



# Cloud Networking Services: vWAAS and vNAM

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# Cisco ONE/N1K Public Webinars, 1H 2013

Date/Time	Topic
Thur, Feb 21st at 0900 PST	Cisco Open Network Environment (Cisco ONE) – Next Phase of Network Programmability and SDN
Thur, Feb 28th at 0900 PST	Cisco One Platform Kit (onePK): Technical Deep Dive and key use cases
Wed, Mar 6th at 0900 PST	Nexus 1000V for Hyper-V with Microsoft SCVMM integration
Wed, Mar 13th at 0900 PST	Cisco ONE Controller: Technical Deep Dive and key use cases
Wed, Mar 20th at 0900 PST	5000 Seat VDI Reference Architecture: Cisco UCS & Nexus 1000V, Citrix XenDesktop, and EMC VNX
Wed, Mar 27th at 0900 PST	Nexus 1000V v2.2 for vSphere: More scale, Multicast-less VXLAN, and VXLAN Gateway
Wed, April 3rd at 0900 PST	Cloud Services Router (CSR 1000V) is now GA! → technical deep dive and key use cases
Wed, April 10th at 0900 PST	Cloud Security with ASA 1000V and Virtual Security Gateway v2.1 (VSG)
Wed, April 17th at 0900 PST	Secure Hybrid Cloud solution with Nexus 1000V InterCloud & VNMC InterCloud
Wed, April 24th at 0900 PST	Nexus 1100 Series Cloud Services Platform: new services & ecosystem including VXLAN-to-VLAN GW and Imperva's SecureSphere WAF
Wed, May 1st at 0900 PST	Cloud Networking Services: vWAAS and vNAM
Wed, May 8th at 0900 PST	Virtualized Multiservice Data Center (VMDC) solution with Cloud Networking Services
Wed, May 15th at 0900 PST	Nexus 1000V for KVM (with OpenStack and VXLAN)

**Register and view recordings/presentations here:**

[www.cisco.com/go/1000vcommunity](http://www.cisco.com/go/1000vcommunity)

# Agenda

- Quick Intro
- vWAAS
- vNAM
- Q & A as we go via panelists...

# Introduction



# Physical | Virtual | Cloud Journey

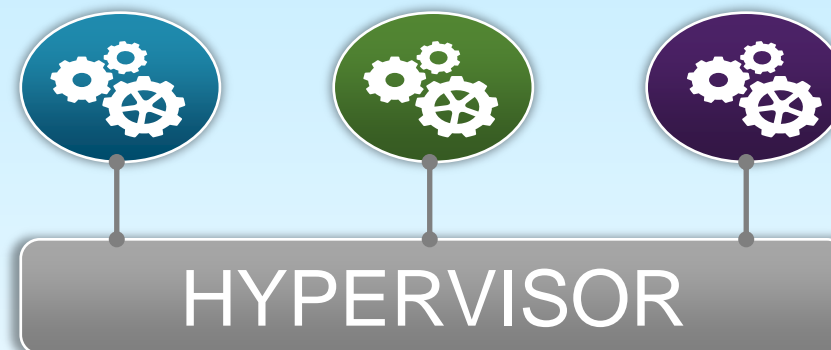
## PHYSICAL WORKLOAD

- One app per Server
- Static
- Manual provisioning



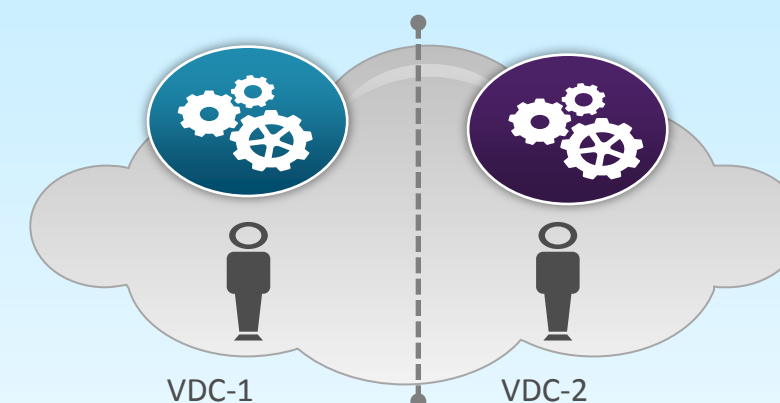
## VIRTUAL WORKLOAD

- Many apps per Server
- Mobile
- Dynamic provisioning



## CLOUD WORKLOAD

- Multi-tenant per Server
- Elastic
- Automated Scaling



**CONSISTENCY: Policy, Features, Security, Management, Separation of Duties**

### Switching

Nexus 7K/5K/3K/2K

Nexus 1000V, VM-FEX

### Routing

ASR, ISR

Cloud Services Router (CSR 1000V)

