



DANZ Monitoring Fabric Verified Scale Guide

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DANZ Monitoring Fabric Verified Scale Guide

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DANZ Monitoring Fabric Verified Scale

This document describes the DANZ Monitoring Fabric multi dimension scale test performed with DMF controllers.

1.1 Overview

Network visibility is a growing concern in data centers due to increasing virtualization, service-oriented architecture, and cloud-based IT. However, visibility into network traffic with traditional monitoring infrastructure is very limited. Expensive monitoring infrastructure, including application performance monitoring tools, Intrusion Detection Systems (IDS), and forensic tools, are not efficiently utilized due to a lack of management of monitored traffic.

DANZ Monitoring Fabric is an advanced network monitoring solution that alleviates this problem dramatically. DANZ Monitoring Fabric leverages high-performance bare metal Ethernet switches to provide the most scalable, flexible, and cost-effective monitoring fabric. Using an SDN-centric architecture, DANZ Monitoring Fabric enables tapping traffic everywhere in the network and delivers it to any troubleshooting, network monitoring, application performance monitoring, or security tool.

At its core is the centralized DANZ Monitoring Fabric Controller software that converts user-defined policies into highly optimized flows programmed into the forwarding ASICs of bare metal Ethernet switches running the production-grade Switch Light™ Operating System from Arista Networks Confidential. DANZ Monitoring Fabric delivers unprecedented network visibility with bare-metal economics, getting the right traffic to the right tool at the right time. With its open and published Application Programming Interfaces (APIs), the DANZ Monitoring Fabric Controller allows customers to deploy integrated network monitoring solutions along with the DANZ Monitoring Fabric.



Note: The scale and performance numbers reported in this document were executed on a DMF hardware controller.

1.2 DMF Verified Scale Values

1.2.1 TCAM Rule Limits

The tables in this section list the limits tested and verified for scalability of the DANZ Monitoring Fabric solution.

Table 1: Verified Jericho Series of Switches

Broadcom Switch Series	Broadcom Chipset	Switch Name
Jericho Series	Jericho	Arista DCS-7280SR-48C6
	Jericho Plus	Arista DCS-7280SR2-48YC6
	Jericho 2	Arista DCS-7280CR3-32P4
	Jericho 2C	Arista DCS-7280SR3-48YC8



Note: The table above lists the switches that were used to verify scale and performance for each supported Broadcom Chipset. For a complete list of supported switches, refer to the DMF Hardware Compatibility Guide.

Table 2: Verified TCAM Rule Limits: Jericho Series of Switches

	Match Mode	Broadcom Jericho Switches	Broadcom Jericho Plus Switches	Broadcom Jericho 2 Switches	Broadcom Jericho 2C Switches
IPv4 TCAM rules per switch (Verified Limit/Max Limit)	Full	6140/6144	6140/6144	6140/6144	6140/6144
	L3-L4	6140/6144	6140/6144	6140/6144	6140/6144
	Offset	Not Supported	Not Supported	Not Supported	Not Supported
IPv6 TCAM rules per switch (Verified Limit/Max Limit)	Full	6140/6144	6140/6144	6140/6144	6140/6140
	L3-L4	6140/6144	6140/6144	6140/6144	6140/6140
	Offset	Not Supported	Not Supported	Not Supported	Not Supported
Match conditions per policy	Full IPv4/IPv6	6140/6140	6140/6140	6140/6140	6140/6140
	L3-L4 IPv4/IPv6	6140/6140	6140/6140	6140/6140	6140/6140
	L3-L4 Offset IPv4/IPv6	Not Supported	Not Supported	Not Supported	Not Supported

Table 3: Supported Trident Series of Switches

Broadcom Switch Series	Broadcom Chipset	Switch Name
Trident Series	Trident 2	Dell S4048F-ON, Dell S6000F-ON
	Trident 2 Plus	Dell S4048-48T, Dell S6010F-ON
	Trident 3	Arista DCS-7050CX3-32S, Arista DCS-7050SX3-48YC8, Arista DCS-7050SX3-48YC12, Dell S5248F-ON, Dell S5232F-ON, Arista DCS-7050SX3-96YC8

Table 4: Verified TCAM Rule Limits: Trident Series of Switches

	Match Mode	Broadcom Trident 2 Switches	Broadcom Trident 2 Plus Switches	Broadcom Trident 3 Switches
IPv4 TCAM rules per switch (Verified Limit /Max Limit)	Full	2040/2044	8100/8188	3055/3068
	L3-L4	4088/4092	8100/8188	3055/3068
	Offset	2040/2044	8100/8188	3055/3068
IPv6 TCAM rules per switch (Verified Limit /Max Limit)	Full	1535/2044	6100/8188	2300/3068
	L3-L4	1535/4092	6100/8188	2300/3068
	Offset	1535/2044	6100/8188	2300/3068
Match conditions per policy	Full-IPv4/v6	2040/1535	8100/6100	3055/2300
	L3-L4IPv4/v6	4088/1535	8100/6100	3055/2300
	L3-L4	2040/1535	8100/6100	3055/2300
	Offset-IPv4/v6			

Table 5: Supported Tomahawk Series of Switches

Broadcom Switch Series	Broadcom Chipset	Switch Name
Tomahawk Series	Tomahawk	Dell Z9100F-ON, Dell S6100F-ON
	Tomahawk Plus	Dell S5048F-ON
	Tomahawk 2	Arista DCS-7260CX3-64E Dell Z9264F-ON

