
OPEN
Compute Project
OCP U.S. SUMMIT 2017
Santa Clara, CA

OCP Driven Telco Cloud

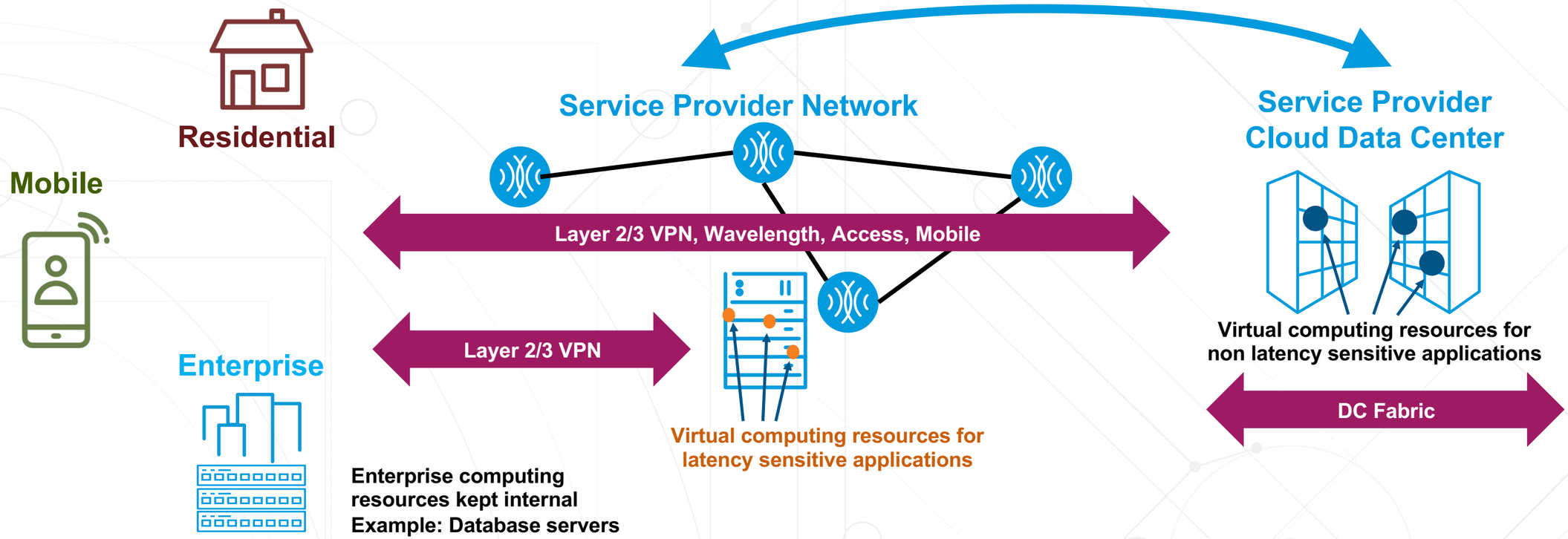
Dharmesh Jani, VP Technology

Cloud and Data Center BU, FLEX

OPEN HARDWARE. OPEN SOFTWARE. OPEN FUTURE.

OPEN Compute Project

Telco Cloud

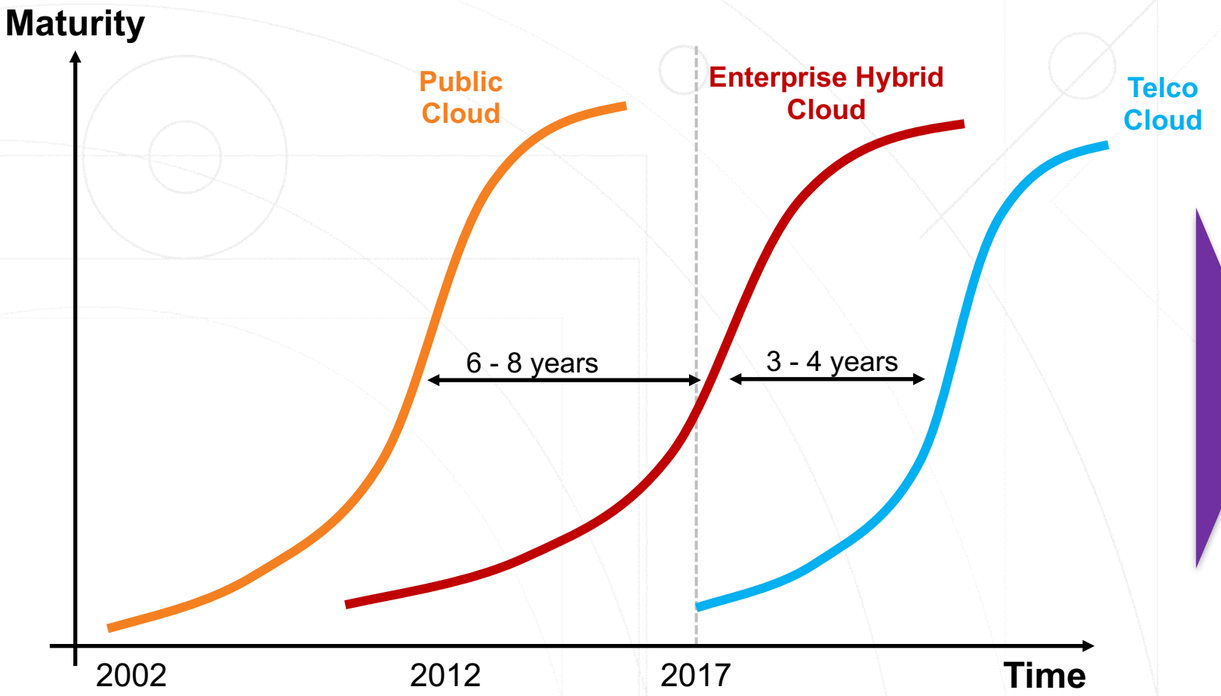


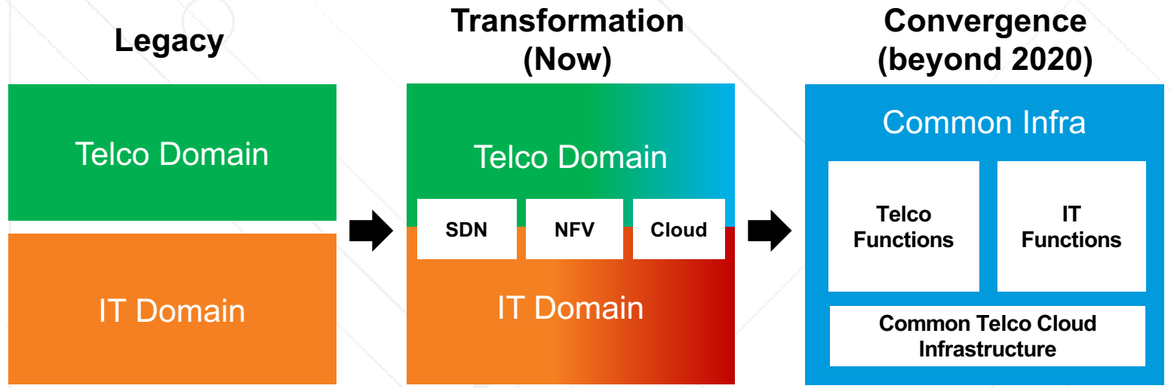
Synchronized delivery of Network and Computing

