



# Akraino Annual Report 2022

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# Akraino Annual Report - Contents



- **Executive Summary**
- **Activities**
- **Modifications to Key Documents**
- **Subcommittee Updates**
  - Security
  - API
  - Upstream / Downstream
  - Technical Discussion
- **Regional Akraino Organizations**
- **More Info / Q&A**
  
- **Supplemental - edge computing blueprint summary**

# 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, enterprise, and manufacturing**
- **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

- **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
  - 2<sup>nd</sup> day live at locations in Germany, China, and S Korea, 3<sup>rd</sup> 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



- **Improvements to API Info gathering spreadsheet and procedures**
  - additional subcategories
  - required brief Q&A with LF legal counsel
- **Discussion about 2<sup>nd</sup> 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 2<sup>nd</sup> 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

# 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>

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		



## 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

## 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

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

# Security Subcommittee



- **New chair**

- Danill Egranov @ Arm, has taken over from Randy Stricklin @ AT&T

- **TBD 1**

- **TBD 2**

# Regional Akraino Organizations



- **Two new organizations approved**

- Africa – The Edge Hub, aka The Cortex Hub
  - East London, S Africa
  - theedgehub.org
  - thecortexhub.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



**绿色计算产业联盟**  
Green Computing Consortium

- **Pending**

- China south

- **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 !

**Following slides are supplemental material**

- **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

- **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

- **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

- **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

- **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

- **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



- **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**

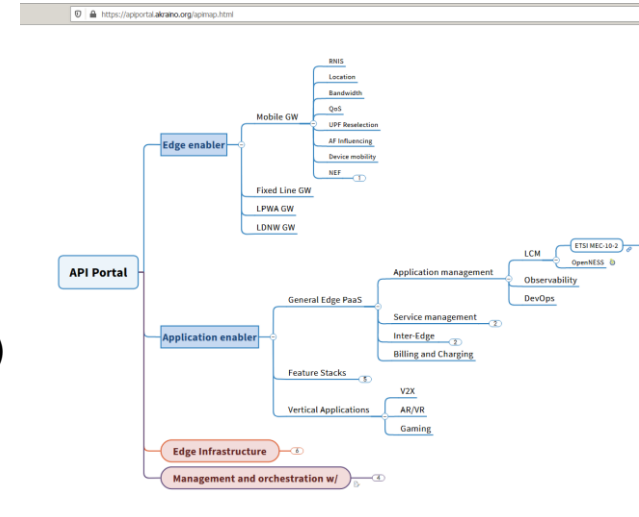
- documentation subcommittee

# 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