TEST REPORT

Tolly.

#222128

August 2022

Commissioned by

New H3C Technologies Co., Ltd.

H3C S6812/S6813 Series Switch

Performance Evaluation and Feature Validation

Executive Summary

With the rapid growth of data center virtualization deployment, commercial deployment of 10GE servers, and high-bandwidth applications, 100GE and 10GE networks have become mainstream requirements.

H3C S6812/S6813 series switches are data center-level high-density Ethernet switch products independently developed by H3C. The S6812/S6813 series switches are specially designed for data centers and support rich data center features, dual power supplies, multiple fans, and flexible dynamic combinations of 40GE, 100GE and 10GE ports.

H3C S6812/S6813 series support IRF stacking and DRNI (M-LAG) to provide strong scalability, reliability, and availability. S6812/S6813 series switches also support the VXLAN protocol to build a flexible, easy-to-expand, high-performance layer-2 network architecture and a cloud data center that supports dynamic migration of virtual machines. As a high-performance gateway of the overlay virtualized network, it supports the multi-tenant data center operation network. By docking with the H3C cloud management platform, a new generation of data centers with high reliability and high scalability can be built that are flexible, efficient, and on-demand.

H3C commissioned Tolly to evaluate S6812/S6813 series ToR switch's performance, capacity and features.

H3C S6812/S6813 Series Switches

S6812-24X6C
S6813-24X6C

S6812-48X6C
S6813-48X6C

Source: Tolly, December 2021

Figure 1

Test Results

Tolly engineers tested functions and performance of the H3C S6812 and S6813 series switches (hereinafter referred to as the S6812 and S6813.) Test results apply to all H3C S6812 and S6813 models including S6812-24X6C, S6812-48X6C, S6813-24X6C and S6813-48X6C. For a summary of the performance test cases, refer to Table 1 and Table 2 on Page 2 and Page 3. For a summary of the feature test cases, refer to Table 3 to Table 5 on Page 9 to Page 11. Test results are as follows.

Performance

Port Performance

Tolly engineers evaluated the port performance of each S6812 and S6813 switch model using the RFC2544 test in Spirent TestCenter.

All tested S6812 and S6813 switch models supported 100% line-rate port forwarding for all RFC2544 standard frame sizes and the 9216-byte jumbo frame size. Please see Table 1 and 2 for detailed results.

New H3C Technologies Co., Ltd.

S6812/ S6813 Series Switch

Performance Evaluation and Feature Validation

Tested December 2021

H3C S6812/S6813 Series Switch Port Performance (Percentage of Line-rate)

(as reported by Spirent TestCenter)

Switch Model	Frame Size	64-Byte	128-Byte	256-Byte	512-Byte	1024-Byte	1280-Byte	1518-Byte	9216-Byte
S6812-24X6C	10GE ports	100%	100%	100%	100%	100%	100%	100%	100%
	100GE ports	100%	100%	100%	100%	100%	100%	100%	100%
S6812-48X6C	10GE ports	100%	100%	100%	100%	100%	100%	100%	100%
	100GE ports	100%	100%	100%	100%	100%	100%	100%	100%
S6813-24X6C	10GE ports	100%	100%	100%	100%	100%	100%	100%	100%
	100GE ports	100%	100%	100%	100%	100%	100%	100%	100%
S6813-48X6C	10GE ports	100%	100%	100%	100%	100%	100%	100%	100%
	100GE ports	100%	100%	100%	100%	100%	100%	100%	100%

Note: Port performance was tested using two ports of the same type (two 10GE ports or two 100GE ports) with bidirectional traffic.

Source: Tolly, December 2021

Table 1

Latency

Tolly engineers evaluated latency between two ports on each S6812 and S6813 switch model. Please see Table 3 and Table 4 for detailed results.

