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ZTE ZXR10 9900 Series Switch Datasheet

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ZTE

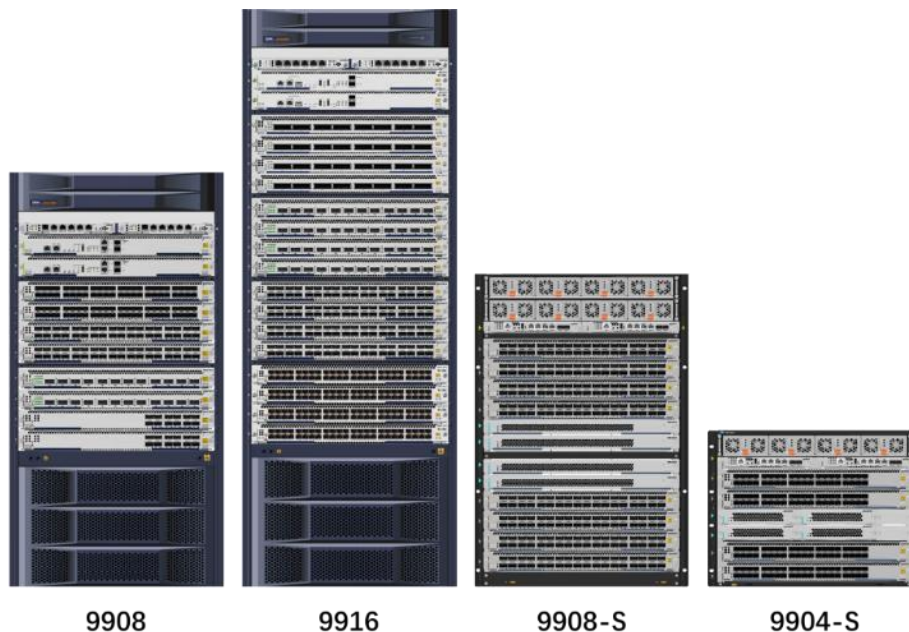


Product Overview

The ZXR10 9900/9900-S Series switch is ZTE's new generation of large-capacity, high-performance, highly reliable core switches oriented to data center. It provides large switching capacity, high density 10GE/40GE/100GE interfaces, carrier-class reliability and superior scalability. The ZXR10 9900/9900-S Series switch supports extensive data center service features such as VSC2.0 (Virtual Switch Cluster)/ TRILL (Transparent Interconnection of Lots of Links)/ FCOE (Fibre Channel over Ethernet) / VXLAN (Virtual eXtensible Local Area Network) / SDN (Software Defined Network)/ Front-to-back airflow. The ZXR10 9900/9900-S Series switch can work with the ZXR10 5960-H Series switch to build elastic, virtualized, high-quality switching network that meets the requirements of cloud-computing data centers.

The ZXR10 9900/9900-S Series switch uses advanced CLOS hardware architecture and provides up to 198Tbps wire-speed switching capacity with high capacity service cards including: 48 x10GE interfaces, 36 x 40GE interfaces, and 36 x100GE interfaces.

The ZXR10 9900 Series switch uses modular design, which shares control board, monitoring board, power supply module and fan module, minimizing the cost of spare parts and fully protecting user investment.



Coupled with distributed ROSng Software Platform, the ZXR10 9900/9900-S Series switch has models as 9908, 9916 (8 Switch Fabric Unit Slots) and 9904-S, 9908-S (4 Switch Fabric Unit Slots). The ZXR10 9900 Series switch delivers comprehensive products:



- 9908 supports 2 Intelligent Monitor Board slots, 2 Management Process Unit slots, 8 Line Interface Card slots, 8 Switch Fabric Units slots (Rear panel), 8 AC/DC/HVDC Power Supply Module slots and 20 Fan Module slots. 21RU, Front-to-back airflow.
- 9916 supports 2 Intelligent Monitor Board slots, 2 Management Process Unit slots, 16 Line Interface Card slots, 8 Switch Fabric Units slots (Rear panel), 16 AC/DC/HVDC Power Supply Module slots and 24 Fan Module slots. 32RU, Front-to-back airflow.
- 9904-S supports 2 half-width Management Process Unit slots, 4 Line Interface Card slots, 4 half-width Switch Fabric Units slots (Front Panel), 4 AC/DC/HVDC Power Supply Module slots and 3 huge Fan Trays in the rear panel. 8RU, Front-to-back airflow.
- 9908-S supports 2 half-width Management Process Unit slots, 8 Line Interface Card slots, 4 Switch Fabric Units slots (Front Panel), 8 AC/DC/HVDC Power Supply Module slots and 6 huge Fan Trays in the rear panel. 16RU, Front-to-back airflow.

