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Eclipse Hara

Updating Embedded Devices with hawkBit Made Easy

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Agenda

- Who we are
- A glance at Eclipse hawkBit
- Eclipse Hara
- Native Services
- Virtual Devices
- Hara 2022 Enhancements
- Conclusion

About us

- We provide OSes and Applications for embedded systems
  - Android
  - Open Embedded
- UpdateFactory
  - Software as a Service to update remote devices at scale
  - Based on Eclipse hawkBit
- Members of the Eclipse Foundation
  - Maintainers of Project Hara
  - IoT Working group
  - Edge Native Working Group & Edge Native Steering Committee

Eclipse hawkBit: helicopter view

IoT Business Solutions

Management UI

Management API

Eclipse hawkBit – Update Server

Device and Software Repository

Artifact Content Delivery

Software Update and Roll out Management

Direct Device Integration API

Device Management Federation API

Device Management Services

OMA-DM | LWM2M | *Custom*

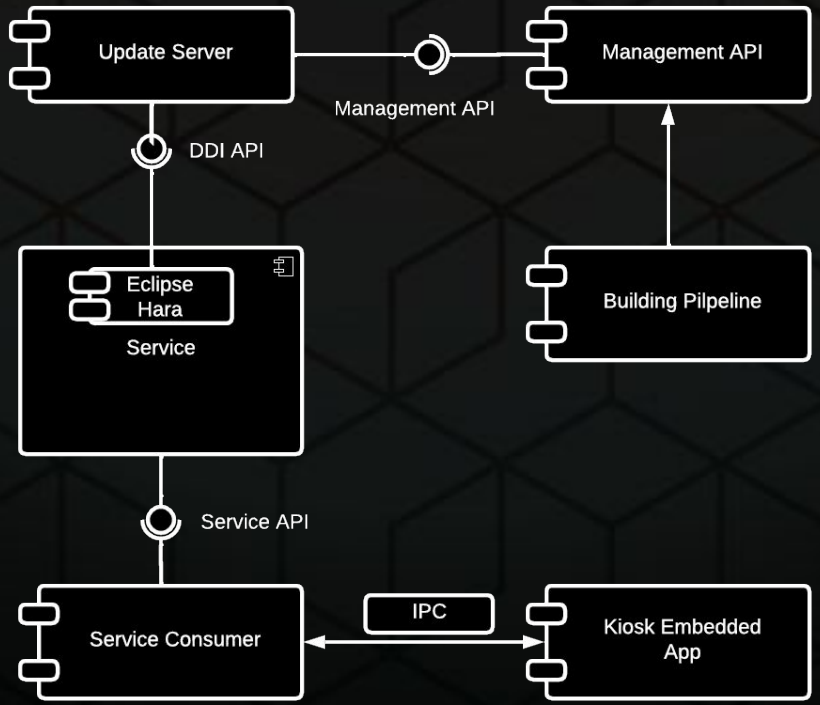
Why project Hara

- hawkBit provides solid backend/API but no client implementation
  - Need for hawkBit client supporting update workflows
- Linux devices already taken care of
  - SWUpdate
  - RAUC + hawkBit Updater
- Internal design of an Android hawkBit client
  - Upon DDI API
  - Customer deployments
- Need for a JVM-based OS-agnostic reusable library

