Starting a Denodo Scheduler Job based on Kafka Events

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Denodo Inc.: 525 University Avenue, Suite 31, Palo Alto, CA 94301. USA www.denodo.com

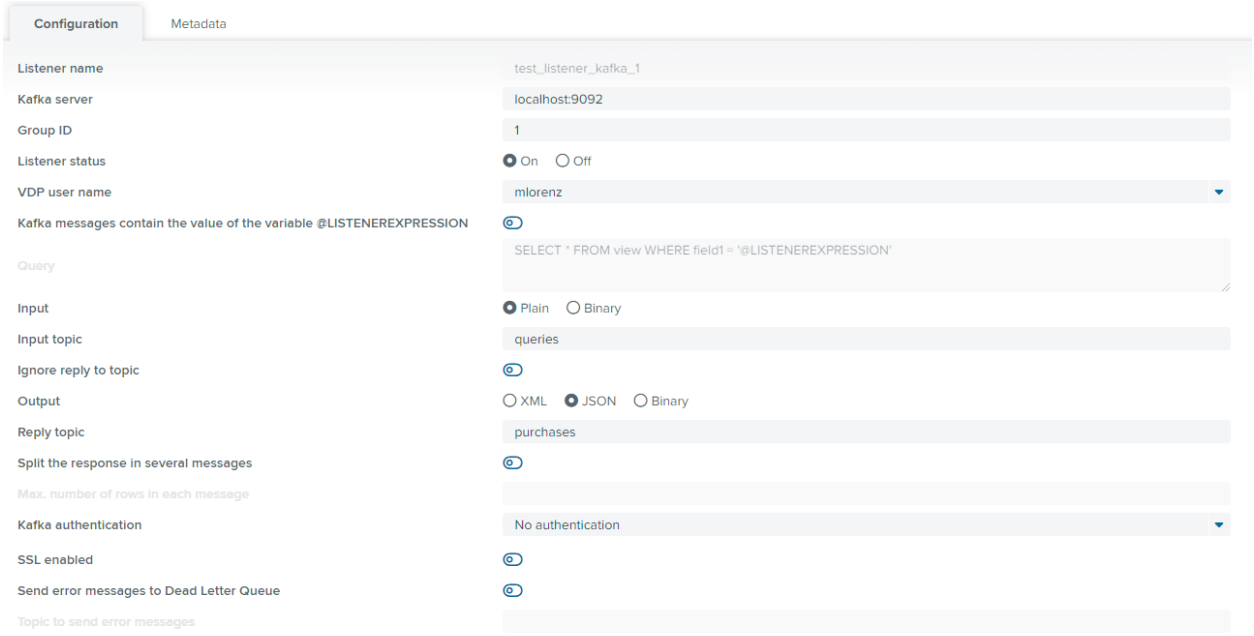
Denodo's Kafka Listener allows Denodo to listen to Kafka Events in real time. These Kafka events can be VQL Queries that Denodo can execute. The Goal is to use VQL Query Kafka events to query a view in Denodo that will call the Scheduler REST API to do a certain task, in our case starting a Scheduler job.

1 CREATE A KAFKA LISTENER

To be able to listen to Kafka events in the first place, it is necessary to configure a Kafka Listener.

- In either Denodo Design Studio or Denodo Virtual Dataport Administration Tool go to `File > New > Listener > Kafka Listener`
- Configure your Kafka Listener, for this use case there are not many requirements:
  - Make sure `Listener status` is turned on.
  - Select the `VDP User` under whom you want to execute the queries passed through Kafka.
  - Specify your `Input Topic` and `Reply Topic`.

For more detailed information on how to configure a Kafka listener go to the Section `Creating Kafka Listeners` of the `Virtual DataPort Administration Guide`

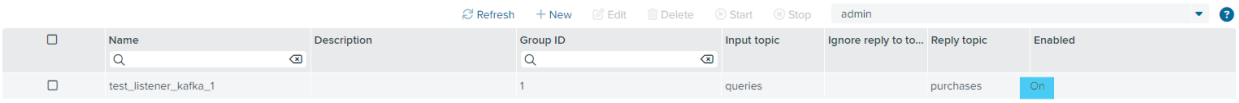


When creating the data sources and views to call the REST API you will have the **option to work with an interpolation variable**. This means you only need to create one view instead of multiple views if you want to start multiple scheduler jobs. You will find more information about that later in this topic. If you decide to do so you should also specify the `SELECT` statement by checking the option `Kafka messages contain the variable @LISTENEREXPRESSION`

```
SELECT * FROM <DenodoDataBase>.runschedulerjob WHERE post_body = '@LISTENEREXPRESSION'
```

This allows you to only insert the Post_Body of the PUT REST API into the Kafka Events as parameters.

