Cisco WAAS
News, Update and Deployment

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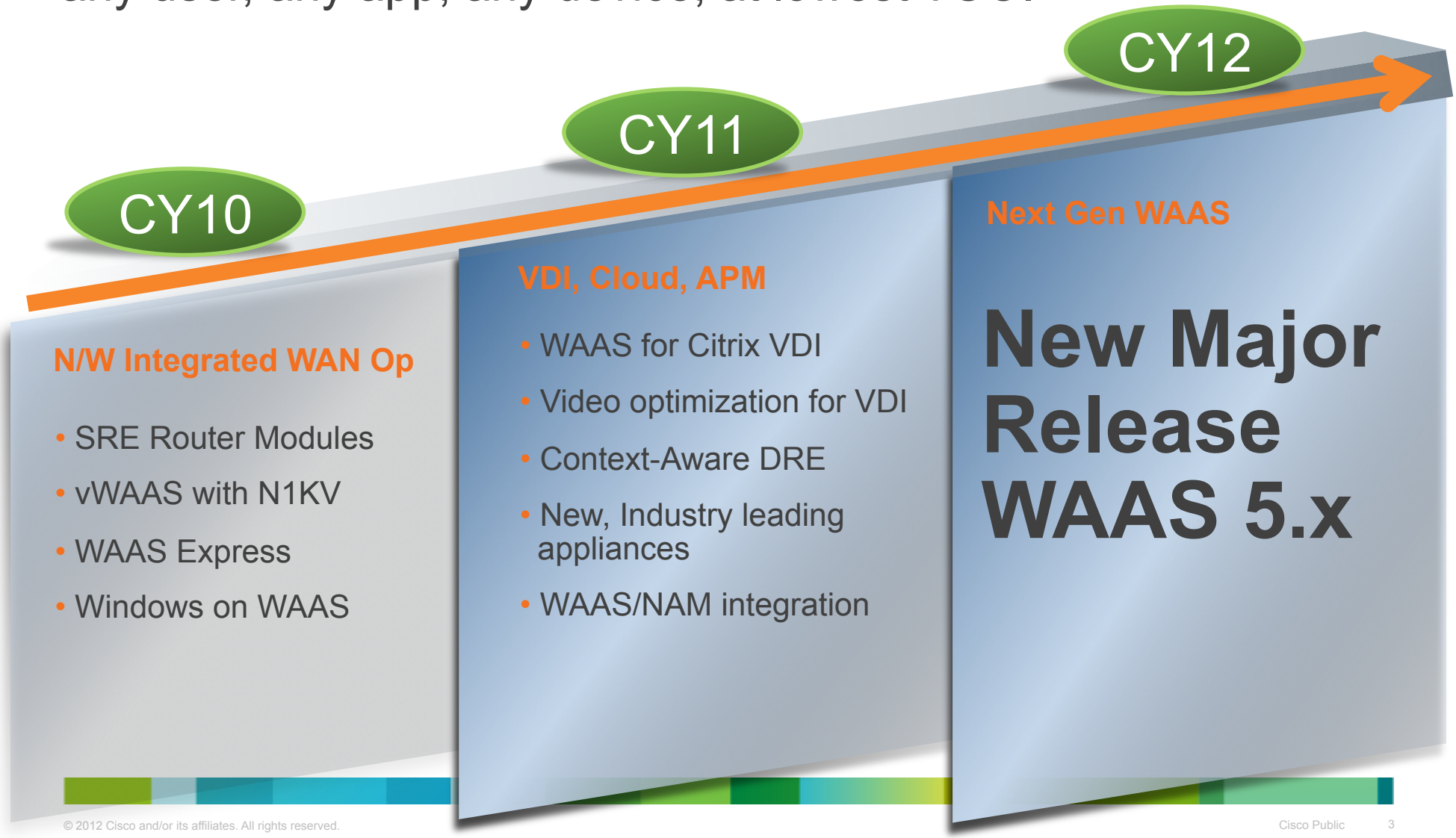
Deploying Cisco WAAS
Agenda

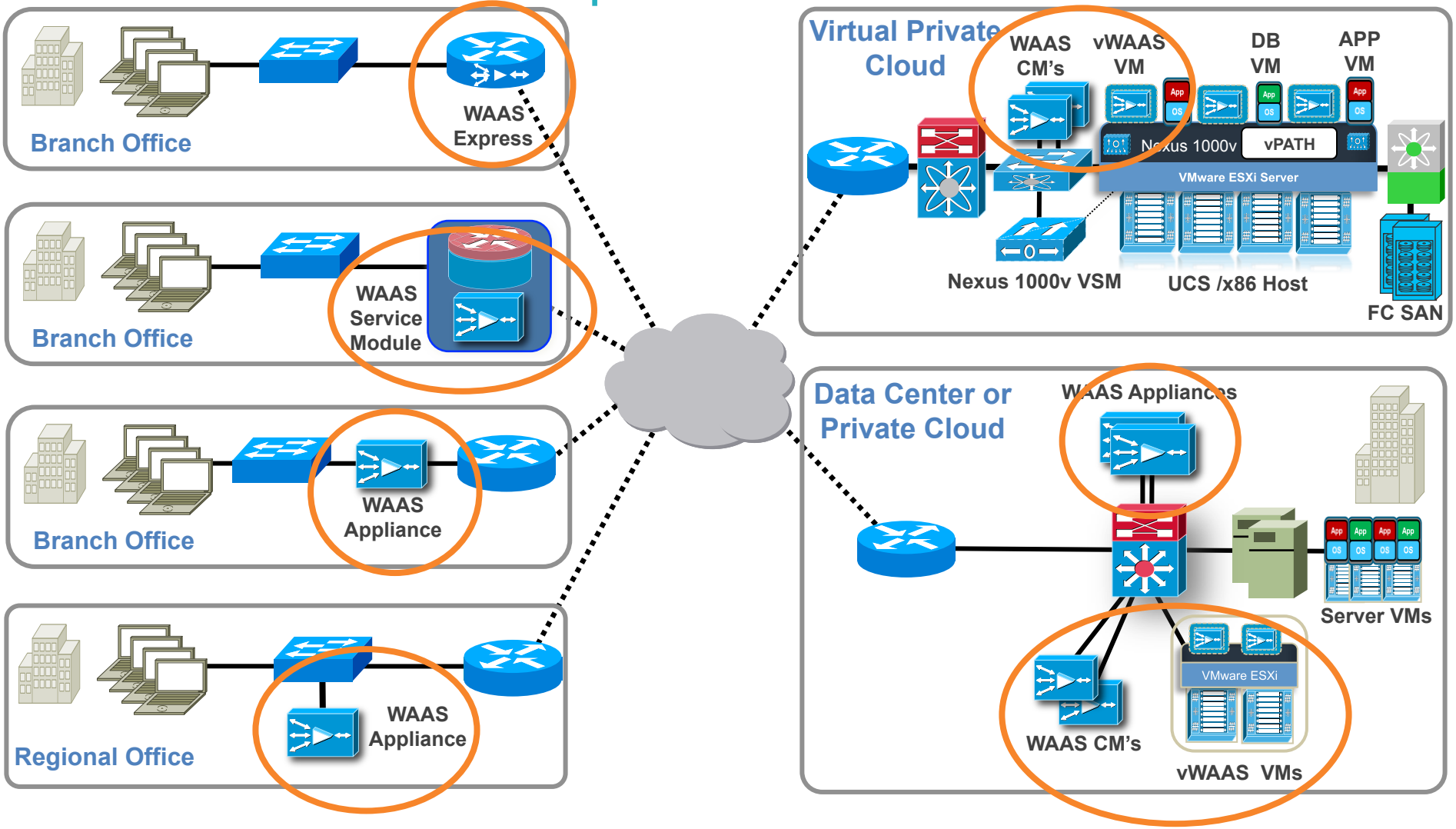
- WAAS Overview
- WAAS News
- Citrix Optimization on WAAS
- WAAS Deployment (Installation and Configuration)
  - WAAS on SRE
- New WAE Hardware
- WAAS Sizing Guidelines

Our Vision

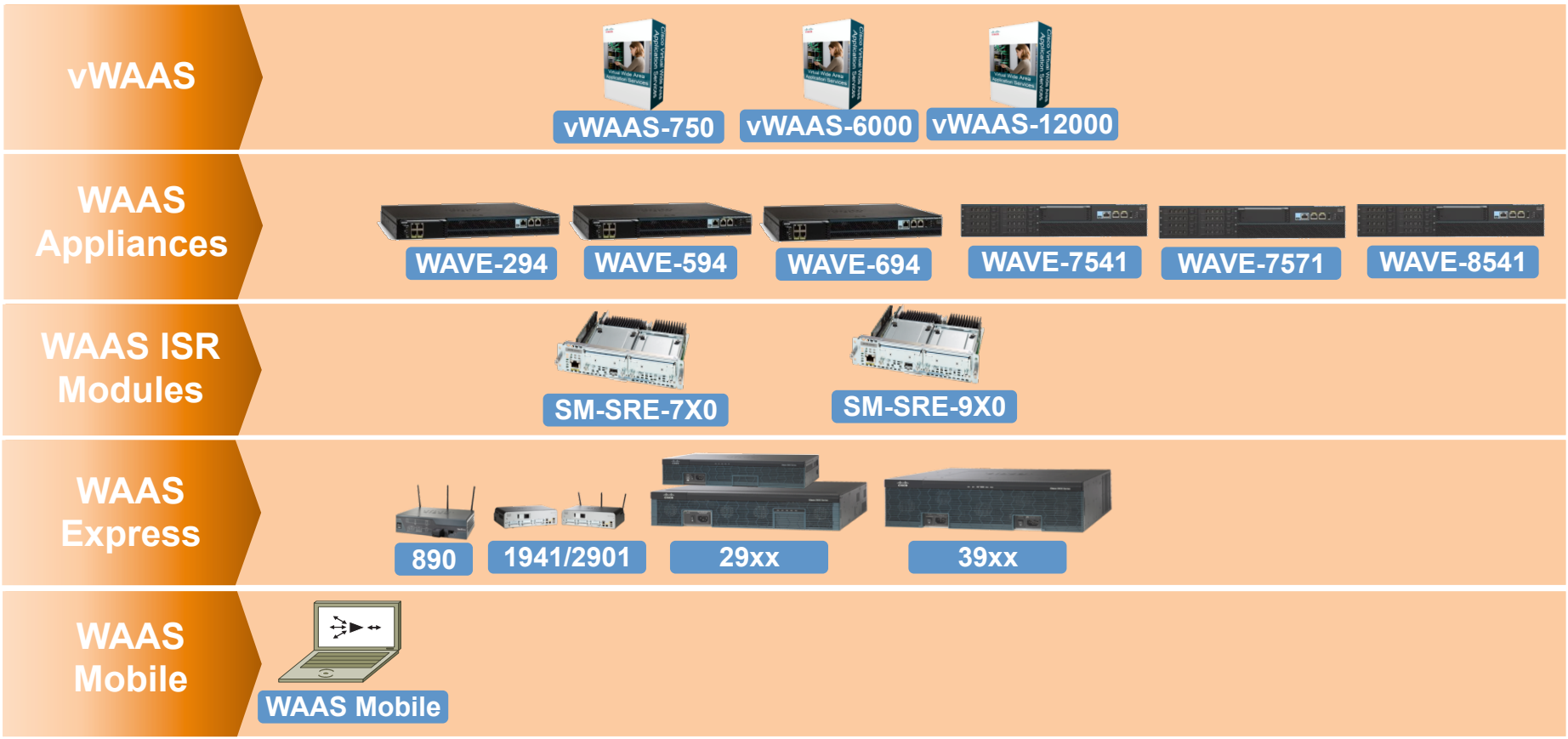
Deliver optimal & secure user experience at scale for any user, any app, any device, at lowest TCO.



