



EDGE SERVICES : THE FUTURE STARTS NOW

Connecting the Dots at the Edge

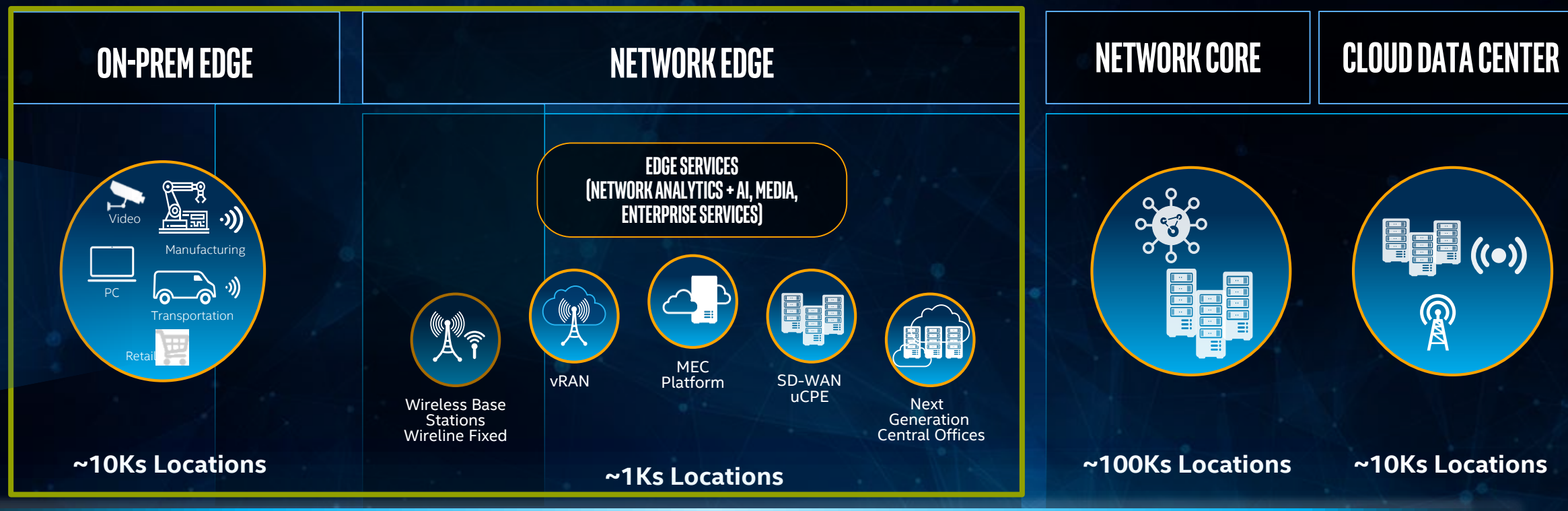
Mandar Chincholkar

Director, Network Edge and Ecosystem Enabling,
Network and Custom Logic Group

RISE OF THE INTELLIGENT EDGE

Edge Computing: Placement Of Data Center-Grade Network, Compute and Storage Closer to the Endpoint Devices

