Accelerate NFVi Workloads For 5G Deployments

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HCL

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Accelerate NFV Workloads for 5G deployment

Speakers

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Director - Product Management, HCL

Nick Davey,

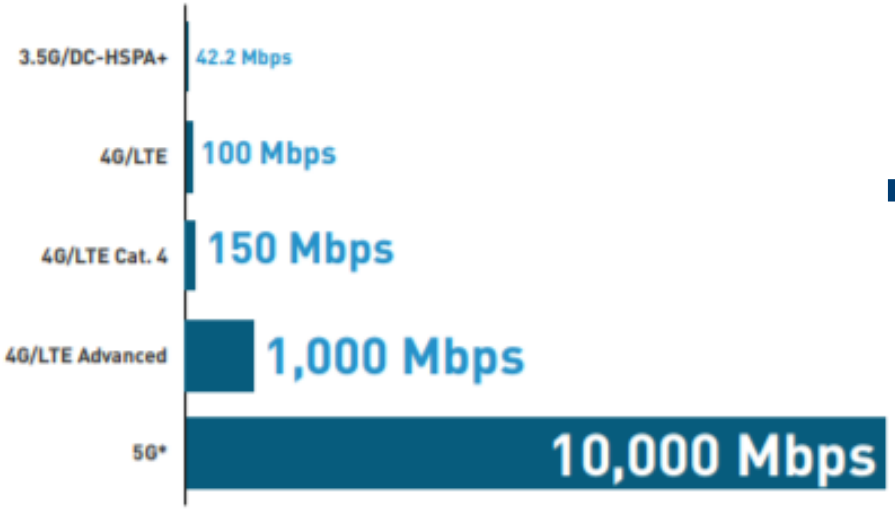
Product Manager – Cloud and SDN, Juniper Networks

