6WIND | Virtualized Networking Software

Unleashing Security Gateway Performance in Virtualized Environments

Delivering High Performance and Enhanced Efficiency on Standard COTS Servers

17th January 2023

Webinar Speakers

Karim MCHIRKI

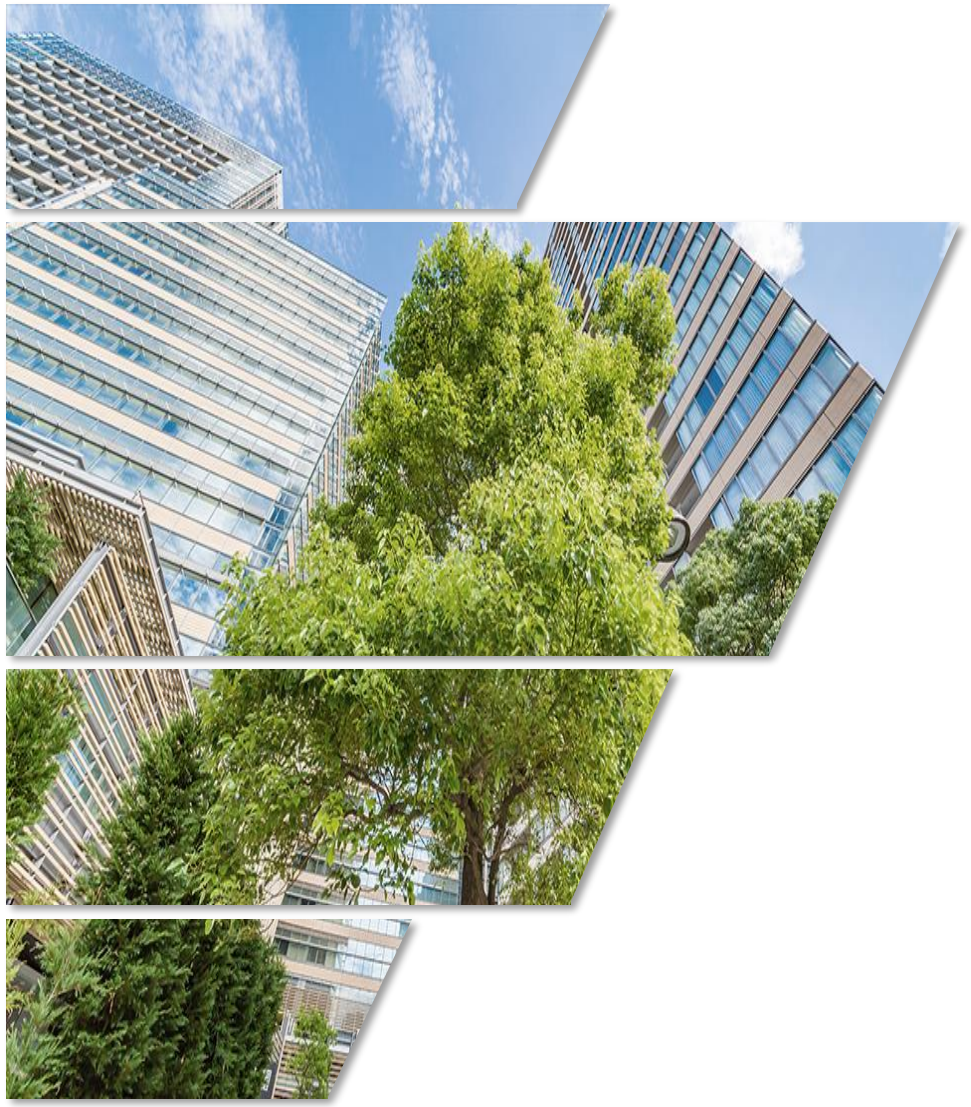
VP of Product Management,
6WIND

As VP of Product Management, Karim is leading the 6WIND product roadmap definition and is helping the product committee, in accordance with the company business strategy, in cultivating product vision and enriching the product solutions

Jyoti KOLHE

Segment Manager, Cloud Networking and Security,
Intel Corporation

As Segment Manager, Cloud Networking and Security, Jyoti has deep knowledge of Intel products and technologies. She is responsible for business strategy, business development and strategic partnership management with cloud networking and security vendors.



6WIND
Company Profile

6WIND is a **green-tech networking software company**, with Headquarters in Paris, France, in Santa Clara California USA, and in Singapore.

We specialize in delivering optimized and **high performance and secure networking software solutions** to support customers with new applications for **5G, IoT and SD-WAN**.

We deliver **Virtualized** and **Cloud Native** networking solutions that offer the **lowest TCO** in the market with **best cost-performance functionality ratio** while **lowering the energy consumption**.

6WIND's leading edge solutions are used by CSPs, MNOs, Cloud Providers, Datacenters, and Enterprises around the world.

20+ Years Experience

200+ Customers

WW Deployments

Green-Tech

Meeting CSPs' Challenges

Cost Reduction
(Reduce TCO drastically)

Sustainability
(Reduce energy consumption and carbon footprint)

Move to Software
(Virtualized & Cloud-Native Networking Software)

Performance, Scalability Flexibility, Automation
(Reduce TTM for new services)

Seamless migration to Disaggregation
(PNF → VNF → CNF → Cloud Native)

Minimize Operational Disruption
(Integration with existing tools - Automation, Orchestration, Monitoring,..)

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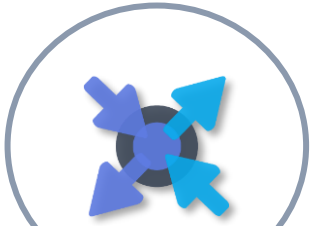
Poll Question 1

Which of the following aspects is the most important to consider when adopting network virtualization ?

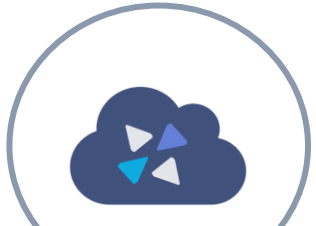
a. Cost Reduction
b. Performance and Scalability
c. Security and Data Privacy
d. Sustainability
e. Ease of Integration / Minimize Operation Disruption

6WIND Products Portfolio



6WIND VSR (Virtual Service Routers)

- ❑ High Performance virtualized service routers
- ❑ Optimized for COTS servers
- ❑ Deployed as PNF, VNF or CNF
- ❑ Private and Public clouds
- ❑ Wide variety of networking and security services
- ❑ Optimized HW resource usage (Efficiency and Sustainability)



6WINDCloud (Cloud Native Network Services)

- ❑ Cloud native network solutions
- ❑ Simplified network operations
- ❑ Enhanced automation
- ❑ Easy Management and Operations
- ❑ Flexibility through service disaggregation and distribution
- ❑ High Performance, scalability and resiliency
- ❑ Optimized resource usage

6WIND Virtual Accelerator (SDN/NFV Host Acceleration)

- ❑ Virtual Switch Acceleration solution
- ❑ Unlocks virtualization performance
- ❑ Switching and Networking acceleration
- ❑ High performance and Low latency
- ❑ Enhanced VMs density
- ❑ Increased VMs capacities
- ❑ Improved resources sharing
- ❑ Higher SDN/NFV efficiency.

