

OpenAPI Specification

Version 3.0.2

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [BCP 14](#) [RFC2119](#) [RFC8174](#) when, and only when, they appear in all capitals, as shown here.

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> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)

Introduction

The OpenAPI Specification (OAS) defines a standard, language-agnostic interface to RESTful APIs which allows both humans and computers to discover and understand the capabilities of the service without access to source code, documentation, or through network traffic inspection. When properly defined, a consumer can understand and interact with the remote service with a minimal amount of implementation logic.

An OpenAPI definition can then be used by documentation generation tools to display the API, code generation tools to generate servers and clients in various programming languages, testing tools, and many other use cases.

Definitions

OpenAPI Document

A document (or set of documents) that defines or describes an API. An OpenAPI definition uses and conforms to the OpenAPI Specification.

Path Templating

Path templating refers to the usage of curly braces ({}) to mark a section of a URL path as replaceable using path parameters.

Media Types

Media type definitions are spread across several resources. The media type definitions SHOULD be in compliance with [RFC6838](#).

Some examples of possible media type definitions:

```
1. text/plain; charset=utf-8
2. application/json
3. application/vnd.github.json
4. application/vnd.github.v3+json
5. application/vnd.github.v3.raw+json
6. application/vnd.github.v3.text+json
7. application/vnd.github.v3.html+json
8. application/vnd.github.v3.full+json
9. application/vnd.github.v3.diff
10. application/vnd.github.v3.patch
```

HTTP Status Codes

The HTTP Status Codes are used to indicate the status of the executed operation. The available status codes are defined by [RFC7231](#) and registered status codes are listed in the [IANA Status Code Registry](#).

Specification

Versions

The OpenAPI Specification is versioned using [Semantic Versioning 2.0.0](#) (semver) and follows the semver specification.

The `major.minor` portion of the semver (for example `3.0`) SHALL designate the OAS feature set. Typically, `.patch` versions address errors in this document, not the feature set. Tooling which supports OAS 3.0 SHOULD be compatible with all OAS 3.0.* versions. The patch version SHOULD NOT be considered by tooling, making no distinction between `3.0.0` and `3.0.1` for example.



Supported by SMARTBEAR
Same major version. Thus a hypothetical [3.1.0](#) specification SHOULD be usable with tooling designed for [3.0.0](#).

[Sign In](#)[Try Free](#)> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

Format

An OpenAPI document that conforms to the OpenAPI Specification is itself a JSON object, which may be represented either in JSON or YAML format.

For example, if a field has an array value, the JSON array representation will be used:

```
1. {
2.   "field": [ 1, 2, 3 ]
3. }
```

All field names in the specification are **case sensitive**. This includes all fields that are used as keys in a map, except where explicitly noted that keys are **case insensitive**.

The schema exposes two types of fields: Fixed fields, which have a declared name, and Patterned fields, which declare a regex pattern for the field name.

Patterned fields MUST have unique names within the containing object.

In order to preserve the ability to round-trip between YAML and JSON formats, YAML version [1.2](#) is RECOMMENDED along with some additional constraints:

- Tags MUST be limited to those allowed by the [JSON Schema ruleset](#).
- Keys used in YAML maps MUST be limited to a scalar string, as defined by the [YAML Failsafe schema ruleset](#).

Note: While APIs may be defined by OpenAPI documents in either YAML or JSON format, the API request and response bodies and other content are not required to be JSON or YAML.

Document Structure

An OpenAPI document MAY be made up of a single document or be divided into multiple, connected parts at the discretion of the user. In the latter case, `$ref` fields MUST be used in the specification to reference those parts as follows from the [JSON Schema](#) definitions.

It is RECOMMENDED that the root OpenAPI document be named: `openapi.json` or `openapi.yaml`.

Data Types

Primitive data types in the OAS are based on the types supported by the [JSON Schema Specification Wright Draft 00](#). Note that `integer` as a type is also supported and is defined as a JSON number without a fraction or exponent part. `null` is not supported as a type (see `nullable` for an alternative solution). Models are defined using the [Schema Object](#), which is an extended subset of JSON Schema Specification Wright Draft 00.

Primitives have an optional modifier property: `format`. OAS uses several known formats to define in fine detail the data type being used. However, to support documentation needs, the `format` property is an open `string`-valued property, and can have any value. Formats such as `"email"`, `"uuid"`, and so on, MAY be used even though undefined by this specification. Types that are not accompanied by a `format` property follow the type definition in the JSON Schema. Tools that do not recognize a specific `format` MAY default back to the `type` alone, as if the `format` is not specified.

The formats defined by the OAS are:

<code>type</code>	<code>format</code>	Comments
<code>integer</code>	<code>int32</code>	signed 32 bits
<code>integer</code>	<code>int64</code>	signed 64 bits (a.k.a long)
<code>number</code>	<code>float</code>	
<code>number</code>	<code>double</code>	

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String		
string	byte	base64 encoded characters
string	binary	any sequence of octets
boolean		
string	date	As defined by full-date - RFC3339
string	date-time	As defined by date-time - RFC3339
string	password	A hint to UIs to obscure input.

- > [Definitions](#)
- [OpenAPI Document](#)
- [Path Templating](#)
- [Media Types](#)
- [HTTP Status Codes](#)
- [Specification](#)
- [Appendix A: Revision History](#)

Rich Text Formatting

Throughout the specification **description** fields are noted as supporting CommonMark markdown formatting. Where OpenAPI tooling renders rich text it MUST support, at a minimum, markdown syntax as described by [CommonMark 0.27](#). Tooling MAY choose to ignore some CommonMark features to address security concerns.

Relative References in URLs

Unless specified otherwise, all properties that are URLs MAY be relative references as defined by [RFC3986](#). Relative references are resolved using the URLs defined in the [Server Object](#) as a Base URI.

Relative references used in `$ref` are processed as per [JSON Reference](#), using the URL of the current document as the base URI. See also the [Reference Object](#).

Schema

In the following description, if a field is not explicitly **REQUIRED** or described with a MUST or SHALL, it can be considered OPTIONAL.

OpenAPI Object

This is the root document object of the [OpenAPI document](#).

Fixed Fields

Field Name	Type	Description
openapi	string	REQUIRED. This string MUST be the semantic version number of the OpenAPI Specification version that the OpenAPI document uses. The <code>openapi</code> field SHOULD be used by tooling specifications and clients to interpret the OpenAPI document. This is <i>not</i> related to the API info.version string.
info	Info Object	REQUIRED. Provides metadata about the API. The metadata MAY be used by tooling as required.
servers	[Server Object]	An array of Server Objects, which provide connectivity information to a target server. If the <code>servers</code> property is not provided, or is an empty array, the default value would be a Server Object with a <code>url</code> value of <code>/</code> .
paths	Paths Object	REQUIRED. The available paths and operations for the API.
components	Components Object	An element to hold various schemas for the specification.
security	[Security Requirement Object]	A declaration of which security mechanisms can be used across the API. The list of values includes alternative security requirement objects that can be used. Only one of the security requirement objects need to be satisfied to authorize a request. Individual operations can override this definition.



tags	Tag Object	A list of tags used by the specification with additional metadata. The order of the tags can be used to reflect on their order by the parsing tools. Not all tags that are used by the Operation Object must be declared. The tags that are not declared MAY be organized randomly or based on the tools' logic. Each tag name in the list MUST be unique.
externalDocs	External Documentation Object	Additional external documentation.

This object MAY be extended with [Specification Extensions](#).

Info Object

The object provides metadata about the API. The metadata MAY be used by the clients if needed, and MAY be presented in editing or documentation generation tools for convenience.

Fixed Fields

Field Name	Type	Description
title	string	REQUIRED. The title of the application.
description	string	A short description of the application. CommonMark syntax MAY be used for rich text representation.
termsOfService	string	A URL to the Terms of Service for the API. MUST be in the format of a URL.
contact	Contact Object	The contact information for the exposed API.
license	License Object	The license information for the exposed API.
version	string	REQUIRED. The version of the OpenAPI document (which is distinct from the OpenAPI Specification version or the API implementation version).

This object MAY be extended with [Specification Extensions](#).

Info Object Example

```

1. {
2.   "title": "Sample Pet Store App",
3.   "description": "This is a sample server for a pet store.",
4.   "termsOfService": "http://example.com/terms/",
5.   "contact": {
6.     "name": "API Support",
7.     "url": "http://www.example.com/support",
8.     "email": "support@example.com"
9.   },
10.  "license": {
11.    "name": "Apache 2.0",
12.    "url": "https://www.apache.org/licenses/LICENSE-2.0.html"
13.  },
14.  "version": "1.0.1"
15. }
```

```

1. title: Sample Pet Store App
2. description: This is a sample server for a pet store.
3. termsOfService: http://example.com/terms/
4. contact:
5.   name: API Support
6.   url: http://www.example.com/support
7.   email: support@example.com
8. license:
9.   name: Apache 2.0
10.  url: https://www.apache.org/licenses/LICENSE-2.0.html
11.  version: 1.0.1
```

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)

Contact Object

Contact information for the exposed API.



Field Name	Type	Description
name	string	The identifying name of the contact person/organization.
url	string	The URL pointing to the contact information. MUST be in the format of a URL.
email	string	The email address of the contact person/organization. MUST be in the format of an email address.

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)This object MAY be extended with [Specification Extensions](#).

Contact Object Example

```

1. {
2.   "name": "API Support",
3.   "url": "http://www.example.com/support",
4.   "email": "support@example.com"
5. }
```

```

1. name: API Support
2. url: http://www.example.com/support
3. email: support@example.com
```

License Object

License information for the exposed API.

Fixed Fields

Field Name	Type	Description
name	string	REQUIRED. The license name used for the API.
url	string	A URL to the license used for the API. MUST be in the format of a URL.

This object MAY be extended with [Specification Extensions](#).

License Object Example

```

1. {
2.   "name": "Apache 2.0",
3.   "url": "https://www.apache.org/licenses/LICENSE-2.0.html"
4. }
```

```

1. name: Apache 2.0
2. url: https://www.apache.org/licenses/LICENSE-2.0.html
```

Server Object

An object representing a Server.

Fixed Fields

Field Name	Type	Description
url	string	REQUIRED. A URL to the target host. This URL supports Server Variables and MAY be relative, to indicate that the host location is relative to the location where the OpenAPI document is being served. Variable substitutions will be made when a variable is named in {brackets}.
description	string	An optional string describing the host designated by the URL. CommonMark syntax MAY be used for rich text representation.
variables	Map[string, Server Variable Object]	A map between a variable name and its value. The value is used for substitution in the server's URL template.

This object MAY be extended with [Specification Extensions](#).



```

1. {
2.   "url": "https://development.gigantic-server.com/v1",
3.   "description": "Development server"
4. }

```

```

1. url: https://development.gigantic-server.com/v1
2. description: Development server

```

The following shows how multiple servers can be described, for example, at the OpenAPI Object's [servers](#):

```

1. {
2.   "servers": [
3.     {
4.       "url": "https://development.gigantic-server.com/v1",
5.       "description": "Development server"
6.     },
7.     {
8.       "url": "https://staging.gigantic-server.com/v1",
9.       "description": "Staging server"
10.    },
11.    {
12.      "url": "https://api.gigantic-server.com/v1",
13.      "description": "Production server"
14.    }
15.  ]
16. }

```

```

1. servers:
2. - url: https://development.gigantic-server.com/v1
3.   description: Development server
4. - url: https://staging.gigantic-server.com/v1
5.   description: Staging server
6. - url: https://api.gigantic-server.com/v1
7.   description: Production server

```

The following shows how variables can be used for a server configuration:

```

1. {
2.   "servers": [
3.     {
4.       "url": "https://{{username}}.gigantic-server.com:{{port}}/{{basePath}}",
5.       "description": "The production API server",
6.       "variables": {
7.         "username": {
8.           "default": "demo",
9.           "description": "this value is assigned by the service provider, in
this example 'gigantic-server.com'"
10.        },
11.        "port": {
12.          "enum": [
13.            "8443",
14.            "443"
15.          ],
16.          "default": "8443"
17.        },
18.        "basePath": {
19.          "default": "v2"
20.        }
21.      }
22.    }
23.  ]
24. }

```

[> Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)



```

4.   variables:
5.     username:
6.       # note! no enum here means it is an open value
7.       default: demo
8.       description: this value is assigned by the service provider, in this
example `gigantic-server.com`
9.     port:
10.    enum:
11.      - '8443'
12.      - '443'
13.    default: '8443'
14.    basePath:
15.      # open meaning there is the opportunity to use special base paths as
assigned by the provider, default is `v2`
16.    default: v2

```

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

Server Variable Object

An object representing a Server Variable for server URL template substitution.

