EUROTECH
Imagine. Build. Succeed.

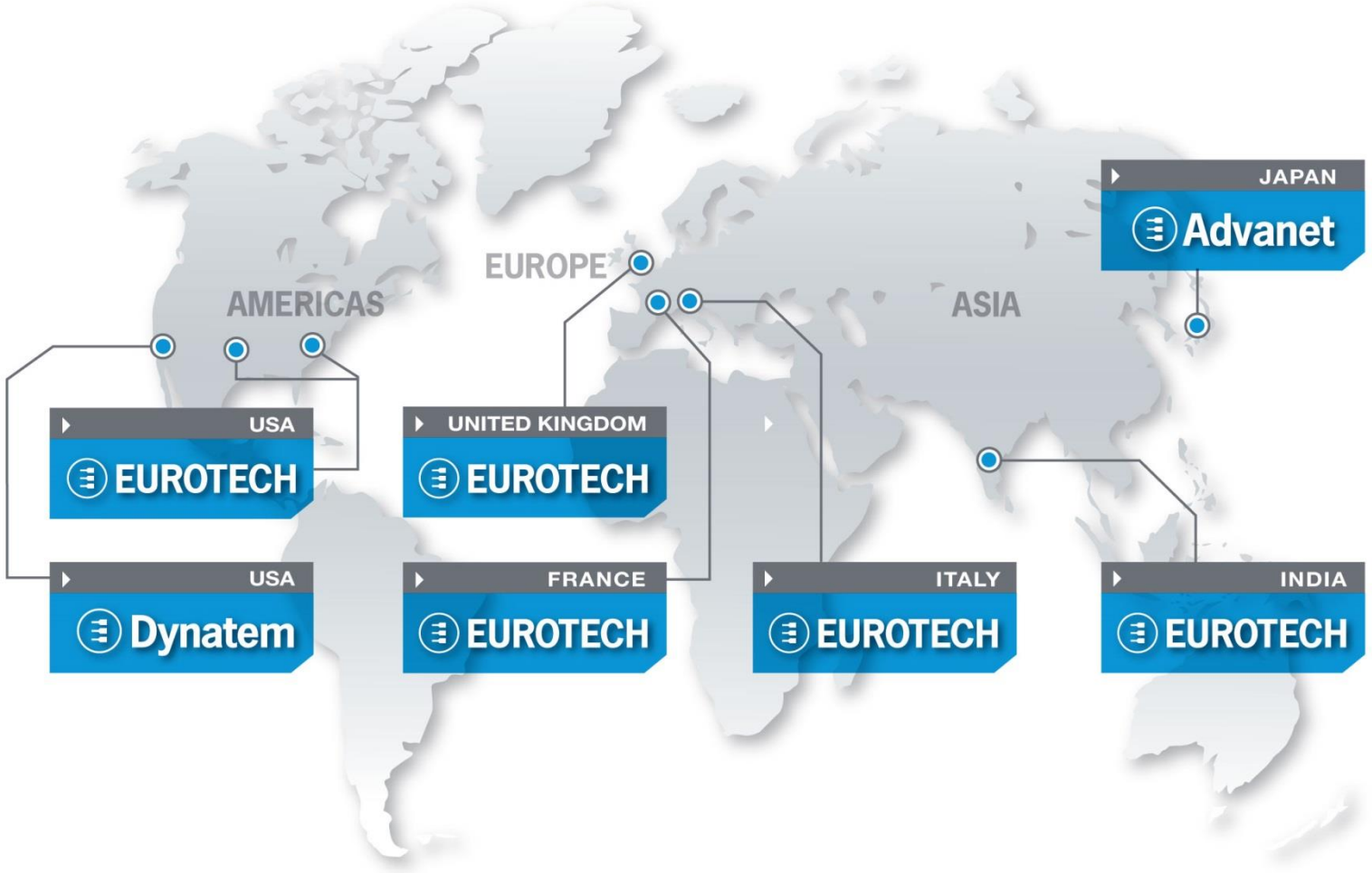
Real Use Cases where Eurotech applied KURA for businesses

Andrea Ceiner, November 2014

Eurotech's Essence

- **World top 10 player in the Embedded Computers market**
- **Behind the products of more than 20 Global 500**
- **One of two European producers of High Performance Computers**
- **Public Company, in the STAR segment of Italian Stock Exchange**
- **Core competences: Miniaturization & Interconnection of computing devices**
- **2 Strategic Business Units:**
  - NanoPC SBU: Pervasive Computing Devices & Device Data Management
  - HPC SBU: Green Petascale High Performance Computers
- **1 horizontal Line Of Business**
  - M2M & IoT Software Framework & Cloud Integration Platform

Eurotech Group Global Footprint



Business Model - Manufacturing Industry

Partners

- BIRT
- Pentaho
- Klipfolio
- WebRatio
- KURA
- PAHO
- others

Tasks

- Operative marketing
- Support
- Training
- Consulting on analytics, apps, portals
- Backoffice
- Account management
- Partner management

Resources

- EC, ESF, GW
- 3° party or outsourced mobile apps, portlets, olap, applications
- Marketing & Brand
- Support service
- Trainer,
- Administration
- Account Manager

- Direct Contact

Channel, Direct Contact, Salesforce

Value Proposition

- Retrofit & Reuse existing HW asset
- Real time monitoring ➔ improve customer service
- Device remote Maintenance & Diagnostics ➔ reduces opex
- Device use data metrics & analitics ➔ improve product quality
- Cost-effective (pay-as-you-go): no capex, low opex,
- Flexible business model PAAS
- Best time-to-market
- IoT Application enablement (API REST,WebSockets)
- IoT BI enablement
- Security ➔ VPN

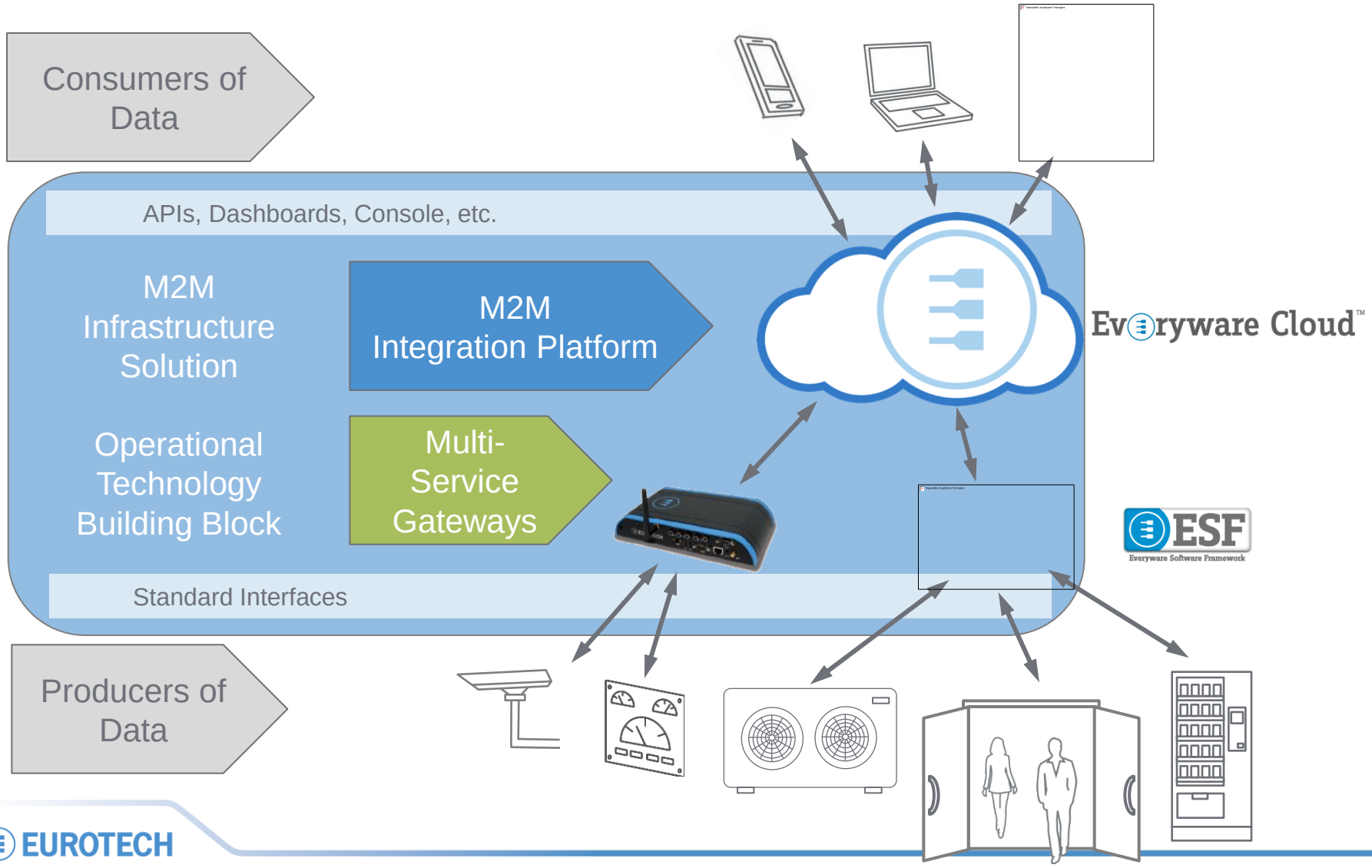
- Gateway asset sale or DeviceAsAService (DAAS)
- EDC Monthly Fee
- Professional Services Fees