DEVICES



Latency expectation

Varies <1 ms

<5 ms

<10-40 ms

< 60 ms

~100 ms

IMPROVE SERVICE CAPABILITIES



OPTIMIZE TCO



COMPLY WITH DATA LOCALITY



REDUCE APPLICATION LATENCY

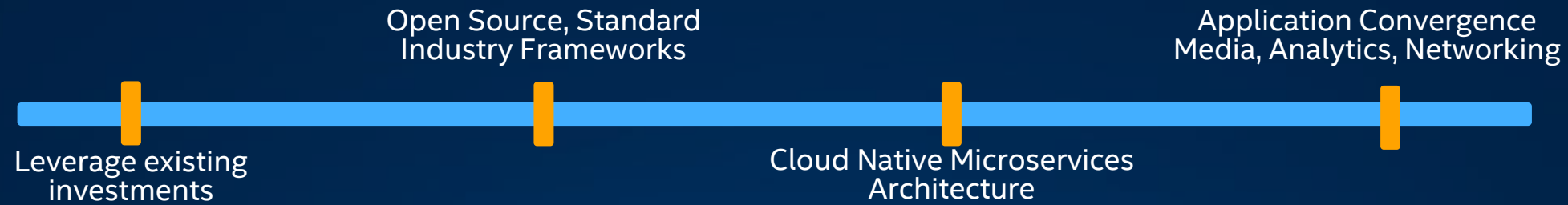


AND DELIVER RICH USER EXPERIENCES

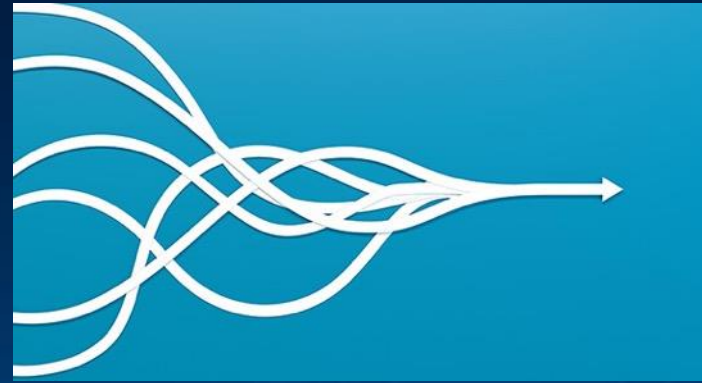


ENABLING EDGE SERVICES – KEY CONSIDERATIONS AND PAIN POINTS

INDUSTRY TRENDS



Network complexity demands diverse scalable platforms which in turn complicate application development and deployment



Convergence of multiple workloads at Edge demanding integrated solutions and platforms with intelligent compute



Absence of a strong ecosystem for network applications and services

INTEL'S APPROACH TO WIN THE EDGE



**TRANSFORMATIVE
PLATFORM
TECHNOLOGIES**



**WORKLOAD CONVERGENCE
AND SOLUTION
OPTIMIZATION**



**SERVICES INNOVATION
THROUGH ECOSYSTEM
COLLABORATIONS**

**Based on Open Source, Industry Standards and
Delivered Through a Diverse and Rich Ecosystem**

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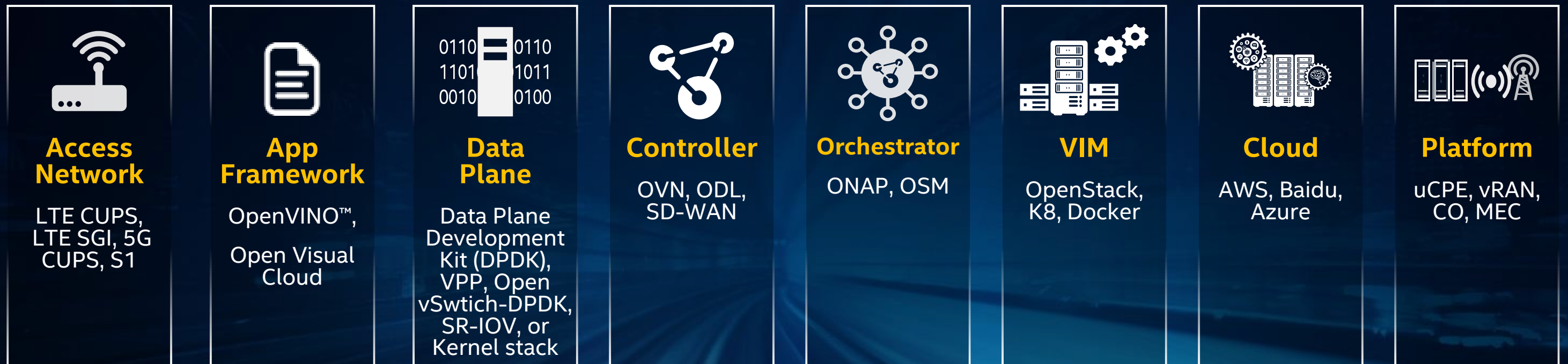
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SERVICES AT THE EDGE: THE TECHNICAL PROBLEM STATEMENT