Treat Compute & Network Assets as part of a single pool of resources

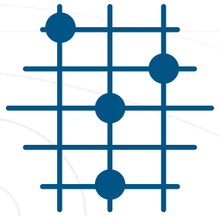
Two Distinct Growth Markets for next 2-3 years

Infrastructure For Enterprise IT and Telco will converge longer term





Telco Cloud vs Data Center Cloud



Spans access, backhaul & core

Brownfield deployments

NEBS CERTIFIED

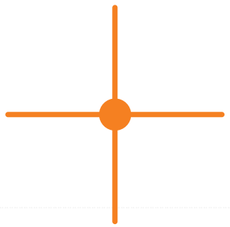
HW reliability critical, traditionally five 9's OA&M/SLAs

Network services

Central Offices

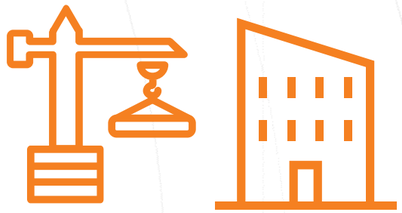
Edge/ Fog/ IoT

TOPOLOGY



Specific connectivity points

DEPLOYMENTS



Greenfield & Brownfield deployments

OPERATIONS

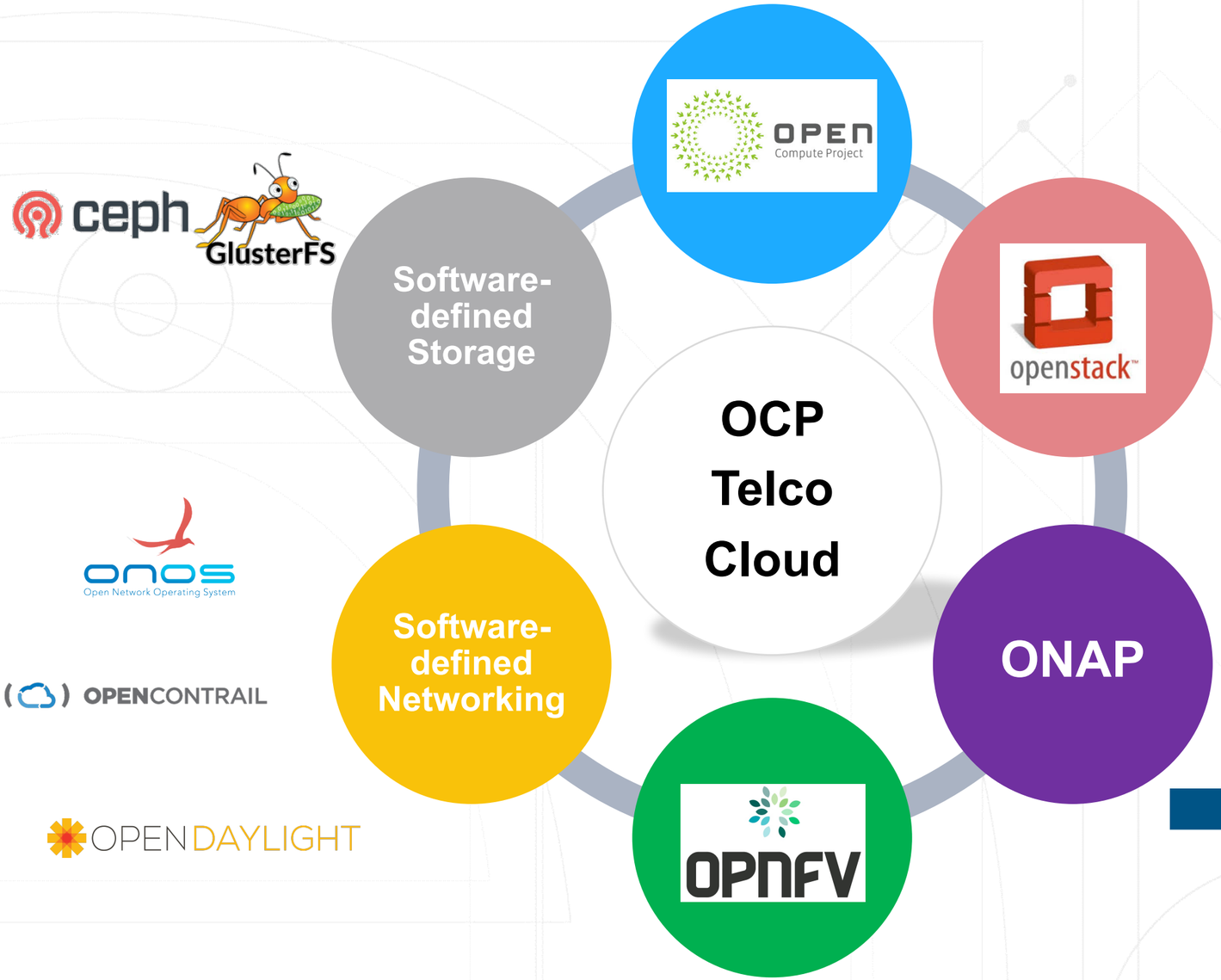
HW Resilience via SW

USE CASES

IT Workloads

flex

Telco Cloud Open Source Components



OPEN STACK

