

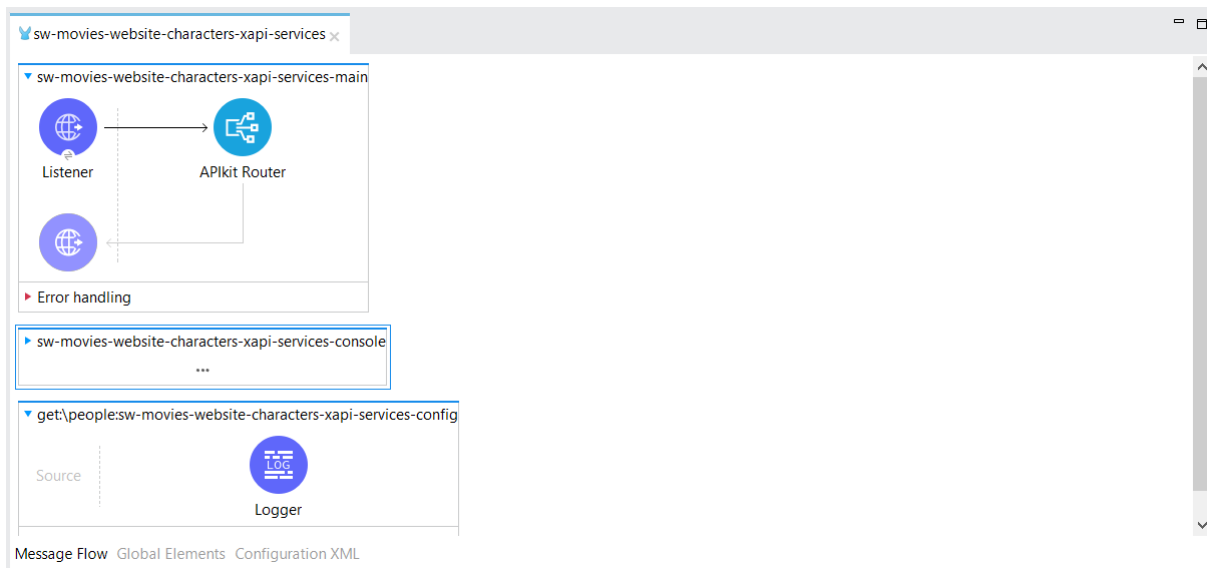
To make this exercise, the first step is the Raml elaboration of according to the indicated requirements.

```
1  #%RAML 1.0
2  title: sw-movies-website-characters-xapi-services
3  baseUrl: https://swapi.dev/api/
4  version: 1.0
5  protocols:
6  | - HTTP
7  mediaType:
8  - application/json
9  description: This API will only retrieves all Star Wars movies characters
10 |
11 /people:
12   get:
13     queryParameters:
14       gender:
15         displayName: gender
16         type: string
17         description: Filter by Character gender
18         example: male
19         required: false
20
21     responses:
22       200:
23         description: Retrieves all Star Wars characters
24         body:
25           application/json:
26             properties:
27               name:
28                 type: string
29                 example: Luke Skywalker
30
31               height:
32                 type: number
33                 example: 172
34               mass:
35                 type: number
36                 example: 77
37               hair_color:
38                 type: string
39                 example: blond
40               skin_color:
41                 type: string
42                 example: fair
43               eye_color:
44                 type: string
45                 example: blue
46               birth_year:
47                 type: string
48                 example: 19BBY
49               gender:
50                 type: string
51                 example: male
52       401:
53         description: Bad request
54       404:
55         description: Not found
```

Once the Raml is done, we publish it on Exchange.

Then we open Anypoint Studio and create a new Mule project, where we are going to download our Raml from the Desing Center.

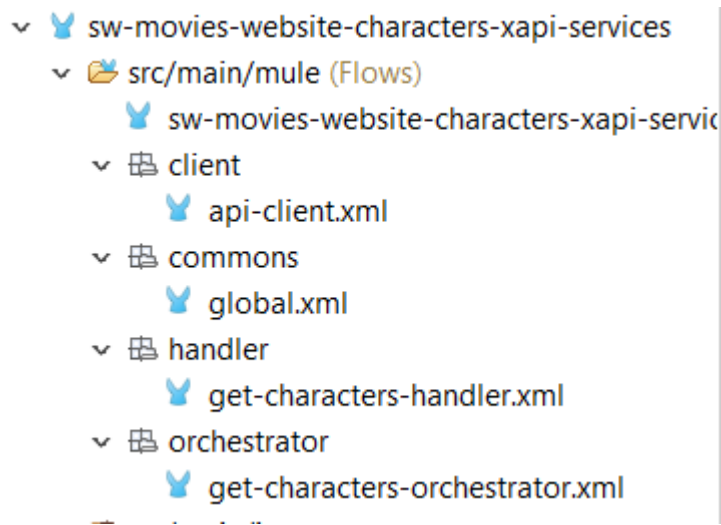
This will make automatically scaffold our application.



We configure our listener with our properties from our config file

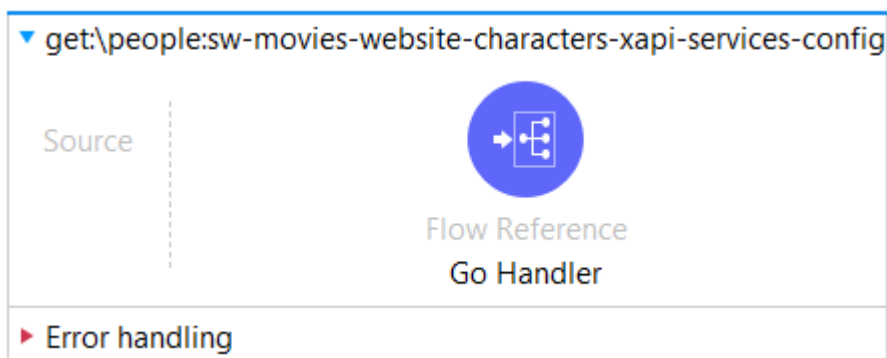
The screenshot shows the 'Global Element Properties' dialog box for an 'HTTP Listener config'. The dialog has tabs for 'General', 'Notes', and 'Help'. The 'General' tab is selected. The 'Name' field is set to 'sw-movies-website-characters-xapi-services-httpListenerConfig'. The 'Connection' section is expanded, showing the 'General' sub-tab. The 'Connection' sub-section contains the following fields: 'Protocol' (set to 'HTTP (Default)'), 'Host' (set to 'All Interfaces [0.0.0.0] (default)'), 'Port' (set to '\${http.port}'), and 'Read timeout' (set to '30000'). At the bottom of the dialog, there are buttons for 'Test Connection...', 'OK', and 'Cancel'.

