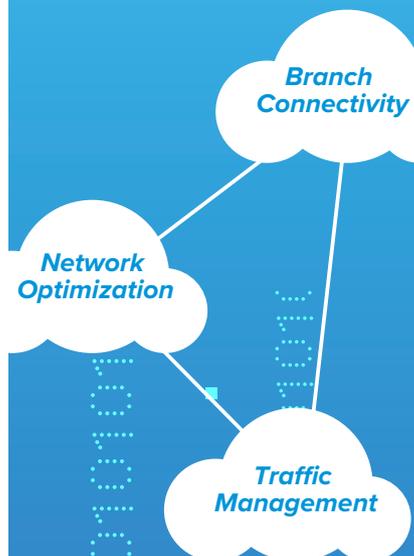


SANGFOR WAN OPTIMIZATION

Sangfor WANO (WAN Optimization) is a connectivity and optimization solution providing seamless connectivity among data center, disaster recovery and public cloud features for multiple office locations or branches, enhancing both productivity and business continuity with a low WAN investment.



One-Step Connectivity and Optimization: Enjoy a LAN Speed on Your WAN



- Quickly Build Reliable Connectivity
- Optimize Your User Application Experience
- Maximize Bandwidth Value
- WAN Investment Reduced by 70%

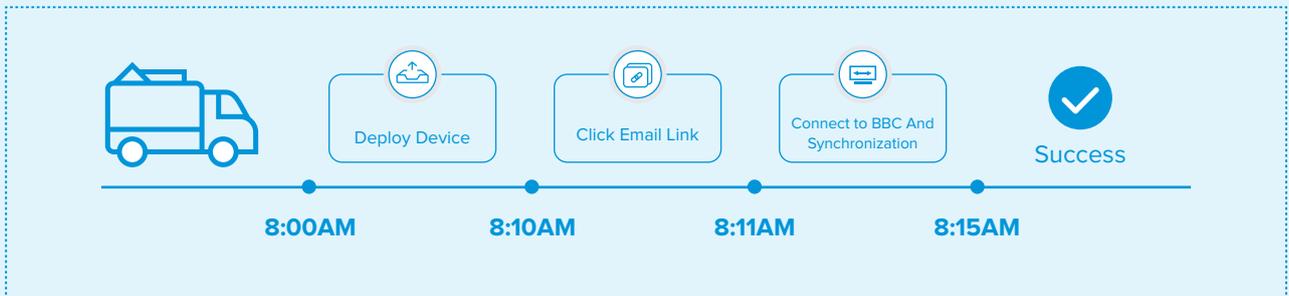




Quickly Build Reliable Connectivity

Sangfor WANO not only support built-in IPSEC VPN with other brand products, public cloud, but also has its own patented Sangfor VPN, quickly build connections with Sangfor network and security products with simple configurations. Based on link QoE (packet loss rate/latency/jitter) detection, Sangfor VPN supports critical applications by dynamically choosing the best quality link and fail-over without any user perception, improving business availability when the WAN link down.