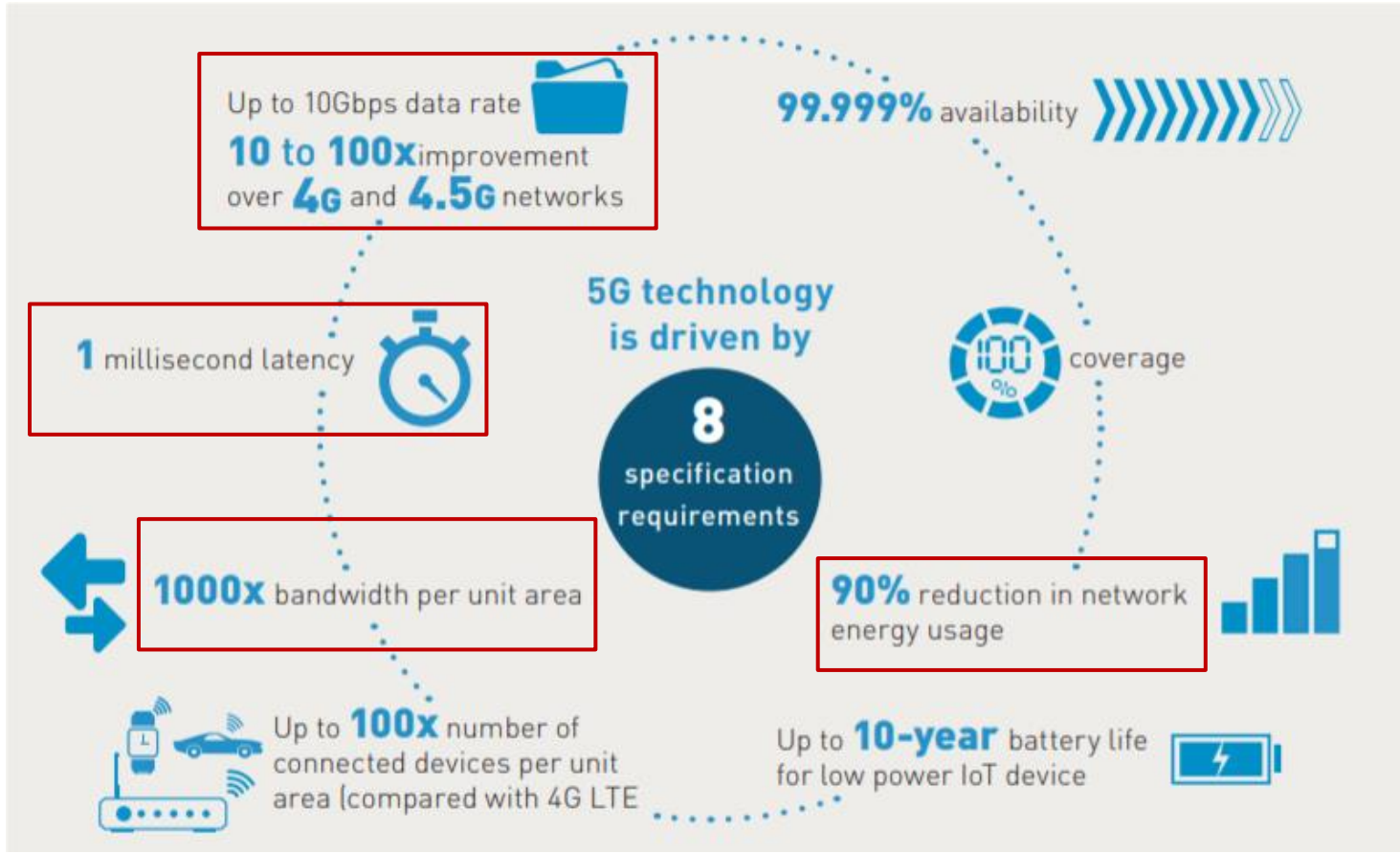
Geetha Jayagopi,

PLM & Strategic Planner for Wireline & NFV Business Division, Intel

Requirements for 5G deployment

Speed

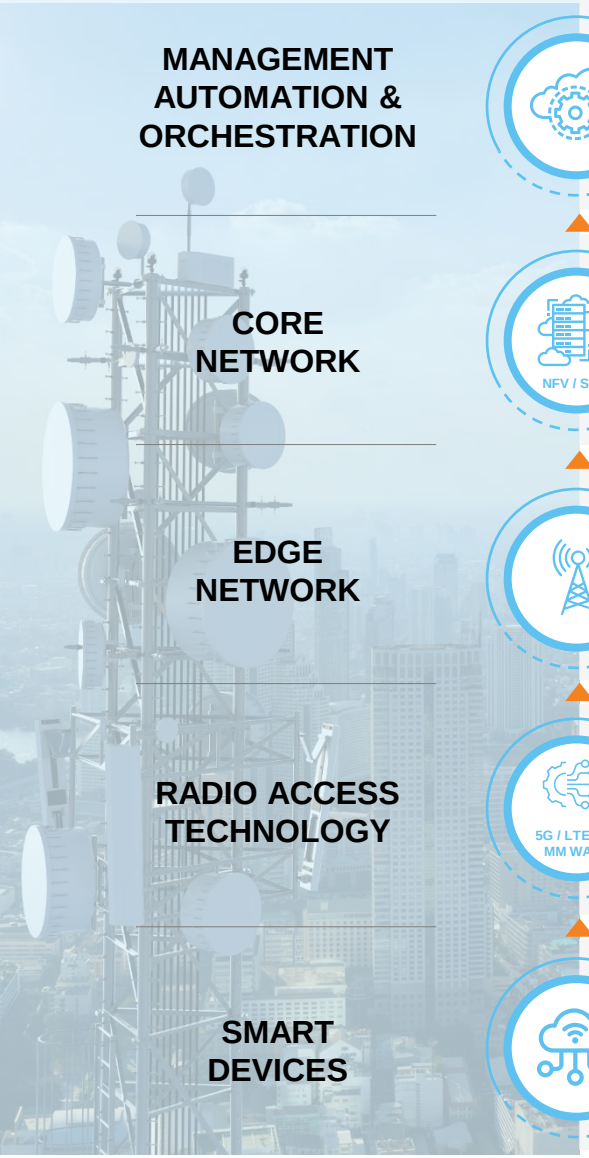




Acceleration is key

Source: https://www.gemalto.com/brochures-site/download-site/Documents/tel-5G-networks-QandA.pdf

HCL Industry Software Division enabling Telecom companies with…



MANAGEMENT AUTOMATION & ORCHESTRATION

CORE NETWORK

NFV / SDN

EDGE NETWORK

RADIO ACCESS TECHNOLOGY

5G / LTE 4G / MM WAVE

SMART DEVICES

HCL SONFlex Applications

iCE.X Device Management

HCL SMARTWiFi

NFVi Acceleration (OvS, vRouter)

SRv6 Acceleration

UPF Acceleration

HCL ANA (Next-Gen SON)

X-Haul Modem IP

Need for NFVi acceleration

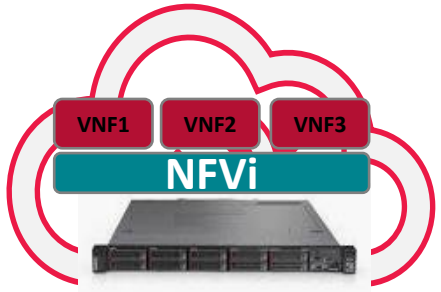
DRIVERS

Digital Transformation
5G Revolution
Cloud Adoption

CHALLENGES

Data growth & faster services
Competition from OTT players
Network Complexity

Communication Service Providers (CoSP)



Commodity, Open, Agile

Core/Edge Cloud

Virtualization

HW Appliances

Proprietary, Closed, Fixed

IMS
BBU
MME
SBC
SGW
GGSN

Impact

OPPORTUNITY

Improve NW Efficiency & Service agility

CHALLENGES

SW-only **cannot** economically handle the growing amount of users, devices, and services

High # of CPU Cores

High CPU Cycles, latency

Low Throughput

Programmable Data Acceleration is needed!

