LF Edge Akraino Project 2021 Annual Review to LF Edge TAC

February 9th, 2022 Rev A

Ike Alisson

Akraino TSC member & Documentation Sub-committee TSC Chair

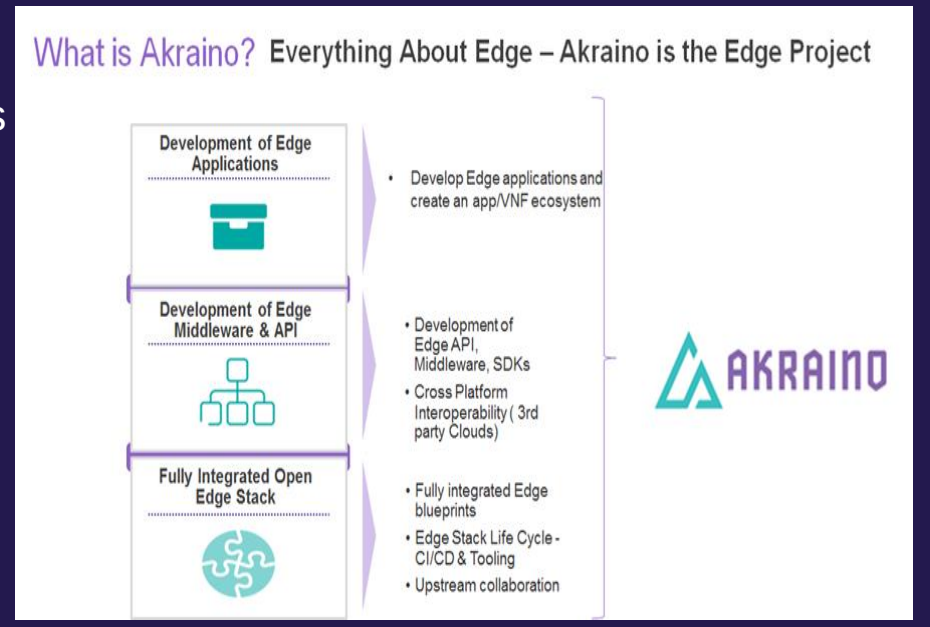
Contents

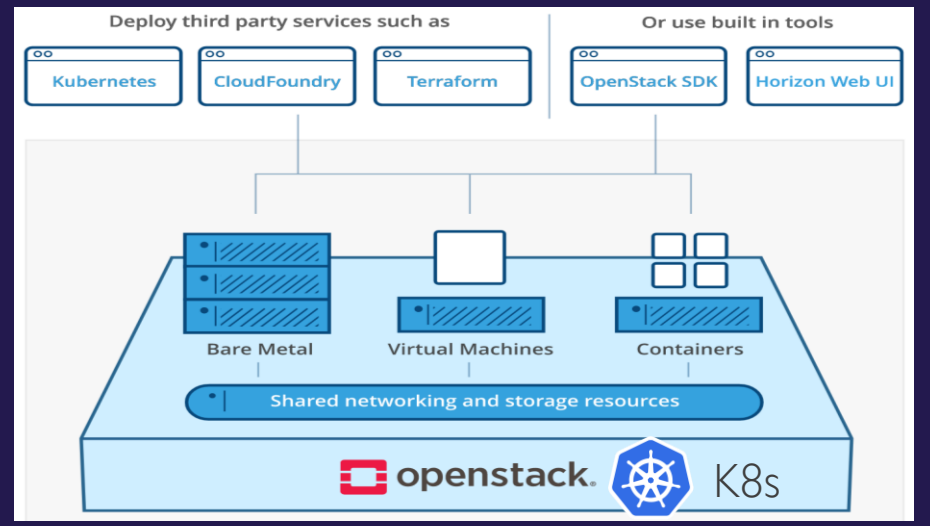
1. Akraino Overview
2. Akraino Internal Activities
3. Akraino External Activities
4. Questions

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

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

Objective: To deliver a fully integrated stack





Akraino Project (Blueprint) Lifecycle States and Reviews phases

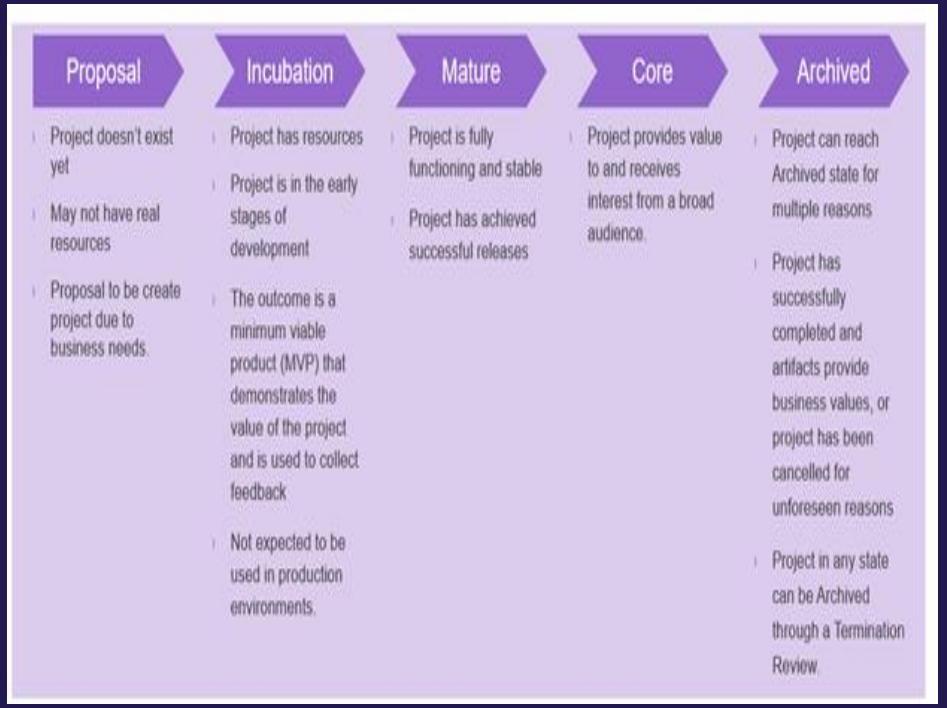
- Five (5) states that Projects goes through.

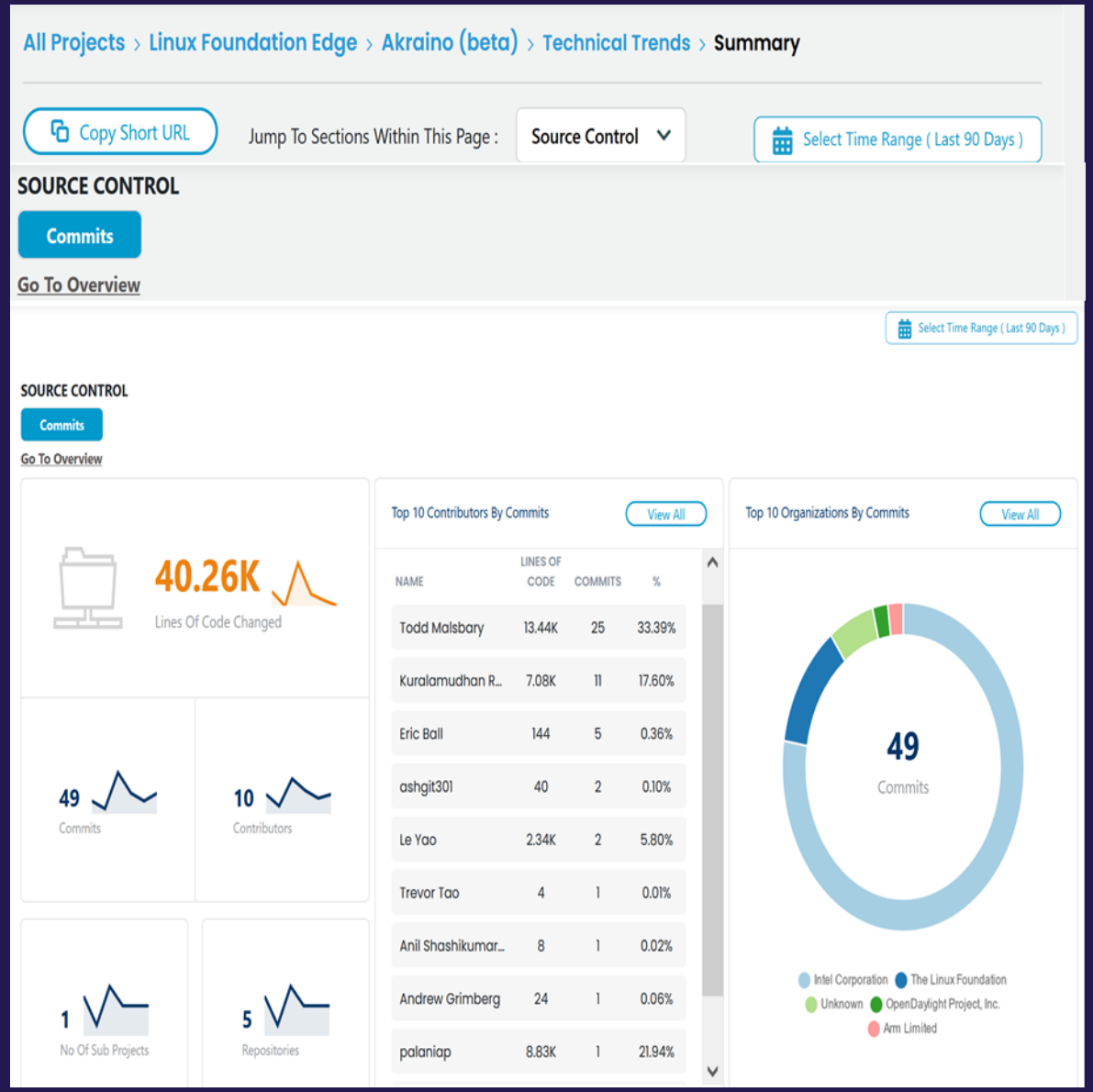
- A Project Lifecycle may **extend across** Multiple Projects & Akraino Releases

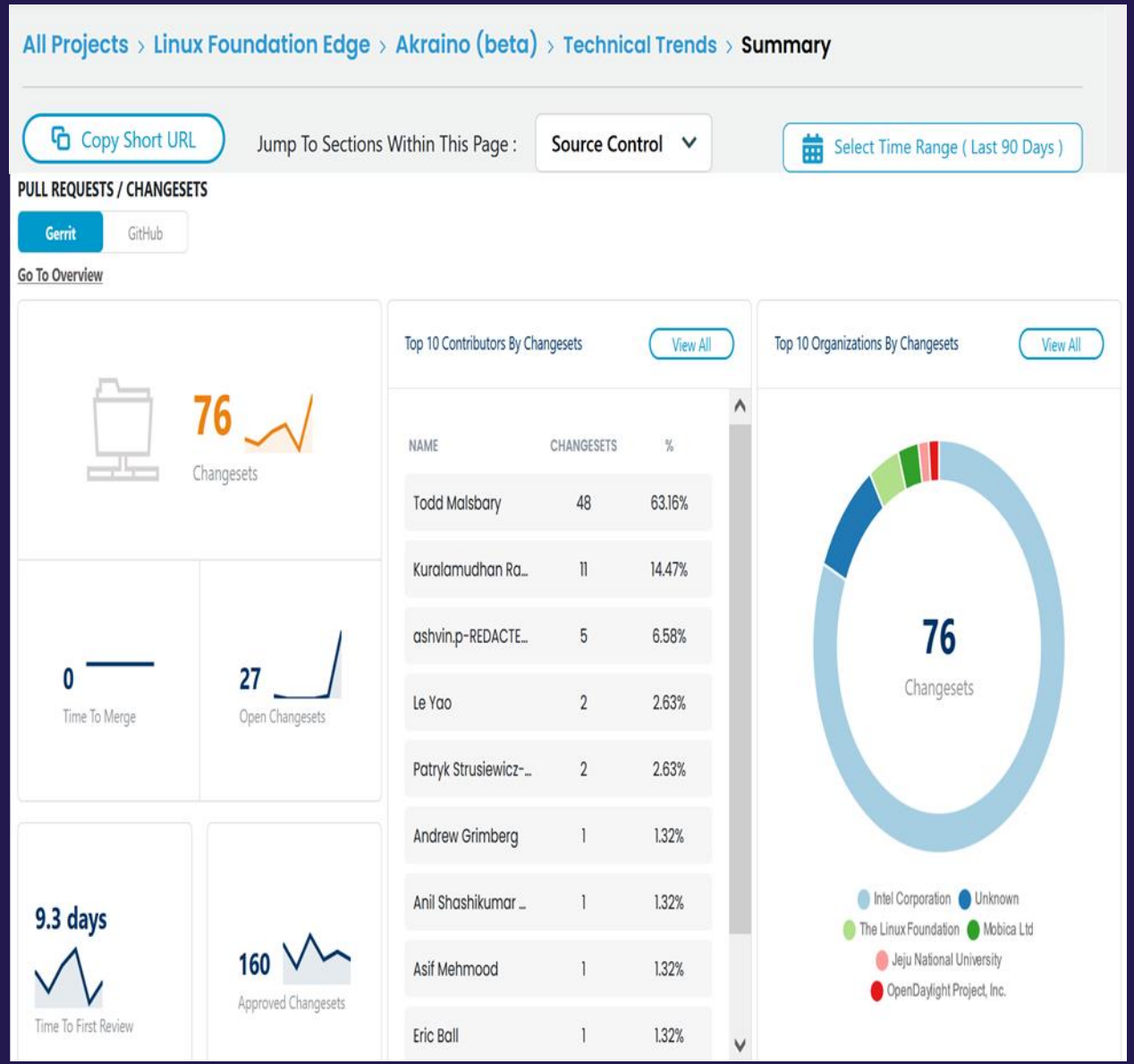
- The Procedure of moving from one (1) State to the next one is **independent from the Akraino Release Lifecycle** and the pace depends on each individual Project.

