



# Cisco Wide Area Application Services (WAAS) v4.0.13

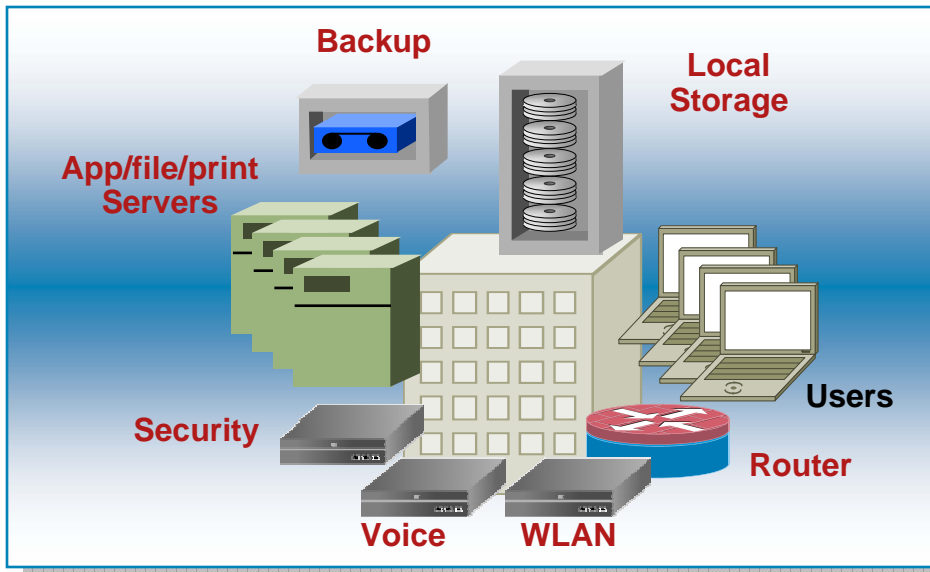
## Technical Overview



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# Branch IT Infrastructure Issues



Companies spend 6 billion dollars per year on branch servers, storage, backup and management -*Source: IDC, Gartner, Cisco*

Branches consume 70- 90% of business resources. -*Source: NetworkWorld*

Most enterprises have many servers running at 15% or less utilization, but still requiring 100% administration -*Source: Gartner*

## ■ Infrastructure cost / complexity

File, print and application servers

Storage and backup

Plethora of networking equipments

## ■ Data protection worries

Failing backups / lost data

Costly off-site vaulting

Compliance

## ■ WAN limitations prevent centralization

Bandwidth & throughput limitations

Latency and packet loss

End user experience

# The Root Causes of Cost and Complexity

- **WAN Limitations Prevent Centralization**

- Poor application performance
  - Low bandwidth, high latency, packet loss

- **Distributed Server Sprawl**

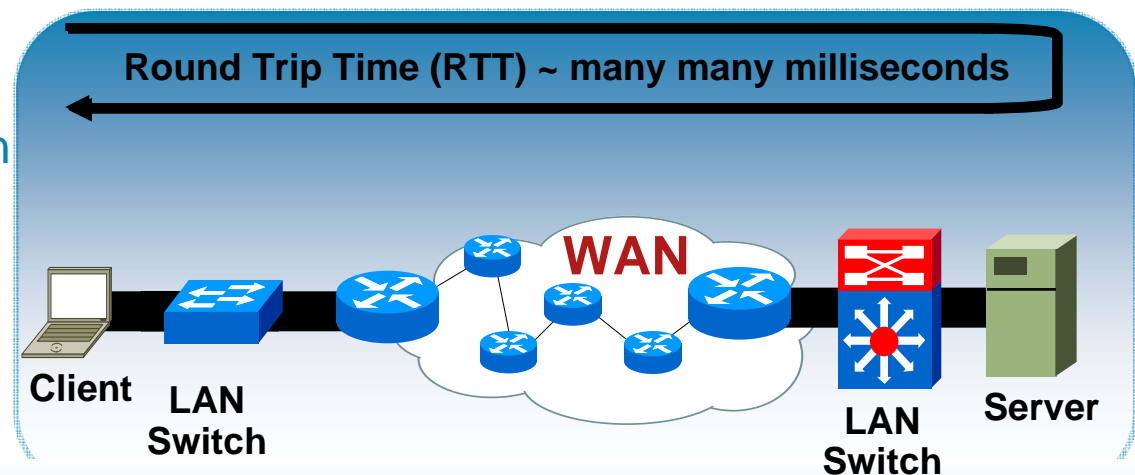
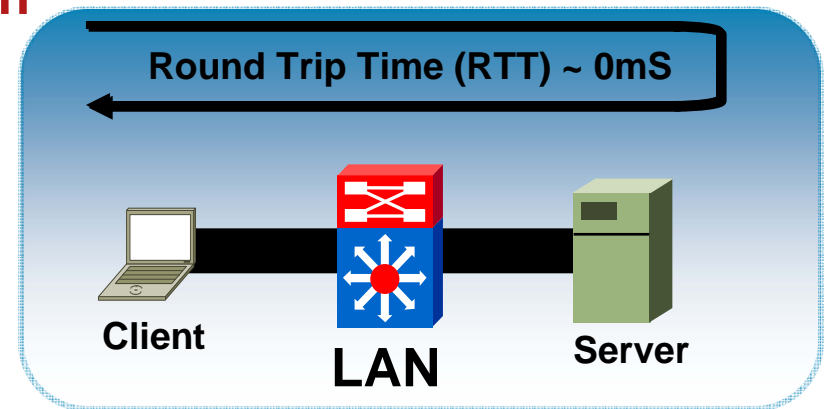
- No economies of scale
  - Low asset utilization
  - Islands of patch management

- **Storage Everywhere**

- Data sprawl
  - Remote backup and replication

- **Compliance Worries**

- Data leakage risks
  - Onsite IT staff
  - Remote data management

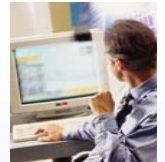


# Cisco WAAS Solutions and Benefits

Bridging the gap between centralized IT and distributed offices

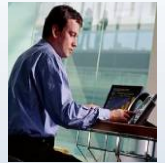
## Application Acceleration

- Any centralized TCP application
- LAN-like speed to the branch



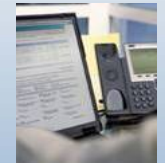
## Branch and Data Center Consolidation

- Server/storage/networking consolidation
- Reduced branch TCO
- Simplified management & support



## WAN Bandwidth Optimization

- Minimized bandwidth expenses
- Improved VoIP quality
- Improved application performance management

