public

IoT & I4.0 - From Things to Outcomes

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SIT Hamburg
June 2016

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SAP INSIDE TRACK 2016
Hamburg - 11 June

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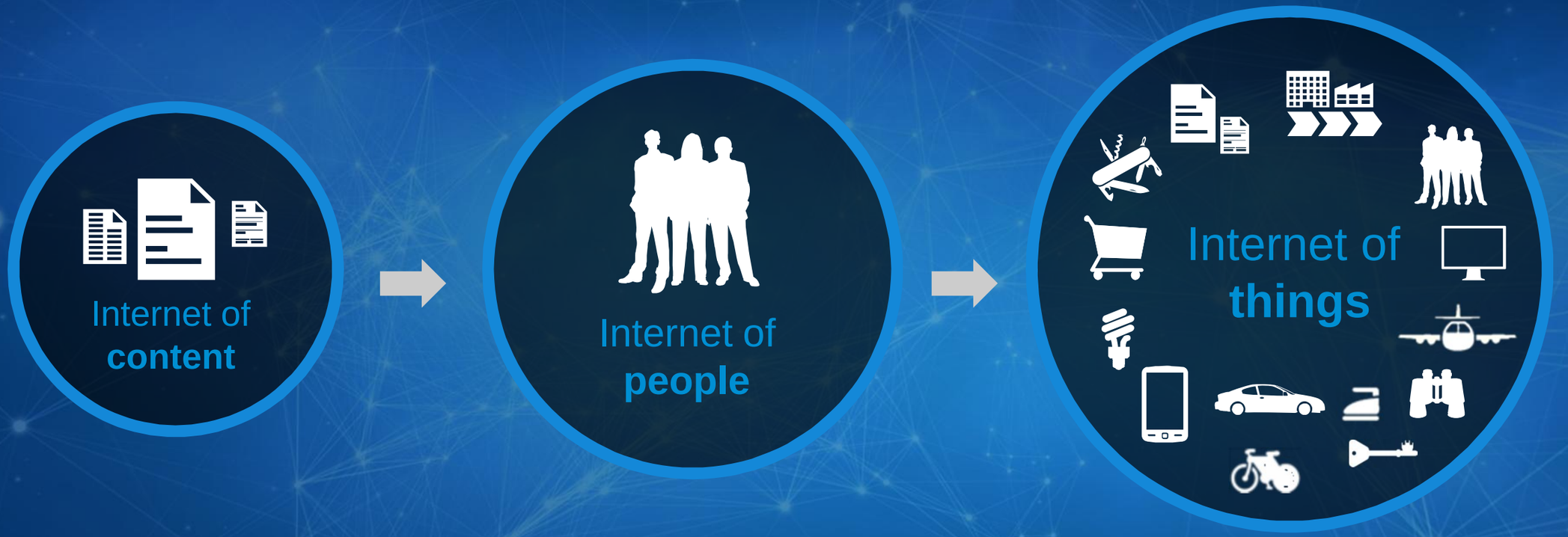
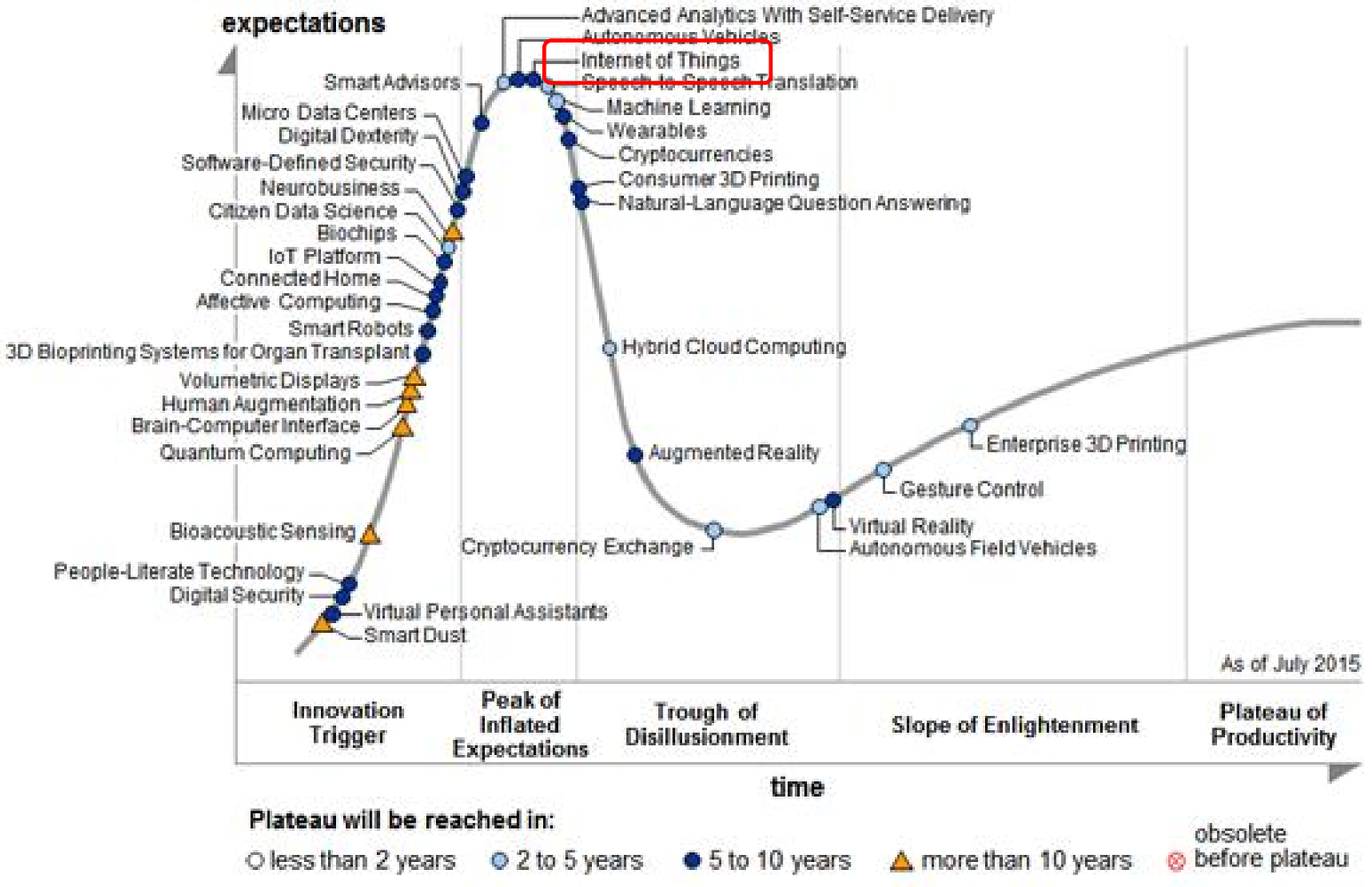
Internet is connecting... information, people, and things



