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Module 7: Automating Administration with the MMC REST API

Goals

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ESPOps MMC REST API
3 Aug at 4:11PM • 4 requests

- GET Get Server Info
- GET Get Server Groups
- GET Get All Servers
- POST Add Max Server to MMC

Builder | Runner | Import | Disabled | Sign in

Get Server ... | Get Server I... | New tab | Get Server ... | Get All Serv... | Add Max Ser... | Add Max Ser...

POST http://localhost:8585/mmc-3.7.0/api/servers | Params | Send

Authorization | Headers (2) | Body | Pre-request script | Tests

form-data | x-www-form-urlencoded | raw | binary | JSON (application/json)

```
{
    "name": "Max",
    "agentUrl": "http://localhost:7777/mmc-support",
    "groupIds": ["cf412459-32a5-4a3f-89bb-01bb35cd9b42"]
}
```

Body | Cookies | Headers (5) | Tests | Status 201 Created | Time 5799 ms

Pretty | Raw | Preview | JSON


```
{
  "name": "Max",
  "id": "local$64e0bfc4-f7c2-4fee-b477-fcef240826a8",
  "agentUrl": "https://localhost:7777/mmc-support",
  "groups": [
    {
      "name": "Development",
      "href": "http://localhost:8585/mmc-3.7.0/api/serverGroups/cf412459-32a5-4a3f-89bb-01bb35cd9b42"
    }
  ],
  "href": "http://localhost:8585/mmc-3.7.0/api/servers/local$64e0bfc4-f7c2-4fee-b477-fcef240826a8",
  "version": "3.7.0",
  "status": "OK",
```


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Objectives

- Use the MMC REST API to:
  - Create server groups and add servers to a server group
  - Deploy applications from the MMC repository
  - Deploy a deployment to Mule servers
- Use the MMC REST API to:
  - Manage Mule servers
  - Manage Mule servers to list all servers registered with an MMC server
  - Add and remove servers to an MMC server via the MMC REST API

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Topics

- Introduction to REST API for MMC
- Adding a Server
- Deploying an Application
- Undeploying an Application
- Restarting the Server
- Working with Files

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Requirements

- These tools are needed if you wish to try out the examples in this module:
  - **Postman** for Chrome or a similar add-on for your browser to make REST calls
  - A text editor or notepad application

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REST API for MMC - Overview

Introduction to the REST API

- You can programmatically access the MMC's functionality using REST APIs:
  - Add /api/ to the URL to automate a set of services:
    - Server management
    - Deployments and applications management
    - Cluster management
    - Gathering of information and statistics

- The API is meant to automate all the GUI features:
  - If there is a button, a menu or a tab, there should be an API call
  - Unfortunately there are areas where this is not the case yet:
    - Flow analyzer and business events don't have an API yet.

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Module Outline

- Replace MMC GUI operations with REST requests
- We won't cover the whole API here:
  - It would take days to go through it, and would be extremely boring
  - Instead, we'll cover a small subset and then look at how to read the docs

- Some of the REST calls will have links to the Mule Documentation
  - http://www.mulesoft.org/documentation/display/current/REST+API+Reference

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Adding a Server

The REST API URL

HTTP://host:port/mmc/api/[module]/[resourceID]/[action]/[parameters]

- Module is the functional area you want to address:
  - clusters
  - servers
  - serverGroups
  - deployments
  - repository
  - usergroups
- ResourceID is a UUID that points to a resource:
  - E.g.: A specific server, or a specific deployment
  - Some modules/actions do not require a Resource ID (e.g. to list servers)
- Action will tell MMC what to do with the module or resource
- Optional parameters will customize the action

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Adding a Mule Server

To add/register a server to MMC using Postman:

1. Set the URL to **http://localhost:8585/mmc-3.7.0/api/servers**
2. Set the HTTP method to **POST**
3. Add a header with "**Content-Type : application/json**"
4. In the request body, define your **server's name**, **URL** and the server **group** which it will belong to (e.g. Development or Test) in JSON format
5. Fill the Basic Authentication with **Username=admin** and **Password=admin**
   - This is the authentication requested to log in to MMC as described in Module 2

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Postman - Add Server request

http://www.mulesoft.org/documentation/display/current/Servers#Servers-PAIR/REGISTER

Normal | **Basic Auth** | Digest Auth | OAuth 1.0 | No environment

Username admin

Password ••••• 5

Note

The authorization header will be generated and added as a custom header.