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

    1. Proposal,
    2. Incubation,
    3. Mature,
    4. Core
    5. Archived




All Projects › Linux Foundation Edge › Akraino (beta) › Technical Trends › Summary
Copy Short URL
Jump To Sections Within This Page :
Source Control
Select Time Range (Last 90 Days)
SOURCE CONTROL
Commits
Go To Overview
40.26K
Lines Of Code Changed
49
Commits
10
Contributors
1
No Of Sub Projects
5
Repositories
Top 10 Contributors By Commits
View All
NAME
LINES OF CODE
COMMITS
%
Todd Malsbary 13.44K 25 33.39%
Kuralamudhan R... 7.08K 11 17.60%
Eric Ball 144 5 0.36%
ashgit301 40 2 0.10%
Le Yao 2.34K 2 5.80%
Trevor Tao 4 1 0.01%
Anil Shashikumar... 8 1 0.02%
Andrew Grimberg 24 1 0.06%
palaniap 8.83K 1 21.94%
Top 10 Organizations By Commits
49
Commits
Intel Corporation
The Linux Foundation
Unknown
OpenDaylight Project, Inc.
Arm Limited


All Projects › Linux Foundation Edge › Akraino (beta) › Technical Trends › Summary
Copy Short URL
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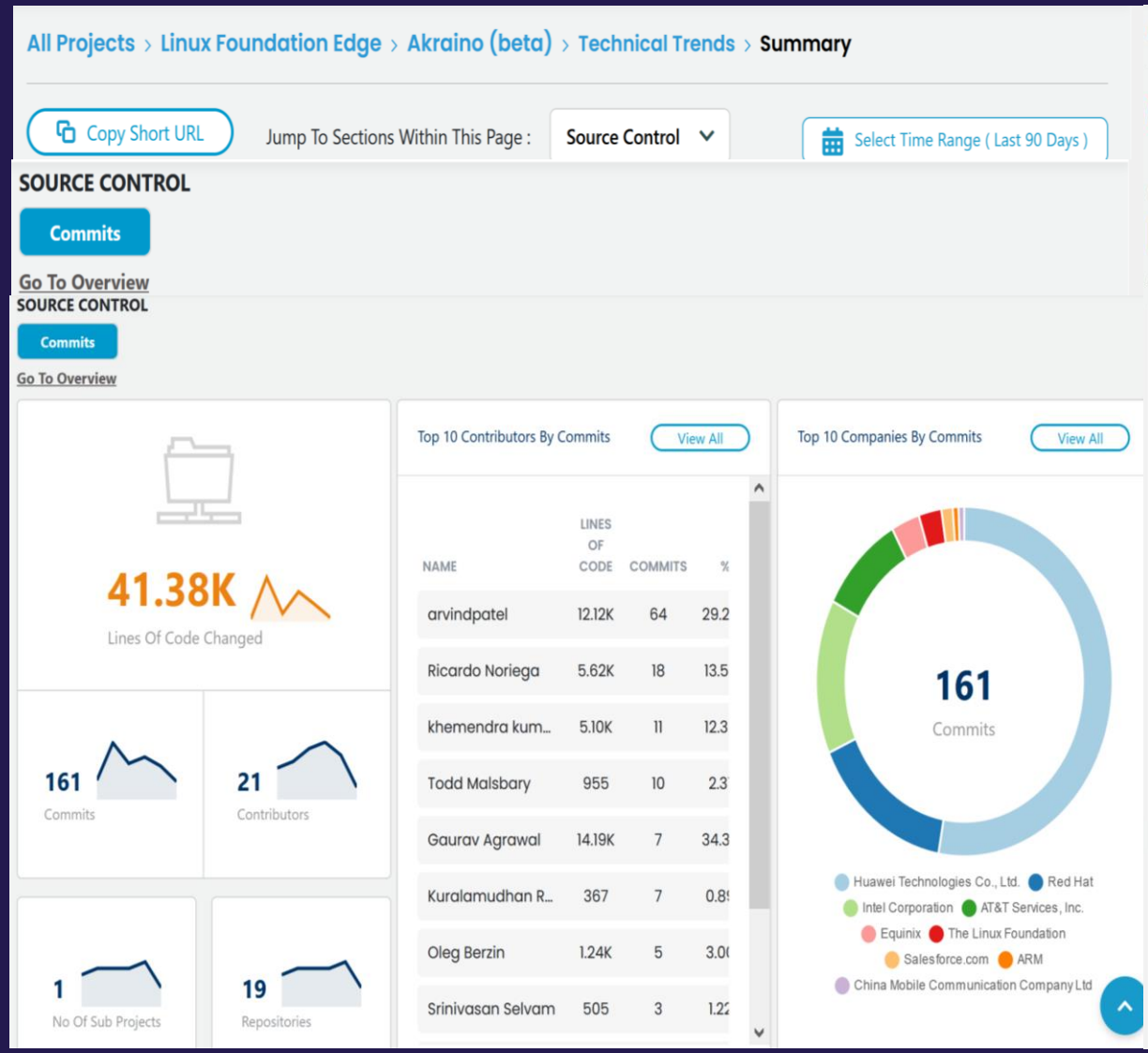
Source Control
Select Time Range (Last 90 Days)
PULL REQUESTS / CHANGESETS
Gerrit
GitHub
Go To Overview
76
Changesets
0
Time To Merge
27
Open Changesets
9.3 days
Time To First Review
160
Approved Changesets
Top 10 Contributors By Changesets
View All
NAME
CHANGESETS
%
Todd Malsbary 48 63.16%
Kuralamudhan Ra... 11 14.47%
ashvin.p-REDACTE... 5 6.58%
Le Yao 2 2.63%
Patryk Strusiewicz-... 2 2.63%
Andrew Grimberg 1 1.32%
Anil Shashikumar ... 1 1.32%
Asif Mehmood 1 1.32%
Eric Ball 1 1.32%
Top 10 Organizations By Changesets
View All
76
Changesets
Intel Corporation
Unknown
The Linux Foundation
Mobica Ltd
Jeju National University
OpenDaylight Project, Inc.


All Projects › Linux Foundation Edge › Akraino (beta) › Technical Trends › Summary
Copy Short URL
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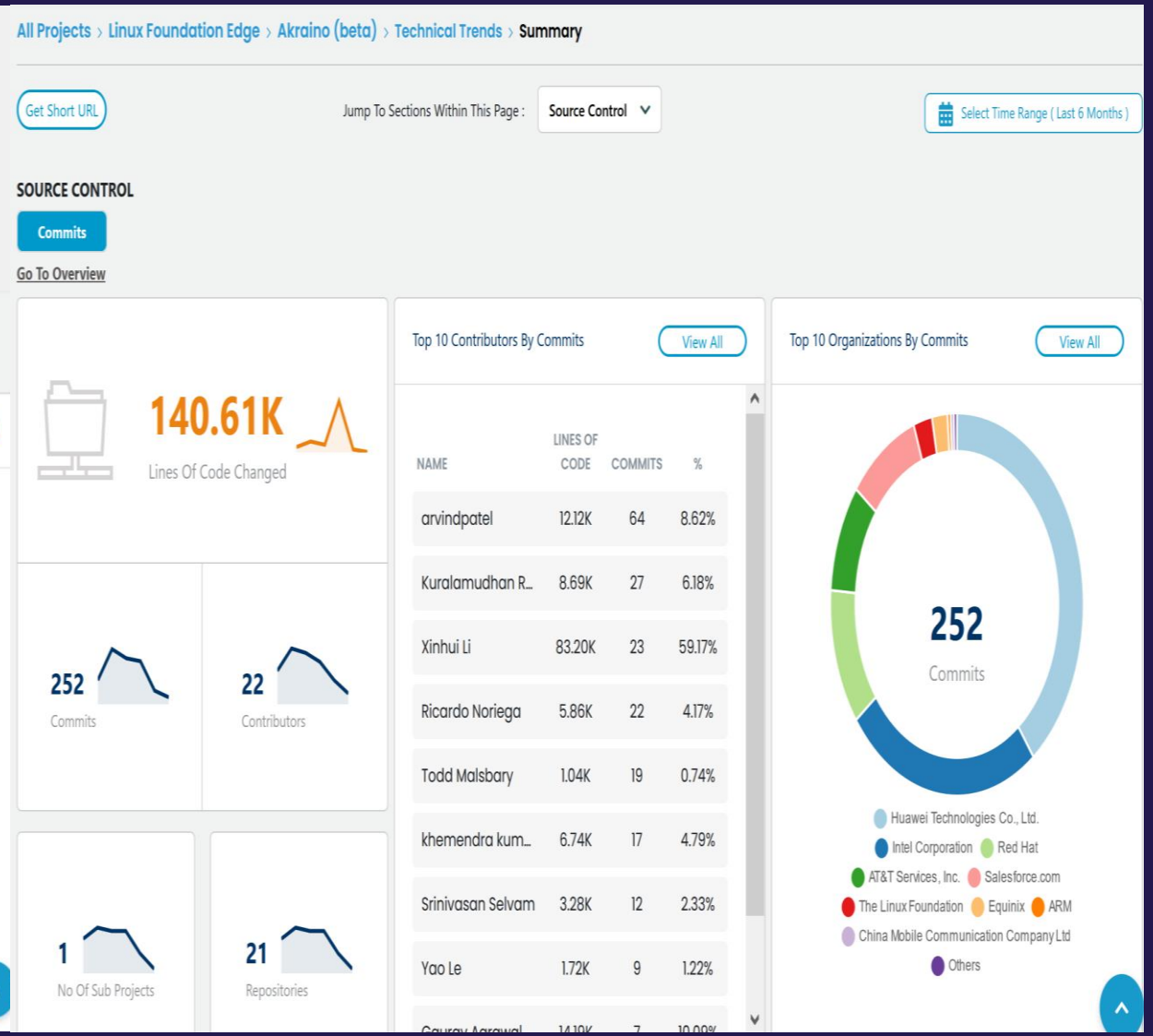
Source Control
Select Time Range (Last 90 Days)
SOURCE CONTROL
Commits
Go To Overview
41.38K
Lines Of Code Changed
161
Commits
21
Contributors
1
No Of Sub Projects
19
Repositories
Top 10 Contributors By Commits
View All
NAME
LINES OF CODE
COMMITS
%
arvindpatel 12.12K 64 29.2
Ricardo Noriega 5.62K 18 13.5
khemendra kum... 5.10K 11 12.3
Todd Malsbary 955 10 2.3
Gaurav Agrawal 14.19K 7 34.3
Kuralamudhan R... 367 7 0.8
Oleg Berzin 1.24K 5 3.0
Srinivasan Selvam 505 3 1.2
Top 10 Companies By Commits
View All
161
Commits
Huawei Technologies Co., Ltd.
Red Hat
Intel Corporation
AT&T Services, Inc.
Equinix
The Linux Foundation
Salesforce.com
ARM
China Mobile Communication Company Ltd


All Projects › Linux Foundation Edge › Akraino (beta) › Technical Trends › Summary
Get Short URL
Jump To Sections Within This Page :
Source Control
Select Time Range (Last 6 Months)
SOURCE CONTROL
Commits
Go To Overview
140.61K
Lines Of Code Changed
252
Commits
22
Contributors
1
No Of Sub Projects
21
Repositories
Top 10 Contributors By Commits
View All
NAME
LINES OF CODE
COMMITS
%
arvindpatel 12.12K 64 8.62%
Kuralamudhan R... 8.69K 27 6.18%
Xinhui Li 83.20K 23 59.17%
Ricardo Noriega 5.86K 22 4.17%
Todd Malsbary 1.04K 19 0.74%
khemendra kum... 6.74K 17 4.79%
Srinivasan Selvam 3.28K 12 2.33%
Yao Le 1.72K 9 1.22%
Top 10 Organizations By Commits
View All
252
Commits
Huawei Technologies Co., Ltd.
Intel Corporation
Red Hat
AT&T Services, Inc.
Salesforce.com
The Linux Foundation
Equinix
ARM
China Mobile Communication Company Ltd
Others

AKRAINO

03/01/2021 - 03/03/2021 Akraino Technical Meetings - Spring

Summary

› Agenda:- R5 planning, 2021 priorities for the community, labs, developer sync-up
› Dates: March 1st to 3rd, 2021

> All the time mentioned here is PT, California time.

> Register for the event at https://events.linuxfoundation.org/akraino-technical-meetings-spring/

> Speakers please upload the presentation before the meeting starts.

