

LwM2M x Forge demonstration



MicroEJ

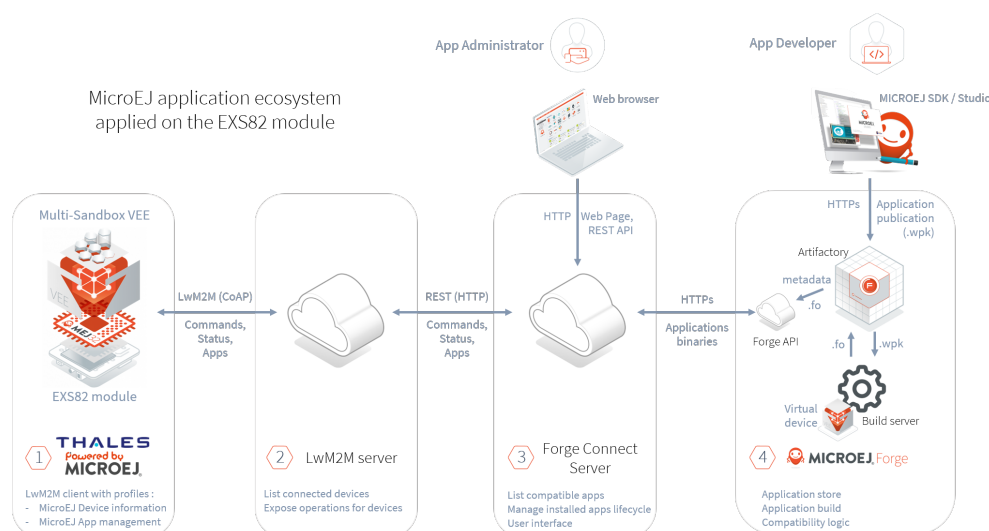
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OVERVIEW

This package demonstrates the remote deployment and management of MicroEJ (Java) applications on the THALES EXS82 module.



Services involved in this demo are the following:

1. THALES EXS82 module with:

- the firmware of the Gemalto EXS82 Embedded Processing SDK Version 00.024,
- a MicroEJ multi-sandbox kernel,
- a LwM2M client (application): device information and application management interfaces.

2. forge.microej.com (application store) hosting:

- an artifact repository (Artifactory) : stores kernels, applications, etc.,
- a build server: build published applications for compatible kernels,
- the Forge API: used to retrieve the list of compatible applications for a given kernel.

3. leshan.microej.com:8080 (Leshan server) hosting:

- a LwM2M server.

4. leshan.microej.com (Forge Connect server) hosting:

- a REST API to interact with remote devices (device information & application management),
- a web application: consume the REST API and Forge API to deploy and manage MicroEJ (Java) applications.

REQUIREMENTS

To follow the steps described in this documentation, you will need:

- A Gemalto Cinterion LGADevKit with:
 - a Gemalto EXS82 module
 - a wideband antenna
 - a SIM card
 - cables
- The Gemalto EXS82 Embedded Processing SDK Version 00.024 with:
 - the THALES firmware for EXS82 version 00.024
 - the tools to interact with the module
- A Python 2.7 installation with the serial module
- A web browser

USAGE

To demo is divided in two phases:

- *Device setup*: setup the module and install the MicroEJ kernel.
- *Play with apps*: remotely deploy and manage applications from an app repository (Forge) to the device.

