LF Edge Akraino Project presentation to ETSI MEC ISG

March 23rd, 2021

Ike Alisson

LF Edge Akraino Documentation Sub-committee TSC Chair

Table of Contents

1.1 LF Edge Akraino Project Overview

- 20 < Blueprints (BPs), BPs Proposals & Development Projects
  - set of Open Infrastructures & Application Blueprints (BPs)

- Coordination & Co-operation with Multiple Upstream Open Source Communities/SDOs as:
  - Airship,
  - OpenStack,
  - ONAP,
  - ETSI MEC,
  - GSMA,
  - TIP,
  - CNCF
  - O-RAN

Objective: To deliver a fully integrated stack

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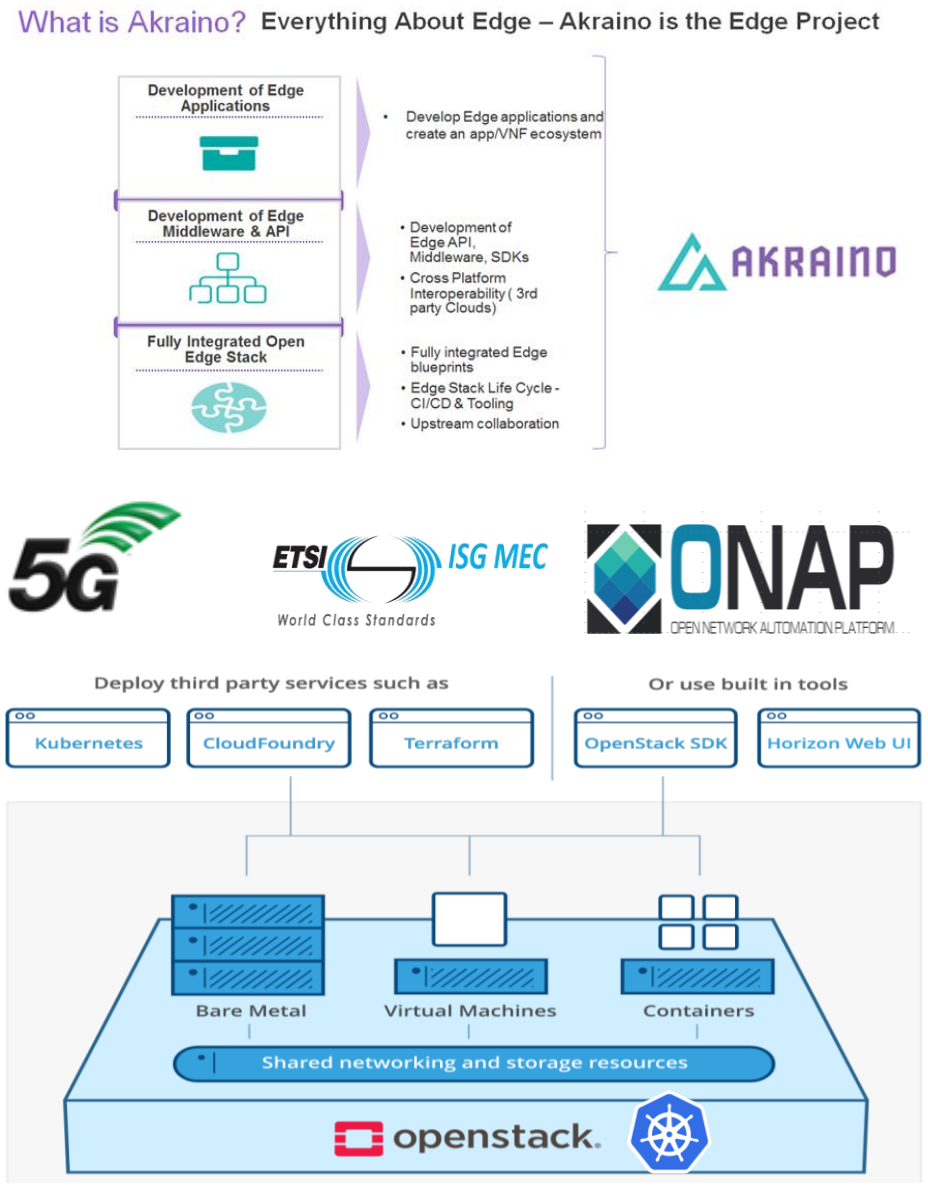


1. 2 LF Edge Akraino Project Overview: Stage 3 Project - 2

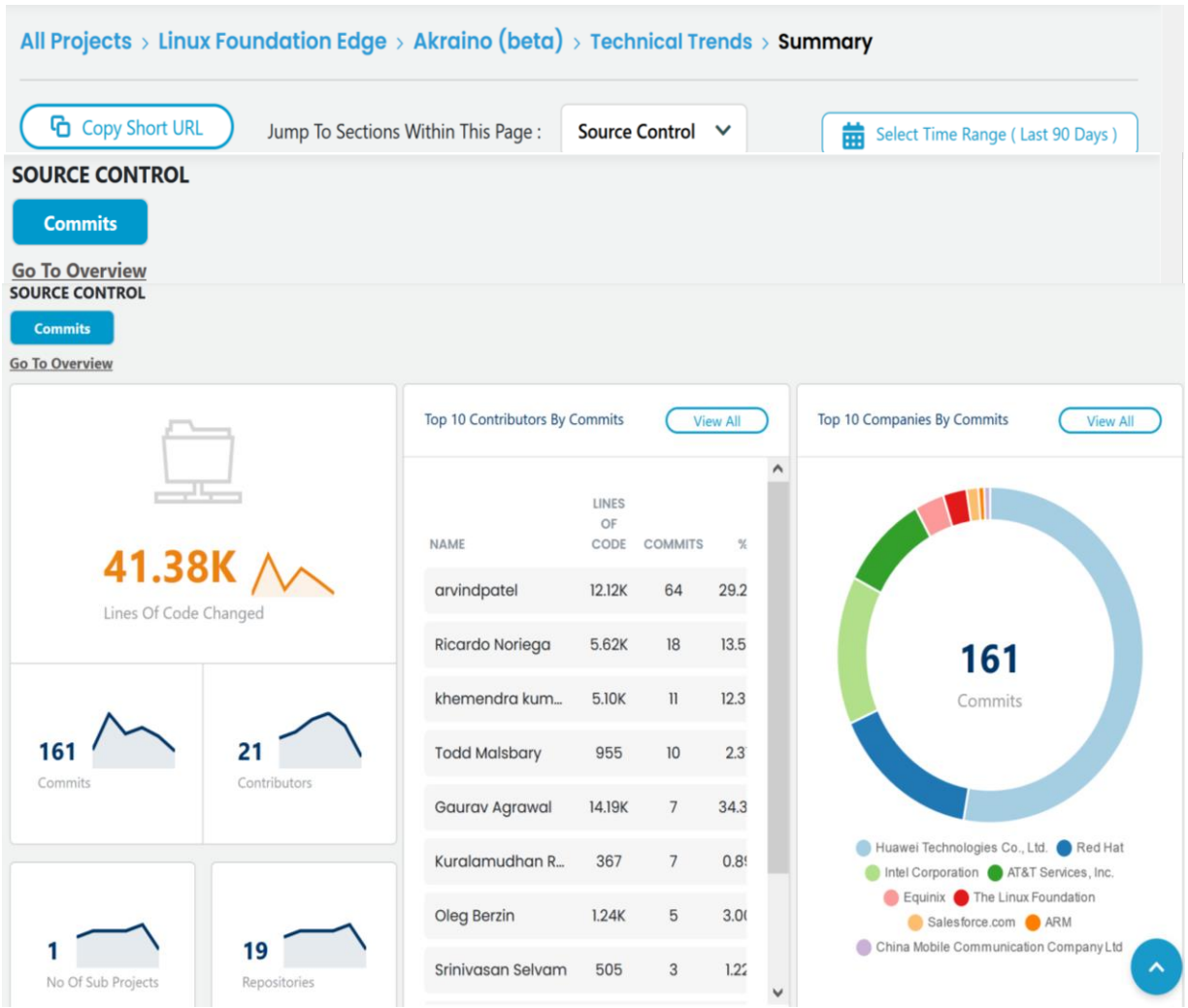
- **LF Edge Stages - Definitions & Expectations**
  Every Foundation Project has an associated Maturity Level, as voted on under the approved Project Lifecycle Document (PLD) Process.