> Akraino PowerPoint/Google Slides Template

Meeting Agenda Lead: @Tina Tsou , Akraino TSC Chair

Please submit any questions about this event to tsc@lists.akraino.org in the #akraino channel on https://slack.lfedge.org/

Meeting Recordings

- **Day 1:** https://zoom.us/rec/share/a-t4W7MZJjVP7_D3o505OkbPX7SQg9BHIPuMP2cJat5Z3dN-ZhqESojOTRYHV8Gm.RlueAB0KcgFBEikB?startTime=1614609817000 (Part 1)
- https://zoom.us/rec/share/a-t4W7MZJjVP7_D3o505OkbPX7SQg9BHIPuMP2cJat5Z3dN-ZhqESojOTRYHV8Gm.RlueAB0KcgFBEikB?startTime=1614641824000 (Part 2)
- **Day 2:** https://zoom.us/rec/share/uiBs_eUEkdKiEPMY-pkdCs1xytBvweEMjTMx64YfUEmHuumU07Hf8TWI2gyXTiJi.OWxZyKbSqOQFprpj?startTime=1614696618000
- **Day 3:** https://zoom.us/rec/share/wcxUiNydslG2o5lBeriDRKy6ZsdT68o5wSl7TNjgm4BXN9Yj2n9-

Tuesday, 2021-mar-02

Meeting Location: Zoom (https://zoom.us/j/97031339119?pwd=U2FXM1RJU1BvRGFvOUt5dDZaTmp2Zz09 Passcode: 134822)

Meeting Recording - Day 2: https://zoom.us/rec/share/uiBs_eUEkdKiEPMY-pkdCs1xytBvweEMjTMx64YfUEmHuumU07Hf8TWI2gyXTiJi.OWxZyKbSqOQFprpj?startTime=1614696618000

Time	Topics
7:15 am - 7:45 am	TSC Members Sharing Technical Steering Committee (TSC) 2020-2021
7:45 am - 8:05 am	Open Source Networking, Edge, and Access - Arpit Joshipura, Linu Foundation

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09/22/2021 - 09/24/2021 Akraino Technical Meetings - Fall

Summary

› Agenda:- R6 planning, 2021 priorities for the community, labs, developer sync-up
› Dates: September 22nd to 24th, 2021

> All the time mentioned here is PT, California time.

WEDNESDAY, SEPTEMBER 22 (North America time zone friendly)

09:00 – 10:30 PDT (UTC-7) 12:00 – 13:30 EDT (UTC-4) 18:00 – 19:30 CEST (UTC+2) 00:00 – 01:30 CST (UTC+8) *(Thursday)*	**Keynote Sessions**
10:30 – 10:45 PDT (UTC-7) 13:30 – 13:45 EDT (UTC-4) 19:30 – 19:45 CEST (UTC+2) 01:30 – 01:45 CST (UTC+8) *(Thursday)*	**Break**
10:45 – 12:00 PDT (UTC-7) 13:45 – 15:00 EDT (UTC-4) 19:45 – 21:00 CEST (UTC+2) 01:45 – 03:00 CST (UTC+8) *(Thursday)*	**Keynote Sessions Resume**

THURSDAY, SEPTEMBER 23 (APAC time zone friendly)

18:00 – 19:30 PDT (UTC-7) 21:00 – 22:30 EDT (UTC-4) 03:00 – 04:30 CEST (UTC+2) *(Friday)* 09:00 – 10:30 CST (UTC+8) *(Friday)*	**Keynote Sessions**
19:30 – 19:45 PDT (UTC-7) 22:30 – 22:45 EDT (UTC-4) 04:30 – 04:45 CEST (UTC+2) *(Friday)* 10:30 – 10:45 CST (UTC+8) *(Friday)*	**Break**
19:45 – 21:00 PDT (UTC-7) 22:45 – 24:00 EDT (UTC-4) 04:45 – 06:00 CEST (UTC+2) *(Friday)* 10:45 – 12:00 CST (UTC+8) *(Friday)*	**Keynote Sessions Resume**

Thursday, 2021-sep-23

Meeting Location: Zoom: https://zoom.us/j/96204631964?pwd=RGZBZmdoUnhadjdkSUJZekxHMnVpUT09

Meeting Recording - Day 2: https://zoom.us/rec/share/ebe8WfCM8LcOasRr8GR_I0hwUVcpI4-pNxgwBCInLe87E_VRIe-IwXmcGnPGnM70.8oUQ8K8g7gzm3tuu?startTime=1632444412000

Time Zone: All times below are US Pacific Time Zone

Time	Topics
6:15 pm - 6:30 pm	Edge AI Cloud Native Brief Introduction @.叶王 (Wang Ye), Baidu 
6:30 pm - 6:40 pm	IoT/edge social implementation example @ Fukano Haruhisa ,Yamada Kenji, Fujitsu

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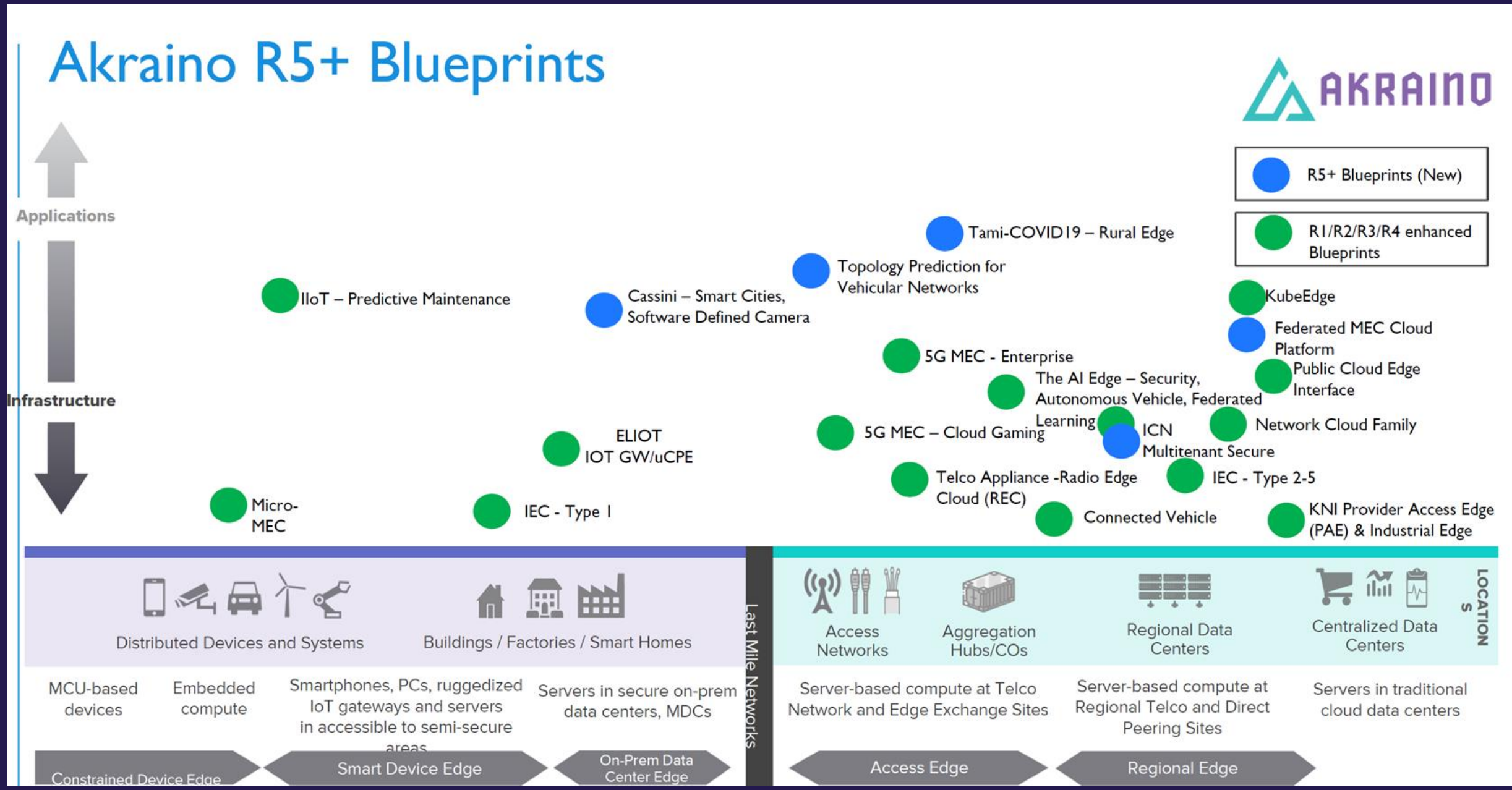
Akraino R5+ Blueprints
AKRAINO
R5+ Blueprints (New)
R1/R2/R3/R4 enhanced Blueprints
Applications
Infrastructure
Tami-COVID19 – Rural Edge
Topology Prediction for Vehicular Networks
IIoT – Predictive Maintenance
Cassini – Smart Cities, Software Defined Camera
KubeEdge
Federated MEC Cloud Platform
5G MEC - Enterprise
Public Cloud Edge Interface
The AI Edge – Security, Autonomous Vehicle, Federated Learning
ELIOT IOT GW/uCPE
5G MEC – Cloud Gaming
ICN Multitenant Secure
Network Cloud Family
Telco Appliance -Radio Edge Cloud (REC)
IEC - Type 2-5
Micro-MEC
IEC - Type 1
Connected Vehicle
KNI Provider Access Edge (PAE) & Industrial Edge
Distributed Devices and Systems
Buildings / Factories / Smart Homes
Last Mile Networks
Access Networks
Aggregation Hubs/COs
Regional Data Centers
Centralized Data Centers
LOCATIONS
MCU-based devices
Embedded compute
Smartphones, PCs, ruggedized IoT gateways and servers in accessible to semi-secure areas
Servers in secure on-prem data centers, MDCs
Server-based compute at Telco Network and Edge Exchange Sites
Server-based compute at Regional Telco and Direct Peering Sites
Servers in traditional cloud data centers
Constrained Device Edge
Smart Device Edge
On-Prem Data Center Edge
Access Edge
Regional Edge

LF EDGE

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Release 5 - October 2021

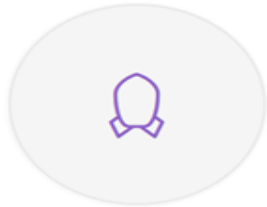
New Blueprints for R5

Smart Cities

Read More

MEC-based Stable Topology Prediction for Vehicular Networks

Read More



Multitenant Secure Cloud Native platform (ICN-MTSCN)

Read More

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AKRAINO
Release 5 - October 2021

R5 Updates to Existing Blue Prints

- Connected Vehicles — Read More
- IEC Type 4: AR/VR oriented Edge Stack for Integrated Edge Cloud (IEC) Blueprint Family — Read More
- ICN – Integrated Cloud-Native Family — Read More
- ELIOT IoT Gateway Blueprint — Read More
- ELIOT SD-WAN/WAN Edge/uCPE Blueprint — Read More
- Network Cloud and TF (Tungsten Fabric) Integration Project Network Cloud and TF (Tungsten Fabric) Integration Project — Read More
- KNI Provider Access Edge — Read More
- KNI Industrial Edge — Read More
- The AI Edge: School/Education Video Security Monitoring — Read More
- The AI Edge: Intelligent Vehicle-Infrastructure Cooperation System(I-VICS) — Read More
- 5G MEC/Slice System to Support Cloud Gaming, HD Video and Live Broadcasting Blueprint — Read More
- IEC Type 3: Android cloud native applications on Arm servers in edge for Integrated Edge Cloud (IEC) Blueprint Family — Read More
- IEC Type 5: SmartNIC for Integrated Edge Cloud (IEC) Blueprint Family — Read More
- Enterprise Applications on Lightweight 5G Telco Edge — Read More
- Public Cloud Edge Interface (PCEI) BlueprintPublic Cloud Edge Interface (PCEI) Blueprint — Read More
- IoT Workloads at the Smart Device Edge – Predictive Maintenance (with a Thermal Imaging Camera, vibration sensors, etc.) — Read More
- The AI Edge: Federated ML application at edge — Read More
- KubeEdge Edge Service Blueprint — Read More
- Private LTE/5G ICN Blueprint — Read More
- IEC Type 2 for Integrated Edge Cloud (IEC) Blueprint Family — Read More

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09/28/2021 Akraino R5 Webinar: Expanding the Edge

Skapad av Tina Tsou, senast ändrad av Asif Mehmood den sep 28, 2021

VIRTUAL SCHEDULE AT-A-GLANCE

Tuesday, SEPTEMBER 28

09:00 – 10:00 PDT (UTC-7)
12:00 – 13:00 EDT (UTC-4)
18:00 – 19:00 CEST (UTC+2)
00:00 – 01:00 CST (UTC+8) *(Thursday)*

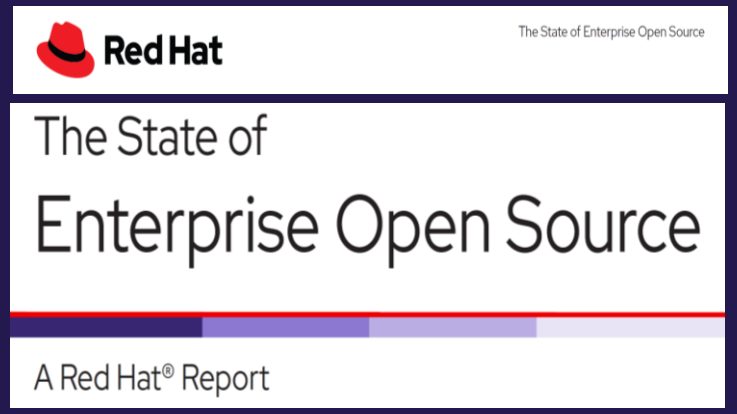
Date Time: Sep 28, 2021 09:00 AM Pacific Time (US and Canada)
Topic: Akraino R5: Expanding the Edge

Here is the link to register for the webinar -- please share this with your friends and colleagues: https://zoom.us/webinar/register/WN_xnujjJxiTJa9irf9h0_rrw

Description: Akraino is an open source software stack that improves the state of edge cloud infrastructure for carrier, provider, and IoT networks. It offers new levels of flexibility to scale edge cloud services quickly, to maximize the applications or subscribers supported on each server, and to help ensure the reliability of systems that must be up at all times.