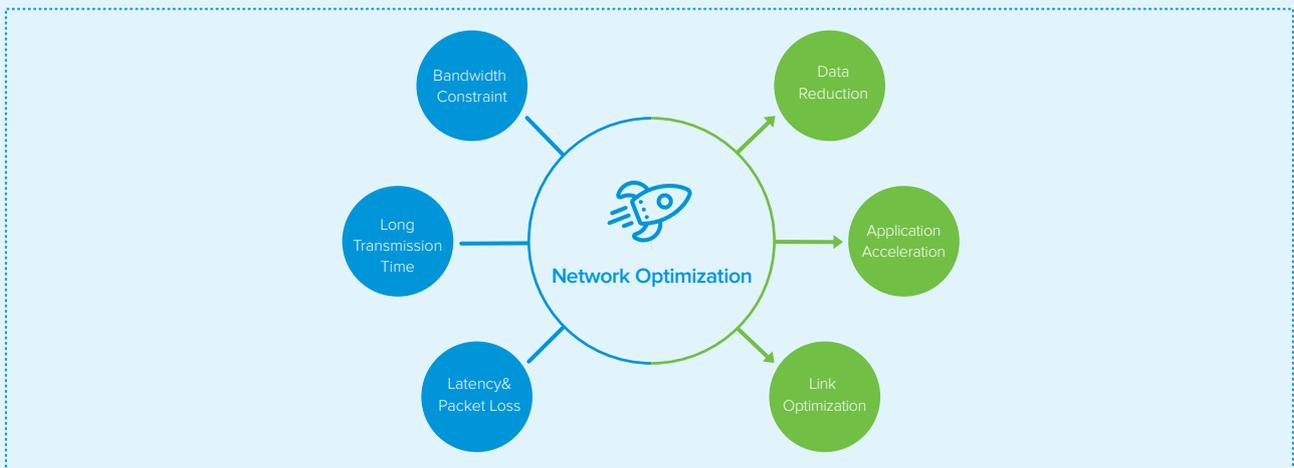
Deployment is easier and more cost effective when integrated with Sangfor centralized management platform, BBC (Branch Business Center). BBC's email deployment feature makes deployment easy for anyone in branch offices without the need for on-site engineers, thus reducing cost and online business cycle.



Optimize Your User Application Experience

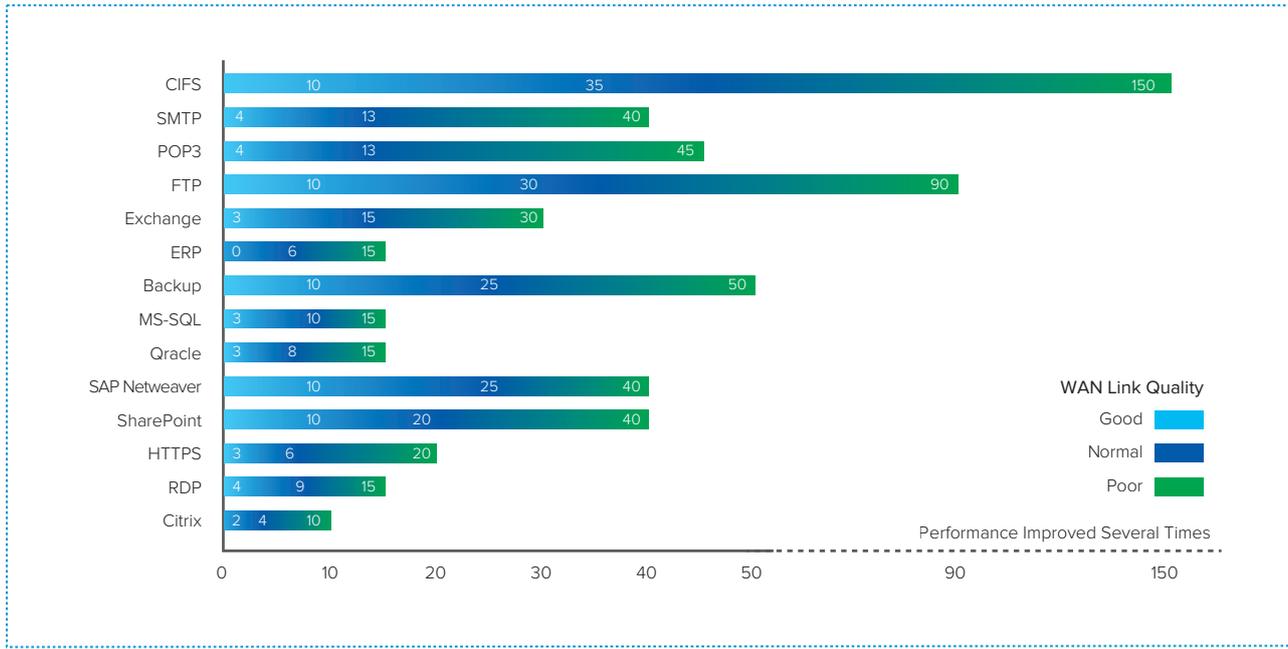
Most business applications perform well on LAN, yet they don't operate or transmit efficiently on WAN due to bandwidth constraints, protocol limitations and latency. Businesses often resort to upgrading their bandwidth to solve this problem, usually with less than effective results.

