OPEN Compute Project

TAIWAN Regional Community

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Road to 5G · AI · Edge Computing

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OCP Project Overview & Deep Dive on OAM, RMC, OSF and Open EDGE

▶ Rajeev Sharma, Director of Software and Technologies

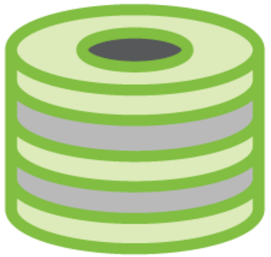
OCP Projects & Sub-projects

NETWORKING

ONL, ONIE, SAI, SONiC

RACK & POWER

Adv cooling Solutions
Power Shelf Interoperability
OpenRack V3



STORAGE

Archival
Cloud Fast Fail API

SERVER

PCI 3.0 MEZZ
Open Domain Specific Architecture (ODSA)
OCP Accelerator Infrastructure (OAI)

DC Facility

Modular DC

HPC

TELCO

OpenEDGE

HW MGMT

OpenRMC

Open Sys FW

SECURITY

Open System Firmware Project

OPEN
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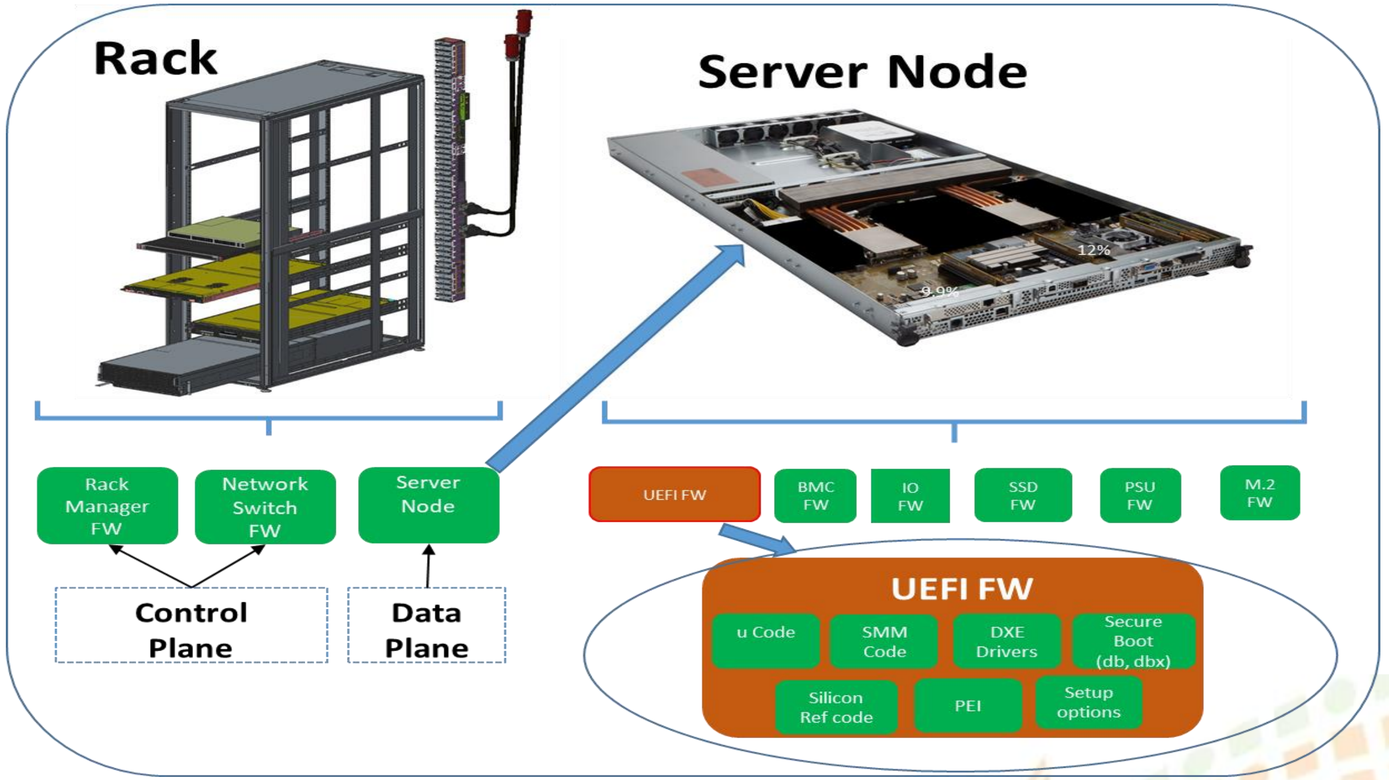
Open System Firmware (OSF)