Refresh headers

http://localhost:8585/mmc-3.5.1/api/servers 1

POST 2

URL params | Headers (1)

Content-Type | application/json 3

Manage presets

Header | Value

form-data | x-www-form-urlencoded | raw | JSON

```
1 {
2   "name" : "muleServer1",
3   "agentUrl" : "http://localhost:7777/mmc-support",
4   "groupIds" : ["a92231fe-e9ff-4027-a393-1ef4c32e8dc2"]
5 }
```

4

Send | Preview | Add to collection | Reset

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Postman - Add Server reply

http://www.mulesoft.org/documentation/display/current/Servers#Servers-PAIR/REGISTER

Body | Cookies (4) | Headers (5) | STATUS 201 Created | TIME 5630 ms

Pretty | Raw | Preview | JSON | XML


```
1  {
2      "agentUrl": "https://localhost:7777/mmc-support",
3      "muleServerId": ".agent",
4      "started": "Wed Aug 27 12:17:57 CEST 2014",
5      "agents": [
6          {
7              "description": "DevKit Extension Information",
8              "name": "DevKitSplashScreenAgent"
9          },
10         {
11             "description": "Clustering Agent",
12             "name": "_muleClusterSupportAgent"
13         },
14         {
15             "description": "JMX Agent",
16             "name": "jmx-agent"
17         },
18         {
19             "description": "Batch module default engine",
20             "name": "DefaultBatchEngine"
21         }
22     ],
23     "pausedServices": -1,
24     "stoppedServices": -1,
25     "href": "http://localhost:8585/mmc-3.5.1/api/servers/local$7189ba26-f5ce-45db-9680-f7f00c48ab31",
26     "runningServices": -1,
27     "hostIp": "127.0.1.1",
28     "version": "3.5.1",
29     "groups": [
30         {
31             "href": "http://localhost:8585/mmc-3.5.1/api/serverGroups/a92231fe-e9ff-4027-a393-1ef4c32e8dc2",
32             "name": "Test"
33         }
34     ],
35     "status": "OK",
36     "name": "muleServer1",
37     "id": "local$7189ba26-f5ce-45db-9680-f7f00c48ab31"
38 }
```


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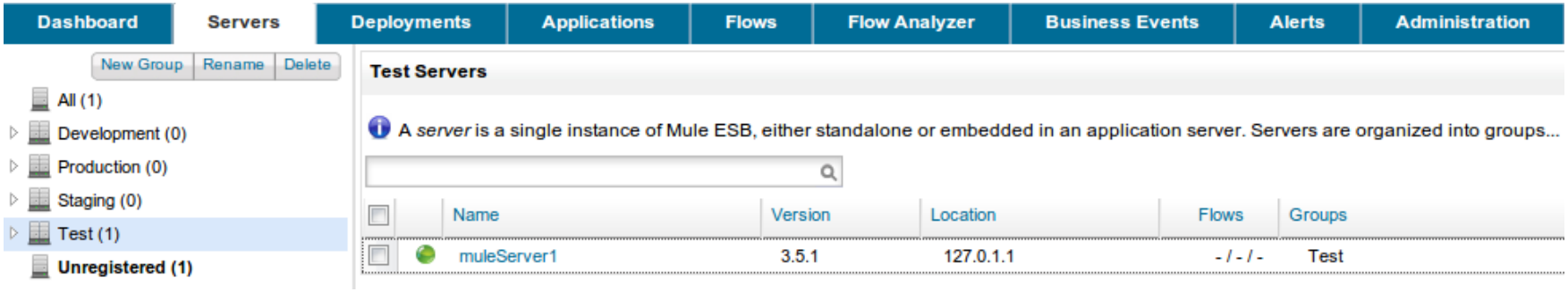
MMC after using Postman