### Services

WAAS, ASA, NAM

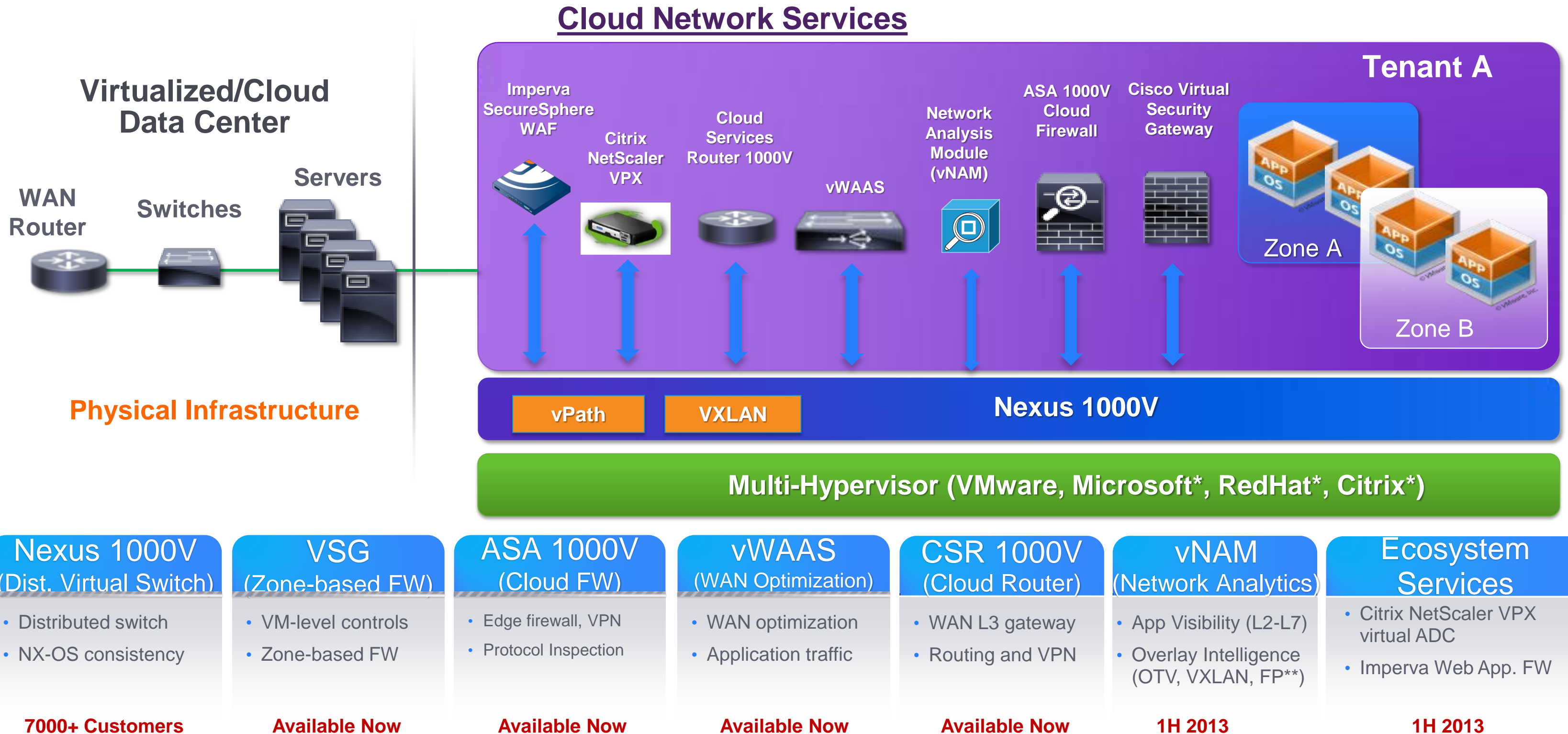
vWAAS, VSG, ASA 1000V, vNAM\*\*

### Compute

UCS for Bare Metal

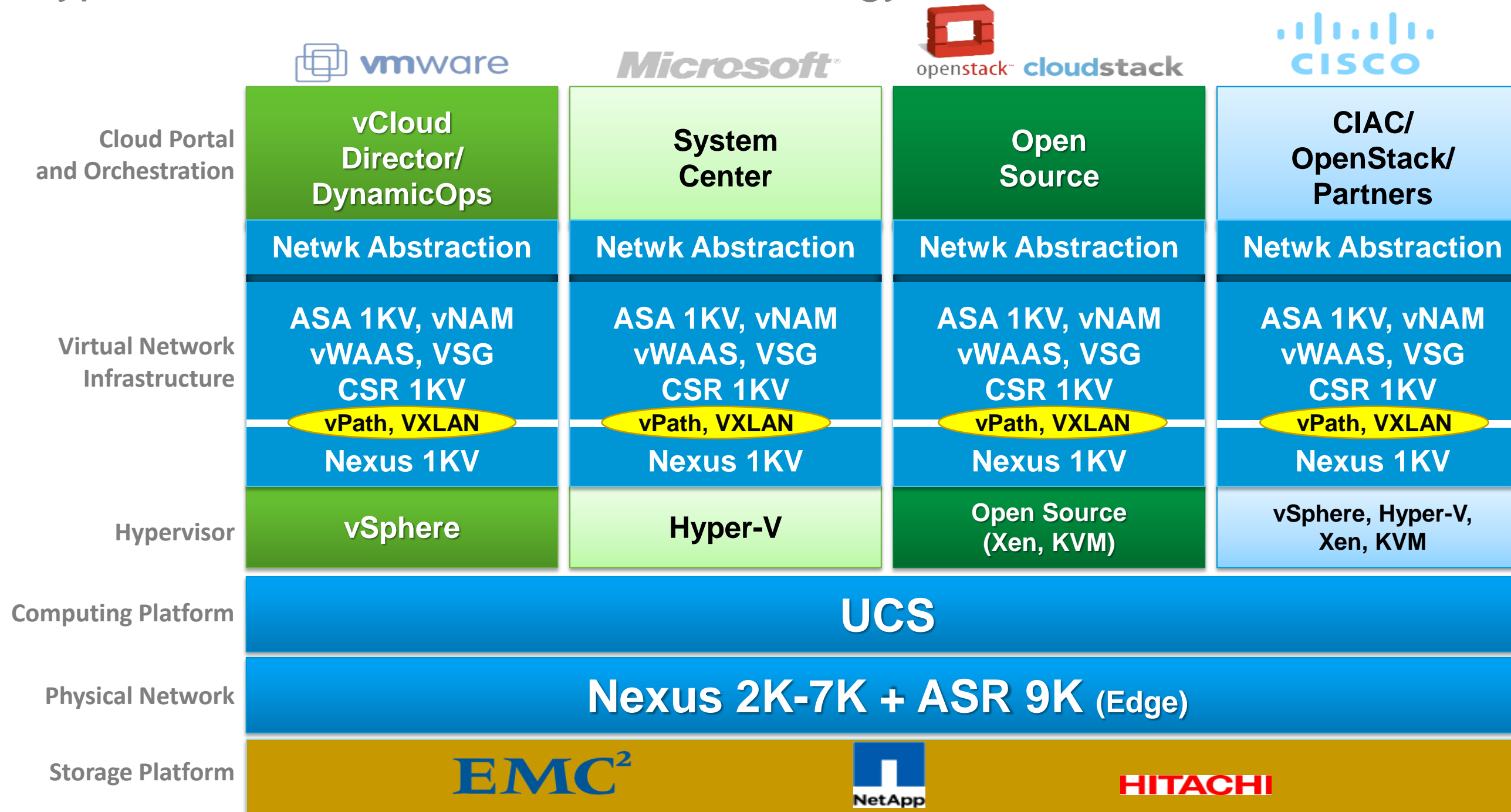
UCS for Virtualized Workloads

# Cisco Virtual Networking and Cloud Network Services



# Cloud technology stacks

## Multi-Hypervisor and Multi-Orchestration Strategy



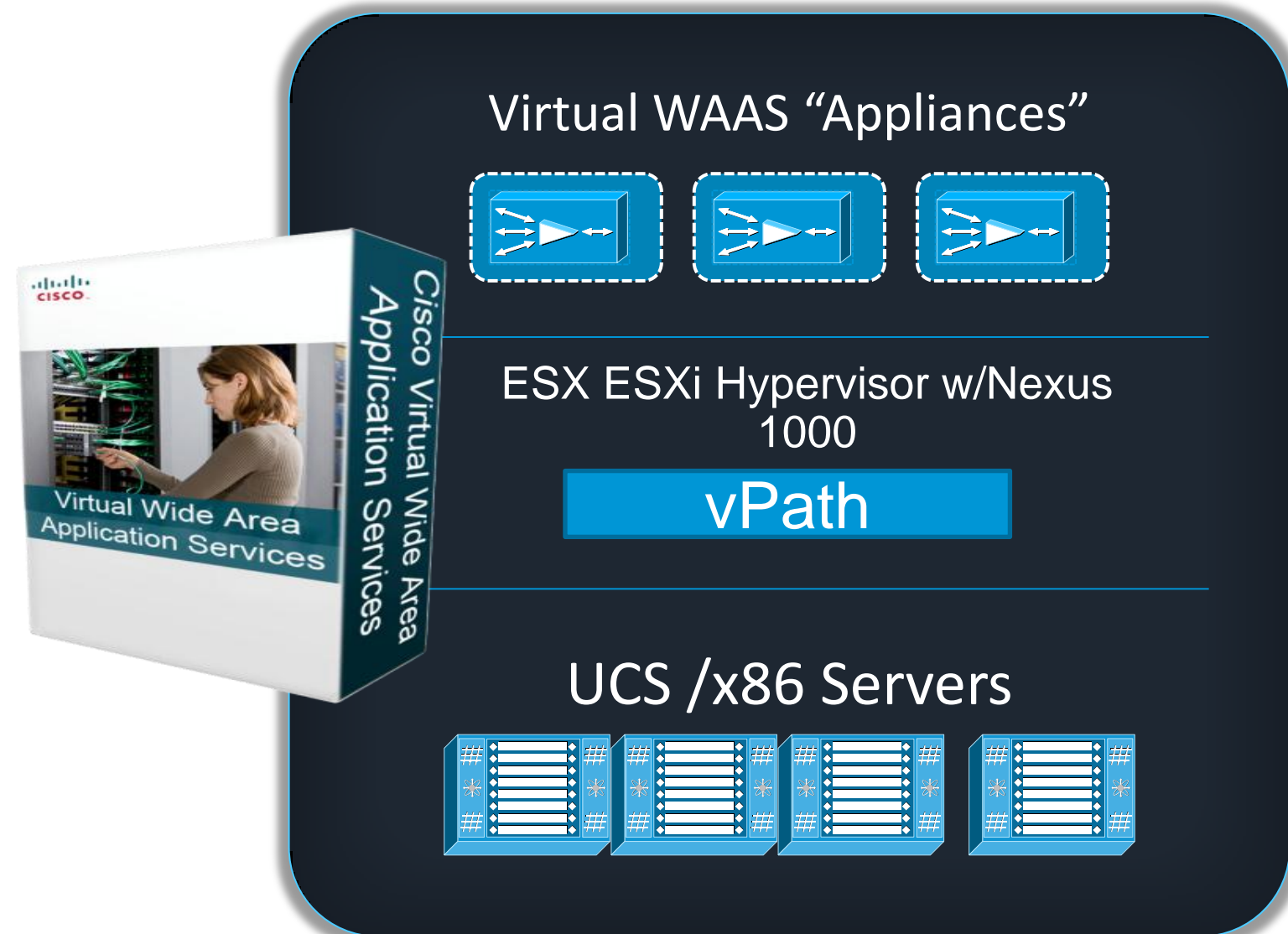
Solutions: Vblock, FlexPOD, VMDC, VDI, HCS, Cross-DC Mobility

# vWAAS





# Cisco Virtual WAAS



**Virtual WAAS**  
on Nexus 1000V with vPath

## FEATURES

- Full feature parity with traditional WAAS
- Allows Agile, Elastic, & Multi Tenant Deployment
- Supports DRE Cache in SAN
- Policy-based Provisioning w/ Nexus 1000V
- wccp, vPath, or AppNav based deployment

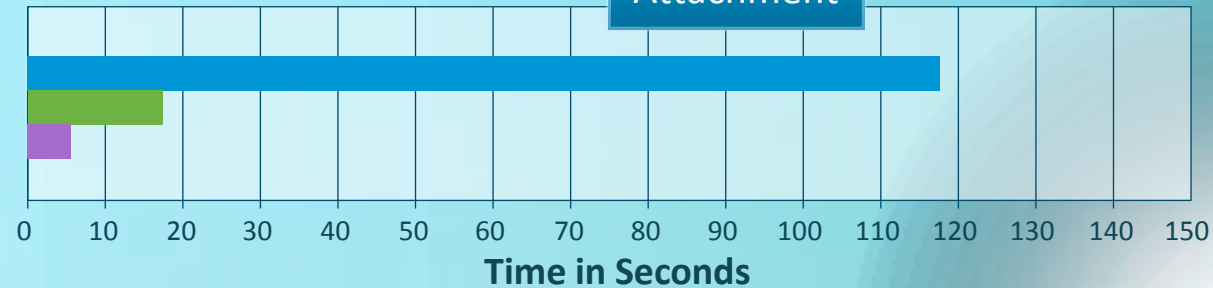
## BUSINESS BENEFITS

- Business Agility with on-demand orchestration
- Lower operational cost, reduced migration risk
- Fault-tolerance with VM mobility awareness

# vWAAS Improves End User Experience for Day to Day Applications

## Email

5 MB Attachment

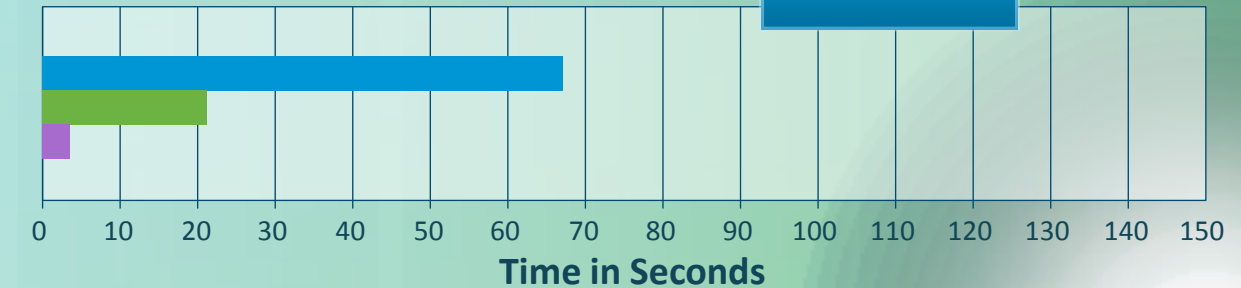


- Send and Receive Email over native WAN
- First Optimized with WAAS
- Second Pass Optimized with WAAS

**24X  
Faster**

## CIFS

5 MB File



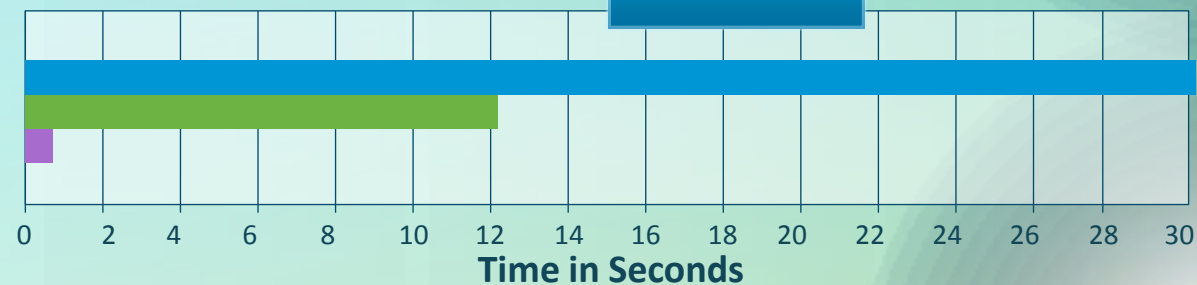
- File Drag and Drop Over native WAN
- First Optimized with WAAS
- Second Pass Optimized with WAAS

**17X  
Faster**

T1  
(1.54Mbps)  
80 ms  
latency

## MS Sharepoint

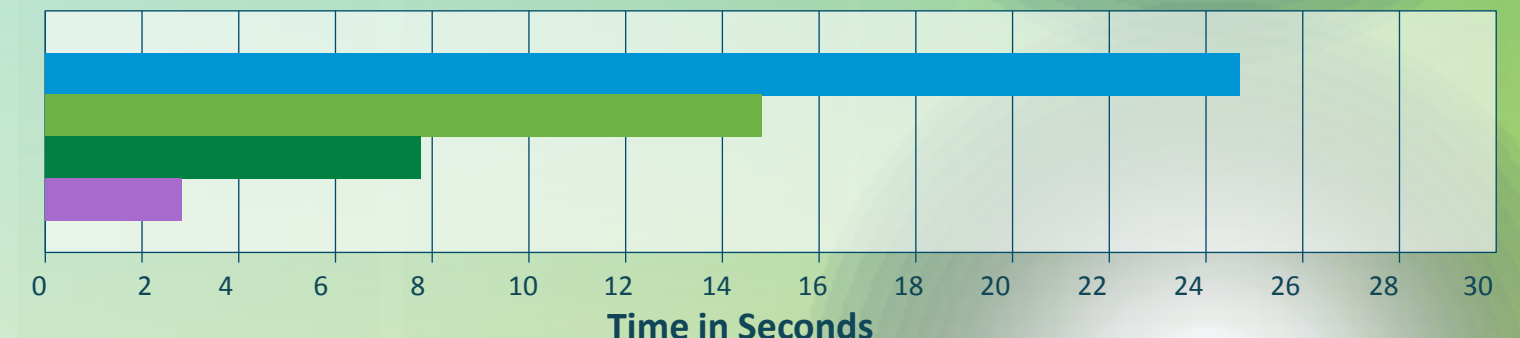
5 MB Document



- Sharepoint File Download over Native WAN
- First Optimized with WAAS
- Second Pass Optimized with WAAS

**30X  
Faster**

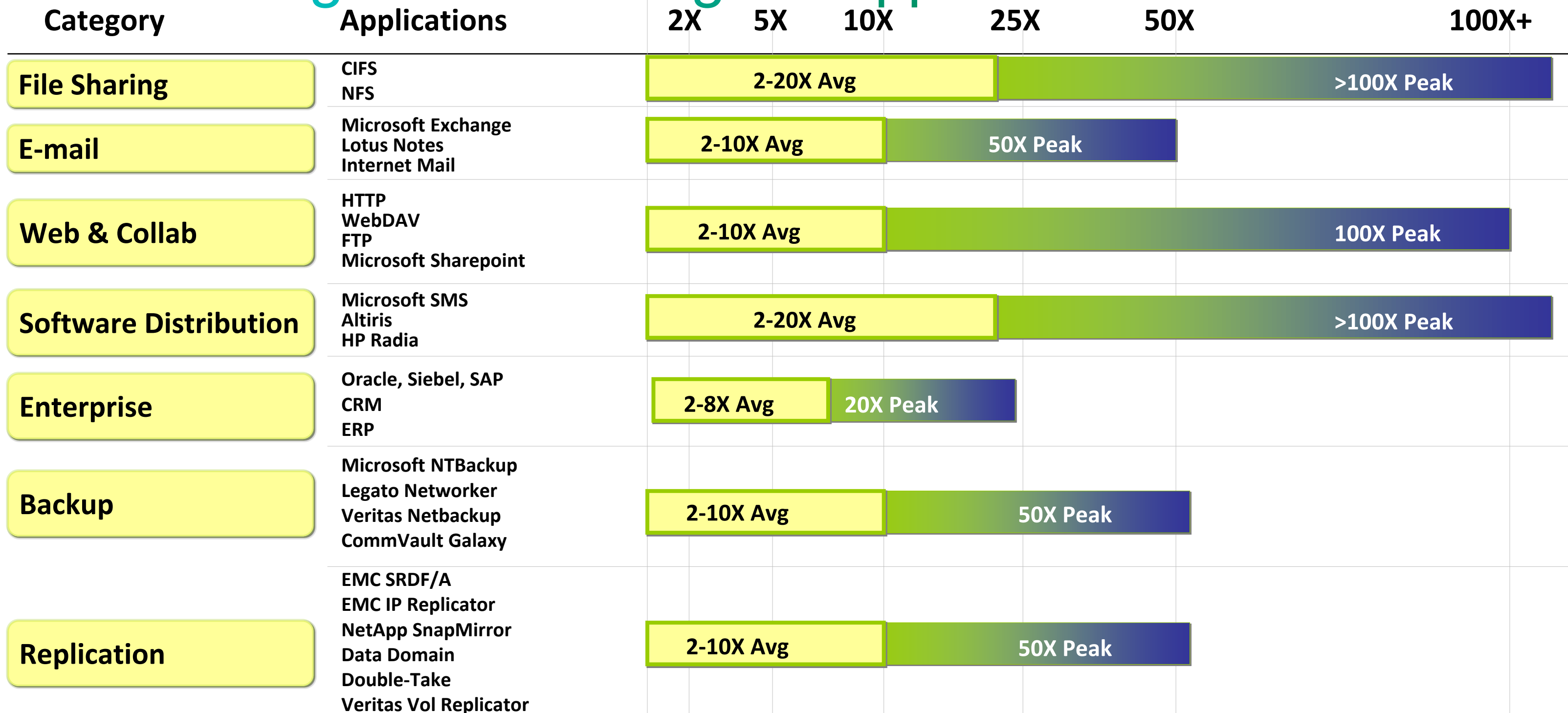
## VDI (Citrix)



