

# nGenius 5000 Series Packet Flow Switches

## Software-Driven and Cost-Effective Performance

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### HIGHLIGHTS

- 1-, 2-, or 4RU (Rackmount Unit) space-efficient, fixed configuration devices
- 720 Gbps to 12800 Gbps throughput with non-blocking switching fabrics
- 1GbE, 10GbE, 25GbE, 40GbE, and 100GbE port options
- Network packet broker functionality including rate conversion, aggregation, replication, filtering, load balancing, and source port tagging
- Protocol stripping & de-encapsulation (e.g. VLAN, VN-tag, VXLAN)
- IP Tunnel termination (e.g. ERSPAN)
- Intelligent fully meshed stacking / interconnect (pfsMesh)
- Flexible policy defined triggers for event handling and high availability scenarios
- Management via command line, NETCONF, and graphical user interfaces for local and remote access
- Software-driven and powered by the NETSCOUT® Packet Flow Operating System (PFOS)

### Product Description

The nGenius® 5000 Series Packet Flow Switches (PFS) are dense, 1G to 100G models designed for dense 1GbE to 100GbE deployments and bridge the gaps between 1GbE, 10GbE, 25GbE, 40GbE, and 100GbE networks and tools.

The nGenius 5000-series Packet Flow Switches offer SFP+, SFP28, QSFP+, and QSFP28 ports in various 1RU, and 2RU, and 4RU fixed configuration form factors. All ports are enabled by default<sup>1</sup>, with each port configurable as an input port, intermediate (service) port, or output port. With the NETSCOUT pfsMesh, a self-organizing architecture, the nGenius 5000-Series Packet Flow Switch can be deployed in a redundant, low-latency meshed architecture for dynamic and fault-tolerant visibility that can scale to over 4000<sup>2</sup> ports across LAN and WAN environments.

### Cost-Effective Feature Set

Providing a lot of interfaces into a compact form factor, the nGenius 5000 Series Packet Flow Switches support core network packet broker features including filtering, load balancing, replication, and aggregation. With an expansive feature set, the nGenius 5000 Series Packet Flow Switches are capable of managing a monitoring network independently. Connect the HD Fiber TAPs and any number of tools, including NETSCOUT's Service Assurance and Security Assurance products, to an nGenius 5000 Series Packet Flow Switch and easily manage a diverse and complex monitoring network.

Flow-aware load balancing enables intelligent control of traffic distribution to the monitoring tools, increasing output capacity while maintaining session integrity. For example, packets from a 40GbE TAP can be captured and automatically load-balanced across multiple 1GbE or 10GbE monitoring tool ports based on user-defined session criteria. The PFS 5000 series can load balance among tools of different processing capacity (e.g., 10GbE tools and 40GbE tools) by assigning weights to each tool port to achieve weighted load balancing. Flow-aware load balancing can operate in tandem with hardware-based filtering or independently.

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<sup>1</sup> Except on the PFS 5010-16X.

<sup>2</sup> Total number of ports in a single pfsMesh is dependent on quantity and complexity of filtering.



Models shown: nGenius 5010 and 5100 packet flow switches.

## Management

The nGenius 5000 Series Packet Flow Switches can be managed via a Web UI, CLI, and NETCONF XML API using HTTP, HTTPS, or SSH and the system can be monitored via Syslog and SNMP. Each device ships with an intuitive and easy to use graphical element management system (EMS) out of the box. Simply point a web browser at the nGenius 5000 Series Packet Flow Switch and let the web-based user interface (WebUI) power the packet flow system. Management IP addresses can be manually assigned or obtained via DHCP.

## Virtual Access

For accessing traffic that is completely virtualized and never makes it onto a physical network, traffic can be mirrored and forwarded from the virtual network to the physical network using tunneling protocols such as NVGRE (L2GRE) or ERSPAN which encapsulate the traffic of interest. The nGenius 5000 Series Packet Flow Switches can terminate these tunnels so the traffic can then be forwarded on to monitoring applications.

## Power and Cooling

Each of the nGenius 5000 Series Packet Flow Switches supports redundant, hot-swappable power supplies. Redundant, hot-swappable fan modules (in an N+1 configuration) supply ample cooling in a front-to-back air flow configuration.