Commodity HW

Hadoop Engine

Commodity HW

ONOS SDN

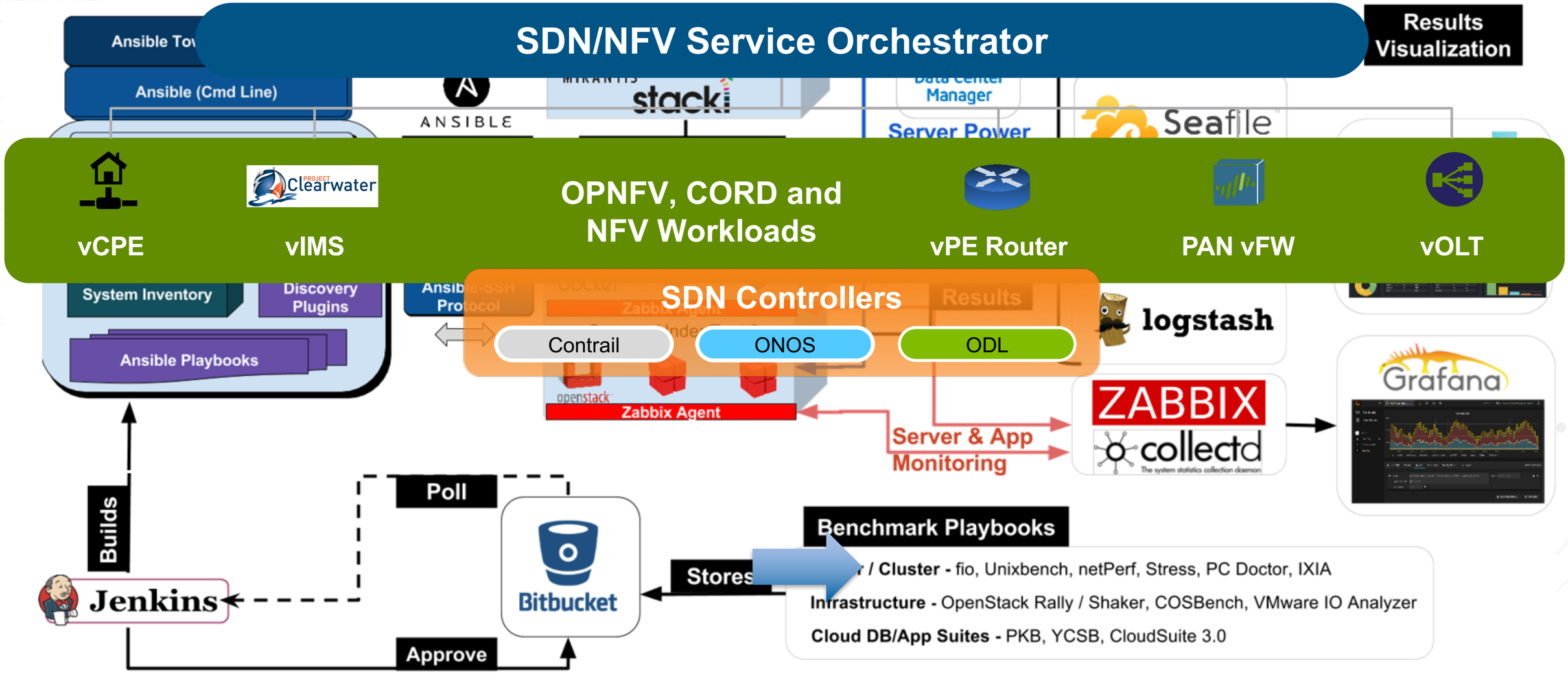
OCP Telco HW

OPNFV STACK

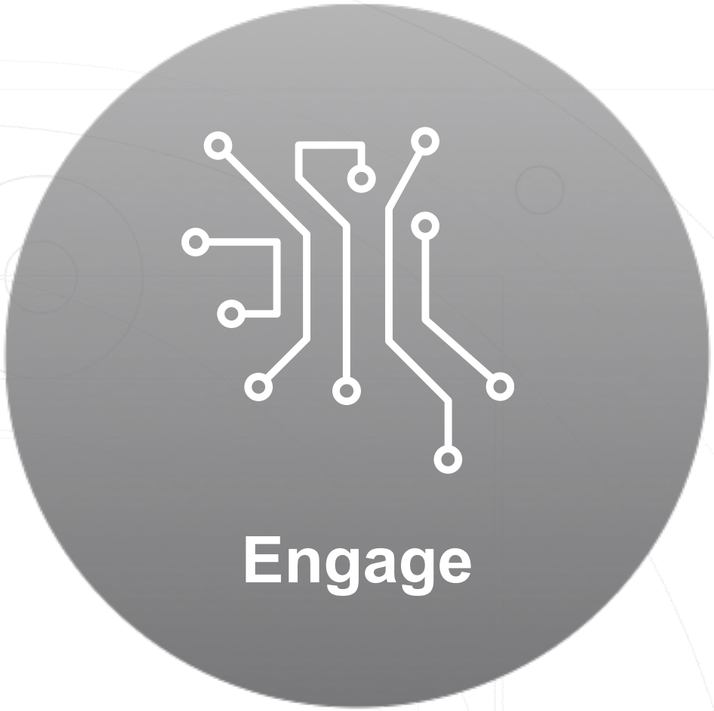
OCP Telco HW

flex

Flex Telco Cloud Test Framework



Telco Cloud Deployment Requires Multiple Areas In Cadence



Solutions Design & Engineering

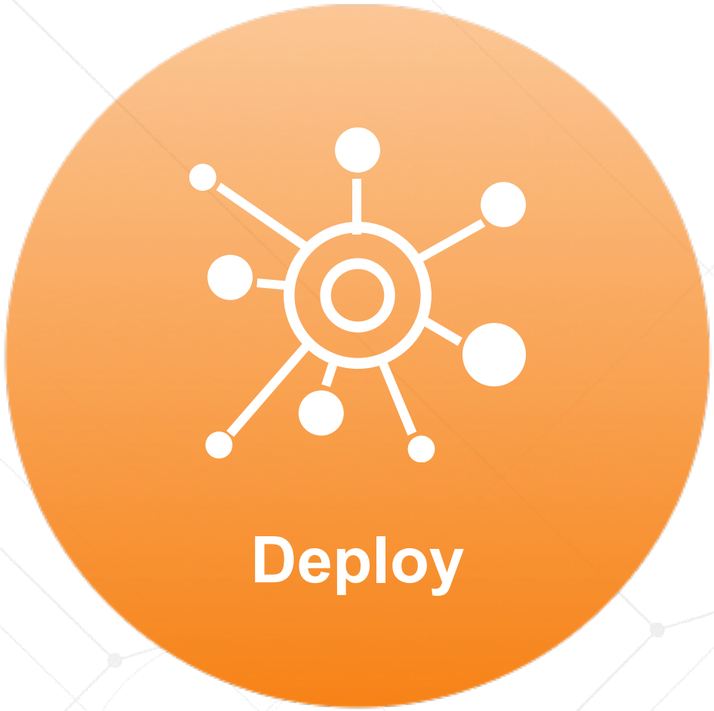
Platform & Product Validation

Lifecycle Management

Application Health Monitoring

Supply Chain Management

System Integration

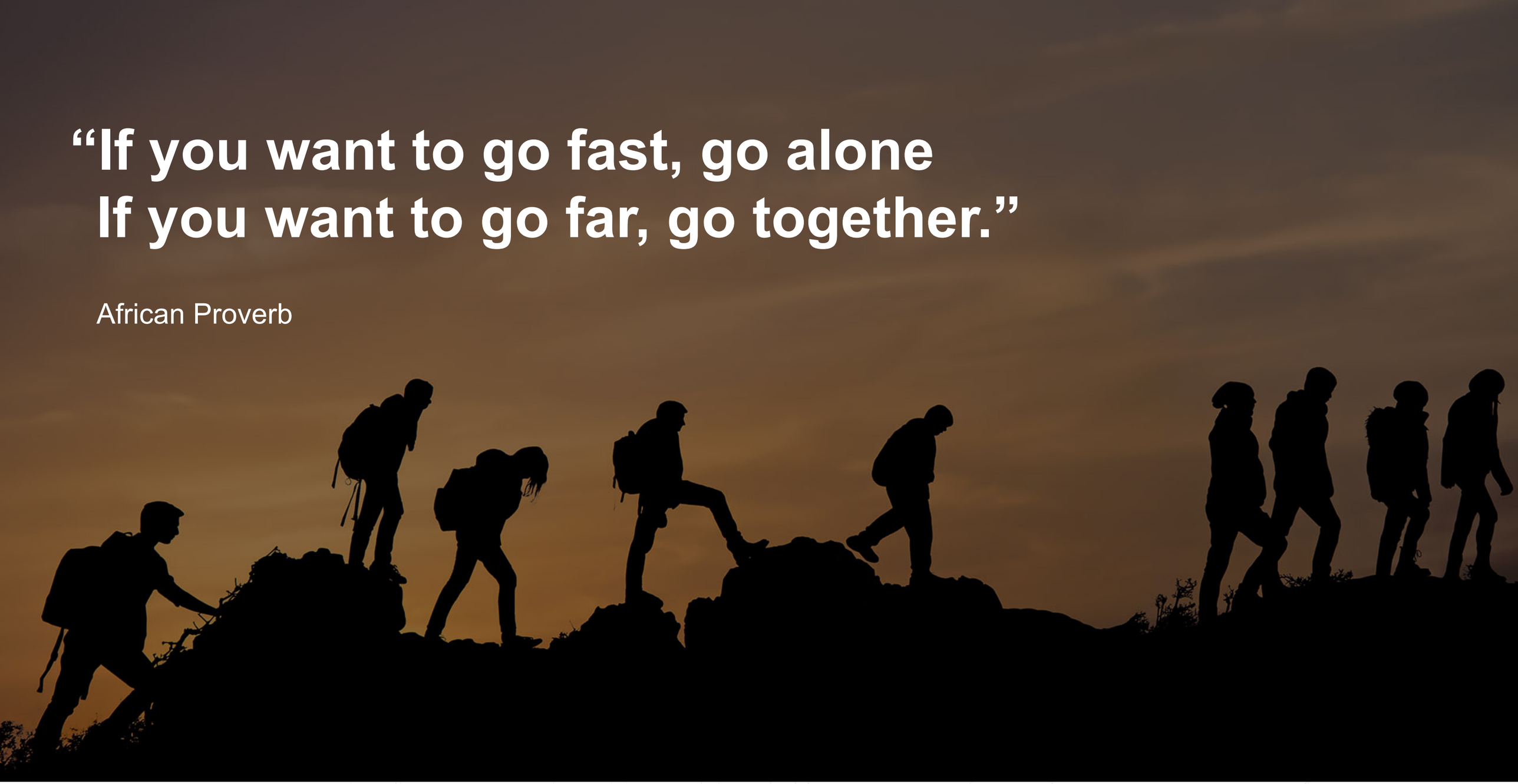


Regulatory & Compliance Certifications

Global Logistics, Support & Services

“If you want to go fast, go alone
If you want to go far, go together.”

African Proverb



OCP FLEX BOOTH INFO

FLEX BOOTH # C3

OPEN HARDWARE. OPEN SOFTWARE. OPEN FUTURE.

OPEN Compute Project

