DATASHEET

WD25000 Data Center Core Series Switch

WD25000

Data Center Core Series Switches

Apollo Infoways Private Limited

Overview

The WD25000 Data Center Cloud Core Switch Series is designed for cloud services data centers. It provides the following features:

- CLOS+ multi-grade multi-plane architecture
- With 768 line-speed 40G/100G interface per chassis and up to 9.6Tbps switch capacity per slot
- Integration of VSS, and MDC (Multi-tenant Device Context) to implement virtual resource pools
- Distributed ingress buffers (200 ms) to accommodate burst traffic in data centers
- Independent control, detection, and maintenance engines to implement 50ms failover and powerful control capabilities

  The WD25000 switch series, which meet various port density and performance requirements. The WD25000 switch series can work with WD routers, switches, security devices, NMC, and WD cloud to provide a wide variety solutions

WD25000 Switch Series

Advanced multi-grade multi-plane switching architecture

- Multi-grade multi-plane architecture, midplane free design, providing continuous bandwidth upgrade capability

- Supports industry first 48-port 40GE/ 100GE interfaces and can meet the existing and future application requirements of data centers
- Adopts independent switching fabric modules and MPU engines to improve device availability and ensure bandwidth expansion

Virtualization Technologies – VSS

VSS can virtualize up to two WD25000 switches into one logical VSS fabric. VSS delivers the following benefits:

- High Availability (HA) - Patented hot standby technology provides data backup and non-stop forwarding on the control plane and data plane. It improves availability and performance, eliminates single-point of failures, and ensures service continuity
- Distribution - Multi-chassis link aggregation to enable load sharing and backup over multiple uplinks, improving redundancy and link utilization
- Easy Management - A single IP address to manage the whole IRF fabric, which simplifies device and topology management, improving operating efficiency, and lowering network maintenance cost

Virtualization technologies - MDC

- MDC virtualizes one WD25000 switch into multiple logical switches, enabling multiple services to share one core switch. The 1:N virtualization maximizes switch utilization, reduces network TCO, and ensures secure isolation of services

DC-oriented features

- VXLAN (Virtual Extensible LAN) —VXLAN uses a MAC-in-UDP encapsulation method where the original Layer 2 package is added with a VXLAN header, and is then placed in a UDP-IP packet. With the help of MAC-in-UDP encapsulation, VXLAN tunnels Layer 2 network over Layer 3 network which provides two major benefits: higher scalability of Layer 2 segmentation and better utilization of available network paths
- MP-BGP EVPN (Mutli-protocol Border Gateway Protocol Ethernet Virtual Private Network) MP-BGP EVPN uses standard-based BGP protocol as the control plane for VXLAN overlay networks, providing BGP based VTEP auto peer discovery and end-host reachability information distribution. MP-BGP EVPN delivers many benefits, such as eliminating traffic flooding, reducing full mesh requirements between VTEPs via the introduction of BGP RR, achieving optimal flow based end to end load sharing and more
- Large capacities for storing ARP/ND, MAC, and ACL entries

RoCE (RDMA over Converged Ethernet)

- Remote Direct Memory Access (RDMA) directly transmits the user application data to the storage space of the servers, and uses the network to fast transmit the data from the local system to the storage of the remote system. RDMA eliminates multiple data copying and context switching operations during the transmission process, and reduces the CPU load.
- RoCE supports RDMA on standard Ethernet infrastructures. WD switch support RoCE and can be used to build a lossless Ethernet network to ensure zero packet loss.
- RoCE include the following key features, include PFC(Priority based Flow Control), ECN(Explicit Congestion Notification), DCBX(Data Center Bridging Capability Exchange Protocol), ETS(Enhanced Transmission Selection).