## Features and Benefits

Features	Benefits
<b>32 to 128 ports in 1RU, 2RU, or 4RU, Fixed Configurations</b> Compatible with SFP, SFP+, SFP28, QSFP+, and QSFP28 MSA compliant transceivers – for complete details, please refer to the list of transceivers offered by NETSCOUT	<b>High Density Systems</b> <ul style="list-style-type: none"> <li>• Drives cost-effectiveness by reducing per-port cost and increasing flexibility</li> <li>• Condenses the nGenius PFS footprint (rack space) into a minimum of space in a fixed configuration</li> <li>• Reduces power consumption</li> <li>• Software-driven, simplifies management</li> </ul>
<b>Configurable I/O</b> <ul style="list-style-type: none"> <li>• Full flexibility in selecting ports for network access, intermediate service, interconnect, or monitor output</li> <li>• Dual network access &amp; monitor output port class</li> <li>• IP tunnel (e.g. NVGRE, ERSPAN) termination</li> </ul>	<ul style="list-style-type: none"> <li>• Enables agile response to monitoring infrastructure changes</li> <li>• Facilitates effectively doubled capacity for input and output</li> <li>• Allows virtualized traffic to be forwarded over an IP network to PFS ingress ports, and then forwarded onto monitoring devices as is, or de-encapsulated<sup>3</sup></li> </ul>
<b>Selective Aggregation</b> <ul style="list-style-type: none"> <li>• Fully flexible any-to-any port mapping</li> </ul>	<ul style="list-style-type: none"> <li>• Enables large scale aggregation to maximize tool visibility</li> <li>• Addresses asymmetrical routing issues</li> </ul>
<b>Flexible and Powerful Filtering</b> <ul style="list-style-type: none"> <li>• OSI Layers 2 - 7</li> <li>• Ingress</li> <li>• Overlapping</li> </ul>	<ul style="list-style-type: none"> <li>• Allows only traffic of interest to be forwarded to each tool, increasing tool efficiency and reduces the number of required tool interfaces</li> </ul>
<b>Session-Based/Flow-Aware Load Balancing</b> <ul style="list-style-type: none"> <li>• Distributes traffic load across multiple instances of a tool or tool port</li> <li>• Maintains session stickiness for full conversations</li> </ul>	<ul style="list-style-type: none"> <li>• Prevents oversubscription of monitoring tools and security systems – eliminating blind spots without sacrificing session integrity</li> <li>• Copied traffic can be easily distributed across multiple lower speed tool ports, allowing users to preserve existing tool investments</li> </ul>
<b>Weighted Load Balancing</b> <ul style="list-style-type: none"> <li>• Distributes traffic among tools of different capacities</li> </ul>	<ul style="list-style-type: none"> <li>• Prevents oversubscription of monitoring tools and security systems</li> <li>• Preserves investment in existing tools while allowing growth with newer, higher-capacity tools</li> </ul>

<sup>3</sup> De-encapsulation may require a PFX or advanced PFS.

Features	Benefits
<b>Monitor Traffic Port Tagging</b> <ul style="list-style-type: none"> <li>Provides identification of traffic based on source network/link using VLAN tagging</li> </ul>	<ul style="list-style-type: none"> <li>Users can quickly and precisely pinpoint where an issue, such as latency or security event, is occurring in the network</li> <li>Allows different tools to access port identification</li> </ul>
<b>Intelligent Stacking (pStack)</b> <ul style="list-style-type: none"> <li>Enables pfsMesh architecture for local and remote of up to 256<sup>3</sup> Total PFS devices as a single redundant system</li> </ul>	<ul style="list-style-type: none"> <li>Ensures highly available monitoring</li> <li>Scales visibility with network infrastructure and new tools</li> <li>Ensures delivery of traffic across LAN or WAN to tools</li> </ul>
<b>Line-Rate Header Stripping<sup>5</sup></b> <ul style="list-style-type: none"> <li>VLAN</li> <li>VxLAN</li> <li>VN-tag</li> </ul>	<ul style="list-style-type: none"> <li>Preserve tool resources (bandwidth and processing) by eliminating unnecessary headers</li> <li>Re-use legacy tools that may not understand newer protocol headers</li> <li>Enable native filtering and load balancing on inner packet fields</li> </ul>
<b>Policy-Based Event Triggering and Actions</b> <ul style="list-style-type: none"> <li>Dynamic traffic redirection based on occurrence of events</li> <li>Send alerts when specific events occur</li> </ul>	<ul style="list-style-type: none"> <li>Reduces management overhead and enables faster response times to incidents</li> </ul>
<b>Local and Remote Management</b> <ul style="list-style-type: none"> <li>NETCONF XML API</li> <li>CLI (SSH or serial)</li> <li>GUI (HTTP/HTTPS)</li> <li>SNMP</li> <li>Syslog (transport over UDP, TCP, or TLS)</li> </ul>	<ul style="list-style-type: none"> <li>Easy to use via graphical interfaces or via CLI</li> <li>Easy integration with applications using CLI or NETCONF XML API</li> <li>Alerts can be received by any Syslog server or SNMP manager, with option for sending securely</li> </ul>
<b>Role-Based Access</b> <ul style="list-style-type: none"> <li>Multiple user and user role support</li> <li>Flexible user/role defined privileges, unique screen views, and access control</li> </ul>	<ul style="list-style-type: none"> <li>Conforms to security policy needs of IT organizations</li> </ul>
<b>AAA Security with Remote (RADIUS and/or TACACS+)</b>	<ul style="list-style-type: none"> <li>Meets authentication policy needs of IT organizations and Local authentication</li> </ul>
<b>Redundant Power Supplies</b> <ul style="list-style-type: none"> <li>AC and DC<sup>6</sup> hot-swappable options</li> </ul>	<ul style="list-style-type: none"> <li>Maintains high availability for the device</li> </ul>
<b>Traffic Statistics</b> <ul style="list-style-type: none"> <li>Port-level packet and throughput metrics, including overflow drops, bad packets, etc.</li> <li>Flow level packet and throughput metrics</li> </ul>	<ul style="list-style-type: none"> <li>Visibility into network and tool port activity</li> <li>Visibility into traffic type activity</li> </ul>