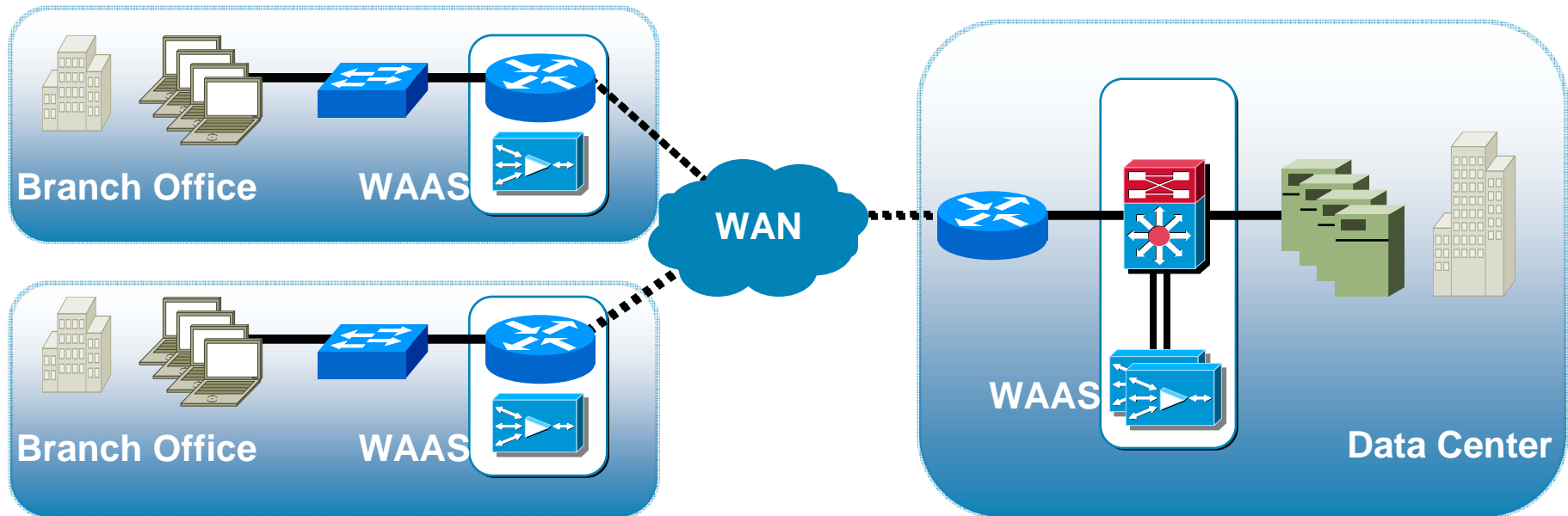


## Improved Data Protection Compliance

- Faster remote data replication
- Centralized compliance
- Improve disaster recovery readiness



# Cisco WAAS Solution Overview



## Solutions

- Application acceleration
- Branch and data center consolidation
- WAN bandwidth optimization
- Improved data protection & compliance

## Technologies













- Compression & acceleration
- Router integration
- Security integration
- Application perf. mgmt. integration

## Products

- Software: Wide Area Application Services
- Hardware: Wide Area Application Engine
- Branch and data center deployment
- Centralized management



# Application Acceleration

Category	Applications	2X	5X	10X	25X	50X	100X+	
File Sharing	CIFS NFS 	2-20X Avg			>100X Peak			
Email	Microsoft Exchange Lotus Notes Internet Mail 	2-5X Avg	20X Peak					
Web and Collaboration	HTTP WebDAV FTP Microsoft Sharepoint   	2-10X Avg			100X Peak			
Software Distribution	Microsoft SMS Altiris HP Radia 	2-20X Avg			>100X Peak			
Enterprise Applications	Microsoft SQL Oracle, SAP Lotus Notes    	2-5X Avg	20X Peak					
Backup Applications	Microsoft NTBackup Legato Networker Veritas Netbackup CommVault Galaxy  	2-10X Avg		50X Peak				
Data Replication	EMC SRDF/A EMC IP Replicator NetApp SnapMirror Data Domain Double-Take Veritas Vol Replicator	2-10X Avg		50X Peak				

# Cisco WAAS - Seamless Integration

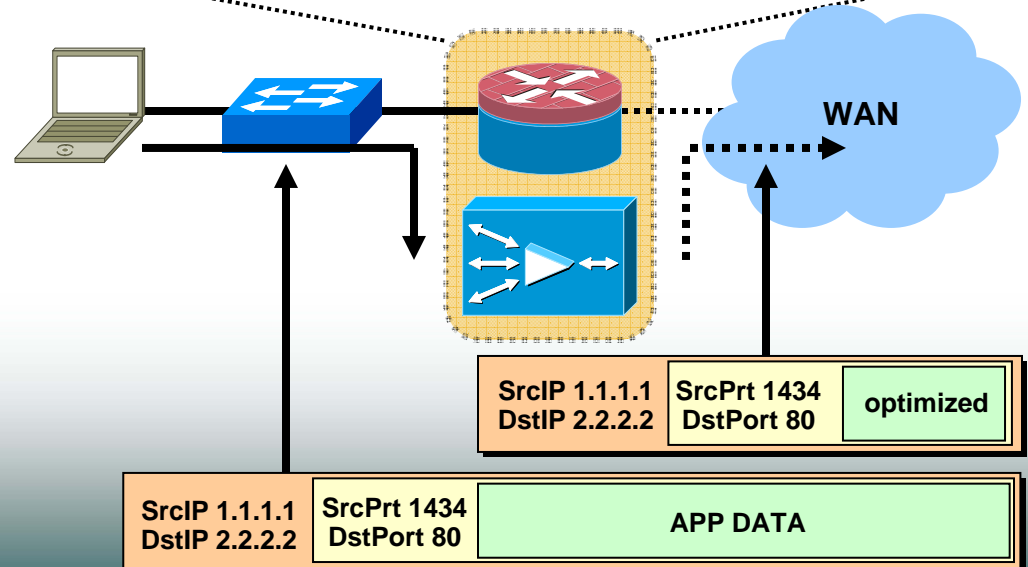
- Transparency ensures compliance with critical network features to provide the industry's only holistic and secure optimization, visibility, and control solution
- Quality of Service (QoS)
  - Classification, NBAR, marking
  - Policing, shaping, queuing, WRED
  - LFI, header compression
- Network Management
  - 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