- We see that with the REST API call we did on Postman, we registered our server “muleServer1” to MMC
- Also notice that “muleServer1” was also added to the server group Test, which came from the “groupIds” field



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Adding a Mule Server - Details

- Note that:
  - For this API call to work, your Mule Server instance and Tomcat instance need to be running
  - The port number (e.g. 7777) in the agentUrl field is the port that your current Mule Server instance is using
  - The groupIds field represents an array of server group IDs:
    - This can be left empty if you do not want to assign a group to your server
    - The following slides will demonstrate how to obtain the group ID used in our example

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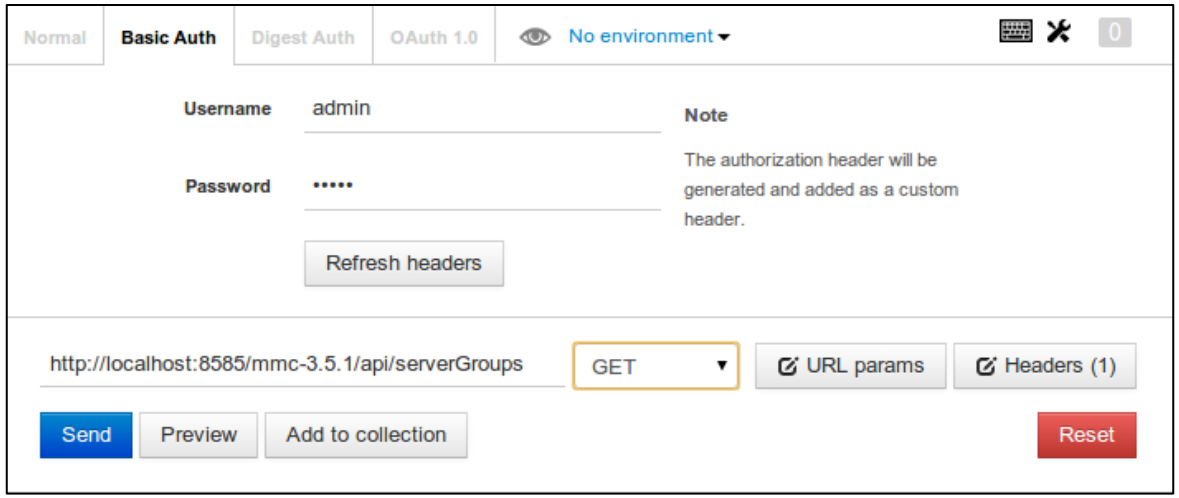
Obtaining a Server Group ID

To get a server group ID using Postman:

1. Set the URL to **http://localhost:8585/mmc-3.7.0/api/serverGroups**
2. Set the HTTP method to **GET**
3. Fill the Basic Authentication with **Username=admin** and **Password=admin**



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Walkthrough 7-1: MMC REST API

- List MMC Registers servers
- Register a new server into the MMC GUI
- Create a new Server Group
- Remove a server from MMC

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Deploying an Application

Deployment Requirements

- To deploy an application, we need to POST this:

http://localhost:8585/mmc-3.7.0/api/deployments/{deploymentId}/deploy

- {deploymentId} indicates that we need to create a deployment before we actually deploy it
- To create a deployment, we would need:
  - the ID of the server(s) we are deploying on
  - the ID of the application(s) and their respective version we want to deploy:
    - this implies that we need to upload our applications to the MMC repository beforehand

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Step-by-step

- These are the steps to do before we can deploy:
  1. Register a server to MMC (done in previous section)
  2. Get the server ID (store it in your notepad)
  3. Upload an application to the MMC repository
  4. Get the application version ID (store it in your notepad)
  5. Create a deployment
  6. Get the deployment ID (store it in your notepad)
  7. Deploy the deployment