Product Features

- **High Performance, Provide Up to 198Tbps Wire-speed Switching Capacity, 4T High-Density Line Cards**
 - The ZXR10 9900 Series switch supports up to 198Tbps wire-speed switching capacity, which can be extended to 1032Tbps smoothly. It supports high-density 10GE/40GE/100GE interfaces and delivers huge bandwidth capability to fulfill the growing service requirement in data center.
 - The ZXR10 9900 Series switch supports 36*40GE, 36*100GE, 144*25GE, and 144*10GE line cards, which provide line-rate forwarding.
 - ZXR10 9900 Series switch provides as many as 576*100GE, 576*40GE, 2,304*25GE, or 2,304*10GE line-rate ports.
 - The 10 GE ports support working as GE ports, 40GE port can be expanded into 4 10 GE port, 100GE QSFP28 ports support working as 40GE, flexible interface combination delivers easy deployment for core switch and save cost for customer.
 - Line interface card provides up to 24 GB buffer, which is dynamically shared by interfaces to improve usage efficiency.
 - ZXR10 9900/9900-S Series switch support up to 750K MAC and 256K FIB/16M RIB entries for use in large-scale networks. And MAC, FIB, ARP, ACL entries can be changed flexibly to suit dynamic service requirements.



- **Step into SDN Era**
 - The ZXR10 9900/9900-S Series switch is SDN-based data center switch, based on OpenFlow interface to provide customer benefits of SDN technology.
 - Through southbound interface of SDN Controller Netconf/OpenFlow, the ZXR10 9900/9900-S Series can download forwarding flow table, set up VxLAN forwarding tunnel, service configuration and centralized management.
 - Through NVO3 technology, extend the number of tenant and provide the supply for large-scale IDC service.
 - The ZXR10 9900/9900-S Series switch supports the leading open cloud service configuration and dispatch system OpenStack, which can reduce the service online time and increase the flexibility.
 - The ZXR10 9900/9900-S Series switch supports Hybrid mode, divide the resource by port, VLAN. Support the traditional protocols and OpenFlow protocol, which is suitable for all kinds of scenarios and the customers can upgrade the network to SDN smoothly.
 - Visual GUI interface of SDN controller helps customer realize easy operation and service provisioning
- **VxLAN and EVPN Enables Flexible Network Expansion in vDC and DCI Scenarios**
 - Support VXLAN (Virtual eXtensible Local Area Network) protocol, Not only L2 VxLAN but also L3 VxLAN. The ZXR10 9900/9900-S Series switch can support large L2 network interconnection cross L3 network and can support more than 16M tenants, which implements fast service deployment without changing the customer network in order to protect customer's investments.
 - The ZXR10 9900/9900-S Series switch can work as gateway of the VM in VxLAN scenario to expand the network scale and reduce the load of the core switch. Therefore it can enhance the reliability of the network.
 - The ZXR10 9900/9900-S Series switch supports EVPN, which can run as the VxLAN control plane to simplify VxLAN deployment.



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- The ZXR10 9900/9900-S Series switch supports RT-2 (MAC/ARP synchronization), RT-5 (Subnet synchronization), supports symmetric IRB, distributed routes, EVPN RR.
- EVPN triggers automatic VxLAN tunnel setup between virtual tunnel endpoints (VTEPs), avoiding the full-mesh tunnel configuration and also reduces flooding of unknown traffic on the control plane.
- EVPN and VxLAN can be used to set up Layer 2 interconnections between data centers, enabling active-active VxLAN deployment across data centers and conserving DCI link bandwidth.
- **Deliver Better Data Center Service Experience.**
 - Support DCB (Data Center Bridging) protocol family and fully guarantee network reliability and no loss in full range. The ZXR10 9900/9900-S Series switch supports PFC (Priority-based Flow Control), QCN (Quantized Congestion Notification), ETS (Enhanced Transmission Selection), DCBX (Data Center Bridging Exchange), which ensure low latency and zero packet loss for high-speed computing services.
 - Support multiple EVB (Ethernet Virtual Bridging) patterns including VM, VEB and VEPA (Virtual Ethernet Port aggregator), and these different patterns can coexist, so it can fulfill different networking requirements. With full support for related protocols like VDP (VSI Discovery Protocol), EDCP (Edge Devices Communication Protocol) and CDCP (S-Channel Discovery and Configuration Protocol), EVB can run smoothly.
 - The ZXR10 9900/9900-S Series switch uses a patented front-to-back airflow that isolates cold air channels from hot air channels. LICs and SFUs use independent airflow channels, which solve the problems of mixing hot and cold air and cascade heating, and effectively reduce energy consumption. The fan speed can be dynamically adjusted based on the workload of line cards, which lowers power consumption and reduces noise.
 - The ZXR10 9900/9900-S Series switch supports SDN switch overlay traffic visualization diagnosis to satisfy the complicated maintenance of Data Center.
 - The ZXR10 9900/9900-S Series switch supports 1 : 2K NetFlow for Data Center large scale traffic collecting.



