Device Firmware Management

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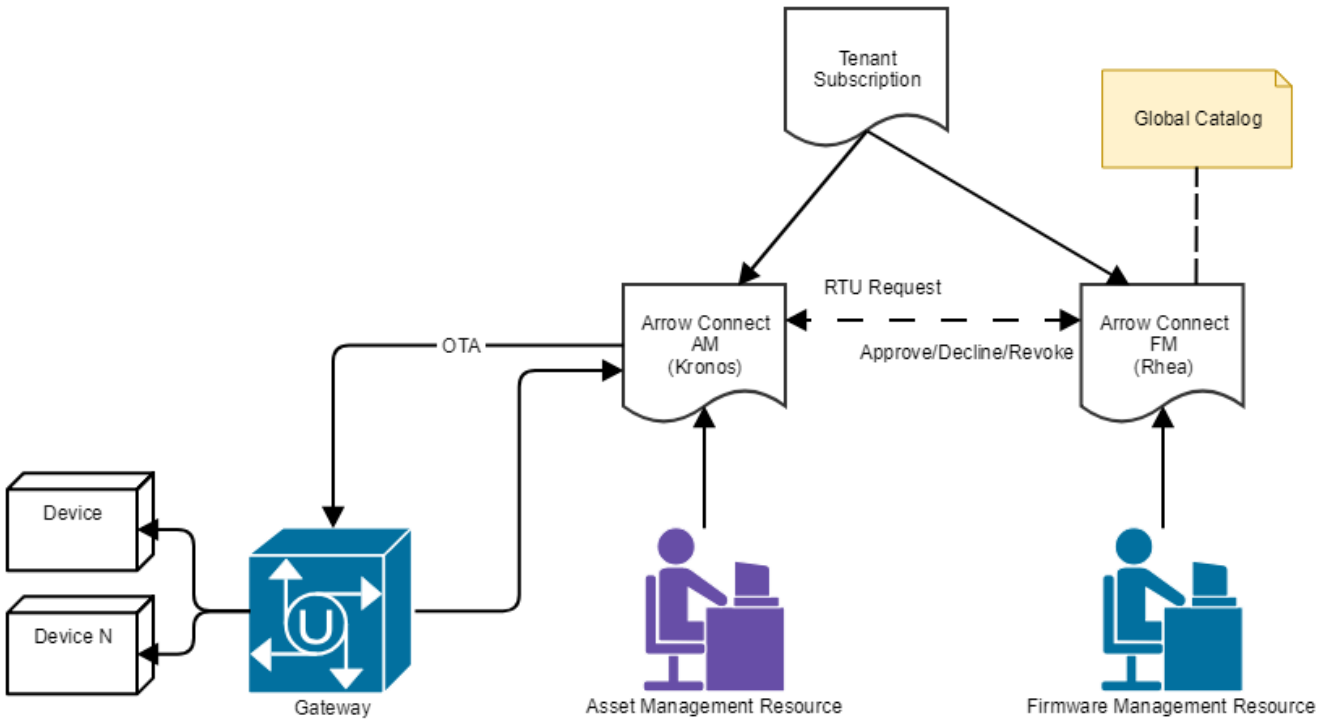
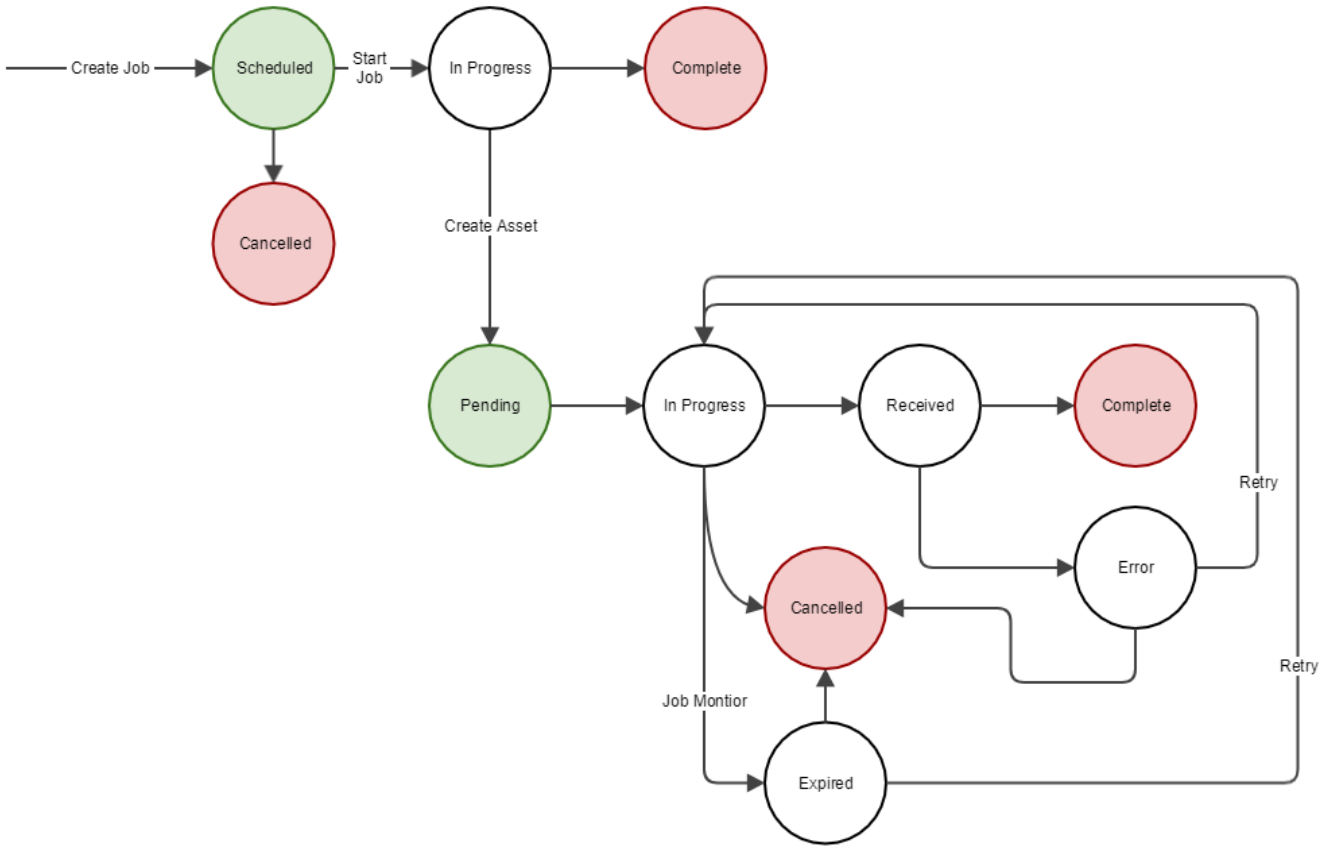
- Entity Relationship Diagram
- End To End Process
