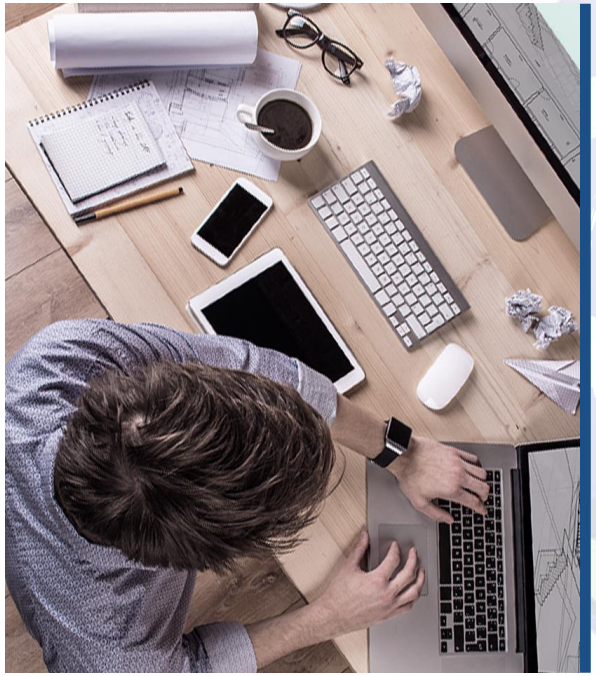
SANGFOR WANO

Chapter 2

Acceleration Technology



1. WANO Acceleration Technology Overview
2. Transport Protocol Optimization
3. Data Reduction
4. Application Acceleration

1. WANO Acceleration Technology Overview

SANGFOR
深信服科技

WANO Accelerated Technology Classification

Sangfor WANO Acceleration techniques fall into the following categories:

- Transport Protocol Optimization
- Application acceleration
- Data reduction

Sangfor WANO Acceleration Technology

1. **Improving transmission efficiency, improving traditional transport protocol**

(High Speed TCP & Packet loss comp. TCP & HTP-UDP)

2. Application acceleration

(Application Proxy)

- **TCP Proxy**
- **HTTP/HTTPS Proxy**
- **FTP Proxy**
- **Network Neighbour Proxy**
- **POP3/SMTP Proxy**
- **RDP Proxy**
- **Citrix Proxy**
- **Oracle ebs Proxy**
- **Exchange Proxy**

3. Data reduction

(Byte cache, compression technology)

2. Transport Protocol Optimization

SANGFOR
深信服科技

Traditional TCP transport protocol

What are the problems with the traditional TCP protocol?

- The TCP protocol is a connection-oriented, reliable transport protocol. At the beginning of the protocol design, the network has just emerged, which is completely incomparable compared with the current network throughput. Therefore, when the TCP protocol is designed, its congestion control mechanism adopts a "slow rise, fast fall" approach. In the face of the network conditions at the time, it is a better choice to avoid network congestion.

- But for the current network throughput, such a mechanism has greatly limited the speed of cross-network access: When the network environment is good, the sliding window size of the transmission grows slowly, but the window is only 64K at the maximum. However, in the process of transmission, once the packet loss occurs, the window size will be reduced to half of the original window. At the same time, all data after the packet lost in the window will be retransmitted after the packet is lost. It can be seen that the traditional TCP protocol faces slow growth of transmission speed, poor strain control mechanism, and low efficiency of retransmission mechanism. It is difficult to make data reach the actual throughput speed of the network in the packet loss and delay environment.

Transport Protocol Optimization

Improving the traditional transmission protocol is an effective means to improve the quality of the WAN link and ensure the stable operation of the network.

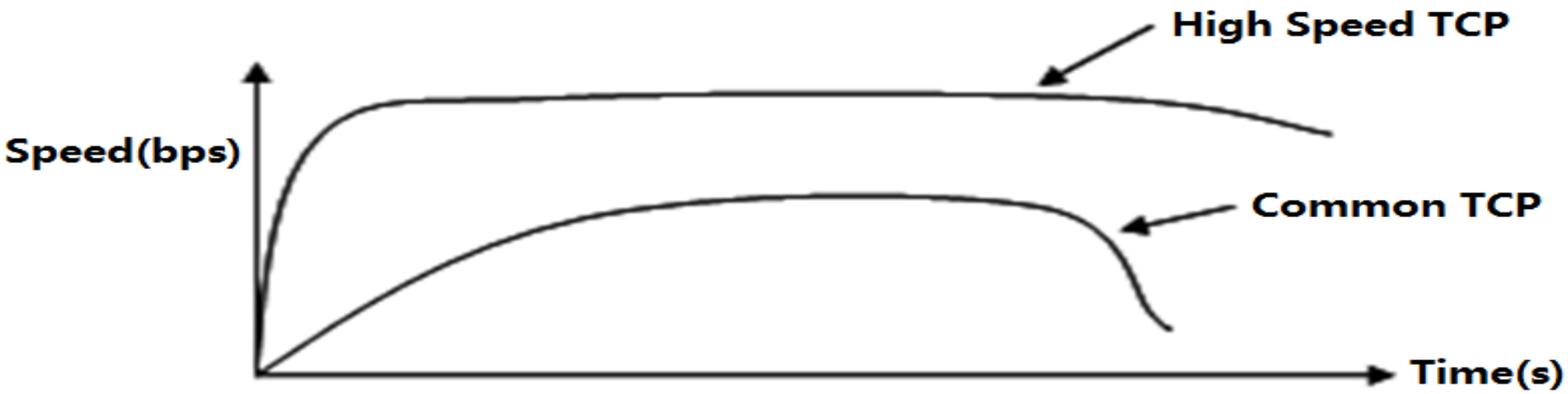
Sangfor WANO's improvements to the transport protocol are as follows:

- HTP protocol
- High-speed TCP

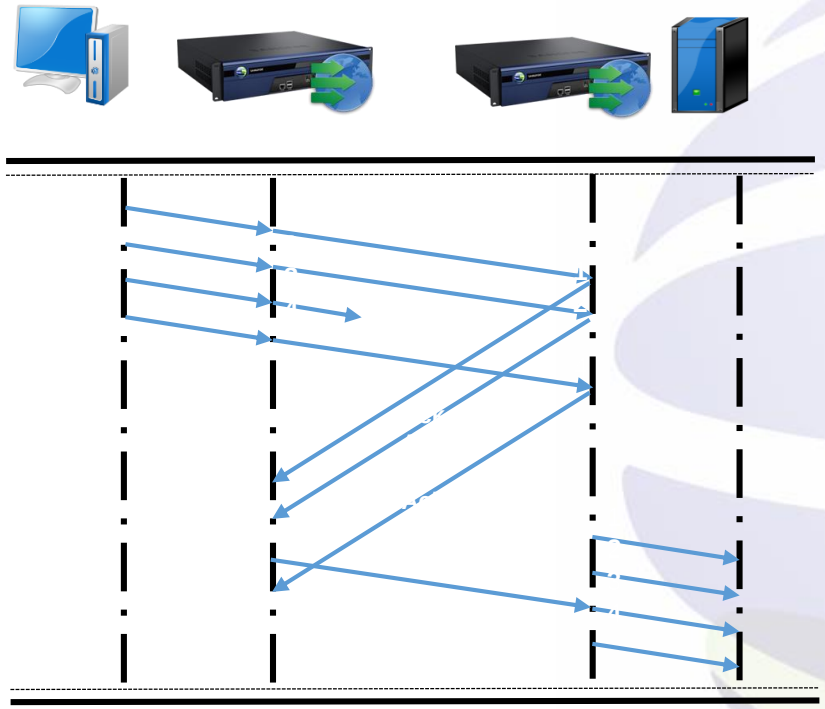
Transport Protocol Optimization(High-speed TCP)

- Common TCP protocol is not ideal over high-bandwidth, high-latency, and packet loss environment (TCP sliding window slowly rise, decline quickly mechanism).

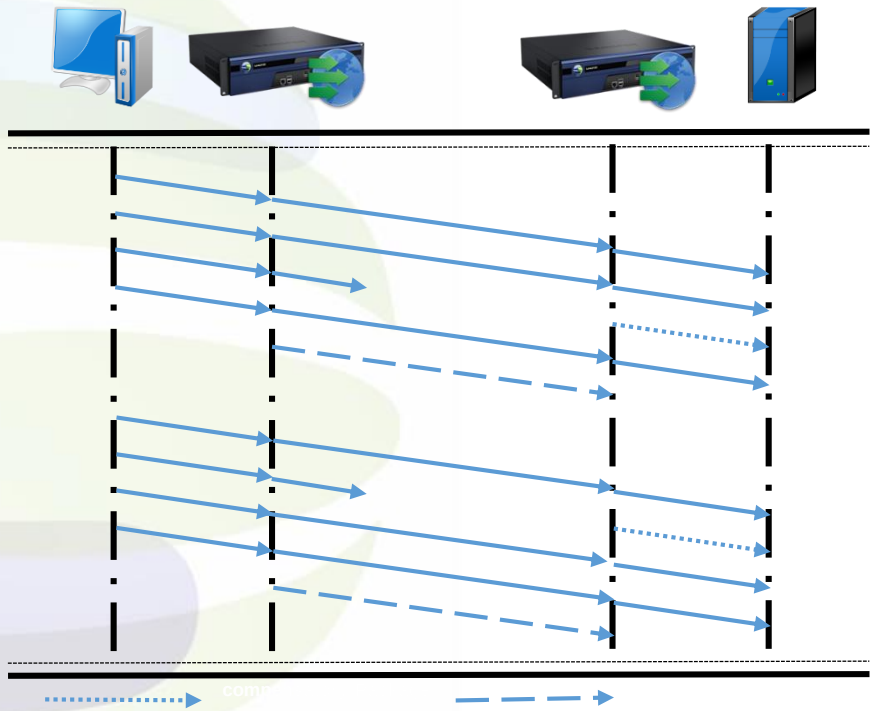
- High-speed TCP transmission reduce delay and packet loss rate (improve TCP sliding window mechanism, rising fast, slow down, improving transmission efficiency).



Transport Protocol Optimization (HTP-UDP)



HTP-UDP



UDP Proxy
Designed for links with low latency, high packets loss

FEC algorithm
Designed for links with high latency

HTP(UDP packet) is based on UDP design for high packet loss environment
Especially for video conference optimization.

3. Data Reduction

SANGFOR
深信服科技

Data Reduction

Sangfor WANO uses the following techniques for data reduction for transmission data:

- Byte Cache
- Compression Algorithm
- IP traffic compression

Byte Cache

Traditional caching: file caching

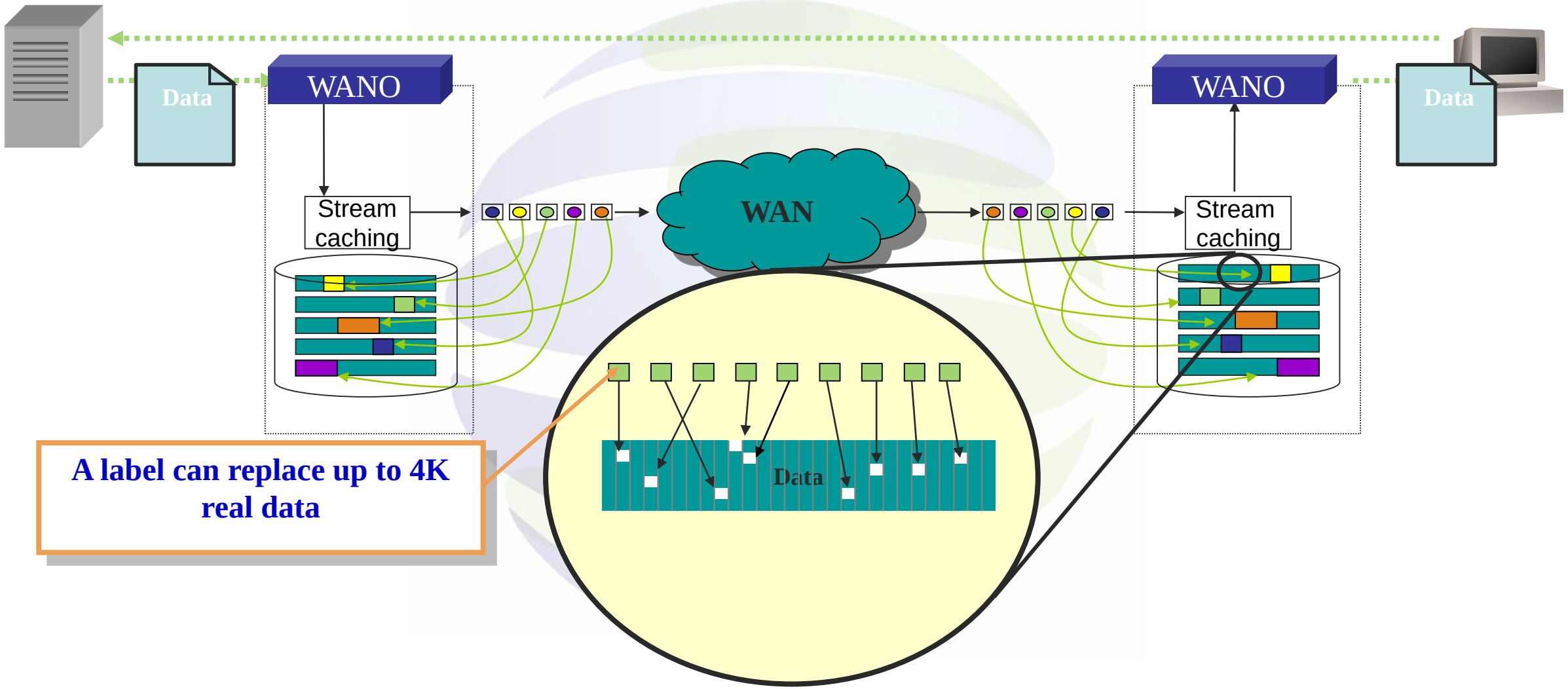
The file is cached on the gateway device. When the user accesses the file, the file is actually obtained from the local gateway device, and the file on the remote server is not directly accessed.

