THE Open GROUP

MSA-IoT Overview

Introducing the Panelists

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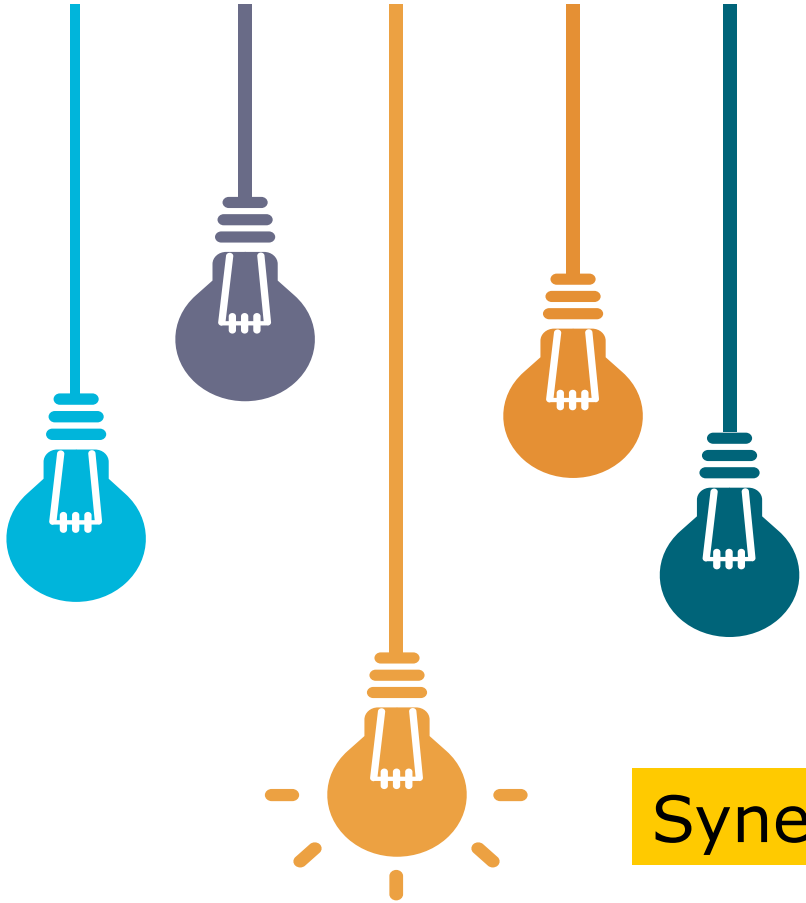


Synergy - the bonus that is achieved when things work together harmoniously.
Mark Twain

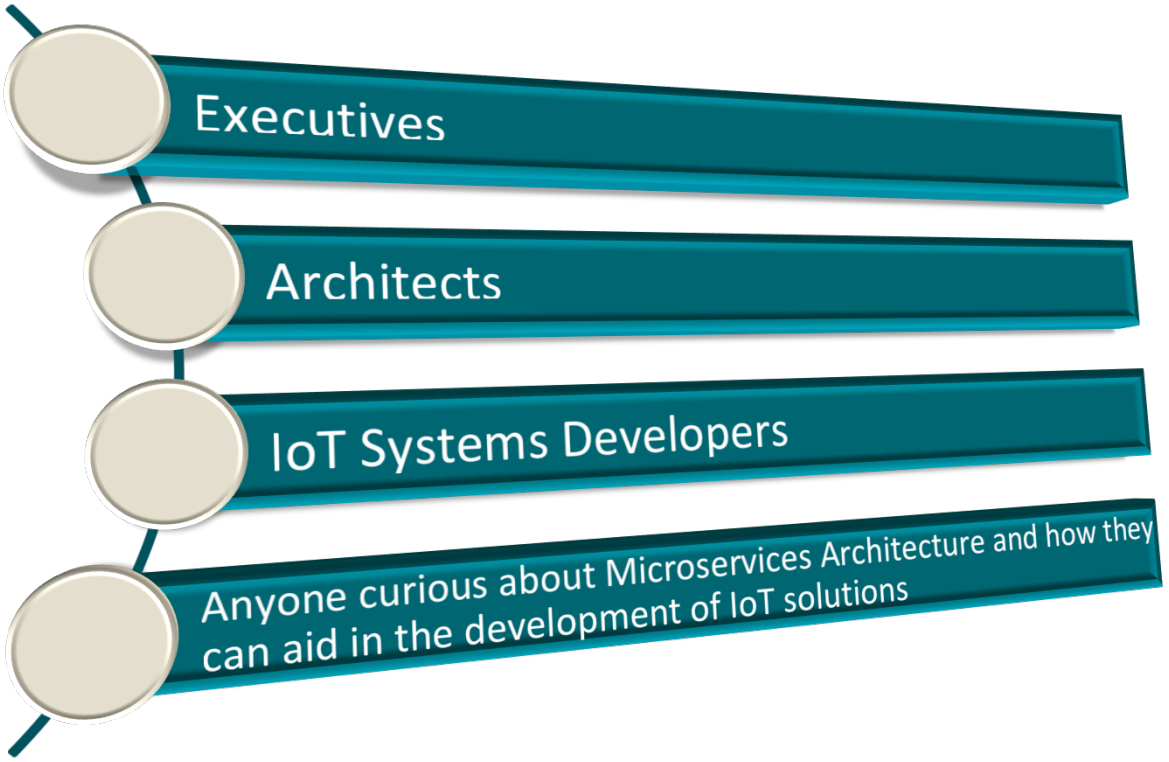
A Glimpse into the Guide on Microservices Architecture (MSA) and Internet-of-Things (IoT)