6WIND Virtual Service Router Product Family

6WIND VSR
(Virtual Service Routers)

- High Performance virtualized service routers
- Optimized for COTS servers
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- Private and Public clouds
- Wide variety of networking and security services
- Optimized HW resource usage (Efficiency and Sustainability)

Efficiency

energy saving

- 6WIND Virtual Provider Edge Router (vPE)
- 6WIND Virtual Security Gateway Router (vSecGW)
- 6WIND Virtual Cell Site Router (vCSR)
- 6WIND Virtual CG-NAT Router (vCG-NAT)
- 6WIND Virtual Border Router (vBorderRouter)
- 6WIND Virtual CPE router (uCPE)

IMIX$_{350B}$

PNF VNF CNF

Forwarding:
46Gbps per CPU core
800Gbps per instance

IPsec:
9Gbps per CPU core
400Gbps per instance

CG-NAT:
35Gbps per CPU core
400Gbps per instance

openstack vmware kubernetes

vmware READY TELCO CLOUD INFRASTRUCTURE

Reference results on Intel® Xeon® Gold 6342 CPU @ 2.80GHz
Pure software performance, with no HW acceleration

Delivering sustainability and Efficiency

200 Gbps
Security Gateway

< 200 Watts

vs
500 ~ 600 W

40 Gbps
Cell Site Router

< 40 Watts

vs
85 ~ 120 W

100 Gbps
Provider Edge Router

< 150 Watts

vs
400 ~ 450 W

Measured with virtualized instances running on COTS servers (Pure software performance, no HW acceleration)

vSecGW

Delivering End-to-End Security Deployment Use Cases

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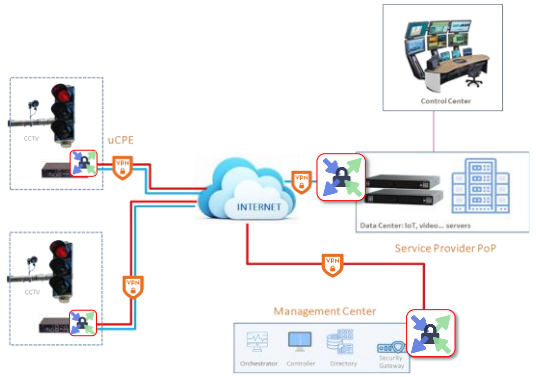
Poll Question 2

How is IPsec VPN security deployed in your network ?

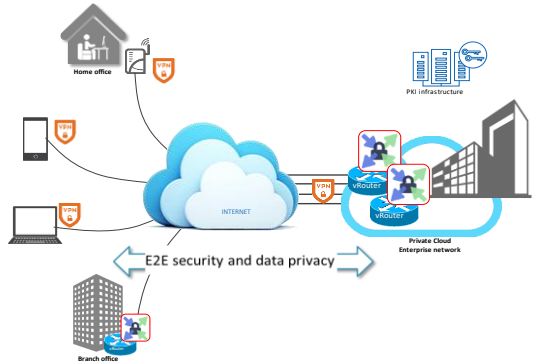
a. Bare Metal
b. Virtualized (private and/or public clouds)
c. Cloud Native (disaggregated and distributed)
d. None

6WIND vSecGW : Use Cases

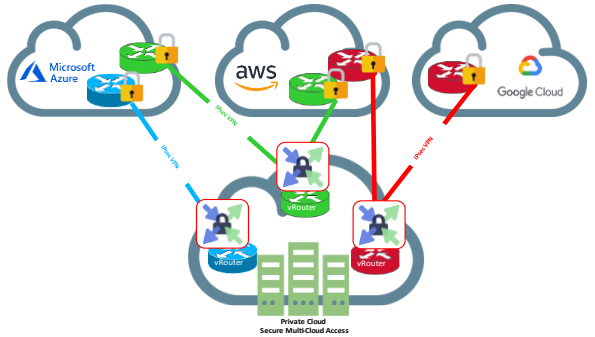
Secure IoT infrastructure



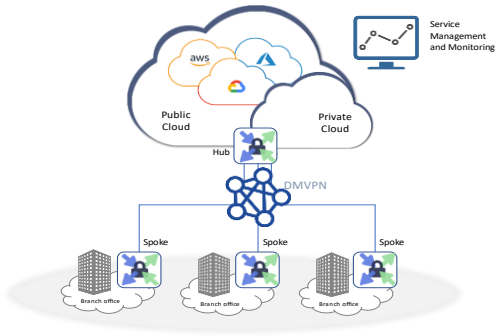
Remote-Access VPN Service



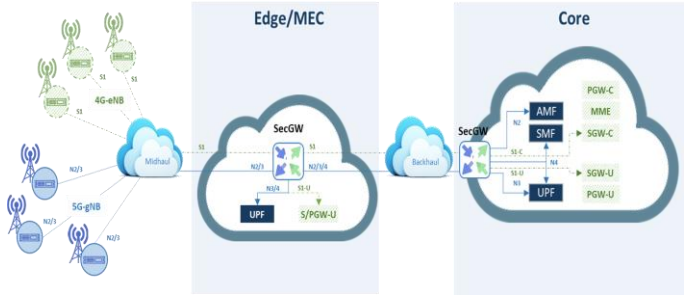
Secure Multi-Cloud Access



Multi-Site Security



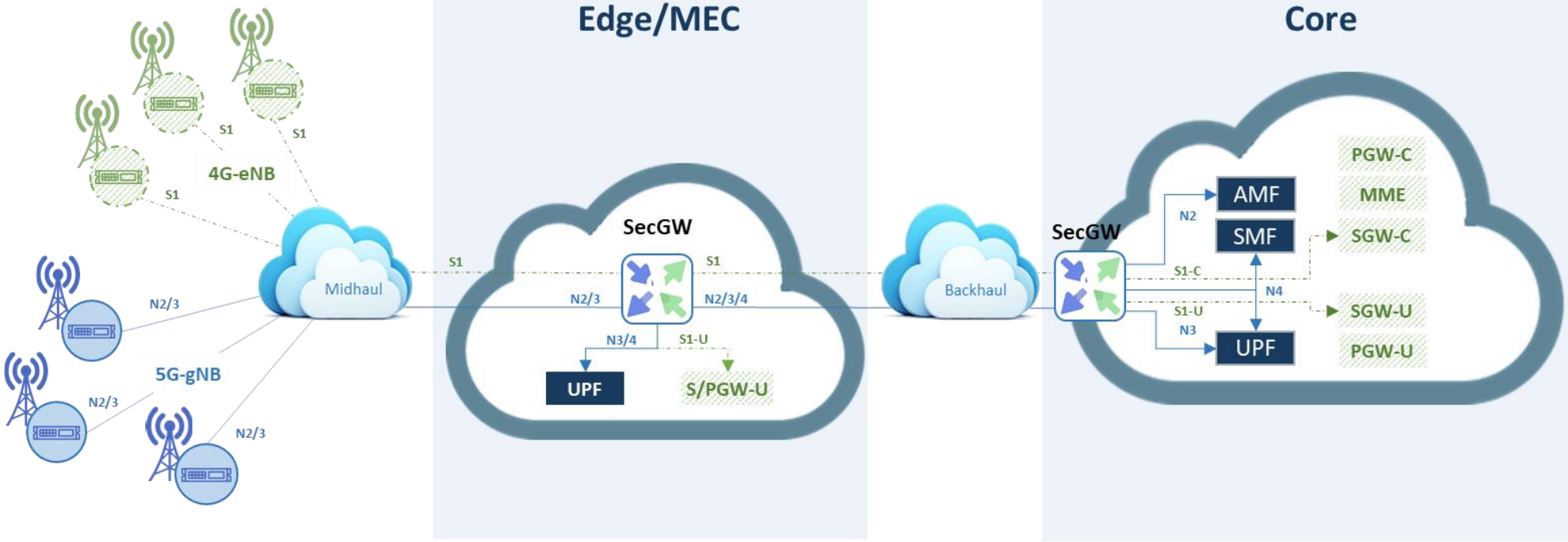
Mobile Security Gateway



- ✓ Virtualized solution
- ✓ High Performance and Scalability
- ✓ Efficiency - Optimized HW Resource usage
- ✓ Fat-Pipe (Elephant tunnels) support
- ✓ Run on COTS Servers
- ✓ 100 000 IPsec VPN Tunnels per instance

