DATASHEET

Data Center Core Switch

Data Center Switches

Product Data Sheet

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Data Center Core Switches

Product overview

WatchDog high-density intelligent series switches is developed for data centers and cloud computing networks. It provides powerful hardware forwarding capacity and abundant data center features. It provides up to 32*100G ports and 2 out-of-band management ports (one fiber port and one copper port). The 100G ports are 100G/40G autosensing and each can be split into four interfaces. This enables the switch to provide up to 128*25G or 10G ports. The switch supports modular power supplies and fan trays. By using different fan trays, the switch can provide field-changeable airflows.
The switch is an ideal product for high-density 100GE or 25GE accessing and aggregation at data centers and cloud computing networks. It can also operate as a TOR access switch on an overlay or integrated network.

The Data Center series switches includes two models:

- WD-DC-9600: The switch provides 4 × service slots of 24 × 25G SFP ports, 2 × fan tray slots, 2 × out-of-band management ports, 1 × mini USB console port, and 1 × USB port. The switch uses 650W AC or DC removable power modules and supports 2+2 power module redundancy.
- WD-DC-32QF: The switch provides 32 × 100G QSFP28 ports, 2 × 1G SFP ports, 5 × fan tray slots, 2 × out-of-band management ports, 1 × mini USB console port, and 1 × USB port. The switch uses 650W AC or DC removable power modules and supports 1+1 power module redundancy.

WD-DC-9600 front panel

WD-DC-9600 rear panel

WD-DC-32QF front panel

WD-DC-32QF rear panel

Features and Benefits

High port density and powerful forwarding capacity

- The switch offers high-density 100G/40G/25G/10G ports and a forwarding capacity as high as 6.4Tbps, which enables the switch to provide high-density server access in high-end data centers without over subscriptions.

WatchDog Virtual Switching System (VSS)

- Facing the application requirements of the unified switching architecture of the data center, the series switches support the VSS technology, which virtualizes multiple devices into one logical.
- The equipment has strong advantages in scalability, reliability, distributed and availability.
- VSS not only can achieve a long-distance intelligent elastic architecture within a rack, across racks, and even across regions.

Abundant Data Center Features

The switch supports abundant data center features, including:

- WatchDog Data Center switches supports VXLAN (Virtual Extensible LAN), which provides two major benefits, higherscalability of Layer 2 segmentation and better utilization of available network paths.
- WatchDog Data Center switches supports MP-BGP EVPN (Multiprotocol Border Gateway Protocol Ethernet VirtualPrivate Network) which can run as VXLAN control plane to simplify VXLAN configuration, eliminate traffic flooding and reduce full mesh requirements between VTEPs via the introduction of BGP RR.
- WatchDog Data Center switches support Fiber Channel over Ethernet (FCoE), which permits storage, data, andcomputing services to be transmitted on one network, reducing the costs of network construction and maintenance.
- WatchDog Data Center switches support Priority-based Flow Control (PFC), Enhanced Transmission Selection (ETS)and Data Center Bridging eXchange (DCBX). These features ensure low latency and zero packet loss for FC storage, RDMA applications and high-speed computing services.

Multi Chassis Link Aggregation Group (M-LAG)

- WatchDog Data Center switches support M-LAG, which enables links of multiple switches to aggregate into one to implement device-level link backup. M-LAG is applicable to servers dual-homed to a pair of access devices for node redundancy.
- Streamlined topology: M-LAG simplifies the network topology and spanning tree configuration by virtualizingtwo physical devices into one logical device.
- Independent upgrading: The M-LAG member devices can be upgraded independently one by one to minimize theimpact on traffic forwarding.
- High availability: The M-LAG system uses a keep alive link to detect multi-active collision to ensure that only one member device forwards traffic after a Multi Chassis system splits.

Powerful Visibility

With the rapid development of data center, the scale of the data center expands rapidly; reliability, operation and maintenance become the bottleneck of data center for further expansion. WatchDog Data Center switches conform to the

trend of automated data operation and maintenance, and support visualization of data center.

- INT (Inband-Telemetry) is a network monitoring technology used to collect data from the device. Compared with the traditional network monitoring technology featuring one query, one reporting, INT requires only one-time configuration for continuous data reporting, thereby reducing the request processing load of the device. INT can collect timestamp information, device ID, port information, and buffer information in real time. INT can be implemented in IP, EVPN, and VXLAN networks.
- Provides a variety of traffic monitoring and analytic tools, including sFlow, NetStream, SPAN/RSPAN/ERSPAN mirroring, and port mirroring to help customers perform precise traffic analysis and gain visibility into network application traffic. With these tools, customers can collect network traffic data to evaluate network health status, create traffic analysis reports, perform traffic engineering, and optimize resource allocation.
- Supports realtime monitoring of buffer and port queues, allowing for visible and dynamic network optimization.
- Supports PTP (Precision Time Protocol) to achieve highly precise clock synchronization.