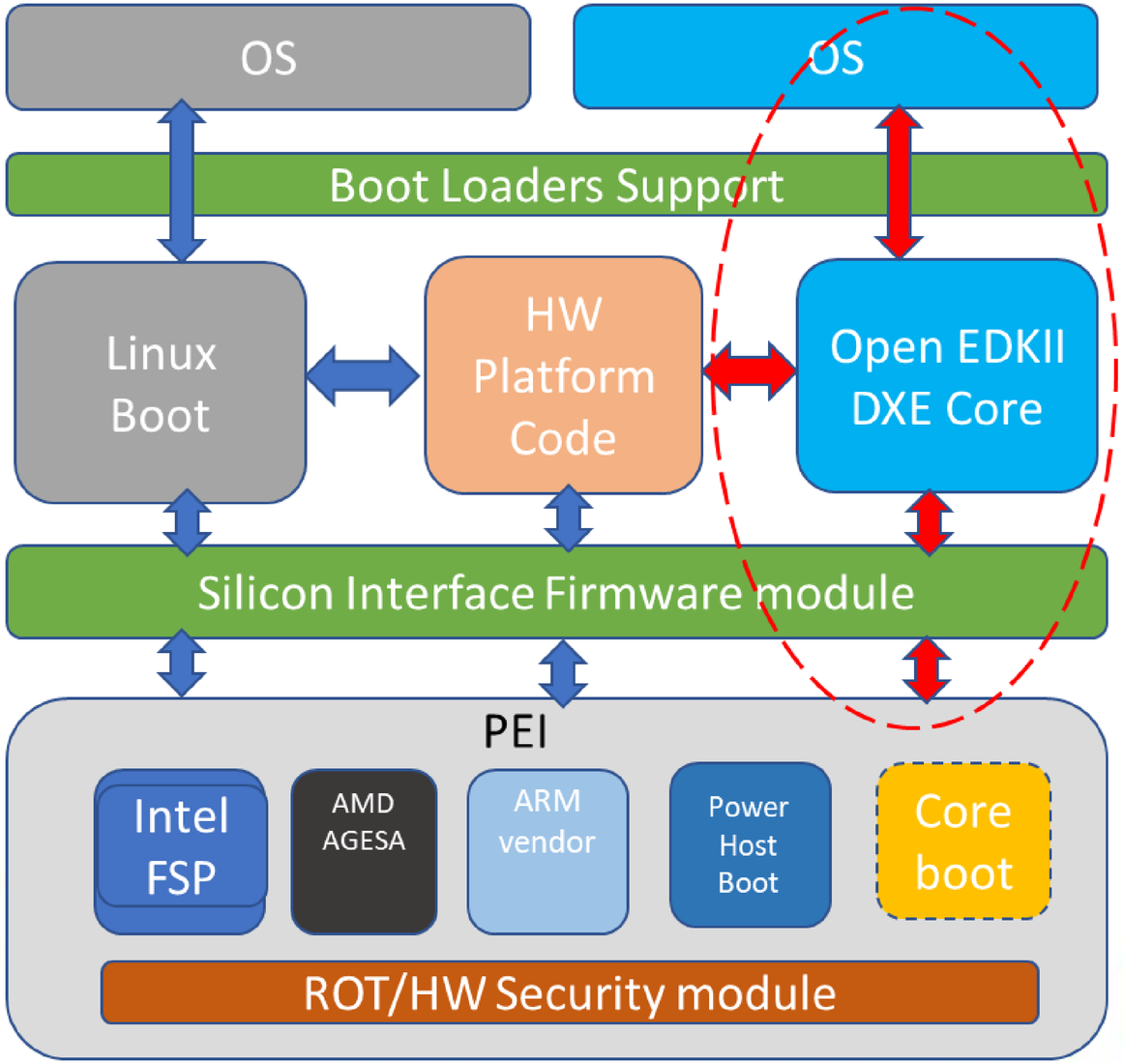
- Where does System Firmware reside in a typical Cloud/Rack



Need for OSF to be Open?

- ”Closed” System firmware
- Different Silicon vendors have their own version of boot flows.
- No one has single implementation
- Current firmware dev model not been able to keep pace with multiple cloud HW vendors.

Open System Firmware Concept



- **Many silicon vendors supplying their own silicon interface**
- **We need one SIFM module which will help us go in different paths**
  - E.g. one can go from Coreboot with Intel's help or AMDs help and go boot Linux
  - Even one can go through Linuxboot and boot Windows

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OCP OpenRMC Project

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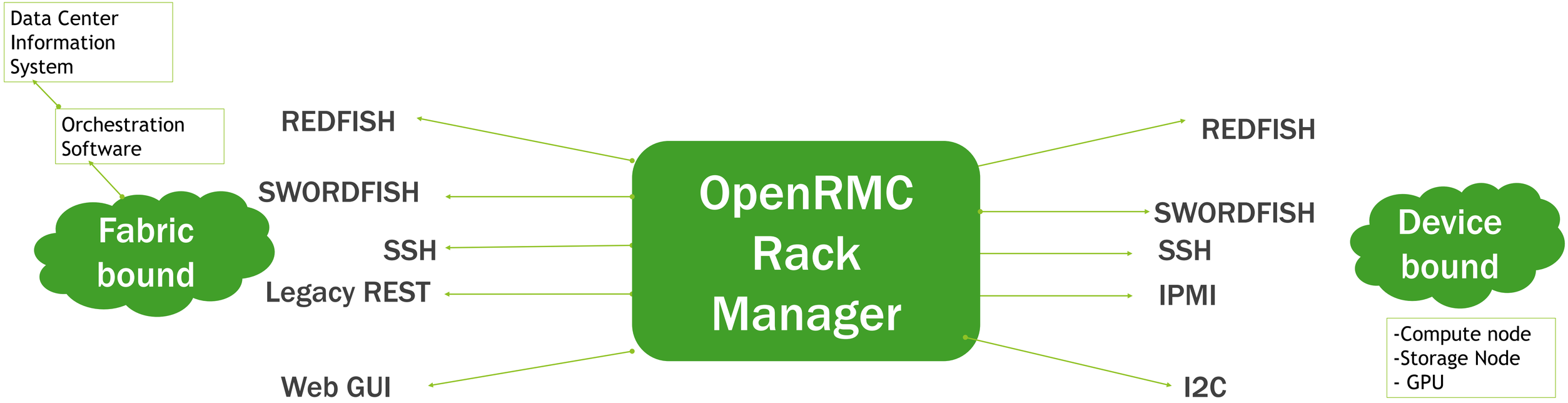
OpenRMC

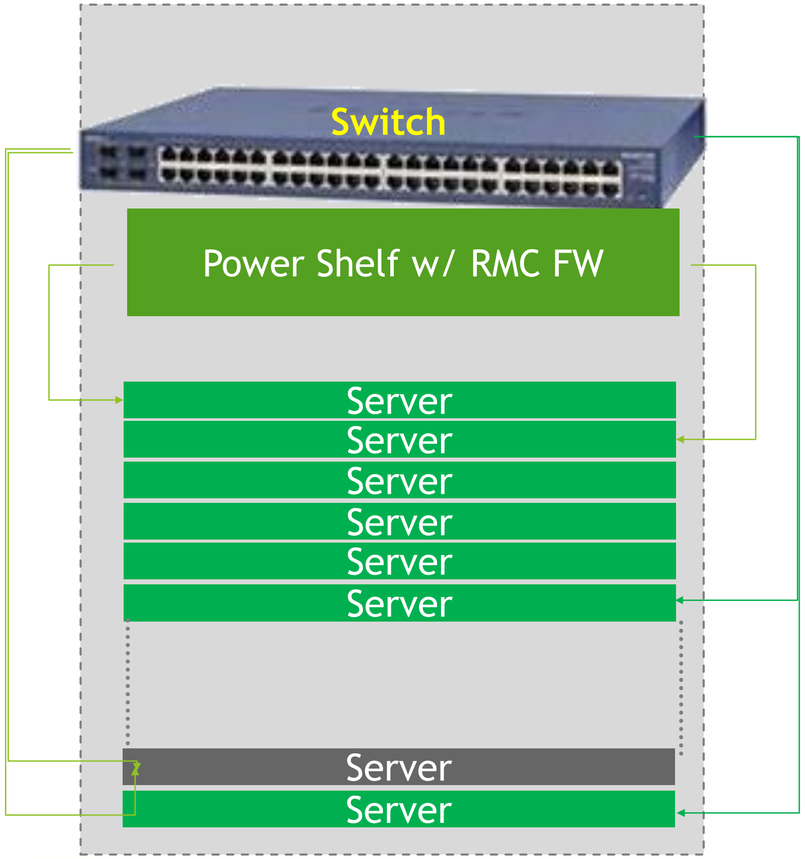
- **Motivation from System Firmware (BIOS) and BMC Firmware**
- **Needed to work on Rack Manager**
  - OCP is designing Rack and Power
  - Not just the compute manager but a Rack level Manager
- **The Rack Manager will run-**
  - Firmware
  - Software