What are the disadvantages of traditional caching?

The real-time nature of the file cannot be guaranteed. If the file on the server is updated, the user may be accessing the previous version.

If there is a small change in the file on the server, for example, if a 1MB package file is added to a 100MB ZIP file, the entire file needs to be retransmitted once.

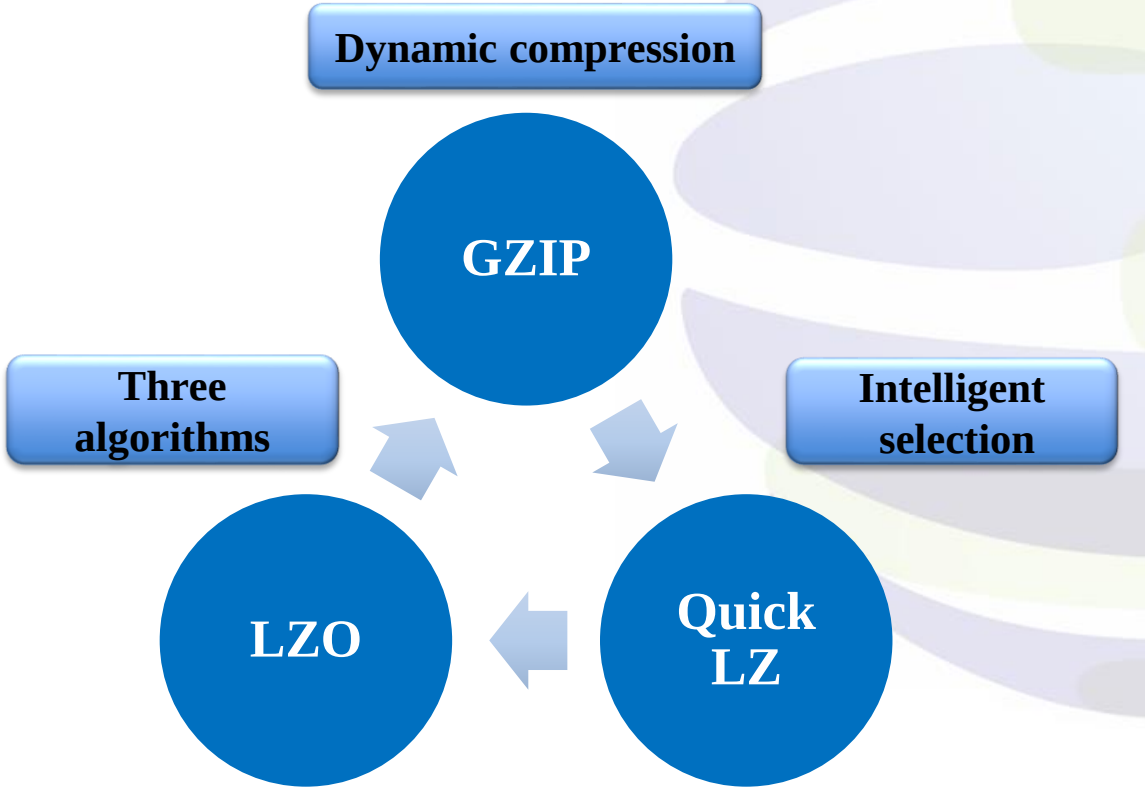
Byte Cache

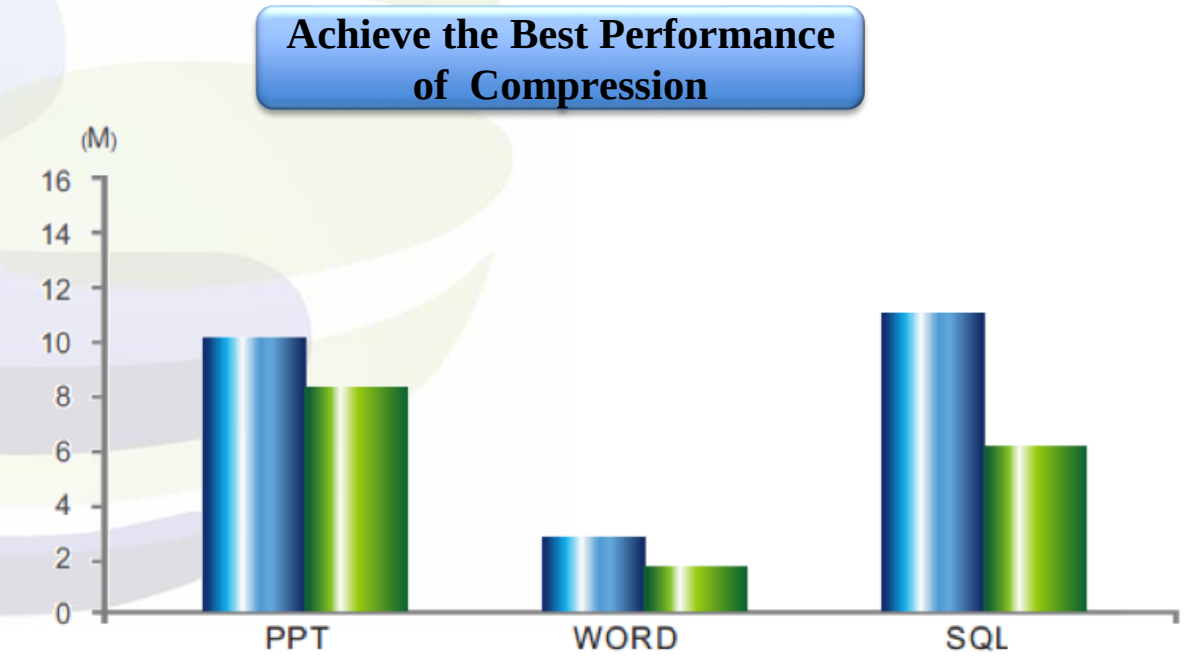


If cache disk full, WANO will clear the oldest data automatically according to the hit rate.

