Open M2M API
Overview of Eurescom Study P1957

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Open M2M API
Eurescom Study P1957

**Rationale**

- M2M is expected to evolve into a multi-billion Euro market in Europe.
- Development is hampered by the monolithic infrastructure of existing M2M platforms.
- Several initiatives to define steps in terms of services and capabilities that will allow migration from existing monolithic M2M infrastructure towards a flexible environment for service development and ubiquitous deployment and operation.
- Necessary prerequisite for standardization of M2M communications to become commercially successful and technically viable and pave the way for a future IP-based Internet of Things.

**Participants: Eurescom Study P1957**

- Telenor
- France Telecom / Orange Labs
- Portugal Telecom Inovação
- Deutsche Telekom
Open M2M API
Key features

Feature list at a glance

- Access to basic enablers via a uniform, standardized API.
- Interoperability across heterogeneous transports.
- High-level does not dictate implementation technology.
- Message based solution.
- Combines P2P with client-server model.
- Supports routing via intermediaries.
Open M2M API
Enabling technologies / service capabilities

Main API sections

- Messaging (single, group, b-cast; a/synchronous, transactional).
- Subscription and Notification (e.g. Publish/Subscribe).
- Grouping.
- Transactions.
- Application Interaction: Read, Do, Observe.
- Compensation (micro-payment).
- Sessions.
Open M2M API
API Levels

API Level 1 Compliance
Messaging, Read / Do / Observe

Level 2
Grouping, Subscription/Notification

Level 3
Transactions, Sessions, Compensation, etc.
REST interface
HTTP binding

Key points

- Provides HTTP binding for Open M2M API.
- Specifies a REST-style interface.
- Defines resources (URLs) on each node.
- XML messages sent to / received at resources.
- Formal web service definition as WADL.
- XML schema file defines valid message structure.

- Future possibilities: CoAP (UDP/IPv6)
REST interface
HTTP binding

Details

- Each API method contains a counterpart in the web description.
- Two messages, request and response, are defined for each method call.
- Message contains complete parameter list for each method call.
- No argument must be read out of the URI.
- Existing work can be easily ported to WSDL, CoAP, SIP or other protocols.
- Hierarchal XML message definitions.
- Routing: Origin and destination contained in each request/response message.
Use case 1
Smart metering

- Implement the API for the single use case of smart metering: reading data.
- Modelling the smart metering web service using the CRUD methods.
- The M2M API must be implemented on a M2M server, which will act as an intermediary between the costumer and the device.
- Using the "Read" service capability feature to reading the data device.
Use case 2
Logistics

- Describes using the API to track rail cars.
- Cars outfitted with an odometer sensor.
- Sensor connected to mobile internet.
- Centralised coordinator subscribes to odometer readings.
- Cars publish kilometres travelled at regular intervals.
- Schedule maintenance after $X$ kilometres travelled instead of fixed interval.
Service capabilities
Messaging (synchronous)

- Supports synchronous or asynchronous modes.
- Receiver may immediately confirm receipt of message.
- Or return non-committal message.
Service capabilities
Messaging (asynchronous)

- Supports synchronous or asynchronous modes.
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- Or return non-committal message.
Service capabilities
Subscription

- Registrar and target may be one.
- No central point of failure.
- Target may also indicate a group.
- Subscribe to notifications when
  - Node leaves a group.
  - Readings exceed threshold.
  - Geofencing.
Service capabilities
Notification

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- No central point of failure.
- Target may also indicate a group.
- Subscribe to notifications when
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  - Readings exceed threshold.
  - Geofencing.
- Notifications may be offloaded to registrar.
Open M2M API
Next steps

- Eurescom P1957 hopes to contribute to dialog to standardise a uniform enabling technology for M2M applications.

- A common interface around which independent software vendors (ISVs), device manufacturers and telecommunication providers can build solutions better serves industry than the very realistic possibility of a myriad of competing solutions.

- Paper: Open API for M2M applications with pervasive and asynchronous transactions.