- Arrow Connect & LWM2M
- Data Flow
- Mobile gateway client state-machine

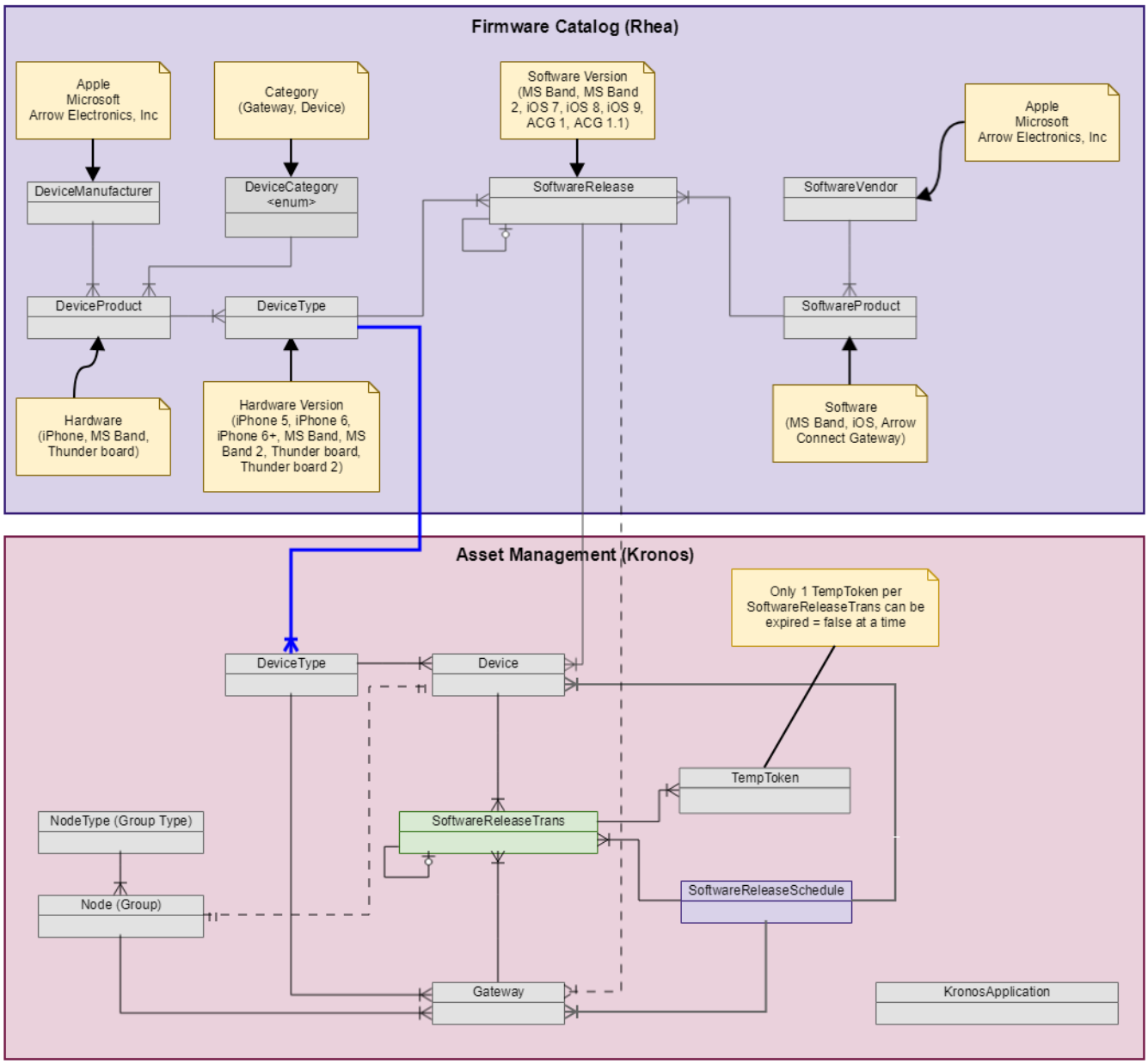
Firmware Management Birds Eye View



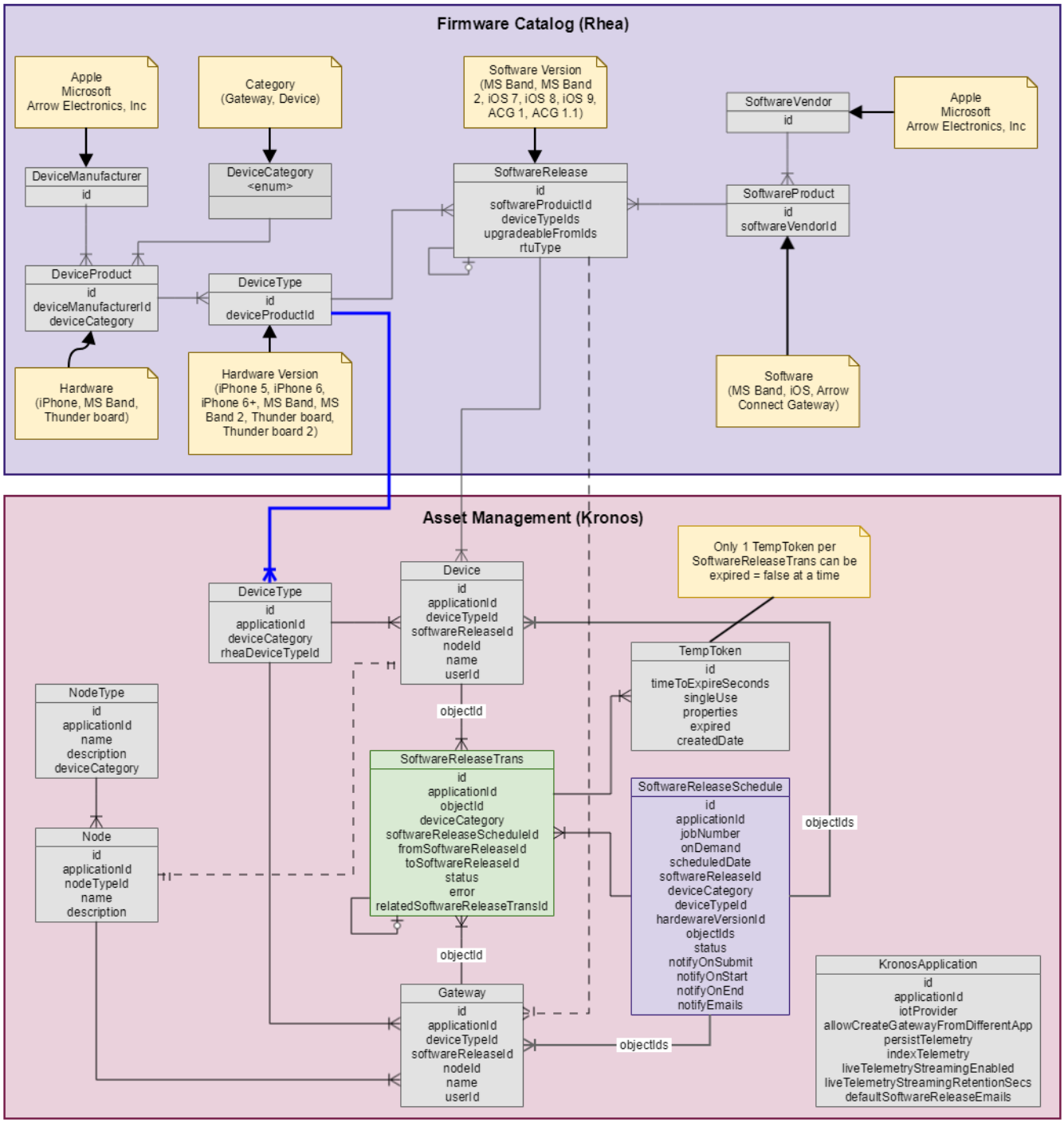
State Diagrams