6WIND vSecGW: Edge Cloud Security Gateway

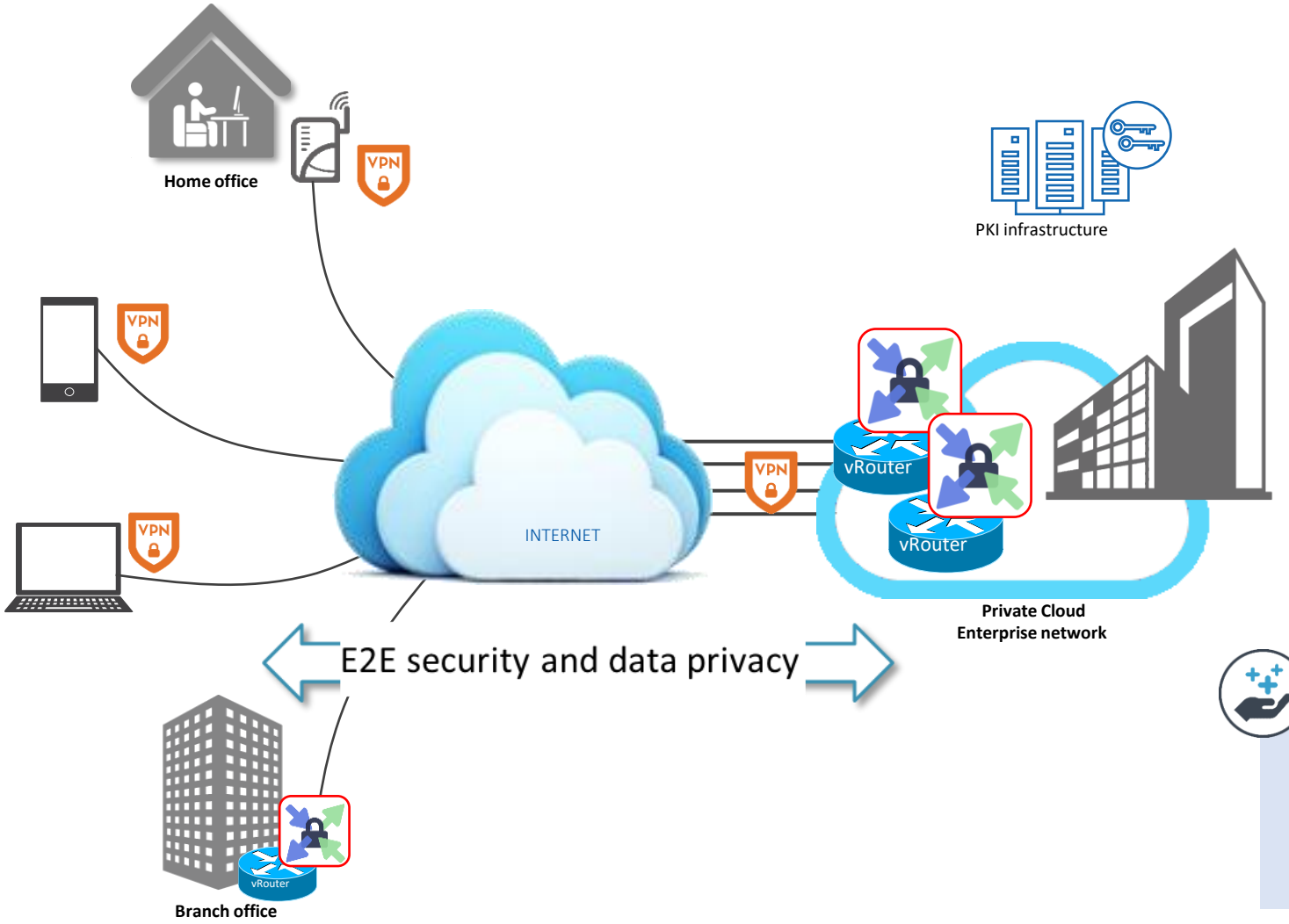
vSecGW



- ✓ Virtualized solution (Public, Private clouds)
- ✓ High Performance and Scalability
- ✓ Stateful HA (Local and Geo)
- ✓ Optimized HW Resource usage
- ✓ Run on COTS Servers

