Using Akraino to Simplify Edge Stack

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LF Edge – New Umbrella for Edge Projects

Drivers

› Complementary and aligned vision on multiple LF projects
› Fuels faster adoption and deployment
› Edge market is fragmented and creating a larger entity provides leadership

Anchor Projects

Incubation Projects

Fledge     OpenEdge
Premier Members
Where are the edges?
Distributed cloud, edge compute, AI/ML, IoT, 5G, VNFs/NFV, FMC

- **EDGE**
  - Enterprise & IoT

- **EDGE**
  - MEC server, AI/ML, IoT, 5G

- **EDGE**
  - 97% of operators plan VNF execution in Smart CO

- **EDGE**
  - VNFs, vEPC, MEC, distributed RAN, vRAN, BBU hotel, FMC, vCPE, AI/ML, IoT

- **PARTIAL EDGE**
  - 85% of operators plan VNF execution in DC Near CO

- **NOT EDGE**
  - 70% of operators plan VNF execution in DC Not Near CO

- **UCPE**
  - 82% of operators plan VNF execution on uCPE at customer sites

- **20msecs**

Source: IHS Markit. NFV Strategies: Global Service Provider Survey, June 2017; Respondents control 61% of global telecom capex
Akraino R1: Tested & Validated Blueprints

Akraino Blueprints & release

• 11+ Blueprint families, 20 Blueprints under development

• Community-tested & validated on real hardware, Akraino Labs by members and community.

Blueprints - approved & tested declarative configuration based on use cases, set of hardware, POD & software

Reference Architecture - defines Akraino building blocks

Declarative Configuration - hides lower layer complexity to user

CI/CD, Integration & Testing Tools - drive product quality
Why Akraino Blueprint?

Benefits:
- Low Cost
- Large Scale
- Zero Touch Provisioning
- Industry Adoption
- OCP Whitebox/OEM H/W

Use Case Based
- Fully Integrated End to End Solution (CI/CD)
- Proven and Tested by Community
- Community Life Cycle Support
- Production Quality
Akraino Executive Summary

Akraino is an Edge project targeted to

› Address Telco, Enterprise and Industrial IoT use cases

Mission:

1. Create end-to-end configuration for a particular Edge Use case which is complete, tested and production deployable meeting the use case characteristics {Integration Projects - Blueprints}

2. Develop projects to support such end-to-end configuration. Leverage upstream community work as much as possible to avoid duplication. {Feature Projects}

3. Work with broader edge communities to standardize edge APIs {Upstream Open Source Community Coordination - For example, Socialization, so community tools and Blueprints can interoperate. This work can be a combination of an upstream collaboration and development within the Akraino community [i.e. a feature project]}

4. Encourage Vendors and other communities to validate Edge applications and VNFs on top of Akraino blueprints {Validation Project - ensures the working of a Blueprint}
Use Case 1: Operator’s Owned Network Edge

Optimal Zone For Edge Placement

<table>
<thead>
<tr>
<th>Customer Devices</th>
<th>Customer Premises</th>
<th>Access Methods</th>
<th>Telco Network Edge</th>
<th>Backbone</th>
<th>Backbone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device* ~2 ms</td>
<td>Last Mile Network* &lt;5 ms</td>
<td>Access* 1-3 ms</td>
<td>Edge Computing ~5-20 ms</td>
<td>Backbone ~2-100</td>
<td>Non-Accelerated Processing ~5-50 ms</td>
</tr>
<tr>
<td>Mobile</td>
<td>Home</td>
<td>5G</td>
<td>Tower</td>
<td>Centralized Clouds</td>
<td></td>
</tr>
<tr>
<td>AR/VR End User</td>
<td>Smart Cities</td>
<td>LTE</td>
<td>Central Offices</td>
<td>Public Clouds</td>
<td></td>
</tr>
<tr>
<td>Drones</td>
<td>Small Enterprises</td>
<td>WiFi</td>
<td>Other Telco Real Estates (Wire Centers, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomous Vehicles ...</td>
<td>Stadiums</td>
<td>Wireline</td>
<td></td>
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</tr>
</tbody>
</table>

* Estimates

Device: Mobile, AR/VR End User, Drones, Autonomous Vehicles

Customer Premises: Home, Smart Cities, Small Enterprises, Stadiums, Enterprises, Public buildings

Access Methods: 5G, LTE, WiFi, Wireline

Telco Network Edge: 5G, LTE, WiFi

Backbone: Centralized Clouds, Public Clouds

Burst Capacity: ~2 ms

Optimal Edge Zone: Telco Operated

Not Optimal
Use Case 2: IOT Driving the New Edge for Enterprise
Retail, Transportation, Healthcare...