Market Segment

manufacturing industry

The Internet of Things

Distributed Systems Architectural Overview

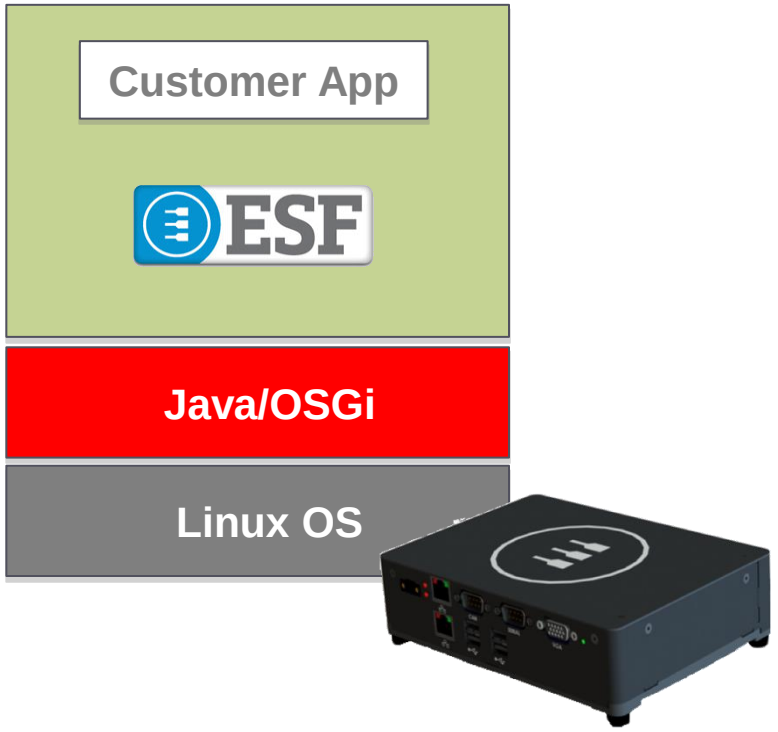


Everyware Software Framework (ESF)

What is ESF?

ESF is a **Java/OSGi-based Application Framework for M2M Service Gateways and Edge Nodes** that simplifies the design, deployment and remote management of embedded applications.

- Cohesive and integrated app environment
- Modular software components
- HW abstraction layer
- Field protocol libraries
- Cloud connectivity
- Remote app and device management
- Local app and device management
- Built-in Security
- Development tools



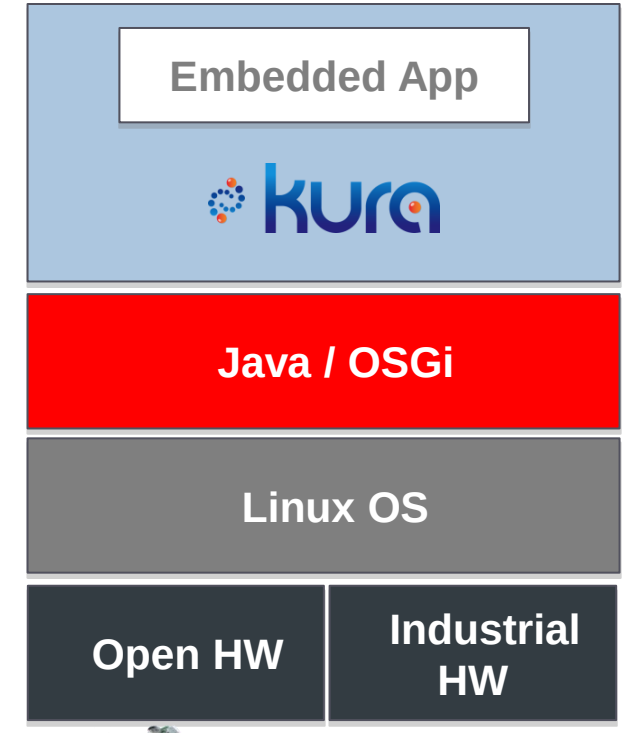
eclipse kura

Derived from ESF, Kura is an open source Java/OSGi-based Application Framework for M2M Gateways, part of the IoT Projects of the Eclipse Foundation

KURA

What is Kura?

- Modular software for IoT Gateway Service
- Manage cloud connectivity
- Network configuration and administration
- Support for different protocols
- Remote management and access
- Integrated development environment
- Application portability
- Open sourced in Eclipse IoT



Based on Kura, ESF is commercially supported, remotely managed, and optimized for industrial gateways and applications.

ESF vs Kura

What ESF offers beyond Kura

ESF is leveraging the Kura implementation, but adds some important elements :

- ESF is commercially supported by Eurotech and does contain a genuine Java VM (Oracle)
- Eurotech certifies a fully supported java/osgi/ESF stack; we do the release validation and testing on the Eurotech and other 3rd party devices
- On supported devices ESF comes pre-installed, configured and tuned
- A VPN service is available as a standard bundle of ESF. A VPN server is available as part of EC to provide on-demand VPN service between server-side app and devices.
- ESF contains more field protocols that are outside the scope of Kura
- ESF enables remote Device Diagnostics via Everyware Cloud
- ESF enables remote Device Provisioning (remote software upload) via Everyware Cloud
- ESF will include or be integrated with advanced app design tools like:
  Oracle Event Processing tool integrated
  BitReactive (they made a prototype on top of Kura)
- ESF can be integrated by Eurotech with 3° parties' (Eurotech partners) sw tools/platforms

ESF, KURA & Paho

What ESF & KURA offers beyond the Paho MQTT Client

ESF adopts the MQTT Paho implementation and adds some important features :

Data Services:

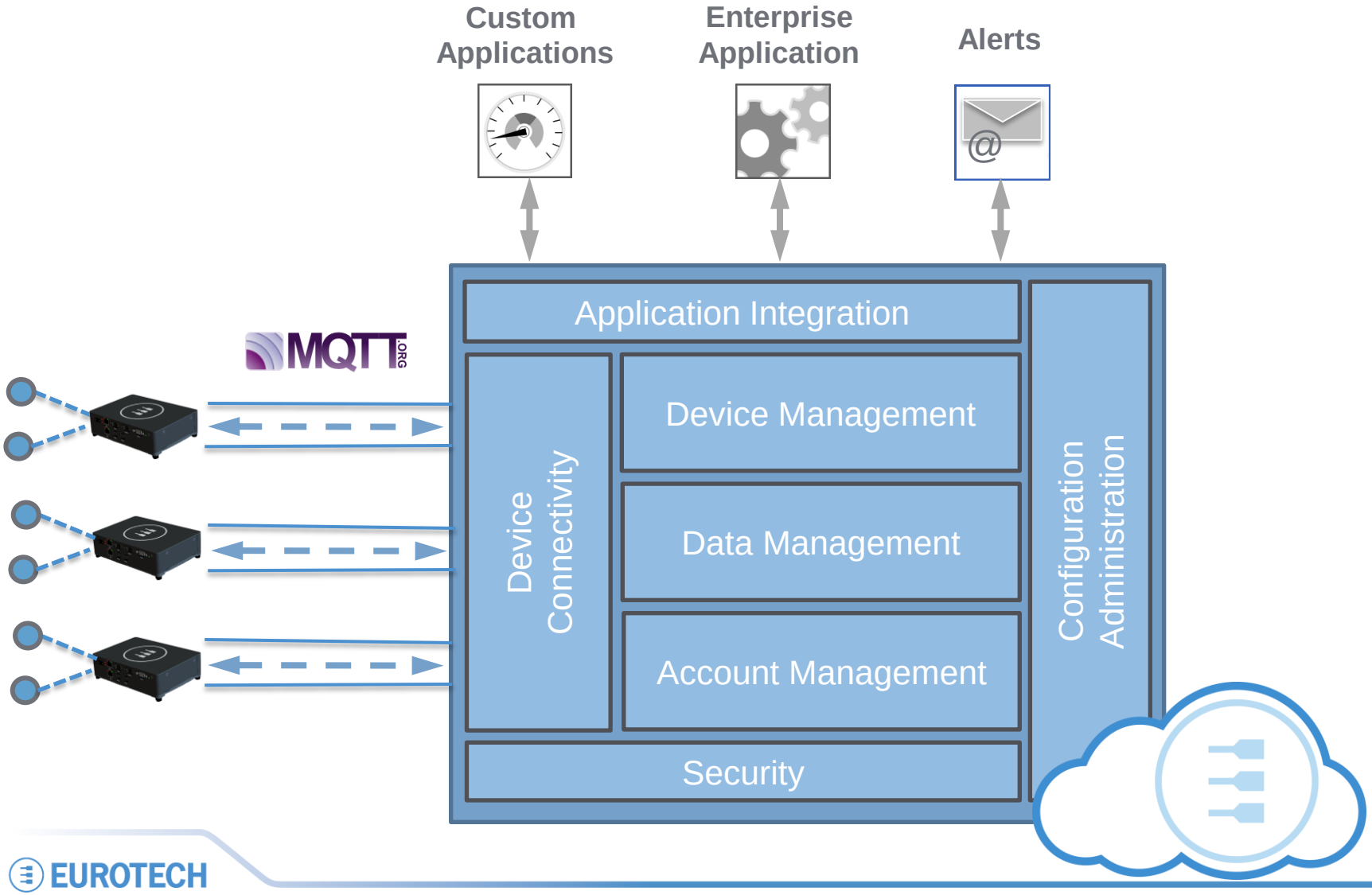
- Manages remote connectivity and reconnect policies
- Manages message queuing with priority
- Manages message store while disconnected and resume publishing on reconnects
- Operates on an abstracted transport protocol

Cloud Services:

- Data model for telemetry applications
- Topic partitioning across applications
- Compression
- Birth, Death & App certificates
- Request and Response message exchanges
- Simplified code for remote resource management

Everyware Cloud™

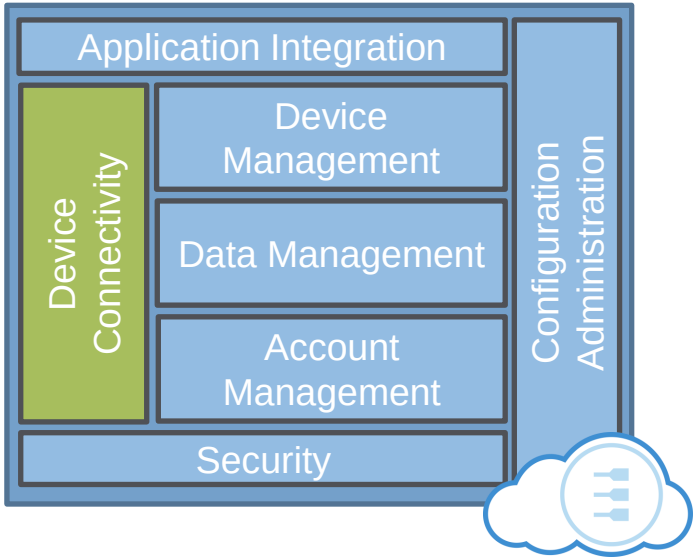
Functional Overview



Everyware Cloud ™

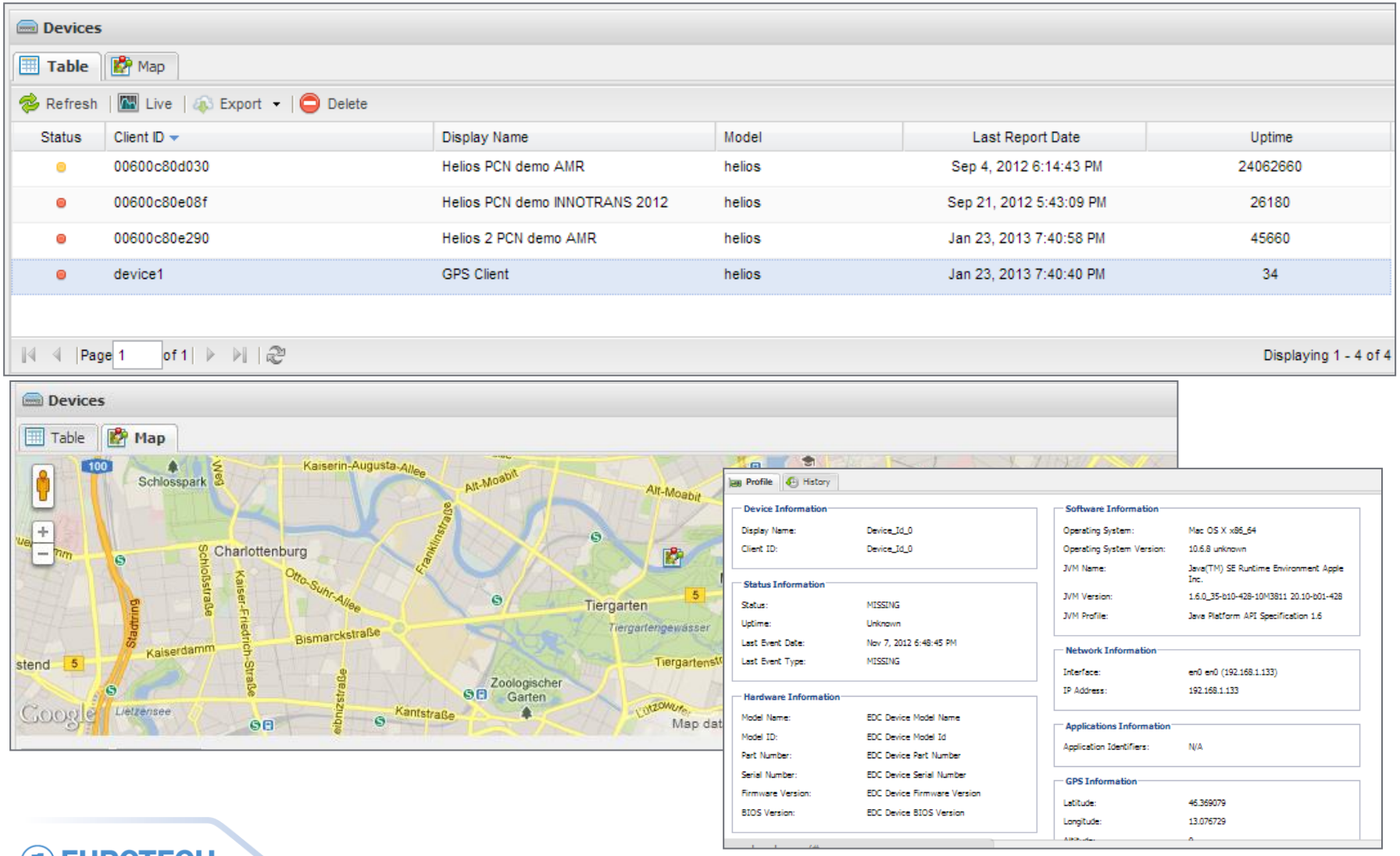
Device Connectivity

- Designed on the MQTT Protocol
- Secure with SSL and Authentication
- M2M Optimized
- Built-in Device Tracking
- Device Initiated Connection
- 2-way Communication
- Publish and Subscribe
- Hierarchical Namespaces
- Data Agnostic Payload
- Optional Eurotech Payload for M2M with Data Compression
- Java, C Implementations