- **High-Performance VSC (Virtual Switch Cluster) Technology**
 - VSC2.0 Capability: Stacking bandwidth between the VSC switches can be up to 3.2Tbps, which can solve the bandwidth bottleneck of VSC and deliver customer a real-time non-blocking VSC system. By using optical Ethernet interface for stacking, the stacking distance can be up to 80km and even more, it helps customer to get rid of distance restriction while designing a reliable VSC system.
 - Reliability: Independent out-band management makes the control plane and forwarding plane separated. Through real-time control information hot-standby technology, the VSC system can achieve seamless switchover when failure happens.
 - Saving investments: No need special stacking line card, the normal line card can be used for VSC connecting. When some interfaces are used for VSC, the other interfaces on this line card can also be used for traffic forwarding. No interfaces are wasted and that helps customer to save investments.
 - Flexibility: Master and slave in VSC2.0 works in 1+N redundancy mode, MAD (Multi-active Detect) technology is used to detect and avoid dual master in VSC system when failure happens. Together with real-time hot-standby and seamless switchover it brings customer a more flexible VSC network.
 - VSC3.0: using the 5960 device as the remote Line Interface Card for 9900(-S) to realize the vertical virtualization.
- **VLD (Virtual Logical Device) Technology**
 - VLD (Virtual Logical Device) technology can deliver an industry-leading virtualization capability that makes one switch to be virtualized into as many as sixteen logical switches. This 1:16 ratio enables one core switch to manage services for an enterprise's multiple service areas such as production, office, and DMZ, or for multiple tenants.
 - VLD technology divides one network into separate logical areas for service isolation. The failure of one virtual switch does not affect other virtual switches, enhancing network security.
 - VLD technology improves the use efficiency of physical devices by implementing on-demand resource allocation and saves space in data center equipment room. This



ensures network scalability, reduces investment in devices and reduces the cost of device maintenance.

- VLD technology can be deployed with the VSC, which deliver the switch resource virtualization pool.

- **Powerful Service Bearing Capability**

- By supporting rich L2 switching and L3 routing functions and low latency forwarding, the ZXR10 9900/9900-S Series switch can bear lots of service including WLAN, Internet, Voice, Video, Enterprise private network and other data services.
- Support L2/L3 multicast, including IGMP snooping, Filtering, Proxy and Fast leave, MVR (Multicast VLAN Registration) and PIM to facilitate the services deployments such as IPTV, Multi-terminal HD video surveillance and video conferencing.

- **Comprehensive IPv6 Solution**

- The ZXR10 9900/9900-S Series switch has passed the IPv6 Ready Phase 2 Gold Medal Certification issued by IPv6 Forum.
- Support IPv6 unicast routing protocols: IPv6 static routing, RIPng, OSPFv3, IS-ISv6, and BGP4+ and multicast features: MLD v1/v2, MLD snooping, PIMv6.
- Support IPv4-to-IPv6 tunnel technologies: IPv6 manual tunnels, 6-to-4 tunnel, ISATAP tunnel and IPv4-compatible automatic tunnel, etc.

- **Carrier-Class Reliability, Multi-Dimensional Security**

- Control plane, Forwarding plane and Monitoring plane are physically separated on the ZXR10 9900 Series switch.
- All the key components of the ZXR10 9900 Series switch are redundant design and hot pluggable, including: Intelligent Monitor Boards, Management Process Units, Power supply modules, Fan modules.
- Support Ethernet OAM, including IEEE 802.3ah, 802.1ag, help monitor network real-time operating status and fulfill fast fault detection, fault location.
- Support various authentication methods such as 802.1x, Radius, TACACS+. Support CPU overload protection, anti-DDOS, deliver customer a security network.