6WIND vSecGW: Remote Access VPN Service

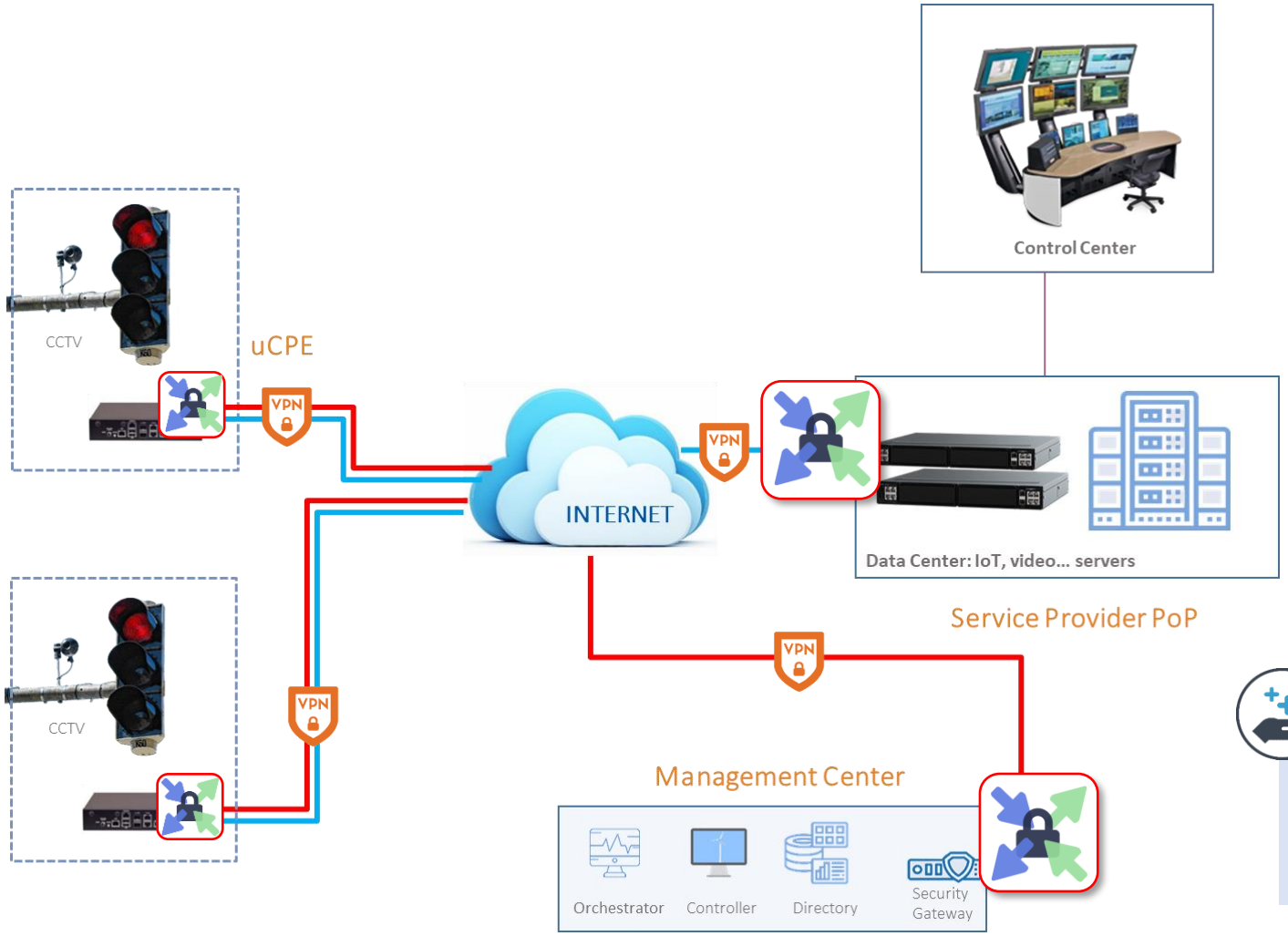
vSecGW



- ✓ Scalable VPN Concentrator
- ✓ High Performance and Scalability
- ✓ Stateful HA for reliable connectivity service
- ✓ Compatibility with native VPN client solutions

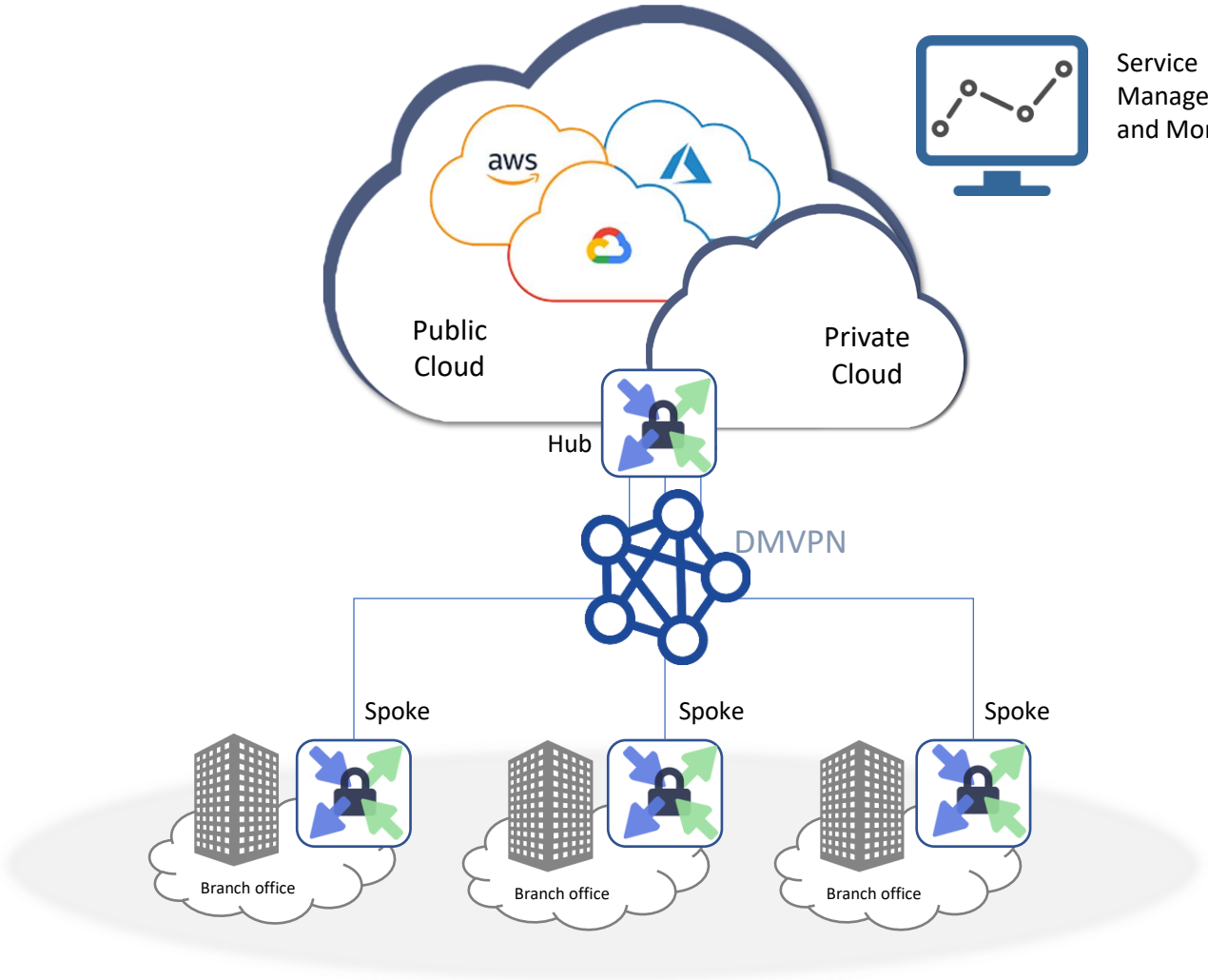
6WIND vSecGW: Secure IoT infrastructure

vSecGW



- ✓ High Scalable Performance
- ✓ Multi-tenancy support
- ✓ Extended deployment options (Public/Private)