With the deployment of Sangfor WAN, headquarters, branch offices and partners in different locations can experience accelerated network performance where business-critical applications aren't hindered and data exchange is immediate. All told, Sangfor WAN provides a LAN-like experience over WAN.



Laboratory Test Results

The performance improvement is even more obvious when the link quality is bad.



Data Reduction

95% reduction in redundant data occupying bandwidth.

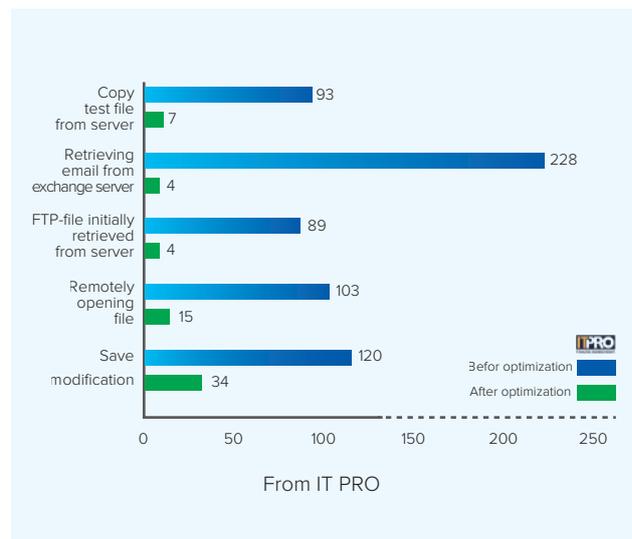
“ The appliance clearly delivers an impressive WAN acceleration performance for a wide range of applications and is remarkably easy to deploy.”

--From IT PRO

Sangfor WANO uses leading Byte Cache Technology, allowing deduplication of data across WAN on subsequent transmissions. Once data is transmitted from one end to the other, it is cached at byte level.

As we know, different compression algorithms have different compression efficiency for different data. A single compression algorithm is unable to achieve a maximum compression ratio. Equipped with 3 built-in compression algorithms and dynamic compression technology, Sangfor WANO and substantially minimize the amount of data transmission.

WANO also eliminates redundant data transmission which can occupy up to 95% of WAN traffic, delivering cached data at LAN speed!





Application Acceleration

Business application speed improved 3-10 times

Operation	Performance Increase
File copy	✔ 8-31x
Email	✔ 57-64x
FTP	✔ 22-64x

Operation	Performance Increase
Remote file open	✔ 8-31x
Remote file save	✔ 57-64x
Remote Desktop	✔ 22-64x

From BINARY TESTING

“They come with an extensive range of optimization technologies as standard, are extremely easy to deploy and capable of delivering impressive boosts to WAN performance across a wide range of applications.”

--From BINARY TESTING

Sangfor acceleration technology is based on TCP acceleration technology which can accelerate virtually any application.

Sangfor application acceleration is specially designed to accelerate the most critical business applications up to 10X, performing proxy to protocols of MAPI, HTTP/HTTPS, CIFS, Oracle, EBS, Citrix, RDP and SMTP. In addition it boosts the performance of a wide range of applications including Exchange, SharePoint, ERP, CRM, Lotus Notes, Backup, SAP, Disaster Recovery and FTP.

Link Optimization

Elevate WAN Link Quality

HTP (High-Speed Transmission Protocol) technology is the equivalent of upgrading a dirt road to a highway. Based on the transmission layer, it improves link quality and transmission performance of applications, vastly improving user experience.

Sangfor WANO optimizes the TCP and UDP protocols, reducing the impact of latency and packet loss over long distance transmission.

HTP-TCP enhances WAN transmission by selective and quick re-transmission of lost packets, improving the efficiency of congestion control mechanisms in traditional TCP protocol and significantly boosting WAN link performance. HTP-UDP can also reduce UDP packet loss using two built-in algorithms; UDP Proxy and FEC Technologies, significantly improving transmission of UDP based applications like video conferencing.