The OCP Driven Telco Cloud

Said Berrahil
Vice President of Telco Cloud Infrastructure
Nokia

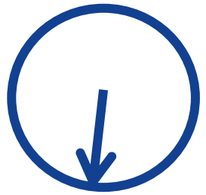
OPEN HARDWARE. OPEN SOFTWARE. OPEN FUTURE.

OPEN Compute Project

Fundamental digital needs for new human & business value creation

seemingly infinite capacity

1 **Need:** 100x capacity growth in <10 years



imperceptible latency

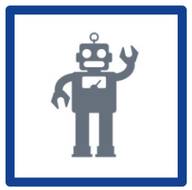
2 **Need:** Millisecond latency for networks & new ‘human’ services

terascale things

3 **Need:** Optimize TCO for a trillion things

global-local alliance

4 **Need:** Massive distribution of cloud infra with global federation



human cognitive operation

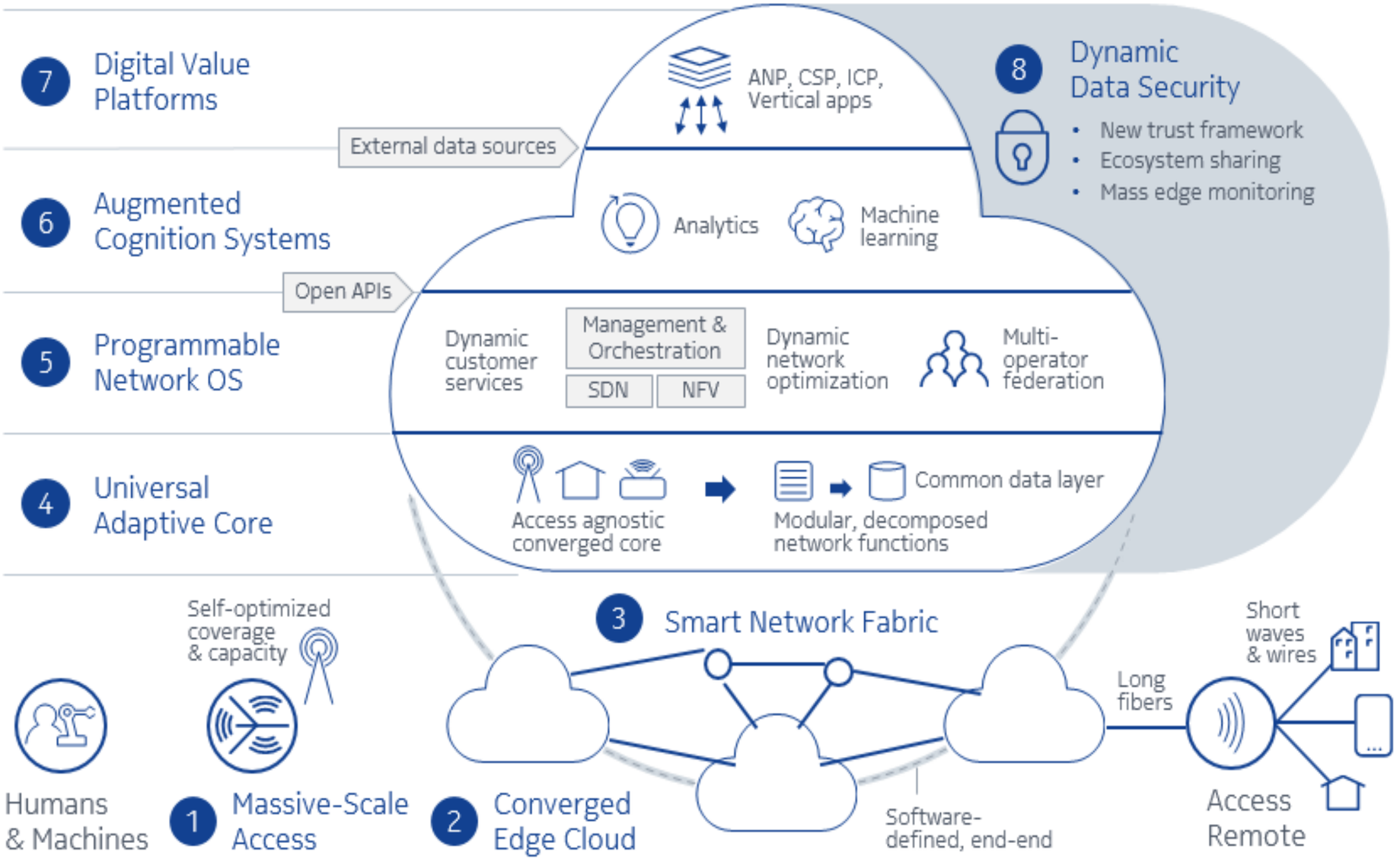
5 **Need:** Human assistance & task automation @ machine scale