IBoE (InfiniBand over Ethernet)

- InfiniBand over Ethernet (IBoE) 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. IBoE eliminates multiple data copying and context switching operations during the transmission process, and reduces the CPU load.
- IBoE supports RDMA on standard Ethernet infrastructures. WatchDog Data Center switch support IBoE and can be used to build a lossless Ethernet network to ensure zero packet loss.
- IBoE 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).

Flexible programmability

- The switch uses industry-leading programmable switching chips that allow users to define the forwarding logic as needed.
- Users can develop new features that meet the evolving trend of their networks through simple software updates.

Powerful SDN capacity

- WatchDog Data Center switches adopt the next-generation chip with more flexible Openflow FlowTable, more resources and accurate ACL matching, which greatly improves the software-defined network (SDN) capabilities and meet the demand of data center SDN network.
- WatchDog Data Center switches can interconnect with NMS Controller through standard protocols such as OVSDB, Netconf and SNMP to implement network automatic deployment and configuration.

Comprehensive security control policies

- WatchDog Data Center switch supports AAA, RADIUS and user account based authentication, IP, MAC, VLAN, port- based user identification, dynamic and static binding; when working with the WatchDog platform, it can conduct real time management, instant diagnosis and crackdown on illicit network behavior.

- WatchDog Data Center switch supports enhanced ACL control logic, which enables an enormous amount of inbound and outbound ACL, and delegate VLAN based ACL. This simplifies user deployment process and avoids ACL resource wastage. Data Ceter switch can also take advantage of Unicast Reverse Path Forwarding (Unicast RFP). When the device receives a packet, it will perform the reverse check to verify the source address from which the packets are supposedly originated, and will drop the packet if such path doesn’ t exist. This can effectively prevent the source address spoofing in the network.

Multiple reliability protection

- The Data Center switch provides multiple reliability protection at both switch and link levels. With over current, overvoltage, and overheat protection, all models have a redundant pluggable power module, which enables flexible configuration of AC or DC power modules based on actual needs. The entire switch supports fault detection and alarm for power supply and fan, allowing fan speed to change to suit different ambient temperatures.
- The switch supports diverse link redundancy technologies such as RRP, VRRP, and SmartLink. These technologies ensure quick network convergence even when large amount of traffic of multiple services runs on the network.

Flexible choice of airflow

- To cope with data center cooling aisle design, the WatchDog Data Center switch comes with flexible airflow design,which features bi-cooling aisles in the front and back. Users may also choose the direction of airflow (from front to back or vice versa) by selecting a different fan tray.

Excellent manageability

The switch improves system management through the following ways:

- Provides multiple management interfaces, including the serial console port, mini USB console port, USB port, two out-of-band management ports, and two SFP ports. The SFP ports can be used as in-band management port through which encapsulated sampling packets are sent to the controller or other management devices for deep analysis.
- Supports multiple access methods, including SNMPv1/v2c/v3, Telnet, SSH 2.0, SSL, and FTP.
- Supports standard NETCONF APIs that allow users to configure and manage the switch, enhancing the compatibility with third-party applications.

Hardware Specification

Item	WD-DC-9600	WD-DC-32QF
Dimensions (H × W × D)	88.1 × 440 × 660 mm (3.47 × 17.32 × 25.98 in)	43.6 × 440 × 460 mm (1.72 × 17.32 × 18.11 in)
Weight(Full loaded)	≤ 27 kg (59.53 lb)	≤ 15 kg (33.07 lb)
Serial console port	1	1
Out-of-band management port	One GE copper port and one GE fiber port	One GE copper port and one GE fiber port

Mini USB console port	1	1
USB port	1	1
QSFP28	/	32
SFP port	2	2
Expansion slot	4	-
CPU	4 cores, 2.2 GHz	4 cores, 2.4 GHz
Flash/SDRAM	8GB/8GB (Expandable upto 16GB/16GB)	8GB/8GB (Expandable upto 16GB/16GB)
Latency	< 1.5μs	
Switching capacity	6.4 Tbps	
Forwarding capacity	2024 Mpps	
Buffer	32M	
AC-input voltage	90v to 264v	90v to 264v
DC-input voltage	–40v to –72v	–40v to –72v
Power module slot	4	2
Fan tray slot	2	5
Air flow direction	From front to rear or from rear to front	From front to rear or from rear to front
MTBF(years)	45.8	27.2
MTTR(hour)	1	1
Operating temperature	0°C to 50°C	
Operating humidity	5% to 95%, noncondensing	

Software Specification

Item	Feature description
Device Virtualization	IRF
	M-LAG(DRNI)
	S-MLAG
Network Virtualization	BGP-EVPN
	VxLAN
	EVPN ES
VxLAN	L2 VxLAN gateway
	L3 VxLAN gateway
	Distributed VxLAN gateway
	Centralized VxLAN gateway
	EVPN VxLAN
	manual configured VxLAN
	IPv4 VxLAN tunnel
	IPv6 VxLAN tunnel
	QinQ VxLAN access
SDN	Yes