Innovative multi-engine design

- Independent control, detection, and maintenance engines provide powerful control capability and millisecond-level HA:
- Independent control engine— Uses a powerful CPU system that can efficiently process protocol and control packets, providing refined control for protocol packets and comprehensive protection against protocol packet attacks
- Independent detection engine— Provides highly reliable Fast Fault Detection and Restoration (FFDR) such as BFD and OAM, which can interact with protocols on the control plane to implement millisecond-level failover and convergence, ensuring service continuity
- Independent maintenance engine—Uses an intelligent Embedded Maintenance Subsystem (EMS), a CPU system that provides smart power management, including sequential power-on and power-off and device status check. Sequential power-on and power-off reduces power impulse, electromagnetic radiation, power consumption, and extends the device lifespan

DC-class HA

FFDR provides BFD and OAM functions to implement fast failover and convergence. The following lists the DC-class HA features:

- BFD for VRRP/BGP/IS-IS/RIP/OSPF/RSVP/static routing
- NSR/GR for OSFP/BGP/IS-IS/RSVP
- Separation of control and data planes through independent control engine and switching fabric module.
- 1+1 redundancy for control engines
- N+1 redundancy for switch fabric modules
- 1+1 redundancy for fan trays
- N+M redundancy for power modules

Multi-level security protection

- The WD25000 switch series use QoS policies to filter and limit traffic from data plane to control plane. During a DoS attack, the switch can identify and protect important packets and discard attack packets, ensuring normal operation
- Supports a large numbers of ACLs while ensuring line-speed forwarding. ACLs can identify and control L2/IPv4/IPv6/MPLS traffic by using combinations of packet fields
- The WD25000 switch series supports hardware level encryption technology MACsec (802.1ae), which is an industry-standard security technology that provides secure communication for all traffic on Ethernet links.

Distributed buffering and precise QoS

- Distributed ingress buffers accommodate burst traffic. Each port performs a precise bandwidth assignment and traffic shaping for incoming traffic, and distributes the traffic to ingress buffers. Distributed buffering can fully utilize the buffers of line cards to ensure best buffering performance
- A network model change from C/S to B/S leads to increased volumes of burst traffic. Network devices must have larger buffering capabilities to support this. The WD25000 series supports 200 ms buffering of burst traffic per 10G interface, which can meet the burst traffic requirements of large data centers
- Each chip can support 4GB buffer, maximum of 24GB buffer per line card
- Each line card supports a maximum of 96K hardware queues, refined QoS, and traffic management. QoS can assign different priorities and queues to different users to provide differentiated services

Comprehensive maintenance and monitoring

- Online state monitoring - Uses a dedicated engine to monitor the state of switch fabric modules, backplane channels, service communication channels, key chips, and storage. Once a failure occurs, it reports the failure to the system through EMS
- Card isolation- Isolates specified cards from the forwarding plane. The isolated cards still work on the control plane, allowing the user to perform management operations such as real-time diagnosis and CPLD upgrade on the isolated cards without affecting system operation
- Ethernet OAM- Provides multiple device-level and network-level fault detection methods

Green

- Intelligent EMS engine system - Provides smart power management that supports sequential power-on and power-off and device status check. Sequential power-on and power-off reduces power impulse and electromagnetic radiation, and increases the lifetime of the device. Additionally, device status checks can isolate faulty and idle cards to reduce power consumption
- Smart fan management- Collects fan temperature, calculates fan speed, and assigns the calculated speed to the fan tray. In addition, it detects fan speeds, fault alarms, and performs speed adjustment based on configuration sand area, reducing power consumption and noise, increasing the fan's lifetime
- Internal interface monitoring-Automatically shuts down unused internal interfaces to reduce power consumption
- RoHS compliance - The WD25000 switch series meets the EU RoHS safety standards.
- The WD25000 switch series is designed with front to back air flow, satisfying highly efficient heat dissipation requirements in data center.