OpenRMC Data Traffic Interfaces

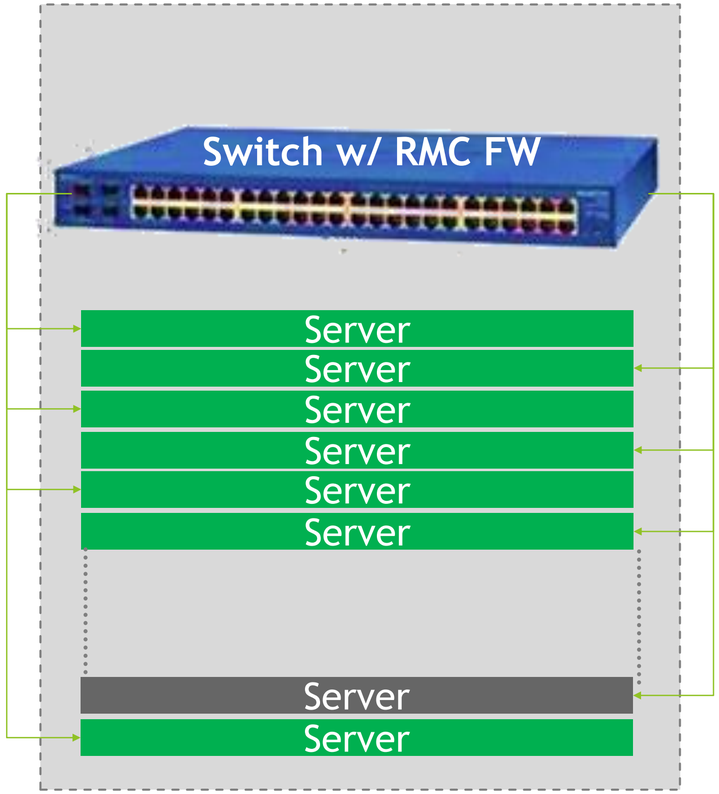
A piece of hardware that provides Rack Management Functions



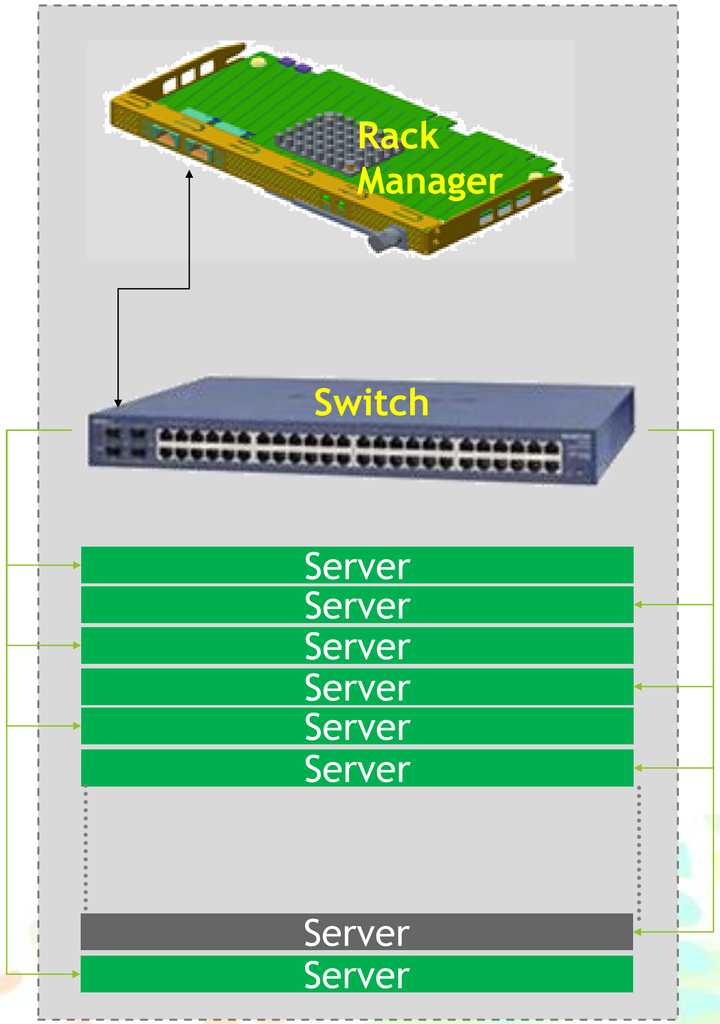
OpenRMC Proposed Configurations



OpenRack



EIA, OpenRack



Olympus

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OCP Open Accelerator Infrastructure (OAI)

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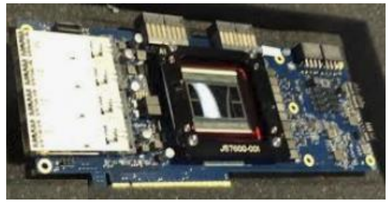
Accelerator Infrastructure

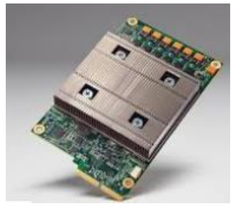
- **Exponentially growing producing an explosion of new types of Hardware accelerators for -**
  - Machine Learning (ML)
  - Deep Learning (DL)
  - High Performance Computing (HPC)