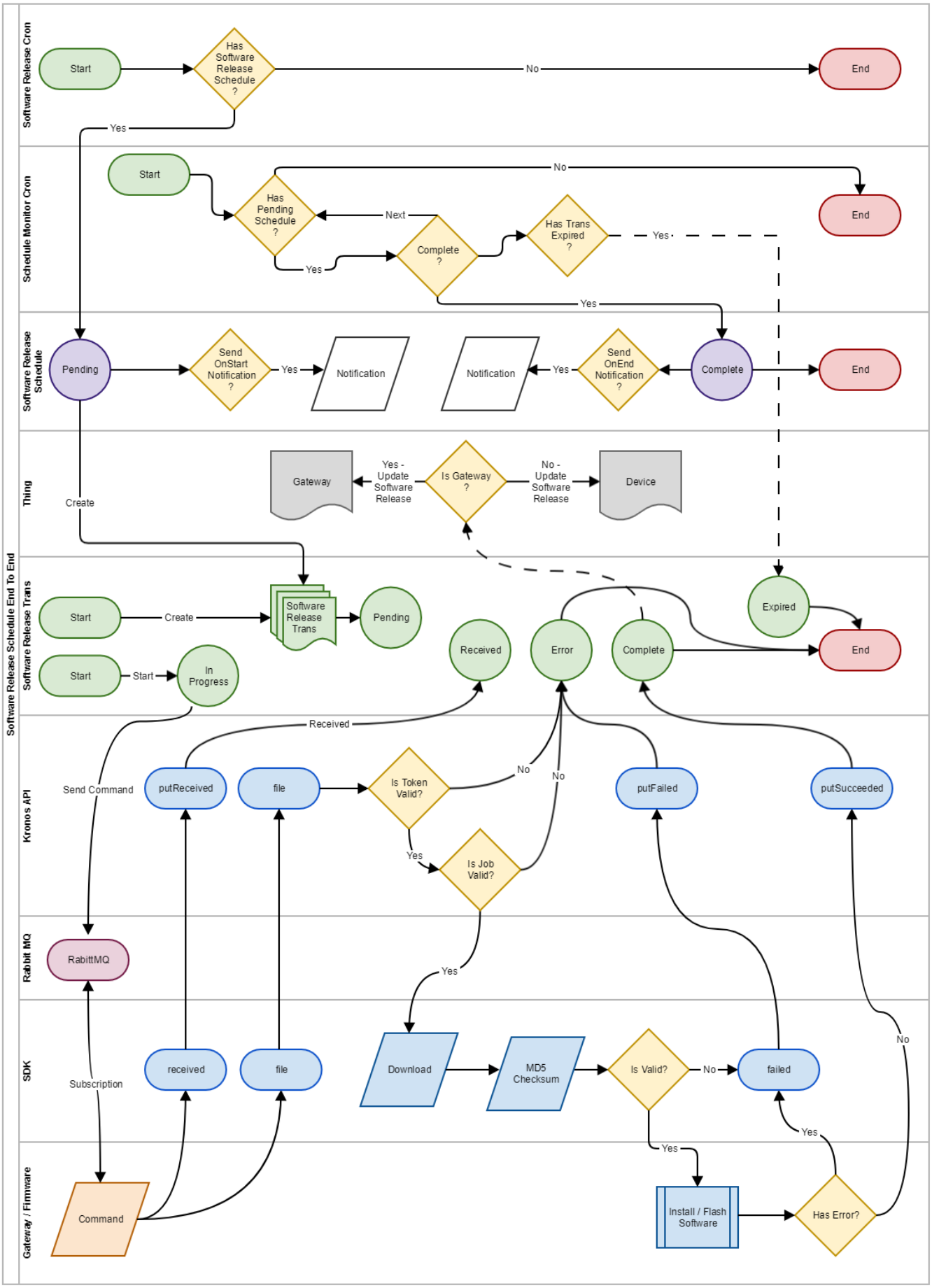
Entity Relationship Diagram (Simple)



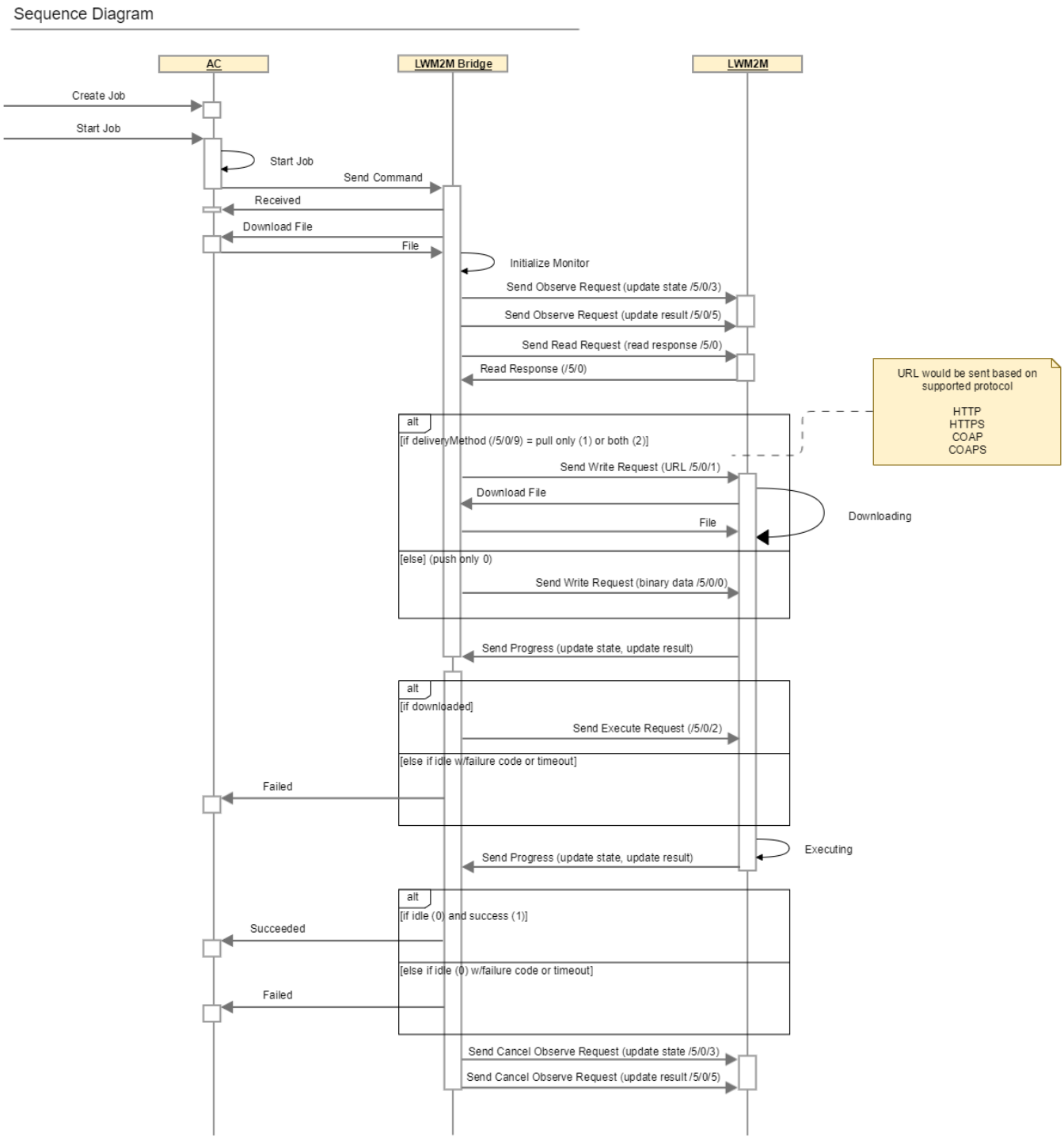
Entity Relationship Diagram



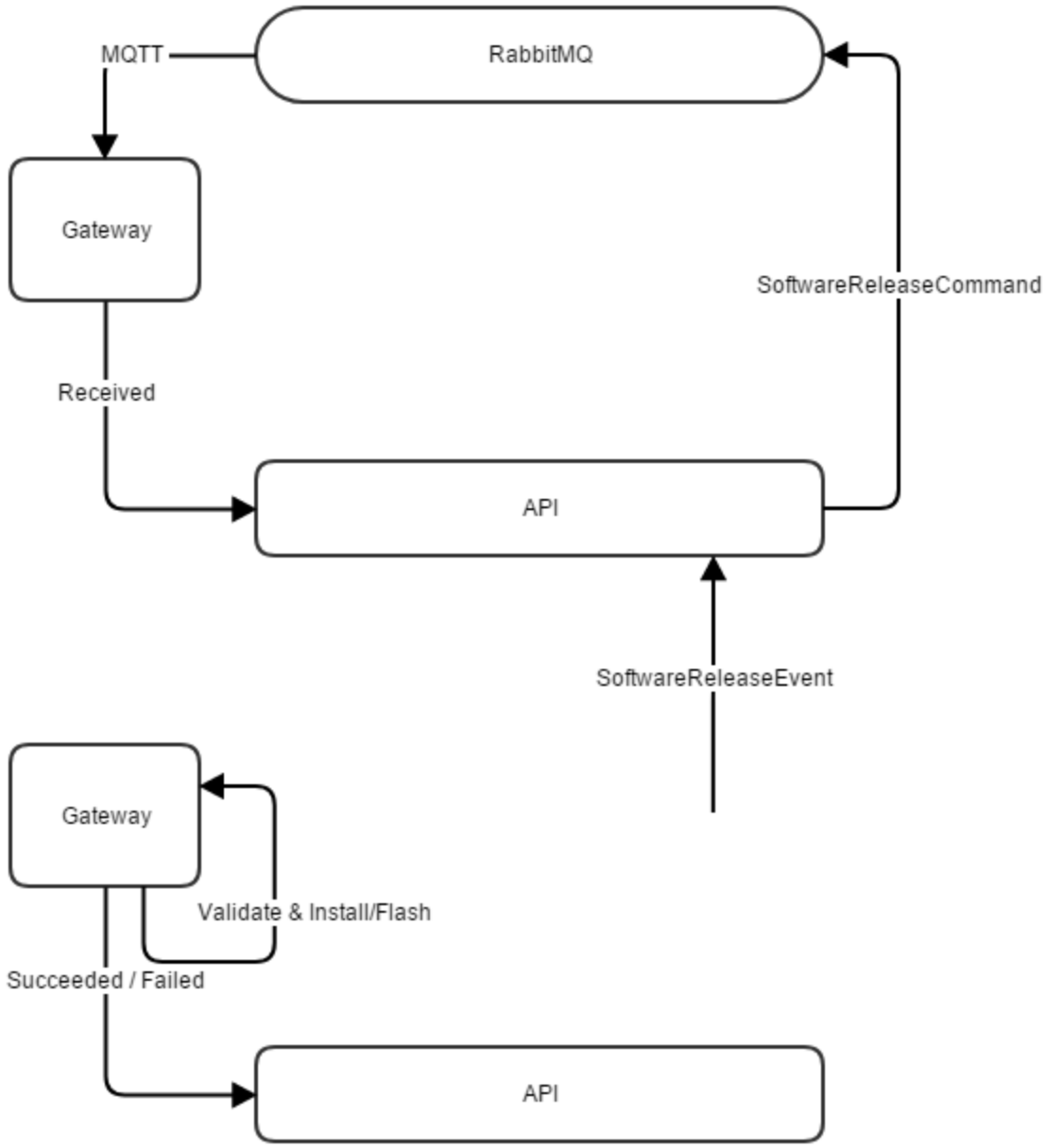
End To End Process


Software Release Schedule End To End
Software Release Cron
Start
Has Software Release Schedule ?
No
End
Yes
Schedule Monitor Cron
Start
Has Pending Schedule ?
No
End
Next
Complete ?
Has Trans Expired ?
Yes
Yes
Yes
Software Release Schedule
Pending
Send OnStart Notification ?
Yes
Notification
Notification
Yes
Send OnEnd Notification ?
Complete
End
Thing
Create
Gateway
Yes - Update Software Release
Is Gateway ?
No - Update Software Release
Device
Software Release Trans
Start
Create
Software Release Trans
Pending
Expired
End
Start
Start
In Progress
Received
Error
Complete
Kronos API
Received
Send Command
putReceived
file
Is Token Valid?
No
No
putFailed
putSucceeded
Yes
Is Job Valid?
Rabbit MQ
RabittMQ
Yes
SDK
Subscription
received
file
Download
MD5 Checksum
Is Valid?
No
failed
No
Yes
Yes
Gateway / Firmware
Command
Install / Flash Software
Has Error?