…and IoT inflates expectations :)



http://www.gartner.com/newsroom/id/3114217

Have you heard of “Real-time Awareness”?

or “Smart Items”?

www.rfidjournal.com/articles/view?2121/

URNAL Search RFID Journal

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EVENTS

RFID Lands at Frankfurt Airport

After placing passive tags on such things as fire shutters, emergency lights and even passenger lounges, Fraport has significantly improved the productivity and accuracy of its maintenance operations.

By Jonathan Collins

PDF | Email | Print | Definitions | Save Article

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Feb 06, 2005—In November 2003, Fraport, the German company that owns and operates Frankfurt Airport, started testing RFID to help manage the airport's operations. Less than a year later, when its partner in the enterprise, ERP software giant SAP, publicized the success of the project, the deployment became a very public model for using RFID in facilities management.

Three years later, after installing many tens of thousands more RFID tags, the company has seen significant benefits from its use of RFID. However, it still has reservations about the limits of the technology's usefulness.

Project: Smart Vending Center

SAP RESEARCH

Objectives
- Integrate vending machines into business process
- Provide platform for low-risk RoI analysis
- Gain experience from real world

Photo: Harting

Application Areas
- (Near) real-time and predicted inventory
- Advanced Data Analysis
- Remote Management
- Remote Monitoring
- Cash Accounting

Current Partners
- Harting Vending GmbH
- Lantec AG
- M-Lab
- TecO

Running Prototypes
- Cigarettes (Dietz)
- Prepaid phone cards (Baumann)
- Cafeteria accounting (SAP)

THE BEST-RUN BUSINESSES RUN SAP

Smart Items Research

Thomas Odenwald
Research Program Manager
SAP Research, RC Palo Alto

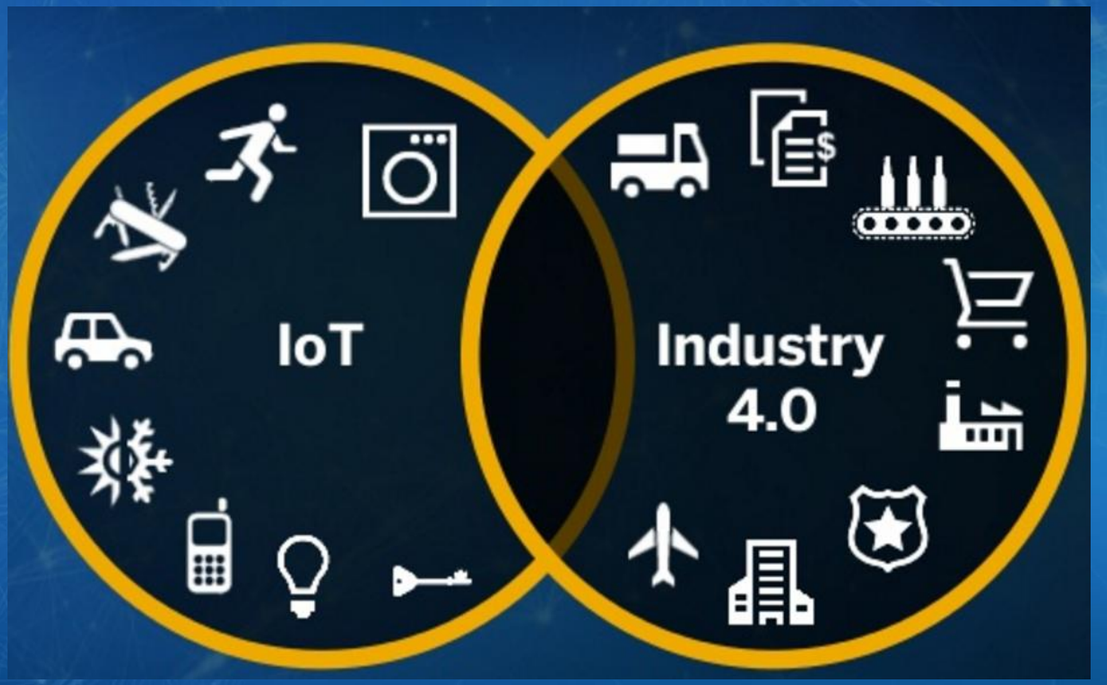
THE BEST-RUN BUSINESSES RUN SAP

IoT and Industry 4.0

"Internet of Things" ← Smart Devices, Personal Area Networks

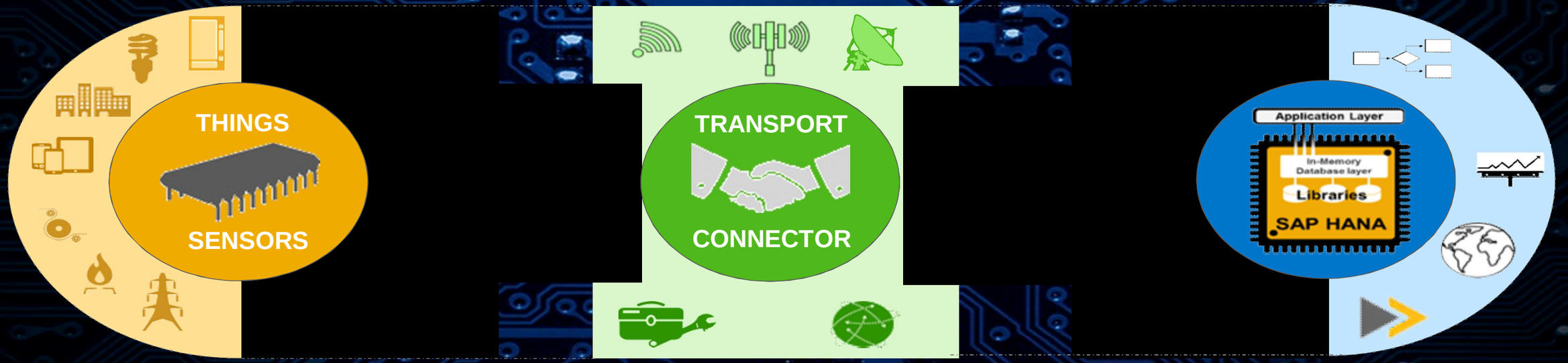
Industrial Automation → "Industrial Internet" / Industry 4.0

