

```
GET /api/33/eventFilters?fields=*
```

All event filters for a specific program can be retrieved by using the following api

```
GET /api/33/eventFilters?filter=program:eq:IpHINAT79UW
```

An event filter can be deleted by using the following api

```
DELETE /api/33/eventFilters/{uid}
```

Relationships

Relationships are links between two entities in tracker. These entities can be tracked entity instances, enrollments and events.

There are multiple endpoints that allow you to see, create, delete and update relationships. The most common is the /api/trackedEntityInstances endpoint, where you can include relationships in the payload to create, update or deleting them if you omit them - Similar to how you work with enrollments and events in the same endpoint. All the tracker endpoints, /api/trackedEntityInstances, /api/enrollments and /api/events also list their relationships if requested in the field filter.

The standard endpoint for relationships is, however, /api/relationships. This endpoint provides all the normal CRUD operations for relationships.

You can view a list of relationships by trackedEntityInstance, enrollment or event:

```
GET /api/relationships?[tei={teiUID}|enrollment={enrollmentUID}|event={eventUID}]
```

This request will return a list of any relationship you have access to see that includes the trackedEntityInstance, enrollment or event you specified. Each relationship is represented with the following JSON:

```
{
  "relationshipType": "dDrh5UyCyvQ",
  "relationshipName": "Mother-Child",
  "relationship": "t0HIBrc65Rm",
  "bidirectional": false,
  "from": {
    "trackedEntityInstance": {
      "trackedEntityInstance": "vOxUH373fy5"
    }
  },
  "to": {
    "trackedEntityInstance": {
      "trackedEntityInstance": "pybd813kIWx"
    }
  },
  "created": "2019-04-26T09:30:56.267",
  "lastUpdated": "2019-04-26T09:30:56.267"
}
```

You can also view specified relationships using the following endpoint:

```
GET /api/relationships/<id>
```

To create or update a relationship, you can use the following endpoints:

```
POST /api/relationships
PUT /api/relationships
```

And use the following payload structure:

```
{
  "relationshipType": "dDrh5UyCyvQ",
  "from": {
    "trackedEntityInstance": {
      "trackedEntityInstance": "vOxUH373fy5"
    }
```

```
  },
  "to": {
    "trackedEntityInstance": {
      "trackedEntityInstance": "pybd813kIWx"
    }
  }
}
```

To delete a relationship, you can use this endpoint:

```
DELETE /api/relationships/<id>
```

In our example payloads, we use a relationship between trackedEntityInstances. Because of this, the "from" and "to" properties of our payloads include "trackedEntityInstance" objects. If your relationship includes other entities, you can use the following properties:

```
{
  "enrollment": {
    "enrollment": "<id>"
  }
}
```

```
{
  "event": {
    "event": "<id>"
  }
}
```

Relationship can be soft deleted. In that case, you can use the `includeDeleted` request parameter to see the relationship.

```
GET /api/relationships?tei=pybd813kIWx?includeDeleted=true
```

Update strategies

Two update strategies for all 3 tracker endpoints are supported: enrollment and event creation. This is useful when you have generated an identifier on the client side and are not sure if it was created or not on the server.

Available tracker strategies

Parameter	Description
CREATE	Create only, this is the default behavior.
CREATE_AND_UPDATE	Try and match the ID, if it exist then update, if not create.

To change the parameter, please use the strategy parameter:

```
POST /api/33/trackedEntityInstances?strategy=CREATE_AND_UPDATE
```

Tracker bulk deletion

Bulk deletion of tracker objects work in a similar fashion to adding and updating tracker objects, the only difference is that the `importStrategy` is *DELETE*.

Example: Bulk deletion of tracked entity instances:

```
{
  "trackedEntityInstances": [
    {
      "trackedEntityInstance": "ID1"
    }, {
      "trackedEntityInstance": "ID2"
    }, {
      "trackedEntityInstance": "ID3"
    }
  ]
}
```

```
curl -X POST -d @data.json -H "Content-Type: application/json"
  "http://server/api/33/trackedEntityInstances?strategy=DELETE"
```

Example: Bulk deletion of enrollments:

```
{
  "enrollments": [
    {
       "enrollment": "ID1"
    }, {
      "enrollment": "ID2"
    }, {
      "enrollment": "ID3"
    }
  ]
}
```

```
curl -X POST -d @data.json -H "Content-Type: application/json"
  "http://server/api/33/enrollments?strategy=DELETE"
```

Example: Bulk deletion of events:

```
{
  "events": [
    {
      "event": "ID1"
    }, {
      "event": "ID2"
    }, {
      "event": "ID3"
    }
  ]
}
```

```
curl -X POST -d @data.json -H "Content-Type: application/json"
  "http://server/api/33/events?strategy=DELETE"
```

Identifier reuse and item deletion via POST and PUT methods

Tracker endpoints */trackedEntityInstances*, */enrollments*, */events* support CRUD operations. The system keeps track of used identifiers. Therefore, an item which has been created and then deleted (e.g. events, enrollments) cannot be created or updated again. If attempting to delete an already deleted item, the system returns a success response as deletion of an already deleted item implies no change.

The system does not allow to delete an item via an update (*PUT*) or create (*POST*) method. Therefore, an attribute *deleted* is ignored in both *PUT* and *POST* methods, and in *POST* method it is by default set to *false*.

Import parameters

The import process can be customized using a set of import parameters:

Import parameters

Parameter	Values (default first)	Description
dataElementIdScheme	id | name | code | attribute:ID	Property of the data element object to use to map the data values.
orgUnitIdScheme	id | name | code | attribute:ID	Property of the org unit object to use to map the data values.
idScheme	id | name | code| attribute:ID	Property of all objects including data elements, org units and category option combos, to use to map the data values.
dryRun	false | true	Whether to save changes on the server or just return the import summary.
strategy	CREATE | UPDATE | CREATE_AND_UPDATE | DELETE	Save objects of all, new or update import status on the server.
skipNotifications	true | false	Indicates whether to send notifications for completed events.
skipFirst	true | false	Relevant for CSV import only. Indicates whether CSV file contains a header row which should be skipped.

Parameter	Values (default first)	Description
importReportMode	FULL, ERRORS, DEBUG	Sets the `ImportReport` mode, controls how much is reported back after the import is done. `ERRORS` only includes *ObjectReports* for object which has errors. `FULL` returns an *ObjectReport* for all objects imported, and `DEBUG` returns the same plus a name for the object (if available).

CSV Import / Export

In addition to XML and JSON for event import/export, in DHIS2.17 we introduced support for the CSV format. Support for this format builds on what was described in the last section, so here we will only write about what the CSV specific parts are.

To use the CSV format you must either use the `/api/events.csv` endpoint, or add *content-type: text/csv* for import, and *accept: text/csv* for export when using the `/api/events` endpoint.