Eclipse Hara: helicopter view

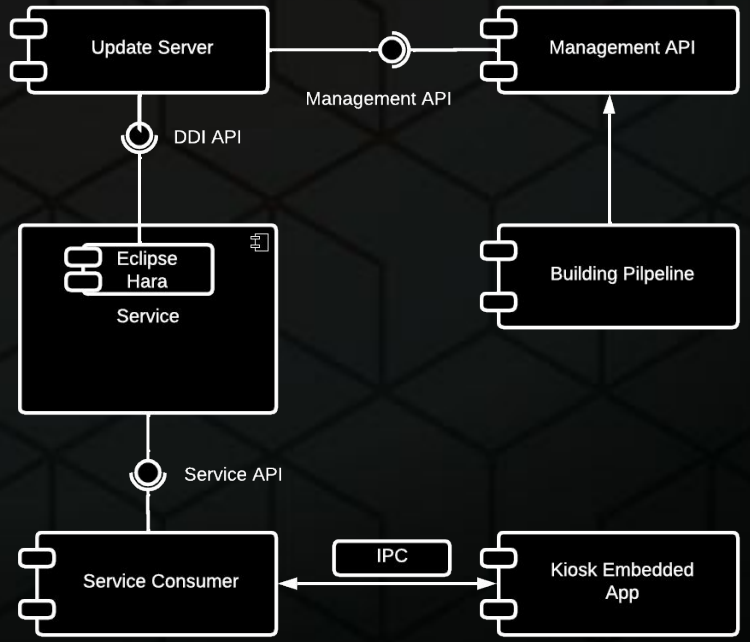
- Kotlin library to speed up the development of hawkBit DDI native clients
- OS independent
- Architecture dependent
  - Based on JVM (available for many architectures)
- Agnostic with respect to the update artifacts (apps, OS OTA, …)
- Designed to facilitate the integration of native update Services

hawkBit & Hara: the full picture



Eclipse Hara: use cases

- Download artifacts from the server
- Provide feedback
- Send device attributes
- Ask for pending actions

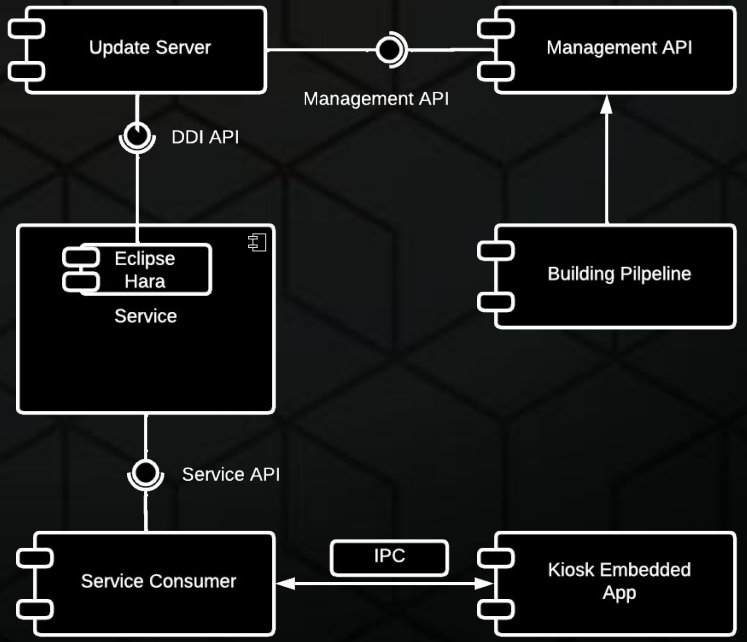


Eclipse Hara: internals

- ddi-consumer
  - Implementation of a REST client for DDI API
- hara-ddclient-api
  - Interfaces towards the Update Server
  - Actor-based
- virtual-device
  - Simple app using hara-ddiclient-api
  - Reference implementation