To make sure your Kafka Listener is running go to `Tools > Listeners > Kafka.`



- Under the `Enabled` Column you can see the status of the Listener

2 DENODO SCHEDULER REST API

Next we need to work with the Scheduler REST API. You can access the documentation under the following URL:

```
http://<host>:<port>/webadmin/denodo-scheduler-admin/swagger-ui/index.html
```

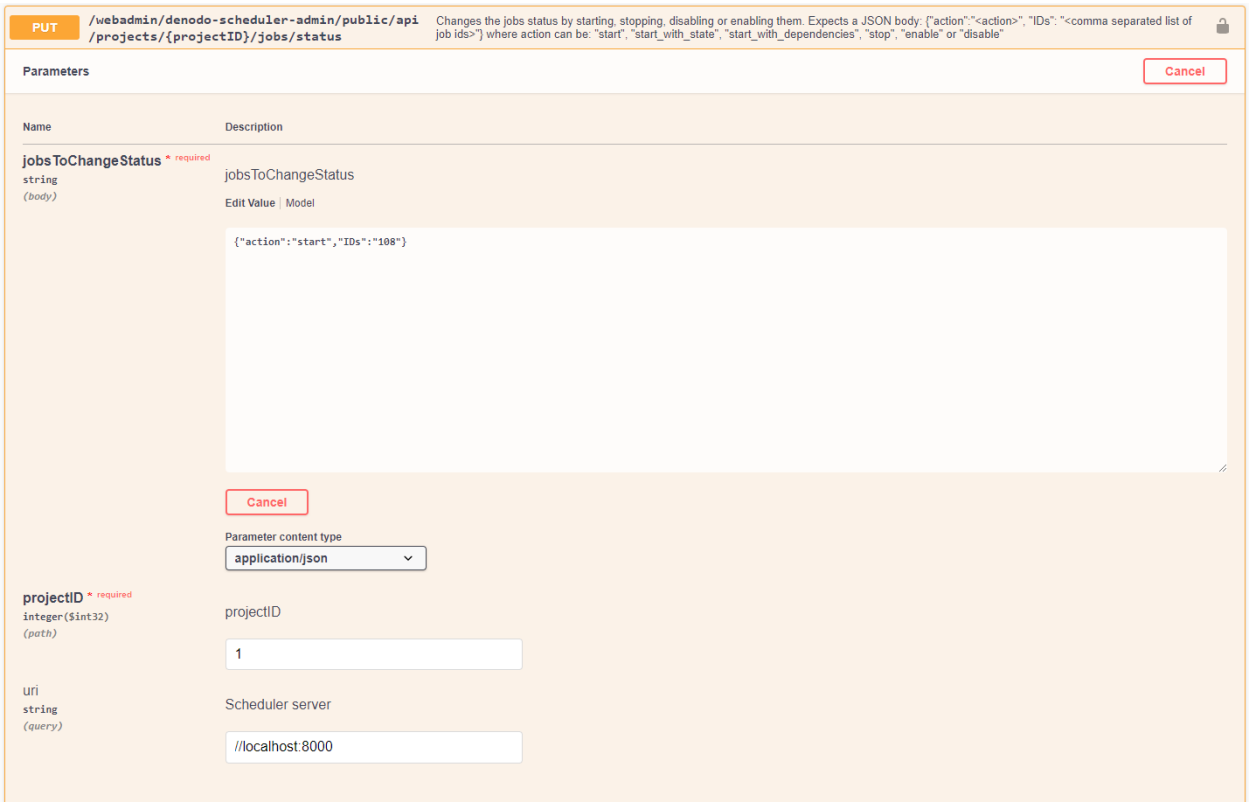
Your Scheduler Server and Scheduler Administration Tool have to be started to access the URL.

You can for example run the
`GET /webadmin/denodo-scheduler-admin/public/api/jobs`
Method to retrieve the id's and project id's of your jobs, which you will need to start them.