The order of column in the CSV which are used for both export and import is as follows:

CSV column

Index	Key	Type	Description
1	event	identifier	Identifier of event
2	status	enum	Status of event, can be ACTIVE | COMPLETED | VISITED | SCHEDULE | OVERDUE | SKIPPED
3	program	identifier	Identifier of program
4	programStage	identifier	Identifier of program stage
5	enrollment	identifier	Identifier of enrollment (program instance)
6	orgUnit	identifier	Identifier of organisation unit
7	eventDate	date	Event date
8	dueDate	date	Due Date
9	latitude	double	Latitude where event happened
10	longitude	double	Longitude where event happened
11	dataElement	identifier	Identifier of data element
12	value	string	Value / measure of event
13	storedBy	string	Event was stored by (defaults to current user)

Index	Key	Type	Description
14	providedElsewhere	boolean	Was this value collected somewhere else
14	completedDate	date	Completed date of event
14	completedBy	string	Username of user who completed event

Example of 2 events with 2 different data value each:

```
EJNxP3WreNP,COMPLETED,<pid>,<psid>,<enrollment-id>,<ou>,2016-01-01,2016-01-01,,,<de>,1,,
EJNxP3WreNP,COMPLETED,<pid>,<psid>,<enrollment-id>,<ou>,2016-01-01,2016-01-01,,,<de>,2,,
qPEdI1xn7k0,COMPLETED,<pid>,<psid>,<enrollment-id>,<ou>,2016-01-01,2016-01-01,,,<de>,3,,
qPEdI1xn7k0,COMPLETED,<pid>,<psid>,<enrollment-id>,<ou>,2016-01-01,2016-01-01,,,<de>,4,,
```

Import strategy: SYNC

The import strategy SYNC should be used only by internal synchronization task and not for regular import. The SYNC strategy allows all 3 operations: CREATE, UPDATE, DELETE to be present in the payload at the same time.

Tracker Ownership Management

A new concept called Tracker Ownership is introduced from 2.30. There will now be one owner organisation unit for a tracked entity instance in the context of a program. Programs that are configured with an access level of *PROTECTED* or *CLOSED* will adhere to the ownership privileges. Only those users belonging to the owning org unit for a tracked entity-program combination will be able to access the data related to that program for that tracked entity.

Tracker Ownership Override : Break the Glass

It is possible to temporarily override this ownership privilege for a program that is configured with an access level of *PROTECTED*. Any user will be able to temporarily gain access to the program related data, if the user specifies a reason for accessing the tracked entity-program data. This act of temporarily gaining access is termed as *breaking the glass*. Currently, the temporary access is granted for 3 hours. DHIS2 audits breaking the glass along with the reason specified by the user. It is not possible to gain temporary access to a program that has been configured with an access level of *CLOSED*. To break the glass for a tracked entity program combination, you can issue a POST request as shown:

```
/api/33/tracker/ownership/override?trackedEntityInstance=DiszpKrYNg8
  &program=eBAyeGv0exc&reason=patient+showed+up+for+emergency+care
```

Tracker Ownership Transfer

It is possible to transfer the ownership of a tracked entity-program from one org unit to another. This will be useful in case of patient referrals or migrations. Only an owner (or users who have broken the glass) can transfer the ownership. To transfer ownership of a tracked entity-program to another organisation unit, you can issue a PUT request as shown:

```
/api/33/tracker/ownership/transfer?trackedEntityInstance=DiszpKrYNg8
  &program=eBAyeGv0exc&ou=EJNxP3WreNP
```

Potential Duplicates

Potential duplicates are records we work with in the data deduplication feature. Due to the nature of the deduplication feature, this API endpoint is somewhat restricted.

A potential duplicate represents a pair of records which are suspected to be a duplicate.

The payload of a potential duplicate looks like this:

```
{
  "original": "<id>",
  "duplicate": "<id>",
  "status": "OPEN|INVALID|MERGED"
}
```

You can retrieve a list of potential duplicates using the following endpoint:

```
GET /api/potentialDuplicates
```

Parameter name	Description	Type	Allowed values
teis	List of tracked entity instances	List of string (separated by comma)	existing tracked entity instance id
status	Potential duplicate status	string	`OPEN <default>`, `INVALID`, `MERGED`, `ALL`

Status code	Description
400	Invalid input status

You can inspect individual potential duplicate records:

```
GET /api/potentialDuplicates/<id>
```

Status code	Description
404	Potential duplicate not found

To create a new potential duplicate, you can use this endpoint:

```
POST /api/potentialDuplicates
```

The payload you provide must include IDs of Original and Duplicate TEIs.

```
{
  "original": "<id>",
```

```
  "duplicate": "<id>"
}
```

Status code	Description
400	Input original or duplicate is null or has invalid id
403	User do not have access to read origianl or duplicate TEIs
404	TEI not found
409	Pair of original and duplicate TEIs already existing

To update a potential duplicate status:

```
PUT /api/potentialDuplicates/<id>
```

Parameter name	Description	Type	Allowed values
status	Potential duplicate status	string	`OPEN`, `INVALID`, `MERGED`

Status code	Description
400	You can't update a potential duplicate to MERGED as this is possible only by a merging request
400	You can't update a potential duplicate that is already in a MERGED status

Merging Tracked Entity Instances

Tracked entity instances can now be merged together if they are viable. To initiate a merge, the first step is to define two tracked entity instances as a Potential Duplicate. The merge endpoint will move data from the duplicate tracked entity instance to the original tracked entity instance, and delete the remaining data of the duplicate.

To merge a Potential Duplicate, or the two tracked entity instances the Potential Duplicate represents, the following endpoint can be used:

```
POST /api/potentialDuplicates/<id>/merge
```

Parameter name	Description	Type	Allowed values
mergeStrategy	Strategy to use for merging the potentialDuplicate	enum	AUTO(default) or MANUAL

The endpoint accepts a single parameter, "mergeStrategy", which decides which strategy to use when merging. For the AUTO strategy, the server will attempt to merge the two tracked entities automatically, without any input from the user. This strategy only allows merging tracked entities without conflicting data (See examples below). The other strategy, MANUAL, requires the user to send in a payload describing how the merge should be done. For examples and rules for each strategy, see their respective sections below.

Merge Strategy AUTO

The automatic merge will evaluate the mergability of the two tracked entity instances, and merge them if they are deemed mergable. The mergability is based on whether the two tracked entity instances has any conflicts or not. Conflicts refers to data which cannot be merged together automatically. Examples of possible conflicts are: - The same attribute has different values in each tracked entity instance - Both tracked entity instances are enrolled in the same program - Tracked entity instances have different types

If any conflict is encountered, an errormessage is returned to the user.

When no conflicts are found, all data in the duplicate that is not already in the original will be moved over to the original. This includes attribute values, enrollments (Including events) and relationships. After the merge completes, the duplicate is deleted and the potentialDuplicate is marked as MERGED.

When requesting an automatic merge like this, a payload is not required and will be ignored.

Merge Strategy MANUAL

The manual merge is suitable when the merge has resolvable conflicts, or when not all the data is required to be moved over during a merge. For example, if an attribute has different values in both tracked entity instances, the user can specify whether to keep the original value, or move over the duplicate's value. Since the manual merge is the user explicitly requesting to move data, there are some different checks being done here: - Relationship cannot be between the original and the duplicate (This results in an invalid self-referencing relationship) - Relationship cannot be of the same type and to the same object in both tracked entity instances (IE. between original and other, and duplicate and other; This would result in a duplicate relationship)

There are two ways to do a manual merge: With and without a payload.

