
LearnSphere Workflow Public API

A way to
programmatically get
workflow data in
LearnSphere

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1 API

This API is a list of methods for programmatically getting LearnSphere workflow data.

As of LearnSphere version 2.1 (November 2018), we've implemented:

- Get Workflow Metadata
- Get workflow files

2 Note on format

https://url/[?optional_section]

URL to perform the action.

3 Representational state transfer (REST)

The LearnSphere Workflow API design generally follows a "REST" approach to web services. In doing so, we've modeled a workflow as a collection of resources which can be retrieved using HTTP.

3.1 HTTP Response Status Codes

LearnSphere Web Services will, in many cases, return an HTTP status code that you can use to determine how to analyze the body of the HTTP message. For example, if you know the HTTP response code was an error such as "401 Unauthorized", then you know that the content of the body of the message will be XML describing the error.

For a list of web services result codes and the HTTP status codes that appear with them, see Appendix A.

4 Authentication

Authentication is a process for identifying and verifying who is sending a request. To use LearnSphere web services, you need to identify yourself as the sender of each request. This is accomplished by sending a digital signature that is derived from a pair of public/private access keys.

Note: LearnSphere web services use DataShop web services authentication mechanism to verify the user. To use LearnSphere web services, you must first request access. Visit <http://pslcdatashop.web.cmu.edu/WebServicesCredentials> to read the User Agreement and request access. You will need to first register with DataShop if you haven't already.

Note: In addition to this documentation, consult the Java source of [the sample DataShop web services client](#) for code examples. See methods *signedRequest*, *encrypt*, and *httpTimestamp* in particular. Contact DataShop for LearnSphere Workflow specific web services client code examples.

4.1 Access Credentials

Access credentials refers to your two access keys. You can retrieve or reset your access keys from DataShop's [Web Services Credentials](#) page.

Access Key ID

Your Access Key ID identifies you as the party responsible for service requests. Include it with each request you send to us.

Secret Access Key

Your Access Key ID has a Secret Access Key associated with it. Use your Secret Access Key to calculate a signature to include in requests to DataShop web services. Your Secret Access Key is a secret, and should be known only by you and DataShop. You should never include your Secret Access Key in your requests to DataShop web services. You should never email your Secret Access Key to anyone. It is important to keep your Secret Access Key confidential to protect your account.

4.2 Using your Access Credentials to Sign a Request

Consult “Datashop Public API.docx” for detailed information for this section.

5 Getting Data

5.1 Get Workflow Metadata

[https://pslcdatashop.web.cmu.edu/learnsphere/services/workflows/\[?id\]](https://pslcdatashop.web.cmu.edu/learnsphere/services/workflows/[?id])

Get list of workflows matching the parameters, or information about a single workflow (if an id is specified).

5.1.1 Workflow ID

The LearnSphere Workflow API expects you to reference workflows by “ID”, a unique identifier for each workflow in the repository. The ID of any of workflow can be determined by performing a request to list the workflows, which lists the IDs in the response. The ID of each workflow is shown as the “id” attribute of each workflow element

5.1.2 Request Parameters

global

true or false. When true, web service returns only workflows that are public. When false, web service returns only workflows that are not public. When undefined, web service doesn’t filter out workflows by global flag.

Note: If you request a single dataset, global is not a valid parameter

mine

true or false. When true, web service returns only workflows that are owned by the authenticated user . When false, web service returns workflows that are not owned by the authenticated user. When undefined, web service doesn’t filter out workflows by workflow owner.

Note: If you request a single dataset, mine is not a valid parameter

verbose

true or false. Default is **false**. False returns the simpler, less verbose description for each workflow (see directly below) while true returns the more verbose description for each workflow (see further below).

5.1.3 Response Fields

Default

name: workflow name

owner: creator of the workflow

global: true for public or false for private

data_access: access status of workflow data; possible values are: public, private, locked, locked*, request, request*

last_updated: date of last change

state: status of workflow; possible values are: new, running, error, success, paused

Additional fields of default for verbose

description: description of workflow

components: parent node for component

component: starting of a component

id_human: component name readable to human

name: component name from UI

type: component type

connections: parent node for connections

connection: starting of a connection of a component

to: the end point of a connection

from: the beginning point of a connection

index: index of the connections

frindex: index of all from connections

tindex: index of all to connections

import_file: import file of an import component

name: name of the import file

type: type of the import file

file_selection_type: selection type of the import file

dataset_link: dataset id to which the import file is linked

dataset_name: dataset name to which the import file is linked

options: parent node for options

option: starting of a option of a component

name: name of an option

value: value of an option

annotations: parent node for annotations

annotation: starting of an annotation

annotation_text: content of an annotation

Additional fields of verbose for a single workflow

attached_datasets: parent node for datasets that workflow is attached to

dataset: starting of a dataset of attached datasets

name: name of dataset

project: project of dataset, a node in dataset tag, only in verbose version of single workflow

result: starting node of a result

elapsed_second: running time of a workflow

output_file: starting node of a output file

type: type of output file

path: path/id of output file

name: name of output file

index: index of all output files

label: label of output file

errors: parent node for errors

error: component error of a component

Note: The order of datasets in the response XML is indeterminate.

