VOSS Automate API Guide

Release 25.3

December 03, 2025

Legal Information

DOCUMENT ID: 20251203064239

Contents

1. Overview

1.1. Introduction

1.1.1. API Introduction

The secure and comprehensive API provides a single point of integration with multiple business systems that require information and use functionality exposed by the product, the underlying managed network and related products that are enabled by the core.

The REST-based API covers all functionality provided by the product and includes a comprehensive JSON-based schema with schema rules, metadata and data that simplifies integration.

Refer to the API Guide for more information on integrating with the VOSS Automate API.

For a reference of the schema and the operations applicable for each resource in the system, refer to the relevant API Reference. Resources are classified by the type of model in the system (data, device, domain, relation or view), for example `data/AccessProfile`, `device/cucm/Phone`, and so on. Depending on the installed modules and their feature packages, the API of feature package models may be available, for example `relation/Subscriber`, `view/QuickSubscriber`, and so on.

The product is fully integrated with external LDAP directories and SAML identity providers, allowing users to utilize existing identity management system to provide seamless access to portals developed using the product.

1.1.2. API System Concepts

To understand the API, it's important to understand two basic concepts

- Models
- Hierarchy

"Model" describes the types of JSON objects fulfilling purposes such as defining data structures, containing data, defining GUI forms, mapping data from devices or other models.

The system employs the following types of models:

- Data Models
- Device Models
- Domain Models
- Relations

- Views

Data in the system is represented using Data models and Device models.

Device models are generated from the application API of entities that are provisioned on devices.

Domain models, relations and views wrap the Data or Device models by means of references to them.

Data models can be created and are stored in the database. Data models contain a JSON schema/metadata for the entities exposed by the underlying database. The schemas for the data models are stored in the database and represent the structure that instances of the data model conforms to.

Device models interface with devices and services on the system. For example:

- Unified CM device models interface with the Call Manager's AXL SOAP API.
- CUC device models interface with Unity Connection's RESTful API.

The ability to rapidly develop and deploy new device interfaces provides an extensible mechanism to add support for additional provisioning tasks or additional southbound integration into other business systems. Domain models act as "containers" of other data-, device- and domain models along with provisioning workflows to represent the management of a created feature.

Relations do not store data on the system. Instead, they relate groups of resource types such as device models, data models or other domain models.

Views provide a mechanism to define an arbitrary schema, which can be used to define a user input screen.

1.1.3. Hierarchy

A system hierarchy node is present at first startup of the system.

Each entity attached to the hierarchy has an address, represented by a `pkid`, which is defined as a standard URI.

Hierarchies can be created under the system hierarchy node, because the hierarchy is exposed as a RESTful API. API calls are made with reference to the hierarchy.

1.1.4. Basic REST

The system uses a REST (Representational State Transfer) API.

For more information about this type of API, see http://en.wikipedia.org/wiki/Representational_state_transfer

1.1.5. API Traversal

The system represents the reference of an entity in the system as Hypermedia as the Engine of Application State (HATEOS). Each reference position is represented by an object pair pkid and href.

A client integrates with VOSS Automate entirely through hypermedia dynamically provided by the VOSS Automate application and does not need any prior knowledge about how to interact with the system other than a generic understanding of hypermedia. This means that no WADL is provided. This also means that the client and VOSS Automate can be decoupled in a way that allows VOSS Automate to evolve independently.

A client enters the VOSS Automate through a simple fixed URL. All future actions the client may take are discovered within resource representations returned from the server

The detailed URL tree endpoint information is available in the relevant API Reference Guides for the core and features.

This response emulates the HierarchyNode list response, and utilizes the parent and children in the meta references section of the response, as discussed in Meta Data References.

1.1.6. Request and Response Patterns

The request and response patterns between service requester and VOSS Automate is summarized below. For details, refer to the topics in the chapter called *Anatomy of an API Response*.

For synchronous operations:

1. Service Requestor sends a accessor (e.g. Get, List) request with request parameters to VOSS Automate.
2. Either:
    a. VOSS Automate responds synchronously with a Get/List response.
    b. VOSS Automate responds synchronously with a fault response.

For asynchronous operations:

1. Service Requestor sends a mutator (e.g. Add, Modify, Delete) request with parameters.
2. The Add/Update/Delete transaction is scheduled on the VOSS Automate transaction queue with a transactionID.
3. VOSS Automate responds synchronously with either:
    a. An Add/Update/Delete response and a transactionID.
    b. A fault response.
4. The external system either:
    a. Polls the system to retrieve the status of the transaction as needed, or
    b. Specifies a callback URL (with an optional username and password if the interface is secured (recommended)) and waits for a asynchronous transaction status callback (recommended).

    When the transaction completes, VOSS Automate sends an async transaction status callback message to the callback URL specified in the request.

1.2. Anatomy of an API Request

1.2.1. General Structure of the API

The VOSS Automate API accesses system resources or tools.

Resources

The general structure of an API URL for accessing a system resource (an endpoint) is:

Method https://servername/api/Resource/Action/?Parameters

Where:

Method

```
[GET|POST|DELETE|PUT|PATCH]
```

Servername

The installation server determines the base URL, e.g. `https://servername`. In a cluster environment, this is the address of the web proxy node. Refer to the Install Guide for cluster deployment information.

api

A static string in the URL that is a part of the endpoint.

Resource

```
(str:modeltype/str:modelname)[/pkid]
```

Refer to the relevant API Reference guides for a list of supported resources.

Action

For a complete list of actions supported for resources in the system and for a list of custom actions, refer to the relevant API Reference Guides.

Parameters

```
[(str:api parameter)[&(str:api parameter)...]]
```

The HTTP methods and parameters are described in relevant sections. The different resources supported in the system are described in the API Reference Guides.

Tools

The general structure of the URL structure for Tools is, for example:

[GET|POST] /api/tool/(str:tool_name)/

1.2.2. Format

The system API supports the following format HTTP headers when handling and responding to requests.

Field Name	Description	Value
Content-Type	The format type of the body of the request (used with POST and PUT requests)	application/json
Content-Type	The format type of the body of the request (used with PATCH requests)	application/json-patch+json
Accept	Content-Types that are acceptable in response	application/json

1.2.3. Authentication

The system controls access to its service through HTTP basic authentication. The technique is defined in section 11.1 of RFC1945, which is simple to implement, and uses standard HTTP headers.

The HTTP Basic Access Authentication requires authorization credentials in the form of a user name and password before granting access to resources in the system. The username and password are passed as Base64 encoded text in the header of API requests.

The HTTP header format for authentication is defined in the table below.

Field Name	Description	Value
Authorization	Basic authentication is supported.	Basic [Base64 encoded credentials]

Example:

The Base64 encoded credentials for user name of joe and a password of bloggs.

For example, from a command line (note the removal of the new line in the `echo` command):

```
$ echo -n "joe:bloggs" | base64
am9lOmJsb2dncw==
```

the header will be:

`Authorization:  Basic am9lOmJsb2dncw==`

For example, using **curl**:

```
curl -k -H "Authorization: Basic am9lOmJsb2dncw=="
  'https://hostname/api/data/MyModel/'
```

It is required that all requests be conducted over a secure session, such as HTTPS or SSL.

A VOSS Automate self-signed certificate needs to be installed into a local trust store of the client application.

1.2.4. Authorization

A user's access profile determines whether they can perform a given operation on a model. The user can also only access items below the position they are defined in the hierarchy.

1.2.5. HTTP Methods

The API supports the following HTTP methods:

GET

- Used to query a resource or a list of resource.

POST

- Used to create a new resource.
- The data is submitted as a JSON object.
- The return value is the pkid of the resource.

PUT

- Used to update the data of a resource.
- The resource URL includes the resource pkid.
- The data to be updated is submitted as a JSON object.

PATCH

- Used to update the data of a resource.
- PATCH request body in JSON Patch format
- Content-Type is "application/json-patch+json"
- JSON Patch: http://tools.ietf.org/html/rfc6902

DELETE

- Used to delete a resource.
- The resource URL includes the resource pkid.
- The DELETE method can also be used to delete multiple resources on one request as a "bulk delete".

1.2.6. PUT Versus PATCH

For PUT methods the resource data is replaced with the data specified in the request. All fields of the resource are replaced with the fields in the request.

This means that:

- Fields not present in the request that are present in the resource will be dropped from the resource.
- Fields present in the request that are not present in the resource will be appended to the resource.
- The data of fields present in the request is used to update fields that already exist in the resource.

PATCH methods operate in two modes depending on the content type:

- `Content type: application/json` The values of data fields present in the request is used to update the corresponding resource fields.

  This means:

  - Fields present in the request but not in the resource are appended to the resource.
  - The value of each field that is already present in the resource is updated from the request data.
  - Field values that are set to null in the request is dropped from the resource.
  - Fields that are present in the resource but not in the request are left untouched.
- `Content type: application/json-patch+json`

  Existing resource data is patched according to RFC6902.

Modifying Data Fields

- To drop the field from a data model, specify null as the parameter value (i.e. `{"field": null}`).
- To blank out a string value set the parameter value to an empty string (i.e. `{"field":""}`).

1.2.7. API Parameters

Note: VOSS Automate will not support API Backward Compatibility from release 21.1 and future releases. From release 21.1 forward, the following must be removed from API requests.

- API parameter: `api_version=<version_number>`
- Request header: `X-Version:<version_number>`

The hierarchy parameter is required for each API request and can be specified as any of the following:

- the pkid of the hierarchy node in the form of a UUID, for example `1c055772c0deab00da595101`
- in dot notation, for example `ProviderName.CustomerName.LocationName`

To obtain the pkid of a hierarchy node, refer to the `path` element in the metadata of `data/HierarchyNode` resource.

Note: For the purposes of simplifying the documentation, the hierarchy API parameter `&hierarchy=[hierarchy]` is not included in all examples in this document. Specifying the hierarchy is however required in all API requests where the instance pkid is not referenced. In the examples, `[hierarchy]` is substituted with the caller's hierarchy id.

Format

The system API supports the following request parameters for data format when handling requests.

Key	Description	Value
format	The format type of the body of the request	json

A request of the following format returns HTML:

```
GET /api/(str:model_type)/(str:model_name)/help/
```

A parameter `&format=json` is not displayed in all examples, but it is required for all requests unless a different format is specifically stated.

Configuration Template and Template Name

The Configuration Template can be specified in the POST request parameters for a resource as follows:

```
POST /api/(str:model_type)/(str:model_name)/&template_name=[CFG name]
```

Key	Description	Value
template	Apply the Configuration Template with pkid [CFG pkid] to the payload of the POST request.	[CFG pkid]
template_name	Apply the Configuration Template with name [CFG name] to the payload of the POST request.	[CFG name]

Field Display Policy

Field Display Policy can be specified in the GET request parameters for a resource as follows:

```
GET /api/(str:model_type)/(str:model_name)/add/
```

Key	Description	Value
policy	Return a model form schema where the Field Display Policy with pkid [FDP pkid] is applied to it. Use `policy` with the parameters `schema` and `format=json`.	[FDP pkid]
policy_name	Return a model form schema where the Field Display Policy with name [FDP name] is applied to it. Use `policy` with the parameters `schema` and `format=json`.	[FDP name]

Cached

The API can return cached data from the system or data from devices, using the following format:

```
GET /api/(str:model_type)/(str:model_name)/[pkid]/
```

Key	Description	Value	Default
cached	System will respond with resource information where the data was obtained from cache. (Functionally only applicable to device models and domain models containing device models)	true, false	true

Note: From 11.5.2 onwards, the API URL `cached` parameter on the Subscriber list (`/api/relation/Subscriber/`) will not be honoured. Data presented to the API will always display cached information and will not refresh the information from the device during a list query with `cached=false`.

Resource instance

To identify a single resource, the API call contains the single resource (pkid) using the following format:

```
GET /api/(str:model_type)/(str:model_name)/(pkid)/
```

Schema and Schema Rules

To obtain the schema or schema rules of a resource, use the following parameters to an API request:

```
GET /api/(str:model_type)/(str:model_name)/?
  hierarchy=[hierarchy]&schema=true&schema_rules=true
```

Key	Description	Value
schema	Return the schema of the resource. Use with the parameter `format=json`	true, false
schema_rules	Return the GUI Rules and Field Display Policies of the resource if available. Use with the parameters `format=json` and `schema` to see `schema_rules` in the response.	true, false

List pagination

The system API supports the following two tables of API request parameters when specifying the format of and structure of the resources to list.

- Pagination parameters

Key	Description	Value	Default
skip	The list resource offset. If the `Range` request header is used, it will override this parameter.		0
limit	The maximum number of resources returned. The maximum value is 2000. If the `Range` request header is used, it will override this parameter.	1-2000	50
count	Specify if the number of resources should be counted. If false, the `pagination` object in the response shows the `total` as 0, so no total is calculated and the API performance is improved.	true, false	true

List format

- List format parameters

Key	Description	Value	Default
order_by	The summary attribute field to sort on		First summary attribute
direction	The direction of the summary attribute field sort (asc:ascending, desc: descending)	asc, desc	asc
summary	Only summary data is returned in the data object	true, false	true
traversal	The direction of the resource lookup of resources tied to the hierarchy tree from the hierarchy node provided as parameter	up, down, local	down

Note: From 11.5.2 onwards for `api/relation/Subscriber`:

- The API URL `summary` parameter on the Subscriber list (`/api/relation/Subscriber/`) will not be honoured. Data presented to the API will always display summarized information and will not display full CUCM User data with `summary=false`.
- The API parameter `traversal=up` on the Subscriber list (`/api/relation/Subscriber/`) will not be honoured. Data presented to the API will default to display resources down the hierarchy tree with `traversal=up`.

Filter

Models that have the `list` action defined in their schema can also be filtered by using a number of URL filter parameters in parameter sets of four key-value pairs.

Filters also apply to the `api/tool/Transaction/` endpoint, which has additional filter functionality to filter by transaction ID. Refer to the topic on Filter Transactions.

These parameters can be added in addition to the parameters available to list resources as in the topic on API Parameters.

A single filter query can contain one or more sets of the following four parameters:

Key	Description	Value	Default
filter_field	The model attribute name to filter.	The name of the attribute in the list of `summary_attrs` in the model schema.	
filter_condition	The matching operator for the `filter_field`. If `equals` is used in a condition, then other filter sets are ignored.	One of the conditions below, applied to a `filter_text` string value. • `startswith` • `endswith` • `contains` • `notcontain` • `equals` • `notequal`	`contains`
filter_text	A text string applied to the `filter_field` by a `filter_condition`.	Plain text	
ignore_case	Additional specifier applied to the case of the `filter_text`.	Either `true` or `false`.	`true`

Example showing a single filter set:

```
GET /api/(str:model_type)/(str:model_name)/?
  hierarchy=[hierarchy]
  &filter_field=[attribute_name]
  &filter_condition=startswith
  &filter_text=John
  &ignore_case=false
```

Note: For `relation/Subscriber`, the list of `filter_field` values are restricted to:

- `userid`
- `firstname`
- `lastname`
- `mailid`
- `hierarchy_friendly_name`
- `device`
- `extension_mobility`
- `phone`

If more than one filter set is used, all similar keys are grouped, so that the key position indicates the filter set. For example:

```
GET /api/(str:model_type)/(str:model_name)/?
  hierarchy=[hierarchy]
  &filter_field=[attribute_name]
  &filter_field=[attribute_name2]
  &filter_condition=startswith
  &filter_condition=endswith
  &filter_text=John
  &filter_text=an
  &ignore_case=false
  &ignore_case=false
```

The two filter sets in this example, are:

- `&filter_field=[attribute_name]`
- `&filter_condition=startswith`
- `&filter_text=John`
- `&ignore_case=false`

and

- `&filter_field=[attribute_name2]`
- `&filter_condition=endswith`
- `&filter_text=th`
- `&ignore_case=false`

Synchronous and Asynchronous

It is possible to submit mutator type operations with API parameters to complete synchronously, in which case the synchronous response to the transaction either includes the status of the transaction or a fault response. This is not recommended as long-running transactions or a busy system may exceed the HTTP timeout.

This is only available for models where the actions in the meta data contains `support_async`.

Key	Description	Value	Default
nowait	Controls the API synchronous or asynchronous behavior for requests resulting in transactions. Please refer to the `support_async` property in the model schema under **meta** -> **actions**, for an indication of support per action.	true, false	false

Tags

To manage (add, remove) tags of a resource instance where the resource operations permissions allows tag management.

Key	Description	Value
tag	• Applies to resource instance (<instance_pkid>) • Uses +tag in URL • Resource operation enables Tag • API call is PATCH on resource instance	<tag_value> See below.

<tag_value> can be:

1. a tag name (no capital letters if tag should be searchable).
2. __CLEAR_TAG__<tag_name> to remove a tag <tag_name>.
3. __CLEAR_ALL_TAGS__ to remove all tags.

```
PATCH /api/(str:model_type)/(str:model_name)/<instance_pkid>/+tag/?
  hierarchy=[hierarchy]
  &tag=<tag_value>
```

Note: More than one tag parameter may be used, for example &tag=tag_one&tag=tag_two...

Example JSON export of meta object of an instance showing:

- tags: “mytag”, “another_tag”
- version_tag: “1.2”

```
"meta": {
              "tags": [
                  "mytag",
                  "another_tag"
              ],
              "pkid": "5ad5e4e3affa9343e4d9b140",
              "schema_version": "0.2.2",
              "hierarchy": "sys",
              "version_tag": "1.2",
              "model_type": "data/GeneralHelp"
          }
```

Version Tags

To manage (add, remove) tags of a resource instance where the resource operations permissions allows tag management.

Key	Description	Value
version_tag	• Applies to resource instance (<instance_pkid>) • Uses +tag_version in URL • Resource operation enables Version Tag • API call is PATCH on resource instance	<version_tag_value> for example 1.1, 1.2 ..

```
PATCH /api/(str:model_type)/(str:model_name)/<instance_pkid>/+tag_version/?
  hierarchy=[hierarchy]
  &version_tag=<version_tag_value>
```

Example JSON export of `meta` object of an instance showing:

- `tags`: “mytag”, “another_tag”
- `version_tag`: “1.2”

```
"meta": {
              "tags": [
                  "mytag",
                  "another_tag"
              ],
              "pkid": "5ad5e4e3affa9343e4d9b140",
              "schema_version": "0.2.2",
              "hierarchy": "sys",
              "version_tag": "1.2",
              "model_type": "data/GeneralHelp"
          }
```

1.2.8. Filter Parameters for Choices

For the context in which the filter parameter are used, refer to the Choices topic on the `/choices/` endpoint.

Format:

```
GET http://<server_address>/api/<resource_type>/<resource_name>/choices/
 ?hierarchy=[hierarchy]
 &format=json
 &<filter_parameters>
```

Response data of the `/choices/` endpoint *without* filter parameters is a list of value-title pairs of the business keys. This can be modified with filter parameters.

Example without `<filter_parameters>`:

- Request

```
GET http://<server_address>/api/data/Countries/choices/
 ?hierarchy=[hierarchy]
 &format=json
```

- Response

```
HTTP 200 OK
Vary: Accept
X-Request-ID: 9bcd77b4cd27dccd0f18a1d8d22e7ddab85aa848
Content-Type: text/html; charset=utf-8
Allow: GET, HEAD, OPTIONS
Response-Content:
{

    pagination : {
        direction :  asc,
        maximum_limit :  2000,
        skip :  0,
        limit :  0,
        total_limit :  ,
        total :  37
    },
    meta : {
        query :  /api/data/Countries/choices/,
        references : [
           {
               pkid :  5a16c3c68963f91b84baf357,
               href :  /api/data/Countries/5a16c3c68963f91b84baf357/
           },
           ...
        ]
    },
    choices : [
        {
            value :  ["Australia", "AUS", "hcs"],
            title :  ["Australia", "AUS", "hcs"]
        },
        ...
```

Filter parameters available to modify the response:

- `field`: specifies the field in the business key to return as title and value, for example adding the parameter below

```
&field=iso_country_code
```

would return:

```
choices : [
    {
        value :  ["AUS"],
        title :  ["AUS"]
```

(continues on next page)

(continued from previous page)

```
    },
    ...
```

- `choice_title`: specifies the field of the business key to be the `title` value, for example adding the parameter below

```
&field=iso_country_code
&choice_title=country_name
```

would return:

```
choices : [
    {
        value :  ["AUS"],
        title :  ["Australia"]
    },
    ...
```

- `title`: specifies the value of the `field` parameter to filter on, for example adding the parameter below

```
&field=iso_country_code
&title=BHR
&choice_title=country_name
```

would return:

```
choices : [
    {
        value :  ["BHR"],
        title :  ["Bahrain"]
    },
    ...
```

Note that the `title` parameter matches on the *start* of the value.

- `filter_condition`: For an *exact* match, the `&filter_condition=equals` parameter can be added, for example:

```
&filter_condition=equals
&field=iso_country_code
&choice_title=country_name
&title=N
```

returns no value:

```
choices  []
```

Without `filter_condition=equals`, in other words, with just:

```
&field=iso_country_code
&choice_title=country_name
&title=N
```

returns:

```
choices": [
{"value": "NLD", "title": "Netherlands"},
{"value": "NZL", "title": "New Zealand"}]
```

- `filter_field` and `filter_text`: the parameters are a field with value to filter on that is not the `field` parameter, for example to list only countries with `emergency_access_prefix:911`:

```
&field=iso_country_code
&choice_title=country_name
&filter_condition=equals
&filter_field=emergency_access_prefix
&filter_text=911
```

returns:

```
choices":[
{"value":"CAN","title":"Canada"},
{"value":"USA","title":"United States of America"}]
```

1.2.9. API Request Headers

Note: VOSS Automate will not support API Backward Compatibility from release 21.1 and future releases. From release 21.1 forward, the following must be removed from API requests.

- API parameter: `api_version=<version_number>`
- Request header: `X-Version:<version_number>`

API Headers are available for pagination of choices and macro results in an API call.

The headers are `X-range` and `Range`, with the starting value as 0. These override and can be used instead of the `skip` and `limit` API parameters.

For example, the following examples return the same results:

```
GET /api/tool/Macro/?method=evaluate
     &hierarchy=[hierarchy]
     &input={{fn.lines}}
     &skip=0
     &limit=6



GET /api/tool/Macro/?method=evaluate
```

(continues on next page)

(continued from previous page)

```
    &hierarchy=[hierarchy]
    &input={{fn.lines}}

    Request headers:

    X-Range: items=0-5
    Range: items=0-5
```

If the request is `items=0-199` (for 200 items) and there are more results, the response will show:

```
Content-Range:items 0-199/999999999
```

Since it is undetermined how many items there are, the value `999999999` represents the total.

In this example, we have a total of 298 items. if a subsequent request is for the next 200 items (200-399), this includes the total. The response will then also show the total number of items (298) returned by the macro:

```
Content-Range:items 200-399/298
```

Admin

All API requests for Automate Admin GUI to the Automate API include the following headers:

```
REQUEST-PORTAL: Automate Admin
PORTAL-TYPE: administration
```

Self-service

All API requests for Self-service to the Automate API include the following headers:

```
REQUEST-PORTAL: Automate Self-service
PORTAL-TYPE: end-user
```

From a VOSS Automate API perspective, the headers are coming from Self-service. However, from a browser perspective, the user will not see the headers in browser developer tools, since Self-service requests are terminated by a Node.js server on the VOSS platform. The header injection is done in Node.js.

Microsoft Azure Web Proxy servers

All API requests for Microsoft Azure Web Proxy servers require the `User-Agent` header (e.g. for `AzureTestClient`):

```
User-Agent: AzureTestClient
```

1.2.10. Login and Authorization Tokens

The API includes as part of responses a `X-CSRFToken` response header that is set to the CSRF token, for example to `KEMzraBRygy2ZJ7fLuvbfKhAEIPK9D4s`. API clients should source the CSRF token from this header.

For background on CSRF, see:

- Cross-site request forgery
- Cross-Site Request Forgery (CSRF)

The API also includes as a part of responses a `csrftoken` cookie containing the CSRF token. This cookie is marked `httponly` and as such is not readable by browser-based client scripts. API clients should not try to source the CSRF token from this cookie.

The `X-CSRFToken` response header and `csrftoken` cookie values are identical.

When performing requests that require CSRF token validation, API clients should follow the general procedure:

1. Prior to performing the principal request, perform a request to the API and retrieve a CSRF token from the resulting response's `X-CSRFToken` response header. The CSRF token remains constant for the duration of a session, so clients could perform this request once per session (post authentication), storing the CSRF token and using it for subsequent requests.

   Clients should also retrieve the `csrftoken` cookie from the response.

2. For the primary request, include a `X-CSRFToken` request header containing the CSRF token as sourced from the response header, as well as the unchanged `csrftoken` cookie.

Note: Cookies must conform to https://tools.ietf.org/html/rfc6265

Example for login:

```
GET http://localhost:8000/login/

Raw response headers:
Cache-Control: max-age=0
Connection: keep-alive
Content-Encoding: gzip
Content-Language: en-us
Content-Type: text/html; charset=utf-8
Date: Mon, 20 Apr 2015 09:18:47 GMT
Expires: Mon, 20 Apr 2015 09:18:47 GMT
Last-Modified: Mon, 20 Apr 2015 09:18:47 GMT
Server: nginx/1.4.6 (Ubuntu)
Set-Cookie: csrftoken=KEMzraBRygy2ZJ7fLuvbfKhAEIPK9D4s;
 SameSite=Lax;
 httponly;
 Path=/
sessionid=5d1ccc96cbd7e7f290020aaedd64c1b3; httponly; Path=/
sso_login_url=; Path=/
Transfer-Encoding: chunked
Vary: Accept-Encoding, Cookie, Accept-Language, X-CSRFToken
X-CSRFToken: KEMzraBRygy2ZJ7fLuvbfKhAEIPK9D4s
```

1. Source the CSRF token from response's `X-CSRFToken` header.
2. Retain the CSRF cookie from response's `csrftoken` cookie.
3. Now perform the primary POST /login/ request to login, including the CSRF token as a `X-CSRFToken` request header as well as the unchanged `csrftoken` cookie:

```
POST http://localhost:8000/login/

Raw request headers:
Host: localhost:8000
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.10; rv:37.0) Gecko/20100101␣
↪Firefox/37.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://localhost:8000/login/
Cookie: sessionid=5d1ccc96cbd7e7f290020aaedd64c1b3;␣
↪csrftoken=KEMzraBRygy2ZJ7fLuvbfKhAEIPK9D4s; sso_login_url=
Connection: keep-alive
X-CSRFToken: KEMzraBRygy2ZJ7fLuvbfKhAEIPK9D4s
```

With for example payload as parameters:

```
&username=joe
&password=bloggs
&next=%2F
```

Note: Anti-CSRF protection for Self-service is managed via the `XSRF-TOKEN` cookie and not the `csrftoken` cookie which is received on each request.

1.2.11. Non-interactive Login

The following request, parameter and endpoint is available on the API:

REQUEST:

```
POST <hostname>/noninteractivelogin/
```

PAYLOAD:

- `Content-Type: application/json`
- JSON containing user credentials, for example:

```
{
 "username":"joebloggs@email.com",
 "password":"mysecret"
}
```

PARAMETER:

A request parameter to expose hierarchy and role related data is available: `rbacinfo`

With the user credentials payload as above, the following calls result in the same response:

```
POST <hostname>/noninteractivelogin/
POST <hostname>/noninteractivelogin/?rbacinfo=false
POST <hostname>/noninteractivelogin/?rbacinfo=False
```

If the request is successful:

- the HTTP response is 200
- the JSON body is for example:

```
{
 "is_externally_authenticated": false,
 "last_successful_login_time": "2017-06-12T13:28:55.785Z",
 "num_of_failed_login_attempts": 0
}
```

X-CSRFToken VALUE

When enabling the `rbacinfo` parameter and with the same user credentials payload as above, the following calls result in the same response:

```
POST <hostname>/noninteractivelogin/?rbacinfo
POST <hostname>/noninteractivelogin/?rbacinfo=true
POST <hostname>/noninteractivelogin/?rbacinfo=True
POST <hostname>/noninteractivelogin/?rbacinfo=
```

If the request is successful:

- the HTTP response is 200
- the JSON body is for example:

```
{
 "hierarchy_path": "sys.Prov",
 "language": "en-us",
 "is_externally_authenticated": false,
 "hierarchy_name": "Prov",
 "hierarchy_href": "/api/data/HierarchyNode/593e8fa28719cf00060a7011/",
 "role_name": "ProvRole",
 "role_href": "/api/data/Role/593e91098719cf00060a7029/",
 "role_pkid": "593e91098719cf00060a7029",
 "last_successful_login_time": "2017-06-12T13:28:38.390Z",
 "hierarchy_type": "TestHierarchyNodeType",
 "hierarchy_pkid": "593e8fa28719cf00060a7011",
 "num_of_failed_login_attempts": 0
}
```

If a `data/PrivacyPolicy` instance is found at or above the logged in user's hierarchy, the data for the instance closest to that hierarchy will be included in the response JSON body:

```
{
 "privacy_policy": {
     "url": "<URL from data/PrivacyPolicy>",
```

(continues on next page)

(continued from previous page)

```
    "name": "<Name from data/PrivacyPolicy>"
},
"hierarchy_path": "sys.Prov",
"language": "en-us",
...
```

Note:

- Upon the first successful login, the `last_successful_login_time` is an empty string.
- Upon a subsequent successful login, the `last_successful_login_time` is the login time *prior* to current session.
- The `num_of_failed_login_attempts` value is reset to 0 after a successful login.

If the requests above fail:

- the HTTP response is 403
- the JSON body is:

```
{
 "error_message": "Please enter a valid username and password.",
 "error_code": 27009
}
```

- the X-CSRFToken value

1.2.12. Access Profiles

A logged in user is associated with an Access Profile that specifies access permissions to operations and models.

A user's Access Profile may not apply to models that are included or referenced in for example GUI Rules, Wizards or models that provide choices.