When a manual merge is requested without a payload, we are telling the API to merge the two tracked entity instances without moving any data. In other words, we are just removing the duplicate and marking the potentialDuplicate MERGED. This might be valid in a lot of cases where the tracked entity instance was just created, but not enrolled for example.

Otherwise, if a manual merge is requested with a payload, the payload refers to what data should be moved from the duplicate to the original. The payload looks like this:

```
{
  "trackedEntityAttributes": ["B58KFJ45L9D"],
  "enrollments": ["F61SJ2DhINO"],
  "relationships": ["ETkkZVSNSVw"]
}
```

This payload contains three lists, one for each of the types of data that can be moved. `trackedEntityAttributes` is a list of uids for tracked entity attributes, `enrollments` is a list of uids for enrollments and `relationships` a list of uids for relationships. The uids in this payload have to refer to data that actually exists on the duplicate. There is no way to add new data or change data using the merge endpoint - Only moving data.

Additional information about merging

Currently it is not possible to merge tracked entity instances that are enrolled in the same program, due to the added complexity. A workaround is to manually remove the enrollments from one of the tracked entity instances before starting the merge.

All merging is based on data already persisted in the database, which means the current merging service is not validating that data again. This means if data was already invalid, it will not be reported during the merge. The only validation done in the service relates to relationships, as mentioned in the previous section.

Program Notification Template

Program Notification Template lets you create message templates which can be sent as a result of different type of events. Message and Subject templates will be translated into actual values and can be sent to the configured destination. Each program notification template will be transformed to either MessageConversation object or ProgramMessage object based on external or internal notificationRecipient. These intermediate objects will only contain translated message and subject text. There are multiple configuraiton parameters in Program Notification Template which are critical for correct working of notifications. All those are explained in the table below.

```
POST /api/programNotificationTemplates
```

```
{
    "name": "Case notification",
    "notificationTrigger": "ENROLLMENT",
    "subjectTemplate": "Case notification V{org_unit_name}",
    "displaySubjectTemplate": "Case notification V{org_unit_name}",
    "notifyUsersInHierarchyOnly": false,
    "sendRepeatable": false,
    "notificationRecipient": "ORGANISATION_UNIT_CONTACT",
    "notifyParentOrganisationUnitOnly": false,
    "displayMessageTemplate": "Case notification A{h5FuguPFF2j}",
    "messageTemplate": "Case notification A{h5FuguPFF2j}",
    "deliveryChannels": [
        "EMAIL"
    ]
}
```

The fields are explained in the following table.

Program Notification Template payload

Field	Required	Description	Values
name	Yes	name of Program Notification Template	case-notification-alert
notificationTrigger	Yes	When notification should be triggered. Possible values are ENROLLMENT, COMPLETION, PROGRAM_RULE, SCHEDULED_DAYS_DUE_DATE	ENROLLMENT
subjectTemplate	No	Subject template string	Case notification V{org_unit_name}
messageTemplate	Yes	Message template string	Case notification A{h5FuguPFF2j}

Field	Required	Description	Values
notificationRecipient	YES	Who is going to receive notification. Possible values are USER_GROUP, ORGANISATION_UNIT_CONTACT, TRACKED_ENTITY_INSTANCE, USERS_AT_ORGANISATION_UNIT, DATA_ELEMENT, PROGRAM_ATTRIBUTE, WEB_HOOK	USER_GROUP
deliveryChannels	No	Which channel should be used for this notification. It can be either SMS, EMAIL or HTTP	SMS
sendRepeatable	No	Whether notification should be sent multiple times	false

NOTE: WEB_HOOK notificationRecipient is used only to POST http request to an external system. Make sure to choose HTTP delivery channel when using WEB_HOOK.

Retrieving and deleting Program Notification Template

The list of Program Notification Templates can be retrieved using GET.

```
GET /api/programNotificationTemplates
```

For one particular Program Notification Template.

```
GET /api/33/programNotificationTemplates/{uid}
```

To get filtered list of Program Notification Templates

```
GET /api/programNotificationTemplates/filter?program=<uid>
GET /api/programNotificationTemplates/filter?programStage=<uid>
```

Program Notification Template can be deleted using DELETE.

```
DELETE /api/33/programNotificationTemplates/{uid}
```

Program Messages

Program message lets you send messages to tracked entity instances, contact addresses associated with organisation units, phone numbers and email addresses. You can send messages through the `messages` resource.

```
/api/33/messages
```

Sending program messages

Program messages can be sent using two delivery channels:

- SMS (SMS)
- Email address (EMAIL)

Program messages can be sent to various recipients:

- Tracked entity instance: The system will look up attributes of value type PHONE_NUMBER or EMAIL (depending on the specified delivery channels) and use the corresponding attribute values.
- Organisation unit: The system will use the phone number or email information registered for the organisation unit.
- List of phone numbers: The system will use the explicitly defined phone numbers.
- List of email addresses: The system will use the explicitly defined email addresses.

Below is a sample JSON payload for sending messages using POST requests. Note that message resource accepts a wrapper object named `programMessages` which can contain any number of program messages.

```
POST /api/33/messages
```

```
{
  "programMessages": [{
    "recipients": {
      "trackedEntityInstance": {
        "id": "UN810PwyVYO"
      },
      "organisationUnit": {
        "id": "Rp268JB6Ne4"
      },
      "phoneNumbers": [
        "55512345",
        "55545678"
      ],
      "emailAddresses": [
        "johndoe@mail.com",
        "markdoe@mail.com"
      ]
    },
    "programInstance": {
      "id": "f3rg8gFag8j"
    },
    "programStageInstance": {
      "id": "pSllsjpfLH2"
```

```
    },
    "deliveryChannels": [
      "SMS", "EMAIL"
    ],
    "notificationTemplate": "Zp268JB6Ne5",
    "subject": "Outbreak alert",
    "text": "An outbreak has been detected",
    "storeCopy": false
  }]
}
```

The fields are explained in the following table.

Program message payload

Field	Required	Description	Values
recipients	Yes	Recipients of the program message. At least one recipient must be specified. Any number of recipients / types can be specified for a message.	Can be trackedEntityInstance, organisationUnit, an array of phoneNumbers or an array of emailAddresses.
programInstance	Either this or programStageInstance required	The program instance / enrollment.	Enrollment ID.
programStageInstance	Either this or programInstance required	The program stage instance / event.	Event ID.
deliveryChannels	Yes	Array of delivery channels.	SMS | EMAIL
subject	No	The message subject. Not applicable for SMS delivery channel.	Text.
text	Yes	The message text.	Text.
storeCopy	No	Whether to store a copy of the program message in DHIS2.	false (default) | true

A minimalistic example for sending a message over SMS to a tracked entity instance looks like this:

```
curl -d @message.json "https://play.dhis2.org/demo/api/33/messages"
  -H "Content-Type:application/json" -u admin:district
```

```
{
  "programMessages": [{
    "recipients": {
      "trackedEntityInstance": {
        "id": "PQfMcpmXeFE"
      }
    },
    "programInstance": {
      "id": "JMgRZyeLWOo"
```

```
    },
    "deliveryChannels": [
      "SMS"
    ],
    "text": "Please make a visit on Thursday"
  }]
}
```

Retrieving and deleting program messages

The list of messages can be retrieved using GET.

```
GET /api/33/messages
```

To get the list of sent tracker messages, the below endpoint can be used. ProgramInstance or ProgramStageInstance uid has to be provided.

```
GET /api/33/messages/scheduled/sent?programInstance={uid}
GET /api/33/messages/scheduled/sent?programStageInstance={uid}
```

To get the list of all scheduled message

```
GET /api/33/messages/scheduled
GET /api/33/messages/scheduled?scheduledAt=2020-12-12
```

One particular message can also be retrieved using GET.

```
GET /api/33/messages/{uid}
```

Message can be deleted using DELETE.

```
DELETE /api/33/messages/{uid}
```

Querying program messages

The program message API supports program message queries based on request parameters. Messages can be filtered based on below mentioned query parameters. All requests should use the GET HTTP verb for retrieving information.

