Akraino Annual Report 2022

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Akraino Annual Report - Contents

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Executive Summary

- **Akraino continues to generate edge computing blueprints and use case examples. TSC meetings are twice-a-week, holding a steady average of around 10-12 participants**
- **Trend in use cases has shifted in 2021 and 2022 from telco-oriented to a wider range of cloud interfacing and smart edge**
- **Examples of ongoing effort include cloud – edge interface and architecture, connected/intelligent vehicles, and robotics**
- **Progress in establishing regional Akraino organizations is a notable accomplishment in 2022**
- **Promotion and marketing to a wider technical audience continues to be Akraino's main challenge**

Akraino Overview

- **For anyone who may need an overview …**
- **Akraino is an LF Edge open source community focusing on edge computing**
  - covers a broad range of use cases and technologies
  - publishes blueprints – a high level combination of software, architecture, and data flow diagrams, working code, and documentation
  - collaborates with SDOs such as ETSI MEC
  - applies a multidisciplinary approach with key subcommittees
  - key strengths - wide range of industry participants, technology diversity

Activities

- **Nov 2021 get-together and tech presentations**
  - Akraino held its first face-to-face meeting since Mar 3 2020 ! It worked out well and was exciting for people to see each other again
  - 1 day face-to face in Palo Alto (at Hanahaus)
  - attendance around 12, with additional remote participants
- **Spring Technical Summit, Mar 2022**
  - 3 days in hybrid format
  - 1 day face-to-face in Palo Alto (at Hanahaus)
  - attendance around 20, with additional remote participants
- **Fall Summit, Technical and Organizational, Sep 2022**
  - 3 days in hybrid format, both technical and organizational topics
  - 1 day face-to-face at Google Mountain View location
  - 2nd day live at locations in Germany, China, and S Korea, 3rd day live at Arm (Santa Clara)
  - attendance day 1 around 30, with additional remote participants. Excellent !
- **Upcoming**
  - ETSI MEC Hackathon, Edge Computing World conference, 10-12 Oct, organized by ETSI and LF Edge/Akraino

Modifications to Key Documents

- **Modifications to governing documentation**
  - required TSC voting approval
  - required brief Q&A with LF legal counsel
- **Technical Community Document wiki page**
  - TSC responsibilities, section 4.5.1, Identifying and Recruiting Akraino Localized Organizations
  - cross-reference to regional communities wiki page
  - summary – new regional organizations have a step-by-step list for marketing and compliance, the TSC actively reviews and then votes
- **Regional Communities wiki page**
  - clarify policy and operational procedure
  - cross-reference to Tech Community Document wiki page
- **Technical Community subcommittee wiki page**
  - modifications to blueprint review procedure

Security Subcommittee

- **New chair**
  - Danill Egranov @ Arm has taken over from Randy Stricklin @ AT&T

- **Defining security requirements for blueprint execution environments and software components used by blueprint owners (maturity and incubation releases)**
  1. **Minimum OS requirements (OS vendor, release version).**
  2. **Minimum OS configuration including security and runtime services**
  3. **Minimum CVE level permitted for maturity and incubation releases**
- **Reviewing and updating security requirements every 6 months (aligned with Akraino releases)**
- **Reviewing blueprint security logs generated by BluVal (https://wiki.akraino.org/display/AK/Bluval+-+Akraino+blueprint+validation+framework)**
- **Working with blueprint owners on security issues found with Lynis, Vuls and kube-hunter (BluVal test package), and helping to resolve them**
- **Day-to-day monitoring of of Lynis, Vuls, and kube-hunter security issues and databases**
- **Defining platform security requirements (work in progress)**