We make our flow structure.

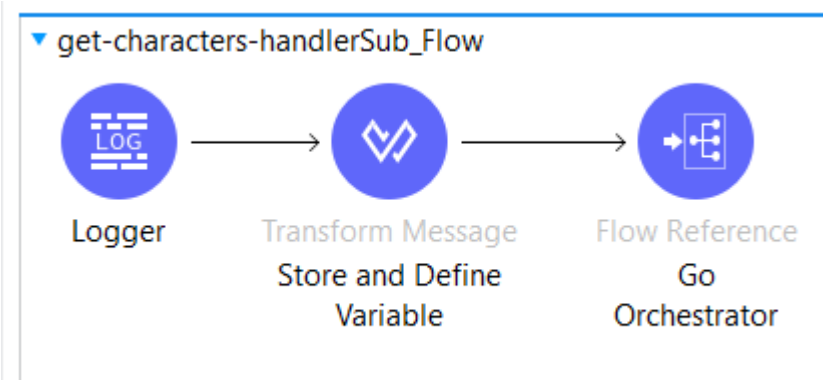


We make our flows and sub-flows

We start by directing our main flow to our handler package where we store everything that comes from the HTTP request.



We store and define our variables with a Transform Message process



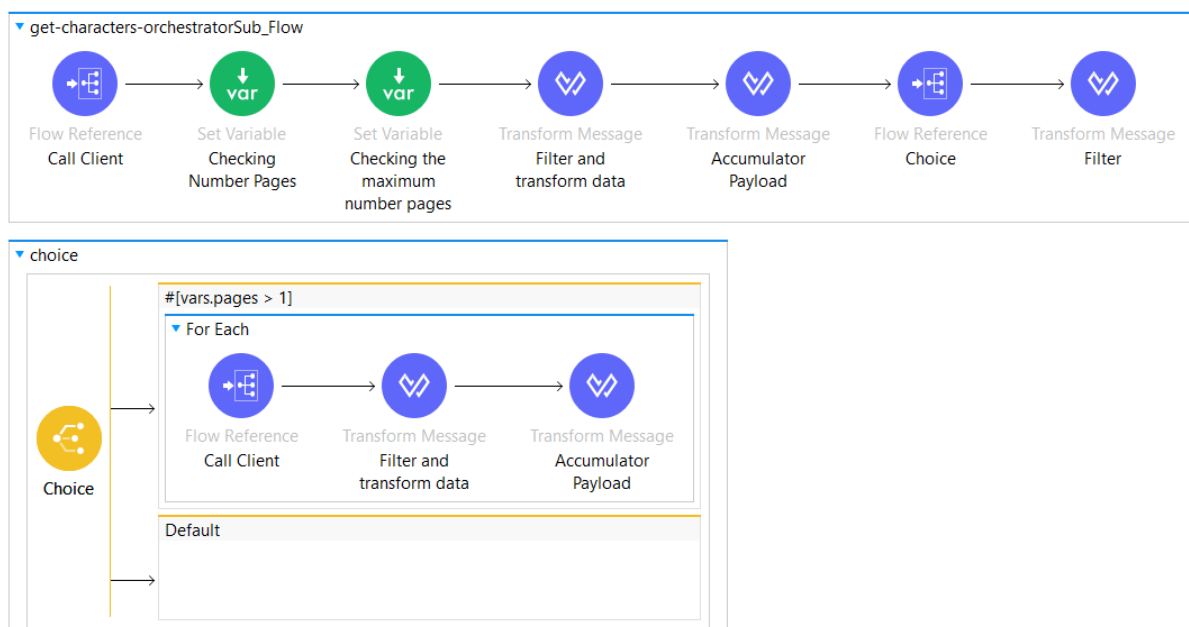
Output Variable - query ▼ ≡+ ✎ 🗑

```
1 attributes.queryParams.gender
```

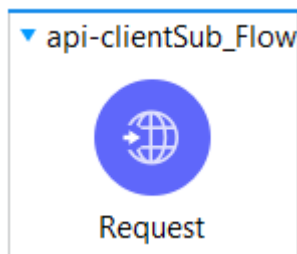
Output Variable - accumulator ▼ ≡+ ✎ 🗑 ⚠ 20 issues found

```
1 []
```

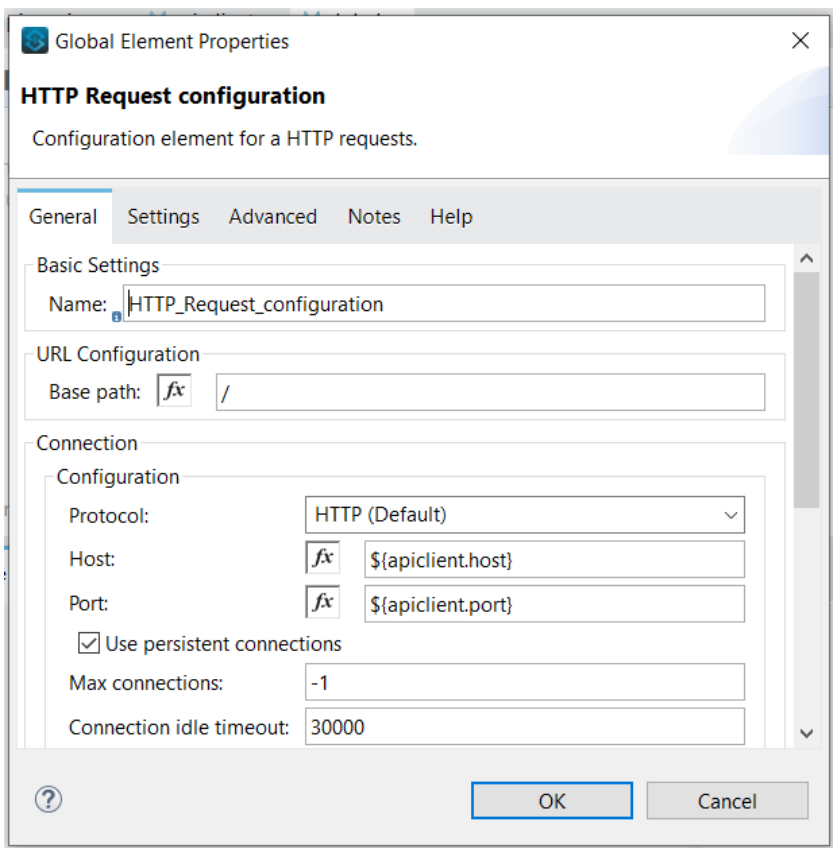
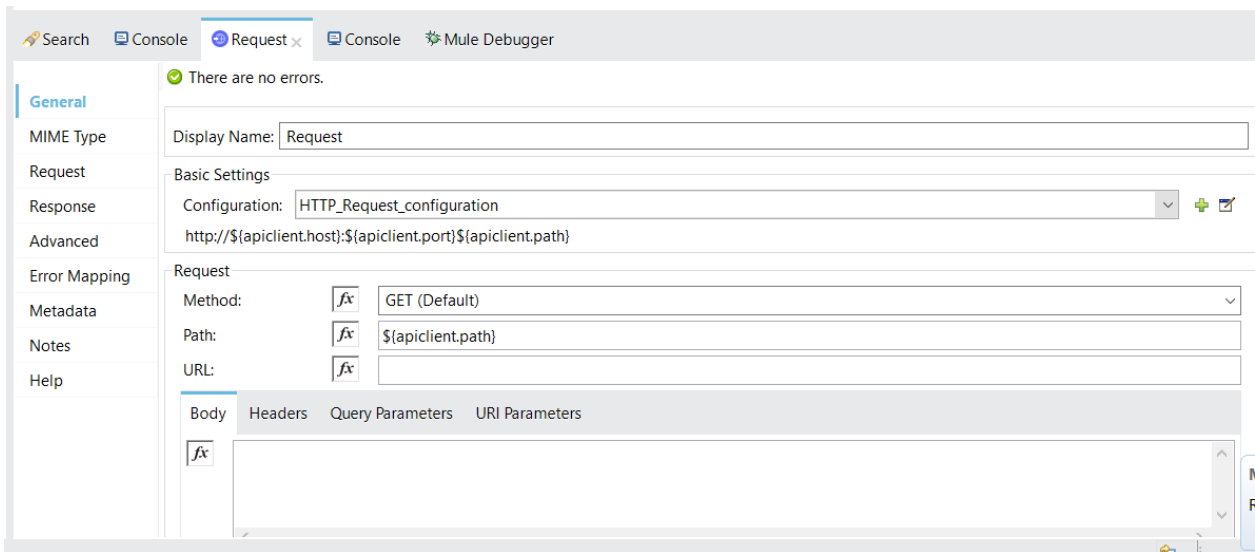
We direct our flow to our orchestrator, which orchestrates our flow and transforms the information to which we will respond.