For example, when API calls are made to models that contain choices, such as:

```
GET api/data/DataSync/add/?schema_rules=&schema=&format=json
```

then any model GET calls that are carried out to provide the list of choices are shown with a generated `auth_token` that is required to provide access to these GET calls. This can be seen in the returned schema, for example, for the `target` call to show the choices available for `sync_order` in `data/DataSync` (`[hierarchy]` is substituted with the GET caller hierarchy ID.):

```
sync_order: {
target: "/api/data/ModelTypeList/choices/?hierarchy=[hierarchy]&
 field=name&format=json&
 auth_token=[auth_token]"
title: "Synchronization Order"
description: "The selected 'ordered' model type list that was created
as a model instance of the Model Type List. This list dictates the
```

(continues on next page)

(continued from previous page)

```
order in which models will be synchronized. See: Model Type List."
format: "uri"
choices: [ ]
target_attr: "name"
target_model_type: "data/ModelTypeList"
type: "string"
```

This `auth_token` parameter is required to provide authorization to access the `data/ModelTypeList`, which may not be available in a user's Access Profile.

In the VOSS Automate portal, the `auth_token` is extracted from the `target` in the schema snippet above and instead of a parameter, sent as an `Authorization` header.

1.2.13. Time to Live (TTL)

For client applications that use session-based authentication upon initial login, an API endpoint that extends (if possible) and reports the session lifetime is available. This endpoint is typically used for client-side session management, for example to display a pop up to warn the user to extend the session before it expires (as in the case of for example self-service).

```
POST <hostname>/api/session/keep_alive/
```

The request returns a payload in JSON format with details:

- max_age: The number of seconds remaining for the session.
- expiry: The date at which the session will expire.
- extendable: Boolean indicating if the client can extend the length of the session by triggering an API request.

An example response:

```
{
  max_age: 86296
  extendable: false
  expiry: "2015-03-18T10:24:53.059Z"
}
```

1.2.14. Account Endpoint

The `<hostname>/account` endpoint provides additional endpoints:

- `<hostname>/account/me/` : returns user details
- `<hostname>/account/password/` : allows for password management

Logged-in User Details

The following request and endpoint is available on the API to return logged-in user details:

- Request:

```
GET <hostname>/account/me/?format=json
```

If the request is successful:

- the HTTP response is 200
- the JSON body contains user account details, as shown in the example snippet below:


```
{
  "username": "CS-PAdmin",
  "menu_layout": {
    "pkid": "5c7daa2a7579050013878f83",
    "href": "/api/data/MenuLayout/5c7daa2a7579050013878f83/",
    "name": "HcsProviderMenu"
  },
  "language": "en-us",
  "landing_page": {
    "pkid": "5c7daa157579050013878d88",
    "href": "/api/data/LandingPage/5c7daa157579050013878d88/",
    "name": "HcsProviderLP"
  },
  "pkid": "5c7db7c5757905001387e6a1",
  "account_information": {
    "password_last_change_time": "2019-03-05T00:54:27.277Z",
    "last_login_time": "2019-03-05T08:01:11.184Z"
  },
  "hierarchy": {
    "pkid": "5c7db7b5757905001387e2d6",
    "node_type": "Provider",
    "href": "/api/data/HierarchyNode/5c7db7b5757905001387e2d6/",
    "name": "CS-P",
    "hierarchy_path": "sys.hcs.CS-P"
  },
  "theme": {
    "pkid": "5c7db13d757905001387c33b",
    "href": "/api/data/Theme/5c7db13d757905001387c33b/",
    "name": "default"
  },
  "role": {

  ...
```

Password Change

An API endpoint is available to request the details needed for a user password change and to submit a password change.

To get details of the POST request and the JSON schema of the payload to change the password, use the request:

```
GET https://hostname/account/password/change?hierarchy=[hierarchy]&format=json
```

To change a user password, the request will then be of the format:

```
POST https://hostname/account/password/change?hierarchy=[hierarchy]&format=json
```

The payload is in JSON format and contains user details, old password and new password.

A successful password change request returns a response of the format:

```
{"meta": {
     "uri": "/account/password/change/"
     },
     "success": true
}
```

The request format if a user changes their own password on the GUI, payload parameters include the token, for example:

```
csrfmiddlewaretoken=am9lOmJsb2dncw==
```

In this instance, the `user_pkid` a part of the payload, as it is hidden in the GUI.

For a successful password change from the GUI, the user's browser client is redirected to the endpoint:

```
https://hostname/account/password/change/done/
```

This presents the user with a message and request to log in with the new password.

1.3. Anatomy of an API Response

1.3.1. API Response Overview

Below are the typical elements of an API response:

- header - API header.
- meta - Meta data.
- data - Actual data contained in the model as name:value pairs.
- schema - Schema describing the structure of the data of the resource, in particular the data types of the names in the name:value pairs in the data.
- resources - An object grouping a list of single resource's meta and data objects in an API list response

- pagination - an object containing pagination data in an API list response

Not all the elements above exist in each response. These differ depending on request parameters and whether response contains a list of resource or a single resource.

1.3.2. API Response Header

The following is a header data example of an API response from an API request not using Basic Auth:

```
Date: Tue, 28 Jun 2022 12:17:22 GMT-1s
Content-Type:        text/html; charset=utf-8
Content-Length:      0 byte
Connection:  keep-alive
Content-Language:    en-us
Vary:        Accept-Language, Cookie
X-Request-Id:        b41b12575a97b6b16ca79451b1d5c94c7f488c0b
X-Request-Duration:  0.021724
Location:    /login/
X-Session-Id:        hy1y3y2nj1bm3kjnypfz1w24egvd4vbi
X-Session:   {"max_age": 1800, "extendable": true, "expiry": "2022-06-28T12:47:22.
↪346294+00:00"}
Set-Cookie: csrftoken=MnPzYbeItKcSyyysmHWyyypz3igZ79iy;
 SameSite=Lax;
 httponly;
 Path=/
Set-Cookie: sessionid=q150dg1ctpgc1sza3ktggyguo4nsbg5u;
 SameSite=Lax;
 httponly;
 Path=/
Referrer-Policy: strict-origin-when-cross-origin
Cache-Control:
Content-Security-Policy:     style-src 'unsafe-inline' 'self'; script-src 'unsafe-eval'
↪'self';
Strict-Transport-Security:   max-age=63072000
X-Content-Type-Options:      nosniff
X-Frame-Options:     SAMEORIGIN
X-XSS-Protection:    1; mode=block
```

- The `Set-Cookie` header entries with `csrftoken` and `sessionid` have `SameSite=Lax;` set to defend against Cross Site Request Forgery (CSRF) attacks.
- The `X-Session` header entry has the following properties:
  - `max_age`: The number of seconds remaining for the session.
  - `expiry`: The date at which the session will expire.
  - `extendable`: Boolean indicating if the client can extend the length of the session by triggering an API request.

  This information is also available from a POST call to the following endpoint:

  ```
  POST <hostname>/api/session/keep_alive/
  ```

  An example response JSON payload:

```
{
  max_age: 86296
  extendable: false
  expiry: "2015-03-18T10:24:53.059Z"
}
```

Refer to the section: Time to Live (TTL)

Note: This header is not present in responses from Basic Auth API requests.

1.3.3. Single Resource Response

A single resource response outline is as follows:

```
{
  "meta": {
    ...
  },
  "data": {
    ...
  },
  "schema": {
    ...
  }
}
```

The *schema* object is only returned for a single resource request when the *schema* request parameter is added to the request. Please see Response Elements

1.3.4. Resource List Response

The response object outline is as follows:

```
{
    "pagination": {
        ...
    },
    "meta": {
        ...
    },
    "resources": [{
        "meta": {
            ...
        },
        "data": {
            ...
        }
```

(continues on next page)

(continued from previous page)

```
    },
    {
        "meta": {
            ...
        },
        "data": {
            ...
        }
    }]
}
```

1.3.5. POST/PUT/DELETE/PATCH Response

Support for synchronous and asynchronous request resulting in transactions, is controlled by the `nowait` parameter in the request URL. The support for asynchronous request handling is indicated in the API schema structure **actions** with the `support_async` property.

The outline of the default synchronous transaction response of mutator transactions when the API parameter `nowait` is set to be false, is as follows:

```
{
  "pkid": "51f7e09bd0278d4b28e981da",
  "model_type": "data/CallManager",
  "meta": {
    "parent_id": {
      "pkid": "51f7d06ad0278d4b34e98134",
      "uri": "/api/data/HierarchyNode/51f7d06ad0278d4b34e98134"
    },
    "summary_attrs": [
      {
        "name": "description",
        "title": "Description"
      },
      {
        "name": "host",
        "title": "Host Name"
      },
      {
        "name": "port",
        "title": "Port"
      }
    ],
    "uri": "/api/data/CallManager/51f7e09bd0278d4b28e981da"
  },
  "success": true
}
```

The outline of the synchronous response to asynchronous mutator transactions when the API parameter `nowait` is set to be true, is as follows:

```
{
  "href": "/api/tool/Transaction/cfe8a8fd-98e6-4290-b0c3-2dfa2224b808",
  "success": true,
  "transaction_id": "cfe8a8fd-98e6-4290-b0c3-2dfa2224b808"
}
```

To retrieve (for example by polling) the transaction status of any mutator transactions, use the *transaction_id* in the synchronous response to the asynchronous mutator transaction as follows:

```
GET /api/tool/Transaction/cfe8a8fd-98e6-4290-b0c3-2dfa2224b808
```

The response contains the status ad replay action URL, for example:

```
{
 "meta": {
        "model_type": "tool/Transaction",
        "summary_attrs":
        {
         "name": "name",
         "title": "Name"
        },
        "references": {}
        "actions":
          {
           "replay": {
             "class": "execute",
             "href": "/api/tool/Transaction/cfe8a8fd-98e6-4290-b0c3-2dfa2224b808/
               replay?format=json",
             "method": "GET",
             "title": "Replay"
            }
          }
        }
 "data": {
       "status": "Completed",
       "username": "sysadmin",
       "resource": {
        "hierarchy: "sys",
        "after_transaction": "/api/data/GeneralHelp/5268c7d3a616540a766b91f5/?
          cached=5268f2eba616540a736b926c Entity",
        "current_state": "/api/data/GeneralHelp/5268c7d3a616540a766b91f5/ Entity",
        "before_transaction": "/api/data/GeneralHelp/5268c7d3a616540a766b91f5/
          ?cached=5268c7d3a616540a766b91f7 Entity",
        "pkid": "5268c7d3a616540a766b91f5",
        "model_type": "data/GeneralHelp",
       }
  [...]
```

This mechanism can be used to retrieve the transaction status of any transaction or its sub-transaction, using the pkid of the (sub) transaction.

For the View model, the GET call to `tool/Transaction/[trans pkid]` shows the View resource has no instance pkid, because a view model stores no instances.

1.3.6. Asynchronous Mutator Transaction Status Callback

When using the API parameter `nowait=true`, the service requester can submit optional request metadata - containing a callback URL - with any mutator request by appending the `request_meta` tag to the normal payload of the request.

To receive asynchronous transaction status notifications, the requesting system needs to publish an HTTP service to service requests made by the callback URL. An example of a simple http service is provided in a separate section.

The callback operation supports a `callback_auth_name` parameter that VOSS Automate uses to perform HTTP authentication on requests made to the callback service. This data is maintained in the `data/ApiCallbackAuth` model that allows for:

- Name (`callback_auth_name`)
- URL for the callback server
- Authorization type
- User name
- Password
- Token

The optional elements `external_id` and `external_reference` are explained in the section on correlation identifiers.

Example:

```
{
   <Actual request data goes here>,
   "request_meta": {
        "external_id": "3x4mpl3-3xtern4l-FF",
        "external_reference": "Example External Reference-FF",
        "callback_url": "http://my.callbackservice:8080",
        "callback_auth_name": "SNOW Integration"
     }
}
```

Note the following details:

- The schema of system resources or system tools do not include reference to the request meta data in the schema definition of each resource in the system.
- The `<Actual request data goes here>` request data needed to for example add a `country_name` instance for data/Countries would be similar to: `"country_name": "South Africa"`.
- The request data for deleting two countries for example would be

```
"hrefs":[
   "/api/data/Countries/534fdf190dd19012066433ce",
   "/api/data/Countries/534fda1d0dd1901206643397"
]
```

- For the callback service to function, the callback service needs to be accessible from the fulfillment server.

Upon completion of the asynchronous mutator transaction posted with a callback URL, VOSS Automate POSTs an HTTP request (asynchronous transaction status callback) to the callback service specified by the callback URL. The callback service needs to respond with a HTTP 200 ACK *before* internal processing of the callback. The callback includes the transaction ID sent to the requesting system as part of the synchronous response. To correlate the asynchronous transaction status callbacks with the original request, the requesting system would need to record the `transaction_id` returned in the synchronous response.

The HTTP headers and the payload of the asynchronous transaction status callback includes the following information:

HTTP headers:

```
{
    'accept-encoding': 'identity',
    'authorization': 'BasicdXNlcm5hbWU6cGFzc3dvcmQ=',
    'content-length': '275',
    'content-type': 'application/json',
    'host': 'localhost: 8080'
}
```

Payload:

```
{
    "external_id": "3x4mpl3-3xtern4l-FF",
    "external_reference": "ExampleExternalReference",
    "status": "Success",
    "transaction": {
        "href":
          "http: //my.fulfillmentserver/api/tool/
            Transaction/e6ac7c1e-c63a-11e3-9af5-080027916O5b/",
        "id": "e6ac7c1e-c63a-11e3-9af5-080027916O5b"
    }
}
```

Note the following details:

- Correlation identifiers (see correlation identifiers) are included in the payload if they are present.
- The status of the transaction is as in the transaction log: Fail or Success.

The transaction status in VOSS Automate is not affected by the response of the HTTP service published by the requesting system. The transaction log information includes the callback request and the response returned by the callback service published by the external system.

For transactions with multiple sub-transactions, a single transaction status callback request is made upon the completion of the parent transaction. Transaction status callbacks are not supported for the parent transactions tool/BulkLoad and tool/DataImport.

In the event that the transaction status callback is not received by the external system due to for example a network outage, the external system can poll to retrieve the transaction status. For example:

```
GET /api/tool/Transaction/e6ac7c1e-c63a-11e3-9af5-080027916O5b
```

Callbacks for failing transactions include error data as part of the callback body/payload. For example:

```
{u'authorization': 'Basic dXNlcm5hbWU6cGFzc3dvcmQ=',
 u'error': {u'code': 4001,
            u'http_code': 400,
            u'message': u'Error, Duplicate Resource Found.
             data/CallbackDataModel already exists with the following
              unique data - (name = "CallbackDataModel Name 2")'},
 u'external_id': u'3x4mpl3-3xt3rn4l-7d',
 u'external_reference': u'External Ref',
 u'resource': {u'hierarchy': u'542a7347c952703e3646a4c5',
               u'model_type': u'data/CallbackDataModel',
               u'pkid': u'542a7357c952703e3646a4da'},
 u'status': u'Fail',
 u'transaction': {u'href':
  u'http://django.testserver/api/tool/Transaction/844344ee-4881-11e4-a4f9-0800279e955b/',
                  u'id': u'844344ee-4881-11e4-a4f9-0800279e955b'}}
```

Error data, as shown in the example, includes:

- the exception code: 4001
- http error code: 400
- error message:

```
'Error, Duplicate Resource Found. data/CallbackDataModel already
exists with the following unique data - (name = "CallbackDataModel Name 2")'
```

This is the same error message structure as returned by the API for failing requests.

1.3.7. Example of an Asynchronous Mutator Transaction with nowait=true

Request:

```
POST http://172.29.232.238/api/data/Countries/
 ?hierarchy=[hierarchy]
 &nowait=true
Payload of the request:

{'country_name': 'Callback Created Example Country Name',
 'request_meta': {'callback_auth_name': 'SNOW Integration',
                  'callback_url': 'http://localhost:9365',
                  'external_id': '3x4mpl3-3xt3rn4l-7d',
                  'external_reference': 'External Ref'}}
```

Synchronous response:

```
{
href: "/api/tool/Transaction/e6ac7c1e-c63a-11e3-9af5-08002791605b"
success: true
transaction_id: "e6ac7c1e-c63a-11e3-9af5-08002791605b"
}
HTTP 202 ACCEPTED
```

Asynchronous transaction status callback (console output of the simple http service provided in the separate example section):

```
POST - 2014-04-17 16:16:43.737509


Headers:

{'accept-encoding': 'identity',
 'authorization': 'Basic dXNlcm5hbWU6cGFzc3dvcmQ=',
 'content-length': '275',
 'content-type': 'application/json',
 'host': 'localhost:8080'}


Raw Callback Body:

'{"status": "Fail", "transaction":
{"href":
   "http://django.testserver/api/tool/Transaction/
    34866060-fd47-11e3-88dd-080027880ca6/",
 "id": "34866060-fd47-11e3-88dd-080027880ca6"},
 "resource": {"hierarchy": "1c0efge2c0deab10da595101",
              "model_type": "data/Countries",
              "pkid": "53ac3d41c9527062809c0021"},
              "external_reference": "External Ref",
              "external_id": "3x4mpl3-3xt3rn4l-7d"}'

Pretty Callback Body:

{u'external_id': u'3x4mpl3-3xt3rn4l-7d',
 u'external_reference': u'External Ref',
 u'resource': {u'hierarchy': u'1c0efge2c0deab10da595101',
               u'model_type': u'data/Countries',
               u'pkid': u'53ac3d41c9527062809c0021'},
 u'status': u'Fail',
 u'transaction': {u'href':
   u'http://django.testserver/api/tool/Transaction/
    34866060-fd47-11e3-88dd-080027880ca6/',
                  u'id': u'34866060-fd47-11e3-88dd-080027880ca6'}}

localhost - - [17/Apr/2014 16:16:43] "POST / HTTP/1.1" 200 -
```

1.3.8. Correlation Identifiers

In order to allow an external system use its own identifiers to cross-reference transactions in the system, the API supports two external identifiers for all transactions. This allows the external system to:

1. Tie together multiple transactions in the system (using for example an order number)
2. Track individual requests in the system using the external IDs.

External identifiers are not supported for the parent transactions tool/BulkLoad and tool/DataImport.

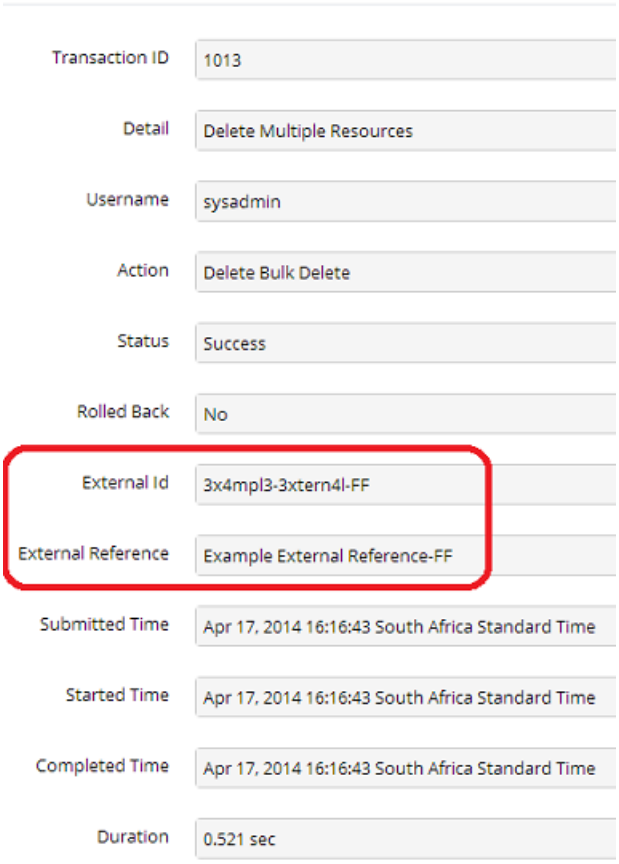
The transaction log will include these two IDs and the transaction log, as shown below.

You can obtain the details of the parent transaction with a given ID by using the following API call:

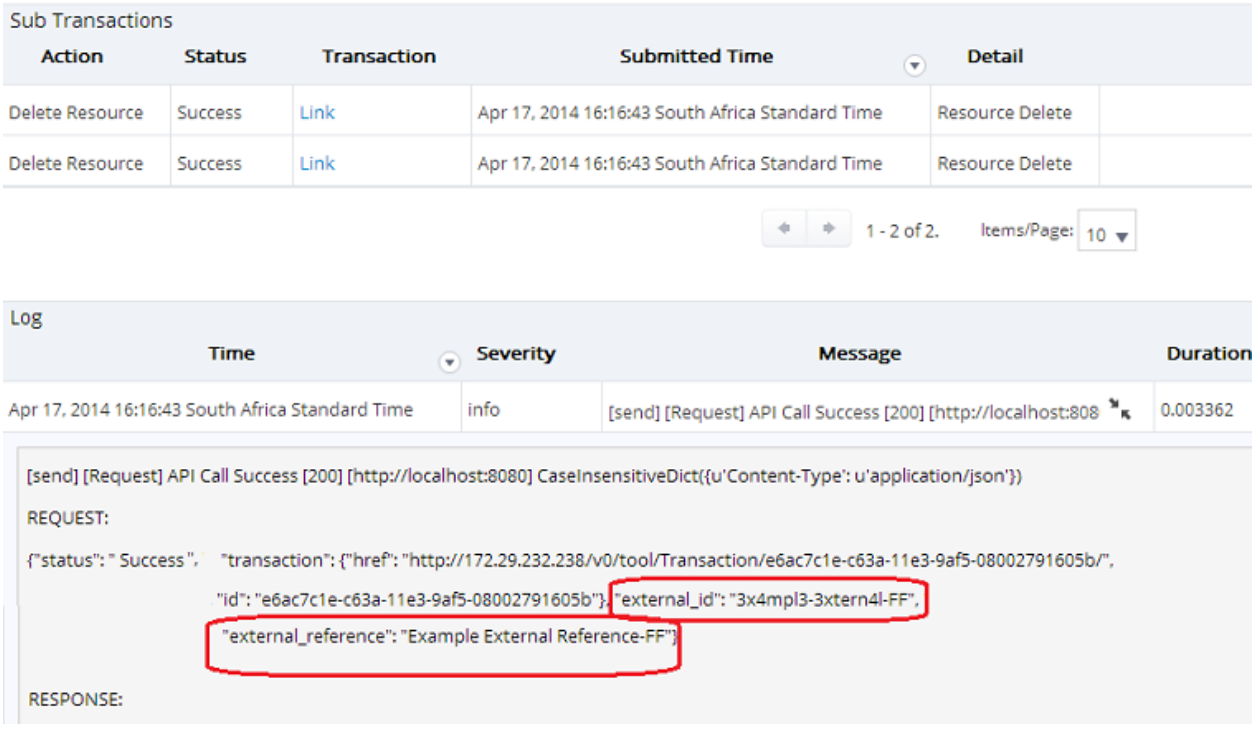
```
GET http://my.fulfillmentserver/api/tool/Transaction/
    ?hierarchy=[hierarchy]&
     filter_condition=contains&
     format=json&
     filter_text=3x4mpl3-3xtern4l-FF&
     filter_field=external.id
```

You can obtain the details of transactions tied together using an external reference number using the following API call:

```
GET http://my.fulfillmentserver/api/tool/Transaction/
 ?hierarchy=[hierarchy]&
     filter_condition=contains&
     format=json&
     filter_text=Example%20External%20Reference-FF&
     filter_field=external.reference
```



.



1.3.9. Example Of A Simple HTTP Server

The following code is an example of a simple HTTP server that can be used to test basic async transaction status callback operations. The code is not intended for actual use.

Note that the HTTP 200 ACK is sent asyncronously *before* internal processing of the callback.

```
#!/usr/bin/env python3
from datetime import datetime
import http.server
import socketserver
import logging
import json
from pprint import pprint
PORT = 8080
class ServerHandler(http.server.SimpleHTTPRequestHandler):
    def do_GET(self):
        http.server.SimpleHTTPRequestHandler.do_GET(self)
    def do_POST(self):
        self.send_response(200)
        self.wfile.write("ACK")
        # Insert internal processing here.
        # Below is an example of internal processing that simply prints out the
        # callback request.
        print("\nPOST - {}".format(datetime.now()))
        print("Headers:")
        pprint(dict(self.headers))
        print("\nRaw Body:")
        body = self.rfile.read(int(self.headers['Content-Length'])).decode('utf-8')
        pprint(body)
        print("\nPretty Body:")
        pprint(json.loads(body))

Handler = ServerHandler
httpd = socketserver.TCPServer(("", PORT), Handler)
print("Serving at port", PORT)
httpd.serve_forever()
```

2. Using the API

2.1. Developer Guidelines

The following practices are recommended to all developers. The aim is to reduce the number and extent of any updates that may be necessary.

1. The order of elements within the interface data and messages may change, within the constraints of the interface specification. Developers should avoid unnecessary dependence on the order of elements to interpret information exchanged with VOSS Automate.
2. New interface methods, operations, actions, requests, responses, headers, parameters, attributes, other elements, or new values of existing elements, may be introduced into the VOSS Automate interfaces. Developers should disregard or provide generic treatments where necessary for any unknown elements or unknown values of known elements encountered.
3. Notifications, operations, methods, actions, requests, responses, headers, parameters, attributes, and other elements from previous versions of VOSS Automate interfaces, will remain, and will maintain their previous meaning and behavior to the extent possible and consistent with the need to correct defects.
4. Applications should not be dependent on interface behavior resulting from defects (behavior not consistent with published interface specifications), since the behavior can change when defects are fixed.
5. The use of deprecated methods, operations, actions, handlers, requests, responses, headers, parameters, attributes, or other elements should be removed from applications as soon as possible to avoid issues when those deprecated items are removed from VOSS Automate or its interfaces.
6. Application Developers should be aware that not all new features and new supported devices (for example, phones) will be forward compatible. New features and devices may require application modifications to be compatible or to make use of the new features or devices.

2.2. Workflow Tasks

1. Log in with “hcsadmin@sys.hcs”, using the password that was set during the installation.
2. Get the Provider Name & Provider PKID using the data/HierarchyNode API in the url, where “hierarchy” = “sys.hcs”.
3. For all POST/PUT/DELETE operations to be asynchronous transactions, set the query param “nowait=true” in the URI.

   To create a provider admin, use the relation/User API in the url, with the hierarchy value that you receive in the GET call of Step-1 (PKID or the dot notation).

4. Creating a Reseller is not mandatory, and it depends on the structure of provisioning. A Reseller must be created if the tree structure of the provisioning is: Provider -> Reseller -> Customer -> Site.

   To create a Reseller use the relation/HcsResellerREL API, with the Provider hierarchy of the API of Step-1.

5. To create a Reseller Admin, use the relation/User API in the url, with the hierarchy value of the Reseller (PKID or the dot notation).

6. To create a Shared Network Device (Cisco Unified Communications Manager or Unity), it needs to be done either at either the Provider Hierarchy or the Reseller Hierarchy Level.

   Use the following APIs for each of the devices listed below:

Device	API
Cisco Unified Communications Manager	relation/HcsCallManagerREL
Unity	relation/HcsUnityConnectionREL
Presence	relation/HcsPresenceREL
WebEx	relation/HcsWebExREL

7. The Customer is directly under Provider if the deployment structure is Provider -> Customer -> Site or under the Reseller if the deployment structure is Provider ->Reseller ->Customer -> Site.

   To create a Customer, use the relation/HcsCustomerREL API, with the hierarchy of provider/reseller that can be retrieved using the respective API.

8. To create a Customer Admin, use the relation/User API in the url, with the hierarchy value of the Customer(PKID or the dot notation).

9. If the Customer is using “shared_uc_apps”, you cannot add dedicated devices for that customer.

   Adding a Dedicated Network Device for a Customer(Cisco Unified Communications Manager or Unity) needs to be done at the Customer hierarchy Level. Use the following APIs for each of the devices listed below:

Device	API
Cisco Unified Communications Manager	relation/HcsCallManagerREL
Unity	relation/HcsUnityConnectionREL
Presence	relation/HcsPresenceREL
WebEx	relation/HcsWebExREL

10. Once the devices are configured, a Network Device List (NDL) needs to be configured for the Customer. To create an NDL use the relation/HcsNetworkDeviceListREL API. At least one device is required to add an NDL.

11. It is not mandatory to have a Network Device List (NDL) to create a Site. However, an NDL is needed to add a Subscriber or Phone or Lines to a Site. Sites created without an NDL can later be able associated to one.

    To create a site, use the relation/HcsSiteREL API.

12. Using the relation/User API will only be local Cisco Unified Communications Domain Manager admin. To add an Admin who is also a Subscriber, use the relation/User API, which can later be moved to any Cisco Unified Communications Manager that is associated with the Site.

To create a Site Admin, use the relation/User API in the url, with the hierarchy value of the Site (PKID or the dot notation).

13. Complete the following activities at the Site level:
    a. To create a Subscriber use the relation/Subscriber API.
    b. To create a Line use the view/HcsDNMgmtVIEW API.
    c. To create a Phone use the relation/SubscriberPhone API.
    d. To create a Voicemail use the relation/Voicemail API.

2.3. Developer Tools

The Developer tools that are available in Mozilla Firefox and Google Chrome allow all the actions exposed by each API to be displayed as they are being called in the GUI. This gives us the opportunity to view the request and response actions as they occur, and provide the details of what each API provides and its relationship to the GUI.

With Developer tools enabled, the network tab of the Developer tools show the information that is contained in each request and response as you navigate and use the GUI. This allows service providers a direct view as to what data each API requires.

3. Handling API Fault Responses

3.1. Fault Responses

To interpret the HTTP fault responses codes and the response_code within the data element of a API response for a faulty request, refer to the list of possible error codes.

