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## Optimize and Accelerate Data Replication and Applications Between Data Centers

Increasing amounts of data are being transferred between data centers, driven by data replication and backup, storage requirements, and data center consolidation. Virtualization and cloud computing trends also add to the requirement for a high throughput and scalable WAN optimization solution.

BIG-IP® WAN Optimization Manager™ (WOM) overcomes network and application issues on the WAN to ensure that application performance, data replication, and disaster recovery requirements are met. The high throughput and scalable architecture of BIG-IP WOM can dramatically reduce data replication times and enable more efficient use of your existing bandwidth. These advanced optimization services are available as an add-on module on your F5 BIG-IP® Local Traffic Manager™ device or as a standalone appliance or virtual edition.

### Key benefits

#### Accelerate and encrypt WAN traffic between data centers

Optimize and secure data traffic between data centers. Get up to 20 Gbps LAN-side, TCP optimized throughput.

#### Reduce server and bandwidth usage

Save with TCP optimization, data deduplication, adaptive compression, and SSL offloading. Up to 14 Gbps LAN-side, fully optimized throughput.

#### Prioritize bandwidth

Manage traffic and prioritize bandwidth to ensure that critical applications (such as replication) across the WAN get the fastest performance.

#### Accelerate application and replication performance

Achieve faster file transfers, Microsoft Exchange mailbox replication, database backup, VM live migration, data replication, and more. Meet stringent disaster RPO and RTO objectives.

#### Consolidate WAN optimization and application delivery

Save on hardware costs, rack space, and energy consumption as well as management resources with consolidated services.

## BIG-IP WOM Architecture

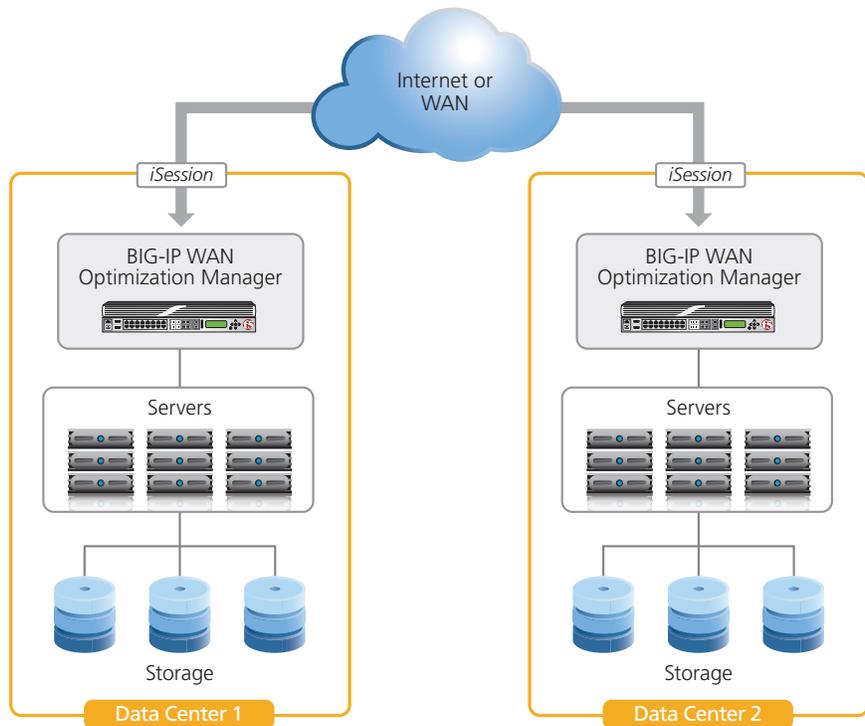
BIG-IP WOM is built natively on the F5 TMOS® unified architecture, enabling the integration of application delivery with WAN optimization technologies. This enables traditional acceleration technologies like SSL offloading, compression, caching, and traffic prioritizing to combine with optimization technologies like symmetric adaptive compression and byte-level data deduplication, reducing complexity in your data center.

BIG-IP WOM makes use of the F5 iControl® API and F5 iRules® scripting language capabilities, giving you unprecedented flexibility and control in scaling, managing, and optimizing your BIG-IP system.