- Projects of all maturities have access to Foundation Resources.

- **Stage 3: Impact Stage ('Top-Level')** Definition
  - Projects that have reached their Growth Goals and are now on a Self-sustaining Cycle of Development, Maintenance, and Long-term Support.

Impact Stage projects are widely used in Production Environments and have Large, Well-established Project Communities with a number of Contributors from at least two (2) Organizations.

1.3 LF Edge Akraino Project Analytics - Commits by Contributors and Companies



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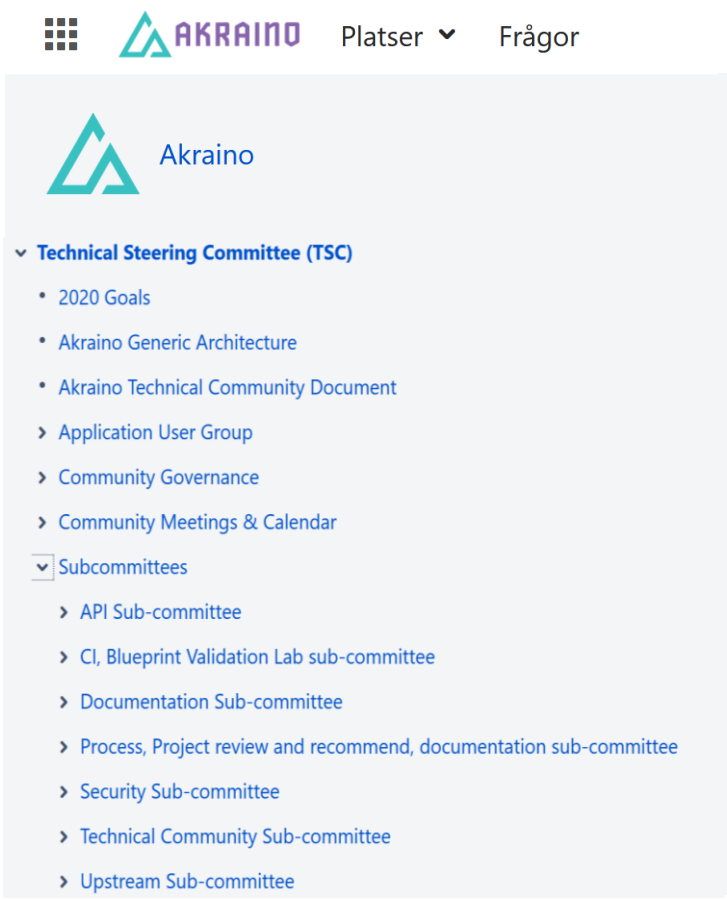
1. 4 Akraino Project TSC Sub-committees



Akraino TSC Sub-Committees

Subcommittees

- API Sub-committee
- CI, Blueprint Validation Lab sub-committee
- Documentation Sub-committee
- Process, Project review and recommend, documentation sub-committee
- Security Sub-committee
- Technical Community Sub-committee
- Upstream Sub-committee

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1. 5 Akraino Project (Blueprint) Lifecycle States and Reviews phases

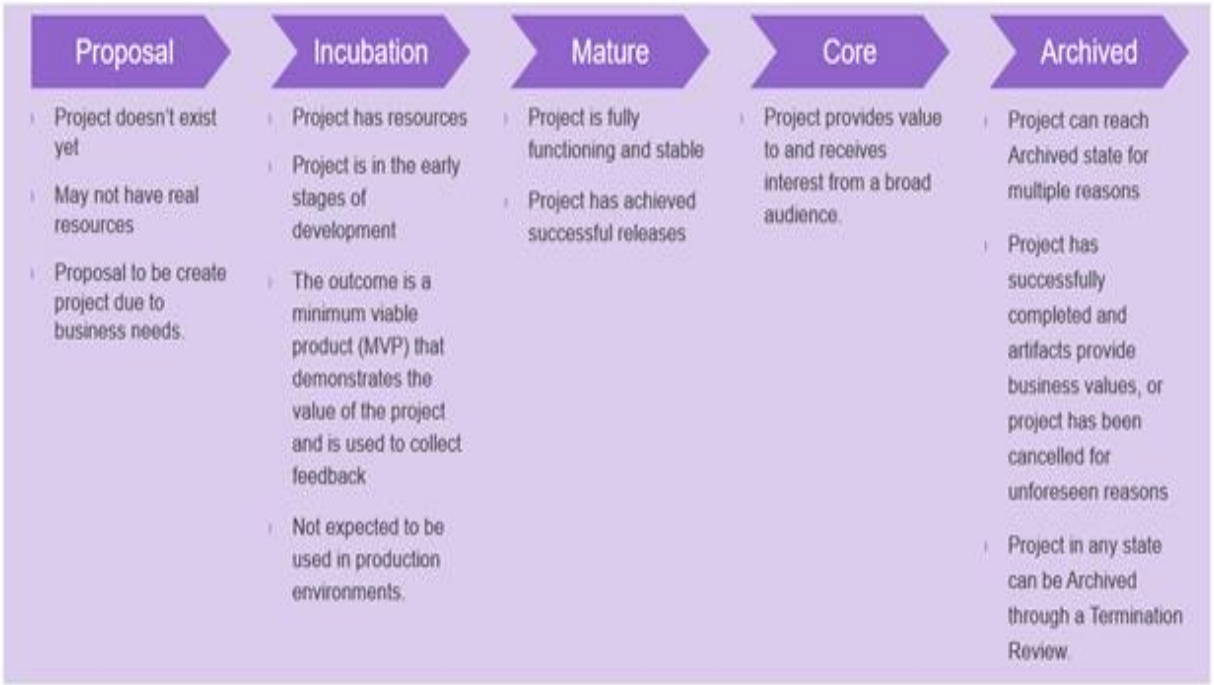
- **F**ive (5) states that Projects goes through.

- A Project Lifecycle may **extend across** Multiple Projects and Akraino Releases.

- The Procedure of moving from one(1) State to the next one is **independent from the Akraino Release Lifecycle** and the pace depends on each individual Project.

