CISCO WIDE AREA APPLICATION SERVICES (WAAS) OPTIMIZATIONS FOR EMC AVAMAR

INTRODUCTION

Enterprise organizations face numerous challenges when delivering applications and protecting critical business data at remote offices. As the global workforce continues to become more distributed, providing adequate service levels throughout the organization becomes increasingly difficult, causing IT organizations to deploy costly and difficult-to-manage infrastructure at each location, including file services, e-mail, video, software distribution, print services, and more.

Protecting critical remote office data using traditional backup methods can be a nightmare as data continues to grow. Key challenges include a lack of trained local staff, limited WAN bandwidth, the high cost of obtaining additional bandwidth (if available), failure-prone local equipment, manual processes, and lack of centralized management. Shipping tapes offsite for disaster recovery can lead to data loss or theft, exposing the company to significant financial risk. As a result, it's no surprise that remote office data protection is top of mind for most enterprise IT executives.

The award-winning Cisco® Wide Area Application Services (WAAS) solution can be deployed with EMC® Avamar® solutions to improve WAN backup, replication and application performance, and enable IT organizations to better consolidate distributed infrastructure.

EMC AVAMAR SOLUTION OVERVIEW

EMC® Avamar® backup and recovery software with integrated source/global data de-duplication solves the challenges associated with traditional backup, enabling fast, efficient protection for remote offices, VMware environments, and data center LANs. Unlike traditional backup solutions, Avamar identifies redundant data segments at the source (client) - before data is transferred across the network. By moving only new, unique sub-file data segments, Avamar delivers fast daily full backups while reducing the required daily network bandwidth by up to 500x. This allows companies to utilize existing network bandwidth for backup and disaster recovery of remote offices and data centers, despite slow or congested networks and infrastructure. Data can be encrypted both in flight and at rest for added security, and centralized management makes protecting hundreds of remote offices easy and efficient.

By storing just a single instance of each sub-file data segment globally, Avamar also reduces total back-end disk backup storage by up to 50x, enabling cost-effective disk-based recovery over extended periods of time. While EMC Avamar backs up data to disk, it can also work with existing tape and traditional backup software such as EMC NetWorker®. Finally, Avamar's grid architecture provides online scalability, and patented redundant array of independent nodes (RAIN) technology provides high availability. Key Avamar capabilities include:

- Backup data is de-duplicated at the source (client) – before transfer across the WAN

- Enables fast, daily full backups across existing networks and infrastructure

- Reduces required daily network bandwidth by up to 500x

- Enables efficient VMware backups via Guest, ESX Service Console, and VCB proxy server

- Up to 10x faster backups

- Backup data encrypted in flight and at rest

- Patented RAIN technology provides fault tolerance across nodes and eliminates single points of failure

- Scalable grid architecture makes it easy to increase performance and capacity when needed

- Global data de-duplication reduces total backup disk storage by up to 50x

- Data recoverability and Avamar server integrity verified daily - no surprises

- Centralized Web-based management

- Simple one-step recovery

- Flexible deployment options, including software only, EMC Avamar Data Store and Avamar Virtual Edition (virtual appliance)

CISCO WAAS SOLUTION OVERVIEW

Cisco Wide Area Application Services (WAAS) is a powerful application acceleration and WAN optimization solution for the branch office that improves the performance of any TCP-based application operating in a WAN environment. With Cisco WAAS, IT organizations can offer LAN-like application performance to centralized applications for any employee, regardless of location, and for a wide variety of enterprise applications delivered across the WAN.

Cisco WAAS provides a solution that not only allows consolidation of distributed servers and storage, but also improves the performance of applications that traverse the WAN while minimizing the amount of required WAN bandwidth. Cisco WAAS overcomes problematic WAN conditions to dramatically increase throughput and improve application performance. In this way, Cisco WAAS provides value to nearly any TCP-based application, including applications provided by EMC Avamar.

Cisco WAAS couples application acceleration and WAN optimization capabilities so that remote office workers can access centralized servers, storage, and application infrastructure with LAN-like performance. Its features include the following:

• **Application acceleration:** Cisco WAAS mitigates latency and bandwidth through advanced protocol optimizations, including read-ahead, message prediction, and caching. This application-specific acceleration, has been developed and validated with application vendors for Microsoft Exchange; for HTTP applications from Oracle, SAP, and Microsoft SharePoint; and for Windows print services and UNIX network file server (NFS) services. Cisco WAAS v4.1 provides acceleration of SSL encrypted traffic over HTTP without compromising the security of customers' existing trust models by helping ensure that server private keys never leave the data center. Furthermore, Cisco WAAS 4.1 accelerates the widest range of enterprise SSL traffic, including deployments that require HTTP proxy, client certificates, and real-time certificate revocation checks.

