

Government Procurement of IT Products (GITP) Scheme

Reference Technical Requirements for IT Products

Category A (Network Products and Infrastructure Equipment)

1. Specifications of Add-on Hardware and Software Items

For each of those items **marked with an asterisk**, the applicant who applies to become GITP provider of the sub-category of Category A to which such item belongs must propose at least one model (together with all requested information) for such item.

Whilst it is not mandatory to do so, for each of those items which are not marked with an asterisk, the applicant applying to become a GITP provider of the relevant sub-category to which such item belongs may wish to propose one model (together with the requested information) for such item.

1.1 Sub-category A1 - Network Router and Switch

1.1.1 Router [Item No. 11000] *

Network Interface	■ Provide at least two (2) GbE optical or electrical interfaces
Routing Protocol	■ Able to run OSPFv3 or multiprotocol BGP
High Availability	■ Able to handle VRRP
Form Factor	■ Rack mount
Others	■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	■ Shall comply with mandatory requirement of Green Product Code D03

1.1.2 Router Accessory 1 [Item No. 11011]

Feature	■ One (1) power supply unit
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.3 Router Accessory 2 [Item No. 11012]

Feature	■ Provide redundant processing module(s) which allows the router to continue operation through failover to the redundant module in the event of failure of a single module
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.4 Router Accessory 3 [Item No. 11013]

Feature	■ One (1) single transceiver
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.5 Router Accessory 4 [Item No. 11014]

Feature	■ One (1) single module port adapter
Compatibility	■ Compatible with the proposed router [Item No. 11000]

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1.1.6 Router Accessory 5 [Item No. 11015]

Feature	■ Provide layer 2 and layer 3 routing or network segmentation feature(s)
Implementation Method	■ Implement either (a) through the addition of new module(s) or (b) through the activation of module(s) already included in the proposed router [Item No. 11000]

1.1.7 Router Accessory 6 [Item No. 11016]

Feature	■ Provide virtual extensible local area network (VXLAN) or multiprotocol label switching (MPLS) or policy base routing feature(s)
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.8 Router Accessory 7 [Item No. 11017]

Feature	■ Provide network security feature(s)
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.9 Router Accessory 8 [Item No. 11018]

Feature	■ Provide cellular connection adaptor
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.10 Router Accessory 9 [Item No. 11019]

Feature	■ One (1) memory module
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.11 Router Accessory 10 [Item No. 11020]

Feature	■ One (1) single expansion module for enhancement feature
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.12 Router Accessory 11 [Item No. 11021]

Feature	■ Increase the routing performance of the proposed router
Compatibility	■ Compatible with the proposed router [Item No. 11000]

1.1.13 Switch [Item No. 11001] *

Network Interface	■ Provide at least twenty-four (24) GbE interfaces
Packet Forwarding Performance	■ Provide at least 60Mpps
High Availability	■ Able to handle VRRP
Form Factor	■ Rack mount

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Others	■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	■ Shall comply with mandatory requirement of Green Product Code D03

1.1.14 Switch Accessory 1 [Item No. 11051]

Feature	■ One (1) power supply unit
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.15 Switch Accessory 2 [Item No. 11052]

Feature	■ Provide redundant processing module(s) which allows the switch to continue operation through failover to the redundant module in the event of failure of a single module
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.16 Switch Accessory 3 [Item No. 11053]

Feature	■ One (1) single transceiver
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.17 Switch Accessory 4 [Item No. 11054]

Feature	■ One (1) single module port adapter
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.18 Switch Accessory 5 [Item No. 11055]

Feature	■ One (1) stacking module with at least two (2) 40Gbps interfaces
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.19 Switch Accessory 6 [Item No. 11056]

Feature	■ One (1) stacking cable
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.20 Switch Accessory 7 [Item No. 11057]

Feature	■ One (1) hot-swappable fan module
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.21 Switch Accessory 8 [Item No. 11058]