- In order to effectively review Project progress, **four (4) R**eviews are built-in to the Project Lifecycle, namely,

    - Proposal,
    - Incubation,
    - Mature,
    - Core
    - Archived

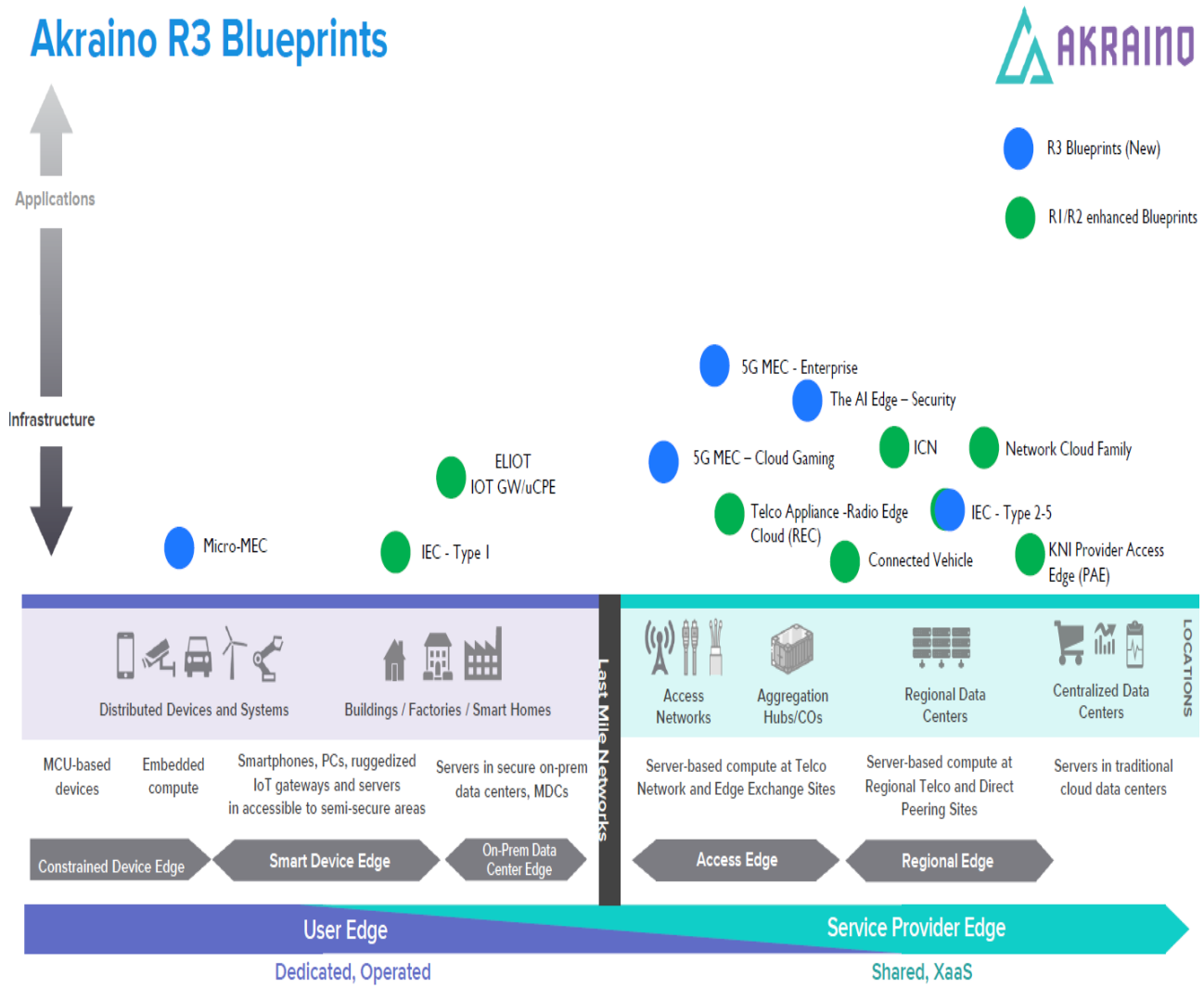


1. 6 Akraino Project R3 Overview

- Akraino Release 3 (R3) - approved in August 2020

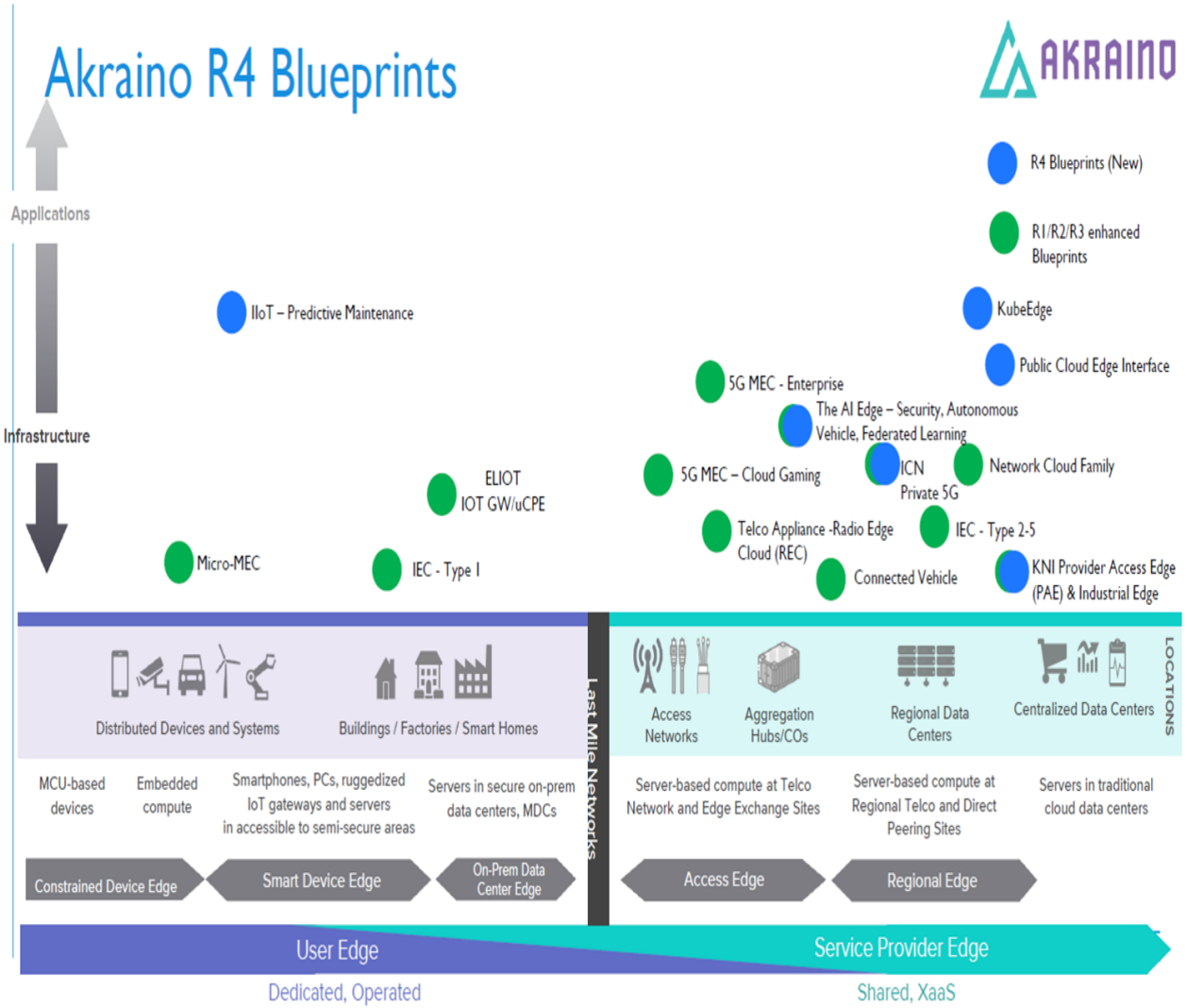
- Akraino Release 3 (R3) included 6 new Blueprints:

1. 5G MEC/Slice System to Support Cloud Gaming, HD Video and Live Broadcasting Blueprint
2. The AI Edge: Education Video Security Monitoring;
3. Micro-MEC
4. IEC Type 3: Android Cloud Native Applications on Arm servers on the Edge
5. IEC Type 5: SmartNIC for Integrated Edge Cloud
6. Enterprise Applications on Lightweight 5G Telco Edge