Query program messages API

Parameter	URL
programInstance	/api/33/messages?programInstance=6yWDMa0LP7
programStageInstance	/api/33/messages?programStageInstance=SllsjpfLH2
trackedEntityInstance	/api/33/messages?trackedEntityInstance=xdfejpfLH2
organisationUnit	/api/33/messages?ou=Sllsjdhoe3
processedDate	/api/33/messages?processedDate=2016-02-01

Email

Email

The Web API features a resource for sending emails. For emails to be sent it is required that the SMTP configuration has been properly set up and that a system notification email address for the DHIS2 instance has been defined. You can set SMTP settings from the email settings screen and system notification email address from the general settings screen in DHIS2.

```
/api/33/email
```

System notification

The *notification* resource lets you send system email notifications with a given subject and text in JSON or XML. The email will be sent to the notification email address as defined in the DHIS2 general system settings:

```
{
  "subject": "Integrity check summary",
  "text": "All checks ran successfully"
}
```

You can send a system email notification by posting to the notification resource like this:

```
curl -d @email.json "localhost/api/33/email/notification" -X POST
  -H "Content-Type:application/json" -u admin:district
```

Outbound emails

You can also send a general email notification by posting to the notification resource as mentioned below. `F_SEND_EMAIL` or `ALL` authority has to be in the system to make use of this api. Subject parameter is optional. "DHIS 2" string will be sent as default subject if it is not provided in url. Url should be encoded in order to use this API.

```
curl "localhost/api/33/email/notification?
recipients=xyz%40abc.com&message=sample%20email&subject=Test%20Email"
  -X POST -u admin:district
```

Test message

To test whether the SMTP setup is correct by sending a test email to yourself you can interact with the *test* resource. To send test emails it is required that your DHIS2 user account has a valid email address associated with it. You can send a test email like this:

```
curl "localhost/api/33/email/test" -X POST -H "Content-Type:application/json" -u admin:district
```

Data store

Data store

Using the *dataStore* resource, developers can store arbitrary data for their apps. Access to a datastore's key is based on its sharing settings. By default all keys created are publicly accessible (read and write). Additionally, access to a datastore's namespace is limited to the user's access to the corresponding app, if the app has reserved the namespace. For example a user with access to the "sampleApp" application will also be able to use the sampleApp namespace in the datastore. If a namespace is not reserved, no specific access is required to use it.

```
/api/33/dataStore
```

Note that there are reserved namespaces used by the system that require special authority to be able to read or write entries. For example the namespace for the android settings app `ANDROID_SETTINGS_APP` will require the `M_androidsettingsapp` authority.

Data store structure

Data store entries consist of a namespace, key and value. The combination of namespace and key is unique. The value data type is JSON.

Data store structure

Item	Description	Data type
Namespace	Namespace for organization of entries.	String
Key	Key for identification of values.	String
Value	Value holding the information for the entry.	JSON
Encrypted	Indicates whether the value of the given key should be encrypted	Boolean

Get keys and namespaces

For a list of all existing namespaces:

```
GET /api/33/dataStore
```

Example curl request for listing:

```
curl "play.dhis2.org/demo/api/33/dataStore" -u admin:district
```

Example response:

```
[
  "foo",
  "bar"
]
```

For a list of all keys in a namespace:

```
GET /api/33/dataStore/<namespace>
```

Example curl request for listing:

```
curl "play.dhis2.org/demo/api/33/dataStore/foo" -u admin:district
```

Example response:

```
[
  "key_1",
  "key_2"
]
```

To retrieve a value for an existing key from a namespace:

```
GET /api/33/dataStore/<namespace>/<key>
```

Example curl request for retrieval:

```
curl "play.dhis2.org/demo/api/33/dataStore/foo/key_1"-u admin:district
```

Example response:

```
{
  "foo":"bar"
}
```

To retrieve meta-data for an existing key from a namespace:

```
GET /api/33/dataStore/<namespace>/<key>/metaData
```

Example curl request for retrieval:

```
curl "play.dhis2.org/demo/api/33/dataStore/foo/key_1/metaData" -u admin:district
```

Example response:

```
{
  "id": "dsKeyUid001",
  "created": "...",
  "user": {...},
  "namespace": "foo",
  "key": "key_1"
}
```

Query API

The query API is allows you to query and filter values over all keys in a namespace. The `fields` parameter is used to specify the query. This is useful for retrieving specific values of keys across a namespace in a single request.

```
GET /api/dataStore/<namespace>?fields=
```

The list of `fields` can be:

- empty: returns just the entry keys
- `.`: return the root value as stored
- comma separated list of paths: `<path>[,<path>]`; each `<path>` can be a simple property name (like `age`) or a nested path (like `person.age`)

Furthermore, entries can be filtered using one or more `filter` parameters and sorted using the `order` parameter.

Multiple filters can be combined using `rootJunction=OR` (default) or `rootJunction=AND`.

All details on the `fields`, `filter` and `order` parameters are given in the following sections.

Paging

By default, results use paging. Use `pageSize` and `page` to adjust size and offset. The parameter `paging=false` can be used to opt-out and always return all matches. This should be used with caution as there could be many entries in a namespace. The default page size is 50.

```
GET /api/dataStore/<namespace>?fields=.&page=2&pageSize=10
```

When paging is turned off, entries are returned as plain result array as the root JSON structure. The same effect can be achieved while having paged results by using `headless=true`.

```
{
  "pager": { ... },
  "entries": [...]
}
```

vs.

```
[...]
```

Value extraction

The data store allows extracting entire simple or complex values as well as the extraction of parts of complex JSON values.

> **Note**
>
> For clarity of the examples the responses shown mostly omit the outermost object with the `pager` information and the `entries` array that the examples show.