Join the community for a webinar outlining the newest blue prints available in the latest release, Akraino R5, covering new uses cases for:

AKRAINO

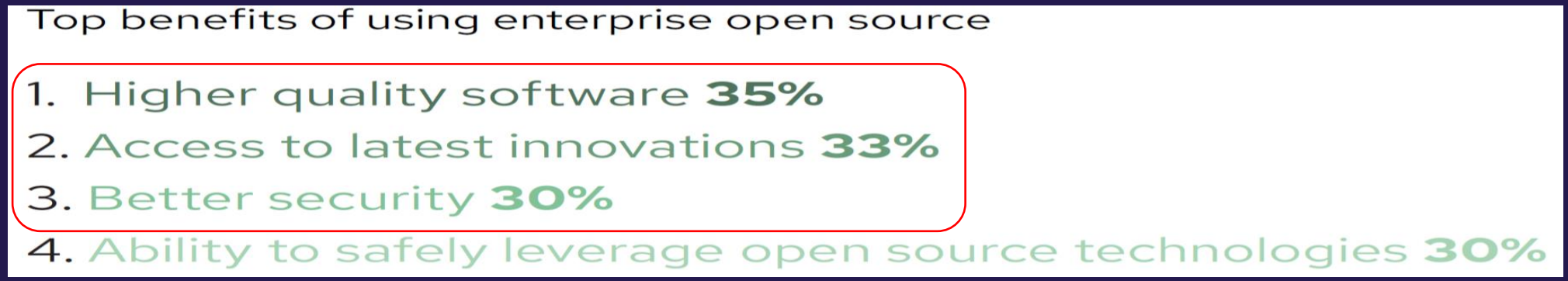


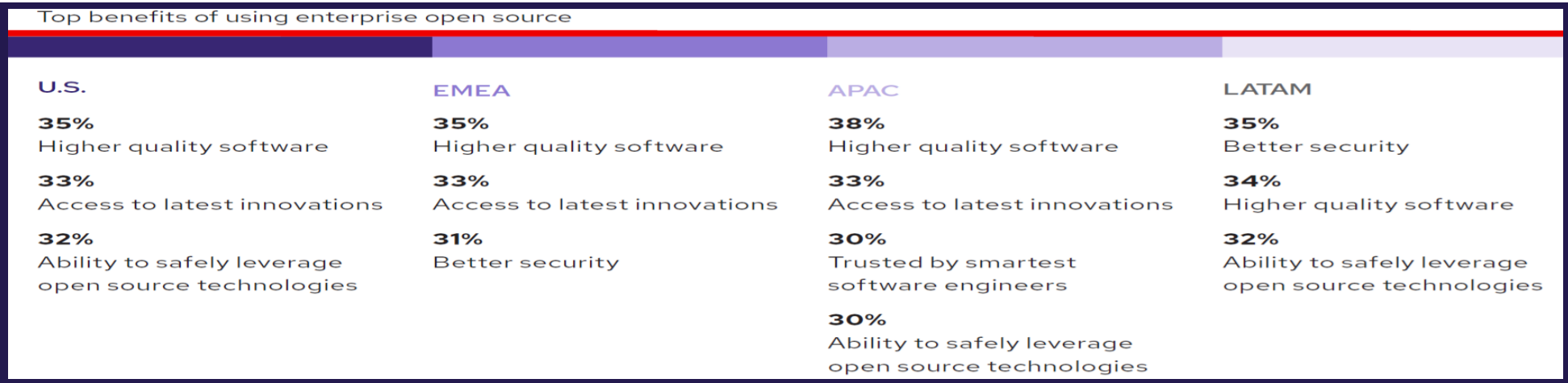
In a stand-out finding of interest to our Telco Customers, 95% of respondents from the Telecommunications Industry report using Open Source.

The high-level takeaway of the report is that: "using Open Source SW across all Industries is no longer principally about making best use of IT Budgets.

Lower Cost of Ownership has fallen off the top spot and now sits in sixth (6th) position.

Today, the Strategic Benefits of using Open Source are valued more, including:





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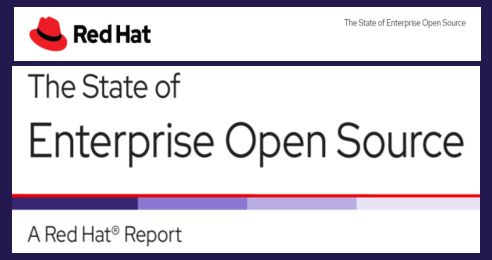
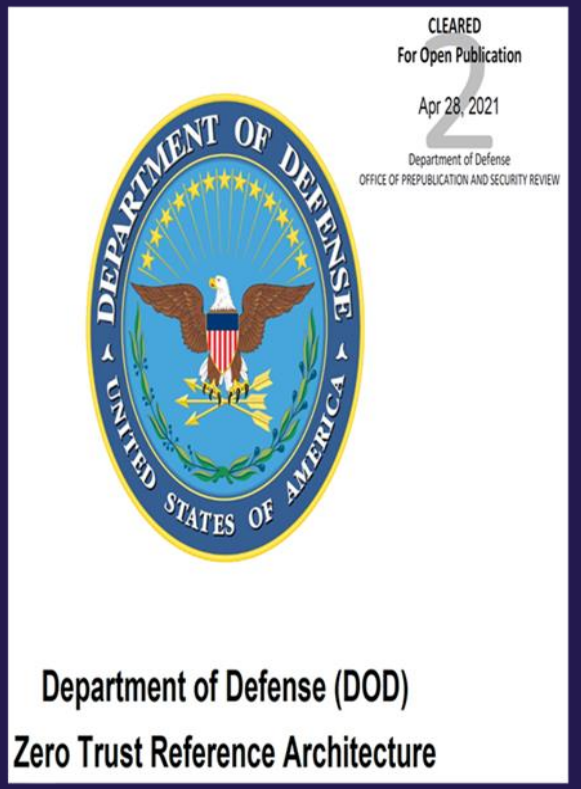

Red Hat
The State of Enterprise Open Source
The State of
Enterprise Open Source
A Red Hat® Report


INNOVATION


SOFTWARE


CLEARED
For Open Publication
Apr 28, 2021
Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW
DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA
Department of Defense (DOD)
Zero Trust Reference Architecture


Zero Trust Architecture
Scott Rose
Oliver Borchert
Stu Mitchell
Sean Connelly
This publication is available free of charge from:
https://doi.org/10.6028/NIST.SP.800-207
COMPUTER SECURITY
NIST
National Institute of Standards and Technology
U.S. Department of Commerce

AKRAINO

Akraino Edge Stack
Security Sub-Committee

September 24, 2021

Daniil Egranov
Security Sub-Committee Co-Chair, Akraino

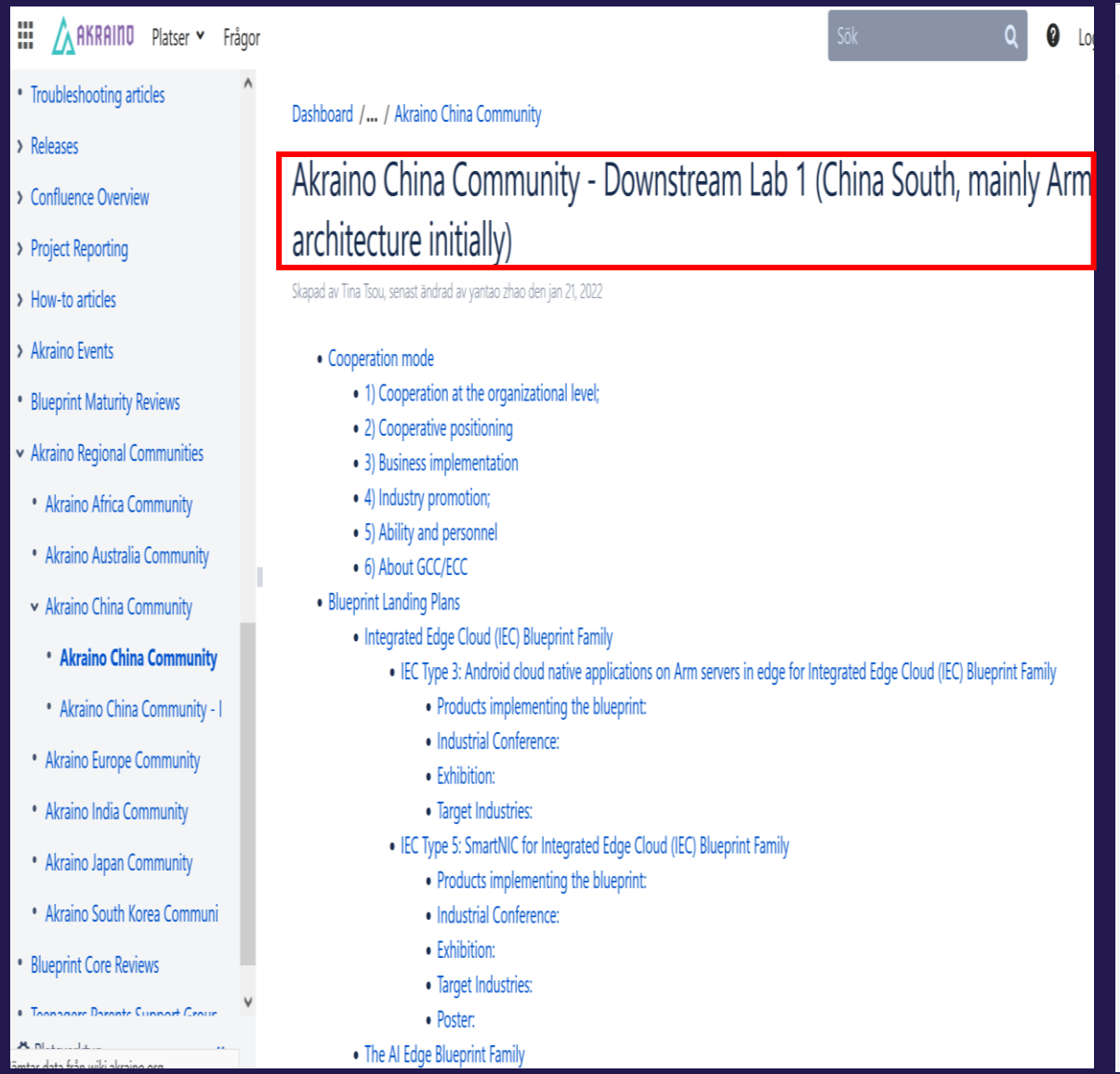
Randy Stricklin
Security Sub-Committee Chair, Akraino