H3C S6812/S6813 Series Switch Latency (µs)
Port-to-port, LIFO (last-in-first-out) latency type
(as reported by Spirent TestCenter)

Switch Model	Frame Size	64-Byte	128-Byte	256-Byte	512-Byte	1024-Byte	1280-Byte	1518-Byte	9216-Byte
S6812-24X6C	10GE ports	1.87	1.91	1.92	1.92	2.02	2.02	2.03	2.02
	100GE ports	1.78	1.78	1.79	1.80	1.79	1.80	1.80	1.81
S6812-48X6C	10GE ports	2.01	2.05	2.06	2.06	2.30	2.29	2.30	2.29
	100GE ports	1.90	1.90	1.91	1.92	1.91	1.92	1.92	2.00
S6813-24X6C	10GE ports	2.01	2.05	2.06	2.06	2.30	2.29	2.30	2.29
	100GE ports	1.90	1.90	1.91	1.92	1.91	1.92	1.92	2.00
S6813-48X6C	10GE ports	1.96	2.00	2.01	2.01	2.26	2.25	2.27	2.26
	100GE ports	1.90	1.91	1.92	1.93	1.92	1.92	1.93	2.00

Note: 100% line-rate traffic between two ports were used as the test traffic to evaluate the latency between the two ports.

Source: Tolly, December 2021

Table 2

IRF Stack

Intelligent Resilient Framework (IRF) is H3C's stacking technology to stack multiple switches into one for management and forwarding with high availability.

IRF Stacking Bandwidth

With 5*100GE links as the stacking links between two S6812 switches, the stack supports 500Gbps stacking bandwidth. Because of the stacking overhead on packets, the stack with two S6812-48X6C supported up to 936Gbps bidirectional aggregated stacking throughput in the test.

With 5*100GE links as the stacking links between two S6813 switches, the stack supports 500Gbps stacking bandwidth. Because of the stacking overhead on packets, the stack with two S6813-48X6C supported up to 933Gbps bidirectional aggregated stacking throughput in the test.

Load Balancing

In an IRF stack with S6812/S6813 switches, the stacking links support load balancing for the traffic between IRF members.

Single-point Management

Administrators can connect to any one of the stack members to manage the entire stack of S6812/S6813 switches.

Layer 2 Features

STP/RSTP/MSTP/PVST

The S6812/S6813 switch supports the Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), and Spanning Tree in Per VLAN Mode (PVST mode.)

ERPS

The S6812/S6813 switch supports the Ethernet Ring Protection Switching (ERPS) protocol with less than 50ms failover time.

RRPP

The S6812/S6813 switch supports the Rapid Ring Protection Protocol (RRPP) with less than 50ms failover time.

Smart Link

The S6812/S6813 switch supports the Smart Link with less than 50ms failover time.

Link Aggregation High Availability

With link aggregation from the IRF stack members to the uplink or downlink device, traffic is load balanced between the IRF members with S6812/S6813 switches. When one IRF member is rebooted or one link in the aggregation group is shutdown, there is 0 packet loss. (Note: The zero loss feature needs to be enabled on the switch.)

VLAN

The S6812/S6813 switch supports 4,094 VLANs.

Layer 3 Features

BFD for VRRP

The S6812/S6813 switch supports BFD for VRRP. With the 3ms BFD sending interval, the traffic failover time is about 14ms when the link to the VRRP master fails.

BFD for IPv4 Routing Protocols

The S6812/S6813 switch supports BFD for IPv4 routing protocols to quickly detect the forwarding path failure with the current active routes and trigger the route and traffic failover.

The failover time for each IPv4 routing protocol in the test is as follows:
BFD for static route: 13.1ms;
BFD for RIP FRR: 11.8ms;
BFD for OSPF FRR LFA: 14.5ms;
BFD for IS-IS FRR LFA: 14.5ms;
BFD for BGP FRR: 12.0ms.

BFD for IPv6 Routing Protocols

The S6812/S6813 switch supports BFD for IPv6 routing protocols to quickly detect the forwarding path failure with the current active routes and trigger the route and traffic failover.

The failover time for each IPv4 routing protocol in the test is as follows:
BFD for static route: 14.8ms;
BFD for RIPng FRR: 10.0ms;
BFD for OSPFv3 FRR LFA: 11.6ms;
BFD for IS-IS IPv6 FRR LFA: 11.9ms;
BFD for BGP4+ FRR: 11.7ms failover time.

OSPF Fast Re-Route (FRR)

The S6812/S6813 switch supports OSPF FRR with less than 20ms failover time.

Policy Route

The S6812/S6813 switch supports policy route.

ECMP

The S6812/S6813 switch supports Equal-cost Multi-path Routing (ECMP.)