3.2. Error Messages

The tables below provide:

- an error code range reference
- message details of the error codes

To inspect application log messages from the command line, set the debug level on and view the app log. Refer to the Platform Guide for more details.

```
voss set_debug 1
log view voss-deviceapi/app.log
```

The message strings are shown in their template format: references to specific properties are shown as placeholders that are represented by {} .

Note: For AuthError codes, the following rules apply:

- For API version 11.5.3 and below, only the **AuthError_11_5_3** table messages apply.
- For API greater than 11.5.3, **AuthError** table messages override the corresponding **AuthError_11_5_3** table messages, while the unchanged **AuthError_11_5_3** table messages still apply.

RuleError	Message	HTTP Code
15000	Invalid hierarchy for this operation. Please select new hierarchy.	449
15001	Multiple devices found at this Hierarchy level. Please select device.	449
15002	Multiple network device lists (NDL) found at this Hierarchy. Please select a NDL.	449
15003	Network device list reference (NDLR) not found at this Hierarchy.	449
15004	Network device list (NDL) with pkid [{}] not found in available list. Please check NDL rule at the Hierarchy	400
15005	No network device lists (NDL) found at this Hierarchy.	449
15999	Error, (UNHANDLED_ERROR)	400

TransactionError	Message	HTTP Code
23000	Unable to determine Transaction ID.	400
23001	Transaction must be registered with valid user details.	400
23002	Transaction not found.	404
23003	Transaction must be viewed with valid user details.	400
23004	{} (MAX_INSTANCES_EXCEEDED)	400
23005	Invalid Transaction State: {}	400
23006	Transaction canceled.	400
23007	Transaction must be registered with the hierarchy in which it is executing.	400
23008	Transaction must be registered with model_type if pkid is provided.	400
23010	The current filter caused a long running request. Please add more filter fields, use Case Sensitive or change the criteria types to one of {}.	400
23011	Invalid choices field [{}].	400
23012	The [{0}] condition on field [{1}], is not allowed.	400
23013	Invalid start and end date range provided in filter.	400
23014	Invalid start and end ID range provided in filter.	400
23015	Invalid ID value in filter	400
23999	Error, {} (UNHANDLED_ERROR)	400

ListUtilError	Message	HTTP Code
20000	Invalid query dictionary, expected 1 key!	400
20999	Error, (UNHANDLED_ERROR)	400

AllError	Message	HTTP Code
999999	All Error	400

ForeignKeyError	Message	HTTP Code
24000	Could not resolve foreign key to {model_type} with {attr_name}: {attr_value}.	400
24999	Error, {} (UNHANDLED_ERROR)	400

ChoicesError	Message	HTTP Code
26000	Instance context for choices not valid, instance: {instance}	400
26999	Error, {} (UNHANDLED_ERROR)	400

CnfError	Message	HTTP Code
40000	Device change notifications are not supported for device {}.	400
40001	Device change notification data for device {} has been lost. Tracking data has been repaired and collector process will continue. Some changes may have been lost, please run a full sync on the device.	400
40002	Device change notification tracking data for device {} has become corrupted. Tracking data has been repaired and collector process will continue. Some changes may have been lost, please run a full sync on the device.	400
40003	Device change notification tracking DB write for device {} failed. The collector process will continue to attempt DB writes. Please investigate the database write failure. {}	400
40004	Device change notification data DB write for device {} failed. The collector process will continue to attempt DB writes. Please investigate the database write failure. {}	400
40005	Unable to repair device change notification tracking data for device {}. {}	400
40006	Too many unprocessed changes recorded for device {}. No new changes will be recorded until at least {} changes are processed. Please configure and run the necessary data syncs.	400
40008	Could not update pending changes data for device {}. {}.	400
40010	Unable to clear device change notifications for device {}. {}.	400

PackageError	Message	HTTP Code
17000	Unable to load package. Package ({}) depends on ({}) but it does not exist.	400
17001	Unable to load package. Package ({}) requires ({} {}) but {} is currently loaded.	400
17999	Unable to load package. {}	400

CascadeDeleteError	Message	HTTP Code
13000	Hierarchy path or pkid required	400
13001	Could not delete {} out of {} resources.	400
13002	Could not move the following resources that failed to delete: {}.	400
13999	Error, (UNHANDLED_ERROR)	400

WebExError	Message	HTTP Code
31000	[{}] Site Name or Site ID must at least be specified	400

CertificateError	Message	HTTP Code
25001	Certificate request cannot be exported while 'Generate Certificate Signing Request' is not set.	400
25002	Certificate can only be imported when 'Generate Certificate Signing Request' is set.	400
25003	Certificate upload failed.	400
25004	Uploaded file is not a certificate in .pem format.	400
25005	The SSL certificate expired.	400
25006	Public key cannot be exported while 'Generate Certificate Signing Request' is set.	400
25999	Error, {} (UNHANDLED_ERROR)	400

FileUploadError	Message	HTTP Code
39000	Can not determine supported file extensions.	400
39001	'{}' does not have a valid file extension.	400
39002	File is too large. Maximum permitted file size is {} bytes.	400

BulkLoadError	Message	HTTP Code
10000	File Upload Error for File Name : ({})	400
10001	File Encoding Error : ({})	400
10002	Only valid Excel xlsx files are accepted	400
10003	General Error; ({})	400
10004	{success} out of {total} items loaded successfully.	400
10005	Resource data was not found in worksheet '{worksheet}'.	400
10006	Both parallel and serial are not allowed in '{worksheet}'.	400
10007	Differing parallel_transaction_limit values are not allowed in '{worksheet}'.	400
10008	Invalid value of '{limit}' for parallel_transaction_limit header in '{worksheet}', should be left blank or a number between 1 and 100(inclusive).	400
10010	Data does not conform to schema; ({})	400
10011	Hierarchy not specified for row with data; ({})	400
10012	'{user}' is not permitted access to resources at '{hierarchy}'.	403
10020	Hierarchy '{hierarchy}' was not found.	400
10021	Action '{action}' not allowed.	400
10022	Action '{action}' not allowed for model '{model}'.	400
10030	User '{username}' is not allowed to {operation} {model_type}.	403
10040	Fields do not exist in {model}: {fields}.	400
10041	No search fields specified in row.	400
10042	More than one resource found. Search fields '{search}'.	400
10043	Resource not found. Search fields '{search}'.	400
10044	Malformed search fields: {fields}.	400
10045	Malformed fields{message}: {fields}.	400
10046	Can not find meta actions for specified resource instance.	400
10047	Malformed entity header '{header}' in cell '{cell}' worksheet '{sheet}'.	400
10050	Can not enforce data type '{data_type}' on '{data}'. Row data: {row_data}	400
10051	An internal error occurred while processing workbook '{filename}'{note}	400
10052	The specified meta_prefix '{meta_prefix}' in sheet '{sheet_name}' is invalid.	400
10053	The specified meta_prefix '{meta_prefix}' in sheet '{sheet_name}' was not found in base headers.	400
10054	The following base headers '{headers}' in '{sheet_name}' are prefixed, but meta_prefix is not specified.	400
10061	No match for device '{device}'.	400
10062	XLSX File Error: ({})	400

CnfWarning	Message	HTTP Code
45000	Unprocessed changes at 75%% of limit for device {}. Please configure and run the necessary data syncs.	400

DataSyncError	Message	HTTP Code
29000	Could not find user executing data sync operation.	500
29001	User [{}] does not have {} {} permissions.	403
29002	Could not establish a test connection to the device. Verify that your device connection details are correct.	400
29003	Aborting operation. Reason: {}	400
29004	{} (CRITICAL_SUBTRANSCATION_ERROR)	400
29005	Auth Error while testing connection to device	400
29999	Error, {} (UNHANDLED_ERROR)	500

WorkflowError	Message	HTTP Code
7000	Workflow not found	400
7001	Maximum workflow recursion depth exceeded	400
7002	Invalid workflow script identifier {}	400
7003	Specified workflow script name {} not found	400
7004	Error looking up workflow script names against API	400
7005	Invalid workflow action	400
7006	{} (FAILED)	400
7007	Advanced Find Options invalid - Resource not found with options {}	400
7008	{} (CONDITION_CONSTRAINT)	400
7009	Advanced Find Options invalid - More than one resource found with options {}	400
7010	Network Device List {} does not contain an entry for type {}	400
7011	Workflow operation Sync not supported for type {}	400
7012	No target device found for Workflow Sync operation	400
7999	Unexpected error occurred.	400

ExpectError	Message	HTTP Code
35000	The expect binary is not present in the path on the server	500
35001	There was an error executing the expect script : {}	500

ResourceError	Message	HTTP Code
4000	Error, Cannot delete Hierarchy until all resources under it are removed	400
4001	Error, Duplicate Resource Found. {}	400
4002	Resource Not Found {}	404
4003	Failed to save {}. {}	400
4004	Failed to save {}. {}	400
4005	Model Type cannot be None when adding a new Resource	400
4006	Resource Parent {} not found	400
4007	Resource Meta structure corrupt for {}	400
4008	Cannot create a Resource without a Parent Hierarchy	400
4009	Failed to save {}. {}	400
4010	Cannot find Resource relation {}	400
4011	Cannot find target device for model type {} in current hierarchy context	400
4012	Cannot find summary attr [{}] in schema root	400
4013	Cannot perform operation, model {} already has one or more instances	400
4014	Cannot perform operation, resource is part of domain model {}	400
4015	Resource Meta structure corrupt. {}	400
4016	Badly-formed schema; ‘properties’ missing for data type ‘object’	400
4017	Cannot perform operation, model {} is already referenced by one or more resources: {}	400
4018	Failed to execute {}. {}	400
4019	One or more errors occurred during import	400
4020	Transaction resource failed with errors {}	400
4021	Resources are not of the same type	400
4022	Model type for Resources not found	400
4023	Cannot move Hierarchy Node {} to {}	400
4024	Resource move failed with error {}	400
4025	Invalid business key {}, expected {}	400
4026	Cascade delete failed with error {}	400
4027	Invalid business key for import. Did not expect path, found {}.	400
4028	Resource move failed, Device at source hierarchy [{}] is different from the target hierarchy [{}]	400
4029	Resource [{}] cannot be accessed by user [{}]	403
4030	Cannot perform operation. Hierarchy Node Type [{}] is reserved.	400
4031	Search index is not up to date. Please notify your administrator before proceeding	400
4032	Attempting to create hierarchy node ‘{}’ is not permitted.	403
4033	Could not update reference cache, from: {}, reference: {}, error: {}	403
4034	Resource move failed, hierarchy [{}] of type [{}] does not contain an NDLR	400

continues on next page

Table 2 – continued from previous page

ResourceError	Message	HTTP Code
4035	CCM User Group [{}] not allowed.	400
4999	Unhandled Resource Error	400

MacroError	Message	HTTP Code
6000	Template must be a dictionary - got {}	400
6001	No hierarchy supplied	400
6002	Invalid macro specified: {}	400
6003	Macro lookup of {} failed at hierarchy {}	400
6004	Macro lookup of {} returned multiple values {} at hierarchy {}	400
6005	Macro lookup of {} failed when fetching from {} at hierarchy {}	400
6006	Macro lookup failed for field {} in context {}	400
6007	Macro lookup failed for field {} in context {}, type str or int expected not type dict {}	400
6008	Macro function {} not found	400
6009	Macro function arguments error - {}	400
6010	Macro function error - {}	400
6011	Unexpected business key format - {}	400
6012	Conditional Logic error occurred - {}	400
6013	Custom Macro function {} not found	400
6014	Custom Macro function {} not secure or contains invalid strings	400
6015	Could not parse the WhereClause Error:{} WhereClause:{} Please check quotation	400
6016	Lookup field {} not supported/permitted.	400
6017	Filter field: {} not in fields: {}.	400
6018	Incorrect hierarchy direction, {}. Allowed: {}.	400
6019	Error in macro function '{}' - {}	400
6999	Error, (UNHANDLED_ERROR)	400

InternalError	Message	HTTP Code
1000	Cannot import Python model name {}	404
1001	Python Type error	400
1002	{} must be an integer	400
1003	Improperly configured settings, {}	400

GraphLookupError	Message	HTTP Code
37000	Cannot perform operation, Resource with pkid [{}] cannot be accessed.	403

AuthError	Message	HTTP Code
27000	{} (INCORRECT_PASSWORD_ERROR)	401
27001	{} (PASSWORD_VERIFICATION_ERROR)	401
27009	Please enter a valid username and password.	401
27013	External (SSO or LDAP) authentication is required.	401
27014	Please enter valid answers to security questions.	401
27024	Login not allowed currently. Please contact your administrator.	403

ModelError	Message	HTTP Code
5000	[{}] Child model exists; ({})	400
5001	[{}] Model already exists; ({})	400
5002	One or more data sync errors occurred; ({})	400
5003	[{}] The helper cannot instantiate a model it does not recognize; ({})	400
5004	[{}] The specified resource could not be found; ({})	404
5005	[{}] A single model instance was expected but more than one was found; ({})	404
5006	[{}] Attempt to modify a read-only model failed; ({})	400
5007	[{}] Attempt to modify a read-only model field failed; ({})	400
5008	[{}] Data does not conform to schema; {}	400
5009	[{}] Validation failed; {}	400
5010	[{}] Error manipulating schema; ({})	400
5011	[{}] Error generating schema; ({})	400
5012	[{}] Invalid foreign key to {} for business keys {}	400
5013	[{}] Badly-formed schema; ({})	400
5014	[{}] Error deriving field value; {}	400
5015	Singleton constraint violated: Only one instance of [{}] is allowed per {}.	400
5016	The existing device in [{}] model cannot be modified, it is referenced by other resources.	400
5017	[{}] Invalid foreign key to {} for value {}	400
5018	[{}] Operation not supported for model instance; ({})	405
5019	[{}] Operation not supported; ({})	405
5020	Unable to determine workflow for operation ‘{}’	400

continues on next page

Table 3 – continued from previous page

ModelError	Message	HTTP Code
5021	Workflow '{}' not found	400
5022	Workflow operation '{}' clashes with an existing model attribute/method	400
5023	Unable to execute {} workflow. {}	400
5024	Unable to compile data for provisioning workflow for {}, error {}	400
5025	[{}] Connection timeout error after ({}) seconds	400
5026	[{}] Connection error; ({})	400
5027	[{}] API retry error; ({})	503
5028	[{}] Authentication error; ({})	400
5029	[{}] Attempt to add a contradicting rule; ({})	400
5030	[{}] Phones of this type must be added as gateway endpoints	400
5031	[{}] Unable to add NDLR to hierarchy node containing device models belonging to devices not referenced by NDLR	400
5032	[{}] Unable to query API with available data [{}]	400
5033	Retries exhausted; ({})	400
5050	Password cannot be reused.	400
5051	New password must have {} characters different from old password.	400
5052	User cannot change their password more than once within {} day(s). Please contact your administrator.	400
5053	Password does not meet minimum length required.	400
5054	Password {}.	400
5200	Invalid connection parameters for {}. Username and Password must specified for BASIC authentication method.	400
5201	Invalid connection parameters for {}. Token must specified for OAUTH authentication method.	400
5202	[{} {}] Unable to render model template [{}]. TEMPLATE: {} CONTEXT: {}	400
5203	[{} {}] Unable to parse API response. RESPONSE: {}	400
5204	Invalid connection parameters for {}. Hierarchy must be specified.	400
5205	[{}] Invalid paging parameters: page_size {} page_offset {}	400
5206	[{}] Paging required: page_size {} page_offset {}	400
5207	[{}] External response exceeded memory limit [{}] [{} {}]	400
5208	[{}] Template output exceeded memory limit [{}] [{}]	400
5209	[{}] Bad override for [{}]	400
5210	[{}] Session expired. The session cache has been cleared and the next request will go through successfully.	400
5211	[{}] Unable to authenticate using session based auth. {}	400
5212	[{}] Cannot add device {}	400
5215	[{}] Disallowed input [{}]	400
5270	[{}] Request start over required: {}	400

continues on next page

Table 3 – continued from previous page

ModelError	Message	HTTP Code
5280	Request start over attempts exhausted {}	400
5290	AXL request pagination error	400
5998	[{0}] {1}	400
5999	Error, {}. (UNHANDLED_ERROR)	400

ApiError	Message	HTTP Code
3000	Hierarchy context may not be None, please select Hierarchy	400
3001	Error, Incorrect request format	400
3002	Error, Unhandled method for URL	400
3003	Invalid import file specified. {}	400
3004	Invalid export URL specified. {}	400
3005	Error, Invalid list view sort key [{}]. Valid options are {}	400
3006	Error, Invalid list direction [{}]. Valid options are {}	400
3007	Error, No schema available during list view	400
3008	Provisioning Workflow error [{}]	400
3009	Nothing to export	400
3010	List delete failed, error [{}]	400
3011	List size not allowed, requested [{}], maximum [{}]	400
3012	List sort by hierarchy path not allowed	400
3013	Function not implemented	400
3014	Attribute field name required	400
3015	Hierarchy path [{}] not found.	400
3016	Model type list [{}] not found at or above the current hierarchy.	400
3017	Bulk update failed, error [{}].	400
3018	Bulk operation {} failed, error [{}].	400
3019	Schemas of data being imported have cyclic foreign keys {}.	400
3020	Imported {} out of {} items successfully.	400
3021	{} is a required GET parameter.	400
3022	Invalid Range HTTP header: {}	400
3023	{} is an invalid GET parameter.	400
3024	Resource pkid(s) must be specified	400
3025	Request was throttled.	429
3026	Invalid UTC date format given: {0}, requires: {1} or {2}	400
3027	The current filter caused a long running request. Please add more filter fields, use Case Sensitive or change the criteria types to one of {}.	400
3028	Model Instance Filter [{}] not found at or above the current hierarchy.	400

continues on next page

Table 4 – continued from previous page

ApiError	Message	HTTP Code
3029	Purge failed, error [{}]	400
3030	Model Type List of [{}] type not valid for [{}] sync.	400
3031	Model Instance Filter of [{}] type not valid for [{}] sync.	400
3032	{} GET parameter has an invalid value.	400
3999	Unhandled API Error	400

AuthError_11_5_3	Message	HTTP Code
27000	{} (INCORRECT_PASSWORD_ERROR)	403
27001	{} (PASSWORD_VERIFICATION_ERROR)	403
27002	{} (USER_NOT_FOUND_ERROR)	404
27003	{} (LOGIN_NOT_ALLOWED_ERROR)	403
27004	Account locked. Please contact your administrator.	403
27005	Too many failed login attempts for this user account. Try again later.	403
27006	Too many failed login attempts from this computer. Try again later.	403
27007	Your Web browser doesn't appear to have cookies enabled. Cookies are required for logging in.	400
27008	User is not allowed to log in.	403
27009	Please enter a valid username and password.	403
27010	This account is inactive.	403
27011	User account password must be changed before any API requests are authorized.	403
27012	{} (ACCOUNT_DISABLED)	403
27013	External (SSO or LDAP) authentication is required.	403
27014	Please enter valid answers to security questions.	403
27015	Password reset is not available for user.	403
27016	Security questions and answers not set up.	403
27017	User can not log in to this interface.	403
27018	User is disabled due to inactivity	403
27019	User is not allowed to login. Please contact your administrator.	403
27020	Login is currently disabled due to a temporary overload. Please try again later.	503
27021	User is not allowed to log in. Maximum user login sessions has been reached.	403

DatabaseError	Message	HTTP Code
2000	Cannot setup Mongo DB collection {}	400
2001	Find failed with spec={}, fields={}, skip={}, limit={}, sort_by={}, err={}	400
2002	Find one failed with spec={}, fields={}, err={}	400
2003	Get archive history failed with spec={}, fields={}, skip={}, limit={}, err={}	400
2004	Remove failed with spec={}, err={}	400
2005	Find and modify failed with spec={}, modify={}, err={}	400
2006	Save failed with spec={}, modify={}, err={}	400
2007	Count failed for {}	400
2008	Find failed with spec={}, fields={}, err={}	400
2009	Duplicate error with spec={}, modify={}, err={}	400
2010	Found more than one record with spec={}	400
2100	Error, Cannot connect to RESOURCE database collection	400
2101	Error, Cannot connect to DATA database collection	400
2102	Error, Cannot connect to ARCHIVE database collection	400
2103	Aggregate failed with group_by={}, match={}, aggregations={}, sort={}, err={}	400
2104	Bulk insert failed, err={}	400
2106	Bulk write failed, err={}	400
2107	Distinct failed with key={}, spec={}, err={}	400
2108	Explain not implemented for {}	400
2999	Unhandled Database Error	400

Authentication-ProxyError	Message	HTTP Code
32000	Cannot decode target user from authentication proxy. Error: {}	400
32001	Insufficient target user details specified by authentication proxy. Target user details must be contained in a JSON-formatted object with an email attribute.	400
32002	User [{}] is not a valid authentication proxy.	400
32003	Proxy user must be at a hierarchy above that of the target user.	400
32004	Error, {} (UNHANDLED_ERROR)	500

LibSchemaError	Message	HTTP Code
9000	Unhandled schema property error: [{}]	400
9001	Unhandled schema and data processing error: [{}]	400
9002	Data type incorrect, property: {}, not of type: {}	400
9999	Error, (UNHANDLED_ERROR)	400

RbacError	Message	HTTP Code
16000	Permission denied: {}.	400
16001	User not found.	400
16002	Role not specified; User [{}]	400
16003	Access profile not specified; User [{}], Role [{}]	400
16004	Role not found; User [{}], Role [{}]	400
16005	Access profile not found; User [{}], Role [{}], Access Profile [{}]	400
16006	User [{username}] is not allowed to {operation} attribute(s) of {model_type} resource [{pkid}]. Attribute(s) in breach: {breach_attrs}. This operation must be performed by the user's administrator.	403
16007	User [{username}] is not allowed to {operation} {model_type} resource [{pkid}]. This operation must be performed by the user's administrator.	403
16008	Invalid authorization token detected.	403
16009	Role not found; Hierarchy [{}], Role [{}]	400
16010	Access profile [{}] not found for Role [{}] in or above Hierarchy [{}]	400
16011	Access profile of role [{}] is not a subset of the request user's.	400
16012	SelfService Access Profile [{}] for Role [{}] at Hierarchy [{}] must not be created outside 'sys' hierarchy.	400
16999	Error, (UNHANDLED_ERROR)	400

SsoSettingsError	Message	HTTP Code
30000	Invalid certificate file found.	400
30001	Invalid key file found.	400
30002	Validity must not be negative or larger than {} hours ({} years).	400

ApiVersionError	Message	HTTP Code
38000	Invalid API header version specified: {}.	400
38001	No API version mapping defined.	400
38002	API header version: {} and API parameter version: {} mismatch	400

ExportError	Message	HTTP Code
36000	The export format is not specified in request.	400
36001	The specified export format is not supported.	415
36002	The worksheet was not initialized and can not be exported.	500
36100	License audit file transfer failed.	400
36101	tool/DataExtract failed for '{}'.	400
36102	A malformed record with pkid: '{}' and model_type: '{}' has been encountered.	400

DataImportError	Message	HTTP Code
11000	Multiple json files {} found in zip archive root; only 1 expected	400
11001	Import file validation failed with: {}	400
11999	Error, (UNHANDLED_ERROR)	400

InterfaceError	Message	HTTP Code
50000	Invalid interface value [{}] for header 'X_INTERFACE'	403
50001	No access profile associated with Interface [{}]	403

BulkLoad-MacroError	Message	HTTP Code
60000	Data type must be {}	400
60001	Invalid bulk load macro format {}. Supported format: {}	400

MigrationError	Message	HTTP Code
21000	Post condition failed. {}	400
21999	Error, {} (UNHANDLED_ERROR)	400

CryptoError	Message	HTTP Code
19000	Cryptography validation failed; {}.	400
19999	Error, (UNHANDLED_ERROR)	400

Saml2SsoError	Message	HTTP Code
14000	Could not find SSO settings; Hierarchy: {}.	400
14001	Found multiple SSO settings, only one expected; Hierarchy: {}.	400
14002	Could not find SSO Identity Provider; Hierarchy: {}, IDP uri: {}.	400
14003	Could not resolve SSO Identity Provider; Hierarchy: {}, IDP uri: {}.	400
14004	System generated certificate expected but not specified in data/SsoSettings.	400
14005	System generated certificate has an invalid private key.	400
14006	System generated certificate has an invalid certificate.	400
14007	Unknown principal: {}.	400
14008	Unsupported binding: {}.	400
14009	Verification error: {}.	400
14010	SubjectConfirmation is used but there is no NotOnOrAfter attribute	400
14012	NotBefore and NotOnOrAfter should be present when using either in Condition	400
14013	OneTimeUse element should be present when neither NotBefore nor NotOnOrAfter attributes in Condition	400
14014	Only one OneTimeUse element should be present in Condition	400
14015	Unencrypted assertions are not allowed	400
14016	The session cannot be used yet	400
14999	Error: {}. (UNHANDLED_ERROR)	400

ScriptError	Message	HTTP Code
8000	Script not found	400
8002	Syntax error on line {}	400
8003	Could not connect to {}	400
8004	Authentication failed {}	400
8999	Error, (UNHANDLED_ERROR)	400

Hierarchy-BasedAccessError	Message	HTTP Code
22000	Invalid traversal argument: '{}'; Traversal must be one of {}.	400
22001	{model_type} with {attr_name} {attr_value} is only permitted at the following hierarchy type(s): {hierarchy_types}.	403
22999	Error, {} (UNHANDLED_ERROR)	400

TestConnection-Error	Message	HTTP Code
12000	Please specify the model type of the device connection parameters	400
12999	Error, (UNHANDLED_ERROR)	400

SysError	Message	HTTP Code
0	Error, Mongo service not started	400
1	Error, Server too busy	400
2	Error, Celery service not started	400

PlatformError	Message	HTTP Code
28000	Could not execute platform command; Exit code: {}	500
28999	Error, {} (UNHANDLED_ERROR)	500

InternalApiUser-Error	Message	HTTP Code
18000	Authorization user [{}] not found.	400
18999	Error, (UNHANDLED_ERROR)	400

SystemMoni-toringError	Message	HTTP Code
70000	Aggregate {} is not supported by {}	400
72051	Connectivity failure	400
72052	Slow connection	400
72053	Utilization approaching limit	400
72054	Transactions queued for too long	400
72055	Transactions processing for too long	400

RisApiError	Message	HTTP Code
80000	RIS API data collection failed for {}	400

ThemeError	Message	HTTP Code
90000	Theme name {} is reserved for system use. Please choose another name. RIS API data collection failed for {}	400

ClientShapeError	Message	HTTP Code
100000	File operation error: '{}'	400

ClientShapeWarning	Message	HTTP Code
105000	System has not yet been linked to an account in ClientShape	400
105001	System is already linked to an account in ClientShape	400
105002	System has already been registered in ClientShape	400

NumberInventoryError	Message	HTTP Code
110000	Number inventory threshold reached: '{}'	400
111000	Failed to write the User Number Inventory CSV file to the configured NFS destination: '{}'	400

License Checking	Message	HTTP Code
120000	<LicenseCheckError>	
120001	<LicenseCheckExpiredError>	
120002	<LicenseCheckExpiryNotice>	
120003	<LicenseCheckServiceError>	
120004	<LicenseCheckAppNotReadyError>	
120000-120999		

License Audit	Message	HTTP Code
140000	The software version of the platform could not be determined.	400
140000 - 140099		

4. Tool APIs

4.1. Introduction to Tool APIs

This section describes API calls that are not related to a specific model. The full URL would include the host name: *http://[hostname]*.

The calls described here all contain `/tool/` in the URL and the full list can be obtained by the GET call for `choices`:

Task	Call	URL	Parameters	Response
List tools	GET	/api/tool/choices/	format=json hierarchy=[hierarchy]	JSON format of the list of tools as `title` - `value` pairs.

Variables are enclosed in square brackets, e.g.:

- [hierarchy] is the hierarchy UUID
- [filename] refers to a file

Other parameters are described with the relevant API call.

4.2. Search and Search Result Export

For an API call that carries out a search, a POST payload in JSON format is added.

Task	Call	URL	Parameters	Payload
Search	POST	/api/tool/Search/	format=json hierarchy=[hierarchy]	{“query”:”[query]”}

The value of `[query]` follows Search syntax, for example:

```
{"query":"data/Countries with country_name contains King"}
```

While the default search direction is down, a second parameter can be added to `[query]` to indicate the hierarchy direction to search. These are enabled by adding a value `true`:

- `hierarchy_paths` - up the hierarchy

- `hierarchy_shallow` - at the local hierarchy
- `hierarchy_all` - up and down the hierarchy

For example, if the user making the API call is at `sys.hcs`, then a call payload like:

```
{"query":"relation/Bundle with name is 'HcsBase' ", "hierarchy_paths":true}
```

will also search up the hierarchy path.

The parameter `filter_hierarchy` can also be used to filter the hierarchy of search results. Specifying a hierarchy to which the user has no access will return a Permission Denied error.

Note:

- If for both `hierarchy=sys.hcs` and `filter_hierarchy=sys.hcs.CSP` for example are used, then `filter_hierarchy=sys.hcs.CSP` takes precedence.
- If for neither `hierarchy=sys.hcs` nor `filter_hierarchy=sys.hcs.CSP` for example are used, then the user's hierarchy is applied.

The Request payload can also be a GET parameter, for example:

Task	Call	URL	Parameters	Response
Search	GET	/api/tool/Search/	format=json hierarchy=[hierarchy] filter_hierarchy=[hierarchy] query=[url_query]	JSON format of the search result.

The value of `[url_query]` is URL encoded string, for example:

```
data/Countries%20with%20country_name%20contains%20King
```

Furthermore, the `meta` property of the schema in the response to `/api/tool/Search/` contains action details for the export of search results. This includes the URL for the data export POST request:

```
/api/export/export_data/?url=/api/tool/Search/
```

as well as the URL:

```
/api/view/ExportData/add
```

which has a schema that lists the data export data type choices that will be used as a parameter to the POST call.