• **Throughput optimization:** Cisco WAAS improves behavior of transport protocols to make them more efficient in WAN environments.

• **Bandwidth optimization:** Cisco WAAS reduces the transmission of redundant data patterns through Cisco WAAS Data Redundancy Elimination (DRE) and compression.
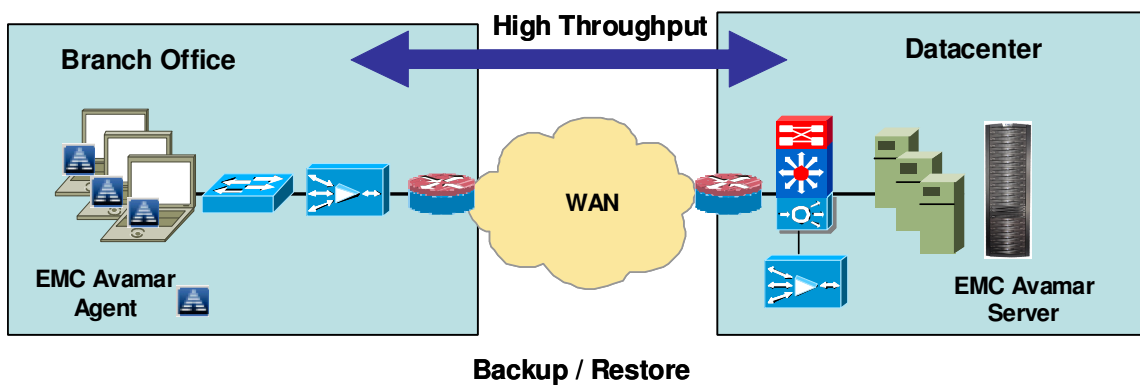
CISCO WAAS AND EMC AVAMAR

When IT organizations deploy EMC Avamar and Cisco WAAS together, the following key benefits are realized:

- Increase user productivity by enhancing the user experience for business applications such as email, Microsoft Office, file sharing, SharePoint, SAP, and Oracle applications

- Backup data is de-duplicated at the source (client) – before transfer across the WAN

- Fast, daily full backups and daily replication for disaster recovery – even across high latency or low quality network links

- Reduce the cost of branch-office operations by centralizing IT resources such as file and print servers and storage backup tapes in the data center.

- Reduce costs by reducing, deferring, or eliminating the need for WAN bandwidth upgrades

- Deliver live video to the branch office without requiring expensive bandwidth upgrades or complex configuration of the network that increases operating costs

- Increase IT agility by reducing the amount of time and resources required to deliver new IT services to the branch office without causing device sprawl

- Consolidated infrastructure, yielding lower costs and simplified manageability

As shown in Figure 1, EMC Avamar easily integrates with Cisco WAAS solutions.

Figure 1 – Typical Deployment Using Cisco WAAS with EMC Avamar

Deploying Cisco WAAS with EMC Avamar provides significant performance benefits when backing up or replicating remote data over long distances or international network links that suffer from high latency or poor network quality. Cisco and EMC have worked together to deliver this joint solution, collaborating on lab setup, solution testing, and validation of test results. Cisco and EMC jointly validate that the lab setup and solution testing represent best efforts in creating a realistic customer deployment and accurate documentation of such deployment
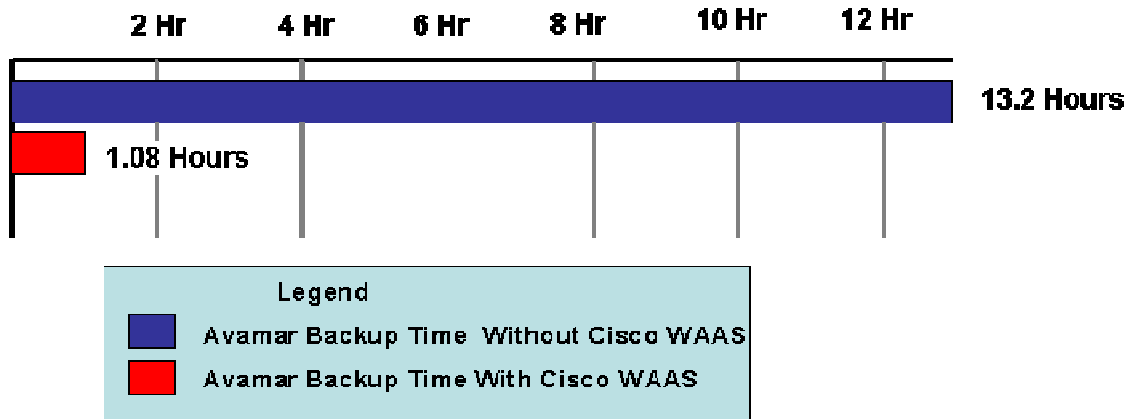
For example, in an environment with a DS3 (45 Mbps) WAN link between two locations, 230 milliseconds (ms) of round-trip time (RTT) latency and 0.5% packet loss, Cisco WAAS increased EMC Avamar performance by up to 13x, reducing the backup window from approximately 13 hours to just over 1 hour .