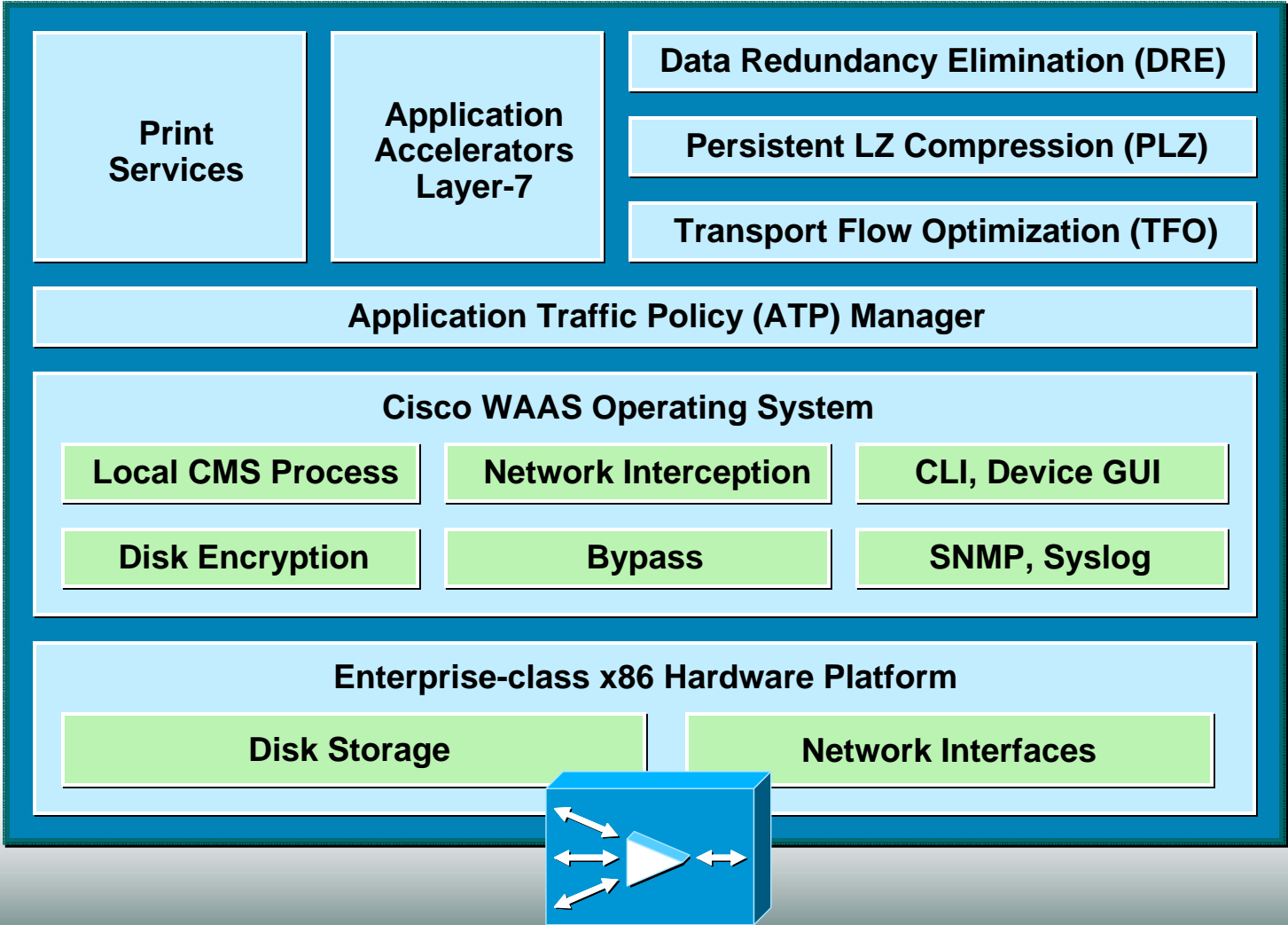
- Quality of Service (QoS)
- Network Analysis/NetFlow
- IOS Firewall
- Intrusion Prevention
- Optimized Edge Routing
- Policy Based Routing
- IP Service Level Agreements
- VPN

## Cisco Wide Area Application Services

- Application Acceleration
- Advanced Compression
- Transport Optimization
- Wide Area File Services



# Cisco WAAS Product Architecture





# 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 preposition enables intelligent distribution of large objects to improve performance

- Intelligent Server Offload

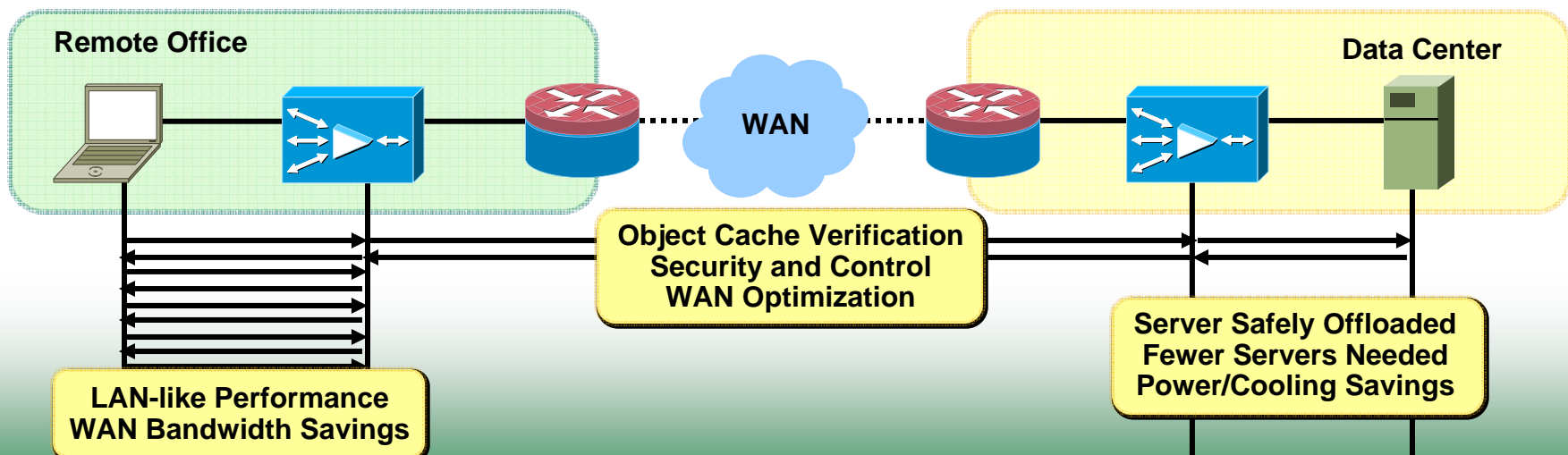
Caching and optimizations minimize workload on accelerated servers enabling consolidation along with centralization

Consolidation enables the 'green data center' and power/cooling/space savings

- WAASv4 Application Accelerators

CIFS (Windows File Services)