Everyware Cloud ™

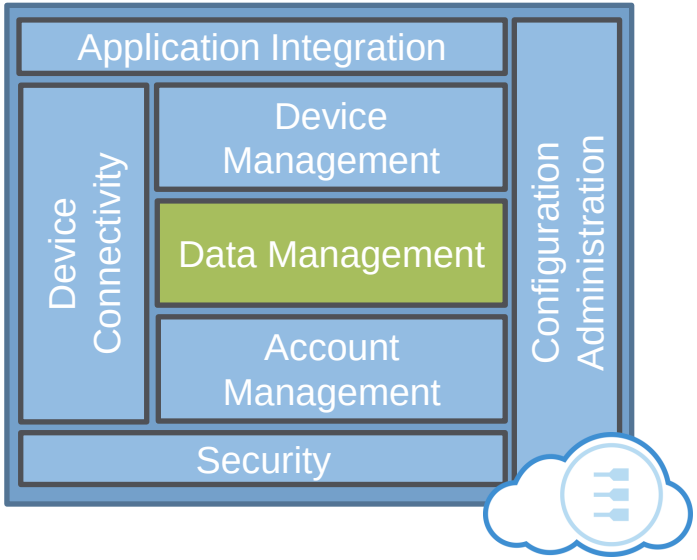
Device Connectivity



Everyware Cloud ™

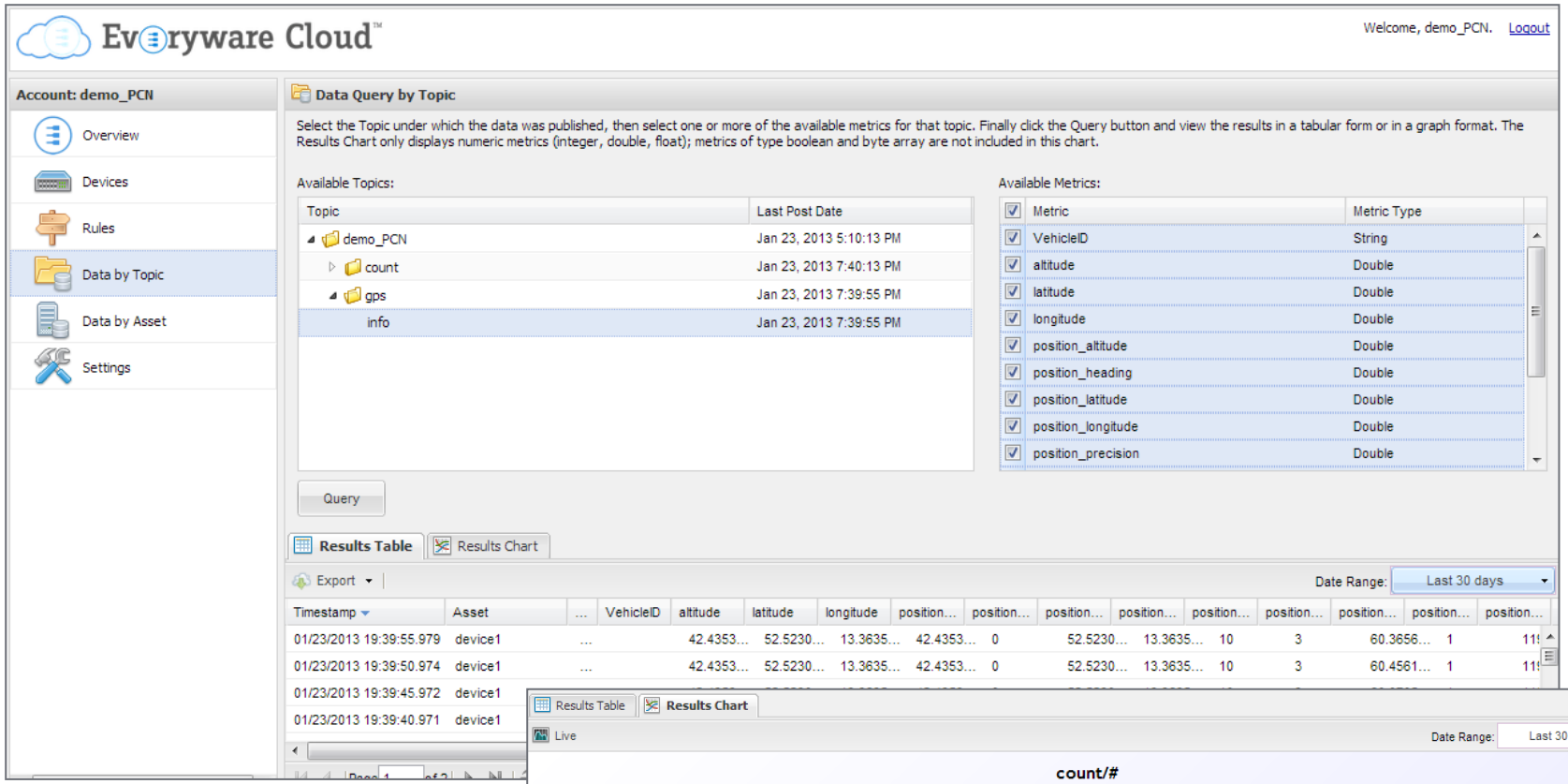
Data Management

- **Datastore**
  - NoSQL database optimized for large volume inserts
  - Redundant, Replicated, Highly Available
  - Data Discovery on Assets and Topics
  - Data Aggregation on Topics
  - Big Data Ready
- **Complex Event Processing Engine**
  - Continuous Queries for Real-Time Analytics
  - Declarative SQL-like language
  - Complex Statistical Operations
- **Triggers**
  - Alerts: SMS, Email, Twitter
  - Integration: MQTT, REST



