Open Source M2M at Eclipse
The Koneki Project

Eclipse Party Toulouse – June, 23rd 2011

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Agenda

M2M?

M2M engineering… state of the union

M2M at Eclipse: Koneki
  • What it is about
  • What is available
  • What you can expect
  • Demo!

What’s next / Get involved
Machine-to-Machine (M2M)

Wikipedia says:

“[…] technologies that allow both wireless and wired systems to communicate with other devices of the same ability.”
M2M is everywhere!
AirVantage Cloud Platform

Complete Solution to Build and Operate M2M Applications

AirVantage
Ready Agent

AirVantage
Operating Portal
- Subscription Management
- Device Management
- Asset Management

WEB SERVICES API

ASSETS
- Machines
- Infrastructure
- Meters
- Vehicles
- Cameras

AirPrime
Intelligent Embedded Modules

AirLink
Intelligent Gateways and Routers

3rd-Party Hardware

M2M APPLICATIONS

AirVantage
Services Platform

AirVantage
Developer Suite
Embedded, Web 2.0, and Mobile Application Development
AirVantage Cloud Platform

Complete Solution to Build and Operate M2M Applications

- AirVantage™ Ready Agent
- AirLink™ Intelligent Gateways and Routers
- AirPrime™ Intelligent Embedded Modules
- 3rd-Party Hardware
- ASSETS: Machines, Infrastructure, Meters, Vehicles, Cameras
- WEB SERVICES API:
  - Subscription Management
  - Device Management
  - Asset Management
- M2M APPLICATIONS
- AirVantage™ Services Platform
- AirVantage™ Developer Suite
  - Embedded, Web 2.0, and Mobile Application Development
Fragmentation!
Heterogeneous hardware
And also…

etc…
Heterogeneous OSes

- iOS
- SYMBIAN
- WIND RIVER
- MontaVista
- Android
- MeeGo
- OpenAT
- Nucleus
- QNX
Heterogeneous programming languages

C / C++

Shell script

Python

Java

Lua
Heterogeneous protocols

TCP
UDP
ICMP
SNMP
SMS
FTP
HTTP
...

XML & its derivatives
- (SOAP, binary XML, ...)
- OMA-DM
- TR-069

JSON
MQTT
AWT-DA
Protocol buffers
...

Modbus
CAN-bus
Zigbee
X10
1 wire
...

1 wire
Let’s just stop reinventing the wheel…

Every M2M solution provider ships its own « SDK »
Every M2M solution provider exposes its own APIs
Every M2M solution provider relies on its own protocol(s)

… and create an Open Source initiative at Eclipse
Eclipse Foundation... why?

— *Eclipse is an open source community, whose projects are focused on building an open development platform comprised of extensible frameworks, tools and runtimes for building, deploying and managing software across the lifecycle* —

• All the infrastructure to « work in the open » (Wiki, source control, bug tracker, …)

• Governance

• IP management

• Strong ecosystem of industrial partners
Koneki project

Eclipse Technology project aiming at:

“providing Machine-to-Machine solutions developers with tools easing the development, simulation, testing/debugging and deployment of such solutions”
Provide extensible tooling for M2M developers

- M2M application model
- « Embedded » languages support
- M2M and industrial protocols support
- M2M Server simulation (OMA-DM, Asset Mgt, …)
- User assistance, examples

Provide an M2M embedded framework for Linux based devices
M2M end-to-end chain (simplified)
Koneki Overview

M2M APPLICATION EDITORS

M2M APPLICATION MODEL

EMBEDDED RUNTIMES
- Lua
- Celix
- OSGi
- Android
- ...

LANGUAGE TOOLS
- LuaEclipse
- CDT
- JDT
- ...

PROTOCOLS

M2M SERVER DEVELOPMENT

KONEKI COMMONS

APPLICATION EXAMPLES

M2M APP. GENERATORS

SIMULATION

APP. EXAMPLES

M2M EMBEDDED DEVELOPMENT

Koneki Overview
Koneki Enablers

- APPLICATION EXAMPLES
- SIMULATION
- SIMULATION
- APP. EXAMPLES
- M2M APPLICATION EDITORS
- M2M APPLICATION MODEL
- EMBEDDED RUNTIMES
  - Lua
  - Celix
  - OSGi
  - Android
  - ...
- LANGUAGE TOOLS
  - LuaEclipse
  - CDT
  - JDT
  - ...
- M2M EMBEDDED DEVELOPMENT
- PROTOCOLS
- M2M SERVER DEVELOPMENT
- KONEKI COMMONS
Embedded development

Eclipse already provides support great support for embedded development but Koneki will provide M2M specificities

- M2M runtimes/frameworks
  - Lua
  - OSGi
  - Android
- Target communication
- Application examples
Protocols manipulation

Koneki will provide common UI elements to:

• Capture data frames and display them in a human-readable form
• Simulate complex communication scenarios
• Estimate bandwidth consumption
M2M Server Development

Smoothly integrate M2M servers into the IDE

- Perform administration tasks
- Discover server capabilities
- Simulate server behaviour
Koneki M2M application model

APPLICATION EXAMPLES
M2M APP. GENERATORS
SIMULATION
SIMULATION
APP. EXAMPLES

M2M APPLICATION EDITORS

M2M APPLICATION MODEL

EMBEDDED RUNTIMES
Lua  Celix  OSGi  Android  ...

LANGUAGE TOOLS
LuaEclipse  CDT  JDT  ...

PROTOCOLS

M2M EMBEDDED DEVELOPMENT

M2M SERVER DEVELOPMENT

KONEKI COMMONS
A model to rule them all?

Describe the **interfaces** of an M2M application:

- Communication capabilities
  - Protocol, connection interval
- Manipulated data / events
  - Name, unit, description, archiving policy
- Configuration parameters
- Application packaging / Software update capabilities

Optionally

- Describe the **behaviour** of the M2M application
Code generation rules!

- Embedded application
  - Unit tests
  - Documentation
- Communication simulation
  - Bandwidth use estimation
- Web application
  - Smartphone widget
  - Gadget
  - ...

APPLICATION MODEL
Demo!
Roadmap overview

Q3 2011

• Call for community participation to define an M2M application model
• Improve Lua Tooling: LuaRocks, Luadoc, debugging/tracing

Q4 2011

• M2M server simulation infrastructure
• OMA-DM simulator (based on OSGi spec)
• Lua Tooling component to be moved to its own Technology project

Q2 2012

• First release of an usable « end-to-end » M2M IDE
Community feedback

Great interest at EclipseCon US

Eclipse tooling vendors interested in having a common programming model for embedded

M2M actors interested in establishing a reference IDE

How about you?!
Thank you!

http://www.eclipse.org/koneki

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