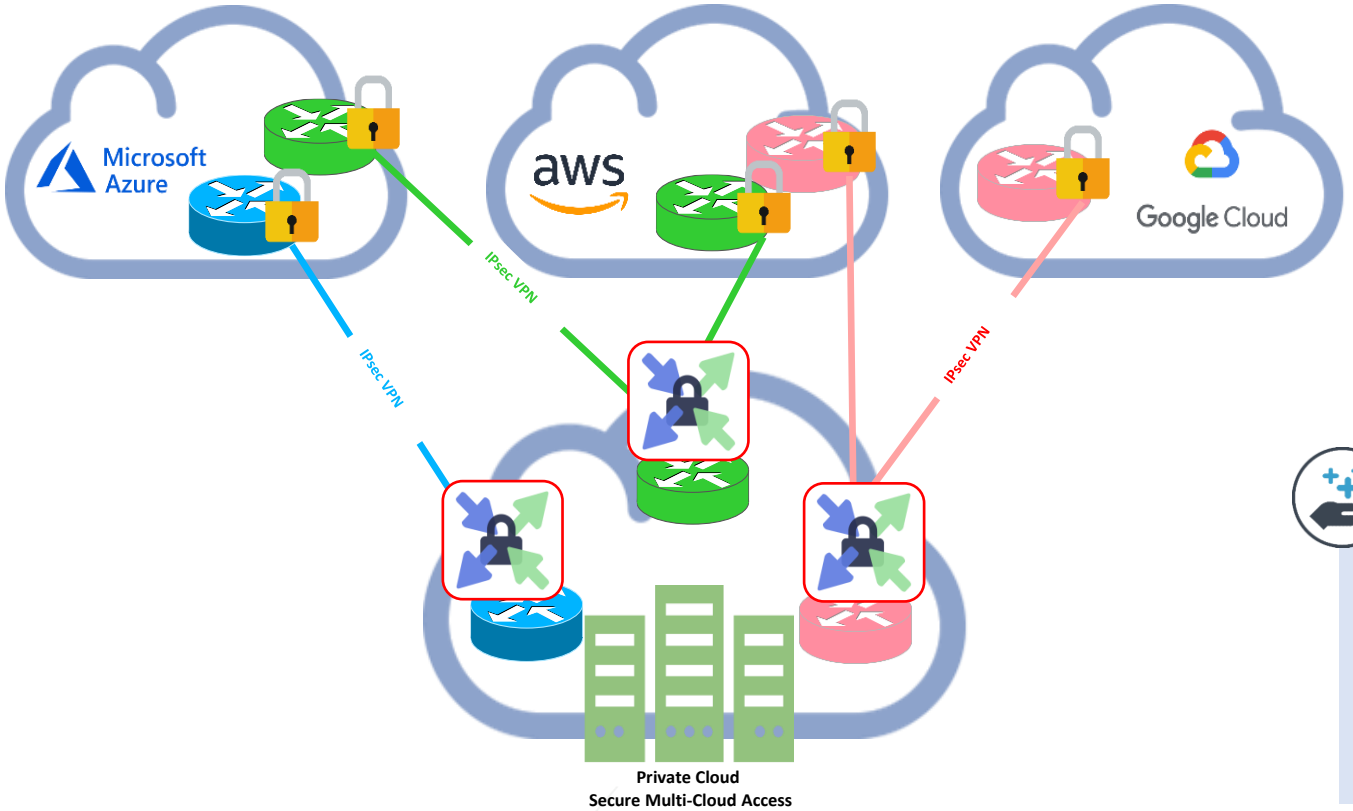
6WIND vSecGW: Multi-Site Security



- ✓ Centralized Service management
- ✓ Simplified operations
- ✓ Full interconnection through DMVPN
- ✓ Multi-regional support

6WIND vSecGW: Secure Multi-Cloud Access

vSecGW



- ✓ High Scalable Performance
- ✓ Consistent data protection across cloud providers
- ✓ Secure access to distributed cloud assets, software, applications, and more across several cloud environments

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Poll Question 3

Do you think virtualization and high-performance delivery are compatible ?

a. Absolutely
b. Yes, but requires hardware acceleration
c. No
d. Don’t know

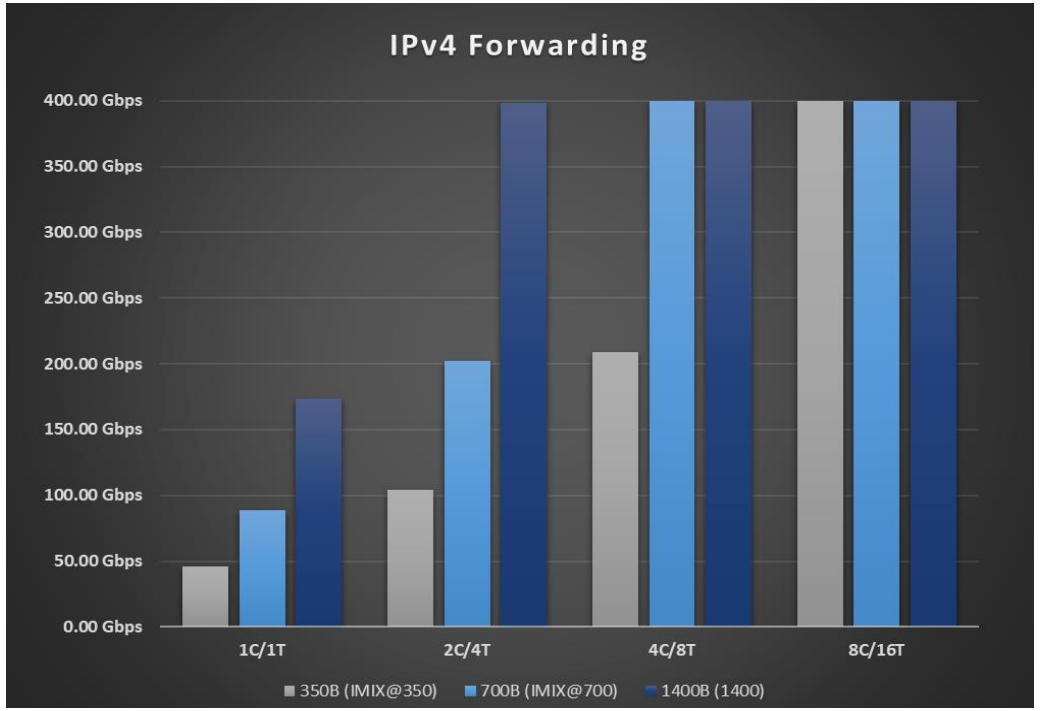
vSecGW

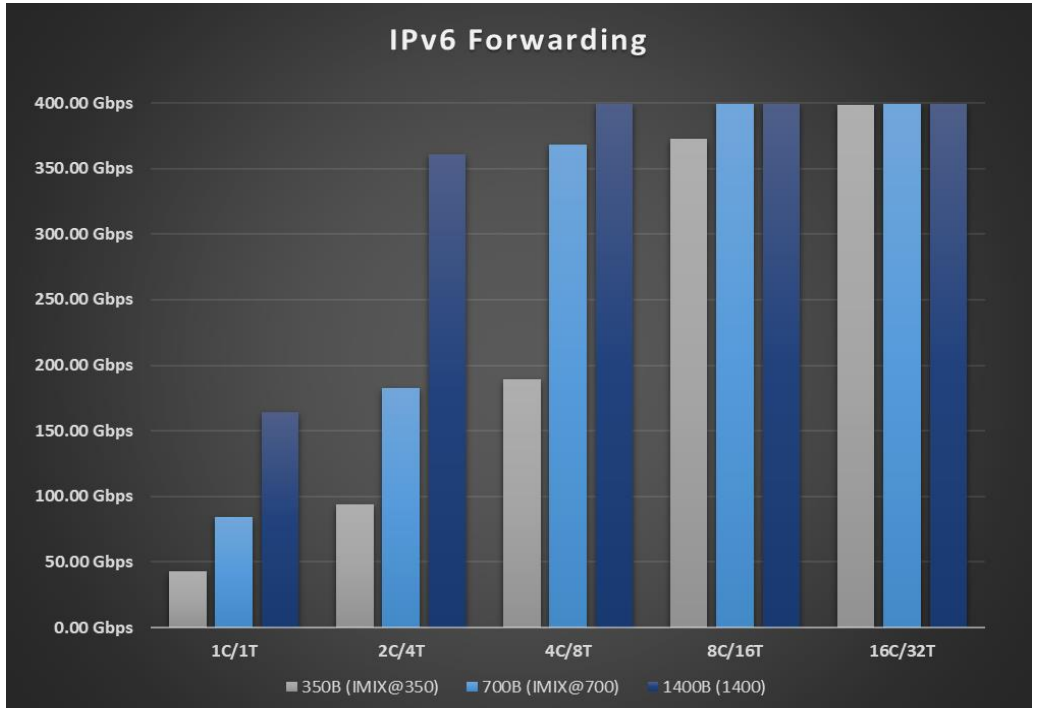
Performance Benchmarks

3rd Gen Intel® Xeon® Scalable Processor

(Intel® Xeon® Gold 6342 CPU @ 2.80GHz)