Compression Algorithm

LZO algorithm is well known for its high efficient , it only need 64KB compression workspace.
GZIP is better than LZO in high redundancy data scenario, but the CPU consumption is about 15% higher than the LZO.
Quick LZ is the fastest among LZO and GZIP.
WANO default use GZIP as compression algorithm.
In WANO 8.0 and above, the Compression Algorithm used are LZO and GZIP only





4. Application Acceleration

SANGFOR
深信服科技

TCP Proxy

PC send SYN request

Intercept by WANO,
reply ACK and sends a SYN

PC replies ACK,
complete three-way handshake.

Send messages to peer and server
to establish a TCP connection

Peer send a SYN request
to server

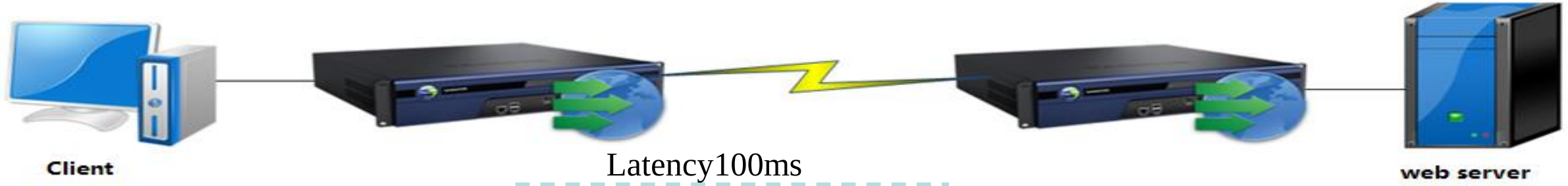
Server reply ACK and send SYN

Peer send ACK again,
complete three-way handshake.

Reduce 2-way handshake in WAN

Web Push(Http proxy)

Disabled Web Push technology to get the web page



Latency100ms

HTTP GET request

http://200.200.0.20/index.php

IE found the page contains an image http://200.200.0.20/show.gif

HTTP GET request

http://200.200.0.20/show.gif

In this case, HTTP GET need to transmit 4 times in WAN, and it takes 400ms.

Web Push(Http proxy)

Enable Web Push technology to access a Web server

Latency 100ms

HTTP GET Request

http://200.200.0.20/index.php

Peer found the page contains an image http://200.200.0.20/show.gif

IE found the page contains an image http://200.200.0.20/show.gif

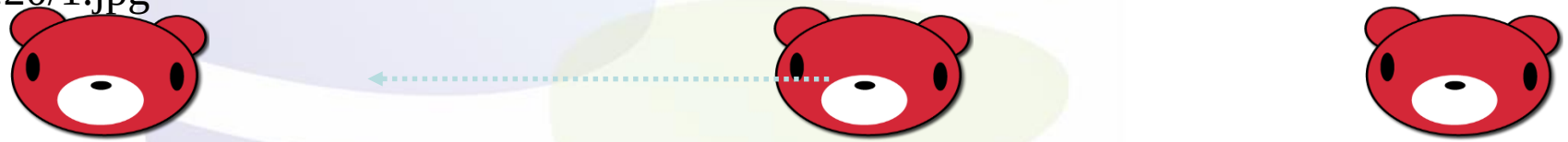
WANO directly reply the request

After enabled Web Push, HTTP GET need to transmit 2 times in WAN, and it takes 200ms.