Feature	■ Provide virtual extensible local Area network (VXLAN) feature
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

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1.1.22 Switch Accessory 9 [Item No. 11059]

Feature	■ Provide network security feature
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.23 Switch Accessory 10 [Item No. 11060]

Feature	■ Provide the multiprotocol label switching (MPLS) layer 3 VPN services for the proposed Switch
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.24 Switch Accessory 11 [Item No. 11061]

Feature	■ Provide layer 3 routing protocol support for the proposed Switch
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.25 Switch Accessory 12 [Item No. 11062]

Feature	■ Provide BGP support for the proposed switch
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.1.26 Switch Accessory 13 [Item No. 11063]

Feature	■ Provide MACsec support for the proposed switch
Compatibility	■ Compatible with the proposed switch [Item No. 11001]

1.2 **Sub-category A2 - Wireless Network Equipment**

1.2.1 Wireless Controller [Item No. 12000] *

Network Interface	■ Provide at least one (1) GbE optical interface ■ Provide at least four (4) 1000BASE-T interfaces
Wireless Interface	■ 802.11ax
Performance	■ Support up to at least 40 access points ■ Support up to at least 300 clients ■ Support up to at least 4,000 VLANs
Form Factor	■ Rack mount
Others	■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	■ Shall comply with mandatory requirement of Green Product Code D03

1.2.2 Wireless Equipment Accessory 1 [Item No. 12011]

Feature	■ One (1) power supply unit
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Compatibility	<ul style="list-style-type: none"> ■ Compatible with the proposed wireless controller [Item No. 12000]
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1.2.3 Wireless Equipment Accessory 2 [Item No. 12012]

Feature	<ul style="list-style-type: none"> ■ One (1) single transceiver
Compatibility	<ul style="list-style-type: none"> ■ Compatible with the proposed wireless controller [Item No. 12000]

1.2.4 Wireless Equipment Accessory 3 [Item No. 12013]

Feature	<ul style="list-style-type: none"> ■ Provide access controller licences
Compatibility	<ul style="list-style-type: none"> ■ Compatible with the proposed wireless controller [Item No. 12000]

1.2.5 Wireless Access Point [Item No. 12001] *

Network Interface	<ul style="list-style-type: none"> ■ Provide at least one (1) GbE 802.3af or better power-over-(PoE) interface
Wireless Interface	<ul style="list-style-type: none"> ■ 802.11ax ■ Support multi-user, multi-in multi-out (MU-MIMO) ■ Support wireless LAN controller mode
Others	<ul style="list-style-type: none"> ■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	<ul style="list-style-type: none"> ■ Shall comply with mandatory requirement of Green Product Code D03

1.2.6 Wireless Router [Item No. 12002] *

Network Interface	<ul style="list-style-type: none"> ■ Provide at least four (4) GbE interfaces
Wireless Interface	<ul style="list-style-type: none"> ■ 802.11ax ■ Support multi-user, multi-in multi-out (MU-MIMO)
High Availability	<ul style="list-style-type: none"> ■ Able to handle VRRP
Others	<ul style="list-style-type: none"> ■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	<ul style="list-style-type: none"> ■ Shall comply with mandatory requirement of Green Product Code D03

1.3 **Sub-category A3 - Network Load Balancer**

1.3.1 Load Balancer [Item No. 13000] *

Network Interface	<ul style="list-style-type: none"> ■ Provide at least two (2) 10GbE interfaces ■ Provide at least four (4) GbE interfaces
Feature	<ul style="list-style-type: none"> ■ Perform load balancing based on IP-based protocols
Application Throughput	<ul style="list-style-type: none"> ■ Provide at least 6Gbps Application Throughput (Layer 4 / Layer 7)

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Form Factor	■ Rack mount
Others	■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	■ Shall comply with mandatory requirement of Green Product Code D03