4.3. Bulk load API

Two API calls are required.

Task	Call	URL	Parameters	Response

Submit file	POST	`/api/uploadfiles/`
		This URL will be moved to tool/UploadFile in future.
			`hierarchy=[hierarchy]`
			`Content-Type: multipart/form-data`
			
			`name='uploadedfile'`
			`filename=<filename>`
			`the file to upload`
				`{"uploadedfiles": [{"id": "<file_id>", "name": "<filename>"}]}`

The response is HTTP 202

Task	Call	URL	Parameters	Payload

Bulk Load	POST	`/api/tool/BulkLoad/`	`method=bulkload_spreadsheet`
			`hierarchy=[hierarchy]`
				Examples:
				`{'bulkload_file': '<filename>', 'execute_immediately': true}`
				or:
				`{'bulkload_file': '<filename>', 'execute_immediately': false 'execute_date': '2013-06-20', 'execute_time': '12:00:00', 'execute_timezone': '0'}`

The following `curl` commands illustrate the two steps:

Step 1

```
curl -H 'Authorization: Basic <auth_key>'
     -F uploadedfile="@<file>.xlsx"
     'http://<hostname>/api/uploadfiles/'
```

Step 2

```
curl -H 'Authorization: Basic <auth_key>'
     -H 'Content-Type: application/json'
     -H 'accept: application/json'
     --data-binary '{"bulkload_file":"DEMO.xlsx","execute_immediately":true}'
     'http://<host>/api/tool/BulkLoad/?hierarchy=[hierarchy]&
       method=bulkload_spreadsheet&
       nowait=true&
       format=json'
```

The response to this call is for example as in the following table.

Response

```
{"href": "/api/tool/Transaction/0b340a6f-b658-48bb-ac8c-7562adc5572d",
 "success": true,
 "transaction_id": "0b340a6f-b658-48bb-ac8c-7562adc5572d"}
```

- If the Bulk Load is to be scheduled, the payload of the second task includes schedule details:
  - *execute_immediately* is set to false
  - *execute_date* is added in the format YYYY-MM-DD
  - *execute_time* is added in the format HH:MM:SS
  - *execute_timezone* is added in the format of a numeric value in minutes relative to UTC. For example, UTC is 0, UTC+2:00 is 120, UTC-1:00 is -60, and so on.
- An entry is also generated in the schedule; that is, an instance is added to the data/Schedule module.
- If the second task payload has *'execute_immediately':true*, a POST is generated to /api/data/Bulkload/. The payload includes the uploaded filename and a generated name and time stamp as well as a description, for example:

```
{'filename': '<file>.xlsx', 'description': 'Generated by Bulk Loader
Administration Tools', 'name': 'AnyUser.xlsx -- 2013-05-21
16:47:11.801664 (UTC)'}
```

To inspect the detailed progress and status of the transaction, use the API call from the response above:

`GET /api/tool/Transaction/[pkid]`

with parameters:

- `hierarchy=[hierarchy]`
- `format=json`

The response to this GET call is a JSON object that provides details of the transaction, as for example in the truncated snippet:

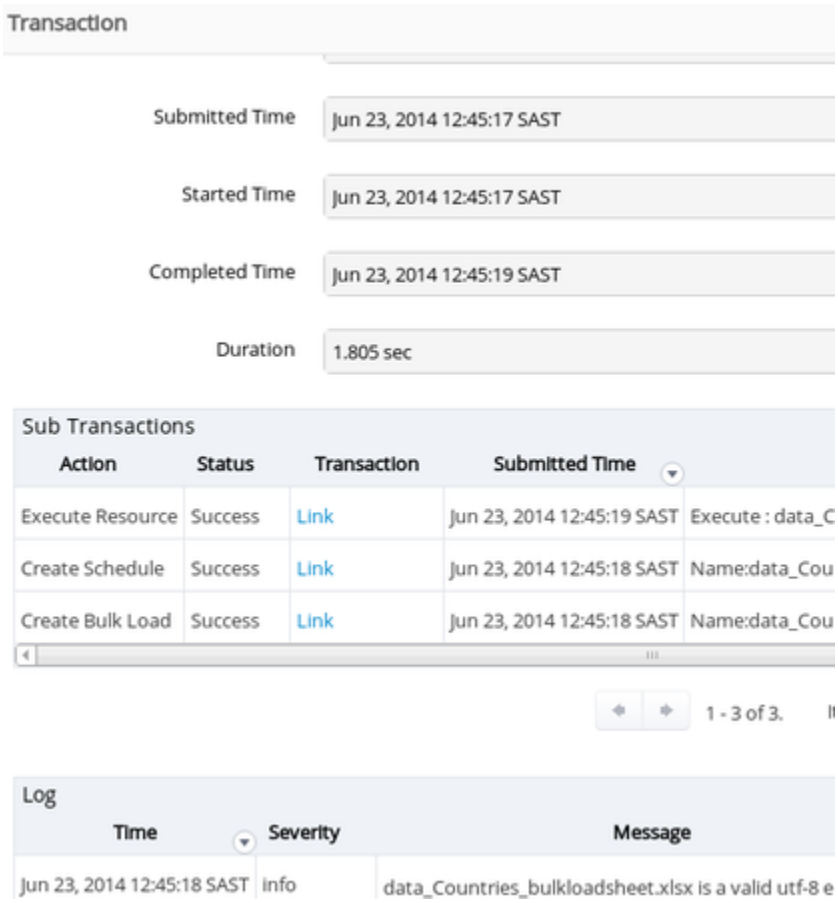
```
...
   "href": "/api/tool/Transaction/[pkid]
    "log_id": "53a8053ea616540708141f44",
    "message": "data_Countries_bulkloadsheet.xlsx is a valid
```

(continues on next page)

(continued from previous page)


```
    "severity": "info",
    "time": "2014-06-23T10:45:18.029000",
    "transaction_id": "[pkid]"
  }
],
"pkid": "[pkid]",
"resource": {},
"rolled_back": "No",
"started_time": "2014-06-23T10:45:17.813000",
"status": "Success",
"sub_transactions": [
  {
    "action": "Execute Resource",
    "detail": "Execute : data_Countries_bulkloadsheet.xlsx -- ...
    "status": "Success",
    "submitted_time": "2014-06-23T10:45:19.567000",
    "transaction": "/api/tool/Transaction/[pkid1]    ...
  },
  {
    "action": "Create Schedule",
    "detail": "Name:data_Countries_bulkloadsheet.xlsx -- 2014- ...
    "status": "Success",
    "submitted_time": "2014-06-23T10:45:18.912000",
    "transaction": "/api/tool/Transaction/[pkid2]    ...
  },
  {
    "action": "Create Bulk Load",
    "detail": "Name:data_Countries_bulkloadsheet.xlsx -- 2014-06 ...
    "status": "Success",
    "submitted_time": "2014-06-23T10:45:18.419000",
    "transaction": "/api/tool/Transaction/[pkid3]    ...
  }
],
"submitted_time": "2014-06-23T10:45:17.794000",
```


On the GUI, the same transaction displays as in the Transaction log image.



For long transactions, to retrieve a summary of the status of the transaction, the transaction can be polled, using `poll` in the URL, using the same parameters:

`GET /api/tool/Transaction/poll/?transactions=[pkid]`

In this case, there is a shortened response, for example:

```
{"[pkid]":
 {"status": "Processing",
  "href": "/api/tool/Transaction/0b340a6f-b658-48bb-ac8c-7562adc5572d",
  "description": null}
}
```

4.4. Move and Bulk Move

The following model types can be enabled for this operation:

- Data models
- Device models
- Relations

For an API call that carries out a move on a `<model_type>`, a POST payload in JSON format is added.

A move can only take place from a source hierarchy equal to or lower than `[target_hierarchy]`.

- Task

  Move the instance with [pkid] to [target_hierarchy]

Call	URL	Parameters	Payload
POST	/api/tool/DataMove/ ?model_type= <model_type>	format=json hierarchy=[hierarchy] context_hierarchy= [target_hierarchy] (nowait=true)	{“hrefs”: [“/api/<model_type>/[pkid]”]}

- Task

  Move one or more model instances ([pkid1], [pkid2],. . .) from source hierarchy (pkid or dot notation) to target_hierarchy (pkid or dot notation).

Call	URL	Parameters	Payload
POST	/api/tool/DataMove/ ?model_type= <model_type>	format=json hierarchy=[hierarchy] context_hierarchy= [target_hierarchy] (nowait=true)	{“hrefs”: [“/api/relation/Subscriber/[pkid1]”, “/api/relation/Subscriber/[pkid2]”, . . .]}

For a list of hierarchy pkids and their dot notation available from [hierarchy], use the GET call:

```
GET api/relation/<model_type>/
 ?hierarchy=[hierarchy]
 &format=json
 &schema_rules=true
```

4.5. Data Extract

Two endpoints are available:

operations

Get the available `DataExtract` operations endpoints.

```
GET api/tool/DataExtract/operations/
 ?hierarchy=[hierarchy]
 &format=json
```

Returned payload:

```
{"meta":
  {"query":"/api/tool/DataExtract/operations/
            ?hierarchy=[hierarchy]
            &format=json"},
  "choices":[
```

(continues on next page)

(continued from previous page)

```
    {"value":"execute",
     "title":"Execute"},
    {"value":"help",
     "title":"Help"},
    {"value":"nbi_subscriber",
     "title":"Nbi Subscriber"},
    {"value":"read",
    "title":"Read"}]
}
```

nbisubscriber

For example, on a system with NBI deployed, get the subscriber data for subscriber instance with <PKID>:

```
GET api/tool/DataExtract/nbisubscriber/<PKID>/
 ?hierarchy=[hierarchy]
 &format=json
```

Returned payload:

```
{
 "FirstName": "NBI",
 "LastName": "User EKB-9492",
 "ActivationDate": "2021-06-17T00:00:00",
 "Location": "CL1-AB-C-Berlin",
 "Email": "NBIUser@nbivoss.onmicrosoft.com",
 "Username": "NBIUser",
 "ExternalID": "EKB-8003-AB-C-BE",
 "Customer": "AB_Group",
 "Lines": [
 {
  "DDI": "+494215381218",
  "ExtensionNumber": "8211218"
 },
 {
  "DDI": "+494215381227",
  "ExtensionNumber": "8211227"
 }
 ],
 "Devices": [
 {
  "Model": "Microsoft Teams",
  "Name": "MSTNBIUser@nbivoss.onmicrosoft.com"
 }
 ],
 "FMC": {},
 "EndUserVoicemail": false,
 "HardwareGroup": "[\"AB_Group-Germany-CL1-NDL\", \"hcs.CS-P.CS-AB.AB_Group\"]",
 "MobilityProfiles": [
 {
```

(continues on next page)

(continued from previous page)

```
  "Model": "Cisco 6921",
  "Name": "NBIUser-UDP"
 }
 ]
}
```

4.6. Custom Workflows

Custom Workflows can be added to:

- Domain Models
- Relations

A Custom Workflow can be called from a model *instance*.

The usage in the URLs and parameters below are:

[model]

- Domain Model [domain/DomainModelName]
- Relation [relation/RelationName]

[pkid]

Model instance pkid

[CustomWF]

Custom Workflow name. The name is of the format *add-*, *del-* to indicate the operation type.

- For Domain Models, the Custom Workflow name suffix corresponds with a Group name of Domain Model attributes.
- For Relations, the Custom Workflow name suffix corresponds with the alias of the joined model type.

To get the payload schema for a Custom Workflow, carry out a *list* API call for the instance, with parameters:

Task	Call	URL	Parameters
Get payload schema	GET	/api/[model]/[pkid]/	hierarchy=[hierarchy] format=json schema=true schema_rules=true

The response contains:

- The **action** to carry out the Custom Workflow. For example, for an **add** action on a domain model DOMAIN100 instance with a group name or alias called ADDRESS:

```
AddADDRESS: {
href: "/api/domain/DOMAIN100/523c2213a61654174273ab07/+AddADDRESS/"
title: "Addaddress"
```

(continues on next page)

(continued from previous page)

```
schema: "ADDRESS"
method: "POST"
submit: "payload"
class: "add"
}
```

- The **schema** of the model in the response contains the specification of the **submit** payload for the Custom Workflow.

Task	Call	URL	Parameters	Payload
Call Custom add workflow	POST	/api/domain/[model]/[pkid]/+[CustomWF]/	hierarchy=[hierarchy	See below

Payload for grouped attributes is defined in the schema that is returned from the GET call above. For PUT methods the resource data is replaced with the data specified in the request. All fields of the resource is replaced with the fields in the request.

This means that:

- fields not present in the request that are present in the resource will be dropped from the resource
- fields present in the request that are not present in the resource will be appended to the resource
- the data of fields present in the request is used to update fields that already exist in the resource

PATCH methods operate in two modes depending on the content type:

- `Content type: application/json`
- The values of data fields present in the request is used to update the corresponding resource fields. This means that:
  - Fields present in the request but not in the resource is appended to the resource. The value of each field that is already present in the resource is updated from the request data.

Note: Field values that are set to null in the request is dropped from the resource. Fields that are present in the resource but not in the request are left untouched.

`Content type: application/json-patch+json`

Existing resource data is patched according to RFC6902.

Modifying data fields:

- To drop the field from a data model, specify null as the parameter value (i.e. `{"field": null}`)
- To blank out a string value set the parameter value to an empty string (i.e. `{"field":""}`)
- When the key (field name) appears in the field for a parameter, then the field is updated with the supplied value.
- Any field that is not specified in the request will be left untouched
- When a key (field name) is specified but no value is supplied, or an empty string is supplied, the value is blanked out or set to NULL

5. Transactions

5.1. List Transactions

To list transactions on the system use the following operation

```
GET https://<server_address>/api/tool/Transaction/
  ?hierarchy=[hierarchy]
  &format=json
  &summary=true
```

The following query parameter illustrates how a second page of 50 transactions in the transaction log is requested.

```
skip=50
&limit=50
&hierarchy=[hierarchy]
&format=json
&summary=true
&direction=desc
&order_by=submitted_time
```

For further information on the query parameters refer to API Parameters above.

The synchronous response contains:

- pagination information
- meta data specifying the summary attributes of the transaction log view
- resources containing a list of the transactions in the transaction log

5.2. Get Instance Transactions

The status of a specific transaction can be retrieved by using a GET call to `/tool/Transaction` for a specific transaction pkid (also referred to as transaction ID or transaction_id). The transaction_id is available in for example the synchronous response to an asynchronous mutator transaction.

For example, if the transaction_id in the response is `[pkid]`, then the transaction can be polled with:

```
GET https://<server_address>/api/tool/Transaction/[pkid]
```

The GET response `data` section of the JSON content for a transaction also shows:

- `submitter_host_name`: the host name of the application node that scheduled the transaction.
- `processor_host_name`: the host name of the application node that processed the transaction (this value will only be set once the transaction is processed).

On a clustered system, these attributes make it possible to distinguish between the application nodes on which the transaction was respectively scheduled and processed.

Refer to the examples in the API Response topics, in particular, the topics POST/PUT/DELETE/PATCH Response and Asynchronous Mutator Transaction Status Callback.

5.3. Poll Transactions

It is recommended to use asynchronous transaction call back mechanism described in “Asynchronous Mutator Transaction Status Callback”. If this can however not be used a consumer of the VOSS Automate API can also use this polling mechanism to poll the status of individual transactions using the poll action of the transaction tool. A user interface that allows a user to monitor the progress of a given transaction can use the following method to retrieve the status of a given transaction:

```
GET /api/tool/Transaction/[pkid]/poll/?format=json
```

The response contains essential status of the transaction, for example:

```
{
    [pkid]: {
        status: "Success",
        href: "/api/tool/Transaction/[pkid]",
        description: "Name:RDP-auser1857 Description:RD for auser1857"
    }
}
```

5.4. Replay Transactions

Transactions that have failed can, under certain circumstances, be replayed. This means that the transaction is re-submitted with the original request parameters. This is done by specifying the pkid of the transaction

```
GET https://<server_address>/api/tool/Transaction/[pkid]/replay/
```

The transaction current operation replays the transaction and the result returns the list view of the transaction log.

5.5. Edit and Replay Transactions

Transactions can, under certain circumstances, be edited and then replayed. This means that the transaction is re-submitted with the updated request parameters. This is done by specifying the pkid of the transaction:

```
GET https://<server_address>/api/tool/Transaction/[pkid]/edit-replay/
```

The transaction current operation edit and then replays the transaction and the result returns the list view of the transaction log.

5.6. Sub Transactions

The sub-transactions of a transaction with pkid can be retrieved by submitting the following URI

```
GET https://<server_address>/api/tool/Transaction/[pkid]/sub_transaction/
```

5.7. Log Transactions

The log messages of a transaction with pkid can be retrieved by submitting the following URI

```
GET https://<server_address>/api/tool/Transaction/[pkid]/log/
```

5.8. Transaction Choices

A URL endpoint and parameter is available to list the transaction actions as they may be shown in the transaction log.

- The API call to get the list of transaction actions uses the parameter and value: `field=action`, for example:

```
GET api/tool/Transaction/choices/?
    field=action&
    hierarchy=[hierarchy]&
    format=json
```

The output shows the list of transaction actions:

```
[
  {
    "value": "Auto Migrate Base Customer Dat",
    "title": "Auto Migrate Base Customer Dat"
  },
  {
    "value": "Auto Migrate Base Provider",
```

(continues on next page)

(continued from previous page)


```
    "title": "Auto Migrate Base Provider"
  },
  {
    "value": "Auto Migrate Base Site Dat",
    "title": "Auto Migrate Base Site Dat"
  },
  {
    "value": "Auto Migrate Dial Plan",
    "title": "Auto Migrate Dial Plan"
  },
  {
    "value": "Auto Migrate Feature Subscriber Phone Cft",
    "title": "Auto Migrate Feature Subscriber Phone Cft"
  },
  {
    "value": "Auto Migrate Hotdial Data",
    "title": "Auto Migrate Hotdial Data"
  },
  {
    "value": "Auto Migrate Init Ippbx",
    "title": "Auto Migrate Init Ippbx"
  },
  {
    "value": "Auto Migrate Internal Number Inventory",
    "title": "Auto Migrate Internal Number Inventory"
},

...
```


5.9. Transaction Filters

In addition to the filter parameters that can be applied to transactions as indicated in the topic on API Parameters, transactions in particular can be filtered:

- By the following values for the URL parameter `filter_field`:
  - Transaction ID: `id`
  - Start or end submitted time: `submitted_time`
  - The transaction message: `message`
- By also listing sub transactions using the URL parameter and value `subtransactions=true`. By default, sub transactions are not listed, in other words, the value is `false`.
- To carry out a filter on sub-transactions of a parent transaction, the `/sub-transactions/` endpoint is added to the GET request:

```
/api/tool/Transaction/[parent-pkid]/sub-transactions/
```

- To carry out a filter on transaction logs of a parent transaction, the `/logs/` endpoint is added to the GET request:

```
/api/tool/Transaction/[parent-pkid]/log/
```

The transaction filters do not apply to logs.

The parameters can have the `filter_condition` values:

- `eq` (equals)
- `ne` (not equals)
- `gt` (greater than)
- `gte` (greater than or equals)
- `lt` (less than)
- `lte` (less than or equals)

The date-time is a `filter_text` value for `filter_field=submitted_time`.

The format follows RFC3339: `[https://tools.ietf.org/html/rfc3339]` and is *YYYY-MM-DDTHH:MM:SS.fZ*, where:

- "T" is the time separator and the character should be added.
- "Z" indicates UTC time and the character should be added.
- "f" represents the decimal fraction of a second and the character should not be added. The specification of the decimal fraction is optional.

For example:

June 29 2016 14 hours 41 minutes 0.01 seconds UTC, is:

```
2016-06-29T14:41:00.01Z
```

To filter for transactions after this date-time, the API call is:

```
GET api/tool/Transaction/?
    hierarchy=[hierarchy]
    &format=json
    &filter_field=submitted_time
    &filter_text=2016-06-29T14:41:00.01Z
    &filter_condition=gt
```

To filter between transaction IDs or times, two parameter sets are needed.

For example:

- To filter transaction IDs between 12000 and 13000:

```
GET api/tool/Transaction/?
    hierarchy=[hierarchy]
    &format=json
    &filter_field=id
    &filter_text=12000
    &filter_condition=gt
    &filter_field=id
    &filter_text=13000
    &filter_condition=lt
```

- To filter transactions between June 29 2016 14 hours 41 minutes UTC and June 29 2016 15 hours 41 minutes UTC (no fraction of a second in the example):

```
GET api/tool/Transaction/?
    hierarchy=[hierarchy]
    &format=json
    &filter_field=submitted_time
    &filter_text=2016-06-29T14:41:00Z
    &filter_condition=gt
    &filter_field=submitted_time
    &filter_text=2016-06-29T15:41:00Z
    &filter_condition=lt
```

If the upper or lower bound in the filter are not available, the transactions with values between the filter values and the bound are returned.

When the URL parameter `subtransactions=true` is used, the `data` object in the JSON API response shows:

- a parent transaction has: `parent: null`
- a sub transaction has: `parent: <pkid>`, where `<pkid>` is the value of the parent attribute `pkid`.

The example snippets below show the values of `parent`:

```
data: {
  username: "system",
  status: "Success",
  description: "",
  parent: null,
  pkid: "01a559c5-e77f-40e7-8403-683d7204d1e1",
  friendly_status: "Success",
  detail: "HcsLdapSyncSchedule--1",
  action: "Execute Schedule",
  href: "/api/tool/Transaction/01a559c5-e77f-40e7-8403-683d7204d1e1/",
  txn_seq_id: "17693",
  data_type_: "tool/Transaction",
  message: "",
  submitted_time: "2016-07-14T12:13:41.758000Z"
}


data: {
  username: "system",
  status: "Success",
  description: "",
  parent: "f4daa234-590d-4002-a3b0-8c329c583d1d",
  pkid: "019f44a3-df6e-4e4f-86f3-a09a6b91e482",
  friendly_status: "Success",
  detail: "10.120.2.221",
  action: "Import Ldap",
  href: "/api/tool/Transaction/019f44a3-df6e-4e4f-86f3-a09a6b91e482/",
  txn_seq_id: "17695",
  data_type_: "tool/Transaction",
  message: "models completed.",
  submitted_time: "2016-07-14T12:13:43.075000Z"
```

(continues on next page)

(continued from previous page)

```
}
```

- In the case of a transaction error, the `message` attribute value will show the corresponding error message. If a custom message was defined in a provisioning workflow, and the response is the result of the workflow, the value will be the custom message.

  To filter transaction messages, the parameter `filter_field=message` is used, with at least one of the following additional filter criteria:

  – a date range of maximum 7 days using `submitted_time`

  – an additional `filter_field`, with one of the conditions:

    * `filter_condition=contains`

    * `filter_condition=startswith`

    Also required is the case sensitive parameter:

    * `ignore_case`

    Note that a filter is by default case insensitive. If the case is explicitly set, then it should be added *to each filter parameter group* in order to ensure proper parameter grouping.

  The additional criteria do not apply to sub-transaction message filters, because the `[parent-pkid]` in the URL serves as an additional filter.

  The example below is a message filter that contains “Invalid business key”, by date range:

```
GET api/tool/Transaction/?
    hierarchy=[hierarchy]
    &format=json
    &filter_field=submitted_time
    &filter_text=2016-06-25T14:41:00Z
    &filter_condition=gt
    &ignore_case=false
    &filter_field=submitted_time
    &filter_text=2016-06-29T15:41:00Z
    &filter_condition=lt
    &ignore_case=false
    &filter_field=message
    &filter_text=Invalid%20business%20key
    &filter_condition=contains
    &ignore_case=false
```

6. API Examples

6.1. API Examples Overview and Conventions

The example sections illustrate the use of the API for a number of calls, using the `curl` command line tool. Each example shows the command and the console output.

- API calls are illustrated:
  - From server `http://localhost`
  - Referencing a relation: `relation/LineRelation`.
- User authorization is for two administrator users:
  - one user has additional permissions to import and bulk load.
  - The Authorization header and hierarchy parameter in the URL identify the two users.
  - Field Display Policies and Configuration Templates in URL parameters can differ according to the MenuLayout associated with the user role, for example, `&policy_name=LineMenuFDPSite` is a Field Display Policy applied to `relation/LineRelation` from a Site administrator user menu.
- Where a response to an API call shows an instance of `/api/tool/Transaction/`, the transaction instance details can be inspected with a GET call to this instance. An example is shown in this section.
- Some payload files and console output is truncated (indicated with ellipses or text: “snippets”).
- Line breaks have been added to console output in the examples for better formatting.
- The a selection of the MS Excel bulk load sheet `LineRelation.xlsx` columns are shown in a table.

6.2. POST

- task: POST and instance of `relation/LineRelation`
- user: site administrator
- hierarchy: `55b9dc81a6165413b9d16ab6`
- Field Display Policy: `LineMenuFDPSite`
- Configuration Template: `line-cft`

```
$ curl -v
       -H 'Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA=='
       -H 'Content-Type:application/json'
```

(continues on next page)

(continued from previous page)

```
       --data-binary @post-payload.json
       -X POST 'http://localhost/api/relation/LineRelation/
                ?hierarchy=55b9dc81a6165413b9d16ab6
                &policy_name=LineMenuFDPSite
                &template_name=line-cft
                &nowait=true
                &format=json'
+ About to connect() to localhost port 80 (#0)
+ Trying 127.0.0.1... connected
> POST /api/relation/LineRelation/
        ?hierarchy=55b9dc81a6165413b9d16ab6
        &policy_name=LineMenuFDPSite
        &template_name=line-cft
        &nowait=true
        &format=json HTTP/1.1
> Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA==
> User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu)
              libcurl/7.22.0
              OpenSSL/1.0.1
              zlib/1.2.3.4
              libidn/1.23
              librtmp/2.3
> Host: localhost
> Accept: */*
> Content-Type:application/json
> Content-Length: 1941
> Expect: 100-continue
>
< HTTP/1.1 100 Continue
< HTTP/1.1 202 ACCEPTED
< Server: nginx/1.1.19
< Date: Thu, 30 Jul 2015 13:10:46 GMT
< Content-Type: application/json
< Transfer-Encoding: chunked
< Connection: keep-alive
< Vary: Accept, Cookie, Accept-Language, X-CSRFToken
< Content-Language: en-us
< Allow: GET, POST, DELETE, HEAD, OPTIONS
< X-CSRFToken: d2q7nV4aWDWFpuazsnRvJVMcj9qX5Ksg
< Set-Cookie: csrftoken=d2q7nV4aWDWFpuazsnRvJVMcj9qX5Ksg;
   SameSite=Lax;
   httponly;
   Path=/
< Set-Cookie: sessionid=hahbo0wy7sa8u8rfaiz2tcqxvkvwshp8;
   SameSite=Lax;
   httponly;
   Path=/
<
+ Connection #0 to host localhost left intact
+ Closing connection #0
{"href": "/api/tool/Transaction/aff36c0b-ff6a-431b-be58-d2f636edb7cd/",
```

(continues on next page)

(continued from previous page)

```
 "success": true,
 "transaction_id": "aff36c0b-ff6a-431b-be58-d2f636edb7cd"}
```

Snippet of the file: `post-payload.json`:

```
{
  "data": {
    "partyEntranceTone": "Default",
    "cfaCssPolicy": "Use System Default",
    "autoAnswer": "Auto Answer Off",
    "callForwardNotRegisteredInt": {
      "callingSearchSpaceName": "Intl24HrsEnh-locus1"
    },
    "routePartitionName": "Site-locus1",
    "callForwardOnFailure": {
      "callingSearchSpaceName": "Intl24HrsEnh-locus1"
    },
    "shareLineAppearanceCssName": "Intl24HrsEnh-locus1",
    "callForwardBusy": {
      "callingSearchSpaceName": "Intl24HrsEnh-locus1"
    },
    "pattern": "90217",
    "patternPrecedence": "Default",
    "callForwardNoAnswer": {
      "callingSearchSpaceName": "Intl24HrsEnh-locus1"
    },
    "callForwardNoCoverage": {
      "callingSearchSpaceName": "Intl24HrsEnh-locus1"
    },
    "callForwardNotRegistered": {
      "callingSearchSpaceName": "Intl24HrsEnh-locus1"
    },
    "usage": "Device",
    "alertingName": "techsupport",
    "enterpriseAltNum": {
      "isUrgent": false,
      "addLocalRoutePartition": false,
      "advertiseGloballyIls": true
```

6.3. GET

- task: GET all instances of `relation/LineRelation`
- user: site administrator
- hierarchy: `55b9dc81a6165413b9d16ab6`
- Field Display Policy: `LineMenuFDPSite`
- Configuration Template: `line-cft`

```
curl -v
     -H 'Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA=='
     'http://localhost/api/relation/LineRelation/
      ?hierarchy=55b9dc81a6165413b9d16ab6
      &policy_name=LineMenuFDPSite
      &template_name=line-cft
      &nowait=true
      &format=json'
+ About to connect() to localhost port 80 (#0)
+ Trying 127.0.0.1... connected
> GET /api/relation/LineRelation/
      ?hierarchy=55b9dc81a6165413b9d16ab6
      &policy_name=LineMenuFDPSite
      &template_name=line-cft
      &nowait=true
      &format=json HTTP/1.1
> User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu)
              libcurl/7.22.0
              OpenSSL/1.0.1
              zlib/1.2.3.4
              libidn/1.23
              librtmp/2.3
> Host: localhost
> Accept: */*
> Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA==
>
< HTTP/1.1 202 ACCEPTED
< Server: nginx/1.1.19
< Date: Fri, 31 Jul 2015 08:51:11 GMT
< Content-Type: application/json
< Transfer-Encoding: chunked
< Connection: keep-alive
< Vary: Accept, Cookie, Accept-Language, X-CSRFToken
< Content-Language: en-us
< Allow: GET, POST, DELETE, HEAD, OPTIONS
< X-CSRFToken: GdcfnSz25RsL16Qe9lN6ESHBAw8ElDvM
< Set-Cookie: csrftoken=GdcfnSz25RsL16Qe9lN6ESHBAw8ElDvM; httponly; Path=/
< Set-Cookie: sessionid=7kj9nhbh2ra5r1awn40md0059ebm956k; httponly; Path=/
<
```