To filter a certain set of fields add a `fields` parameter to the namespace query:

```
GET /api/dataStore/<namespace>?fields=name,description
```

This returns a list of all entries having a non-null `name` and/or a `description` field like in the following example:

```
[
  {"key": "key1", "name": "name1", "description": "description1"},
  {"key": "key2", "name": "name2", "description": "description2"}
]
```

If for some reason we even want entries where none of the extracted fields is non-null contained in the result list the `includeAll` parameter can be added:

```
GET /api/dataStore/<namespace>?fields=name,description&includeAll=true
```

The response now might look like this:

```
[
  {"key": "key1", "name": "name1", "description": "description1"},
  {"key": "key2", "name": "name2", "description": "description2"},
  {"key": "key3", "name": null, "description": null},
  {"key": "key4", "name": null, "description": null}
]
```

The extraction is not limited to simple root level members but can pick nested members as well by using square or round brackets after a members name:

```
GET /api/dataStore/<namespace>?fields=name,root[child1,child2]
GET /api/dataStore/<namespace>?fields=name,root(child1,child2)
```

The example response could look like this:

```
[
  { "key": "key1", "name": "name1", "root": {"child1": 1, "child2": []}},
  { "key": "key2", "name": "name2", "root": {"child1": 2, "child2": []}}
]
```

The same syntax works for nested members:

```
GET /api/dataStore/<namespace>?fields=root[level1[level2[level3]]]
GET /api/dataStore/<namespace>?fields=root(level1(level2(level3)))
```

Example response here:

```
[
  { "key": "key1", "root": {"level1": {"level2": {"level3": 42}}}},
```

```
  { "key": "key1", "root": {"level1": {"level2": {"level3": 13}}}}
]
```

When such deeply nested values are extracted we might not want to keep the structure but extract the leaf member to a top level member in the response. Aliases can be used to make this happen. An alias can be placed anywhere after a member name using `~hoist` followed by the alias in round brackets like so:

```
GET /api/dataStore/<namespace>?fields=root[level1[level2[level3~hoist(my-prop)]]]
```

The response now would look like this:

```
[
  { "key": "key1", "my-prop": 42},
  { "key": "key2", "my-prop": 13}
]
```

If the full path should be kept while giving an alias to a nested member the parent path needs to be repeated using dot-syntax to indicate the nesting. This can also be used to restructure a response in a new different structure like so:

```
GET /api/dataStore/<namespace>?fields=root[level1[level2[level3~hoist(my-root.my-prop)]]]
```

The newly structured response now looks like this:

```
[
  { "key": "key1", "my-root": {"my-prop": 42}},
  { "key": "key2", "my-root": {"my-prop": 13}}
]
```

OBS! An alias cannot be used to rename an intermediate level. However, an alias could be used to resolve a name collision with the `key` member.

```
GET /api/dataStore/<namespace>?fields=id,key~hoist(value-key)
```

```
[
  { "key": "key1", "id": 1, "value-key": "my-key1"},
  { "key": "key2", "id": 2, "value-key": "my-key2"}
]
```

Sorting results

Results can be sored by a single property using the `order=<path>[:direction]` parameter. This can be any valid value `<path>` or the entry key (use `_` as path).

By default, sorting is alphanumeric assuming the value at the path is a string of mixed type.

For example to extract the name property and also sort the result by it use:

```
GET /api/dataStore/<namespace>?fields=name&order=name
```

To switch to descending order use `:desc`:

```
GET /api/dataStore/<namespace>?fields=name&order=name:desc
```

Sometimes the property sorted by is numeric so alphanumeric interpretation would be confusing. In such cases special ordering types `:nasc` and `:ndesc` can be used.

In summary, order can be one of the following:

- `asc`: alphanumeric ascending order
- `desc:`: alphanumeric descending order
- `nasc`: numeric ascending order
- `ndesc`: numeric descending order

> **OBS!**
>
> When using numeric order all matches must have a numeric value for the property at the provided `<path>`.

Filtering entries

To filter entries within the query API context add one or more `filter` parameters while also using the `fields` parameter.

Each `filter` parameter has the following form:

- unary operators: `<path>:<operator>`
- binary operators: `<path>:<operator>:<value>`
- set operators: `<path>:<operator>:[<value>,<value>,...]`

Unary operators are:

Operator	Description
`null`	value is JSON `null`
`!null`	value is defined but different to JSON `null`
`empty`	value is an empty object, empty array or JSON string of length zero
`!empty`	value is different to an empty object, empty array or zero length string

Binary operators are:

Operator	Description
`eq`	value is equal to the given boolean, number or string
`!eq`, `ne`, `neq`	value is not equal to the given boolean, number or string
`lt`	value is numerically or alphabetically less than the given number or string

Operator	Description
`le`	value is numerically or alphabetically less than or equal to the given number or string
`gt`	value is numerically or alphabetically greater than the given number or string
`ge`	value is numerically or alphabetically greater than or equal to the given number or string

Text pattern matching binary operators are:

Operator	Case Insensitive	Description
`like`	`ilike`	value matches the text pattern given
`!like`	`!ilike`	value does not match the text pattern given
`$like`	`$ilike`, `startswith`	value starts with the text pattern given
`!$like`	`!$ilike`, `!startswith`	value does not start with the text pattern given
`like$`	`ilike$`, `endswith`	value ends with the text pattern given
`!like$`	`!ilike$`, `!endswith`	value does not end with the text pattern given

For operators that work for multiple JSON node types the semantic is determined from the provided value. If the value is `true` or `false` the filter matches boolean JSON values. If the value is a number the filter matches number JSON values. Otherwise, the value matches string JSON values or mixed types of values.

> **Tip**
>
> To force text comparison for a value that is numeric quote the value in single quotes. For example, the value `'13'` is the text 13 while `13` is the number 13.

Set operators are:

Operator	Description
`in`	entry value is textually equal to one of the given values (is in set)
`!in`	entry value is not textually equal to any of the given values (is not in set)

The `<path>` can be:

- `_`: the entry key is
- `.`: the entry root value is
- `<member>`: the member of the root value is
- `<member>.<member>`: the member at the path is (up to 5 levels deep)

A `<member>` path expression can be a member name or in case of arrays an array index. In case of an array the index can also be given in the form: `[<index>]`. For example, the path `addresses[0].street` would be identical to `addresses.0.street`.

Some example queries are found below.

Name (of root object) is "Luke":

```
GET /api/dataStore/<namespace>?fields=.&filter=name:eq:Luke
```

Age (of root object) is greater than 42 (numeric):

```
GET /api/dataStore/<namespace>?fields=.&filter=age:gt:42
```

Root value is a number greater than 42 (numeric matching inferred from the value):

```
GET /api/dataStore/<namespace>?fields=.&filter=.:gt:42
```

Enabled (of root object) is true (boolean matching inferred from the value):

```
GET /api/dataStore/<namespace>?fields=.&filter=enabled:eq:true
```

Root object has name containing "Pet" and has an age greater than 20:

```
GET /api/dataStore/<namespace>?fields=.&filter=name:like:Pet&filter=age:gt:20
```

Root object is either flagged as minor or has an age less than 18:

```
GET /api/dataStore/<namespace>?fields=.&filter=minor:eq:true&filter=age:lt:18&rootJunction=or
```

Create values

To create a new key and value for a namespace:

```
POST /api/33/dataStore/<namespace>/<key>
```

Example curl request for create, assuming a valid JSON payload:

```
curl "https://play.dhis2.org/demo/api/33/dataStore/foo/key_1" -X POST
  -H "Content-Type: application/json" -d "{\"foo\":\"bar\"}" -u admin:district
```

Example response:

```
{
  "httpStatus": "OK",
  "httpStatusCode": 201,
```

```
  "status": "OK",
  "message": "Key 'key_1' created."
}
```

If you require the data you store to be encrypted (for example user credentials or similar) you can append a query to the url like this:

```
GET /api/33/dataStore/<namespace>/<key>?encrypt=true
```

Update values

To update a key that exists in a namespace:

```
PUT /api/33/dataStore/<namespace>/<key>
```