Hardware Specifications

Item	WD25004X	WD25008X	Wd25016X
Switching capacity	57.6T/387Tbps	115.2T/516Tbps	230.4T/1032Tbps
Throughput	28800Mpps	57600Mpps	115200Mpps
MPU slots	2	2	2
LPU slots	4	8	16
Maximum power consumption	4800 W	9600 W	19200W
Weight (full configuration)	≤ 100 kg ≤ 220.5 lb	≤ 190 kg ≤ 418.9 lb	≤ 350 kg ≤ 771.6 lb
Dimensions (H x W x D)	264 x 440 x 857 mm (6U) 10.4 x 17.3 x 33.7 in	531 x 440 x 857 mm (12U) 20.9 x 17.3 x 33.7 in	931 x 440 x 857 mm (21U) 36.7 x 17.3 x 33.7 in
Switching fabric module slots	6	6	6

MPU Name	WDXM1SUP04B1	WDXM1SUP04H1	WDXM1SUPB1	WDXM1SUPH1	WDXM1SUPB1	WDXM1SUPH1
MPU processor	Quad Core 1.2 GHz		Quad Core 1.2 GHz		Quad Core 1.2 GHz	
MPU SDRAM	8 GB	16 GB	8 GB	16 GB	8 GB	16 GB
MPU Flash	1 GB		1 GB		1 GB	
MPU Console Port	1		1		1	
MPU MGMT Ports	2x 10/100/1000M Base-T 2x 1000M SFP		2x 10/100/1000 M Base-T 2x 1000M SFP	1x 10/100/1000 M Base-T 1x 1000M SFP	2x 10/100/1000 M Base-T 2x 1000M SFP	1x 10/100/1000 M Base-T 1x 1000M SFP
MPU USB Port	1		1		1	
Redundancy	Redundant MPUs, switching fabric modules, power modules, and fan trays					

Software Specification

Item	Feature description
Device Virtualization	IRF
Network Virtualization	BGP-EVPN
	VxLAN
VxLAN	L2 VxLAN gateway
	L3 VxLAN gateway
	Distributed VxLAN gateway
	Centralized VxLAN gateway
	EVPN VxLAN
	manual configured VxLAN
	IPv4 VxLAN tunnel
Programmability	Openflow1.3
	Netconf

Item	Feature description
	Ansible
	Python//TCL/Restful API to realize DevOps automated operation and maintenance
Traffic analysis	Sflow
VLAN	Port-based VLANs
	VLAN mapping
	L2PT
	MVRP(Multiple VLAN Registration Protocol)
MAC address	Dynamic learning and aging of mac address entries
	Dynamic,static and blackhole entries
IPv4 routing (Hardware-based unicast routing)	RIP(Routing Information Protocol) v1/2
	OSPF (Open Shortest Path First) v1/v2
	ISIS(Intermediate System to Intermediate system)
	BGP (Border Gateway Protocol)
	Routing policy
	VRRP
	PBR
	ICMP
IPv6 routing (Hardware-based unicast routing)	RIPng
	OSPFv3
	IPv6 ISIS
	BGP4+
	Routing policy
	VRRP
	PBR
	IPv6 ICMP
IP Service	DHCP Server, DHCP Relay, DHCP Snooping DHCP server of 3K operations/second
MPLS/VPLS	Support L3 MPLS VPN
	Support MCE
	VPLS

Item	Feature description
	Support MPLS OAM
	Support P/PE function
	Support LDP protocol
Multicast (Hardware-based multicast routing)	IGMP snooping
	MLD snooping
	IPv4 and IPv6 multicast VLAN
	IPv4 and IPv6 PIM snooping
	IGMP and MLD
	PIM and IPv6 PIM, Any-RP
	MSDP
Reliability	LACP LACP local forwarding first LACP short-time LACP Stack split detection
	STP/RSTP/MSTP protocol, PVST/PVST+/ RPVST+ compatible
	STP Root Guard and BPDU Guard
	RRPP and ERPS(ITU-T G.8032)
	Loopback detection
	Ethernet OAM
	Smartlink
	DLDP
	BFD for OSPF/OSPFv3, BGP/BGP4, IS-IS/IS-ISv6, PIM/IPM for IPv6 and Static route
	VRRP and VRRPE
Telemetry	ERSPAN
	Packet capture
QOS	Weighted Random Early Detection (WRED) and tail drop
	Flexible queue scheduling algorithms based on port and queue, including strict priority (SP), Weighted Deficit Round Robin (WDRR), Weighted Fair Queuing (WFQ), SP + WDRR, and SP + WFQ.
	Traffic shaping
	COPP