Snippet of one of the returned instances:

```
...


   },
        "pattern": "90124",
        "patternPrecedence": "Default",
        "callForwardNoAnswer": {
          "destination": null,
          "forwardToVoiceMail": false,
          "callingSearchSpaceName": null
```

(continues on next page)

(continued from previous page)


```
        },
        "hrInterval": null,
        "callForwardNoCoverage": {
          "destination": null,
          "forwardToVoiceMail": false,
          "callingSearchSpaceName": null
        },
        "callForwardNotRegistered": {
          "destination": null,
          "forwardToVoiceMail": false,
          "callingSearchSpaceName": null
        },
        "usage": "Device",
        "summary_device": "10.120.2.216, 8443, prov1.cust1",
        "hrDuration": null,
        "parkMonForwardNoRetrieveVmEnabled": false,
        "alertingName": "Helpdesk",
        "description": "DN created without device from QAS.",
        "directoryURIs": null,
        "aarVoiceMailEnabled": false,
        "hierarchy_path": "sys.prov1.cust1.locus1",
        "parkMonForwardNoRetrieveIntCssName": null,
        "parkMonForwardNoRetrieveDn": null,
        "allowCtiControlFlag": true,
        "defaultActivatedDeviceName": null,
        "parkMonReversionTimer": null,
        "releaseClause": "No Error",
        "e164AltNum": {
          "numMask": null,
          "addLocalRoutePartition": false,
          "advertiseGloballyIls": false,
          "routePartition": null,
          "isUrgent": false
        },
        "callForwardAll": {

...
```


6.4. PUT

- task: Update instance `relation/LineRelation/55b9fe59a6165413b9d17628`
- user: site administrator
- hierarchy: `55b9dc81a6165413b9d16ab6`
- Field Display Policy: `LineMenuFDPSite`
- Configuration Template: `line-cft`
- Payload file: `put-payload.json`

Snippet of `put-payload.json`, showing the updated `alertingName` value to “Helpdesk”:

```
...

{
  "data": {
    "partyEntranceTone": "Default",
    "cfaCssPolicy": "Use System Default",
    "autoAnswer": "Auto Answer Off",
    "callForwardNotRegisteredInt": {
      "forwardToVoiceMail": false
    },
    "routePartitionName": "Site-locus1",
    "callForwardOnFailure": {
      "forwardToVoiceMail": false
    },
    "rejectAnonymousCall": false,
    "aarKeepCallHistory": true,
    "callForwardBusy": {
      "forwardToVoiceMail": false
    },
    "pattern": "90124",
    "patternPrecedence": "Default",
    "presenceGroupName": "Standard Presence group",
    "callForwardNoAnswer": {
      "forwardToVoiceMail": false
    },
    "callForwardNoCoverage": {
      "forwardToVoiceMail": false
    },
    "callForwardNotRegistered": {
      "forwardToVoiceMail": false
    },
    "usage": "Device",
    "alertingName": "Helpdesk",

...
```

```
$ curl -v
       -H 'Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA=='
       -H 'Content-Type:application/json'
       --data-binary @put-payload.json
       -X PUT 'http://localhost/api/relation/LineRelation/55b9fe59a6165413b9d17628/
               ?hierarchy=55b9dc81a6165413b9d16ab6
               &policy_name=LineMenuFDPSite
               &template_name=line-cft
               &nowait=true
               &format=json'
+ About to connect() to localhost port 80 (#0)
+ Trying 127.0.0.1... connected
> PUT /api/relation/LineRelation/55b9fe59a6165413b9d17628/
    ?hierarchy=55b9dc81a6165413b9d16ab6
    &policy_name=LineMenuFDPSite
    &template_name=line-cft
```

(continues on next page)

(continued from previous page)

```
    &nowait=true
    &format=json HTTP/1.1
> Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA==
> User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu)
              libcurl/7.22.0
              OpenSSL/1.0.1
              zlib/1.2.3.4
              libidn/1.23
              librtmp/2.3
> Host: localhost
> Accept: */*
> Content-Type:application/json
> Content-Length: 1926
> Expect: 100-continue
>
< HTTP/1.1 100 Continue
< HTTP/1.1 202 ACCEPTED
< Server: nginx/1.1.19
< Date: Thu, 30 Jul 2015 13:00:33 GMT
< Content-Type: application/json
< Transfer-Encoding: chunked
< Connection: keep-alive
< Vary: Accept, Cookie, Accept-Language, X-CSRFToken
< Content-Language: en-us
< Allow: GET, POST, PUT, PATCH, DELETE, HEAD, OPTIONS
< X-CSRFToken: GgxBBhTjkB2IUib2lHgIVzeohhmK2arc
< Set-Cookie: csrftoken=GgxBBhTjkB2IUib2lHgIVzeohhmK2arc;
   SameSite=Lax;
   httponly;
   Path=/
< Set-Cookie: sessionid=8skxwiqojuyz5xl37cdcflbr5ct5ncrk;
   SameSite=Lax;
   httponly;
   Path=/
<
+ Connection #0 to host localhost left intact
+ Closing connection #0
{"href": "/api/tool/Transaction/0bebcaa2-df37-420f-bd15-3a00ea056092/",
 "success": true,
 "transaction_id": "0bebcaa2-df37-420f-bd15-3a00ea056092"}
```

6.5. DELETE

- task: Delete instance `relation/LineRelation/55ba2482a6165413b9d19fb8`
- user: site administrator
- hierarchy: `55b9dc81a6165413b9d16ab6`
- Field Display Policy: `LineMenuFDPSite`
- Configuration Template: `line-cft`

```
$ curl -v
       -H 'Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA=='
       -X DELETE 'http://localhost/api/relation/LineRelation/55ba2482a6165413b9d19fb8/
                  ?hierarchy=55b9dc81a6165413b9d16ab6
                  &policy_name=LineMenuFDPSite
                  &template_name=line-cft
                  &nowait=true
                  &format=json'* About to connect() to localhost port 80 (#0)
+   Trying 127.0.0.1... connected
> DELETE /api/relation/LineRelation/55ba2482a6165413b9d19fb8/
         ?hierarchy=55b9dc81a6165413b9d16ab6
         &policy_name=LineMenuFDPSite
         &template_name=line-cft
         &nowait=true
         &format=json HTTP/1.1
> Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA==
> User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu)
              libcurl/7.22.0
              OpenSSL/1.0.1
              zlib/1.2.3.4
              libidn/1.23
              librtmp/2.3
> Host: localhost
> Accept: */*
>
< HTTP/1.1 202 ACCEPTED
< Server: nginx/1.1.19
< Date: Thu, 30 Jul 2015 13:21:00 GMT
< Content-Type: application/json
< Transfer-Encoding: chunked
< Connection: keep-alive
< Vary: Accept, Cookie, Accept-Language, X-CSRFToken
< Content-Language: en-us
< Allow: GET, POST, PUT, PATCH, DELETE, HEAD, OPTIONS
< X-CSRFToken: a6fFDYZyk9ET8K8xTq9HITFrRi8TROrV
< Set-Cookie: csrftoken=a6fFDYZyk9ET8K8xTq9HITFrRi8TROrV;
   SameSite=Lax;
   httponly;
   Path=/
< Set-Cookie: sessionid=9i0w39d1d32mdx6fs2skl564y8pmhmu9;
   SameSite=Lax;
   httponly;
   Path=/
<
+ Connection #0 to host localhost left intact
+ Closing connection #0
{"href": "/api/tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/",
 "success": true,
 "transaction_id": "01de8720-d627-4e53-8e1b-e1ad66edb7bd"}
```

6.6. Bulk Load Example

- task: Bulk load instances of `relation/LineRelation/`
- user: provider administrator
- hierarchy: `55b9daeca6165413b9d166de`
- Bulk load file: `LineRelation.xlsx`

Snippet of file to Bulk load: `LineRelation.xlsx`

# Hierarchy Node	# Device		# CFT Template	# Directory Number	# Alerting Name
sys.prov1.cust1. locus1	10.120.2.216, prov1.cust1	8443,	line-cft	90218	techsupport
sys.prov1.cust1. locus1	10.120.2.216, prov1.cust1	8443,	line-cft	90219	techsupport
sys.prov1.cust1. locus1	10.120.2.216, prov1.cust1	8443,	line-cft	90220	techsupport
sys.prov1.cust1. locus1	10.120.2.216, prov1.cust1	8443,	line-cft	90221	techsupport
sys.prov1.cust1. locus1	10.120.2.216, prov1.cust1	8443,	line-cft	90222	techsupport

Upload the file:

```
$ curl -v
       -H 'Authorization: Basic YWRtaW5AcHJvdjEuY29tOnBhc3N3b3Jk'
       -F uploadedfile='@LineRelation.xlsx'
       'http://localhost/api/uploadfiles/
        ?hierarchy=55b9daeca6165413b9d166de'* About to connect() to localhost port 80 (
↪#0)
+   Trying 127.0.0.1... connected
> POST /api/uploadfiles/?hierarchy=55b9daeca6165413b9d166de HTTP/1.1
> Authorization: Basic YWRtaW5AcHJvdjEuY29tOnBhc3N3b3Jk
> User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu)
              libcurl/7.22.0
              OpenSSL/1.0.1
              zlib/1.2.3.4
              libidn/1.23
              librtmp/2.3
> Host: localhost
> Accept: */*
> Content-Length: 10455
> Expect: 100-continue
> Content-Type: multipart/form-data;
                boundary=------------------------------5a0f36378f19
>
< HTTP/1.1 100 Continue
```

(continues on next page)

(continued from previous page)

```
< HTTP/1.1 200 OK
< Server: nginx/1.1.19
< Date: Thu, 30 Jul 2015 15:09:25 GMT
< Content-Type: text/html; charset=utf-8
< Transfer-Encoding: chunked
< Connection: keep-alive
< Vary: Accept-Encoding
< Vary: Accept, Cookie, Accept-Language, X-CSRFToken
< Content-Language: en-us
< Allow: POST, OPTIONS
< X-CSRFToken: C4ceiFEWSbjif1O4Jzhr1gZV9ytd9f2F
< Set-Cookie: csrftoken=C4ceiFEWSbjif1O4Jzhr1gZV9ytd9f2F;
   SameSite=Lax;
   httponly;
   Path=/
< Set-Cookie: sessionid=07z03pbatb1qelahcc01ygufgzsr6i35;
   SameSite=Lax;
   httponly;
   Path=/
<
+ Connection #0 to host localhost left intact
+ Closing connection #0
{"uploadedfiles": [
  {"name": "LineRelation.xlsx",
  "id": "55ba3e25a616541bb906b209"}
 ]}
```

Bulk load the file:

```
$ curl -v
       -H 'Authorization: Basic YWRtaW5AcHJvdjEuY29tOnBhc3N3b3Jk'
       -H 'Content-Type: application/json'
       -H 'accept: application/json'
       --data-binary '{"bulkload_file":"LineRelation.xlsx",
                       "execute_immediately":true}'
       -X POST 'http://localhost/api/tool/BulkLoad/?
                hierarchy=55b9daeca6165413b9d166de
                &method=bulkload_spreadsheet
                &nowait=true
                &format=json'
+ About to connect() to localhost port 80 (#0)
+ Trying 127.0.0.1... connected
> POST /api/tool/BulkLoad/
       ?hierarchy=55b9daeca6165413b9d166de
       &method=bulkload_spreadsheet
       &nowait=true
       &format=json HTTP/1.1
> Authorization: Basic YWRtaW5AcHJvdjEuY29tOnBhc3N3b3Jk
> User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu)
              libcurl/7.22.0
              OpenSSL/1.0.1
```

(continues on next page)

(continued from previous page)

```
              zlib/1.2.3.4
              libidn/1.23
              librtmp/2.3
> Host: localhost
> Content-Type: application/json
> accept: application/json
> Content-Length: 64
>
+ upload completely sent off: 64out of 64 bytes
< HTTP/1.1 202 ACCEPTED
< Server: nginx/1.1.19
< Date: Thu, 30 Jul 2015 14:51:22 GMT
< Content-Type: application/json
< Transfer-Encoding: chunked
< Connection: keep-alive
< Vary: Accept, Cookie, Accept-Language, X-CSRFToken
< Content-Language: en-us
< Allow: GET, POST, HEAD, OPTIONS
< X-CSRFToken: iFh5q8FUBxoXyyiLcELHoO8W5IDFbAiP
< Set-Cookie: csrftoken=iFh5q8FUBxoXyyiLcELHoO8W5IDFbAiP;
              httponly;
              Path=/
< Set-Cookie: sessionid=3ayny2y73i43u6sj9bdyoawhhtr8wbm8;
              httponly;
              Path=/
<
+ Connection #0 to host localhost left intact
+ Closing connection #0
{"href": "/api/tool/Transaction/16e1e599-494a-4898-944a-0528915d2f42/",
 "success": true,
 "transaction_id": "16e1e599-494a-4898-944a-0528915d2f42"}
```

6.7. Export Example

- task: Export an instance `relation/LineRelation/55ba3e55a6165413b9d1a18d` as a formatted `.xlsx` spreadsheet file called: `55ba3e55a6165413b9d1a18d.xlsx`
- user: provider administrator
- hierarchy: `55b9daeca6165413b9d166de`

```
$ curl -v
       -H 'Authorization: Basic YWRtaW5AcHJvdjEuY29tOnBhc3N3b3Jk'
       -o 55ba3e55a6165413b9d1a18d.xlsx
       'http://localhost/api/relation/LineRelation/55ba3e55a6165413b9d1a18d/export/
        ?hierarchy=55b9daeca6165413b9d166de
        &export_format=xlsx
        &template_name=line-cft
        &policy_name=LineMenuFDPProv
        &schema=true
```

(continues on next page)

(continued from previous page)

```
        &schema_rules=true'
+ About to connect() to localhost port 80 (#0)
+ Trying 127.0.0.1...   % Total    % Received % Xferd  Average Speed   Time    Time     ␣
↪Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0connected
> GET /api/relation/LineRelation/55ba3e55a6165413b9d1a18d/export/
      ?hierarchy=55b9daeca6165413b9d166de
      &export_format=xlsx
      &template_name=line-cft
      &policy_name=LineMenuFDPProv
      &schema=true
      &schema_rules=true HTTP/1.1
> Authorization: Basic YWRtaW5AcHJvdjEuY29tOnBhc3N3b3Jk
> User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu)
              libcurl/7.22.0
              OpenSSL/1.0.1
              zlib/1.2.3.4
              libidn/1.23
              librtmp/2.3
> Host: localhost
> Accept: */*
>
  0     0    0     0    0     0      0      0 --:--:--  0:00:02 --:--:--     0
< HTTP/1.1 200 OK
< Server: nginx/1.1.19
< Date: Thu, 30 Jul 2015 15:45:05 GMT
< Content-Type:
   application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
< Transfer-Encoding: chunked
< Connection: keep-alive
< X-CSRFToken: tey9Z6fdlDtwEMYczJ2UmSleIolfG4ys
< Content-Disposition: attachment;
    filename=relation_LineRelation_exportedsheet_formatted_2015-07-30_17-45-03.xlsx
< Content-Language: en-us
< Vary: Accept, Cookie, Accept-Language, X-CSRFToken
< Allow: GET, HEAD, OPTIONS
< Set-Cookie: fileDownloadToken=downloaded; Path=/
< Set-Cookie: csrftoken=tey9Z6fdlDtwEMYczJ2UmSleIolfG4ys;
   SameSite=Lax;
   httponly;
   Path=/
< Set-Cookie: sessionid=aioz1ykt36ht47fzthjpljektbg1z1yr;
   SameSite=Lax;
   httponly;
   Path=/
<
{ [data not shown]
100  9906    0  9906    0     0   3744      0 --:--:--  0:00:02 --:--:--  3745
+ Connection #0 to host localhost left intact
+ Closing connection #0
```

6.8. Example Transaction

- task: GET transaction instance `tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/`
- user: site administrator
- hierarchy: `55b9dc81a6165413b9d16ab6`

The transaction shows the workflow steps to delete the instance of the `relation/LineRelation`.

The example is from the JSON format of the transaction with detail: “Delete Line Relation”.

```
curl -v
     -H 'Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA==='
     'http://localhost/api/tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/
      ?hierarchy=55b9dc81a6165413b9d16ab6
      &nowait=true
      &format=json'
+ About to connect() to localhost port 80 (#0)
+ Trying 127.0.0.1... connected
> GET /api/tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/
      ?hierarchy=55b9dc81a6165413b9d16ab6
      &nowait=true
      &format=json HTTP/1.1
> User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu)
              libcurl/7.22.0
              OpenSSL/1.0.1
              zlib/1.2.3.4
              libidn/1.23
              librtmp/2.3
> Host: localhost
> Accept: */*
> Authorization: Basic YWRtaW5AbG9jdXMxLmNvbTpwYXNzd29yZA==
>
< HTTP/1.1 202 ACCEPTED
< Server: nginx/1.1.19
< Date: Fri, 31 Jul 2015 11:44:27 GMT
< Content-Type: application/json
< Transfer-Encoding: chunked
< Connection: keep-alive
< Vary: Accept, Cookie, Accept-Language, X-CSRFToken
< Content-Language: en-us
< Allow: GET, POST, HEAD, OPTIONS
< X-CSRFToken: pcWhI6fzSbevYskrNVcP34JDZOWH6Nti
< Set-Cookie: csrftoken=pcWhI6fzSbevYskrNVcP34JDZOWH6Nti;
   SameSite=Lax;
   httponly;
   Path=/
< Set-Cookie: sessionid=nyoefznzm1qy9t51qq6v2x0vgkmbvbij;
   SameSite=Lax;
   httponly;
   Path=/
<
```

Response JSON `data` attribute snippet showing some workflow steps:

```
{

...

  "data": {
    "username": "admin",
    "status": "Success",
    "rolled_back": "No",
    "resource": {
      "hierarchy": "sys.prov1.cust1.locus1",
      "model_type": "relation/LineRelation",
      "current_state": "/api/relation/LineRelation/55ba2482a6165413b9d19fb8/ Entity",
      "pkid": "55ba2482a6165413b9d19fb8"
    },
    "log": [
      {
        "severity": "info",
        "format": "text",
        "log_id": "55ba24bea6165413b9d19fcd",
        "href": "/api/tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/log/
                ?log_id=55ba24bea6165413b9d19fcd",
        "time": "2015-07-30T13:21:02.637000",
        "message": "Step 2 - End",
        "transaction_id": "01de8720-d627-4e53-8e1b-e1ad66edb7bd"
      },
      {
        "severity": "info",
        "format": "text",
        "log_id": "55ba24bea6165413b9d19fcc",
        "href": "/api/tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/log/
                 ?log_id=55ba24bea6165413b9d19fcc",
        "time": "2015-07-30T13:21:02.637000",
        "message": "Step 2 - Condition unmet, skipping step. \n[\n
                    ..(SNIPPED)
        "transaction_id": "01de8720-d627-4e53-8e1b-e1ad66edb7bd"
      },
      {
        "severity": "info",
        "format": "text",
        "log_id": "55ba24bea6165413b9d19fcb",
        "href": "/api/tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/log/
                 ?log_id=55ba24bea6165413b9d19fcb",
        "time": "2015-07-30T13:21:02.609000",
        "message": "Step 2 - Start update data/InternalNumberInventory\nat hierarchy␣
↪level
                   ..(SNIPPED)
        "transaction_id": "01de8720-d627-4e53-8e1b-e1ad66edb7bd"
      },
      {
        "severity": "info",
        "format": "text",
```

(continues on next page)

(continued from previous page)


```
        "log_id": "55ba24bea6165413b9d19fca",
        "href": "/api/tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/log/
                 ?log_id=55ba24bea6165413b9d19fca",
        "time": "2015-07-30T13:21:02.605000",
        "message": "Step 1 - End",
        "transaction_id": "01de8720-d627-4e53-8e1b-e1ad66edb7bd"
      },
      {
        "severity": "info",
        "format": "text",
        "log_id": "55ba24bda6165413b9d19fc5",
        "href": "/api/tool/Transaction/01de8720-d627-4e53-8e1b-e1ad66edb7bd/log/
                 ?log_id=55ba24bda6165413b9d19fc5",
        "time": "2015-07-30T13:21:01.280000",
        "message": "Step 1 - Start remove device/cucm/Line\n
         at hierarchy level sys.prov1.cust1.locus1",
        "transaction_id": "01de8720-d627-4e53-8e1b-e1ad66edb7bd"
      },


...
```


7. Backward Compatibility

7.1. API Backward Compatibility and Import

The VOSS Automate system maintains a Data Model version data store containing all versions that have been imported onto the system.

While there is always a current version of a Data Model in use on the system, a check is carried out during the import of data:

- If the current version is newer than the definition of the imported data, then the imported definition data is flagged internally as automigration: false to prevent resources from auto-migrating from a newer version to an older version.
- Importing an older version will not replace the latest definition as the default schema. The older version will only be added to the version store.

The snippet example below shows the automigration attribute:

```
{ "meta": {},
 "resources": [
   { "data": {
     "name": "test_mig_dm"
     ...
     },
     "meta": {
       "hierarchy": "sys",
       "model_type": "data/DataModel",
       "schema_version": "0.1",
       "version_tag": "0.3",
       "automigration": false
     }
   }
 ]
}
```

This model definition version store makes it possible for version definition imports to be sequence independent, allowing a freshly installed system to construct the version history for backwards compatibility.

8. General API Reference

8.1. Using the API Reference

For each resource, a study of the general Reference for Actions in conjunction with the lists of actions for a resource provides the reference for the resource.

The Field Reference for a resource provides payload details. The list below explains the Field Reference for a resource:

- The field Title is indicated in bold. An asterisk indicates the field is mandatory.
- If the field Type is an array, its the Field Name has a [n] suffix.
- Object and array names are listed to provide the context of fields.
- If a field belongs to an object or an array, the full name is in dot separated notation.
- Where cardinality is shown, the range is [MinItems..MaxItems].
- If a field has a Default value, the value is shown.
- If a field has a Pattern, the regular expression pattern is shown.

In addition, a number of conventions are followed some general guidelines should be noted.

- The full URL includes the host name: `https://[hostname]`; for example, `https://172.29.232.62`
- Variables are enclosed in square brackets.
- [hierarchy] is the hierarchy which can be specified as:
  - UUID (Universally Unique Identifier); for example, `1c012432c0deab00da595101` or
  - In dot notation; for example, `ProviderName.CustomerName.LocationName`

  For a list of available hierarchy UUIDs and their dot notations, refer to the data in the response of the call:

```
GET /api/data/HierarchyNode/?format=json
```

- [pkid] is the ID of the resource instance. Refer to the List action reference for the resource.
- [filename] refers to a file.
- where a custom action (with "+" in the URL) is available, the POST method is used to execute the Provisioning workflow with the name following the "+". For more information, consult the custom workflow section of the API Guide.
- Note that in the VOSS Automate portal, the `auth_token` is extracted from the `target` in the schema snippet below and instead of a parameter, sent as an `Authorization` header.

Relations, Domain models, and Views may have parameters where the choices are constructed from unexposed models (and that may not be available in the API Reference). You can obtain these choices by using the URL specified in the `target` attribute of the schema of parameter.

To illustrate, below is an extract of the schema for a model called relation/SystemUser that contains a parameter SSOUser, which links a user in the system to a user in an SSO identity provider server. This is done by mapping the SSO user name (sso_username) of the user in the SSO server (sso_idp) to a user in VOSS Automate (data/User).

The schema of relation/SystemUser shows that the choices that are available from SSO Identity provider servers are stored in the model data/SsoIdentityProvider. The list of SSO identity providers could be obtained by using the URL in the `target` attribute of the schema.

```
GET /api/relation/SystemUser/?hierarchy=[hierarchy]
  &format=json
  &schema=1
```

The following is an extract of the schema of relation/SystemUser:

```
...

"SSOUser": {
            "items": {
                 "type": "object",
                 "properties": {
                      "sso_username": {
                           "required": true,
                           "type": "string",
                           "description": "The name identifier that is used for
                             an SSO authenticated user.",
                           "title": "SSO Username"
                      },
                      "sso_idp": {
                           "target": "/api/data/SsoIdentityProvider/choices/
                              ?hierarchy=[hierarchy]
                              &field=entity_id
                              &format=json
                              &auth_token=[auth_token]",
                           "format": "uri",
                           "required": true,
                           "choices": [],
                           "target_attr": "entity_id",
                           "target_model_type": "data/SsoIdentityProvider",
                           "title": "SSO Identity Provider",
                           "type": "string",
                           "description": "The entity id of the SSO Identity
                             Provider."
                      },

 ...
```

8.2. API Schema

The schema for a resource is obtained in the request parameter:

```
?format=json&schema=1
```

This way of requesting the schema is only available when requesting an Add form or when viewing a resource.

A specific url is also available for obtaining the schema of a resource:

```
GET /api/{model_type}/{model_name}/schema/?format=json&hierarchy=pkid
```

All the schemas are in JSON format.

To see a specific resource API schema, refer to the API Reference page for the resource in the API Reference material on the documentation portal.

8.3. Notifications

VOSS Automate APIs support sending out notifications when instances of certain models are added or changed. For more details on which models are supported for notifications, and how to configure these notifications please refer to the topics on:

- Alerts in the VOSS Automate Core Feature Guide
- SNMP Traps in the Platform Guide

8.4. Meta data

8.4.1. Metadata

The metadata of a resource provides :

- **tags**: List of instance tag names - for tag management, see *API Parameters*.
- **version_tag**: List of version tags - for version tag management, see *API Parameters*.
- **model_type**: The complete model type with name.
- **references**: Information of how this resource relates to other resources
- **summary_attrs**: Summary attributes used for list views.
- **actions**: The actions that can be performed in this resource
- **path**: The hierarchy (business node) path to the existing resource
- **singleton**: If set, instances of the resource can be restricted to one per system or hierarchy.

These are discussed in more detail elsewhere in this guide.

8.4.2. References

References in the system represent the reference of an entity in the system as Hypermedia as the Engine of Application State (HATEOS). Each reference position is represented by an object pair pkid and href.

- **device**: A list of one device that relates the resource to a device resource in the system.
- **owner**: The owner reference would exist if the current resource was created by a Domain Model (feature model)
- **self**: A list of containing a reference to the current resource.
- **parent** (reserved for hierarchy): An entry containing the parent in the hierarchy: zero for root node, one for other resources.
- **children** (reserved for hierarchy): A list of zero or more children in the hierarchy tree below the resource.

For example:

```
"references": {
    "device": [{
        "pkid": "",
        "href": ""
    }],
    "owner": [{
        "pkid": "",
        "href": ""
    }],
    "self": [{
        "pkid": "5135fc0f31790a3000a83b2b",
        "href": "/api/data/CallManager/5135fc0f31790a3000a83b2b"
    }],
    "children": [],
    "parent": [{
        "pkid": "5135fb8331790a2ffee7d7ab",
        "href": "/api/data/HierarchyNode/5135fb8331790a2ffee7d7ab"
    }]
}
```

8.4.3. Summary Attributes

For resources that will be displayed on the GUI as a summarized list, data fields can be selected for this list. Members of the **summary_attr** list identify:

- **title** as the list column header on the GUI display

  Note: If the default Field Display Policy for the resource contains a value, this will be displayed in the column header.

- **name** as the resource field to show in the column of the list

For example:

```
summary_attrs: [
  {
   title: "Name"
   name: "name"
  }
  {
   title: "Description"
   name: "description"
  }
]
```

8.4.4. Path

The **path** object in the meta of a specific resource contains the list of parent pkid values in the hierarchy sequence to which the resource belongs. This list represents the navigation path from the root node of the hierarchy to the specific resource.

Example

```
path: [
 "50c1e21fa61654441dd8edc4",
 "50c1e2a2a61654441eaebcf8",
 "50c1e2a4a61654441eaebcfe",
 "50c1e2a6a61654441eaebd01"
]
```

In the example above, the **path** to the current resource node is:

```
"50c1e21fa61654441dd8edc4" (ancestor)

--> "50c1e2a2a61654441eaebcf8" (ancestor)

    --> "50c1e2a4a61654441eaebcfe" (parent)

        --> "50c1e2a6a61654441eaebd01" (current node)
```

8.4.5. Model Type

Model type is referenced from **model_type** in the schema. The reference is to the type of model and the model name - see: model_type .

Example

"data/CallManager" in

```
{"meta":
       {"model_type": "data/CallManager",
       ...
       },
}
```

8.4.6. Actions

The actions in the metadata of a resource schema provide HTTP method calls to a resource for a number of purposes. The available actions in the schema depend on whether the call request is:

- to a *specific* resource, i.e. pkid is specified in the call, or
- to the resource *in general*, i.e. no pkid in the call
- the actions contain a schema property to indicate which requests will support asynchronous transaction handling. This behavior is controlled by the `nowait` parameter in the URL.