Before transforming the information we proceed to make the call to our client, in this case a web page through a Request connector



We configure our request and move our configuration to the commons package in our configuration file called global



*sw-movies-website-characters-xapi-services

*global

Global Configuration Elements

Type	Name	Description	Create
<div><div></div>HTTP Request configuration (Configuration)</div>	HTTP_Request_configuration		<div>Edit</div> <div>Delete</div>

We put a Query Parameters to query all the pages that the response contains

Search Console Request x Console Mule Debugger

General

MIME Type

Request

Response

Advanced

Error Mapping

Metadata

Notes

Help

There are no errors.

Display Name: Request

Basic Settings

Configuration: HTTP_Request_configuration

http://\${apiclient.host}:\${apiclient.port}\${apiclient.path}

Request

Method: GET (Default)

Path: \${apiclient.path}

URL:

Body Headers Query Parameters URI Parameters

Name	Value
page	vars.counter default 1

We search the number of Star Wars characters and divide them by 10

get-characters-orchestratorSub_Flow

Flow Reference Call Client

Set Variable Checking Number Pages

Set Variable Checking the maximum number pages

Transform Message Filter and transform data

Transform Message Accumulator Payload

Flow Reference Choice

Transform Message Filter

Message Flow Global Elements Configuration XML

Search Console Checking Number Pages x Console Mule Debugger

General

MIME Type

Metadata

Notes

Help

There are no errors.

Display Name: Checking Number Pages

Settings

Name: pages

Value: `#[ceil(payload.count/10)-1]`

We make our array

get-characters-orchestratorSub_Flow

Flow Reference Call Client

Set Variable Checking Number Pages

Set Variable Checking the maximum number pages

Transform Message Filter and transform data

Transform Message Accumulator Payload

Flow Reference Choice

Transform Message Filter

Message Flow Global Elements Configuration XML

Search Console Checking the maximum number p... x Console Mule Debugger

General

MIME Type

Metadata

Notes

Help

There are no errors.

Display Name: Checking the maximum number pages

Settings

Name: maxpages

Value: `#[2 to vars.pages.as Number`

We configure our Transform Message process to transform and filter the information that we are going to accumulate in our array and display according to the request.

The screenshot displays the MuleSoft Anypoint Studio interface. At the top, a flow diagram for 'get-characters-orchestratorSub_Flow' is shown, with steps: Flow Reference (Call Client), Set Variable (Checking Number Pages), Set Variable (Checking the maximum), Transform Message (Filter and transform data), Transform Message (Accumulator Payload), Flow Reference (Choice), and Transform Message (Filter). The 'Filter and transform data' step is selected, and its configuration is shown in the right-hand pane. The configuration includes a search bar, a console, and a Mule Debugger. The output payload is displayed as JSON, showing a list of characters filtered by gender. The JSON output is as follows:

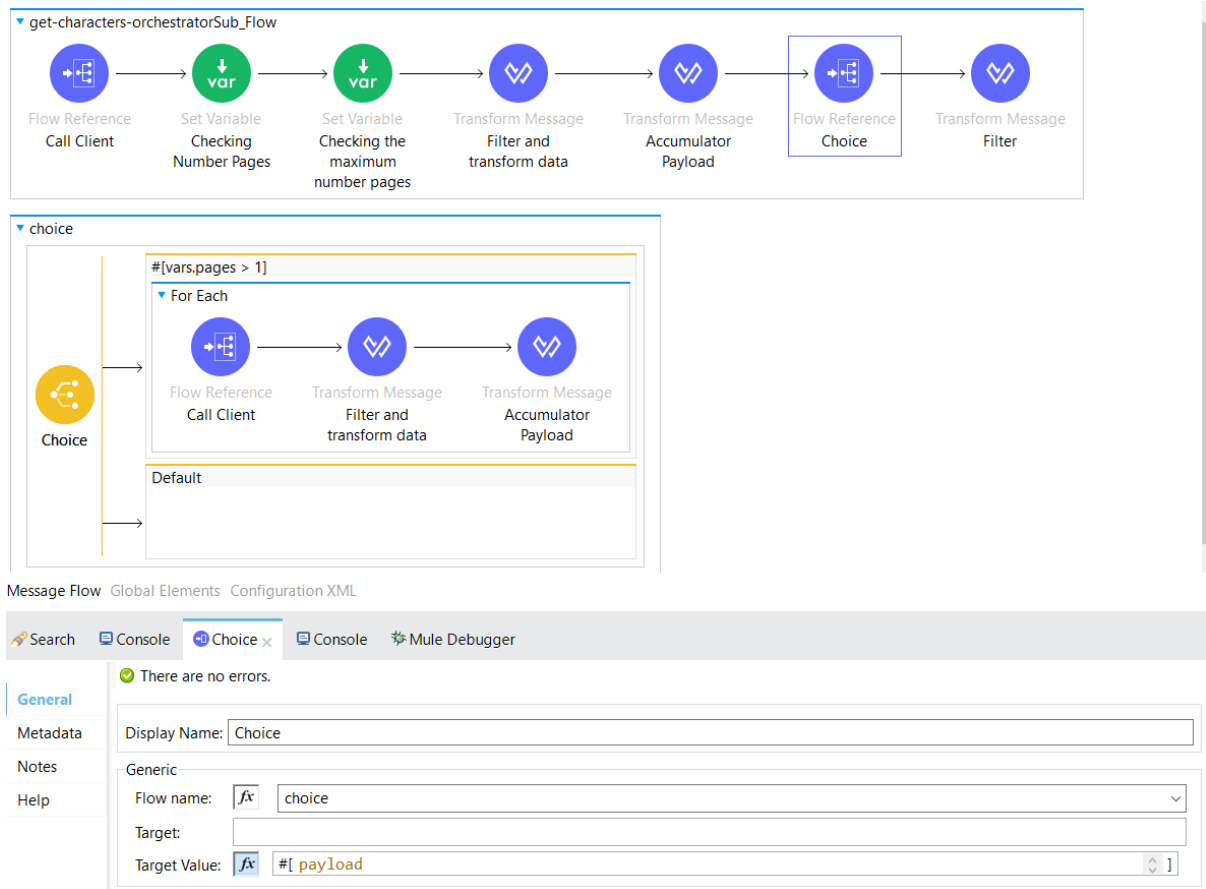
```
1 @dw 2.0
2 output application/json
3 ---
4 if (vars.query == null)
5   payload.results map(n, idx) ->
6   {
7     "name": n.name,
8     "height": n.height,
9     "mass": n.mass,
10    "hair_color": n.hair_color,
11    "skin_color": n.skin_color,
12    "eye_color": n.eye_color,
13    "birth_year": n.birth_year,
14    "gender": n.gender
15  }
16 else
17   ((payload.results map(n, idx) ->
18   {
19     "name": n.name,
20     "height": n.height,
21     "mass": n.mass,
22     "hair_color": n.hair_color,
23     "skin_color": n.skin_color,
24     "eye_color": n.eye_color,
25     "birth_year": n.birth_year,
26     "gender": n.gender
27   }) filter ((value, index) -> value.gender == vars.query))
```

We accumulate the information

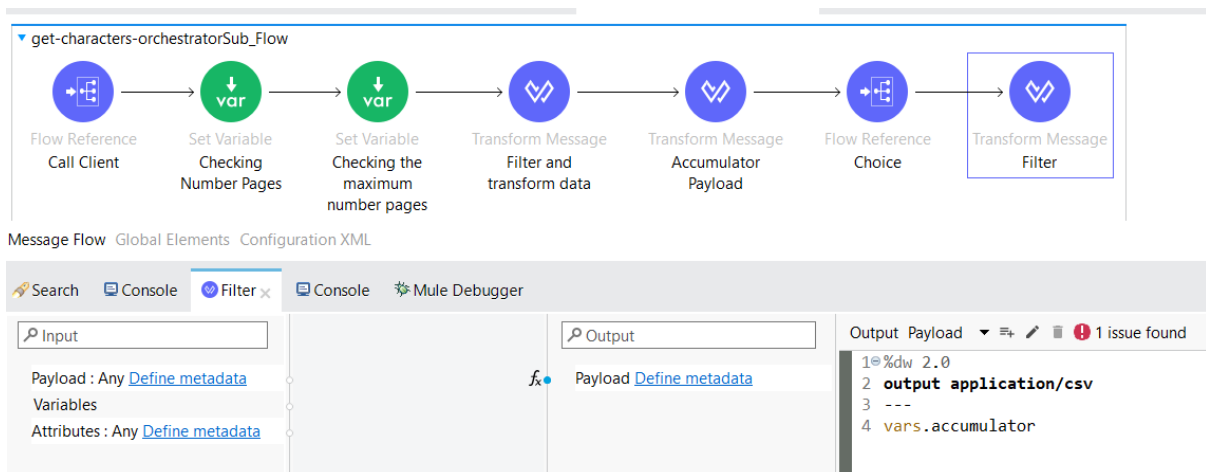
The screenshot displays the MuleSoft Anypoint Studio interface. At the top, a flow diagram for 'get-characters-orchestratorSub_Flow' is shown, with steps: Flow Reference (Call Client), Set Variable (Checking Number Pages), Set Variable (Checking the maximum), Transform Message (Filter and transform data), Transform Message (Accumulator Payload), Flow Reference (Choice), and Transform Message (Filter). The 'Accumulator Payload' step is selected, and its configuration is shown in the right-hand pane. The configuration includes a search bar, a console, and a Mule Debugger. The output variable is displayed as JSON, showing the accumulator variable being updated with the payload. The JSON output is as follows:

```
1 @dw 2.0
2 output application/json
3 ---
4 vars.accumulator ++ payload
```

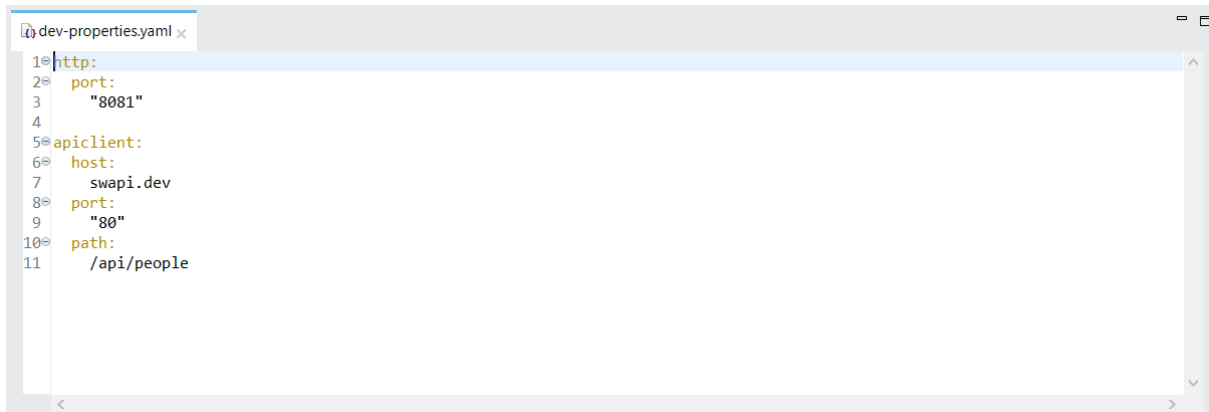
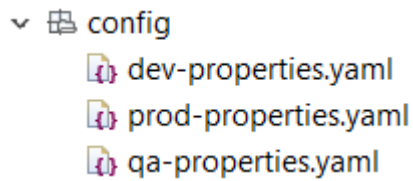
We make a condition if, if it is fulfilled, the cycle will be repeated until our array is formed