Local Image



Remote Image

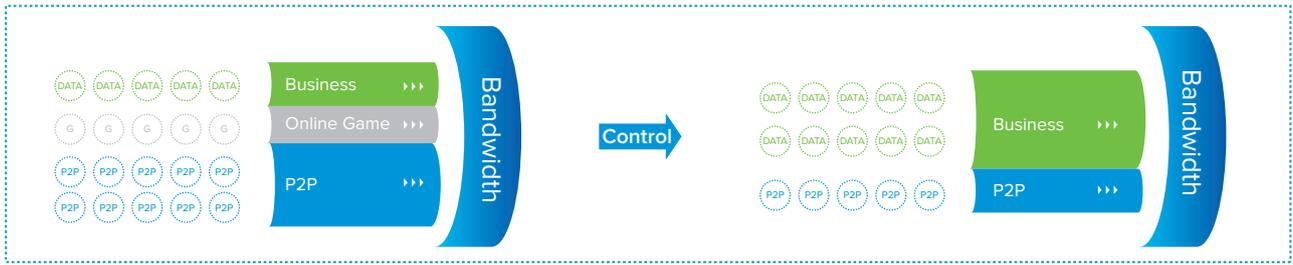


Remote Image with WANO

Maximize Bandwidth Values

Where traffic is uncontrolled, we find traffic accidents and congestion. Branch user internet access is similar to road traffic. Users playing online games, streaming videos or even accessing non-business-related sites within compliance occupies bandwidth with file sharing and P2P traffic, causing poor performance of critical business applications.

Based on Sangfor's +3000 application signature database and URL library of 10 million, Sangfor WANO is capable of intercepting non-compliant browsing activities and limiting unproductive traffic. WANO's effective traffic management guarantees maximum core business application bandwidth and improves staff efficiency and productivity.



WANO Best-Practice Networking Scenarios

SD-WAN Branch Network Access

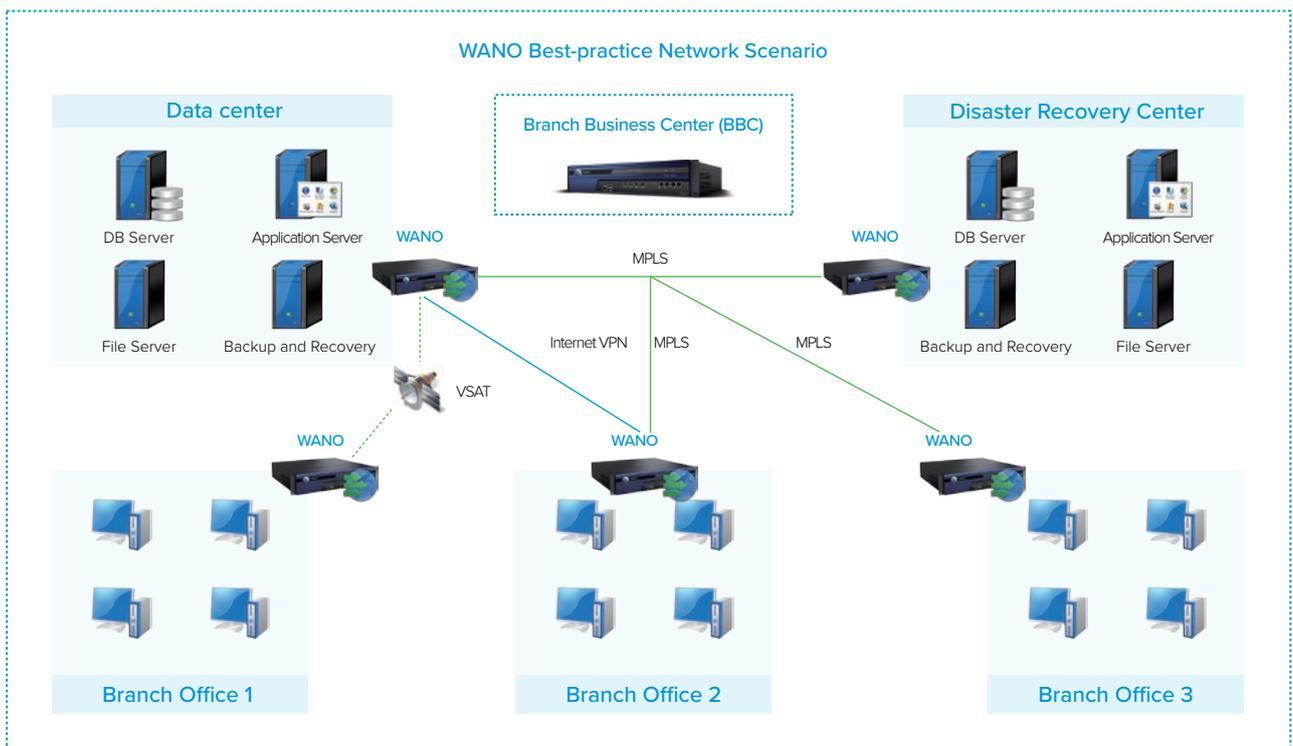
- Quickly build high speed connections from branches to data centers
- Hybrid WAN improves business reliability
- Internet VPN replaces MPLS network to increase bandwidth and reduce cost

