WIND

Akraino Blueprint Proposal
Far Edge Family

WHEN IT MATTERS,
IT RUNS ON WIND RIVER.

Use case

- Far Edge – vRAN, Hi density stadium/event WiFi, MEC, Industrial Automation
- Example applications:
  - AR, video replay, Wireless Networking
    - Low packet latency and high packet through put
  - Industrial automation: HMI, AI, video processing
    - Tight timing constraints
- Geographically distributed network topology of distributed clouds
- API considerations:
  - EdgeX Foundry could be hosted on the cloud along with north bound API's to an ONAP instance.

Business driver

- Address edge and far edge use case at high density locations such as malls, airports and sports stadiums to support value added services at these events and locations.
  - Enables new revenue opportunities for operators
- In addition, industrial automation use cases require similar topologies
- With many sub locations and far edge sites, remote deployment and management is critical to ensure day 2 operational costs are minimized.
- Small physical foot print and low physical security are constraints in these environments
- Target cost – TBD

Operational Model

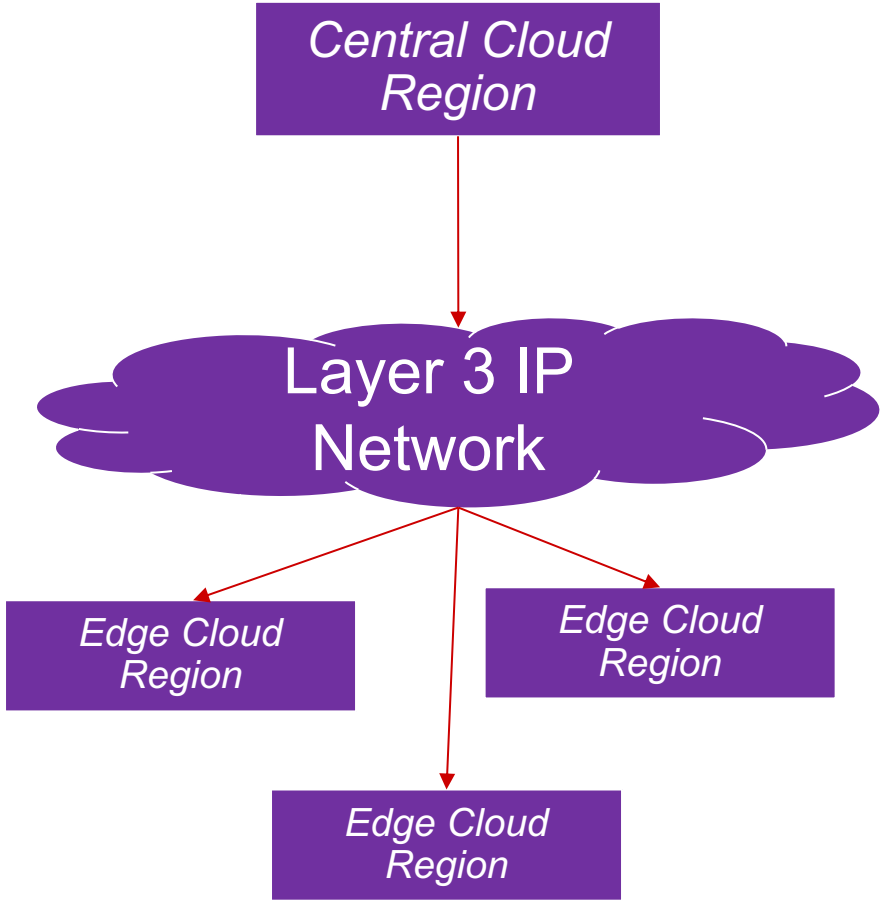
- Operational costs will be minimized by providing a single pane of glass approach along with support for north bound API's to ONAP. A distributed edge cloud architecture is enabled by StarlingX to drive down day 2 operations, by providing a central point for deploying and managing applications, deploying updates and looking after upgrades to future releases as required.
- A distributed cloud infrastructure supported by redundant hyper converged sub-clouds, based on OCP hardware, allows the use of minimal hardware at the far underpinned by a centralized cloud infrastructure management framework.

Technical requirements

- TPM for storing certificates
- vTPM support for applications
- Base OS tuned for minimum attack surface
- Monitoring of critical files for tampering (IMA)
- Low latency for networking and interrupts
  - vSwitch based Packet latency below 50us
    - SRIOV ~10us
  - Interrupt latency variation 99.999% within 7us

