SAP Leonardo Live
Not just another business conference

SAP: IoT Technology
All About Edges, Foundations, Bridges, and Services

July 12, 2017
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Our Plan for the Next 45 Minutes

Introduction to IoT Technology
- SAP Cloud Platform Internet of Things
- SAP IoT Application Enablement
- SAP Leonardo IoT Edge
- SAP Leonardo IoT Bridge
(15 Minutes)

Question-and-Answer Panel with Our Experts
(30 Minutes)
Your SAP experts in the room today

Sindhu Gangadharan

Thomas Kaiser

Merlin Yamssi

Elvira Wallis

Christoph Inauen
Overview

SAP Leonardo Internet of Things

Christoph Inauen
(15 minutes)
SAP Leonardo Internet of Things (IoT)

Physical world

SAP Leonardo IoT Edge

SAP Leonardo IoT capabilities

Applications powered by SAP Leonardo

SAP Leonardo IoT Foundation
- Technical services
- Business services
- IoT data management

SAP Cloud Platform

Integration services

Core (cloud)

Edge

Business system

Process integration

Data sharing

Business solutions from SAP
- Business applications
- Transactional data
- Master data
SAP Leonardo IoT Foundation and SAP Leonardo IoT Edge

Capabilities view

SAP Leonardo IoT Bridge

SAP Leonardo IoT Edge

SAP Edge Services

Device adapters

- Persistence service
- Streaming service
- Business transaction service
- Predictive analytics service*
- Machine learning service*
- Visual analytics service*

IoT business services

Thing services

UI content and event services

SAP Leonardo IoT Foundation

Administration services

Analytics services and APIs

Location services

Rules framework and machine learning*

IoT technical services

Event processing

Connectivity management*

Device management

Data management

SAP Cloud Platform

Security

Mobile

Data and storage

API business hub

DevOps

Collaboration

User experience

Integration

Analytics

*Planned innovation
SAP Cloud Platform
Internet of Things Services
Internet of Things
SAP Cloud Platform Internet of Things

Key capabilities
- IoT cockpit as the central UI for device management
- Support for receiving device data and sending commands to remote devices
- REST APIs for device modeling and data consumption
- Notification management (alerts/rules/events)
- Certificate-based onboarding and authentication of devices to IoT gateway (edge and cloud)
- Support for various gateway protocols (such as HTTP [REST], MQTT, CoAP, SNMP, ModBus, Zigbee, XMPP)
- SDK for development of custom protocol adapters and custom filters (interceptors) on IoT gateway edge
- Integration with SAP IoT Application Enablement
- Quick start using guidelines, tutorials, and code examples coming with the starter kit for the SAP Cloud Platform Internet of Things publicly available on GitHub

Read more:
SAP Cloud Platform IoT
SAP Cloud Platform
SAP IoT Application Enablement
Manage the digital twin
Thing data, hierarchies, time series, and events

**Thing hierarchies**
- Structure
- Hierarchy
- Relationships

**Thing data**
- Basic data
- Properties
- Status
- Documents and specifications

**Thing packages**
- Flexible usage in different applications
- Thing configurations

**Time series and events**
- Measurements
- Thresholds
- Error codes
- Alerts

SAP IoT Application Enablement includes microservices and reusable components providing business semantics to model physical devices and processes across different industries and IoT scenarios. This is the foundation for all IoT scenarios from SAP and the partner ecosystem.
The IoT developer experience is a set of tools, content, and knowledge helping customers and partners to build great apps faster.

**User interfaces**
- Web-based development environment
- IoT project templates and UI components
- Rules modeler
- KPI modeler

**Mash-up services**
- Web-based service composition environment
- Event and API-driven application flow modelling
- Rich selection of reusable process atoms

**Microservices**
- Thing model
- Business partner authorization
- Partner and customer’s own microservices
SAP Cloud Platform
SAP Edge Services
Drivers for edge computing

- Data volume/bandwidth capacity
- Intermittent connectivity
- Real-time decision making
The programming model for IoT is shifting from being cloud-centric to a distributed edge-cloud model. IoT data will be stored, processed, analyzed, and acted upon at the edge.

**SAP Edge Services**

- **Persistence service** – locally store IoT data on IoT gateways
- **Streaming service** – analyze IoT data streams, finding exceptions and patterns in incoming IoT data stream and creating events and alerts
- **Business essential services** – execute business processes at the edge to provide continuity for critical business functions even when the edge is disconnected from the core (plant maintenance, inventory/materials management)
- **Predictive service** – use predictive models for analyzing IoT data. The predictive algorithm is trained in the core based on all available data. The resulting predictive model is then sent to the edge and applied there.
- **Machine learning service** – apply machine learning algorithms at the edge specifically for image and video analysis
- **Visual analytics service** – explore visually IoT data stored on IoT gateways. IoT data analysts can visually inspect the data collected at the edge.
- **Device adaptors** – data format conversion across a multitude of IoT device protocols; secure data transmission with SAP Cloud Platform
SAP Cloud Platform
SAP Leonardo IoT Bridge
SAP Leonardo IoT Bridge

“SAP Leonardo IoT Bridge brings your business operations together into a single collaborative work environment for people, things, and business processes, leveraging the Internet of Things.”
Scenario – outbound logistics
Overview page

Scenarios
Value chain collaboration

Personas
Empowered users

Cards
Situational assessment

Services
Insight to all available data

Events/Notifications
Preventative capabilities

Resolution support
Prescriptive guidance