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- Support ISSU, NSR, NSF, GR, enhancing the network reliability
- **Easy Maintenance, Saving OPEX**
 - Support physically independent monitoring plane, which can monitor the working temperature, fan situation, power situation, etc. It can help customer hold the network running status in real time.
 - Support Zero-touch provisioning, the software and the configuration files can be loaded automatically, Reduce provision process and manpower requirement.
 - Support the SQA (Service Quality Analyzer), detecting the network quality periodically or in real time. In order to provide better quality of service for more valuable services.
- **Green for More**
 - The ZXR10 9900 Series Switch uses innovative energy saving technologies. The port power consumption is lower than the industry average. The power supply system measures power consumption in real time and puts one or more power modules into sleep mode when system power demands are low.
 - Strict front-to-back airflow and proprietary C-shape airflow improve heat dissipation to reduce power consumption.
 - Fan speed can automatically adjust by 5 levels in accordance with the temperature inside the switch. It not only saves the power consumption, but also reduces noise and extends life cycle of the fans.
 - Using the high efficient digital power modules, which can increase power efficiency and save the power consumption.
 - Complying with ROHS, WEEE and ISO14001 certification, No plumbum (Pb) in not only product materials but also the whole processing technic. Meanwhile, uses re-cycle degradable packing materials, practice green for more.



System Specification

The Universal System Specification of the ZXR10 9900 Series switch:

| Parameters | 9908 | 9916 | 9904-S | 9908-S |
|---|--|-------------------------------|-------------------------------|-------------------------------|
| Switching Capacity | 99Tbps | 198Tbps | 29.7Tbps | 59.4Tbps |
| Packet Forwarding Rate | 43,200Mpps | 86,400Mpps | 14,400Mpps | 28,800Mpps |
| Height | 21RU | 32RU | 8RU | 16RU |
| Dimensions (H*W*D,mm) | 930.6 *445*819 | 1419.6*445*819 | 352.8*445*681 | 708.4*445*681 |
| Number of Line Interface Card Slots | 8 | 16 | 4 | 8 |
| Number of Management Process & Monitor Board Slots | 0 | 0 | 2 | 2 |
| Number of Management Process Unit Slots | 2 | 2 | 0 | 0 |
| Number of Intelligent Monitor Board Slots | 2 | 2 | 0 | 0 |
| Switch Fabric Unit Redundancy | 7+1 | 7+1 | 3+1 | 3+1 |
| Max Weight | <290kg | <500kg | <103kg | <194kg |
| Power Consumption | <13,000W | <25,000W | <3,650W | <7,600W |
| AC Power Supply | 100V~240V, 50Hz~60Hz | | | |
| DC Power Supply | -48V | | -48V/-60V | |
| HVDC Power Supply | 192V~400V | | | |
| Heat Dissipation Pattern | Fan Cooling, Independent fan Modules, Front-to-back Airflow | | | |
| Working Temperature | Short term working temperature: -10°C ~ +55°C; Long term working temperature: -5°C ~ +45°C; | | | |
| Storage Temperature | -40°C ~ +70°C | | | |
| Working Humidity | 5%~95% (non-condensing) | | | |
| Working Altitude | <5,000 meters | | | |
| MTBF/MTTR | >303169 hours/ <30 minutes | >272480 hours/ <30 minutes | >416897 hours/ <30 minutes | >240806 hours/ <30 minutes |