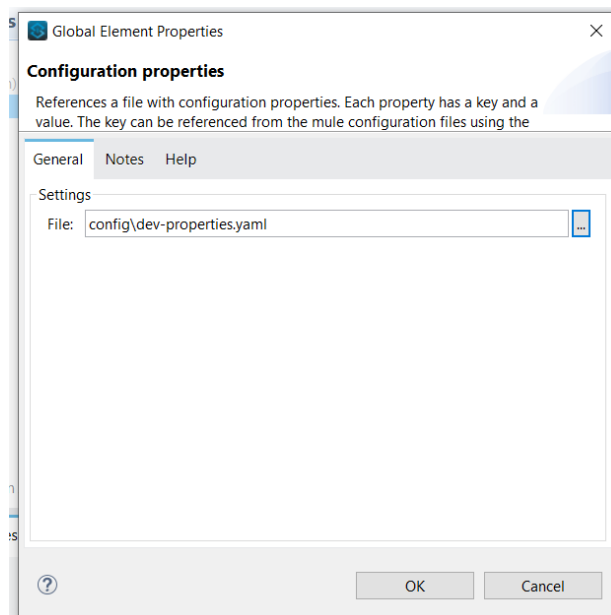
Finally we print our array in csv format



We proceed to create our properties file where we define our environment variables for each respective environment



Later we proceed to create our configuration properties file and link it to the environment we are working on.




In order not to have to make changes to the file in its respective environment, we declare an environment variable to later specify the environment with which we are working.

```
file="config\\${env}-properties.yaml" />
```

After all these steps we proceed to run our mule application:

In the arguments we declare our environment variable to work with the desired environment

 Edit Configuration


— □ ×


Edit configuration and launch.





Mule Application


Name:


 General

 Mule Debug...

 Arguments

 JRE

 Environment

 Common

Program arguments:

Variables...

VM arguments:

Variables...

☒ Use the -XX:+ShowCodeDetailsInExceptionMessages argument when launching


☐ Use @argfile when launching

Working directory:

☒ Default:

Revert

Apply



Debug

Close

Once our application is deployed locally, we proceed to carry out tests with postman:

http://localhost:8081/api/people

GET http://localhost:8081/a + ...

Dev

http://localhost:8081/api/people

GET http://localhost:8081/api/people

Send

Params

Authorization

Headers (6)

Body

Pre-request Script

Tests

Settings

Cookies

Query Params

Key	Value	Description	...	Bulk Edit
Key	Value	Description		

Body

Cookies

Headers (3)

Test Results

Status: 200 OK Time: 5.44 s Size: 4.28 KB Save as Example ...

Pretty

Raw

Preview

Visualize

Text

1

name,height,mass,hair_color,skin_color,eye_color,birth_year,gender

2

Luke Skywalker,172,77,blond,fair,blue,1988Y,male

3

C-3PO,167,75,n/a,gold,yellow,11288Y,n/a

4

R2-D2,96,32,n/a,white\, blue,red,3388Y,n/a

5

Darth Vader,202,136,none,white,yellow,41.988Y,male

6

Leia Organa,150,49,brown,light,brown,1988Y,female

7

Owen Lars,178,120,brown\, grey,light,blue,5288Y,male

8

Beiru Whitesun lars,165,75,brown,light,blue,4788Y,female

9

R5-D4,97,32,n/a,white\, red,red,unknown,n/a

10

Biggs Darklighter,183,84,black,light,brown,2488Y,male

11

Obi-Wan Kenobi,182,77,auburn\, white,fair,blue-gray,5788Y,male

12

Luke Skywalker,172,77,blond,fair,blue,1988Y,male

13

C-3PO,167,75,n/a,gold,yellow,11288Y,n/a

14

R2-D2,96,32,n/a,white\, blue,red,3388Y,n/a

15

Darth Vader,202,136,none,white,yellow,41.988Y,male

16

Leia Organa,150,49,brown,light,brown,1988Y,female

17

Owen Lars,178,120,brown\, grey,light,blue,5288Y,male

18

Beiru Whitesun lars,165,75,brown,light,blue,4788Y,female

19

R5-D4,97,32,n/a,white\, red,red,unknown,n/a

20

Biggs Darklighter,183,84,black,light,brown,2488Y,male

21

Obi-Wan Kenobi,182,77,auburn\, white,fair,blue-gray,5788Y,male

http://localhost:8081/api/people?gender=male

GET http://localhost:8081/a + ...

Dev

http://localhost:8081/api/people?gender=male

GET http://localhost:8081/api/people?gender=male

Send

Params

Authorization

Headers (6)

Body

Pre-request Script

Tests

Settings

Cookies

gender

male

Body

Cookies

Headers (3)

Test Results

Status: 200 OK Time: 4.11 s Size: 3.16 KB Save as Example ...

Pretty

Raw

Preview

Visualize

Text

1

name,height,mass,hair_color,skin_color,eye_color,birth_year,gender

2

Luke Skywalker,172,77,blond,fair,blue,1988Y,male

3

Darth Vader,202,136,none,white,yellow,41.988Y,male

4

Owen Lars,178,120,brown\, grey,light,blue,5288Y,male

5

Biggs Darklighter,183,84,black,light,brown,2488Y,male

6

Obi-Wan Kenobi,182,77,auburn\, white,fair,blue-gray,5788Y,male

7

Luke Skywalker,172,77,blond,fair,blue,1988Y,male

8

Darth Vader,202,136,none,white,yellow,41.988Y,male

9

Owen Lars,178,120,brown\, grey,light,blue,5288Y,male

10

Biggs Darklighter,183,84,black,light,brown,2488Y,male

11

Obi-Wan Kenobi,182,77,auburn\, white,fair,blue-gray,5788Y,male

12

Anakin Skywalker,188,84,blond,fair,blue,41.988Y,male

13

Wilhuff Tarkin,180,unknown,auburn\, grey,fair,blue,6488Y,male

14

Chewbacca,228,112,brown,unknown,blue,20088Y,male

15

Han Solo,180,80,brown,fair,brown,2988Y,male

16

Greedo,173,74,n/a,green,black,4488Y,male

17

Wedge Antilles,170,77,brown,fair,hazel,2188Y,male

18

Jek Tono Porkins,180,110,brown,fair,blue,unknown,male

19

Yoda,66,17,white,green,brown,89688Y,male

20

Palpatine,170,75,greys,pale,yellow,8288Y,male

21

Boba Fett,183,78.2,black,fair,brown,31.588Y,male

http://localhost:8081/api/people?gender=female

GET http://localhost:8081/a + ... Dev

http://localhost:8081/api/people?gender=female Save

GET http://localhost:8081/api/people?gender=female Send

Params Authorization Headers (6) Body Pre-request Script Tests Settings Cookies

Key	Value	Description
<input checked="" type="checkbox"/> gender	female	
Key	Value	Description