Distributed Cloud Topology

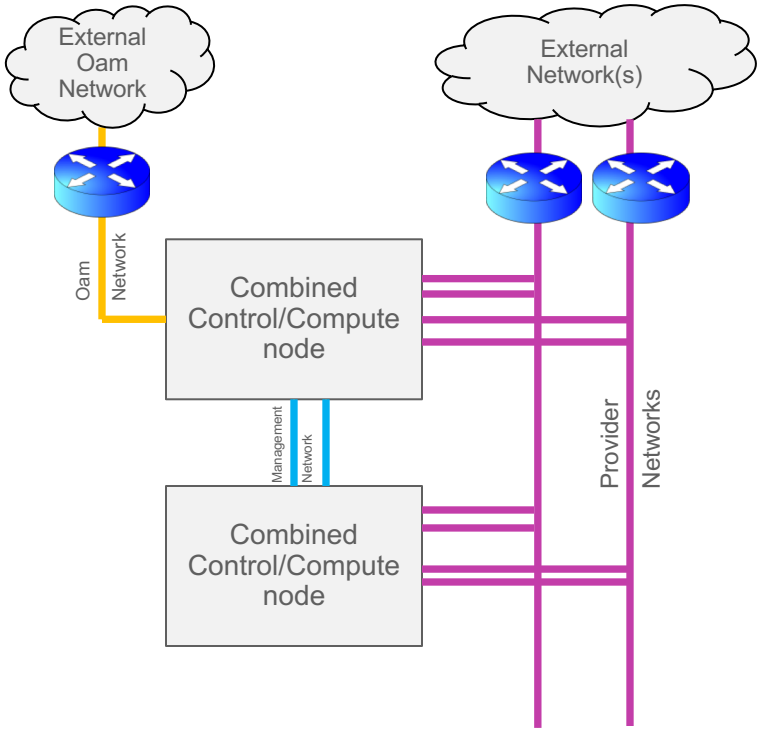
- Central Cloud Region:
  - Hosting Shared Services
  - System-wide Infrastructure Orchestration functions:
    - Deployment and Management of Edge Clouds,
    - Configuration portal for shared configuration across all Edge Clouds,
    - Fault aggregation across all Edge Clouds,
    - Patching orchestration across all Edge Clouds.
- Remote Edge Cloud Regions:
  - Geographically dispersed,
  - Scalable from 1 to 1000s of Servers,
  - Connected via L3 IP Network,
  - Running reduced Control Plane.
- Inter-Region Communications strictly REST APIs / L3.



Hyperconverged Duplex

Application consolidation and High Availability at the Far Edge

- Platform – 2 x 2U Servers OCP
- Network
  - 10G TOR Switch
    - TOR optional
  - LAG interfaces
  - Direct connect for inter control network



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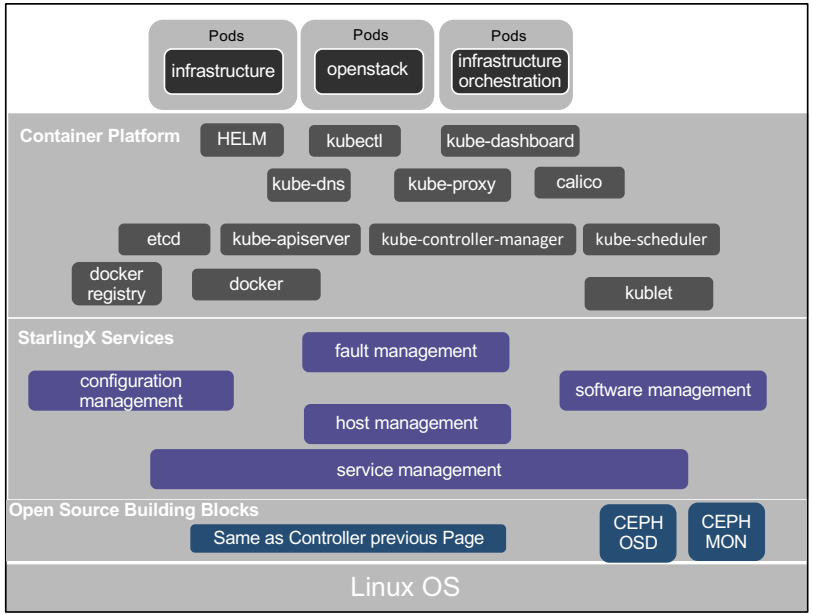
Common Software Stack

- Zero Touch Provisioning
- StarlingX based
- Containers and VM application deployment
- Small infrastructure foot print for far edge deployments
  - Distributed cloud
  - Duplex far edge sites

ONAP OPEN NETWORK AUTOMATION PLATFORM

EDGE X FOUNDRY™



Full Support for VMs and Containers

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Configuration Considerations

- A basic building block for this Blueprint/configurations OCP rackmount servers. These are common 2u servers that provide a wide range of configuration flexibility.
- This blueprint will use hardware redundancy of subcomponents through LAG / RAID.
- Networks will use the Intel 710 10G NICS

Proposal

- Two configurations are presented:
  - A distributed cloud infrastructure – single centralized single pane of glass to control geographically distributed hyper converged edge sub clouds.
  - A 2-node hyper converged configuration – Storage, compute, cloud control in a redundant hardware configuration
- All configurations based on OCP servers.
- Low physical security environment
- Low interrupt latency application requirements