Fixed Fields

Field Name	Type	Description
enum	[string]	An enumeration of string values to be used if the substitution options are from a limited set.
default	string	REQUIRED. The default value to use for substitution, which SHALL be sent if an alternate value is <i>not</i> supplied. Note this behavior is different than the Schema Object's treatment of default values, because in those cases parameter values are optional.
description	string	An optional description for the server variable. CommonMark syntax MAY be used for rich text representation.

This object MAY be extended with [Specification Extensions](#).

Components Object

Holds a set of reusable objects for different aspects of the OAS. All objects defined within the components object will have no effect on the API unless they are explicitly referenced from properties outside the components object.

Fixed Fields

Field Name	Type	Description
schemas	Map[string , Schema Object Reference Object]	An object to hold reusable Schema Objects .
responses	Map[string , Response Object Reference Object]	An object to hold reusable Response Objects .
parameters	Map[string , Parameter Object Reference Object]	An object to hold reusable Parameter Objects .
examples	Map[string , Example Object Reference Object]	An object to hold reusable Example Objects .
requestBodies	Map[string , Request Body Object Reference Object]	An object to hold reusable Request Body Objects .
headers	Map[string , Header Object Reference Object]	An object to hold reusable Header Objects .
securitySchemes	Map[string , Security Scheme Object Reference Object]	An object to hold reusable Security Scheme Objects .
links	Map[string , Link Object Reference Object]	An object to hold reusable Link Objects .



An object to hold reusable

Callback Objects.

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

This object MAY be extended with [Specification Extensions](#).

All the fixed fields declared above are objects that MUST use keys that match the regular expression: ^[a-zA-Z0-9\._\-]+\$.

Field Name Examples:

1. `User`
2. `User_1`
3. `User_Name`
4. `user-name`
5. `my.org.User`

Components Object Example

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```
4.     "type": "object",
5.     "properties": {
6.       "code": {
7.         "type": "integer",
8.         "format": "int32"
9.       },
10.      "message": {
11.        "type": "string"
12.      }
13.    },
14.    "Category": {
15.      "type": "object",
16.      "properties": {
17.        "id": {
18.          "type": "integer",
19.          "format": "int64"
20.        },
21.        "name": {
22.          "type": "string"
23.        }
24.      }
25.    },
26.    "Tag": {
27.      "type": "object",
28.      "properties": {
29.        "id": {
30.          "type": "integer",
31.          "format": "int64"
32.        },
33.        "name": {
34.          "type": "string"
35.        }
36.      }
37.    }
38.  },
39.  "parameters": {
40.   "skipParam": {
41.     "name": "skip",
42.     "in": "query",
43.     "description": "number of items to skip",
44.     "required": true,
45.     "schema": {
46.       "type": "integer",
47.       "format": "int32"
48.     }
49.   },
50.   "limitParam": {
51.     "name": "limit",
52.     "in": "query",
53.     "description": "max records to return",
54.     "required": true,
55.     "schema": {
56.       "type": "integer",
57.       "format": "int32"
58.     }
59.   }
60. },
61. },
62. "responses": {
63.   "NotFound": {
64.     "description": "Entity not found."
65.   },
66.   "IllegalInput": {
67.     "description": "Illegal input for operation."
68.   },
69.   "GeneralError": {
70.     "description": "General Error",
71.     "content": {
72.       "application/json": {
73.         "schema": {
74.           "$ref": "#/components/schemas/GeneralError"
75.         }
76.       }
77.     }
78.   },
79. },
80. "securitySchemes": {
81.   "api_key": {
82.     "type": "apiKey",
83.     "name": "api_key",
84.     "in": "header"
85.   }
86. }
```



```
87.     "type": "oauth2",
88.     "flows": {
89.       "implicit": {
90.         "authorizationUrl": "http://example.org/api/oauth/dialog",
91.         "scopes": {
92.           "write:pets": "modify pets in your account",
93.           "read:pets": "read your pets"
94.         }
95.       }
96.     }
97.   }
98. }
```

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.   type: object
5.     properties:
6.       code:
7.         type: integer
8.         format: int32
9.       message:
10.      type: string
11.      Category:
12.        type: object
13.        properties:
14.          id:
15.            type: integer
16.            format: int64
17.          name:
18.            type: string
19.      Tag:
20.        type: object
21.        properties:
22.          id:
23.            type: integer
24.            format: int64
25.          name:
26.            type: string
27.        parameters:
28.          skipParam:
29.            name: skip
30.            in: query
31.            description: number of items to skip
32.            required: true
33.          schema:
34.            type: integer
35.            format: int32
36.          limitParam:
37.            name: limit
38.            in: query
39.            description: max records to return
40.            required: true
41.          schema:
42.            type: integer
43.            format: int32
44.        responses:
45.          NotFound:
46.            description: Entity not found.
47.          IllegalInput:
48.            description: Illegal input for operation.
49.          GeneralError:
50.            description: General Error
51.            content:
52.              application/json:
53.                schema:
54.                  $ref: '#/components/schemas/GeneralError'
55.        securitySchemes:
56.          api_key:
57.            type: apiKey
58.            name: api_key
59.            in: header
60.          petstore_auth:
61.            type: oauth2
62.            flows:
63.              implicit:
64.                authorizationUrl: http://example.org/api/oauth/dialog
65.                scopes:
66.                  write:pets: modify pets in your account
67.                  read:pets: read your pets

```

Paths Object

Holds the relative paths to the individual endpoints and their operations. The path is appended to the URL from the [Server Object](#) in order to construct the full URL. The Paths MAY be empty, due to [ACL constraints](#).

Patterned Fields

Field Pattern	Type	Description



{/path}	Path Item Object	A relative path to an individual endpoint. The field name MUST begin with a slash. The path is appended (no relative URL resolution) to the expanded URL from the Server Object 's <code>url</code> field in order to construct the full URL. Path templating is allowed. When matching URLs, concrete (non-templated) paths would be matched before their templated counterparts. Templated paths with the same hierarchy but different templated names MUST NOT exist as they are identical. In case of ambiguous matching, it's up to the tooling to decide which one to use.
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> [Definitions](#)
[OpenAPI Document](#)
[Path Templating](#)
[Media Types](#)
[HTTP Status Codes](#)
[Specification](#)
[Appendix A: Revision History](#)

This object MAY be extended with [Specification Extensions](#).

Path Templating Matching

Assuming the following paths, the concrete definition, `/pets/mine`, will be matched first if used:

```
1. /pets/{petId}
2. /pets/mine
```

The following paths are considered identical and invalid:

```
1. /pets/{petId}
2. /pets/{name}
```

The following may lead to ambiguous resolution:

```
1. /{entity}/me
2. /books/{id}
```

Paths Object Example

```
1. {
2.   "/pets": {
3.     "get": {
4.       "description": "Returns all pets from the system that the user has
access to",
5.       "responses": {
6.         "200": {
7.           "description": "A list of pets.",
8.           "content": {
9.             "application/json": {
10.               "schema": {
11.                 "type": "array",
12.                 "items": {
13.                   "$ref": "#/components/schemas/pet"
14.                 }
15.               }
16.             }
17.           }
18.         }
19.       }
20.     }
21.   }
22. }
```

```
1. /pets:
2.   get:
3.     description: Returns all pets from the system that the user has access
to
4.     responses:
5.       '200':
6.         description: A list of pets.
7.         content:
8.           application/json:
9.             schema:
10.               type: array
11.               items:
12.                 $ref: '#/components/schemas/pet'
```

Path Item Object

Describes the operations available on a single path. A Path Item MAY be empty, due to [ACL constraints](#). The path itself is still exposed to the documentation viewer but they will not know which operations and parameters are available.



Field Name	Type	Description
\$ref	string	Allows for an external definition of this path item. The referenced structure MUST be in the format of a Path Item Object . If there are conflicts between the referenced definition and this Path Item's definition, the behavior is <i>undefined</i> .
summary	string	An optional, string summary, intended to apply to all operations in this path.
description	string	An optional, string description, intended to apply to all operations in this path. CommonMark syntax MAY be used for rich text representation.
get	Operation Object	A definition of a GET operation on this path.
put	Operation Object	A definition of a PUT operation on this path.
post	Operation Object	A definition of a POST operation on this path.
delete	Operation Object	A definition of a DELETE operation on this path.
options	Operation Object	A definition of a OPTIONS operation on this path.
head	Operation Object	A definition of a HEAD operation on this path.
patch	Operation Object	A definition of a PATCH operation on this path.
trace	Operation Object	A definition of a TRACE operation on this path.
servers	[Server Object]	An alternative server array to service all operations in this path.
parameters	[Parameter Object Reference Object]	A list of parameters that are applicable for all the operations described under this path. These parameters can be overridden at the operation level, but cannot be removed there. The list MUST NOT include duplicated parameters. A unique parameter is defined by a combination of a name and location . The list can use the Reference Object to link to parameters that are defined at the OpenAPI Object's components/parameters .

This object MAY be extended with [Specification Extensions](#).

Path Item Object Example

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)

[Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.     "summary": "Find pets by ID",
5.     "operationId": "getPetById",
6.     "responses": {
7.       "200": {
8.         "description": "pet response",
9.         "content": {
10.           "/*": {
11.             "schema": {
12.               "type": "array",
13.               "items": {
14.                 "$ref": "#/components/schemas/Pet"
15.               }
16.             }
17.           }
18.         }
19.       },
20.       "default": {
21.         "description": "error payload",
22.         "content": {
23.           "text/html": {
24.             "schema": {
25.               "$ref": "#/components/schemas/ErrorModel"
26.             }
27.           }
28.         }
29.       }
30.     },
31.   },
32.   "parameters": [
33.     {
34.       "name": "id",
35.       "in": "path",
36.       "description": "ID of pet to use",
37.       "required": true,
38.       "schema": {
39.         "type": "array",
40.         "items": {
41.           "type": "string"
42.         }
43.       },
44.       "style": "simple"
45.     }
46.   ]
47. }
```