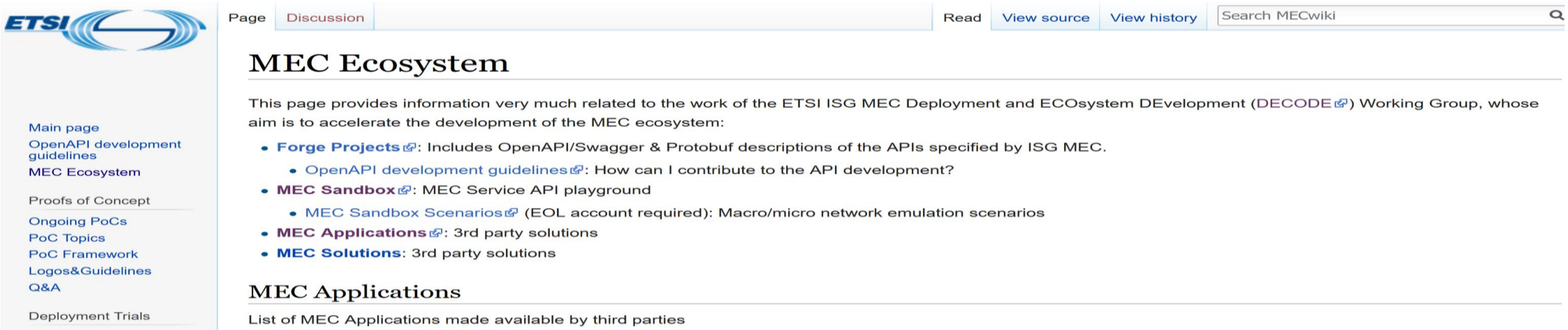


1. 7 Akraino Project R4 Overview

- Akraino Release 4 (R4) - approved February 2021
  - Connected Vehicle,
  - AR/VR oriented Edge Stack for Integrated Edge Cloud (IEC),
  - Radio Edge Cloud (REC),
  - The AI Edge: Intelligent Vehicle-Infrastructure Cooperation System(I-VICS),
  - 5G MEC/Slice System to Support Cloud Gaming,
  - HD Video and Live Broadcasting,
  - IEC Type 3: Android Cloud Native Applications on Arm Servers in Edge for Integrated Edge Cloud (IEC),
  - Enterprise Applications on Lightweight 5G Telco Edge, Public
  - Public Cloud Edge Interface (PCEI),
  - The AI Edge: Federated ML Application at Edge,
  - Private LTE/5G ICN
  - IoT Workloads at the Smart Device Edge - Predictive
  - Maintenance (with a Thermal Imaging Camera, Vibration Sensors).



1. 8 Akraino ETSI MEC Blueprints



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Main page
OpenAPI development guidelines
MEC Ecosystem

Proofs of Concept
Ongoing PoCs
PoC Topics
PoC Framework
Logos&Guidelines
Q&A

Deployment Trials

MEC Ecosystem

This page provides information very much related to the work of the ETSI ISG MEC Deployment and ECOsystem DEvelopment (DECODE) Working Group, whose aim is to accelerate the development of the MEC ecosystem:

- **Forge Projects**: Includes OpenAPI/Swagger & Protobuf descriptions of the APIs specified by ISG MEC.
  - OpenAPI development guidelines: How can I contribute to the API development?
- **MEC Sandbox**: MEC Service API playground
  - MEC Sandbox Scenarios (EOL account required): Macro/micro network emulation scenarios
- **MEC Applications**: 3rd party solutions
- **MEC Solutions**: 3rd party solutions

MEC Applications

List of MEC Applications made available by third parties

Connected Vehicle Blueprint (Aka CVB) AKRAINO	CVB provides a V2X focused MEC platform, which offers services to connected vehicles. These services are delivered to applications hosted on vehicles based on a set of policies for data dispatch and response. As the blueprint continues to be developed, further connected-vehicle applications and services are being incorporated into the blueprint.	MEC Platform(s), MEC Platform Manager	MEC 011 Mp1 & Mm5	Link	Yarg Yang
Enterprise Applications on Lightweight 5G Telco Edge (EALTEdge) AKRAINO	Lightweight telco edge platform, enabling Enterprise applications on telco edge. Offering a: Unified Portal for platform management and for App developers; Sandbox with SDKs and tools chains for MEC app developers; Heterogeneous deployment on Multi-Arch; ETSI MEC Compliance.	MEC Platform(s), MEC Platform Manager	MEC 011 Mp1 & Mm3	Link	Gaurav Agrawal
Public Cloud Edge Interface (PCEI) AKRAINO	The purpose of Public Cloud Edge Interface (PCEI) Blueprint family is to specify a set of open APIs for enabling Multi-Domain Inter-working across functional domains that provide Edge capabilities/applications and require close cooperation between the Mobile Edge, the Public Cloud Core and Edge, the 3rd-Party Edge functions as well as the underlying infrastructure such as Data Centers and Networks.	Provides an enabler layer that facilitates interworking between Edge Computing platforms, including Multi-Access Edge Compute, Public Cloud and 3rd-Party Edge Compute, and Mobile Networks	MEC 013 Location API	Link	Oleg Berzin

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2. Akraino Technology Information update process - 1

ETSI
The Standards People

ETSI MEC: An Introduction

(almost) everything you want to know about ETSI MEC

Presented by: **Alex Reznik, ISG Chair**
ETSI MEC Leadership Team

For: **Public consumption**
Akraino TSC
Sept 23-24, 2020

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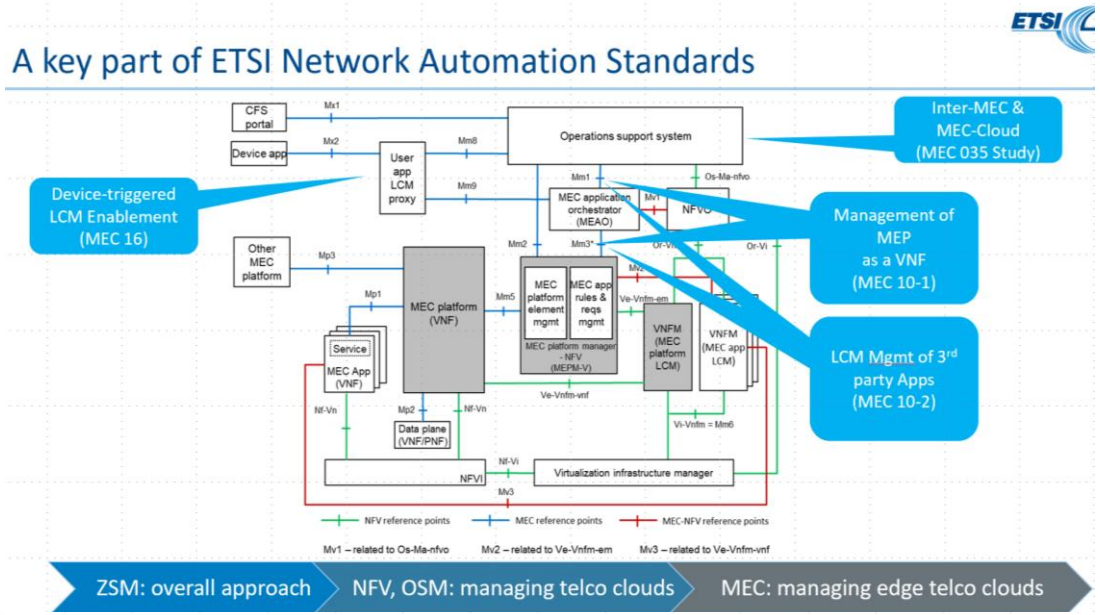
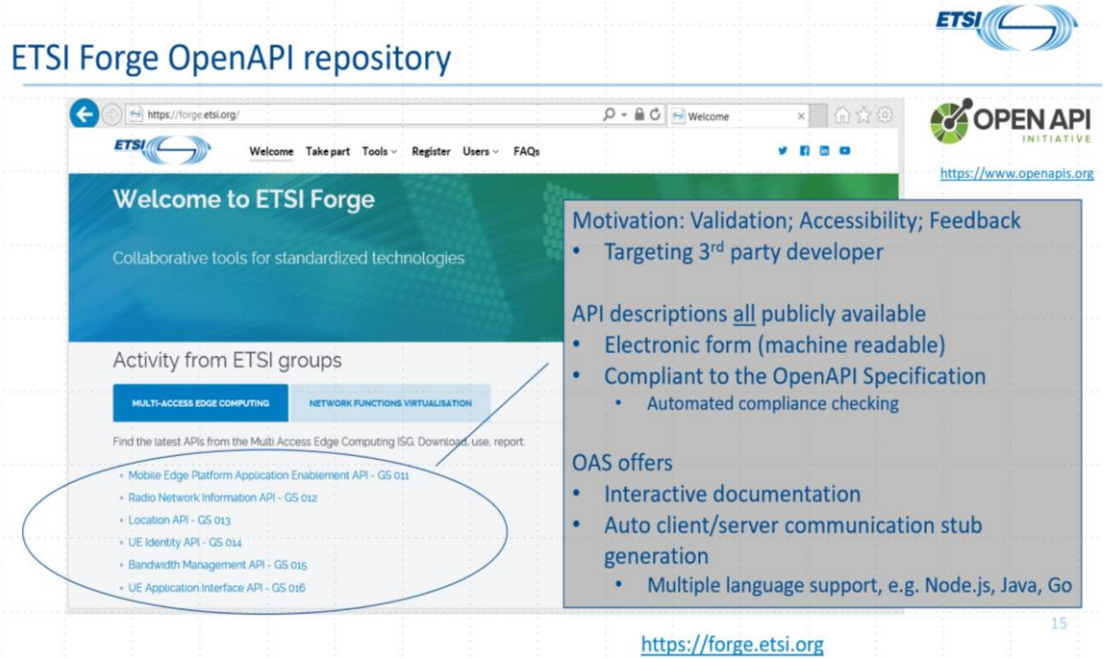