Production and Office Application Optimization Over MPLS/VSAT Link

- Application acceleration improves user application experience
- Data reduction increases link throughput and reduces bandwidth cost
- Link optimization improves link transmission efficiency

DC-DRC Data Backup and Recovery Optimization

- Reduce RTO/RPO, decrease potential loss and satisfy compliance requirements
- Reduce MPLS bandwidth cost





SANGFOR

WAN Optimization (WANO)



Main	Model	SDW-W4000	SDW-W4500	SDW-W5000	SDW-W5100	SDW-W5400	SDW-W5500	SDW-W5600	SDW-W5800	SDW-W5900	SDW-W6000
Hardware Parameters	Use Case	Small Branch	Small Branch	Medium Branch	Medium Branch/Small DC	Medium Branch/Small DC	Large Branch/DC				
	Profile	Desktop	Desktop	1U	1U	1U	2U	2U	2U	2U	2U
	RAM	2G	2G	2G	4G	8G	16G	16G	24G	32G	48G
	HD Capacity	64G	64G	128G	240G	240G	480G	480G	960G	960G	1.92T
Network Interfaces	WAN Port	1*GbE	2*GbE	2*GbE	2*GbE	3*GbE	3*GbE	3*GbE	2*GbE	2*GbE	3*GbE
	Max. WAN Port	2	3	3	3	4	4	4	4	4	4
	LAN Port	1*GbE	1*GbE	1*GbE	1*GbE	2*GbE	2*GbE	2*GbE	1*GbE	1*GbE	1*GbE
	DMZ Port	1*GbE	1*GbE	1*GbE	1*GbE	1*GbE	1*GbE	1*GbE	1*GbE	1*GbE	1*GbE
	SFP/SFP+ Port	N/A	N/A	N/A	N/A	N/A	2*1G SFP (WAN or LAN)	2*1G SFP (WAN or LAN)	4*1G SFP (WAN or LAN)	4*1G SFP (WAN or LAN)	4*10G SFP+ (WAN or LAN)
	Bypass (Copper)	N/A	1	1	1	3	3	3	2	2	2
	Serial Port	1	1	1	1	1	1	1	1	1	1
USB Port	2	2	2	2	2	2	2	2	2	2	
Physical Specifications	Dual Power Supplies	N/A	N/A	N/A	N/A	N/A	N/A	√	√	√	√
	Power[Watt] (Typical)	40W	22W	26W	26W	180W	212W	212W	212W	212W	332W
	Temperature Range	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C	0°C~40°C
	Relative Humidity	5%~95% non-condensing	5%~95% non-condensing	5%~95% non-condensing	5%~95% non-condensing	5%~95% non-condensing	5%~95% non-condensing	5%~95% non-condensing	5%~95% non-condensing	5%~95% non-condensing	5%~95% non-condensing
	System Dimensions (mm)	175*275*44.5	175*275*44.5	300*430*44.5	300*430*44.5	400*430*44.5	600*440*89	600*440*89	600*440*90	600*440*90	600*440*90

