

NETGEAR, Inc.

ProSafe™ GS748TS and GS724TS Gigabit Stackable Smart Switches

Feature and Performance Evaluation



Test Summary

Premise: Businesses that are growing rapidly want full-featured network switches that can accommodate growth, support the full range of network applications and secure the network without the overhead and complexity of fully managed switches. NETGEAR's ProSafe Gigabit Stackable Smart Switch family delivers the scalability, flexibility, reliability, and performance growing small and medium-sized businesses need in an easy-to-manage and affordable package.

NETGEAR, Inc. commissioned The Tolly Group to evaluate the ProSafe GS748TS and GS724TS Gigabit Stackable Smart Switches that provide an affordable stackable Layer 2 switching solution to SMB users.

Tolly Group engineers performed a battery of feature and performance tests to prove that the ProSafe GS748TS and GS724TS provide an easily manageable, secure and scalable LAN access solution for SMBs and branch offices.

Tests measured the zero-loss Layer 2 throughput for a standalone switch. Engineers also tested various advanced features that are often provided by more expensive fully managed switches. Tests were conducted in July 2007.

Test Highlights

- ▶ Delivers wire-speed performance for all frame sizes tested in a full-mesh configuration for 48-port and 24-port switches
- ▶ Offers comparable security and QoS features to managed switches
- ▶ Manages the stack easily with a single IP address and intuitive Web-based management
- ▶ Demonstrates redundant stacking architecture via a pair of bidirectional stacking ports per switch, which provide 20 Gbps aggregate throughput in stacking ring topology
- ▶ Integrates key stackable switch features into SMB domain in a cost-effective way

NETGEAR ProSafe 24- and 48-Port Gigabit Stackable Smart Switches Feature Validation

Resiliency	Automatic master fail-over	✓
	Redundant stacking architecture	✓
	Hot-swappable switches	✓
Management	Stack manageable via single IP address	✓
	Web-based management interface	✓
	SNMP-based management software support	✓
Security	802.1x via RADIUS	✓
	MAC-based Access Control List (ACL)	✓
QoS	Rate limiting	✓
	Layer 2 (802.1p) prioritization	✓
	Layer 3 (DSCP) prioritization	✓

Note: Figure shows only features validated by The Tolly Group, not entire spectrum of ProSafe GS748TS and GS724TS Gigabit Stackable Smart Switch features.

Source: The Tolly Group, July 2007

Figure 1

Executive Summary

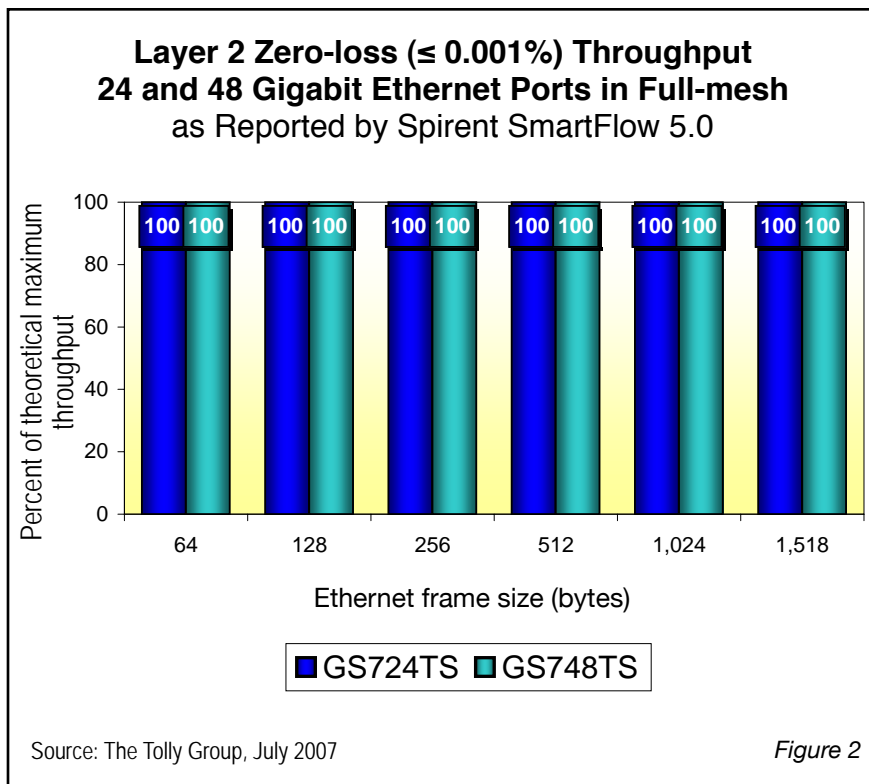
NETGEAR ProSafe GS748TS and GS724TS Gigabit Stackable Smart Switches deliver important network functions to SMBs while providing wire-speed GbE performance necessary for today's bandwidth-intensive applications.