<sup>3</sup> Total number of ports in a single pfsMesh is dependent on quantity and complexity of filtering.

<sup>5</sup> Header stripping is not available on PFS 5130-128X.

<sup>6</sup> The PFS 5130-128X is not currently available with DC power.

**Standards and Compliance**

Standard	Specification(s)
Ethernet	IEEE 802.3, IEEE 802.3ab, IEEE 802.3ae, IEEE 802.3ba, IEEE 802.3bm, IEEE 802.3by, IEEE 802.3z
VLAN	IEEE 802.1Q, IEEE 802.1ad
ARP	IETF RFC 826
IP	IETF RFC 791, 2460
UDP	IETF RFC 768
TCP	IETF RFC 793
SSH	IETF RFC 4251, 4252, 4253
HTTP	IETF RFC 2616, 2817
TLS (SSL)	IETF RFC 4492, 5246
SNMP	IETF RFC 1157, 3411-3418
Syslog	IETF RFC 5424, 5425
NTP	IETF RFC 5905
RADIUS	IETF RFC 2865, 2866
TACACS+	IETF RFC 1492
EMC	FCC Part 15 Subpart B/ICES-003 Class A, EN 55032 Class A, VCCI Class A, AS/NZS CISPR 32 Class A, AS/NZS CISPR 22 & 24, EN 61000, EN 300 386 Class A, CNS 13138 Class A, IEC-003, KCC Class A (except PFS 5130-128X), TUV-GS (PFS 5010 and 5100 only)
Safety	IEC 60950-1:2005 (2nd Edition) + Am 1:2009 + Am 2:2013, UL 60950-1, EN 60950-1, CAN/CSA-C22.2 No. 60950-1, IEC 62368-1 (2nd Edition), EN 62368-1 (2nd Edition), UL/CUL

**Ordering Information**

**NETSCOUT PFS Appliances**

Part Numbers	Description
50FCNANA0000	5010-16X Switch with 16 x 1/10G SFP+ Ports, AC Power
50FCNDNA0000	5010-16X Switch with 16 x 1/10G SFP+ Ports, DC Power
50FCNANQH0J0	5010 Switch with 48 x 1/10Gb SFP+ and 6 x 40Gb QSFP+ or up to 72 x 10Gb Ports, AC Power
50FCNDNQH0J0	5010 Switch with 48 x 1/10Gb SFP+ and 6 x 40Gb QSFP+ or up to 72 x 10Gb Ports, DC Power
51FCNANQK000	5110 Switch with 48 x 1/10/25Gb SFP28 and 6 x 40/100Gb QSFP28 or 72 x 10/25Gb Ports, AC Power
51FCNDNQK000	5110 Switch with 48 x 1/10/25Gb SFP28 and 6 x 40/100Gb QSFP28 or 72 x 10/25Gb Ports, DC Power
51FCNANBB0H0	5100 Switch with 32 x 40/100Gb QSFP28 Ports or up to 128 x 10/25Gb Ports, AC Power
51FCNDNBB0H0	5100 Switch with 32 x 40/100Gb QSFP28 Ports or up to 128 x 10/25Gb Ports, DC Power
51FCNANRE000	5120 Switch with 64 x 40/100Gb QSFP28 or up to 80 x 10/25Gb and 44 x 40/100Gb Ports, AC Power
51FCNDNRE000	5120 Switch with 64 x 40/100Gb QSFP28 or up to 80 x 10/25Gb and 44 x 40/100Gb Ports, DC Power
5108NAISE800	5130-128X Switch with 128 x 40/100Gb QSFP28 Ports, AC Power