```

1. get:
2.   description: Returns pets based on ID
3.   summary: Find pets by ID
4.   operationId: getPetById
5.   responses:
6.     '200':
7.       description: pet response
8.       content:
9.         '/*':
10.           schema:
11.             type: array
12.             items:
13.               $ref: '#/components/schemas/Pet'
14.     default:
15.       description: error payload
16.       content:
17.         'text/html':
18.           schema:
19.             $ref: '#/components/schemas/ErrorModel'
20.   parameters:
21.     - name: id
22.       in: path
23.       description: ID of pet to use
24.       required: true
25.       schema:
26.         type: array
27.         style: simple
28.         items:
29.           type: string
```

Operation Object

Describes a single API operation on a path.



Field Name	Type	Description
tags	[string]	A list of tags for API documentation control. Tags can be used for logical grouping of operations by resources or any other qualifier.
summary	string	A short summary of what the operation does.
description	string	A verbose explanation of the operation behavior. CommonMark syntax MAY be used for rich text representation.
externalDocs	External Documentation Object	Additional external documentation for this operation.
operationId	string	Unique string used to identify the operation. The id MUST be unique among all operations described in the API. The operationId value is case-sensitive . Tools and libraries MAY use the operationId to uniquely identify an operation, therefore, it is RECOMMENDED to follow common programming naming conventions.
parameters	[Parameter Object Reference Object]	A list of parameters that are applicable for this operation. If a parameter is already defined at the Path Item , the new definition will override it but can never remove it. The list MUST NOT include duplicated parameters. A unique parameter is defined by a combination of a name and location . The list can use the Reference Object to link to parameters that are defined at the OpenAPI Object's components/parameters .
requestBody	Request Body Object Reference Object	The request body applicable for this operation. The requestBody is only supported in HTTP methods where the HTTP 1.1 specification RFC7231 has explicitly defined semantics for request bodies. In other cases where the HTTP spec is vague, requestBody SHALL be ignored by consumers.
responses	Responses Object	REQUIRED. The list of possible responses as they are returned from executing this operation.
callbacks	Map[string, Callback Object Reference Object]	A map of possible out-of band callbacks related to the parent operation. The key is a unique identifier for the Callback Object. Each value in the map is a Callback Object that describes a request that may be initiated by the API provider and the expected responses. The key value used to identify the callback object is an expression, evaluated at runtime, that identifies a URL to use for the callback operation.
deprecated	boolean	Declares this operation to be deprecated. Consumers SHOULD refrain from usage of the declared operation. Default value is false .
security	[Security Requirement Object]	A declaration of which security mechanisms can be used for this operation. The list of values includes alternative security requirement objects that can be used. Only one of the security requirement objects need to be satisfied to authorize a request. This definition overrides any declared top-level security . To remove a top-level security declaration, an empty array can be used.
servers	[Server Object]	An alternative server array to service this operation. If an alternative server object is specified at the Path Item Object or Root level, it will be overridden by this value.

This object MAY be extended with [Specification Extensions](#).

Operation Object Example

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```
4. ],
5.   "summary": "Updates a pet in the store with form data",
6.   "operationId": "updatePetWithForm",
7.   "parameters": [
8.     {
9.       "name": "petId",
10.      "in": "path",
11.      "description": "ID of pet that needs to be updated",
12.      "required": true,
13.      "schema": {
14.        "type": "string"
15.      }
16.    },
17.    "requestBody": {
18.      "content": {
19.        "application/x-www-form-urlencoded": {
20.          "schema": {
21.            "type": "object",
22.            "properties": {
23.              "name": {
24.                "description": "Updated name of the pet",
25.                "type": "string"
26.              },
27.              "status": {
28.                "description": "Updated status of the pet",
29.                "type": "string"
30.              }
31.            },
32.            "required": ["status"]
33.          }
34.        }
35.      }
36.    },
37.    "responses": {
38.      "200": {
39.        "description": "Pet updated.",
40.        "content": {
41.          "application/json": {},
42.          "application/xml": {}
43.        }
44.      },
45.      "405": {
46.        "description": "Method Not Allowed",
47.        "content": {
48.          "application/json": {},
49.          "application/xml": {}
50.        }
51.      }
52.    }
53.  },
54.  "security": [
55.    {
56.      "petstore_auth": [
57.        "write:pets",
58.        "read:pets"
59.      ]
60.    }
61.  ]
62. }
```

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4. operationId: updatePetWithForm
5. parameters:
6.   - name: petId
7.     in: path
8.     description: ID of pet that needs to be updated
9.     required: true
10.    schema:
11.      type: string
12. requestBody:
13.   content:
14.     'application/x-www-form-urlencoded':
15.       schema:
16.         properties:
17.           name:
18.             description: Updated name of the pet
19.             type: string
20.           status:
21.             description: Updated status of the pet
22.             type: string
23.             required:
24.               - status
25. responses:
26.   '200':
27.     description: Pet updated.
28.     content:
29.       'application/json': {}
30.       'application/xml': {}
31.   '405':
32.     description: Method Not Allowed
33.     content:
34.       'application/json': {}
35.       'application/xml': {}
36. security:
37.   - petstore_auth:
38.     - write:pets
39.     - read:pets

```

External Documentation Object

Allows referencing an external resource for extended documentation.

Fixed Fields

Field Name	Type	Description
description	string	A short description of the target documentation. CommonMark syntax MAY be used for rich text representation.
url	string	REQUIRED. The URL for the target documentation. Value MUST be in the format of a URL.

This object MAY be extended with [Specification Extensions](#).

External Documentation Object Example

```

1. {
2.   "description": "Find more info here",
3.   "url": "https://example.com"
4. }

```

```

1. description: Find more info here
2. url: https://example.com

```

Parameter Object

Describes a single operation parameter.

A unique parameter is defined by a combination of a [name](#) and [location](#).

Parameter Locations

There are four possible parameter locations specified by the [in](#) field:

- path - Used together with [Path Templating](#), where the parameter value is actually part of the operation's URL. This does not include the host or base path of the API. For example, in [/items/{itemId}](#), the path parameter is [itemId](#).



- **header** - Custom headers that are expected as part of the request. Note that [RFC7230](#) states header names are case insensitive.
- **cookie** - Used to pass a specific cookie value to the API.

Fixed Fields

Field Name	Type	Description
name	string	REQUIRED . The name of the parameter. Parameter names are <i>case sensitive</i> . <ul style="list-style-type: none"> If in is "path", the name field MUST correspond to the associated path segment from the path field in the Paths Object. See Path Templating for further information. If in is "header" and the name field is "Accept", "Content-Type" or "Authorization", the parameter definition SHALL be ignored. For all other cases, the name corresponds to the parameter name used by the in property.
in	string	REQUIRED . The location of the parameter. Possible values are "query", "header", "path" or "cookie".
description	string	A brief description of the parameter. This could contain examples of use. CommonMark syntax MAY be used for rich text representation.
required	boolean	Determines whether this parameter is mandatory. If the parameter location is "path", this property is REQUIRED and its value MUST be true . Otherwise, the property MAY be included and its default value is false .
deprecated	boolean	Specifies that a parameter is deprecated and SHOULD be transitioned out of usage. Default value is false .
allowEmptyValue	boolean	Sets the ability to pass empty-valued parameters. This is valid only for query parameters and allows sending a parameter with an empty value. Default value is false . If style is used, and if behavior is n/a (cannot be serialized), the value of allowEmptyValue SHALL be ignored. Use of this property is NOT RECOMMENDED, as it is likely to be removed in a later revision.

The rules for serialization of the parameter are specified in one of two ways. For simpler scenarios, a [schema](#) and [style](#) can describe the structure and syntax of the parameter.

Field Name	Type	Description
style	string	Describes how the parameter value will be serialized depending on the type of the parameter value. Default values (based on value of in): for query - form ; for path - simple ; for header - simple ; for cookie - form .
explode	boolean	When this is true, parameter values of type array or object generate separate parameters for each value of the array or key-value pair of the map. For other types of parameters this property has no effect. When style is form , the default value is true . For all other styles, the default value is false .
allowReserved	boolean	Determines whether the parameter value SHOULD allow reserved characters, as defined by RFC3986 :/?# []@!\$&'()*)+;:= to be included without percent-encoding. This property only applies to parameters with an in value of query . The default value is false .
schema	Schema Object Reference Object	The schema defining the type used for the parameter.

> [Definitions](#)
[OpenAPI Document](#)
[Path Templating](#)
[Media Types](#)
[HTTP Status Codes](#)
[Specification](#)
[Appendix A: Revision History](#)



example	Any	Example of the media type. The example SHOULD match the specified schema and encoding properties if present. The example field is mutually exclusive of the examples field. Furthermore, if referencing a schema which contains an example, the example value SHALL override the example provided by the schema. To represent examples of media types that cannot naturally be represented in JSON or YAML, a string value can contain the example with escaping where necessary.
examples	Map[string , Example Object Reference Object]	Examples of the media type. Each example SHOULD contain a value in the correct format as specified in the parameter encoding. The examples field is mutually exclusive of the example field. Furthermore, if referencing a schema which contains an example, the examples value SHALL override the example provided by the schema.

For more complex scenarios, the [content](#) property can define the media type and schema of the parameter. A parameter MUST contain either a **schema** property, or a [content](#) property, but not both. When **example** or **examples** are provided in conjunction with the **schema** object, the example MUST follow the prescribed serialization strategy for the parameter.

Field Name	Type	Description
content	Map[string , Media Type Object]	A map containing the representations for the parameter. The key is the media type and the value describes it. The map MUST only contain one entry.

Style Values

In order to support common ways of serializing simple parameters, a set of **style** values are defined.

style	type	in	Comments
matrix	primitive , array, object	path	Path-style parameters defined by RFC6570
label	primitive , array, object	path	Label style parameters defined by RFC6570
form	primitive , array, object	query, cookie	Form style parameters defined by RFC6570 . This option replaces collectionFormat with a csv (when explode is false) or multi (when explode is true) value from OpenAPI 2.0.
simple	array	path, header	Simple style parameters defined by RFC6570 . This option replaces collectionFormat with a csv value from OpenAPI 2.0.
spaceDelimited	array	query	Space separated array values. This option replaces collectionFormat equal to ssv from OpenAPI 2.0.
pipeDelimited	array	query	Pipe separated array values. This option replaces collectionFormat equal to pipes from OpenAPI 2.0.
deepObject	object	query	Provides a simple way of rendering nested objects using form parameters.

Style Examples

Assume a parameter named **color** has one of the following values:

1. **string** -> "blue"
2. **array** -> ["blue", "black", "brown"]
3. **object** -> { "R": 100, "G": 200, "B": 150 }

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)



Matrix	In	;color	;color=blue	;color=blue,black,brown	;color=R,G,B
matrix	true	;color	;color=blue	;color=blue;color=black;color=brown	> Definitions ;R=100;G=200;B=150 OpenAPI Document
label	false	.	.blue	.blue.black.brown	Path Templating .R.100.G.200.B.150 Media Types
label	true	.	.blue	.blue.black.brown	HTTP Status Codes .R=100,G=200,B=150 Specification
form	false	color=	color=blue	color=blue,black,brown	Appendix A: Revision History
form	true	color=	color=blue	color=blue&color=black&color=brown	R=100&G=200&B=150
simple	false	n/a	blue	blue,black,brown	R,100,G,200,B,150
simple	true	n/a	blue	blue,black,brown	R=100,G=200,B=150
spaceDelimited	false	n/a	n/a	blue%20black%20brown	R%20100%20G%20200%20B%20150
pipeDelimited	false	n/a	n/a	blue black brown	R 100 G 200
deepObject	true	n/a	n/a	n/a	color[R]=100&color[G]=200&color[B]=150

This object MAY be extended with [Specification Extensions](#).

Parameter Object Examples

A header parameter with an array of 64 bit integer numbers:

```

1. {
2.   "name": "token",
3.   "in": "header",
4.   "description": "token to be passed as a header",
5.   "required": true,
6.   "schema": {
7.     "type": "array",
8.     "items": {
9.       "type": "integer",
10.      "format": "int64"
11.    }
12.  },
13.  "style": "simple"
14. }
```

```

1. name: token
2. in: header
3. description: token to be passed as a header
4. required: true
5. schema:
6.   type: array
7.   items:
8.     type: integer
9.     format: int64
10. style: simple
```

A path parameter of a string value:

```

1. {
2.   "name": "username",
3.   "in": "path",
4.   "description": "username to fetch",
5.   "required": true,
6.   "schema": {
7.     "type": "string"
8.   }
9. }
```

```

1. name: username
2. in: path
3. description: username to fetch
4. required: true
5. schema:
6.   type: string
```

An optional query parameter of a string value, allowing multiple values by repeating the query parameter:



```

4.   "description": "ID of the object to fetch",
5.   "required": false
6.   "schema": {
7.     "type": "array",
8.     "items": {
9.       "type": "string"
10.    }
11. },
12.   "style": "form",
13.   "explode": true
14. }
```

```

1. name: id
2. in: query
3. description: ID of the object to fetch
4. required: false
5. schema:
6.   type: array
7.   items:
8.     type: string
9. style: form
10. explode: true
```

A free-form query parameter, allowing undefined parameters of a specific type:

```

1. {
2.   "in": "query",
3.   "name": "FreeForm",
4.   "schema": {
5.     "type": "object",
6.     "additionalProperties": {
7.       "type": "integer"
8.     },
9.   },
10.   "style": "form"
11. }
```

```

1. in: query
2. name: freeForm
3. schema:
4. type: object
5. additionalProperties:
6. type: integer
7. style: form
```

A complex parameter using **content** to define serialization:

```

1. {
2.   "in": "query",
3.   "name": "coordinates",
4.   "content": {
5.     "application/json": {
6.       "schema": {
7.         "type": "object",
8.         "required": [
9.           "lat",
10.           "long"
11.         ],
12.         "properties": {
13.           "lat": {
14.             "type": "number"
15.           },
16.           "long": {
17.             "type": "number"
18.           }
19.         }
20.       }
21.     }
22. }
```

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)