Enterprise applications are demanding higher networking performance and stronger security. For small-to-medium businesses (SMBs) and branch offices, network security and high performance on deployed switches is key to network expansion. However, SMBs and branch offices face financial and resource hurdles.

Both SMBs and branch offices need to reduce costs for their IT infrastructures, plus allow for future network upgrades and expansion. Easy-to-manage stackable smart switches can help them to accommodate their needs without significantly adding complexity and costs. Visible dollar savings is important, but robust and ample performance remains more important in SMB solutions.

Engineers focused on validating the performance and features of the NETGEAR ProSafe GS748TS and GS724TS stackable switches.

Tests show that NET-



GEAR ProSafe GS748TS and GS724TS support advanced network features—all of the features that are important to SMB and branch office users while delivering robust performance and functionality.

In a Layer 2 Gigabit Ethernet switch performance test, the NETGEAR stackable switches achieved wire-speed throughput in 48-port and 24-port, full-mesh configurations for all frame sizes tested.

In our feature evaluation, engineers ran various feature tests under the categories of resiliency, management, security and QoS. Engineers proved that the ProSafe GS748TS and GS724TS support advanced security and management features normally offered in more expensive products.

ZERO-LOSS LAYER 2 THROUGHPUT

Engineers subjected the ProSafe GS748TS and

GS724TS to a typical Tolly Group Layer 2 switch performance test. Engineers measured the zero-loss ($\leq 0.001\%$) throughput by pairing 48 and 24 GbE ports in a fully meshed pattern for packet sizes of 64, 128, 256, 512, 1,024 and 1,518 bytes. In the throughput test, engineers measured zero-loss, wire-speed throughput for a Layer 2 configuration. This equates to 48 Gbps and 24 Gbps aggregate throughput for the GS748TS and GS724TS, respectively. What this means is that the ProSafe GS748TS and the GS724TS have ample headroom for growth and embrace high bandwidth applications. (See Figure 2.)

STACKING PORT PERFORMANCE

Tolly Group engineers measured the zero-loss bidirectional throughput of 20 Gbps aggregate across a three-switch stacking ring topology. This proves that each high-speed

stacking port supports 5 Gbps of unidirectional traffic. Engineers also witnessed sub-second fail-over when one of the active switches in the stack was failed. (See Figure 3 for detail stacking port configuration.)

STACK RESILIENCY

Engineers tested stack resiliency in three scenarios. First, engineers proved that the backup switch automatically assumed control when the master switch in the stack failed. Second, when engineers failed one of the switches in the stack, the stack showed sub-second fail-over for packet delivery. Lastly, engineers inserted the third switch into the stack while two other switches exchanged data and validated that the new switch was added to the stack without affecting the data exchange.

MANAGEMENT

Engineers verified that the stack can be managed via a single IP address and also verified that users can manage the stack via a Web browser and SNMP-based management software.

SECURITY

Tolly Group engineers verified that the ProSafe GS748TS and GS724TS authenticate users via 802.1x and refer to a RADIUS server to verify user credentials. They also proved that the switches enable administrators to allow or deny access based on MAC addresses.

QUALITY OF SERVICE (QoS)

The test demonstrated that the ProSafe GS748TS and GS724TS support rate limiting and Layer 2/3 prioritization.

COST EFFECTIVE SOLUTION

The retail prices for GS748TS and GS724TS from cdw.com are \$999.99 and \$529.99, respectively. These are street prices and do not include support.