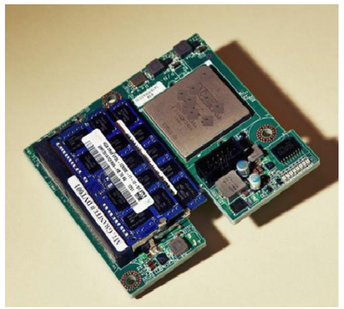
GPU | FPGA | ASIC | NPU | TPU | NNP | IPU | xPU…

Diverse Modules and System Form Factors

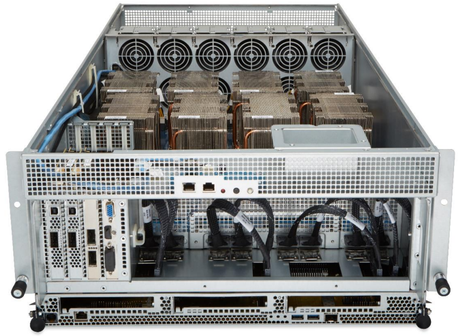
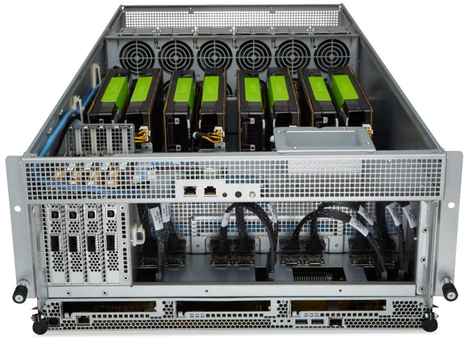




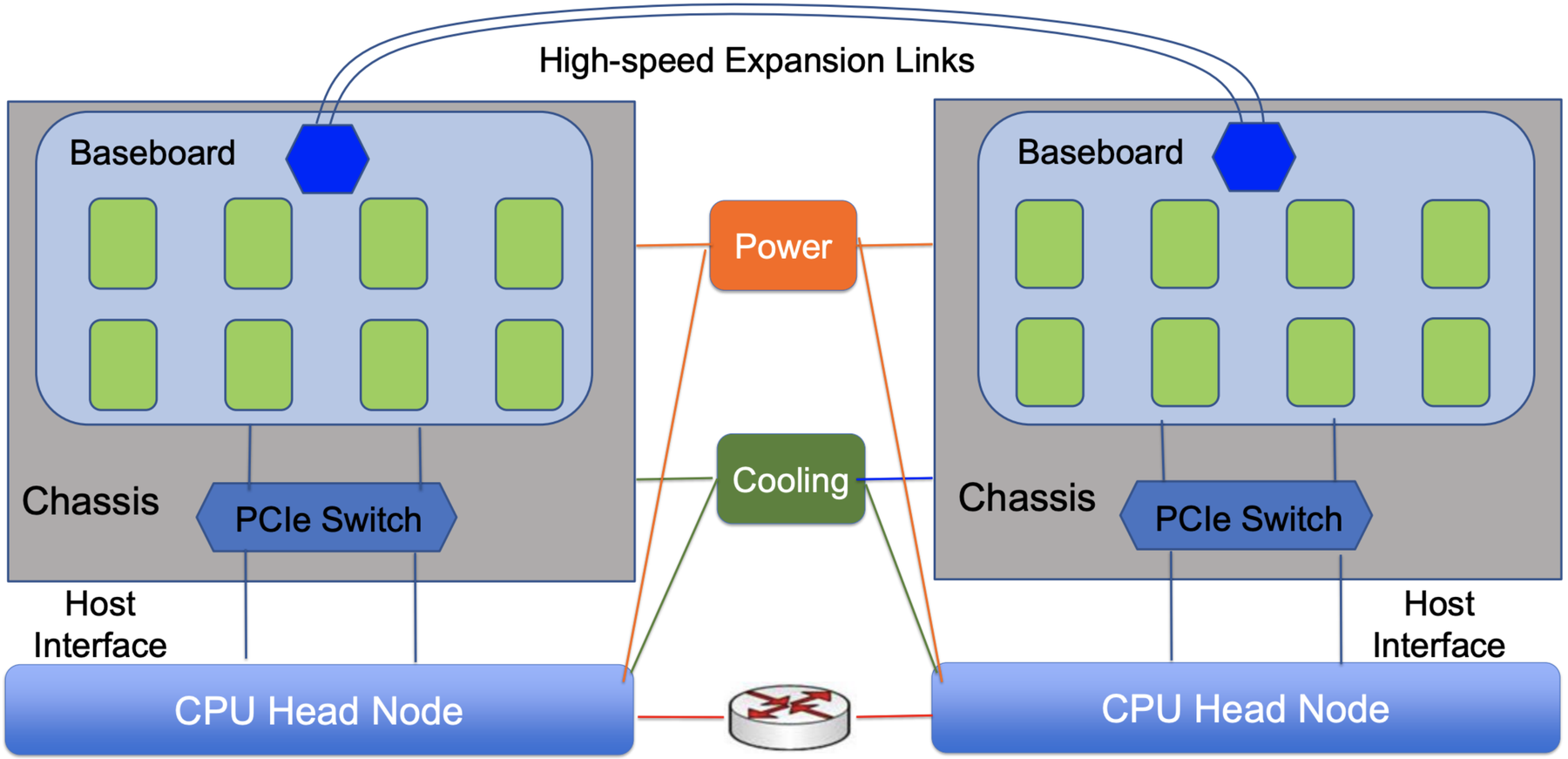






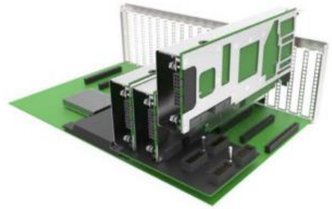




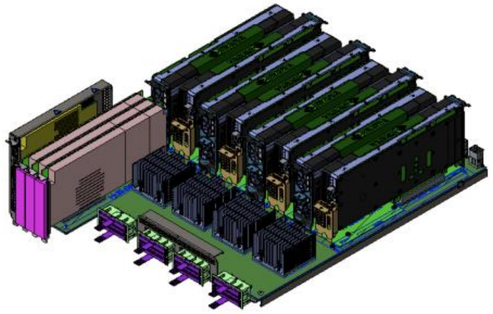
Logical Components for AI Hardware System