HCL NFV Acceleration Software Portfolio

Offload processor intensive network related workloads to Intel **SmartNIC**

SRv6 Acceleration | **OvS Acceleration** | **vRouter Acceleration** | **UPF Acceleration**

Deliver services faster, with lower TCO 4X – 8X Return On Investment

Broad Infrastructure Acceleration Portfolio

Dedicated ASIC Intel® Infrastructure Processing Unit (Intel® IPU)

Performance and power optimized

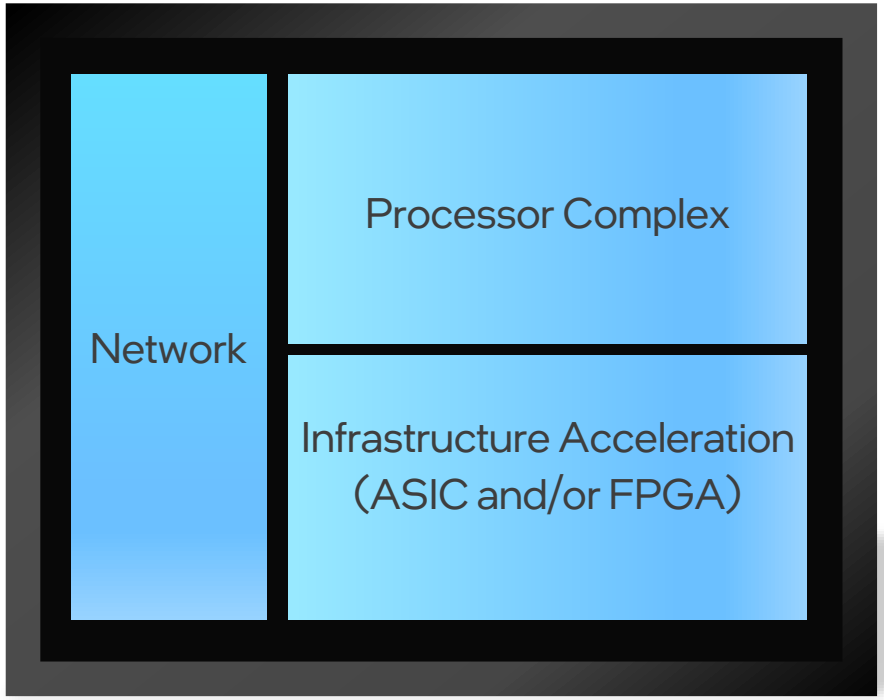
Optimized secure networking and storage pipeline

FPGA-based Acceleration

IPU Platforms & Adapters	Intel® SmartNICs
Faster time to market for evolving standards	
Re-programmable Secure Datapath enables flexible/customizable workload offload (future proof)	Programmable accelerated infrastructure workloads with customizable packet processing
Onboard Intel® Xeon® processor	Intel® Ethernet NIC with DPDK support

Intel® Infrastructure Processing Unit (Intel® IPU)

Providing new data center value

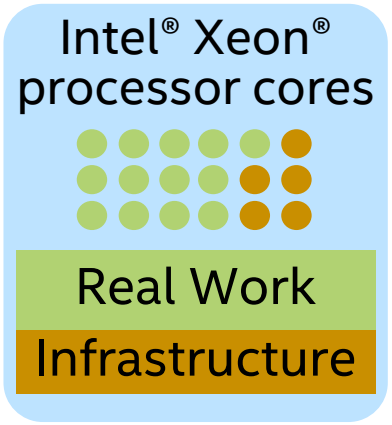


- Highly intelligent **infrastructure acceleration**
- System-level **security, control, and isolation**
- **Common** software frameworks
- HW and SW **programmable**, built to customer needs

Why Customers Want Intel® IPU / Intel® SmartNICs to Accelerate Infrastructure Workloads

Infrastructure Acceleration

Lower Server Overhead



IPUs Reduce Compute Cycles Doing Infrastructure Work[1]

Performance

Higher Throughput and Lower Latency

IPUs Can Provide Better Performance/Watt than Host-based Apps[1]