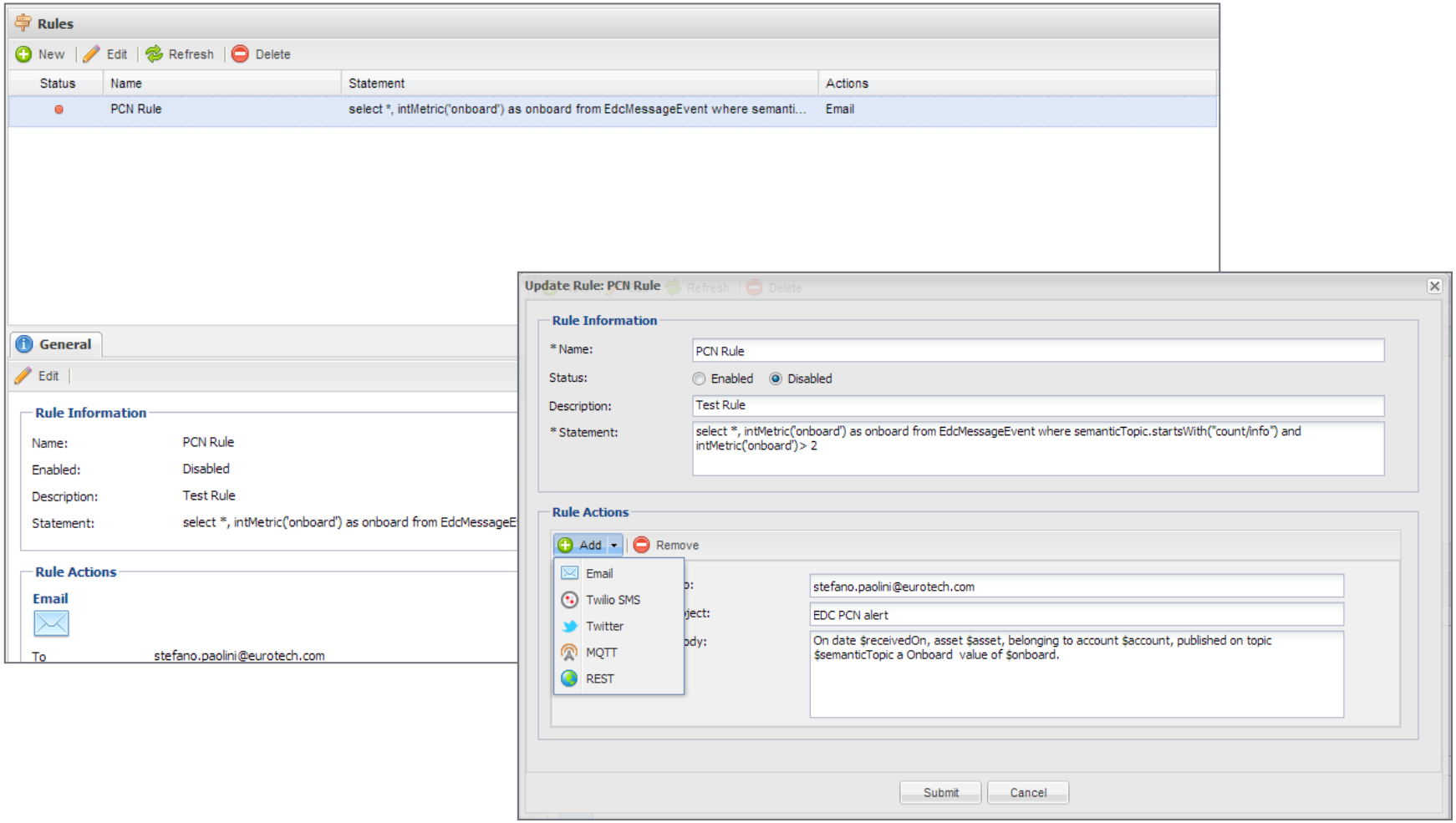
Everyware Cloud ™

Data Management



Everyware Cloud ™

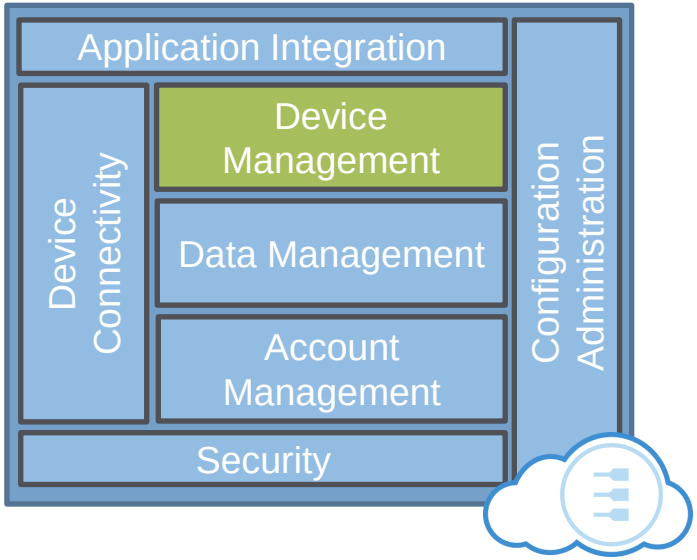
Data Management



Everyware Cloud ™

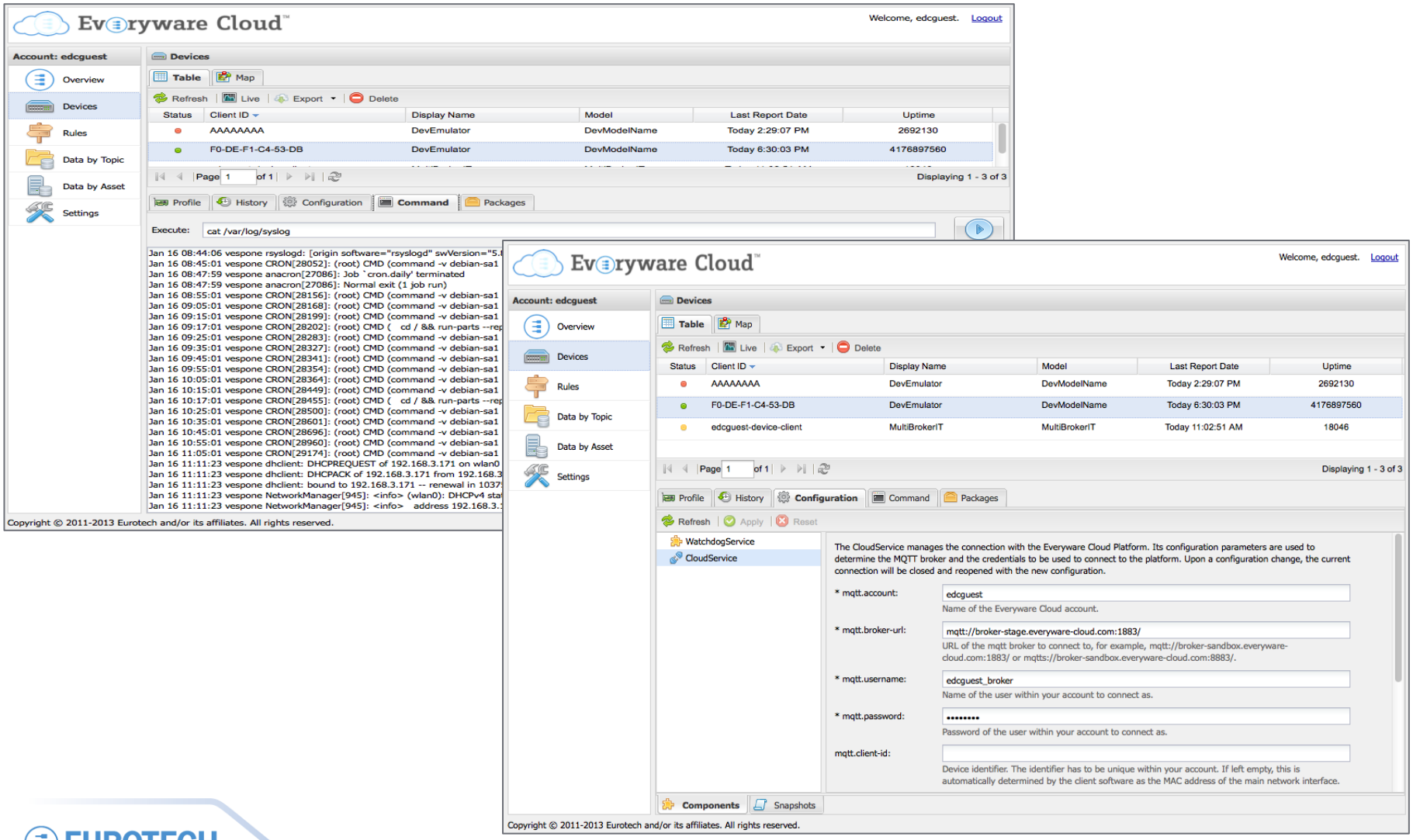
Device Management

- Laid over MQTT connection
- Real-Time Device/Connection Status
- Device Event Logging/History
- Device Profile and Localization
- Device Configuration
- Snapshots and Rollbacks
- Application Lifecycle Management (FW, App remote update)
- Device Access On-Demand VPN
- Remote OS Commands
- Based on OSGi Standard