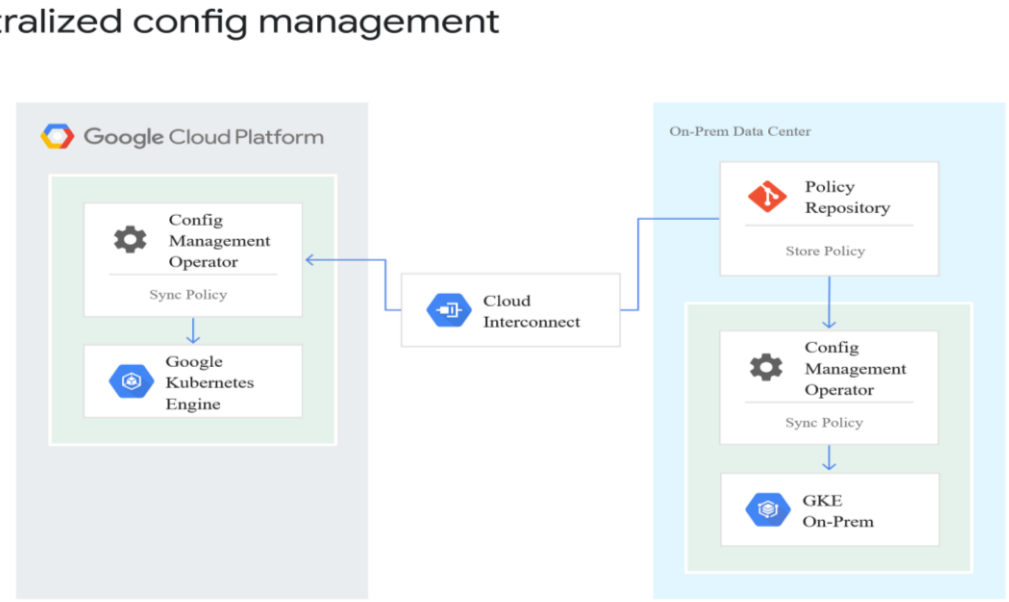
2. Akraino Technology Information update - 2

Google Anthos

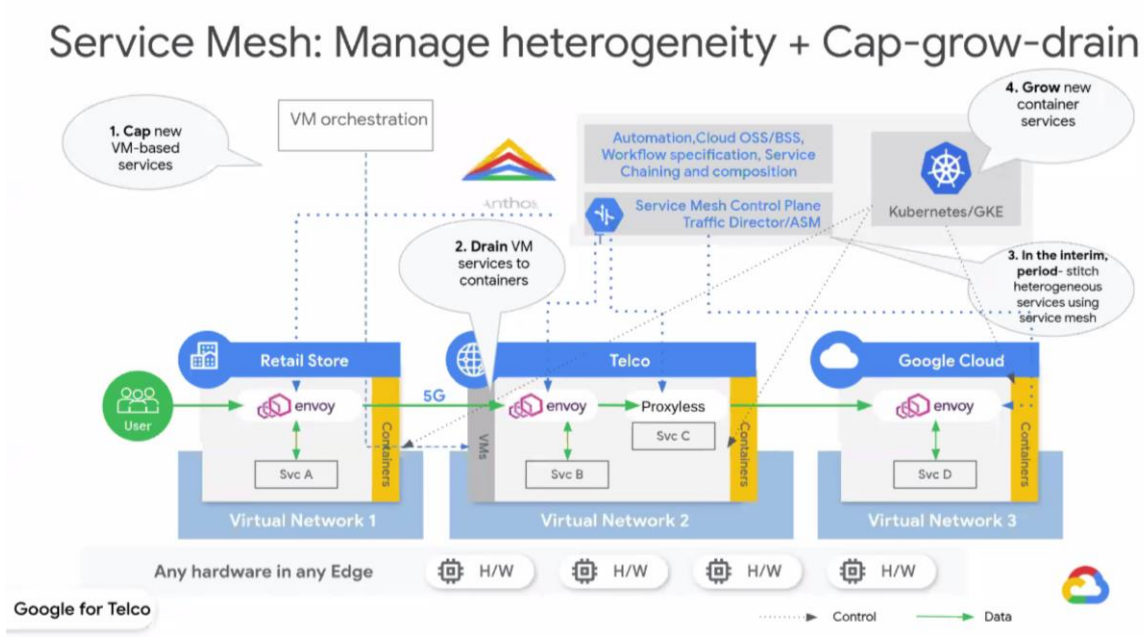
by

Prajakta Joshi

Akraino TSC
2020-10-06



Anthos Config Management architecture (click to enlarge)