**NETSCOUT PFOS Software for Certified PFS**

Part Numbers	Description
PFOSN-YA5-01	Packet Flow Operating System (PFOS) Software for Certified 16 x 1/10G PFS 5010-16X
PFOSN-YX5-01	Packet Flow Operating System (PFOS) Software for Certified PFS 5010
PFOSN-YXK-01	Packet Flow Operating System (PFOS) Software for Certified PFS 5110
PFOSN-YXB-01	Packet Flow Operating System (PFOS) Software for Certified PFS 5100
PFOSN-YRE-01	Packet Flow Operating System (PFOS) Software for Certified PFS 5120
PFOSN-YSE-01	Packet Flow Operating System (PFOS) Software for Certified PFS 5130-128X

**Certified PFS Hardware**

Available from NETSCOUT Certified resellers.

Part Numbers	Description
C-50FCNANA0000	NETSCOUT Certified 5010-16X Switch with 16 x 1/10G SFP+ Ports, AC Power
C-50FCNDNA0000	NETSCOUT Certified 5010-16X Switch with 16 x 1/10G SFP+ Ports, DC Power
C-50FCNANQH0J0	NETSCOUT Certified 5010 Switch with 48 x 1/10Gb SFP+ and 6 x 40Gb QSFP+ or up to 72 x 10Gb Ports, AC Power
C-50FCNDNQH0J0	NETSCOUT Certified 5010 Switch with 48 x 1/10Gb SFP+ and 6 x 40Gb QSFP+ or up to 72 x 10Gb Ports, DC Power
C-51FCNANQK000	NETSCOUT Certified 5110 Switch with 48 x 1/10/25Gb SFP28 and 6 x 40/100Gb QSFP28 or 72 x 10/25Gb Ports, AC Power
C-51FCNDNQK000	NETSCOUT Certified 5110 Switch with 48 x 1/10/25Gb SFP28 and 6 x 40/100Gb QSFP28 or 72 x 10/25Gb Ports, DC Power
C-51FCNANBB0H0	NETSCOUT Certified 5100 Switch with 32 x 40/100Gb QSFP28 Ports or up to 128 x 10/25Gb Ports, AC Power
C-51FCNDNBB0H0	NETSCOUT Certified 5100 Switch with 32 x 40/100Gb QSFP28 Ports or up to 128 x 10/25Gb Ports, DC Power
C-51FCNANRE000	NETSCOUT Certified 5120 Switch with 64 x 40/100Gb QSFP28 or up to 80 x 10/25Gb and 44 x 40/100Gb Ports, AC Power
C-51FCNDNRE000	NETSCOUT Certified 5120 Switch with 64 x 40/100Gb QSFP28 or up to 80 x 10/25Gb and 44 x 40/100Gb Ports, DC Power
C-5108NAISE800	NETSCOUT Certified 5130-128X Switch with 128 x 40/100Gb QSFP28 Ports, AC Power

**NETSCOUT PFOS Software for Qualified PFS**

PFOS Software Part Number	NETSCOUT PFS	Qualified Manufacturer	Model Number
PFOSN-XA5-01	PFS 5010-16X	Edgecore	AS5812-54X
PFOSN-XX5-01	PFS 5010		
PFOSN-XXK-01	PFS 5110	Edgecore	AS7312-54XS
	PFS 5111	Dell	S5048F-ON (EOS from Dell)
PFOSN-XXB-01	PFS 5100	Edgecore	AS7712-32X
	PFS 5101	Dell	Z9100-ON (EOS from Dell)
PFOSN-XRE-01	PFS 5120	Edgecore	AS7816-64X
PFOSN-XSE-01	PFS 5130-128X	Edgecore	AS8000 Minipack

