REST API FOR z/OS

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German User Guide

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WHY REST APIs

SIMPLE

REST APIs are simple to use, requiring just a URL and few parameters as input.

SAFE

HTTPS connection and basic authentication guarantee that all your data are protected in both sending and receiving ways.

QUICK

Response time of a REST API call is in seconds!

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WHY REST APIs

REST APIs are language independent!

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WHAT YOU CAN DO WITH REST APIs

- **Modify** definitions in the database
- **Promote** definitions from dev to prod
- **Dynamically add** occurrences to the plan
- **Monitor or modify** jobs and occurrences in the plan
- Implement a self service interface (e.g. on ServiceNow)
- …
- Call **WAPL** remotely

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INTRODUCTION TO REST APIs

Representational state transfer (REST) or RESTful web services is a way of providing **interoperability between computer systems** on the Internet. REST-compliant Web services allow requesting systems to access and manipulate textual representations of Web resources using a **uniform** and **predefined set** of stateless operations.

In a RESTful Web service, requests made to a resource's **URI** will elicit a response that may be in **XML**, **HTML**, **JSON** or some other defined format. The response may confirm that some alteration has been made to the stored resource. Using HTTP, as is most common, the kind of operations available include those predefined by the HTTP verbs **GET**, **POST**, **PUT**, **DELETE** and so on.

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INFORMATION ABOUT REST APIs

- Communication over HTTPS protocol – enabled Basic Auth
- HTTP methods (GET PUT POST DELETE) enabled actions
- Inputs in JSON format
- Leverage on ZConnector codes
- Available starting Dynamic Workload Console 9.4 FP2

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INFORMATION ABOUT REST APIs: PATH EXAMPLE

https://10.0.0.10:9443/twsz/v1/zengine/model/jobstream/<jsid>

https://10.0.0.10:9443/twsz/v1/zengine/plan/current/job/<jobid>/action/nop

Engine name: name of the engine

Sector: model for AD, plan for CP

Object type: Jobstream, Job, Resource, Calendar and so on.

Object id: id of the object to be processed by REST Api

Action: Query , Release, Hold, Release all dependencies (used in CP)

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STARTING WITH REST APIs

- Create an engine connection:

```
<!-- replace all variables with the proper connection property values -->
<server description="resourceAdapterDef">
    <connectionFactory id="zengine"
        jndiName="eis/tws/zconn/zengine">
        <properties.ZOSConnectorAdapter hostName="10.0.0.10"
                                        portNumber="1234"
                                        scaffoldSwitch="false"
                                        useSocket="false"
                                        useSsl="false"
                                        connectionTimeoutCleanup="10" />
    </connectionFactory>

</server>
```


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STARTING WITH REST APIs

- Open Swagger Doc at **https://<your-host>:<rest-port>/twsz**

IBM Workload Scheduler

IBM Workload Scheduler API

IBM Workload Scheduler REST API

engine — Show/Hide | List Operations | Expand Operations

model — Show/Hide | List Operations | Expand Operations

GET	/{engine}/model/calendar/	GET operation for Calendar
POST	/{engine}/model/calendar/	ADD operation for Calendar
POST	/{engine}/model/calendar/header/query	QUERY operation on calendar header
POST	/{engine}/model/calendar/header/query_next	QUERY operation on Calendar
DELETE	/{engine}/model/calendar/{calendarId}	DELETE operation for Calendar using a Id
GET	/{engine}/model/calendar/{calendarId}	GET operation for Calendar using id
PUT	/{engine}/model/calendar/{calendarId}	UPDATE operation for Calendar using Id
PUT	/{engine}/model/calendar/action/lock	LOCK operation for Calendar using a Name
PUT	/{engine}/model/calendar/action/unlock	UNLOCK operation for calendar using a name
PUT	/{engine}/model/calendar/{calendarId}/action/lock	LOCK operation for Calendar using Id
PUT	/{engine}/model/calendar/{calendarId}/action/unlock	UNLOCK operation for calendar using Id

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STARTING WITH REST APIs

- Try your first REST call

POST /{engine}/plan/{planId}/job/query — Query operation for jobs in plan

Try it out! Hide Response

Curl

```
curl -X POST --header 'Content-Type: application/json' --header 'Accept: application/json' -d '{}' 'https://10.14.37.229:9443/twsz/v1/cwsdsr/plan/current/job/query'
```

Request URL

```
https://10.14.37.229:9443/twsz/v1/cwsdsr/plan/current/job/query
```