```

4.   application/json:
5.     schema:
6.       type: object
7.       required:
8.         - lat
9.         - long
10.      properties:
11.        lat:
12.          type: number
13.        long:
14.          type: number

```

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

Request Body Object

Describes a single request body.

Fixed Fields

Field Name	Type	Description
description	string	A brief description of the request body. This could contain examples of use. CommonMark syntax MAY be used for rich text representation.
content	Map[string, MediaType Object]	REQUIRED. The content of the request body. The key is a media type or media type range and the value describes it. For requests that match multiple keys, only the most specific key is applicable. e.g. text/plain overrides text/*
required	boolean	Determines if the request body is required in the request. Defaults to false .

This object MAY be extended with [Specification Extensions](#).

Request Body Examples

A request body with a referenced model definition.

[Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.   "application/json": {
5.     "schema": {
6.       "$ref": "#/components/schemas/User"
7.     },
8.     "examples": {
9.       "user": {
10.         "summary": "User Example",
11.         "externalValue": "http://foo.bar/examples/user-example.json"
12.       }
13.     }
14.   },
15.   "application/xml": {
16.     "schema": {
17.       "$ref": "#/components/schemas/User"
18.     },
19.     "examples": {
20.       "user": {
21.         "summary": "User example in XML",
22.         "externalValue": "http://foo.bar/examples/user-example.xml"
23.       }
24.     }
25.   },
26.   "text/plain": {
27.     "examples": {
28.       "user": {
29.         "summary": "User example in Plain text",
30.         "externalValue": "http://foo.bar/examples/user-example.txt"
31.       }
32.     }
33.   },
34.   "*/*": {
35.     "examples": {
36.       "user": {
37.         "summary": "User example in other format",
38.         "externalValue": "http://foo.bar/examples/user-example.whatever"
39.       }
40.     }
41.   }
42. }
43. }
```

```

1. description: user to add to the system
2. content:
3.   'application/json':
4.     schema:
5.       $ref: '#/components/schemas/User'
6.     examples:
7.       user:
8.         summary: User Example
9.         externalValue: 'http://foo.bar/examples/user-example.json'
10.      'application/xml':
11.        schema:
12.          $ref: '#/components/schemas/User'
13.        examples:
14.          user:
15.            summary: User Example in XML
16.            externalValue: 'http://foo.bar/examples/user-example.xml'
17.          'text/plain':
18.            examples:
19.              user:
20.                summary: User example in text plain format
21.                externalValue: 'http://foo.bar/examples/user-example.txt'
22.          '*/*':
23.            examples:
24.              user:
25.                summary: User example in other format
26.                externalValue: 'http://foo.bar/examples/user-example.whatever'
```

A body parameter that is an array of string values:



```

4.   "text/plain": {
5.     "schema": {
6.       "type": "array",
7.       "items": {
8.         "type": "string"
9.       }
10.    }
11.  }
12. }
13. }
```

```

1. description: user to add to the system
2. required: true
3. content:
4.   text/plain:
5.     schema:
6.       type: array
7.       items:
8.         type: string
```

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

Media Type Object

Each Media Type Object provides schema and examples for the media type identified by its key.

Fixed Fields

Field Name	Type	Description
schema	Schema Object Reference Object	The schema defining the content of the request, response, or parameter.
example	Any	Example of the media type. The example object SHOULD be in the correct format as specified by the media type. The example field is mutually exclusive of the examples field. Furthermore, if referencing a schema which contains an example, the example value SHALL <i>override</i> the example provided by the schema.
examples	Map[string , Example Object Reference Object]	Examples of the media type. Each example object SHOULD match the media type and specified schema if present. The examples field is mutually exclusive of the example field. Furthermore, if referencing a schema which contains an example, the examples value SHALL <i>override</i> the example provided by the schema.
encoding	Map[string , Encoding Object]	A map between a property name and its encoding information. The key, being the property name, MUST exist in the schema as a property. The encoding object SHALL only apply to requestBody objects when the media type is multipart or application/x-www-form-urlencoded .

This object MAY be extended with [Specification Extensions](#).

Media Type Examples

[Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.     "$ref": "#/components/schemas/Pet"
5.   },
6.   "examples": {
7.     "cat": {
8.       "summary": "An example of a cat",
9.       "value": {
10.         {
11.           "name": "Fluffy",
12.           "petType": "Cat",
13.           "color": "White",
14.           "gender": "male",
15.           "breed": "Persian"
16.         }
17.       },
18.       "dog": {
19.         "summary": "An example of a dog with a cat's name",
20.         "value": {
21.           "name": "Puma",
22.           "petType": "Dog",
23.           "color": "Black",
24.           "gender": "Female",
25.           "breed": "Mixed"
26.         },
27.         "frog": {
28.           "$ref": "#/components/examples/frog-example"
29.         }
30.       }
31.     }
32.   }
33. }
```

```

1. application/json;
2. schema:
3.   $ref: "#/components/schemas/Pet"
4.   examples:
5.     cat:
6.       summary: An example of a cat
7.       value:
8.         name: Fluffy
9.         petType: Cat
10.        color: White
11.        gender: male
12.        breed: Persian
13.     dog:
14.       summary: An example of a dog with a cat's name
15.       value:
16.         name: Puma
17.         petType: Dog
18.         color: Black
19.         gender: Female
20.         breed: Mixed
21.     frog:
22.       $ref: "#/components/examples/frog-example"
```

Considerations for File Uploads

In contrast with the 2.0 specification, `file` input/output content in OpenAPI is described with the same semantics as any other schema type. Specifically:

```

1. # content transferred with base64 encoding
2. schema:
3.   type: string
4.   format: base64
```

```

1. # content transferred in binary (octet-stream):
2. schema:
3.   type: string
4.   format: binary
```

These examples apply to either input payloads of file uploads or response payloads.

A `requestBody` for submitting a file in a `POST` operation may look like the following example:



```

4.      # any media type is accepted, functionally equivalent to `*/*`
5.      schema:
6.          # a binary file of any type
7.          type: string
8.          format: binary

```

In addition, specific media types MAY be specified:

```

1. # multiple, specific media types may be specified:
2. requestBody:
3.     content:
4.         # a binary file of type png or jpeg
5.         'image/jpeg':
6.             schema:
7.                 type: string
8.                 format: binary
9.         'image/png':
10.            schema:
11.                type: string
12.                format: binary

```

To upload multiple files, a **multipart** media type MUST be used:

```

1. requestBody:
2.     content:
3.         multipart/form-data:
4.             schema:
5.                 properties:
6.                     # The property name 'file' will be used for all files.
7.                     file:
8.                         type: array
9.                         items:
10.                            type: string
11.                            format: binary
12.

```

Support for x-www-form-urlencoded Request Bodies

To submit content using form url encoding via [RFC1866](#), the following definition may be used:

```

1. requestBody:
2.     content:
3.         application/x-www-form-urlencoded:
4.             schema:
5.                 type: object
6.                 properties:
7.                     id:
8.                         type: string
9.                         format: uuid
10.                    address:
11.                        # complex types are stringified to support RFC 1866
12.                        type: object
13.                        properties: {}

```

In this example, the contents in the **requestBody** MUST be stringified per [RFC1866](#) when passed to the server. In addition, the **address** field complex object will be stringified.

When passing complex objects in the **application/x-www-form-urlencoded** content type, the default serialization strategy of such properties is described in the [Encoding Object's style](#) property as **form**.

Special Considerations for **multipart** Content

It is common to use **multipart/form-data** as a **Content-Type** when transferring request bodies to operations. In contrast to 2.0, a **schema** is REQUIRED to define the input parameters to the operation when using **multipart** content. This supports complex structures as well as supporting mechanisms for multiple file uploads.

When passing in **multipart** types, boundaries MAY be used to separate sections of the content being transferred — thus, the following default **Content-Types** are defined for **multipart**:

- If the property is a primitive, or an array of primitive values, the default Content-Type is **text/plain**
- If the property is complex, or an array of complex values, the default Content-Type is **application/json**

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)

[Sign In](#)[Try Free](#)

Examples:

```

1. requestBody:
2.   content:
3.     multipart/form-data:
4.       schema:
5.         type: object
6.         properties:
7.           id:
8.             type: string
9.             format: uuid
10.            address:
11.              # default Content-Type for objects is `application/json`
12.              type: object
13.              properties: {}
14.            profileImage:
15.              # default Content-Type for string/binary is `application/octet-
stream`
16.              type: string
17.              format: binary
18.            children:
19.              # default Content-Type for arrays is based on the `inner` type
(text/plain here)
20.            type: array
21.            items:
22.              type: string
23.            addresses:
24.              # default Content-Type for arrays is based on the `inner` type
(object shown, so `application/json` in this example)
25.            type: array
26.            items:
27.              type: '#/components/schemas/Address'

```

An **encoding** attribute is introduced to give you control over the serialization of parts of **multipart** request bodies. This attribute is *only* applicable to **multipart** and **application/x-www-form-urlencoded** request bodies.

Encoding Object

A single encoding definition applied to a single schema property.

Fixed Fields

Field Name	Type	Description
contentType	string	The Content-Type for encoding a specific property. Default value depends on the property type: for string with format being binary – application/octet-stream ; for other primitive types – text/plain ; for object – application/json ; for array – the default is defined based on the inner type. The value can be a specific media type (e.g. application/json), a wildcard media type (e.g. image/*), or a comma-separated list of the two types.
headers	Map[string, HeaderObject ReferenceObject]	A map allowing additional information to be provided as headers, for example Content-Disposition . Content-Type is described separately and SHALL be ignored in this section. This property SHALL be ignored if the request body media type is not a multipart .
style	string	Describes how a specific property value will be serialized depending on its type. See Parameter Object for details on the style property. The behavior follows the same values as query parameters, including default values. This property SHALL be ignored if the request body media type is not application/x-www-form-urlencoded .

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)



		When this is true, property values of type <code>array</code> or <code>object</code> generate separate parameters for each value of the array, or key-value-pair of the map. For other types of properties this property has no effect. When <code>style</code> is <code>form</code> , the default value is <code>true</code> . For all other styles, the default value is <code>false</code> . This property SHALL be ignored if the request body media type is not <code>application/x-www-form-urlencoded</code> .
allowReserved	<code>boolean</code>	Determines whether the parameter value SHOULD allow reserved characters, as defined by RFC3986 :?#[]@!\$&'()*+,;= to be included without percent-encoding. The default value is <code>false</code> . This property SHALL be ignored if the request body media type is not <code>application/x-www-form-urlencoded</code> .

This object MAY be extended with [Specification Extensions](#).

Encoding Object Example

```

1. requestBody:
2.   content:
3.     multipart/mixed:
4.       schema:
5.         type: object
6.         properties:
7.           id:
8.             # default is text/plain
9.             type: string
10.            format: uuid
11.            address:
12.              # default is application/json
13.              type: object
14.              properties: {}
15.            historyMetadata:
16.              # need to declare XML format!
17.              description: metadata in XML format
18.              type: object
19.              properties: {}
20.            profileImage:
21.              # default is application/octet-stream, need to declare an image
22.              # type only!
23.              type: string
24.              format: binary
25.            encoding:
26.              historyMetadata:
27.                # require XML Content-Type in utf-8 encoding
28.                contentType: application/xml; charset=utf-8
29.              profileImage:
30.                # only accept png/jpeg
31.                contentType: image/png, image/jpeg
32.              headers:
33.                X-Rate-Limit-Limit:
34.                  description: The number of allowed requests in the current
35.                  period
36.                  schema:
37.                    type: integer

```

Responses Object

A container for the expected responses of an operation. The container maps a HTTP response code to the expected response.

The documentation is not necessarily expected to cover all possible HTTP response codes because they may not be known in advance. However, documentation is expected to cover a successful operation response and any known errors.

The `default` MAY be used as a default response object for all HTTP codes that are not covered individually by the specification.

The **Responses Object** MUST contain at least one response code, and it SHOULD be the response for a successful operation call.

Fixed Fields

Field Name	Type	Description
------------	------	-------------

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)



default	Response Object Reference Object	The documentation of responses other than the ones declared for specific HTTP response codes. Use this field to cover undeclared responses. A Reference Object can link to a response that the OpenAPI Object's components/responses section defines.
---------	--	---

Patterned Fields

Field Pattern	Type	Description
HTTP Status Code	Response Object Reference Object	Any HTTP status code can be used as the property name, but only one property per code, to describe the expected response for that HTTP status code. A Reference Object can link to a response that is defined in the OpenAPI Object's components/responses section. This field MUST be enclosed in quotation marks (for example, "200") for compatibility between JSON and YAML. To define a range of response codes, this field MAY contain the uppercase wildcard character X. For example, 2XX represents all response codes between [200–299]. Only the following range definitions are allowed: 1XX, 2XX, 3XX, 4XX, and 5XX. If a response is defined using an explicit code, the explicit code definition takes precedence over the range definition for that code.

This object MAY be extended with [Specification Extensions](#).

Responses Object Example

A 200 response for a successful operation and a default response for others (implying an error):