Internet of Things represents the opportunity available to companies in leveraging smart, connected, devices in building, distributing, and managing their products and services for customers



Industry 4.0 represents the opportunity for manufacturing businesses to reinvent their processes by leveraging a confluence of new technologies in the process of building their products

Deconstructing the Internet of Things



10’s of billions of connected things

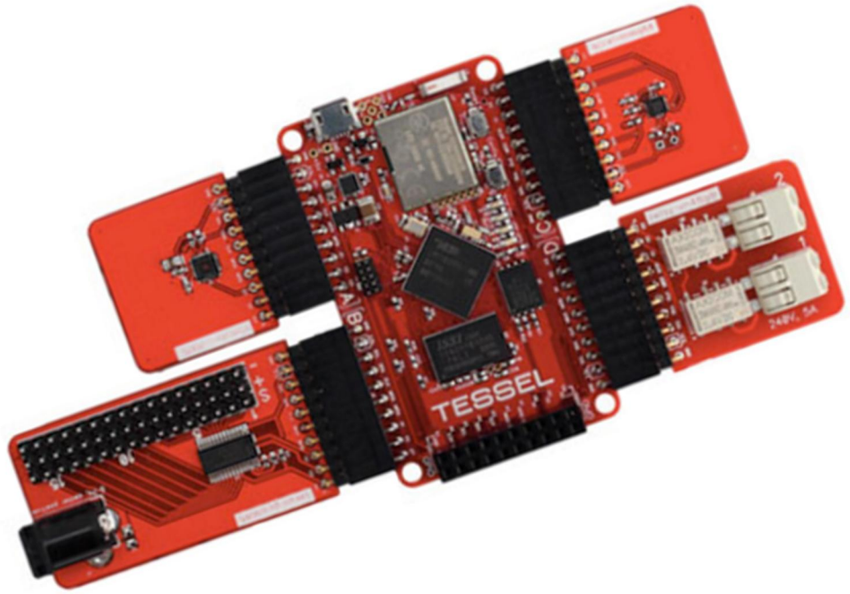
Private and public networks

High-performance compute infrastructure

Mobile Devices for IoT

Technical Characteristics of IoT Mobile Devices

- Connectivity module
- At least one interaction (input / output)
- Integrated program logic for forwarding data
- (Display & keyboard is optional)



Business Characteristics of IoT Mobile Devices

- Is must be cheap
- It should be easy to install
- and it has to be maintenance free

```
LOG   → node_modules/climate-si7005/index.js (5.67 KB)
LOG   → node_modules/climate-si7005/package.json (3.37
LOG   → test.js (0 bytes)
LOG   → wifi.js (772 bytes)
LOG Total file size: 21.51 KB
Bundling directory /Users/timryan/examples (~21.51 KB
Deploying bundle (46.50 KB)...
Running script...
Starting up si7005... on port bank A
Connected to si7005
Degrees: 82.7938F Humidity: 22.3719%RH
Degrees: 82.7375F Humidity: 22.1150%RH
Degrees: 82.7938F Humidity: 22.2223%RH
```

http://start.tessel.io/modules/climate

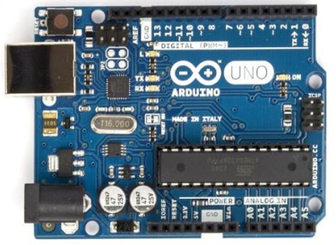
IoT Hardware prototyping platforms

An electronics board and associated software for easily connecting electronics to software and the Cloud.

How they differ from “professional” electronics development kits:

- Self-contained
- Cheap
- Easy to program and extend
- Very often under Open Source and/or Open Hardware license
- Strong online community for learning and support
- Focus on easy onboarding for non-experts
- Strong success in hobbyist / maker / education areas

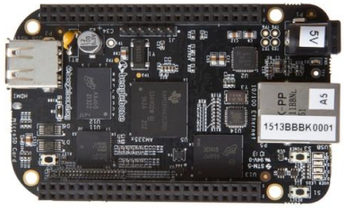
There are new boards popping up every week. Here we focus on the most popular boards with the largest online communities.



Arduino Uno

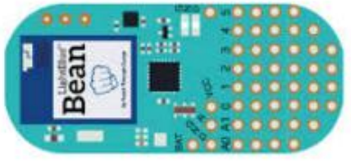

Raspberry Pi 2

Arduino Yun



BeagleBone Black

ESP 8266



LightBlue Bean

You all have a Thing in your Pocket!

… and you can play a sensor for IoT

What is Needed for IoT Business?

Business Model

- Finding the correct devices and data connections for optimized workflows and cost savings

Cloud Operations

- Open access 24x7 secure and accessible compute infrastructure capable to connect the devices and store big data

Powerful REALTIME Platform

- Technical infrastructure for data storage, processing, orchestration and outbound connections to other business systems (ERP, CRM, BI)