IP Fragmentation and Reassembly

The S6812/S6813 switch supports IP fragmentation and reassembly.

Multicast Features

IGMP/MLD Snooping

The S6812/S6813 switch supports IGMP snooping and MLD snooping for Layer 2 multicast.

IPv4 IGMP and PIM

The S6812/S6813 switch supports IPv4 IGMP and PIM multicast routing protocol for IPv4 Layer 3 multicast.

IPv6 MLD and PIM

The S6812/S6813 switch supports IPv6 MLD and PIM multicast routing protocol for IPv6 Layer 3 multicast.

VXLAN

Basic VXLAN Functions

H3C S6812/S6813 supports the VXLAN overlay network which is widely used to build modern campus networks and data center networks.

Tolly engineers verified that H3C S6812/S6813 can provide Layer 2 and Layer 3 endpoint connectivity over the VXLAN overlay network.

EVPN VXLAN with Distributed Gateways

VXLAN with the BGP-EVPN control plane and distributed gateways is the most popular VXLAN implementation with many advantages including high scalability and easy deployment. H3C S6812/S6813 supports EVPN VXLAN with distributed gateways.

S6812/S6813 also supports centralized L3 gateway for traditional VXLAN deployment.

MPLS

MPLS L2VPN/L3VPN

H3C S6812/S6813 supports MPLS L2VPN and MPLS L3VPN to provide Layer 2 and Layer 3 connectivity over the MPLS network;

MPLS BFD

H3C S6812/S6813 supports MPLS BFD to fast detect MPLS L2VPN PW connectivity failures.

Security Features

User Authentication

H3C S6812/S6813 supports 802.1X authentication, MAC authentication, and Web Portal authentication. It also supports triple authentication with all three user authentication methods. Users can use either one of the method to log in to the network.

DHCP Snooping/DHCPv6 Snooping/ ND Snooping

H3C S6812/S6813 supports the DHCP snooping feature to make sure that only the DHCP server connected to the trusted port can distribute IPv4 addresses. It also creates the DHCP user-bind table to record the mapping of each client's IPv4 address, MAC address, VLAN and port.

H3C S6812/S6813 also supports DHCPv6 snooping and ND snooping for IPv6.

DHCP Server and DHCPv6 Server

H3C S6812/S6813 supports working as the DHCP server and DHCPv6 server to allocate dynamic IPv4 and IPv6 addresses to DHCP clients.

PPPoE Relay

PPPoE Relay is deployed on the switch that is located between the PPPoE client and the PPPoE server. It binds the user authentication information with the interface information to provide security for PPPoE access.

The S6812/S6813 switch supports PPPoE Relay.

CPU Defend

H3C S6812/S6813 supports CPU defend to limit the rate of certain protocol packets (e.g. ARP) that need to be processed by the device CPU to prevent the CPU from overloading.

Attack Source Tracing

H3C S6812/S6813 supports attack source tracing to identify the attacker and respond with certain actions (interface error down, alarm, etc.)

MFF

MAC-forced Forwarding (MFF) isolates user devices in a broadcast domain at Layer 2. MFF ensures that all traffic, including traffic in the same VLAN, is sent to the gateway, so that the gateway can monitor data traffic and prevent malicious attacks between users. H3C S6812/S6813 supports MFF.

IP Source Guard

H3C S6812/S6813 supports IP source guard to prevent IP address spoofing attacks (unauthorized hosts access and attack the network with forged IP addresses). The device validates IP packets' source IP, source MAC, VLAN ID and interface with the binding table (static or DHCP snooping) for forwarding.

DAI

H3C S6812/S6813 supports Dynamic ARP Inspection (DAI) to prevent man-in-the-middle attacks and theft on authorized users' information. The device validates ARP packets' source IP, source MAC, VLAN ID and interface with the binding table (static or DHCP snooping) for forwarding.

SAVI

With the Source Address Validation Improvements (SAVI) feature, the S6812/S6813 switch is able to check the validity of the source addresses in the Neighbor Discovery (ND) packets, DHCPv6 packets, and IPv6 data packets. The S6812/S6813 switch is able to filter out invalid packets based on the user-bind table. The user-bind table is generated by ND snooping and DHCPv6 snooping. To check the validity of the source addresses in IPv6 data packets, the IP source guard feature needs to be enabled.