```

1. {
2.   "200": {
3.     "description": "a pet to be returned",
4.     "content": {
5.       "application/json": {
6.         "schema": {
7.           "$ref": "#/components/schemas/Pet"
8.         }
9.       }
10.      }
11.    },
12.   "default": {
13.     "description": "Unexpected error",
14.     "content": {
15.       "application/json": {
16.         "schema": {
17.           "$ref": "#/components/schemas/ErrorModel"
18.         }
19.       }
20.     }
21.   }
22. }
```

```

1. '200':
2.   description: a pet to be returned
3.   content:
4.     application/json:
5.       schema:
6.         $ref: '#/components/schemas/Pet'
7. default:
8.   description: Unexpected error
9.   content:
10.     application/json:
11.       schema:
12.         $ref: '#/components/schemas/ErrorModel'
```

> [Definitions](#)
[OpenAPI Document](#)
[Path Templating](#)
[Media Types](#)
[HTTP Status Codes](#)

[Specification](#)
[Appendix A: Revision History](#)

Response Object

Describes a single response from an API Operation, including design-time, static [links](#) to operations based on the response.

Fixed Fields

Field Name	Type	Description
------------	------	-------------



description	<code>string</code>	REQUIRED. A short description of the response. CommonMark syntax MAY be used for rich text representation.
headers	<code>Map[string, Header Object Reference Object]</code>	Maps a header name to its definition. RFC7230 states header names are case insensitive. If a response header is defined with the name " Content-Type ", it SHALL be ignored.
content	<code>Map[string, MediaType Object]</code>	A map containing descriptions of potential response payloads. The key is a media type or media_type_range and the value describes it. For responses that match multiple keys, only the most specific key is applicable. e.g. <code>text/plain</code> overrides <code>text/*</code>
links	<code>Map[string, Link Object Reference Object]</code>	A map of operations links that can be followed from the response. The key of the map is a short name for the link, following the naming constraints of the names for Component Objects .

This object MAY be extended with [Specification Extensions](#).

Response Object Examples

Response of an array of a complex type:

```

1. {
2.   "description": "A complex object array response",
3.   "content": {
4.     "application/json": {
5.       "schema": {
6.         "type": "array",
7.         "items": {
8.           "$ref": "#/components/schemas/VeryComplexType"
9.         }
10.      }
11.    }
12.  }
13. }
```

```

1. description: A complex object array response
2. content:
3.   application/json:
4.     schema:
5.       type: array
6.       items:
7.         $ref: '#/components/schemas/VeryComplexType'
```

Response with a string type:

```

1. {
2.   "description": "A simple string response",
3.   "content": {
4.     "text/plain": {
5.       "schema": {
6.         "type": "string"
7.       }
8.     }
9.   }
10. }
11. }
```

```

1. description: A simple string response
2. content:
3.   text/plain:
4.     schema:
5.       type: string
```

Plain text response with headers:

> [Definitions](#)
[OpenAPI Document](#)
[Path Templating](#)
[Media Types](#)
[HTTP Status Codes](#)
[Specification](#)
[Appendix A: Revision History](#)

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.   "text/plain": {
5.     "schema": {
6.       "type": "string"
7.     }
8.   },
9.   "headers": {
10.    "X-Rate-Limit-Limit": {
11.      "description": "The number of allowed requests in the current period",
12.      "schema": {
13.        "type": "integer"
14.      }
15.    },
16.    "X-Rate-Limit-Remaining": {
17.      "description": "The number of remaining requests in the current
18.      period",
19.      "schema": {
20.        "type": "integer"
21.      }
22.    },
23.    "X-Rate-Limit-Reset": {
24.      "description": "The number of seconds left in the current period",
25.      "schema": {
26.        "type": "integer"
27.      }
28.    }
29.  }
30. }
```

```

1. description: A simple string response
2. content:
3.   text/plain:
4.     schema:
5.       type: string
6.       example: 'whoa!'
7. headers:
8.   X-Rate-Limit-Limit:
9.     description: The number of allowed requests in the current period
10.    schema:
11.      type: integer
12.   X-Rate-Limit-Remaining:
13.     description: The number of remaining requests in the current period
14.     schema:
15.       type: integer
16.   X-Rate-Limit-Reset:
17.     description: The number of seconds left in the current period
18.     schema:
19.       type: integer
```

Response with no return value:

```

1. {
2.   "description": "object created"
3. }
```

1. description: **object** created

Callback Object

A map of possible out-of band callbacks related to the parent operation. Each value in the map is a [Path Item Object](#) that describes a set of requests that may be initiated by the API provider and the expected responses. The key value used to identify the callback object is an expression, evaluated at runtime, that identifies a URL to use for the callback operation.

Patterned Fields

Field Pattern	Type	Description
{expression}	Path Item Object	A Path Item Object used to define a callback request and expected responses. A complete example is available.

This object MAY be extended with [Specification Extensions](#).

Key Expression



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Request. A simple example might be `request.body#/url`. However, using a [runtime expression](#) the complete HTTP message can be accessed. This includes accessing any part of a body that a JSON Pointer [RFC6901](#) can reference.[Sign In](#)[Try Free](#)

For example, given the following HTTP request:

```

1. POST /subscribe/myevent?queryUrl=http://clientdomain.com/stillrunning
   HTTP/1.1
2. Host: example.org
3. Content-Type: application/json
4. Content-Length: 187
5.
6. {
7.     "failedUrl" : "http://clientdomain.com/failed",
8.     "successUrls" : [
9.         "http://clientdomain.com/fast",
10.        "http://clientdomain.com/medium",
11.        "http://clientdomain.com/slow"
12.    ]
13. }
14.
15. 201 Created
16. Location: http://example.org/subscription/1

```

The following examples show how the various expressions evaluate, assuming the callback operation has a path parameter named `eventType` and a query parameter named `queryUrl`.

Expression	Value
\$url	http://example.org/subscribe/myevent? queryUrl=http://clientdomain.com/stillrunning
\$method	POST
\$request.path.eventType	myevent
\$request.query.queryUrl	http://clientdomain.com/stillrunning
\$request.header.content-Type	application/json
\$request.body#/failedUrl	http://clientdomain.com/failed
\$request.body#/successUrls/2	http://clientdomain.com/medium
\$response.header.Location	http://example.org/subscription/1

Callback Object Example

The following example shows a callback to the URL specified by the `id` and `email` property in the request body.

```

1. myWebhook:
2.   'http://notificationServer.com?transactionId={$request.body#/id}&email=
   {$request.body#/email}':
3.   post:
4.     requestBody:
5.       description: Callback payload
6.       content:
7.         'application/json':
8.         schema:
9.           $ref: '#/components/schemas/SomePayload'
10.      responses:
11.        '200':
12.          description: webhook successfully processed and no retries will be
            performed

```

Example Object

Fixed Fields

Field Name	Type	Description
summary	<code>string</code>	Short description for the example.
description	<code>string</code>	Long description for the example. CommonMark syntax MAY be used for rich text representation.

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)



<code>value</code>	<code>Any</code>	Embedded literal example. The <code>value</code> field and <code>externalValue</code> field are mutually exclusive. To represent examples of media types that cannot naturally be represented in JSON or YAML, use a string value to contain the example, escaping where necessary.
<code>externalValue</code>	<code>string</code>	A URL that points to the literal example. This provides the capability to reference examples that cannot easily be included in JSON or YAML documents. The <code>value</code> field and <code>externalValue</code> field are mutually exclusive.

This object MAY be extended with [Specification Extensions](#).

In all cases, the example value is expected to be compatible with the type schema of its associated value. Tooling implementations MAY choose to validate compatibility automatically, and reject the example value(s) if incompatible.

Example Object Examples

In a model:

```

1. schemas:
2.   properties:
3.     name:
4.       type: string
5.     examples:
6.       name:
7.         $ref: http://example.org/petapi-
examples/openapi.json#/components/examples/name-example

```

In a request body:

```

1. requestBody:
2.   content:
3.     'application/json':
4.       schema:
5.         $ref: '#/components/schemas/Address'
6.       examples:
7.         foo:
8.           summary: A foo example
9.           value: {"foo": "bar"}
10.        bar:
11.           summary: A bar example
12.           value: {"bar": "baz"}
13.         'application/xml':
14.           examples:
15.             xmlExample:
16.               summary: This is an example in XML
17.               externalValue: 'http://example.org/examples/address-example.xml'
18.         'text/plain':
19.           examples:
20.             textExample:
21.               summary: This is a text example
22.               externalValue: 'http://foo.bar/examples/address-example.txt'

```

In a parameter:

```

1. parameters:
2.   - name: 'zipCode'
3.     in: 'query'
4.     schema:
5.       type: 'string'
6.       format: 'zip-code'
7.     examples:
8.       zip-example:
9.         $ref: '#/components/examples/zip-example'

```

In a response:

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)



```

4.   content:
5.     application/json:
6.       schema:
7.         $ref: '#/components/schemas/SuccessResponse'
8.       examples:
9.         confirmation-success:
10.          $ref: '#/components/examples/confirmation-success'

```

[Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

Link Object

The [Link object](#) represents a possible design-time link for a response. The presence of a link does not guarantee the caller's ability to successfully invoke it, rather it provides a known relationship and traversal mechanism between responses and other operations.

Unlike *dynamic* links (i.e. links provided **in** the response payload), the OAS linking mechanism does not require link information in the runtime response.

For computing links, and providing instructions to execute them, a [runtime expression](#) is used for accessing values in an operation and using them as parameters while invoking the linked operation.

Fixed Fields

Field Name	Type	Description
operationRef	string	A relative or absolute reference to an OAS operation. This field is mutually exclusive of the operationId field, and MUST point to an Operation Object . Relative operationRef values MAY be used to locate an existing Operation Object in the OpenAPI definition.
operationId	string	The name of an <i>existing</i> , resolvable OAS operation, as defined with a unique operationId . This field is mutually exclusive of the operationRef field.
parameters	Map[string, Any {expression}]	A map representing parameters to pass to an operation as specified with operationId or identified via operationRef . The key is the parameter name to be used, whereas the value can be a constant or an expression to be evaluated and passed to the linked operation. The parameter name can be qualified using the parameter location [{in}.]{name} for operations that use the same parameter name in different locations (e.g. path.id).
requestBody	Any {expression}	A literal value or {expression} to use as a request body when calling the target operation.
description	string	A description of the link. CommonMark syntax MAY be used for rich text representation.
server	Server Object	A server object to be used by the target operation.

This object MAY be extended with [Specification Extensions](#).

A linked operation MUST be identified using either an [operationRef](#) or [operationId](#). In the case of an [operationId](#), it MUST be unique and resolved in the scope of the OAS document. Because of the potential for name clashes, the [operationRef](#) syntax is preferred for specifications with external references.

Examples

Computing a link from a request operation where the `$request.path.id` is used to pass a request parameter to the linked operation.

[Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.   - name: id
5.     in: path
6.     required: true
7.     description: the user identifier, as userId
8.     schema:
9.       type: string
10.    get:
11.      responses:
12.        '200':
13.          description: the user being returned
14.          content:
15.            application/json:
16.              schema:
17.                type: object
18.                properties:
19.                  uuid: # the unique user id
20.                    type: string
21.                    format: uuid
22.                links:
23.                  address:
24.                    # the target link operationId
25.                    operationId: getUserAddress
26.                parameters:
27.                  # get the `id` field from the request path parameter named
28.                  # `id`
29.                  # the path item of the linked operation
30.                  /users/{userid}/address:
31.                  parameters:
32.                    - name: userid
33.                      in: path
34.                      required: true
35.                      description: the user identifier, as userId
36.                      schema:
37.                        type: string
38.                      # linked operation
39.                      get:
40.                        operationId: getUserAddress
41.                        responses:
42.                          '200':
43.                            description: the user's address

```

When a runtime expression fails to evaluate, no parameter value is passed to the target operation.

Values from the response body can be used to drive a linked operation.

```

1. links:
2.   address:
3.     operationId: getUserAddressByUUID
4.   parameters:
5.     # get the `uuid` field from the `uuid` field in the response body
6.     userUuid: $response.body#/uuid

```

Clients follow all links at their discretion. Neither permissions, nor the capability to make a successful call to that link, is guaranteed solely by the existence of a relationship.

OperationRef Examples

As references to `operationId` MAY NOT be possible (the `operationId` is an optional value), references MAY also be made through a relative `operationRef`:

```

1. links:
2.   UserRepositories:
3.     # returns array of '#/components/schemas/repository'
4.     operationRef: '#/paths/~12.0~1repositories~1{username}/get'
5.   parameters:
6.     username: $response.body#/username

```

or an absolute `operationRef`:

```

1. links:
2.   UserRepositories:
3.     # returns array of '#/components/schemas/repository'
4.     operationRef: 'https://na2.gigantic-
server.com/#/paths/~12.0~1repositories~1{username}/get'
5.   parameters:
6.     username: $response.body#/username

```

Runtime Expressions

Runtime expressions allow defining values based on information that will only be available within the HTTP message in an actual API call. This mechanism is used by [Link Objects](#) and [Callback Objects](#).

The runtime expression is defined by the following [ABNF](#) syntax

```

1.      expression = ("$url" | "$method" | "$statusCode" | "$request." source
| "$response." source )
2.      source = ( header-reference | query-reference | path-reference | body-
reference )
3.      header-reference = "header." token
4.      query-reference = "query." name
5.      path-reference = "path." name
6.      body-reference = "body" ["#" fragment]
7.      fragment = a JSON Pointer [RFC 6901]
     (https://tools.ietf.org/html/rfc6901)
8.      name = *( char )
9.      char = as per RFC [7159](https://tools.ietf.org/html/rfc7159#section-
7)
10.     token = as per RFC [7230](https://tools.ietf.org/html/rfc7230#section-
3.2.6)

```

The **name** identifier is case-sensitive, whereas **token** is not.

The table below provides examples of runtime expressions and examples of their use in a value:

Examples

Source Location	example expression	notes
HTTP Method	\$method	The allowable values for the \$method will be those for the HTTP operation.
Requested media type	\$request.header.accept	
Request parameter	\$request.path.id	Request parameters MUST be declared in the parameters section of the parent operation or they cannot be evaluated. This includes request headers.
Request body property	\$request.body#/use r/uuid	In operations which accept payloads, references may be made to portions of the requestBody or the entire body.
Request URL	\$url	
Response value	\$response.body#/st atus	In operations which return payloads, references may be made to portions of the response body or the entire body.
Response header	\$response.header.S erver	Single header values only are available

Runtime expressions preserve the type of the referenced value. Expressions can be embedded into string values by surrounding the expression with {} curly braces.

Header Object

The Header Object follows the structure of the [Parameter Object](#) with the following changes:

1. **name** MUST NOT be specified, it is given in the corresponding **headers** map.
2. **in** MUST NOT be specified, it is implicitly in **header**.
3. All traits that are affected by the location MUST be applicable to a location of **header** (for example, [style](#)).

Header Object Example

A simple header of type **integer**:

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)



```

4.   "type": "integer"
5. }
6. }
```

```

1. description: The number of allowed requests in the current period
2. schema:
3.   type: integer
```

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

Tag Object

Adds metadata to a single tag that is used by the [Operation Object](#). It is not mandatory to have a Tag Object per tag defined in the Operation Object instances.

Fixed Fields

Field Name	Type	Description
name	string	REQUIRED. The name of the tag.
description	string	A short description for the tag. CommonMark syntax MAY be used for rich text representation.
externalDocs	External Documentation Object	Additional external documentation for this tag.

This object MAY be extended with [Specification Extensions](#).

Tag Object Example

```

1. {
2.   "name": "pet",
3.   "description": "Pets operations"
4. }
```

```

1. name: pet
2. description: Pets operations
```

Reference Object

A simple object to allow referencing other components in the specification, internally and externally.

The Reference Object is defined by [JSON Reference](#) and follows the same structure, behavior and rules.

For this specification, reference resolution is accomplished as defined by the JSON Reference specification and not by the JSON Schema specification.

Fixed Fields

Field Name	Type	Description
\$ref	string	REQUIRED. The reference string.

This object cannot be extended with additional properties and any properties added SHALL be ignored.

Reference Object Example

```

1. {
2.   "$ref": "#/components/schemas/Pet"
3. }
```

```
1. $ref: '#/components/schemas/Pet'
```

Relative Schema Document Example

```

1. {
2.   "$ref": "Pet.json"
3. }
```

```
1. $ref: Pet.yaml
```



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```

2. "$ref": "definitions.json#/Pet"
3. }

```

```
1. $ref: definitions.yaml#/Pet
```

Schema Object

The Schema Object allows the definition of input and output data types. These types can be objects, but also primitives and arrays. This object is an extended subset of the [JSON Schema Specification Wright Draft 00](#).

For more information about the properties, see [JSON Schema Core](#) and [JSON Schema Validation](#). Unless stated otherwise, the property definitions follow the JSON Schema.

Properties

The following properties are taken directly from the JSON Schema definition and follow the same specifications:

- title
- multipleOf
- maximum
- exclusiveMaximum
- minimum
- exclusiveMinimum
- maxLength
- minLength
- pattern (This string SHOULD be a valid regular expression, according to the [ECMA 262 regular expression dialect](#))
- maxItems
- minItems
- uniqueItems
- maxProperties
- minProperties
- required
- enum

The following properties are taken from the JSON Schema definition but their definitions were adjusted to the OpenAPI Specification.

- type - Value MUST be a string. Multiple types via an array are not supported.
- allOf - Inline or referenced schema MUST be of a [Schema Object](#) and not a standard JSON Schema.
- oneOf - Inline or referenced schema MUST be of a [Schema Object](#) and not a standard JSON Schema.
- anyOf - Inline or referenced schema MUST be of a [Schema Object](#) and not a standard JSON Schema.
- not - Inline or referenced schema MUST be of a [Schema Object](#) and not a standard JSON Schema.
- items - Value MUST be an object and not an array. Inline or referenced schema MUST be of a [Schema Object](#) and not a standard JSON Schema. **items** MUST be present if the **type** is **array**.
- properties - Property definitions MUST be a [Schema Object](#) and not a standard JSON Schema (inline or referenced).
- additionalProperties - Value can be boolean or object. Inline or referenced schema MUST be of a [Schema Object](#) and not a standard JSON Schema. Consistent with JSON Schema, **additionalProperties** defaults to **true**.
- description - [CommonMark syntax](#) MAY be used for rich text representation.
- format - See [Data Type Formats](#) for further details. While relying on JSON Schema's defined formats, the OAS offers a few additional predefined formats.
- default - The default value represents what would be assumed by the consumer of the input as the value of the schema if one is not provided. Unlike JSON Schema, the value MUST conform to the defined type for the Schema Object defined at the same level. For example, if **type** is **string**, then **default** can be "**foo**" but cannot be **1**.

Alternatively, any time a Schema Object can be used, a [Reference Object](#) can be used in its place. This allows referencing definitions instead of defining them inline.

Additional properties defined by the JSON Schema specification that are not mentioned here are strictly unsupported.

Other than the JSON Schema subset fields, the following fields MAY be used for further schema documentation:

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)



Field Name	Type	Description
nullable	boolean	Allows sending a <code>null</code> value for the defined schema. Default value is <code>false</code> .
discriminator	Discriminator Object	Adds support for polymorphism. The discriminator is an object name that is used to differentiate between other schemas which may satisfy the payload description. See Composition and Inheritance for more details.
readOnly	boolean	Relevant only for Schema <code>"properties"</code> definitions. Declares the property as "read only". This means that it MAY be sent as part of a response but SHOULD NOT be sent as part of the request. If the property is marked as <code>readOnly</code> being <code>true</code> and is in the <code>required</code> list, the <code>required</code> will take effect on the response only. A property MUST NOT be marked as both <code>readOnly</code> and <code>writeOnly</code> being <code>true</code> . Default value is <code>false</code> .
writeOnly	boolean	Relevant only for Schema <code>"properties"</code> definitions. Declares the property as "write only". Therefore, it MAY be sent as part of a request but SHOULD NOT be sent as part of the response. If the property is marked as <code>writeOnly</code> being <code>true</code> and is in the <code>required</code> list, the <code>required</code> will take effect on the request only. A property MUST NOT be marked as both <code>readOnly</code> and <code>writeOnly</code> being <code>true</code> . Default value is <code>false</code> .
xml	XML Object	This MAY be used only on properties schemas. It has no effect on root schemas. Adds additional metadata to describe the XML representation of this property.
externalDocs	External Documentation Object	Additional external documentation for this schema.
example	Any	A free-form property to include an example of an instance for this schema. To represent examples that cannot be naturally represented in JSON or YAML, a string value can be used to contain the example with escaping where necessary.
deprecated	boolean	Specifies that a schema is deprecated and SHOULD be transitioned out of usage. Default value is <code>false</code> .

This object MAY be extended with [Specification Extensions](#).

Composition and Inheritance (Polymorphism)

The OpenAPI Specification allows combining and extending model definitions using the `allOf` property of JSON Schema, in effect offering model composition. `allOf` takes an array of object definitions that are validated *independently* but together compose a single object.

While composition offers model extensibility, it does not imply a hierarchy between the models. To support polymorphism, the OpenAPI Specification adds the `discriminator` field. When used, the `discriminator` will be the name of the property that decides which schema definition validates the structure of the model. As such, the `discriminator` field MUST be a required field. There are two ways to define the value of a discriminator for an inheriting instance.

- Use the schema name.
- Override the schema name by overriding the property with a new value. If a new value exists, this takes precedence over the schema name. As such, inline schema definitions, which do not have a given id, *cannot* be used in polymorphism.

XML Modeling

The `xml` property allows extra definitions when translating the JSON definition to XML. The [XML Object](#) contains additional information about the available options.

