oneM2M

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oM2M

- oM2M is an OSGi implementation of oneM2M
- It implements the IN and the MN
- It exposes a REST interface to connect external Applications (http and CoAP)
- It implements a web interface to display the resource tree

- In your VM oM2M has been already deployed

Build oM2M

- Open a shell and issue:

```
$ cd $HOME/git/org.eclipse.om2m
$ mvn clean install
```

- Two different projects will be generated:
  - IN-CSE

$HOME/git/org.eclipse.om2m/org.eclipse.om2m.site.in-cse/target/products/in-cse/linux/gtk/x86

  - MN-CSE

$HOME/git/org.eclipse.om2m/org.eclipse.om2m.site.mn-cse/target/products/in-cse/linux/gtk/x86

Configure oM2M

- In the IN-CSE folder edit the file:

  configuration/config.ini

  – Edit:
    - org.eclipse.om2m.dbReset=**true**
    - org.eclipse.om2m.cseBaseId=**$yourname-in-cse**
    - org.eclipse.om2m.cseBaseName=**$yourname-in-name**

- In the MN-CSE folder edit the file:

  configuration/config.ini

  – Edit:
    - org.eclipse.om2m.dbReset=**true**
    - org.eclipse.om2m.cseBaseId=**$yourname-mn-cse**
    - org.eclipse.om2m.cseBaseName=**$yourname-mn-name**
    - org.eclipse.om2m.remoteCseId=**$yourname-in-cse**
    - org.eclipse.om2m.remoteCseName=**$yourname-in-name**

Start oM2M

- Start the IN-CSE:
  - In the IN-CSE folder execute:

