Edge-to-cloud computing infrastructure inspired by the emerging needs of Telco applications.

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Why Edge Computing?

Emerging technologies are demanding lower latency and accelerated processing at the edge.

**Edge Cloud**
Performs data processing at the edge of the network, near data sources

**Low-Latency**
- NFV Edge Infrastructure
- Autonomous Devices
- Immersive Experiences
- Industrial IOT

**Central Cloud**
Highly centralized computing resources of cloud service providers

**High-Latency**
- ~25-200 ms

**Optimal**  
- Low-Latency < 20 ms

**Not Optimal**
Emerging Technologies in IOT and Networks are demanding lower latency and accelerated processing at the edge

<table>
<thead>
<tr>
<th>Telco NFV Edge Infrastructure</th>
<th>Wireless (vRAN,vEPC)</th>
<th>Wireline (PON)</th>
<th>uCPE (SD-WAN)</th>
<th>IP Enterprise Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous Devices</td>
<td>Drones</td>
<td>Autonomous Vehicles</td>
<td>Industry Robots</td>
<td>Medical</td>
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<tr>
<td>Immersive Experiences</td>
<td>Virtual Reality</td>
<td>Augmented Reality</td>
<td>360 Video</td>
<td>Wearable Cognitive Assistance</td>
</tr>
<tr>
<td>IoT &amp; Analytics</td>
<td>Industrial Sensors</td>
<td>Home Devices</td>
<td>Retail</td>
<td>Healthcare</td>
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<tr>
<td>On-Demand NFV</td>
<td>Hardware Acceleration</td>
<td>A.I.</td>
<td>Microservices</td>
<td>5G</td>
</tr>
</tbody>
</table>

Edge Computing
Akraino Supports Telco, Enterprise, IOT,… use cases & variety of edge deployment types

<table>
<thead>
<tr>
<th>Different Industries (examples)</th>
<th>Millions</th>
<th>Thousands</th>
<th>Tens</th>
</tr>
</thead>
<tbody>
<tr>
<td>IoT</td>
<td></td>
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<tr>
<td>Telco</td>
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<tr>
<td>Hospitality</td>
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<td>Healthcare</td>
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<tr>
<td>Manufacturing</td>
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<tr>
<td>Transportation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer Devices</th>
<th>Far Edge</th>
<th>Access Methods</th>
<th>Telco Network Edge</th>
<th>Internet</th>
<th>Provider Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>IoT, Mobile, AR/VR, End User, Autonomous Vehicles...</td>
<td>Home, Stadiums, Small Enterprises, Public buildings, Enterprises</td>
<td>5G, LTE, WiFi, Wireline</td>
<td>Tower, Central Offices, Other Telco Real Estates (Wire Centers, etc.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LF Edge - Founding projects
Bringing several Edge verticals and domains under one umbrella

Platinum Members:

60 + Members already
Why Akraino Edge Stack?

Before Akraino

- User integrates multiple opensource
- Multiple gaps
- No integrated solution for Edge use cases
- Complex CI
- No guaranteed working of the solution

Akraino Model

- Akraino Community Integrates multiple opensource for edge use cases.
- Bridge gaps (development of code in upstream and at Akraino)
- Fully integrated solution
- Simple CI
- Validated with multiple testing
Akraino Blueprints
The Akraino Edge Stack community delivers fully integrated, “ready and proven” Edge Stacks

<table>
<thead>
<tr>
<th>Edge Use Case Driven</th>
<th>Integration of Multiple Opensource Software</th>
<th>Production Readiness</th>
<th>Bridge gaps &amp; Standardize Edge Features and APIs</th>
<th>Vendor Support Eco-system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of features to support fully functional Edge Solution.</td>
<td>Fully Integrated Edge Stack</td>
<td>Multiple Validations with declarative stack</td>
<td>Compliant and Secure</td>
<td>Suppliers and Users upfront collaboration</td>
</tr>
</tbody>
</table>
How Akraino fits in the opensource eco-system?

Facts

› Akraino is complimentary to many opensource projects
› Akraino uses many of the upstream opensources within its blueprints
› Many opensources could use Akraino blueprints
› Users gets fully integrated, “ready and proven” Edge Stacks
# Akraino Blueprints - Incubation Projects

## IOT & Far Edge Use Cases

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
</tr>
</thead>
</table>
| NOKIA | Micro MEC  
Can be installed on light poles, vehicles, etc…  
Target Industry: Smart City, Far Edge Cloud |
| HUAWEI | Edge Light & IoT  
uCPE use cases, IoT appliances  
Target Industry: Manufacturing & Customer Premise |
| INTEL | Time Critical Edge Compute  
IoT use cases, appliances  
Target Industry: Manufacturing, IoT & Safety |
| ARM | Integrated Edge Cloud  
IoT use cases, appliances  
Target Industry: Remote Edge Locations |

## Telco Use Cases

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
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</thead>
</table>
| AT&T | Radio Edge Cloud  
Cloud appliance to address ORAN RIC requirements  
Target Industry: Telco – Radio Edge |
| NOKIA | SDN Enabled Broadband Access  
Virtual broadband access – higher bandwidth, symmetric version of GPON  
Target Industry: Telco – Access |
| AT&T | Network Cloud  
Telco 5G use cases and beyond  
Target Industry: Telco – 5G and generic use cases. Airship Based |
| JUNIPER | Tungsten Fabric Integration  
Enhancement to NC blueprint to support Contrail Tungsten Fabric |

## Other Use Cases

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
</tr>
</thead>
</table>
| ERICSSON | OVS-DPDK Integration  
Enhancement to NC blueprint to support OVS-DPDK |
| ARM | ARM Servers/Appliance  
Enhancement to NC blueprint to support ARM Servers & Appliances |
| REDHAT | Kubernetes Native Infrastructure  
Focused on Native Container workloads  
Target Industry: Industrial Automation |
| WIND RIVER | StarlingX Edge Cloud  
Addresses Industrial Edge Use cases  
Target Industry: Far Edge Automation |

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*Note: Companies listed and blueprint listed are not an exhaustive list.*
Mobility Core to RAN virtualization

The O-RAN Architecture

O-RAN Alliance is aiming at building an “Open” and “Smart” Radio Access Network (RAN) for future wireless systems.
Technology Gaps - Where Academia could help?

› AI/ML based efficient algorithms to handle data placement and movement between Edge to Cloud and vice versa -
› Real time processing using Virtualized compute on COTS
› Efficient large scale distributed real-time databases
› Low latency Edge APIs (Application, RAN, Cloud, etc.) definition and test results
› Cost effective Hardware acceleration at a small scale edge devices
Akraino Community Progress

Akraino Release 1 Highlights

• 8+ Blueprint Families with 19+ Blueprints under development to support variety of Edge use cases.

• Community Development started in Jan’19 and 1st release targeted in 2Q2019
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 take place once a week as a platform to discuss:
  - New Project Proposals
  - Collaborate with other communities

- Community Calls Occur weekly on Thursdays’ at 11:00am-12:00pm ET
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