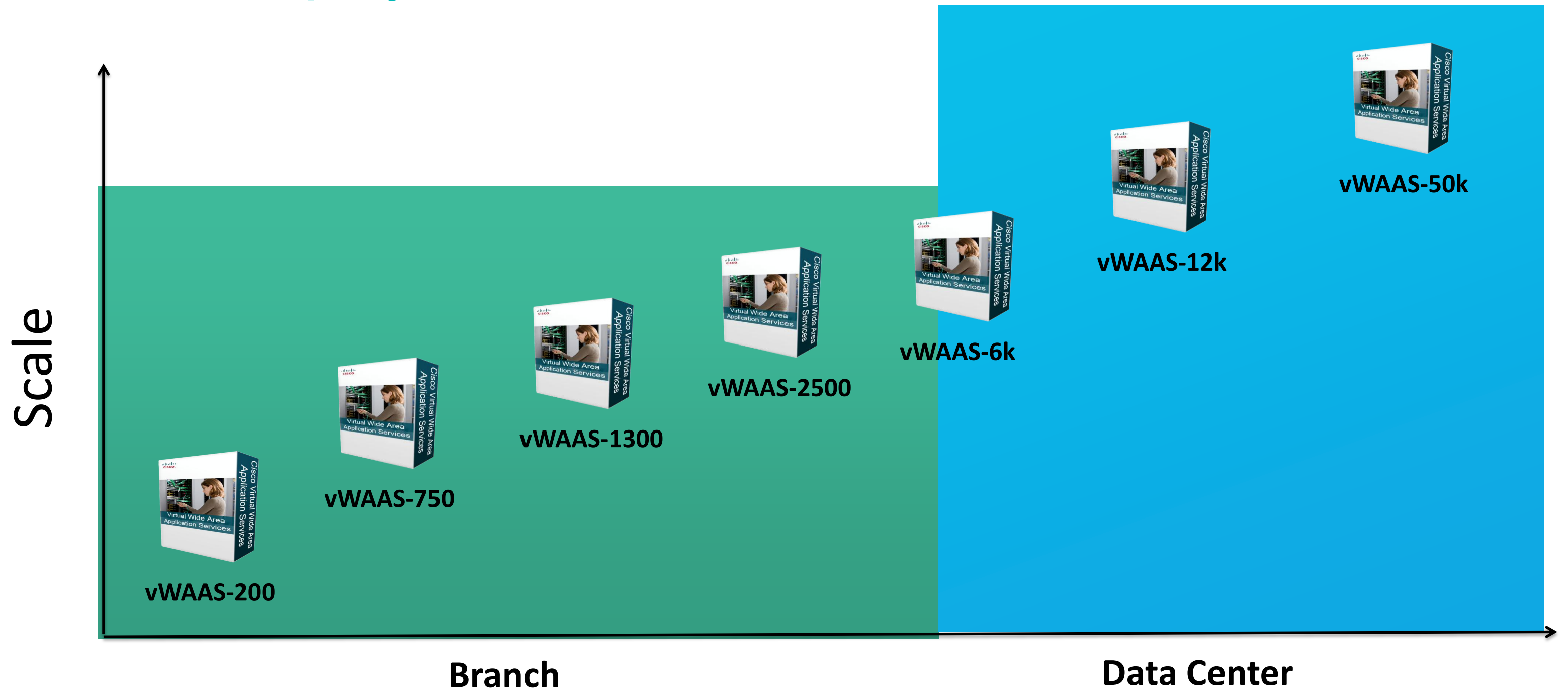
- Launch Citrix XenDesktop Over Native Citrix ICA/SSL
- Launch Citrix XenDesktop with WAAS
- Site Navigation Over Native Citrix ICA/SSL
- Site Navigation with WAAS

**3-8X  
Faster**

# Accelerating a Broad Range of Applications

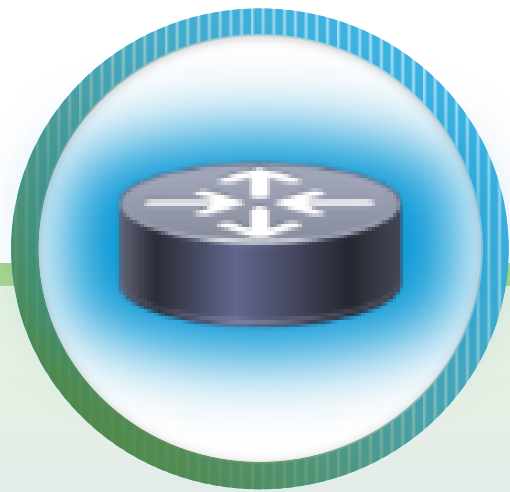


# Scalable Deployments from Branch to Data Center



# New Right to Use Pricing Model for WAAS in ISR

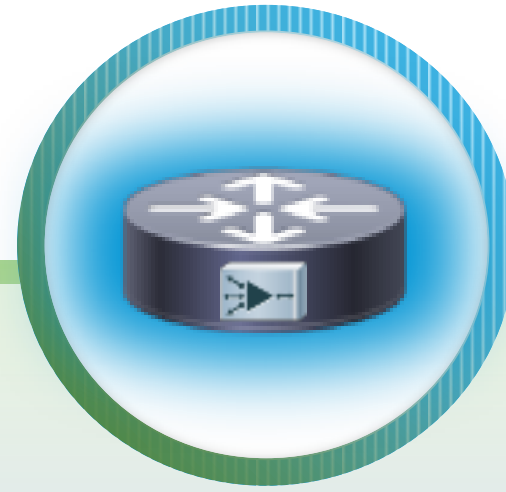
*More cost effective to deploy vWAAS in the branch*



## Direct IOS Integration

Bandwidth Optimization  
Reduce Application Usage  
Simple for Small Branches

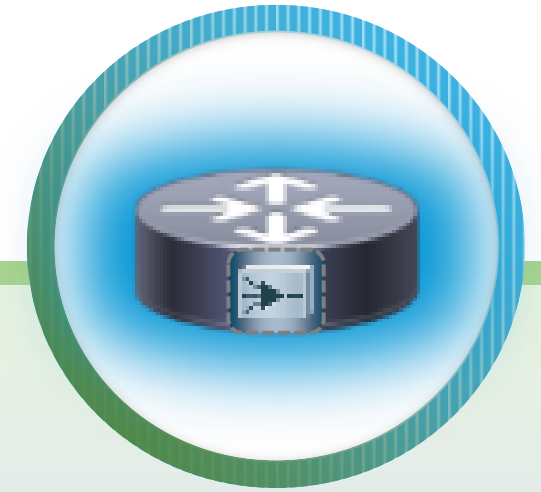
**WAAS Express**



## Integrated Router Card

Full Featured Accelerator  
Multiple cards supported  
Up to 1,000 Connections per card

**WAAS on SRE**



## Flexible Virtual Platform

Full Featured Accelerator  
Multiple Accelerator or multi platforms supported per card  
Scale 200 to 6,000 connections per card

**vWAAS on UCS-E**

# How does the WAAS Right-to-Use License work?

## *Connection-based licensing, flexible compute blade selection*

**Example:** 10 Megabit branch with 40 users needs **bandwidth reduction**. In addition, the branch expected to **quadruple** in size in the future. Also, future plans to deploy business-critical **Oracle**, **SAP** and **Exchange** applications.

### **Solution: ISR 3925-AX**

Contains a WAAS Right-To-Use license for **up to 2500 connections**



NOW  
**WAAS Express**  
400 Connections

**OR**

MORE  
**WAAS or vwaas on SRE**  
1000 Connections

**OR**

EVEN MORE!  
**vWAAS on UCS-E**  
2500 Connections  
aggregate across  
multiple instances

ISR-AX License includes rights and licenses to all of these products!

# vWAAS Capacities Provided by the ISR AX

## *Less than \$1 per optimized connection in the branch!*



Router Model	AX License Pricing**	vWAAS on SRE		vWAAS on UCS-E	
		Connections	Target WAN Bandwidth	Connections	Target WAN Bandwidth
3945E-AX	<b>\$2,000</b>	2500*	150Mbps	2500	200Mbps
3925E-AX		2000*	100Mbps	2500	200Mbps
3945-AX		2500*	150Mbps	2500	150Mbps
3925-AX		2000*	100Mbps	2500	100Mbps
2951-AX	<b>\$1,000</b>	1200*	75Mbps*	1300	75Mbps
2921-AX		1000	50Mbps	1300	50Mbps
2911-AX		1000	35Mbps	1300	35Mbps