Native Service and Consumer

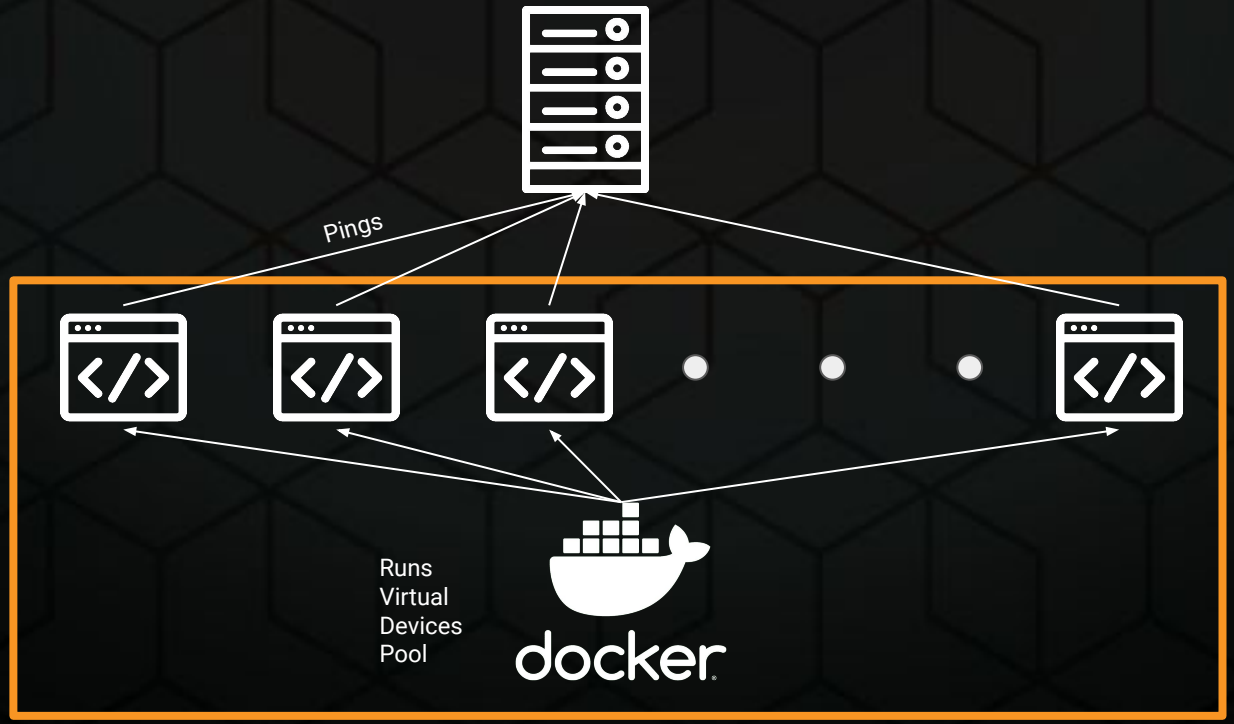
- Service
  - Wrapper around the DDI logic
  - Runs in background
  - OS-dependent
  - Contains target device's update logic
- Consumer (App)
  - Application should interact with Service (monitoring, configuration, …)