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Step 4 - Get Application Version ID

- We could have taken the version ID from the reply when we uploaded the application. However, we can use another REST API call to get it.
- To obtain the version ID using Postman:
  1. Set the URL to **http://localhost:8585/mmc-3.7.0/api/repository**
  2. Set the HTTP method to **GET**
  3. Fill the Basic Authentication with **Username=admin** and **Password=admin**

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Step 4 –Request to get Application Version ID

- The request:

Normal | **Basic Auth** | Digest Auth | OAuth 1.0 | No environment | 0

Username admin

Password •••••

Refresh headers

Note

The authorization header will be generated and added as a custom header.

http://localhost:8585/mmc-3.5.1/api/repository | GET | URL params | Headers (0)

Send | Preview | Add to collection | Reset

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Step 4 - Get Application Version ID - JSON

- The application ID is common for both versions
- To deploy an application, we need the version ID

Body | Cookies (4) | Headers (4) | STATUS 200 OK | TIME 32 ms

Pretty | Raw | Preview | JSON | XML


```
1  {
2      "data": [
3          {
4              "versions": [
5                  {
6                      "parentPath": "/Applications/hello-app",
7                      "name": "1.0",
8                      "id": "local$ff93359a-5533-4ac3-b488-4f875d430519"
9                  },
10                 {
11                     "parentPath": "/Applications/hello-app",
12                     "name": "2.0",
13                     "id": "local$37968481-0305-4412-87d0-d694e2472486"
14                 }
15             ],
16             "href": "http://localhost:8585/mmc-3.5.1/api/repository/local$4ceaab14-e39e-4d3d-80fa-12a038db6d30",
17             "name": "hello-app",
18             "id": "local$4ceaab14-e39e-4d3d-80fa-12a038db6d30"
19         }
20     ],
21     "total": 1
22 }
```


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Walkthrough 7-2: MMC REST API

- Deploy and application from the MMC Repository
- Deploy and re-deploy and prepared deployment

Body | Cookies (4) | Headers (4) | STATUS 200 OK | TIME 32 ms

Pretty | Raw | Preview | JSON | XML


```
{
    "data": [
        {
            "versions": [
                {
                    "parentPath": "/Applications/hello-app",
                    "name": "1.0",
                    "id": "local$ff93359a-5533-4ac3-b488-4f875d430519"
                },
                {
                    "parentPath": "/Applications/hello-app",
                    "name": "2.0",
                    "id": "local$37968481-0305-4412-87d0-d694e2472486"
                }
            ],
            "href": "http://localhost:8585/mmc-3.5.1/api/repository/local$4ceaab14-e39e-4d3d-80fa-12a038db6d30",
            "name": "hello-app",
            "id": "local$4ceaab14-e39e-4d3d-80fa-12a038db6d30"
        }
    ],
    "total": 1
}
```


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Java Management Extensions (JMX)

- Simple and standard management and monitoring interface
  - Default JMX support agent

  <jmx-default-config> config element
  - RMI registery agent
    - rmi://localhost:1099
  - Remote JMX access
    - service:jmx:rmi://jndi/rmi://localhost:1099/server
  - JMX notification agent
  - Log4J notification agent
  - MX4J adapter

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Example: JMX Server Configuration

- Set credentials

```
<management:jmx-server >

  <management:connector-server url="service:jmx:rmi:///jndi/
rmi://localhost:1099/server" rebind="false" />

  <management:credentials>

    <spring:entry key="jsmith" value="foo" />
    <spring:entry key="dthomas" value="bar" />

  </management:credentials>

</management:jmx-server>
```


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Summary

- MMC Console exposes a REST API
- Perform most administrative tasks via REST requests
  - Register/Unregister servers with MMC
  - List, Create Server Groups
  - List Servers
  - Create User Groups
  - Upload Applications to the MMC Repository
  - Create, View, Update Deployments
  - Deploy deployments

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