personalized protection

6 **Need:** Enable dynamic, contextual security & trust @ terascale

From bare metal hardware to cloud data centers

A clear vision of how networks need to evolve



Source: Nokia Bell Labs Future X

Telco Cloud is a key enabler for future networks

5G

Capacity **1000x** more traffic **10-100x** more devices	Latency **1** millisecond
Data rates **10 Gbit/s** @peak	Coverage **100 Mbit/s** wherever

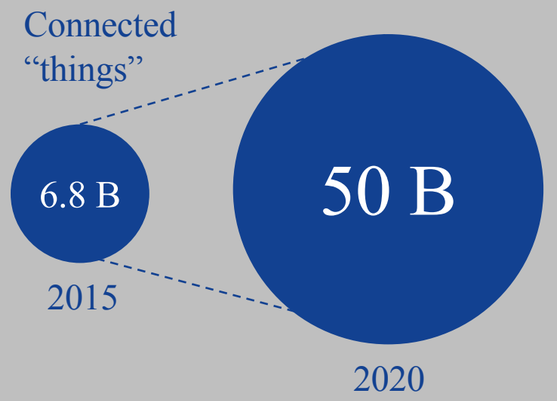
Bandwidth & latency demands

Telco Cloud

Remain profitable and efficient

Make the business case work

IoT

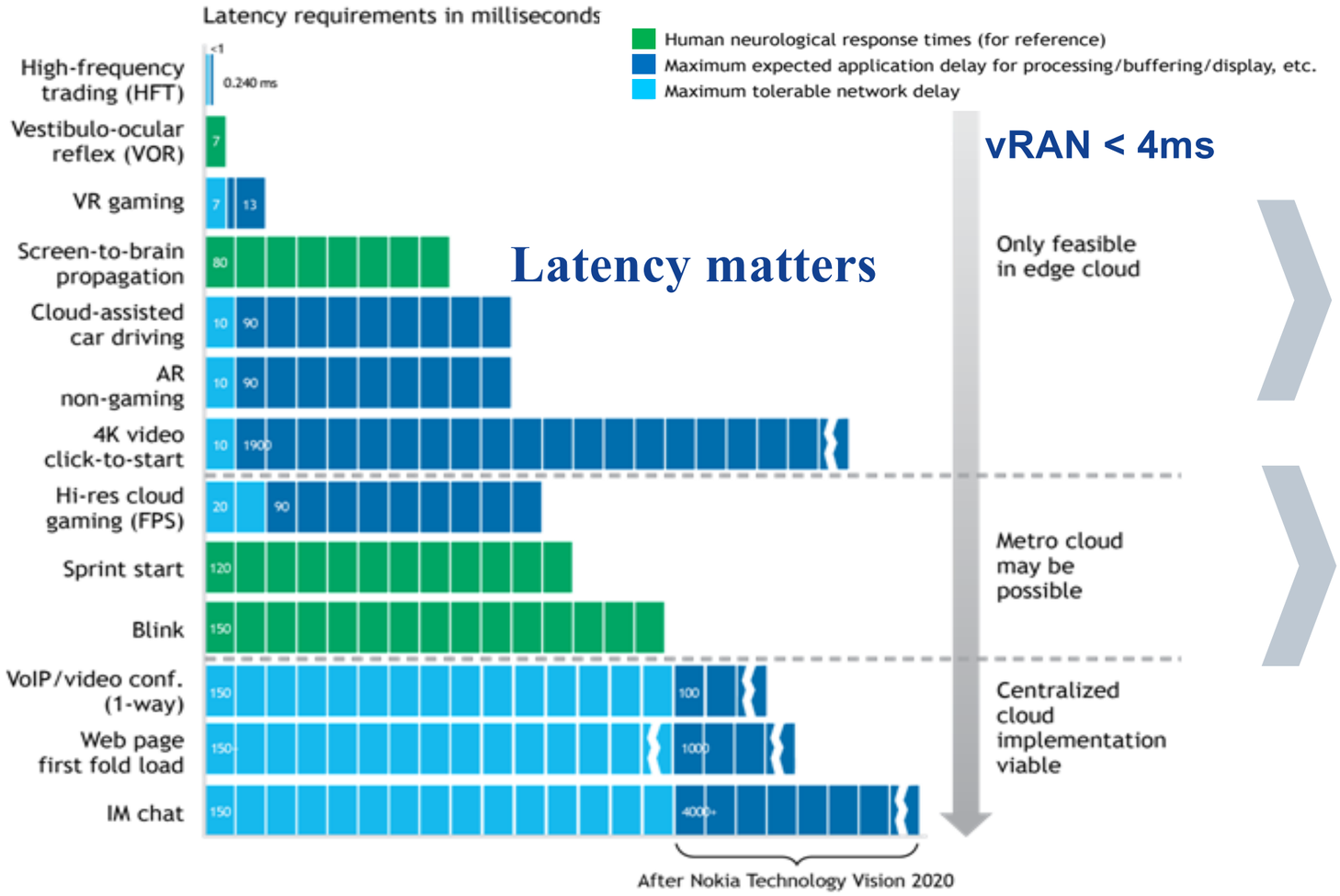


Scale on demand

NOKIA

Cloud infrastructure for telco needs to deliver high performance

Real-time, low latency, centralized and distributed



Cloud infrastructure must efficiently support deployment in both central and edge sites