### iSession

As the foundation for site-to-site communication, the iSession® network tunneling feature secures and accelerates data traveling over the WAN. Any two BIG-IP devices can be deployed symmetrically to create a site-to-site secure connection to improve transfer rates, reduce bandwidth, and offload encryption for more efficient WAN communication.

iSession creates a site-to-site secure connection to accelerate data transfer over the WAN. Organizations can realize up to 14 Gbps LAN-side, fully optimized throughput (with TCP, compression, and data deduplication).



### Symmetric encryption

Through iSession, all data can be symmetrically encrypted between two BIG-IP devices using either SSL or IPsec, providing site-to-site data security. SSL throughput is based on the level of your BIG-IP hardware platform.

## Improved Replication Performance

BIG-IP WOM can improve the performance of WAN application traffic by optimizing application protocols, prioritizing traffic, optimizing TCP from clients to servers, and reducing the amount of data sent over the WAN, helping to prevent costly bandwidth upgrades.

Quality of service (QoS) technologies ensure that critical or time-sensitive applications receive priority over others to maximize performance over the WAN. They provide granular control of traffic based on enterprise needs, enabling you to manage and prioritize bandwidth per application and improve QoS for critical applications over the WAN.

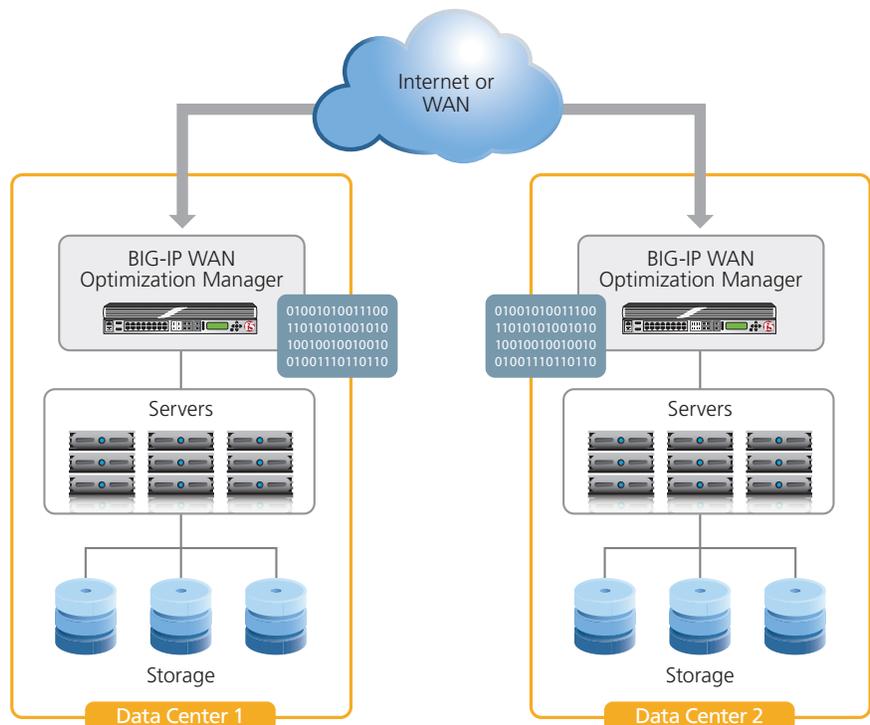
### Symmetric adaptive compression

Symmetric adaptive compression ensures the fastest data reduction for any traffic between BIG-IP systems. Symmetric adaptive compression automatically selects and uses the appropriate deflate, bzip2, or LZ0 compression algorithms (or no compression if the data cannot be compressed) to maximize bandwidth usage and throughput. In addition, symmetric adaptive compression can use BIG-IP hardware compression where available to provide unprecedented scalability.

### Symmetric data deduplication

With symmetric data deduplication, BIG-IP WOM delivers a highly advanced level of WAN optimization. This provides significantly more bandwidth for applications and effectively expands WAN capacity to improve response times and increase throughput. Redundant data is no longer transferred across the network through the use of pattern matching and byte caching technologies. Symmetric data deduplication ensures high-speed application performance and reduces the amount of data transferred over the WAN by up to 99 percent.

Symmetric data deduplication eliminates the transfer of redundant data to increase throughput and improve response times.