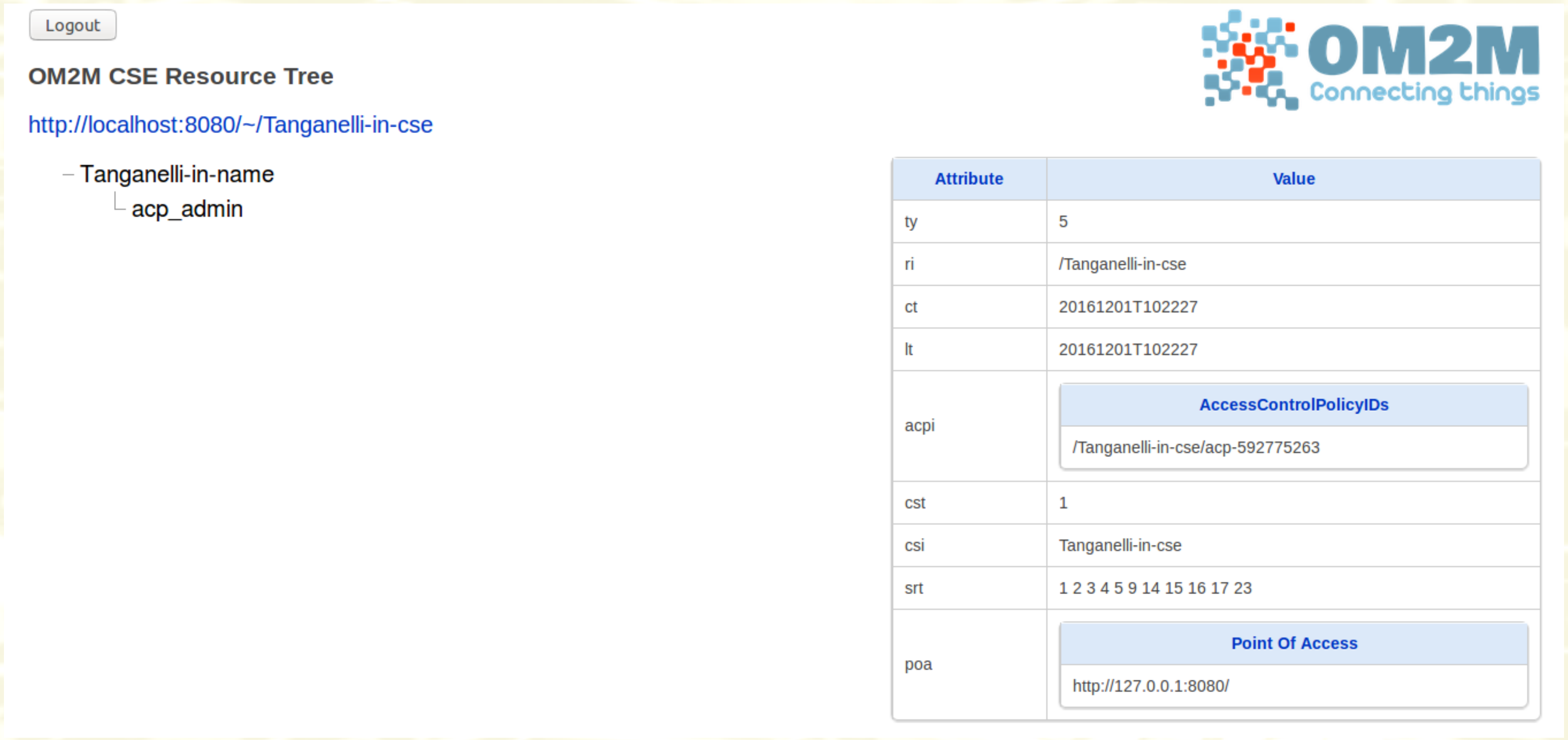
```
bash start.sh
```

  - Verify the IN

http://127.0.0.1:8080/webpage

user:admin
password:admin

IN resource tree



OM2M CSE Resource Tree

http://localhost:8080/~/Tanganelli-in-cse

- Tanganelli-in-name
  - acp_admin

Attribute	Value
ty	5
ri	/Tanganelli-in-cse
ct	20161201T102227
lt	20161201T102227
acpi	**AccessControlPolicyIDs** /Tanganelli-in-cse/acp-592775263
cst	1
csi	Tanganelli-in-cse
srt	1 2 3 4 5 9 14 15 16 17 23
poa	**Point Of Access** http://127.0.0.1:8080/