IoT from edge to engagement

Connect with intelligence on the edge

Monitor assets and send alerts

Connect to people and things

Data acquisition

Transform business operations

Cloud Platform

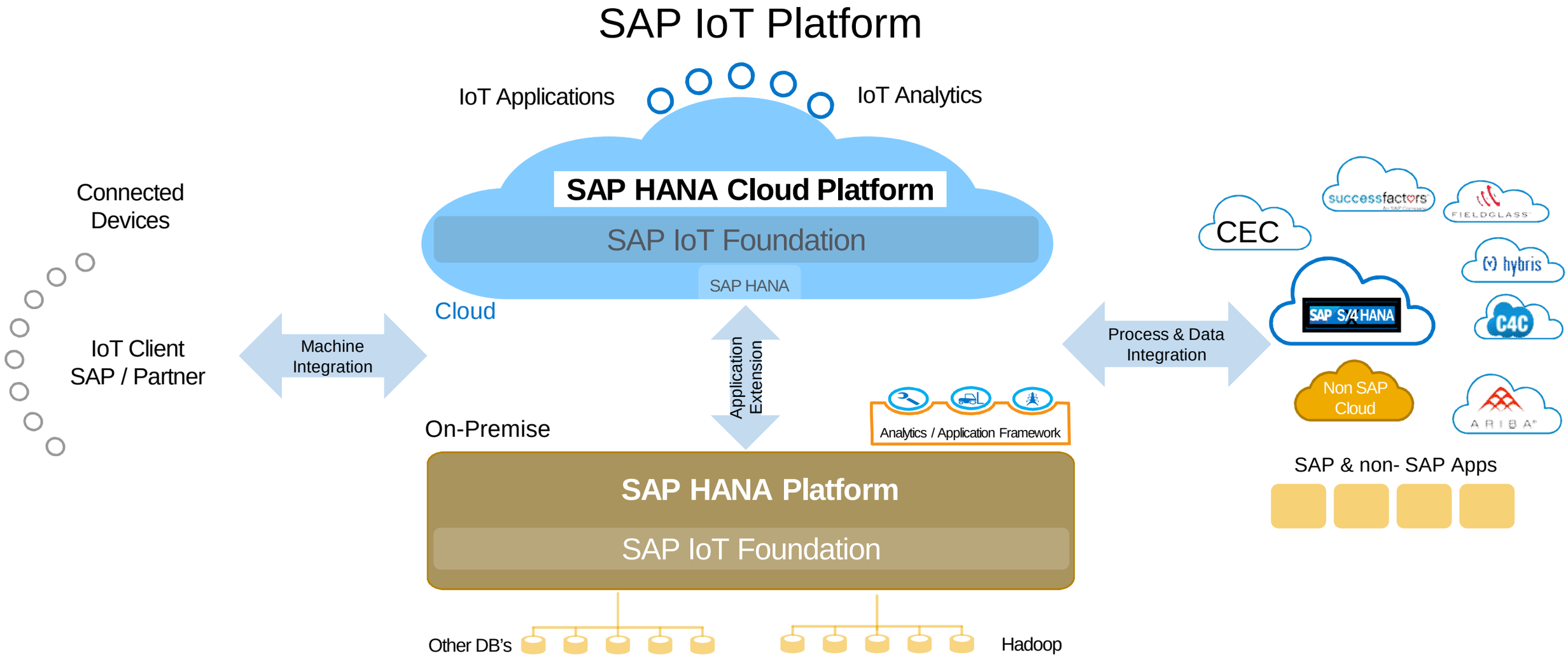
Optimize **corporate** operations

Real-time insights and automated decision-making

Reimagine business models

- Reimagine product design
- Reimagine customer experience
- Reimagine business with value-added services
- Build real-time supply chains
- Enable responsive manufacturing
- Tap into the world's largest business network
- Reimagine employee experience

SAP Internet of Things from Things to Outcomes



IoT App Services in Cloud Platform for IoT

IoT Services allow to manage remote devices and messages.
It enables building IoT applications.

Remote Device Management

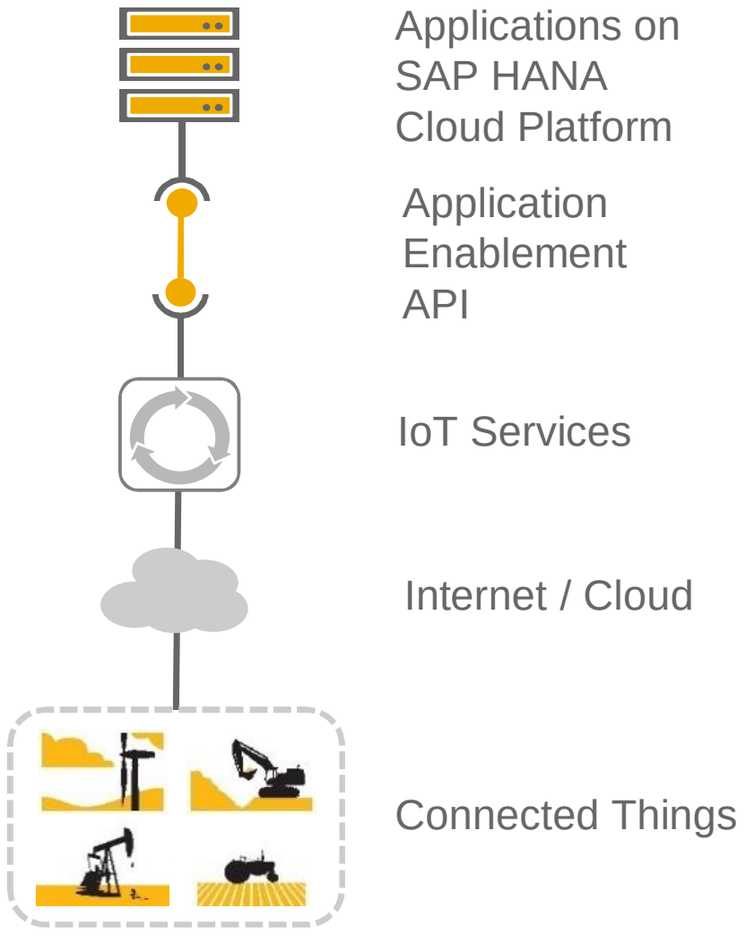
- Manage the device life cycle from onboarding till decommissioning
- Receive device information
- Configure devices remotely
- Send commands to devices

