XConnect for Akraino
# Blueprint Proposal: XConnect

<table>
<thead>
<tr>
<th>Case Attributes</th>
<th>Description</th>
<th>Informational</th>
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<tbody>
<tr>
<td>Type</td>
<td>New Blueprint for edge cloud</td>
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<tr>
<td>Blueprint Family - Proposed Name</td>
<td>IEC</td>
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<tr>
<td>Use Case</td>
<td>Provide MEC platform for virtual network steering with prescribed QoS SLAs and Multi-tenancy isolation for v2x/AI/IOT on Mobile Edge</td>
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<tr>
<td>Blueprint proposed Name</td>
<td>XConnect</td>
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<tr>
<td>Initial POD Cost (capex)</td>
<td>Unicycle and Middle POD</td>
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<tr>
<td>Scale &amp; Type</td>
<td>From 7 to 200 servers</td>
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<tr>
<td>Applications</td>
<td>MEC/Enterprise/5G. For example, applications for autonomous cars.</td>
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<td>Power Restrictions</td>
<td>Less than 10Kw and Middle level capability</td>
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<tr>
<td>Infrastructure orchestration</td>
<td>VMs and Containers together</td>
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<tr>
<td>SDN controller</td>
<td>ProgRAN/network and SEBA with Xconnect</td>
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<td>Workload Type</td>
<td>Containers and VMs</td>
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<td>Additional Details</td>
<td>VerneMQ MQTT Gateway and/or Mosca MQTT Broker depending on community family</td>
<td>To set up lab facilities or leverage current Arm lab</td>
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<td>Kafka message bus and Webhook/Nginx middleware</td>
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<td>Kubeless function management engine over Kubernetes</td>
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<td>Helm chart based Xconnect auto-installer, which is capable to work together with airship</td>
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IEC Stack

- **Heterogeneous Architecture**
  - VM, container, bare metal
  - Servers and customized Edge platforms
  - Virtualized NFs and Physical NFs
  - Accelerator interface

- **Resource constraints**
  - Kubernetes
  - SDN Controller for K8s

- **HW Accelerations**
  - Integrated accelerators
  - PCIe/CCIX attached accelerator (Smart NICs...)

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**Lightweight App orchestration**
- Knative
- Kubeflow
- EdgeX

**Apps**
- Bare metal
- Container
- Container + VM

**Infra Orchestration and Installer**
- Kubernetes
- Containerized Compass

**Networking Software**
- Linux System Networking
- VPP, OVS

**Controller**
- Calico, xConnect, NSM
- Contiv/VPP
- OVN-K8s

**SR-IOV, DPDK**
Real Time Linux distribution

**Edge Servers or Networking Edge Platform**

**Network Equipment**
- Switch/GW
MEC Platform

1. Enable Containerized Application deployment: Uniqueness of container need special support for the provisioning and operation. Alignment with standards and de-facto are indispensable. The differences at clustering provisioning and management cause fundamental change at support of micro-service orient workload. Xconnect targets to resolve this problem by cooperation of products and community.

2. Enable fine-granularity resource sharing and SLA controller mechanism in container scheduling framework. MEC propose challenges on the existing style of resource management on containers from perspectives of resource utilization, SLA enforcement and how to integrate with external network devices/controllers. Akraino and CNCF are targeted de-facto for alignment purpose.

3. Enable edge-adoptable placement functions in platform. MEC brings new challenges to traditional cloud placement problem from the perspective of elasticity, env-awareness, and accuracy. This item targets to provide optimal placement algorithm and module designed with flexibility to allow incorporating new metrics as they become known. This is a complicated NP-hard problem and edge-adoption is the key goal to achieve a feasible and unique delivery. Xconnect target to resolve this problem by cooperation of products and community.