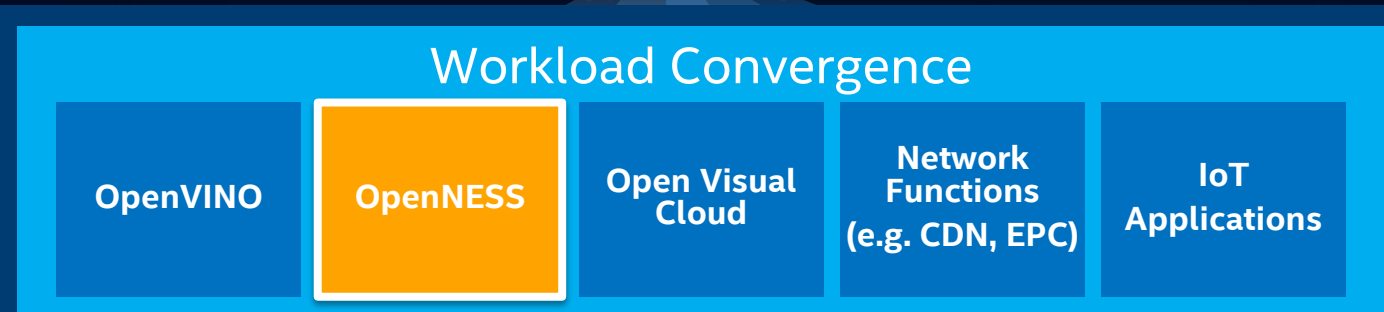


WRITE YOUR EDGE SERVICE ONCE, RUN WITH ANY....

TRANSFORMATIVE HARDWARE AND SOFTWARE

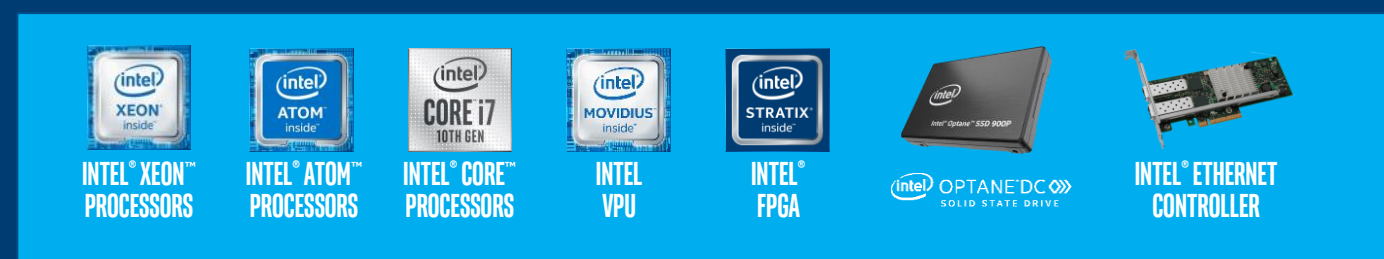
Services (IOT Verticals, Comms, Cloud, Enterprises)

Developer Edge Frameworks (e.g. AWS, Azure, Baidu, Alibaba)



Application and Service Orchestration/Virtualization

Industry Standard Interfaces for Efficient, Programmable, Scalable Data Plane (e.g. DPDK, vSwitch)



*Other names and brands names may be claimed as the property of others





An open source software toolkit to enable easy orchestration and management of edge services across diverse network platform and access technologies in multi-cloud environments

OPEN NETWORK EDGE SERVICES SOFTWARE (OPENNESS)

An open source software toolkit to enable easy orchestration and management of edge services across diverse network platform and access technologies in multi-cloud environments