Distributed Edge Data Centers enable low latency

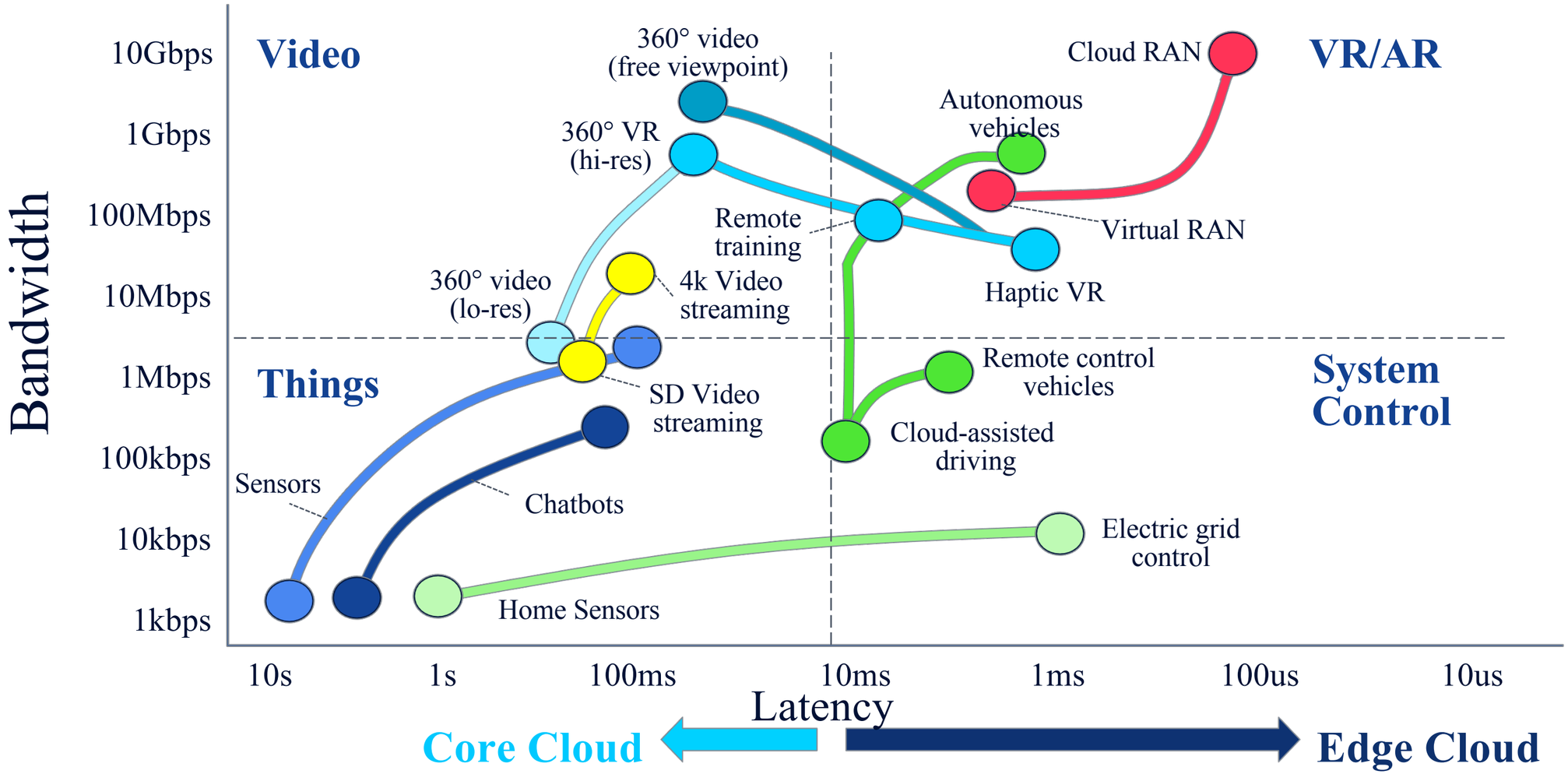
- Cloud at the network edge supporting radio and mobile edge computing applications
- Exploiting cloud infrastructure synergies between distributed and centralized sites e.g. efficient OCP[1] half rack HW configuration

Centralized Data Centers enable efficient capacity

- Cloud for highly scalable workloads without compromising unbreakable core design
- Design for performance with lowest TCO

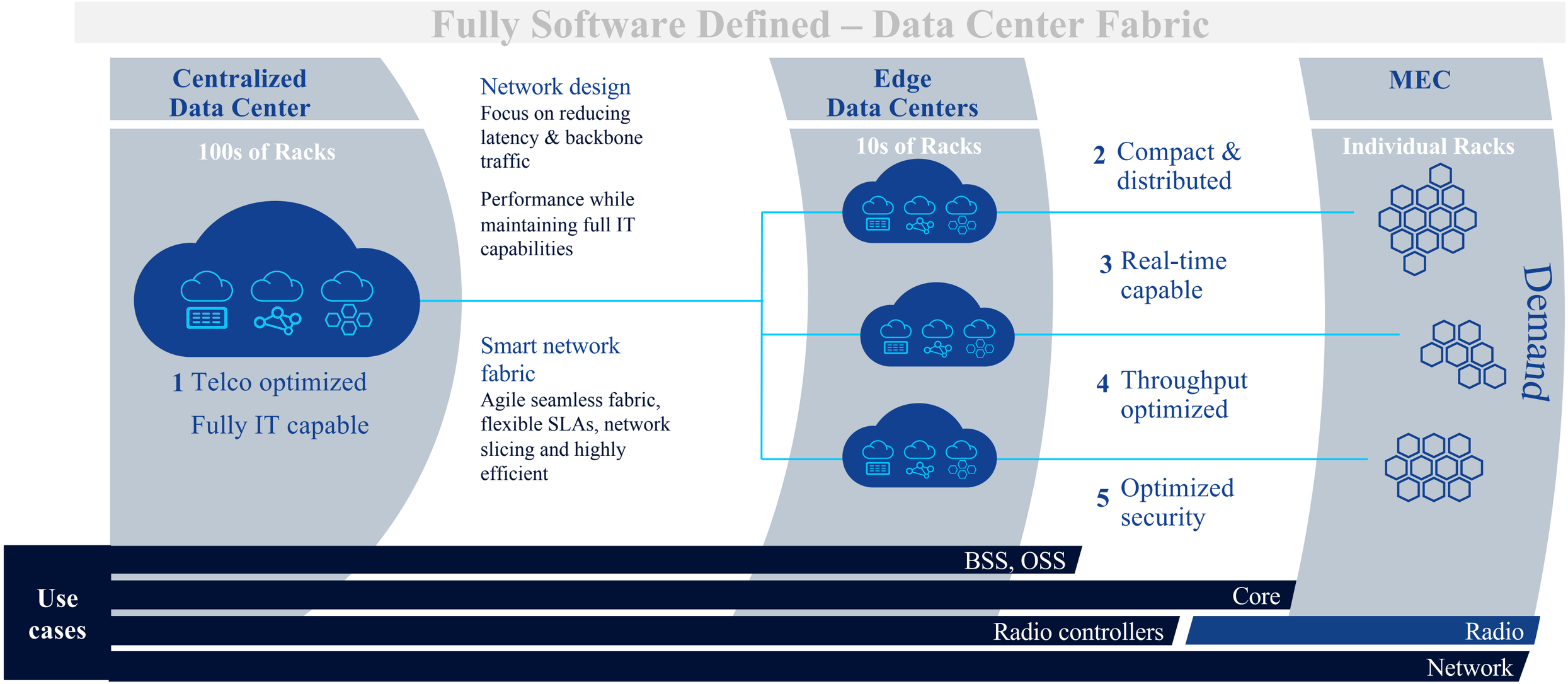
Radical shift in network architecture needed to deliver required latency