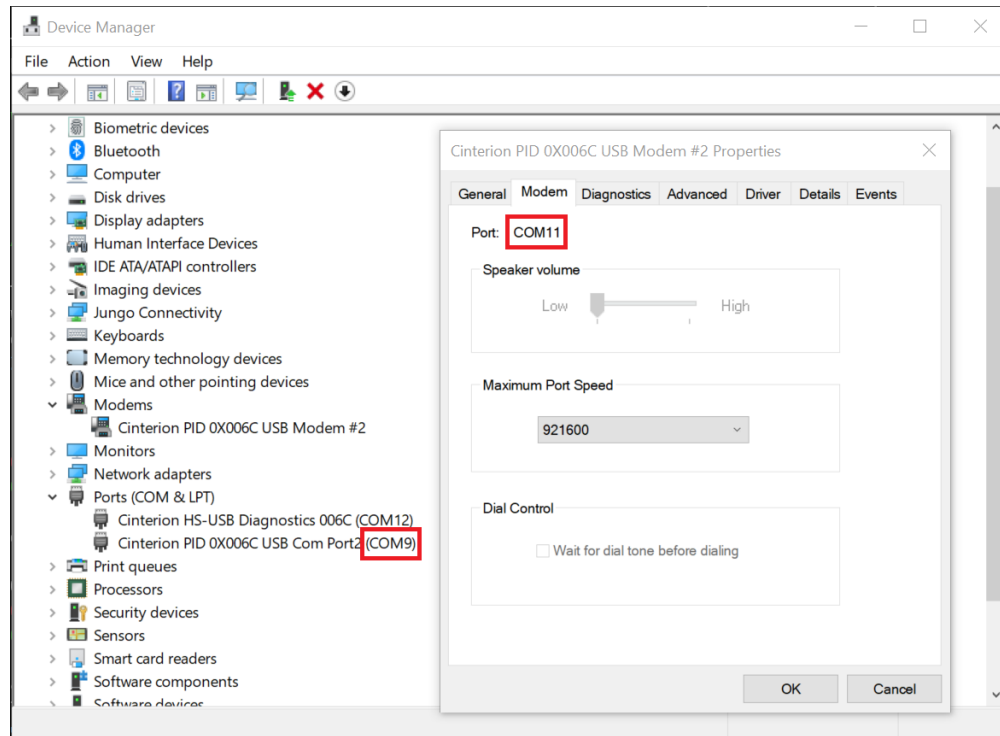
The first phase requires to be on the computer the dev kit is plugged into. The second phase only requires a web browser connected to the Internet. Still, the output of the applications of this demo are only visible on the logging interface.

If something fails, check *Troubleshooting*.

3.1 Device setup

In following steps,

- `<COM port>` refers to the serial port to the modem (`Cinterion PID 0X006C USB Modem #2`).
- `<Log port>` refers to the secondary serial port (`Cinterion PID 0X006C USB Com Port2`).



To setup the demo, follow these steps:

1. Plug the DevKit into your computer.
2. Follow Getting Started from the Gemalto EXS82 Embedded Processing SDK to update the firmware to version 00.024.
3. Download the MicroEJ multi-sandboxed kernel application binary from forge.microej.com/artifactory.
4. Set the configuration in the *config.properties* file, next to this documentation.
5. Upload the binary and the configuration to the module using:

```
<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/app.py download -p <COM port> -n microej EXS82-
firmware-0.2.0-RC202101141129.bin
<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/fs.py mkdir -p <COM port> A:/microej/
<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/fs.py download -p <COM port> config.properties A:/
microej/config.properties
```

6. Open the logging interface using:

```
<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/log.py read -p <COM port> -d "<AT/Modem port>, 460800"
"
```

7. Start the application:

```
<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/app.py start microej
```

8. Verify the application connects successfully to the network and get the URL link to use for next steps:

```
MicroEJ START
[Kernel] Application started: WADAPPSLwm2mClient
[Net Helper] Setting normal mode
[Net Helper] Unlocking the SIM
```