WAAS Overview
Cisco WAAS: WAN Optimization Solution



WAAS Overview
Product Offerings



WAAS News

WAAS News
Next Generation WAVE Appliances

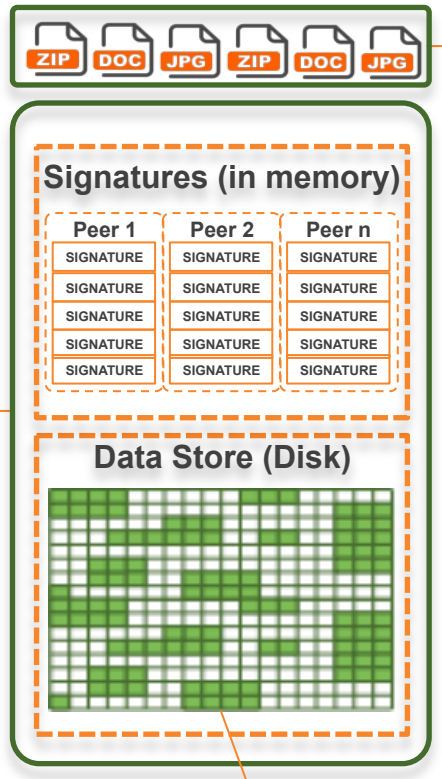
- Purpose build hardware
- Optional I/O modules including Fiber and 10Gbps Ethernet
- Up to 2 Gbps optimized throughput

WAAS News
New Context Aware Caching Architecture

WAAS 4.4

CIFS Object Cache

Includes File Pre-positioning
Ideal for High latency / Low BW links



App Aware Cache Manager

Optimizes cache behavior based upon traffic directionality

Per Peer Signatures- provides fault isolation, prevents branch starvation and enables lowest latency data store access

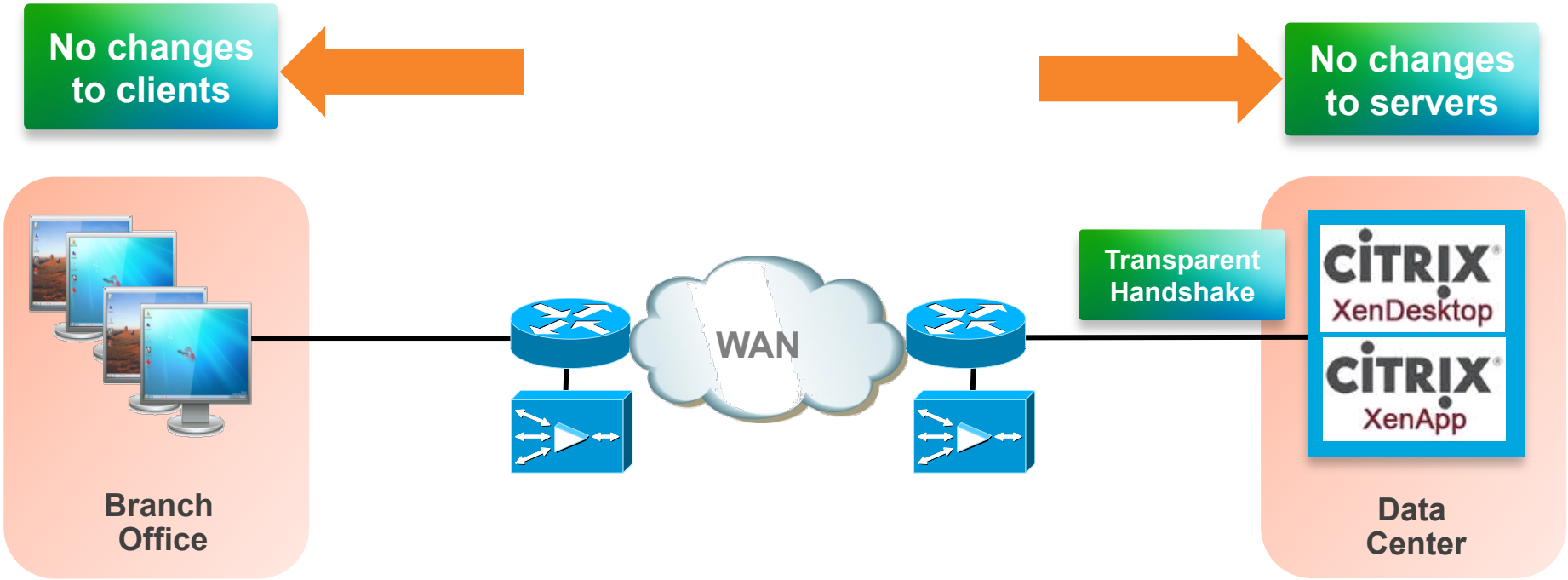
Adaptive DRE Cache

Unified Data Store- Single store for all peers
App Policy Controlled:
Uni-Directional Traffic- written to destination cache only.
No cache consumption at source
Bi-Directional Traffic- written to both caches

WAAS News
Cisco WAAS for Citrix XenApp and XenDesktop

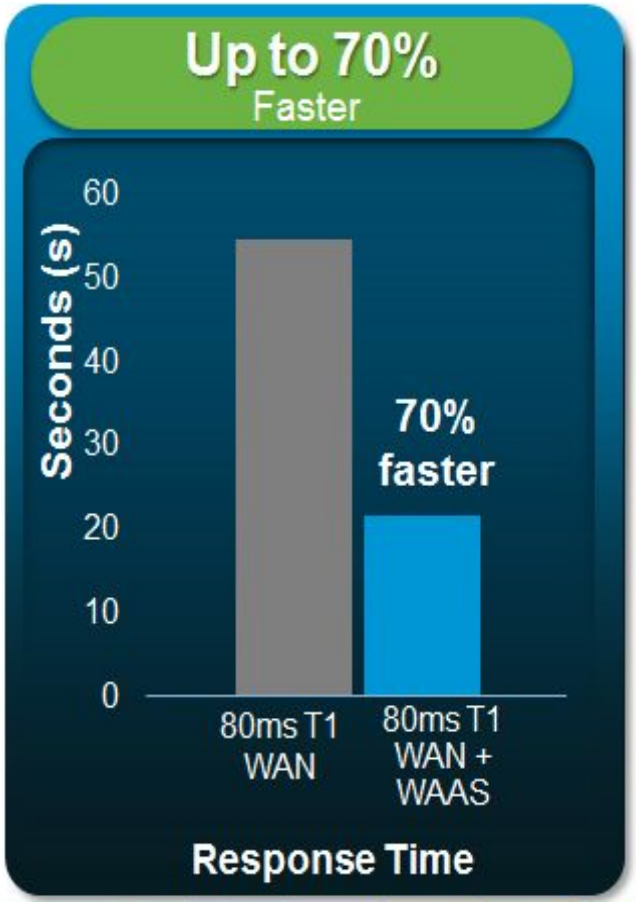
WAAS 4.5

- Zero-touch deployment, auto-interoperability with ICA encryption & compression
- High Performance virtual desktops



Cisco WAAS 4.5.1 is jointly tested, validated, supported and verified as a **Citrix Ready Solution™**

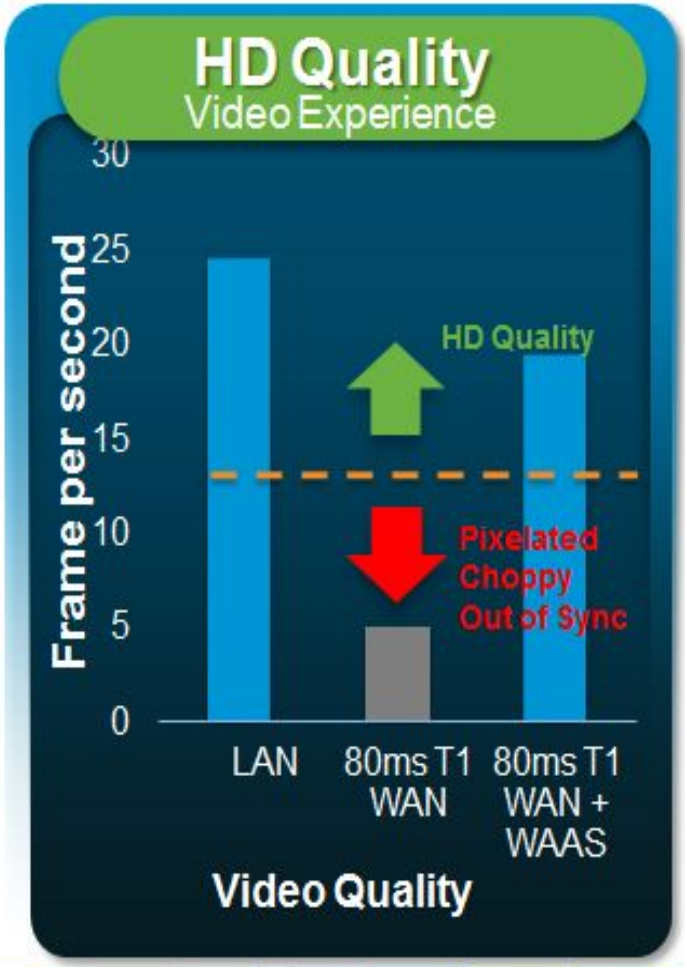
WAAS News
HQ VDI User Experience with WAAS