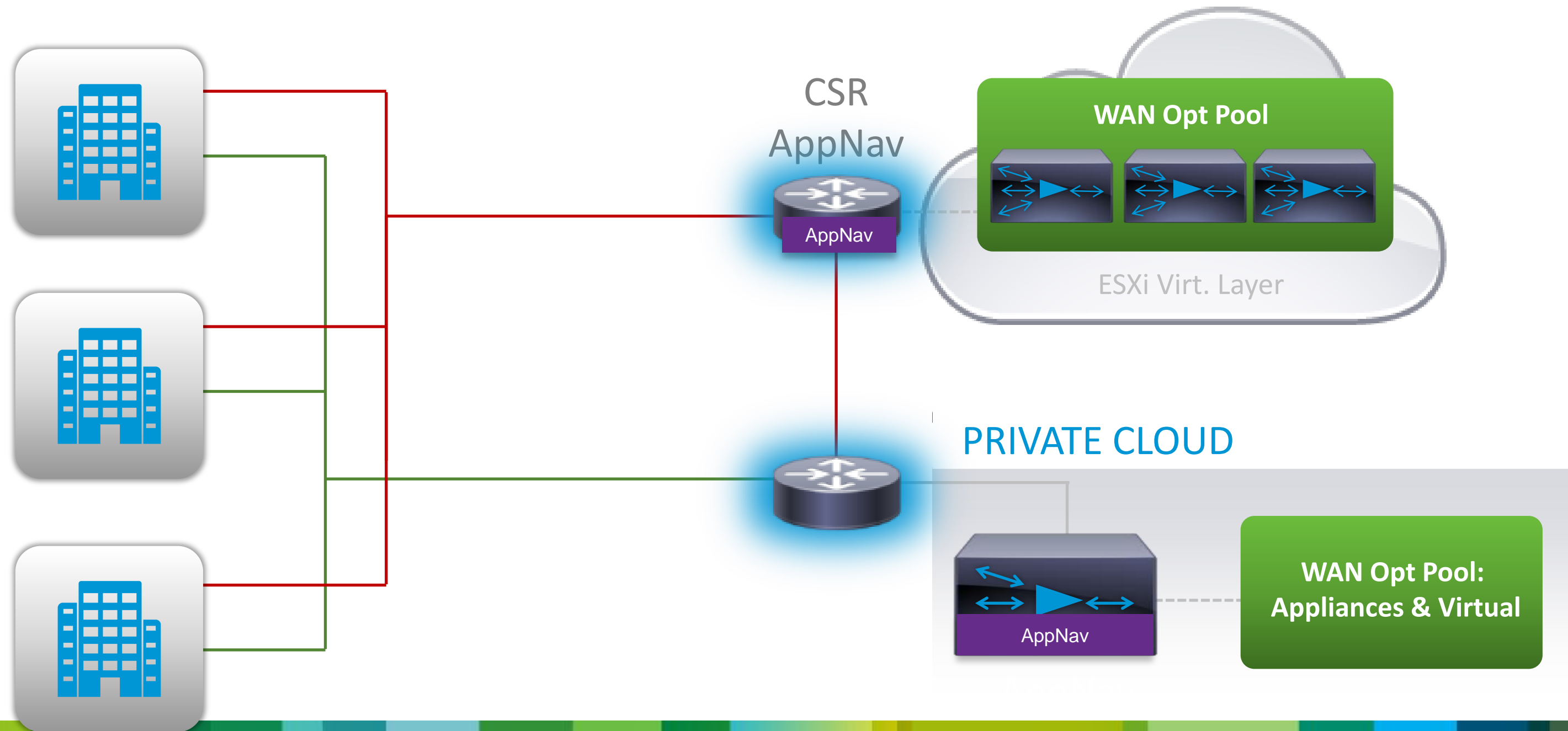
\*Assumes 2 Modules

\*\* includes vWAAS Right to use and Data License

Using forthcoming vWAAS-2500/1300 available in WAAS 3.2.1

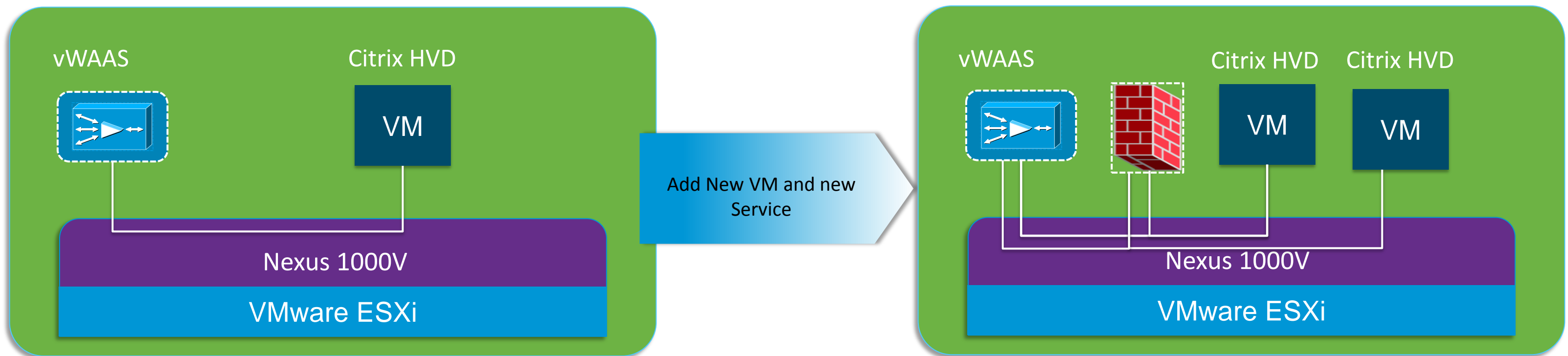
# Elastic Deployment For Data Centers and Clouds

*Connectivity, Visibility, Bandwidth and Performance Optimization*





# Elastic Provisioning with vPATH 2.0



# Simplified Service Provisioning with vPATH & vSphere Enables On-Demand Provisioning and vMotion Awareness

## Nexus 1000v

Add WAN Opt Service to Exchange Server Profile

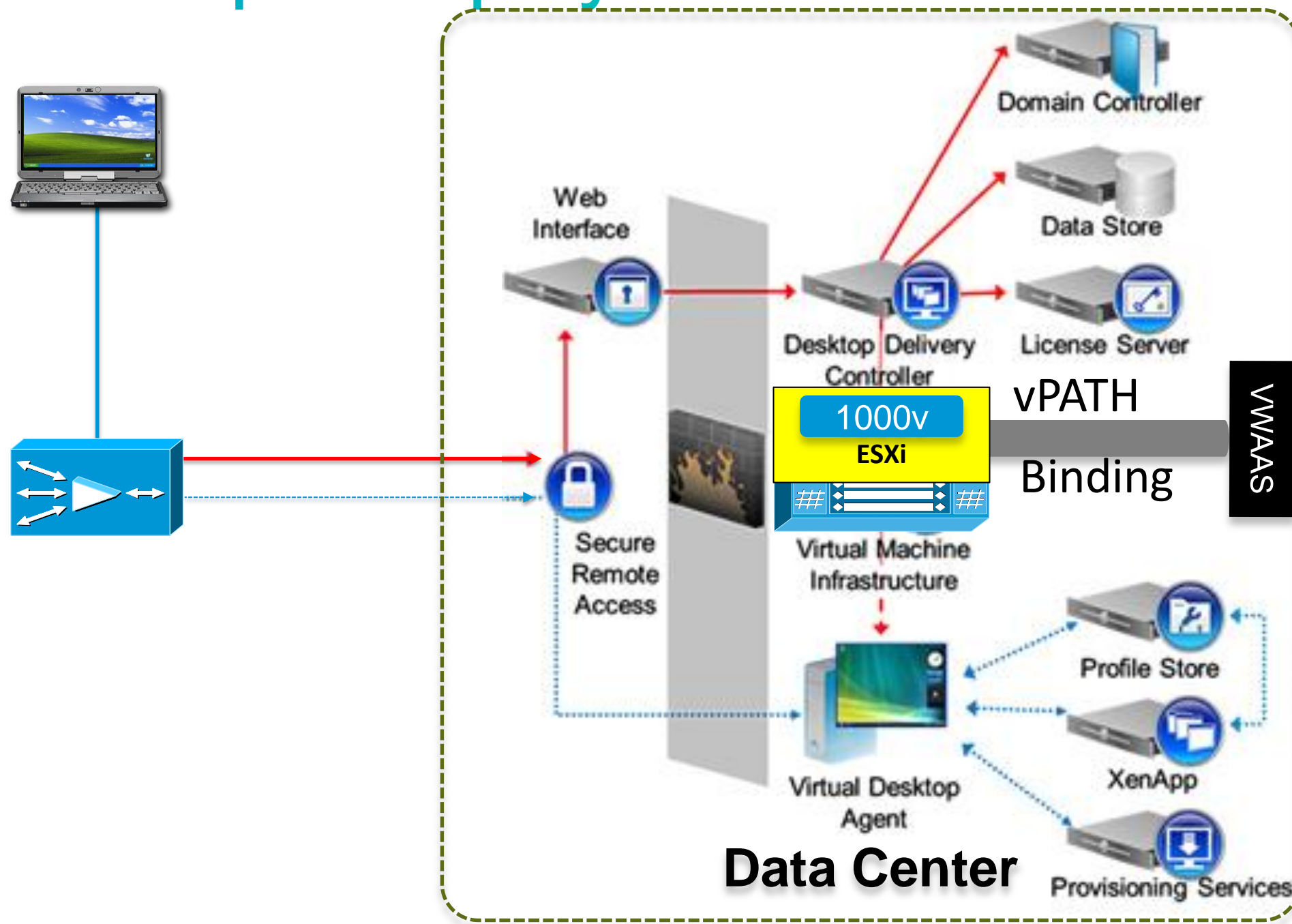
```
port-profile type vethernet Opt-Exchange-Server
vmware port-group
switchport mode access
switchport access vlan 3185
vn-service ip-address 2.8.2.90 vlan 3002 mgmt-ip-address 2.8.2.90 fail open
no shutdown
state enabled
```

## vSphere

The screenshot shows the vSphere VM hardware configuration for a VM named 'VM-Data (N1Kv-VPC)'. The left pane lists hardware components: Network adapter 1, SCSI controller 0, and Hard disk 1. The right pane shows the configuration for 'Network adapter 1', with 'Automatic' selected. Under 'Network Connection', the 'Network label' dropdown menu is open, showing a list of network labels. The 'Opt-Exchange-Server (N1Kv-VPC)' label is selected and highlighted in blue. A red box highlights the 'Opt-Exchange-Server (N1Kv-VPC)' label in the dropdown menu.

Bind the port profile to exchange server VM

# Example Deployment: vWAAS + vPath for Citrix VDI



## Customer Benefits:

- No DC Network configuration changes req'd
- Simplified VM Management via vSPHERE

## Requires:

- E1000 driver for ESXi
- Nexus 1kv Version 1.5

# vWAAS Customer Endorsements



“To optimize and scale cloud services, we need network services to be virtualized, including security and application optimization. **We’re excited to see Cisco taking a leadership role in delivering Unified Network Services, with Cisco Virtual Security Gateway and virtual WAAS for the Nexus 1000V, as part of its broader architectural vision for the data center.**”



“Alphawest continues to work closely with Cisco to develop a strong value proposition for its Australian customers that enable innovative Get Cloud Ready solutions. Our aim is to offer a range of sustainable, scalable and efficient data centre services that help to better manage infrastructure and data centre technologies. Key to this strategy is a network architecture that enables a policy-based, on-demand and elastically scalable service deployment model for cloud services. **We are pleased that Cisco is making this possible by delivering virtual WAAS (vWAAS) and Virtual Security Gateway (VSG), integrated with the Nexus 1000V, as part of its Unified Network Services vision for the data center.**”