Secure Boot

H3C S6812/S6813 supports secure boot with multiple methods to ensure the switch boots from a legit image.

O&M

Port Mirroring

H3C S6812/S6813 supports local port mirroring on the switch, and Remote Switched Port Analyzer (RSPAN) for remote port mirroring. It supports total seven mirroring groups including local and remote ones.

NQA

H3C S6812/S6813 supports Network Quality Analyzer (NQA) for network connectivity monitoring.

iNQA

H3C S6812/S6813 supports Intelligent Network Quality Analyzer (iNQA) which uses the actual service packets to directly measure end-to-end or hop-by-hop packet loss in a large-scale IP network.

TWAMP-light

H3C S6812/S6813 supports TWAMP-light for round trip latency, jitter and packet loss monitoring.

Encrypted Traffic Analysis

H3C S6812/S6813 can interoperate with third-party tools such as the VIEWINTECH ENS system for encrypted traffic analysis.

ZTP

H3C S6812/S6813 supports Zero Touch Provisioning (ZTP) with a DHCP option specifying the TFTP server address and the configuration file on the TFTP server.

Automation with Ansible

H3C S6812/S6813 can be configured by Ansible for automation.

SmartMC

H3C S6812/S6813 supports SmartMC with one commander - Topology Master (TM) device managing multiple member devices - Topology Clients (TC) for configuration file backup and download, software upgrade, configuration deployment, and faulty member replacement.

Telemetry

H3C S6812/S6813 supports Telemetry with GRPC dial-out and dial-in.

QoS

DCBX, PFC and ETS

H3C S6812/S6813 supports Data Center Bridging Exchange (DCBX), Priority-based Flow Control (PFC) and Enhanced Transmission Selection (ETS) for a lossless network.

ECN

H3C S6812/S6813 supports Explicit Congestion Notification (ECN) for a lossless network.

VoQ

H3C S6812/S6813 supports Virtual Output Queuing (VoQ) to avoid head-of-line (HoL) blocking.

Fans

Triple Fans for Redundancy

H3C S6812/S6813 supports three fans for redundancy. There are two types of fans (front-to-back airflow fan or back-to-front airflow fan.) With two or three fans installed on the switch, when one fan is unplugged, the traffic on the switch is not impacted.

Capacity

MAC Table

H3C S6812 supports up to 128K (131,072) MAC addresses in the MAC table. H3C S6813 supports up to 256K (262,144) MAC addresses in the MAC table. Tolly engineers verified that the switch forwarded traffic matching all entries in the MAC table, without frame loss or broadcasts occurring.

ARP Table

H3C S6812 supports up to 65,535 ARP entries in the ARP table. H3C S6813 supports up to 131,071 ARP entries in the ARP table. Tolly engineers verified that the switch forwarded traffic matching all entries in its ARP table, without any packet loss.

ND Table

H3C S6812 supports up to 43,008 ND entries in the ND table. H3C S6813 supports up to 87,040 ND entries in the ND table. Tolly engineers verified that the switch forwarded traffic matching all entries in its ND table, without any packet loss.

FIBv4

H3C S6812 supports up to 65,520 IPv4 routes in the FIB. H3C S6813 supports up to 131,056 IPv4 routes in the FIB. Tolly engineers verified that the switch forwarded traffic matching all routing entries in the FIBv4 table, without any packet loss.

FIBv6

H3C S6812 supports up to 32,761 IPv6 routes in the FIB. H3C S6813 supports up to 65,529 IPv6 routes in the FIB. Tolly engineers verified that the switch forwarded traffic matching all routing entries in the FIBv6 table, without any packet loss.

ACL

H3C S6812 supports 2,046 inbound ACL rules and 256 outbound ACL rules. Tolly engineers verified that all rules worked properly to match the traffic and perform the configured actions (e.g. blocking.)

H3C S6813 supports 4,094 inbound ACL rules and 512 outbound ACL rules. Tolly engineers verified that all rules worked properly to match the traffic and perform the configured actions (e.g. blocking.)

VXLAN Virtual Switched Instances

H3C S6812 supports 1,023 Virtual Switched Instances (VSI - virtual L2 switched domains.)

