FDSN Web Service Specification

fdsnws-event

Version 1.2

2019-06-27

International Federation of Digital Seismograph Networks
www.fdsn.org

Purpose

To specify a web service interface for the exchange of event parameter and related data within the context of the International Federation of Digital Seismograph Networks (FDSN). The intention is to provide a specification that, when implemented at different FDSN data centers, can be used interchangeably by the same client software. Combined with common FDSN web service specifications, this document fully defines the request parameters and expected results.

Common service characteristics

This document must be combined with the common service characteristics defined in version 1.1, or later version 1.x, of the "FDSN-WS-Specification-Commonalities" for a full specification. The common service characteristics include versioning scheme, general calling pattern, common service methods, common error responses, and more.

Service methods

The service should support these methods:

> **query** – to submit a data request
> **catalogs** – to submit a request for available catalogs
> **contributors** – to submit a request for available contributors
> **version** – to request the full service version number
> **application.wadl** – to request a WADL for the interface

Purpose of the *query* method:

This method is designed to return selected event parameters. Results may be requested in multiple formats as documented in this specification.

Purpose of the *catalogs* method:

This method returns a list of available catalogs from which events can be selected.

Purpose of the *contributors* method:

This method returns a list of contributors (agencies, etc.) across all catalogs from which events can be selected.

Request parameters for the *query* method:

The service shall accept requests formulated using the parameters identified in Table 1. The **alias** values are acceptable synonyms for the given **parameter** name.

Table 1. Parameters for the *query* method:

Parameter	Alias	Support	Default	Allowed Values	Type	Unit
starttime	**start**	**required**	**[Any]**	**Any valid time**	**time**	**UTC**
Limit to events on or after the specified start time.						
endtime	**end**	**required**	**[Any]**	**Any valid time**	**time**	**UTC**
Limit to events on or before the specified end time.						
minlatitude	**minlat**	**required**	**-90.0**	**-90.0 to 90.0**	**float**	**degrees**
Limit to events with a latitude larger than or equal to the specified minimum.						
maxlatitude	**maxlat**	**required**	**90.0**	**-90.0 to 90.0**	**float**	**degrees**
Limit to events with a latitude smaller than or equal to the specified maximum.						
minlongitude	**minlon**	**required**	**-180.0**	**-180.0 to 180.0**	**float**	**degrees**
Limit to events with a longitude larger than or equal to the specified minimum.						
maxlongitude	**maxlon**	**required**	**108.0**	**-180.0 to 180.0**	**float**	**degrees**
Limit to events with a longitude smaller than or equal to the specified maximum.						
latitude	**lat**	**optional**	**0.0**	**-90.0 to 90.0**	**float**	**degrees**
Specify the latitude to be used for a radius search.						
longitude	**lon**	**optional**	**0.0**	**-180.0 to 180.0**	**float**	**degrees**
Specify the longitude to be used for a radius search.						
minradius		**optional**	**0.0**	**0.0 to 180.0**	**float**	**degrees**
Limit to events within the specified minimum number of degrees from the geographic point defined by the latitude and longitude parameters.						
maxradius		**optional**	**180.0**	**0.0 to 180.0**	**float**	**degrees**
Limit to events within the specified maximum number of degrees from the geographic point defined by the latitude and longitude parameters.						
mindepth		**required**	**[Any]**	**Any valid depth**	**float**	**kilometers**
Limit to events with depth more than the specified minimum.						
maxdepth		**required**	**[Any]**	**Any valid depth**	**float**	**kilometers**
Limit to events with depth less than the specified maximum.						
minmagnitude	**minmag**	**required**	**[Any]**	**Any valid magnitude**	**float**	*defined by*
Limit to events with a magnitude larger than the specified minimum.						
maxmagnitude	**maxmag**	**required**	**[Any]**	**Any valid magnitude**	**float**	*mag type*
Limit to events with a magnitude smaller than the specified maximum.						
magnitudetype	**magtype**	**optional**	**[Any]**	**Any valid magnitude type**	**string**	
Specify a magnitude type to use for testing the minimum and maximum limits.						
eventtype		**optional**	**[Any]**	**Any valid event type**	**string**	
Limit to events with a specified eventType. The parameter value can be a single item, a comma-separated list of items. Allowed values are from QuakeML or ***unknown*** if eventType is not given.						
includeallorigins		**optional**	**FALSE**	**TRUE or FALSE**	**boolean**	
Specify if all origins for the event should be included, default is data center dependent but is suggested to be the preferred origin only.						
includeallmagnitudes		**optional**	**FALSE**	**TRUE or FALSE**	**boolean**	
Specify if all magnitudes for the event should be included, default is data center dependent but is suggested to be the preferred magnitude only.						
includearrivals		**optional**	**FALSE**	**TRUE or FALSE**	**boolean**	
Specify if phase arrivals should be included.						
eventid		**optional**	**[Any]**	**Any valid ID**	**string**	
Select a specific event by ID; event identifiers are data center specific.						