8.4.7. Singleton

The Data model type resource called `data/Datamodel` has an attribute `singleton` that can take any of 3 values:

- None (default): no singleton constraint
- `system`: a system singleton that only allows one instance throughout the system
- `hierarchy`: a hierarchy singleton that only allows one instance every hierarchy

For example, the snippet below shows a simple `data/Datamodel` instance called `LoginBanner` that can itself only have one instance per hierarchy:

```
"data": {
    "doc": "doc",
    "Meta": {
        "operations": [
            "add",
            "clone",
            "export",
            "export_bulkload_template",
            "get",
            "help",
            "move",
            "list",
            "migration",
            "transform",
            "remove",
            "tag",
            "tag_version",
            "update",
            "field_display_policy"
        ],
        "summary_attrs": [
            "login_banner"
        ],
        "singleton": "hierarchy",
        "attr_props": [
            {
                "title": "Login Banner",
                "required": true,
```

(continues on next page)

(continued from previous page)

```
                "type": "string",
                "displayable": true,
                "name": "login_banner"
            }
        ]
    },
    "name": "LoginBanner"
}
```

8.5. Generic Actions

8.5.1. Choices Generic Action

Format:

```
GET http://<server_address>/api/<resource_type>/<resource_name>/choices/
 ?hierarchy=[hierarchy]
 &format=json
```

Action	choices
Description	Get a list of resource instances at a hierarchy as value-title pairs. Requires a business key in the resource model definition.
Method	GET
URL	/api/<resource_type>/<resource_name>/choices/ or without resource specification: /api/choices/
Parameters	hierarchy=[hierarchy], format=json, pagination parameters (see API Parameters), filter parameters (see Filter Parameters for Choices).
Response	A JSON payload with: • pagination details • meta information: query, list of instance references with `pkid` and `href` of data • choices data: list of value-title pairs of the business keys. On the GUI choices list, the response title displays, while the value is returned. Filter parameters can modify this standard behavior - see Filter Parameters for Choices.
support_async	false

Example:

- Request

```
GET http://<server_address>/api/data/Countries/choices/
 ?hierarchy=[hierarchy]
 &format=json
```

- Response

```
HTTP 200 OK
Vary: Accept
X-Request-ID: 9bcd77b4cd27dccd0f18a1d8d22e7ddab85aa848
Content-Type: text/html; charset=utf-8
Allow: GET, HEAD, OPTIONS
Response-Content:
{

    pagination : {
        direction :  asc,
        maximum_limit :  2000,
        skip :  0,
        limit :  0,
        total_limit : null,
        total :  37
    },
    meta : {
        query :  /api/data/Countries/choices/,
        references : [
           {
               pkid :  5a16c3c68963f91b84baf357,
               href :  /api/data/Countries/5a16c3c68963f91b84baf357/
           },
           ...
        ]
    },
    choices : [
        {
            value :  ["Australia", "AUS", "hcs"],
            title :  ["Australia", "AUS", "hcs"]
        },
        ...
```

8.5.2. Add Generic Action

Action	add
title	Get the GUI Add form.
method	GET
URL	/api/<resource_type>/<resource_name>/add/
Parameters	hierarchy=[hierarchy], format=json
Response	The schema of <resource_type>/<resource_name> as JSON
support_async	false
class	add

When adding the `&schema=1` parameter, the response contains the schema of the payload for the Create action.

The schema required to add the resource may be different from the schema that is used to obtain the details of the resource. Refer to the schema of the GUI Add form.

The actions in the response shows the URL for the POST API call to create an instance (see Create action).

For example, the request below shows the required details. (Using variables [hierarchy])

Request:

```
GET /api/data/AccessProfile/add/
  ?hierarchy=[hierarchy]
  &format=json
  &schema=1
```

Response snippet - POST call:

```
"create": {
     "class": "add",
     "href": "/api/data/HierarchyNode/?hierarchy=[hierarchy]",
     "method": "POST",
     "support_async": true,
     "title": "Create"
 }
```

Response snippet - schema:

```
"schema": {
   "$schema": "http://json-schema.org/draft-03/schema",
   "properties": {
       "description": {
           "description": "A general description for the hierarchy node.",
           "title": "Description",
           "type": "string"
       },
       "name": {
           "description": "The name by which this hierarchy node will
             be known.",
           "pattern": "^[A-Za-z0-9_\\- ]+$",
           "required": true,
           "title": "Name",
           "type": "string"
       },
       "node_type": {
           "choices": [],
           "description": "A type label for this node which refers
             to a Hierarchy Node Type.",
           "format": "uri",
           "is_password": false,
           "items": {
               "is_password": false
           },
           "readonly": false,
           "required": false,
           "target": "/api/data/HierarchyNodeType/choices/?hierarchy=[hierarchy]",
```

(continues on next page)

(continued from previous page)

```
            "target_attr": "name",
            "target_model_type": "data/HierarchyNodeType",
            "title": "Hierarchy node type",
            "type": "string"
        }
    },
    "schema_version": "0.1",
    "type": "object"
},
```

8.5.3. Bulk Update Generic Action

Action	bulk_update (1)
title	First task: Obtain the URL and schema needed to construct the payload to modify the resource.
method	GET
URL	/api/<resource_type>/<resource_name>/bulk_update/
Parameters	hierarchy=[hierarchy], format=json
Response	Returns: POST call that is used to update the instances of resource schema that is used to create POST payload.
support_async	false
class	update

Action	bulk_update (2)
title	Second task: Perform the bulk modify on the required list of instances each with [pkid] with the payload constructed from the schema in the first task.
method	POST
URL	/api/<resource_type>/<resource_name>/bulk_update/
Parameters	hierarchy=[hierarchy], format=json
Payload	Contains update data and instance pkids to update.

Use the GET request to obtain a list of instance pkids to select for the bulk update:

```
GET /api/<resource_type>/<resource_name>/?hierarchy=[hierarchy]&format=json
```

As an example, the request below shows the required details for a particular model. (Using variables [hierarchy], [pkid1], [pkid2])

Request for POST call and schema:

```
GET /api/data/AccessProfile/bulk_update/
  ?hierarchy=[hierarchy]
  &schema_rules=true
  &format=json
  &schema=1
```

Response snippet - POST call:

```
"bulk_update": {
     "class": "update",
     "href": "/api/data/AccessProfile/bulk_update/?hierarchy=[hierarchy]",
     "method": "POST",
     "support_async": true,
     "title": "Bulk Modify"
}
```

Response snippet - schema:

```
"schema": {
   "$schema": "http://json-schema.org/draft-03/schema",
   "properties": {
     "description": {
       "description": "A description for the Access Profile.",
       "required": false,
       "title": "Description",
       "type": "string"
     },
     "full_access": {
       "description": "Enabling this flag, grants the user full
         system access.",
       "required": false,
       "title": "Full Access",
       "type": "boolean"
     },
     "miscellaneous_permissions": {
       "description": "The list of miscellaneous operations permitted by
         this Access Profile.",
       "items": {
         "choices": [
           {
             "title": "",
             "value": ""
           }
         ],
         "type": "string"
       },
       "required": false,
       "title": "Miscellaneous Permissions",
       "type": "array"
     },
     "name": {
       "description": "The name that is given to the Access Profile.",
```

(continues on next page)

(continued from previous page)


```
        "required": false,
        "title": "Name \*",
        "type": "string"
      },
      "type_specific_permissions": {
        "description": "The list of types that are permitted by
          this Access Profile.",
        "items": {
          "properties": {
            "operations": {
              "description": "The operations that are permitted by this Access
                Profile for the given type.",
              "items": {
                "choices": [
                  {
                    "title": "",
                    "value": ""
                  }
                ],
                "type": "string"
              },
              "required": false,
              "title": "Permitted Operations \*",
              "type": "array"
            },
            "type": {
              "choices": [],
              "description": "The type that is permitted by this Access Profile.
                This field supports the use of the * wildcard.",
              "format": "uri",
              "required": false,
              "target": "/api/choices/?hierarchy=[hierarchy]&format=json",
              "target_model_type": "",
              "title": "Permitted Type \*",
              "type": "string"
            }
          },
            "type": "object"
        },
        "required": false,
        "title": "Type Specific Permissions",
        "type": "array"
      }
},
"schema_version": "0.1.8",
"type": "object"
},
```


Example POST request to carry out the update:

```
POST /api/data/AccessProfile/bulk_update/
```

(continues on next page)

(continued from previous page)

```
  ?hierarchy=[hierarchy]
  &nowait=true
  &format=json
```

Payload example - bulk updating the description of instances having pkid1, pkid2 with the string “profile”:

```
{"data":{"description":"profile"},
 "meta":{
   "references":{
     "form_href":"/api/data/AccessProfile/bulk_update/
       ?hierarchy=[hierarchy]
       &schema=
       &schema_rules=true"
   }
 },
 "request_meta":{
   "hrefs":[
     "/api/data/AccessProfile/[pkid1]",
     "/api/data/AccessProfile/[pkid2]"
   ]
 }
}
```

8.5.4. Clone Generic Action

Action	clone
Title	Clone instance with [pkid]. The schema rules are applied.
Method	GET
URL	/api/<resource_type>/<resource_name>/[pkid]/clone/
Parameters	hierarchy=[hierarchy], schema=true, schema_rules=true
Response	A JSON payload with: A POST action URL. The unchanged model [pkid] payload to be modified to create a new instance.
support_async	false
Class	clone

- For the instance pkids that can cloned, refer to the List GET call for the resource:

```
GET http://<server_address>/api/<resource_type>/<resource_name>/
 ?hierarchy=[hierarchy]
 &format=json
```

- Use the POST action in the response and a modification of the response as the payload to create the clone of the the instance with pkid.

8.5.5. Configuration Template Generic Action

Action	configuration_template
title	Obtain the schema and URL needed to create a Configuration Template instance for the resource.
method	GET
URL	/api/<resource_type>/<resource_name>/configuration_template/
Parameters	hierarchy=[hierarchy]
Response	POST call to create the schema for the configuration template of specified resource.
support_async	false
class	config

- Use the returned properties to create the POST payload data for the specified resource.
- For a details on what to add to the POST payload, see the schema in the response.
- The POST call is of the format:

```
POST http://<server_address>/api/data/ConfigurationTemplate/
  ?hierarchy=sys
```

For example, the request:

```
GET /api/data/AccessProfile/configuration_template/
  ?hierarchy=[hierarchy]
  &format=json
  &schema=true
  &schema_rules=true
```

The response includes the required POST call:

```
"create": {
  "class": "add",
  "href": "/api/data/ConfigurationTemplate/?hierarchy=[hierarchy]",
  "method": "POST",
  "support_async": true,
  "title": "Create"
}
```

The response includes the Configuration Template schema for the relevant model. The `template` property of the schema applies to the relevant model. This schema is used to create a payload for the POST.

A simple example of a payload containing a Configuration Template for a model `data/AccessProfile` with name “CFT1” that adds a value to the Access Profile description “Access Profile for:”:

```
{"data":
 {"name":"CFT1",
  "target_model_type":"data/AccessProfile",
  "merge_strategy":"additive",
```

(continues on next page)

(continued from previous page)

```
  "template":{
    "description":"Access Profile for:"}
 },
 "request_meta":{},
 "meta":{
    "references":{
      "form_href":"/api/data/AccessProfile/configuration_template/
        ?hierarchy=[hierarchy]"
    }
 }
}
```

8.5.6. Create Generic Action

Action	create
title	Create an instance of a resource.
method	POST
URL	/api/<resource_type>/<resource_name>/
Parameters	hierarchy=[hierarchy]
Payload	See add schema of the object for the payload specification
support_async	true
class	add

Response is a pkid of the created instance.

To obtain the schema of the resource, use the GET request:

```
GET /api/<resource_type>/<resource_name>/
?hierarchy=[hierarchy]
&format=json
```

To apply a configuration template when creating the resource, use the parameter `&configuration_template` with its value the name of an existing Configuration Template. For details on the parameter, refer to the topic on API parameters.

8.5.7. Delete Generic Action

Action	Delete
title	Delete instance with [pkid]
method	DELETE
URL	/api/<resource_type>/<resource_name>/[pkid]/
Parameters	hierarchy=[hierarchy]
Payload	N/A
support_async	true
Class	delete

Action	Bulk Delete
Title	Bulk delete [pkid1],[pkid2]. . .
Method	DELETE
URL	/api/<resource_type>/<resource_name>/
Parameters	hierarchy=[hierarchy]
Payload	{“hrefs”:[“/api/<resource_type>/<resource_name>/[pkid1]”, “/api/<resource_type>/<resource_name>/[pkid2]”, . . .]}
support_async	true
Class	delete

For the instance pkids [pkid1],[pkid2], . . . that can be added to the DELETE call payload (the instance pkids to delete), use to the GET call for the resource.

```
GET /api/<resource_type>/<resource_name>/
  ?hierarchy=sys
  &format=json
```

8.5.8. Execute Generic Action

Action	Execute (instance)
Title	Execute
Method	POST
URL	/api/<resource_type>/<resource_name>/execute/
Parameters	hierarchy=[hierarchy]
Support Async	true
Class	execute

For example, execute a data synchronization action for a device. In this case, the call would be:

```
POST /api/data/DataSync/[pkid]/execute/
  ?hierarchy=[hierarchy]
  &nowait=true
  &format=json
```

And for a device `data/CallManager`, the payload would be similar to:

```
{
    "data": {
        "asynchronous": false,
        "device_type": "data/CallManager",
        "model_type_list": "minimum CUCM models",
        "name": "minimum CUCM models",
        "refresh_existing_data": true,
        "sync_type": "pull"
    },
    "meta": {
        "references": {
            "form_href": "/api/data/DataSync/[pkid]/
             ?hierarchy=[hierarchy]"
        }
    },
    "request_meta": {}
}
```

8.5.9. Export Generic Action

Action	export (instance)
Task	Get a selected [export_format] of the schema and a single instance with [pkid] of <resource_type>/<resource_name>; optionally with tag_version at [version] and Configuration Template as [configtemplate].
Call	GET
URL	/api/<resource_type>/<resource_name>/export/[pkid]/
Parameters	hierarchy=[hierarchy], version=[version], export_format=[raw_xlsx|xlsx|json], schema=, schema_rules=, template_name=[configtemplate]
Response	The response is an attachment: a compressed zip of the JSON file
support_async	false
Class	export

For `export_format=raw_xlsx`, the response is a "raw" MS Excel spreadsheet with columns corresponding to the JSON format export and response format:

```
Content-Disposition: attachment;
  filename=<resource_type>_<resource_name>_exportedsheet_CCYY-MM-DD_HH-MM-SS.xlsx
```

(continues on next page)

(continued from previous page)

```
Content-Language:en
Content-Type:
  application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
```

For `export_format=xlsx`, the response is a MS Excel spreadsheet, formatted to show all columns and response format:

```
Content-Disposition: attachment;
  filename=<resource_type>_<resource_name>_exportedsheet_formatted_CCYY-MM-DD_HH-MM-SS.
↪xlsx
Content-Language:en
Content-Type:
  application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
```

For `export_format=json`, the response is a time stamped zip file of data in JSON and a response format:

```
Content-Disposition: attachment;
  filename=export_CCYY-MM-DD_HH:MM:SS.MS.json.zip
Content-Language:en
Content-Type:application/x-zip
```

The XLSX format can be used to bulk load instances of the resource and the JSON format can be used to import instances of the resource.

Action	Bulk Export
Title	Get a selected [export_format] the schema and instances [pkid1], [pkid2],... of the resource; optionally with tag_version at [version] and Configuration Template as [configtemplate].
Method	POST
URL	/api/<resource_type>/<resource_name>/export/
Parameters	hierarchy=[hierarchy], version=[version], export_format=[raw_xlsx|xlsx|json], schema=, schema_rules=, template_name=[configtemplate]
Payload	{"hrefs": ["/api/<resource_type>/<resource_name>/[pkid1]", "/api/<resource_type>/<resource_name>/[pkid2]", ...]}
support_async	true
Class	export

For `export_format=raw_xlsx`, the response is a MS Excel spreadsheet and response format:

```
Content-Disposition: attachment;
  filename=<resource_type>_<resource_name>_exportedsheet_CCYY-MM-DD_HH-MM-SS.xlsx
Content-Language:en
Content-Type:
  application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
```

For `export_format=xlsx`, the response is a MS Excel spreadsheet and response format:

```
Content-Disposition: attachment;
  filename=<resource_type>_<resource_name>_exportedsheet_formatted_CCYY-MM-DD_HH-MM-SS.
↪xlsx
Content-Language:en
Content-Type:
  application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
```

For `export_format=json`, the response is a time stamped export zip file and a response format:

```
Content-Disposition: attachment;
  filename=export_CCYY-MM-DD_HH:MM:SS.MS.json.zip
Content-Language:en
Content-Type:application/x-zip
```

The XLSX format can be used to bulk load instances of the resource and the JSON format can be used to import instances of the resource.

To get the list of all instance pkids [pkid1],[pkid2], . . . , use the List action of the resource:

```
GET http://<server_address>/api/<resource_type>/<resource_name>/
  ?hierarchy=sys
```

8.5.10. Export BulkLoad Template Generic Action

Action	export_bulkload_template
Title	Get a compressed file of the Bulk Load spread sheet template for the resource, optionally with a Field Display Policy as [policy] or Configuration Template as [configtemplate].
Method	POST
URL	/api/<resource_type>/<resource_name>/export_bulkload_template/
Parameters	hierarchy=[hierarchy], policy_name=[field_display_policy], template_name=[configtemplate], schema=, schema_rules=
Response	The response is an attachment of the format: <resource_type>_<resource_name>_bulkloadsheet.xlsx
support_async	true
Class	export

Example request:

```
POST /api/data/DATA1/export_bulkload_template/
 ?hierarchy=[hierarchy]
 &template_name=[configtemplate]
 &policy_name=[field_display_policy]
 &schema=
 &schema_rules=
 &format=json
```

Example response:

```
HTTP/1.1 200 OK
Server: nginx/1.1.19
Date: Mon, 09 Mar 2015 15:13:06 GMT
Content-Type: application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
Transfer-Encoding: chunked
Connection: keep-alive
Vary: Accept, Cookie, Accept-Language
Content-Language: en-us
Allow: POST, OPTIONS
Content-Disposition: attachment; filename=data_DATA1_bulkloadsheet.xlsx
```

The returned spreadsheet will reflect the applied Configuration Template and Field Display Policy as indicated in the POST parameters.

8.5.11. Field Display Policy Generic Action

Action	field_display_policy
title	Obtain the schema and URL needed to create a Field Display Policy instance for the resource.
method	GET
URL	/api/<resource_type>/<resource_name>/field_display_policy/
Parameters	hierarchy=[hierarchy]
Response	Field Display Policy schema and rules that include the POST and a reference to the target model used to create the field display policy for the resource.
support_async	false
class	display_policy

- Use the action in the response to create the POST payload for the specified resource.

The response snippet below shows the POST method to create the Field Display Policy:

```
"meta": {
   "actions": [
      {
       "create": {
         "class": "add",
         "href": "/api/data/FieldDisplayPolicy/
          ?hierarchy=[hierarchy]
          &policy_name=[field_display_policy]",
         "method": "POST",
         "support_async": true,
         "title": "Create"
          }
 ...
```

- The Field Display Policy schema in the response shows properties to add to the POST payload.

Example POST payload for target model `data/DATA1` (from an Admin Portal form with `[form_FDP]` and `[form_CFG]` applicable):

```
{
  "data": {
    "field_overrides": [
      {
       "field": "name",
       "help_text": "Help Name"
      }
    ],
    "groups": [
      {
       "fields": [
        "name",
        "surname"
       ],
       "title": "G1"
      }
    ],
    "name": "FDP2",
    "target_model_type": "data/DATA1"
  },
  "meta": {
    "references": {
      "form_href": "/api/data/DATA1/field_display_policy/
       ?hierarchy=[hierarchy]
       &policy_name=[form_FDP]
       &template_name=[form_CFG]"
    }
  },
  "request_meta": {}
}
```

8.5.12. Help Generic Action

Action	help
Title	Get the on-line Help for the resource.
Method	GET
URL	/api/<resource_type>/<resource_name>/help
Parameters	hierarchy=[hierarchy]
Response	On-line help of the resource as HTML
support_async	false
class	help

8.5.13. List Generic Action

Action	list
title	List the resources of a given type in the system.
method	GET
URL	/api/<resource_type>/<resource_name>/
Parameters	hierarchy=[hierarchy], format=json. The schema is returned irrespective of whether the parameter `&schema=true` is sent.
Response method	The <resource_type>/<resource_name> schema and all instances in JSON format.
support_async	false
class	list

8.5.14. Update Generic Action

Action	update (instance) (same for modify)
title	Modify an instance of a resource
method	PUT
URL	/api/<resource_type>/<resource_name>/[pkid]
Parameters	hierarchy=[hierarchy]
Payload	See the schema of the resource for the payload specification
support_async	true
class	update

The update action replaces current resource values with the payload values. The payload should contain the all the attributes in schema.

The response is a pkid of the updated instance.

To apply a configuration template when creating the resource, use the parameter `&configuration_template` (for further information on the API parameter, see the API Guide).

8.6. Custom Device Connection Actions

8.6.1. Import

Action	import (instance)
Title	Execute
Method	POST
URL	/api/<resource_type>/<resource_name>/import/
Parameters	hierarchy=[hierarchy]
Support	Async
Class	import

For example, a full synchronization of the VOSS Automate cache with a device.

8.6.2. Test Connect

Action	test_connect (instance)
Title	Test Connection
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/test_connect/
Parameters	hierarchy=[hierarchy], format=json
Support Async	true
Class	test_connection

8.7. Custom Device Actions

8.7.1. Apply

Action	apply
Title	Apply
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/+apply/
Parameters	hierarchy=[hierarchy], format=json
View	/api/<resource_type>/<resource_name>/[pkid]/+apply/schema/
Support Async	true
Class	custom

8.7.2. Assign

Action	assign
Title	Assign
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/+assign/
Parameters	hierarchy=[hierarchy], format=json
View	/api/<resource_type>/<resource_name>/+assign/schema/
Support Async	true
Class	custom

For example, device/cucm/PresenceUser

8.7.3. Do

Action	do
Title	.
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/+do/
Parameters	hierarchy=[hierarchy], format=json
View	/api/<resource_type>/<resource_name>/+do/schema/
Support Async	true
Class	custom

Example resources:

- cucm/AuthenticateUser
- cucm/DeviceLogin
- cucm/DeviceLogout
- etc. . .

8.7.4. Lock

Action	lock
Title	Lock
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/+lock/
Parameters	hierarchy=[hierarchy], format=json
View	/api/<resource_type>/<resource_name>/+lock/schema/
Support Async	true
Class	custom

For example, a cucm phone.

8.7.5. Promote

Action	promote
Title	Promote
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/+promote/
Parameters	hierarchy=[hierarchy], format=json
View	/api/<resource_type>/<resource_name>/+promote/schema/
Support Async	true
Class	custom

8.7.6. Reset

Action	reset
Title	Reset
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/+reset/
Parameters	hierarchy=[hierarchy], format=json
View	/api/<resource_type>/<resource_name>/+reset/schema/
Support Async	true
Class	custom

8.7.7. Vendor Config

Action	vendor_config
Title	Vendor Config
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/+vendor_config/
Parameters	hierarchy=[hierarchy], format=json
View	/api/<resource_type>/<resource_name>/+vendor_config/schema/
Support Async	true
Class	vendor_config

8.7.8. Wipe

Action	wipe
Title	Wipe
Method	POST
URL	/api/<resource_type>/<resource_name>/[pkid]/+wipe/
Parameters	hierarchy=[hierarchy], format=json
View	/api/<resource_type>/<resource_name>/+wipe/schema/
Support Async	true
Class	custom

8.7.9. Update LDAP Authentication

Action	update_ldap_auth
Title	Set up device/cucm/LdapAuthentication before import. Also use this call for update.
Method	POST
URL	/api/device/cucm/LdapAuthentication/+update_ldap_auth/
Parameters	hierarchy=[hierarchy], format=json
Support Async	true
Class	custom

For payload, see device/cucm/LdapAuthentication schema.

8.7.10. Update LDAP System

Action	update_ldap_system
Title	Set up device/cucm/LdapSystem before import. Also use this call for update.
Method	POST
URL	/api/device/cucm/LdapSystem/+update_ldap_system/
Parameters	hierarchy=[hierarchy], format=json
Support Async	true
Class	custom

For payload, see device/cucm/LdapSystem schema.

8.8. Other elements

8.8.1. Data

The **data** of a resource is an object containing all the required and set fields of a model.

The data instance shows names as they are defined in the schema of the resource while the values of the names are contained in the instance.

Example of a single data instance of a resource of model type `data` and model name `CallManager`.

```
data: {
    iso_country_code: "AUS"
    pkid: "51ef319c746fae3622c710e4"
    pstn_access_prefix: "9"
    service_access_prefix: "13"
    default_user_locale: "English United States"
    network_locale: "United States"
    premium_access_prefix: "8"
    international_access_prefix: "011"
    country_name: "Australia"
    international_dial_code: "61"
    emergency_access_prefix: "000"
    national_trunk_prefix: "0"
    hierarchy_path: "sys"
}
```

8.8.2. Resources

The **resources** object in a resource list is represented as a list of objects containing meta and data of resources of the requested model type and model name.

Below and example of a **resources** object outline.

```
"resources": [{
    "meta": { ... },
    "data": { ... }
},
{
    "meta": { ... },
    "data": { ... }
},
...
]
```

8.8.3. Schema

You can obtain the schema for a resource in the request parameter: `?format=json&schema=true`. This way of requesting the schema is only available when requesting an Add form or when viewing a resource.

A specific URI is also available for obtaining the schema of a resource:

GET /api/(str:model_type)/(str:model_name)/schema/?format=json&hierarchy=pkid

The JSON schema uses the IETF draft-zyp-json-schema-03 (http://tools.ietf.org/html/draft-zyp-json-schema-03 and https://github.com/json-schema/json-schema)

The schema provides the properties of a field for each object in the schema describing the data of a resource:

- **$schema**: The schema URI, currently http://json-schema.org/draft-03/schema.
- **title**: This is the default field name.
- **required**: The property and value **true** value is a property if the field is mandatory
- **type**: The data type of the field. See the definitions and conventions in use. If the data type is:
  - object, then the object itself has a **schema**
  - array, then it has the property **items**
- **format**: if the **type** is string, a further format of the string can be selected.
- **choices**: In the case that the data element takes a value from a specified list of values.
- **target**: where a resource is linked to another resource, this resource is indicated as the **target**.
- **target_attr**: the specific attribute of the **target**.
- **attr_props**: an object containing the list of properties of each attribute.
- **minItems**: minimum number if the data type is an array.
- **maxItems**: maximum number if the data type is an array.
- **items**: the specified items if the data type is an array.
- **documentation** and **description**: text content to document and describe the object.

- **name**: name of the resource. [a-zA-Z_] characters are allowed
- **default**: default value, if specified.
- **valid_re**: the regular expression that a **string** data type should adhere to.

Example

Refer to the example data as in Data. The schema for the example data provides properties of each element:

```
schema: {
 $schema: "http://json-schema.org/draft-03/schema"
 type: "object"
 properties: {
 host: {
         required: true
         type: "string"
         title: "Host Name"
 }
 username: {
          required: true
          type: "string"
          title: "Admin Username"
 }
 password: {
          required: true
          type: "string"
          title: "Admin Password"
 }
 version: {
          target: "/api/data/CallManagerVersion/choices/
            ?hierarchy={hierarchy}&field=version&format=json"
          format: "uri"
          title: "Version"
          choices: [ ]
          target_attr: "version"
          type: "string"
 }
 port: {
          type: "string"
          title: "Port"
 }
 import: {
          type: "boolean"
          title: "Immediate Import"
 }
 data_sync: {
          target: "/api/data/DataSync/choices/
            ?hierarchy={hierarchy}&field=name&format=json"
          title: "Data Sync"
          format: "uri"
          choices: [ ]
          target_attr: "name"
          type: "string"
 }
```

(continues on next page)

(continued from previous page)

```
 }
}
```

8.8.4. Pagination

This object contains the **pagination** information of a resource list.

Three fields always exist in this object:

- **skip**: The offset index into the total resource list to be skipped
- **limit**: The number of resource to be returned
- **total**: The total number of resources that exist on the system/hierarchy. If a GET call was made with the parameter `count=false`, then this value will be 0.

Example of a pagination object within a list response.

```
"pagination": {
    "skip": 0,
    "total": 25,
    "limit": 250
}
```

9. OpenAPI Examples

Refer to the "OpenAPI Specification Examples" section in the HTML API Guide

9.1. Getting Started

9.1.1. Introduction to Automate OpenAPI Examples

Overview

This section of the API Guide describes a number of use-cases for integrating with VOSS Automate, based on the OpenAPI specification.

Note: The OpenAPI specification (formerly called Swagger) defines a standard, language-agnostic interface to RESTful APIs. OpenAPI definition files are written in the YAML format, which is automatically rendered into a more human-readable interface.

See https://swagger.io/specification/

You can use the REST API to interact programmatically with Automate and integrate with external applications, such as ServiceNow. For example, you can use the example calls to retrieve a list of all customers at the Provider hierarchy, retrieve a list of all sites belonging to a customer, add a phone or a subscriber, update phone or line details, or delete a phone or a subscriber.

Note: The OpenAPI examples do not support interactive API calls to VOSS Automate.

Errors

The API uses standard HTTP status codes to indicate the success or failure of the API call.

The Automate API uses conventional HTTP response codes to indicate the success or failure of an API request. Codes in the 2xx range indicate success. Codes in the 4xx range indicate an error that failed given the information provided, for example, a required parameter was omitted.

Samples

Each API call has one or more documented examples, for either a response or request (depending on the method, either GET, POST, PATCH, or DELETE).

The body of the response is JSON format.

The response samples provided for the GET call depend on the macro you provide for the call, a sample response is provided for each input macro parameter. Click the drop-down at **Example** to view the response sample for the relevant input macro.

Request samples are similarly provided for each POST, PATCH, and DEL call. Where more than one example is provided, click the drop-down at **Example** to toggle the examples for the call.

You can view the samples, here:

- Refer to the "OpenAPI Specification Examples" section in the HTML API Guide.

Content Type

The VOSS Automate API supports the `application/json` content type by default.

VOSS Automate API and the OpenAPI Specification Examples

These links provide further details relevant to the OpenAPI examples:

- Automate API Guide (this document)

  The Automate API Guide provides general information for the Automate API, which you can use as references for the examples in this section:

  - What are models?
  - What are model types?
  - What is the importance of “hierarchy” in the API?
  - Request and response patterns
  - API URL structure
  - Headers
  - Authentication
  - Authorization
  - HTTP methods
  - API parameters
  - Request headers
  - Login and authorization tokens
  - API responses
  - Optional request metadata
  - Using the API Reference
  - API schema

- API Model Reference

  The API Model Reference provides resource details. Resources are classified by the type of model in the system (data, device, domain, relation or view), for example, *data/AccessProfile* or *device/cucm/Phone*.