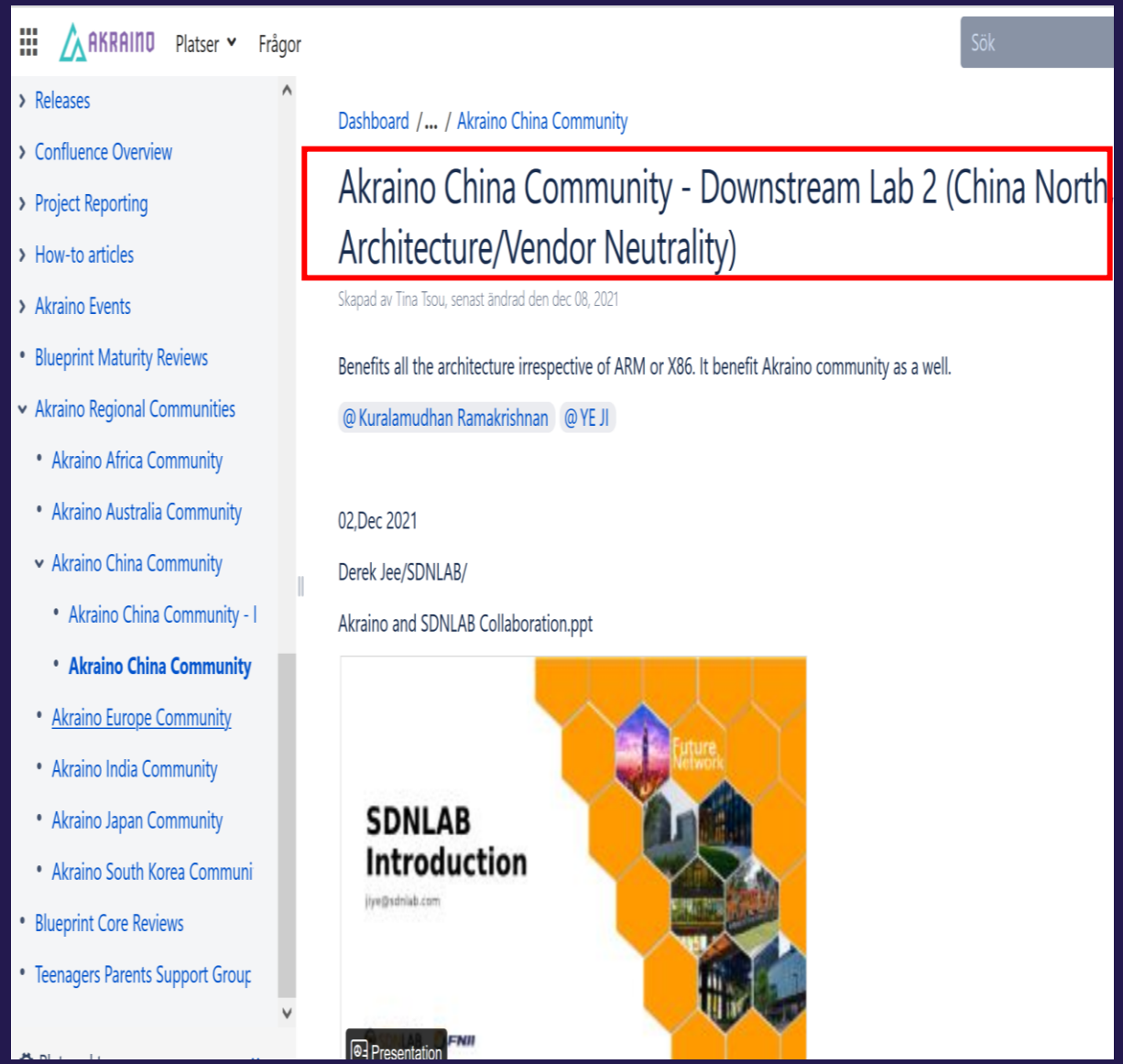
Akraino Security Team 2021 Accomplishments

- Automated Lynis, Vuls and Kube-Hunter Log Output Pass/Fail Analysis
- Lynis – Reviewed Required Tests
  - Formalized and Documented Lynis Incubation vs Maturity Requirements
- Platform Security for Akraino Blueprints
  - Arm
  - x86
- Release 4 and 5 Blueprint Reviews

Akraino Security Team Future Plans - 2022

- Develop Minimum OS Version Support Document
  - Ubuntu, CentOS, RHEL CoreOS, Debian
- Develop Minimum Security Tool Version Support Document
  - Lynis, Vuls, Kube-Hunter, and OVAL (Vuls) database
- BluVal (Blueprint Validation):
  - Integrate Automated Lynis, Vuls and Kube-Hunter Pass/Fail
  - Enforce minimum versions of Vuls, Lynis and Kube-Hunter
- Version 1.0 Platform Security Whitepaper
- Investigate using LFX Security


AKRAINO
Platser
Frågor
Sök
Troubleshooting articles
Releases
Confluence Overview
Project Reporting
How-to articles
Akraino Events
Blueprint Maturity Reviews
Akraino Regional Communities
Akraino Africa Community
Akraino Australia Community
Akraino China Community
Akraino China Community
Akraino China Community - I
Akraino Europe Community
Akraino India Community
Akraino Japan Community
Akraino South Korea Communi
Blueprint Core Reviews
Dashboard / ... / Akraino China Community
Akraino China Community - Downstream Lab 1 (China South, mainly Arm architecture initially)
Skapad av Tina Tsou, senast ändrad av yantao zhao den jan 21, 2022
Cooperation mode
1) Cooperation at the organizational level;
2) Cooperative positioning
3) Business implementation
4) Industry promotion;
5) Ability and personnel
6) About GCC/ECC
Blueprint Landing Plans
Integrated Edge Cloud (IEC) Blueprint Family
IEC Type 3: Android cloud native applications on Arm servers in edge for Integrated Edge Cloud (IEC) Blueprint Family
Products implementing the blueprint:
Industrial Conference:
Exhibition:
Target Industries:
IEC Type 5: SmartNIC for Integrated Edge Cloud (IEC) Blueprint Family
Products implementing the blueprint:
Industrial Conference:
Exhibition:
Target Industries:
Poster:
The AI Edge Blueprint Family


AKRAINO
Platser
Frågor
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Releases
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Project Reporting
How-to articles
Akraino Events
Blueprint Maturity Reviews
Akraino Regional Communities
Akraino Africa Community
Akraino Australia Community
Akraino China Community
Akraino China Community - I
Akraino China Community
Akraino Europe Community
Akraino India Community
Akraino Japan Community
Akraino South Korea Communi
Blueprint Core Reviews
Teenagers Parents Support Group
Dashboard / ... / Akraino China Community
Akraino China Community - Downstream Lab 2 (China North Architecture/Vendor Neutrality)
Skapad av Tina Tsou, senast ändrad den dec 08, 2021
Benefits all the architecture irrespective of ARM or X86. It benefit Akraino community as a well.
@ Kuralamudhan Ramakrishnan
@ YE JI
02,Dec 2021
Derek Jee/SDNLAB/
Akraino and SDNLAB Collaboration.ppt
SDNLAB
Introduction
Future Network
Presentation


Tina Tsou
Top Akrainoian
Integrated Cloud Native (ICN)
Top Blueprint of the Year

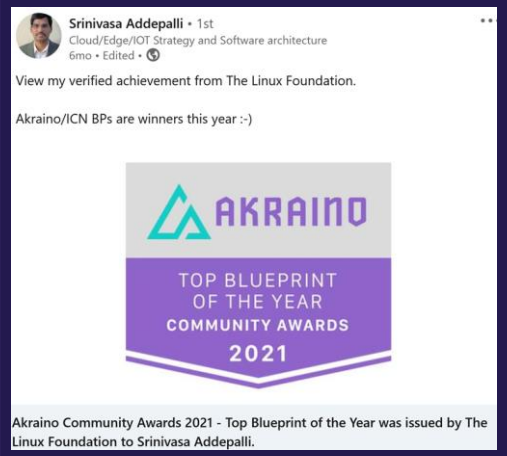

Ting Zou (Tina Tsou) • 1st
Technical Executive Leadership
5mo •
View my verified achievement from The Linux Foundation.
AKRAINO
WOMAN OF THE YEAR
COMMUNITY AWARDS
2021
Akraino Community Awards 2021 - Woman of the Year was issued by The Linux Foundation to Tina Tsou.

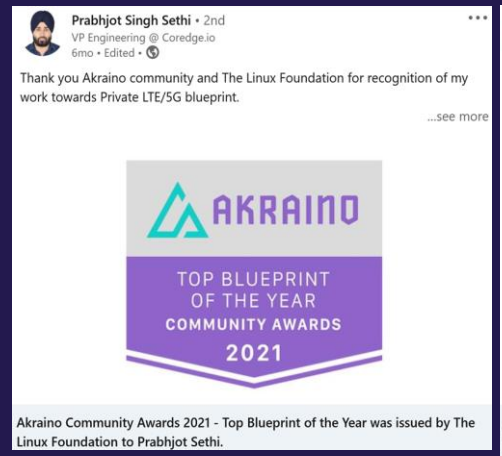

AKRAINO
TOP AKRAINOIAN
COMMUNITY AWARDS
2021

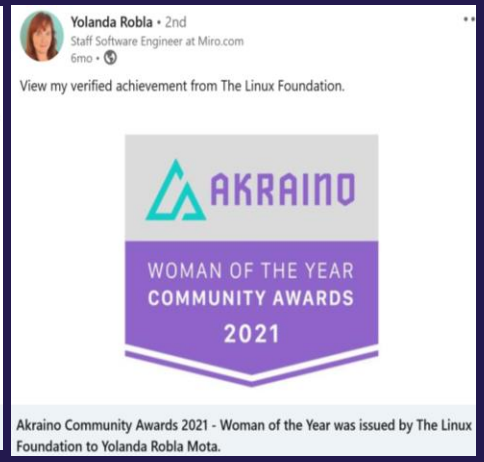

Oleg Berzin • 1st
Fellow, Technology and Architecture, Office of the CTO
6mo •
View my verified achievement from The Linux Foundation.
AKRAINO
TOP BLUEPRINT
OF THE YEAR
COMMUNITY AWARDS
2021
Akraino Community Awards 2021 - Top Blueprint of the Year was issued by The Linux Foundation to Oleg Berzin.

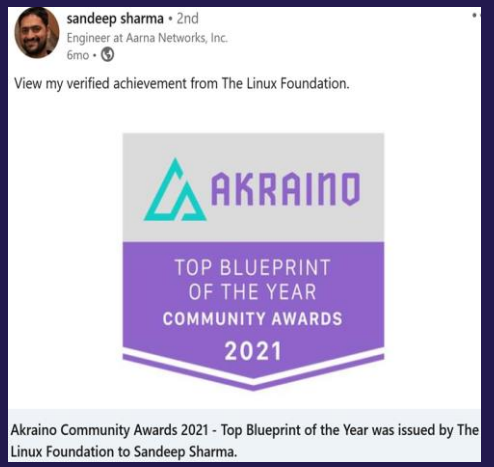

Kuralamudhan Ramakrishnan (He/Him) • 1st
Technical Lead at Intel Corporation | TSC member for Akraino LF Edge Comm...
6mo •
View my verified achievement from The Linux Foundation.
AKRAINO
TOP BLUEPRINT
OF THE YEAR
COMMUNITY AWARDS
2021
Akraino Community Awards 2021 - Top Blueprint of the Year was issued by The Linux Foundation to Kuralamudhan Ramakrishnan.

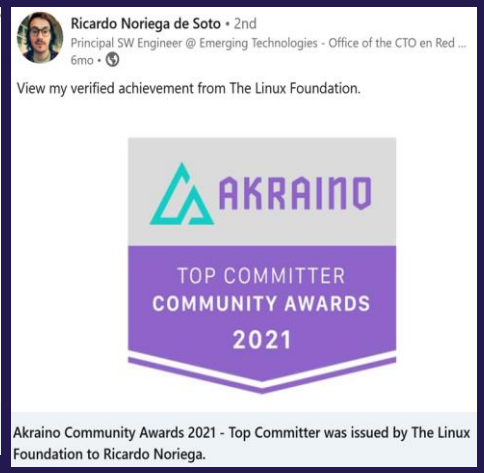
2. Akraino Internal Activities 10 - Akraino Annual Awards -2

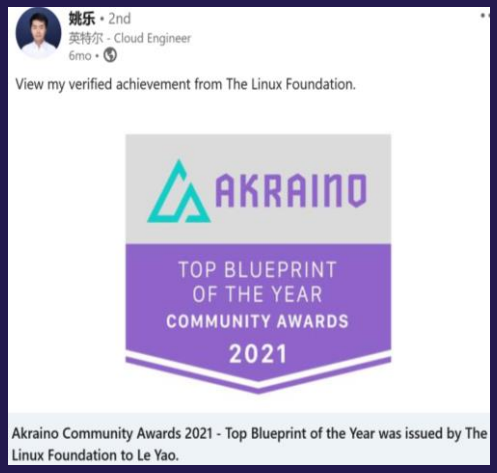












11/23/2021 Akraino Reunion Meeting

Skapad av Tina Tsou, senast ändrad av Jeff Brower den dec 09, 2021

IN PERSON & VIRTUAL SCHEDULE AT-A-GLANCE

When: Tuesday, November 23

10:30 – 14:30 PST (UTC-8)
13:30 – 17:30 EDT (UTC-5)
19:30 – 1:30 CET (UTC+1) *(Wednesday)*
02:30 – 6:30 CST (UTC+8) *(Wednesday)*

Date Time: Nov 23, 2021 10:30 AM - 2:30 PM PST (US and Canada)
Topic: Akraino Reunion Meeting

Where: HanaHaus + Blue Bottle Coffee

Address: 456 University Ave, Palo Alto, CA 94301

websites: HanaHaus (click on Palo Alto), bluebottlecoffee.com

Proposed / Working Agenda, subject to modification (please modify as needed)

1 2022 General Planning

- 1.1 How can we better promote and/or market Akraino strengths
  - 1.1.1 Conduct technical meetups and seminar, create a template and apply it across the community (Kural)
  - 1.1.2 Blueprint diversity (Jeff)
  - 1.1.3 Co-existence of Hyperscalers and Telecoms (Jeff)
  - 1.1.4 Blueprint release security requirements (Randy)
  - 1.1.5 API database (API usage info gathering, API map, collaboration with ETSI MEC DECODE) (Jane, Oleg)

2 Discuss and identify key edge computing trends for 2022

3 Look for ways to increase standards compliance and encourage interoperability between blueprints (Ike)

4 Barnstorming ideas to increase Akraino participation and user contribution

- 3.1 Akraino China Community run by OpenGCC (Tina)
  - 3.1.1 Discuss x86 pilot blueprint; for example, demonstrate x86 compatibility of GCC lab machines (Jeff)
- 3.2 TSC meetings increased participation – assign TSC members to recruit interesting "keynote speakers" for Tuesday
  TSC members to recruit well, for example a small cash prize, points gained for next TSC election, etc (Jeff)

5 Existing Blueprint Areas

- 5.1 Automotive

6 New Blueprint Areas for 2022

- 4.1 Robotics (Jeff)
  - 4.1.2 Fujitsu presentation (Fukano-san, 10:30a)

Introduction to SSES(Sensor-Rich Soft End-Effector System)

1. Use of ETSI MEC architecture in Akraino BPs. Some BPs already explicitly refer to ETSI MEC in their architecture (e.g., EALTEdge). Some BPs are “mappable” to ETSI MEC architecture (e.g. PCEI). Maybe we should include an optional architecture section in BP architecture documents that shows the alignment with ETSI MEC.

