Optimize your Branch WAN with Cisco WAAS

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- Branch Application Delivery Challenges
  - Root Cause and Solutions
- Cisco WAAS Technologies and Benefits
- Cisco WAAS Product Line Overview
- Demo
- Summary
- Q and A
The Application Delivery Dilemma

- **Scattered workforce requires distributed IT:**
  - Email, File, Print, Intranet
  - Customer Relationship Management
  - Enterprise Resource Planning

- **Cost control mandates centralized IT:**
  - Virtualization, CapEx & OpEx Control
  - Service Agility
  - Power, Cooling, Facilities

Diagram:
- Remote Offices
- Regional Offices
- Home Offices
- Distribution of Services
- Data Center Consolidation
- Primary Data Center
- Secondary Data Center
The Root Cause: WAN Limitations

- Applications and video work well on LAN:
  - High bandwidth
  - Low latency
  - Reliability

- But not on WAN:
  - Low bandwidth
  - Application chattiness
  - High latency
  - Frequent packet loss

WAN limitations cause poor application and video performance, and keep servers and storage in branch offices.
The Solution: Make WAN Perform Like LAN

- Accelerates TCP performance over the WAN
- Redundant data does not need to transit the WAN – reduces overall bandwidth usage
- Optimizes application protocols, such as MAPI, CIFS, NFS, HTTP, Print – eliminates protocol inefficiencies
- Streamlined video delivery ensures one copy of live streaming transits the WAN
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Cisco WAAS
Comprehensive WAN Optimization Solution

- Accelerates applications over the WAN
- Delivers video to the branch
- Provides local hosting of branch IT services
WAAS Provides Four Benefits

**Improve Remote User Productivity**
- Application acceleration
- Integrated high quality video delivery

**Minimize Branch IT Costs**
- Branch IT consolidation
- WAN bandwidth optimization

**Lower Data Replication Costs**
- Data replication acceleration
- Lower costs for recovery point objectives

**Increase Agility and Flexibility**
- Best mix of centralized and distributed IT
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Seamless and Transparent Integration

- Compliance with critical network services
- Industry’s only holistic and secure optimization, visibility, and control solution
- Quality of Service (QoS)
  - Classification, NBAR, marking
  - Policing, shaping, queuing, WRED
  - LFI, header compression
- Network Management
  - NAM, PVM, NetFlow
  - NetQoS, IP SLA
- Security
  - IOS Firewall, IDS, IPS, ACL, VPN
- Optimized Routing
  - Network Path Affinity (NPA)
  - Optimized Edge Routing, PBR

Cisco Integrated Services Router
- Quality of Service (QoS)
- Network Analysis/NetFlow
- IOS Firewall
- Intrusion Prevention
- Optimized Edge Routing
- Policy Based Routing
- IP Service Level Agreements
- VPN

Cisco Wide Area Application Services
- Application Optimizers
- Advanced Compression
- Transport Optimization

Optimized Edge Routing
Policy Based Routing
IP Service Level Agreements
VPN

Network Management
NAM, PVM, NetFlow
NetQoS, IP SLA

Security
IOS Firewall, IDS, IPS, ACL, VPN

Optimized Routing
Network Path Affinity (NPA)
Optimized Edge Routing, PBR
Minimize Branch IT Costs
Branch IT Consolidation

Server and Storage Consolidation:
- Accelerating centralized applications reduces branch server and storage sprawl

Networking Equipment Consolidation:
- Integrating WAN optimization with router reduces equipment complexity and total cost of ownership
Advanced Compression

- Data Redundancy Elimination (DRE):
  - Application-agnostic compression
  - Up to 100:1 compression

- Persistent LZ Compression:
  - Session-based compression
  - Up to an additional 10:1 compression even after DRE
TCP Flow Optimization (TFO)

- Improves application throughput
- Improves existing WAN bandwidth utilization
- Shield end-nodes from unruly WAN conditions
  - Bandwidth scalability - help certain applications ‘fill-the-pipe’
  - Connection fairness - ensure bandwidth is allocated fairly amongst flows
  - Loss mitigation - selective acknowledgement and retransmission
  - Slow-start mitigation - improve connection setup time
- TCP Proxy architecture provides LAN-like TCP behavior and provides higher levels of compression than per-packet compression
- TFO provides adaptive buffering to help ensure that connections requiring additional memory can achieve higher throughput automatically without compromising on fairness
Application-Specific Acceleration

- **Application and Protocol Awareness**
  Minimize chatter through protocol proxy-caching, read-ahead, write-behind, and other optimization
  Safe caching preserves coherency, integrity while improving performance and saving WAN bandwidth
  Scheduled File preposition enables intelligent distribution of large objects to improve performance

- **Intelligent Server Offload**
  Caching and optimizations minimize workload on accelerated servers enabling consolidation along with centralization