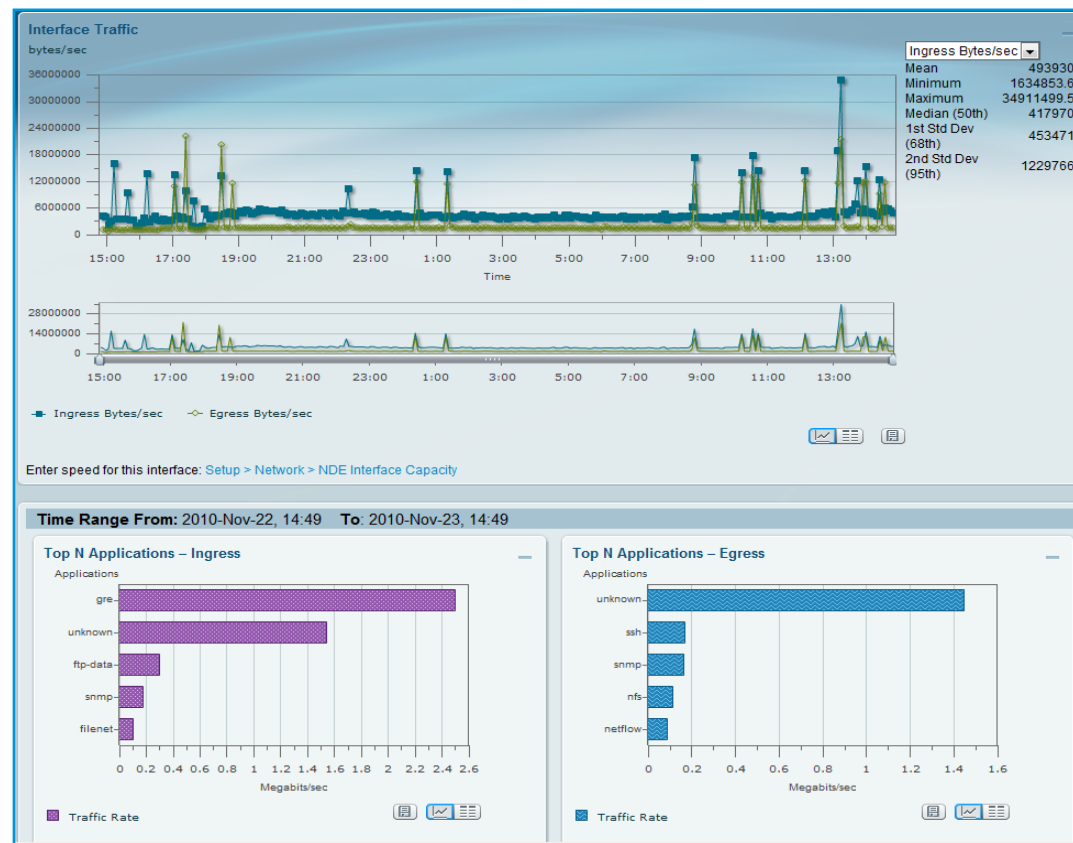
# vNAM



# Cisco Prime Network Analysis Module (NAM)

Integrated Network Traffic and Performance Analysis

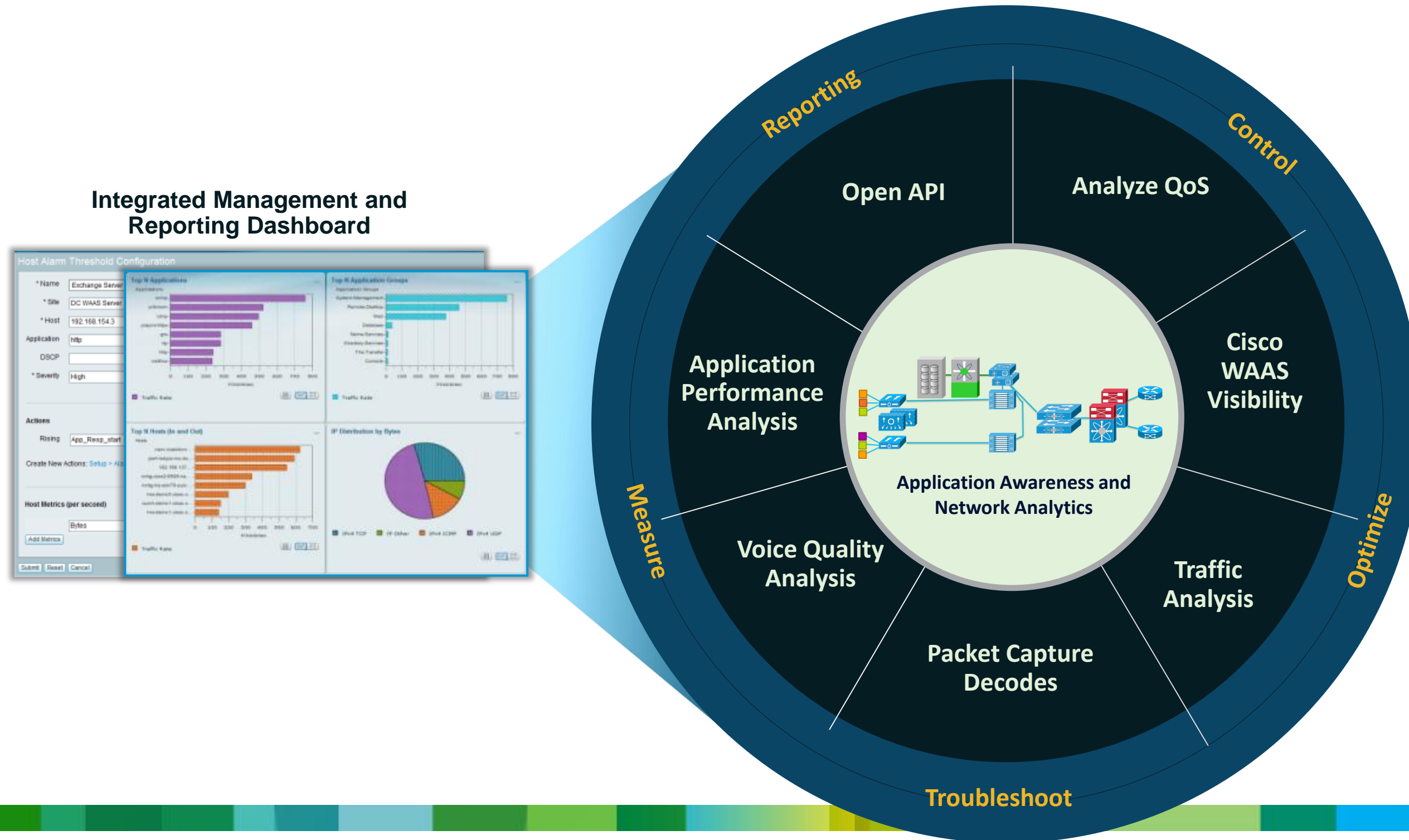
Cisco Prime NAM delivers actionable visibility to optimize resources, troubleshoot performance issues, and ensure consistent end-user experience



- Improves operational efficiency
- Provides consistent application and performance visibility
- Reduces total cost of ownership

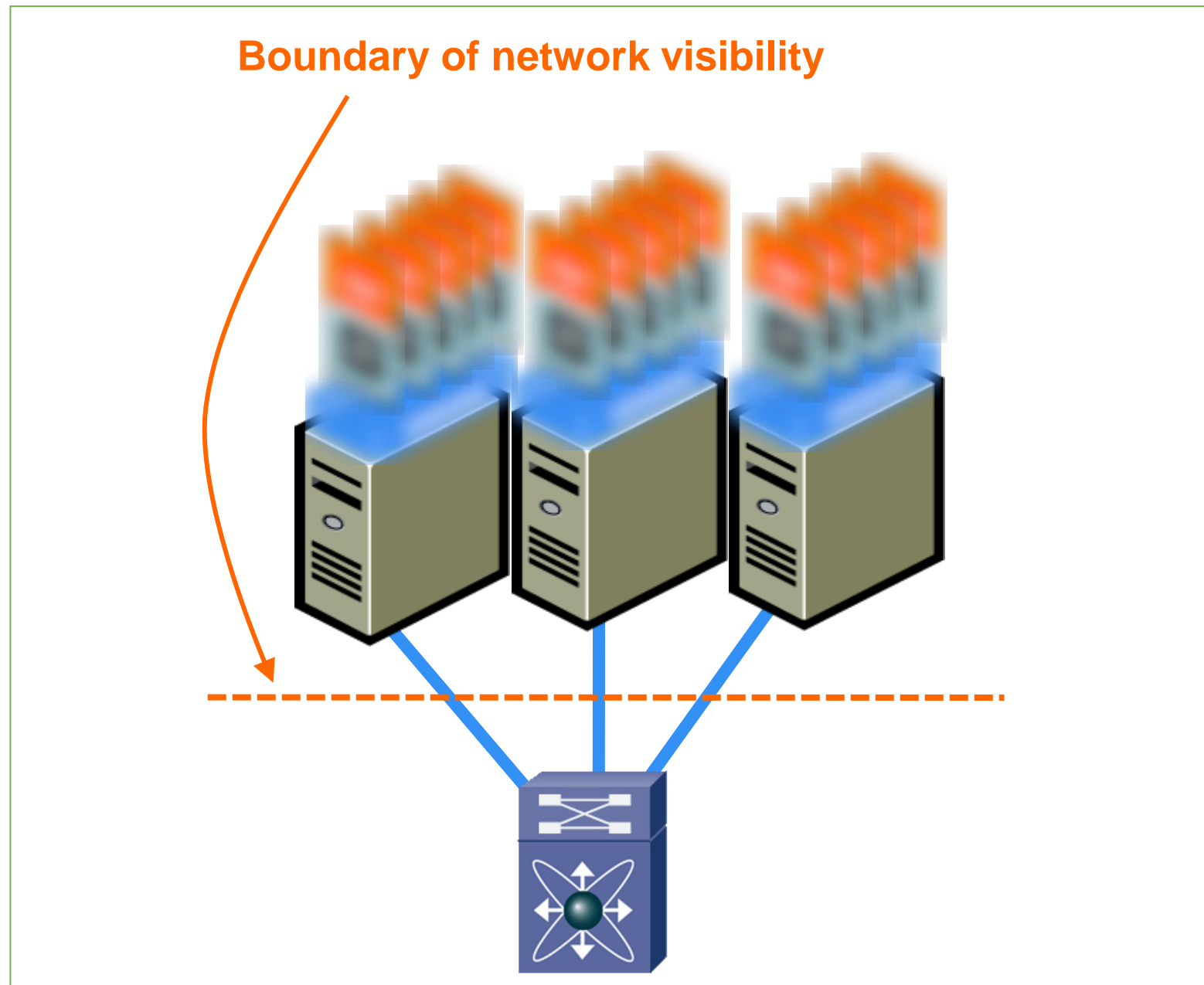
# Cisco Prime NAM Overview

Application Awareness and Rich Network Analytics



# Server Virtualization Demands VM-level Visibility

Essential for Delivering End-to-End Service levels

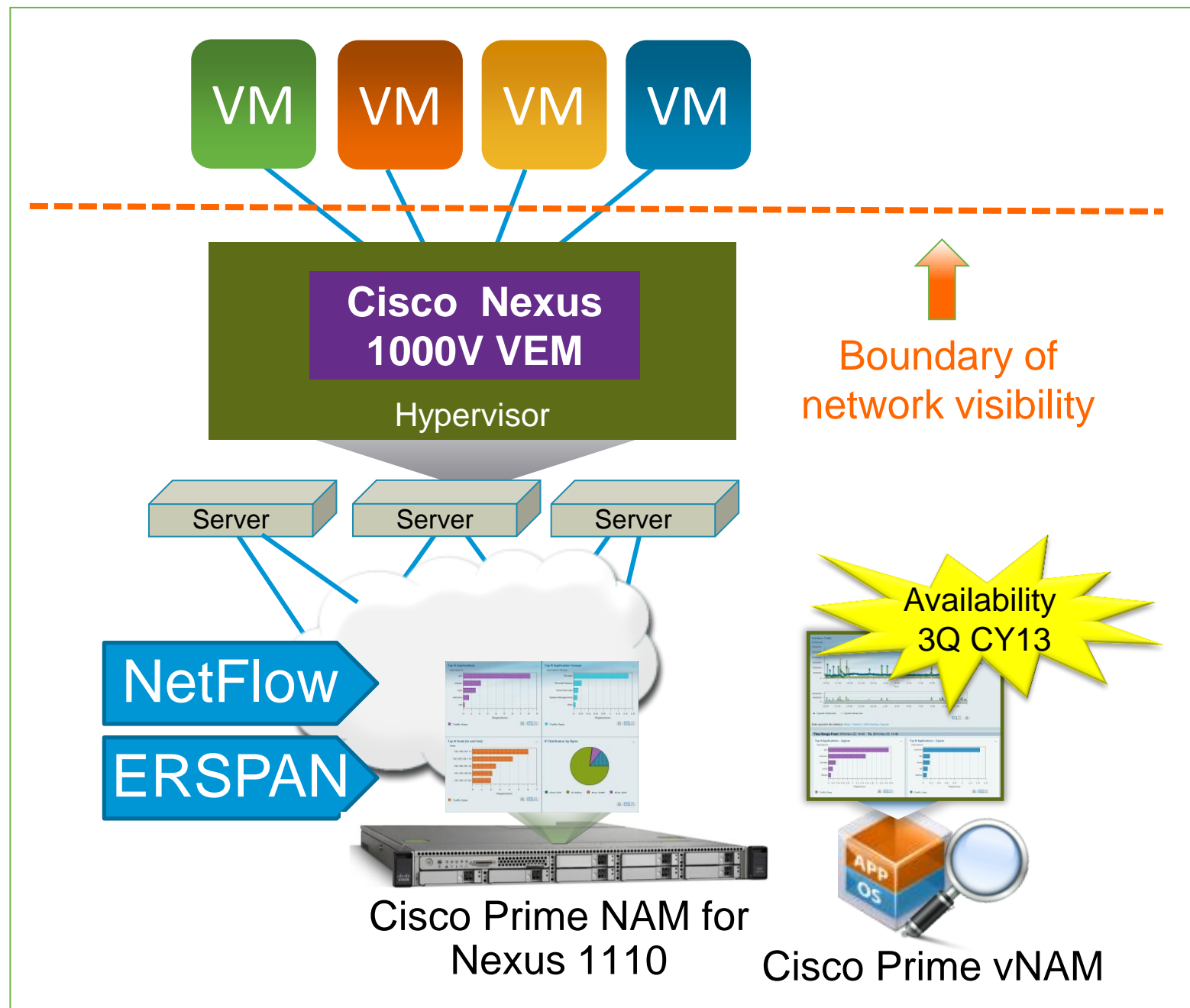


- Lack of visibility into network behavior at the VM level
- Lack of visibility into cross-VM interactions
- Need for operational consistency and continuity across physical and virtual network



