



# Akraino Overview

## Edge Computing Blueprints

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# Akraino Overview - Contents



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    - multi-tenant security
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  - **Integrated edge cloud**
    - edge stack (AR/VR focus)
    - smart NIC
    - Arm servers
  - **Telco**
    - lightweight / private 5G
    - 5G MEC slicing (gaming, video, broadcasting)
  - **AI**
    - federated deep learning
    - school monitoring
    - intelligent vehicle cooperation
  - **IoT**
    - robotics (industrial / enterprise)
    - cloud gateway for IoT apps
    - lightweight edge and IoT application management
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# Executive Summary



- **Akraino is an LF Edge open source community focusing on edge computing**
- **Covers a very broad range of use cases and technologies**
- **Publishes [blueprints](#) – combinations of software, architecture, and data flow diagrams, working code, and documentation**
- **Provides technical and organizational support for blueprint users**
- **Collaborates with SDOs such as ETSI MEC**
- **Following slides organize blueprints by key areas in edge computing**
  - this way of organizing Akraino is an approximation
  - there is overlap between some blueprints

- **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



# Areas of Common Work



- **Whitepapers**
  - collaborative publications between different blueprint teams
  - Akraino Edge Stack APIs
  - Cloud interfacing the telco edge, Jul 2020
- **Security**
  - security subcommittee oversees cert process for blueprints prior to release
  - automated checks include Lynis scan, vulnerabilities, Kubernetes (“kube hunter”)
- **APIs**
  - API subcommittee oversees gathering of organization-wide API info
  - standardized API form
  - API map (<https://apiportal.akraino.org/apimap.html>)
- **Documentation**
  - documentation subcommittee
- **TSC planning, review, and approval process**
  - technical steering committee
  - review and voting approval for all BPs
  - discussion and planning of organization wide issues

- **Akraino is an LF Edge open source community focusing on edge computing**
  - covers a very 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
  - multidisciplinary approach, wide range of industry participants, and technology diversity are Akraino strengths
- **Ask me for any follow-up info**
  - specific blueprints
  - blueprint project team leader (PTL) contact info
- **Top level Wiki page**
  - <https://wiki.akraino.org>
- **Q&A**
  - fire away !