2. Akraino Technology Information update - 3

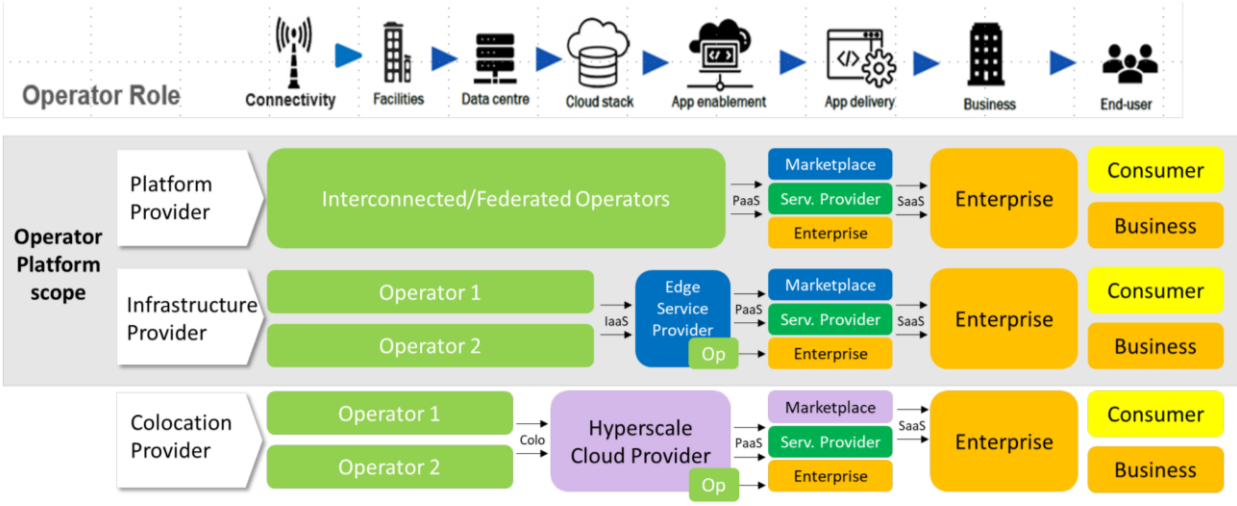
Telefónica

Telco Edge Cloud Goals and Enablers

Diego R. López
Telefónica

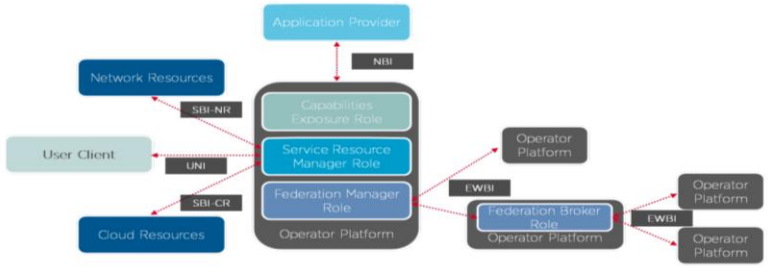
Akraino TSC
2020 - 11 - 06

The Value Chain



#RECONECTA 4 Telefónica

The Framework



#RECONECTA 5 Telefónica

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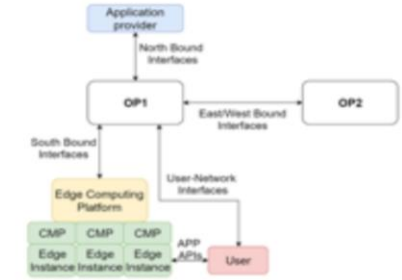
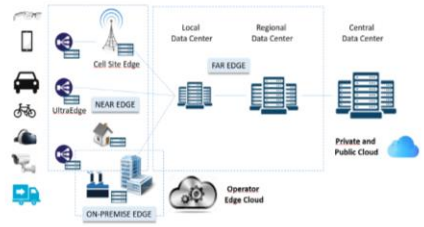
The Unified Edge Theory

- The edge environment has to work as a single cloud provider
  - Consistent APIs for developers: *Build once, run anywhere*
  - Support for different deployment styles
  - Multi-dimensional openness
- The Ultimate Goal: In-Network Computing
  - A service continuum based on
    - Programmable network devices
    - Languages and abstractions to implement network functions
    - Data-plane abstractions and new network protocols to efficiently federate decentralized computing
    - Decentralized security and discovery mechanisms
  - End-to-end orchestration of all kind of resources and functionalities





#RECONECTA 12 Telefónica

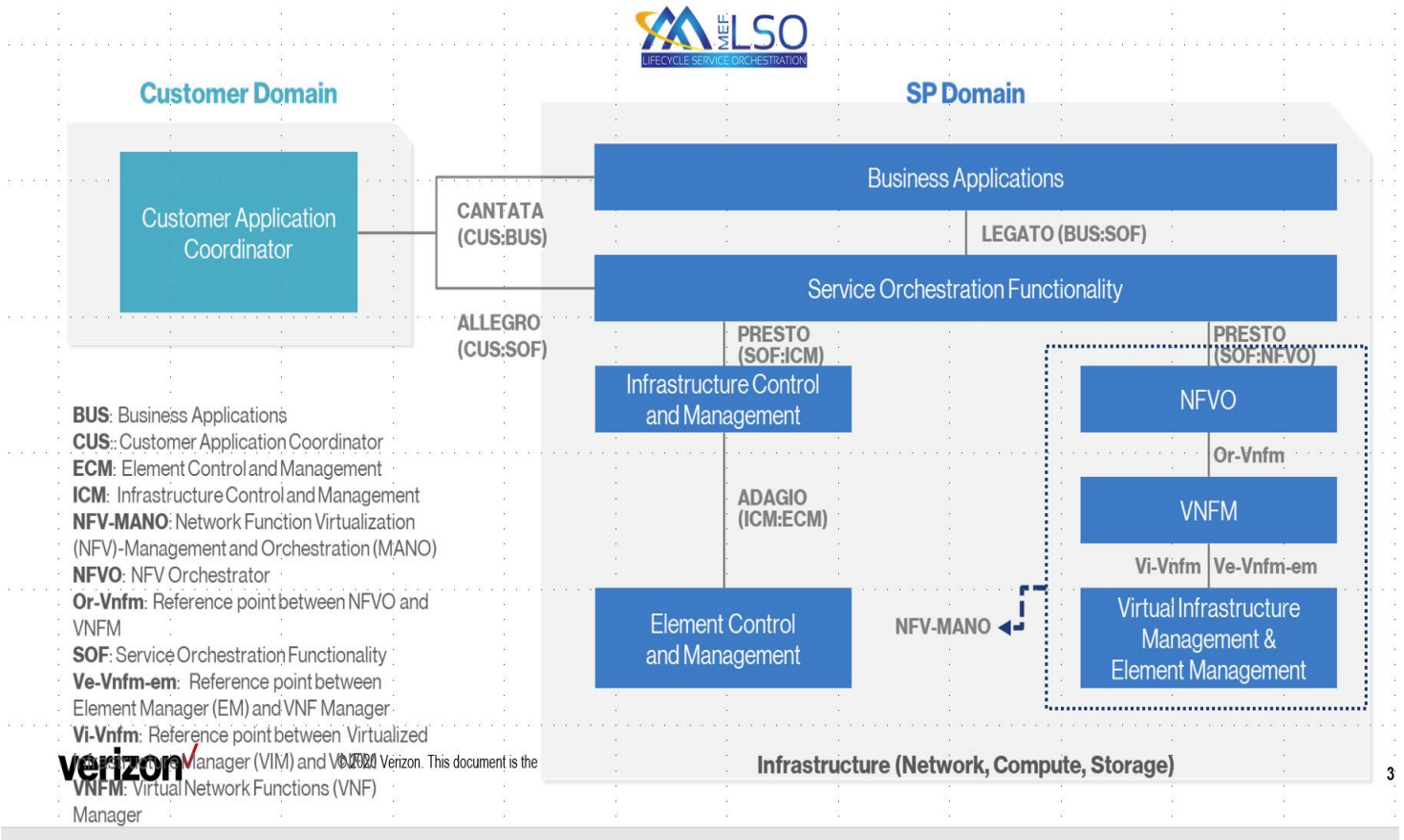
Mapping ETSI MEC Architecture to MEF LSO Architecture

Mehmet Toy, Ph.D
Ass. Fellow
Verizon

December 2020

verizon

Lifecycle Orchestration of MEC Services [MEF 55.1]



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2. Akraino Technology Information update - 5