ABSTRACT NW AND PLATFORM COMPLEXITY

OPENNESS
Edge Node SW



Central Office



Base Station



Customer Premises

CPU

Accelerator

FPGA

NIC

ONBOARD/ORCHESTRATE APPS AND SERVICES

OPENNESS EDGE
CONTROLLER SW



Telco
Cloud

MICROSERVICES
APIs

Application Agent

Dataplane Agent

Lifecycle Agent

Virtualization Agent

Core NW Config Agent

Controller API

Edge Auth Agent

ACCELERATE SERVICES INNOVATION

App
Ecosystem

OpenVINO



Open Visual Cloud

3rd Party
Apps

Industry
Frameworks



openstack



kubernetes

ONAP

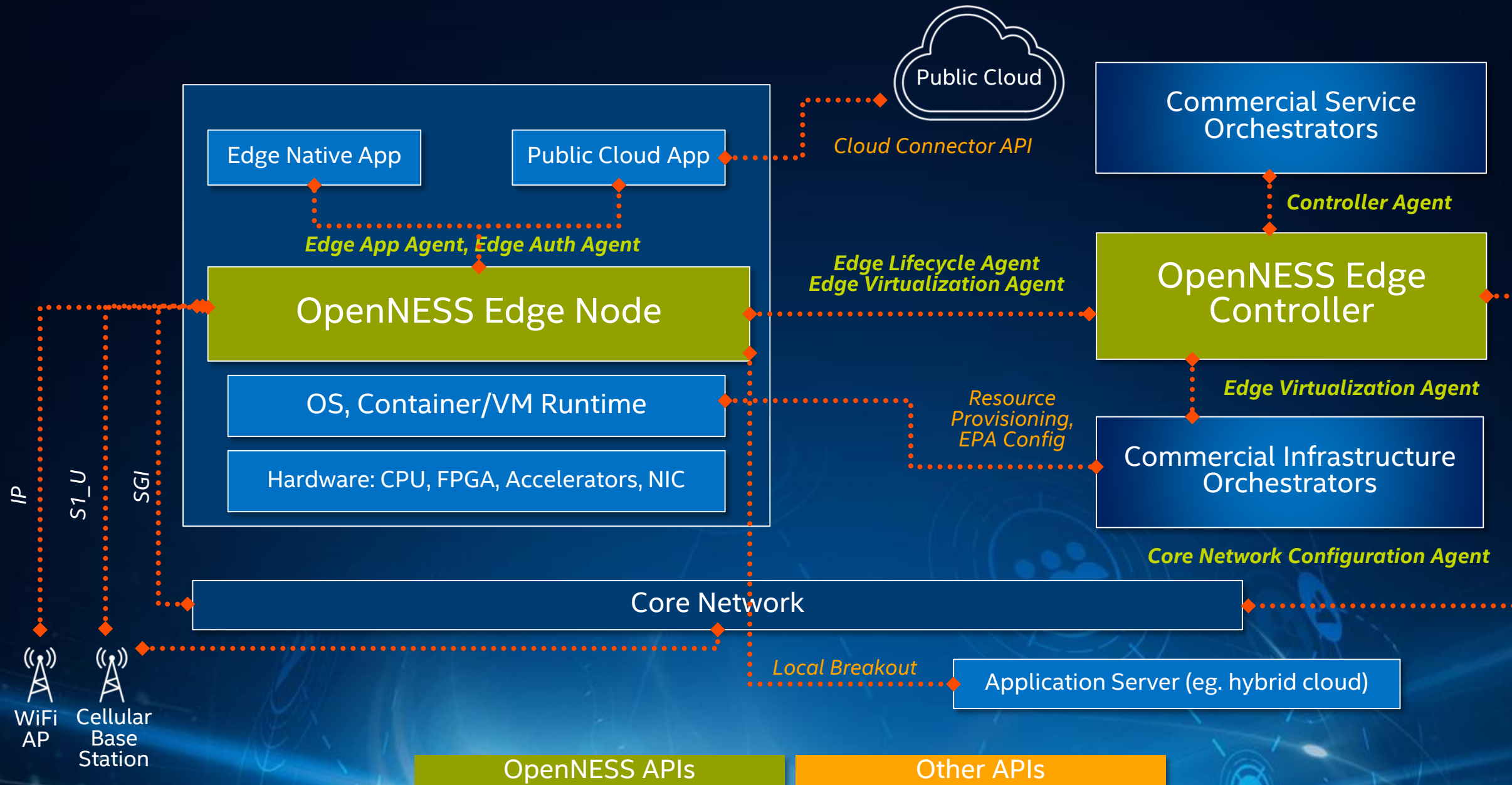
Multi-Cloud
Support



IOT
Devices

END TO END SERVICES INFRASTRUCTURE

OPENNESS: MICROSERVICES BASED ARCHITECTURE



OPENNESS: VALUE PROP TO SERVICE PROVIDERS



OPEN SOURCE

- Faster TTM
- Rapid prototyping and trial
- Optimized for Edge Services Management
- Broad industry innovation
- Invest in differentiation only



