High-Speed, Low-Risk Market Launch of New Digital Services with SAP IoT Application Enablement

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Build Your IoT Application on SAP Leonardo
SAP Leonardo brings intelligent technologies into business processes to achieve breakthrough results

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SAP Leonardo IoT Foundation
The Foundation for Digital Innovations

SAP Leonardo IoT Bridge

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SAP Leonardo IoT Edge

Technical Services

Device management
Connectivity
Messaging

Data Management

Aggregate store
Times series store
Data archive

Business Services

Thing model (SAP Digital Twin)
Application development
Reuse UI and APIs

*Planned Service

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Connect IoT Devices with SAP IoT Services

The SAP Cloud Platform Internet of Things can be used to connect devices to the SAP Cloud Platform in order to use data from these devices in applications.

Lifecycle management at scale for IoT devices from onboarding to decommissioning.

Securely connect to remote devices over a broad variety of IoT protocols.

Collect and process sensor data at scale already at the edge or in the cloud and store it on SAP HANA Cloud Platform for use by other applications.

Read more: SAP Cloud Platform IoT
Enable to create the Digital Twin with using the Thing Modeler

Business semantics to realize the digital twin across different industries and IoT scenarios. The foundation for all IoT scenarios from SAP and the partner ecosystem.
Enable applications with automated, dynamic big data time series storage

Warm storage

Short term: Cassandra, midterm: SAP DataHub (VORA)
Individual data points of time-series data
High-performance access on single objects and updates possible
Retention period: multiple months

Cold storage
Object storage (SWIFT)
Individual data points of time-series data
High-latency access
Retention period: multiple years

Hot storage

SAP HANA for time aggregates, that is, AVG, MAX, MIN, etc. over 120-second intervals, hours, days, weeks
Covers majority of visualization and reporting needs (that is, dashboard, multiday charts, and so on)
High-performance, flexible selections with full SQL
IoT Sensor Data Flow & Storage – Runtime Application Architecture

Device Connectivity and Management

Ingestion Pipeline
- Conversions & calculated values
- Derived events
- Derived KPI’s
- Derived events based on KPI’s

Message Broker Kafka

Transformations Spark Job

IoT Applications
- Event Service
- Thing Data Service

Big Data Store
- Cold Store S3/Swift
- Warm Store Cassandra
- Hot Store HANA
- Vora

*for rules creation based on raw data
IoT Developer Experience
Set of tools, content and knowledge helping customers and partners to build great apps faster

UI Development
- Web-based development environment
- Storyboards as rapid development perspective
- IoT project templates and UI components
- Thing modeler, rules modeler*, KPI modeler and tenant management

Mash-up Services
- API composition: Data collection for user interfaces (REST/ODATA)
- Business Logic: Process automation with event and API-driven application flows

Application Services
- Thing model as central service for business semantics
- Business partner authorization
- Partner and customer’s own micro services

* Future scope
Developer Experience

Model
Business Semantics

- Thing Modeler & Device Mapping
- Tenant Admin
- KPI & Analytics Modeler
- Rules Modeler*

Develop
Applications using
SAP Web IDE

- IoT Application Templates
- Storyboard Perspective
- Development Perspective
- Business Logic Development (Java and Node.js)*

Deploy & Run
on
SAP Cloud Platform

- Deploy Multi-Target Applications
- Cloud Cockpit
- Portal Services
- Analytics Runtime Services

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* Future Scope
SAP Web IDE
For full-stack multi-cloud application development

Rapid app development by professional developers (high control)

Supports SAP technologies (Fiori, IoT, big data, HANA, CDS, OData, ... ) and open-source (JS, Node.js, Java)

Full-stack (database to UI) design, development and deployment

Zero administration cloud-based tools
Storyboards for rapid development
A new Rapid Development Perspective in the SAP Web IDE

- Freely definable page layout with horizontal and vertical sections
- Drag & Drop of Smart Controls with WYSIWYG capabilities
- UI control library for IoT including geo maps, thing lists, thing card, event lists, sensor charts and embedded analytics
- Data binding easily configured via a dialog
- Interaction configuration for events and actions via a dialog
- Live connection to data and live preview
- Deploy multi-target-applications on SAP Cloud Platform as Cloud Foundry App
IoT Application Template

- **Wizard-based** approach for creating customized basic IoT applications
- Code-free app development with a zero learning curve
- Simple way to connect to the SAP backend services from IoT Application Enablement
- Template uses a **standard UI control library for IoT** including geo maps, thing lists, thing card, event lists, sensor charts and embedded analytics
- Live connection to data and **live preview**
- Generated app can be directly **deployed** or **customized** with UI controls in the UI5 development editor
Embedded Analytics Controls (Smart Business)

Include embedded analytics controls in your application as KPI visualization or charts by drag & drop

- Analytics Modeler Apps allow simply creation of analytical content for thing model time series data aggregations
- KPIs Tiles with a rich selection of different visualizations
  - Numeric Tile
  - Deviation Tile
  - Comparison Tile
  - Harvey Ball Tile
  - Donut Tile
  - ...
- KPI Chart as detailed drill down on measures and dimensions with multiple chart types
  - Bar
  - Column
  - Heat Map
  - Line
  - Geo Map
  - ...
Videos of the Rapid Deployment Perspective
Showing all functions and features

Overview on the Rapid Deployment Perspective [Link]

Part 1 – How to start building an IoT Application with the new Freestyle IoT Application template [Link]
Part 2 – How to build an IoT Application with the new Freestyle IoT Application template [Link]

Embedded Analytics
How can I use embedded analytics with the SAP Leonardo IoT Platform? [Link]
What are the prerequisites for using embedded analytics within my IoT application? [Link]
How do I model my “thing” for embedded analytics? [Link]
How do I define an evaluation to select data for my embedded analytics? [Link]
How can I configure analytical visualization with a WYSIWYG editor? [Link]
How do I rapidly build IoT applications with embedded analytics in the SAP Web IDE? [Link]

Multipage Video
See how to develop a MultiPage IoT application to view a list of things and their sensor data. [Link]

Link to the entire playlist
Benefits of SAP Leonardo IoT Foundation

Best-in-class IoT Platform
- Edge Services
- Technical Services
- Data Management
- Business Services

Integrated with Business Applications
- Automate business processes
- Enable new business models
- Improve customer interaction

Open Ecosystem
- Multiple deployment options on different datacenters
- Partner developed apps
- Build your own ecosystem
Integrated Business Applications: Example Asset Central

Create the **digital twin** and **consume the sensor data** in Asset Central by plugging in the equipment.

Publishing an equipment in Asset Central automatically creates and synchronize respective objects in IoT AE and IoT Cloud Platform IoT Services 4.0.

**Future Scope:** Automatic object creation in ERP Plant Maintenance.
Takeaways for planning your IoT solution

Think big
IoT drives the digital transformation of all things – all things will transmit digital information to store and process
Connect things to IT – and to business processes and people to achieve business outcome

Start small
Select a viable use case with fast return on investment (12-18 months)
Build on SAP’s packaged IoT applications and extend for differentiating business value

Scale fast
Learn from early insights and automate as you expand
Big data architectures are prerequisite – build your solution in the cloud to scale fast, process data at the edge