Main	Model	SDW-W4000	SDW-W4500	SDW-W5000	SDW-W5100	SDW-W5400	SDW-W5500	SDW-W5600	SDW-W5800	SDW-W5900	SDW-W6000
Physical Specifications	Sytem/ Packaged Weight	1.7Kg/3.7Kg	4.2Kg/6Kg	4.2Kg/6Kg	4.2Kg/6Kg	6.7Kg/8.7Kg	15.3Kg/21.3Kg	15.3Kg/21.3Kg	18.5Kg/21Kg	20Kg/24Kg	20Kg/24Kg
	Regulatory Compliance	CE,FCC	CE,FCC	CE,FCC	CE,FCC	CE,FCC	CE,FCC	CE,FCC	CE,FCC	CE,FCC	CE,FCC
	Optimized WAN Bandwidth	6 Mbps	10Mbps	20 Mbps	50 Mbps	60 Mbps	100 Mbps	200 Mbps	400 Mbps	650 Mbps	1.5 Gbps
	Optimized Connections	500	1000	2500	3000	4000	9000	16000	30000	80000	100000
	VPN Throughput	100 Mbps	120 Mbps	150 Mbps	200 Mbps	300 Mbps	400 Mbps	600 Mbps	1Gbps	1.5 Gbps	3 Gbps
	Max. Acceleration & VPN Branches	10	20	30	50	100	300	450	600	1000	10000
	Traffic Shaping Throughput	20 Mbps	40 Mbps	100 Mbps	150 Mbps	300 Mbps	400 Mbps	600 Mbps	1Gbps	2 Gbps	5 Gbps

vWANO® SANGFOR Virtual WANO Appliance

Models			vWOC-5000	vWOC-5400	vWOC-5600	vWOC-5800
Speed on Optimized WAN Port			10Mbps	50Mbps	100Mbps	200Mbps
No.of TCP Cons.Accelerated			1500	4000	8000	20000
No.of Sites and PACCs Supported			10	100	300	500
VM Config Requirements	CPU	Recommended	>=4	>=4	>=8	>=8
		Range	4-64	4-64	8-64	8-64
	Memory (GB)	Recommended	4	7	14	14
		Range	4-256	7-256	14-256	14-256
	Cache Disk Size (GB)		100-2000	100-2000	250-2000	250-2000
	Performance (IOPS)		>=100	>=200	>=500	>=1000
	I/O Throughput (MB/s)		>=25	>=50	>=125	>=250
NIC			3	3	3	3
Supported Platforms			VMware vSphere, Microsoft Hyper-V, SANGFOR HCI & aBOS			



System Requirements for Mobile Client (Portable Accelerator)

WANO Mobile System Requirements	
Operating System	Windows XP, Windows 7 & 8 (32/64 bit), Windows 8 (32/64 bit), Windows 10 - No support for tablets & smartphones.
CPU	Celeron1.5GHz
Memory	256MB
Disk Space	2GB
VPN Compatibility	Cisco , Juniper , Nortel , Microsoft , Standard IPSec VPN

SANGFOR WAN Optimization (WANO)



Network and Deployment

Deployment Mode	Gateway, Single Bridge, Double Bridge, Single Arm, Double Arm, Hands Free mode.
Quick Deploy	Email deploy integrated with Sangfor BBC
High Availability	- Active/Passive HA -Hardware Bypass -CDP + PBR, WCCP, NQA
Web Management Console	Intuitive management console makes management easier and more effective.
Hierarchical Administration	Functionality of different modules can be assigned to different administrators as needed via a hierarchical management paradigm.
Auto-Path Discovery	Configuration free for connection between WANO gateways.
Configuration Backup	Support restore and backup of WANO configurations.
Network Diagnosis	- Real-time health status detection by monitoring networkports compatibility, disk information, routing settings, Windows domain, IP conflict, etc. - Able to perform WAN diagnosis such as ping, route, show ARP, tracer, gwinfo, netstat via WebUI and offload maintenance.
Integrity	Support SNMP, Syslog.
DNAT	Visitors are provided a public IP intranet server.
SNAT	Intranet users can access the internet using a public IP gateway.