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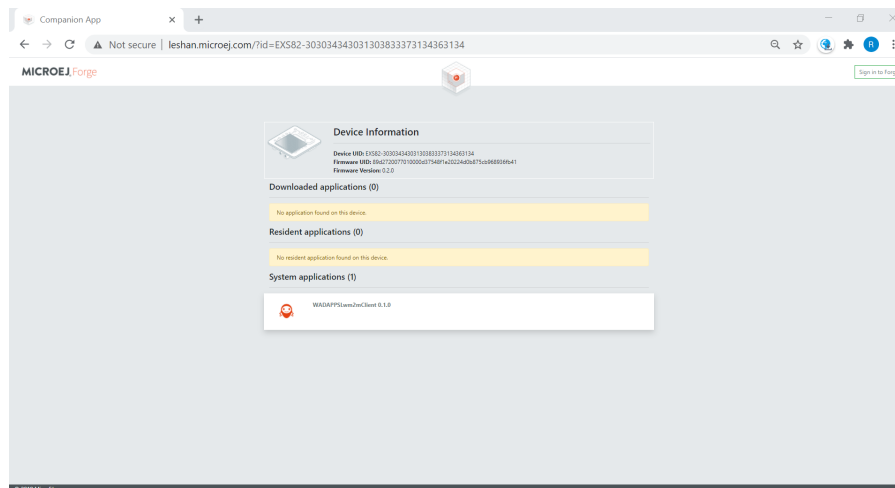
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```
[Net Helper] Attaching the network (May take a while)
[Net Helper] Trying again...
[Net Helper] Trying again...
[Net Helper] Configuring PDP context
[Net Helper] Activating PDP session
[LwM2M] LwM2M client is running.
[LwM2M] Go to http://leshan.microej.com/?id=EXS82-00000000000000000000000000000000
```

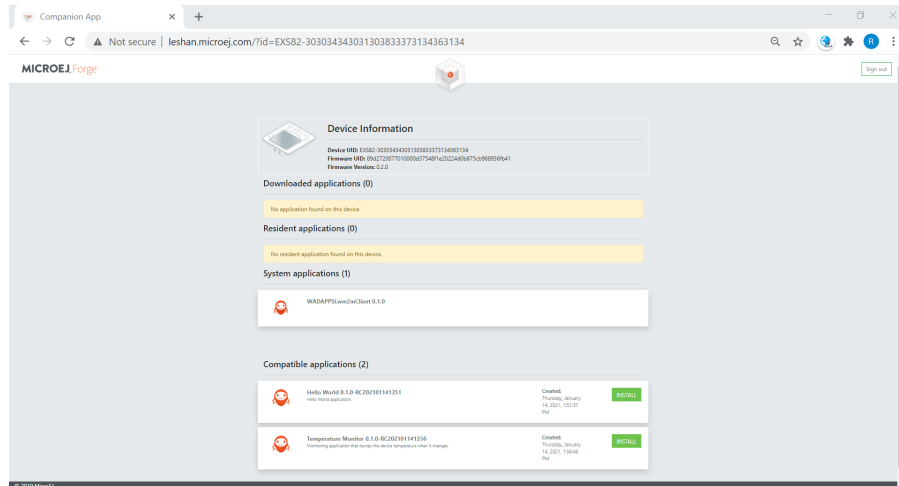
3.2 Play with apps

To remotely deploy and manage applications on the device, follow these steps:

1. Go to the Forge Connect web application using the link from previous step.
 - The page will load the device information and the list of installed applications.

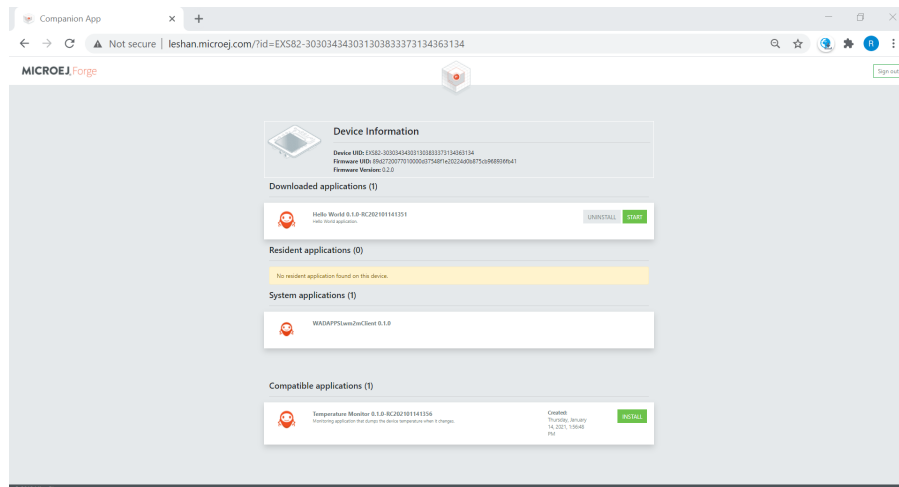


2. Initially, there is only one application : the LwM2M client app.
 - It is a system application, it is not possible to start/stop/uninstall it.
3. Connect to Forge using the “Sign in” button in the upper right corner.
 - Fulfill the form with:
 - Forge: `https://forge.microej.com`
 - Username: `evaluation`
 - Password: `AKCp5e2WtyaTwekimazLGJzruZPhE6FXy9gBhSY7KNgTUKs4EDY56eHbmSRDEP3r914oZkBFg`
 - The page will load the list of published applications compatible with the kernel.

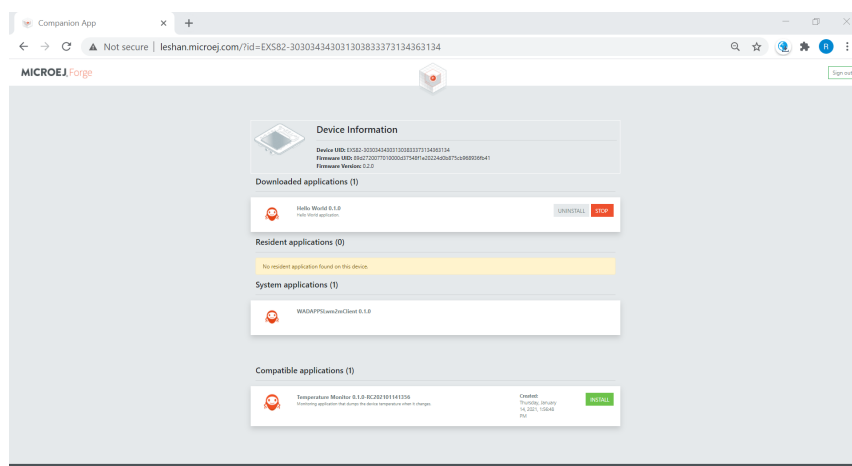


4. To install an application, click on the “Install” button.

- Once the installation is completed, the application is moved from the compatible section to the downloaded section.



5. To start / stop / uninstall an application, click on the corresponding button.



3.3 Demo apps

The EXS82 multi-sandboxed kernel has two compatible applications published on forge.microej.com:

- *“Hello World” application*: this application prints a message when starting and stopping.
- *Temperature monitor application*: this application monitors the temperature of the board. The temperature is logged when it changes.

3.3.1 “Hello World” application

Start

[illegible]

Stop

[illegible]

3.3.2 Temperature monitor application