H3C S6813 supports 2,047 Virtual Switched Instances (VSI - virtual L2 switched domains.)

IPv4 VXLAN Tunnels

H3C S6812 supports 895 IPv4 VXLAN tunnels.

H3C S6813 supports 1,535 IPv4 VXLAN tunnels.

IPv6 VXLAN Tunnels

H3C S6812 supports 896 IPv6 VXLAN tunnels.

H3C S6813 supports 1,024 IPv6 VXLAN tunnels.

DRAM and Flash

H3C S6812/S6813 supports 4GB DRAM and 1GB Flash.

Wireless Access Controller

When working as the wireless access controller, H3C S6812 or S6813 supports managing 2K (2,048) wireless APs and hosting 10K (10,240) concurrent online users.

Resource Table Performance

ARP Learning Rate

H3C S6812 supports learning 586 ARP entries per second.

H3C S6813 supports learning 590 ARP entries per second.

IPv4 BGP Route Learning/ Withdraw Rate

H3C S6812 supports learning 4,844 IPv4 BGP routes per second and withdrawing 5,405 routes per second.

H3C S6813 supports learning 5,240 IPv4 BGP routes per second and withdrawing 5,374 routes per second.

IPv6 BGP4+ Route Learning/ Withdraw Rate

H3C S6812 supports learning 3,554 IPv6 BGP4+ routes per second and withdrawing 4,483 routes per second.

H3C S6813 supports learning 4,533 IPv6 BGP4+ routes per second and withdrawing 5,013 routes per second.

Convergence Time

IRF Stacking Cable Failure

In an IRF stack with H3C S6812/S6813 switches, when one stacking cable failed, the traffic on that cable is automatically failed over to other remaining stacking cables. The failover time was 8.5ms in the test.

Hardware BFD

H3C S6812/S6813 supports hardware BFD with minimum 3ms sending interval. Tolly engineers captured the packets to verify.

Wireless Functions

Unified Wired and Wireless Access Controller

H3C S6812/S6813 supports working as the unified wired and wireless access controller. As a wireless access controller, it can manage the wireless access points (APs) and

authenticate wireless users for network access.

AP Auto Registration

Wireless APs are automatically registered to the wireless AC (the S6812/S6813 switch) in a Layer 2 network or through DHCP option in a Layer 3 network

Wireless User WPA2 + PSK Authentication

The wireless network supports WAP2 + PSK authentication with the S6812/S6813 switch working as the wireless access controller.

Wireless User Portal Authentication

The wireless network supports Web Portal authentication with the S6812/S6813 switch working as the wireless access controller.

Test Methodology

The H3C Comware Software, Version 7.1.070 was used as the switch firmware in the test.

In the capacity test, each item was tested independently. The S6812/S6813 switch supports multiple modes. The test results demonstrated the maximum capacities. For the capacities in each mode, contact H3C.

H3C S6812/S6813 Series Switch Power Consumption

(provided by H3C, not verified by Tolly)

Switch Model	Power Consumption
S6812-24X6C	MIN: single AC 29W; dual AC 35W. MAX: single AC 131W; dual AC 134W.
S6812-48X6C	MIN: single AC 29W; dual AC 36W. MAX: single AC 163W; dual AC 162W.
S6813-24X6C	MIN: single AC 38W; dual AC 46W. MAX: single AC 143W; dual AC 145W.
S6813-48X6C	MIN: single AC 36W; dual AC 44W. MAX: single AC 177W; dual AC 176W.

