Nokia open edge server

Summary for OCP project calls
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Managing the lowest latency/cost trade off with a layered architecture

Data center solution for the edge - Motivation

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<td>Sites</td>
<td>100-1000's</td>
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<td>Footprint</td>
<td>Smallest</td>
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<td>Large</td>
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<tr>
<td>Power budget</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
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Lowest latency / high throughput

Signaling driven

Central data centers

Edge data centers

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Managing the lowest latency/cost trade off with a layered architecture

Data center solution for the edge - Motivation

**Far edge**
- Sites: 100-1000's
- Footprint: Smallest
- Power budget: Low

**Aggregated edge**
- Sites: 10-100's
- Footprint: Small
- Power budget: Medium

**Regional**
- Sites: Few
- Footprint: Large
- Power budget: High

**Central**
- Sites: ~3
- Footprint: Large
- Power budget: High

**Edge data centers**

- Content stays close to the end user
  - Enables lowest latency

- No need to send big data towards the core network
  - Saves backhaul NW resources

*Lowest latency / high throughput*
Why new hardware form factor is needed for edge data centers?

Edge site limitations and new requirements

• Edge sites are often existing telco sites.
• Traditional data center gear is too heavy and large for edge sites - equipment needs to be more compact in terms of depth, height and weight.
• NEBS compliance is mandatory in terms of thermal requirements, seismic tolerance, humidity tolerance, etc.
• Power budgets are limited and support for variety of power feed options for all continents and locations is needed.
• Network functions virtualization (NFV) is driving cloudification of all services also in network edge. General purpose CPU servers are preferred for the virtualization platform.
• New telco 5G and mobile edge computing applications can benefit from acceleration capabilities for processing and networking.
Open edge server deployments

Requirements

- Fits into standard EIA 19” rack, 600 mm deep, max 42RU
- Single socket servers – mainly due to mentioned size and power requirements
- Front cabling, full front serviceability
- Support for high end accelerators (FHFL PCIe)
- Typically 100 GbE connectivity per server needed (OCP mezz + PCIe x8/16 slots on server)
- NEBS requirements are mandatory, thermal, humidity, altitude, seismic zone-4, acoustics
- AC (several options) and -48V DC power feed options needed
- Scalability from small (few servers) to full rack configurations needed (>50 servers/rack)
- 400W power budget per 1RU server
- Redundant hot swappable power supply, redundant fans, redundant connectivity, ...
- Hot swappable storage, RAID support
- BMC management for the servers
Design target: Taking OCP benefits to the edge

- Open
- Modular
- Ecosystem
- Energy efficient
- Vanity free
- Toolless
- Dense

Open rack like tool-less serviceability

Fully front operated

Vanity free design

Centralized power supply

Fit to edge physical limitations

Preserve OpenRack benefits
# Nokia Proposal: Open Edge Server

**x86 Solution Designed to Fully Support Edge / Far-Edge Cloud Deployments**

## Architecture
- **19” Compatible:** fits in any 600mm deep cabinet
- **Compact Form Factor:** ranging from 2RU to 7RU high chassis
- Sleds either 1RU or 2RU high
- Fully front-operated (cabling, open rack-like tool less serviceability)
- Support for high end accelerators
- High availability: redundant fans, hot swappable storage
- Air flow configurable from front to rear/rear to front

## Power
- 2N redundant AC & DC power supplies
- Power fed to sleds through backplane
- 400W per 1U sled
- 700W per 2U sled

## Management
- RMC manages chassis power feed.
- All sleds managed through single interface in RMC unit (acts as an ethernet switch connecting the server slots)
- On board BMC in server sleds (RMC does not manage servers)

## Environment
- Full NEBS compliance, seismic zone 4 [GR-63-Core, GR-1089-Core]
- Extended operating temperature range: -5C..+45C [ETSI EN300 019-1-3 Class 3.2], short term range: -5..+55C [NEBS]

## Commodity
Supports standard commodities like DIMMs, NICs, HBA cards, HDD/SSD/NVMe disks, M.2 disks, GPGPU cards, etc.

## Dimensions
- 130.55 (3RU) x 440 x 430 mm (H x W x D)
- Ca. 12.0 kg / 46.5 lbs. (Chassis with PSU’s and RMC)
Nokia open edge solution – OCP contribution plan

OCP Accepted contributions planned
  a. Open edge chassis
  b. Server mechanics (location and types of rear connectors including pin-out data)

OCP Inspired contribution planned
  a. Server motherboard
  b. Chassis RMC

Contribution process is starting now and target for completion is end of 2018.
Invitation to the community

We invite the OCP community (suppliers and adopters) to work with us on edge data center solutions.

Our target is not a Nokia solution but an open OCP solution for the edge.

This is just the beginning of long journey to the far edge...