Feature Velocity

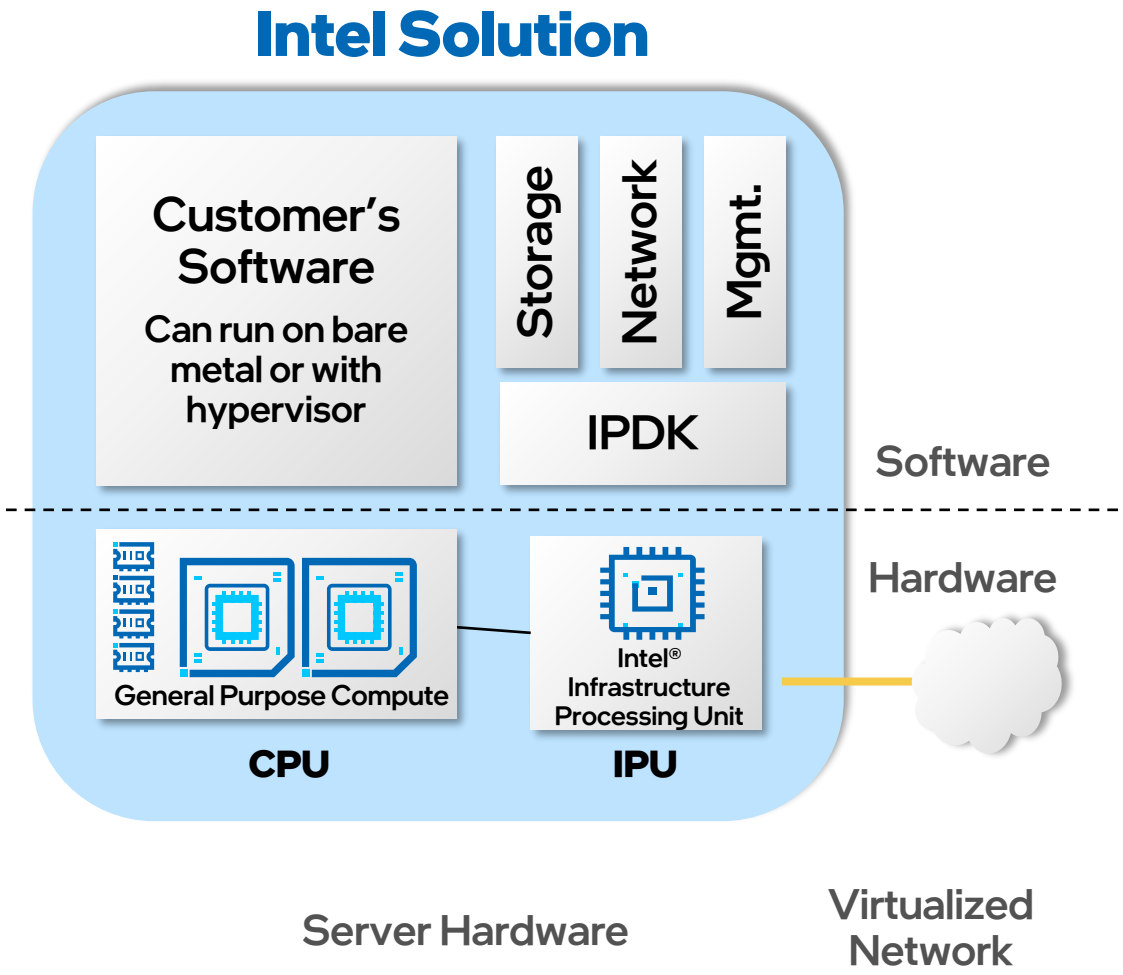
Customizations at the Speed of Software

IPUs Provide Reconfigurability and Programmability

1 - Source: Research from Google and Facebook has shown 22% to 80% of CPU cycles can be consumed by microservices communication overhead
https://www.intel.com/content/www/us/en/newsroom/news/infrastructure-processing-unit-data-center.html
Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.

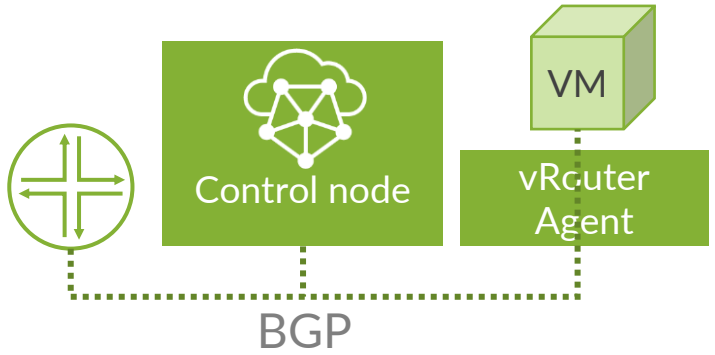
Overview

- Intel is leading the IPU market today with customers deploying at scale in the Cloud and CoSP markets
- Intel offers tailored products to meet Cloud and Networking focused on specific workloads
- Support for a wide range of use cases and datacenter utilization



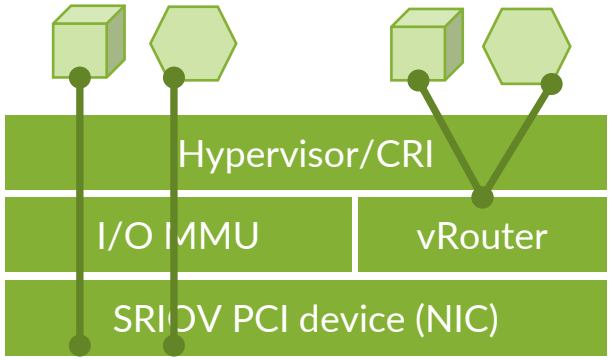
Telco Cloud 4G / 5G

BGPaaS



- Many telco VNFs are BGP speakers (e.g. 450 subinterfaces attached to a P-EGW instance)
- BGP speaker gets peered to Contrail controller/external peers to advertise routes
- vRouter agent accepts BGP connections from the VMs and proxy them to the control node

SRIOV



- SRIOV workloads can co-reside on the same server
- Multus+ Intel SRIOV plug-in in Kubernetes supports running with Contrail CNI