Response Body


```
[
  {
    "id": "Y29tLmlibS50d3Mub2JqZWN0cy5wbGFuLkpvYkluUGxhbgBERU1PU1VDQwAyMDE5LjA0LjE3LjAwLjEwADEA",
    "name": "1",
    "description": "",
    "jobDefinition": {
      "jobDefinitionInPlanKey": {
        "workstationInPlanKey": {
          "name": "CPU1"
        }
      },
      "taskType": "ZOSJOBTASK",
      "command": false,
      "workstationId": "Y29tLmlibS50d3Mub2JqZWN0cy5wbGFuLldvcmtzdGF0aW9uSW5QbGFuAENQVTEA",
      "definedByJsdl": false,
      "estimatedDuration": -1,
      "jclName": "JOB1",
      "jobClass": " ",
      "printClass": " "
```


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DOCUMENTATION

PUT /{engine}/plan/{planId}/job/{jobId}/action/hold

Implementation Notes

Hold Job In Plan

Parameters

Parameter	Value	Description	Parameter Type	Data Type
engine	zengine	name of the engine to connect	path	string
jobId	VRFADIwMTkuMDQuMDUuMTAuMDAAMQA=	Job Id	path	string
planId	current	Plan id - 'current' for current plan	path	string
Id-Encoding		0=ID with old layout not encoded 1=ID Base64-encoded layout (default value)	header	integer

Response Messages

HTTP Status Code	Reason	Response Model
202	No response body is supplied for this operation.	

Try it out!

Response Class (Status 200)

Job in Plan responses

Model | Model Schema


```
[
  {
    "id": "string",
    "name": "string",
    "description": "string",
    "jobDefinition": {
      "jobDefinitionInPlanKey": {
        "name": "string",
        "workstationInPlanKey": {
          "name": "string"
```


Response Content Type application/json

Try it out! Hide Response

Curl

```
curl -X GET --header 'Accept: application/json' 'https://10.14.36.56:16311/twsz/v1/twsx/model/calendar/?name=
```

Request URL

```
https://10.14.36.56:16311/twsz/v1/twsx/model/calendar/?name=davide
```

Response Body


```
{
  "header": {
    "id": "com.ibm.tws.objects.model.Calendar\u0000DAVIDE\u0000Z",
    "description": "",
    "name": "DAVIDE",
    "modifyData": {
      "modifiedBy": "LAPLACA",
```


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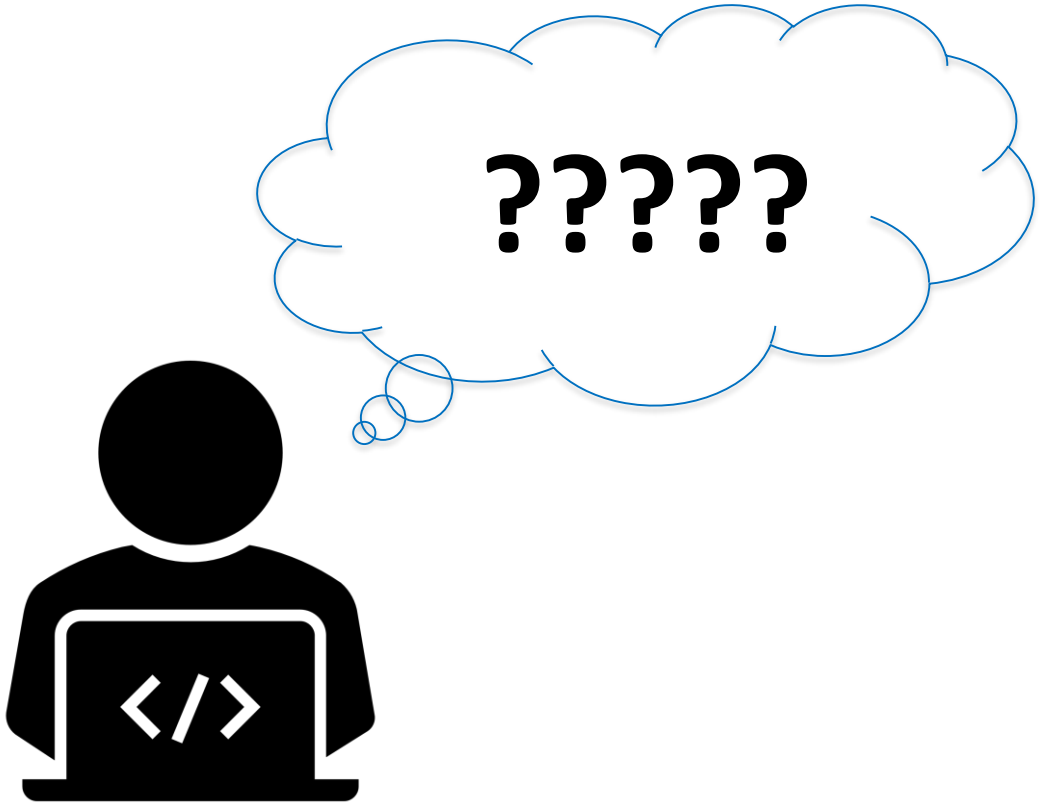
EXAMPLE: List job on a specific workstation