1.3.2 Load Balancer Accessory 1 [Item No. 13011]

Feature	■ One (1) power supply unit
Compatibility	■ Compatible with the proposed network load balancer [Item No. 13000]

1.3.3 Load Balancer Accessory 2 [Item No. 13012]

Feature	■ One (1) single transceiver
Compatibility	■ Compatible with the proposed network load balancer [Item No. 13000]

1.3.4 Load Balancer Accessory 3 [Item No. 13013]

Feature	■ Increase the layer 4 connections per second performance
Compatibility	■ Compatible with the proposed network load balancer [Item No. 13000]

1.3.5 Load Balancer Accessory 4 [Item No. 13014]

Feature	■ Provide annual subscription for regularly automatic update of IP reputation database and control of malicious IP address categories including phishing, denial of service and botnets for the proposed load balancer
Compatibility	■ Compatible with the proposed network load balancer [Item No. 13000]

1.4 **Sub-category A4 - Network and Infrastructure Security Equipment**

1.4.1 UTM Firewall [Item No. 14000] *

Network Interface	■ Provide at least four (4) GbE interfaces
Feature	<ul style="list-style-type: none"> ■ Provide single sign-on with Microsoft Active Directory, LDAP or equivalent directory service for enforcing user-based access control ■ Support IPS, anti-virus, web filtering and anti-spam services
Certification	<ul style="list-style-type: none"> ■ Conform to <ol style="list-style-type: none"> 1. ISO/IEC 15408; or 2. GB/T 18336-2015; or 3. GB/T 20281-2015 or above
Firewall Throughput	■ Provide at least 0.5Gbps (1500 bytes or larger IP packet)

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Form Factor	■ Rack mount
Others	■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	■ Shall comply with mandatory requirement of Green Product Code D03

1.4.2 UTM Firewall Accessory 1 [Item No. 14011]

Feature	■ One (1) power supply unit
Compatibility	■ Compatible with the proposed UTM firewall [Item No. 14000]

1.4.3 UTM Firewall Accessory 2 [Item No. 14012]

Feature	■ One (1) single transceiver
Compatibility	■ Compatible with the proposed UTM firewall [Item No. 14000]

1.4.4 UTM Firewall Accessory 3 [Item No. 14013]

Feature	■ Provide IPS, anti-virus, web filtering and anti-spam services for the proposed UTM firewall
Compatibility	■ Compatible with the proposed UTM firewall [Item No. 14000]

1.4.5 UTM Firewall Accessory 4 [Item No. 14014]

Feature	■ Manage multiple devices for creating policy and object, as well as providing centralised software updates
Compatibility	■ Compatible with the proposed UTM firewall [Item No. 14000]

1.4.6 UTM Firewall Accessory 5 [Item No. 14015]

Feature	■ Measure and analyse the performance of network devices such as the utilisation of processor, memory or network interface on the device
Compatibility	■ Compatible with the proposed UTM firewall [Item No. 14000]

1.4.7 Web Application Firewall [Item No. 14001] *

Network Interface	■ Provide at least five (5) GbE interfaces ■ Support up to at least two (2) GbE optical interface
Certification	■ Conform to 1. ISO/IEC 15408; or 2. GB/T 32917-2016 or above; or 3. GB/T 20281-2015 or above

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HTTP Traffic Throughput	<ul style="list-style-type: none"> ■ Provide at least 200Mbps ■ Support up to at least 50,000 concurrent established connections
Form Factor	<ul style="list-style-type: none"> ■ Rack mount
Others	<ul style="list-style-type: none"> ■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	<ul style="list-style-type: none"> ■ Shall comply with mandatory requirement of Green Product Code D03

1.4.8 Web Application Firewall Accessory 1 [Item No. 14031]

Feature	<ul style="list-style-type: none"> ■ One (1) power supply unit
Compatibility	<ul style="list-style-type: none"> ■ Compatible with the proposed web application firewall [Item No. 14001]