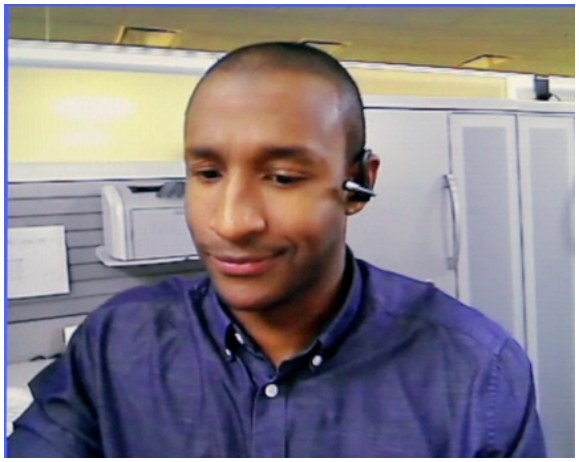
Improved VDI
User Experience

WAAS News
MMX Video Optimization Up To 90% With WAAS

WAAS 4.5



Quality No WAAS

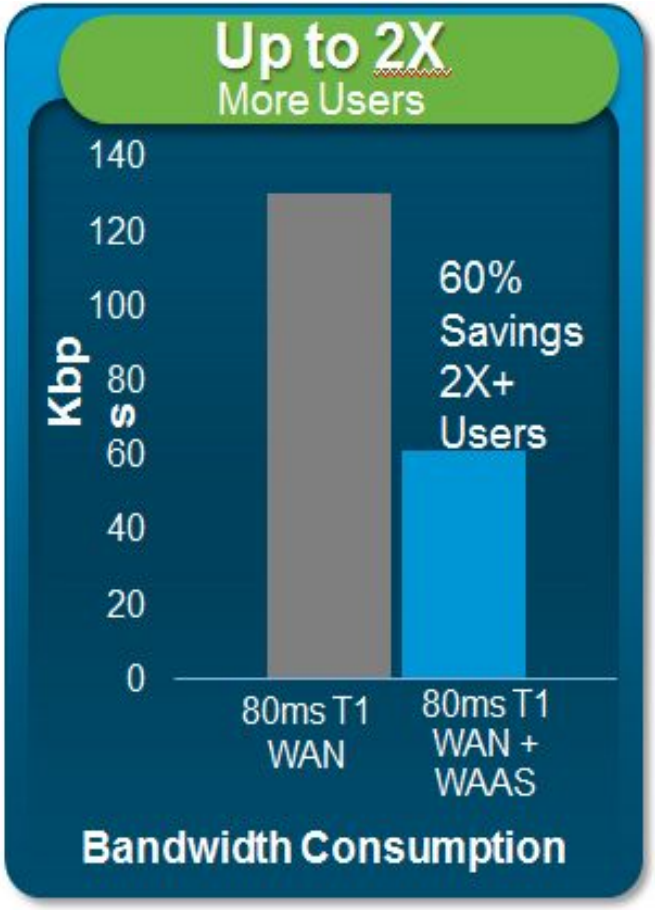


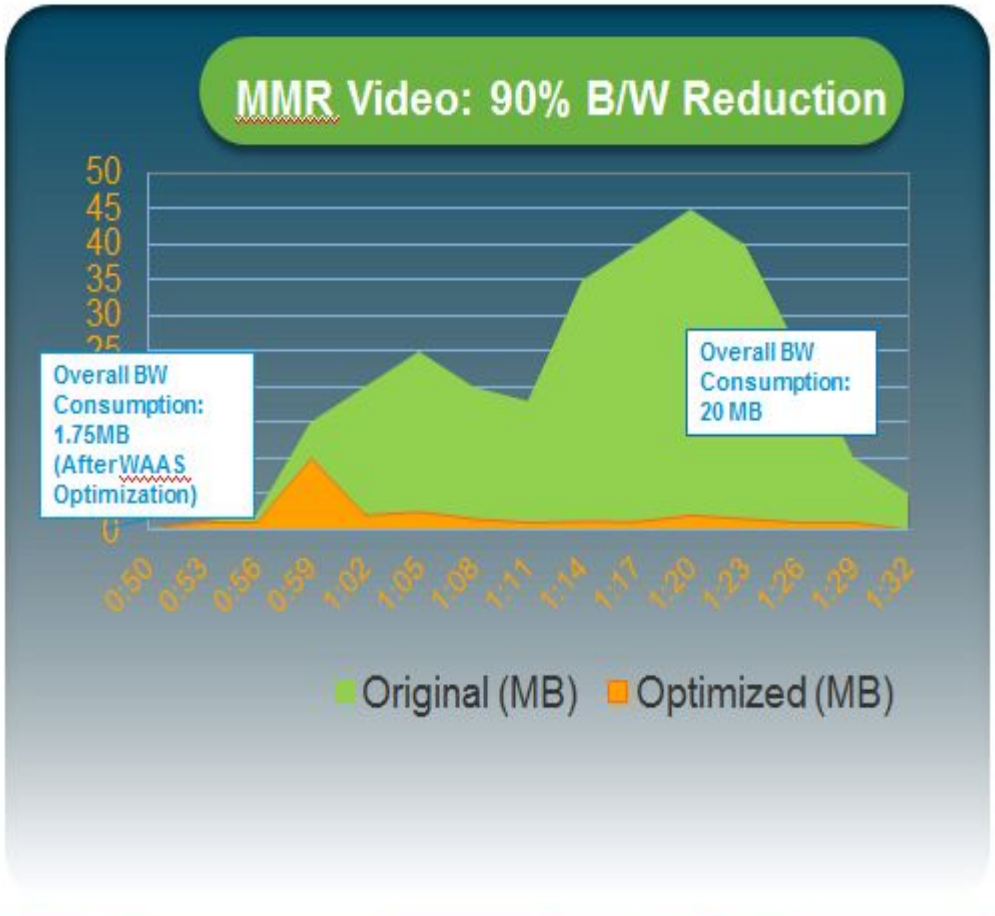
Quality with WAAS

WAAS News

Twice the Number of Users w/o WAN Upgrades

WAAS 4.5

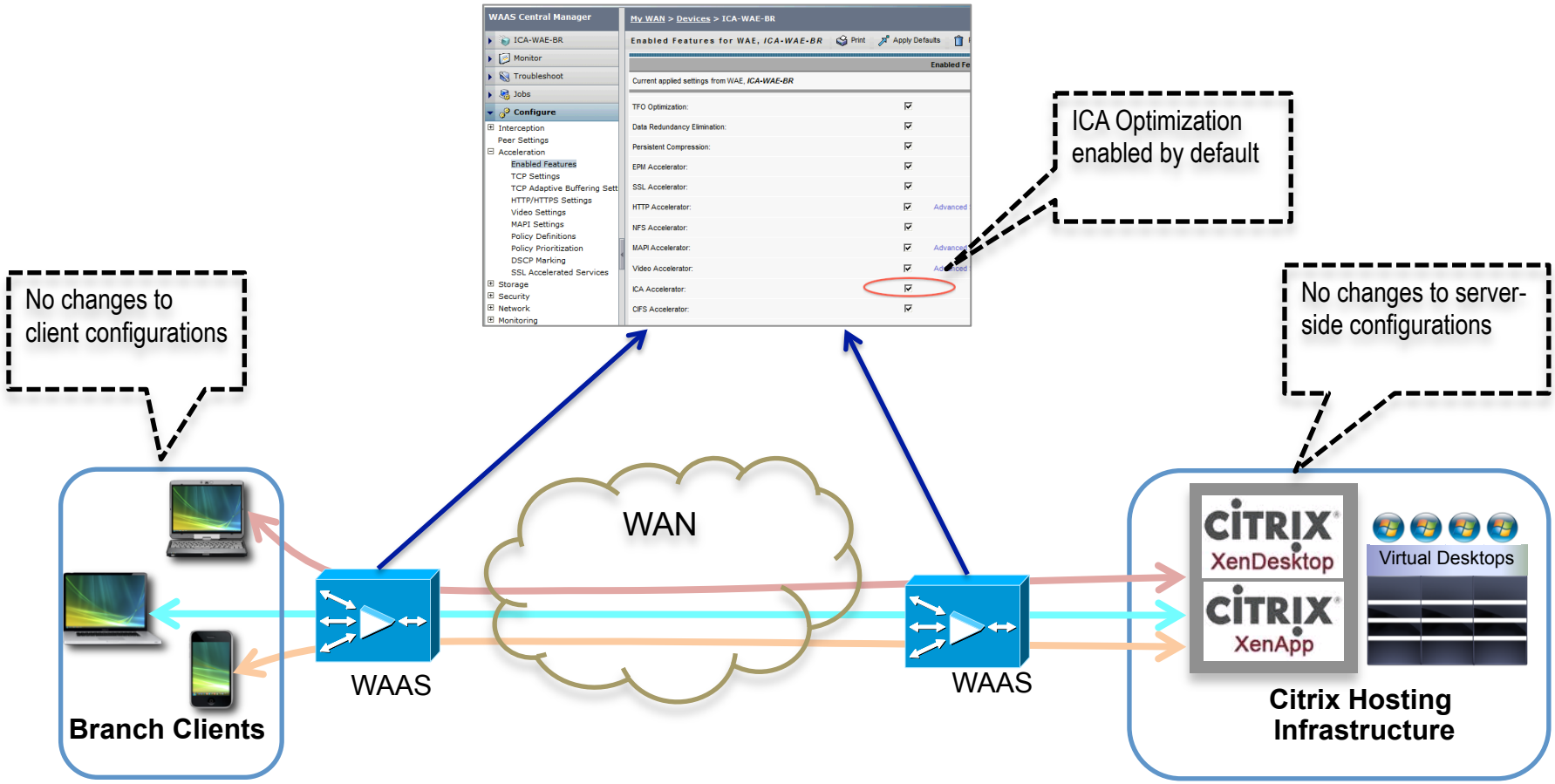




Citrix Optimization on WAAS

Configuring WAAS for Citrix ICA

Works Out of the Box. No Configuration Required



Understanding the Citrix ICA Handshake with WAAS

WAAS acts as a transparent, trusted Man in the Middle

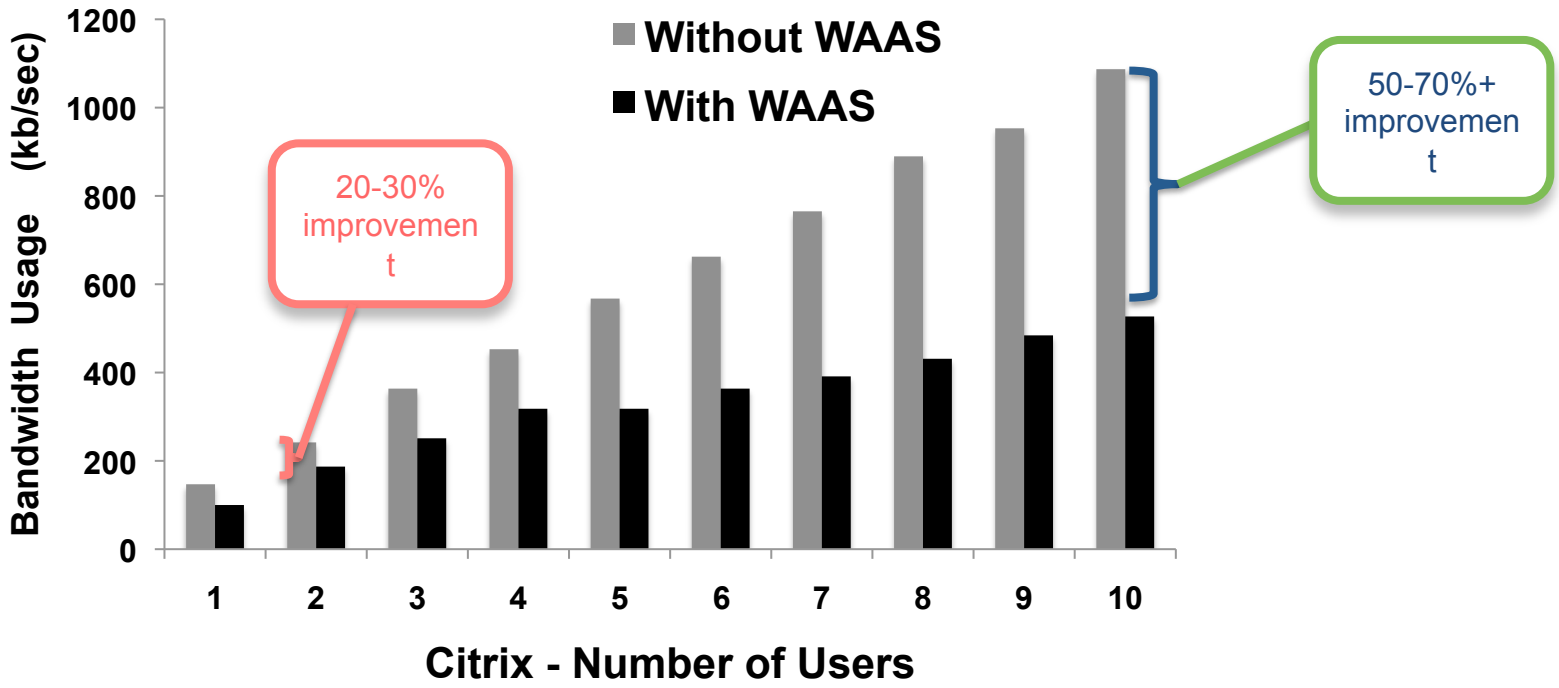
Transparent insertion into encrypted ICA/CGP communication.

WAAS applies inline compression algorithm over the optimized data, maximizing savings

WAAS applies TCP flow optimization to maximize bandwidth usage and mitigate packet loss.