Body Cookies Headers (3) Test Results Status: 200 OK Time: 3.86 s Size: 957 B Save as Example

Pretty Raw Preview Visualize Text

```
1 name,height,mass,hair_color,skin_color,eye_color,birth_year,gender
2 Leia Organa,150,49,brown,light,brown,1988Y,female
3 Beru Whitesun lars,165,75,brown,light,blue,4788Y,female
4 Leia Organa,150,49,brown,light,brown,1988Y,female
5 Beru Whitesun lars,165,75,brown,light,blue,4788Y,female
6 Mon Mothma,150,unknown,auburn,fair,blue,4888Y,female
7 Padmé Amidala,185,45,brown,light,brown,4688Y,female
8 Shmi Skywalker,163,unknown,black,fair,brown,7288Y,female
9 Ayla Secura,178,55,none,blue,hazel,4888Y,female
10 Adi Gallia,184,50,none,dark,blue,unknown,female
11 Cordé,157,unknown,brown,light,brown,unknown,female
12 Luminara Unduli,170,56.2,black,yellow,blue,5888Y,female
13 Barriss Offee,166,50,black,yellow,blue,4088Y,female
14 Doimé,165,unknown,brown,light,brown,unknown,female
15 Zam Wesell,168,55,blonde,fair\, green\, yellow,yellow,unknown,female
16
```

http://localhost:8081/api/people?gender=n/a

GET http://localhost:8081/a + ... Dev

http://localhost:8081/api/people?gender=n/a Save

GET http://localhost:8081/api/people?gender=n/a Send

Params Authorization Headers (6) Body Pre-request Script Tests Settings Cookies

Key	Value	Description
<input checked="" type="checkbox"/> gender	n/a	
Key	Value	Description

Body Cookies Headers (3) Test Results Status: 200 OK Time: 4.17 s Size: 451 B Save as Example

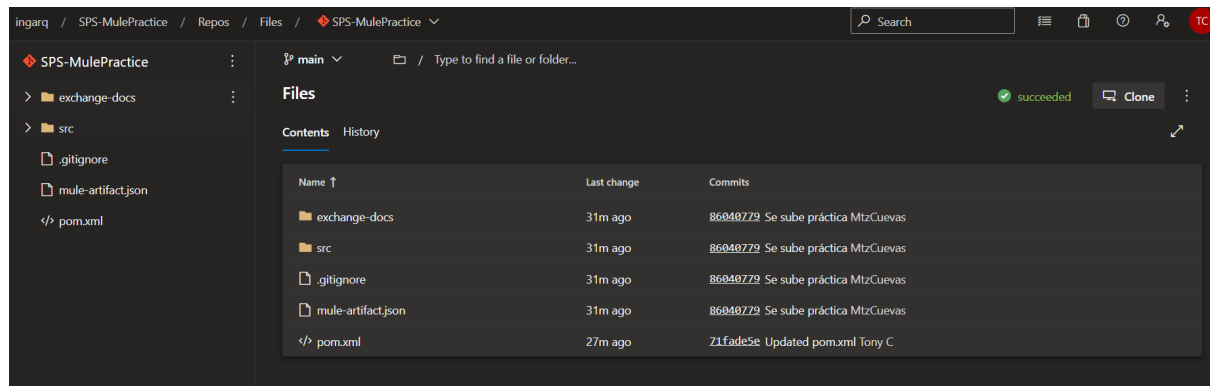
Pretty Raw Preview Visualize Text

```
1 name,height,mass,hair_color,skin_color,eye_color,birth_year,gender
2 C-3PO,167,75,n/a,gold,yellow,11288Y,n/a
3 R2-D2,96,32,n/a,white\, blue,red,3388Y,n/a
4 R5-D4,97,32,n/a,white\, red,red,unknown,n/a
5 C-3PO,167,75,n/a,gold,yellow,11288Y,n/a
6 R2-D2,96,32,n/a,white\, blue,red,3388Y,n/a
7 R5-D4,97,32,n/a,white\, red,red,unknown,n/a
8
```

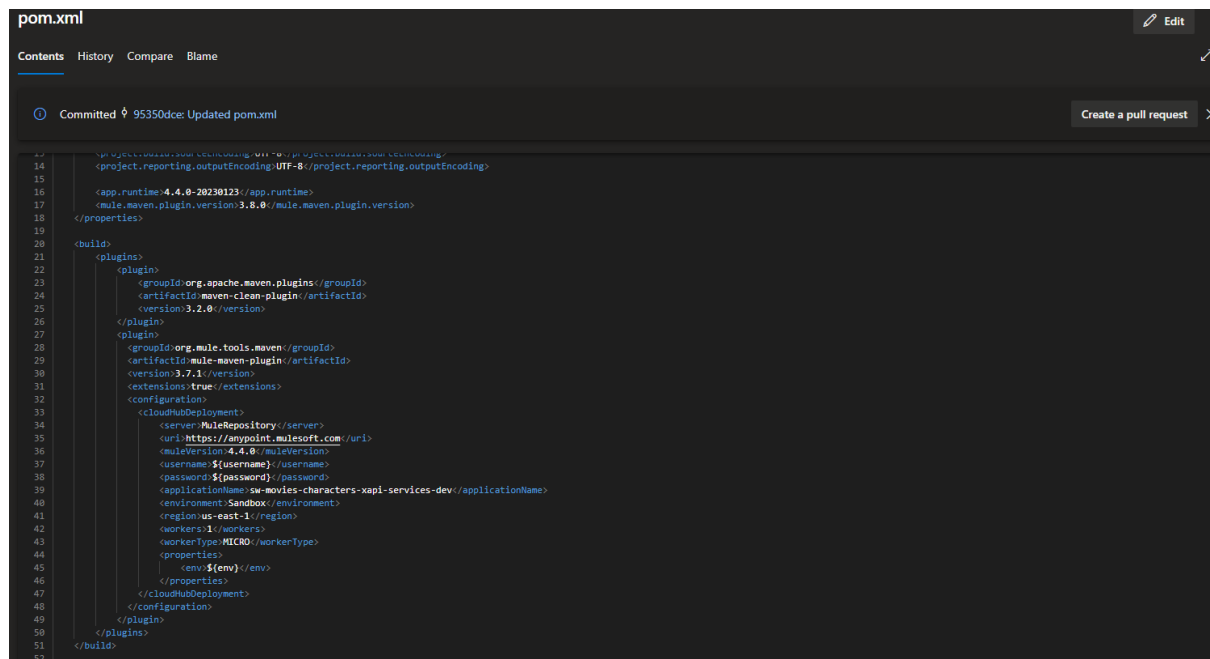
Once the tests have been made out and verify that everything responds as required. We proceed to deploy our mule application to the MuleSoft CloudHub cloud.