Schema Object Examples

Primitive Sample

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)



4. }

```
1. type: string
2. format: email
```

Simple Model

```
1. {
2.   "type": "object",
3.   "required": [
4.     "name"
5.   ],
6.   "properties": {
7.     "name": {
8.       "type": "string"
9.     },
10.    "address": {
11.      "$ref": "#/components/schemas/Address"
12.    },
13.    "age": {
14.      "type": "integer",
15.      "format": "int32",
16.      "minimum": 0
17.    }
18.  }
19. }
```

```
1. type: object
2. required:
3. - name
4. properties:
5.   name:
6.     type: string
7.   address:
8.     $ref: '#/components/schemas/Address'
9.   age:
10.    type: integer
11.    format: int32
12.    minimum: 0
```

Model with Map/Dictionary Properties

For a simple string to string mapping:

```
1. {
2.   "type": "object",
3.   "additionalProperties": {
4.     "type": "string"
5.   }
6. }
```

```
1. type: object
2. additionalProperties:
3.   type: string
```

For a string to model mapping:

```
1. {
2.   "type": "object",
3.   "additionalProperties": {
4.     "$ref": "#/components/schemas/ComplexModel"
5.   }
6. }
```

```
1. type: object
2. additionalProperties:
3.   $ref: '#/components/schemas/ComplexModel'
```

Model with Example

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.   "id": {
5.     "type": "integer",
6.     "format": "int64"
7.   },
8.   "name": {
9.     "type": "string"
10.  }
11. },
12. "required": [
13.   "name"
14. ],
15. "example": {
16.   "name": "Puma",
17.   "id": 1
18. }
19. }
```

```

1. type: object
2. properties:
3.   id:
4.     type: integer
5.     format: int64
6.   name:
7.     type: string
8. required:
9. - name
10. example:
11.   name: Puma
12.   id: 1
```

Models with Composition

```

1. {
2.   "components": {
3.     "schemas": {
4.       "ErrorModel": {
5.         "type": "object",
6.         "required": [
7.           "message",
8.           "code"
9.         ],
10.        "properties": {
11.          "message": {
12.            "type": "string"
13.          },
14.          "code": {
15.            "type": "integer",
16.            "minimum": 100,
17.            "maximum": 600
18.          }
19.        }
20.      },
21.      "ExtendedErrorNodeT": {
22.        "allOf": [
23.          {
24.            "$ref": "#/components/schemas/ErrorModel"
25.          },
26.          {
27.            "type": "object",
28.            "required": [
29.              "rootCause"
30.            ],
31.            "properties": {
32.              "rootCause": {
33.                "type": "string"
34.              }
35.            }
36.          }
37.        ]
38.      }
39.    }
40.  }
```



```
4.   type: object
5.     required:
6.       - message
7.       - code
8.     properties:
9.       message:
10.         type: string
11.       code:
12.         type: integer
13.         minimum: 100
14.         maximum: 600
15.       ExtendedErrorModel:
16.         allOf:
17.           - $ref: '#/components/schemas/ErrorModel'
18.           - type: object
19.             required:
20.               - rootCause
21.             properties:
22.               rootCause:
23.                 type: string
```

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

Models with Polymorphism Support

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```
4.   "Pet": {
5.     "type": "object",
6.     "discriminator": {
7.       "propertyName": "petType"
8.     },
9.     "properties": {
10.       "name": {
11.         "type": "string"
12.       },
13.       "petType": {
14.         "type": "string"
15.       }
16.     },
17.     "required": [
18.       "name",
19.       "petType"
20.     ]
21.   },
22.   "Cat": {
23.     "description": "A representation of a cat. Note that `Cat` will be
used as the discriminator value.",
24.     "allOf": [
25.       {
26.         "$ref": "#/components/schemas/Pet"
27.       },
28.       {
29.         "type": "object",
30.         "properties": {
31.           "huntingSkill": {
32.             "type": "string",
33.             "description": "The measured skill for hunting",
34.             "default": "lazy",
35.             "enum": [
36.               "clueless",
37.               "Lazy",
38.               "adventurous",
39.               "aggressive"
40.             ]
41.           }
42.         },
43.         "required": [
44.           "huntingSkill"
45.         ]
46.       }
47.     ],
48.   },
49.   "Dog": {
50.     "description": "A representation of a dog. Note that `Dog` will be
used as the discriminator value.",
51.     "allOf": [
52.       {
53.         "$ref": "#/components/schemas/Pet"
54.       },
55.       {
56.         "type": "object",
57.         "properties": {
58.           "packSize": {
59.             "type": "integer",
60.             "format": "int32",
61.             "description": "the size of the pack the dog is from",
62.             "default": 0,
63.             "minimum": 0
64.           }
65.         },
66.         "required": [
67.           "packSize"
68.         ]
69.       }
70.     ],
71.   }
72. }
```



> [Definitions](#)
[OpenAPI Document](#)
[Path Templating](#)
[Media Types](#)
[HTTP Status Codes](#)
[Specification](#)
[Appendix A: Revision History](#)

```

4.   type: object
5.     discriminator:
6.       propertyName: petType
7.       properties:
8.         name:
9.           type: string
10.          petType:
11.            type: string
12.            required:
13.              - name
14.              - petType
15.      Cat: ## "Cat" will be used as the discriminator value
16.      description: A representation of a cat
17.      allOf:
18.        - $ref: '#/components/schemas/Pet'
19.        - type: object
20.          properties:
21.            huntingSkill:
22.              type: string
23.              description: The measured skill for hunting
24.              enum:
25.                - clueless
26.                - lazy
27.                - adventurous
28.                - aggressive
29.            required:
30.              - huntingSkill
31.      Dog: ## "Dog" will be used as the discriminator value
32.      description: A representation of a dog
33.      allOf:
34.        - $ref: '#/components/schemas/Pet'
35.        - type: object
36.          properties:
37.            packSize:
38.              type: integer
39.              format: int32
40.              description: the size of the pack the dog is from
41.              default: 0
42.              minimum: 0
43.            required:
44.              - packSize

```

Discriminator Object

When request bodies or response payloads may be one of a number of different schemas, a **discriminator** object can be used to aid in serialization, deserialization, and validation. The discriminator is a specific object in a schema which is used to inform the consumer of the specification of an alternative schema based on the value associated with it.

When using the discriminator, *inline* schemas will not be considered.

Fixed Fields

Field Name	Type	Description
propertyName	string	REQUIRED. The name of the property in the payload that will hold the discriminator value.
mapping	Map[string, string]	An object to hold mappings between payload values and schema names or references.

The discriminator object is legal only when using one of the composite keywords **oneOf**, **anyOf**, **allOf**.

In OAS 3.0, a response payload MAY be described to be exactly one of any number of types:

```

1. MyResponseType:
2.   oneOf:
3.     - $ref: '#/components/schemas/Cat'
4.     - $ref: '#/components/schemas/Dog'
5.     - $ref: '#/components/schemas/Lizard'

```

which means the payload *MUST*, by validation, match exactly one of the schemas described by **Cat**, **Dog**, or **Lizard**. In this case, a discriminator MAY act as a "hint" to shortcut validation and selection of the matching schema which may be a costly operation, depending on the complexity of the schema. We can then describe exactly which field tells us which schema to use:



```

4.   - $ref: '#/components/schemas/Dog'
5.   - $ref: '#/components/schemas/Lizard'
6.   discriminator:
7.     propertyName: petType

```

The expectation now is that a property with name **petType** *MUST* be present in the response payload, and the value will correspond to the name of a schema defined in the OAS document. Thus the response payload:

```

1. {
2.   "id": 12345,
3.   "petType": "Cat"
4. }

```

Will indicate that the **Cat** schema be used in conjunction with this payload.

In scenarios where the value of the discriminator field does not match the schema name or implicit mapping is not possible, an optional **mapping** definition *MAY* be used:

```

1. MyResponseType:
2.   oneOf:
3.     - $ref: '#/components/schemas/Cat'
4.     - $ref: '#/components/schemas/Dog'
5.     - $ref: '#/components/schemas/Lizard'
6.     - $ref: 'https://gigantic-server.com/schemas/Monster/schema.json'
7.   discriminator:
8.     propertyName: petType
9.   mapping:
10.    dog: '#/components/schemas/Dog'
11.    monster: 'https://gigantic-server.com/schemas/Monster/schema.json'

```

Here the discriminator *value* of **dog** will map to the schema `#/components/schemas/Dog`, rather than the default (implicit) value of **Dog**. If the discriminator *value* does not match an implicit or explicit mapping, no schema can be determined and validation *SHOULD* fail. Mapping keys *MUST* be string values, but tooling *MAY* convert response values to strings for comparison.

When used in conjunction with the **anyOf** construct, the use of the discriminator can avoid ambiguity where multiple schemas may satisfy a single payload.

In both the **oneOf** and **anyOf** use cases, all possible schemas *MUST* be listed explicitly. To avoid redundancy, the discriminator *MAY* be added to a parent schema definition, and all schemas comprising the parent schema in an **allOf** construct *MAY* be used as an alternate schema.

For example:

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.   type: object
5.     required:
6.       - petType
7.     properties:
8.       petType:
9.         type: string
10.        discriminator:
11.          propertyName: petType
12.          mapping:
13.            dog: Dog
14.            Cat:
15.              allOf:
16.                - $ref: '#/components/schemas/Pet'
17.                - type: object
18.                  # all other properties specific to a 'Cat'
19.                  properties:
20.                    name:
21.                      type: string
22.                    Dog:
23.                      allOf:
24.                        - $ref: '#/components/schemas/Pet'
25.                        - type: object
26.                          # all other properties specific to a 'Dog'
27.                          properties:
28.                            bark:
29.                              type: string
30.                            Lizard:
31.                              allOf:
32.                                - $ref: '#/components/schemas/Pet'
33.                                - type: object
34.                                  # all other properties specific to a 'Lizard'
35.                                  properties:
36.                                    lovesRocks:
37.                                      type: boolean

```

a payload like this:

```

1. {
2.   "petType": "Cat",
3.   "name": "Misty"
4. }

```

will indicate that the `Cat` schema be used. Likewise this schema:

```

1. {
2.   "petType": "dog",
3.   "bark": "soft"
4. }

```

will map to `Dog` because of the definition in the `mappings` element.

XML Object

A metadata object that allows for more fine-tuned XML model definitions.

When using arrays, XML element names are *not* inferred (for singular/plural forms) and the `name` property SHOULD be used to add that information. See examples for expected behavior.

Fixed Fields

Field Name	Type	Description
name	string	Replaces the name of the element/attribute used for the described schema property. When defined within <code>items</code> , it will affect the name of the individual XML elements within the list. When defined alongside <code>type</code> being <code>array</code> (outside the <code>items</code>), it will affect the wrapping element and only if <code>wrapped</code> is <code>true</code> . If <code>wrapped</code> is <code>false</code> , it will be ignored.
namespace	string	The URI of the namespace definition. Value MUST be in the form of an absolute URI.
prefix	string	The prefix to be used for the <code>name</code> .



attribute	boolean	Declares whether the property definition translates to an attribute instead of an element. Default value is false .
wrapped	boolean	MAY be used only for an array definition. Signifies whether the array is wrapped (for example, <books><book/><book/></books>) or unwrapped (<book/><book/>). Default value is false . The definition takes effect only when defined alongside type being array (outside the items).

> [Definitions](#)
[OpenAPI Document](#)
[Path Templating](#)
[Media Types](#)
[HTTP Status Codes](#)
[Specification](#)
[Appendix A: Revision History](#)

This object MAY be extended with [Specification Extensions](#).

XML Object Examples

The examples of the XML object definitions are included inside a property definition of a [Schema Object](#) with a sample of the XML representation of it.

No XML Element

Basic string property:

```
1. {
2.   "animals": {
3.     "type": "string"
4.   }
5. }
```

```
1. animals:
2.   type: string
```

```
1. <animals>...</animals>
```

Basic string array property ([wrapped](#) is **false** by default):

```
1. {
2.   "animals": {
3.     "type": "array",
4.     "items": {
5.       "type": "string"
6.     }
7.   }
8. }
```

```
1. animals:
2.   type: array
3.   items:
4.     type: string
```

```
1. <animals>...</animals>
2. <animals>...</animals>
3. <animals>...</animals>
```

XML Name Replacement

```
1. {
2.   "animals": {
3.     "type": "string",
4.     "xml": {
5.       "name": "animal"
6.     }
7.   }
8. }
```

```
1. animals:
2.   type: string
3.   xml:
4.     name: animal
```

```
1. <animal>...</animal>
```

XML Attribute, Prefix and Namespace

In this example, a full model definition is shown.

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.   "properties": {
5.     "id": {
6.       "type": "integer",
7.       "format": "int32",
8.       "xml": {
9.         "attribute": true
10.      }
11.    },
12.    "name": {
13.      "type": "string",
14.      "xml": {
15.        "namespace": "http://example.com/schema/sample",
16.        "prefix": "sample"
17.      }
18.    }
19.  }
20. }
21. }
```

```

1. Person:
2.   type: object
3.   properties:
4.     id:
5.       type: integer
6.       format: int32
7.       xml:
8.         attribute: true
9.     name:
10.       type: string
11.       xml:
12.         namespace: http://example.com/schema/sample
13.         prefix: sample
```

```

1. <Person id="123">
2.   <sample:name
3.     xmlns:sample="http://example.com/schema/sample">example</sample:name>
4. </Person>
```