2. Direct implementation of ETSI MEC services and APIs in Akraino BPs

3. Participation in ETSI MEC Hackathons and/or Plugtests. Akraino BPs and releases are essentially a “continuous hackathon”. Given that many Akraino BPs provide solutions for Edge Computing, we should find a way to “channel” Akraino BPs as ETSI MEC hackathon projects as well.

4. Include MEC specs in LF Edge Akraino API map, using either the existing Blueprint-organized map or a different basis of organization

5. Conduct architectural mapping and analysis between sample Akraino Blueprint projects (For example, PCEI) and appropriate MEC reference architecture

6. Promote MEC APIs in Akraino Blueprint projects, specifically MEC009 API design generic guidelines

7. Map, analyze, and compare Akraino Federated edge projects with MEC Federation specifications

8. Focus on implementing specific MEC use case categories (e.g., IoT, URLLC, Vehicular) in Akraino BPs

ETSI MEC Update of the collaborations with OpenSource, with special focus on LF Edge Akraino

Presented by: **Jane Shen,**
VP of Technology Strategy, Mavenir
Technical Expert, ETSI MEC ISG

15.11.2021


GSM Association
Non-confidential
Official Document OPG.02 - Operator Platform Telco Edge Requirements

GSMA

Operator Platform Telco Edge Requirements
Version 1.0
29 June 2021

This is a Non-binding Permanent Reference Document of the GSMA

The OPG believes that, for Operators to develop a Federated Edge Computing Platform such as the OP, Requirements must be enforceable in Contracts by a Published Set of Standards.

To this end, the OPG proposes selecting ETSI ISG MEC and 3GPP to provide a Standard Reference for an Edge Service End to End (E2E) definition.

We note that 3GPP EDGEAPP Architecture and ETSI ISG MEC Architecture could complement each other in a way that is acceptable to OPG:

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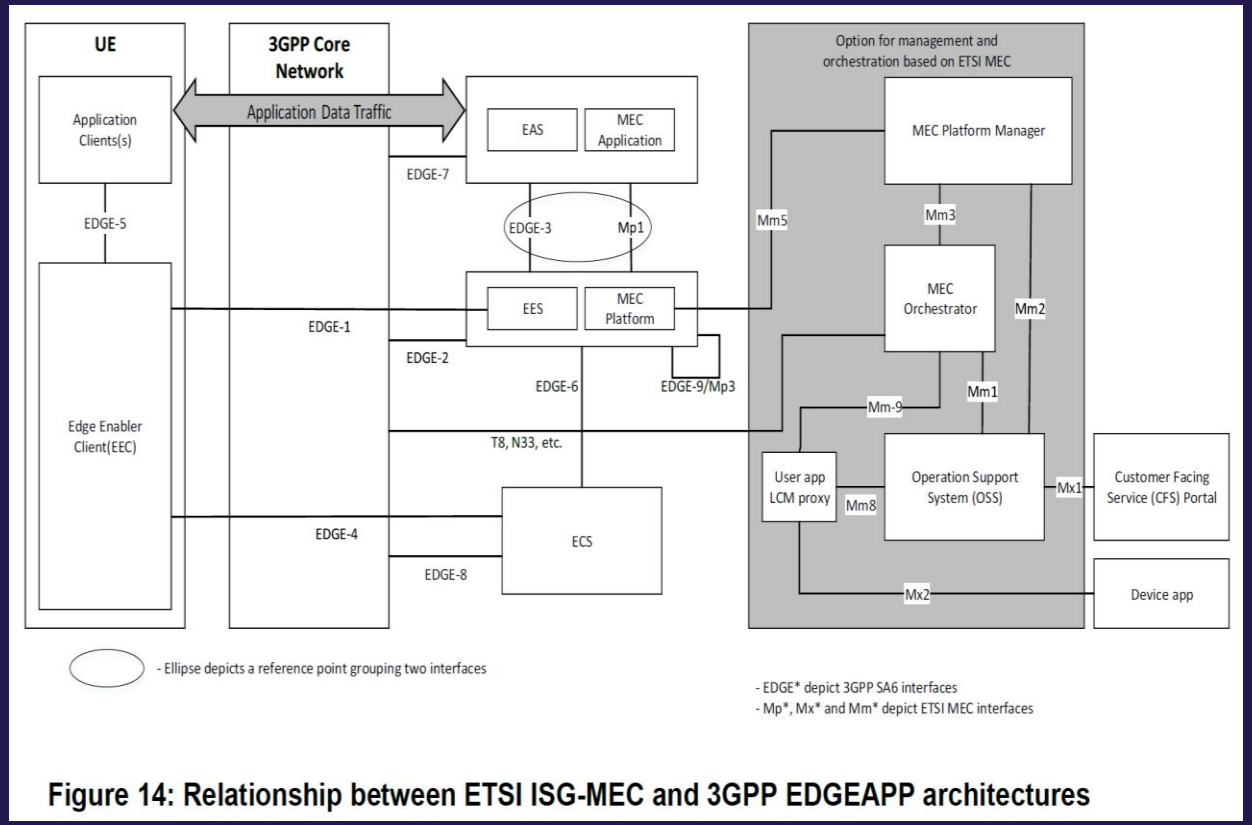


Figure 14: Relationship between ETSI ISG-MEC and 3GPP EDGEAPP architectures

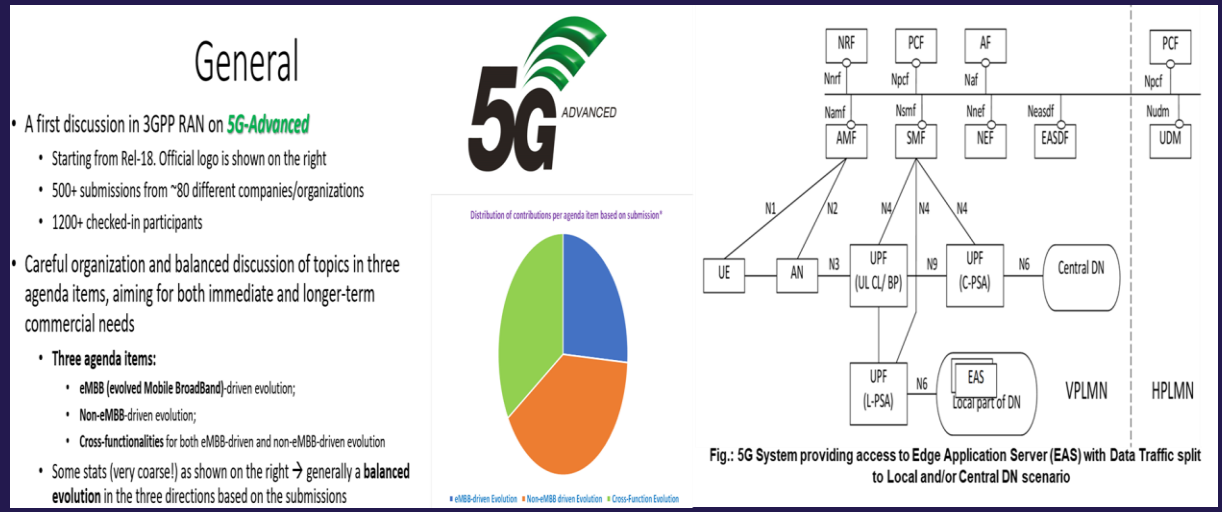


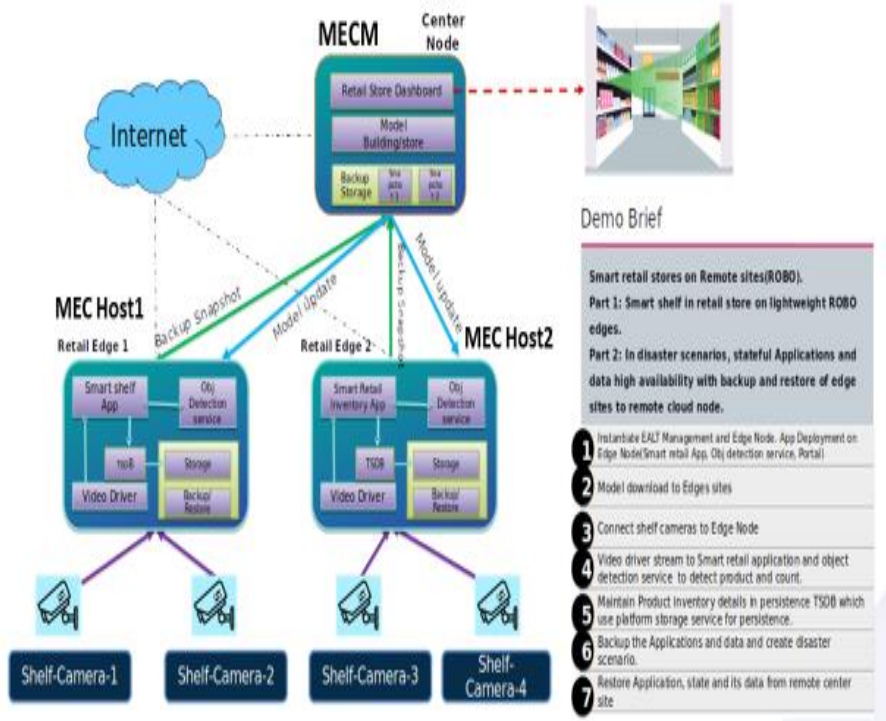
Fig.: 5G System providing access to Edge Application Server (EAS) with Data Traffic split to Local and/or Central DN scenario

ETSI MEC Update of the collaborations with OpenSource, with special focus on LF Edge Akraino

Presented by: **Jane Shen,**
VP of Technology Strategy, Mavenir
Technical Expert, ETSI MEC ISG

15.11.2021

Enterprise Application on Lightweight 5G Telco Edge Use Case



Demo Brief

Smart retail stores on Remote sites(ROBO).

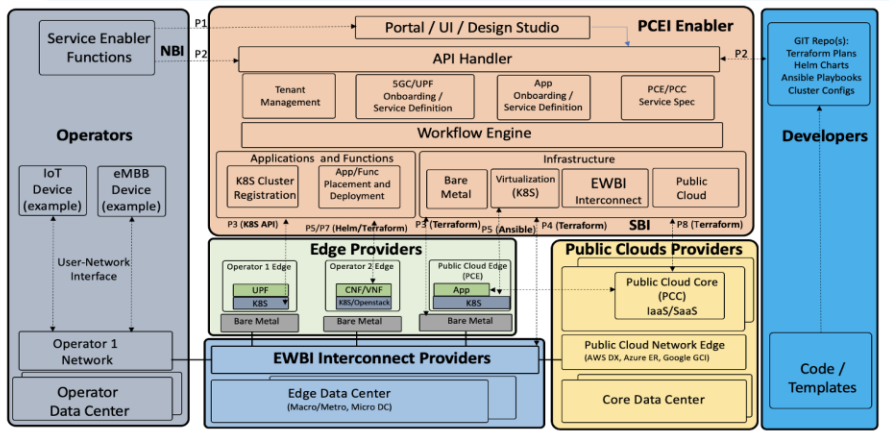
Part 1: Smart shelf in retail store on lightweight ROBO edges.

Part 2: In disaster scenarios, stateful Applications and data high availability with backup and restore of edge sites to remote cloud node.