Item	Feature description
QOS	Committed access rate (CAR)
	Account by packet and byte
	Packet filtering at L2 (Layer 2) through L4 (Layer 4); flow classification based on source MAC address, destination MAC address, source IP (IPv4/IPv6) address, destination IP (IPv4/IPv6) address, port, protocol, and VLAN to apply qos policy,including mirroring,redirection,priority remark etc.
Configuration and maintenance	Console telnet and SSH terminals
	SNMPv1/v2/v3
	ZTP
Configuration and maintenance	System log
	File upload and download via FTP/TFTP BootRom update and remote update
	NQA
	ping,tracert
	NTP
Security and management	Hierarchical management and password protection of users
	Authentication methods,including AAA,RADIUS and HWTACACS
	Support DDos, ARP attack and ICMP attack function
	SSH 2.0
	HTTPS
	SSL
	PKI
	Boot ROM access control (password recovery)
	RMON
	permit third party transceivers (license)
HA	Independent switching fabric modules 1+1 redundancy or key components such as MPUs and power modules N+1 redundancy for switching fabric modules Passive backplane CLOS+ midplane free design (12500X) Hot swapping for all components Real-time data backup on active/standby MPUs

Item	Feature description
HA	Hot patching NSR/GR for OSFP/BGP/IS-IS/RSVP Port aggregation and multi-card link aggregation BFD for VRRP/BGP/IS-IS/OSPF/RSVP/static routing, with a failover time less than 50 milliseconds IP FRR and TE FRR with a switchover time less than 50 millisecond
IEEE Standard	802.3ab/802.3ae/802.3z/802.3x/802.3ad 802.3AH/802.1P/802.1Q/802.1X/802.1D/802.1w/802.1s/802.1AG 802.1x/802.1Qbb/802.1az/802.1Qaz
RFC	RFC793/RFC2328/RFC1256/RFC1771/RFC1185/RFC1191/RFC1195/RFC1195/RFC1212/RFC1213/RFC1213/RFC1213/RFC1215/RFC1245/RFC1246/RFC1256/RFC1256/RFC1265/RFC1266/RFC1268/RFC1271/RFC1284/RFC1286/RFC1305/RFC1305/RFC1305/RFC1321/RFC1323
EMC	FCC Part 15 (CFR 47) CLASS A ICES-003 CLASS A VCCI CISPR 32 CLASS A CISPR 22 CLASS A EN 55022 CLASS A CISPR 32 CLASS A EN 55032 CLASS A CISPR 24 EN 55024 EN 61000-3-2 EN 61000-3-3
Temperature	Operating temperature: 0°C to 50°C Storage temperature: -40°C to 70°C (-40°F to 158°F)
Humidity	5% to 95% (non-condensing)
Environmental protection	RoHS
Safety	EMI/EMC