1.4.9 Web Application Firewall Accessory 2 [Item No. 14032]

Feature	<ul style="list-style-type: none"> ■ Increase the HTTP traffic throughput of the proposed web application firewall
Compatibility	<ul style="list-style-type: none"> ■ Compatible with the proposed web application firewall [Item No. 14001]

1.4.10 Network Threat Protection Appliance [Item No. 14002] *

Network Interface	<ul style="list-style-type: none"> ■ Provide at least six (6) GbE interfaces
Storage	<ul style="list-style-type: none"> ■ Provide at least 4TB local storage
Advanced Threat Protection Throughput	<ul style="list-style-type: none"> ■ Shall provide sandboxing at least 150 files per hour
Form Factor	<ul style="list-style-type: none"> ■ Rack mount
Others	<ul style="list-style-type: none"> ■ Bundled with all necessary cables and accessories including rack mount kit
Green Features	<ul style="list-style-type: none"> ■ Shall comply with mandatory requirement of Green Product Code D03

1.4.11 Network Threat Protection Appliance Accessory 1 [Item No. 14051]

Feature	<ul style="list-style-type: none"> ■ One (1) power supply unit
Compatibility	<ul style="list-style-type: none"> ■ Compatible with the proposed network threat protection appliance [Item No. 14002]

1.4.12 Security Policy Management Appliance [Item No. 14070]

Feature	<ul style="list-style-type: none"> ■ Authentication of various network devices such as firewalls, routers, switches, servers and End point devices ■ Provide full AAA server – RADIUS or TACACS+ ■ Authentication or authorisation support for at least one of
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	<p>LDAP, AD, Kerberos, Token Server, SQL compliant database</p> <ul style="list-style-type: none"> ■ Monitor real time authentication status of network devices through web browser ■ Display alert message when detecting authentication problem in the network ■ Provide role-based and device-based secure network access control ■ Allow remote management through web browser
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1.5 Sub-category A5 - Network Software

1.5.1 Network Management Software [Item No. 15000] *

Features	<ul style="list-style-type: none"> ■ Manage network devices ■ Provide traffic logging and reporting features ■ Able to do audit configuration changes to ensure compliance ■ Able to scheduling device updates
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1.5.2 Network Monitoring Software [Item No. 15001] *

Features	<ul style="list-style-type: none"> ■ Monitor the performance of at least 100 network devices such as firewalls, routers, switches, servers and other SNMP-enabled devices ■ Provide tool to measure and analyse the performance of network devices such as the utilisation of processor, memory or network interface on the device ■ Provide tool to view the real time performance of network devices through web browser ■ Display alert message when detecting problem in the network
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1.5.3 Network Virtual Security Appliance [Item No. 15002] *

Features	<ul style="list-style-type: none"> ■ Provide real-time monitoring of malware ■ Support integration with firewall for inline blocking ■ Support Internet Content Adaptation Protocol (ICAP) integration
Others	<ul style="list-style-type: none"> ■ Virtual Appliance with support of common virtualisation platforms

1.5.4 Network Traffic Analysis Software [Item No. 15010]

Feature	<ul style="list-style-type: none"> ■ Provide tool to measure and analyze the performance of network devices
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1.5.5 Network Software Licenses and Accessories [Item No. 15030]

Feature	<ul style="list-style-type: none"> ■ Provide anti-virus, web filtering or anti-spam services
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1.6 Sub-category A6 - Power Equipment

1.6.1 Uninterruptible Power Supply [Item No. 16000] *

Voltage	<ul style="list-style-type: none">■ Supply 220V sine wave AC power during normal operation■ Accept utility AC power input
Output Capacity	<ul style="list-style-type: none">■ 1000VA
Battery Capacity	<ul style="list-style-type: none">■ Shall be able to last at least five (5) minutes at 700W load during power outages
Power Protection	<ul style="list-style-type: none">■ Shall be able to regulate the output voltage against sags, spike and surge
Others	<ul style="list-style-type: none">■ With minimum four (4) output power receptacles■ With audible alarms and visual indicators for generating alerts when the uninterruptible power supply is running on battery■ Provide battery free of charge to maintain the UPS in proper working order so long as the Uninterruptible Power Supply is under Maintenance Services