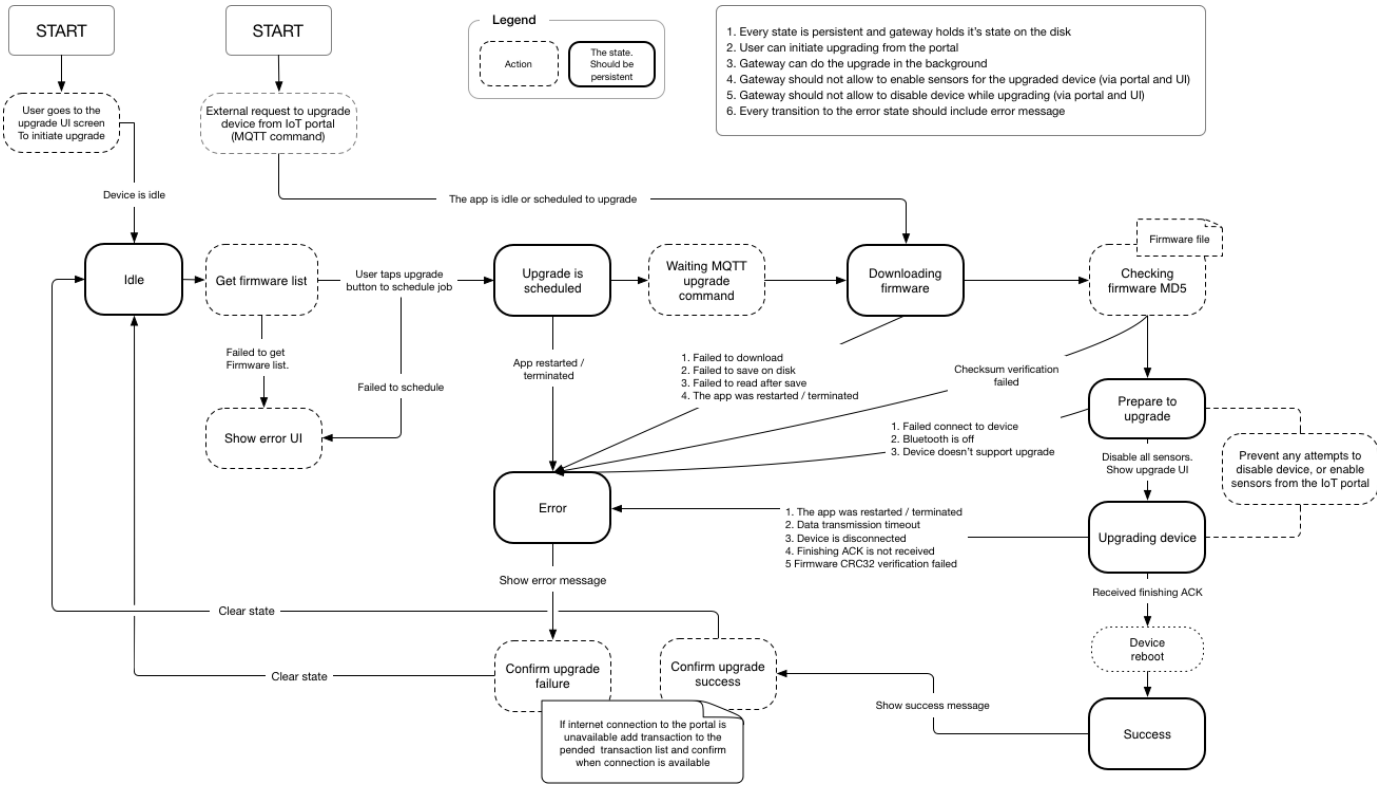
Arrow Connect & LWM2M



Data Flow



Mobile gateway client state-machine


START
START
User goes to the upgrade UI screen To initiate upgrade
External request to upgrade device from IoT portal (MQTT command)
Legend
Action
The state. Should be persistent
1. Every state is persistent and gateway holds it's state on the disk
2. User can initiate upgrading from the portal
3. Gateway can do the upgrade in the background
4. Gateway should not allow to enable sensors for the upgraded device (via portal and UI)
5. Gateway should not allow to disable device while upgrading (via portal and UI)
6. Every transition to the error state should include error message
Device is idle
The app is idle or scheduled to upgrade
Idle
Get firmware list
User taps upgrade button to schedule job
Upgrade is scheduled
Waiting MQTT upgrade command
Downloading firmware
Firmware file
Checking firmware MD5
Failed to get Firmware list.
Show error UI
Failed to schedule
App restarted / terminated
1. Failed to download
2. Failed to save on disk
3. Failed to read after save
4. The app was restarted / terminated
Checksum verification failed
Prepare to upgrade
1. Failed connect to device
2. Bluetooth is off
3. Device doesn't support upgrade
Disable all sensors. Show upgrade UI
Prevent any attempts to disable device, or enable sensors from the IoT portal
Error
1. The app was restarted / terminated
2. Data transmission timeout
3. Device is disconnected
4. Finishing ACK is not received
5 Firmware CRC32 verification failed
Upgrading device
Show error message
Received finishing ACK
Clear state
Device reboot
Clear state
Confirm upgrade failure
Confirm upgrade success
Show success message
Success
If internet connection to the portal is unavailable add transaction to the pended transaction list and confirm when connection is available