Message Management

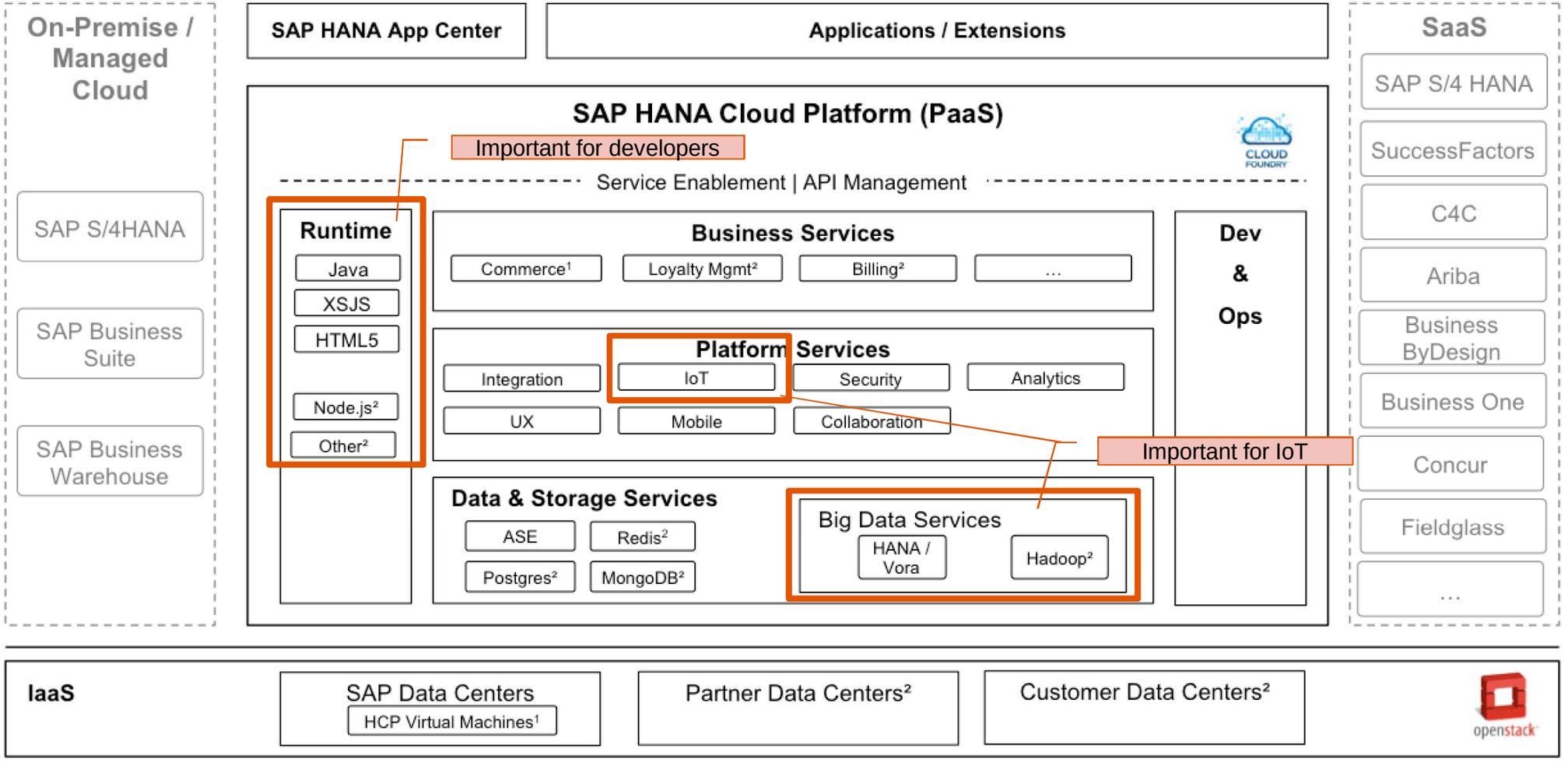
- Collect sensor data and store it in the HCP persistence layer
- Supports various transport protocols and message formats

Application Enablement

- Use Device Management and Message Management functionality in your applications



HCP Cloud Foundry as Foundation



1) beta functionality, 2) planned innovations / future direction

https://scn.sap.com/community/developer-center/cloud-platform/blog/2015/09/17/continuous-evolution-on-sap-hana-cloud-platform-with-cloud-foundry-and-openstack

Types of IoT Applications

Network Solutions

Single Customer Solutions

Public Cloud

Private Cloud

Areas for IoT Applications

Business Example / Maintenance Case

SAP Predictive Maintenance

http://www.sap.com/pc/tech/internet-of-things/software/predictive-maintenance/index.html

https://www.youtube.com/watch?v=583aGe0xIGY

Predicting Maintenance Work

- Real Time
  - equipment monitoring
  - prediction data models
- Automated alerting based on prediction

Customer and Consumer Value

- Better maintenance planning
- Less out-of-service preventive checks
- Less wasted time spend by technicians

Mobile Applications

- Integration into Smart Devices (e.g. watches)
- Real Time Notification Systems
- Reporting & Analysis Applications

Business Example / Car Connections

SAP Vehicles Network

https://www.youtube.com/watch?v=cWo4lDa_1uw
http://hana.sap.com/implementation/customer-innovation/solutions/vehicles-network.html

Connecting Automotive Industry and Service Industry

- Real Time
  - parking slot monitoring
- Automated parking slot booking

Customer and Consumer Value

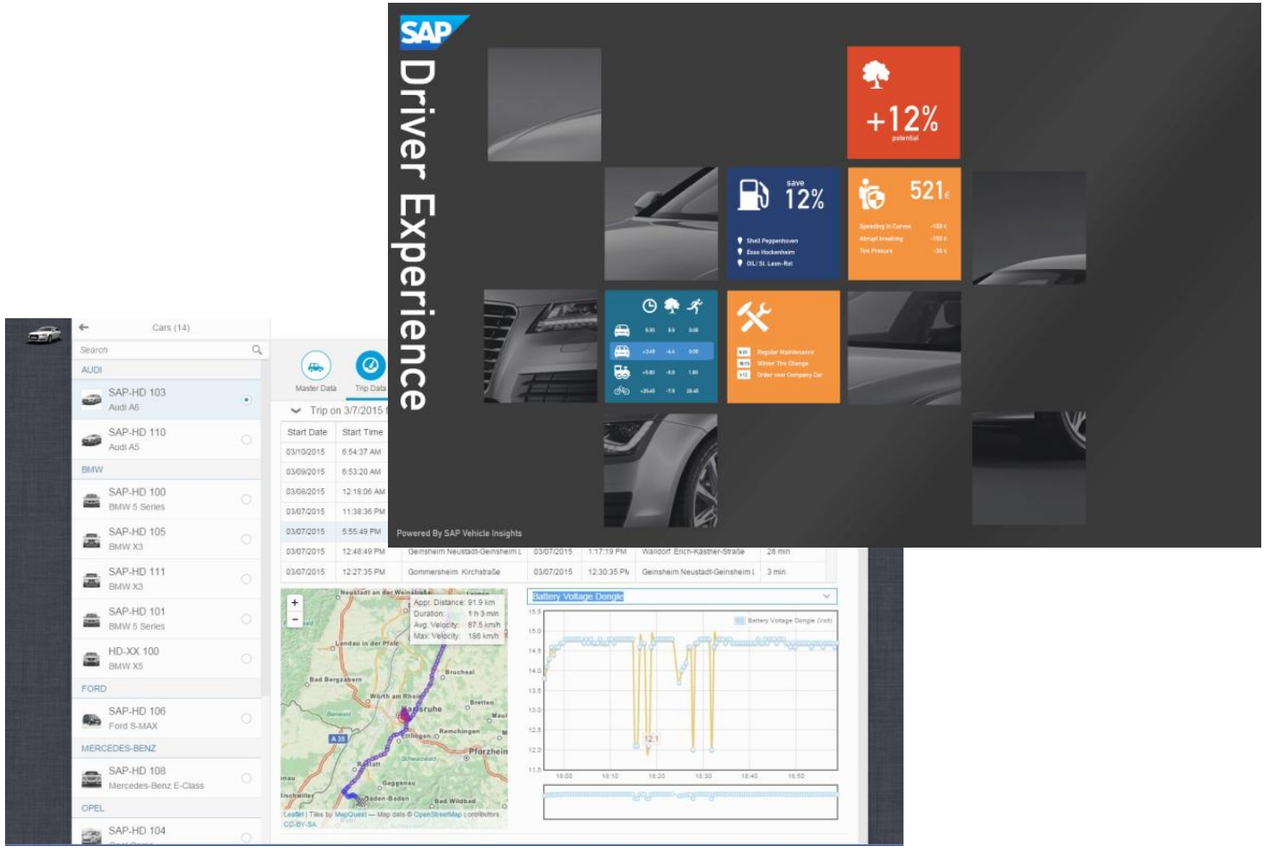
- Better service for End-Users
- Easy parking search / booking
- Easy payment