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EXAMPLE: List job on a specific workstation

POST /{engine}/plan/{planId}/job/query — Query operation for jobs in plan

Parameters

Parameter	Value	Description
engine	ZosEngine	name of the engine to connect
planId	current	Plan id - 'current' for current plan
body	{"filters":{"jobInPlanFilter":{"workstationName":"CPU1"}}}	Filter on job in plan

Parameter content type: application/json

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EXAMPLE: List job on a specific workstation

Response Body


```
[
  {
    "id": "Y29tLmlibS50d3Mub2JqZWN0cy5wbGFuLkpvYkluUGxhbgBQTEFORVhUADIwMTguMTEuMDguMDMuMDAAMQA=",
    "name": "1",
    "description": "",
    "jobDefinition": {
      "jobDefinitionInPlanKey": {
        "workstationInPlanKey": {
          "name": "CPU1"
        }
      },
      "taskType": "ZOSJOBTASK",
      "command": false,
      "workstationId": "Y29tLmlibS50d3Mub2JqZWN0cy5wbGFuLldvcmtzdGF0aW9uSW5QbGFuAENQVTEA",
      "definedByJsdl": false,
      "estimatedDuration": -1,
      "jclName": "CPEXT",
      "jobClass": " ",
      "printClass": " ",
```


Response Code

```
200
```


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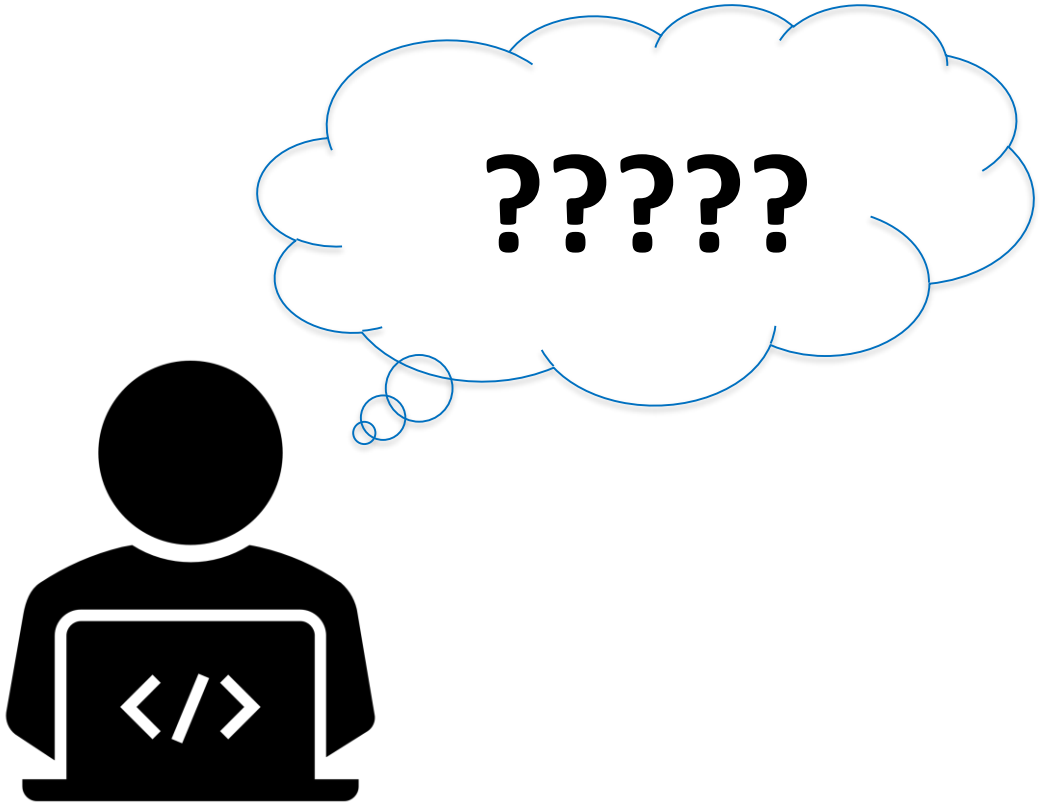
EXAMPLE: Submit a job stream in the plan



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EXAMPLE: Submit a job stream in the plan