5.1.4 Example request:

GET <https://pslcdatashop.web.cmu.edu/learnsphere/services/workflows?mine=true&global=false>

5.1.5 Example response on success:

```
<?xml version="1.0" encoding="UTF-8"?>
<learnsphere_message result_code="0" result_message="Success. 3 workflows found.">
<workflow id="6">
  <name>test_multi</name>
  <owner>hcheng</owner>
  <global>>false</global>
  <data_access>private</data_access>
  <last_updated>2018-08-20</last_updated>
  <state>success</state>
</workflow>
<workflow id="8">
  <name>test</name>
  <owner>hcheng</owner>
  <global>>false</global>
  <data_access>private</data_access>
  <last_updated>2018-09-17</last_updated>
  <state>success</state>
</workflow>
<workflow id="11">
  <name>test errors in workflow level</name>
  <owner>hcheng</owner>
  <global>>false</global>
```

```
<data_access>private</data_access>
<last_updated>2018-09-24</last_updated>
<state>error</state>
</workflow>
</learnsphere_message>
```

5.1.6 Example response on error:

```
<?xml version="1.0" encoding="UTF-8"?>
<pslc_datashop_message result_code="-34" result_message="Error. Workflow 1 is not valid."/>
```

5.1.7 Example request (verbose)

GET <https://pslcdatashop.web.cmu.edu/learnsphere/services/workflows/10?verbose=true>

```
<?xml version="1.0" encoding="UTF-8"?>
<learnsphere_message result_code="0" result_message="Success. 1 workflows found.">
  <workflow id="8">
    <name>test</name>
    <owner>hcheng</owner>
    <global>no</global>
    <data_access>private</data_access>
    <description/>
    <last_updated>2018-09-17</last_updated>
    <state>success</state>
    <attached_datasets>
      <dataset id="1">
        <name>Sample Module to test SWFs - Take 2</name>
        <project>Default</project>
      </dataset>
    </attached_datasets>
    <annotations>
      <annotation id="1">
        <annotation_text>test</annotation_text>
      </annotation>
    </annotations>
    <components>
      <component id="Data-1-x076886">
        <id_human>Data #1</id_human>
        <name>Import</name>
        <type>data</type>
        <connections>
          <connection>
            <to>Anaysis-1-x186672</to>
            <index>0</index>
            <frindex>0</frindex>
          </connection>
        </connections>
        <import_file id="170">
```

```
<name>ds96_student_step_export.txt</name>
<type>student-step</type>
<file_selection_type>student-step</file_selection_type>
<dataset_link>1</dataset_link>
<dataset_name>Sample Module to test SWFs - Take 2</dataset_name>
</import_file>
<result>
  <elapsed_seconds>0</elapsed_seconds>
</result>
</component>
<component id="Analysis-1-x186672">
<id_human>Analysis #1</id_human>
<name>AFM</name>
<type>analysis</type>
<connections>
  <connection>
    <from>Data-1-x076886</from>
    <index>0</index>
    <tindex>0</tindex>
  </connection>
</connections>
<options>
  <option>
    <name>model</name>
    <value>\s*KC\s*\((.*)\)\s*</value>
  </option>
</options>
<result>
  <elapsed_seconds>2</elapsed_seconds>
  <output_files>
    <output_file>
      <type>student-step</type>
      <path>171</path>
      <name>Step-values-with-predictions.txt</name>
      <index>0</index>
      <label>student-step</label>
    </output_file>
  </output_files>
</result>
</component>
</components>
</workflow>
</learnsphere_message>
```


5.2 Get workflow files

https://pslcdatashop.web.cmu.edu/learnsphere/services/workflow_files/id/

Get all accessible files for a workflow.

5.2.1 Request Parameters

File_type

input or output. When input, web service returns this workflow's import files accessible for the authenticated user. When output, web service returns this workflow's output files accessible for the authenticated user. When undefined, web service returns this workflow's input and output files accessible for the authenticated user.

5.2.2 Example request:

GET

https://pslcdatashop.web.cmu.edu/learnsphere/services/workflow_files/8?file_type=output

5.2.3 Example response:

5.2.4 All result files are archived into a zip file. To see examples of implementation of accessing the zip file, contact Datashop.

Appendix A

All Possible Result Codes

Result Code	HTTP Status Code	Description	Services that could return this result code
0	200 OK	Success. [Optional message]	All
-5	400 Bad Request	Error. Invalid request parameter: [parameter].	All
-6	400 Bad Request	Error. Invalid value for parameter [param]: [value].	All
-6	400 Bad Request	Number format error for workflow [workflowID]	All
-17	400 Bad Request	XML parsing error for workflow [workflowID]	All
-33	401 Unauthorized	Workflow [workflowID] is not accessible	All
-34	404 Not Found	Workflow [workflowID] is not valid	All
-99	404 Not Found	Error. No web service found matching the URL. For a list of valid URLs, see http://pslcdatashop.org/api/	All
-100	500 Internal Server Error	Unknown error.	All
-100	500 Internal Server Error	XML parsing error for workflow [workflowID]	ALL
-100	500 Internal Server Error	JSONException for workflow [workflowID]	All
-101	401 Unauthorized	Authorization failed. Check your credentials.	All

Appendix B

Revision History