Lossless network	PFC and ECN
	DCBX
	RDMA and ROCE
	PFC deadlock watchdog
	ECN overlay
	ROCE stream analysis
Programmability	Openflow1.3
	Netconf
	Ansible
	Python//TCL/Restful API to realize DevOps automated operation and maintenance
	Openflow1.3
Traffic analysis	Sflow
	Netstream
VLAN	Port-based VLANs
	Mac-based VLAN ,Subnet-based VLAN and Protocol VLAN
	VLAN mapping
	QinQ
	MVRP(Multiple VLAN Registration Protocol)
	Super VLAN
	PVLAN
MAC address	Dynamic learning and aging of mac address entries
	Dynamic,static and blackhole entries
	Mac address limiting on ports
IPv4 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
IPv6 routing	RIPng
	OSPFv3
	IPv6 ISIS
	BGP4+
	Routing policy
	VRRP
	PBR
MPLS/VPLS	Support L3 MPLS VPN
	Support L2 VPN: VLL (Martini, Kompella)
	Support VPLS, VLL
	Support hierarchical VPLS and QinQ+VPLS access
	Support P/PE function
	Support LDP protocol
	Support MCE
	Support MPLS OAM
Multicast	IGMP snooping
	MLD snooping
	IPv4 and IPv6 multicast VLAN
	IPv4 and IPv6 PIM snooping

	IGMP and MLD
	PIM and IPv6 PIM
	MSDP
	Multicast VPN
Reliability	LACP
	STP/RSTP/MSTP protocol, PVST compatible
	STP Root Guard and BPDU Guard
	RRPP and ERPS
	Ethernet OAM
	Smartlink
	DLDP
	BFD for OSPF/OSPFv3, BGP/BGP4, IS-IS/IS-ISv6, PIM/IPM for IPv6 and Static route
	VRRP and VRRPE
	LACP
	STP/RSTP/MSTP protocol, PVST compatible
	STP Root Guard and BPDU Guard
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
	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.
	Committed access rate (CAR)
QOS	Account by packet and byte
	COPP
Telemetry	gRPC
	ERSPAN
	Mirror on drop
	Telemetry Stream
	INT
	iNQA
	Packet trace, Packet capture
Configuration and maintenance	Console telnet and SSH terminals
	SNMPv1/v2/v3
	ZTP
	System log
	File upload and download via FTP/TFTP BootRom update and remote update
	NQA
	ping,tracert
	VxLAN ping and VxLAN tracert
	NTP
	PTP(1588v2)
	GIR Graceful Insertion and Removal
Security and management	Macsec, Macsec subcard is supported on S9850-4C and only 100G macsec subcard can support 256-bit AES encryption
	Micro-Segmentation

	Hierarchical management and password protection of users
	Authentication methods,including AAA,RADIUS and WDTACACS
	Support DDos, ARP attack and ICMP attack function
	IP-MAC-port binding and IP Source Guard
	SSH 2.0
	HTTPS
	SSL
	PKI
	Boot ROM access control (password recovery)
	RMON
IEEE Standard	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
Safety	IEC 60950-1, EN 60950-1

Performance and scalability

Item	Description	
Virtualization	IRF stack	9
	M-LAG device number	2
	ED group	8
ACL	max number of ingress ACLs	18K/pipe, total 2 pipes
	max number of ingress Car	2304/pipe, total 2 pipes
	max number of ingress Counter	10752/pipe, total 2 pipes
	max number of egress ACLs	2048
	max number of egress Car	1K
	max number of egress Counter	1K
Forwarding table	Jumbo frame length(byte)	9416
	Mirroring group	4
	PBR policy	1000
	PBR node	256
	max number of MACs per switch	288K max
	max number of ARP entries IPv4	272K max
	max ND table size for IPv6	136K max
	max number of unicast routes IPv4	324K max
	max number of unicast routes IPv6	324K max
	IPv4 l2 multicast group	4000
	IPv4 l3 multicast group	4000
	IPv4 multicast routing	128K
	IPv6 l2 multicast group	4000
	IPv6 l3 multicast group	4000
	IPv6 multicast routing	64K
	LAGG group	1024
	LAGG member per group	256
	ECMP group	max 4K
	ECMP member per group	2-128
	VRF	4095

Interface	Loopback interface number	1K
	L3 sub interface number	2500
	SVI interface number	4K
	VxLAN AC number	16K
	VxLAN VSI number	16K
	VxLAN tunnel number	2K
	VSI interface number	8K
	IPv4 tunnel number	2K
	IPv6 tunnel number	2K
	VLAN number	4094
Performance	RIB	1M
	MSTP instance	64
	PVST instance	510
	PVST logical port number	2000
	VRRP VRID	255
	VRRP group	256
	NQA group	32
Static table	static mac-address	4000
	static multicast mac-address	1K
	static ARP	1K
	static ND	4K
	static IPv4 routing table	2K
	static IPv6 routing table	4000

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