POST /{engine}/model/jobstream/header/query

Parameters

Parameter	Value	Description
engine	cwsdsr	**Name of the engine to connect**
body	Parameter content type: application/json	Filter on JobStream
How-Many		How many objects (max 10000) - mutual exclusive with Query-PageSize and Query-PageOffset - used with a query on a first bunch of object. Use 0 (zero) to retrieve all the objects that match the given filter in one shot
Id-Encoding		0=ID with old layout not encoded 1=ID Base64-encoded layout (default value)

Try it out! Hide Response

Curl

Response Body


```
[
  {
    "id": "Y29tLmlibS50d3Mub2JqZWN0cy5tb2RlbC5Kb2JTdHJlYW0AQVBQTEFURQBmYWxzZQBmYWxzZQAyMDE5LjA0LjAzAA==",
    "key": {
      "name": "APPLATE",
      "validFrom": "2019-04-03T00:00:00",
      "isDraft": false,
      "isGroup": false,
      "className": "com.ibm.tws.objects.model.JobStreamKey"
    },
    "description": "",
    "priority": 5,
    "validTo": "2071-12-31T00:00:00",
    "carryForward": false,
    "limit": -1,
    "groupName": "",
    "ownerName": "CANALIS",
    "ownerDescription": "",
    "authorityGroup": "",
```


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EXAMPLE: Submit a job stream in the plan

POST /{engine}/plan/{planId}/jobstream/action/add_jobstream

Implementation Notes

Add the job stream instance in the plan .

Parameters

Parameter	Value	Description
engine	cwsdsr	**name of the engine to connect**
planId	current	**The plan identifier**
jobstream	{ "name": "APPLATE" } Parameter content type: application/json	
Id-Encoding		0=ID with old layout not encoded 1=ID Base64-encoded layout (default value)

Response Messages

HTTP Status Code	Reason	Response Model
200	No response body is supplied for this operation.	

Try it out! Hide Response

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EXAMPLE: Submit a job stream in the plan

Curl

```
curl -X POST --header 'Content-Type: application/json' --header 'Accept: application/json' -d '{ \
   "name": "APPLATE" \
 }' 'https://10.14.37.229:9443/twsz/v1/cwsdsr/plan/current/jobstream/action/add_jobstream'
```

Request URL

```
https://10.14.37.229:9443/twsz/v1/cwsdsr/plan/current/jobstream/action/add_jobstream
```

Response Body


```
[
  "Y29tLmlibS50d3Mub2JqZWN0cy5wbGFuLkpvYlN0cmVhbUluUGxhbgBBUFBMQVRFADIwMTkuMDQuMjAuMTYuMDQA"
]
```


Response Code

```
200
```


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9.4 vs 9.5

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9.4 vs 9.5

No more wastools scripts

```
C:\Program Files\IBM\TWAUI\wastools>displayZosEngine.bat zEngine
WASX7357I: By request, this scripting client is not connected to

 name : zEngine
 hostName : 10.0.0.10
 portNumber : 1234
 connectionTimeoutCleanup : 10 minutes
 scaffoldSwitch : false
 useSsl : false
 maxConnections : 40
 connectionTimeout : 180 seconds
 unusedTimeout : 300 seconds
 reapTime : 60 seconds
```

vs

```xml
<!-- replace all variables with the proper connection property values -->
<server description="resourceAdapterDef">
    <connectionFactory id="zengine"
        jndiName="eis/tws/zconn/zengine">
        <properties.ZOSConnectorAdapter hostName="10.0.0.10"
                                        portNumber="1234"
                                        scaffoldSwitch="false"
                                        useSocket="false"
                                        useSsl="false"
                                        connectionTimeoutCleanup="10" />
    </connectionFactory>

</server>
```

Live manage engine with a single xml

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9.4 vs 9.5

You'll never be bothered by id handling issues


```
"com.ibm.tws.objects.plan.JobStreamInPlan\u0000APPLATE\u00002019.04.20.16.53\u0000"
```


vs


```
"Y29tLmlibS50d3Mub2JqZWN0cy5wbGFuLkpvYlN0cmVhbUluUGxhbgBBUFBMQVRFADIwMTkuMDQuMjAuMTYuMDQA"
```


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MORE INFORMATION

- http://www.workloadautomation-community.com/blogs/rest-assured-rest-apis-for-zos-is-the-way
- https://github.com/WAdev0/TWSzOS_REST_API_Python_samples
- https://youtu.be/7WPaiarZtV0

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Q & A

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merci
gracias
graciñas
obrigada
hvala
thank
dank
rahmat
gràcies
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tesekkur
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pers
mamnun
terima
mauruuru
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