1.6.2 Uninterruptible Power Supply Accessory [Item No. 16011]

Feature	<ul style="list-style-type: none">■ One (1) UPS network management card■ Connect a UPS to the network by Ethernet, serial or USB port■ Allow remote control and monitoring of a UPS through the network■ Support open standard protocols such as HTTP or SNMP■ Provide logging functions
Compatibility	<ul style="list-style-type: none">■ Compatible with the proposed Uninterruptible Power Supply [Item No. 16000]

1.6.3 Automatic Transfer Switch [Item No. 16001] *

Feature	<ul style="list-style-type: none">■ Automatic transfer of electrical load from primary power source to secondary power source upon the failure of the primary power source
Form Factor	<ul style="list-style-type: none">■ Rack mount■ 1U
Voltage	<ul style="list-style-type: none">■ 200-230V AC power during normal operation
Output Current	<ul style="list-style-type: none">■ 10A
Output Connections	<ul style="list-style-type: none">■ At least ten (10) IEC 60320 C13

1.7 Sub-category A7 - Cabinet

1.7.1 Rack Cabinet [Item No. 17000] *

Standard	<ul style="list-style-type: none">■ EIA 19-inch cabinet compliant
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External Height	■ 9 - 47U
Power Bar	■ At least one (1) 6 sockets power bar with sockets type of BS1363 or IEC C13 or C19
Rack Shelf	■ Optional provide rack shelf
Security	■ Cabinet door with lock

1.7.2 Rack Cabinet Accessory 1 [Item No. 17011]

Feature	<ul style="list-style-type: none"> ■ Rack air distribution unit ■ EIA 19-inch cabinet compliant ■ Less than 3U ■ At least two (2) cooling fans ■ Airflow at least 14 m³/min cubic metres per minute
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1.7.3 LCD KVM Console [Item No. 17001] *

Standard	■ EIA 19-inch cabinet compliant
Form Factor	<ul style="list-style-type: none"> ■ Rack mount ■ 1U
Console	■ At least an integrated 19" LED-backlit LCD panel
Feature	■ Control and manage at least eight (8) computers using a single keyboard drawer (with touchpad)

1.7.4 LCD KVM Console Accessory 1 [Item No. 17031]

Feature	■ Cable accessories for connecting server or computer equipment
Compatibility	■ Compatible with the proposed LCD KVM console [Item No. 17001]

1.8 Sub-category A8 - Network Cable

1.8.1 Network Cable [Item No. 18000] *

Cable Type	■ OM3 multi-mode or OS2 single-mode fibre patch cord or above / OM3 Multi-mode or OS2 Single-mode fibre cable or above / Cat 6 8P8C ("RJ45") patch cord or above / Cat 6 8P8C ("RJ45") cable or above
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1.8.2 Cable Accessories [Item No. 18011 - 18022]

Item No.	Product Requirement
18011	QSFP+ to 4 SFP+ direct attach copper fan-out cable (5 metres)
18012	QSFP+ to QSFP+ direct attach copper cable (5 metres)

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Item No.	Product Requirement
18013	Fibre patch panel 24-port (1U)
18014	Fibre patch panel 12-port (1U)
18015	Cat 6 8P8C (“RJ45”) plugs (100 pieces/pack)
18016	Network Cable Tester
18017	PVC Conduit
18018	Cat 6 patch panel 48-port (1U)
18019	Cat 6 patch panel 24-port (1U)
18020	Cat 6 patch panel 16-port (1U)
18021	Cable management panel with front Cover (1U)
18022	Ethernet copper to fibre media converter