Smart NIC

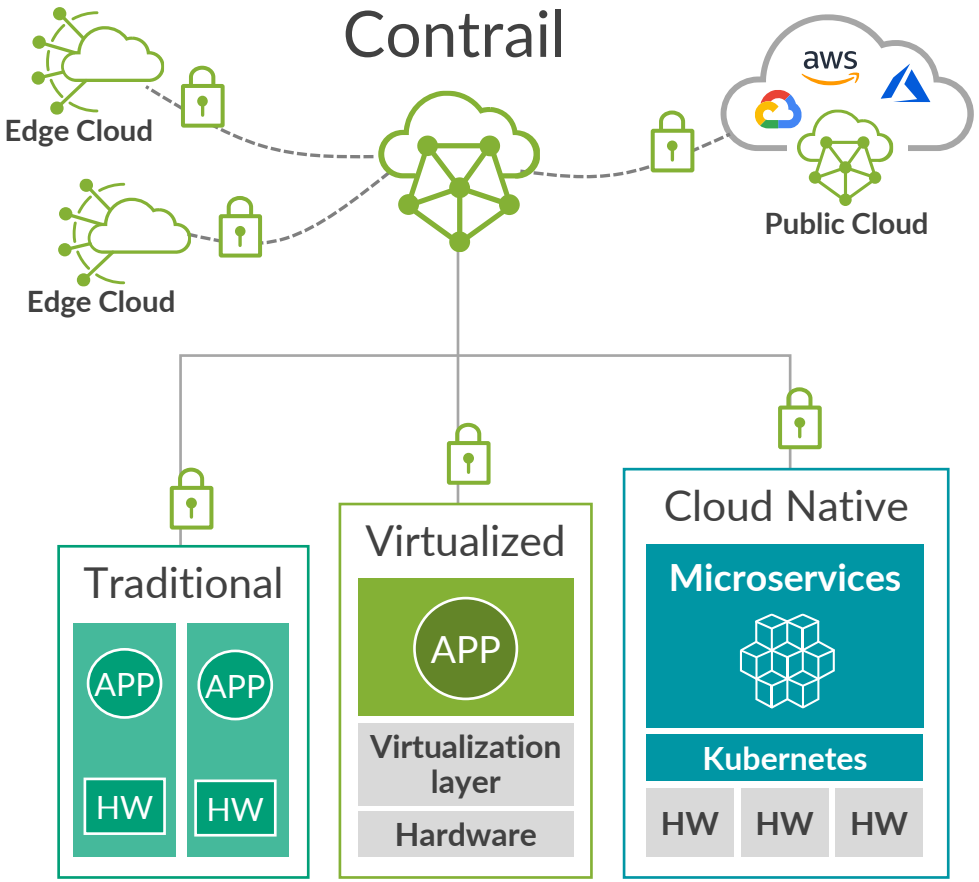
- vRouter data plane offload support on
  - Intel – Full offload

Also frequently in use:

- Advanced networking (MAC learning, customer RTs, fat flows…)
- Service chaining
- DPDK data plane tested to 100Gbps

Contrail Networking's open, cloud native architecture

Investment protection, flexibility, agility, and greater economies of scale



Investment protection

Modernized, Kubernetes-Native to migrate to cloud native at your own pace
Support legacy and virtual processes, services, and systems

High performance, service assured

Support demanding telco services and applications
DPDK and SmartNIC vRouter for high throughput, low-latency, telco-scale

Application-driven security

SDN-automated, dynamic policy to secure and protect ephemeral workloads
Common security policies across OpenStack and Kubernetes

Operational scale

Remote Compute and multi-cluster management to simplify and economize
HW acceleration to preserve expensive CPUs for revenue generating apps

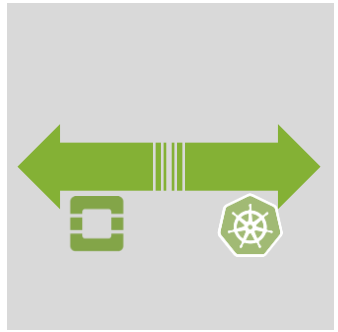
Contrail - Industry leading SDN solution.