WAAS delivers Citrix-aware multi-user **Context-Aware Data Redundancy** that removes redundant data from across **all** end user connections.

WAAS provides best VDI benefit for multiple users

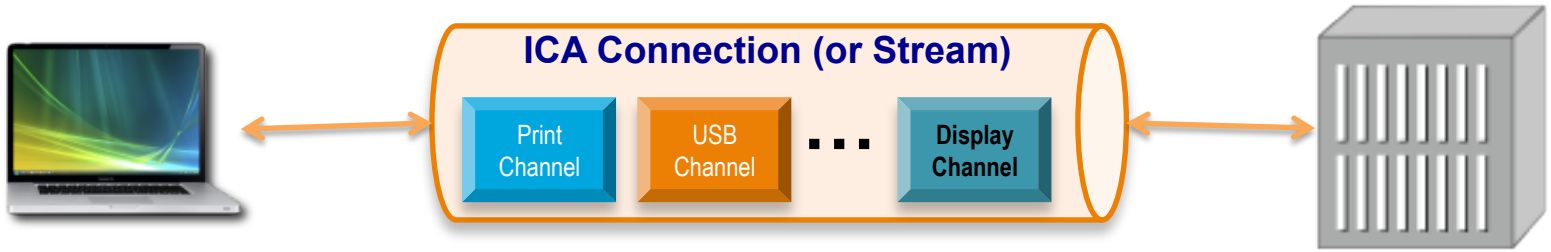


Best Practice

Ensure POC's and lab tests are conducted with multiple clients

Single Stream ICA is Default Setting for Citrix

WAAS optimizes all channels within single stream ICA

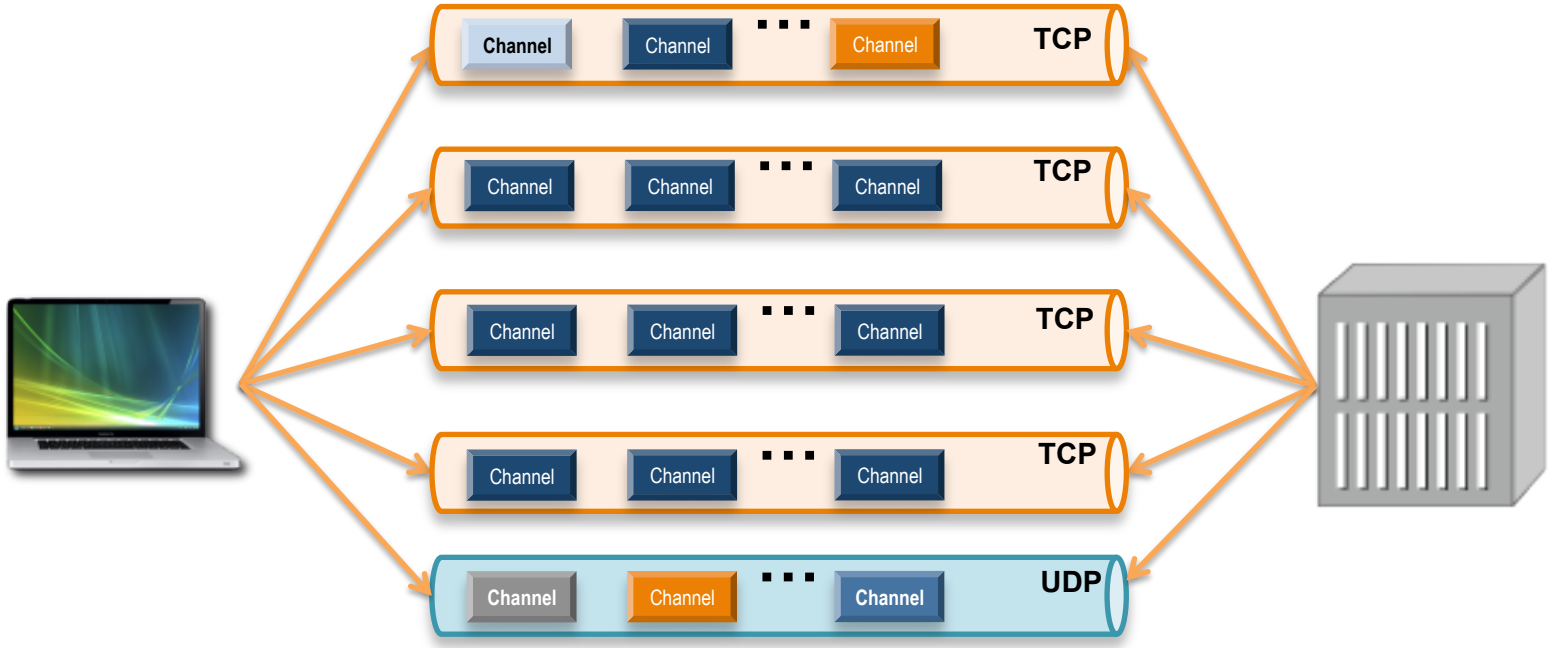


- 1 Single TCP connection (or Stream) per ICA Client
- All channels map to a single stream

Multi-stream ICA (MSI) Splits a User into 5 Streams

MSI is disabled by default in Citrix today

Target: Phoenix H2CY12



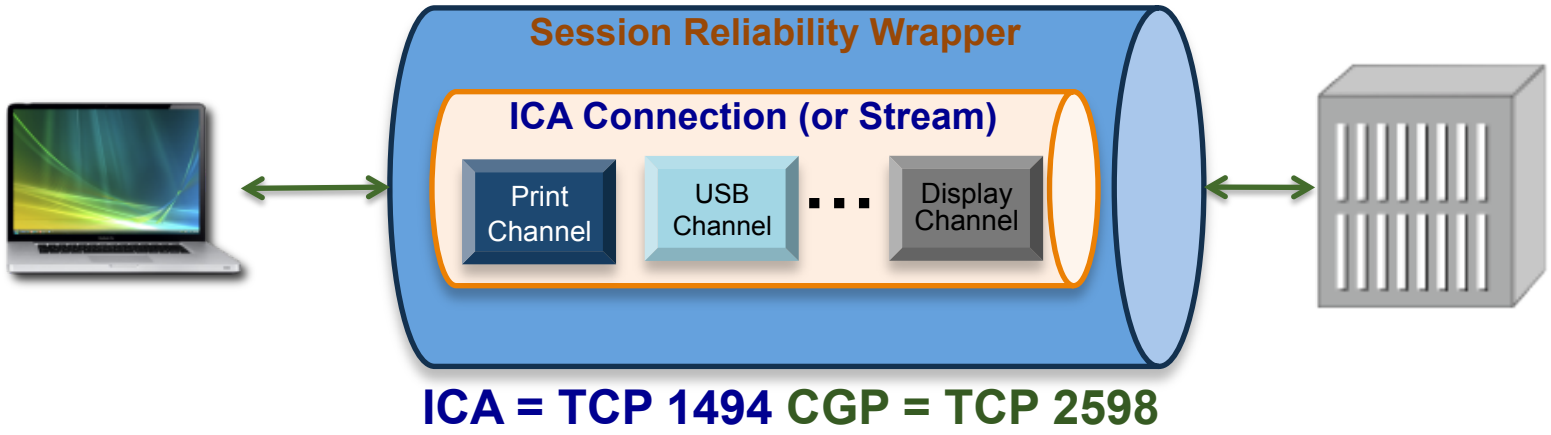
- **Requires manual mapping of ICA streams to specific ports on Citrix Server**
- **All channels within a stream will inherit same settings**
- **UC and media traffic is mapped to UDP stream**