Service Specification

| Function | The ZXR10 9900 Series Switch |
|-----------------------------|--|
| Data Center Features | <ul style="list-style-type: none"> Support VSC2.0 (Virtual Switching Clustering) Support VLD (Virtual Logical Device) Support TRILL (Transparent Interconnection of Lots of Links) Support FCoE (FIP Snooping) Support DCB (Data Center Bridging) Support PFC (Priority-based Flow Control) Support ETS (Enhanced Transmission Selection) Support VEPA (IEEE 802.3Qbg) Support VxLAN (Virtual eXtensible Local Area Network) Support EVPN (Ethernet VPN) Support SDN (Software Defined Network) Support OpenFlow 1.3 Support VSC3.0 |
| L2 Features | <ul style="list-style-type: none"> Support IEEE 802.1p (COS), IEEE 802.1q (VLAN), IEEE 802.3x Support IEEE 802.1d (STP)/ 802.1w (RSTP)/ 802.1s (MSTP) Support IEEE 802.1ad (QinQ), Selective QinQ Support IEEE 802.3ad (LACP) Support IEEE 802.3z (1000BASE-X) / 802.3ab (1000BaseT) Support IEEE 802.3ae (10Gbase), Support IEEE 802.3ba (40Gbase), IEEE 802.3ba (100Gbase) Support Port mirroring, Traffic mirroring Support VLAN switching, VLAN translation Support PVLAN, SuperVLAN Support GVRP Support LLDP |
| L3 Features | <ul style="list-style-type: none"> Support IPv4 routing protocols, such as Static routing, Policy based routing , RIP, OSPF, BGP, and IS-IS Support DHCP server/ relay/proxy, DHCP snooping Support IPv6 dynamic routing protocols, such as Static routing, Policy based routing , RIPng, OSPFv3, ISISv6, and BGP4+ Support ND, DHCPv6, PMTU Support manual IPv6 tunnel, 6to4 tunnel, 6PE, ISATAP tunnel |



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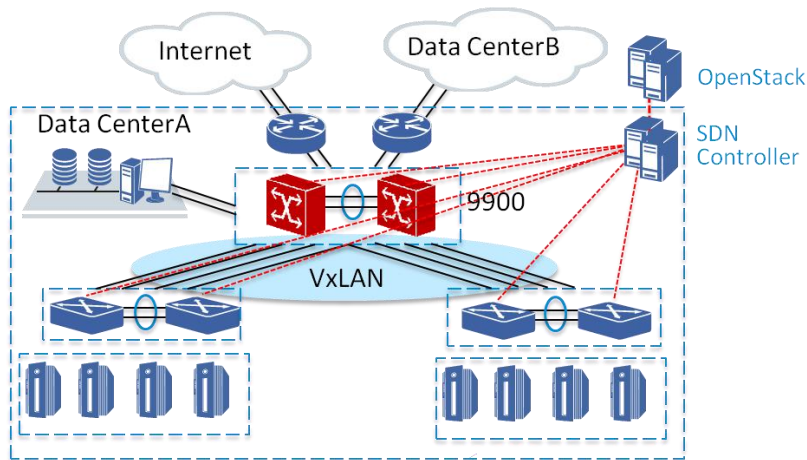
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|-----------------------------|--|
| Multicast | <p>Support IGMP v1/v2/v3, IGMPv1/v2/v3 snooping</p> <p>Support PIM-SM, PIM-DM, PIM-SSM, MSDP, MBGP, Any-RP</p> <p>Support administratively scoped multicast/ IPTV, MVR,</p> <p>Support MLD V1/V2、MLD V1/V2 Snooping</p> <p>Support PIMv6</p> |
| MPLS | <p>Support basic MPLS functions, LDP</p> <p>Support MCE</p> <p>Support VPLS,VPWS, H-VPLS</p> <p>Support MPLS L2 VPN, MPLS L3 VPN</p> |
| QOS | <p>Support traffic classification based on Layer 2 headers, Layer 3 protocols, Layer 4 protocols, and 802.1p priority</p> <p>Support queue scheduling algorithms, such as SP, WRR, DWRR, SP+WRR</p> <p>Support congestion avoidance mechanisms, such as WRED and tail drop</p> <p>Support policing/shaping based on port/flow</p> |
| Security | <p>Support L2-L4 ACL</p> <p>Support Ingress/ Egress ACL</p> <p>Support 802.1x authentication and 802.1x server</p> <p>Support MAC authentication</p> <p>Support AAA/ RADIUS and TACACS+ authentication for login users</p> <p>Support SSH v1.0/v2.0 server</p> <p>Support CPU anti-attack, CPU overload protection,</p> <p>Support STP Root Guard, BPDU guard,</p> <p>Support URPF</p> <p>Support RIP/OSPF/BGP MD5 encryption checking</p> |
| Equipment Management | <p>Support CLI, Telnet, SSH, Local and remote (Radius/Tacacs+) authentication of user</p> <p>Support SNMP v1/v2/v3</p> <p>Support RMON</p> <p>Support NTP</p> <p>Support Syslog, Sflow, NetFlow</p> |
| Reliability | <p>Support Redundant Intelligent Monitor Board/Management Process Unit/Switch Fabric Unit/Power Supply Module/Fan Module</p> <p>Support Hot plugging</p> <p>Support LACP, SmartGroup</p> <p>Support ZESR/ZESR+ (ZTE Ethernet Switch Ring)</p> <p>Support VRRP, VRRPv3, VRRPE</p> |