# Extend Visibility into Virtual Machine Network

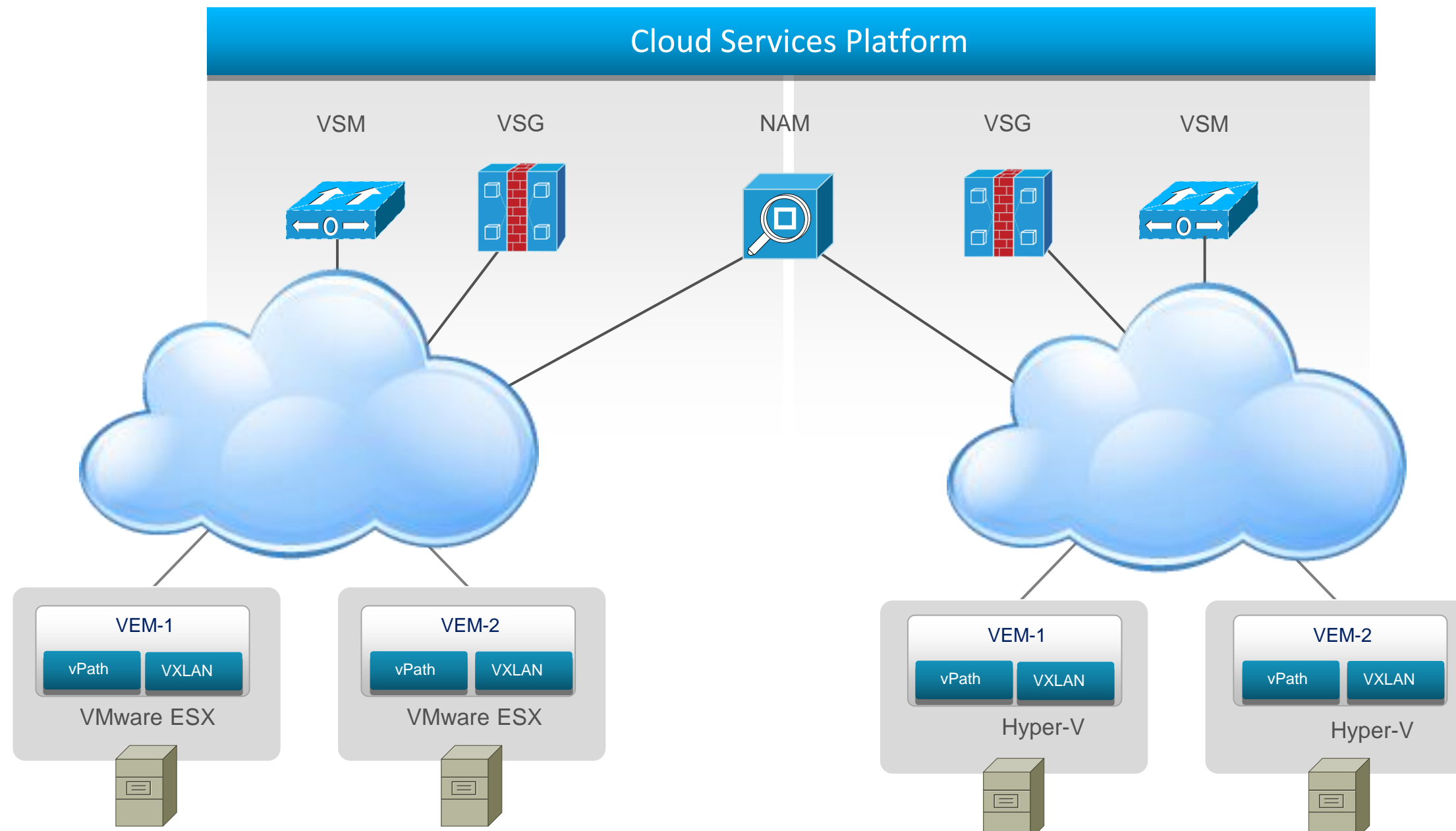
Cisco Prime NAM integrates with Nexus 1000V switch infrastructure



- Extend operational visibility to virtual switching layer
- Assess impact on network behavior due to changes such as VM migration, port profile update, etc.
- Monitor VMs while they migrate with VMotion

# NAM on Nexus 1100 Series

Consistent architecture across hypervisors

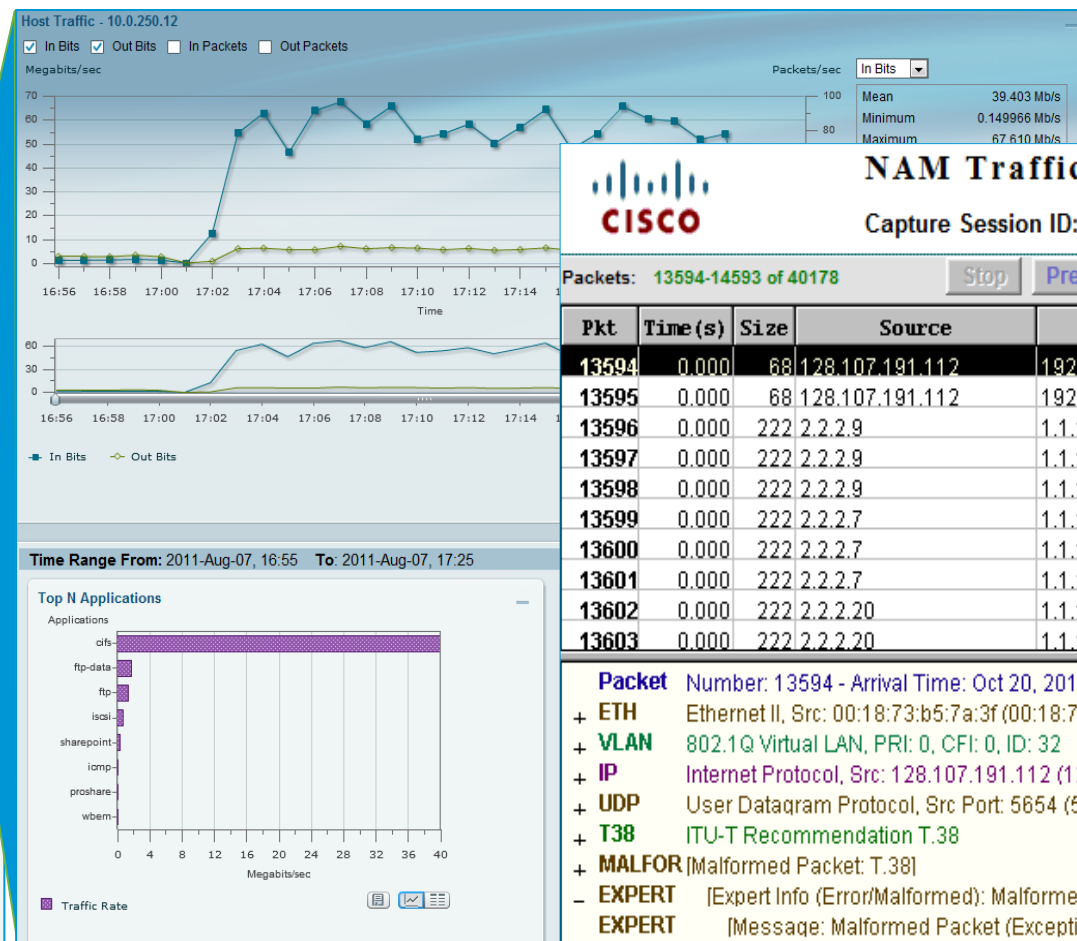
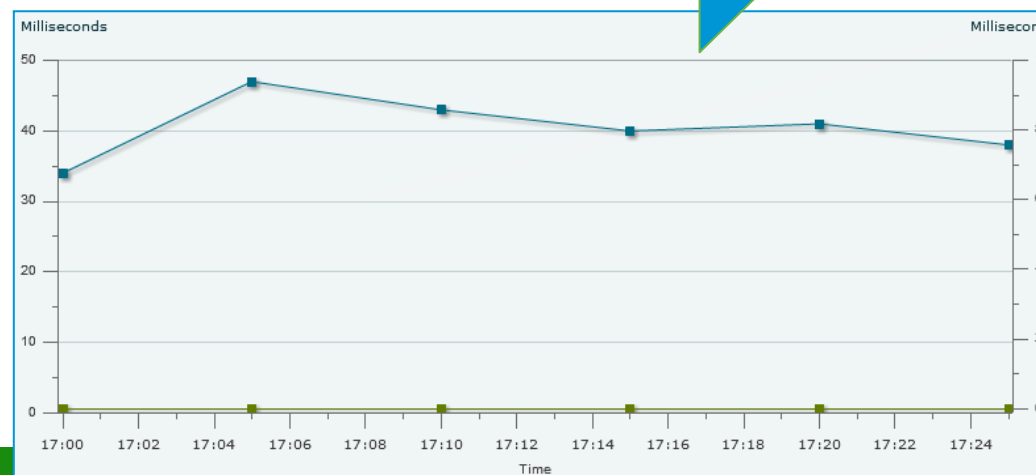
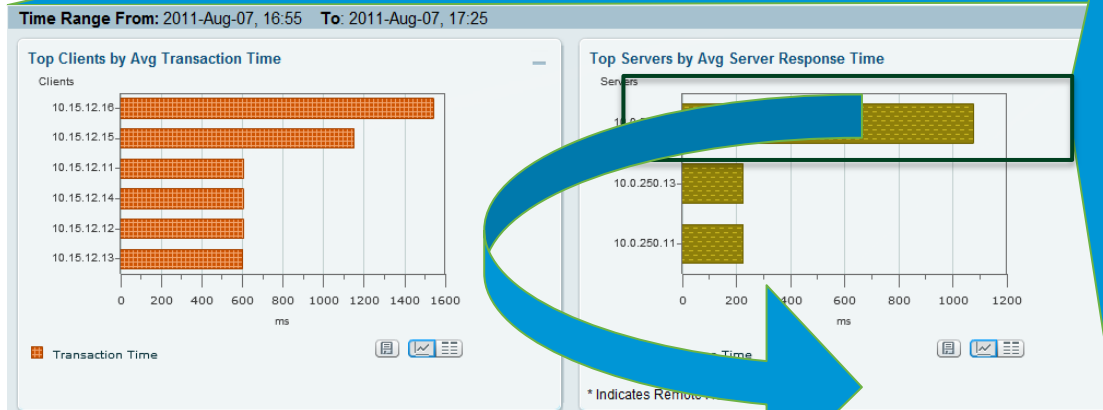
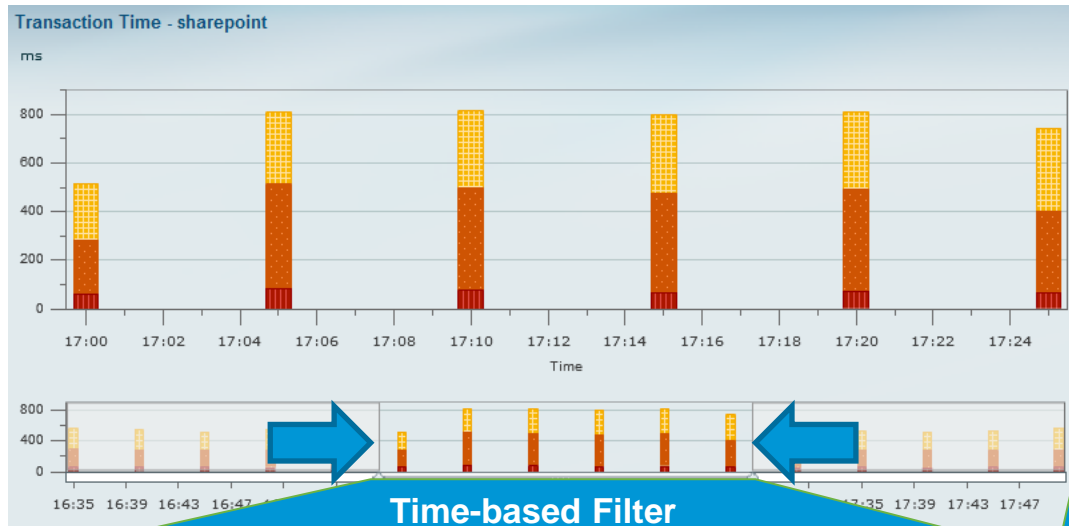


Existing Nexus 1010 will support Multi-hypervisor Environment as Well

# Troubleshoot Application Performance Issues

Connect Problem Detection, Isolation and Root-cause Analysis

Client: 10.15.12.16  
 Application: sharepoint  
 Reporting Time Range: Last 1 hour  
 Site: San Jose Campus