- **Chair Danill Egranov**

API Subcommittee

- **Improvements to API Info gathering spreadsheet and procedures**
  - additional subcategories
  - required brief Q&A with LF legal counsel
- **Discussion about 2nd sources**
  - Ongoing, this started up after the Google IoT Core deprecation, which was an attention getter
  - the current thinking is to ask blueprint teams to list and/or comment on possible 2nd sources for upstream dependencies
- **Subcommittee help with other activities**
  - the subcommittee took the lead in ironing out issues with regional Akraino organization application and approval process
  - the subcommittee helped organize the Nov 2021 face-to-face and Spring Technical Summit
- **Chair Jeff Brower**

Upstream / Downstream Subcommittee

- Release 6/7 review going well. Most BPs have no upstream changes. Any BPs with upstream changes will need to inform us in advance
  - https://wiki.akraino.org/display/AK/Release+6+Upstream+Review+Status

- Worked with API subcommittee in review of three (32) regional labs (so far in 2022). Africa lab and China north lab are fully approved. China south lab in TSC process.
  - https://wiki.akraino.org/display/AK/Akraino+Regional+Communities

- **Chair Jim Xu**

Dependencies of the release (upstream version, patches)

S. No	Software	Version	Remarks	
1.	Edge Gallery	1.5.1		
2.	Docker	18.09+		
3.	Kubernetes	1.18.7		
4.	EdgeX	Edinburgh	This old version used due to k8s deployment	
5.	OPC-UA	Geneva		

Technical Discussion Subcommittee

Primary role is to review blueprints in incubation stage

Gain an understanding of the blueprint

- Overall goals, objectives, and long-term direction in edge computing

Look for areas of synergy with

- Other blueprints, upstream communities, downstream communities, and Akraino regional organizations

Map the blueprint into areas being promoted by Akraino and LF Edge

- Such as: edge cloud, data privacy, security, 5G/6G, Metaverse, Blockchain, MEC, high performance computing (HPC), robotics, etc

- **Chair Doug Eng**

Technical Discussion Subcommittee, cont.

3 incubation reviews approved in 2022

pipelineDP Blueprint

- Conversation led by Wenhui Zhang

CFN (Computing Force Network) Ubiquitous Computing Force Blueprint

- Conversation led by Hanyu Ding and Yanjun Chen

Edge Service Enabling Platform Blueprint

- Converation led by Colin Peters
- Special Thank You to Jeff Brower for chairing this meeting!!!

Documentation Subcommittee

- **Information to be added …**
- **Chair Ike Alisson**

Regional Akraino Organizations

- **Two new organizations approved**
  - Africa – The Edge Hub, aka The Cortex Hub
    -East London, S Africa
    -theedgehub.org
    -thecoretexhub.africa
    -an ICT incubator
  - China north – Green Computing Consortium
    -Beijing
    -opengcc.org
    -open and innovative ecosystem in China for green computing in cloud data center infrastructure
- **Pending**
  - China south

More Info / Q&A

- **Ask me for any follow-up info**
  - specific blueprints
  - subcommittee chair and co-chair contact info
  - blueprint project team leader (PTL) contact info
- **Top level Wiki page**
  - https://wiki.akraino.org
- **Q&A**
  - fire away !

Supplemental

Following slides are supplemental material

Cloud Native

- **NFV stack**
  - SDWAN, customer edge, edge clouds – deploy VNFs and CNFs as micro-services
  - key organization: Intel
- **Multi-tenant security**
  - deploy secure and trusted workloads and bare-metal containers
  - key organization: Intel

Cloud / Edge Border

- **Public cloud / edge interface**
  - set of open APIs for edge applications (primarily telco) to expose towards public cloud providers
  - key organization: Equinix
- **Network cloud**
  - network cloud architecture allowing single SDN controller for containers, VMs, and bare metal servers. Incorporates Tungsten Fabric
  - key organization: Juniper Networks

Integrated Edge Cloud

- **Edge stack**
  - Integrated Edge Cloud (IEC) family of blueprints
  - deployment of edge VR/AR streaming
  - key organization: Tencent
- **Smart NIC**
  - accelerate performance of VPCs and 5G UPFs
  - key organizations: ByteDance, SocNoc, Arm
- **Edge Arm Servers**
  - run Android cloud native apps at the edge
  - key organizations: ByteDance, Arm