Web Cache

1st time HTTP GET Request

http://200.200.0.20/1.jpg



2nd time HTTP GET Request

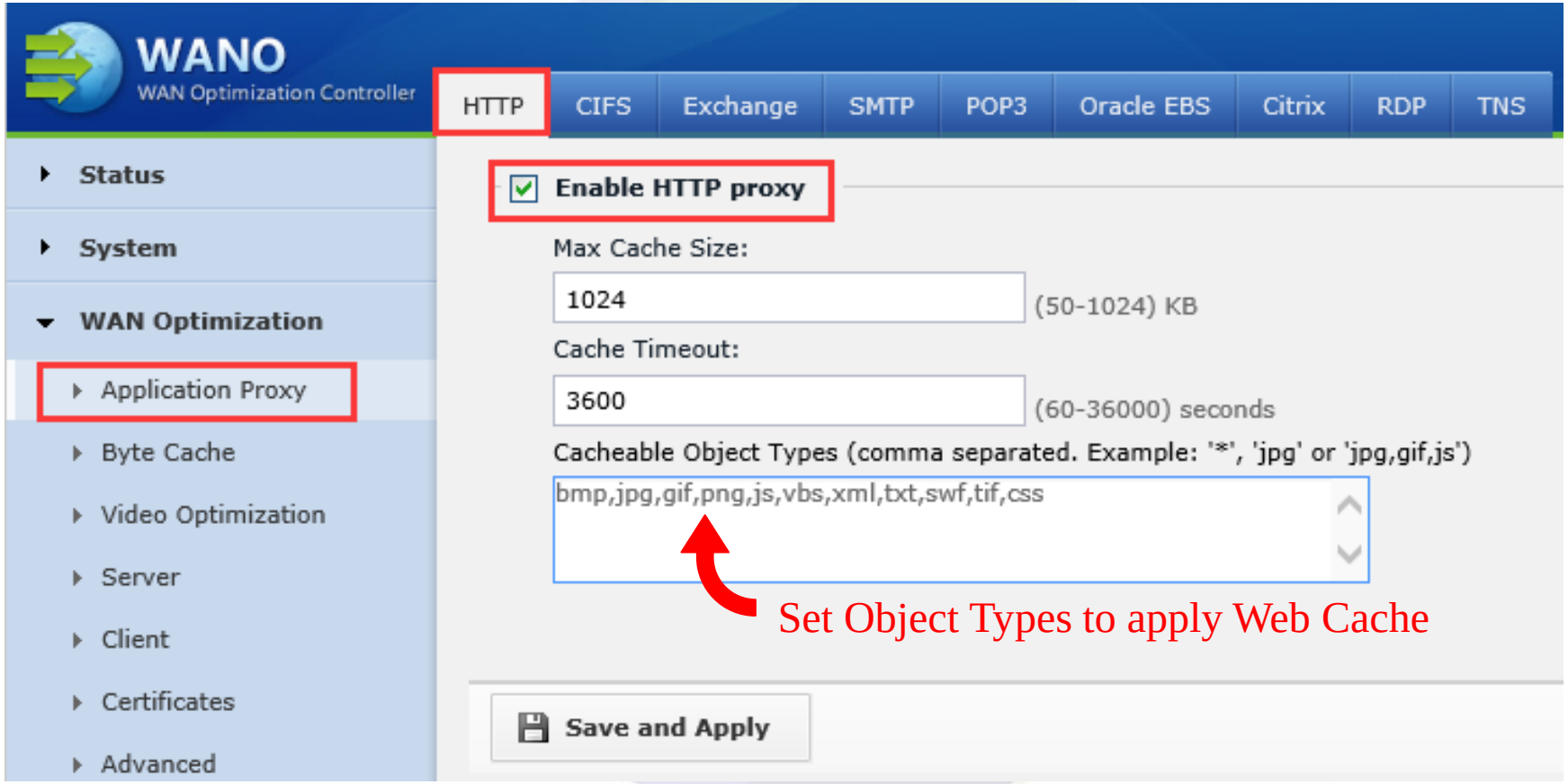
http://200.200.0.20/1.jpg

Difference between Web Cache and Byte Cache:

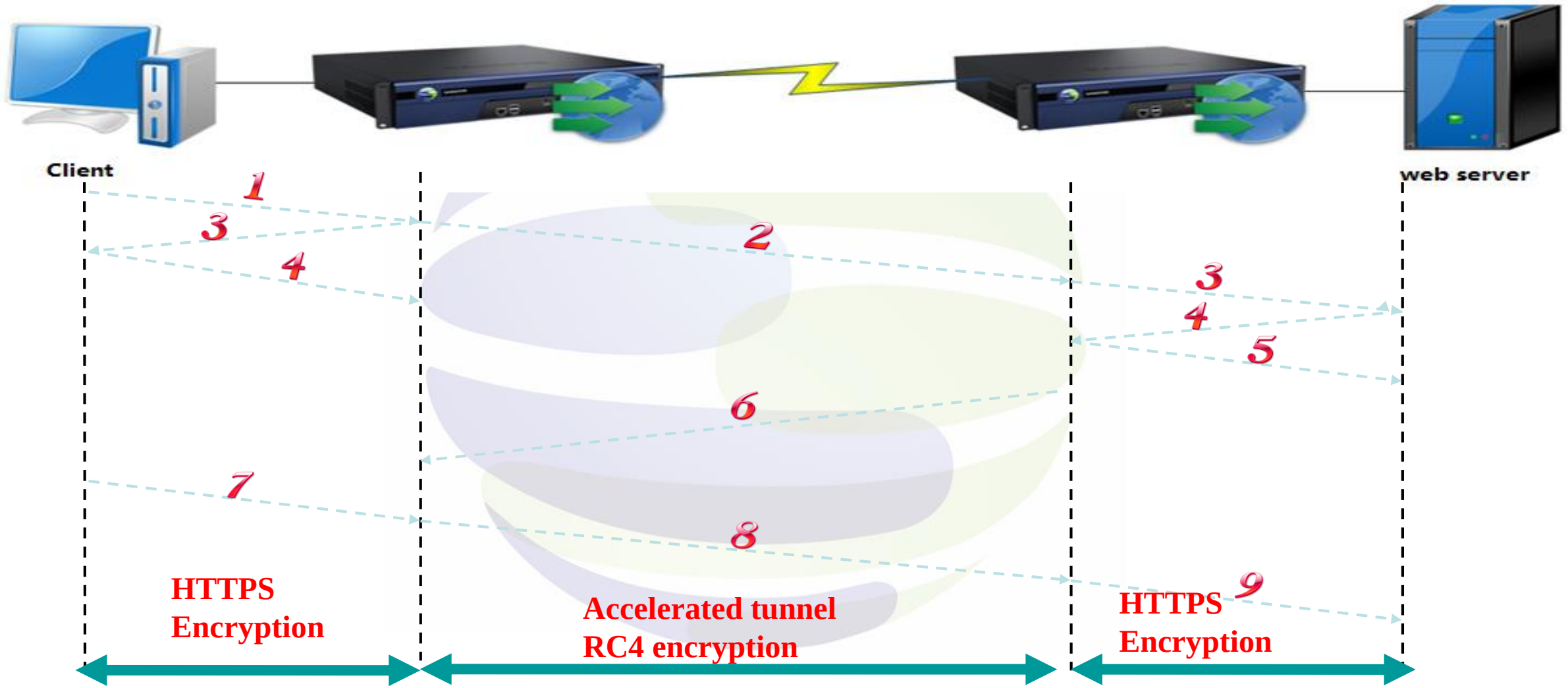
Web Cache directly store the page content. It is only valid for HTTP protocol.

Byte Cache will store the binary data of the content. It is valid for ALL protocol.

Web Push and Web Cache Configuration

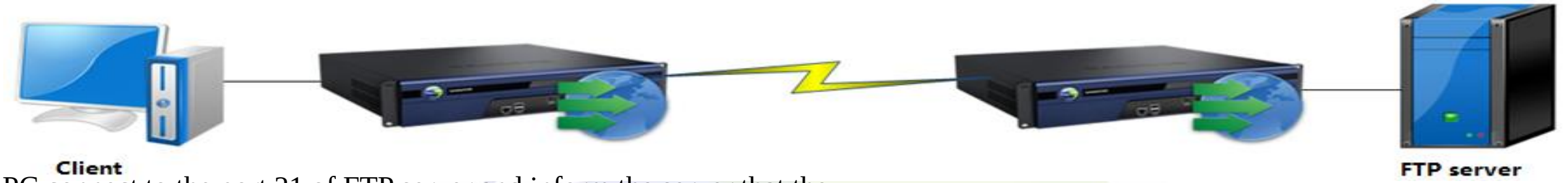


HTTPS proxy


Client
web server
1
2
3
4
3
4
5
6
7
8
9
HTTPS
Encryption
Accelerated tunnel
RC4 encryption
HTTPS
Encryption

FTP proxy

FTP server set as active mode



PC connect to the port 21 of FTP server and inform the server that the PC's port 22345 is ready to connect.