Source: H3C, December 2021

H3C S6812/S6813 Series Switch

Tolly Verified Features - Part 1 of 3

IRF		✔	**BFD for IPv6 Routing Protocols** BFD for static route: 14.8ms failover time BFD for RIPng FRR: 10.0ms failover time BFD for OSPFv3 FRR LFA: 11.6ms failover time BFD for IS-IS IPv6 FRR LFA: 11.9ms failover time BFD for BGP4+ FRR: 11.7ms failover time
✔	**IRF Stacking Bandwidth** up to 500Gbps stacking bandwidth with 5*100GE stacking links		
✔	**Load Balancing between Stacking Links** When switches are stacked with multiple stacking links, traffic between the stack members is load balanced between stacking links	✔	**OSPF Fast Re-route (FRR)**
✔	**Single-point Management** Administrators can connect to any one of the stack members to manage the entire stack	✔	**Policy Route**
Layer 2 Features		✔	**Equal-cost Multi-path Routing (ECMP)**
✔	**STP/RSTP/MSTP/PVST**	✔	**IP Fragmentation and Reassembly**
✔	**ERPS** <50ms failover time	**Multicast Features**	
✔	**RRPP** <50ms failover time	✔	**IPv4 IGMP Snooping for Layer 2 Multicast**
✔	**Smart Link** <50ms failover time	✔	**IPv6 MLD Snooping for Layer 2 Multicast**
✔	**Link Aggregation High Availability** With link aggregation from the IRF stack members to the uplink or downlink device, traffic is load balanced between the IRF members. When one IRF member is rebooted or one link in the aggregation group is shutdown, there is 0 packet loss	✔	**IPv4 IGMP and PIM for Layer 3 Multicast**
		✔	**IPv6 MLD and IPv6 PIM for Layer 3 Multicast**
		VXLAN	
✔	**VLAN** The device supports 4,094 VLANs	✔	**L2 and L3 Connectivity over VXLAN with the Centralized Gateway**
Layer 3 Features		✔	**L2 and L3 Connectivity over VXLAN with the EVPN Control Plane and Distributed Gateways**
✔	**BFD for VRRP** ~12ms failover time with 3ms BFD interval	**MPLS**	
✔	**BFD for IPv4 Routing Protocols** BFD for static route: 13.1ms failover time BFD for RIP FRR: 11.8ms failover time BFD for OSPF FRR LFA: 14.5ms failover time BFD for IS-IS FRR LFA: 14.5ms failover time BFD for BGP FRR: 12.0ms failover time	✔	**MPLS L2VPN**
		✔	**MPLS L3VPN**
		✔	**MPLS BFD** e.g. fast detect MPLS L2VPN PW connectivity failure

Source: Tolly, December 2021 Table 3

H3C S6812/S6813 Series Switch

Tolly Verified Features - Part 2 of 3

Security Features		O&M	
✔	**802.1X Authentication**	✔	**Port Mirroring** Local port mirroring or Remote Switched Port Analyzer (RSPAN) with total 7 mirroring groups
✔	**Portal Authentication**		
✔	**Triple Authentication** MAC, 802.1X and Web Portal authentication on the same port	✔	**Network Quality Analyzer (NQA)** Network connectivity monitoring
✔	**DHCP Snooping, DHCPv6 Snooping** Trusted port for the DHCPv6 server; Binding table creation	✔	**iNQA** Intelligent Network Quality Analyzer (iNQA) uses the actual service packets to directly measure end-to-end or hop-by-hop packet loss in a large-scale IP network
✔	**DHCP Relay, DHCPv6 Relay**		
✔	**ND Snooping** Trusted port for ND; Binding table creation	✔	**TWAMP-light** Round trip latency, jitter and packet loss monitoring
✔	**DHCP Server, DHCPv6 Server**	✔	**Encrypted Traffic Analysis** Interoperate with third-party tools (e.g. VIEWINTECH ENS system)
✔	**PPPoE Relay** Add the PPPoE client-side interface and VLAN information to the PPPoE packets for the BRAS to distinguish between end hosts	✔	**Zero Touch Provisioning (ZTP)** with a DHCP option specifying the TFTP server address and the configuration file on the TFTP server
✔	**CPU Defend** Limit the rate of certain protocol packets (e.g. ARP) that need to be processed by the device CPU to prevent the CPU from overloading	✔	**Automation with Ansible** The switch can be configured by Ansible
✔	**Attack Source Tracing** Identify the attacker and respond with certain actions (interface error down, alarm, etc.)	✔	**Smart Management Center (SmartMC)** One commander - Topology Master (TM) device manages multiple member devices - Topology Clients (TC) for configuration file backup and download, software upgrade, configuration deployment, and faulty member replacement
✔	**MAC-Forced Forwarding (MFF)** Layer 2 isolation. All Layer 2 communications have to go through the gateway		
✔	**IP Source Guard (IPSG)** Prevent IP address spoofing attacks (unauthorized hosts access and attack the network with forged IP addresses). The device validates IP packets' source IP, source MAC, VLAN ID and interface with the binding table (static or DHCP snooping)	✔	**Telemetry GRPC Dial-out and Dial-in**
		QoS	
✔	**Dynamic ARP Inspection (DAI)** Prevent man-in-the-middle attacks and theft on authorized users' information. The device validates ARP packets' source IP, source MAC, VLAN ID and interface with the binding table (static or DHCP snooping)	✔	**DCBX, PFC and ETS** Data Center Bridging Exchange (DCBX), Priority-based Flow Control (PFC) and Enhanced Transmission Selection (ETS)
✔	**Source Address Validation Improvements (SAVI)** Validate DHCPv6 and ND protocol packets, and IPv6 data packets with the binding table	✔	**Explicit Congestion Notification (ECN)**
✔	**Secure boot** Multiple methods to ensure the switch boots from a legit image	✔	**Virtual Output Queuing (VoQ)** to avoid head-of-line (HoL) blocking