Table 1 continued.

Parameter	Alias	Support	Default	Allowed Values	Type	Unit
limit		optional	[Any]	>= 1	integer	
Limit the results to the specified number of events.						
offset		optional	1	>= 1	integer	
Return results starting at the event count specified, starting at 1.						
orderby		required	*time*	Valid sort value	string	

Order the result by time or magnitude with the following possibilities:
    time: order by origin descending time
    time-asc: order by origin ascending time
    magnitude: order by descending magnitude
    magnitude-asc: order by ascending magnitude						

catalog		optional	[Any]	Valid catalog identifier	string	
Limit to events from a specified catalog.						
contributor		optional	[Any]	Valid contributor identifier	string	
Limit to events contributed by a specified contributor.						
updatedafter		optional*	[Any]	Any valid time	time	UTC
Limit to events updated after the specified time. * While this option is not required it is highly recommended due to usefulness.						
format		optional	text	xml, text	string	
Specify format of result, either *xml* (default) or *text* (defined below). If this parameter is not specified the service must return QuakeML.						
nodata		optional	204	204 or 404	string	
Select status code for "no data", either '204' (default) or '404'.						

Requests using the *query* method

The parameters should be submitted as key=value pairs using the HTTP GET method and may not be specified more than once; if a parameter is submitted multiple times the result is undefined.

Responses for the *__query__* method:

The results of a successful request shall be returned as QuakeML 1.2 using MIME type **application/xml** by default or when the *format* parameter value is 'xml'. If the *format* parameter value is 'text' the results shall be returned in a simple ASCII format using MIME type **text/plain** as defined below.

Behavior for the *__catalogs__* method

The service shall return the return the list of available catalogs in the simple XML schema illustrated below using the MIME type **application/xml**. Any parameters submitted with the method will be ignored.

```
<Catalogs>
  <Catalog>EMSC</Catalog>
  <Catalog>GCMT</Catalog>
  <Catalog>NEIC PDE</Catalog>
  <Catalog>ISC</Catalog>
</Catalogs>
```

Behavior for the *contributors* method

The service shall return the return the list of available contributors in the simple XML schema illustrated below using the MIME type **application/xml**. Any parameters submitted with the method will be ignored.

```
<Contributors>
  <Contributor>NEIC</Contributor>
  <Contributor>EMSC</Contributor>
  <Contributor>ISC</Contributor>
</Contributors>
```

Behavior for the *version* method

The service shall return the return the implementation version as a simple text string using the MIME type **text/plain**. Any parameters submitted with the method will be ignored.

Behavior for the *application.wadl* method

The service shall return a WADL conformant description of the interface using the MIME type **application/xml**. Any parameters submitted with the method will be ignored. The WADL shall describe all parameters supported by the interface and is primarily used to document which optional parameters are supported.

Behavior for the **error** conditions

All errors returned to the client shall use the type and pattern described in the common service characteristics specification.

Text output format

This simple text output format contains one event per line with common fields separated by vertical bar characters (ASCII decimal 124). Field entries cannot contain vertical bar characters. Lines beginning with a hash character ("#": ASCII decimal 35) should be considered comment lines.

```
EventID|Time|Latitude|Longitude|Depth/km|Author|Catalog|Contributor|ContributorID|Ma-g
Type|Magnitude|MagAuthor|EventLocationName|EventType
EventID|Time|Latitude|Longitude|Depth/km|Author|Catalog|Contributor|ContributorID|Ma-g
Type|Magnitude|MagAuthor|EventLocationName|EventType
…
```

As multiple origins, multiple magnitudes and arrivals cannot be represented in the text format, service implementations should ignore the 'includeallorigins', 'includeallmagnitudes' and 'includearrivals' parameters when the text output has been selected.