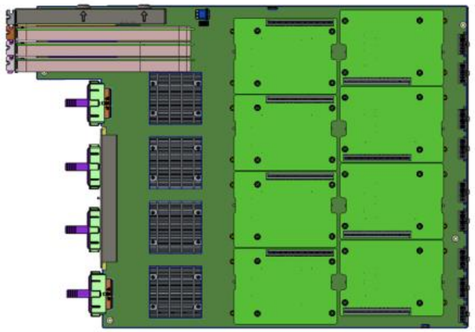


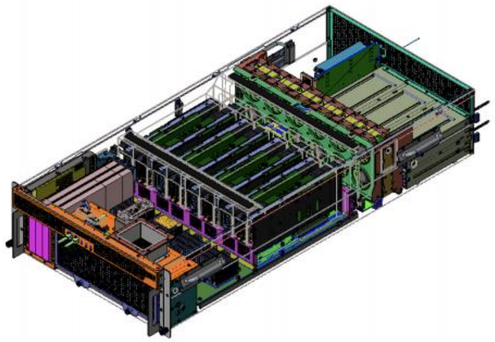
Accelerators in Different Form Factors

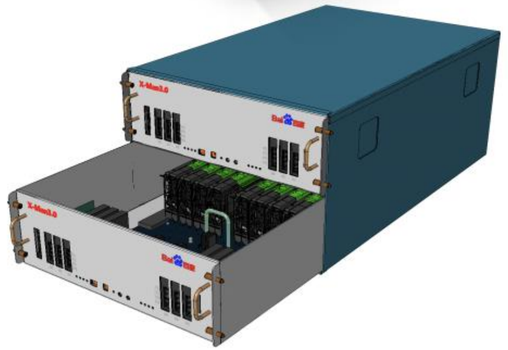
Accelerators in PCIe CEM Form Factor





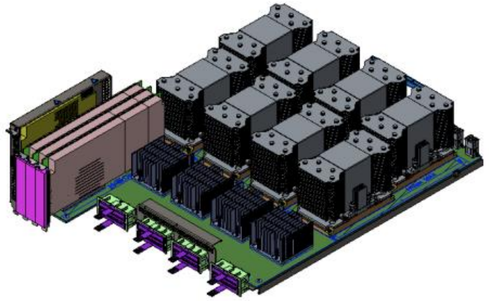


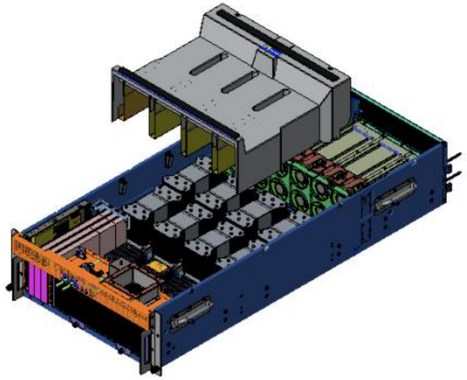




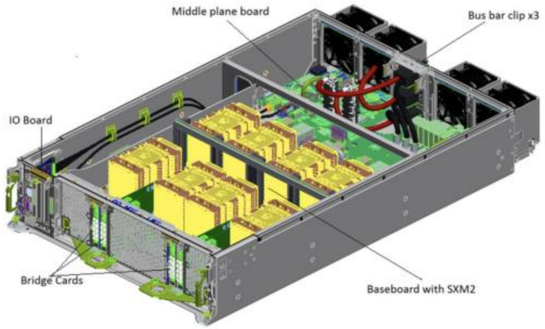
Accelerators in Mezzanine Form Factor

MS-HGX1

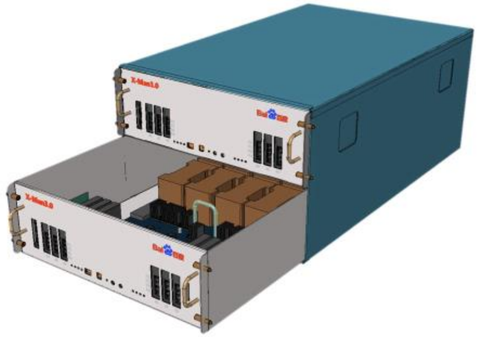




FB-Big-Basin



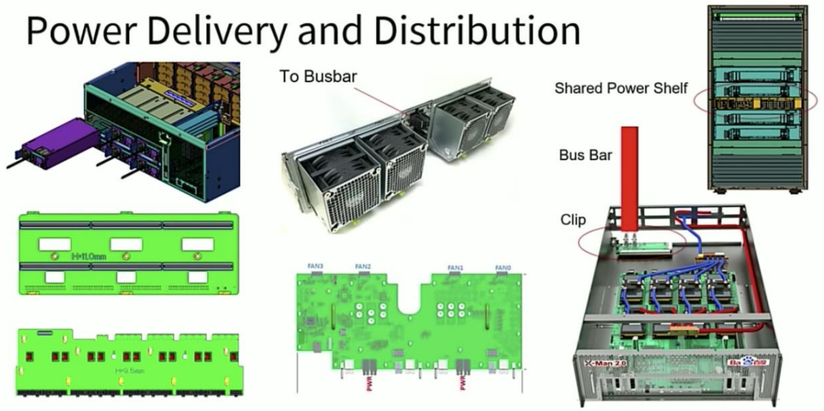
Baidu-X-MEN



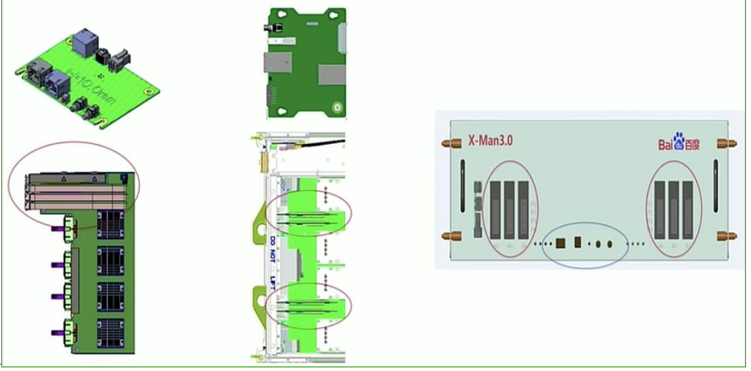
Accelerator Piece Parts

Various Interconnect Topologies

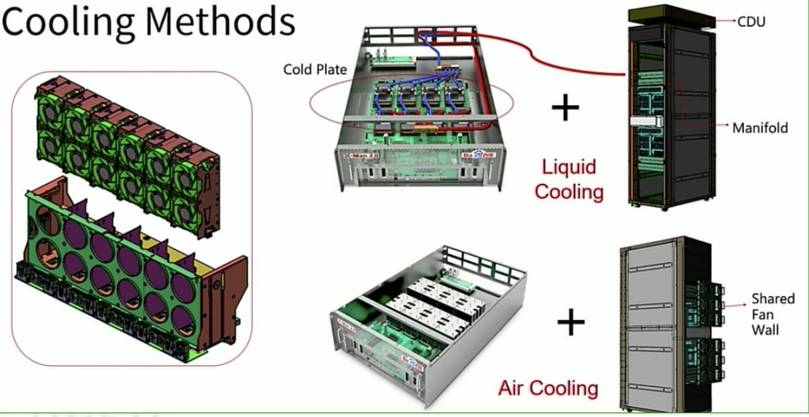