Anuket – Telecom Reference Infrastructure for SDN Functions

Project Update

Sukhdev Kapur, Distinguished Engineer, Juniper Networks
Beth Cohen, Verizon

December 17, 2020

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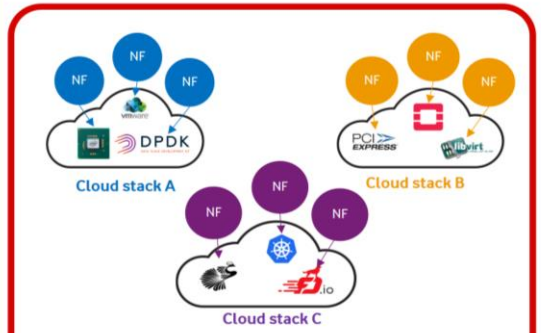
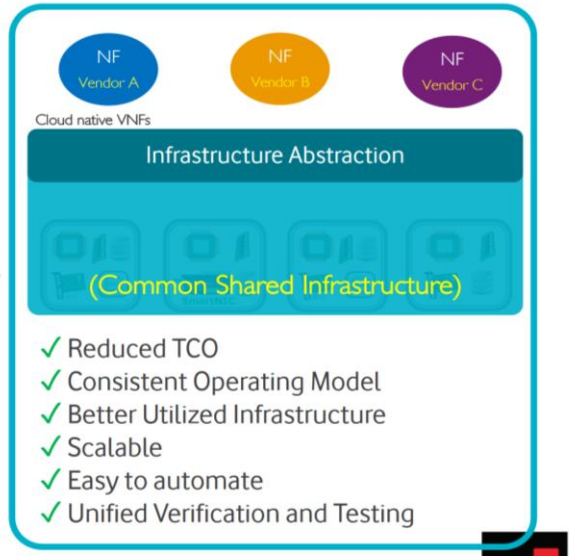
GSMA

Anuket | Problem Statement





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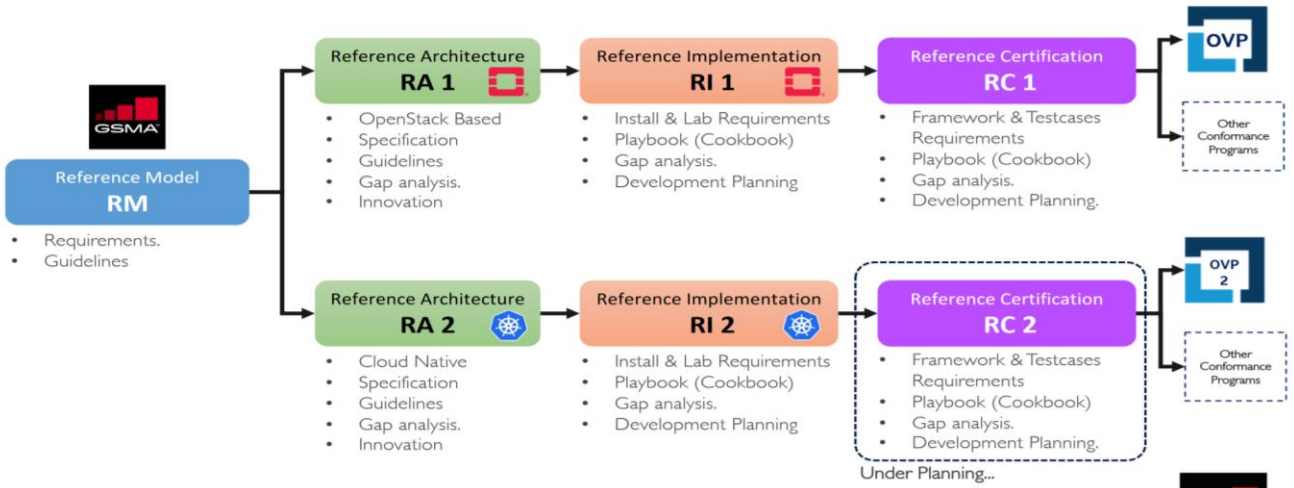
Anuket | Workstreams (WS)



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2. Akraino Technology Information update - 6

AWS Outposts and AWS Wavelength

An in-depth look at hybrid cloud use cases

Matt Lehwess
Principal Developer Advocate
AWS

Extending the cloud for a truly consistent hybrid experience

On-premises, Metro centers and the 5G edge

AWS OUTPOSTS

Fully managed AWS infrastructure delivered to virtually any customer datacenter or on-premises location

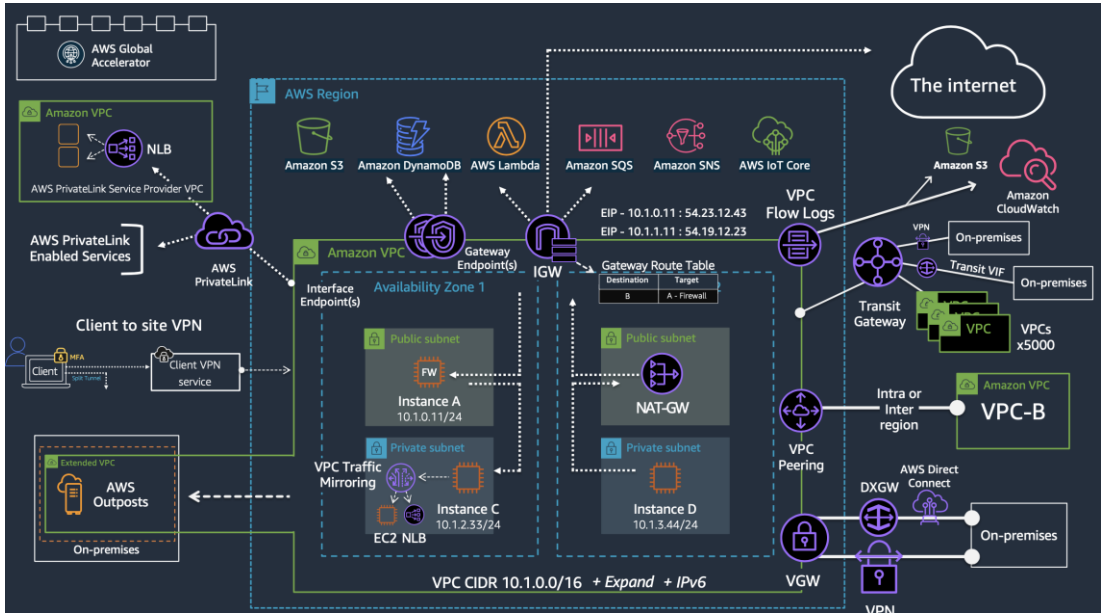
AWS LOCAL ZONES

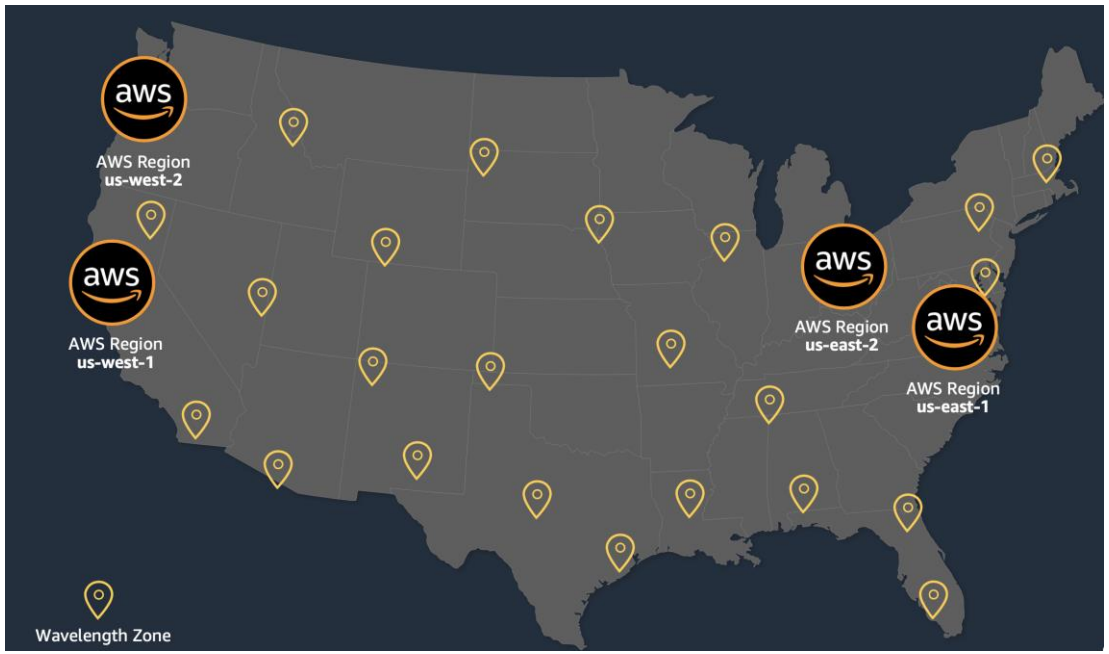
Places compute, storage, database, and select AWS services closer to where your end users are located