Telco

- **Lightweight 5G**
  - enable enterprise applications at the telco edge
  - key organization: Huawei
- **Private 5G**
  - end-to-end LTE/5G connectivity using CBRS band
  - key organizations: Cohere Technologies, Verizon
- **5G MEC slicing**
  - high performance cloud gaming, HD video, and live broadcasting edge applications
  - key organizations: Tencent, China Mobile

AI

- **Federated machine learning**
  - machine learning across mobile and IoT devices
  - key organizations: WeBank, inwinStack
- **School monitoring**
  - school safety, security, and surveillance
  - key organizations: Baidu, Arm, Intel, Penn State Univ
- **Intelligent vehicle cooperation**
  - AVs – current focus is on autonomous taxis
  - key organizations: Baidu, Intel, Arm

IoT

- **Robotics**
  - current focus is industrial and enterprise robots (e.g. food preparation and production)
  - areas of emphasis:
    - technical challenges: tactile/touch, speech recognition, real-time operation
    - robot safety (cloud independence as needed)
    - privacy of user data
  - key organizations: Fujitsu, Signalogic
- **Cloud gateway for IoT apps**
  - enable industrial IoT use cases
  - key organization: Huawei
- **SD-WAN**
  - networking for edge and micro CPE use cases
  - key organization: Huawei

Connected Edge Nodes

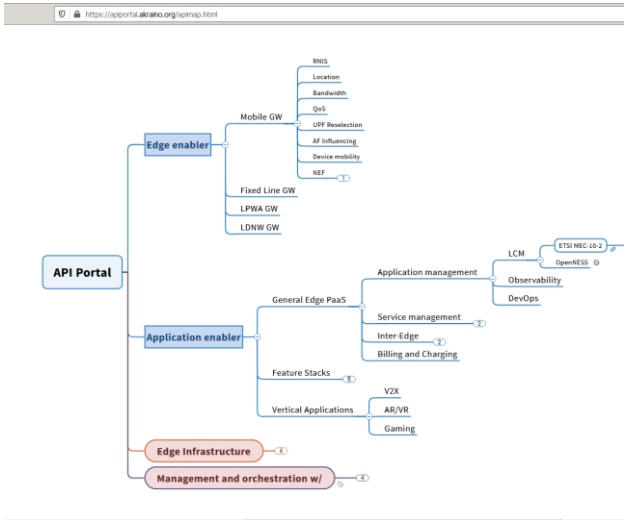
- **Cities**
  - smart cities – AVs, utilities management, smart buildings, safety and emergency services
  - key organizations: Arm, Microsoft, Nexcom
- **Vehicles**
  - connected vehicles – vehicle communication of route, action, safety information. Key org: Tencent
  - MEC-based topology prediction – AV path prediction, communication. Key org: Jeju Nat Univ

Areas of Common Work

- **Whitepapers**
  - collaborative publications between different blueprint teams
  - Akraino Edge Stack APIs, Jun 2020
  - Cloud interfacing at the telco edge, Jul 2020
  - Sharpening the Edge: Overview of the LF Edge Taxonomy and Framework (LF Edge, Aug 2020)
- **Security**
  - security subcommittee oversees cert process for blueprints prior to release
  - automated checks include Lynis scan, vulnerabilities, Kubernetes (“kube hunter”)
- **Documentation**
  - documentation subcommittee

Areas of Common Work, cont.

- **APIs**
  - API subcommittee oversees gathering of organization-wide API info
  - standardized API form
  - API map (https://apiportal.akraino.org/apimap.html)



- **TSC planning, review, and approval process**
  - technical steering committee
  - review and voting approval for all BPs
  - discussion and planning of organization wide issues