Reference

EPD computer equipment and products green requirements:

https://www.epd.gov.hk/epd/english/how_help/green_procure/pdf/Category%20D.pdf

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List of Technical Abbreviations

<u>Abbreviation</u>	<u>Definition</u>
1000BASE-T	IEEE 802.3 standard for 1Gbps LAN media over twisted-pair copper wiring
802.11ax	IEEE 802.11ax standard for wireless local area network
A	Ampere
AAA	Authentication, Authorization and Accounting
AC	Alternating Current
AD	Active Directory
AIX	Advanced Interactive eXecutive
ARIA	Australian Recording Industry Association
BGP	Border Gateway Protocol
BGP-4	Border Gateway Protocol Version 4
BMP	Windows Bitmap
bps	Bit-per-second
CA	Certificate Authority
Cat	Category
CD	Compact Disc
CD-ROM	Compact Disc Read Only Memory
CFM	Cubic Feet per Minute
CIFS	Common Internet File System
CISA	Certified Information Systems Auditor
CISM	Certified Information Security Manager
CISSP	Certified Information Systems Security Professional
CPU	Central Processing Unit
DAT	Digital Audio
DDoS	Distributed Denial of Service
DDR SDRAM	Double Data Rate Synchronous Dynamic Random Access Memory
DES	Data Encryption Standard

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<u>Abbreviation</u>	<u>Definition</u>
DHCP	Dynamic Host Configuration Protocol
DIMM	Dual In-line Memory Module
DP	Display Port
Dpi	dots per inch
DSA	Digital Signature Algorithm
DVD	Digital Video Disc
DVD +/-R	Digital Video Disc Recordable
DVD+/-RW	Digital Video Disc Rewritable
DXF	Drawing Exchange Format
DVI	Digital Visual Interface
DWPD	Drive Writes Per Day
DWG	AutoCAD Drawing File Format
E1	E-carrier System 1
EAN	European Article Number
ECC	Error-Correcting Code
EIA	The Electronic Industries Alliance
EMSD	Electrical and Mechanical Services Department
eSATA	External Serial Advanced Technology Attachment
FIPS	Federal Information Processing Standards
FoIP	Fax over IP
FTP	File Transfer Protocol
GB	Gigabyte
GbE	Gigabit Ethernet
Gbps	Gigabit per second
GBps	Gigabyte per second
GFC	Gigabit per second Fibre Channel
GHz	Gigahertz
GIF	Graphics Interchange Format
GIS	Geographic Information System

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<u>Abbreviation</u>	<u>Definition</u>
GUI	Graphical User Interface
HDD	Hard Disk Drive
HDMI	High-Definition Multimedia Interface
HIM	Hardware Interface Module
HKSCS	Hong Kong Optional Character Set
HP	Hewlett-Packard Company
HTML	HyperText Markup Language
HTTP	Hypertext Transfer Protocol
Hz	Hertz
IBM	International Business Machines Corporation
ICAP	Internet Content Adaptation Protocol
IDE	Integrated Drive Electronics
IDS	Intrusion Detection System
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IOS	iPhone Operating System
IP	Internet Protocol
IPS	Intrusion Prevention System
IPSec	Internet Protocol Security
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
iSCSI	Internet Small Computer System Interface
ISDN	Integrated Services Digital Network
ISL	Inter-Switch Link
ISO	International Organization for Standardization
IT	Information Technology
ITU	International Telecommunication Union
JPG	JPEG File Interchange Format
kbps	kilobit per second