Support NSF/GR for OSPF/BGP/IS-IS
Support BFD for VRRP/ BGP/ IS-IS/ OSPF
Support Ethernet OAM (802.1ag and 802.3ah)

Application Scenario

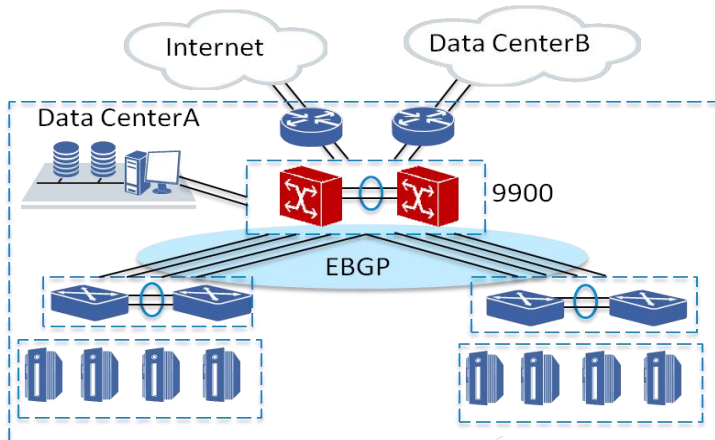
- **Core switch in SDN based VxLAN Data Center Network**



The ZXR10 9900/9900-S Series switch works as Core switch on a SDN required data center network. The ZXR10 9900/9900-S Series switch has high-density 40GE/100GE interfaces to aggregate the TOR switches and interconnects to the backup data center core switches or the routers through 100GE interfaces. Through SDN based VxLAN technology to build a non-blocking Layer 2 network, which allows large-scale VM migrations and flexible service deployments. The ZXR10 9900/9900-S Series switch can also work as the VxLAN gateway.

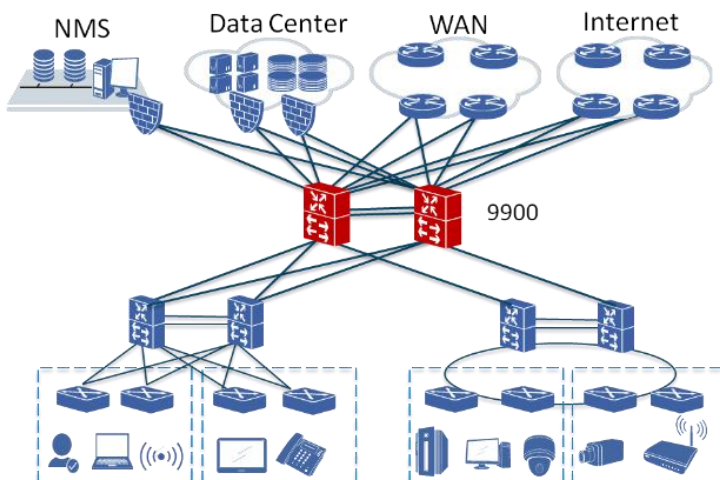


- **Core switch in Typical Data Center Network**



The ZXR10 9900/9900-S Series switch works as Core switch on a typical data center network. The ZXR10 9900/9900-S Series switch has high-density 40GE/100GE interfaces to aggregate the TOR switches and interconnects to the backup data center core switches or the routers through 100GE interfaces. Deploy EBGP and VSC2.0 technology to build a non-blocking Layer 3 network, which allows large-scale VM migrations and flexible service deployments.

- **Aggregation in Carrier Network**



The ZXR10 9900/9900-S Series switch works as high density 10GE/40GE aggregation switch which provide 40GE/100GE as uplink in carrier network. Through L2/L3 features and carrier-class reliability, the ZXR10 9900/9900-S Series switch transmits the traffic from the aggregations and forward it to the routers. VSC2.0 technology can realize fast switchover when failure happens.