Synergy

Use Case

Benefits

Our Intended Audience



Join the Conversation on LinkedIn!

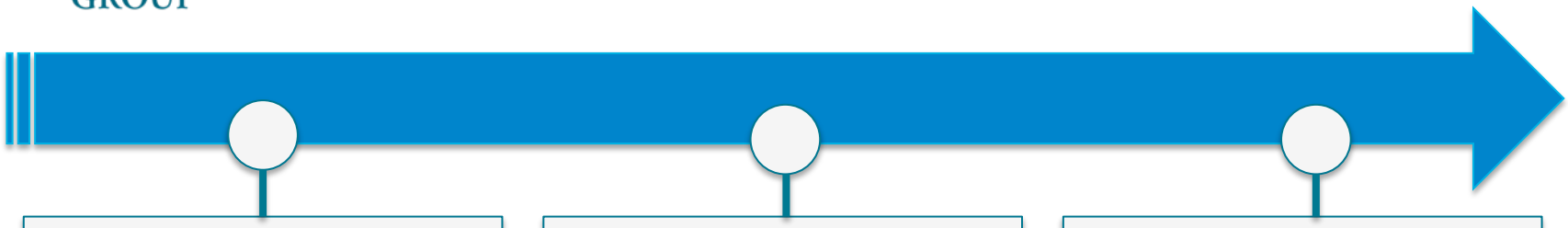
Please join our LinkedIn Community of Interest:
https://www.linkedin.com/groups/4940419/

We will post the recording of the webinar there soon, and we will be happy to answer any questions you leave for us!

About Us

Formation	•The Open Group formed the Microservices Architecture Work Group, as part of the SOA Work Group in June 2014
Publications	• Microservices Architecture Whitepaper • The Open Group MSA – IoT Guide • Benefits of DevOps Methodology for Microservices Solutions Whitepaper
Future Projects	• MSA Reference Architecture • MSA Architecture Patterns Technical Paper • Security for MSA Technical Paper • Explore interesting Use Cases and develop View Point papers (ML, AI, etc…)

History/Background/Context Setting..



The Open Group formed a working group **"Microservices Architecture"** with the charter to develop standards & Viewpoints. Bring maturity to an evolving Architectural paradigm.

"Microservices Architecture" working group has **published multiple paper** including:

- Microservices Architecture
- MSA and the IoT Guide
- Benefits of DevOps Methodology for Microservices Solutions

Why MSA-IoT?

Microservices Solutions and IoT solutions exhibit **similar characteristics**, hence Microservices are the **obvious choice** for IoT solutions.

MSA & IoT Synergy

A **Microservices Architecture (MSA)** *consists of a* **massively parallelized**, **distributed** set of **atomic function** *applications which together constitute a resilient, scalable, and flexible solution.*

Similar characteristics can also be found within **Internet of Things (IoT)** *solutions, which typically consist of many* **single function** *devices or sensors that are* **widely distributed**

The essence of an IoT solution is the **interaction via information services** and the **ability to react quickly**. This is where microservices excel; they are focused on **performing a single (atomic) function** and can **react to events**. Microservices also have a small resource footprint which makes them particularly well suited to be deployed on sensor devices, and they are highly distributed (parallel) instances, which maps well to highly distributed mesh sensor networks.

What are they…

Microservices Architecture (MSA) is a style of architecture that defines and creates systems using small, independent and self-contained services that align closely with business activities. These "microservices" are the primary architectural building blocks of an MSA.
MSA has the following three key characteristics:

- **Service-independence**
- **Self-containment**
- **Single responsibility**

Internet of Things *(IoT) is defined as an infrastructure of interconnected physical entities, systems, and information resources together with the intelligent services which can process and react to information of both the physical world and the virtual world and can influence activities in the physical world.*

MSA + IoT

Applicable Patterns

Interpolation	•Avoid loss of information due to failed sensors by interpolating the data provided by nearby sensors
Sensor Façade	•Convert IoT sensor's readings data to meaningful information required by range of consumers
Cached Service Nodes	•Improve both the scalability and the resilience of an IoT device

Applicable Patterns cont....