OMDIA

WHAT MAKES CONTRAIL UNIQUE

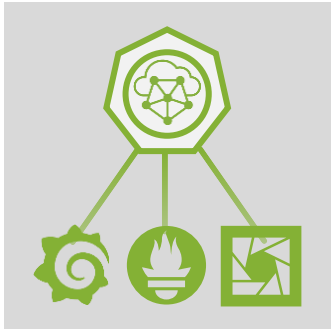
Advanced Networking

Application Based Network Policy



Spans VMs & Containers

Multi-cluster Connectivity

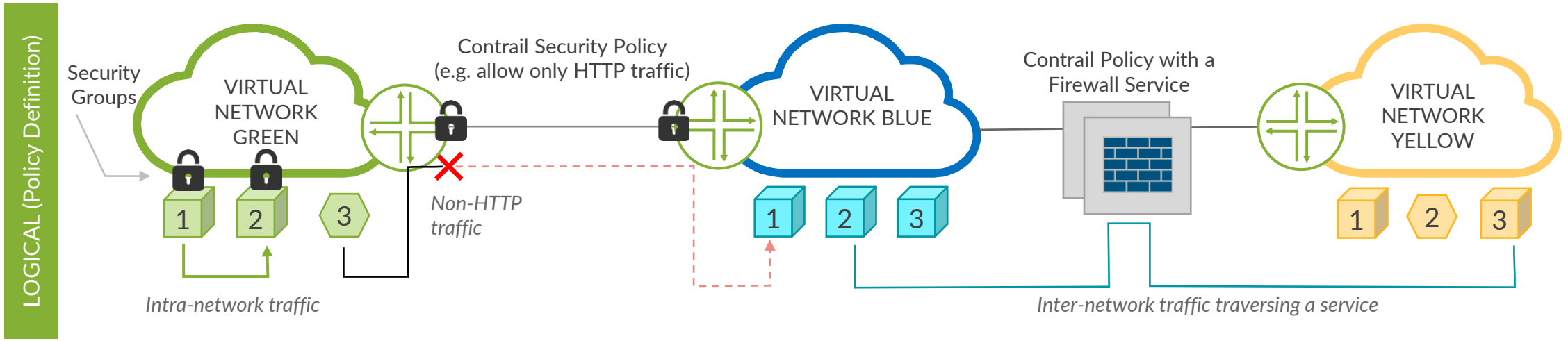


Extends K8s Native Tools

Automate and Validate

Contrail implements and extends Cloud Networking

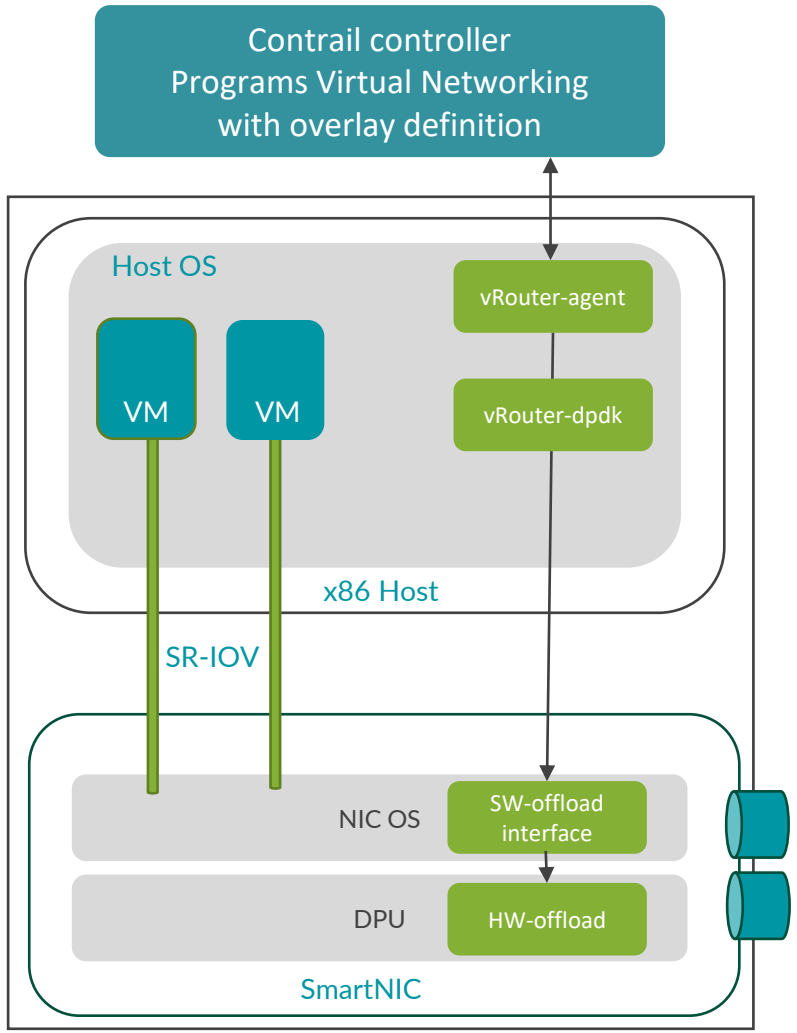
MULTI-POINT SECURITY POLICY ENFORCEMENT



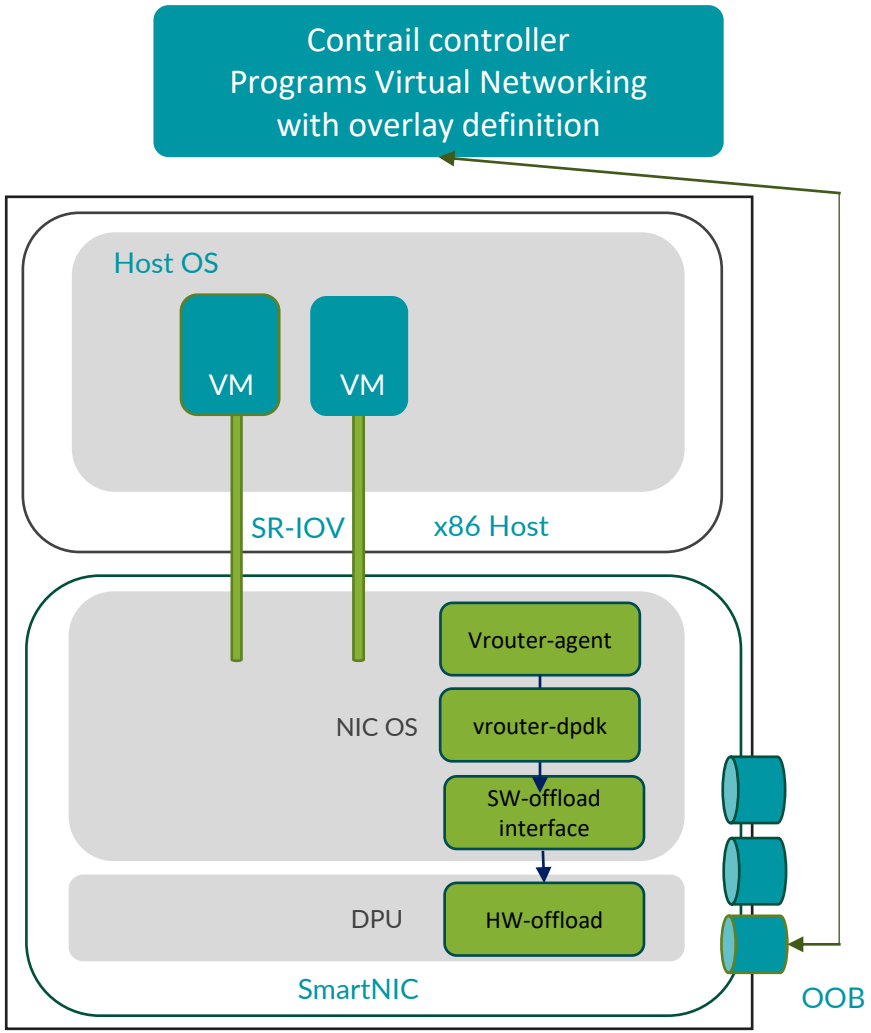
Policies	NG-Firewalling	Service Chains
Allow / deny traffic between workloads *using Contrail Security policy applied in the vRouter*	Apply cSRX/vSRX NG-FW between workloads *using Contrail Security host-based firewalling*	Direct traffic through a service chain, including arbitrary firewalls *using Contrail Networking service chaining policies*