Analyze Host Traffic

Analyze Network Key Performance Indicators

**CISCO** NAM Traffic Analyzer - Packet Decoder

Capture Session ID: 0

Packets: 13594-14593 of 40178

Pkt	Time (s)	Size	Source	Destination	Protocol	Info
13594	0.000	68	128.107.191.112	192.168.153.131	T.38	UDP: UDPTLPacket Seq=44372 data:<unknown>
13595	0.000	68	128.107.191.112	192.168.153.131	T.38	UDP: UDPTLPacket Seq=44372 data:<unknown>
13596	0.000	222	2.2.2.9	1.1.1.9	UDP	Source port: 1604 Destination port: 3270
13597	0.000	222	2.2.2.9	1.1.1.9	UDP	Source port: 1604 Destination port: 3270
13598	0.000	222	2.2.2.9	1.1.1.9	UDP	Source port: 1604 Destination port: 3270
13599	0.000	222	2.2.2.7	1.1.1.7	UDP	Source port: 1600 Destination port: 3266
13600	0.000	222	2.2.2.7	1.1.1.7	UDP	Source port: 1600 Destination port: 3266
13601	0.000	222	2.2.2.7	1.1.1.7	UDP	Source port: 1600 Destination port: 3266
13602	0.000	222	2.2.2.20	1.1.1.20	UDP	Source port: 1609 Destination port: 3275
13603	0.000	222	2.2.2.20	1.1.1.20	UDP	Source port: 1609 Destination port: 3275

Packet Number: 13594 - Arrival Time: Oct 20, 2010 11:48:26.000391000 - Frame Length: 68 bytes - Capture Length: 68 bytes

- + ETH Ethernet II, Src: 00:18:73:b5:7a:3f(00:18:73:b5:7a:3f), Dst: 00:11:5d:03:b8:00(00:11:5d:03:b8:00)
- + VLAN 802.1Q Virtual LAN, PRI: 0, CFI: 0, ID: 32
- + IP Internet Protocol, Src: 128.107.191.112(128.107.191.112), Dst: 192.168.153.131(192.168.153.131)
- + UDP User Datagram Protocol, Src Port: 5654(5654), Dst Port: 6004(6004)
- + T38 ITU-T Recommendation T.38
- + MALFOR [Malformed Packet: T.38]
- EXPERT [Expert Info (Error/Malformed): Malformed Packet (Exception occurred)]
- EXPERT [Message: Malformed Packet (Exception occurred)]
- EXPERT [Severity level: Error]
- EXPERT [Group: Malformed]

```

0000 00 11 5d 03 b8 00 00 18 73 b5 7a 3f 81 00 00 20  ..].....s.z?...
0010 08 00 45 00 00 24 70 d2 00 00 77 11 38 ef 80 6b  ..E..$p...w.8..k
0020 bf 70 c0 a8 99 83 16 16 17 74 00 10 06 c6 ad 54  .p.....t.....T
0030 9b 82 75 6c 73 32 00 00 00 00 00 00 00 00 00  ...uls2.....
    
```

# Contextual Drill Down to Packet Analysis

Accelerate Resolution of Complex Performance Issues

- Active troubleshooting with contextual One-Click packet capture
- Proactive troubleshooting with alarm threshold based triggered packet capture
- Targeted troubleshooting with Software filters for packet captures, e.g. VLAN ID, Ports, Application
- Expedited troubleshooting with Packet capture Error Scan

### Built-in Packet Analysis

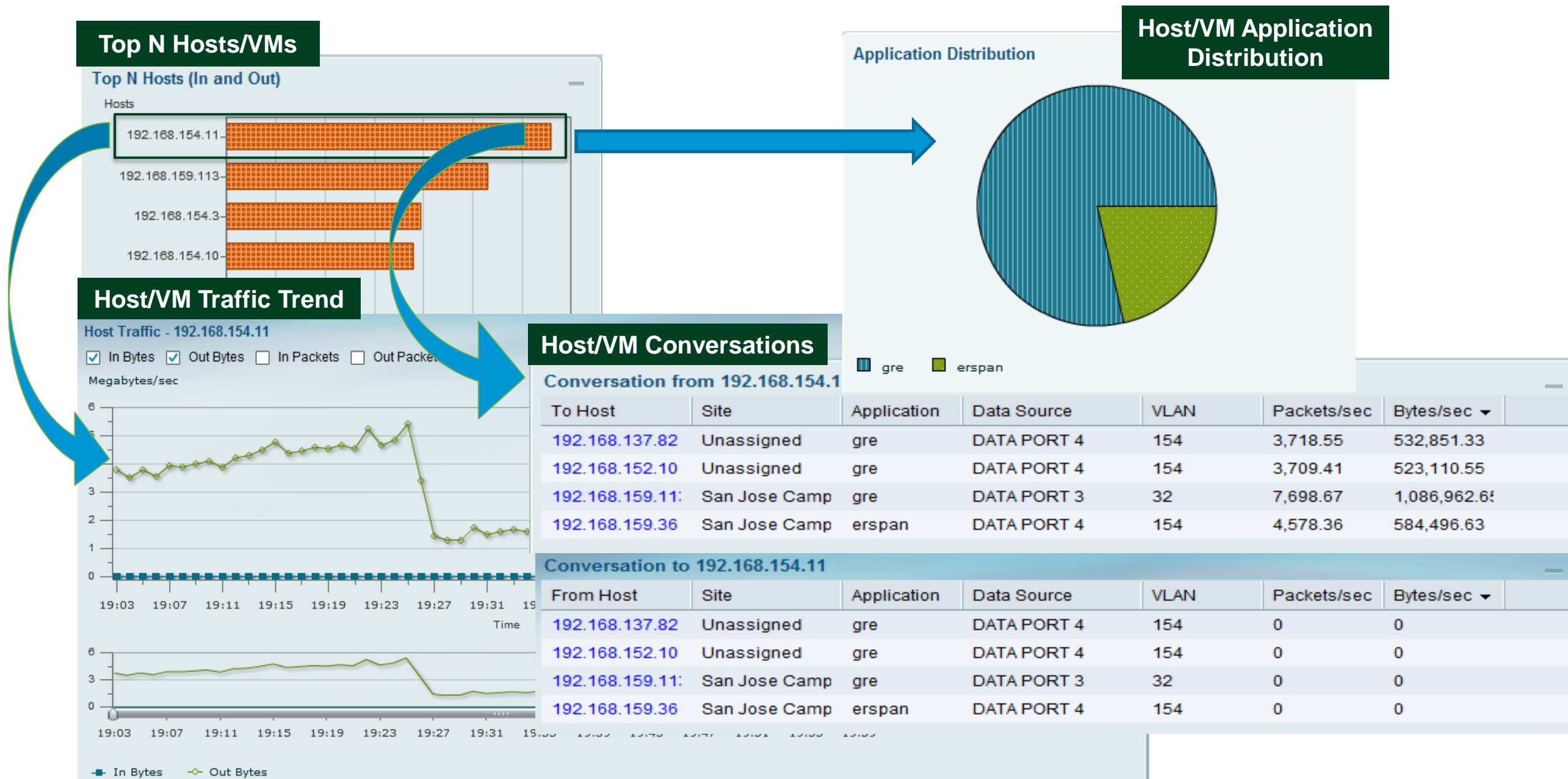
The screenshot shows the NAM Traffic Analyzer - Packet Decoder interface. The main window displays a list of packets with columns for Pkt, Time(s), Size, Source, Destination, Protocol, and Info. Packet 4 is highlighted, showing a Negotiate Protocol Request from 169.254.122.11 to 169.254.11.21. Below the list, a detailed view of packet 4 is shown, including Ethernet II, Internet Protocol, Transmission Control Protocol, and NetBIOS Session Service details. The SMB (Server Message Block) protocol details are expanded, showing the SMB Header, Server Component, and SMB Command (Negotiate Protocol). The NT Status is STATUS\_SUCCESS (0x00000000). The Flags are 0x18. The packet is identified as a Request/Response: Message is a request to the server.

Packet Id	Protocol	Severity	Group	Description
28162	eth.vlan:ip:udp	Error	Malformed	Bad length value 0 < 8
35741	eth.vlan:ip:udp	Error	Malformed	Bad length value 0 < 8
67596	eth.vlan:ip:udp	Error	Malformed	Bad length value 0 < 8
8	eth.vlan:ip:tcp:ssl	Warn	Reassemble	Unreassembled Packet (Exception occurred)
9	eth.vlan:ip:tcp:ssl	Warn	Reassemble	Unreassembled Packet (Exception occurred)
327	eth.vlan:ip:tcp:ssl	Warn	Reassemble	Unreassembled Packet (Exception occurred)
330	eth.vlan:ip:tcp:ssl	Warn	Reassemble	Unreassembled Packet (Exception occurred)