Best Practice

Use Single stream ICA with MMR and Directed Print for best performance

What is Session Reliability (aka CGP)

Improves session persistence for lossy environments such as satellite

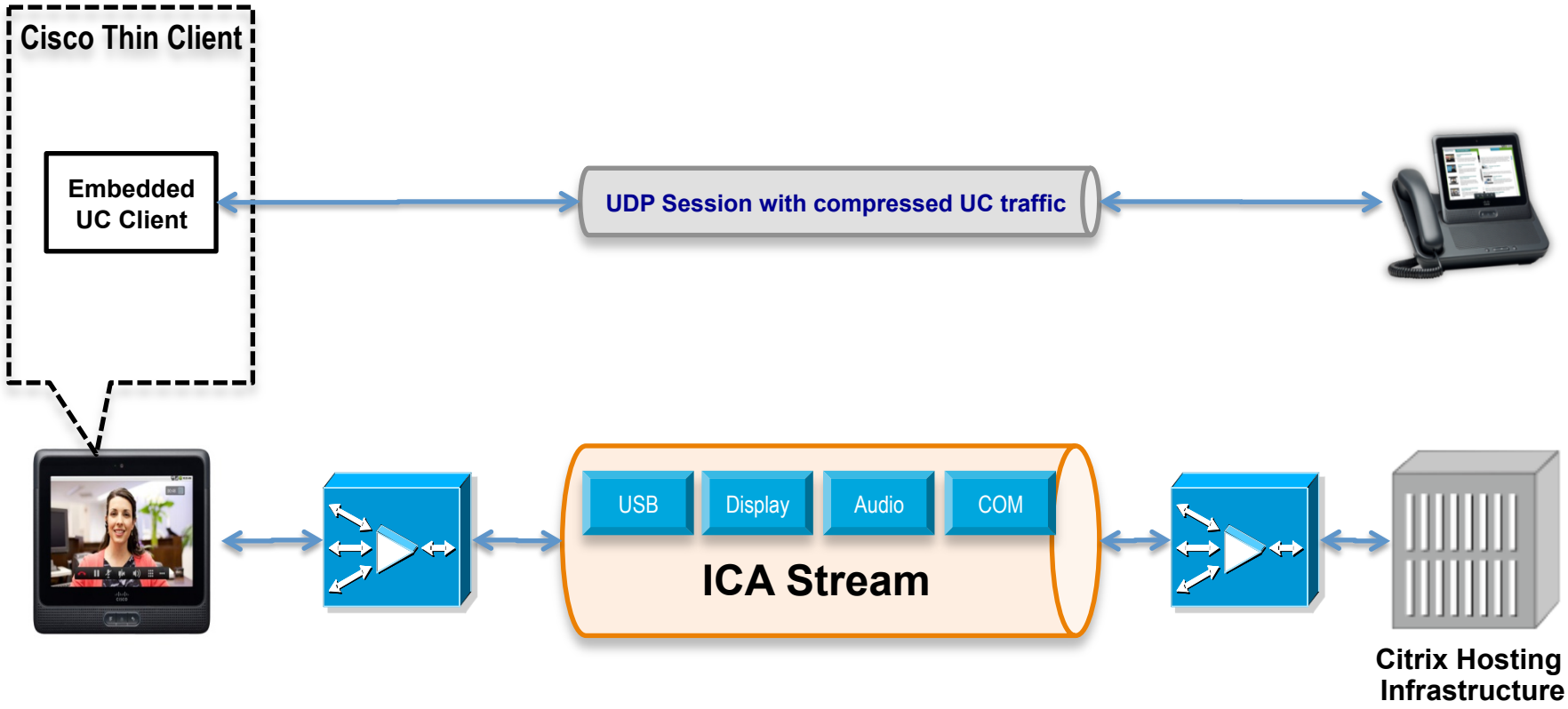


- Session Reliability encapsulates ICA inside another protocol (CGP)
- This is a “Default” setting that doesn’t usually provide much benefit
- WAAS optimized ICA traffic with CGP enabled albeit with reduced compression

Best Practice

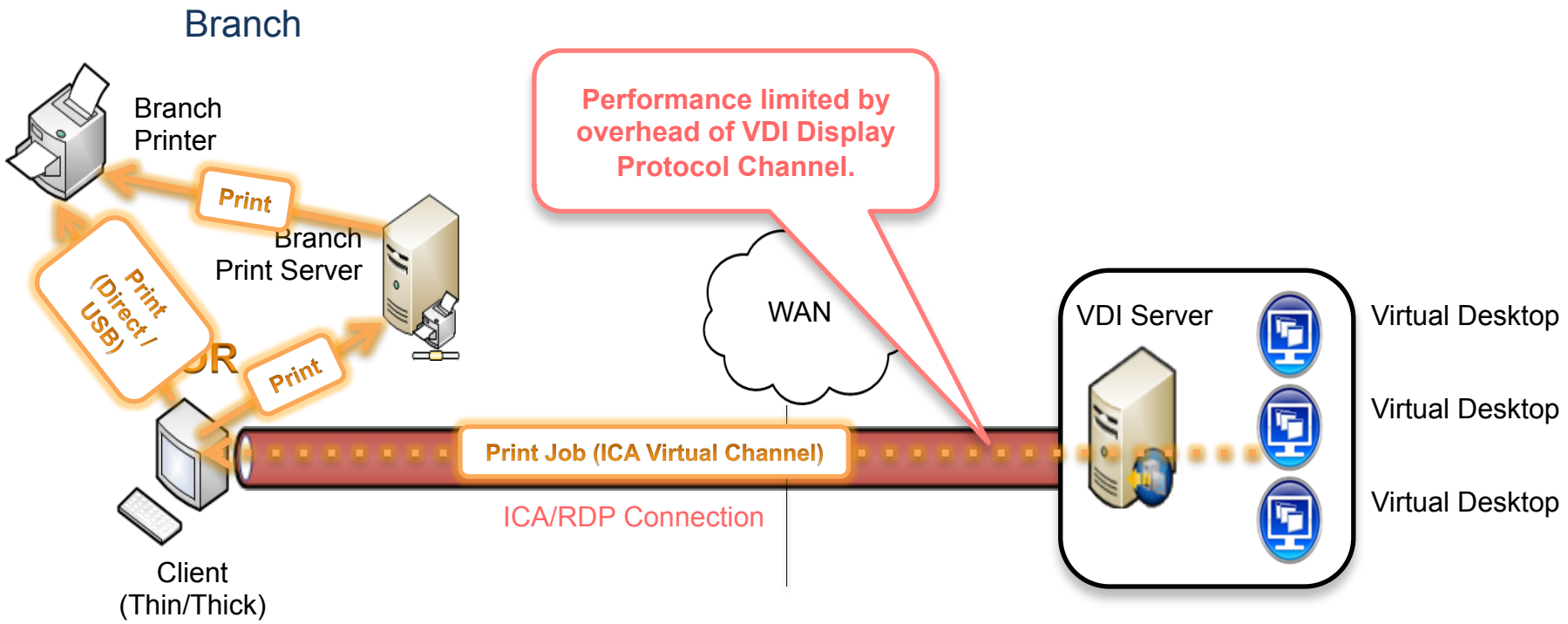
Dis-able CGP except in extreme lossy environments

Cisco Addresses Customer Concerns Regarding Unified Communications with Embedded UC client



