Hands-on: MangOH

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Hands-on

The goal of this hands-on session is to run the Java Leshan client on the mangOH board (WP8548 module).

Leshan is an Eclipse project providing libraries to develop your own LWM2M client or server in Java.

- https://eclipse.org/leshan/
- https://github.com/eclipse/leshan

Setup: mangOH board

- Setup to ssh to the board:

  – connect the USB cable to your laptop (power supply by default). you need to switch the power jumper if you want to use DC power.

  – connect the board to your laptop through ethernet

  – share your wifi connection

  – get the board IP (e.g. `cat /var/log/syslog | grep DHCPREQUEST` for linux OS)

  – ssh to the mangOH board: `ssh root@<mangohIP>`

Setup: mangOH board

You can retrieve board information with the *cm* command:

```
> cm info

Device:      WP8548
IMEI:        359377060005690
FSN:         LL537500070703
Firmware:    SWI9X15Y_07.05.01.00 r30585 CARMD-EV-FRMWR1 2015/12/08 01:28:58
 Bootloader: SWI9X15Y_07.05.01.00 r30585 CARMD-EV-FRMWR1 2015/12/08 01:28:58
```

More *cm* commands:

http://www.legato.io/legato-docs/15_10/tools_target_cm.html

Setup: Embedded JRE

You need an Embedded JRE to run the LWM2M client.

Here are the steps to build a custom JRE:

- copy and extract the file *ejdk-8u51-linux-arm-sflt.tar.gz* (from the USB stick) on your laptop

- create the JRE with the *jrecreate* tool:

```
cd ejdk1.8.0_52

/bin/jrecreate.sh --dest /tmp/jre --profile compact2 --vm client --
extension sunec,sunpkcs11
```

- copy the generated JRE on the module:

```
scp -r /tmp/jre root@<mangoIP>:/opt/
```

Setup: Leshan client

- Build the client executable jar from sources (Eclipse required)

    - get the sources from git (or from the USB-stick)

        ```
        git clone git@github.com:msangoi/mangoh-leshan.git
        ```

    - import the java project into Eclipse
    - generate the jar file

        Export > Runnable Jar file (Extract required libraries into generated JAR)

- Or get the jar file *mangoh-client.jar* from the USB-stick

- Copy the jar file on the target:

    ```
    scp mangoh-client.jar root@<mangoIP>:/home/root
    ```

Setup: LWM2M server

You need a LWM2M server to register your client:

- Use the leshan sandbox if reachable:

  http://leshan.eclipse.org

- Or run a local server:

  - copy the file l*eshan-demo-server* on your laptop (from the USB-stick)

  - run it:

    ```
    java -jar leshan-demo-server.jar
    ```

  - test the web UI: http://localhost:8080

Register your LWM2M client

On the target:

```
/opt/jre/bin/java -jar /home/root/mangoh-client.jar -u leshan.eclipse.org:5683
```

Your device registers with its IMEI as endpoint (run `cm info imei` to read the IMEI on the target).

If the registration is successful, you should see your device in the list of registered clients of the leshan server UI.

Use the web UI to send some read/write/execute requests to your device.

Going further... Security

The LWM2M client and server can be configured to communicate in a secure way (DTLS).

We will use the *Pre-Shared Key* mode: shared secret between the client and the server.

- Provision the credentials into the server:

  Security tab > Add new client security information

  Enter a unique identity and a secret key in hexadecimal format

- Run the client in PSK mode

  ```
  java -jar mangoh-client.jar -u leshan.eclipse.org:5684 -i <identity> -p <psk-in-hex>
  ```

Going further… Bootstrap

The bootstrap mechanism is used to provision essential information (server, security) into the client to perform a registration with a server.

You need to run a local bootstrap server:

- copy the file *leshan-bs-demo-server.jar* on your laptop (from the USB-stick)

- run it:

```
java -jar leshan-bs-demo-server.jar
```

    -DPORT=8083 to change the web UI port,
     -DCOAPIFACE=0.0.0.0:5783 to change the non secure interface,
    -DCOAPSIFACE=0.0.0.0:5784 to change the secure interface

- test the web UI: http://localhost:8080

Going further... Bootstrap

- Provision the information into the bootstrap server

- Provision the credential into the device management server

- Bootstrap the client:

```
java -jar mangoh-client.jar -u <BS_server_IP:5683> -b
```

- Verify the client is registered on the DM server

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Thank You

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