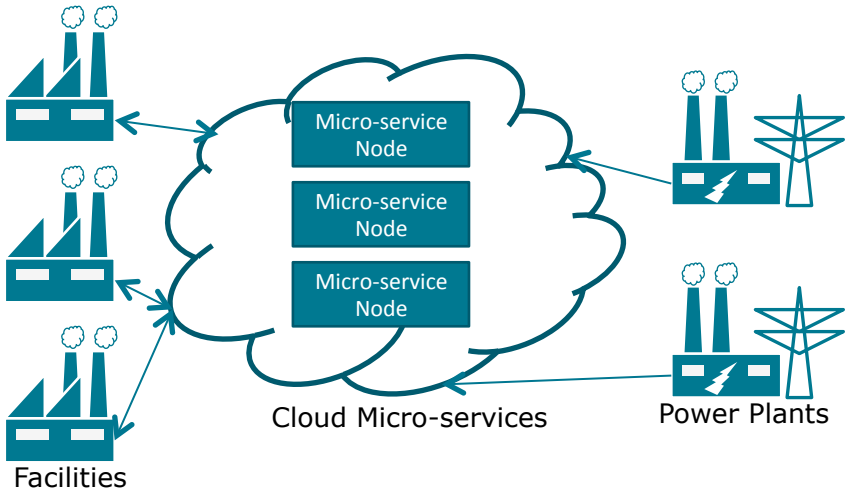
Gateway Microservice	•Implement security enforcement, protocol transformation and service enhancement
Sensor Aggregator	•Aggregate data from multiple IoT device to extract meaningful information
Control Aggregator	•Collect and analyze data from a large number of sensors to take well-informed control actions across multiple devices

Applicable Patterns cont....

Multicast

- Send IoT data to multiple subscribed consumers based on pre-defined events

Power Monitoring and Billing



The situation:

Operator of a large number of facilities distributed across a region can save on electric bills by reducing load during peak power demand

Task

Create monitoring and control services to shed load when power plant consumption is peaking

Power Monitoring and Billing

Action

MSA was used due to availability and price sensitivity needs

Sensors within a facility and a region were aggregated eliminating dependencies on individual sensors

Aggregation Pattern

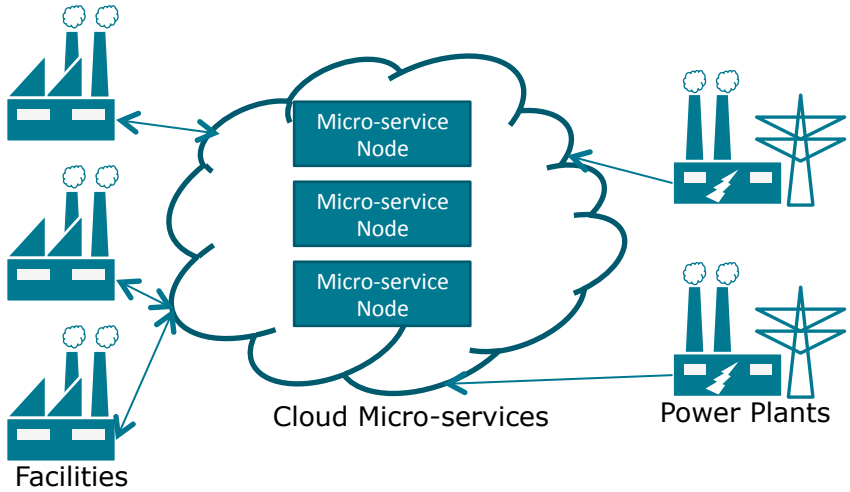
Power companies sent power consumption level notifications which were replicated across the service nodes

Multicast pattern

Regional Power spikes result in load shedding at the facilities, even if the facility is not experiencing a power consumption spike itself

Control Aggregator Pattern

Result – working cooperatively with the power companies reduced power for the region demand and the cost of power at the facilities saving money for both companies



Definitions

Architecture	•The fundamental organization of a system embodied in its components, their relationships to each other and to the environment, and the principles guiding its design and evolution.
Internet of Things	•An infrastructure of interconnected objects, people, systems, and information resources together with the intelligent services to allow them to process information of the physical and the virtual world and react.
Microservice	•An individual microservice is a service that is implemented with a single purpose that is closely aligned to a specific business capability, self-contained, and independent of other instances and services. The microservice is the primary architectural building block of the Microservices Architecture.

Definitions (cont.)

Microservices Architecture	•An architectural style that structures an application or system as a set of loosely coupled, independent, and self-contained services, which align closely with a business capability.
Resiliency	•The ability of an application or system to react to problems in one of its components and continue to operate and provide its defined capability.
Scalability	•The characteristic of a system, network, or process to handle an increasing amount of work.
Service-Oriented Architecture	•An architectural style in software design in which application components provide services to other components via a communications protocol, typically over a network. The principles of service-orientation are independent of any vendor, product, or technology.

Recap…

If this webinar has piqued your curiosity and an interest, join us for the next one where we delve deep into the MSA-IoT Guide.

Q&A

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Thank You!