Windows printing

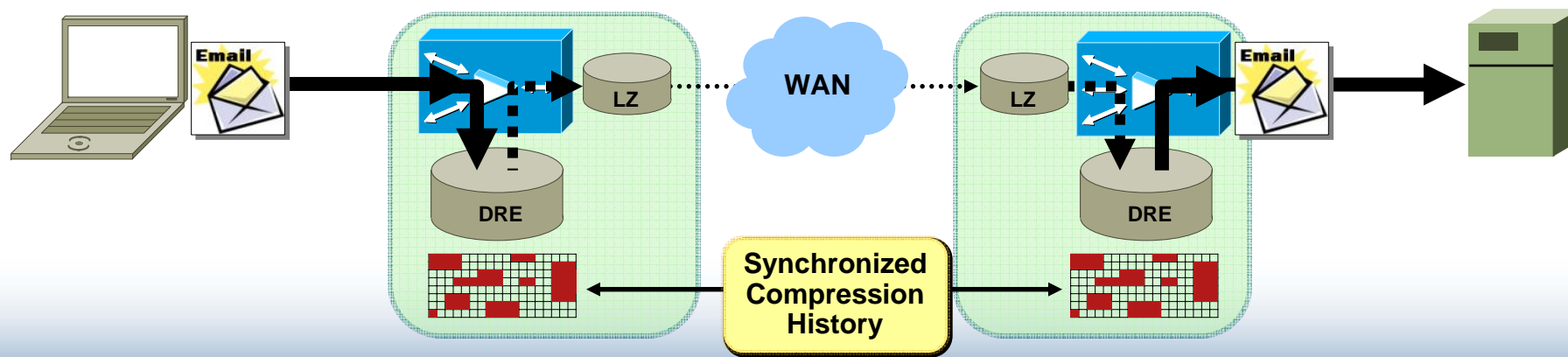


# Advanced Compression

- Cisco WAAS advanced compression nearly eliminates the transmission of redundant data patterns and compresses data that must traverse the WAN to improve application performance and save bandwidth

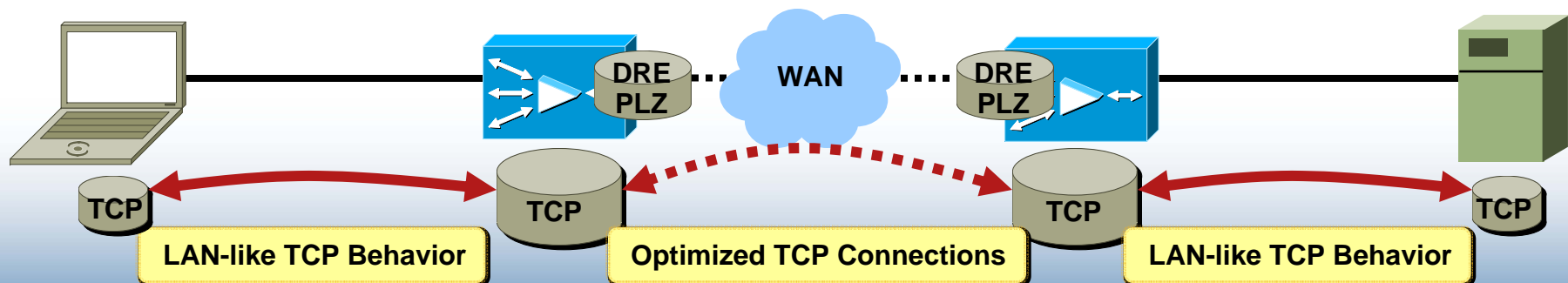
Data Redundancy Elimination (DRE): application-agnostic compression eliminates redundant data from TCP streams providing up to 100:1 compression

Persistent LZ Compression: session-based compression provides up to an additional 10:1 compression even for messages that have been optimized by DRE

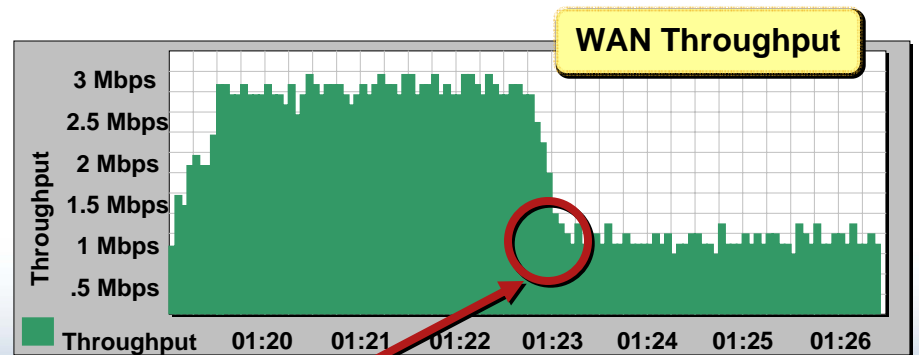
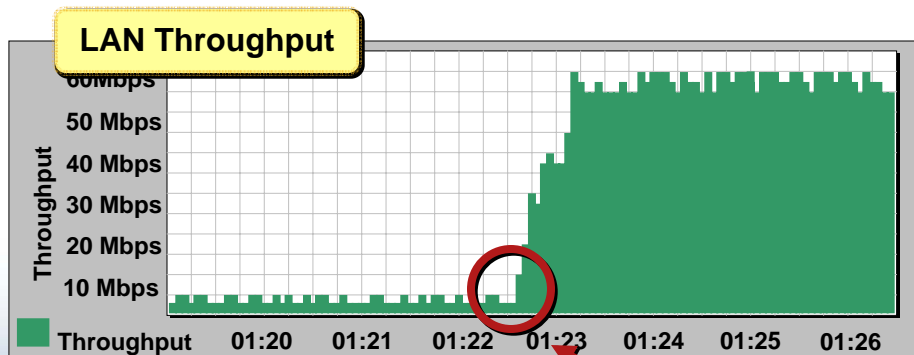
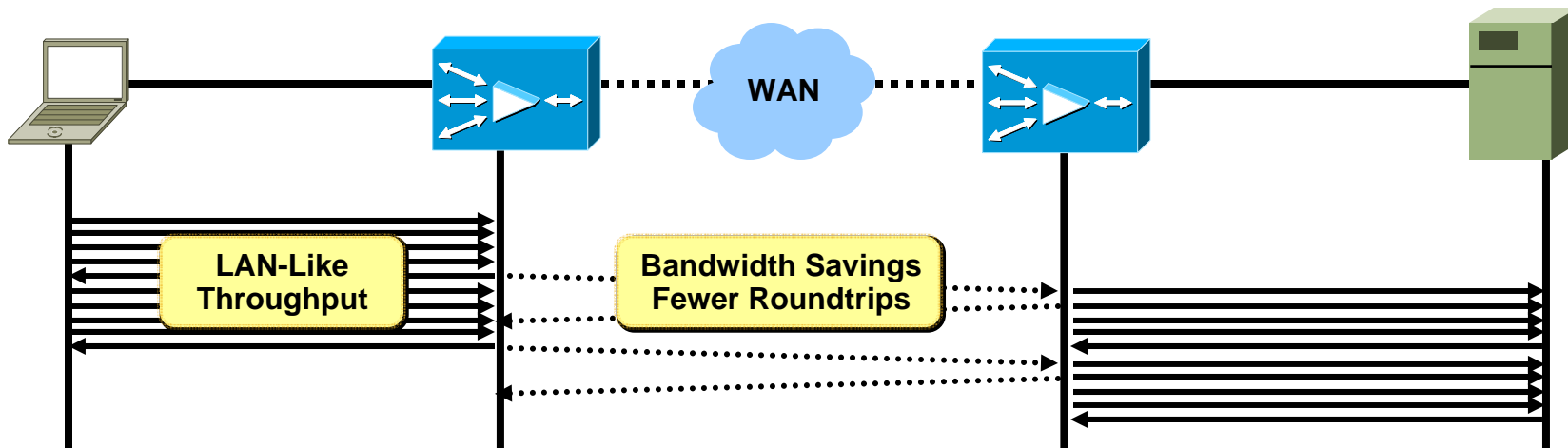