Order Information

Chassis

| | |
|-------------|--------------------------|
| 9916-CHS-AC | 9916 AC Assembly Chassis |
| 9916-CHS-DC | 9916 DC Assembly Chassis |
| 9908-CHS-AC | 9908 AC Assembly Chassis |
| 9908-CHS-DC | 9908 DC Assembly Chassis |
| 9908-S-CHS | 9908-S Assembly Chassis |
| 9904-S-CHS | 9904-S Assembly Chassis |

Intelligent Monitor Board

| | |
|----------|---------------------------------------|
| 9900IPMB | 9900 B Type Intelligent Monitor Board |
|----------|---------------------------------------|

Management Process Unit

| | |
|------------|---|
| 9900MPUAI | 9900 A II Type Management Process Unit |
| 9900MPUB | 9900 B Type Management Process Unit |
| 9900-SMPUA | 9900-S A Type Monitor & Management Process Unit |

Switch Fabric Unit

| | |
|-------------|-----------------------------------|
| 9916SFUB | 9916 B Type Switch Fabric Unit |
| 9908SFUB | 9908 B Type Switch Fabric Unit |
| 9916SFUA | 9916 A Type Switch Fabric Unit |
| 9908SFUA | 9908 A Type Switch Fabric Unit |
| 9904-SSFUB | 9904-S B Type Switch Fabric Unit |
| 9908-SSFUBA | 9908-S BA Type Switch Fabric Unit |

Power Supply Module

| | |
|-----------------|------------------------|
| 9900ACPWA-SLL | 9900 AC Junction Box |
| 9900-SACPWA-SLL | 9900-S AC Junction Box |



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|-----------------|-------------------------------|
| 9900-SDCPWA-SLL | 9900-S DC Junction Box |
| 9900ACPWA | 9900 AC Power Supply Module |
| 9900DCPWA | 9900 DC Power Supply Module |
| 9900-SACPWA | 9900-S AC Power Supply Module |
| 9900-SDCPWA | 9900-S DC Power Supply Module |

Fan Supply Module

| | |
|------------|-------------------------|
| 9900FANB | 9900 B Model Fan Module |
| 9900-SFANA | 9900-S Fan Tray |

10GE Ethernet Interface Cards

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|-------------|--|
| 9900XF48E2A | 48-port 10GE SFP+ Optical Line Interface Card (2A Type, SDN) |
|-------------|--|

40GE Ethernet Interface Cards

| | |
|-------------|---|
| 9900LQ36E2A | 36-port 40GE QSFP+ Optical Line Interface Card (2A Type, SDN) |
|-------------|---|

100GE Ethernet Interface Cards

| | |
|-------------|---|
| 9900UQ12E2A | 12-port 100GE QSFP28 Optical Line Interface Card (2A Type, SDN) |
| 9900UQ36E2A | 36-port 100GE QSFP28 Optical Line Interface Card (2A Type, SDN) |

Mixed Ethernet Interface Cards

| | |
|------------------|---|
| 9900XF48UQ2E2A | 48-port 10GE SFP+ + 2-port 100GEQSFP28 Optical Line Interface Card (2A Type, SDN) |
| 9900UQ36LQE2AU18 | 18-port 40GE QSFP+ + 18-port 40GE/100GE QSFP28 Optical Line Interface Card (2A Type, SDN) |

Software

| | |
|------------------|------------------------------|
| 9900-SWLIC-Vxlan | 9900 VXLAN Service |
| 9900-SWUD | 9900 System Software Upgrade |
| 9900-SW-BASIC | 9900 Base Software |
| 9900-SWLIC-DCB | 9900 DCB Service |
| 9900-SWLIC-Qbg | 9900 802.1Qbg Service |



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| | |
|--------------------------|----------------------------|
| 9900-SWLIC-TRILL | 9900 TRILL Service |
| 9900-SWLIC-VSC | 9900 VSC Service |
| 9900-SWLIC-FCOE | 9900 FCOE Service |
| 9900-SWLIC-EVPN-L2 | 9900 L2 EVPN Service |
| 9900-SWLIC-EVPN-L3 | 9900 L3 EVPN Service |
| 9900-SWLIC-EVPN-VTEP | 9900 EVPN VTEP Service |
| 9900-SWLIC-OPENFLOW_L2 | 9900 L2 OpenFlow Service |
| 9900-SWLIC-OPENFLOW_L3 | 9900 L3 OpenFlow Service |
| 9900-SWLIC-OPENFLOW-VTEP | 9900 OpenFlow VTEP Service |



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