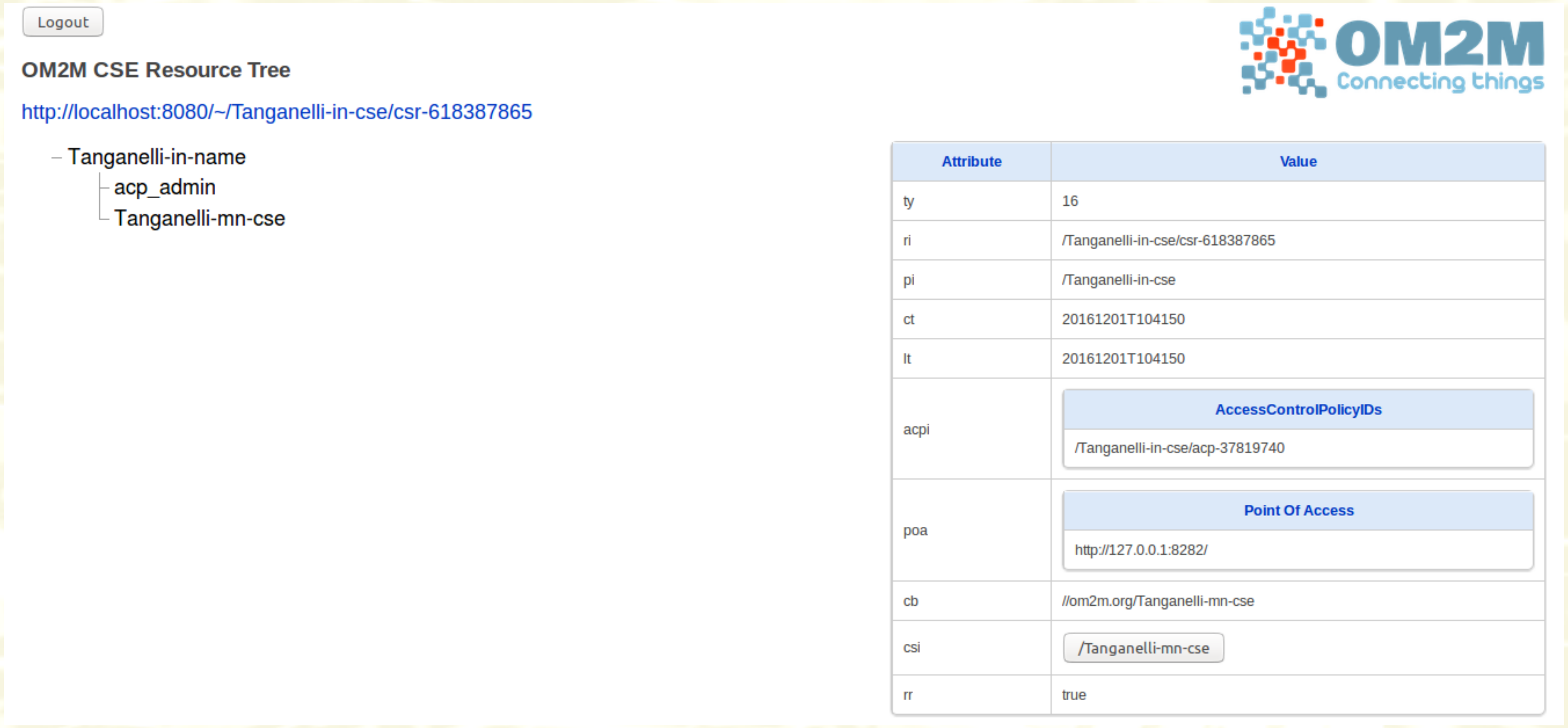
IN resource tree

- Start the MN-CSE:
  - In the MN-CSE folder execute:

    ```
    bash start.sh
    ```

  - Verify the new resource tree

IN resource tree



OM2M CSE Resource Tree

http://localhost:8080/~/Tanganelli-in-cse/csr-618387865

- Tanganelli-in-name
  - acp_admin
  - Tanganelli-mn-cse

Attribute	Value
ty	16
ri	/Tanganelli-in-cse/csr-618387865
pi	/Tanganelli-in-cse
ct	20161201T104150
lt	20161201T104150
acpi	AccessControlPolicyIDs: /Tanganelli-in-cse/acp-37819740
poa	Point Of Access: http://127.0.0.1:8282/
cb	//om2m.org/Tanganelli-mn-cse
csi	/Tanganelli-mn-cse
rr	true

What is the new resource?

Create an AE

- Create a new Maven project and include Californium as dependency
- Add the json library:
  - Open a browser and explore the mvn repository

```
<dependency>
        <groupId>org.json</groupId>
        <artifactId>json</artifactId>
        <version>20160810</version>
</dependency>
```

Create an AE (2)

- Create a CoAP client to interact with the IN node
  - To create an AE:
    - POST to 127.0.0.1:5683/~/$yourname-in-cse
    - Payload in json:

```
{
      “m2m:ae”:{
              “api”: “TempApp-ID”,
              “rn”: “TempApp”,
              “rr”: “true”
      }
}
```

api = Application ID
rn = ResourceName
rr = RequestReachability

Create an AE (3)

- Set oM2M specific options
  - ty = 2 (ResourceType for the AE is 2)
    - new Option(267, 2)
  - authorization (admin:admin)
    - new Option(256, “admin:admin”)
  - Set Content Format to json
  - Set accept to json

Json Library

- To create an empty object:
  - JSONObject obj = new JSONObject()
- To add elements to object:
  - obj.put(key, value)

- To create an object from a json string:
  - JSONObject obj = new JSONObject(string)
- To get an element from an object:
  - obj.get(key)

Exercise 1

- Create a CoAP Client that creates an AE on the IN node. Exploit the json library to create the request payload and to parse the response payload.

- Open the AE in the resource tree.

Create a Container

- To create a Container:
  - POST to:

    127.0.0.1:5683/~/$yourname-in-cse/$yourname-in-name/TempApp

    - Payload in json:

```
{
        “m2m:cnt”:{
                “rn”: “DATA”,
        }
}
```

Create a Container (2)

- Set oM2M specific options
  - ty =3 (ResourceType for the Container is 3)
    - new Option(267, 3)
  - authorization (admin:admin)
    - new Option(256, “admin:admin”)
  - Set Content Format to json
  - Set accept to json

Exercise 2

- Add a container to the AE of the previous example. Parse the results to get the “la” (last data) path
- Open the Container in the resource tree.

Publish data

- Every data is a ContentInstance:
  - POST to:

    127.0.0.1:5683/~/$yourname-in-cse/$yourname-in-name/TempApp/DATA

    - Payload in json:

```
{
    “m2m:cnt”:{
            “cnf”: “new Reading”,
            “con”: “12 C°”
    }
}
```

cnf = ContentInfo
con = Content

Create a ContentInstance (2)

- Set oM2M specific options
  - ty =4 (ResourceType for the ContentInstance is 4)
    - new Option(267, 4)
  - authorization (admin:admin)
    - new Option(256, “admin:admin”)
  - Set Content Format to json
  - Set accept to json

Exercise 3

- Publish new data to the DATA container created before.

- Write a Client that:
  - Use a Thread to periodically read the “la” path to get the last value
  - Use another Thread to publish data.