# TCP Optimization

- Cisco WAAS employs TCP optimization to improve application throughput and better leverage existing WAN bandwidth capacity and 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



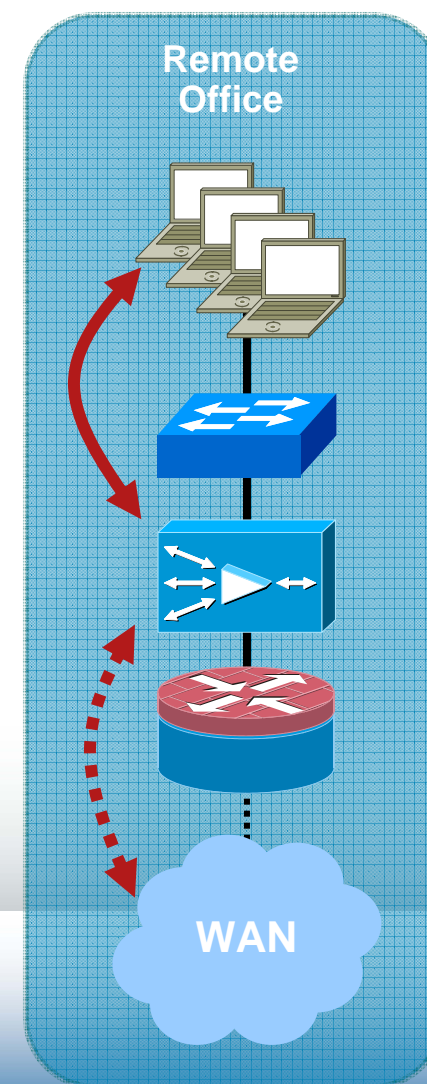
# Combined Power of TCP Optimization and Advanced Compression



**Optimization Enabled**

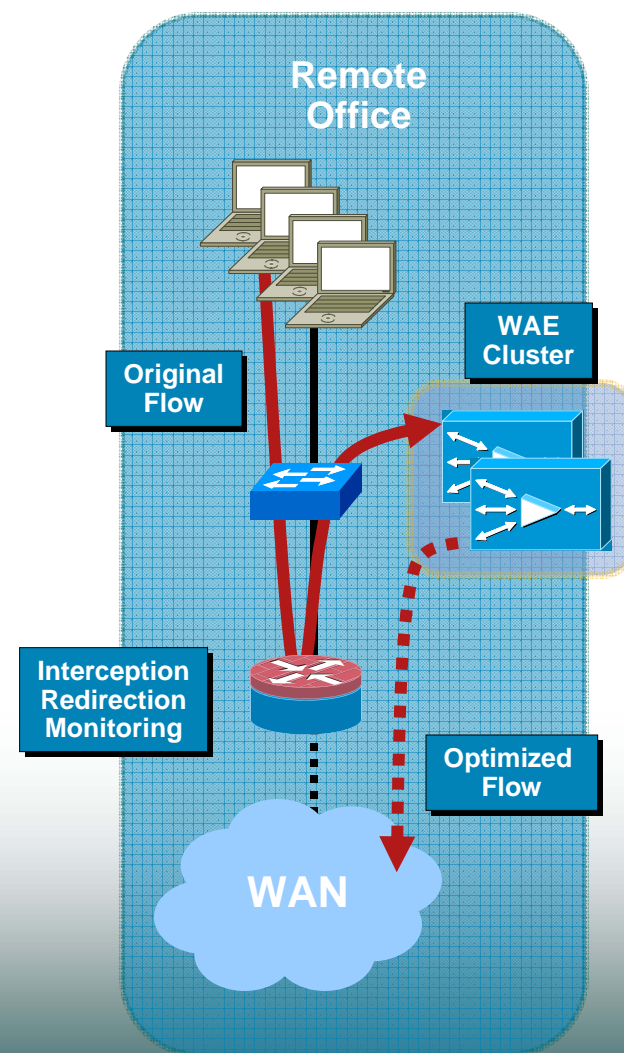
# Simple In-path Deployment

- **Simple Plug-and-Play**
  - Physical in-path deployment
  - No network changes required
  - Fail-to-wire upon hardware, software, or power failure
- **Scalability and High Availability**
  - Support for redundant network paths and asymmetric routing
  - Serial in-path clustering with load-sharing and fail-over
- **Seamless Transparent Integration**
  - Transparency and automatic discovery
  - 802.1q VLAN trunking support
  - Supported on all WAE appliance models



# Scalable & Resilient Off-path Deployment

- **WCCPv2 Interception**
  - Active/active clustering supports up to 32 WAEs and 32 routers with automatic load-balancing, load redistribution, fail-over, and fail-through operation
  - Near-linear scalability and performance improvement when adding devices
- **Policy-Based Routing Interception**
  - Routing of flows to be optimized through a Cisco WAE as a next-hop router
  - Active/passive clustering provides high availability and failover using IP SLAs as a tracking mechanism
- **Seamless Transparent Integration**
  - Transparency and automatic discovery