Power Delivery and Distribution



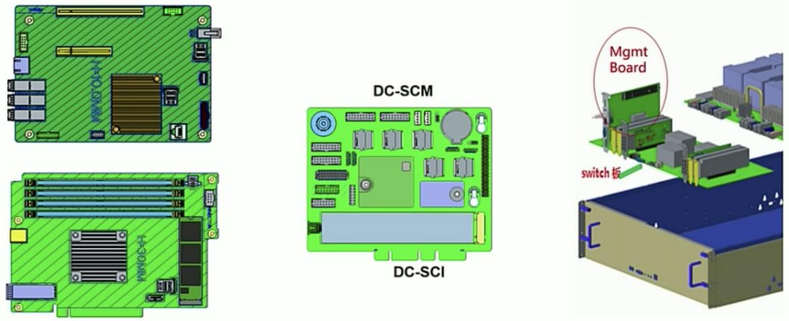
IO Board



Cooling Methods



Management Module



What We Are Planning to Do..?

- Build a universal baseboard (UBB) for various interconnect topologies
- Tray
- Chassis
- Management Infrastructure & security

Hierarchical Base Specification

- Power and Cooling
- Mechanical
- Electrical
- Security & Management
- OAM
- UBB (for the Interconnect)
- Tray
- DC-SCM

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OpenEdge

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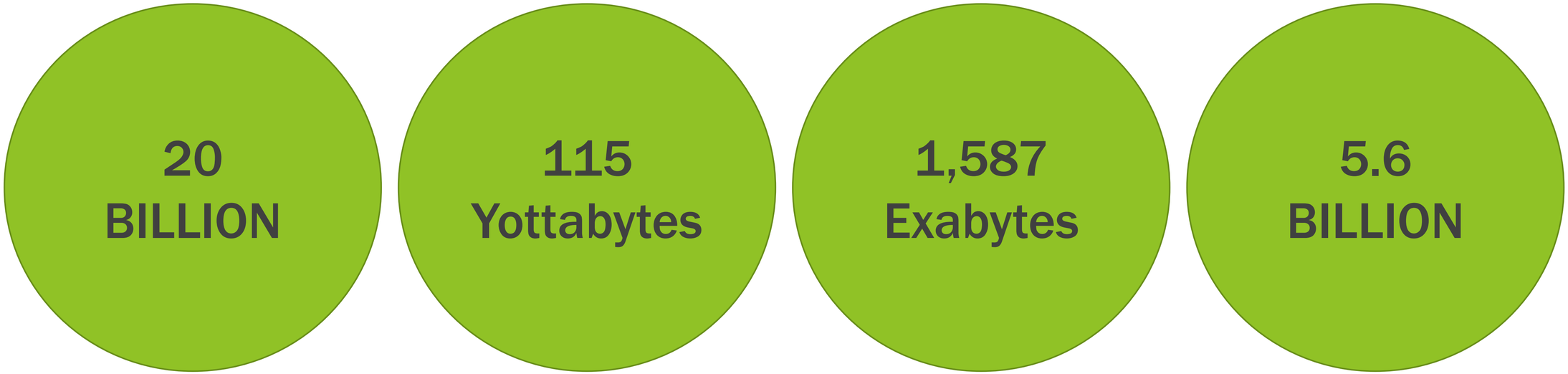
Continuous Data Drives The Need For The Edge Cloud