Dual Stack (v4/v6) Forwarding Performance

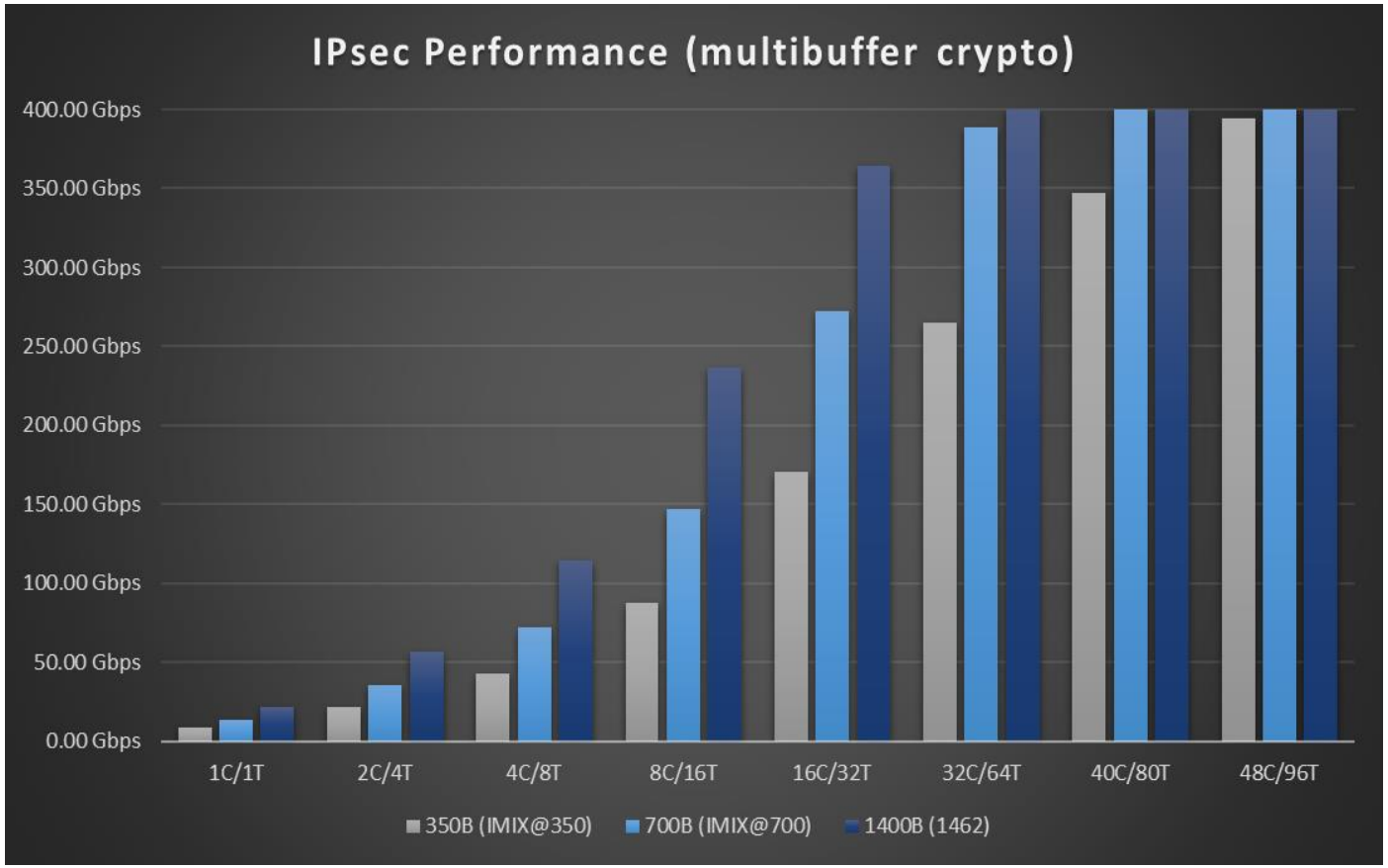




- 46 Gbps @ $IMIX_{350B}$ with 1 CPU Core (1C/1T).
- 400 Gbps (Line Rate)
  - @ $IMIX_{700B}$ with less than 4 CPU Cores
  - @ 1400B with 2 physical core

Test platform: Intel® Xeon® Gold 6342 CPU @ 2.80GHz
Pure software performance, with no HW acceleration
Line rate performance (400GBps) using 2 x Intel E810

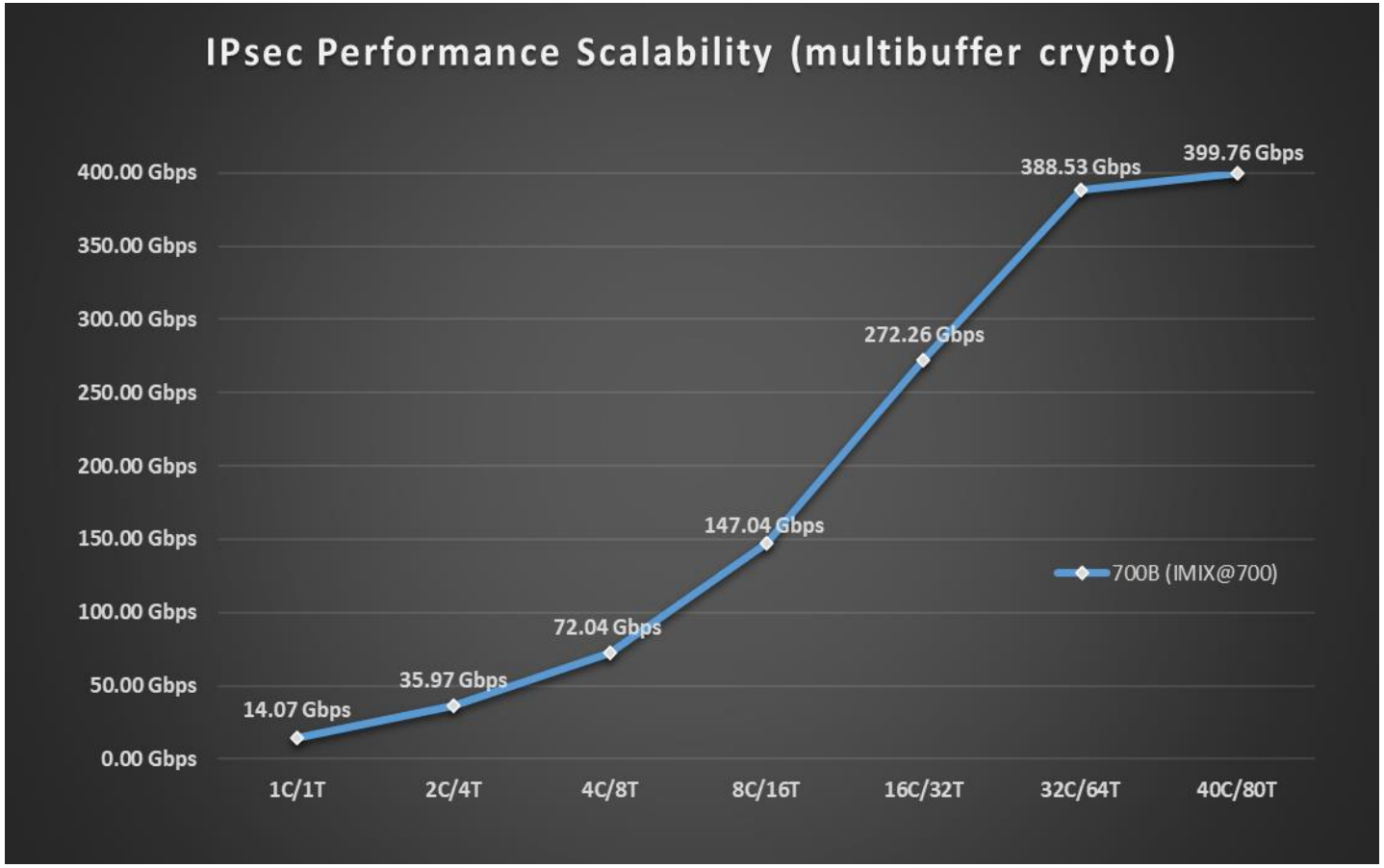
IPsec Performance : AES-GCM-256 (Multi-buffer Crypto)