Mobile Applications

- Integration into Car Systems
- Mobile access for consumers

Business Example / Location Monitoring

SAP Vehicle Insights



https://news.sap.com/tags/sap-vehicle-insights/

Use Case

- Vehicle monitoring
- Vehicle telematics data and analytic insights
- Predictive capabilities

Customer Value

- Efficient process planning and control
- Reduced costs through improved operating
- Increased efficiency in logistics

Mobile Applications

- used for reporting and data analysis
- used for connectivity, GPS data collection

Business Example / Location Monitoring

SAP Networked Logistic Hub

https://www.youtube.com/watch?v=zKZDgsni0Y4
https://help.sap.com/scl

SAP and SK Solutions Anti-Collision System

https://www.youtube.com/watch?v=J45uSpBmVqo

Use Case

- Real Time Sensor Monitoring
  - of Trucks and Containers
  - of any Equipment
- Anti-Collision systems

Customer Value

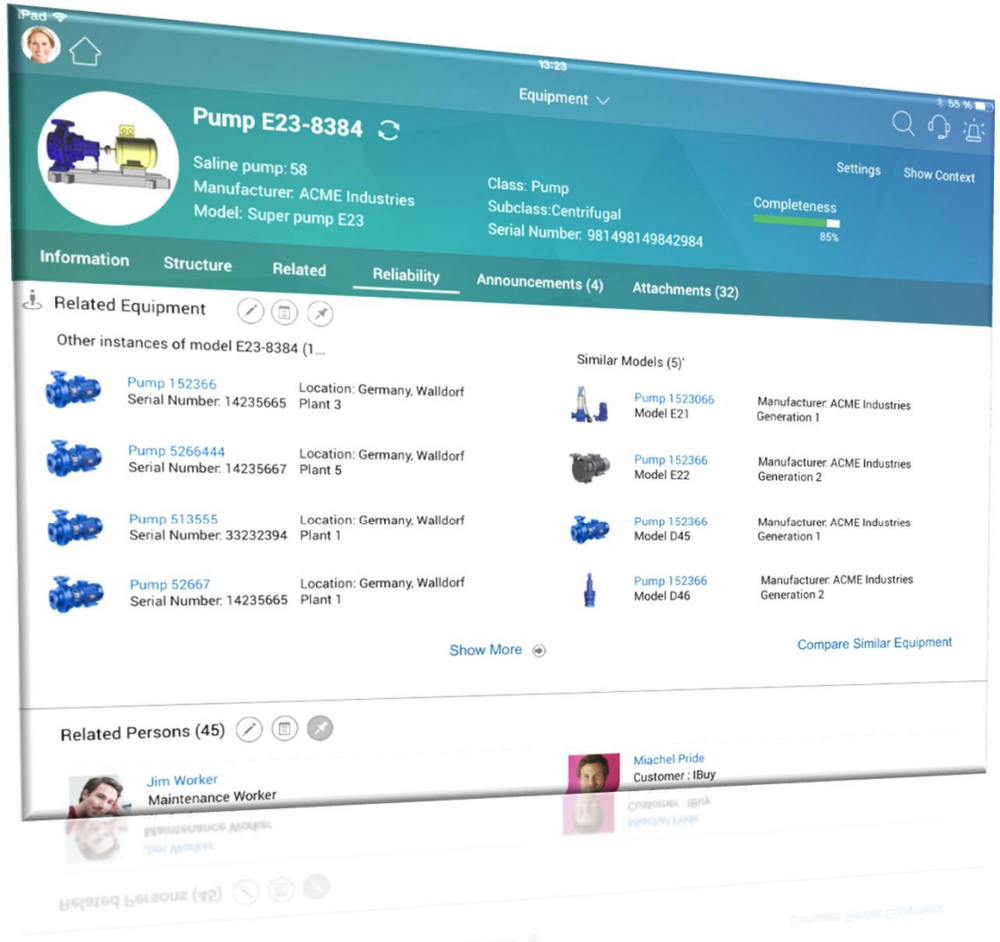
- Increased Safety
- Optimized workflow and operations
- Increased efficiency in logistics

Mobile Applications

- used for reporting and data analysis
- used for connectivity, GPS data collection

Business Example / Assets

SAP Asset Intelligence Network



Use Case

- Centrally manage and publish
  - information about models
  - information about equipment
- to selected audiences
- Gain Operation Insights / Access
  - of any Assets

Customer Value

- Increased Transparency
- Enable New Business Models
  - consume equipment as a service
- Sell Add-Value Services