## SPECIFICATIONS

	nGenius PFS 5010-16X	nGenius PFS 5010	nGenius PFS 5110	nGenius PFS 5100	nGenius PFS 5120	nGenius PFS 5130-128X
<b>Physical Switching Ports</b>						
SFP/SFP+	16	48				
SFP28			48 <sup>7</sup>			
QSFP+		6				
QSFP28			6	32	64	128 <sup>7</sup>
<b>Switching Port Speeds</b>						
1G Ports	16	48	48 <sup>8</sup>			
10G Ports	16	48 (72 with QSFP+ breakout)	48 (72 with QSFP+ breakout)	0 (128 with QSFP+ breakout)	0 (80 with QSFP+ breakout)	
25G Ports			48 (72 with QSFP28 breakout)	0 (128 with QSFP28 breakout)	0 (80 with QSFP28 breakout)	
40G Ports		6	6	32	64	128
100G Ports			6	32	64	128
<b>Other Specifications</b>						
Throughput	160 Gbps non-blocking	720 Gbps non-blocking	1800 Gbps non-blocking	3200 Gbps non-blocking	6400 Gbps non-blocking	12800 Gbps non-blocking
Management Ports	1 RJ45 100/1000BASE-T; 1 RJ45 serial console					
Rack Unit	1 Rack Unit (1RU)				2 Rack Units (2RU)	4 Rack Units (4RU)
Height	1.71 in (43 mm)		1.73 in (44 mm)	1.75 in (44 mm)	3.5 in (88 mm)	6.94 in (176 mm)
Width	17.4 in (443 mm)		17.3 in (438 mm)	17.3 in (438 mm)	17.2 in (438 mm)	17.34 in (440 mm)
Depth	18.6 in (473 mm)		18.6 in (473 mm)	20.3 in (515 mm)	22.8 in (580 mm)	29.74 in (756 mm)
Weight (with PSUs)	19.73 lbs. (8.95 kg)		20.78 lbs. (9.43 kg)	23 lbs. (10 kg)	31.1 lbs. (14.1 kg)	121.25 lbs. (55 kg)
Power Supplies	Dual redundant, hot swappable PSUs					4 redundant, hot-swappable PSUs
Power Input (AC)	100 to 240VAC/ 50-60Hz		90-240VAC/ 50-60Hz	100-240VAC, 50-60Hz	90-240VAC/ 50-60Hz	100-277VAC/ 50-60 Hz
Power Input (DC)	-48 to -72VDC		-36 to -72VDC	-36 to -72VDC	-36 to -72VDC	N/A
Power Consumption	282W (962 BTU/hr) max (without transceivers) 400W (1365 BTU/hr) max (with transceivers)		583W (1989 BTU/hr) max	350W (1194 BTU/hr) max (without transceivers) 650W max (2218 BTU/hr) max (with transceivers)	760W (2593 BTU/hr) max	3000W (10236 BTU/hr) max
Fans	5 redundant (4+1), hot-swap fan modules			6 redundant (5+1), hot-swap fan modules	4 redundant (3+1), hot-swap fan modules	8 redundant (7+1), hot-swap fan modules
Airflow	Front-to-back					
Operating Temperature	32° to 104°F (0° to 40°C)			32° to 113°F (0° to 45°C)		
Storage Temperature	-40° to 158°F (-40° to 70°C)					
Operating Humidity	5% - 95% (non-condensing)					

<sup>7</sup> SFP28 port speeds on the PFS 5110 (and PFS 5111) and QSFP28 port speeds on the PFS 5130-128X are assigned in groups of 4 (e.g., ports 1-1 through 1-4 must have the same speed).

<sup>8</sup> 1GbE fiber (IEEE Clause 37) auto-negotiation is not supported by the PFS 5110 so use of 1GbE fiber should be limited to use with TAPs. 1GbE copper does not have this restriction.



**Corporate Headquarters**

NETSCOUT Systems, Inc.  
Westford, MA 01886-4105  
Phone: +1 978-614-4000  
[www.netscout.com](http://www.netscout.com)

**Sales Information**

Toll Free US: 800-309-4804  
(International numbers below)

**Product Support**

Toll Free US: 888-357-7667  
(International numbers below)

NETSCOUT offers sales, support, and services in over 32 countries. Global addresses, and international numbers are listed on the NETSCOUT website at: [www.netscout.com/company/contact-us](http://www.netscout.com/company/contact-us)