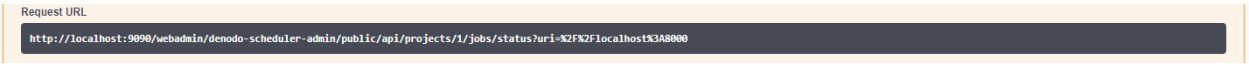
To trigger a Scheduler job there are two PUT APIs available. For changing the status of a single job it does not really matter which one you pick. However you can only use one of them to change the status of multiple jobs a the same time

- PUT `/webadmin/denodo-scheduler-admin/public/api/projects/{projectID}/jobs/{jobID}/status`
  - This AP enpdoint changes the job status of a single job.
- PUT `/webadmin/denodo-scheduler-admin/public/api/projects/{projectID}/jobs/status`
  - You can use this endpoint to change the status of multiple jobs, e.g. starting multiple jobs at the same time.

You can use the site to prebuilt your Request URL which you need in the next section of this guide. In the example below we choose the action start to trigger a Scheduler Job with the ID 108.


PUT
/webadmin/denodo-scheduler-admin/public/api/projects/{projectID}/jobs/status
Changes the jobs status by starting, stopping, disabling or enabling them. Expects a JSON body: {"action":"<action>", "IDs": "<comma separated list of job ids>"} where action can be: "start", "start_with_state", "start_with_dependencies", "stop", "enable" or "disable"
Parameters
Cancel
Name
Description
jobsToChangeStatus * required
string
(body)
jobsToChangeStatus
Edit Value | Model
{"action":"start","IDs":"108"}
Cancel
Parameter content type
application/json
projectID * required
integer($int32)
(path)
projectID
1
uri
string
(query)
Scheduler server
//localhost:8000

...

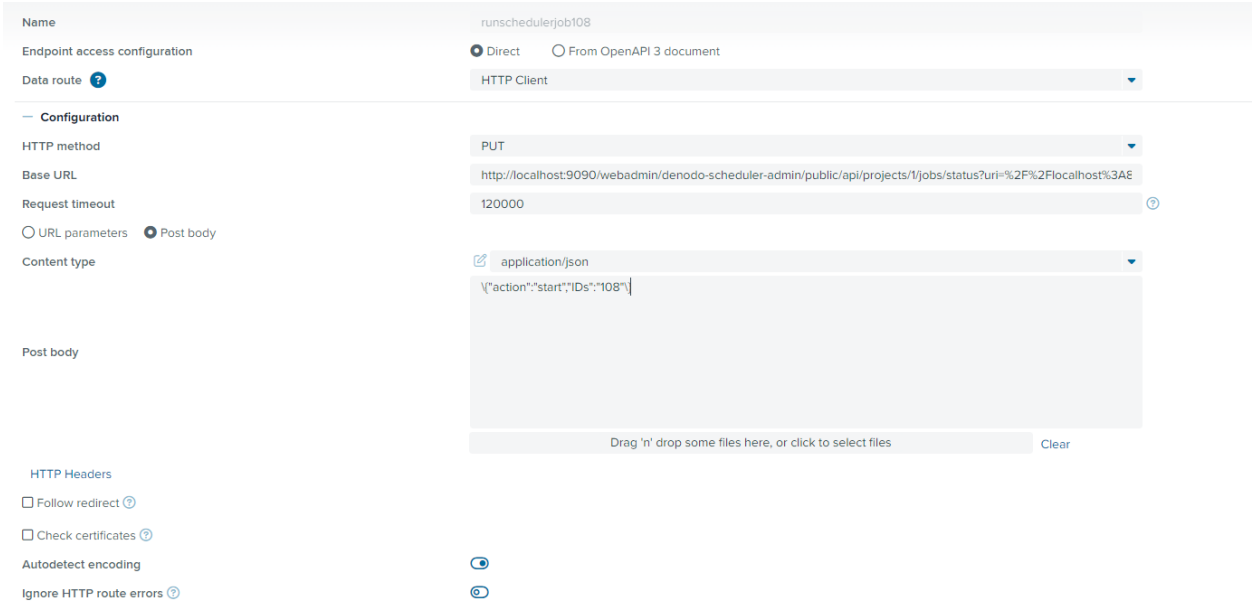

Request URL
http://localhost:9090/webadmin/denodo-scheduler-admin/public/api/projects/1/jobs/status?uri=%2F%2Flocalhost%3A8000