Connectivity

Sangfor VPN	Sangfor patented VPN provides a secure VPN tunnel between Sangfor devices with easy configuration and high function scalability.
Auto VPN	Integrated with Sangfor BBC and supports branch devices, automatically building a VPN tunnel to HQ devices without any additional WANO configuration.
Tunnel NAT	Allows access between multiple branches and HQ when branches have the same subnet
IPSec VPN	<ul style="list-style-type: none">- Offers IPSec VPN with third-party brand VPN gateways- IPSec Protocol: AH, ESP- D-H Group: Group 1/2/5/14/15/16/17/18- IPSec Authentication Algorithm: MD5, SHA1, SHA2-256, SHA2-384, SHA2-512- IPSec Encryption Algorithm: DES, 3DES, AES-128, AES-192, AES-256

Path Selection

Policy-Based Routing	Select path in WANs and VPN tunnel based on link survival status, applications and user groups.
SD-WAN Path Selection	<ul style="list-style-type: none">- Link detection based on link QoE (packet loss, latency, jitter).- Dynamically choose path between multiple VPN tunnels based on policy.
VPN Tunnel Bonding	Bonding multiple VPN tunnels as a path to transfer core business applications

Data Reduction

Byte Cache	<ul style="list-style-type: none">- Data cache at byte level to ensure the WAN data traffic is deduplicated and previously viewed data are served directly from the local cache to LAN.- Support shared cache among multiple WANOs.
Dynamic Compression	Built-in with 3 kind of compression algorithms with dynamic mechanism to choose the most proper compression (LZO, GZIP, Quick LZ).
HTTP and FTP file pre-fetching	Pre-fetch the static data from remote HTTP/FTP server to local WANO per configurable timetable.

Application Acceleration

Application Identification	Automatically identify the application with the built-in Application Signature Database.
Application Proxy	Boost application performance for Exchange, SharePoint, CRM, Lotus Notes, Backup, SAP, Disaster Recovery and FTP with application protocol proxy technology supporting Exchange, HTTP/HTTPS, CIFS, Oracle EBS, Citrix, RDP and SMTP.
TCP Proxy	Dynamically optimizes transmission control protocol with TCP proxy by intelligently emulating the cumulative acknowledgments.
HTTPS Optimization	Support certificate import method, identify and accelerate HTTPS protocol based applications.



Link Optimization

High-Speed Transmission Protocol (HTP)	Designed to streamline data packets experiencing high packet loss in high latency network environments like satellite, wireless and cross-border.
HTP-TCP	HTP-TCP improves TCP transmission efficiency by expanding the transmission window, improving the congestion control algorithm and performing selective quick retransmission.
HTP-UDP	HTP-UDP supports FEC and UDP Proxy technologies and guarantees the stability of UDP based applications such as video conferencing by reducing packet loss and ensuring it runs with the highest priority.

Traffic Management

Access Control	-Application Control -HTTP URL Filtering
Bandwidth Control	- Traffic guarantee or limitation policy for upload and download. - Exclusion policy based on applications, websites, files, users, schedules, destination IPs, etc. - Dynamic bandwidth policy for core business applications.
ACL	Packet filtering based on source/destination IP and service.
Anti-DoS	Protects users and servers from DoS attack.
ARP Protection	Avoid network confusion from MAC disguise attack.

Visibility

Real-Time Monitor	System status, application connections, flow and network optimization status.
Reporting	- Comprehensive reports include flow and optimization monitoring, allowing effective monitoring of the ever changing network environment. - Provides visibility of a wide range of network information, including logs for alarms, errors and debugging. - Report of real-time and historical traffic, analysis of accelerated, non-accelerated traffic and sessions. - Generates/export reports in PDF format, support email subscription. - Traffic visibility based on users, IPs, applications, etc.
Traffic Visibility	- Visibility of URLs with built-in dataset and customizable resources. - Intelligent identification of traffics from P2P, IM, SSL, Proxy, etc. for full network visibility and control. - Support basic direction traffic, port and custom application.