In another scenario with an E1 (2 Mbps) WAN link between two locations, 150 milliseconds (ms) of round-trip time (RTT) latency and 0.5% packet loss, Cisco WAAS increased EMC Avamar performance by reducing backup time from approximately 5 hours to less than 3 hours.
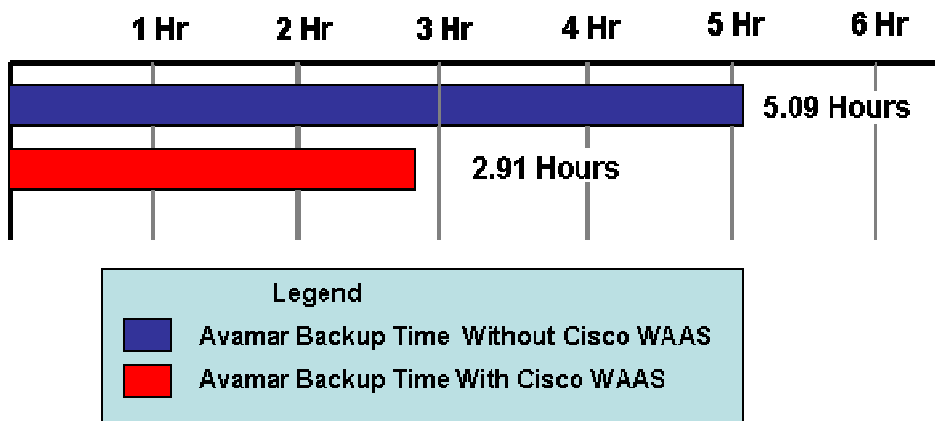
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As shown in Figure 2, combining EMC Avamar and Cisco WAAS can dramatically increase backup and replication performance even across high latency or low quality WAN links. Please note that performance improvements depend on WAN conditions, data, and other factors that may vary in your environment.

Figure 2 – Performance Benefits Using Cisco WAAS with EMC Avamar

Performance over DS3 link (45 Mbps) with 230 ms RTT latency and 0.5% packet loss

| | 2 Hr | 4 Hr | 6 Hr | 8 Hr | 10 Hr | 12 Hr |

13.2 Hours

1.08 Hours

Legend
Avamar Backup Time Without Cisco WAAS
Avamar Backup Time With Cisco WAAS

Performance over E1 link (2 Mbps) with 150 ms RTT latency and 0.5% packet loss

| | 1 Hr | 2 Hr | 3 Hr | 4 Hr | 5 Hr | 6 Hr |

5.09 Hours

2.91 Hours

Legend
Avamar Backup Time Without Cisco WAAS
Avamar Backup Time With Cisco WAAS

SUMMARY

IT departments face several critical challenges to control costs, facilitate data availability and recoverability, and use technology to help enterprises overcome potential disasters. Cisco WAAS enables IT departments to take advantage of the business, compliance, and operational benefits of branch-office consolidation and application centralization while removing the performance effects of delivering applications and data across the WAN. It accelerates applications over the WAN, enables IT departments to centralize applications and storage in the data center while maintaining LAN-like application performance.

EMC® Avamar® backup and recovery software with integrated source/global data de-duplication solves the challenges associated with traditional backup, enabling fast, efficient protection for remote offices, VMware environments, and data center LANs. By identifying redundant data segments at the source (client) - before data is transferred across the network – Avamar enables fast, daily full backups even across congested networks and infrastructure.

Deploying Cisco WAAS with EMC Avamar can significantly increase backup and replication performance, especially over long distances or international network links that suffer from high latency or poor network quality. As a result, IT organizations can effectively meet critical data protection requirements, while utilizing existing network links and infrastructure.