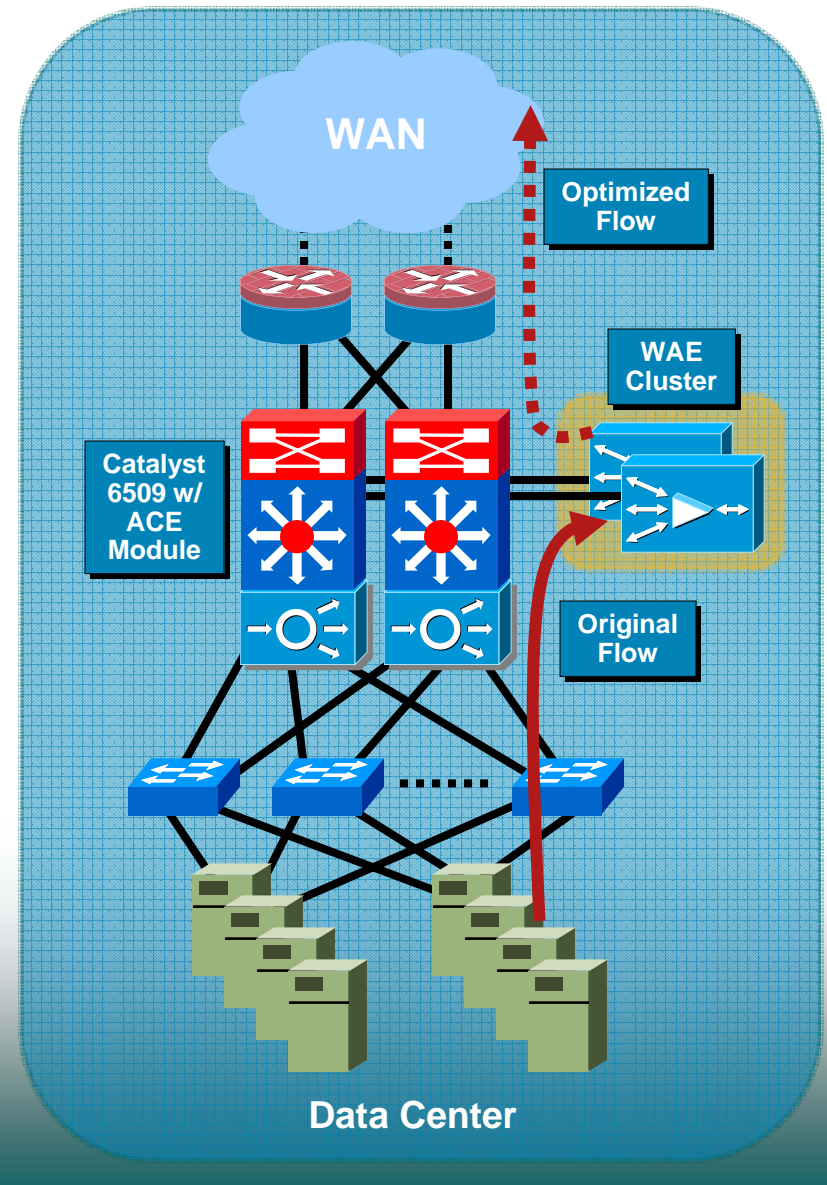
# Scalable Data Center Integration

## ■ Application Control Engine (ACE)

- Appliance and Catalyst 6500 series module provide industry-leading scalability and performance
- 1Gbps to 64Gbps of aggregate throughput
- Up to 4M concurrent TCP connections

## ■ Asymmetric Optimization

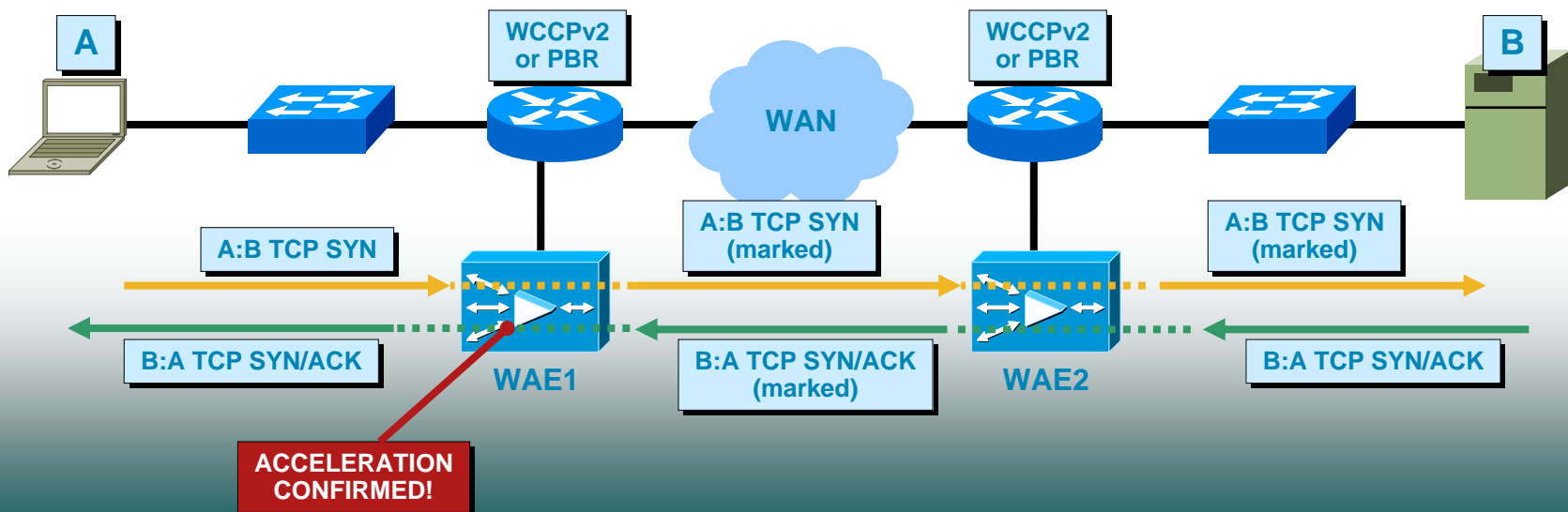
- Asymmetric optimizations complementing WAAS
- Intelligent compression
- Latency reduction for HTTP applications
- SSL offload
- TCP connection re-use



# Auto-Discovery

## *Ease of Installation and Management*

- Cisco WAAS devices automatically discover one another and negotiate optimization capabilities
- Eliminates the need for complex overlay networks with tunnels that could double management effort and break control, security, and monitoring systems





# Cisco WAE Disk Encryption

- Cisco WAE Disk Encryption

Optional feature applied against data partitions within the WAE to mitigate concern of data theft due to stolen drives or physically compromised WAE devices

Keys fetched from CM upon boot and stored in memory only, WAE will pass-through if keys are unavailable