21

WANO listen to the connections and found port 22345 was opened in PC

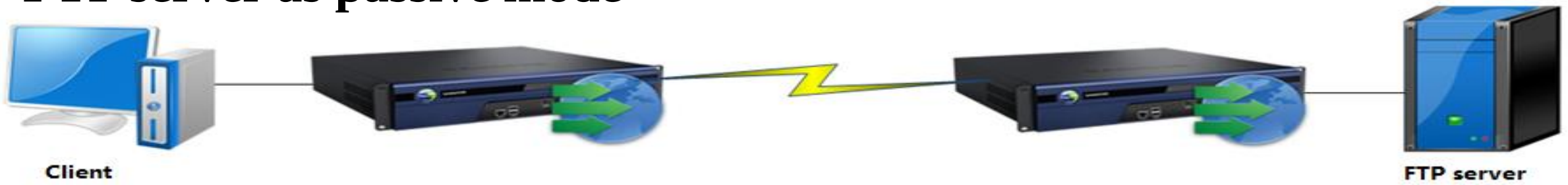
Server and client connection via port 22345 will send to the acceleration tunnel

Server is sending data

Byte cache start work

FTP proxy

FTP server as passive mode



PC connect to the port 21 of FTP server

21

WANO listens connection and found port 22345 was opened at peer.