The 4 Key Workload Dimensions



A cloud architecture driven by telco performance requirements

Layered approach combining centralized and distributed data centers



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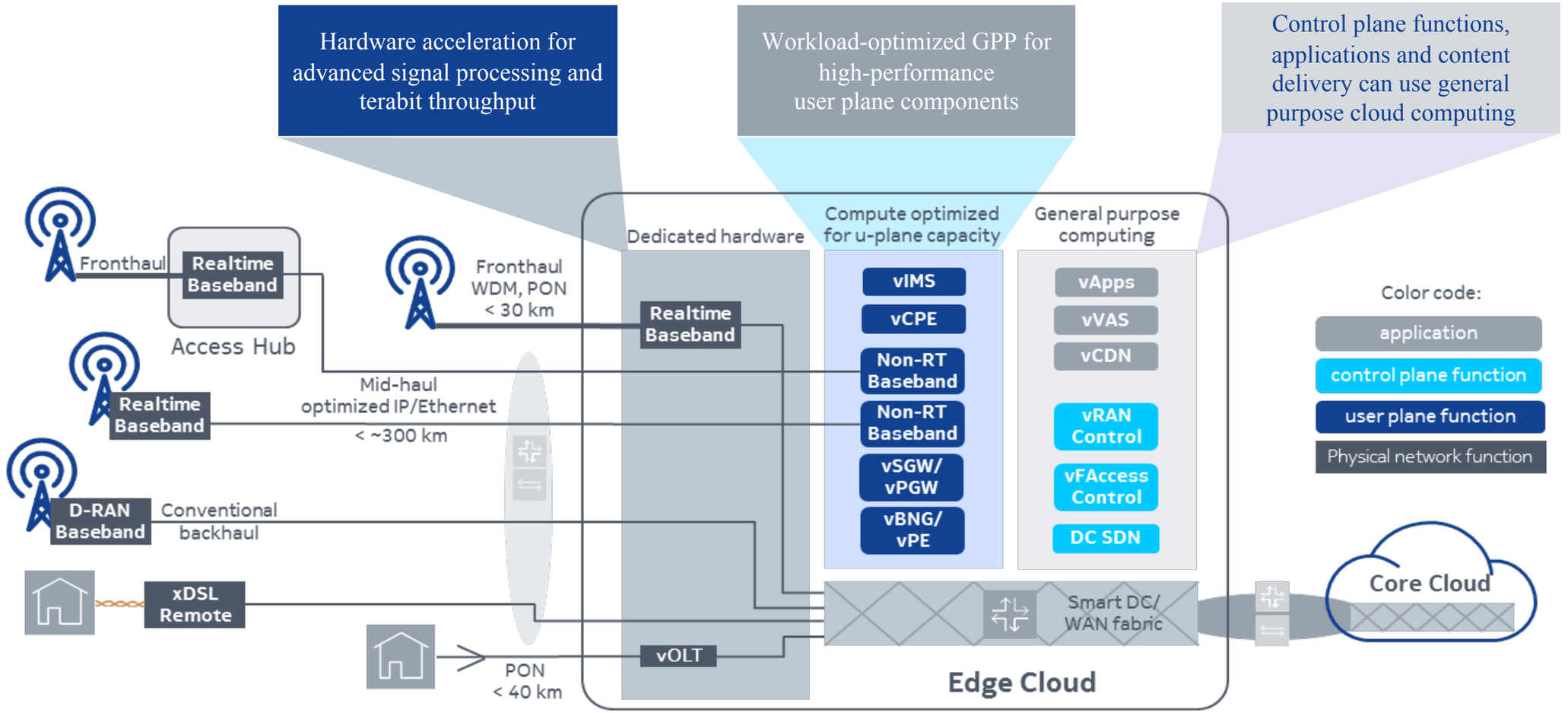
Telco Cloud Edge Data Center



A target architecture for the Edge Cloud Data Center, all fiber in, all fiber out, converged across residential and enterprise, fixed and mobile.

Open Hardware - OCP

OCP delivers industry leading density per rack and enables lean operations

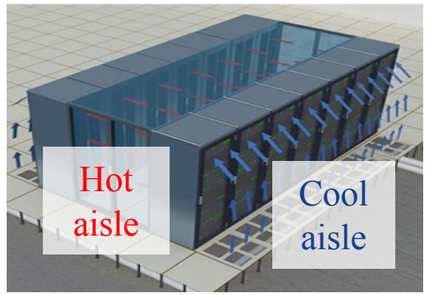
High Rack Efficiency

Overall reduction in number of racks required compared to traditional rack mount

Improves floor Space

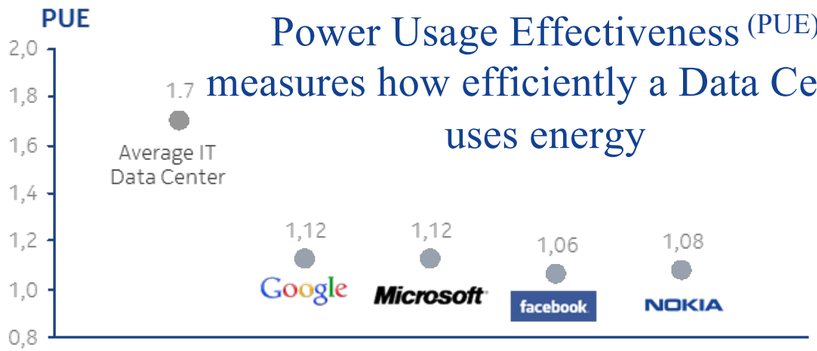
50% improved density in OCP compared to rack mount:

25K servers /One operative



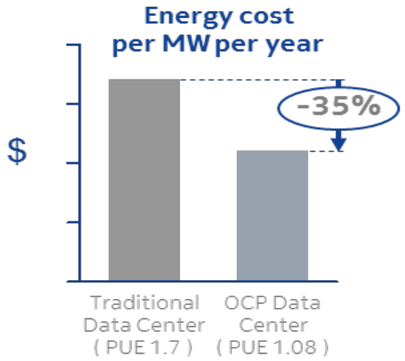
Access only required from cool aisle

OCP Data Centers perform with high efficiency



Power Usage Effectiveness (PUE) measures how efficiently a Data Center uses energy