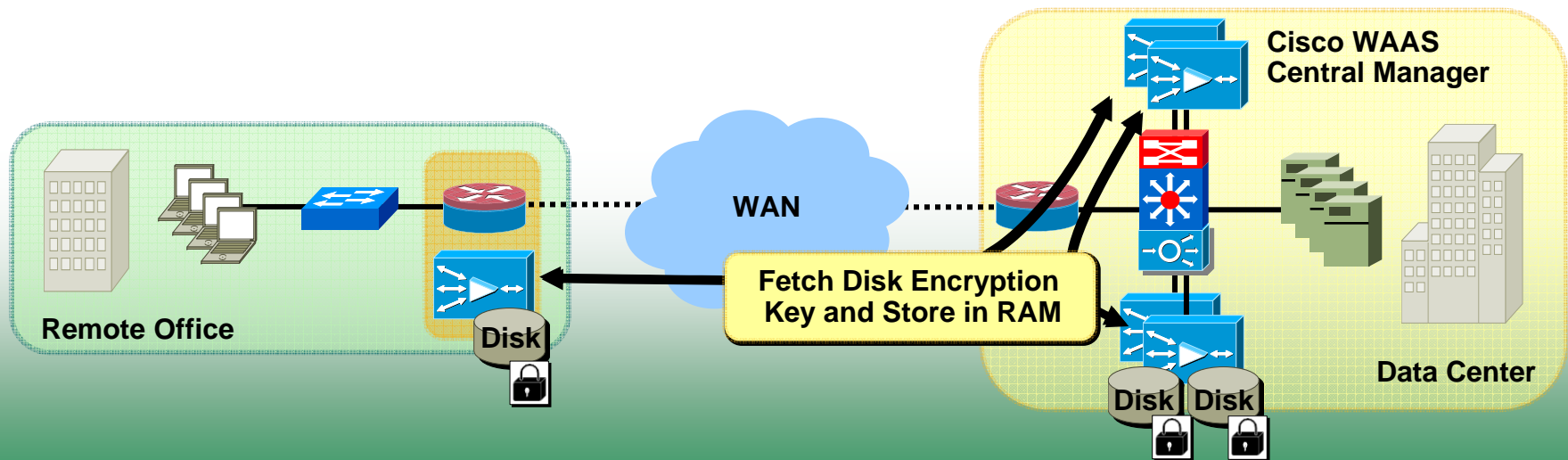
Keys synchronized amongst Central Managers to ensure high availability

- Standards-Based Strong Encryption

Follows FIPS 140-2 level 2 specification with certification to follow

256-bit Advanced Encryption Standard (AES) cipher, which is the standard for US Government data protection and the strongest commercially-available encryption

Cisco WAAS is 'In Evaluation' with Common Criteria certification



# Scalable, Secure Central Management

- Centralized Management

  - Robust management, monitoring, and reporting for up to 2500 nodes

  - Device grouping for simplified rollout of configuration changes

  - Device and system alarms, as well as integration with SNMP and syslog

- Secure Management Platform

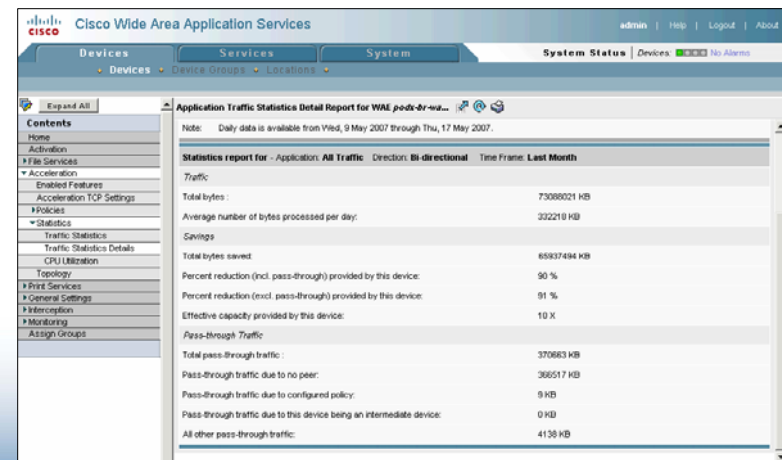
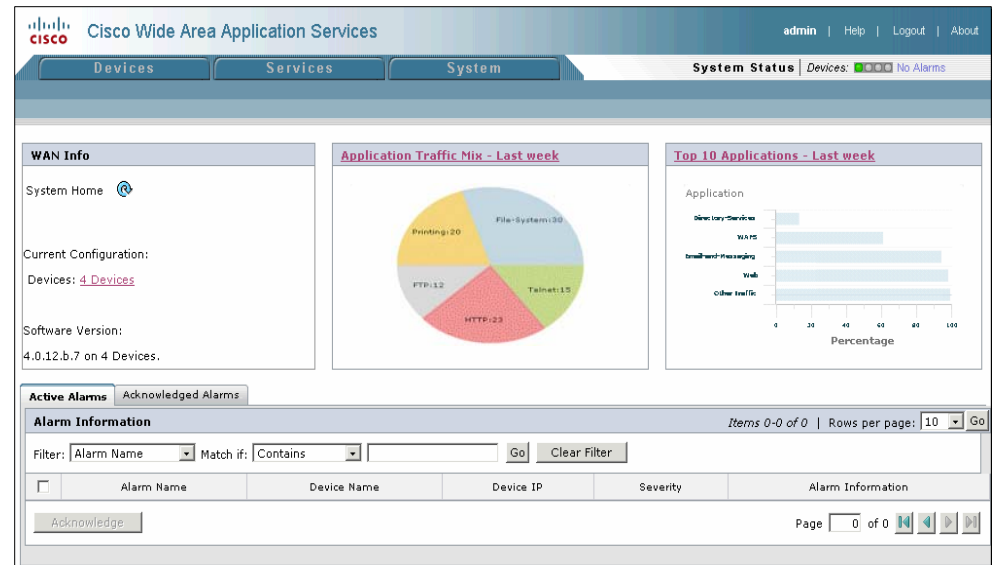
  - SSL-encrypted HTTP GUI and intra-device communication

  - Roles-based Access Control (RBAC) to isolate users to specific capabilities and domains of management