Example curl request for update, assuming valid JSON payload:

```
curl "https://play.dhis2.org/demo/api/33/dataStore/foo/key_1" -X PUT -d "[1, 2, 3]"
  -H "Content-Type: application/json" -u admin:district
```

Example response:

```
{
  "httpStatus": "OK",
  "httpStatusCode": 200,
  "status": "OK",
  "message": "Key 'key_1' updated."
}
```

Delete keys

To delete an existing key from a namespace:

```
DELETE /api/33/dataStore/<namespace>/<key>
```

Example curl request for delete:

```
curl "play.dhis2.org/demo/api/33/dataStore/foo/key_1" -X DELETE -u admin:district
```

Example response:

```
{
  "httpStatus": "OK",
  "httpStatusCode": 200,
  "status": "OK",
  "message": "Key 'key_1' deleted from namespace 'foo'."
}
```

To delete all keys in a namespace:

```
DELETE /api/33/dataStore/<namespace>
```

Example curl request for delete:

```
curl "play.dhis2.org/demo/api/33/dataStore/foo" -X DELETE -u admin:district
```

Example response:

```
{
  "httpStatus": "OK",
  "httpStatusCode": 200,
  "status": "OK",
  "message": "Namespace 'foo' deleted."
}
```

Sharing data store keys

Sharing of data store keys follows the same principle as for other metadata sharing (see Sharing).

To get sharing settings for a specific data store key:

```
GET /api/33/sharing?type=dataStore&id=<uid>
```

Where the id for the data store key comes from the `/metaData` endpoint for that key:

```
GET /api/33/dataStore/<namespace>/<key>/metaData
```

As usual the `access` property in the response reflects the capabilities of the current user for the target entry. Namespace wide protection might still apply and render a user incapable to perform certain changes.

To modify sharing settings for a specific data store key:

```
POST /api/33/sharing?type=dataStore&id=<uid>
```

with the following request:

```
{
  "object": {
    "publicAccess": "rw------",
    "externalAccess": false,
    "user": {},
    "userAccesses": [],
    "userGroupAccesses": [
      {
        "id": "hj0nnsVsPLU",
        "access": "rw------"
      },
      {
        "id": "qMjBflJMOfB",
        "access": "r-------"
```

```
      }
    ]
  }
}
```

User data store

In addition to the *dataStore* which is shared between all users of the system, a user-based data store is also available. Data stored to the *userDataStore* is associated with individual users, so that each user can have different data on the same namespace and key combination. All calls against the *userDataStore* will be associated with the logged in user. This means one can only see, change, remove and add values associated with the currently logged in user.

```
/api/33/userDataStore
```

User data store structure

userDataStore consists of a user, a namespace, keys and associated values. The combination of user, namespace and key is unique.

User data store structure

Item	Description	Data Type
User	The user this data is associated with	String
Namespace	The namespace the key belongs to	String
Key	The key a value is stored on	String
Value	The value stored	JSON
Encrypted	Indicates whether the value should be encrypted	Boolean

Get namespaces

Returns an array of all existing namespaces

```
GET /api/33/userDataStore
```

Example request:

```
curl -H "Content-Type: application/json" -u admin:district "play.dhis2.org/api/33/userDataStore"
```

```
[
  "foo",
  "bar"
]
```

Get keys

Returns an array of all existing keys in a given namespace

```
GET /api/userDataStore/<namespace>
```

Example request:

```
curl -H "Content-Type: application/json" -u admin:district "play.dhis2.org/api/33/userDataStore/
foo"
```

```
[
  "key_1",
  "key_2"
]
```

Get values

Returns the value for a given namespace and key

```
GET /api/33/userDataStore/<namespace>/<key>
```

Example request:

```
curl -H "Content-Type: application/json" -u admin:district "play.dhis2.org/api/33/userDataStore/
foo/bar"
```

```
{
  "some": "value"
}
```

Create value

Adds a new value to a given key in a given namespace.

```
POST /api/33/userDataStore/<namespace>/<key>
```

Example request:

```
curl -X POST -H "Content-Type: application/json" -u admin:district -d "['some value']"
  "play.dhis2.org/api/33/userDataStore/foo/bar"
```

```
{
  "httpStatus": "Created",
  "httpStatusCode": 201,
  "status": "OK",
  "message": "Key 'bar' in namespace 'foo' created."
}
```

If you require the value to be encrypted (For example user credentials and such) you can append a query to the url like this:

```
GET /api/33/userDataStore/<namespace>/<key>?encrypt=true
```

Update values

Updates an existing value

```
PUT /api/33/userDataStore/<namespace>/<key>
```

Example request:

```
curl -X PUT -H "Content-Type: application/json" -u admin:district -d "['new value']"
  "play.dhis2.org/api/33/userDataStore/foo/bar"
```

```
{
  "httpStatus":"Created",
  "httpStatusCode":201,
  "status":"OK",
  "message":"Key 'bar' in namespace 'foo' updated."
}
```

Delete key

Delete a key

```
DELETE /api/33/userDataStore/<namespace>/<key>
```

Example request:

```
curl -X DELETE -u admin:district "play.dhis2.org/api/33/userDataStore/foo/bar"
```

```
{
  "httpStatus":"OK",
  "httpStatusCode":200,
  "status":"OK",
  "message":"Key 'bar' deleted from the namespace 'foo."
}
```

Delete namespace

Delete all keys in the given namespace

```
DELETE /api/33/userDataStore/<namespace>
```

Example request:

```
curl -X DELETE -u admin:district "play.dhis2.org/api/33/userDataStore/foo"
```

```
{
  "httpStatus":"OK",
  "httpStatusCode":200,
  "status":"OK",
  "message":"All keys from namespace 'foo' deleted."
}
```

Admin Access to another User's Datastore

Admins can manipulate another user's datastore by adding the `username` parameter to any of the manipulations described above to not have them affect the admins own datastore but the datastore of the user given by the `username` parameter.

For example, to add a value to `Peter`'s datastore an admin uses:

```
POST /api/userDataStore/<namespace>/<key>?username=Peter
```

Partial Update (Experimental)

Both the datastore and user datastore allow partial updating of entry values.

All the subsequent examples operate on the basis that the following JSON entry is in the namespace `pets` with key `whiskers`.

```
{
  "name": "wisker",
  "favFood": [
    "fish", "rabbit"
  ]
}
```

We can perform many update operations on this entry. The following examples use `{store}` in the API calls, please substitute with `dataStore` or `userDataStore` for your use case.

Update root (entire entry)

We can update the entry at the root by not supplying the `path` request param or leaving it empty `path=`.

`PUT /api/{store}/pets/whiskers` with body `"whiskers"` updates the entry to be the supplied body. So a `GET` request to `/api/{store}/pets/whiskers` would now show:

```
"whiskers"
```

Update at specific path

We can update the entry at a specific path by supplying the `path` request param and the property to update.

`PUT /api/{store}/pets/whiskers?path=name` with body `"whiskers"` updates the entry at the `name` property only. So a `GET` request to `/api/{store}/pets/whiskers` would now show the updated `name`:

```
{
    "name": "whiskers",
    "favFood": [
        "fish",
        "rabbit"
    ]
}
```

We can update an array element at a specific path.