Everyware Cloud ™

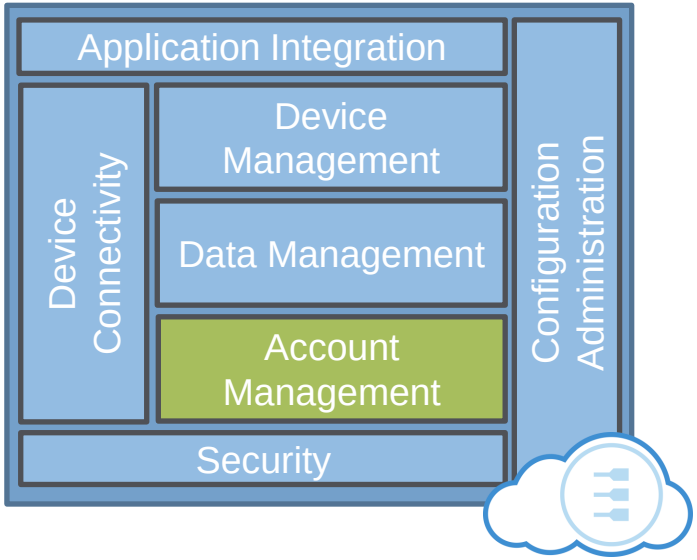
Device Management



Everyware Cloud ™

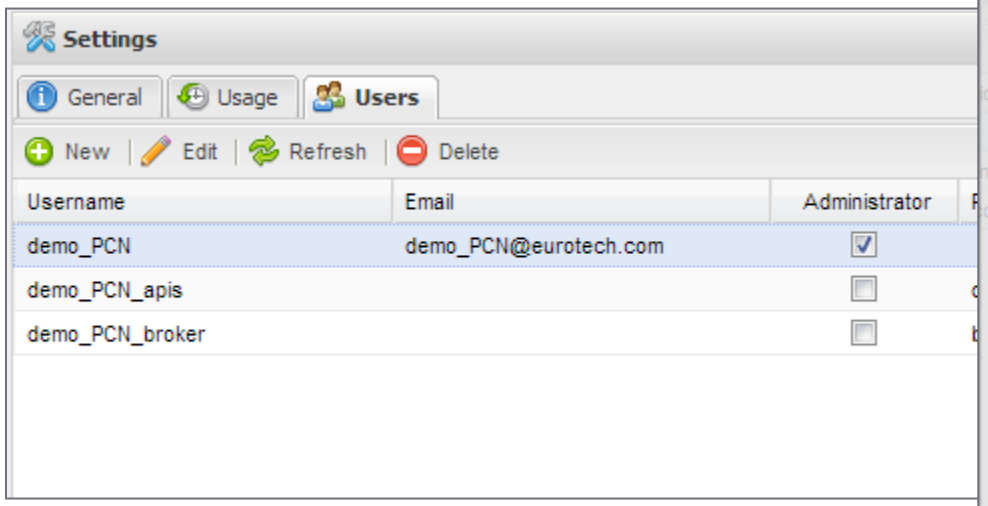
Account Management

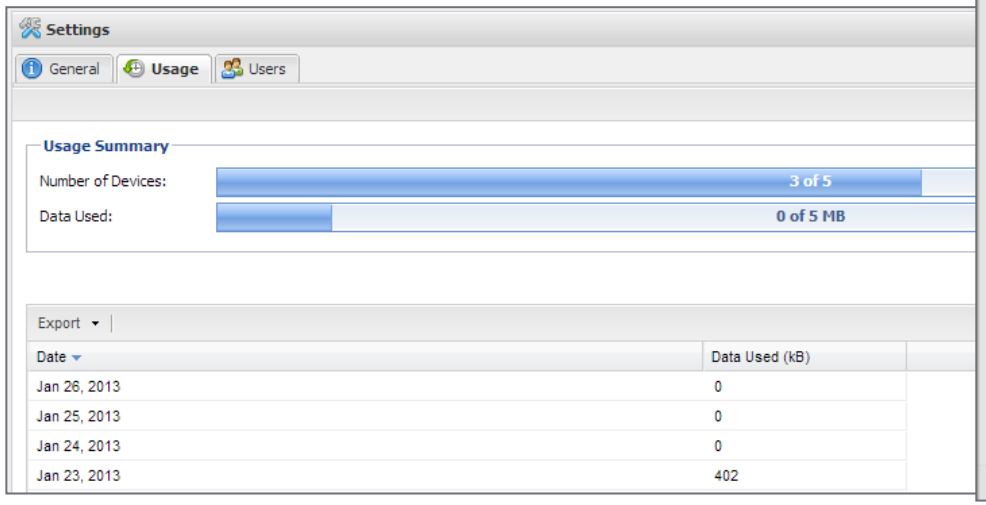
- Multi-Tenant Architecture
- Hierarchical Accounts
- Topic Partitioning for Messaging
- Data Segregation through Virtual Private Database
- Separate Execution Context for Complex Event Processing
- Service Plans
- Usage Tracking
- Automated Provisioning of new Tenants
- Management of Dedicated Instances in the Cloud

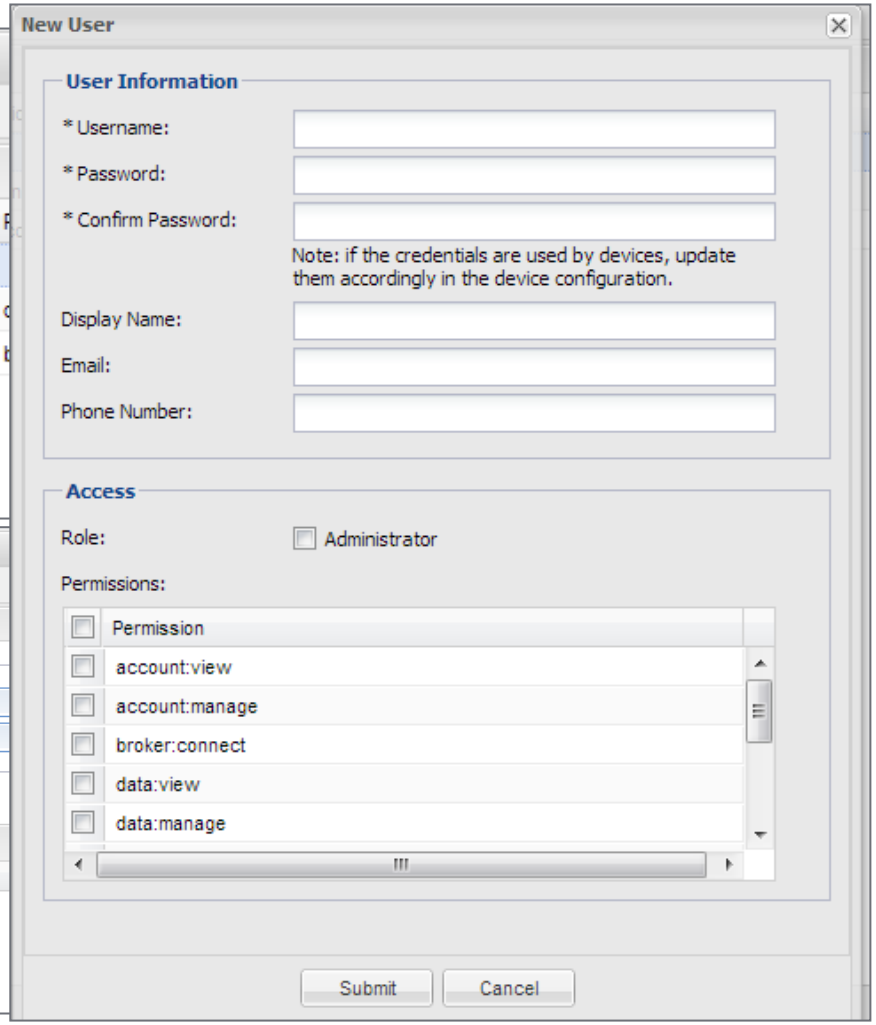


Everyware Cloud ™

Account Management



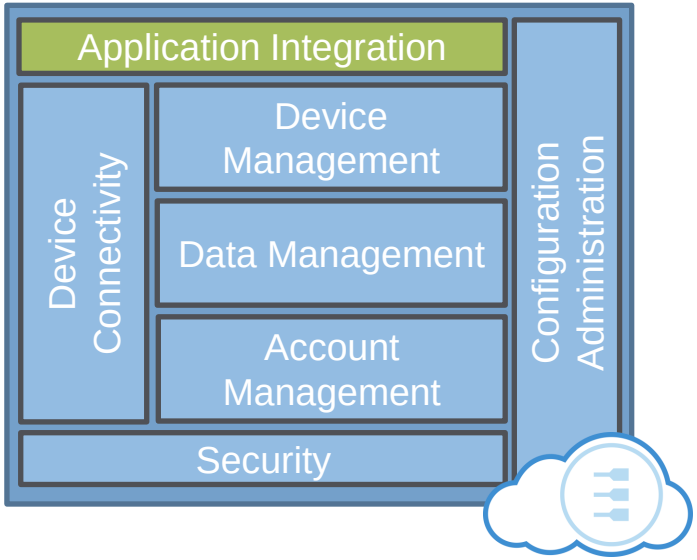




Everyware Cloud ™

Application Integration

- Easy to use REST APIs
- Encompass all platform functionality
- XML and JSON formats
- HTTP/MQTT Bridge for Device Control
- Real-Time REST/Comet APIs
- Google Chart Tools Native Support
- Extensive Documentation
- Complete sample code
- Rich Example Library



