Device Lifecycle

In OCF, OneM2M, L2M2M, T2TRG vs WoT

References

OCF https://openconnectivity.org/developer/specifications/

- OCF Onboarding Tool Specification
  - 5.1, Table 1: definition of states from OBT point of view
- OCF Security Specification
  - 5.3, Figure 8: Onboarding overview
  - Sections 7 and 8

OneM2M

- Technical Report, Security 2016, Sections 11-12
- Security Solutions 2014

LwM2M Technical Specification: Core / Bootstrap

T2TRG Security (RFC 8576), Thing Lifecycle

OCF

Stage 1. Onboarding:
- discover *unowned* devices and get supported ownership transfer methods (OTM)
- select and perform OTM (based on certificate / shared key / random pin / vendor-specific)
- provision *device identity*
- provision *owner credentials*

Stage 2. Security Provisioning (can happen even in operational state)
- provision ***credentials*** (other keys and certificates than ownership)
- provision ***ACL's*** to access other devices/***services*** (like discovery/addressing/id's).

Stage 3. Security Configuration
- configure ***apps*** and access management (policies).

On an OCF device, WoT servient is an application (that acts as a bridge).

Note: OCF provides bridging specifications to BLE, OneM2M, AllJoyn, UPlus, ZigBee, Z-Wave.

OneM2M

GBA: Generic Bootstrapping Architecture

Trust Enabling Architecture:

M2M Enrolment, Authentication, Authorization Functions

M2M Initial Provisioning:

- M2M Node Enrolment and Service Provisioning
  - Pre-provisioning: out of band, or manufacturer certificate
  - Remote provisioning: relies on pre-existing credentials to access the Enrolment function
  - Service provisioning (credentials for using Authentication Functions)
- Application Enrolment/provisioning (M2M Application key)

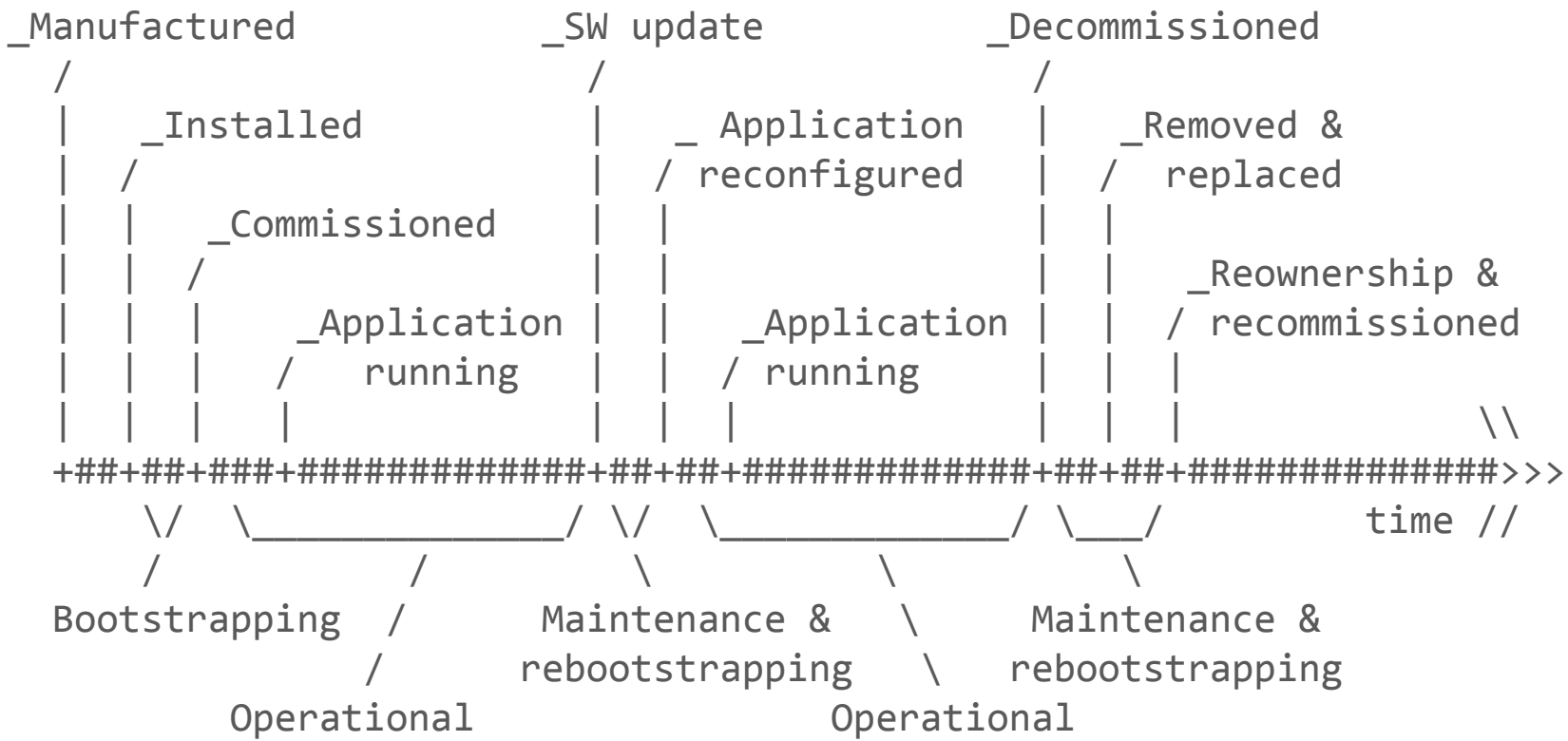
Lightweight M2M

4 bootstrap modes:

1. Factory: pre-provisioned for communicating with Bootstrap Server
2. Smartcard: carries initial secrets
3. Client initiated: needs a pre-provisioned account to access Bootstrap Server
4. Server initiated: if a (non-specified) secure connection can be established between client and server.

Bootstrap discovery is also supported (not the same as operational discovery).

T2TRG lifecycle



Possible Mapping to WoT device lifecycle model

- **Manufactured** | Factory defaults
  - Factory defaults, with or without initial secrets
- **Bootstrapping** | Provisioning, with sub-states:
  - 1. (Onboarding | Bootstrapping?): Provision with trust chain and device id in a solution (multiple types of onboarding: shared key, manufacturer certificate, etc).
  - 2. Service Provisioning: with security data to access basic services in a solution (discovery, credential/access management, etc) + solution/service *configuration* data (after this [+ reboot], MAY become Operational in some cases)
  - 3. App Provisioning: with security data to access other devices in a solution and app/user configuration data (after this [+ reboot], becomes Operational)
  - **Data**: security + configuration (for solution [+ user])
- **Operational**, with sub-states:
  - Normal operation
  - (re)configuration by user or provider (can be done while operating)
  - Maintenance / SW updates (some can do it in background, while operating)
  - **Data**: solution [+user] configuration, solution [+user] data
- **Decommissioned**
  - All data and trust chain removed, a.k.a. Reset to factory defaults.
  - It can be still recommissioned with majority of protocols.
  - It could be merged with the `Manufactured | Factory defaults` state.
- **Destroyed**: device HW no longer usable