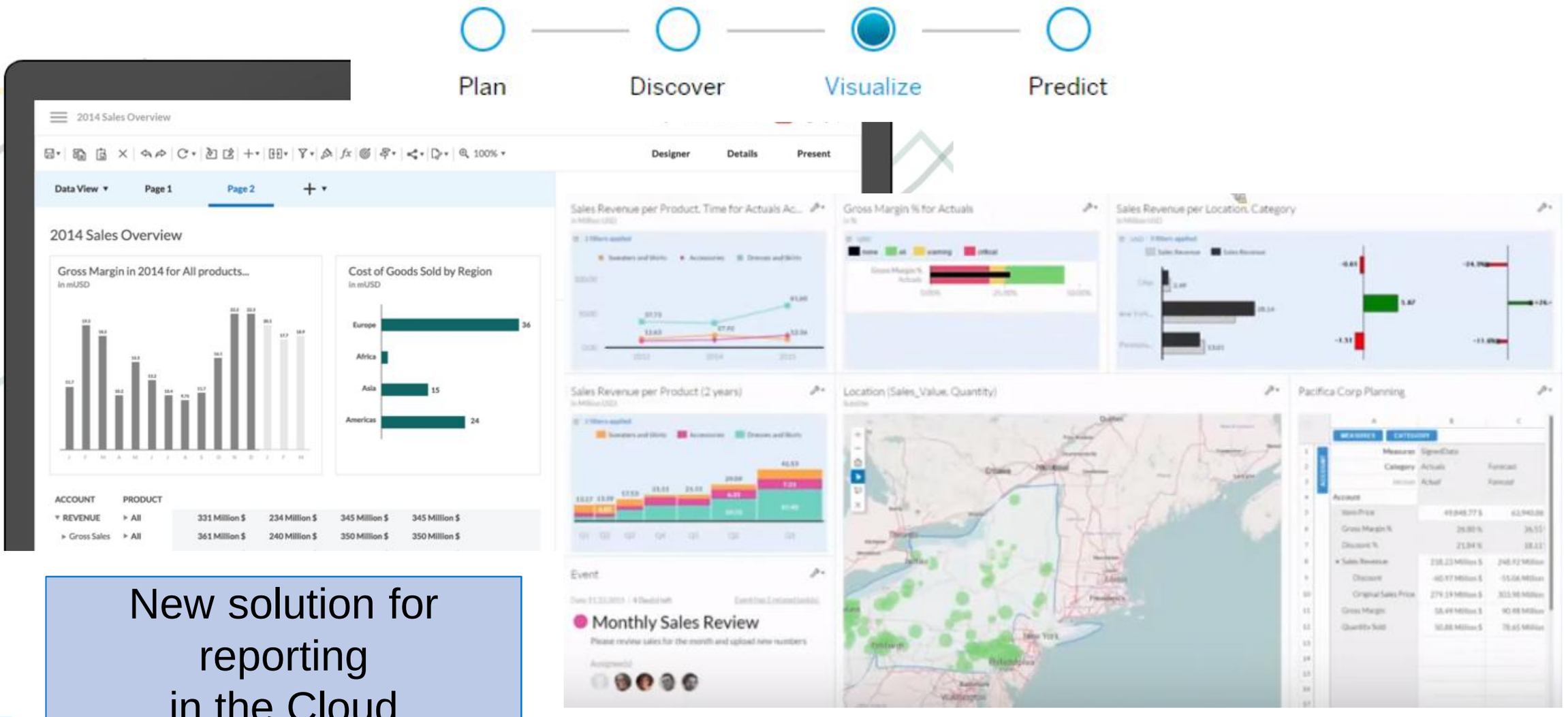
http://go.sap.com/product/plm/asset-intelligence-network.html

IoT changes the infrastructure…

… as the data is coming into the cloud

SAP BusinessObjects Cloud

~~SAP Cloud for Analytics~~



New solution for reporting in the Cloud

http://discover.sap.com/cloudforanalytics?CRM-XM16-GAM-IT_AR

Risks and Challenges for IoT

IoT is full of traps! – Learn how to make money with it

- Finding meaningful use cases is key to success
- Visions are allowed, but first bills have to be paid
- New business models are key to making money with IoT
- Business models will have an impact on the architecture of solutions!

IoT can be complex!

- Keep it simple by structured data models and good scale
- Keep it understandable for customers and consumers

IoT needs privacy & security

- Privacy and Security will distinguish between success and failure
- Managing one's own privacy will become a complex task – and needs to be kept simple
- Historical personal data availability – who will delete the data?

Cyber security

Language and culture

Data protection

Regulations and standards

24x7 Operations

public

SAP Enterprise Architecture Explorer
SIT Hamburg 2016

Karol Kalisz (presenting), Jürgen Jakowski, P&I, SAP SE

We take people from the current stage of their information journey

To help them driving decisions and to improve their enterprises

Jumpstart → **Get enabled** → **Learn from generic practices** → **Learn from detailed practices** → **Adapt practices to customer needs** → 100%

- **Get a quick overview of a certain topic**
- Get answers
- Compare topics
- Review benefits, features and more

- **Get enablement material**
- Learn to convince others in your company
- Get a quick overview of possible options and approaches

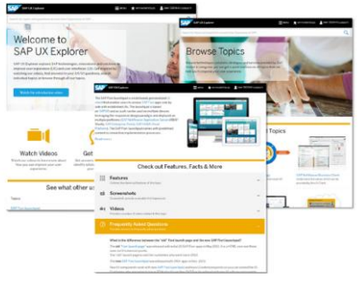
- **Learn from typical customer concerns**
- Get methods
- Get reference models
- Get reference architectures

- **Review reference architecture models in all detail**

- **Adapt reference architecture models to your needs**
- Create own architecture models