Server reply that port 22345 is open

22345

Data from server to PC via port 22345 will be sent to acceleration tunnel

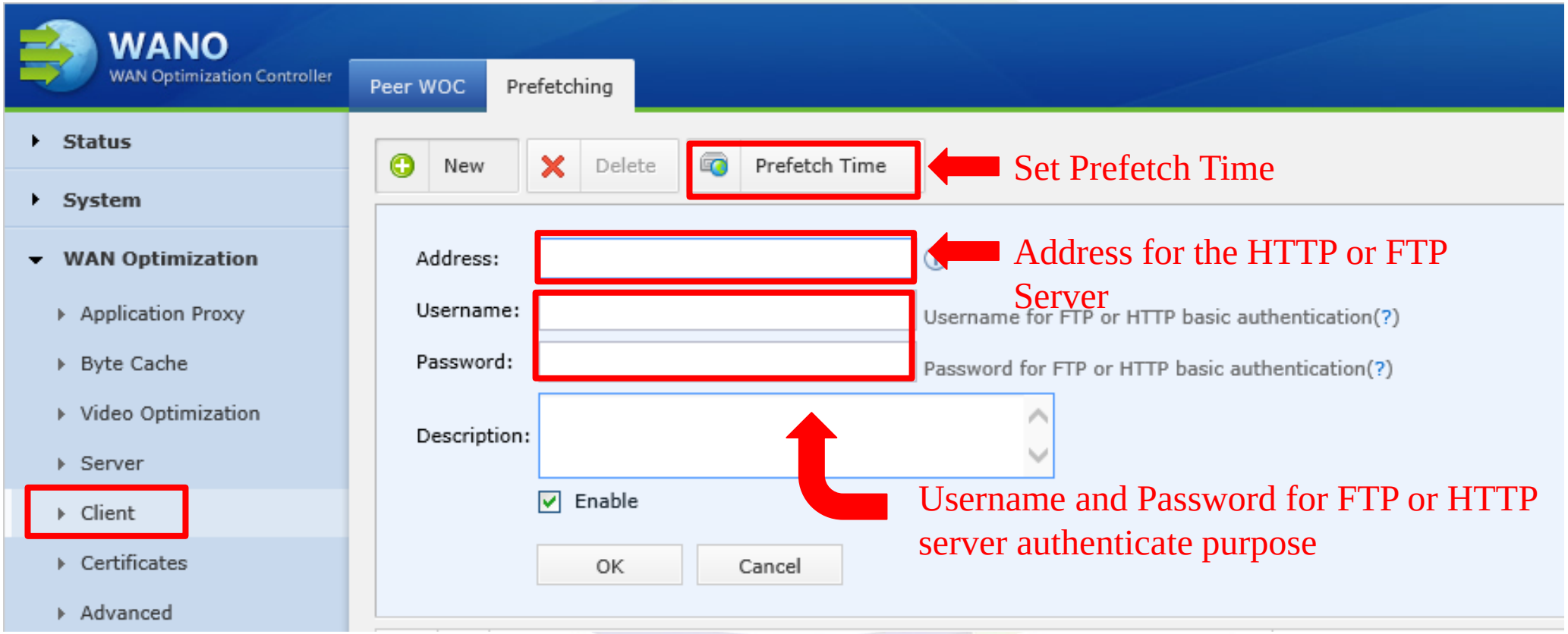
Server begins to transmit data

Byte cache start work

Pre-fetch

Pre-fetch only support HTTP and FTP

Pre-fetch Configuration



CIFS Proxy

Disable CIFS Proxy to visit server

PC send an OPEN command

Server response file ID to PC

PC send a READ command

Server response and send the first part of the file

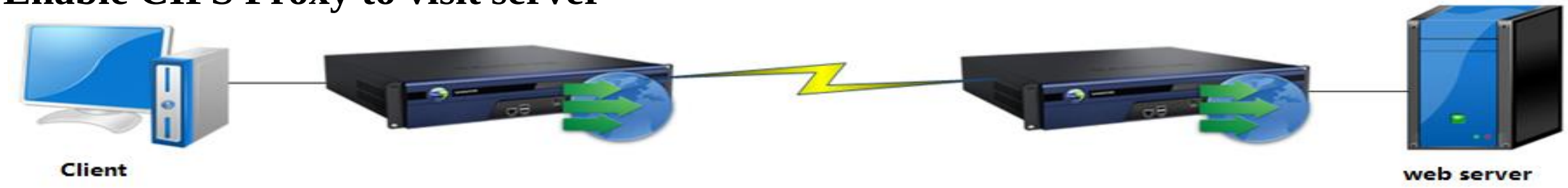
PC send another READ command

Server response again and send the second part of the file

• • • • • •

CIFS Proxy

Enable CIFS Proxy to visit server



PC send an OPEN command

Server response file ID to PC

PC send a READ command

Server response and send the first part of the file

PC send a READ command again

Device send a read command

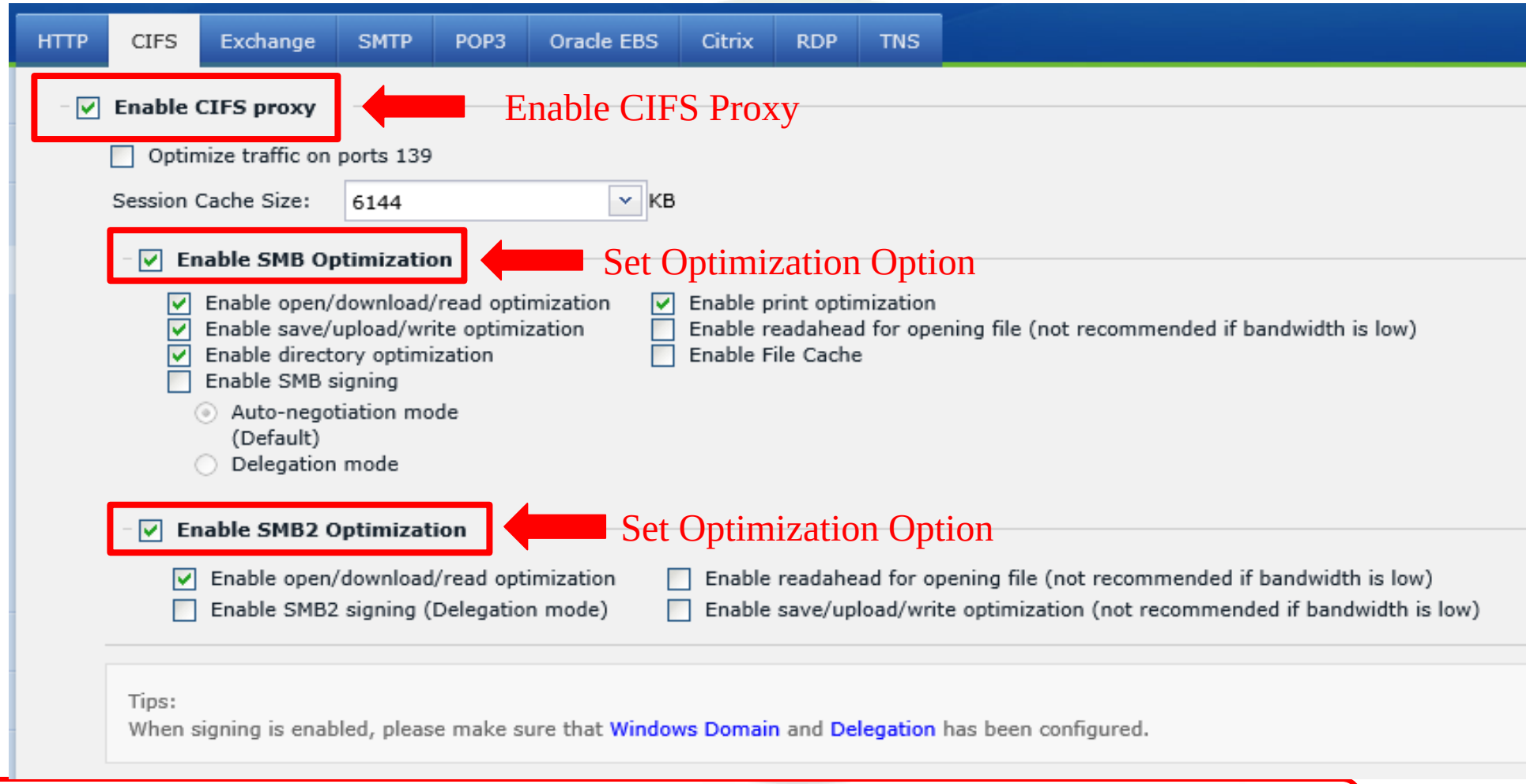
Device reply response command

Server response and send the second part of the file

• • • • • •

After enable CIFS proxy, it has better efficiency.

CIFS Proxy Configuration



Note: To support signature CIFS, the server side WANO must join domain and configure Delegation.

SMTP/POP3 Proxy

Disable SMTP/POP3 Proxy to visit mail server

Mail content will send by client after went through base64 coding.

SANGFOR Test Mail

coding

QXQgU0lORk9S

Byte cache recorded the content as: Q**XQgU0lO**Rk9S

After modified mail content:

SANGFOR Test Mail2

coding

Rm9yIFNJTkZPUi

Byte cache recorded the content as:

Rm9yIFNJTkZPUi

The two are completely different, byte cache has no effect.

SMTP/POP3 Proxy

Disable SMTP/POP3 Proxy to visit mail server

Mail content will send by client after went through base64 coding.