- 9 Gbps IPsec @$IMIX_{350B}$ with 1 CPU Core
- 22 Gbps IPsec @1400B with 1 CPU Core
- 400 Gbps (Line Rate)
  - @ $IMIX_{700B}$ with less than 40 CPU Cores
  - @ 1400B with less than 32 CPU Cores

Test platform: Intel® Xeon® Gold 6342 CPU @ 2.80GHz
Pure software performance, with no HW acceleration
Line rate performance (400GBps) using 2 x Intel E810

IPsec Performance : AES-GCM-256 (Multi-buffer Crypto)



- Linear scalability
- High Efficiency
- High throughput per CPU core

Test platform: Intel® Xeon® Gold 6342 CPU @ 2.80GHz
Pure software performance, with no HW acceleration
Line rate performance (400GBps) using 2 x Intel E810

6WIND Virtualized Networking Software

Performance Results Summary

Forwarding Performance

IMIX$_{350B}$	Per Core	46 Gbps
	Line Rate	8 CPU Core
IMIX$_{700B}$	Per Core	90 Gbps
	Line Rate	4 CPU Core
1400B	Per Core	180 Gbps
	Line Rate	2 CPU Core

IPsec Performance

IMIX$_{350B}$	Per Core	9 Gbps
	Line Rate	48 CPU Core
IMIX$_{700B}$	Per Core	14 Gbps
	Line Rate	40 CPU Core
1400B	Per Core	22 Gbps
	Line Rate	32 CPU Core

Test platform: Intel® Xeon® Gold 6342 CPU @ 2.80GHz
Pure software performance, with no HW acceleration
Line rate performance (400GBps) using 2 x Intel E810

vSecGW

What's Next ?

Unleashing “Network Optimized” Intel Cloud Platforms

- AWS c6in/m6in instances powered by 3rd Gen Intel® Xeon® Scalable processors
- First x86-based AWS instances offering up to 200 Gbps network bandwidth
- 60% IPsec performance boost over c5n instances
- 2.8x connections per second for Nginx/Https compared to c5n

Name	vCPUs	Memory	Network Bandwidth	EBS Bandwidth
c6in.large	2	4 GiB	UP to 25 Gbps	UP to 20 Gbps
c6in.xlarge	4	8 GiB	UP to 30 Gbps	UP to 20 Gbps
c6in.2xlarge	8	16 GiB	UP to 40 Gbps	UP to 20 Gbps
c6in.4xlarge	16	32 GiB	UP to 50 Gbps	UP to 20 Gbps
c6in.8xlarge	32	64 GiB	50 Gbps	20 Gbps
c6in.12xlarge	48	96 GiB	75 Gbps	30 Gbps
c6in.16xlarge	64	128 GiB	100 Gbps	40 Gbps
c6in.24xlarge	96	192 GiB	150 Gbps	60 Gbps
c6in.32xlarge	128	256 GiB	200 Gbps	80 Gbps

Name	vCPUs	Memory	Network Bandwidth	EBS Bandwidth
m6in.large	2	8 GiB	UP to 25 Gbps	UP to 20 Gbps
m6in.xlarge	4	16 GiB	UP to 30 Gbps	UP to 20 Gbps
m6in.2xlarge	8	32 GiB	UP to 40 Gbps	UP to 20 Gbps
m6in.4xlarge	16	64 GiB	UP to 50 Gbps	UP to 20 Gbps
m6in.8xlarge	32	128 GiB	50 Gbps	20 Gbps
m6in.12xlarge	48	192 GiB	75 Gbps	30 Gbps
m6in.16xlarge	64	256 GiB	100 Gbps	40 Gbps
m6in.24xlarge	96	384 GiB	150 Gbps	60 Gbps
m6in.32xlarge	128	512 GiB	200 Gbps	80 Gbps

See backup for workloads and configurations. Results may vary.

Transitioning to 4th Gen Intel® Xeon® Scalable Processors

- Performance Enhancements
- Leveraging Built-in Acceleration
- Improved Efficiency at Lower Power Consumption
- Cost Reduction (GiGs/$)

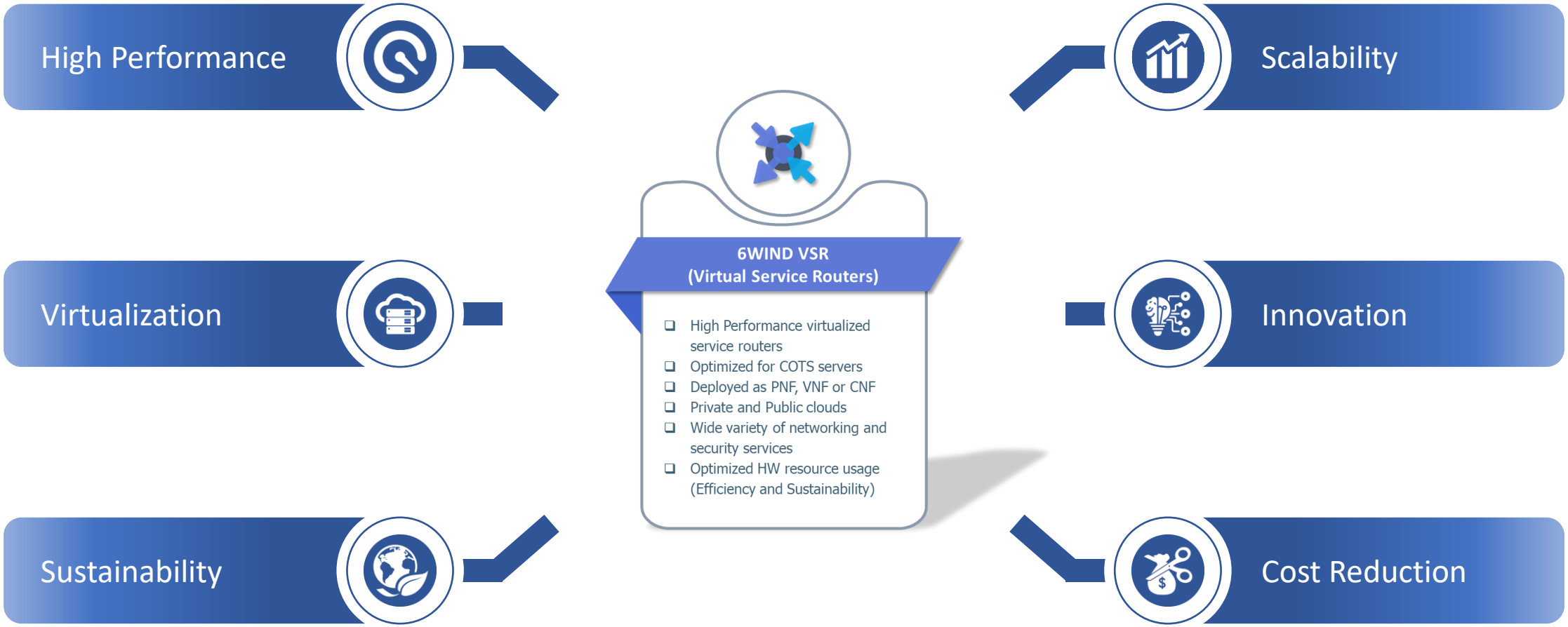
https://www.intel.com/content/www/us/en/newsroom/resources/press-kit-4th-gen-intel-xeon-scalable-processors.html#gs.mtumuc