For this step i'll implementing CI/CD with Azure Pipelines:

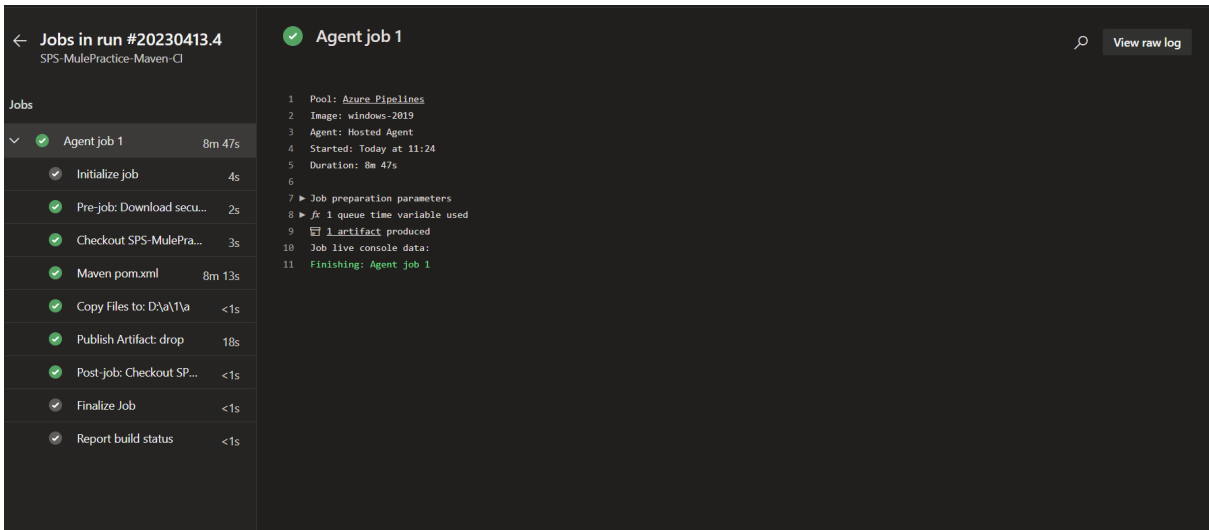
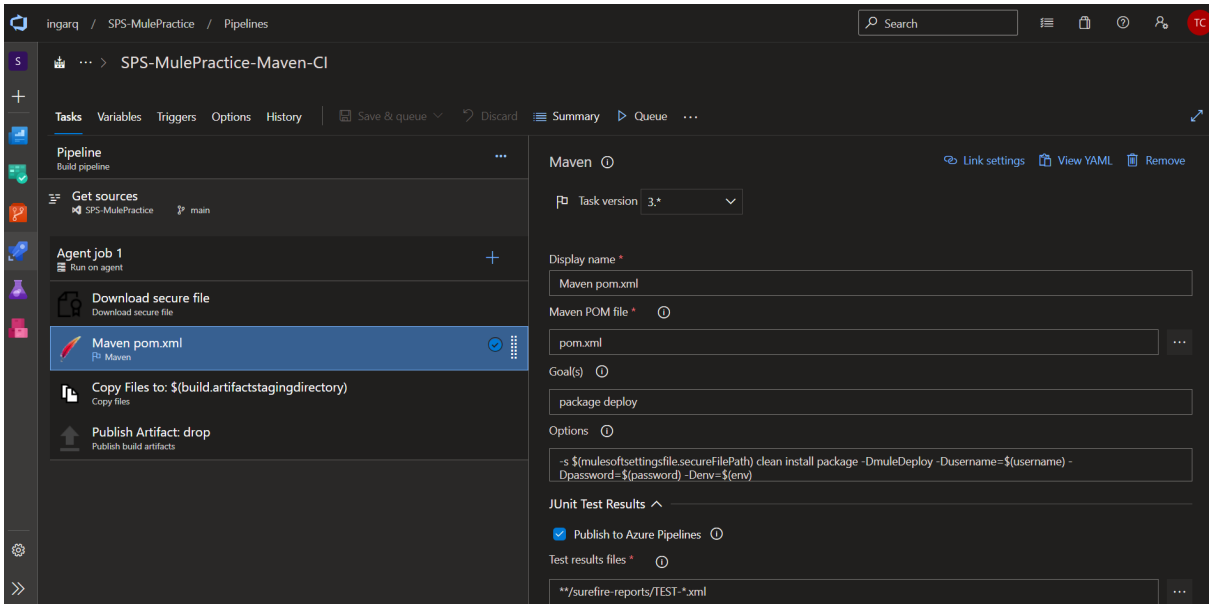
In this step, I import the GitHub repository into an Azure Repos repository, the changes are made in the pom.xml to be able to do the Deploy in CloudHub



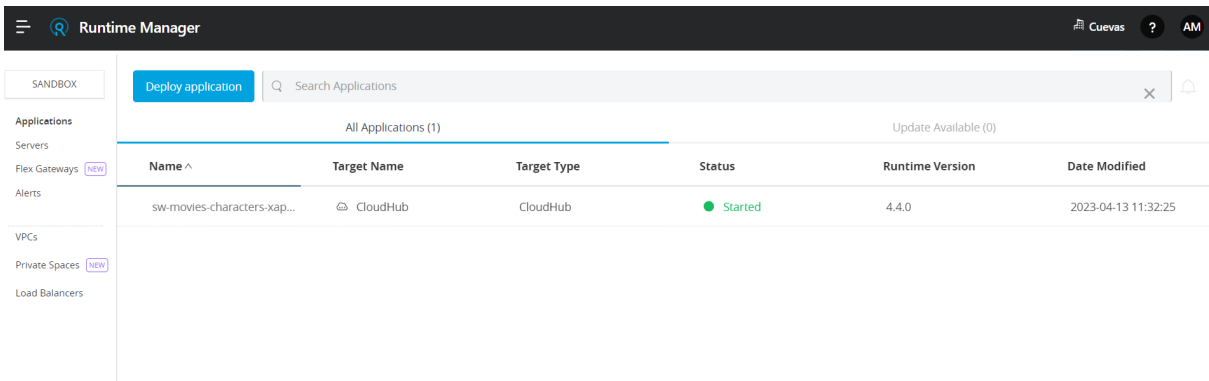
We indicate the server, which must be specified in our settings.xml file, the user, password, name of the deployed application, the environment where we will do our deploy, the region, the number of workers and the size with which we will run our muleapp, in addition to the properties of our deploy.



