



# WAN Optimization

Enterprises that deploy FortiOS to protect traffic between locations and to and from the cloud can also employ WAN Optimization to accelerate and secure this traffic.

## Centralize, Don't Compromise

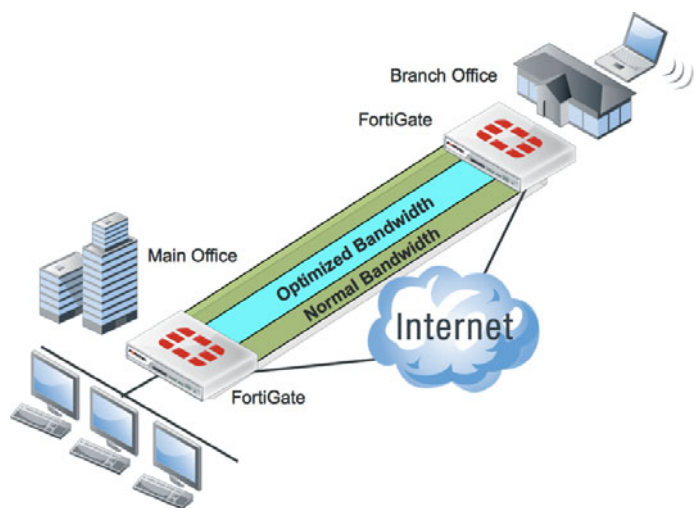
In a multi-location environment, such as an enterprise with multiple branch offices, the drive to reduce costs and consolidate resources often means that applications are centralized or provided in the cloud. Efficient and secure high-speed communication between locations and to and from the cloud is critical and remote sites don't always have access to high bandwidth. Yet, workers at all sites expect the same network performance. Often, applications designed for local area networks creep into the cloud with little consideration for user impact.

Applications such as Windows File Sharing (CIFS), email exchange (MAPI) many others may work fine on a local LAN but can suffer due to bandwidth and latency issues when being accessed over the WAN. This can result in loss of productivity, a perceived need for expensive network upgrades, and a drop in staff morale. FortiOS WAN Optimization can be a relatively inexpensive and easy to deploy solution for these problems.

FortiOS is commonly deployed in central and satellite offices and in the cloud to provide secure communications across a WAN using IPsec or SSL VPN. This installed FortiOS infrastructure can be leveraged to add more value by employing WAN Optimization to accelerate the traffic among locations and with the cloud.

## FortiOS WAN Optimization

In version 4.0, FortiOS introduced license-free WAN Optimization on all recent FortiGate devices that contain a hard drive. For the relatively low cost of a few hard drives (a one-off investment) multi-location and in the cloud organizations can now provide WAN Optimization from within FortiOS. FortiOS WAN Optimization reduces network overheads, removes unnecessary traffic from the network and de-duplicates traffic to give better overall network performance over the WAN. This optimization can provide significant cost benefits (removing the urgent need to increase internet bandwidth or for dedicated leased lines) and significantly increase employee productivity.



## Protocol optimization

Protocol optimization is effective for applications designed for the LAN that do not function well on low bandwidth high latency networks. FortiOS protocol optimization improves the efficiency CIFS, FTP, HTTP, MAPI, and general TCP sessions.

CIFS, which is a fairly "chatty" protocol, requires many background transactions to successfully transfer a single file. When transferring the file, the CIFS protocol does this in small chunks and waits sequentially for each to arrive and be acknowledged before requesting the next, creating unnecessary request/acknowledgement traffic and delaying the transfer due to its sequential nature. FortiOS WAN Optimization removes this chattiness and gets on with the job of transferring the file.

TCP protocol optimization uses techniques such as TCP SACK support, TCP window scaling and window size adjustment, and TCP connection pooling to remove common WAN TCP bottlenecks.