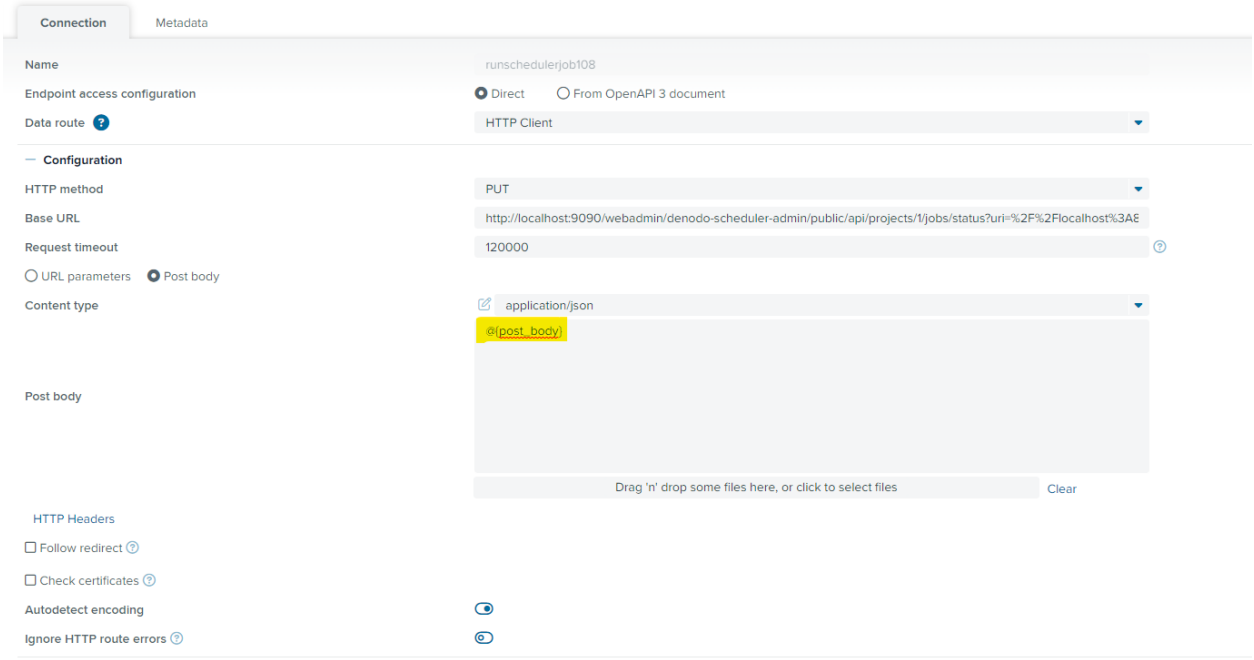
3 CREATING A JSON DATA SOURCE

With the Request URL you can now create a JSON data source in Denodo.

- Got to `File > New > Data source > JSON`.
- Provide a Name to the connection.
- Choose `HTTP Client` as your `Data route`.
- Choose `PUT` as your `HTTP Client`.
- Post your Request URL in the `Base URL` field.
- In the `Post body` section choose `application/json` as your `Content type`.
  - Enter the JSON Body as described in the REST API documentation
  - IMPORTANT: add the backslash "\" character before your curly braces "{" / "}"
    - For reference look at the screenshot below
    - This is only needed when specifying the post_body directly in `Content Type`. If you want to work with `interpolation variables` this is not needed.
  - You can also specify an `interpolation variable`. This is **recommended** as you will not have to create a separate view for every single Post Body. An example is shown below in a screenshot.

- In the `Authentication` section provide the authentication details of your `Denodo User`.
- **NOTE**: When testing the connection, Denodo will call the API and therefore run the scheduler jobs if the connection details are correct. Keep that in mind in case that is unwanted. You might want to change the `action` to `enable/disable/stop` to test the connection without triggering the job(s).





In the Screenshot above `@{post_body}` represents an interpolation variable.

4 CREATING A VIEW

Since the Scheduler API PUT Methods described above return no content but only change the jobs status, we cannot create the base view in the conventional graphical way.

We **first have to create a JSON Wrapper** with some output schema. After that we can create the views.

- You can use the VQL Code below as a template.
- Provide a Wrapper name of your choosing.
- The DATASOURCENAME should be set to your JSON data source created before.
- You can specify any OUTPUTSCHEMA. We need it to be able to create a base view since we can not create a base view without an Output.

If you have specified an interpolation variable in the data source creation, your VQL code has to be adjusted. Templates and Examples are provided below.