Cloud Automation
Retail

Network Automation
Hospitality
Healthcare
Manufacturing
Transportation & Logistics

IOT Automation
Enterprises
Public Buildings

“Southbound” Devices, Sensors and Actuators
Akraino R1: Unifying the Edge

Akraino Edge Stack Issues Premier Release, Sets Framework to Enable 5G, IoT Edge Application Ecosystem

- Inaugural release unifies multiple sectors of the edge across disciplines, including IoT, Enterprise, Telecom, and Cloud
- Delivers tested and validated deployment-ready blueprints
- Creates framework for defining and standardizing APIs across stacks, via upstream/downstream collaboration

SAN FRANCISCO – June 6, 2019 – LF Edge, an umbrella organization within the Linux Foundation that aims to establish an open, interoperable framework for edge computing independent of hardware, silicon, cloud, or operating system, today announced the availability of Akraino Edge Stack Release 1 (“Akraino R1”). Created via broad community collaboration, Akraino’s premiere release unlocks the power of intelligent edge with deployable, self-certified blueprints for a diverse set of edge use cases.
Functional View: R1 Blueprints in Akraino Edge Stack

Telco Appliance/REC – SEBA Blueprint targeted for R2 (both Intel & Arm)
Akraino Community Lab

Lab Collaboration

- Akraino blueprints are validated in the dedicated validation labs
- Akraino hosts community lab for additional validation of blueprints
- Automated testing of blueprints
Akraino Edge Stack Technical Community

Technical Community Collaboration

- Akraino Technical Community Calls: once a week to discuss:
  - New Project Proposals
  - Collaborate with other communities

- Calls scheduled Thursdays at 11:00am-12:00pm ET

- https://wiki.akraino.org/display/AK/Akraino+TSC+Group+Calendar
How to get involved..

- Join Akraino Community Events and calls
- Join the projects’ mailing lists and participate in the discussions

Key Links:
Website:
https://www.lfedge.org/projects/akraino
Wiki:
https://wiki.akraino.org
Gerrit:
https://wiki.akraino.org/display/AK/documentation
Mail Lists:
https://lists.akraino.org/g/main
Blueprints:
Calendar:
https://wiki.akraino.org/display/AK/Akraino+TSC+Group+Calendar
Powering ONF Software at the Edge using Akraino
SEBA/VOLTHA Deployed and Supported by Akraino

Cross-Domain Correlation & Automation

- **Akraino Regional Controller** – Infrastructure Orchestration of SEBA Site(s) - Install OS, K8s “bare-metal”, Helm server.

- **Akraino POD with Blueprint** – Provides common OS, Infrastructure, Kubernetes, and Helm charts that instantiate SEBA
COMAC / O-RAN Supported by Akraino

Telco Cloud Appliance – Radio Edge Cloud/ SEBA/ COMAC

Purpose/Features

- Telco-grade edge cloud platform for near-real time container workloads.
- Automated CD pipeline testing the full software stack.

* Target architecture shown here and the fully installable building blocks is in RI
Akraino as a Common Foundation for ONF Projects

- Akraino provides common, “cookie-cutter” method to deploy at scale with automation.
- Onboard bare metal,
- Blueprints instantiate a function, set of functions, or create a cloud instance for the global orchestrator to operate.
- Centralized control and telemetry allow managing many deployments in a unified way.
- Loosely coupled, no lock-in. Use it or lose it – it’s up to you.
Call for collaboration between Akraino and ONF community

- Establish stronger cross community collaboration between ONF and Akraino
- Akraino to integrate ONF Software with Akraino Edge Stack to deliver ETE stack.
- ONF community to use Akraino BP for ETE functionality testing and in to production deployment
- Reduce cost by upfront integration, full CI/CD and functionality testing by the community
- Adopt Whitebox hardware solutions to reduce cost and increase innovation
Thank You

Follow Up Link:
http://akraino.org