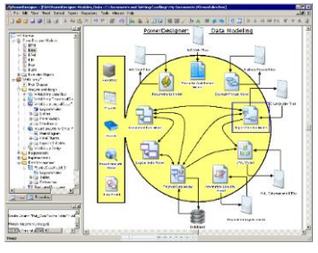
Information Gathering — **Modeling**

SAP Enterprise Architecture Explorer

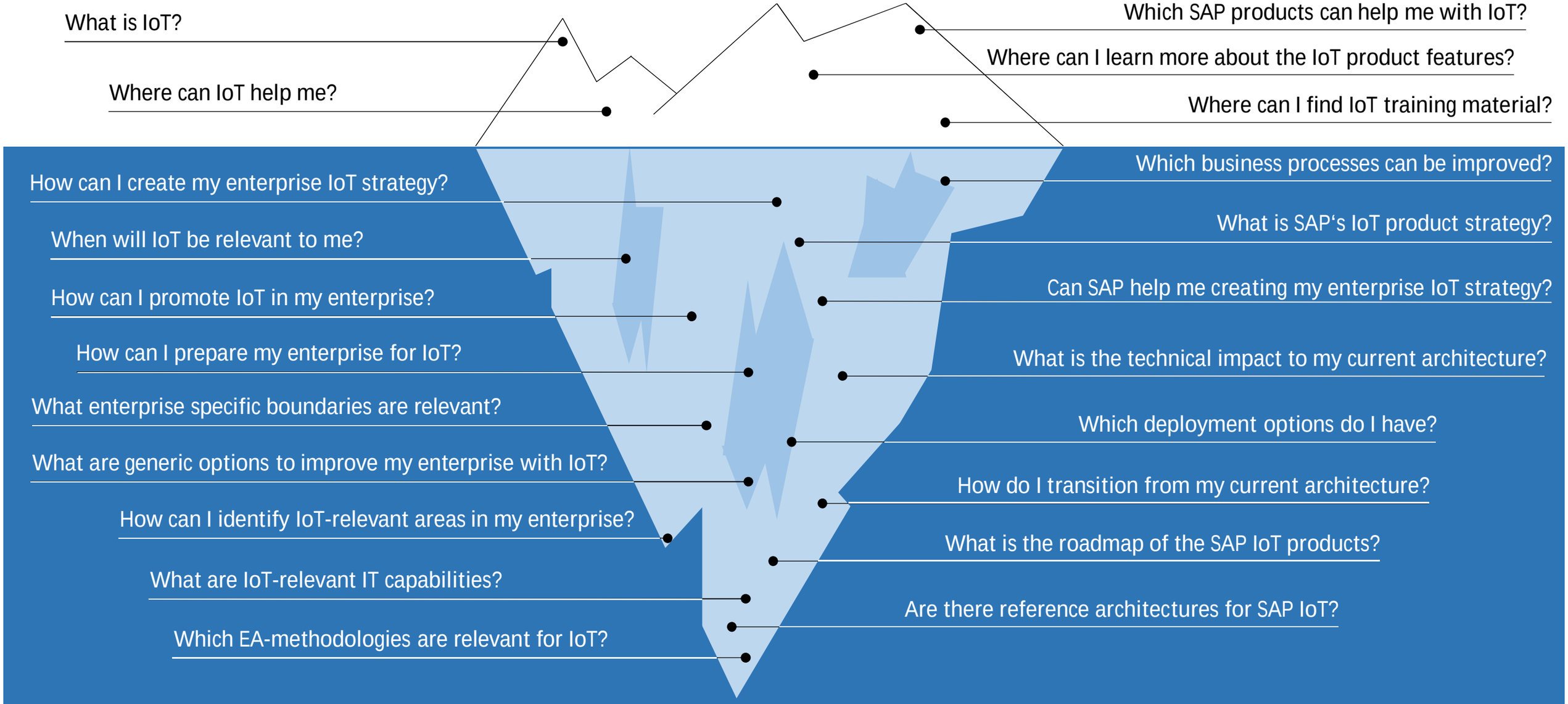


Specialized SAP sources

SAP PowerDesigner



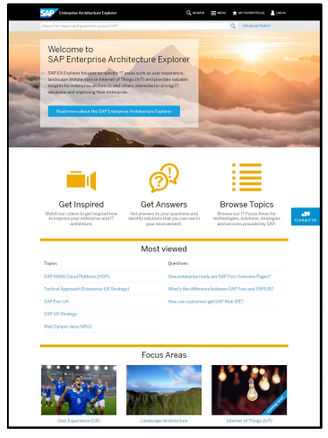
There are more customer questions as those appearing at first sight



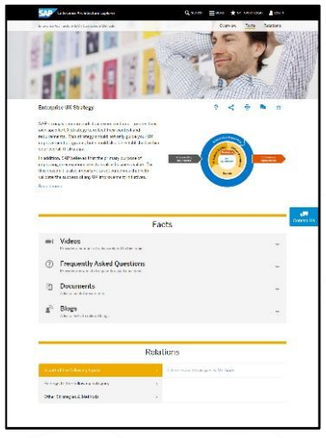
We put things into relations, structure them and give flexible access

Every new IT focus area multiplies the value for everybody

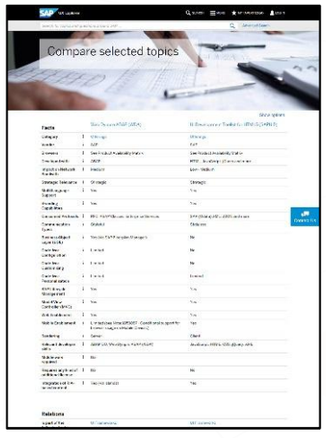
Multiple Access Options



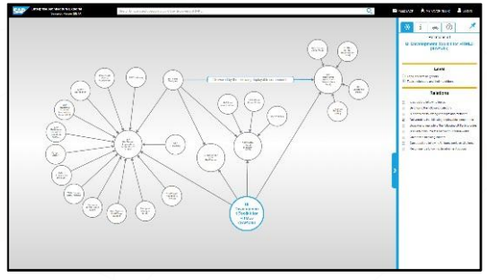
Startpage



Detail Page



Comparison Page



Semantic Viewer (Beta)

Designing the Target IT Landscape Architecture

Relevant Information Elements and supporting SAP tools

Level 0

Drives

Impacts

Level 1

Level 2

Level 3

Strategy View

Strategy on sap.com

SCN – SAP Business Trends

Capability View

Solution Explorer

Software View

Innovation Discovery

SAP Help

SAP Service Marketplace

Platform Availability Matrix

Installation View

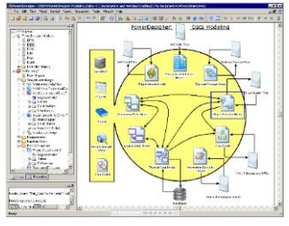
Installation & Upgrade Guides

Software Download Center

Maintenance Planner

SAP Enterprise Architecture Explorer

SAP PowerDesigner



public

/*

Try. The Developer account is free :-)

*/

http://hcp.sap.com/developers

Tutorials are available:

https://github.com/SAP/iot-starterkit

And request a free SAP CodeJam workshop:

http://scn.sap.com/docs/DOC-37775

more online…
SAP Internet of Things: From Things to Outcomes - What's New in 2016
https://www.youtube.com/watch?v=Y2THEZdz0ic

Thank You!

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