FLEXIBLE

- Leverage your existing infrastructure
- Modular architecture; adopt what you need
- Support for major industry frameworks



RICH ECOSYSTEM

- Rich ecosystem options of OS, Orchestrators, Apps, ...
- Pre-integrated with major commercial offerings

APPLICATION DEVELOPER

Facilitates extending apps from cloud to Edge - abstract complexity

Transport apps from Cloud to Edge

Write once – deploy anywhere on the Edge

Match make platform and apps

OPENNESS: VALUE PROP TO THE DEVELOPERS

PLATFORM DEVELOPER

Makes network platforms Edge Services aware

Orchestrate Edge Services at scale

Access to real-time telemetry

Application service chaining

Commercial versions in the making

Flexibility of microservices architecture

INTEL'S APPROACH TO WIN THE EDGE



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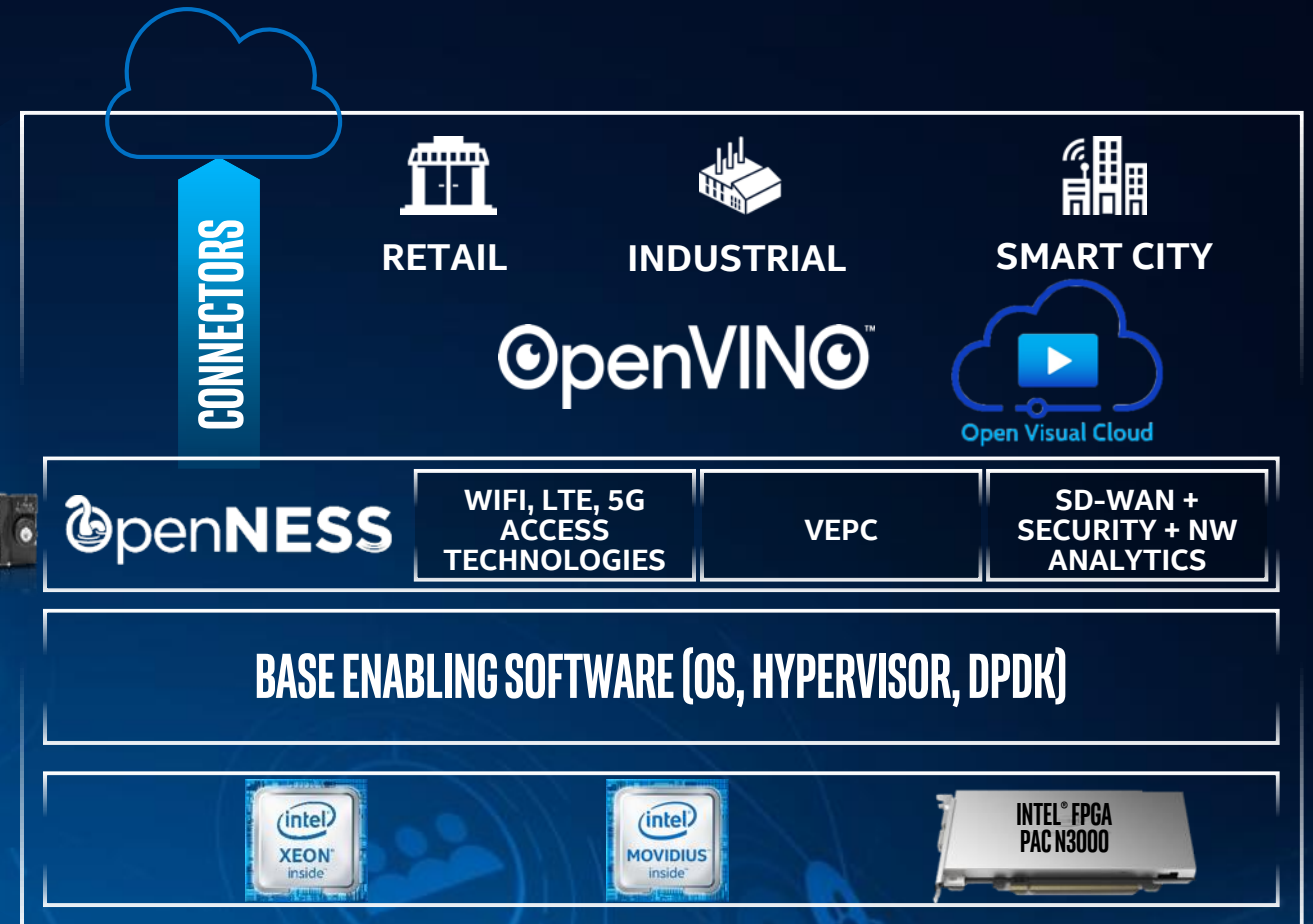