### Solid state drives deduplication

Data duplication can be done in memory or hard drive disks. Typically, memory-based deduplication is recommended due to the slow I/O performance of standard hard drives. However, for large volumes of data, deduplication using solid state drives (SSD) can have up to 3x improvement in replication time over memory-based deduplication. BIG-IP WOM running on the BIG-IP 11000 platform with support for 4 x 600 GB SSDs is the ideal choice for the high volume requirements of data center to data center replication or as the head end of a hub and spoke deployment.

### L7 QoS rate shaping

Network traffic management ensures that critical or time-sensitive applications receive priority over others. Layer 7 QoS rate shaping also allows for the enforcement of bandwidth minimums and maximums per application as well as burst control, which enables customers to manage and prioritize bandwidth per application and improve quality of service for critical applications over the WAN. Also, BIG-IP WOM supports Terms of Service (ToS) and Differentiated Services Code Point (DSCP). This helps enable quality of service over the WAN and rate shaping at other points on the network based on the BIG-IP device's L7 classification.

## TCP Optimization

When application performance suffers, IT managers often assume that adding bandwidth will solve the problem. But TCP throughput degrades significantly on the WAN, particularly on high-latency, intercontinental links, so adding bandwidth is often ineffective. To overcome inherent protocol limitations, BIG-IP WOM uses adaptive TCP optimization, which combines session-level application awareness, persistent sessions, selective acknowledgements, error correction, and optimized TCP windows. This enables BIG-IP WOM to adapt, in real time, to the latency, packet loss, and congestion characteristics of WAN links, to fully utilize available bandwidth and accelerate application traffic (for up to 20 Gbps LAN-side, TCP optimized throughput).

### TCP Express

F5's TCP/IP stack is standards-based and contains hundreds of improvements that affect both WAN and LAN efficiencies. For low-speed WANs, TCP Express™ detects client speed and estimates bandwidth to limit packet loss and recovery in the case of dropped packets. It improves transfer rates for all connecting client types and increases bandwidth efficiency across the WAN. TCP Express dynamically and automatically optimizes TCP window sizes and TCP congestion information for each connection (every client and every server), improving throughput in high loss networks.

## Application Protocol Optimization Across the WAN

Application performance on the WAN is affected by a large number of factors that can't be solved by adding bandwidth alone. Performance is limited by factors such as: the natural behavior of application protocols that were not designed for WAN conditions; application protocols that engage in excessive handshaking; and the serialization of the applications themselves.

### CIFS acceleration

Microsoft's remote file access protocol, common Internet file system (CIFS), is standard on Windows clients and servers and is commonly used to provide complete read/write access to files across data centers and branch offices. CIFS is a "chatty" protocol and not designed for high latency WAN environments. F5's CIFS acceleration provides intelligent read-ahead and write-behind plus other techniques to help mitigate the effect of WAN latency. This provides significant reduction in transfer times and bandwidth usage, improving performance of enterprise information transferred over the WAN.

### MAPI acceleration

Message Application Programming Interface (MAPI) is the email protocol used by Microsoft Exchange Server and Outlook clients. Use of symmetric adaptive compression and symmetric data deduplication dramatically improves performance and reduces bandwidth usage for customers using Microsoft Exchange, especially when sending email attachments.

## Flexible Deployment

BIG-IP WOM can be deployed in multiple modes to suit your existing infrastructure and network topology, and to simplify deployment.

### Inline mode

When deploying in an inline topology, BIG-IP WOM is installed in the data path behind the WAN router, in either a routed or bridged configuration.

### One-arm mode

With one-arm mode via policy-based routing (PBR), BIG-IP WOM can be deployed to optimize traffic based on specific policies on the router, making this deployment method extremely flexible for application needs.

One-arm mode via the Cisco-developed Web Cache Control Protocol v2 (WCCP) and other methods can be used to deploy BIG-IP devices with a single connection to a switch or router. With WCCP support there is no need to change network topology.