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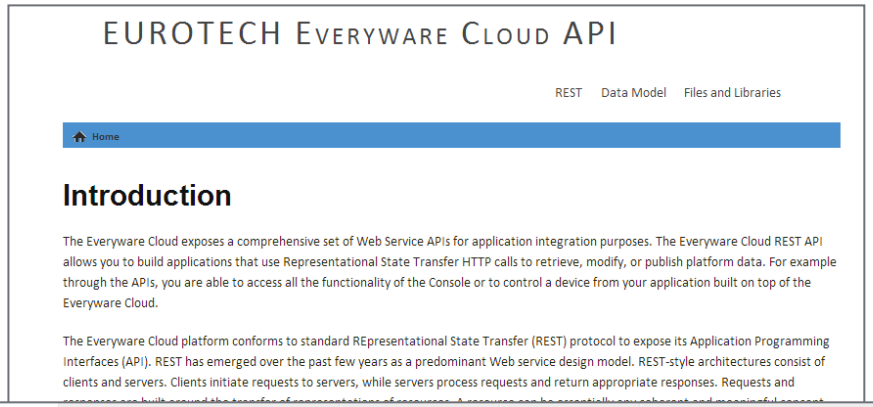
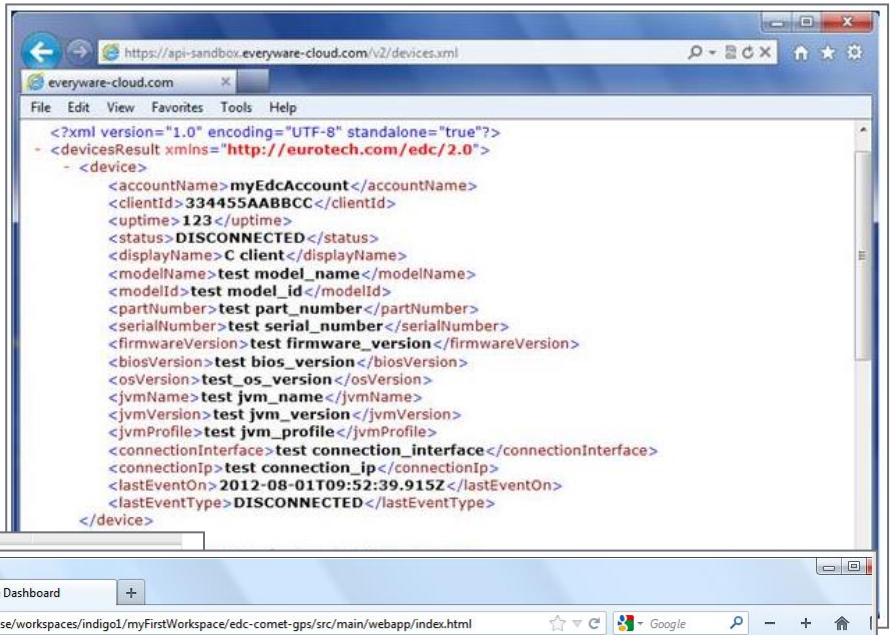
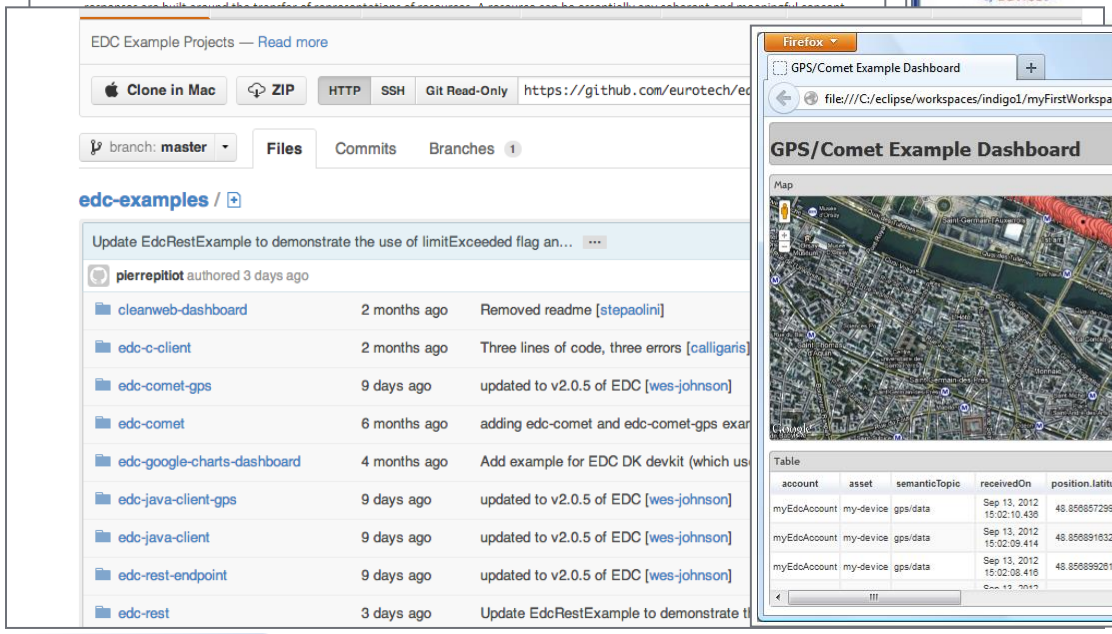
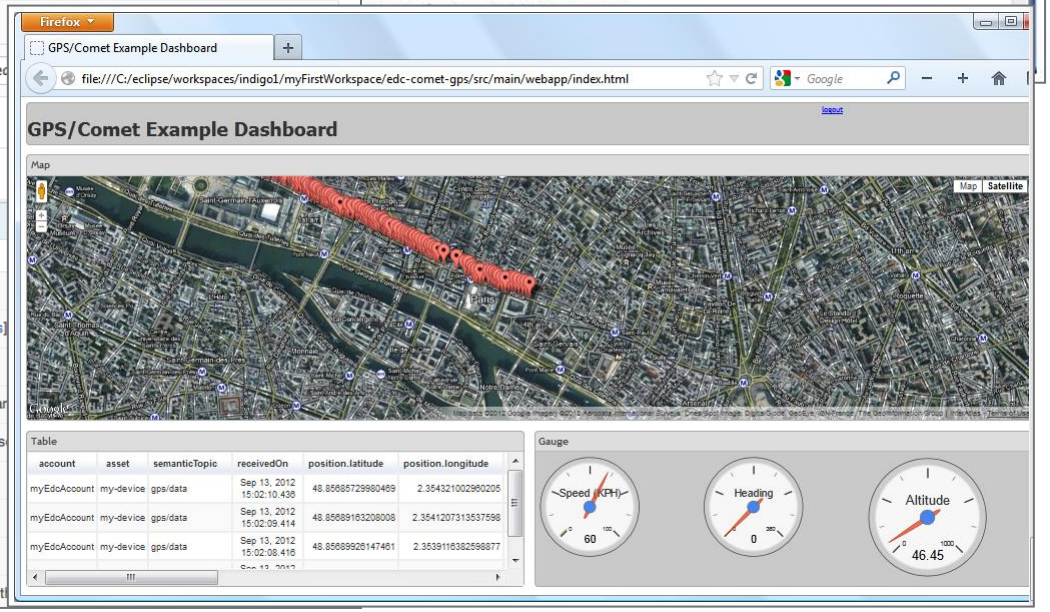
Application Integration





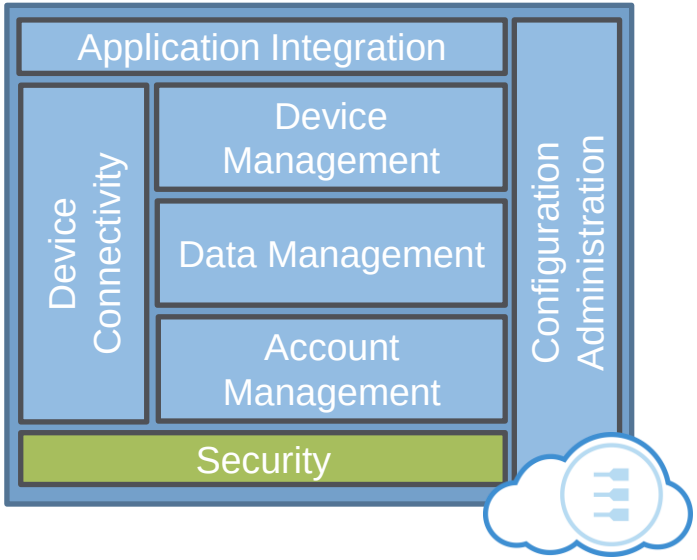




Everyware Cloud ™

Security

- **Access Control**
  - Centralized Access Control
  - Authentication via HTTPS and SSL
  - Role-Based Access Control
  - User Management
- **Data**
  - Tenant Isolation
- **Device Connectivity**
  - SSL with Authentication
  - Two firewalls in front of broker
- **Device Connectivity**
  - On-demand VPN Connections