Scalability

Virtualization Platform	vWANO in Sangfor HCI/aBOS, VMware, Hyper-V.
Public Cloud	vWANO in Alibaba Cloud, AWS, CT Clouds.
Portable Accelerator(PACC)	Install software client on Windows PC to improve access speed and increase productivity of remote workers.
Centralized Management Console	Sangfor's next generation centralized management controller, BBC (Branch Business Center).

Please contact us by email if you need more information about our WANO features.

COMPANY PROFILE



Sangfor Technologies is a leading global vendor of IT infrastructure solutions, specializing in Cloud Computing & Network Security with a wide range of products including: Hyper-Converged Infrastructure, Virtual Desktop Infrastructure, Next Generation Firewall, Internet Access Management, WAN Optimization, SD-WAN and many others.

Sangfor takes customers' business needs and user experience seriously, placing them at the heart of our corporate strategy. Constant innovation and commitment to creating value for our customers helps them achieve sustainable growth. Established in 2000, Sangfor currently has 5,000+ employees with more than 60 branch offices globally in exciting locations like Hong Kong, Malaysia, Thailand, Indonesia, Singapore, Philippines, Vietnam, Myanmar, Pakistan, UAE, Italy and the USA.

CONTINUOUS INNOVATION & EXCELLENT SERVICE

Sangfor invests at least 20% of its yearly revenue in R&D, improving current products and developing new solutions in their four R&D centers in the USA & China. So far, Sangfor has applied for more than 940+ patents with more patent applications scheduled for 2019. This dedication to innovation enables Sangfor to release new and updated versions of products every quarter and launch new products yearly or bi-yearly.

Sangfor also emphasizes excellent service. With three Customer Service Centers in Malaysia & China, Sangfor's total customer service capacity exceeds 250 technicians and providers.

With thousands of certified engineers and 24/7 online support 365 days a year, Sangfor customers enjoy fast and personalized on-site service support.

At present, Sangfor has more than 60,000 customers worldwide, many of them Fortune 500 companies, governmental institutions, universities and schools.



AWARDS & ACHIEVEMENTS



- "Technology Fast 500 Asia Pacific Region" Award for 8 consecutive years from 2005 to 2012 by Deloitte
- Sangfor SSL VPN no. 1 in Network Security market in China, Hong Kong & Taiwan according to F&S
- No. 1 for Secure Content Management Hardware and VPN Hardware segment in China according to IDC
- Sangfor IAM listed in the Gartner MQ for Secure Web Gateways (2011-2018)
- Sangfor WANO listed for 3 consecutive years in the Gartner MQ for WAN Optimization (2013-2016)
- Sangfor NGAF listed in the Gartner MQ for Enterprise Network Firewalls (2015-2018)
- Sangfor NGAF WAF recommended by NSS labs (2014)
- Sangfor HCI listed in the Gartner MQ for x86 Server Virtualization Infrastructure MQ (2016)
- ICSA Labs certification for SANGFOR Next Generation Firewall (2018)
- "Most Promising Network Security Solution" in June 2016 by Singapore NetworkWorld Asia
- "Readers Choice Awards for Enterprise Security" in October 2016 by Computerworld Malaysia
- Member of various technology alliances including VirusTotal

SANGFOR WAN OPTIMIZATION

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AVAILABLE SOLUTIONS

- IAM** Simplify User & Network Management
- NGAF** Smarter Security Powered By AI
- SD-WAN** Boost Your Branch Business With Sangfor
- WANO** Enjoy a LAN Speed on your WAN
- HCI** Driving Hyperconvergence to Fully Converged
- aCLOUD** Enterprise Cloud Built on HCI
- VDI** Ultimate User Experience that Beats PC
- aBOS** The World First NFV Converged Gateway
- BBC** Centralized Management Platform



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<https://www.linkedin.com/company/sangfor-technologies>



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<http://www.youtube.com/user/SangforTechnologies>