1. Instantiate EALT Management and Edge Node. App Deployment on Edge Node(Smart retail App, Obj detection service, Portal)
2. Model download to Edges sites
3. Connect shelf cameras to Edge Node
4. Video driver stream to Smart retail application and object detection service to detect product and count.
5. Maintain Product inventory details in persistence TSDB which use platform storage service for persistence.
6. Backup the Applications and data and create disaster scenario.
7. Restore Application, state and its data from remote center site

From LF Edge Akraino

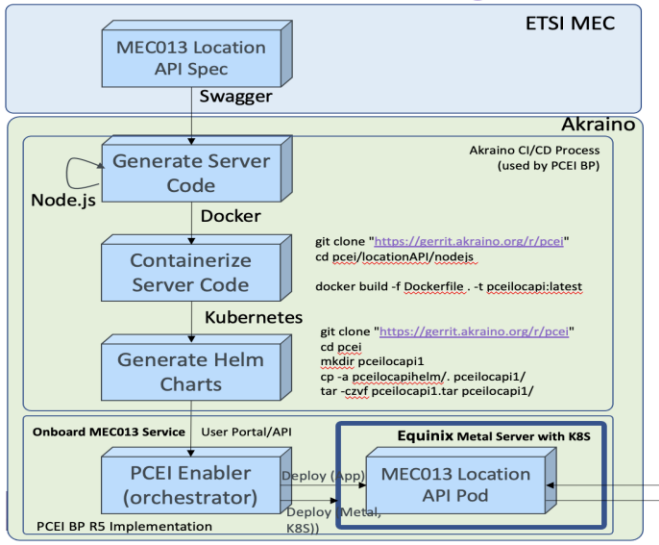
PCEI Release 5 Overview



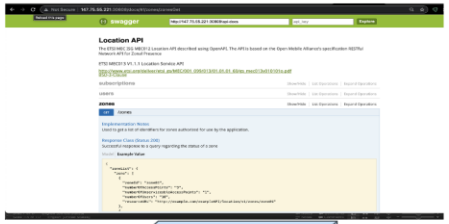
PCEI Release 5 Demo Video Link

- NBI APIs
  - GIT Integration
  - Dynamic Edge Cluster Registration
  - Dynamic App Helm Chart Onboarding
  - Automatic creation of Service Instance in EMCO and deployment of Apps
  - Automatic Terraform Plan Execution
- Integrated Terraform Plan Executor
  - Azure (PCC)
  - AWS (PCC)
  - Equinix Fabric (Interconnect)
  - Equinix Metal (Bare Metal Cloud)
  - Openstack (3PE)
- Equinix Fabric Interconnect
- Multi-Public Cloud Core (PCC) Orchestration
- Kubernetes Edge
- Openstack Edge
- Cloud Native 5G UPF Deployment

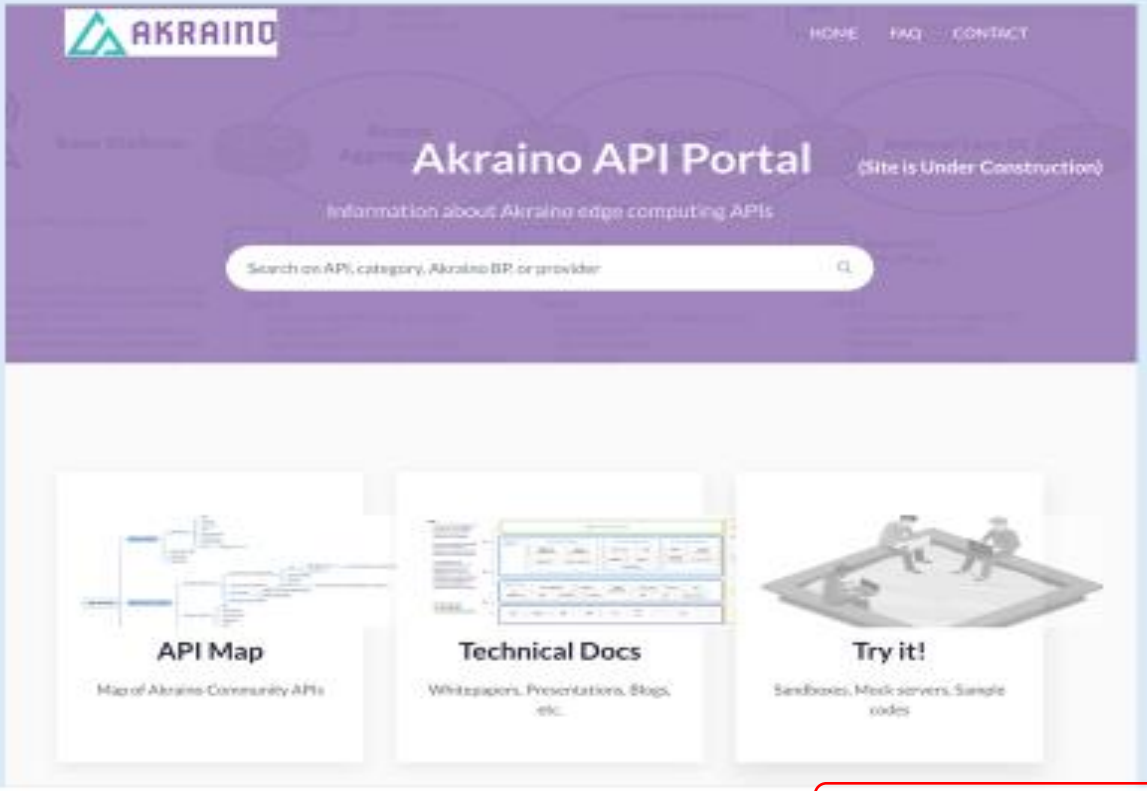
PCEI Use Case in ETSI MEC Plugtests 2021



- Use ETSI MEC spec – MEC013 Location API
- Generate and containerize MEC013 Location API server code
- Generate Helm charts for the code to make it deployable on Kubernetes
- Use Akraino PCEI Orchestrator as a MEO/MEPM to:
  - Onboard MEC013 Location API server as a Service/App
  - Deploy Equinix Metal server (MEP/MEC Host)
  - Install Kubernetes on Metal server
  - Onboard Kubernetes cluster to PCEI Orchestrator
  - Deploy MEC013 Location API Service (as MEC App)



An API Portal For Edge Developers



- An API info hub of Akraino projects
- Cross reference with other relevant API information sites, e.g. ETSI MEC wiki, forge.etsi.org etc.
- Highlight API offerings from Akraino projects

https://apiportal.Akraino.org

From LF Edge Akraino

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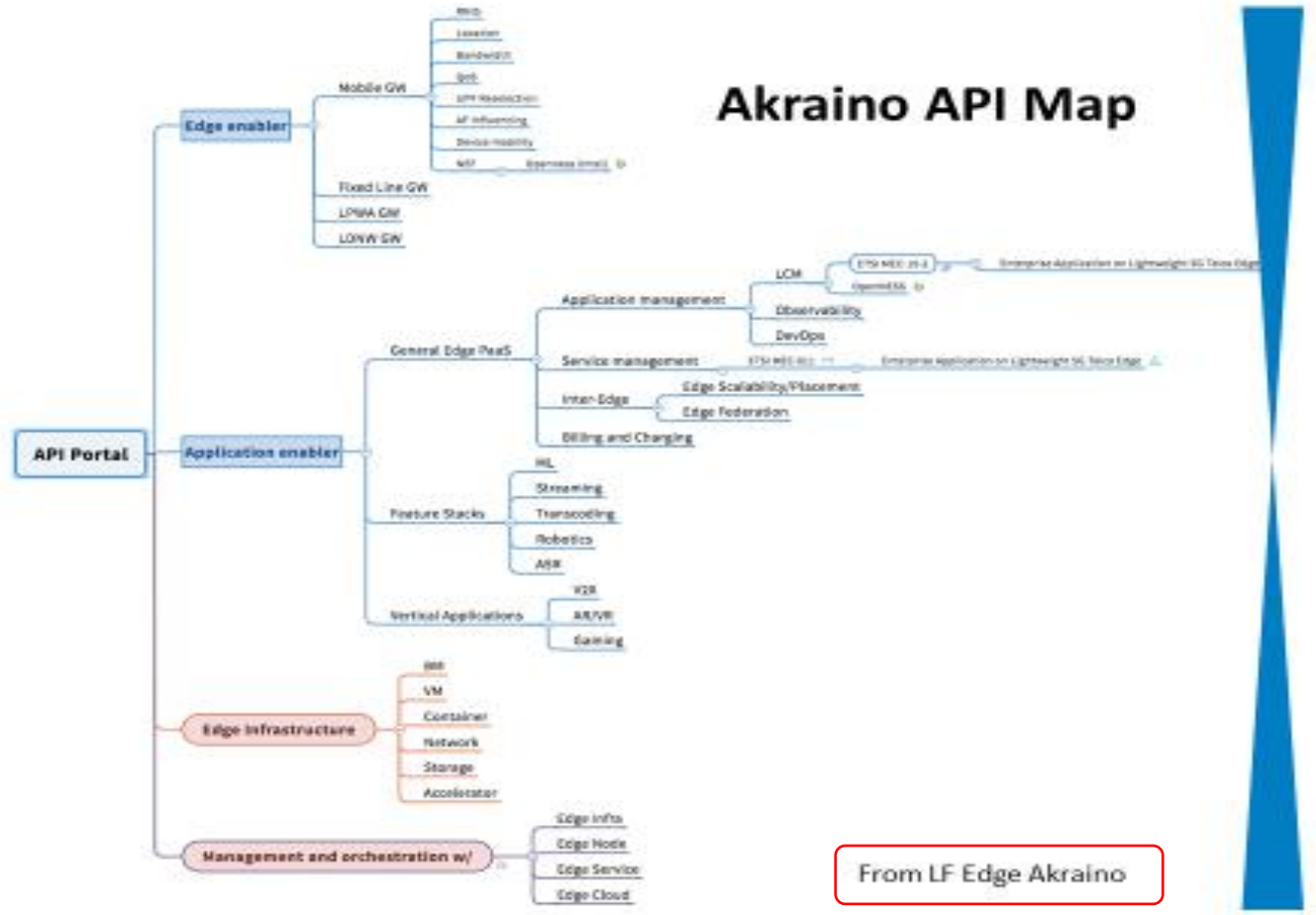
An API Map For Akraino Project APIs



Akraino API Map

From LF Edge Akraino

ETSI MEC DECODE

Summarized by Walter Featherstone

Group Spec (GS)	GS Version	Service Name	apiName
MEC-010-2	2.1.1	Application lifecycle, rules & req management (Mm1 & Mm3)	app_pkgm
			app_lcm
			granting
	2.1.3		app_pkgm
			app_lcm
			granting
MEC-011	1.1.1	Platform Application Enablement (Mp1)	mp1
	2.1.1		mec_app_support
			mec_service_mgmt
	2.1.2		mec_app_support
			mec_service_mgmt
MEC-012	1.1.1	RNIS	rni
	2.1.1		rni
MEC-013	1.1.1	Location Service	location
	2.1.1		location
MEC-014	1.1.1	UE Identity Service	ui
MEC-015	1.1.1	BandWidth Management (BWM) service	bwm
	2.1.1	BandWidth Management (BWM) service and Multi-access Traffic Steering (MTS) service	bwm
			mts
MEC-016	1.1.1	UE App (Mx2)	mx2
	2.1.1		mx2
	2.2.1	Device App (Mx2)	dev_app
MEC-021	2.1.1	App Mobility Service (interface)	amsi
MEC-028	2.1.1	WLAN Access Information Service	wis
MEC-029	2.1.1	Fixed Access Information Service	fai
MEC-030	2.1.1	V2X Information Service	vis
MEC-033	2.0.2	IoT API	iot

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07/26/2021 - 07/27/2021 Akraino Automotive Area workshop

Skapad av Tina Tsou, senast ändrad av Kendall Perez den jul 27, 2021

Summary

› Agenda:- Automotive Area deployers, developers sync-up

› Dates: July26, 2021

Tuesday, 2021-jul-27

Meeting Location:

Join Zoom Meeting

	Topics
9:00 am - 9:05 am	Summary of Day 1, and Introduction of Day 2 – @ Tina Tsou , TSC Chair; @ Oleg Berzin , TSC Co-Chair
9:05 am – 9:50 am	Arm in Automotive - John Heinlein, VP North America Automotive Partnerships
9:50 am - 10:35 am	Open Discussion @ Ike Alisson

5:15 pm - 5:45 pm

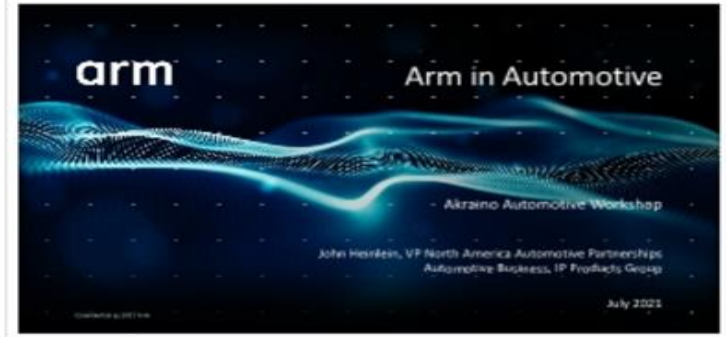
Edge computing research, standardization and roll-out practices in CVIS and Automative Networking Area

YiXue, Lei , Tencent

5:45 pm - 6:15 pm

MEC-based Stable Topology Prediction for Vehicular Networks

@ Asif Mehmood



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CLOUD NATIVE COMPUTING FOUNDATION

CNCF Telecom User Group meeting notes

Monday, October 4th at 15:00 UTC (8am Pacific Time)

Attendees: *Please add your name to the list below*

- Taylor Carpenter - taylor@vulk.coop - Vulk Coop
- Drew Bentley - drew@vulk.co - Vulk Coop
- Akash Manohar - akash@vulk.coop Vulk Coop
- Lucina Stricko - lucina@vulk.coop - Vulk Coop
- Tal Liron - tliron@redhat.com - Red Hat
- Alexis de Talhouët - adetalho@redhat.com - Red Hat
- Ike Alisson - ike@alicon.se - Alicon
- Daniel Bernier - daniel.bernier@bell.ca - Bell Canada
- Chenpengxiang -chenpengxiang@chinamobile.com China Mobile

Agenda: *Please add your agenda item(s) to the list below*

- 👇 *Please add your agenda item(s)* 👇
- [Tal - Red Hat] 20 minute presentation of CNCK: Cloud Native Configurations for Kubernetes, using Open5GS as a use case example
- [Ike] - Alicon, 30min presentation on 5G Legacy of Edge and New Service Capabilities:
  [Broken] https://www.slideshare.net/secret/gyAnZlC1YpGa4V