vSecGW

Take Aways

High Performance and Efficiency

Delivering Best-in-Class Virtualized Network Solutions



Additional Resources

6WIND VSR online datasheets:

- 6WIND vPE
- 6WIND vSecGW
- 6WIND vCGNAT
- 6WIND vCSR
- 6WIND vBR
- 6WIND vCPE

6WIND VSR online documentation:

- 6WIND VSR User Guide

Solution briefs:

- 6WIND and Kontron Team Up for Open vRAN Integrated DU Solution
- 6WIND vRouter Provides BGP-Based Border Routing for ISPs
- Secure Mobile Infrastructure

White Papers:

- Fat IPsec VPN Tunnels on a Budget
- 6WIND Proves the 5G Virtual Security Gateway Concept
- Network Functions Virtualization: The Portability Challenge
- ADVA SmartWAN using 6WIND VSR with Intel® QAT Performance Benchmarking

Register for a Free Evaluation !

Thank You!

www.6wind.com

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6WIND Americas HQ
Santa Clara, USA

6WIND APAC HQ
Singapore

Notices and Disclaimers

Performance varies by use, configuration and other factors. Learn more on the Performance Index site.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

Your costs and results may vary.

Intel technologies may require enabled hardware, software or service activation.

System Configuration

Name	c5n.4xlarge	c5n.18xlarge	c6in.4xlarge	c6in.16xlarge
Time	Tue Nov 29 16:37:42 UTC 2022	Tue Nov 29 16:35:59 UTC 2022	Tue Nov 29 16:43:31 UTC 2022	Tue Nov 29 16:43:07 UTC 2022
System	Amazon EC2 c5n.4xlarge	Amazon EC2 c5n.18xlarge	Amazon EC2 c6in.4xlarge	Amazon EC2 c6in.16xlarge
Baseboard	Amazon EC2 Not Specified	Amazon EC2 Not Specified	Amazon EC2 Not Specified	Amazon EC2 Not Specified
Chassis	Amazon EC2 Other	Amazon EC2 Other	Amazon EC2 Other	Amazon EC2 Other
CPU Model	Intel® Xeon® Platinum 8124M CPU @ 3.00GHz	Intel® Xeon® Platinum 8124M CPU @ 3.00GHz	Intel® Xeon® Platinum 8375C CPU @ 2.90GHz	Intel® Xeon® Platinum 8375C CPU @ 2.90GHz
Microarchitecture	SKX	SKX	ICX	ICX
Sockets	1	2	1	1
Cores per Socket	8	18	8	32
Hyperthreading	Enabled	Enabled	Enabled	Enabled
CPUs	16	72	16	64
Intel Turbo Boost	Enabled	Enabled	Enabled	Enabled
Base Frequency	3.0GHz	3.0GHz	2.9GHz	2.9GHz
All-core Maximum Frequency	3.4GHz	3.4GHz	3.5GHz	3.5GHz
Maximum Frequency	3.5	3.5	3.5	3.5
NUMA Nodes	1	2	1	1
Prefetchers	L2 HW, L2 Adj., DCU HW, DCU IP	L2 HW, L2 Adj., DCU HW, DCU IP	L2 HW, L2 Adj., DCU HW, DCU IP	L2 HW, L2 Adj., DCU HW, DCU IP
PPINs				
Accelerators	QAT:0, DSA:0, IAA:0, DLB:0	QAT:0, DSA:0, IAA:0, DLB:0	QAT:0, DSA:0, IAA:0, DLB:0	QAT:0, DSA:0, IAA:0, DLB:0
Installed Memory	42GB (1x42GB DDR4 2666 MT/s [Unknown])	192GB (2x96GB DDR4 2933 MT/s [Unknown])	32GB (1x32GB DDR4 3200 MT/s [Unknown])	128GB (1x128GB DDR4 3200 MT/s [Unknown])
Hugepagesize	1048576 kB	1048576 kB	1048576 kB	1048576 kB
Transparent Huge Pages	madvise	madvise	madvise	madvise
Automatic NUMA Balancing	Disabled	Enabled	Disabled	Disabled
NIC	3x Elastic Network Adapter (ENA)	3x Elastic Network Adapter (ENA)	3x Elastic Network Adapter (ENA)	3x Elastic Network Adapter (ENA)
Disk	1x 8G Amazon Elastic Block Store	1x 8G Amazon Elastic Block Store	1x 8G Amazon Elastic Block Store	1x 8G Amazon Elastic Block Store
BIOS	1	1	1	1
Microcode	0x2006c0a	0x2006c0a	0xd000331	0xd000331
OS	Ubuntu 20.04.5 LTS	Ubuntu 20.04.5 LTS	Ubuntu 20.04.5 LTS	Ubuntu 20.04.5 LTS
Kernel	5.15.0-1023-aws	5.15.0-1023-aws	5.15.0-1023-aws	5.15.0-1023-aws
TDP				
Power & Perf Policy				
Frequency Governor				
Frequency Driver				
Max C-State	9	9	9	

Software/Workload Configuration

	OpenSSL client	Nginx server
OS	Ubuntu 20.04.5 LTS	Ubuntu 20.04.5 LTS
Kernel	5.15.0-1023-aws	5.15.0-1023-aws
QAT_Engine		22.02
Nginx		0.4.7
OpenSSL	1.1.1l	1.1.1l
ipp_crypto	2021.5	2021.5
ipsec_mb	1.1	1.1
IPsec Cipher Suite	AES128-GCM-SHA256 / RSA 2k	AES128-GCM-SHA256 / RSA 2k
COMMAND LINE USED	# for connections per second sudo /opt/test-cps.sh # for throughput sudo /opt/test-tput.sh	sudo /opt/start-nginx.sh qat

GUIDANCE FOR DATASET
(in order of preference)
1) Publicly available datasets with version number mentioned in Configuration foil
2) Customer-provided real-world dataset – Configuration must have a description of how it was availed
If 1 or 2 is not available, then synthetic datasets with the following details

- How were the data generated?
- Steps to regenerate the data (if the foil is to be presented publicly)