`PUT /api/{store}/pets/whiskers?path=favFood.[0]` with body `"carrot"` updates the first element in the `favFood` array only. So a `GET` request to `/api/{store}/pets/whiskers` would now show the updated `favFood`:

```
{
    "name": "wisker",
    "favFood": [
        "carrot",
        "rabbit"
    ]
}
```

Benefits

- smaller payloads required for small changes
- less error-prone (no copy-pasting large entries to change 1 property)

Roll (Experimental)

The `roll` request param enables the user to have a 'rolling' number of elements in an array. In our example we have the `favFood` array. If we wanted to update this array previously, we'd have to supply the whole payload like so:
`PUT /api/{store}/pets/whiskers` with body

```
{
    "name": "wisker",
    "favFood": [
        "fish",
        "rabbit",
        "carrot"
    ]
}
```

Now we can use the `roll` request param (with the `path` functionality) to state that we want the rolling functionality for *n* number of elements. In this example we state that we want the array to have a rolling value of 3, passing in an extra element in the call.
`PUT /api/{store}/pets/whiskers?roll=3&path=favFood` with body `"carrot"` would result in the following state.

```
{
    "name": "wisker",
    "favFood": [
        "fish",
        "rabbit",
        "carrot"
```

```
    ]
}
```

Since we passed the rolling value of 3, this indicates that we only want the last 3 elements passed into the array. So if we now make another call and add a new element to the array, we would expect the first element (`fish`) to be dropped from the array. PUT `/api/{store}/pets/whiskers?roll=3&path=favFood` with body `"bird"` would result in the following state:

```
{
    "name": "wisker",
    "favFood": [
        "rabbit",
        "carrot",
        "bird"
    ]
}
```

> **Note**
>
> Once a rolling value has been set (e.g. `role=3`), it can only be increased (e.g. `roll=5`) and cannot be decreased (e.g. `roll=2`)

Dot notation does allow for nested calls. Let's say we have this current entry value:

```
{
  "name": "wisker",
  "favFood": [
    "fish", "rabbit"
  ],
  "type": {
    "breed": ["shorthair"]
  }
}
```

If we wanted to add another breed using a rolling array we could make the call: PUT `/api/{store}/pets/whiskers?roll=3&path=type.breed` with body `"small"` which would result in the following state:

```
{
  "name": "wisker",
  "favFood": [
    "fish", "rabbit"
  ],
  "type": {
    "breed": ["shorthair, small"]
  }
}
```

Benefits

- Only interested in keeping track of *n* values which may change over time

Organisation unit profile

The organisation unit profile resource allows you to define and retrieve an information profile for organisation units in DHIS 2.

```
/api/organisationUnitProfile
```

A single organisation unit profile can be created and applies to all organisation units.

The information part of the organisation unit profile includes:

- Name, short name, description, parent organisation unit, level, opening date, closed date, URL.
- Contact person, address, email, phone number (if exists).
- Location (longitude/latitude).
- Metadata attributes (configurable).
- Organisation unit group sets and groups (configurable).
- Aggregate data for data elements, indicators, reporting rates, program indicators (configurable).

Create organisation unit profile

To define the organisation unit profile you can use a `POST` request:

```
POST /api/organisationUnitProfile
```

The payload in JSON format looks like this, where `attributes` refers to metadata attributes, `groupSets` refer to organisation unit group sets and `dataItems` refers to data elements, indicators, data sets and program indicators:

```
{
  "attributes": [
    "xqWyz9jNCA5",
    "n2xYlNbsfko"
  ],
  "groupSets": [
    "Bpx0589u8y0",
    "J5jldMd8OHv"
  ],
  "dataItems": [
    "WUg3MYWQ7pt",
    "vg6pdjObxsm",
    "DTVRnCGamkV",
    "Uvn6LCg7dVU",
    "eTDtyyaSA7f"
  ]
}
```

The `F_ORG_UNIT_PROFILE_ADD` authority is required to define the profile.

Get organisation unit profile

To retrieve the organisation unit profile definition you can use a `GET` request:

```
GET /api/organisationUnitProfile
```

The response will be in JSON format.

Get organisation unit profile data

To retrieve the organisation unit profile data you can use a `GET` request:

```
GET /api/organisationUnitProfile/{org-unit-id}/data?period={iso-period}
```

The organisation unit profile data endpoint will combine the profile definition with the associated information/data values.

- The `org-unit-id` path variable is required and refers to the ID of the organisation unit to provide aggregated data for.
- The `iso-period` query parameter is optional and refers to the ISO period ID for the period to provide aggregated data for the data items. If none is specified, the *this year* relative period will be used as fallback.

The response will include the following sections:

- `info`: Fixed information about the organisation unit.
- `attributes`: Metadata attributes with corresponding attribute values.
- `groupSets`: Organisation unit group sets with the corresponding organisation unit group which the organisation unit is a member of.
- `dataItems`: Data items with the corresponding aggregated data value.

Note that access control checks are performed and metadata items which are not accessible to the current user will be omitted.

An example request looks like this:

```
GET /api/organisationUnitProfile/DiszpKrYNg8/data?period=2021
```

The profile data response payload in JSON format will look like this, where the `id` and `label` fields refer to the metadata item, and the `value` field refers to the associated value:

```
{
  "info": {
    "id": "DiszpKrYNg8",
    "code": "OU_559",
    "name": "Ngelehun CHC",
    "shortName": "Ngelehun CHC",
    "parentName": "Badjia",
    "level": 4,
    "levelName": "Facility",
    "openingDate": "1970-01-01T00:00:00.000",
    "longitude": -11.4197,
    "latitude": 8.1039
  },
  "attributes": [
    {
      "id": "n2xYlNbsfko",
      "label": "NGO ID",
      "value": "GHE51"
    },
    {
      "id": "xqWyz9jNCA5",
      "label": "TZ code",
```

```
      "value": "NGE54"
    }
  ],
  "groupSets": [
    {
      "id": "Bpx0589u8y0",
      "label": "Facility Ownership",
      "value": "Public facilities"
    },
    {
      "id": "J5jldMd8OHv",
      "label": "Facility Type",
      "value": "CHC"
    }
  ],
  "dataItems": [
    {
      "id": "WUg3MYWQ7pt",
      "label": "Total Population",
      "value": 3503
    },
    {
      "id": "DTVRnCGamkV",
      "label": "Total population < 1 year",
      "value": 140
    },
    {
      "id": "vg6pdjObxsm",
      "label": "Population of women of child bearing age (WRA)",
      "value": 716
    },
    {
      "id": "Uvn6LCg7dVU",
      "label": "ANC 1 Coverage",
      "value": 368.2
    },
    {
      "id": "eTDtyyaSA7f",
      "label": "FIC <1y",
      "value": 291.4
    }
  ]
}
```


Upload image for organisation unit

To upload an image for an organisation unit you can use the `fileResources` endpoint.

```
/api/fileResources
```

The `fileResource` endpoint accepts a raw file as the request body. The `JPG`, `JPEG` and `PNG` formats are supported for organisation unit images. The domain for organisation unit images is `ORG_UNIT`.

Please consult *File resources* in the *Metadata* section for details about the `fileResources` endpoint.