A pipeline is made, with a Maven template, it is configured and run



We deploy our cloud application on mulesoft CloudHub



Runtime Manager

SANDBOX

← Applications

Dashboard

Insight

Logs

Object Store

Queues

Schedules

Settings

sw-movies-characters-xapi-services-dev

Live Console

🔔

📄 Logs are kept for 30 days or up to 100 MB

Q Search

Advanced

11:29:22.83504/13/2023Worker-0ArtifactDeployer.start.01INFO

Re-enabling component: mule.agent.application.properties.service

11:29:22.84604/13/2023Worker-0ArtifactDeployer.start.01INFO

* Application: sw-movies-characters-xapi-services-dev*

* OS encoding: UTF-8, Mule encoding: UTF-8*

11:29:22.94504/13/2023Worker-0[MuleRuntime].uber.03: [sw-movies-characters-xapi-services-dev].uber@org.mule.runtime.module.extension.internal.runtime.source.ExtensionMessageSource.lambda\$null\$17:435 @68e785f0INFO

Message source 'listener' on flow 'sw-movies-website-characters-xapi-services-console' successfully started

11:29:22.94604/13/2023Worker-0[MuleRuntime].uber.01: [sw-movies-characters-xapi-services-dev].uber@org.mule.runtime.module.extension.internal.runtime.source.ExtensionMessageSource.lambda\$null\$17:435 @62c4f532INFO

Message source 'listener' on flow 'sw-movies-website-characters-xapi-services-main' successfully started

11:29:23.14804/13/2023DeploymentsystemSYSTEM

Worker(18.189.157.87): Your application has started successfully.

11:32:25.58204/13/2023DeploymentsystemSYSTEM

Application was updated successfully with zero downtime. The new version of your application has been launched and the old version has been stopped.

11:32:25.61204/13/2023DeploymentsystemSYSTEM

Your application is started.

Once our application is deployed locally, we proceed to carry out tests with postman:
sw-movies-characters-xapi-services-dev.us-e2.cloudhub.io/api/people

sw-movies-characters-xapi-services-dev.us-e2.cloudhub.io/api/people

Save

GET

sw-movies-characters-xapi-services-dev.us-e2.cloudhub.io/api/people

Send

Params

Authorization

Headers (6)

Body

Pre-request Script

Tests

Settings

Cookies

Query Params

Key	Value	Description	...	Bulk Edit
Key	Value	Description		

Body

Cookies

Headers (3)

Test Results

🌐 Status: 200 OK Time: 21.44 s Size: 4.28 KB 📄 Save as Example ⋮

Pretty

Raw

Preview

Visualize

Text

1 name,height,mass,hair_color,skin_color,eye_color,birth_year,gender

2 Luke Skywalker,172,77,blond,fair,blue,19BBY,male

3 C-3PO,167,75,n/a,gold,yellow,112BBY,n/a

4 R2-D2,96,32,n/a,white\, blue,red,33BBY,n/a

5 Darth Vader,202,136,none,white,yellow,41.9BBY,male

6 Leia Organa,150,49,brown,light,brown,19BBY,female

7 Owen Lars,178,120,brown\, grey,light,blue,52BBY,male

8 Beru Whitesun lars,165,75,brown,light,blue,47BBY,female

9 R5-D4,97,32,n/a,white\, red,red,unknown,n/a

10 Biggs Darklighter,183,84,black,light,brown,24BBY,male

11 Obi-Wan Kenobi,182,77,auburn\, white,fair,blue-gray,57BBY,male

12 Luke Skywalker,172,77,blond,fair,blue,19BBY,male

13 C-3PO,167,75,n/a,gold,yellow,112BBY,n/a

14 R2-D2,96,32,n/a,white\, blue,red,33BBY,n/a

15 Darth Vader,202,136,none,white,yellow,41.9BBY,male

16 Leia Organa,150,49,brown,light,brown,19BBY,female

17 Owen Lars,178,120,brown\, grey,light,blue,52BBY,male

18 R5-D4,97,32,n/a,white\, red,red,unknown,n/a

sw-movies-characters-xapi-services-dev.us-e2.cloudhub.io/api/people?gender=male

http://sw-movies-characters-xapi-services-dev.us-e2.cloudhub.io//api/people

Save

GET

http://sw-movies-characters-xapi-services-dev.us-e2.cloudhub.io//api/people

Send

Params

Authorization

Headers (6)

Body

Pre-request Script

Tests

Settings

Cookies

Query Params

Key	Value	Description	...	Bulk Edit
Key	Value	Description		

Body

Cookies

Headers (3)

Test Results

Status: 200 OK

Time: 4.99 s

Size: 4.28 KB

Save as Example

...

Pretty

Raw

Preview

Visualize

Text

1

name,height,mass,hair_color,skin_color,eye_color,birth_year,gender

2

Luke Skywalker,172,77,blond,fair,blue,19BBY,male

3

C-3P0,167,75,n/a,gold,yellow,112BBY,n/a

4

R2-D2,96,32,n/a,white\, blue,red,33BBY,n/a

5

Darth Vader,202,136,none,white,yellow,41.9BBY,male

6

Leia Organa,150,49,brown,light,brown,19BBY,female

7

Owen Lars,178,120,brown\, grey,light,blue,52BBY,male

8

Beru Whitesun lars,165,75,brown,light,blue,47BBY,female

9

R5-D4,97,32,n/a,white\, red,red,unknown,n/a

10

Biggs Darklighter,183,84,black,light,brown,24BBY,male

11

Obi-Wan Kenobi,182,77,auburn\, white,fair,blue-gray,57BBY,male

12

Luke Skywalker,172,77,blond,fair,blue,19BBY,male

13

C-3P0,167,75,n/a,gold,yellow,112BBY,n/a

14

R2-D2,96,32,n/a,white\, blue,red,33BBY,n/a

15

Darth Vader,202,136,none,white,yellow,41.9BBY,male

16

Leia Organa,150,49,brown,light,brown,19BBY,female

17

Owen Lars,178,120,brown\, grey,light,blue,52BBY,male

18