#For creating a view without an interpolation variable:

```
CREATE OR REPLACE WRAPPER JSON <WRAPPER_NAME>
    DATASOURCENAME=<DATA SOURCE NAME>
    TUPLEROOT '/JSONFile'
    OUTPUTSCHEMA (
     <output_name>=<output>:'<Java_data_type>
    );
```

#Example:

```
CREATE OR REPLACE WRAPPER JSON runschedulerjob
    DATASOURCENAME=runschedulerjob108
    TUPLEROOT '/JSONFile'
    OUTPUTSCHEMA (
        iss = 'iss' : 'java.lang.String'
    );
```

#For creating a view **with** an **interpolation variable:**

```
CREATE OR REPLACE WRAPPER JSON <WRAPPER_NAME>
    DATASOURCENAME=<DATA SOURCE NAME>
    TUPLEROOT '/JSONFile'
    ROUTE HTTP 'http.CommonsHttpClientConnection,120000' PUT ''
    POSTBODY '@{post_body}'
    OUTPUTSCHEMA (
                post_body  =  'post_body'  :  'java.lang.String'  (OBL)
(DEFAULTVALUE='{"action":  "<default_action>","IDs":  "<default_IDs>"}')
```

```
EXTERN
    );
```

```
#Example:

CREATE OR REPLACE WRAPPER JSON runschedulerjob108
    DATASOURCENAME=runschedulerjob108
    TUPLEROOT '/JSONFile'
    ROUTE HTTP 'http.CommonsHttpClientConnection,120000' PUT ''
    POSTBODY '@{post_body}'
    OUTPUTSCHEMA (
                 post_body  =  'post_body'  :  'java.lang.String'  (OBL)
(DEFAULTVALUE='{"action": "start","IDs": "108,99,1"}') EXTERN
    );
```

Next we can create a base view using the Wrapper we just created.

- Use the VQL Code below as a template again.
- Provide a view name.
- Choose your I18N setting.

```
#For creating a view without an interpolation variable:

CREATE OR REPLACE TABLE <VIEW_NAME> I18N <INTERNATIONALIZATION> (
        iss:text
    )
    CACHE OFF
    TIMETOLIVEINCACHE DEFAULT
    ADD SEARCHMETHOD <WRAPPER_NAME>(
        I18N <INTERNATIONALIZATION>
        CONSTRAINTS (
             ADD iss NOS ZERO ()
        )
        OUTPUTLIST (iss)
        WRAPPER (<WRAPPER_NAME>)

       );
```

```
#Example

CREATE OR REPLACE TABLE runschedulerjob108 I18N de_euro (
        iss:text
    )
    CACHE OFF
    TIMETOLIVEINCACHE DEFAULT
    ADD SEARCHMETHOD runschedulerjob108(
        I18N de_euro
        CONSTRAINTS (
             ADD iss NOS ZERO ()
        )
        OUTPUTLIST (iss)
        WRAPPER (json runschedulerjob108)

       );
```

```
#Example for creating a view with interpolation variables

CREATE OR REPLACE TABLE runschedulerjob I18N de_euro (
        post_body:text (extern)

    )
    CACHE OFF
    TIMETOLIVEINCACHE DEFAULT
    ADD SEARCHMETHOD runschedulerjob(
        I18N de_euro
        CONSTRAINTS (
            ADD post_body (=) OBL ONE
        )
        WRAPPER (json runschedulerjob)
    );
```

5 RUN THE SCHEDULER JOB VIA KAFKA EVENT

You have now set up everything necessary to be able to run Scheduler jobs via Kafka events.
Create a new Event under the topic you have subscribed to under the Kafka Listener.

Kafka Event Example for working without the interpolation variable.

```
PS C:\Denodo Projects\Kafka Event Driven Scheduler Jobs\kafka-java-getting-started> docker exec -it broker bash
[appuser@75b5c6bb1778 ~]$ kafka-console-producer --topic queries --bootstrap-server broker:9092
>SELECT * FROM schedulercw.runschedulerjob108
```

Kafka Event Example for working with the interpolation variable and the `@LISTENEREXPRESSION` set up in the Kafka Listener.

```
>{"action":"start","IDs":"108"}
>{"action":"start","IDs":"108"}
>
```

If the Kafka Listener is running and picking up the Event, the Scheduler job will be started.

6 REFERENCES

Creating Kafka Listeners
Scheduler REST Client API
JSON Sources