Item	Feature description
	EN No 60950-1 IEC 60950-1 EN 60950-1

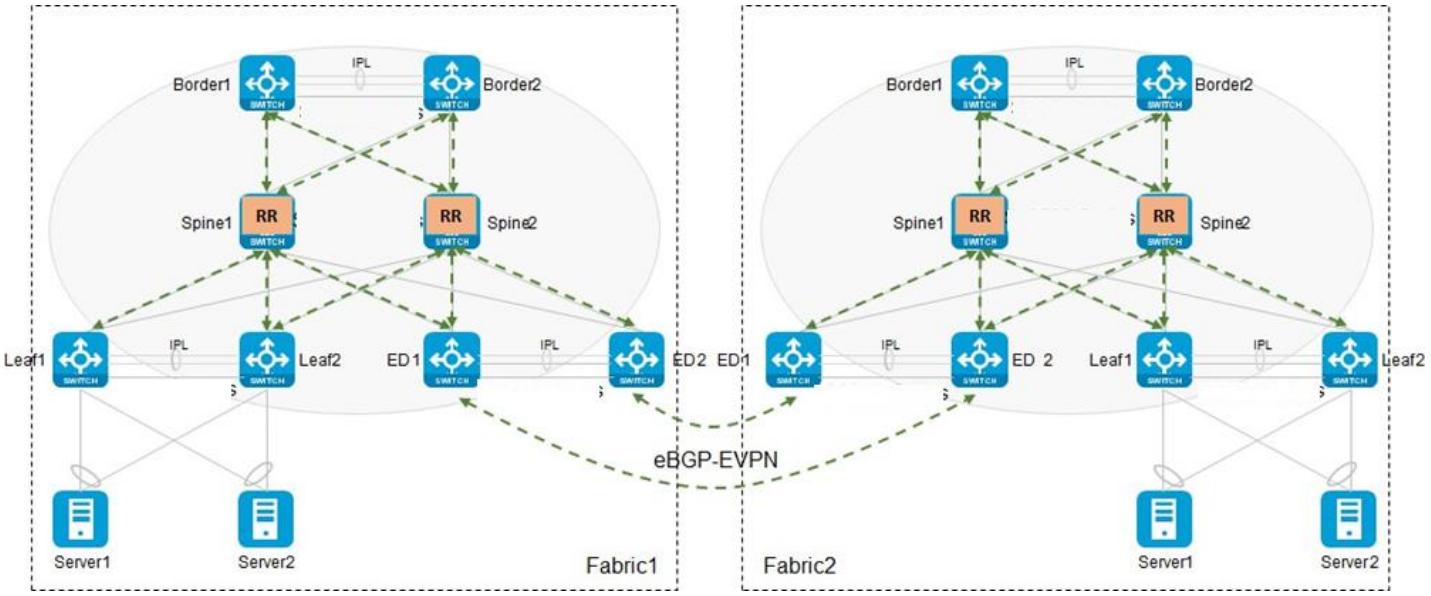
Performance and scalability

Item	Description	HB LPU	HF LPU
Virtualization	IRF2.0 stack	2	2
	M-LAG device number	2	2
ACL	max number of ingress ACLs	40K	40K
	max number of ingress Car	8K	8K
	max number of ingress Counter	8K	8K
	max number of egress ACLs	20K	20K
	max number of egress Counter	4K	4K
Forwarding table	Jumbo frame length(byte)	12288	12288
	Mirroring group	15	15
	PBR policy	1000	1000
	PBR node	256	256
	max number of MACs per switch	750K	750K
	max number of ARP entries IPv4	350K	1M
	max ND table size for IPv6	48K	48K
	max number of unicast routes IPv4	250K	4M
	max number of unicast routes IPv6	64K	2M
	IPv4 l2 multicast group	2000	4000
	IPv4 l3 multicast group	2000	4000
	IPv4 multicast routing	16K	16K
	IPv6 l2 multicast group	1000	2000
	IPv6 l3 multicast group	1000	2000
	IPv6 multicast routing	8K	8K
	LAGG group	1024	1024
	LAGG member per group	64	64
	ECMP group	max 2047	max 2047
	ECMP member per group	2-128	2-128
	VRF	4095	4095

Item	Description	HB LPU	HF LPU
Interface	Loopback interface number	1K	1K
	L3 sub interface number	4094	4094
	SVI interface number	4094	4094
	VxLAN AC number	16K	16K
	VxLAN VSI number	16K	16K
	VxLAN tunnel number	4K	4K
	VSI interface number	8K	8K
	IPv4 tunnel number	127	127
	IPv6 tunnel number	127	127
	VLAN number	4094	4094
Performance	RIB	1M	4M
	MSTP instance	64	64
	PVST instance	128	128
	PVST logical port number	1000	1000
	VRRP VRID	16	16
Performance	VRRP group	256	256
	NQA group	32	32
MPLS/VPLS	LDP peer	128(local),256(remote)	128(local),256(remote)
	VRF	4000	4000
	VPLS: Number of Pseudo Wires	4000	4000
	VPLS: number of peers/single VPLS full mesh instance	100	100
	RSVP adjacency	200	200
Static table	static mac-address	20K	20K
	static multicast mac-address	256	256
	static ARP	8K	8K
	static ND	1K	1K
	static IPv4 routing table	250K	250K
	static IPv6 routing table	128K	128K

Data Center Application

The typical data center application is an EVPN-VxLAN design, WD25000 switches work as spine or spine/border, WD DC series work as leaf and border or ED. From this design, the users can get a non-blocking large L2 system.