The description for each column of the text format is as follows:

EventID	Event ID assigned by the data center, as to be used with *eventid* parameter
Time	Origin time of the event in UTC
Latitude	Event latitude in degrees
Longitude	Event longitude in degrees
Depth/km	Event depth in kilometers
Author	Identifier of event origin author

Catalog	Identifier of source catalog
Contributor	Identifier of event information contributor
ContributorID	Event ID as reported by the contributor
MagType	Magnitude scale identifier (e.g. mb, ML, Mw)
Magnitude	Magnitude value
MagAuthor	Identifier of magnitude author
EventLocationName	Geographic description of event location (e.g. Flinn-Engdahl region name)
EventType	Event type classification string as of QuakeML 1.2 EventType enumeration

Examples

Requesting origins for all events above magnitude 6 in 2012:

https://DataCenter/fdsnws/event/1/query?minmag=6&starttime=2012-01-01T00:00:00&endtime=2013 -01-01T00:00:00

Requesting origins above magnitude 7 in text format:

https://DataCenter/fdsnws/event/1/query?minmag=7&starttime=2012-09-01T00:00:00&endtime=2012 -12-01T00:00:00&format=text

```
#EventID|Time|Latitude|Longitude|Depth/km|Author|Catalog|Contributor|ContributorID|MagType|Magnitude|M
agAuthor|EventLocationName|EventType
usp000jv5f|2012-11-07T16:35:46.930|13.988|-91.895|24|us|us|us|usp000jv5f|mww|7.4|us|offshore
Guatemala|earthquake
usp000juhz|2012-10-28T03:04:08.820|52.788|-132.101|14|us|us|us|usp000juhz|mww|7.8|us|Haida Gwaii,
Canada|earthquake
usp000jta1|2012-09-30T16:31:35.970|1.929|-76.362|170|us|us|us|usp000jta1|mww|7.3|us|Colombia|earthquak
e
usp000jrsw|2012-09-05T14:42:07.800|10.085|-85.315|35|us|us|us|usp000jrsw|mww|7.6|us|Costa
Rica|earthquake
...
```

References

FDSN Web Service Commonalities - http://www.fdsn.org/webservices/

QuakeML - https://quake.ethz.ch/quakeml/

Web Application Description Language (WADL) - http://www.w3.org/Submission/wadl/

Credits

This document was designed and is maintained by the Incorporated Research Institutions for Seismology (IRIS), Data Services on behalf of the FDSN.

Changes

Note: Through 2019-06-27 the changes relevant for this service are extracted from the original, monolithic specification document.

2012-07-12 · Initial specification, release candidate 1

2012-07-18

1. Remove <Total> elements from **catalog** and **contributor** XML responses for **fdsnws-event**.

2012-11-20

1. Include examples request URI's for each service.

2013-04-24 · Version 1.0 final

1. Replace parameter name *preferredonly* with *includeallorigins* in the fdsnws-event section of Table 1 and make the default value FALSE. This now matches other references to the parameter names and was the original intention.
2. Remove the DRAFT designation.

2013-09-18 · Integrate proposed version 1.1 changes

1. Add designation of required versus optional parameters.
2. Add optional *format* parameter. The default format of QuakeML remains the same. Document an alternate, simple text format to return when *format=text* including examples.
3. Add optional *nodata* parameter that accepts values of '204' (default) and '404'. This parameter controls the HTTP status code to return when the request was successful but matched no data.
4. Clarify definition of *starttime* and *endtime* parameters to explicitly include metadata epochs intersection with the specified time range.
5. Clarify definition of minimum and maximum latitude and longitude to be inclusive by adding "or equal to" to their description.

2013-10-04 · 1.1 release candidate

1. Add description and clarification for the columns of the text format.
2. Avoid ambiguity of required parameters by re-naming the appropriate column "Support" and changing the values to "Required" and "Optional".
3. Add another example request illustrating a query for text data and a portion of the response that might be expected.

2013-10-25 · Version 1.1 final

1. Clarify limitations of text output format: vertical bars cannot be included in fields, multiple origins & magnitudes cannot be included, phase arrivals cannot be included.
2. Change minimum value for the *limit* parameter to 1, previously 0.

2019-04-02 · Version 1.2

1. Update specification to version 1.2, with the following changes:
   a. addition of the *eventtype* parameter
   b. addition of the EventType column in the text output format (and example)

2019-06-27

1. Reformat document to contain only the specification for **fdsnws-event** service. Common service characteristics are maintained in a separate document, including the earlier change history for this specification.