TEST SETUP & METHODOLOGY

Tolly Group engineers tested the NETGEAR ProSafe GS724Ts and GS748TS GbE stackable smart switches running firmware version 1.0.1.4. The ProSafe GS724TS and GS748TS were equipped with 24 and 48 GbE ports and two high-speed stacking ports in the back. Engineers used Spirent SmartBits SMB6000B and Anritsu MP1591 for major traffic generation and for traffic analysis. All performance tests were run for 60 seconds three times and the results were averaged to obtain the final results.

For the zero-loss ($\leq 0.001\%$) Layer 2 throughput test, engineers connected the 24 or 48 GbE ports on the switches directly to the SmartBits ports and configured the SmartBits to generate the flows in a full-mesh pattern for packet sizes of 64, 128, 256, 512, 1,024 and 1,518 bytes. For the test, engineers changed last three digits of the MAC address for each SmartBits port.

NETGEAR,
Inc.

ProSafe
GS748TS and
GS724TS



Feature and Performance
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Product Specifications

Vendor-supplied information not necessarily verified by The Tolly Group

NETGEAR ProSafe GS748TS and GS724TS

- 24 and 48 10/100/1000 Mbps switching ports
- Performance: 48 Gbps for GS724TS, 96 Gbps for GS748TS
- Latency: less than 20 microseconds for 64-byte frames in store-and-forward mode for GbE transmission
- Auto-sensing and auto-negotiating capabilities for all copper ports
- Auto Uplink™ on all ports to make the right connection
- 20 Gbps, dual-ring, stacking bus that accommodates growth and offers the highest level of resiliency
- Stack up to six switches or 288 10/100/1000 ports
- Resiliency: Automatic fail-over in case any switch in the stack fails, with rapid reconfiguration
- Easily manage switches with a single IP address
- Supports SNMP v1, v2c, v3
- IEEE 802.1.Q VLAN (128 groups, Static)
- IEEE 802.1p Class of Service (CoS)
- Support for Access Control Lists (ACL), 802.1x port authentication
- IEEE 802.1d Link Aggregation
- Enhanced Layer 3 QoS, rate limiting and IGMP Snooping
- Backed by NETGEAR lifetime warranty

For more information contact:

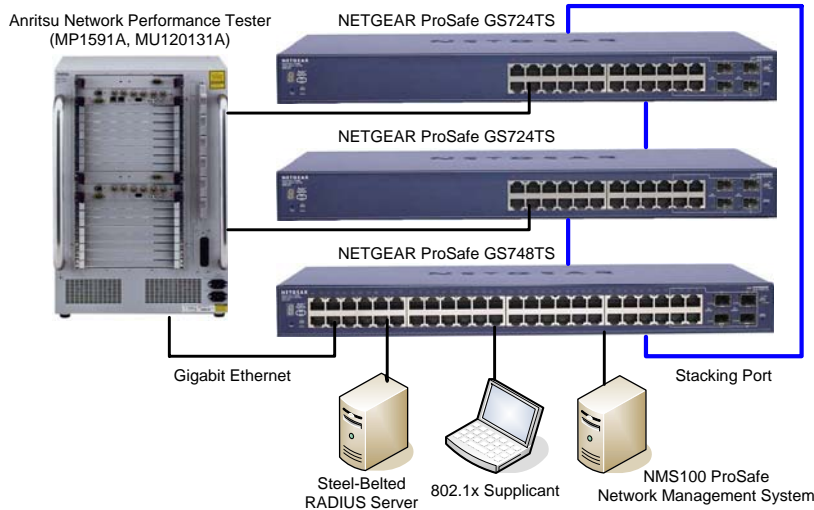
NETGEAR

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Test Bed Diagram

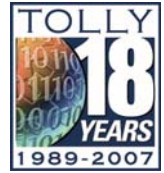


Note: A Spirent SmartBits SMB6000B and SmartFlow Ver. 5.0 software were used for performance testing of the NETGEAR switches.

Source: The Tolly Group, August 2007

Figure 3

The Tolly Group is a leading global provider of third-party validation services for vendors of IT products, components and services.



The company is based in Boca Raton, FL and can be reached by phone at (561) 391-5610, or via the Internet at:

Web: <http://www.tolly.com>,
E-mail: sales@tolly.com

Test Equipment Summary

Vendor	Product	Web URL
Anritsu Company	MP1591A, MU120131A	http://www.anritsu.com
Spirent Communications	SmartBits 6000B, SmartFlow 5.0	http://www.spirentcom.com

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