Ordering information

Product ID	Product Description
WD-25004X	WD25004X Ethernet Switch Host
WD-25008X	WD25008X Ethernet Switch Host
WD-25016X	WD25016X Ethernet Switch Host
WDXM1SUP04B1	WD25004X Supervisor Engine Module
WDXM1SUP04H1	WD25004X Supervisor Engine Unit
WDXM1SUPB1	WD25000 Supervisor Engine Module
WDXM1SUPH1	WD25000 Supervisor Engine Unit
WDXM1SFH04D1	WD25004X Fabric Module,Type H(Class D)
WDXM1SFH08C1	Switching Fabric Module For WD25008X,Type H(Class C)
WDXM1SFH08D1	WD25008X Fabric Module,Type H(Class D)
WDXM1SFH08E1	Switching Fabric Module For WD25008X,Type H(Class E)
WDXM2SFH16C1	WD25016X Fabric Module,Type H(Class C)
WDXM1SFH16C1	WD25016X Fabric Module,Type H(Class C+)
WDXM1SFH16E1	WD25016X Fabric Module,Type H(Class E)
WDXM1CGQ18QGHF1	WD25000 18-PORT 100GBASE Ethernet Optical Interface(QSFP28)/36-Port 40GBASE Ethernet Optical Interface Module(QSFP+)(HF)
WDXM1CGQ18QGHB1	WD25000 18-Port 100GBASE (QSFP28)/36-Port 40GBASE Ethernet Optical Interface Module (QSFP+)(HB)
WDXM1TGS24QGMODHB1	WD25000 24-Port 10GBASE Ethernet Optical Interface(SFP+,LC)+4-Port 40GBASE Ethernet Optical Interface Module(QSFP+)(HB),With 1 Expansion Slot
WDXM1CGQ36HB1	WD25000 36-Port 100GBASE Ethernet Optical Interface

	Module(QSFP28)(HB)
WDXM1QGS36HB1	WD25000 36-Port 40GBASE Ethernet Optical Interface Module(QSFP+)(HB)
WDXM1TGS48HB1	WD25000 48-Port 10GBASE Ethernet Optical Interface Module(SFP+,LC)(HB)
WDXM1QGS48HB1	WD25000 48-Port 40GBASE Ethernet Optical Interface Module(QSFP+)(HB)
WDXM1CGQ48HB1	WD25000 48-Port 100GBASE Ethernet Optical Interface Module(QSFP28)(HB)
WDXM1CGQ6QGHB1	WD25000 6-Port 100GBASE Ethernet Optical Interface(QSFP28)/12-Port 40GBASE Ethernet Optical Interface Module(QSFP+)(HB)
WDXM1TGS48C2HB1	WD25000,48-Port 10G BASE Ethernet Optical Interface (SFP+LC)+2-Port 100GBASE Ethernet Optical Interface Module(QSFP28)(HB)
WDXM1BFP16A	16 Fabric Blank Filler Panel
WDXM1BFP08A	08 Fabric Blank Filler Panel
WDXM1BFP04A	04 Fabric Blank Filler Panel
WDXM116XFAN	WD25016X Ethernet Switch Fan Module
WDXM108XFAN	WD25008X Ethernet Switch Fan Module
WDXM104XFAN	WD25004X Ethernet Switch Fan Module
WDXM116XFANH	WD25016X Ethernet Switch High Speed Fan Module
WDXM108XFANH	WD25008X Ethernet Switch High Speed Fan Module
WDXM104XFANH	WD25004X Ethernet Switch High Power Fan Module
PWR2400-54A	AC Power Module,2400W
PWR2400-54D	DC Power Module,2400W
PWR3000-54A	3000W AC Power Supply Module
PWR3000-54AHD	3000W AC & 240V-380V HVDC Power Supply

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