```
[Temperature Monitor] Polling temperature
[Notification][Temperature Monitor] Temperature changed: 27degC
[Temperature Monitor] Polling temperature
[Notification][Temperature Monitor] Temperature changed: 26degC
[Temperature Monitor] Polling temperature
[Temperature Monitor] Polling temperature
[Temperature Monitor] Polling temperature
[Temperature Monitor] Polling temperature
[Notification][Temperature Monitor] Temperature changed: 25degC
```

3.4 Troubleshooting

- In case you get errors from the web application, check that your device is registered to the LwM2M server : <http://leshan.microej.com:8080/>.

- In case the device is not registered, restart the kernel:

```
<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/app.py stop -p <COM port> microej
<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/app.py start microej
```

- If the registration fails:

- check the configuration file `A:/microej/config.properties` (PIN code and AP settings),
- or, if it is correct, restart the device
 - * Push the “On” button for a few seconds to stop the device.
 - * Click the “On” button to start the device.

- To reinitialize the device:

- restart the device,
 - * Push the “On” button for a few seconds to stop the device.
 - * Click the “On” button to start the device.
- remove files in `A:/microej` ,

```
<<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/fs.py rmdir -p <COM port> A:/microej
```

- restart the kernel.

```
<PYTHON_PATH>/python.exe <GEMALTO_SDK>/tools/app.py start microej
```

KNOWN ISSUES/LIMITATIONS

- The downloaded applications are not persistent:
 - They are stored on the filesystem of the device but they are not loaded at kernel startup.
- Simple operations like start / stop are slow.