Low PUE helps reduce OPEX and emissions



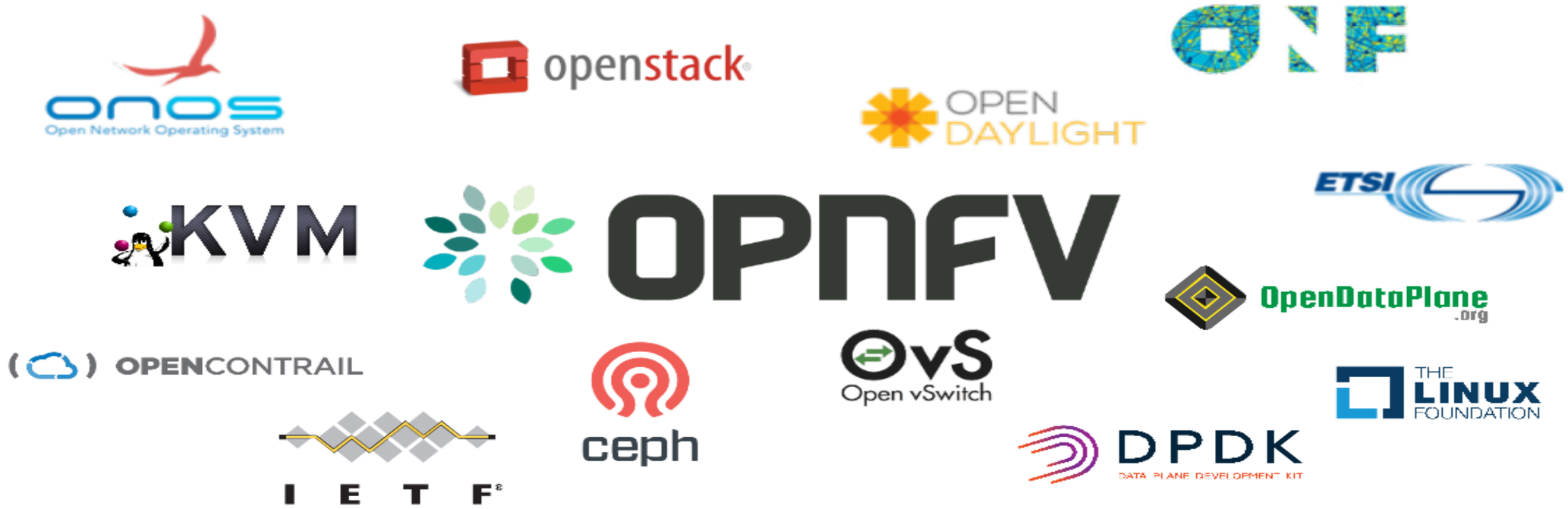
Calculated based on public sources

OCP Data Center consumes 35% less energy than a traditional Data Center

Open Software - OPNFV

Open carrier-grade platform for NFV

- Open software ecosystem is the way to accelerate the introduction of new NFV products and services.
- Nokia is a strong member in several open source community projects targeting to create an open solution for NFVI and MANO.



NOKIA

Open Data Center Manager for operations automation

Common management for both centralized and distributed Data Centers

Target is to create a hardware independent Open Data Center Management solution

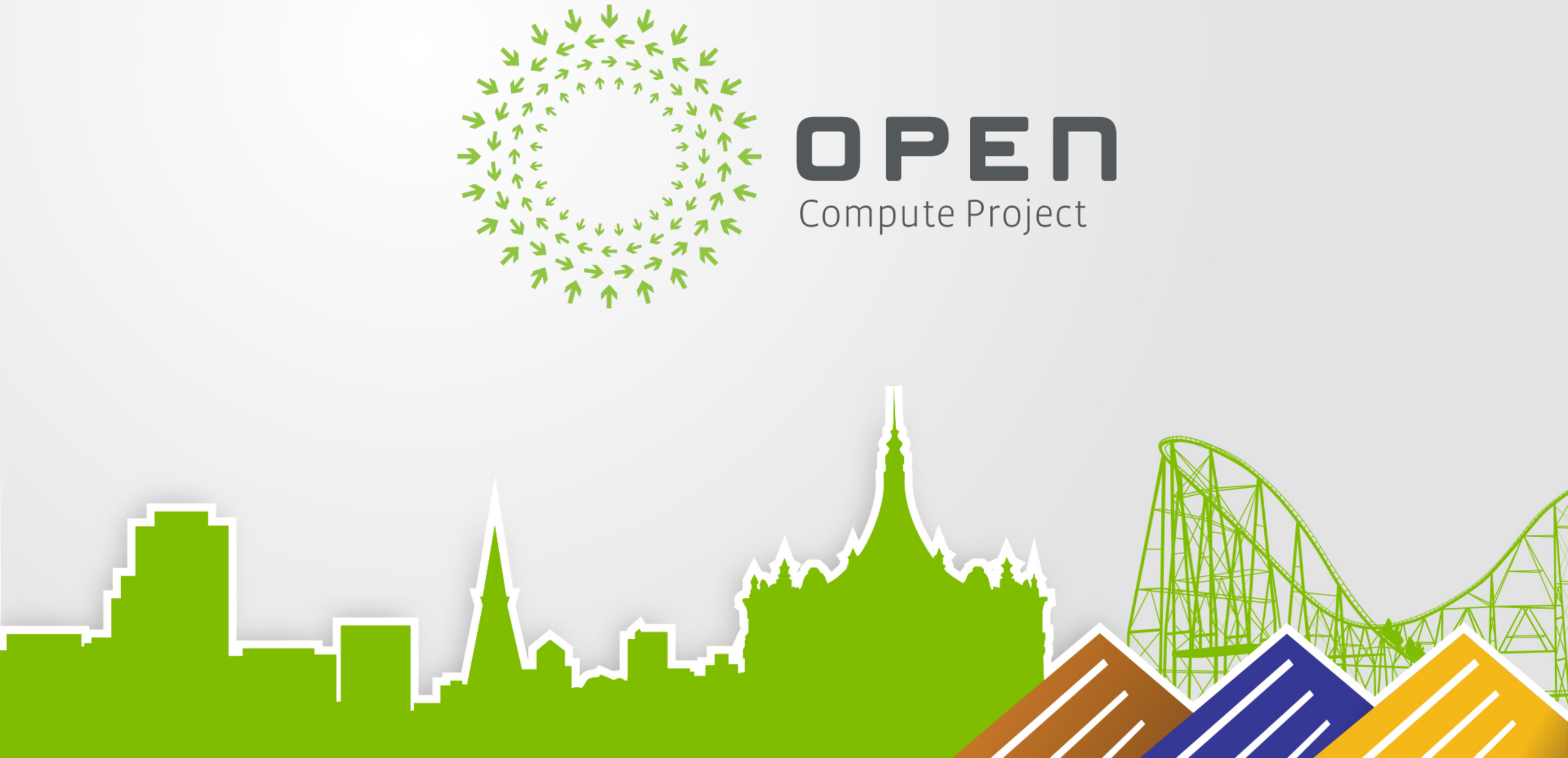
1. Provides Hardware-agnostic Hardware Manager
2. Supporting Nokia Airframe hardware and other servers, switches and storages
3. Extensible Hardware support with provided open APIs

Enabler for lean Data Center management

- Single view and operations over Data Centers
- Real-time data for automated operations
- Increase utilization of existing servers
- Smart capacity planning for future workloads

Web User interface and RESTful APIs for

- DC Hardware Management
- Open HW management
- Scalable Multi Data Center management
- programmable Analytics and Intelligent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