- By 2020



Connected Devices
3-4x from 2018

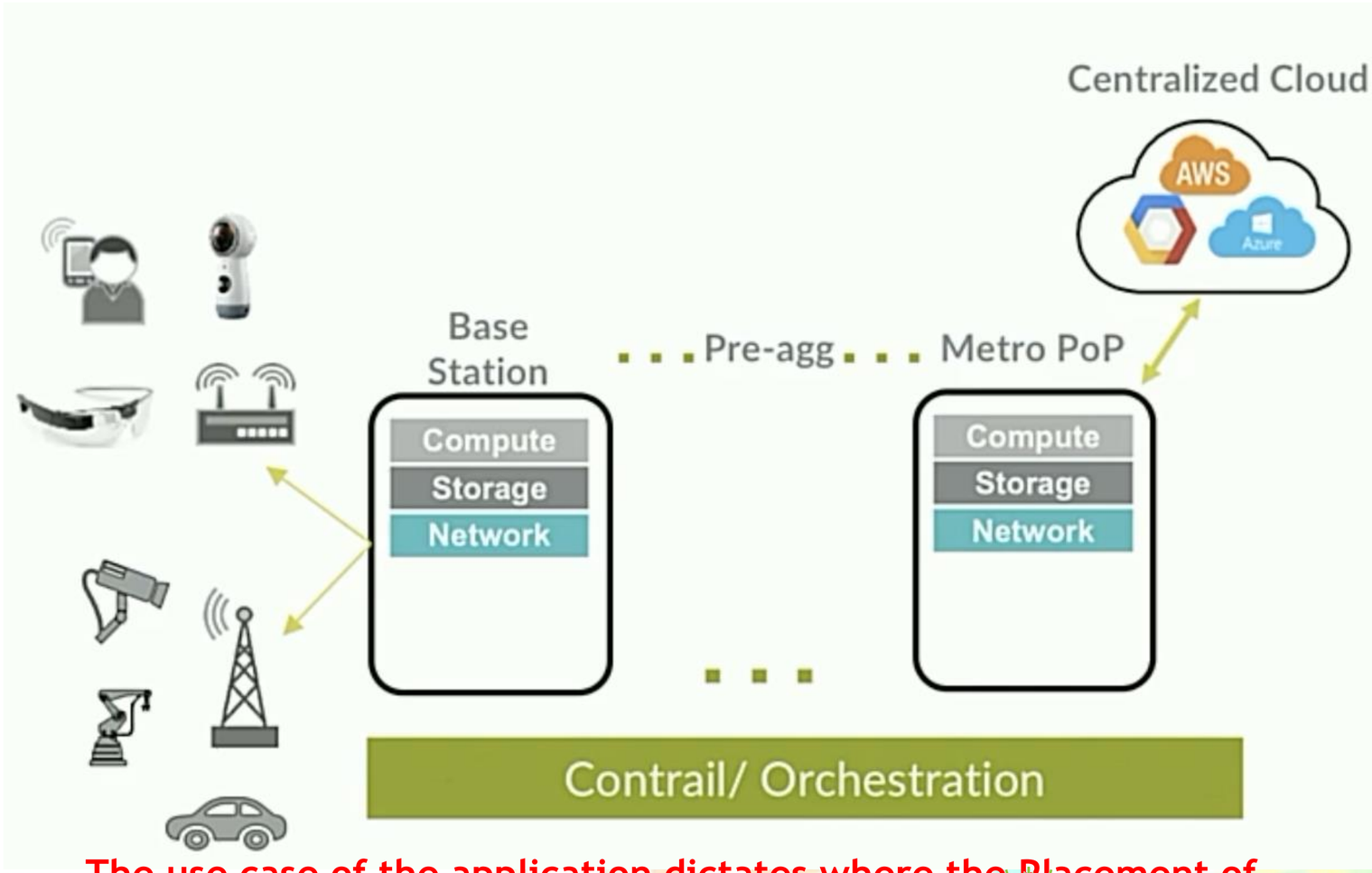
IoT Data Generated
(1 YB= 10^{24} Bytes)

IoT Data Captured
(1 Exb= 10^{18} Bytes)

IoT Devices
processing data at
the Edge

Distributed Cloud – Where is the Edge?

- **Edge Compute**
- **Drivers**
  - Low Latency
  - Reduce NW traffic, filter superfluous data
  - Improve security & reliability
  - Customization & local control
- **Challenges**
  - Complexity in managing 1000s sites
  - Numerous EC standards
  - Revenue opportunities unfolding



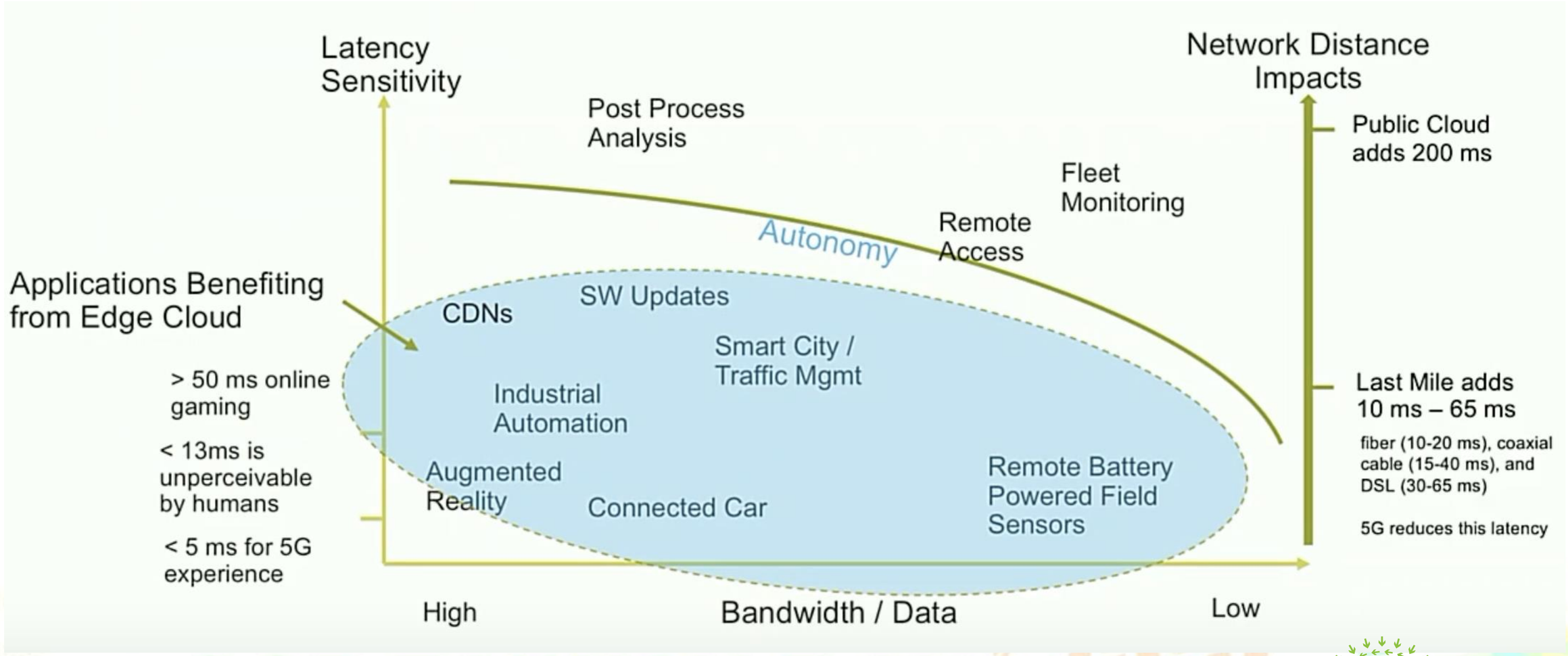
The use case of the application dictates where the Placement of the Edge Workloads