SANGFOR Test Mail

coding

QXQgU0lORk9S

WANO will decode and byte cache recorded content as:
SANGFOR Test Mail

New data

After modified mail content:
SANGFOR Test Mail2

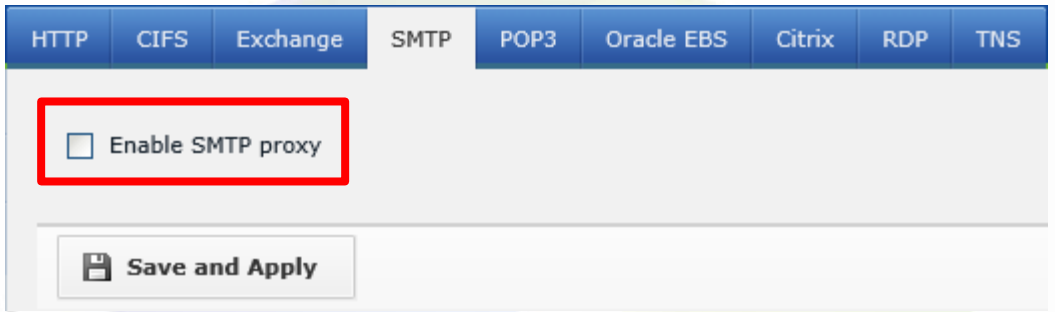
coding

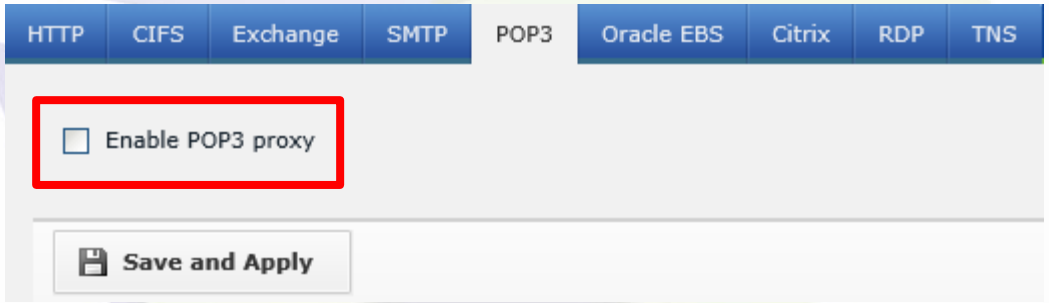
Rm9yIFNJTkZPUi

WANO will decode and byte cache recorded content as:
SANGFOR Test Mail2

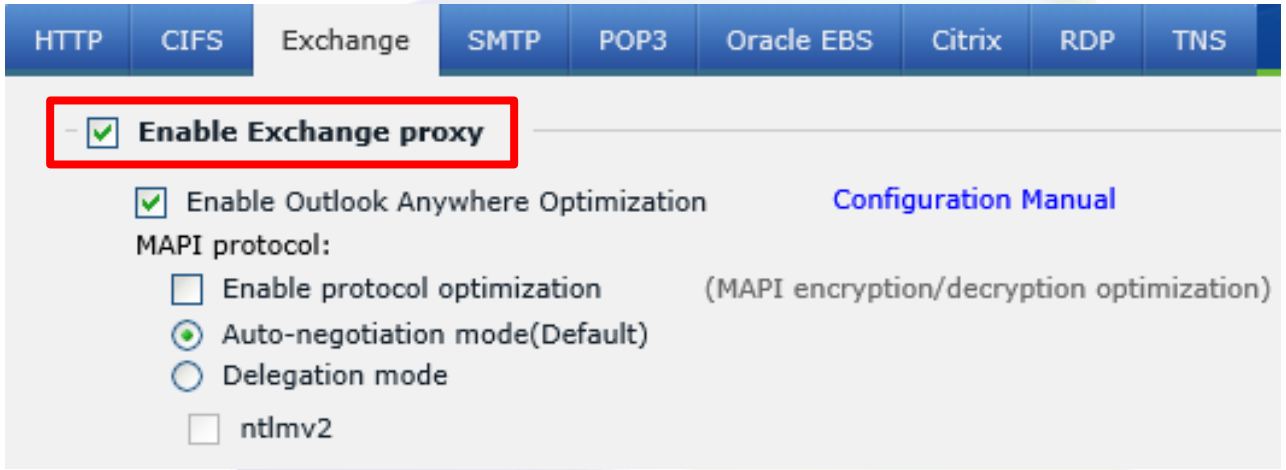
Some part of the two mails are the same, so byte cache take effect.

SMTP/POP3 Proxy configuration





Exchange Proxy Configuration



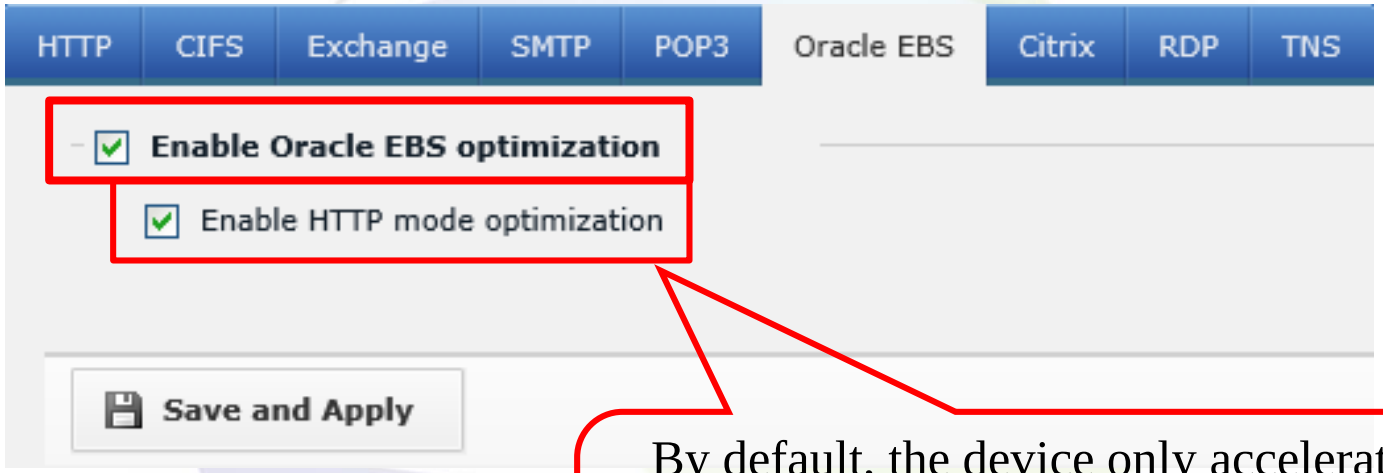
For more Exchange configuration, kindly refer to Sangfor_WANO_Exchange_Acceleration_Guide.

Oracle EBS Optimization

WANO use an application agent plugin, it does not optimize the EBS own protocol but intercept the negotiate key between client and Oracle EBS server to decrypt data. After decrypted data, WANO can use compression and byte cache technology for traffic reduction.

Note: support HTTP, HTTPS mode & socket mode acceleration

Oracle EBS Configuration



By default, the device only accelerate Oracle EBS socket mode. Once this option is checked, the HTTP mode Oracle EBS will be able to accelerate.

Application Support List

Supported Acceleration Application:

All those TCP's applications and the application which is able to decrypt by device will have the acceleration effect.

Common supported acceleration applications:

HTTP, HTTPS, FTP, SMTP, POP3, Network Neighbour, Exchange, Lotus notes, OA/ERP system, Remote Desktop, Oracle, Sybase, MYSQL, VSS, Share point, Veritas, DB2, Commvault, Microsoft Backup, Netapp, VMwareSRM and etc.

Supported Optimization Application:

H.323 UDP based video conference. No effect for H.264 & T.261

Non-supported Acceleration Application:

UDP and other non-TCP-based applications, other encrypted applications

and voice applications.

Question

1. What is the technology WANO used to reduce traffic ?
2. What is the difference between Web cache and Byte cache?
3. What are the three WANO compression technology? What is the difference of the three technologies?
4 .Please list out three supported acceleration of applications and three non-supported acceleration of applications.

SANGFOR

Enjoy a LAN Speed on your WAN