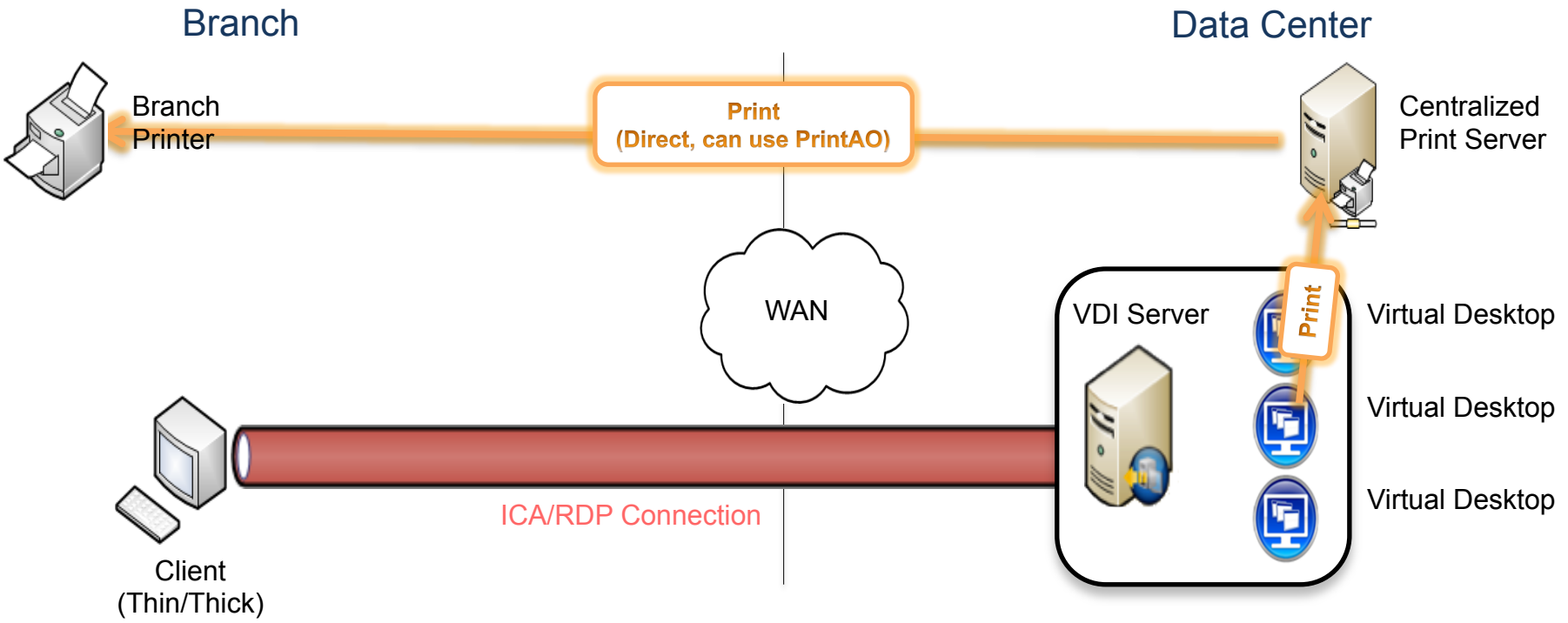
VDI Redirected printing

Default setting. Poorest performance, may impact other apps



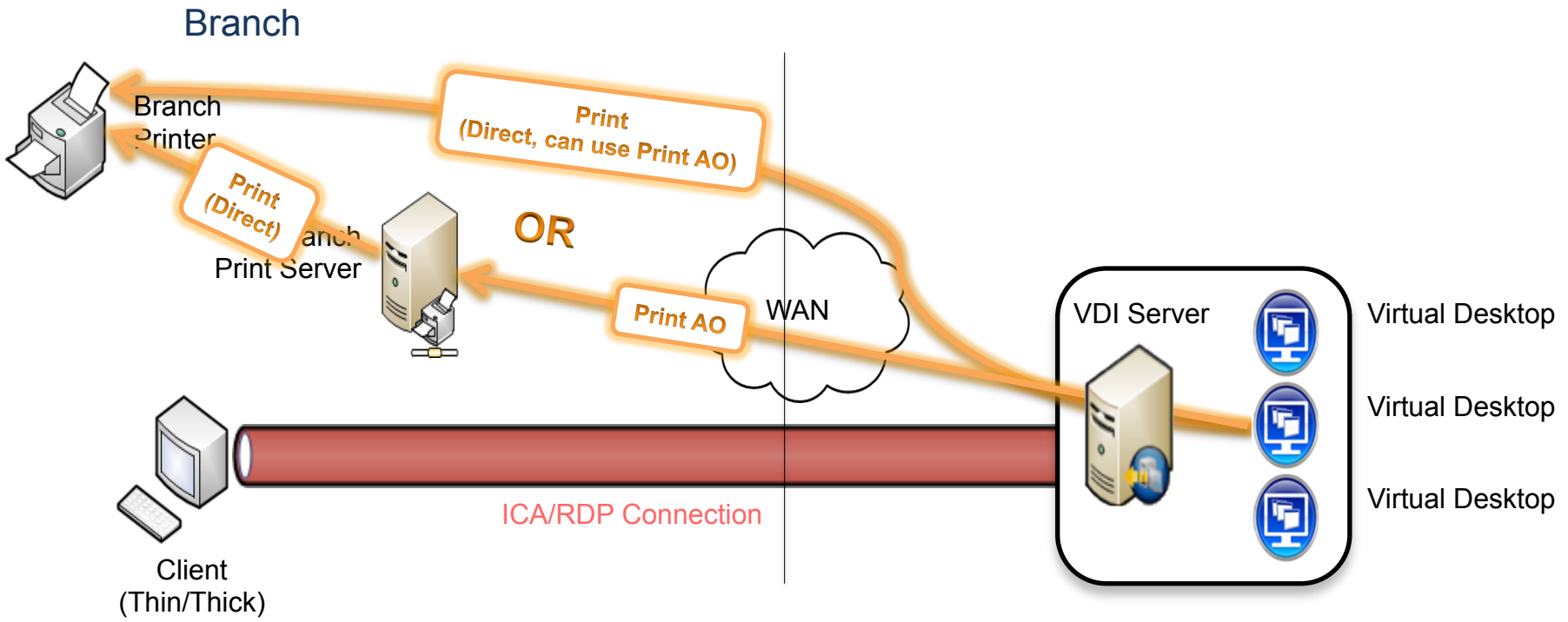
Best Practice

Direct Print, Centralized Print Server



Best Practice

Direct Print, Branch Print Server

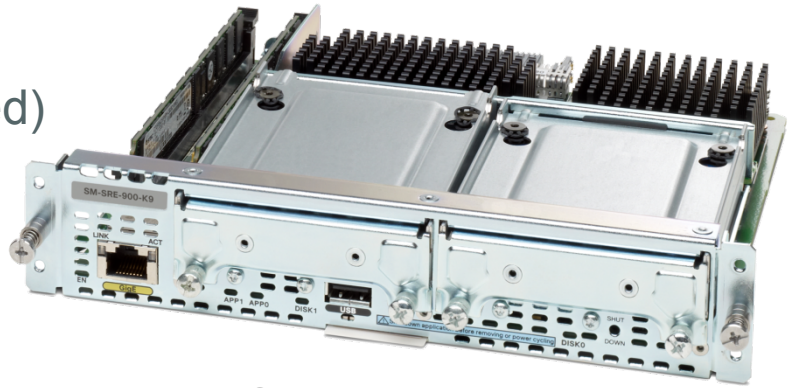


WAAS Deployment

Installation and Configuration of SRE Module

WAAS Deployment
Deploying WAAS on Service Ready Engine (SRE)

- ISR-G2 generation services module
- Initial SRE Configuration
  - Configure IP Connectivity between ISR and SRE
- Initial WAAS Installation
  - Load WAAS Software on SRE (when needed)
  - WAAS on SRE: min version 4.2.1
- Initial WAAS Configuration
  - Router based configuration
  - Standard WAAS configuration steps
- SRE Management
  - Daily management is done using the CM
  - No CLI to SRE is needed after initial setup



SRE 7X0/9X0

WAAS Deployment
Obtain WAAS SRE Software

- Download WAAS software from CCO
  - CCO account needed
  - Look for file named similar to “waas-sre-installer-4.5.1.2-k9.zip
- Extract the ZIP file and copy content to FTP directory
  - **Make sure FTP Server is reachable from ISR!**
  - Directory should contain following 6 files:

```
waas-accelerator-4.5.1.2-k9.bin
waas-accelerator-4.5.1.2-k9.bin.install.sre
waas-accelerator-4.5.1.2-k9.bin.install.sre.header
waas-accelerator-4.5.1.2-k9.bin.installer
waas-accelerator-4.5.1.2-k9.bin.key
waas-accelerator-4.5.1.2-k9.bin.srebootloader
```

WAAS Deployment
Initial SRE Configuration

- SRE is recognized by IOS as “Interface SM<slot>/0”

```
Router#show run interface SM1/0

interface SM1/0
 no ip address
 shutdown
 service-module fail-open
```

- Configure IP Addresses and Gateway (router side and **module site**)

```
Router#conf t

Router(config)#interface SM1/0
Router(config)#ip address 10.42.12.254 255.255.255.0
Router(config)#service-module ip address 10.42.12.1 255.255.255.0
Router(config)#service-module ip default-gateway 10.42.12.254
```

WAAS Deployment
SRE WAAS SW Load with Router CLI Script

- CLI Script: service-module sm1/0 install url <path>
- **Use full path to the bin image (include username:password@)**

```
Router# service-module sm 1/0 install url (continued on next line)
 ftp://username:password@10.42.40.100/waas/SRE/waas-accelerator-4.5.1.2-k9.bin
```

```
Proceed with installation? [no]: yes
Loading SRE/waas-accelerator-4.5.1.2-k9.bin.install.sre !
[OK - 1722/4096 bytes]
Welcome to the WAAS installation
Checking resource requirements now
Resource check complete proceeding with installation
```

WAAS Deployment
SRE WAAS Initial Configuration using CLI

- Session into SRE (is reverse telnet on line 2067)

```
Router#service-module sm 1/0 session
Trying 10.42.12.254, 2067 ... Open
```

- Device comes up as WAAS Accelerator with Interface IP and Default Gateway already configured

```
NO-HOSTNAME#sho run
! waas-accelerator-k9 version 4.5.1 (build b2 Nov 29 2011)
!
device mode application-acceleratorinterface GigabitEthernet 1/0
 ip address 10.42.12.1 255.255.255.0
 exit
!
ip default-gateway 10.42.12.254
```

- Once the SRE is up, you can configure it like any other WAAS Appliance or vWAAS device

WAAS Deployment
SRE WAAS Initial Configuration using CLI

- Either use WAAS setup script or configure manually using CLI
- CLI: configure license, hostname, domain-name, dns, primary-interface and central-manager address before enabling CMS and do **save the configuration**...

```
NO-HOSTNAME(config)#hostname SRE700
SRE700(config)#ip domain-name waas.amslab.cisco.com
SRE700(config)#ip name-server 10.42.40.101
SRE700(config)#primary-interface gi 1/0
SRE700(config)#central-manager address 10.42.40.1
SRE700(config)#cms enable
Registering WAAS Application Engine...
Sending  device registration request to Central Manager with address 10.42.40.1
Please wait, initializing CMS tables
Successfully initialized CMS tables
Registration complete.
Please preserve running configuration using 'copy running-config startup-
config'. Otherwise management service will not be started on reload and node
will be shown 'offline' in WAAS Central Manager UI.
management services enabled
```

WAAS Deployment
SRE WAAS Initial Configuration using CLI

- Save the config and check if CMS is running

```
SRE700(config)#exit
SRE700#wr mem
SRE700#sho cms info
Device registration information :
Device Id                              = 4206
Device registered as                   = WAAS Application Engine
Current WAAS Central Manager           = 10.42.40.1
Registered with WAAS Central Manager = 10.42.40.1

CMS services information :
Service cms_ce is running
```

- Next step (skipped in this example) would be configuring WCCP on SRE and ISR

New WAE Hardware

Introducing Cisco's Next Generation WAVE appliances *Purpose built, highest performance, video ready.*

Introducing New WAVE Appliances for the Branch

Enable your branches for rich media applications

WAVE-694

WAVE-594

WAVE-294

Best in Class Performance:

- Increased compute capacity for Virtual Blades
- Increased WAN BW to support rich media applications such as VDI and Video
- Context Aware DRE

Simplified Management:

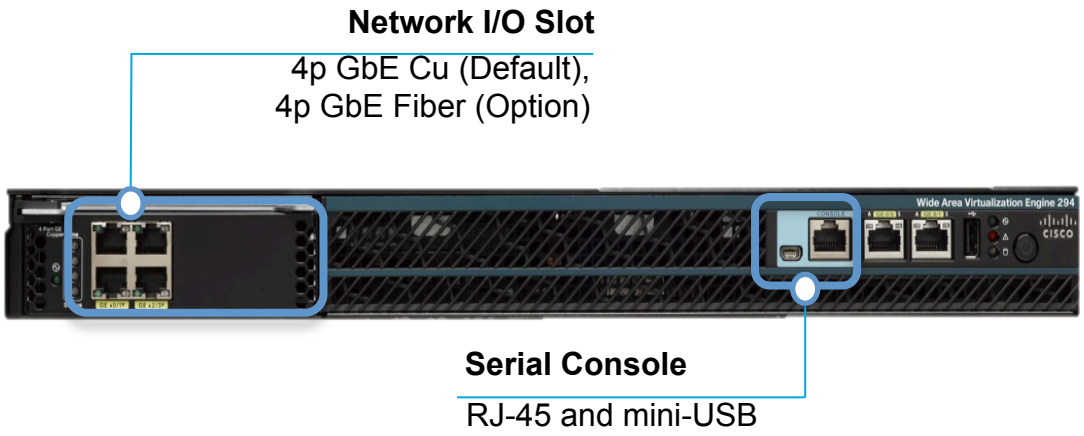
- Branch Auto-deployment and device group management via CM
- Centralized SSL configuration management
- mini-USB console port