## Web Caching (file caching)

In a multi-location environment, multiple users at each location often want to look at the same content (for example, a sales spreadsheet or a corporate presentation). Each time a user opens this information from the central file store, it is downloaded over the WAN utilizing precious resources. FortiOS Web Caching (a component of WAN Optimization) greatly reduces download times by adding web caching to WAN Optimization tunnels. Web caching caches remote files and web pages on local FortiGate devices so that repeat accesses to the same file occurs locally with zero impact to the WAN and reduced latency for the requestor since the file is downloaded locally.

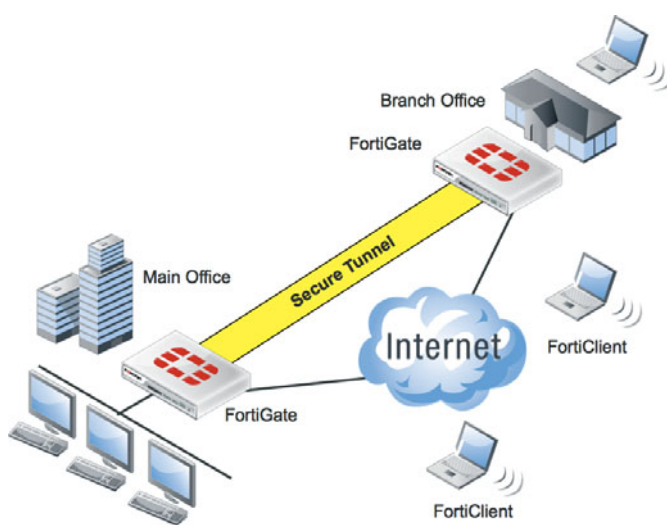
## Byte Caching

Byte caching improves on web or file caching by accelerating the download of similar but not identical content. Byte caching can accelerate multiple downloads of different email messages with the same corporate disclaimer by downloading the disclaimer over the WAN once and then downloading all subsequent disclaimers from the local FortiGate unit. Byte caching can also reduce the amount of data crossing the WAN when multiple different emails with the same or similar attachments or different versions of an attachment are downloaded from a corporate email server to different locations over the WAN.

Byte caching breaks large units of application data (for example, an email attachment or a file download) into small chunks of data, labeling each chunk of data with a hash of the chunk and storing those chunks and their hashes in a database on the local FortiGate unit. Then, when a remote user requests a file, instead of sending the actual data over the WAN tunnel, WAN Optimization sends the hashes. The FortiGate unit at the other end of the network reassembles the data from the stored hash database. In addition to reducing the amount of data downloaded across the WAN, byte caching is not application specific and can help to accelerate all of the protocols supported by WAN Optimization.

## SSL acceleration

SSL is used by many organizations to keep WAN communications private. WAN Optimization leverages the SSL acceleration properties of FortiGate FortiASIC hardware by accelerating SSL traffic across the WAN. The FortiGate unit can handle SSL encryption/decryption for corporate servers that provide SSL encrypted connections over the WAN.



## VPN replacement

FortiOS WAN optimization supports secure SSL-encrypted tunnels between FortiGate units on the WAN. Employing secure WAN Optimization tunnels can remove the need for IPsec VPN tunnels or SSL VPN configurations between sites. The result is a single relatively simple configuration that supports optimization and privacy of communications across the WAN and uses FortiGate SSL acceleration to maintain high performance.

## Road Warriors and Home Workers

The drive to give employees greater flexibility and to reduce operational costs has led to more remote and home working. Whether accessing the office from a hotel, public wireless hotspot or home, the problem is

often the same, low bandwidth and high latency harming application performance. WAN Optimization is integrated into FortiClient Endpoint Security to optimize communication remote workers and their offices.

## Conclusion

WAN Optimization is not new, it has been around for several years with many vendors provide standalone solutions. FortiOS WAN Optimization has the advantage of combining WAN Optimization functionality with UTM security. The benefits of this combination include:

- Reduced capital outlay, organizations only need to purchase a single device per location for security and performance
- Reduced licensing cost, no need to license more devices
- Reduced network complexity, single device to at each location. The need for fewer devices can be crucial for retail and small offices that may not have the space or power connections for multiple devices.