  Depending on the installed modules and their feature packages, the API of feature package models may be available, for example, *relation/Subscriber* or *view/QuickSubscriber*.

  The documentation for each API example contains a link to the model reference for that call.

- API Reference

  The API Reference describes the schema and the operations applicable for each resource in the system. The documentation for each API example contains a link to the API reference for that call.

- Refer to the "OpenAPI Specification Examples" section in the HTML API Guide.

9.2. CUCM OpenAPI Examples

9.2.1. GET /tool/Macro

Overview

This section provide details on use case examples with `GET tool/macro`.

In each case, you will need to specify the organization hierarchy, for example, Provider, Customer, or Site, and provide a macro that specifies the data to retrieve.

All GET calls in this OpenAPI format example point to the same endpoint, `tool/macro`. You will add a VOSS Automate macro as the input parameter for this endpoint to retrieve the information you require.

The following is a basic example of the syntax of a GET request, using a macro as the input parameter, to a fictional Automate endpoint:

```
GET https://<hostname>/api/tool/Macro/
    ?hierarchy=<hierarchy>
    &method=evaluate
    &input='<macro>'
```

Refer to the link below to view full details around the syntax, parameter values, and response samples related to the combination of endpoint (`GET tool/macro`) and various macro input parameters used for retrieving data associated to the macro:

Refer to the "Open API Specification Examples" section in the HTML API Guide.

(GET) Customers

Fetches a list of customers and their details, in UC deployments.

Customer data is held in the following fields in VOSS Automate:

Field	Description
Short Name	The name of the customer.
Extended Name	An extended version of the customer name.
Deal ID	The external reference ID for the customer

(GET) Customers

Looks up an external reference used for customers. The external reference ID is stored in `data.HCSHcmfCustomerDAT.dealIDInfo` (Automate field), for each customer.

Note: Other fields in `data.HCSHcmfCustomerDAT` (Automate table/model) can also be used for storing external references and can also be looked up, using this same method.

Example 1: Fetch the list of all customers and their respective external IDs

Query parameters:

- Hierarchy: Provider
- Input: None
- Macro:

```
{# data.HCSHcmfCustomerDAT.shortName,extendedName,dealIDInfo #}
```

Example 2: Pass a customer's external ID and fetch information for that customer only

Query Parameters:

- Hierarchy: Provider
- Input: DealIDInfo
- Macro:

```
{# data.HCSHcmfCustomerDAT.shortName,extendedName | dealIDInfo:<Reference ID>#}
```

(GET) All Sites Belonging to the Customer

Passes the customer name to fetch a list of all sites (locations) in the system that belong to the specified customer.

Note: You can use this macro to dynamically populate the list of sites in the ServiceNow form, enabling the user to select the site where the standalone phone needs to be provisioned.

Query parameters:

- Hierarchy: Site
- Input: Customer Name
- Macro:

```
{# device.hcmf.CustomerLocation.shortName | bkCustomer_shortName:<CustomerName> #}
```

(GET) Directory Numbers

Fetches all directory numbers that are at a specific site, regardless of whether the numbers are available or used.

Query parameters:

- Hierarchy: Site
- Input: None
- Macro:

```
{# data.InternalNumberInventory.internal_number,e164number,description,status,usage
↪#}
```

(GET) Next Available Number

Fetches the next available (unused) directory number (DN) in the site.

Automate maintains the availability and status in the internal number inventory (INI). The API call uses the flags set in the INI table to fetch the relevant information.

Query parameters:

- Hierarchy: Site
- Input: None
- Macro:

```
{{ fn.one data.InternalNumberInventory.internal_number | status:Available |␣
↪direction:up }}
```

(GET) Phone Models

Fetches phone model information. Two options are provided:

- Fetch all phone models currently available to a customer
- Fetch all phone models currently offered to customers by the Provider

(GET) All phone models currently available to a customer

Fetches all phone models that are currently available to a customer.

Note: This is useful where a Provider supplies a selection of phone models for different customers, rather than a general list of phone models for all of its customers.

Query parameters:

- Hierarchy: Customer
- Input: None
- Macro:

```
{{ data.PhoneConfigMapping.profiles.*.profile_name | name:Default }}
```

Note: Ensure that `data.PhoneConfigMapping.profiles` is cloned from the *sys* or *provider* level to the *customer* level, and only retain the device types that are offered to the customer.

(GET) All phone models currently offered to customers by the provider

Fetches all phone models that are currently offered to customers by the Provider. The user selects a phone model from the dynamically populated list, to be used in the next transaction.

Query parameters:

- Hierarchy: Customer or Site
- Input: None
- Macro:

```
{# data.HcsDeviceTypeDAT.name | name:/^Cisco \d\d\d\d/ | direction:up #}
```

(GET) All Phones Belonging to a Customer (with PKIDs)

Fetches the following details for all phones belonging to a customer, with their PKIDs:

Phone detail	Notes
PKID	`PKID` is the database record reference of the phone in phone model (table) that will be used for modification or deletion.
MAC Address	
Phone Model	
Phone Description	
Phone Owner (if associated)	
Line settings	For example: • Line Display • Line Display ASCII • Line Label • Line Recording

Query parameters:

- Hierarchy: Customer (or) Site
- Input: None
- Macro:

```
{# device.cucm.Phone.__pkid,name,product,description,ownerUserName,lines.line.index,
↪lines.line.dirn.pattern,lines.line.dis  play,lines.line.displayAscii,lines.line.
↪label,lines.recordingFlag,lines.recordingMediaSource,lines.recordingProfileName #}
```

(GET) Subscriber PKID and Name

Fetches the PKID, user ID, first name, and last name of all users at the customer or site hierarchy.

Query parameters:

- Hierarchy: Customer (or) Site
- Input: None
- Macro:

```
{# device.cucm.User.firstName,userid,__pkid,lastName #}
```

(GET) All Phones

Fetches all phones at a specified hierarchy.

Query parameters:

```
* Hierarchy: Customer (or) Site
* Input: None
* Output(s): Phone MAC Address, Details of Phone
* Macro
```

customer hierarchy:

```
{{ fn.get_phone_choices ,,,down }}
```

site hierarchy:

```
{{ fn.get_phone_choices ,,,local }}
```

(GET) All Phones Belonging to a Subscriber

Fetches all phones that belong to a specified user.

Query parameters:

- Hierarchy: Site
- Input: Userid
- Macro:

```
{{ fn.one device.cucm.User.associatedDevices.device | userid:<username> }}
```

(GET) All Phones Without Associated User

Fetches all phones at a site that do not have a *owneruserid*; that is, unassociated phones.

Query parameters:

- Hierarchy: Site
- Input: None
- Output values: Phone MAC Address, Phone Description
- Macro:

```
{# device.cucm.Phone.name,description | ownerUserName:null | direction:local #}
```

(GET) All DeviceProfiles Without Associated User

Fetches all Cisco Unified Device Profiles (UDP) at a site that are not associated to a user.

Query parameters:

- Hierarchy: Site
- Input: None
- Output value(s): UDP Name
- Macro:

```
{# fn.list_set_left macro.DEVICEPROFILE_LIST,macro.PHONEPROFILE_LIST_FLATTENED #}
```

(GET) All Line Details

Fetches all lines at a specified hierarchy.

Query parameters:

- Hierarchy: Customer (or) Site
- Input: None
- Output(s): Line record PKID, Line Pattern, Line Description, Line AlertingName, Line ASCIIAlerting-Name
- Macro:

```
{# device.cucm.Line.__pkid,pattern,description,alertingname,asciialertingname #}
```

(GET) Subscribers Lines

Fetches all lines that belong to a subscriber.

Query parameters:

- Hierarchy: Customer (or) Site
- Input: User name
- Macro:

```
{{ fn.get_associated_lines <username> }}
```

(GET) Supported Protocols

Fetches all the protocols that a specified phone model supports.

Query parameters:

- Hierarchy: Customer
- Input: Phone Model
- Macro:

```
{{device.cucm.PhoneType.ProtocolTemplates.*.Protocol | PhoneType:<Phone Model> |␣
↪direction:up, device:macro.SITE_CUCM }}
```

(GET) Phone Button Templates for Phone Model

Fetches all the Phone Buttons Templates that are available in the system for a specified phone model.

Query parameters:

- Hierarchy: Customer
- Input: Phone Model, Protocol
- Macro

```
{{ device.cucm.PhoneType.ProtocolTemplates.*.PBT| PhoneType:<Phone Model>,␣
↪ProtocolTemplates.*.Protocol:<Phone Protocol> | direction:up, device:macro.SITE_
↪CUCM }}
```

(GET) Security Profiles for Phone Model

Fetches all the available security profiles for a specified phone model.

Query parameters:

- Hierarchy: Customer
- Input: Phone Model, Protocol
- Macro:

```
{{ device.cucm.PhoneType.ProtocolTemplates.*.SecurityProfile | PhoneType:<Phone␣
↪Model>, ProtocolTemplates.*.Protocol:<Phone Protocol> | direction:up, device:macro.
↪SITE_CUCM }}
```

(GET) Subscriber's Phones and Services

Fetches the details of existing phones, lines, and services of a subscriber. You can use these details to assign further services to a subscriber or to move a subscriber between sites.

Query parameters:

- Hierarchy: Customer
- Input: username
- Macro:

```
{{ fn.movesub_getguirules_on_username_change <username> }}
```

(GET) Available Hierarchies of a Customer

Fetches all the available hierarchy paths for a specified customer.

Query parameters:

- Hierarchy: Customer
- Input: None
- Macro:

```
{# fn.friendly_path_choices,down #}
```

The output provides the customer hierarchy and site hierarchies.

(GET) Usernames at Customer and Downwards

Fetches all usernames at the customer hierarchy, and below.

Query parameters:

- Hierarchy: Customer
- Input: None
- Macro:

```
{{ fn.list_end_user_names down, fn.null }}
```

(GET) User Details

Fetches a user's username, first name, last name, email, and sync_type.

Query parameters:

- Hierarchy: Site
- Input: Username
- Macro

```
{# data.User.username,first_name,last_name,email,sync_type | username: <username> #}
```

(GET) Customer Common Phone Configs

Fetches the names of all Common Phone Configs.

Query parameters:

- Hierarchy: Customer
- Input: None
- Macro:

```
{# device.cucm.CommonPhoneConfig.name #}
```

(GET) Available Quick Add Groups

Fetches all Quick Add Groups available at a site. This will be used in Quick Add Subscriber.

Query parameters:

- Hierarchy: Site
- Input: None
- Macro

```
{# data.QuickAddGroups.group_name || direction:up, to:Hcs #}
```

(GET) Unassociated Phones of Specific Model at Site

Fetches all unassociated phones of a specified model and protocol, at a site.

Query parameters:

- Hierarchy: Site
- Input: Phone Model, Phone Protocol

> **Note:** This query is used to pre-populate the Phone MAC Address field in Quick Subscriber.

- Macro

```
{{ fn.get_phone_choices <Phone Model>,<Phone Protocol>,null,up }}
```

9.2.2. Add a standalone Cisco phone

Overview

This API POST call adds a standalone Cisco phone.

`POST https://<hostname>/api/api/view/AddPhone`

References:

- OpenAPI example for view/AddPhone
- Model: view/AddPhone
- API Reference for view/AddPhone

Using POST AddPhone

The API call involves the following tasks:

1. Identify the customer and customer hierarchy, and the site and site hierarchy.
2. Provide phone details:
    - Phone MAC address
    - Phone model
    - Phone description
3. Provide line details:
    - Directory numbers
    - Line labels
    - Display names

Step 1: Identify Customer+Customer Hierarchy and Site+Site Hierarchy

1. Fetch the list of customers and populate a drop-down list. Allow the operator to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*.
2. Fetch available site hierarchies for the selected customer (`<Customer Name>`). Allow the operator to select the site where the phone will be added.

   Refer to *(GET) All Sites Belonging to the Customer*
3. Resolve `<Customer Hierarchy>` and `<Site Hierarchy>`.
    - `<Customer Hierarchy>` is the entry in the earlier step that ends with the `<Customer Name>`.

      For example, if `<Customer Name>` is Innovia, the `<Customer Hierarchy>` will be `sys.hcs.CS-P.CS-NB.Innovia`.
    - `<Site Hierarchy>` is the entry in the earlier step that the operator selects.

      For example, `sys.hcs.CS-P.CS-NB.Innovia.INV-Reading`, `sys.hcs.CS-P.CS-NB.Innovia.INV-New York`

Step 2: Provide phone details

1. Fill out a phone description `<PhoneDescription>` for the `description` field.
2. Select a phone model:
    - Populate `device_type` with phone models currently available to the customer.

      Refer to *(GET) Phone Models* by passing `<Customer Hierarchy>`.
    - User chooses a phone model, and the choice is resolved into `<PhoneModel>`.
3. Fill out the MAC address of the new phone in the `name` field.

> **Note:** Note the input conditions for MAC address in the OpenAPI example for view/AddPhone

Step 2: Provide line details

1. List all available directory numbers (DN) to populate `lines`.

   Refer to *(GET) Directory Numbers*.

2. User chooses a directory number (`directory_number`).

   Note: Multiple lines can be added to one phone. Two or more lines can be ordered 1,2,... (`<line_(n)>`).

3. For each directory number selected, user fills out:

   - A line label (`label: <Label (n)>`)
   - A display name (`display: <Display Name (n)>`)

   Note: Note the input conditions in the OpenAPI example for view/AddPhone

Query parameters

Parameter	Value
`hierarchy`	Site

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
{
   "standalone": true,
   "name": "<MACAddress>",
   "device_type": "<PhoneModel>",
   "description": "<PhoneDescription>",
   "lines": [
      {
         "directory_number": "<line_1>",
         "label": "<Label 1>",
         "display": "<Display Name 1>"
      }
   ],
   "request_meta": {
   "external_id": "<id>",
   "external_reference": "<Reference>",
   "callback_url": "<url_string>",
   "callback_username": "<callback_username>",
   "callback_password": "<callback_password>"
   }
}
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
name	The MAC address or phone name of the new phone.	string	The form field should check the following inputs: • Max value: 15 characters • The first 3 characters must be SEP • Following the first 3 characters, the next 12 characters must consist of hexadecimal characters.
device_type	The phone model.	string	A drop-down with available phone types. The operator selects a phone model.
description	The phone description.	string	Max value: 30 characters
lines	Line details for each line added.	array	Line is populated by listing all directory numbers (DNs) available, and then allowing the user to select a DN. Multiple lines can be added to a phone. Two or more lines can be ordered 1,2,... (<line (n)>) • <directory_number> (Line number) • <label> (Line Label) – User input text field – Value <Label (n)> – Max characters (for each line added): 30 • <display> (Display Name) – User input text field – Value: <Display Name (n)> – Max characters (for each line added): 30
request_meta	Contains callback details.	object	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.3. Add a Cisco subscriber

Overview

This API POST call creates a new Cisco subscriber.

POST https://<hostname>/api/api/view/QuickSubscriber

References:

- OpenAPI example for view/QuickSubscriber
- Model: view/QuickSubscriber
- API Reference for view/QuickSubscriber

Using POST QuickSubscriber

Creating a new Cisco subscriber involves the following tasks:

1. Identify the customer and customer hierarchy, and the site and site hierarchy.
2. Hardcode the value of `lookUpForUser` to `true` in the payload.
3. Resolve the user details and credentials.
4. Retrieve lines and select the lines to be assigned.
5. Retrieve Quick Add Groups.
6. Select services for the subscriber.
7. Allocate soft phones for the subscriber
8. Allocate one or more desk phones for the subscriber

Step 1: Identify Customer+Customer Hierarchy and Site+Site Hierarchy

1. Fetch the list of customers and populate a drop-down list. User selects a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*.

2. Fetch available site hierarchies for the selected customer (`<Customer Name>`). User selects the site where the subscriber will be added.

   Refer to *(GET) All Sites Belonging to the Customer*

3. Resolve `<Customer Hierarchy>` and `<Site Hierarchy>`.
   - `<Customer Hierarchy>` is the entry in the earlier step that ends with the `<Customer Name>`.

     For example, if `<Customer Name>` is Innovia, the `<Customer Hierarchy>` will be `sys.hcs.CS-P.CS-NB.Innovia`.

   - `<Site Hierarchy>` is the entry in the earlier step that the operator selects.

     For example, `sys.hcs.CS-P.CS-NB.Innovia.INV-Reading`, `sys.hcs.CS-P.CS-NB.Innovia.INV-New York`

Step 2: Set lookUpForUser to True in the payload

1. In the payload, hardcode the value for `lookUpForUser` to `true`.

Step 3: Resolve user details and credentials

1. Fetch all available users currently in the customer to populate the `user_username` drop-down.

   Refer to *(GET) Usernames at Customer and Downwards* (Customer hierarchy).

2. The user can either select a value from the drop-down (for LDAP users synced in from CUCM or Active Directory), or they can fill out a username (for local users).

   Choose an option, and follow the relevant steps for the use case:

   - Option 1: User selects an existing name from the drop-down:
     a. Resolve <user_username> to the selected value:
        1. Run *(GET) User Details* to fetch the users detail stored in the system, and resolve the returned values to `user_firstname`, `user_lastname` and `user_email`.
        2. Does the sync_type in the returned data contain the word "LDAP"?
           - **Yes**. In this case, disable the following fields: `username`, `firstname`, `lastname`, `email`, and `password`.

             Populate the following fields with the values returned in *(GET) User Details*

             Do not send <user_password> in the payload.
           - **No**. In this case, populate the following fields with the values fetched from *(GET) User Details*: `firstname`, `lastname`, `email`

             Keep these fields enabled to allow the user to change values if they wish.

             Keep the `password` field enabled, allowing the user to fill out a password (which is resolved in <user_password>, in the payload.
   - Option 2: User enters a new value for `username`:
     a. User inputs values for the following fields: `firstname`, `lastname`, `email`
     b. Resolve these values to the following: <user_firstname>, <user_lastname>, <user_email>
     c. User fills out a password (`password`), which resolves to <user_password>.

3. User fills out the voicemail / Extension Mobility PIN in `pin`, which resolves to <user_vm_em_pin>

Step 4: Retrieve the lines to be assigned

1. List all available directory numbers (DN) to populate `lines`.

   Refer to *(GET) Directory Numbers* (at the site hierarchy)

Note: Values in the drop-down should be the concatenation of values fetched ("internal_number | e164number | status"). For example, "1084000 | +441184121000 | Available","1084010 | +441184121010 | Used".

---

2. User chooses a directory number (`directory_number`).

Note: Multiple lines can be added to one phone. Two or more lines can be ordered 1,2,... (`<line_(n)>`).

Step 5: Retrieve Quick Add Groups

1. Populate read-only `qagroup_name` drop-down with values from the system.

   Refer to *(GET) Available Quick Add Groups*

   Display that value in the list as default ("78XX Reference Quick Add Group").
2. Set `<qag_name>` with the default value or a selected value.

Step 6: Select services for the subscriber

- Voicemail service:

  If user selects the **Voicemail** checkbox, set the value for `<voicemail>` to True (`<voicemail_reqd_true_false> = true`)
- Extension Mobility service:

  If the user selects the **Extension Mobility** checkbox, set the value for `<mobility>` to True (`<extnmobility_reqd_true_false> = true`)

Step 7: Allocate a soft phone for a subscriber

1. If the user selects the **Cisco Jabber Phone** checkbox, they can assign one or more jabber devices.

   Device names are allocated using an API call specific to the device type selected:

   - `<android_jabber_device_name>`

   ```
   GET https://ucprovision.voss-solutions.com/api/tool/Macro/?method=evaluate&
   ↪input={{ fn.jabber_device_name 'Cisco Dual Mode for Android', <user_username>␣
   ↪}}
   ```

   - `<csf_jabber_device_name>`

   ```
   GET https://ucprovision.voss-solutions.com/api/tool/Macro/?method=evaluate&
   ↪input={{ fn.jabber_device_name 'Cisco Unified Client Services Framework',
   ↪<user_username> }}
   ```

   - `<ipad_jabber_device_name>`

   ```
   GET https://ucprovision.voss-solutions.com/api/tool/Macro/?method=evaluate&
   ↪input={{ fn.jabber_device_name 'Cisco Jabber for Tablet', <user_username> }}
   ```

   - `<iphone_jabber_device_name>`

```
GET https://ucprovision.voss-solutions.com/api/tool/Macro/?method=evaluate&
↪input={{ fn.jabber_device_name 'Cisco Dual Mode for iPhone', <user_username> }
↪}
```

Step 8: Allocate desk phones for a subscriber

1. If the user selects the **Allocate Deskphone** checkbox, set the value for <voice> to true, and enable and display the relevant fields.
2. Fetch available phone types, and allow the user to select a phone model, which resolves into <deskphone_model>

   Refer to *(GET) Phone Models* (<Site Hierarchy>)
3. Once a value is selected for <deskphone_model>, populate the following fields:
   - <phone_protocol>

     User selects a phone protocol (<phone_protocol>)from the drop-down. The chosen option is resolved as the value (<deskphone_protocol>)

     Refer to *(GET) Supported Protocols* (using <Site Hierarchy> and <deskphone_model>)
   - <button_template>

     Users selects a phone button template (<button_template>) from the drop-down, which is resolved as the value for <deskphone_pbt_name>

     Refer to *(GET) Phone Button Templates for Phone Model*
   - "phone_name": "<deskphone_MAC_address>

     In the “Phone MAC Address” drop-down, populate unassociated phones that belong to <deskphone_model>, currently in this site.

     Refer to *(GET) Unassociated Phones of Specific Model at Site*

     Choose *one* of the following options:
     - User selects one value, which resolves to <deskphone_MAC_address>.

       Alternatively:
     - Users fills out a MAC address for <deskphone_MAC_address>.

       Note: Note the input conditions for MAC address in the OpenAPI example for view/QuickSubscribe

Query parameters

Parameter	Value
hierarchy	Site

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
{
   "lookUpForUser": true,
   "username": "<user_username>",
   "firstname": "<user_firstname>",
   "lastname": "<user_lastname>",
   "email": "<user_email>",
   "password": "<user_password>",
   "pin": "<user_vm_em_pin>",
   "lines": [
   {
         "directory_number": "<line_1>"
   },
   {
         "directory_number": "<line_2>"
   }
   ],
   "qagroup_name": "<qag_name>",
   "voice": <deskphone_reqd_true_false>,
   "phone_type": "<deskphone_model>",
   "phone_protocol": "<deskphone_protocol>",
   "button_template": "<deskphone_pbt_name>",
   "phones": [
   {
         "phone_name": "<deskphone_MAC_address>"
   }
   ],
   "voicemail": <voicemail_reqd_true_false>,
   "mobility": <extnmobility_reqd_true_false>,
   "jabber": <jabber_reqd_true_false>,
   "jabber_devices": [
   {
         "jabber_agent": "android",
         "device_name": "<android_jabber_device_name>"
   },
   {
         "jabber_agent": "csf",
         "device_name": "<csf_jabber_device_name>"
   },
   {
         "jabber_agent": "ipad",
```

(continues on next page)

(continued from previous page)

```
        "device_name": "<ipad_jabber_device_name>"
    },
    {
        "jabber_agent": "iphone",
        "device_name": "<iphone_jabber_device_name>"
    }
    ],
    "request_meta": {
    "external_id": "<id>",
    "external_reference": "<Reference>",
    "callback_url": "<url_string>",
    "callback_username": "<callback_username>",
    "callback_password": "<callback_password>"
    }
}
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
username	The username.	string	For local users, the operator enters the user details (username, firstname, lastname, and email) in the form. For Active Directory (AD) users, the user details (username, firstname, lastname, and email) are fetched from the system, and the form fields are read-only.
firstname	The user's first name.	string	For local users, the operator enters the user details (username, firstname, lastname, and email) in the form. For Active Directory (AD) users, the user details (username, firstname, lastname, and email) are fetched from the system, and the form fields are read-only.
lastname	The user's last name.	string	For local users, the operator enters the user details (username, firstname, lastname, and email) in the form. For Active Directory (AD) users, the user details (username, firstname, lastname, and email) are fetched from the system, and the form fields are read-only.
email	The user's email address.	string	For local users, the operator enters the user details (username, firstname, lastname, and email) in the form. For Active Directory (AD) users, the user details (username, firstname, lastname, and email) are fetched from the system, and the form fields are read-only.
password	The user's password.	string	For local users, the operator enters the user password in the form. For Active Directory (AD) users, the user password is not relevant, and the password field is hidden on the form.
pin	Voicemail/ extension mobility PIN.	string	
lines	One or more user lines.	array of objects	Multiple lines can be added to a phone, and are ordered 1,2, and so on. "directory_number":"line_1", "directory_number":"line_2", "directory_number": "line_n"

Parameter	Description	Type	Notes
qagroup_name	The Quick Add Group name	string	Part of the desk phone details, which includes qagroup_name, phone_type, phone_protocol, phone_name.
voice	Desk phone.	boolean	Defines whether a desk phone is required. <deskphone_reqd_true_false> Default is False.
phone_type	The phone model.	string	Part of the desk phone details, which includes qagroup_name, phone_type, phone_protocol, phone_name. Displays when "voice": true.
phone_protocol	The desk phone protocol.	string	Part of the desk phone details, which includes qagroup_name, phone_type, phone_protocol, phone_name.
button_template	The desk phone button template name.	string	
phones	One or more phones.	array of objects.	Includes the desk phone MAC address (phone_name) for each of the user's phones.
voicemail	Voicemail service	boolean	Defines whether the voicemail service is required. <voicemail_reqd_true_false> The default is False.
mobility	Extension mobility service	boolean	Defines whether the extension mobility service is required. <extnmobility_reqd_true_false> The default is False.
jabber	Jabber service (True/False)	boolean	Allows allocation of soft phones. <jabber_reqd_true_false> The default is False.
jabber_devices	One or more Jabber devices.	array of objects	If <jabber>=True, the list of Jabber devices, specifying a value for <jabber_agent> and <device_name> Four types of jabber devices can be assigned: • "android" • "ipad" • "iphone" • "windows"
request_meta	Callback details.	object	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.4. Reset a CUCM PIN/password and/or CUC PIN

Overview

This API POST call resets passwords and PINs for the following:

1. CUCM (Cisco Unified Communications Manager) PIN, used for extension mobility
2. CUCM (Cisco Unified Communications Manager) password for Jabber (if device is associated to a CUCM local user)
3. CUC (Cisco Unified Unity) voicemail PIN

`POST https://<hostname>/api/api/view/ResetUCPasswordPinVIEW`

References:

- OpenAPI Example for view/ResetUCPasswordPinVIEW
- Model: view/ResetUCPasswordPinVIEW
- API Reference for view/ResetUCPasswordPinVIEW

Using POST ResetUCPasswordPinVIEW

Resetting a CUCM PIN/password and/or CUC PIN involves the following tasks:

1. Identify the customer and the customer's hierarchy.
2. Define whether the password/PIN reset is for CUCM (Extension Mobility PIN and Jabber password) and/or CUC voicemail PIN.
3. Resolve the user details and credentials.
4. Allow user to fill out a PIN.

Step 1: Identify Customer+Customer Hierarchy

1. Fetch the list of customers and populate a drop-down list, and allow the user to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*.

2. Fetch available hierarchies for the selected customer (`<Customer Name>`).

   Refer to *(GET) Available Hierarchies of a Customer*

3. Resolve `<Customer Hierarchy>`.

   `<Customer Hierarchy>` is the entry from step 2 that ends with the `<Customer Name>`).

   For example, if `<Customer Name>` is Innovia, the `<Customer Hierarchy>` will be `sys.hcs.CS-P.CS-NB.Innovia`.

Step 2: Define whether the password/PIN reset is for CUCM or CUC

1. The user is presented with two checkboxes on the GUI, one for CUCM and one for CUC.
   - <cucm_checkbox_boolean>
   - <cuc_checkbox_boolean>
2. Users can select one or both checkboxes.

   When selected, set the value for the relevant fields to `true`, else, set to `false`.

Step 3: Resolve user details and credentials

1. Fetch all available users currently in the customer to populate the `user_username` drop-down, and allow the user to select a value.

   Refer to *(GET) Usernames at Customer and Downwards* (Customer hierarchy)
2. Fetch user details stored in the system to identify whether it is a LDAP user or a local user.

   Refer to *(GET) User Details*
3. Does the `sync_type` in the data returned contain the word "LDAP"?
   - **Yes**. Disable the `password` field, and do bot send <password_value> in the payload.
   - **No**. Keep the `password` field enabled, allowing the user to fill out a password, which resolves to <password_value> in the payload.
4. Provide a text field titled "Voicemail/Extension Mobility PIN", and allow the user to fill out a PIN, which resolves to <pin_value>.

   Note: Validate form field to only allow numeric values.

Query parameters

Parameter	Value
hierarchy	Site

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
{
   "user": "<username>",
   "cucm": <cucm_checkbox_boolean>,
   "cuc": <cuc_checkbox_boolean>,
   "password": "<password_value>",
   "pin": "<pin_value>",
   "request_meta": {
```

(continues on next page)

(continued from previous page)

```
      "external_id": "<id>",
      "external_reference": "<Reference>",
      "callback_url": "<url_string>",
      "callback_username": "<callback_username>",
      "callback_password": "<callback_password>"
   }
}
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
user	The username.	string	
cucm	CUCM.	boolean	Defines whether the password/PIN reset is for CUCM. <cucm_checkbox_boolean> Default is False. Set to True to reset a CUCM PIN or password.
cuc	CUC	boolean	Defines whether the password/PIN reset is for CUC. <cuc_checkbox_boolean> Default is False. Set to True to reset a CUC PIN.
password	The Jabber password.	string	When value for <cucm_checkbox_boolean> is True, set the Jabber password in <password_value>.
pin	The Extension Mobility or Voicemail PIN.	integer	When value for <cucm_checkbox_boolean> and/or <cuc_checkbox_boolean> is True, set a numeric PIN for CUCM Extension Mobility and CUC voicemail.
request_meta	Callback details.	object	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.5. Replace a Cisco phone

Overview

This API POST call replaces an existing Cisco phone with a new phone.