Deployment Flexibility

- Support for In Path and Off Path
- Modular I/O ports (up to 8p GE Cu)

Cisco WAVE-294

Cost Effective, Small Footprint



Target Application(s):

- Low density branch
- Retail office

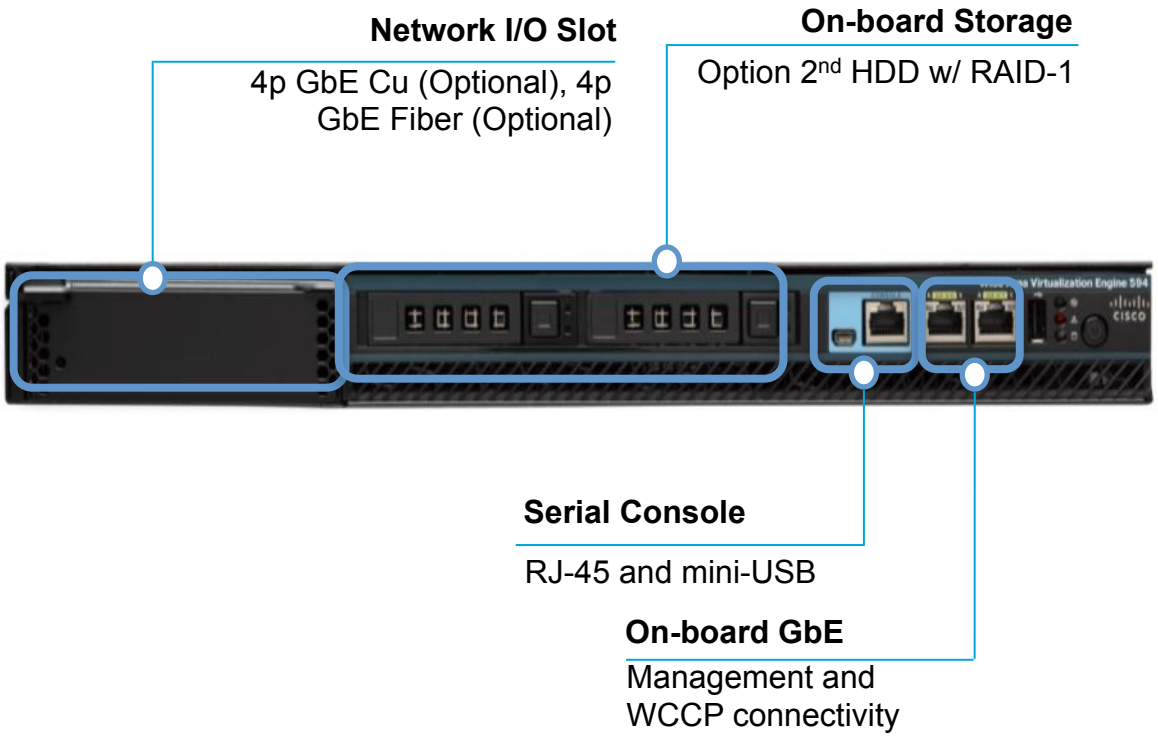
Performance Specifications:

- **TCP:** Up to 400 Connections
- **WAN:** Up to 20 Mbps

Platform Characteristics:

- 4GB DRAM (Default) / 8GB DRAM (Optional)
- Single Enterprise Class HDD
- 1 RU

Cisco WAVE-594-K9

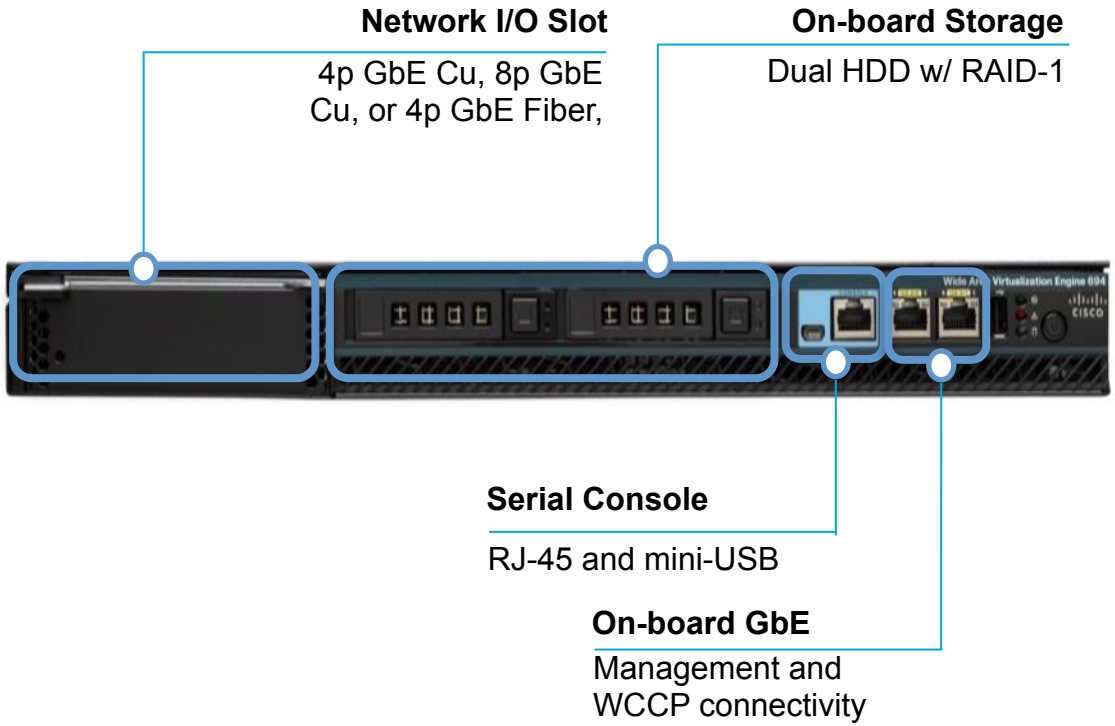


Target Application(s):
- Large Branch
- Regional Office

Performance Specifications:
- **TCP:** Up to 1,300 Connections
- **WAN:** Up to 100 Mbps

Platform Characteristics:
- 8GB DRAM (Default) / 12GB DRAM (Optional)
- Single Enterprise Class HDD
- Optional 2nd HDD for RAID-1
- 1 RU
- Optional Redundant AC Pwr

Cisco WAVE-694-K9



Target Application(s):
- Regional Office
- Commercial Head End

Performance Specifications:
- **TCP:** Up to 6000 Connections
- **WAN:** Up to 200 Mbps

Platform Characteristics:
- 16GB DRAM (Default) / 24GB DRAM (Optional)
- Dual Enterprise Class HDD (RAID-1)
- 1 RU

New WAVE Appliances for the Branch

Higher throughput, more memory and HDD for VB's.

	WAVE-294-K9		WAVE-594-K9		WAVE-694-K9	
TCP Conns	200	400	750	1300	2500	6000
WAN BW	10 mbps	20 mbps	50 mbps	100 mbps	200 mbps	200 mbps
Memory	4GB	8GB	8GB	12GB	16GB	24GB
Virtual Blades	2	2	2	4	4	6
mem capacity	1GB	4GB	2GB	4GB	4GB	8GB
disk capacity	60GB	60GB	175GB	175GB	180GB	180GB
HDD	1x250GB Enterprise Class		1x500GB (Optional second HDD for RAID 1)		2x600GB HDD (RAID 1)	

Introducing New WAVE Data Center Appliances

Purpose-built for highest performance WAN Optimization.

WAVE-8541

WAVE-7571

WAVE-7541

Best in Class Performance:

- Context Aware DRE- highest throughput and effective cache history
- Up to 2Gbps WAN BW

Best in Class Scalability:

- Up to 150,000 TCP connections

10GE Capable:

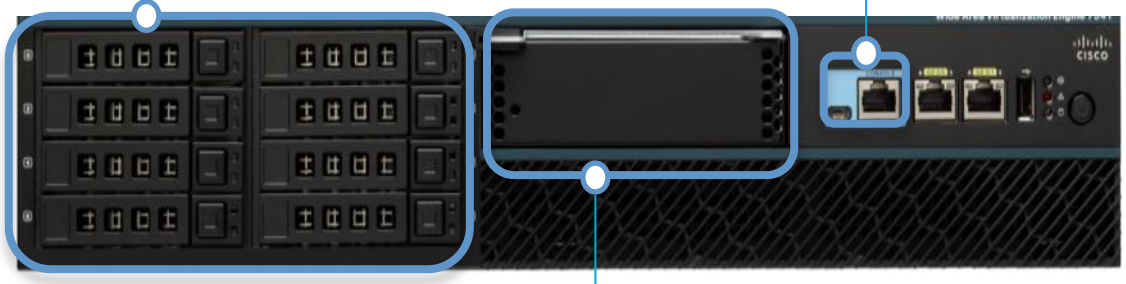
- Optional 2p 10GE IO Module
- SFP+

Cisco WAVE-7541-K9

50% more scalable than 7341

High Capacity RAID 5 Storage
Up to 500GB DRE History

Serial Console
RJ-45 and mini-USB



Network I/O Slot
2p 10GbE SFP+, 8p GbE Cu, 4p GbE Fiber Options

Target Applications:
- Data Center Head End
- Regional Hub

Specifications:
- **Memory:** 24GB DRAM
- **TCP:** Up to 18,000 Connections
- **WAN:** Up to 500Mbps

Physical Characteristics:
- 2RU

Cisco WAVE-7571-K9

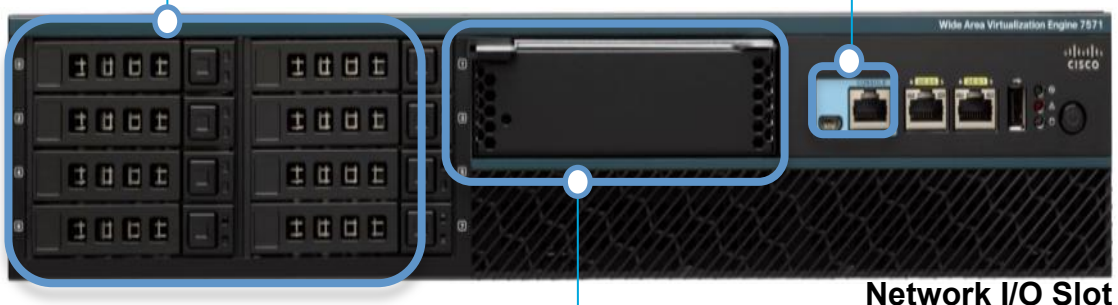
20% more scalable than 7371

High Capacity RAID 5 Storage

Up to 1TB DRE History

Serial Console

RJ-45 and mini-USB



Network I/O Slot

2p 10GbE SFP+, 8p GbE Cu, 4p GbE Fiber Options

Target Applications:

- Data Center Head End

Specifications:

- **Memory**: 48GB DRAM
- **TCP:** Up to 60,000 Connections
- **WAN:** Up to 1Gbps

Physical Characteristics:

- 2RU

Cisco WAVE-8541-K9

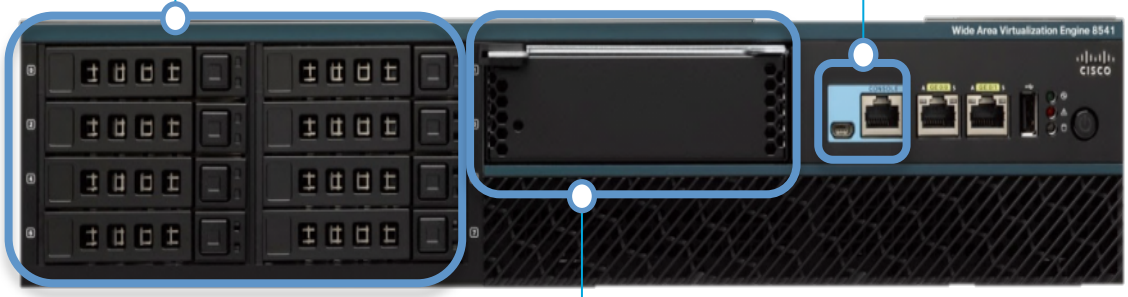
Industry's Most Scalable Data Center WAN Opt Engine

High Capacity RAID 5 Storage

Up to 2TB DRE History

Serial Console

RJ-45 and mini-USB



Network I/O Slot

2p 10GbE SFP+, 8p GbE Cu, 4p GbE Fiber Options

Target Applications:

- Large Enterprise and Service Provider DC Head End
- High Performance DC to DC inter-connect

Specifications:

- **Memory:** 96GB
- **TCP:** Up to 150,000 Connections
- **WAN BW:** Up to 2Gbps

Physical Characteristics:

- 2 RU
- Redundant 650W AC Pwr

New WAVE Appliances for the Data Center

Unmatched performance and scale.



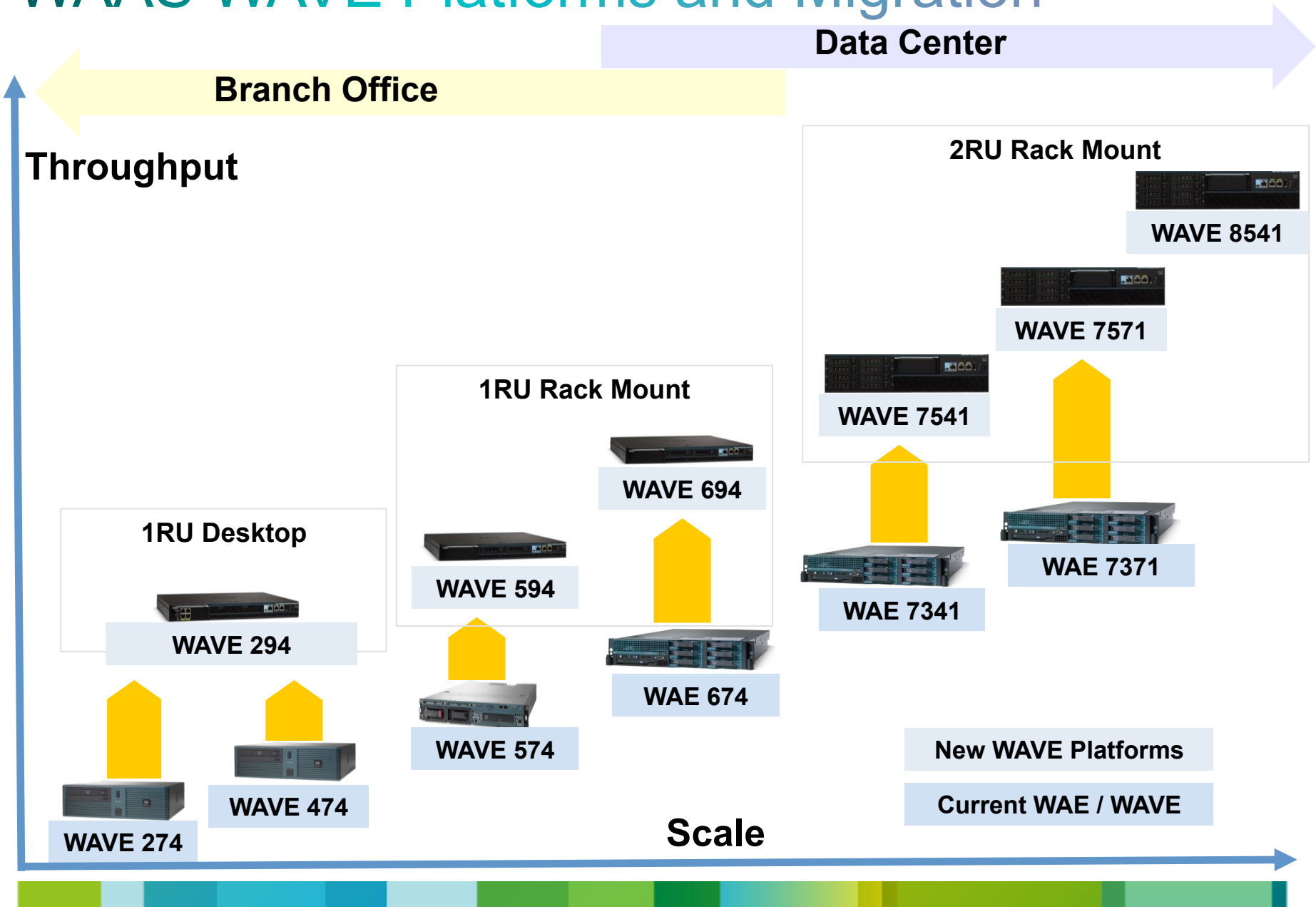
	WAVE-7541-K9	WAVE-7571-K9	WAVE-8541-K9
Memory	24GB	48GB	96GB
TCP Conns	18,000	60,000	150,000
WAN BW	Up to 500Mbps	Up to 1Gbps	Up to 2Gbps
HDD	6 x 450GB Raid 5	8 x 450 Raid 5	8 x 600 Raid 5

New WAAS High Performance Connectivity Options




	2 port 10GE Module	4 port GE Cu Module	8 port GE Cu Module	4 port GE Fiber Module
Part Number	**WAVE-10GE-2SFP**	**WAVE-INLN-GE-4T**	**WAVE-INLN-GE-8T**	**WAVE-INLN-GE-4SX**
Inline Mode		✓	✓	✓

WAAS WAVE Platforms and Migration



WAAS Sizing Guidelines

WAAS Sizing Guidelines

- WAAS devices are normally selected based on
  - Number of users (count 5 – 20 connections per user)
  - Target WAN Bandwidth
  - Number of Video Streams (1 per user)
  - Number of VB's if any
  - Router integrated device or not
- We have sized our WAAS devices based on real live assumptions about traffic patterns, usage patterns, applications, protocols, specific platforms and storage
- Peak level performance not limited by a license. Max loading a WAAS device will cause new connections to be put in Pass Through until load falls below the rated capacity again
- Plan for peak levels and future growth
- Ask your SE for the WAAS sizing guide and calculator
- Cisco Professional Service is also able to help when needed...

WAAS Sizing Guidelines
WAVE WAAS - Platform Performance (4.5)

	SRE-7X0-S	SRE 7X0-M	SRE-9X0-S	SRE-9X0-M	SRE-9X0-L	294-4G	294-8G	594-6G	594-12G	694-16G	694-24G	7541	7571	8541
WAN Bandwidth (Mbps)	20	20	50	50	50	10	20	50	100	200	200	500	1000	2000
Optimized TCP Connections	200	500	200	500	1000	200	400	750	1300	2500	6000	18k	60k	150k
Optimized LAN Throughput (Mbps)	200	200	300	300	300	100	150	250	300	450	500	1000	2000	4000
Total Disk Capacity (GB)	500	500	500	500	500	250	250	500	500	600	600	2250	3150	4200
DRE Disk Capacity (GB)	80	80	120	120	120	40	55	80	120	120	200	500	1000	2000
CIFS Disk Capacity (GB)	57	57	95	95	95	75	75	100	100	100	100	225	225	300
Maximum LAN Video Streams	40	150	40	150	300	40	80	150	300	400	1000	1000	1000	1000
Virtual Blades Supported						2	2	2	4	4	6			
Total Virtual Blade Disk Capacity						60	60	175	175	180	180			
Peer Fan Out								50	100	150	300	700	1400	2800
CM Managed Devices						250	250	1000	1000	2000	2000			

WAAS Sizing Guidelines
vWAAS - Platform Performance (4.5)

	vWAAS-200	vWAAS-750	vWAAS-6000	vWAAS-12000	vCM-100N	vCM-2000N
Number of vCPU	1	2	4	4	2	4
Virtaul Memory (GB)	2	4	8	12	2	8
Virtual Disk Datastore (GB)	160	250	500	750	250	600
Target WAN Bandwidth (Mbps)	10	50	200	310		
Optimized TCP Connections	200	750	6000	12000		
Optimized LAN Throughput (Mbps)	100	250	500	1000		
Peer Fan-out		50	300	1400		
DRE Disk Capacity	50	95	320	450		
CIFS Disk Capacity	75	95	95	175		
Max LAN Video Streams	40	150	1000	1000		
CM Managed Devices					100	2000

WAAS Sizing Guidelines
WAAS Express – Platform Performance

	Required DRAM	Maximum WAN bandwidth	Recommended Number of Users	Max TCP Connections
89x	768 M	2 Mbps	1-10	75
1941	2.5 G	4 Mbps	15-20	150
2901	2.5 G	6 Mbps	15-20	150
2911	2.5 G	6 Mbps	25	200
2921	2.5 G	6 Mbps	25	200
2951	4 G	6 Mbps	25	200
3925	4 G	10 Mbps	50	500
3945	4 G	10 Mbps	50	500

Thank you.