SERVICES INNOVATION
THROUGH ECOSYSTEM
COLLABORATIONS

Based on **Open Source, Industry Standards** and
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CONVERGED EDGE REFERENCE ARCHITECTURE FOR ON-PREMISE

WE ARE PLEASED TO
ANNOUNCE THAT OUR
PARTNERS
ARE DEVELOPING
COMMERCIAL PRODUCTS
BASED ON INTEL'S
REFERENCE ARCHITECTURE



ENABLING THE ENTERPRISE EDGE

OPTIMIZED UCPE FOR MANAGED ENTERPRISE SERVICES

IoT Meets On-Premise

Virtualized Cloud Native Infrastructure combined with edge intelligence optimizes uCPE for a variety of workloads and service deployments



ONE PLATFORM – MULTIPLE WORKLOADS

Core optimization
TCO reduction
Scalability



USE CASE DRIVEN DESIGN

Critical ingredients designed in for AI inferencing and network analytics along with third party VNFs on a Cloud-Native Architecture



PRE-INTEGRATED PARTNER SOLUTIONS

Market Ready solutions reduce deployment complexities and accelerate TTM

AI Inferencing/
Network Analytics

Robust Software
Frameworks

Process
Everything

5G/LTE
Access Enabled

INTEL'S APPROACH TO WIN THE EDGE



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WORKLOAD CONVERGENCE
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INTEL BUILDING THE ECOSYSTEM FOR THE EDGE



OPEN COMMUNITIES

AKRAINO

THE LINUX FOUNDATION

OpenNESS
Ecosystem services
from concepts to
real-world applications

TELECOM INFRA PROJECT

EDGE X FOUNDRY™

HOW TO GET STARTED

Available for Enterprises
Commercial versions in the making



Get access to Open Network Edge Services Software (OpenNESS) at OpenNESS.org
Documentations:
[Architecture Overview](#)
[User Guides](#)
[OpenNESS White Paper](#)
[OpenNESS Overview](#)
[Webinar/Video](#)
Other Developer Resources [here](#)

Intel® Network Builder University Training
Partner Webinars in the making

IN CLOSING



The Data-Centric Future will be Moving, Storing, and Processing Massive Amounts of Data at the Edge



Intel is a leader in Edge Transformation with Transformative Hardware and Software Technologies built on Open Systems and Standards



Intel is at the forefront of building a robust ecosystem for the Edge through close collaborations with partners across the value chain and contributing to Open Source Communities

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