- **WAAS Application Accelerators**
  CIFS, NFS, MAPI, Video, HTTP, SSL
  Windows printing

- **Licensed developed and validated with application vendors**
Cisco WAAS SSL Optimization Solution

- Core WAE acts as a Trusted Intermediary Node for SSL requests by client.
- Private Key and Server Certificate are stored on the Core WAE device.
- Core WAE participates in SSL Handshake to derive “session key”
- Distributes the “session key” securely in-band to the Edge WAE over the established connection between the Edge WAE and Core WAE.
Branch User Acceleration Technologies

- LAN-Like Throughput
- Bandwidth Savings Fewer Roundtrips
- End user throughput goes up 5x
- WAN consumption drops 67%

Advanced Compression/Cache
- Data Redundancy Elimination (Up to 100:1 compression)
- Persistent LZ Compression (Additional 5:1 compression)

Application Specific Acceleration
- CIFS, NFS
- MAPI
- HTTP
- SSL
- Print

TCP Flow Optimization (TFO)
- LAN-like TCP behavior
- Loss mitigation
- Slow-start mitigation
VoD Streaming in Microsoft Environment – Windows Media, CIFS Servers and Active Directory

1. Open Web page
2. Click on VoD (Video.asx)
3. ... opens Windows Media Player
4. Play Video .wma file

*ASX Windows Media file points to *.WMA video file

<ASX Version = "3.0">
<Title>My Video</Title>
<Entry>
  <Title>Video Title</Title>
  <Entry>
    <Title>Video Title</Title>
    <Ref href = "file://\ServerName\Path\Filename.wmv"/>
  </Entry>
</Entry></ASX>
VoD Streaming in a Microsoft Environment –

1. Open Web page
2. Click on VoD (Video.asx)
3. ... opens Windows Media Player
4. Play Video .wma file locally

Windows File server

\CIFS_server\Directory\Video.wmv
Live Video Streaming for Windows Media Environment

2. Click on published URL to get live stream

3. Opens Windows Media Player

4. Windows Media RTSP unicast streams

Bottleneck

- Redundant streams issued for the same source!
- Overloaded streaming servers
Live Video Streaming with WAAS

Edge stream splitting

1. Uncompressed Video
   - Microsoft Windows Media Server (WMS)
   - WAAS

2. Click on published URL to get live stream
   - BRANCH OFFICE
   - WAAS
   - DATA CENTER

3. Opens Windows Media Player
   - BRANCH OFFICE
   - WAAS
   - DATA CENTER

Note: Separate WAAS license for Windows Media Live Streaming required per contract w/Microsoft

Only one stream per remote site
- auto-detect RTSP connections (no configuration required)

Web Portal
- List of scheduled live streaming events

Encoder
- WAN
Cisco DMS & WAAS to enable Video Applications in the Branch

- **Video to Branch Desktop**
  - Live streaming and Video-on-Demand (VoD)
  - DMS in Data Center, WAAS 4.1 in Branch

- **Video to Branch Digital Signage**
  - Cisco Digital Media Player (DMP) to pull video from WAAS (New DMP Feature)
  - WAAS can also deliver video to signage enabled Telepresence

Digital Media Services (DMS)
Improve Remote User Productivity
NBC Beijing Olympics Application Acceleration

Challenges:
- 3,600 hours of coverage
- Limited 450Mbps WAN
- Cost control

Strategy:
- File-based video editing (no tapes)
- Centralize editing in New York
- End-to-end integrated IP solution, including QoS

Results:
- **Video**: 3,600 hours content sent across 450Mbps WAN
- **Data**: 140Mbps WAN throughput on 35Mbps bandwidth
- **Zero downtime**: 100% compatibility between WAAS and GSR router QoS

Improve Agility and Flexibility
Best Mix of Centralized & Distributed IT

Optimizing Performance, Cost, Reliability, Flexibility

Centralize what you can
- LAN-like performance for centralized CRM, ERP, email, files
- Minimized costs via branch server/storage/network consolidation

Distribute what you need
- Improved reliability through local and virtualized services
- Proven Windows Print, Active Directory, DNS, DHCP

Flexible deployment option
- Leverage your existing Windows 2008/2003 licenses – option 1
- Use Windows Server on WAAS bundle from Cisco – option 2

Windows Server 2008 Server Core

Microsoft

Wide Area Application Services (WAAS)

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Cisco WAAS Advantages

Application Vendor Validated
- Architecture leadership and joint R&D
- Lower risks via technology licensing
- Ease of integration and support escalation

Network Integrated
- Ease of operations via network transparency
- Accurate application SLA monitoring
- Secure acceleration
- Better with VoIP and video

Cost of Ownership Minimized
- Minimized device complexity via router integration
- Integrated high quality video
- Reduced data center server OpEx via offload technology
Q and A