XML Arrays

Changing the element names:

```

1. {
2.   "animals": {
3.     "type": "array",
4.     "items": {
5.       "type": "string",
6.       "xml": {
7.         "name": "animal"
8.       }
9.     }
10.   }
11. }
```

```

1. animals:
2.   type: array
3.   items:
4.     type: string
5.     xml:
6.       name: animal
```

```

1. <animal>value</animal>
2. <animal>value</animal>
```

The external `name` property has no effect on the XML:

[› Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

```

4.   "items": {
5.     "type": "string",
6.     "xml": {
7.       "name": "animal"
8.     }
9.   },
10.  "xml": {
11.    "name": "aliens"
12.  }
13. }
14. }
```

```

1. animals:
2.   type: array
3.   items:
4.     type: string
5.     xml:
6.       name: animal
7.     xml:
8.       name: aliens
```

```

1. <animal>value</animal>
2. <animal>value</animal>
```

Even when the array is wrapped, if a name is not explicitly defined, the same name will be used both internally and externally:

```

1. {
2.   "animals": {
3.     "type": "array",
4.     "items": {
5.       "type": "string"
6.     },
7.     "xml": {
8.       "wrapped": true
9.     }
10.   }
11. }
```

```

1. animals:
2.   type: array
3.   items:
4.     type: string
5.     xml:
6.       wrapped: true
```

```

1. <animals>
2.   <animal>value</animal>
3.   <animal>value</animal>
4. </animals>
```

To overcome the naming problem in the example above, the following definition can be used:

```

1. {
2.   "animals": {
3.     "type": "array",
4.     "items": {
5.       "type": "string",
6.       "xml": {
7.         "name": "animal"
8.       }
9.     },
10.    "xml": {
11.      "wrapped": true
12.    }
13.  }
14. }
```

```

1. animals:
2.   type: array
3.   items:
4.     type: string
5.     xml:
6.       name: animal
7.     xml:
8.       wrapped: true
```



4. </animals>

Affecting both internal and external names:

```

1. {
2.   "animals": {
3.     "type": "array",
4.     "items": {
5.       "type": "string",
6.       "xml": {
7.         "name": "animal"
8.       }
9.     },
10.    "xml": {
11.      "name": "aliens",
12.      "wrapped": true
13.    }
14.  }
15. }
```

```

1. animals:
2.   type: array
3.   items:
4.     type: string
5.     xml:
6.       name: animal
7.     xml:
8.       name: aliens
9.     wrapped: true
```

```

1. <aliens>
2.   <animal>value</animal>
3.   <animal>value</animal>
4. </aliens>
```

If we change the external element but not the internal ones:

```

1. {
2.   "animals": {
3.     "type": "array",
4.     "items": {
5.       "type": "string"
6.     },
7.     "xml": {
8.       "name": "aliens",
9.       "wrapped": true
10.    }
11.  }
12. }
```

```

1. animals:
2.   type: array
3.   items:
4.     type: string
5.     xml:
6.       name: aliens
7.     wrapped: true
```

```

1. <aliens>
2.   <aliens>value</aliens>
3.   <aliens>value</aliens>
4. </aliens>
```

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

Security Scheme Object

Defines a security scheme that can be used by the operations. Supported schemes are HTTP authentication, an API key (either as a header, a cookie parameter or as a query parameter), OAuth2's common flows (implicit, password, application and access code) as defined in [RFC6749](#), and [OpenID Connect Discovery](#).

Fixed Fields

Field Name	Type	Applies To	Description
------------	------	------------	-------------



type	string	Any	REQUIRED. The type of the security scheme. Valid values are "apiKey", "http", "oauth2", "openIdConnect".
description	string	Any	A short description for security scheme. CommonMark syntax MAY be used for rich text representation.
name	string	apiKey	REQUIRED. The name of the header, query or cookie parameter to be used.
in	string	apiKey	REQUIRED. The location of the API key. Valid values are "query", "header" or "cookie".
scheme	string	http	REQUIRED. The name of the HTTP Authorization scheme to be used in the Authorization header as defined in RFC7235 .
bearerFormat	string	http ("bearer")	A hint to the client to identify how the bearer token is formatted. Bearer tokens are usually generated by an authorization server, so this information is primarily for documentation purposes.
flows	OAuth Flows Object	oauth2	REQUIRED. An object containing configuration information for the flow types supported.
openIdConnectUrl	string	openIdConnect	REQUIRED. OpenId Connect URL to discover OAuth2 configuration values. This MUST be in the form of a URL.

This object MAY be extended with [Specification Extensions](#).

Security Scheme Object Example

Basic Authentication Sample

```
1. {
2.   "type": "http",
3.   "scheme": "basic"
4. }
```

```
1. type: http
2. scheme: basic
```

API Key Sample

```
1. {
2.   "type": "apiKey",
3.   "name": "api_key",
4.   "in": "header"
5. }
```

```
1. type: apiKey
2. name: api_key
3. in: header
```

JWT Bearer Sample

```
1. {
2.   "type": "http",
3.   "scheme": "bearer",
4.   "bearerFormat": "JWT",
5. }
```

```
1. type: http
2. scheme: bearer
3. bearerFormat: JWT
```

Implicit OAuth2 Sample

> [Definitions](#)
[OpenAPI Document](#)
[Path Templating](#)
[Media Types](#)
[HTTP Status Codes](#)
[Specification](#)
[Appendix A: Revision History](#)



```

4.   "implicit": {
5.     "authorizationUrl": "https://example.com/api/auth/dialog",
6.     "scopes": {
7.       "write:pets": "modify pets in your account",
8.       "read:pets": "read your pets"
9.     }
10.   }
11. }
12. }
```

```

1. type: oauth2
2. flows:
3.   implicit:
4.     authorizationUrl: https://example.com/api/oauth/dialog
5.     scopes:
6.       write:pets: modify pets in your account
7.       read:pets: read your pets
```

> [Definitions](#)[OpenAPI Document](#)[Path Templating](#)[Media Types](#)[HTTP Status Codes](#)[Specification](#)[Appendix A: Revision History](#)

OAuth Flows Object

Allows configuration of the supported OAuth Flows.

Fixed Fields

Field Name	Type	Description
implicit	OAuth Flow Object	Configuration for the OAuth Implicit flow
password	OAuth Flow Object	Configuration for the OAuth Resource Owner Password flow
clientCredentials	OAuth Flow Object	Configuration for the OAuth Client Credentials flow. Previously called <code>application</code> in OpenAPI 2.0.
authorizationCode	OAuth Flow Object	Configuration for the OAuth Authorization Code flow. Previously called <code>accessToken</code> in OpenAPI 2.0.

This object MAY be extended with [Specification Extensions](#).

OAuth Flow Object

Configuration details for a supported OAuth Flow

Fixed Fields

Field Name	Type	Applies To	Description
authorizationUrl	<code>string</code>	<code>oauth2</code> (<code>"implicit"</code> , <code>"authorizationCode"</code>)	REQUIRED. The authorization URL to be used for this flow. This MUST be in the form of a URL.
tokenUrl	<code>string</code>	<code>oauth2</code> (<code>"password"</code> , <code>"clientCredentials"</code> , <code>"authorizationCode"</code>)	REQUIRED. The token URL to be used for this flow. This MUST be in the form of a URL.
refreshUrl	<code>string</code>	<code>oauth2</code>	The URL to be used for obtaining refresh tokens. This MUST be in the form of a URL.
scopes	<code>Map[string, string]</code>	<code>oauth2</code>	REQUIRED. The available scopes for the OAuth2 security scheme. A map between the scope name and a short description for it.



```

1. {
2.   "type": "oauth2",
3.   "flows": {
4.     "implicit": {
5.       "authorizationUrl": "https://example.com/api/oauth/dialog",
6.       "scopes": {
7.         "write:pets": "modify pets in your account",
8.         "read:pets": "read your pets"
9.       }
10.    },
11.    "authorizationCode": {
12.      "authorizationUrl": "https://example.com/api/oauth/dialog",
13.      "tokenUrl": "https://example.com/api/oauth/token",
14.      "scopes": {
15.        "write:pets": "modify pets in your account",
16.        "read:pets": "read your pets"
17.      }
18.    }
19.  }
20. }
```

```

1. type: oauth2
2. flows:
3.   implicit:
4.     authorizationUrl: https://example.com/api/oauth/dialog
5.     scopes:
6.       write:pets: modify pets in your account
7.       read:pets: read your pets
8.   authorizationCode:
9.     authorizationUrl: https://example.com/api/oauth/dialog
10.    tokenUrl: https://example.com/api/oauth/token
11.    scopes:
12.      write:pets: modify pets in your account
13.      read:pets: read your pets
```

Security Requirement Object

Lists the required security schemes to execute this operation. The name used for each property MUST correspond to a security scheme declared in the [Security Schemes](#) under the [Components Object](#).

Security Requirement Objects that contain multiple schemes require that all schemes MUST be satisfied for a request to be authorized. This enables support for scenarios where multiple query parameters or HTTP headers are required to convey security information.

When a list of Security Requirement Objects is defined on the [OpenAPI Object](#) or [Operation Object](#), only one of the Security Requirement Objects in the list needs to be satisfied to authorize the request.

Patterned Fields

Field Pattern	Type	Description
{name}	[string]	Each name MUST correspond to a security scheme which is declared in the Security Schemes under the Components Object . If the security scheme is of type "oauth2" or "openIdConnect", then the value is a list of scope names required for the execution. For other security scheme types, the array MUST be empty.

Security Requirement Object Examples

Non-OAuth2 Security Requirement

```

1. {
2.   "api_key": []
3. }
```

```
1. api_key: []
```

OAuth2 Security Requirement

```

1. {
2.   "petstore_auth": [
3.     "write:pets",
4.     "read:pets"
5.   ]
6. }
```

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)

Specification Extensions

While the OpenAPI Specification tries to accommodate most use cases, additional data can be added to extend the specification at certain points.

The extensions properties are implemented as patterned fields that are always prefixed by "`x-`".

Field Pattern	Type	Description
<code>^x-</code>	Any	Allows extensions to the OpenAPI Schema. The field name MUST begin with <code>x-</code> , for example, <code>x-internal-id</code> . The value can be <code>null</code> , a primitive, an array or an object. Can have any valid JSON format value.

The extensions may or may not be supported by the available tooling, but those may be extended as well to add requested support (if tools are internal or open-sourced).

Security Filtering

Some objects in the OpenAPI Specification MAY be declared and remain empty, or be completely removed, even though they are inherently the core of the API documentation.

The reasoning is to allow an additional layer of access control over the documentation. While not part of the specification itself, certain libraries MAY choose to allow access to parts of the documentation based on some form of authentication/authorization.

Two examples of this:

1. The [Paths Object](#) MAY be empty. It may be counterintuitive, but this may tell the viewer that they got to the right place, but can't access any documentation. They'd still have access to the [Info Object](#) which may contain additional information regarding authentication.
2. The [Path Item Object](#) MAY be empty. In this case, the viewer will be aware that the path exists, but will not be able to see any of its operations or parameters. This is different than hiding the path itself from the [Paths Object](#), so the user will not be aware of its existence. This allows the documentation provider to finely control what the viewer can see.

Appendix A: Revision History

Version	Date	Notes
3.0.2	2018-10-08	Patch release of the OpenAPI Specification 3.0.2
3.0.1	2017-12-06	Patch release of the OpenAPI Specification 3.0.1
3.0.0	2017-07-26	Release of the OpenAPI Specification 3.0.0
3.0.0-rc2	2017-06-16	rc2 of the 3.0 specification
3.0.0-rc1	2017-04-27	rc1 of the 3.0 specification
3.0.0-rc0	2017-02-28	Implementer's Draft of the 3.0 specification
2.0	2015-12-31	Donation of Swagger 2.0 to the Open API Initiative
2.0	2014-09-08	Release of Swagger 2.0
1.2	2014-03-14	Initial release of the formal document.
1.1	2012-08-22	Release of Swagger 1.1
1.0	2011-08-10	First release of the Swagger Specification

> [Definitions](#)

[OpenAPI Document](#)

[Path Templating](#)

[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)



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- [Definitions](#)
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[Media Types](#)

[HTTP Status Codes](#)

[Specification](#)

[Appendix A: Revision History](#)

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