Source: Tolly, December 2021 Table 4

H3C S6812/S6813 Series Switch

Tolly Verified Features - Part 3 of 3

Fans		**Resource Table Performance**	
✔	**Triple Fans for Redundancy** There are two types of fans (front-to-back airflow fan or back-to-front airflow fan.) With two or three fans installed, when one fan is unplugged, the traffic on the switch is not impacted	✔	**ARP Learning Rate** S6812: 586 ARP entries per second S6813: 590 ARP entries per second
Capacity		✔	**IPv4 BGP Route Learning/Withdraw Rate** S6812: Learn 4,844 routes per second; Withdraw 5,405 routes per second S6813: Learn 5,240 routes per second; Withdraw 5,374 routes per second
✔	**MAC Table** S6812: 128K (131,072) MAC addresses S6813: 256K (262,144) MAC addresses		
✔	**ARP Table** S6812: 65,535 entries S6813: 131,071 entries		
✔	**ND Table** S6812: 43,008 entries S6813: 87,040 entries	✔	**IPv6 BGP4+ Route Learning/Withdraw Rate** S6812: Learn 3,554 routes per second; Withdraw 4,483 routes per second S6813: Learn 4,533 routes per second; Withdraw 5,013 routes per second
✔	**IPv4 Routing Table/FIBv4** S6812: 65,520 routes S6813: 131,056 routes	**Convergence Time**	
✔	**IPv6 Routing Table/FIBv6** S6812: 32,761 routes S6813: 65,529 routes	✔	**IRF Stacking Cable Failure** When one of the stacking cables failed, the traffic failover time was 8.5ms
✔	**ACL** S6812: 2,046 inbound rules, 256 outbound rules S6813: 4,094 inbound rules, 512 outbound rules	✔	**Hardware BFD with 3ms sending interval**
✔	**VXLAN Virtual Switched Instances (VSI - virtual L2 switched domain)** S6812: 1,023 instances S6813: 2,047 instances	**Wireless Functions**	
✔	**IPv4 VXLAN Tunnels** S6812: 895 tunnels S6813: 1,535 tunnels	✔	**Unified Wired and Wireless Access Controller** The switch can act as the wireless access controller (AC) to manage WLAN APs and authenticate wireless users
✔	**IPv6 VXLAN Tunnels** S6812: 896 tunnels S6813: 1,024 tunnels	✔	**AP Auto Registration** APs are automatically registered to the wireless AC (the switch) in a Layer 2 network or through DHCP option in a Layer 3 network
✔	**DRAM and Flash** S6812: 4GB DRAM, 1GB Flash S6813: 4GB DRAM, 1GB Flash	✔	**Wireless User WPA2 + PSK Authentication**
✔	**Wireless Access Controller** Managing 2K (2,048) WLAN APs; hosting 10K (10,240) concurrent online users	✔	**Wireless User Portal Authentication**

Source: Tolly, December 2021

Table 5

About Tolly

The Tolly Group companies have been delivering world-class ICT services for over 30 years. Tolly is a leading global provider of third-party validation services for vendors of ICT products, components and services.

You can reach the company by E-mail at sales@tolly.com, or by telephone at +1 561.391.5610.

Visit Tolly on the Internet at: http://www.tolly.com

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