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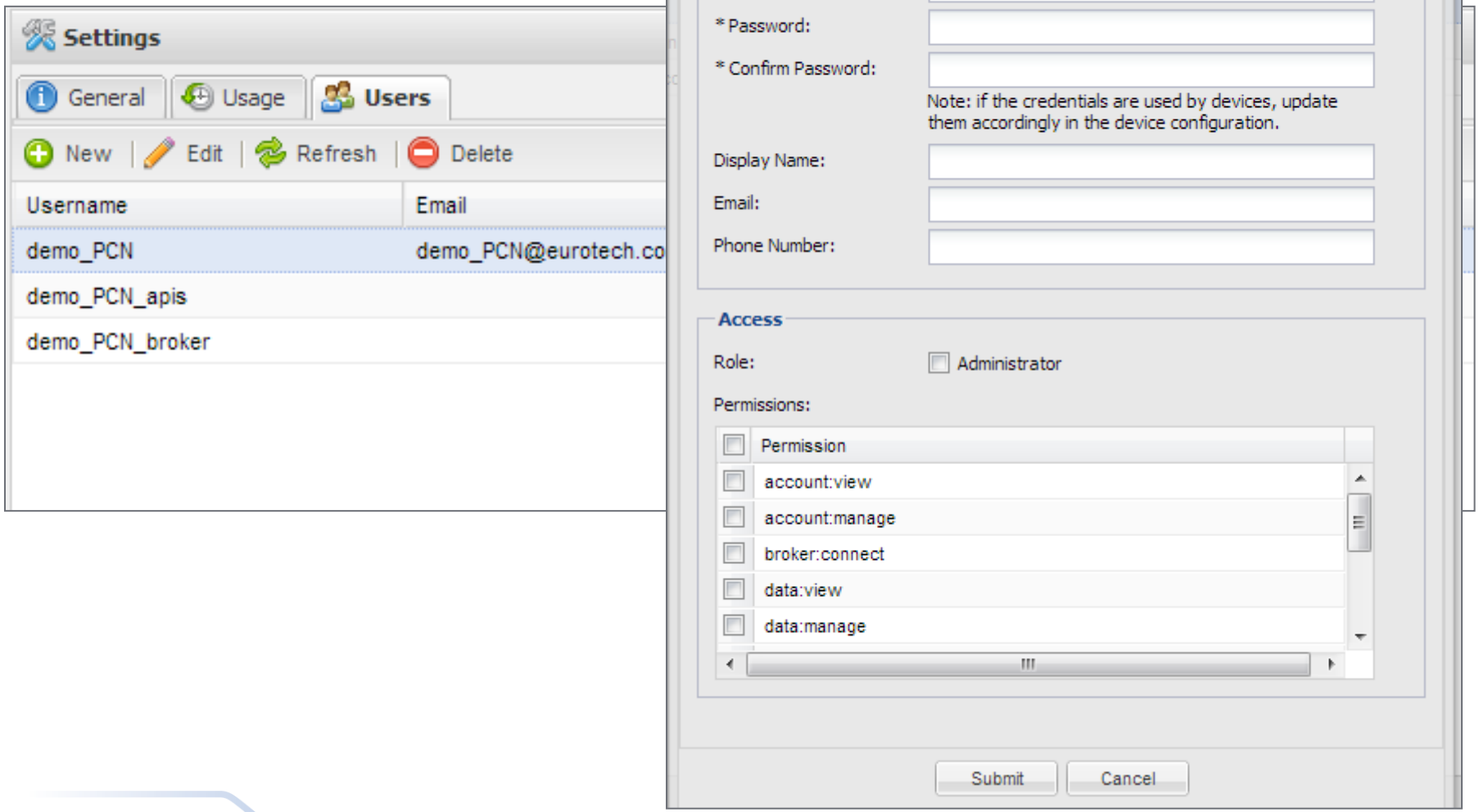
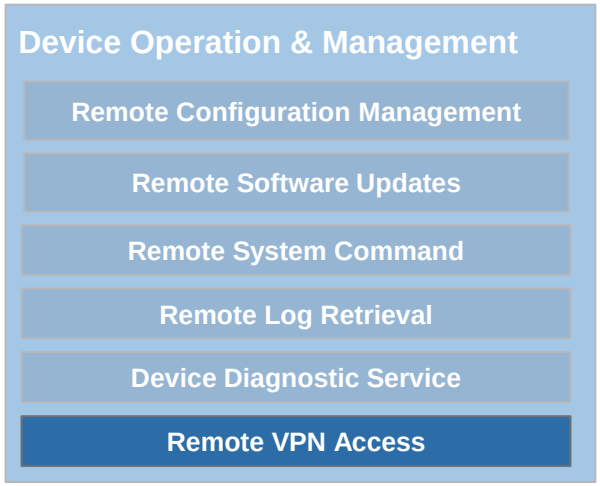
Security

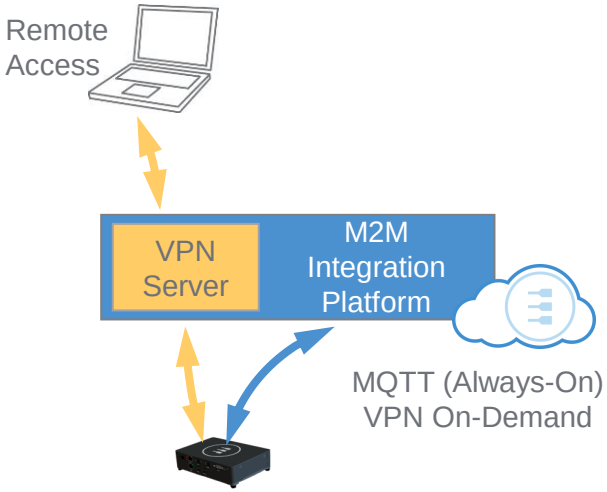


Everyware Cloud ™

Remote VPN Access

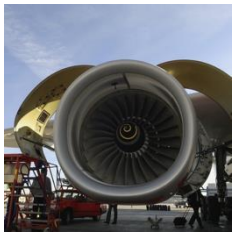
- Secure initiated transparent IP connection between remote systems and devices in the field
- Gateways behind firewalls can be reached
- No IP addressing conflicts prevent or complicate the establishment of connections
- Using the established MQTT channel for initiating the VPN connection to the remote device (openVPN)
- Requires ESF 2.x / Kura 1.x and the Everyware VPN Client on the device side





Use Cases – some real examples

Internet of Things & M2M Applications Everywhere…



Vertical Market Example Use Case

Use Case: Industrial Air Conditioning System Monitoring

Application:

The customer, a leading manufacturer of industrial grade air conditioning (chiller) systems was looking for a solution that would allow them to **monitor constantly the status of deployed Air Conditioning Chillers world wide**. The main data monitored in real time: **pressure, temperature, power consumption, efficiency**

Data transferred via different transports (3G, Ethernet, WiFi) using Internet connections in real time to operations (and R&D).

Product:

ReliaGATE 50-21

Key Factors:

- Short time to market due to EDC approach
- Modbus / PLC support in ESF
- Flexible powerful hardware platform
- Real Time telemetering data

Vertical Market Example Use Case

Use Case: Reverse Vending Machine

Application:

Reverse vending machine vendor needed a **rugged, reliable** communications **gateway** to **exchange data from remote** sites in harsh environments **with operations and maintenance centers**.

Adding EDC to the solution allowed the IT team to **eliminate plans to expand data center equipment**, power and space to manage and process increased data traffic.

Data streams enable new functions, such as one-to-one advertising.

Products:

Custom Gateway

HW / SW Development Services

Support

Key Success Factors:

- Short time to market for hardware
- EDC, offering real time data collection
- Lower Opex for device diagnostics and preventive maintenance
- improved Monitoring
- Rugged hardware to reduce maintenance costs
- Users preferences data analytics

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Vertical Market Example Use Case

Use Case: Retail Energy & Asset Management

Application:

The customer required a programmable Intel cellular platform for **monitoring of refrigeration units at grocery stores for energy and asset management application**.

ReliaGATE 50-21

Key Success Factors:

- Started with Helios… software portability by ESF
- Eurotech SW/HW knowledge and experience
- Flexible hardware platform
- Looking into EDC for long term data storage

Vertical Market Example Use Case

Use Case: Coffe Machines

Application:

The customer required a solution for **monitoring of consumption and user preferences** and **remote diagnostics** of their existing coffe machines sold worldwide.

ReliaGATE 50-21

Key Success Factors:

- ready-solution, fast time to market
- cost effective business model
- Real time data on user preferences to improve the product design (eliminating unused functions)
- Real time monitoring for better preventive maintenance
- worldwide footprint

Thank You!

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