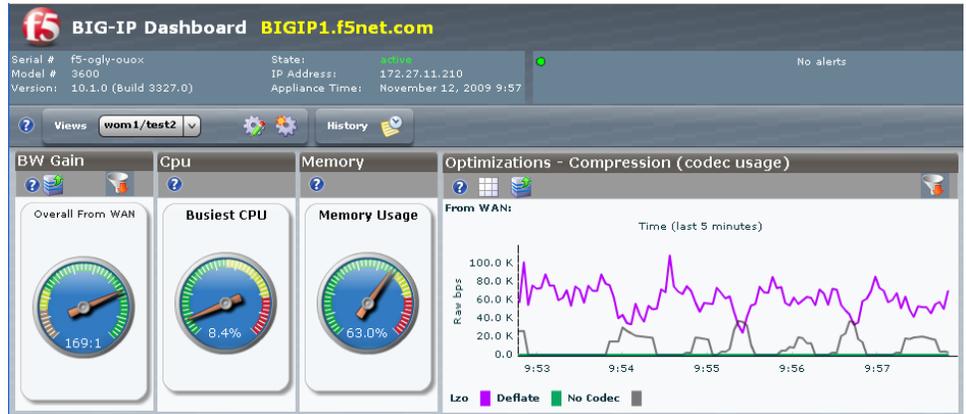
## Simplified Management

BIG-IP WOM includes an intuitive, web-based administration and management interface. Administrators can manage appliances and perform a wide variety of system level tasks such as creating custom optimization policies, disk drive provisioning, diagnosing and fixing network connectivity issues, viewing real-time traffic flows, and exporting detailed performance statistics.

### Performance dashboard

The performance dashboard offers a detailed "on-box" monitoring and reporting tool, giving administrators a quick look at real-time data, performance, and bandwidth gains for traffic optimized with BIG-IP WOM. The easy-to-use GUI provides a faster, intuitive way to find the information you need: historical statistics, log based alerts, remote peer status, health statistics, and more.

The performance dashboard provides real-time data on traffic optimized with BIG-IP WOM.



### Dynamic discovery

BIG-IP WOM drastically reduces configuration time by discovering remote BIG-IP device peers and the networks that they serve. Once a remote BIG-IP device has been discovered and a secure connection is established, the BIG-IP device then updates available networks for WAN optimization. Servers and clients that communicate across the WAN can be added or removed, without having to reconfigure the BIG-IP devices.

## BIG-IP WAN Optimization Manager Platforms

BIG-IP WOM is available as a standalone solution on the platforms listed below or as an add-on module for integration with BIG-IP Local Traffic Manager on any BIG-IP platform or BIG-IP LTM VE. For detailed physical specifications, please refer to the BIG-IP System Hardware Datasheet.



11000 Series



10000 Series



8900 Series



6900 Series



4000 Series



3900 Series



3600 Series



2000 Series



1600 Series



BIG-IP WOM Virtual Edition

## Virtual Platform

BIG-IP WAN Optimization Manager Virtual Edition (VE) offers the flexibility of a virtual software WAN optimization controller. Running on your choice of hardware, BIG-IP WOM VE can help you meet the needs of your virtualized environment.



BIG-IP WOM Virtual Edition

### Hypervisors Supported:

VMware vSphere Hypervisor 4.0, 4.1, 5.0, and 5.1 and vCloud Director 1.5  
Citrix XenServer 5.6 and 6.0  
Microsoft Hyper-V for Windows Server 2008 R2 and 2012  
KVM – Linux Kernel 2.6.32 (RHEL 6.2/6.3, CentOS 6.2/6.3)

BIG-IP Virtual Edition is also available as an Amazon Machine Image for use within Amazon Web Services.



## F5 Services

F5 Services offers world-class support, training, and consulting to help you get the most from your F5 investment. Whether it's providing fast answers to questions, training internal teams, or handling entire implementations from design to deployment, F5 Services can help you achieve IT agility. For more information about F5 Services, contact [consulting@f5.com](mailto:consulting@f5.com) or visit [f5.com/services](http://f5.com/services).

## More Information

Browse for these and other resources on [f5.com](http://f5.com) to learn more about BIG-IP WOM.

### White papers

[F5 BIG-IP WAN Optimization Module in Data Replication Environments  
Optimize and Accelerate Applications Across the WAN](#)

### Technical brief

[BIG-IP WAN Optimization Module Performance](#)

### Solution profiles

[Optimizing NetApp SnapMirror with BIG-IP WAN Optimization Module](#)

[Optimizing Oracle Data Guard with BIG-IP WOM](#)

[Optimizing Microsoft Exchange Mailbox Replication with F5 BIG-IP WOM](#)

### Case studies

[CSG's Content Direct Speeds Data Replication, Improves Bandwidth Utilization  
with F5 and Dell](#)

[Human Rights Watch Ensures High Availability for Exchange 2010 with F5](#)

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