To upload an image you can send a `POST` request with `ORG_UNIT` as domain query parameter together with the image as the request payload. The `Content-Type` header should match the type of file being uploaded.

```
POST /api/fileResources?domain=ORG_UNIT
```

The `id` property of the `response` > `fileResource` object in the JSON response will contain a reference to the identifier of the file resource.

The organisation unit entity has an `image` property which refers to the file resource image. To set the file resource reference on an organisation unit you can send a `PATCH` request to the organisation unit with a JSON payload:

```
PATCH /api/organisationUnits/{id}
```

```
{
  "image": "{file-resource-id}"
}
```

Alternatively, you can use a `PUT` request with the full organisation unit payload (fields omitted for brevity):

```
PUT /api/organisationUnits/{id}
```

```
{
  "id": "Rp268JB6Ne4",
  "name": "Adonkia CHP",
  "image": {
    "id":  "{file-resource-iid}"
  }
}
```

Get image for organisation unit

The organisation unit entity has an `image` object which refers to a file resource by identifier. You can get the organisation unit information from the `organisationUnits` endpoint. If set, the JSON format looks like this:

```
GET /api/organisationUnits/{id}
```

```
{
  "id": "Rp268JB6Ne4",
  "name": "Adonkia CHP",
  "image": {
    "id":  "{file-resource-id}"
  }
}
```

The image file resource identifier can be used to make a request to the `fileResources` endpoint to retrieve the file content:

```
GET /api/fileResources/{id}/data
```

The `Content-Type` header will reflect the type of file being retrieved.

Apps

Apps

The `/api/apps` endpoint can be used for installing, deleting and listing apps. The app key is based on the app name, but with all non-alphanumerical characters removed, and spaces replaced with a dash. *My app!* will return the key *My-app*.

> **Note**
>
> Previous to 2.28, the app key was derived from the name of the ZIP archive, excluding the file extension. URLs using the old format should still return the correct app in the api.

```
/api/33/apps
```

Get apps

> **Note**
>
> Previous to 2.28 the app property folderName referred to the actual path of the installed app. With the ability to store apps on cloud services, folderName's purpose changed, and will now refer to the app key.

You can read the keys for apps by listing all apps from the apps resource and look for the *key* property. To list all installed apps in JSON:

```
curl -u user:pass -H "Accept: application/json" "http://server.com/api/33/apps"
```

You can also simply point your web browser to the resource URL:

```
http://server.com/api/33/apps
```

The apps list can also be filtered by app type and by name, by appending one or more *filter* parameters to the URL:

```
http://server.com/api/33/apps?filter=appType:eq:DASHBOARD_APP&filter=name:ilike:youtube
```

App names support the *eq* and *ilike* filter operators, while *appType* supports *eq* only.

Install an app

To install an app, the following command can be issued:

```
curl -X POST -u user:pass -F file=@app.zip "http://server.com/api/33/apps"
```

Delete an app

To delete an app, you can issue the following command:

```
curl -X DELETE -u user:pass "http://server.com/api/33/apps/<app-key>"
```

Reload apps

To force a reload of currently installed apps, you can issue the following command. This is useful if you added a file manually directly to the file system, instead of uploading through the DHIS2 user interface.

```
curl -X PUT -u user:pass "http://server.com/api/33/apps"
```

Share apps between instances

If the DHIS2 instance has been configured to use cloud storage, apps will now be installed and stored on the cloud service. This will enable multiple instances share the same versions on installed apps, instead of installing the same apps on each individual instance.

> **Note**
>
> Previous to 2.28, installed apps would only be stored on the instance's local filesystem. Apps installed before 2.28 will still be available on the instance it was installed, but it will not be shared with other instances, as it's still located on the instances local filesystem.

App store

The Web API exposes the content of the DHIS2 App Store as a JSON representation which can found at the `/api/appHub` resource.

```
/api/33/appHub
```

Get apps

You can retrieve apps with a GET request:

```
GET /api/33/appHub
```

A sample JSON response is described below.

```
{
  [
    {
      "name": "Tabular Tracker Capture",
      "description": "Tabular Tracker Capture is an app that makes you more effective.",
      "sourceUrl": "https://github.com/dhis2/App-repository",
      "appType": "DASHBOARD_WIDGET",
      "status": "PENDING",
      "id": "NSD06BVoV21",
      "developer": {
        "name": "DHIS",
        "organisation": "Uio",
        "address": "Oslo",
        "email": "dhis@abc.com",
      },
```

```
      "versions": [
        {
          "id": "upAPqrVgwK6",
          "version": "1.2",
          "minDhisVersion": "2.17",
          "maxDhisVersion": "2.20",
          "downloadUrl": "https://dhis2.org/download/appstore/tabular-capture-12.zip",
          "demoUrl": "http://play.dhis2.org/demo"
        }
      ],
      "images": [
        {
          "id": "upAPqrVgwK6",
          "logo": "true",
          "imageUrl": "https://dhis2.org/download/appstore/tabular-capture-12.png",
          "description": "added feature snapshot",
          "caption": "dialog",
        }
      ]
    }
  ]
}
```

Install apps

You can install apps on your instance of DHIS2 assuming you have the appropriate permissions. An app is referred to using the `id` property of the relevant version of the app. An app is installed with a POST request with the version id to the following resource:

```
POST /api/33/appHub/{app-version-id}
```

OpenAPI

The DHIS2 server can provide an OpenAPI document for its API. This document is created on the fly from analysis of the actual API. It means the document is complete but details may be lost or misrepresented due to limitations in the analysis.

Both JSON and YAML format are supported by all OpenAPI endpoints. YAML should be requested with `Accept` header of `application/x-yaml`.

To fetch a single document containing all endpoints of the server use:

```
GET /api/openapi.json
GET /api/openapi.yaml
```

OBS! Be aware that this generates a document that is several MBs in size.

A document for a specific endpoint can be accessed by appending either `openapi.json` or `openapi.yaml` to an endpoint root path. For example, to generate a document for the `/users` endpoints use:

```
GET /api/users/openapi.json
GET /api/users/openapi.yaml
```

To generate a document with a specific selection of root paths and/or tags the general `/openapi` endpoint can be used with one or more `tag` and `path` selectors.

```
GET /api/openapi/openapi.json?path=/users&path=/dataElements
GET /api/openapi/openapi.yaml?tag=system&tag=metadata
```

Available tags are:

- `user`
- `data`
- `metadata`
- `ui`
- `analytics`
- `system`
- `messaging`
- `tracker`
- `integration`
- `login`
- `query`
- `management`

All endpoints that generate a OpenAPI document support the following optional request parameters:

`failOnNameClash`

When set to `true`, two or more types of same simple (unqualified) name are considered clashing and the generation fails with an error.

When set `false` (default), name clashes are resolved by adding numbers to the simple name to make each of them unique. As a result the names are not predictable or stable. Merging simple names with

their intended markdown documentation based on name will be broken. This option is meant as a preview feature which should only be used during development.

`failOnInconsistency`

When set to `true`, a semantic inconsistency in the declaration causes the generation to fail with an error. Usually this indicates a programming mistake. For example, declaring a field both as required and having a default value.

When set to `false`, a semantic inconsistency is logged as warning but the generation proceeds. This might produce a document that contradicts itself semantically but is valid formally.