AWS WAVELENGTH

Embedded in 5G networks to extend AWS infrastructure, services, APIs, and tools

AKRAINO





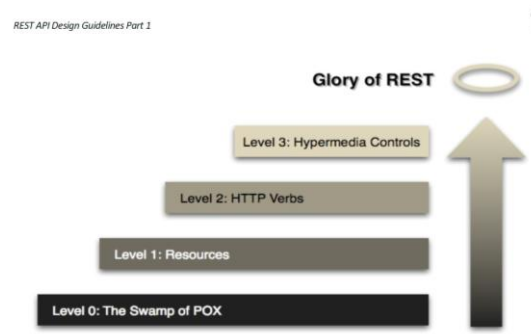
3. Akraino 2021 API related activities - 1

Akraino API Sub-committee TSC Mission:
Chair: Jeff Brower Co-Chair: Jane Shen

Develop an API Plan for the Akraino BPs Collaboration + Development.

The TSC has asked the API subcommittee to identify commonality between APIs, and possibly identify a “base” set of Akraino Edge Computing APIs.

This is future work, under discussion.



1.3 REST API SPECIFICATION INFORMATION

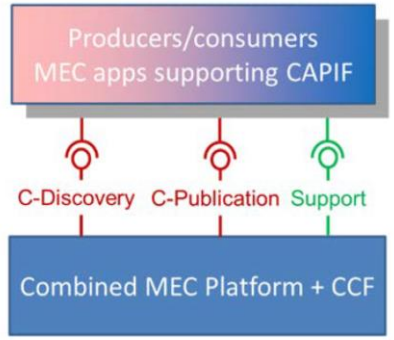


Figure 4.3.3-1: Fully-integrated hybrid deployment of CAPIF and MEC

3. Akraino 2021 API related activities - 2

Akraino Blueprint Projects R4 API Reporting Requirements

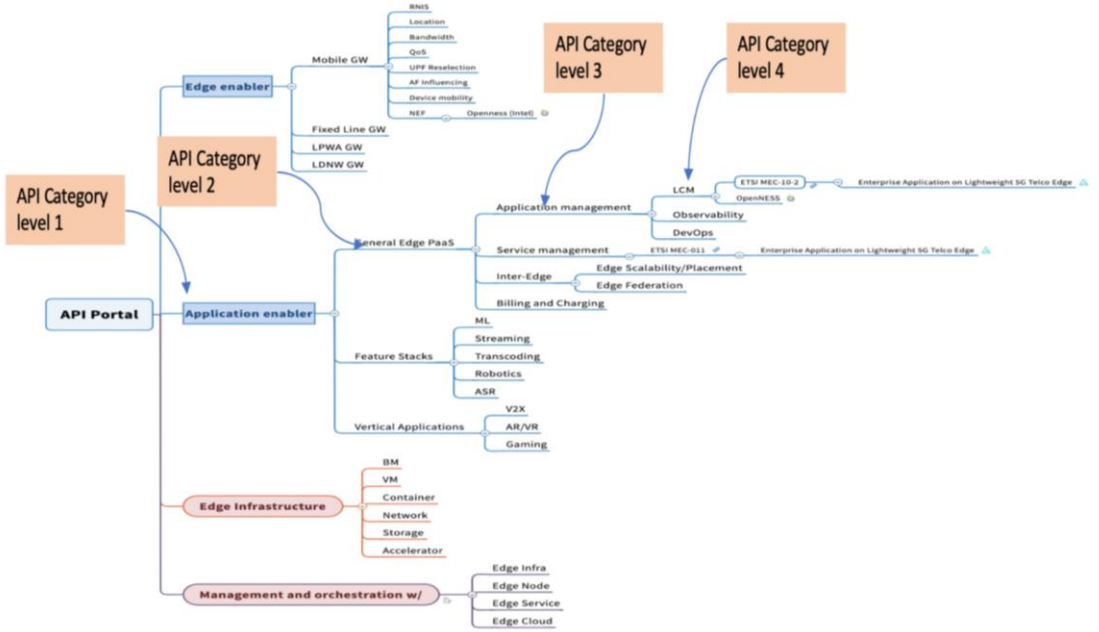
- All R4 BPs Project APIs will be organized and published on the API map page of the Akraino API Portal.

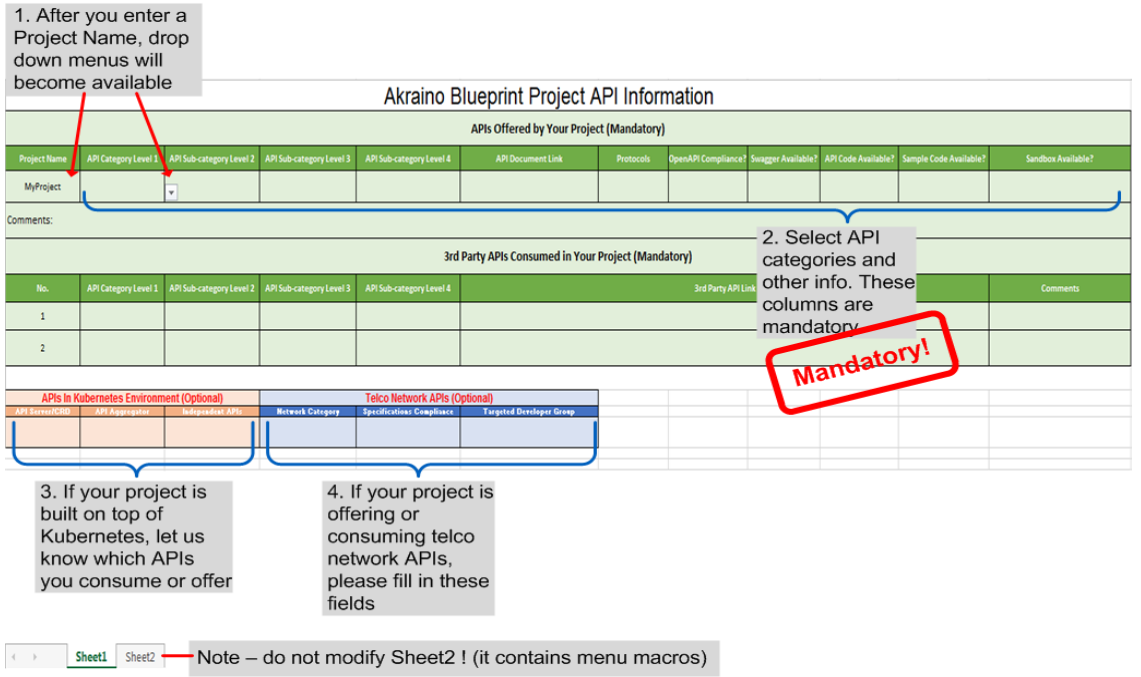
- The API Portal will include both:
  - API Map Navigation and
  - Search Capability

- In addition to BP Projects' mandatory baseline API info, optional information about:

(a) Telco Network Interface APIs, and
(b) Kubernetes Environment APIs Info will be collected.

This will be used to support:
- One-stop API Presentation,
- Analysis, Comparison, finding similar APIs, and
- Sandbox/Sample Code.





Questions?

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