`POST https://<hostname>/api/api/view/ReplacePhone_VIEW`

References:

- OpenAPI example for
- Model: view/ReplacePhone_VIEW
- API Reference for view/ReplacePhone_VIEW

Using POST ReplacePhone_VIEW

Replacing a Cisco phone involves the following tasks:

1. Identify the customer and customer hierarchy, and the site and site hierarchy.
2. Populate a list of existing phones in the site, and allow user to choose the phone to be replaced.
3. User provides details for the replacement phone.

Step 1: Identify Customer+Customer Hierarchy and Site+Site Hierarchy

1. Fetch the list of customers to populate a drop-down list, and allow the user to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*.
2. Fetch available site hierarchies for the selected customer (`<Customer Name>`), and allow the user to select the site where the phone will be replaced.

   Refer to *(GET) All Sites Belonging to the Customer*
3. Resolve `<Customer Hierarchy>` and `<Site Hierarchy>`.
   - `<Customer Hierarchy>` is the entry in the earlier step that ends with the `<Customer Name>`.

     For example, if `<Customer Name>` is Innovia, the `<Customer Hierarchy>` will be `sys.hcs.CS-P.CS-NB.Innovia`.
   - `<Site Hierarchy>` is the entry in the earlier step that the operator selects.

     For example, `sys.hcs.CS-P.CS-NB.Innovia.INV-Reading`

Step 2: Populate a list of existing phones at the site

1. Fetch all phones currently available to the customer to populate a list of existing phones (`existing_phone`) at the site.

   Refer to *(GET) Phone Models*
2. User select the MAC address of the existing phone that must be replaced (`<old_phone_MAC_Address>`).

Step 3: Provide replacement phone details

In this step the user fills out the details of the replacement phone:

1. Users fills out the replacement phone MAC address in `replacement_phone`, and the value is resolved to `<new_phone_MAC_Address>`.

   Note: Note the input conditions for the MAC address in the OpenAPI example for

2. Fetch the available phone models to populate `replacement_model`.

   Refer to *(GET) Phone Models*.

   Note: Depending on how Automate is set, fetch either all phone models currently available to the customer, or fetch all phone models currently offered to customers by the Provider.

3. Fetch the phone protocols that the replacement phone model supports, to populate `protocol`.

   Pass `new_phone_model` in the GET query.

   Refer to *(GET) Supported Protocols*.

4. Fetch all available phone button templates for the phone model to populate `pbt`.

   Refer to *(GET) Phone Button Templates for Phone Model*

5. Fetch available security profiles for the replacement phone model to populate `security_profile`.

   Refer to *(GET) Security Profiles for Phone Model*

6. User fills out a phone description for `replacement_description`.

Query parameters

Parameter	Value
`hierarchy`	Site

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
{
   "existing_phone": "<old_phone_MAC_Address>",
   "replacement_phone": "<new_phone_MAC_Address>",
   "replacement_model": "<new_phone_model>",
   "protocol": "<new_phone_protocol>",
   "pbt": "<new_phone_PBT>",
   "security_profile": "<new_phone_SecProfile>",
   "replacement_description": "<new_phone_Description>",
   "request_meta": {
```

(continues on next page)

(continued from previous page)

```
   "external_id": "<external-id>",
   "external_reference": "<external_)reference>",
   "callback_url": "<callback_url_or_ip",
   "callback_username": "callback_username",
   "callback_password": "callback_password"
   }
}
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
existing_phone	Existing phone name.	string	The MAC address of the existing phone, the phone to be replaced.
replacement_phone	Replacement phone name.	string	The MAC address of the replacement phone.
replacement_model	Replacement phone model.	string	Choose from existing phone models available.
protocol	The phone protocol.	string	The phone protocols that the replacement phone model supports.
pbt	The phone button template.	string	The phone button templates that are available in the system for the specified replacement phone model.
security_profile	The phone security profile.	string	The phone security profile for the replacement phone model.
replacement_descri	New phone description.	string	A phone description for the new, replacement
request_meta	Callback details.	object	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.6. Associate an existing Cisco device or device profile to subscriber

Overview

This API POST call associates a standalone phone (Cisco device) or standalone Cisco Unified Device Profile (UDP) to a subscriber.

`POST https://<hostname>/api/api/view/GS_AddDeviceToUser_VIEW`

References:

- OpenAPI example for view/GS_AddDeviceToUser_VIEW
- Model: view/GS_AddDeviceToUser_VIEW
- API Reference for view/GS_AddDeviceToUser_VIEW

Using POST GS_AddDeviceToUser_VIEW

Associating an existing device or UDP to an existing subscriber involves the following tasks:

1. Identify the customer and customer hierarchy, and the site and site hierarchy.
2. Populate a list of users to which the Cisco device or UDP can be associated.
3. Assign the unassociated Cisco device or UDP.

Step 1: Identify Customer+Customer Hierarchy and Site+Site Hierarchy

1. Fetch the list of customers to populate a drop-down list, and allow the user to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*.
2. Fetch available site hierarchies for the selected customer (`<Customer Name>`), and allow the user to select the relevant site.

   Refer to *(GET) All Sites Belonging to the Customer*
3. Resolve `<Customer Hierarchy>` and `<Site Hierarchy>`.
   - `<Customer Hierarchy>` is the entry in the earlier step that ends with the `<Customer Name>`.

     For example, if `<Customer Name>` is Innovia, the `<Customer Hierarchy>` will be `sys.hcs.CS-P.CS-NB.Innovia`.
   - `<Site Hierarchy>` is the entry in the earlier step that the operator selects.

     For example, `sys.hcs.CS-P.CS-NB.Innovia.INV-Reading`

Step 2: Retrieve users and choose a user

1. Populate the list of existing users at the site, displaying `username`, `firstname`, and `lastname`.

   Refer to *(GET) Subscriber PKID and Name*, passing the site hierarchy (`<Site Hierarchy>`).
2. User selects one user from the list, and resolve the choice to `<username>`.

Step 3: Assign unassociated Cisco device or UDP

1. The form provides two radio buttons. The user selects one option, either Device or Device Profile:
   - If user selects “Device”:
     a. For `newDeviceType`, assign the value `phone` for `<device_or_udp>`
     b. Use *(GET) All Phones Without Associated User* to fetch all unassociated devices at the site.
     c. User selects one device (phone) at `newDeviceName`, and the selected value is resolved to `<device_or_udp_name>`.
   - If user selects “Device Profile”:
     a. For `newDeviceType`, assign the value `deviceProfile` to `<device_or_udp>`
     b. Use *(GET) All DeviceProfiles Without Associated User* to fetch all unassociated device profiles at the site.
     c. Users selects a device profile at `newDeviceName`, and the selected value is resolved to `<device_or_udp_name>`.

Query parameters

Parameter	Value
`hierarchy`	Site

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
{
   "username": "<username>",
   "newDeviceType": "<device_or_udp>",
   "newDeviceName": "<device_or_udp_name>",
   "request_meta": {
   "external_id": "<external-id>",
   "external_reference": "<external_)reference>",
   "callback_url": "<callback_url_or_ip",
   "callback_username": "<callback_username>",
   "callback_password": "<callback_password>"
   }
}
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
username	The username.	string	
newDeviceType	The device type.	string	Device type, either Cisco device (phone), or Cisco UDP (device profile).
newDeviceName	The device name.	string	The name of an unassociated device or unassociated device profile name
request_meta	Callback details.	object	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.7. Disassociate a Cisco phone from a subscriber

Overview

This API POST call removes a subscriber-phone association to make it an unassigned (standalone) Cisco phone (device).

`POST https://<hostname>/api/api/view/GS_removeDeviceFromUser_VIEW`

References:

- OpenAPI example for view/GS_removeDeviceFromUser_VIEW
- Model: GS_removeDeviceFromUser_VIEW
- API Reference for GS_removeDeviceFromUser_VIEW

Using POST GS_removeDeviceFromUser_VIEW

Replacing a Cisco phone involves the following tasks:

1. Identify the customer and customer hierarchy, and the site and site hierarchy.
2. Identify the user and device to disassociate.

Step 1: Identify Customer+Customer Hierarchy and Site+Site Hierarchy

1. Fetch the list of customers to populate a drop-down list, and allow the user to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*.

2. Fetch available site hierarchies for the selected customer (`<Customer Name>`), and allow the user to select the relevant site.

   Refer to *(GET) All Sites Belonging to the Customer*

3. Resolve `<Customer Hierarchy>` and `<Site Hierarchy>`.

- <Customer Hierarchy> is the entry in the earlier step that ends with the <Customer Name>.

  For example, if <Customer Name> is Innovia, the <Customer Hierarchy> will be sys.hcs.CS-P.CS-NB.Innovia.

- <Site Hierarchy> is the entry in the earlier step that the operator selects.

  For example, sys.hcs.CS-P.CS-NB.Innovia.INV-Reading

Step 2: Identify the user and device to disassociate

1. Fetch users to populate the list of users for username.

   Refer to *(GET) Subscriber PKID and Name*

   Note: Hide the PKID. Display only the following, for username: username, first name, last name

2. User selects a username. Resolve the value to <username>.
3. Fetch all phones associated to the selected user to populate oldDeviceName.

   Refer to *(GET) All Phones Belonging to a Subscriber*

4. Users selects the phone to be unassigned. Resolve the chosen value to <MAC_Address>.

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
{
   "username": "<username>",
   "oldDeviceName": "<MAC_Address>",
   "request_meta": {
   "external_id": "<external-id>",
   "external_reference": "<external_)reference>",
   "callback_url": "<callback_url_or_ip",
   "callback_username": "<callback_username>",
   "callback_password": "<callback_password>"
   }
}
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
username	The username.	string	
oldDeviceName	Associated device name.	string	The name of the device you're removing.
request_meta	Callback details.	object	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.8. Move a Cisco subscriber between sites

Overview

This API POST call moves a Cisco subscriber (and their services and devices) between sites, creates one or more new lines during the move, and assigns the new lines to the devices/services.

`POST https://<hostname>/api/api/view/UserPhoneMoveUsers_VIEW`

References:

- OpenAPI example for view/UserPhoneMoveUsers_VIEW
- Model: view/UserPhoneMoveUsers_VIEW
- API Reference for view/UserPhoneMoveUsers_VIEW

Using POST UserPhoneMoveUsers_VIEW

Moving a subscriber and their services/devices involves the following tasks:

1. Identify the customer and customer hierarchy.
2. Identify the subscriber to be moved, as well as their devices and/or services.
3. Choose the target site.
4. Define whether new lines will be assigned in the target site, or whether to move existing lines.
5. Define whether new phones will be assigned in the target site (with the profile moved from the existing phone), and/or whether to move existing phones belonging to the subscriber.
6. Allocate the default CUC template defined in the site defaults.
7. Hardcode values in the payload.

Step 1: Identify Customer+Customer Hierarchy

1. Fetch the list of customers to populate a drop-down, and allow the user to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*.

2. Fetch available site hierarchies for the selected customer (`<Customer Name>`).

   Refer to *(GET) All Sites Belonging to the Customer*

3. Resolve `<Customer Hierarchy>`.

   `<Customer Hierarchy>` is the entry in the earlier step that ends with the `<Customer Name>`.

   For example, if `<Customer Name>` is Innovia, the `<Customer Hierarchy>` will be `sys.hcs.CS-P.CS-NB.Innovia`.

Step 2: Identify the subscriber to be moved

In this step, identify the subscriber to be moved, as well as their associated devices and/or services.

1. Populate a list of usernames, and allow the user to select one user (<username>).

   Refer to *(GET) Subscriber PKID and Name*

   Note: Hide the PKID. Display only the username, firstname, and lastname in the form.

2. Use *(GET) Subscriber's Phones and Services* to fetch the details of all the selected subscriber's phones, lines, and services.
3. Segregate and collate the data into the following read-only GUI fields:
   - "Existing Phones"
   - "Existing DeviceProfiles"
   - "Existing Voicemail"
   - "Existing SNR"
4. Populate the read-only field, "Current Site", with value collected from step 3, and assign the value to <move_from_hn>.

Step 3: Choose the target site

1. Fetch the customer's sites and populate the values in move_to_hn ("Move to Site").

   Refer to *(GET) Available Hierarchies of a Customer*

2. User selects a target site, and the value is assigned to <move_to_hn>, for example, sys.hcs.CS-P.CS-NB.Innovia.INV-Reading.

Step 4: Add new lines or move existing lines

In this step, decide whether to assign new lines in the target site, or whether to move the subscriber's existing lines.

1. Define whether to move lines to the target site, via the form checkbox titled "Move Line" (<move_line_trueFalse>).
2. Define whether to allocate new lines in the target site when the subscriber is moved, via the checkbox titled "Allocate New Line(s)" <new_line_truefalse>.

   If "Move Line" and "Allocate New Line(s)" are selected (value: true), the system attempts to move existing lines to the target site and also creates new lines (one or more) in the target site, and adds it to the device and/or Extension Mobility.

   When <new_line_truefalse> = true:

   - Fetch all directory numbers currently available at this site. The user can select one value <dn>. See tool-macro-directory-numbers-id.
   - Form text field titled "Line Label" <line_label>.
   - Form text field titled "Display" <line_display>.

Step 5: Add new phones or move existing phones

In this step, define whether to assign new phones in the target site (with the profile moved from the existing phone), or whether to move existing phones belonging to the subscriber.

1. To move desk phones, select the "Move Deskphone(s)" checkbox, setting the value for <move_deskphone_truefalse> to True. The default is False.
2. To create new desk phones, select the "Create new Deskphone" checkbox, setting the value for <add_new_phone_at_target_truefalse> to True. The default is False.
3. If <add_new_phone_at_target_truefalse> = True, choose an option, and follow the relevant steps:
   - Option 1: Use existing phone's config:
     a. Select the "Use Existing Phone config" checkbox, setting the value for <copy_deskphoneprofile_to_target_truefalse> to True. The default is False.
     b. Populate the "Configuration of existing Phone to be used" drop-down with all phones currently belonging to the subscriber. See *(GET) Subscriber's Phones and Services*
     c. User selects one phone (<phone_mac_address_at_source>).
     d. Process the payload returned by the GET call.
     e. Resolve the value at for field "existingPhones", and display it in the drop-down.
     f. Depending on operation selection, assign the following:
        – <phone_mac_address_at_source>
        – <phone_type_at_source>
   - Option 2: Don't use existing phone's config:
     a. Leave the "Use Existing Phone config" checkbox clear, setting the value for <copy_deskphoneprofile_to_target_truefalse> to False. The default is False.
     b. Set <phone_mac_address_at_source> to null.
     c. Assign phone model in target site by fetching available phone models in the platform.
     d. Populate the drop-down titled "Phone Model in target site" (<phone_type_at_target>).

     Note: The GET call you use depends on how Automate is set up, either all phone models available to the customer, or all phone models the provider makes available to the customer.

     Refer to *(GET) Phone Models*

4. Fill out the MAC Address of the phone in the target site in a text field (name), and resolve the value to <new_phone_MAC_Address>.

Note: Note the input conditions for the MAC address at OpenAPI example for view/UserPhoneMoveUsers_VIEW

Step 6: Allocate the default CUC template defined in the site defaults

1. Execute the following GET request to allocate the default CUC template from the Site Defaults:

```
GET https://servername/api/tool/Macro/?hierarchy=<move_to_hn>&method=evaluate&
↪format=json&input={%23 data.SiteDefaultsDoc.defaultcucsubscribertemplate ||␣
↪direction:local %23}
```

   Example:

```
GET https://servername/api/tool/Macro/?hierarchy=sys.hcs.CS-P.CS-NB.Innovia.INV-
↪Reading&method=evaluate&format=json&input={%23 data.SiteDefaultsDoc.
↪defaultcucsubscribertemplate || direction:local %23}
```

2. Assign the value returned from the GET call, to `<default_vm_template>`.

Note: You will only need to include `<default_vm_template>` in the payload if the user being moved to the other site has voicemail.

Step 7: Hardcode values in the payload

1. Hardcode the following values in the payload:
   - Set `AllowLineMove` to `true` (`<move_line_truefalse>`)
   - Set `default_css` to `true`
   - Set `default_dp` to `true`

Query parameters

Parameter	Value
`hierarchy`	Customer

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
{
   "username": "<username>",
   "move_from_hn": "<move_from_hn>",
   "move_to_hn": "<move_to_hn>",
   "move_line": <move_line_truefalse>,
   "AllowLineMove": <move_line_truefalse>,
   "new_line": <new_line_truefalse>,
   "lines": [
```

(continues on next page)

(continued from previous page)

```
        {
           "directory_number": "<line_1>",
           "label": "<line_label1>",
           "display": "<line_display1>"
        },
        {
           "directory_number": "<line_2>",
           "label": "<line_label2>",
           "display": "<line_display2>"
        }
   ],

      "move_phone": <move_deskphone_truefalse>,
      "new_phone": <add_new_phone_at_target_truefalse>,
      "new_phone_from_source": <copy_deskphoneprofile_to_target_truefalse>,
      "new_phone_config_source_product": <phone_type_at_source>,
      "new_phone_config_source": "<phone_mac_address_at_source>",
      "phone_type": <phone_type_at_target>,
      "name": <new_phone_mac_address>,
      "AllowLineMove": <include_lines_from_source_truefalse>,
      "newCucUserTemplate": "<default_vm_template>",
      "default_dp": true,
      "default_css": true

      "request_meta": {
      "external_id": "<external-id>",
      "external_reference": "<external_reference>",
      "callback_url": "<callback_url_or_ip",
      "callback_username": "<callback_username>",
      "callback_password": "<callback_password>"
   }
}
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
username	The username.	string	
move_from_hn	Source site.	string	The name of the site where you're moving the subscriber from.
move_to_hn	Target site.	string	The name of the site where you're moving the subscriber to.
move_line	Whether line move is allowed.	boolean	Defines whether existing lines need to be moved to the new site. True or False. Default is False.
AllowLineMove	Whether to move lines.	boolean	True or False. Default is False.
new_line	Whether to allocate new lines.	boolean	Defines whether to allocate new lines in the target site when moving the subscriber. Default is True.
lines	Line details.	array	For each line you add, the directory number, the line label, and the line display name.
move_phone	Whether to move the phone.	boolean	True or False.
new_phone	Whether to add a new phone.	boolean	True or False.
new_phone_from_sou	Whether to create a new phone from existing phone.	boolean	True or False.
new_phone_config_s	Type of phone.	string	The source phone type.
new_phone_config_s	Configuration source.	string	New phone's configuration source.
phone_type	The phone type.	string	Phone type at target site.
name	The phone name	string	The MAC address of the phone. • Max value: 15 characters • The first 3 characters must be SEP • Following the first 3 characters, the next 12 characters must consist of hexadecimal characters.
AllowLineMove	Whether to include lines in the move.	string	True or False.
newCucUserTemplate	Default CUC template.	string	This value is defined in the Site Defaults.
default_dp		boolean	Hardcode this value to True.
default_css	The CSS	boolean	Hardcode this value to True.
request_meta	Callback details.	string	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.9. Modify line data

Overview

This API PATCH call updates the following device line information:

- Line description
- Line alerting name
- Line alerting name ASCII

`PATCH https://<hostname>/api/api/device/cucm/Line/{Line PKID}`

Where `{Line PKID}` is the ID of the line to update.

References:

- OpenAPI example for device/cucm/Line/{Line PKID}
- Model: device/cucm/Line
- API Reference for device/cucm/Line

Using device/cucm/Line/{Line PKID}

Using this API call involves the following tasks:

1. Identify the customer and the customer's hierarchy, and the site and the site hierarchy.
2. Resolve the line that needs to be modified, and modify line details, as required.

Step 1: Identify Customer+Customer Hierarchy and Site+Site Hierarchy

1. Fetch the list of customers to populate a drop-down list, and allow the user to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*.

2. Fetch available site hierarchies for the selected customer (`<Customer Name>`), and allow the user to select the relevant site.

   Refer to *(GET) All Sites Belonging to the Customer*

3. Resolve `<Customer Hierarchy>` and `<Site Hierarchy>`.
   - `<Customer Hierarchy>` is the entry in the earlier step that ends with the `<Customer Name>`.

     For example, if `<Customer Name>` is Innovia, the `<Customer Hierarchy>` will be `sys.hcs.CS-P.CS-NB.Innovia`.

   - `<Site Hierarchy>` is the entry in the earlier step that the operator selects.

     For example, `sys.hcs.CS-P.CS-NB.Innovia.INV-Reading`

Step 2: Resolve the line that needs to be modified, and modify line details

1. Fetch the following line details from Automate, and present this data in separate fields:
   - Line record PKID
   - Line Pattern
   - Line Description
   - Line AlertingName
   - Line ASCIIAlerting Name

   Refer to *(GET) All Line Details*
2. User selects a line, and for the selected line, resolve the value to `<Line PKID>`.
3. For the selected line, the user can modify the following details to update the line:
   - A line description, at `description`, resolved to `<Line Description Text>`.
   - A line alerting name, at `alertingName`, resolved to `<Line Alerting Text>`
   - A line ASCII alerting name, at `asciiAlertingName`, resolved to `<Line Alerting ASCII Text>`

   Note: Note the input conditions for these fields, at OpenAPI Example

Query parameters

Parameter	Value
`hierarchy`	Site

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
{
   "description": "<Line Description Text>",
   "alertingName": "<Line Alerting Text>",
   "asciiAlertingName": "<Line Alerting ASCII Text",
   "request_meta": {
         "external_id": "<id>",
         "external_reference": "<Reference>",
         "callback_url": "<url_string>",
         "callback_username": "<callback_username>",
         "callback_password": "<callback_password>"
      }
}
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
`description`	Line description.	string	Max 30 characters.
`alertingName`	Line alerting name.	string	Max 30 characters.
`asciiAlertingName`	Line alerting ASCII name.		Max 30 characters.
`request_meta`	Callback details.	string	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.10. Modify phone data - line recording details

Overview

This API PATCH call updates the following phone information:

- Phone description
- Line label
- Line display name
- Line ASCII display name
- Line call recording settings

`PATCH https://<hostname>/api/api/device/cucm/Phone/{Phone PKID}`

Where `{Phone PKID}` is the ID of the phone to update.

References:

- OpenAPI example for device/cucm/Phone/{Phone PKID}
- Model: device/cucm/Phone
- API Reference for device/cucm/Phone

Using device/cucm/Phone/{Phone PKID}

Using this API call involves the following tasks:

1. Identify the customer and the customer's hierarchy, and the site and the site hierarchy.
2. Resolve the phone that needs to be modified, and modify phone details, as required.

Step 1: Identify Customer+Customer Hierarchy and Site+Site Hierarchy

1. Fetch the list of customers to populate a drop-down list, and allow the user to select a customer from the list. <Customer Name>

   Refer to *(GET) Customers*.

2. Fetch available site hierarchies for the selected customer (<Customer Name>), and allow the user to select the relevant site.

   Refer to *(GET) All Sites Belonging to the Customer*

3. Resolve <Customer Hierarchy> and <Site Hierarchy>.

   - <Customer Hierarchy> is the entry in the earlier step that ends with the <Customer Name>.

     For example, if <Customer Name> is Innovia, the <Customer Hierarchy> will be sys.hcs.CS-P.CS-NB.Innovia.

   - <Site Hierarchy> is the entry in the earlier step that the operator selects.

     For example, sys.hcs.CS-P.CS-NB.Innovia.INV-Reading

Step 2: Resolve the phone that needs to be modified, and modify phone details

1. Fetch the following phone details from Automate, and present this data in separate fields:

   - Phone PKID
   - Phone MAC Address
   - Phone Description
   - Phone Line Label
   - Phone Display Name
   - Phone ASCII Display Name

   Refer to *(GET) All Phones Belonging to a Customer (with PKIDs)*

   Note: You can ignore other values, such as Call Recording fields.

2. User selects a phone, and for the selected phone, resolve the value to <Phone PKID>.
3. For the selected phone, the user can modify the following details to update the phone:

   Note: Depending on the number of lines that the phone returns, the form needs to dynamically populate fields relevant to lines.

   - <Phone Description>
   - <Line (n) Label>
   - <Line (n) Display>
   - <Line (n) DisplayAscii>

   For example:

   - <Phone Description>

- <Line 1 Label>
- <Line 1 Display>
- <Line 1 DisplayAscii>
- <Line 2 Label>
- <Line 2 Display>
- <Line 2 DisplayAscii>

Query parameters

Parameter	Value
hierarchy	Site

Request Payload (Body)

The box lists all parameters that could be included in the call request. These parameters are described in the table below the box:

```
[
{
   "op": "add",
   "path": "/request_meta",
   "value": [
      {
            "external_id": "<id>",
            "external_reference": "<Reference>",
            "callback_url": "<url_string>",
            "callback_username": "<callback_username>",
            "callback_password": "<callback_password>"
      }
]
},
{"op": "replace","path": "/description","value": "<Phone Description>" },

{"op": "replace","path": "/lines/line/0/label","value": "<Line 1 Label>" },
{"op": "replace","path": "/lines/line/0/display","value": "<Line 1 Display>" },
{"op": "replace","path": "/lines/line/0/displayAscii","value": "<Line 1 DisplayAscii>" },

{"op": "replace","path": "/lines/line/1/label","value": "<Line 2 Label>" },
{"op": "replace","path": "/lines/line/1/display","value": "<Line 2 Display>" },
{"op": "replace","path": "/lines/line/1/displayAscii","value": "<Line 2 DisplayAscii>" }
]
```

The table describes the parameters in the request:

Parameter	Description	Type	Notes
op		string	
path		string	
value		array of objects	
request_meta	Callback details.	object	These details enable VOSS Automate to update the status when the initiated transaction is complete.

9.2.11. Delete a phone

Overview

This API DELETE call deletes a phone.

`DELETE https://<hostname>/api/api/relation/SubscriberPhone/{Removal_Phone_PKID}`

Where `{Removal_Phone_PKID}` is the ID of the phone to delete.

References:

- OpenAPI example for relation/SubscriberPhone/{Removal_Phone_PKID}
- Model: relation/SubscriberPhone
- API Reference for relation/SubscriberPhone

Using relation/SubscriberPhone/{Removal_Phone_PKID}

Using this API call involves the following tasks:

1. Identify the customer and the customer's hierarchy.
2. Fetch all details of the phone to be deleted.

Step 1: Identify Customer+Customer Hierarchy

1. Fetch the list of customers to populate a drop-down list, and allow the user to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*

2. Fetch available hierarchies for the selected customer (`<Customer Name>`).

   Refer to *(GET) All Sites Belonging to the Customer*

3. Resolve `<Customer Hierarchy>`.
   - `<Customer Hierarchy>` is the entry in the earlier step that ends with the `<Customer Name>`.

     For example, if `<Customer Name>` is Innovia, the `<Customer Hierarchy>` will be `sys.hcs.CS-P.CS-NB.Innovia`.

Step 2: Fetch all details of the phone to be deleted

1. Execute `tool-macro-all-phones-belonging-to-the-customer-id` (at Customer hierarchy) to fetch all phones belonging to the customer.
2. User selects the phone to be deleted.
3. Resolve the phone PKID of the selected phone, to `<Removal_Phone_PKID>`

Note: There is no callback for DELETE. You will need to execute a GET call containing data from the payload to confirm the status of the call, for example:

`GET https://<hostname>/api/tool/Transaction/9095e5a2-6b62-45f8-abbb-93bd908a8bef/`

See the response sample output for this DELETE call in the OpenAPI example for relation/SubscriberPhone/{Removal_Phone_PKID}

9.2.12. Delete a subscriber

Overview

This API DELETE call deletes a subscriber.

`DELETE https://<hostname>/api/api/relation/Subscriber/{Deletion Subscriber PKID}`

Where `{Deletion Subscriber PKID}` is the ID of the subscriber to delete.

References:

- OpenAPI example for relation/Subscriber/{Deletion Subscriber PKID}
- Model: relation/Subscriber
- API Reference for relation/Subscriber

Using relation/SubscriberPhone/{Removal_Phone_PKID}

Using this API call involves the following tasks:

1. Identify the customer and the customer's hierarchy.
2. Fetch all details of the subscriber to be deleted.

Step 1: Identify Customer+Customer Hierarchy

1. Fetch the list of customers to populate a drop-down list, and allow the user to select a customer from the list. `<Customer Name>`

   Refer to *(GET) Customers*
2. Fetch available hierarchies for the selected customer (`<Customer Name>`).

   Refer to *(GET) All Sites Belonging to the Customer*
3. Resolve `<Customer Hierarchy>`.

- <Customer Hierarchy> is the entry in the earlier step that ends with the <Customer Name>.

  For example, if <Customer Name> is Innovia, the <Customer Hierarchy> will be sys.hcs.CS-P.CS-NB.Innovia.

Step 2: Fetch all details of the subscriber to be deleted

1. Execute *(GET) Subscriber PKID and Name* to fetch the following details of all subscribers at the customer's hierarchy, and populate the drop-down:
   - UserID
   - FirstName
   - LastName
2. User selects the subscriber to be deleted.
3. Resolve the subscriber PKID of the selected subscriber, to <Deletion Subscriber PKID>

Note: There is no callback for DELETE. You will need to execute a GET call containing data from the payload to confirm the status of the call, for example:

GET https://<hostname>/api/tool/Transaction/b471aa05-01d5-46c9-981e-685774b645be/

See the response sample output for this DELETE call in the OpenAPI example for relation/SubscriberPhone/{Removal_Phone_PKID}

Index

V