CLOUD NATIVE COMPUTING FOUNDATION

CNCF Telecom User Group meeting notes

5G

5G selected Architecture Themes on 5G New Services Capabilities

to

CNCF TUG

Ike Alisson

LF Edge Akraino TSC member and Documentation Sub-committee TSC Chair

2021-10-04

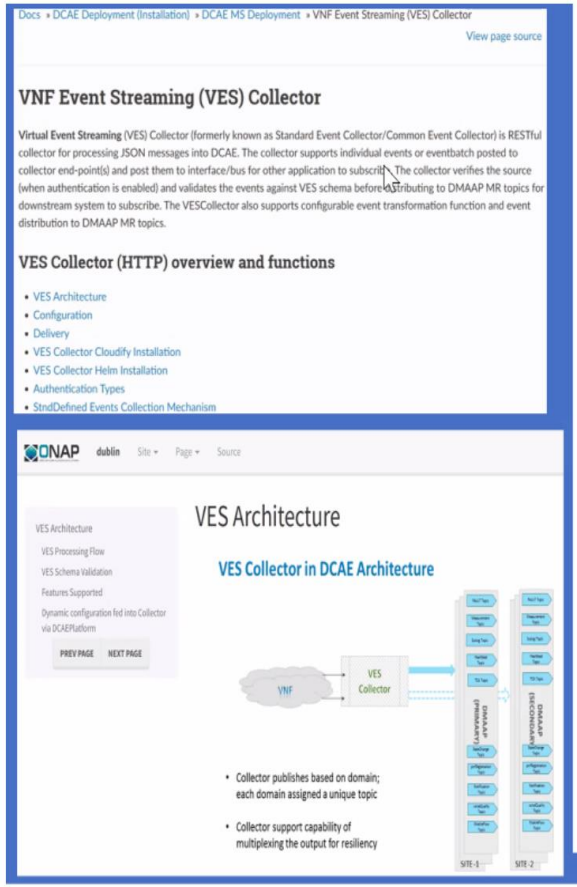
Rev PA8

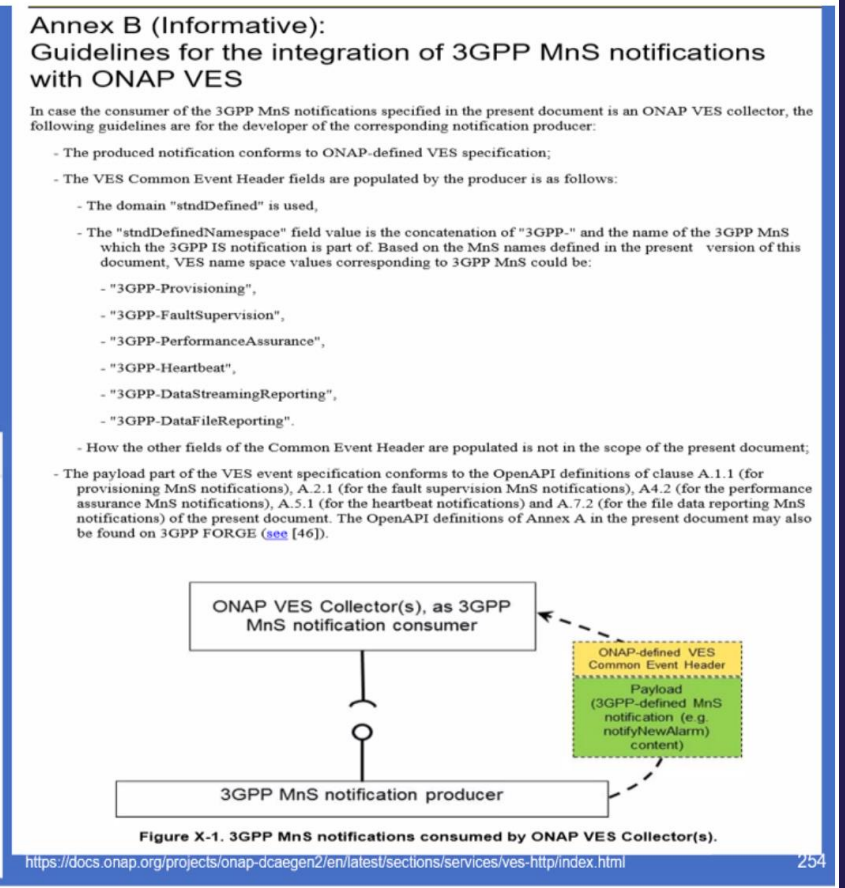
AKRAINO

Platsverktyg

Meeting Minutes - 2022-jan-19 @7:30 am PST

- @ Ike Alisson — 5G Slicing enhancements related to 3GPP "5G Advanced" Specifications
  - Currently Magma is not offering the capabilities enabling us for QoS
  - Importance for Magma to adopt VES Specifications supported by 3GPP - Call scheduled within the coming days





- @ Amar Kapadia — Latest update Magma/ONAP (Service Delivery):

4.2.2 Architecture

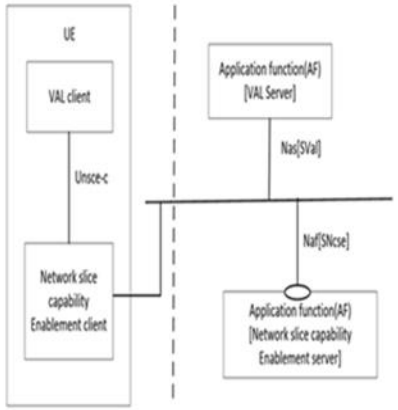


Figure 4.2.2-1 Architecture for network slice capability enablement – Service based representation

Figure 4.2.2-1 exhibits the service-based interfaces for providing and consuming network slice capability enablement services.

The mechanisms for service discovery in the service-based representation depicted in figure 4.2.2-1 are as follows:

- The network slice capability enablement server could provide service to VAL server and NSCE client through interface SNsce.

NOTE: the NSCE layer is the enhancement of SEAL NSCM layer, but which term is going to be used in the specification is FFS.

5.1.2 Pre-conditions

Figure 5.1.2-1 shows the use case scenario where different network slices are configured on different frequency bands at a certain geographical location. In this scenario, all network slices and radio frequency bands belong to the same operator.

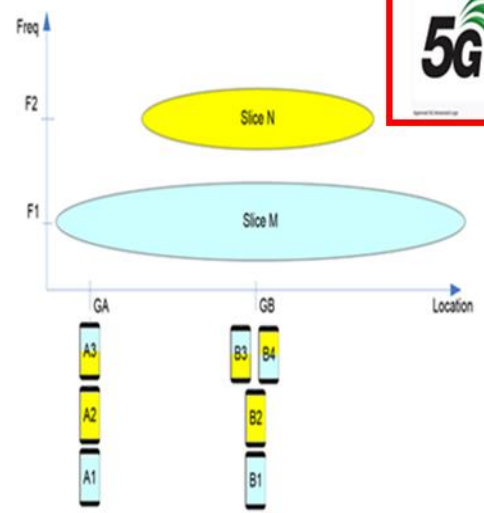


Figure 5.1.2-1 Initial Setup before-power on

Figure 5.2.4-1 shows on which frequency each UE camps on after movement.

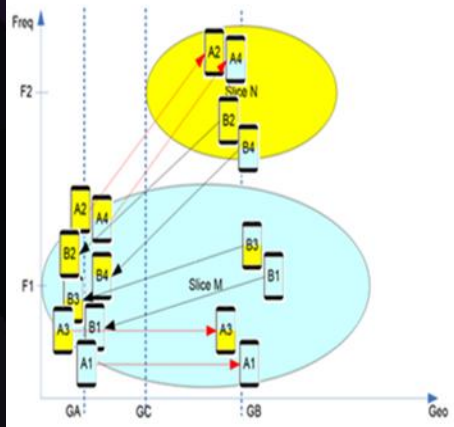


Figure 5.2.3-1 Transition

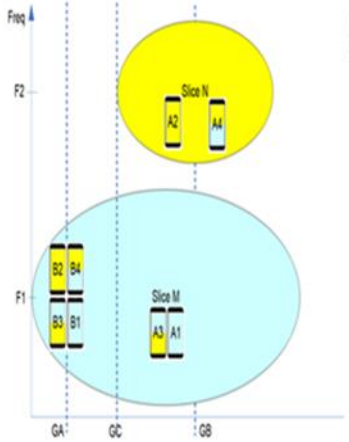


Figure 5.2.4-1 UE status after movement

5.4.4 Post-conditions

The following figure 5.4.4-1 shows the status at the end of the service flow. For the transport of user traffic, UE A1 is served by E-UTRA, UE A2 and A3 are served by NR. UE A4 may camp on either E-UTRA or NR during Idle mode and be configured with E-UTRA, NR or both depending on the active application during Connected mode.

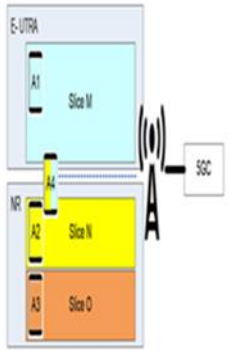


Figure 5.4.4-1 End result

Table 5.15.2.2-1: 5G Standardized Slice/Service Type (SST) Values

Slice/Service type	SST value	Characteristics
eMBB	1	Slice suitable for the handling of 5G enhanced Mobile Broadband.
URLLC	2	Slice suitable for the handling of ultra- reliable low latency communications.
MIoT	3	Slice suitable for the handling of massive IoT.
V2X	4	Slice suitable for the handling of V2X services.
HMTC	5	Slice suitable for the handling of High-Performance Machine-Type Communications.

Attribute		Value
Availability		99.999
Device Velocity		0
UE density (per km^2)		1000
Mission critical support		Mission critical
	Mission-critical capability support	Inter-user prioritization
	Mission-critical service support	MCData
Slice quality of service	3GPP 5QI	83

Table 72 List of attributes needed for NEST for HMTC SST

Attribute		Value
Availability		99,9
Slice quality of service	3GPP 5QI	9
Supported device velocity		2
UE density		100000

Table 71 List of attributes needed for NEST for MIoT SST

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09/15/2021 Akraino IoT Area Webinar / Regional Developer Meetup - Africa

Skapad av Tina Tsou, senast ändrad av Stephen Ozoigbo den sep 15, 2021

The Linux Foundation Akraino community will conduct a workshop on Wednesday, September 15 (Local time, GMT+2) online.

Registration Link: https://zoom.us/meeting/register/tJItceGvqDouGd1ToS3OyzaVb_Sb16eDDPZz

On September 15, 2021 (9.00am -2.00PM PST) the Akraino community will participate in a partner event online.

Launched in 2018, and now part of the LF Edge umbrella, Akraino is creating an open-source software stack that supports a high-availability cloud stack optimized for edge computing systems and applications. Designed to improve the state of edge cloud infrastructure for enterprise edge, OTT edge, and carrier edge networks, it offers users new levels of flexibility to scale edge cloud services quickly, to maximize the applications and functions supported at the edge, and to help ensure the reliability of systems that must be up at all times. The Akraino Edge Stack blueprints use several upstream open-source projects such as ORAN Alliance, CNCF, Openstack, ONF, ONAP, TIP and the community works with open-source communities to enhance any missing edge functionality.

This workshop will provide an overview of leading use cases of Edge computing systems and applications in Africa with a focus on V2X, IoT and Enterprise Edge solutions.

With key presentations from leading African infrastructure stakeholders, this workshop will provide a unique opportunity to gain unique insights on current infrastructure solutions across the African continent as well as specific technology approaches for the fastest growing industry verticals. In addition to providing detailed coverage of topics related to the current state of Edge computing on the African continent, there will be an opportunity for peer networking to connect with fellow professionals and expert industry practitioners.

There is no cost to attend the event and we encourage everyone interested in edge computing infrastructure and related opportunities in Africa to attend.

Agenda:

Workshop, Wednesday, 2021-sep-15 **9.00am - 2.00 p.m PST**

Location: Zoom link will be emailed to you after you register

Registration Link: https://zoom.us/meeting/register/tJItceGvqDouGd1ToS3OyzaVb_Sb16eDDPZz

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11/24/2021 Akraino presentation to KICS on IoT (Korean Institute of Communications and Information Sciences)

Skapad av Ike Alisson, senast ändrad den dec 30, 2021

Akraino presentation to KICS on IoT (Korean Institute of Communications and Information Sciences) about update on Open Source and Standard trends related to 3GPP 5G and oneM2M IoT SL (Service Layer) Global Standard evolvement.

KICS is the largest ICT Institute in Korea with over 26,000 members, 50 members, 8 domestic and 5 overseas chapters, and 30 specialized Research Groups. As the growth engine and leader of ICT in Korea that has achieved the greatest accomplishments in the world, KICS provides open networks for Universities, Corporations, Government-affiliated Agencies and Research Institutes to engage in Academic activities, Technical Cooperation and Policy Reviews in the fields of ICT-based Communications, Broadcasting and ICT Convergence Industries. Today, with the upcoming future driven by the Fourth (4th) Industrial Revolution, KICS is opening a new future for ICT with the pride and passion that led Korea's Information and Communications Technology that amazed the world. KICS is at the heart of the limitless competition of the Fourth (4th) Industrial Revolution.For further information about KICS, please visit the KICS web site: https://eng.kics.or.kr/html/?pmode=intro

https://wiki.akraino.org/display/AK/IoT+Area

Questions ?