vRouter Offload Models

Today – Partial SmartNIC offload

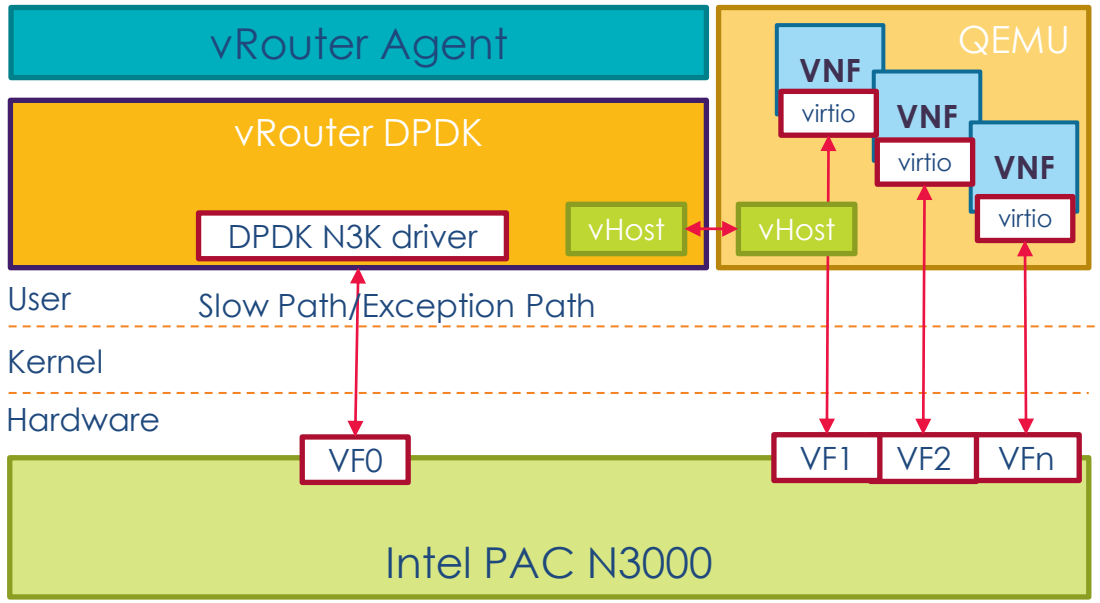


Future – Full SmartNIC offload



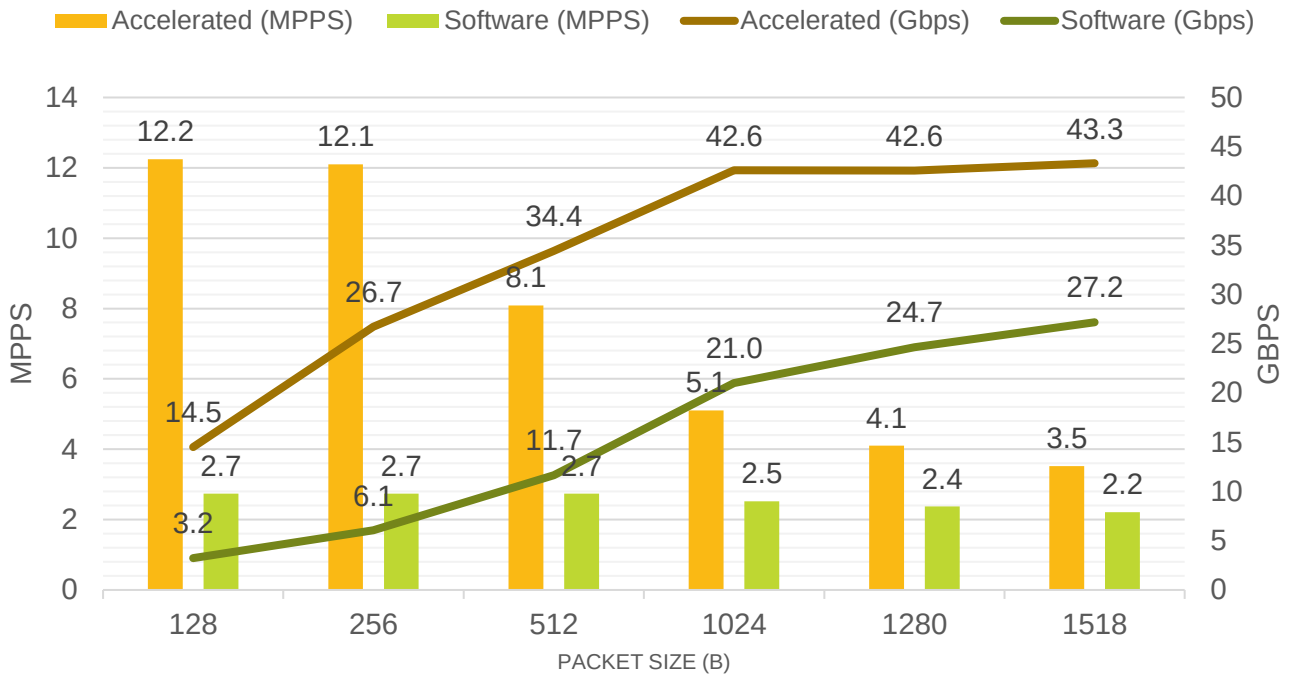
HCL TF vRouter Offload Architecture based on Intel PAC N3000