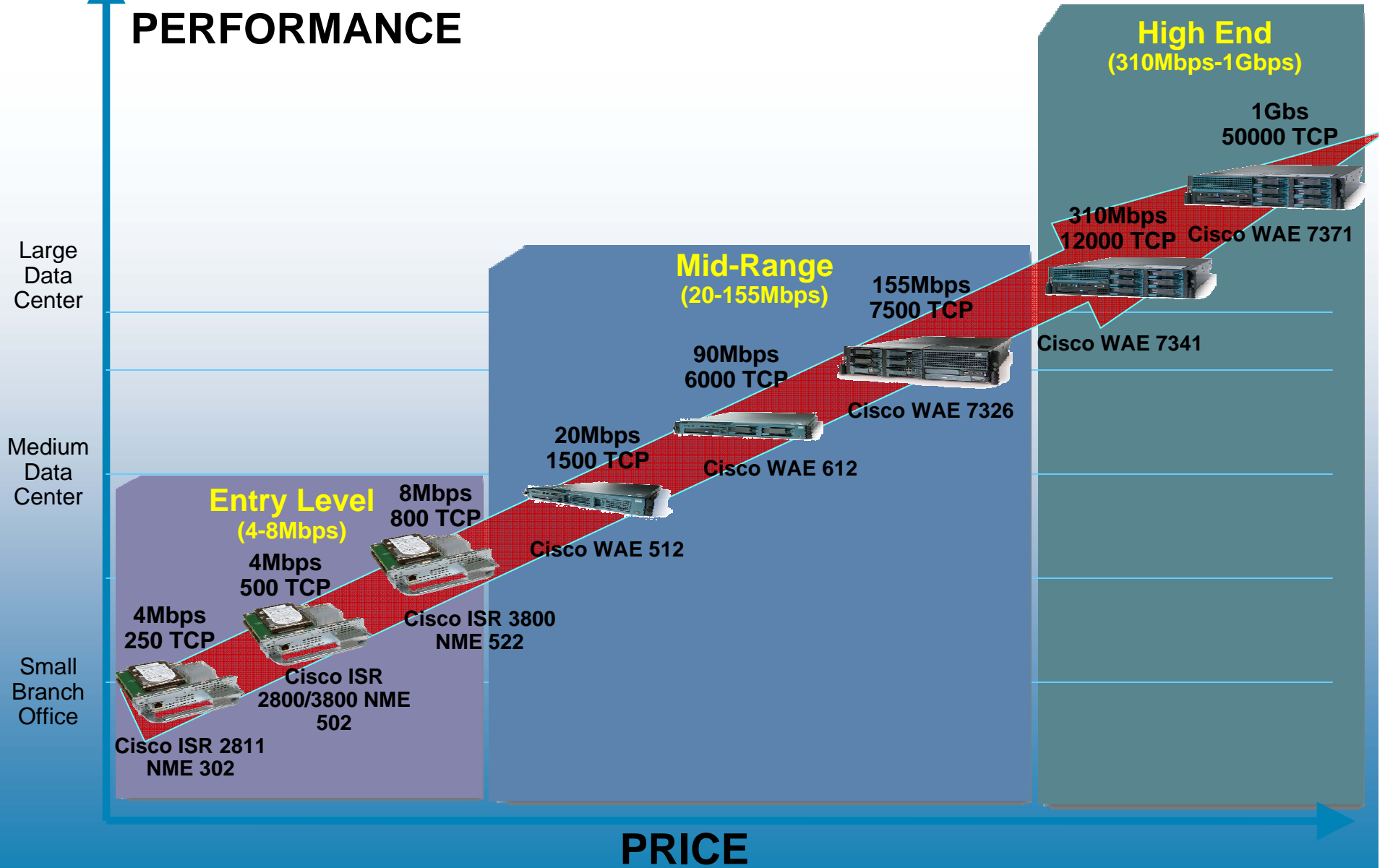
  - Integrated IOS-like CLI accessible via SSH (also telnet, serial)

- High Availability Configurations

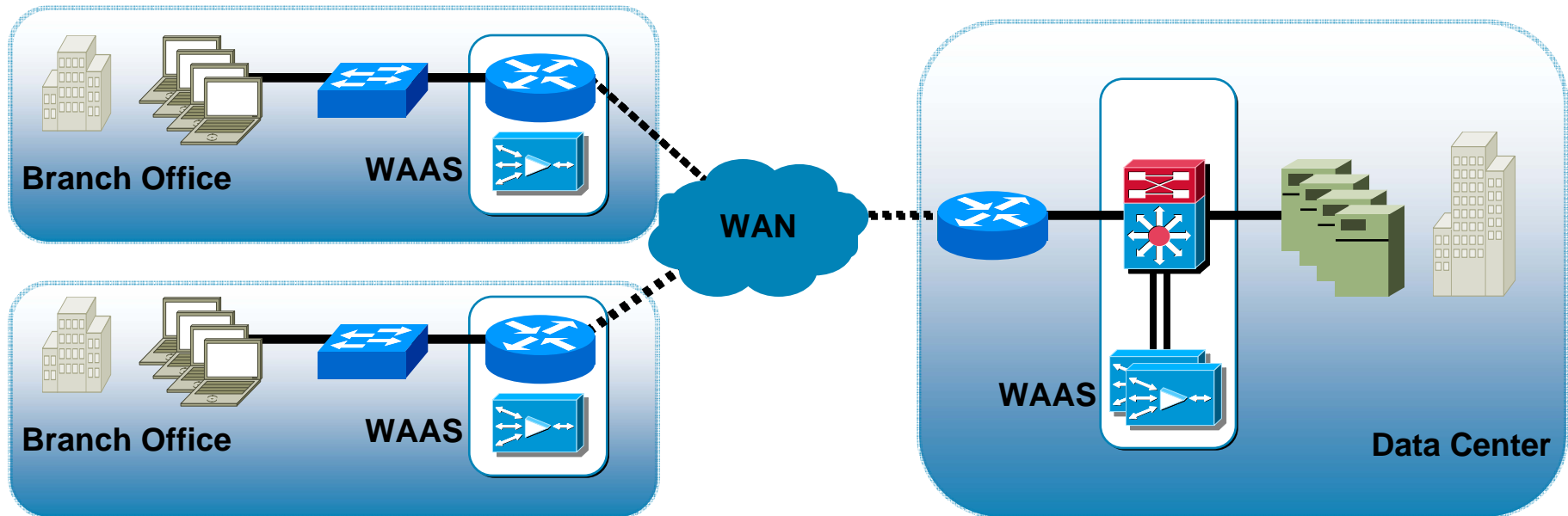
  - Active/standby deployments with automatic failover, replication of Central Manager database, and encryption keys



# Cisco WAE Model Line Up



# Cisco WAAS Summary



## Solutions and Benefits

- Application acceleration
- Branch and data center consolidation
- WAN bandwidth optimization
- Improved data protection & compliance

## Technologies

- Compression & acceleration
- Router integration
- Security integration
- Application perf. mgmt. integration

## Key Success Factors

- Most secure WAN acceleration
- Highest scalability and performance
- Best reliability and interoperability
- Lowest Total Cost of Ownership