Edge Cloud – Part of 5G Transformation

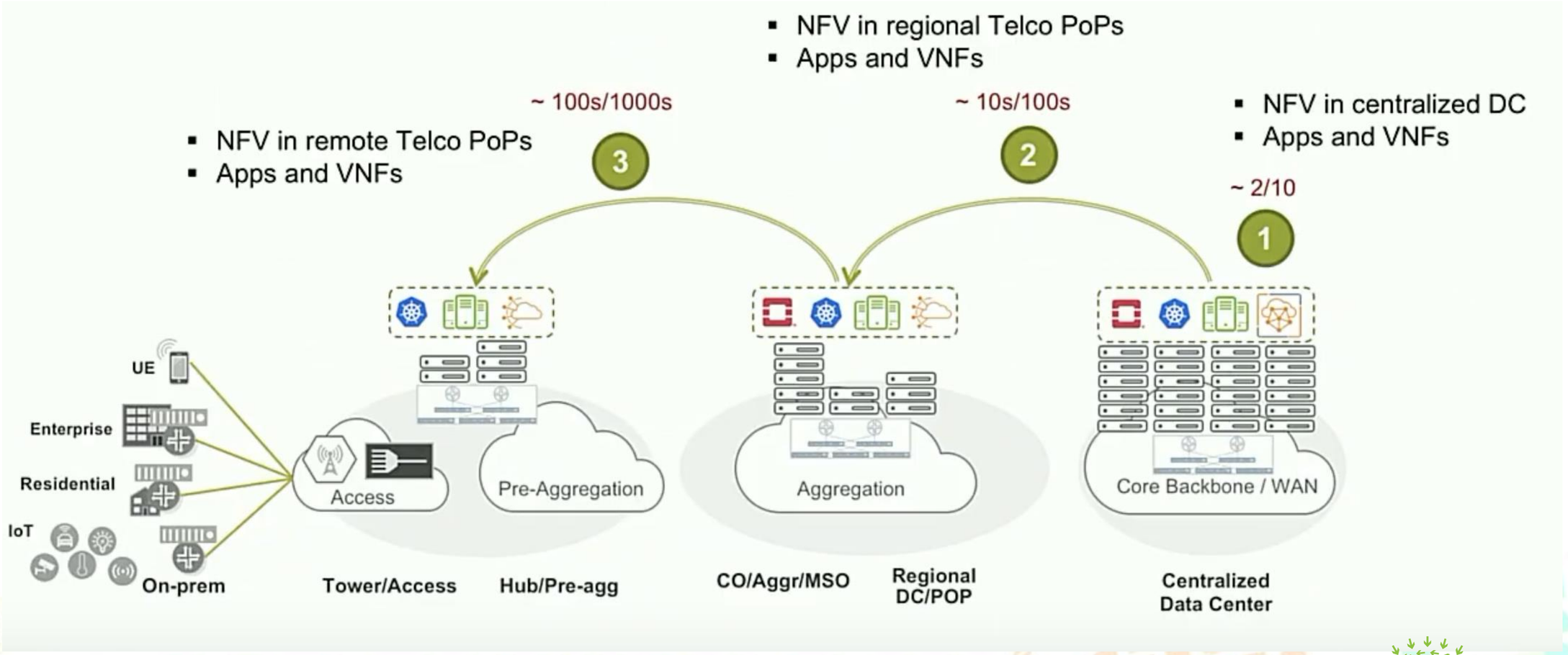
- **Gartner states that by 2022..**
  - 30% of SPs that have deployed 5G will also deploy edge computing services
  - 50% of enterprise data will be created and processed outside of traditional data center or cloud

- **Virtualizing the Edge infrastructure and operating it on the edge cloud is going to be a fundamental to how 5G gets rolled out**

Defining the Edge



Edge Clouds Will be Deployed in Steps



OCP OpenEDGE Chassis Overview

- **Key specifications**
  - 3U, 19” mountable (EIA-310 compatible)
  - 130.6 x 440 x 430 mm (H x W x D)
  - 1U and 2U, half width sleds are supporte
  - Redundant, centralized power supply
    - 2000 W max power feed capacity, 80+ Platinum
    - AC (100..127/ 200..240 VAC) and DC (-48 VDC) options
  - Sled power feed capacity 400 W (1U sled), 700 W (2U sled), 12 VDC

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Announcements

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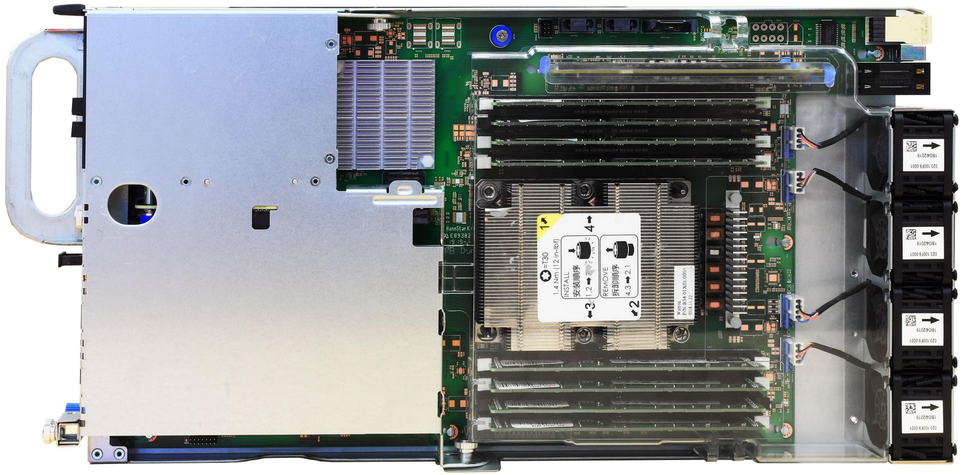
Wiwynn & Nokia Announcements

- **Wiwynn OpenEdge Platform**
  - Based on Nokia contributed design and **EP100** is platform code name in Wiwynn PRs

- **Design Server Sled for OCP Mezz 3.0**
  - For different types of NIC/LAN cards, and it is an update OCP Mezz card design recently



Wiwynn & Nokia Announcements…Cont'd

- **OpenRMC**
  - Develop base OpenRMC for **EP100** platform for the community to develop further, also in consideration of Dev-kit
- **Support Dev-kit for OpenEDGE**
  - Wiwynn target to provide 1st version Dev-kit based on OpenEDGE for OpenRMC (basic), and could for OpenBMC & OSF in the near future

THANK YOU

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