## Reduce Mean Time to Repair

# Analyze Virtual Machine Network Behavior

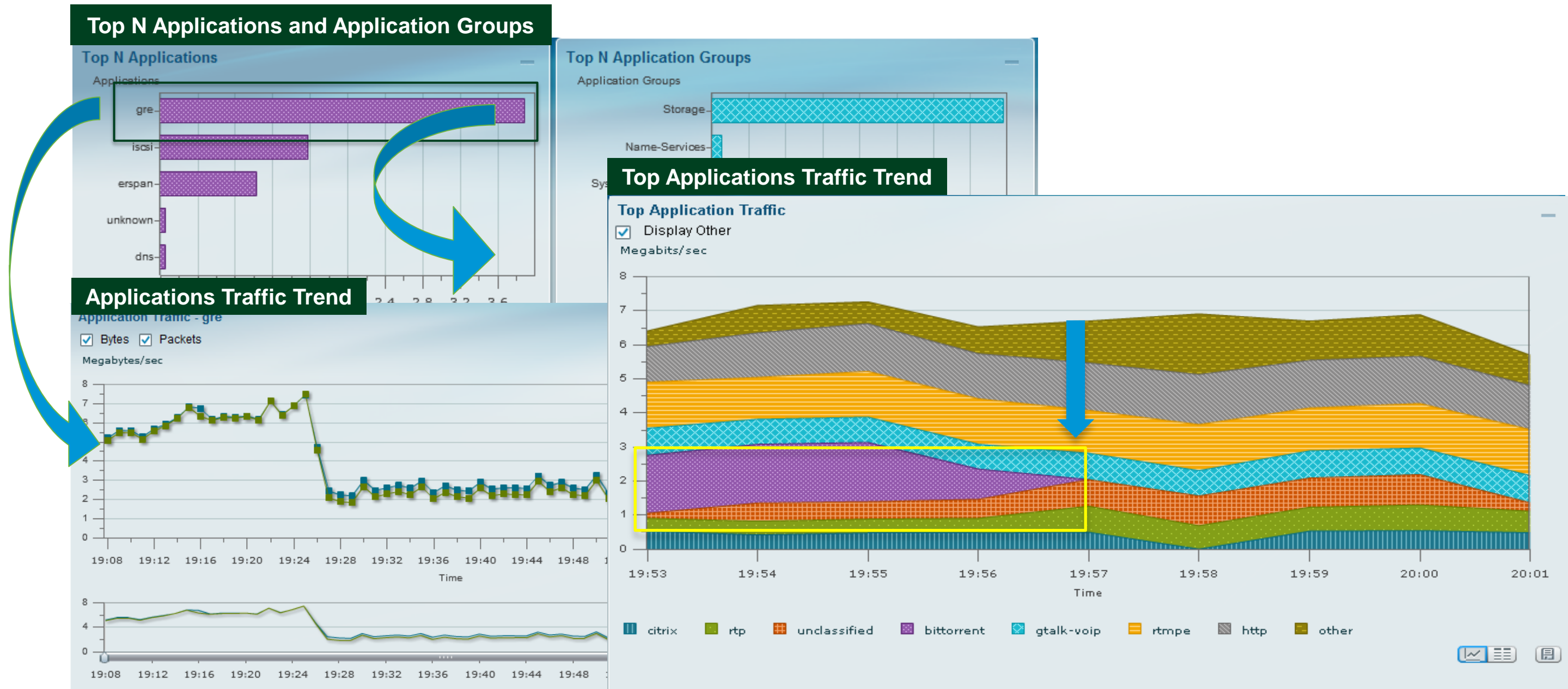
Identify Top Talkers and Conversations



Facilitate Resource Allocation Decisions

# Analyze Application Traffic

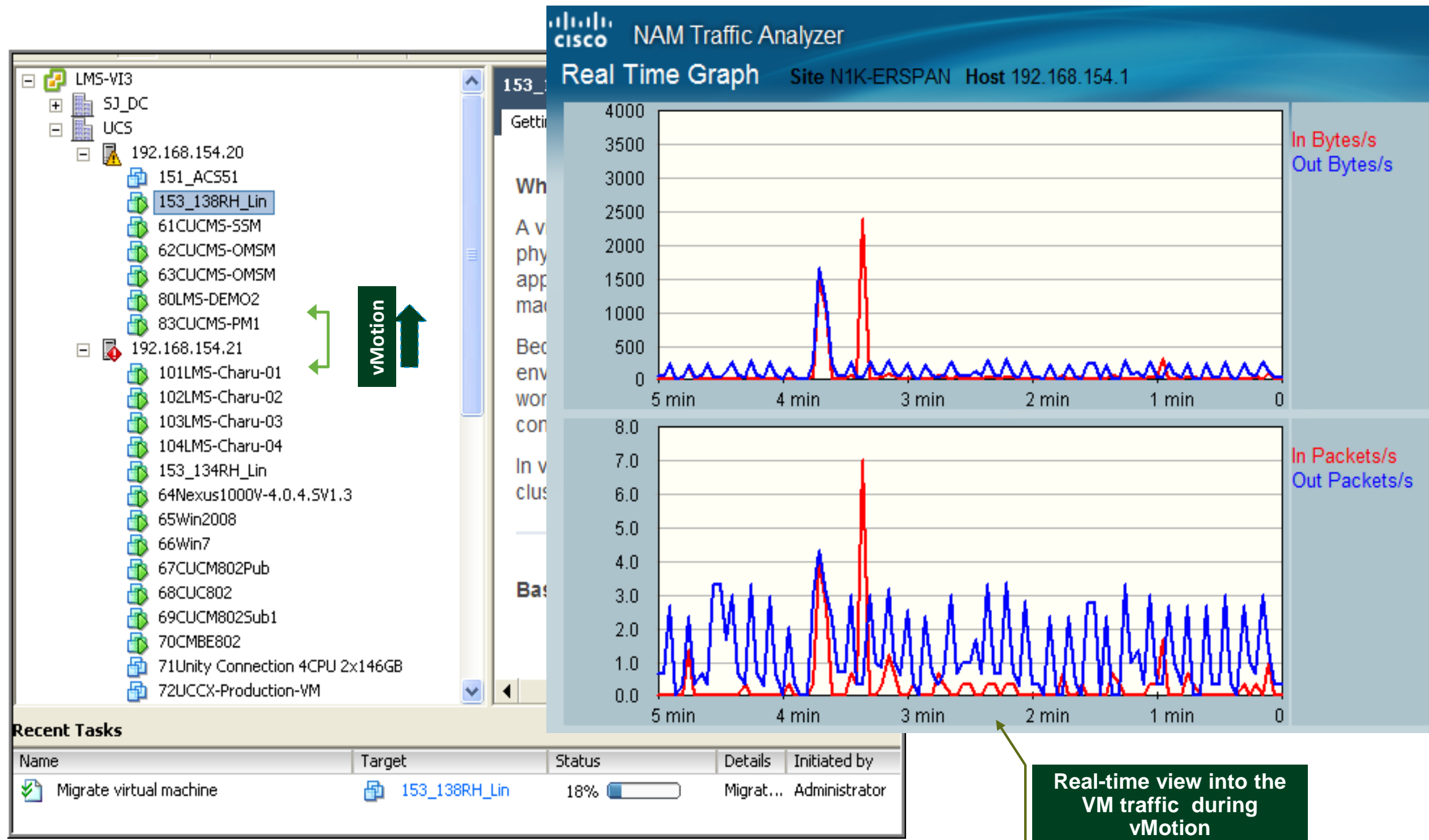
## Profile Network Usage



Identify Anomalous Traffic Behavior

# Monitor VM While being Migrated

Analyze Impact of VM Migration



Real-time view into the VM traffic during vMotion

# Cisco Prime vNAM Preview

## Forward-Looking Statement

“Many of the products and features described herein remain in varying stages of development and will be offered on a when-and-if-available basis. This roadmap is subject to change at the sole discretion of Cisco, and Cisco will have no liability for delay in the delivery or failure to deliver any of the products or features set forth in this document.”





# Cisco Prime Virtual NAM (vNAM)

Extending Performance Analytics to the Cloud

Target  
Availability:  
3Q CY13

## APPLICATION AWARENESS

Improved Application Performance

Application  
Visibility

Enhanced Classification

Performance  
Analytics

Applications, Voice,  
Video

## NETWORK ANALYTICS

Optimized Network Resources

Network  
Intelligence

VXLAN, LISP, Trustsec,

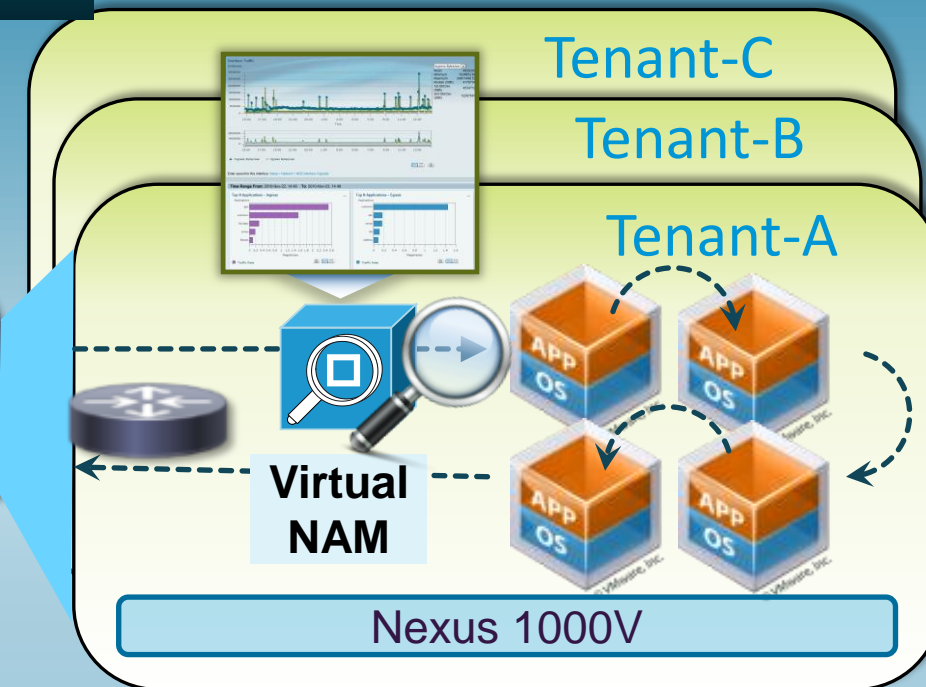
## DEPLOYMENT FLEXIBILITY

Enhanced Operational Agility

Virtualized/Cloud  
Data Center



Application Services



### Per-tenant Workload monitoring

- Characterize workload performance
- Analyze Network Usage
- Enable proactive notification
- Rapidly troubleshoot performance issues

Maintain Consistency across Physical and Virtual Environments

# Cisco Prime NAM Portfolio Overview



# Deployment Choices with Purpose Designed Form-factors

Integrated Service Modules, Virtual Blades and Appliances

Availability  
3Q CY13

Cisco Prime Virtual NAM  
(vNAM)



Availability  
3Q CY13



Nexus 7K Series NAM  
Blade (NAM-NX1)

Cisco Prime NAM for  
Nexus 1110



NAM Product  
Portfolio



Cisco Catalyst 65xx/  
Cisco 76xx NAM blade  
(NAM1, NAM2)

Cisco Prime NAM for  
ISR G2 SRE



NAM 2300 Series Appliance

Catalyst 65xx Series NAM  
Blade (NAM3)



SPAN

ERSPAN

RSPAN

NetFlow

CEF

VACL

WAAS

Performance  
Agent (PA)

# Use Case Driven Deployment Points

Consistent Application Recognition, Performance and Usage Analytics

Am I delivering the service level committed to a tenant?

How much resources is the tenant consuming?

Can I monitor VM during migration?

Where do I get the most benefits of optimization?

Can I characterize application performance?

Are the cross-tier application interactions slowing down?

Is end-user experience acceptable at remote site?

Are optimization strategies working?

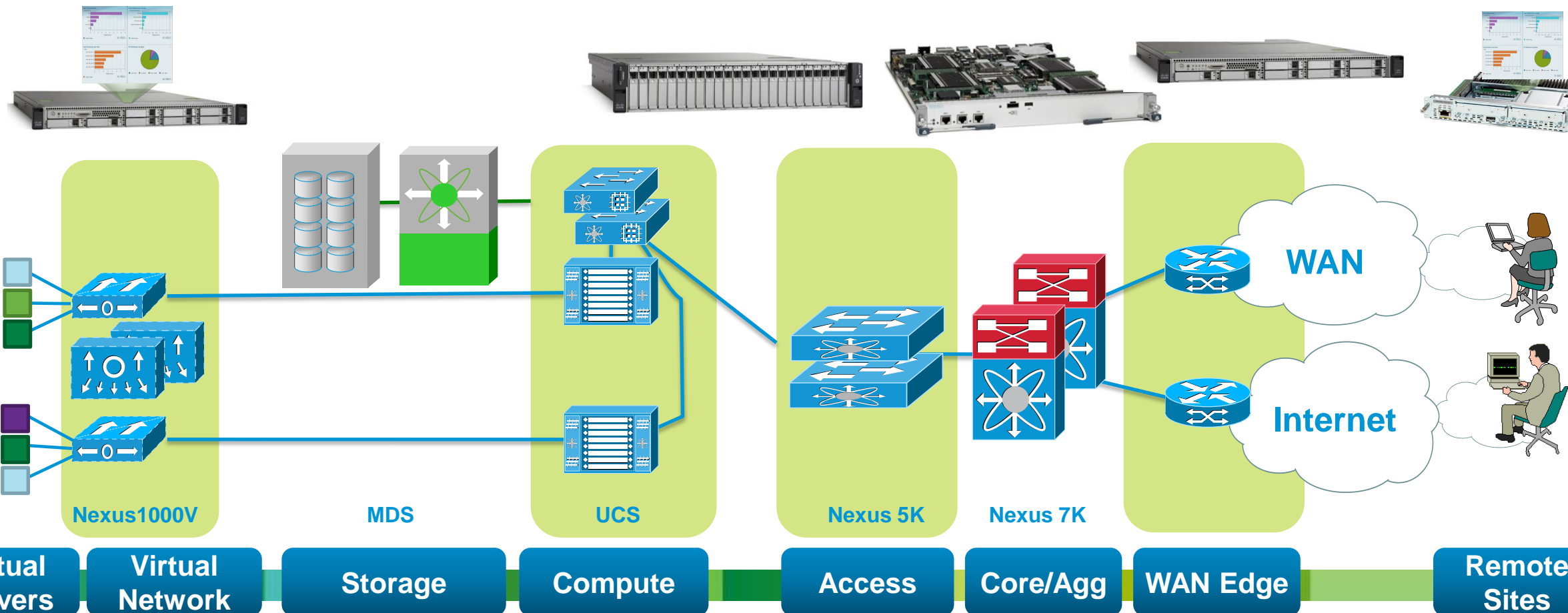
Can I quickly isolate and troubleshoot latency issues?

Measure

Troubleshoot

Optimize

Control



# Summary

## Cisco NAM

- **Enables** quick access to critical network information
- **Simplifies** manageability
- **Delivers** a common instrumentation across Cisco solution architectures
- **Preserves** investment into existing management assets

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With the NAM 5.0 Software release, Cisco's solution is taking big strides in both sophistication and maturity, adding substantial monitoring and troubleshooting features to its existing strengths in application-aware network performance analysis

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Jim Frey

Enterprise Management Associates, Inc.

# Product Information

- Cisco Prime Network Analysis Module (NAM) Family

<http://www.cisco.com/go/nam>

- Cisco Prime NAM on Nexus 1110/1010

<http://www.cisco.com/go/1000nam>

- Cisco Prime Virtual NAM (vNAM)

<http://www.cisco.com/go/vxnam>

- Questions:

Cisco Prime NAM Contact: [nam-info@cisco.com](mailto:nam-info@cisco.com)



Thank you.