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<u>Abbreviation</u>	<u>Definition</u>
kpps	Kilo packets per second
KML	Keyhole Markup Language
kVA	Kilovolt-Ampere
KVM	Keyboard, video and mouse
LAN	Local Area Network
LCD	Liquid Crystal Display
LDAP	Lightweight Directory Access Protocol
LED	Light Emitting Diode
LRDIMM	Load-Reduced Dual Inline Memory Module
LTO	Linear Tape-Open
MAC	Media Access Control
MACsec	IEEE 802.1AE MAC Security standard
MB	Megabyte
Mbps	Megabit per second
MBps	Megabyte per second
Microsoft	Microsoft Corporation
MLC	Multi-level Cell
Mpps	Million packets per second
MPLS	Multiprotocol Label Switching
ms	1,000th of a second
MU-MIMO	Multi-user, multi-in and multi-out
NAS	Network-attached storage
NAT	Network Address Translation
NFS	Network File System
NVMe	Non-volatile Memory Express
OATH	Initiative for Open Authentication
OCR	Optical Character Recognition
OEM	Original Equipment Manufacturer
OGC	Open Geospatial Consortium

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<u>Abbreviation</u>	<u>Definition</u>
OLAP	Online Analytical Processing
Oracle	Oracle Corporation
OS	Operating System
OSPF	Open Shortest Path First
OSPFv3	Open Shortest Path First Version 3
OST	Open Storage Technology
OTP	One-time Password
PERT	Program Evaluation Review Technique
PC	Personal Computer
PCI	Peripheral Component Interconnect
PCI DSS	Payment Card Industry Data Security Standard
PCI-E	Peripheral Component Interconnect - Express
PCI-X	Peripheral Component Interconnect Extended
PDF	Portable Document Format
PERL	Practical Extraction and Report Language
PKI	Public Key Infrastructure
PNG	Portable Network Graphics
PoE	Power-over-Ethernet
PoE+	Power-over-Ethernet Plus
POP	Post Office Protocol
ppm	pages per minute
pps	packets per second
PVC	Polyvinyl Chloride
QSFP	Quad Small Form-factor Pluggable
RADIUS	Remote Authentication Dial-In User Service
RAID	Redundant Array of Independent Disks
RAM	Random-Access Memory
RDIMM	Reduced Dual Inline Memory Module
RIP	Routing Information Protocol

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<u>Abbreviation</u>	<u>Definition</u>
RIP-2	Routing Information Protocol Version 2
RJ11	6P2C connector
RJ45	Registered Jack-45
RoHS	Restriction of Hazardous Substances Directive
ROM	Read-Only Memory
rpm	revolutions per minute
RSA	Rivest-Shamir-Adleman cryptosystem
RS232	Recommended Standard 232
SAN	Storage Area Network
SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SD	Secure Digital
SED	Self-Encrypted Drive
SFP	Small Form-factor Pluggable
SFP+	Enhanced Small Form-factor Pluggable
SHA	Secure Hash Algorithm
SLC	Single-level Cell
SMB	Server Message Block protocol
SNMP	Simple Network Management Protocol
SNMP-2	Simple Network Management Protocol Version 2
SQL	Structured Query Language
SSD	Solid State Disk
SSL	Secure Sockets Layer
T1	T-carrier System 1
TACACS+	Terminal Access Controller Access-Control System Plus
TB	Terabyte
TPC-C	TPC-C is an on-line transaction processing benchmark
TPM	Trusted Platform Module

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<u>Abbreviation</u>	<u>Definition</u>
tpmC	TPC-C is measured in transactions per minute
U	Rack unit
UNSPSC	United Nations Standard Products and Services Code
UPC	Universal Product Code
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus
UTM	Unified Threat Management
UTP	Unshielded Twisted Pair
V	Volt
VA	Voltage-Amperes
VGA	Video Graphics Array
VLAN	Virtual LAN; a logical grouping of end stations within a bridged infrastructure
VPN	Virtual Private Network
VRRP	Virtual Router Redundancy Protocol
VXLAN	Virtual Extensible Local Area Network
W	Watt
WAN	Wide Area Network
WCS	Web Coverage Services
WEP	Wired Equivalent Privacy
WLAN	Wireless LAN
WMS	Web Map Service
WPA	Wi-Fi Protected Access
WPA2	Wi-Fi Protected Access 2
XML	Extensible Markup Language