Key Features	Details
Fast Path offload	Slow path is still in Host CPU
Overlay	IPv4 VxLAN and MPLS over UDP (L2/L3) supported
Underlay	IPv4/IPv6 and VLAN support
LAG/LACP	Static and Dynamic Link aggregation
NAT	Network Address Translation for source and destination addresses
Mirroring	A flow can be mirrored to a different destination
Multiqueue	Each VF can support up to 16 queues
PCI Passthrough	VFs exposed by N3000 are connected directly to VMs as virtio
vDPA	Control path can be delegated to a software application (it allows Live Migration)



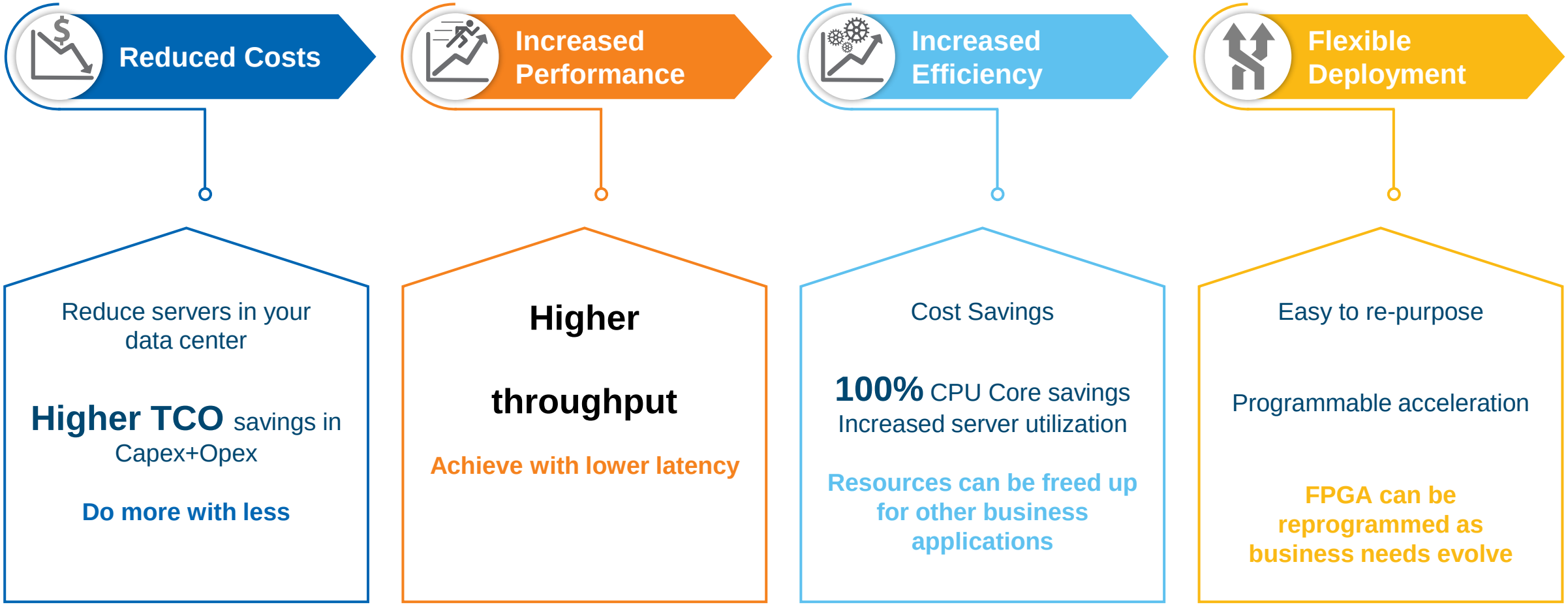
Value proposition of HCL TF vRouter Acceleration Solution

- **100% core savings** for fast path (No cores used for fast path)
- Up to **x6 times increase in throughput** for smaller packets
- Up to **x5 times lower latency** than software
- Up to **100% line rate** for higher packet size
- Support for **Openstack based orchestration**
- Drivers readily available at TF community



Results based on MPLSoUDP(L3) for 50G LAG with loss< 0.001%

Summary and Call to Action



……HCL and Intel technologies accelerate deployments of FPGA-based SmartNIC for NFVi

For Product Demo contact us: NFVi_Acceleration@hcl.com

www.hcltech.com

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