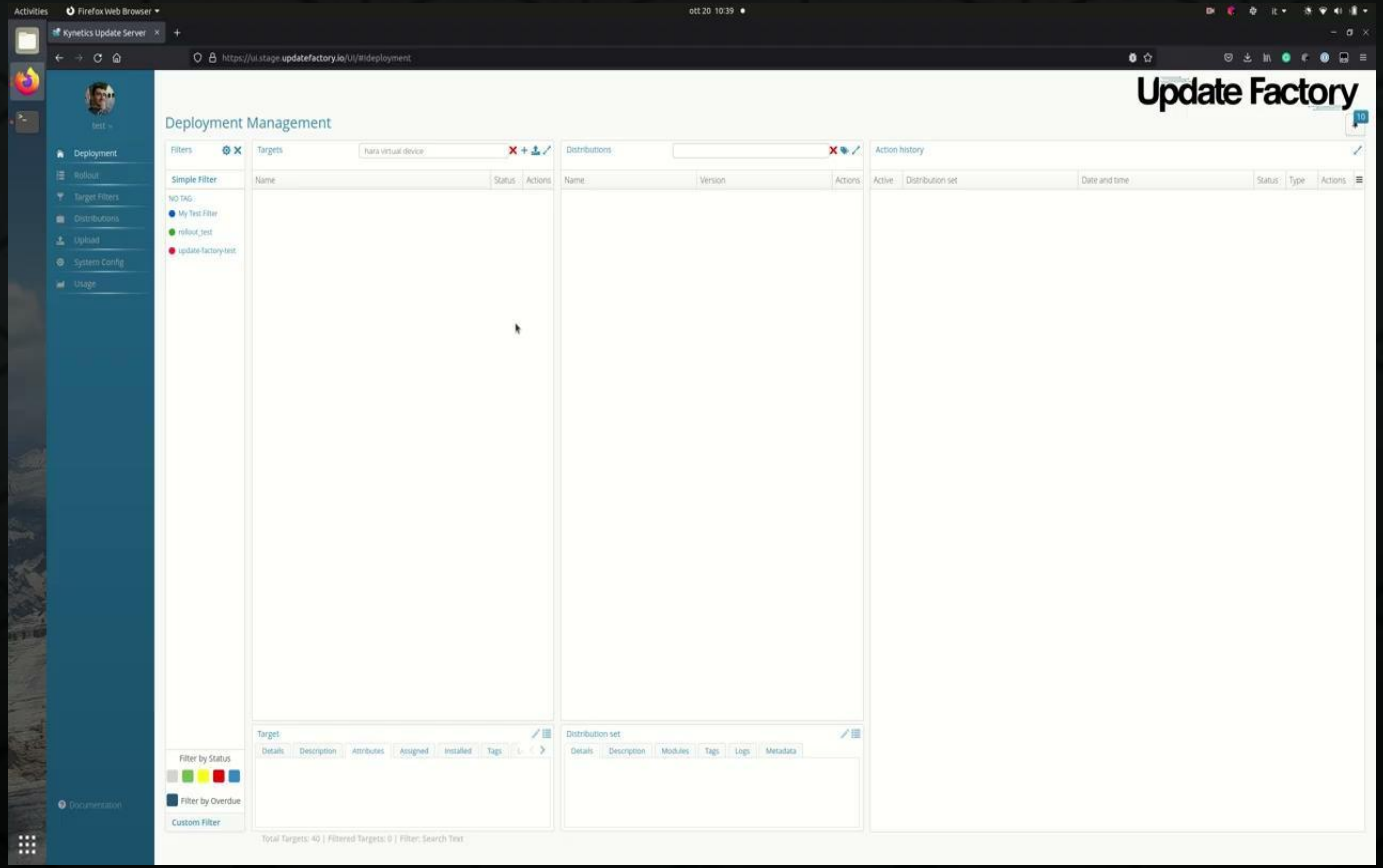
Service and Application drive the update logic!

- User experience
- Outages/timeouts handling
- Single/double copy updates
- Updates of the native service itself
- Error handling

Hara and virtual devices



Video


Activities
Firefox Web Browser
Kynetics Update Server
https://ui.stage.updatefactory.io/UI/#!deployment
Update Factory
Deployment Management
Deployment
Rollout
Target Filters
Distributions
Upload
System Config
Usage
Filters
Simple Filter
Targets
Distributions
Action history
Filter by Status
Filter by Overdue
Custom Filter
Target
Distribution set

Hara latest enhancements (Oct 2022)

- Schedule the download and application of an update for both soft and forced
- Configure the number of download attempts and the time between such attempts
  - Android Client implements this feature with exponential back-off
- Verbose messages from the client to the Update Server
  - Reason of failure
  - Time to the next attempt
- Target Attributes sent at every polling if
  - They are actually updated
  - Server requests, explicitly, to receive the target attributes

Conclusion

Updating embedded devices made easy

1. **DDI logic separated from device-specific Service**
   - Easy to create custom Native Services
2. **Testing with multiple (virtual) devices**
   - No need for physical boards

Let’s increase clients availability to spread the use of hawkBit!

Thank you

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Useful Links

- https://projects.eclipse.org/projects/iot.hawkbit.hara
- https://github.com/eclipse/hara-ddiclient
- https://www.eclipse.org/hawkbit/
- https://www.kynetics.com
- https://github.com/kynetics