Table 6: Verified TCAM Rule Limits: Tomahawk Series of Switches

	Match Mode	Broadcom Tomahawk	Broadcom Tomahawk Plus	Broadcom Tomahawk 2
IPv4 TCAM rules per switch (Verified Limit /Max Limit)	Full	1015/1020	1015/1020	1015/1020
	L3-L4	1015/1020	1015/1020	1015/1020
	Offset	1015/1020	1015/1020	1015/1020
IPv6 TCAM rules per switch (Verified Limit /Max Limit)	Full	760/1020	760/1020	760/1020
	L3-L4	760/1020	760/1020	760/1020
	Offset	760/1020	760/1020	760/1020
Match conditions per policy	Full-IPv4/v6	1015/760	1015/760	1015/760
	L3-L4IPv4/v6	1015/760	1015/760	1015/760
	L3-L4	1015/760	1015/760	1015/760
	Offset-IPv4/v6			

Table 7: Supported Maverick Series of Switches

Broadcom Switch Series	Broadcom Chipset	Switch Name
Maverick Series	Maverick	Dell S4112F-ON

Table 8: Verified TCAM Rule Limits: Maverick Series of Switches

	Match Mode	Broadcom Maverick Switches
IPv4 TCAM rules per switch (Verified Limit /Max Limit)	Full	4088/4092
	L3-L4	8100/8188
	Offset	4088/4092
IPv6 TCAM rules per switch (Verified Limit /Max Limit)	Full	3060/4092
	L3-L4	3060/8188
	Offset	3060/4092
Match conditions per policy	Full-IPv4/v6	4088/3060
	L3-L4IPv4/v6	8100/3060
	L3-L4	4088/3060
	Offset-IPv4/v6	

The DMF 8.4 release supports the following EOS switches using the Broadcom Qumran chipset.

Table 9: Verified Qumran-based Series of Switches

Broadcom Switch Series	Broadcom Chipset	Switch Name
Qumran-based Series	QumranAX	DCS-7020SR-24C2
	Qumran2C	DCS-7280CR3K-36S
	Qumran2A	DCS-7280SR3-40YC6



Note: The table above lists the switch models that were used to verify scale and performance for each supported Broadcom chipset. For a complete list of supported switches, please refer to the DMF 8.4 Hardware Compatibility List.

Table 10: Verified TCAM Rule Limits: Qumran Series of Switches

	Match Mode	Broadcom QumranAX Switches	Broadcom Qumran2C Switches	Broadcom Qumran2A Switches
IPv4 TCAM Rules per Switch (Verified Limit /Max Limit)	Full	4084/4088	6140/6144	6140/6144
	L3-L4	4084/4088	6140/6144	6140/6144
	Offset	Not Supported	Not Supported	Not Supported
IPv6 TCAM Rules per Switch (Verified Limit /Max Limit)	Full	4084/4088	6140/6144	6140/6144
	L3-L4	4084/4088	6140/6144	6140/6144
	Offset	Not Supported	Not Supported	Not Supported
Match Conditions per Policy	Full IPv4/IPv6	4084/4084	6140/6140	6140/6140
	L3-L4 IPv4/IPv6	4084/4084	6140/6140	6140/6140
	L3-L4 Offset IPv4/IPv6	Not Supported	Not Supported	Not Supported

1.2.2 Port Channel Interface Limits

Table 11: Verified Port Channel Interface Limits on Trident/Tomahawk Series

	Maximum Hardware/ Software	Verified Limits
Number of Port Channel Interfaces Per Switch	64	10
Number of Port Channel Member Interfaces	32	32

Table 12: Verified Port Channel Interface Limits on Jericho Series

	Maximum Hardware/ Software	Verified Limits
Number of Port Channel Interfaces Per Switch	1024	16
Number of Port Channel Member Interfaces	32	32

1.2.3 Tunnel Interface Limits

Table 13: Verified VXLAN Tunnel Interface Limits on Trident/Tomahawk Series

	Maximum Hardware/Software Limit	Verified Limits
VXLAN Rx Tunnels per Switch	2000	2000
VXLAN Bidirectional / Tx Tunnels per Switch	Depends on available ports on switch. ¹	60

¹ Configuration of Bidirectional / Tx Tunnels would require using an additional port. Therefore maximum number of supported Bidirectional / Tx Tunnels would be limited to number of free ports available on the switch.



Note: Verification for supported VXLAN tunnel scale was performed on DMF switches based on Trident 3 and Tomahawk 2 chipsets from Broadcom. For details on the feature and supported switch platforms, please refer to the DMF Hardware Compatibility Guide.

Table 14: Verified L2GRE Tunnel Interface Limits on Trident/Tomahawk Series

	Maximum Hardware/Software Limit	Verified Limits
L2GRE Rx Tunnels per Switch	2000	2000
L2GRE Bidirectional / Tx Tunnels per Switch	Depends on available ports on switch.	60

1.2.4 Functional Limits

Table 15: Verified Functional Limits

Functionality	Verified Limits
Filter Interfaces per switch	128
Delivery interfaces per switch	128
Services Chained in a Policy	4
User created policies per fabric (Disable overlap to create more than 200 user policies)	200
Max number of policies which can overlap	10 (Default is 4)
Max number of policies per fabric (user + dynamic policies)	4000
Switches per Fabric	150
Filter interfaces per Fabric	1500
Delivery interfaces per Fabric	1000
Managed Services Per Fabric	40
Managed Services Per Switch	40
No of Service Nodes Per Fabric	5
Filter interfaces per policy per Fabric	1000
Connected devices per fabric	100
IPv4 address groups	170
IPv4 addresses per group	20000
IPv6 address groups	50
IPv6 addresses per group	100
Maximum RTT between active and standby controller, between switch and controllers	300 ms
Maximum Users	500
Maximum Groups	500
Unmanaged Service interfaces per switch	44
Unmanaged Service per switch	22
Unmanaged Service interfaces per Fabric	100
Unmanaged Service per switch	50

1.2.5 Naming Conventions

Table 16: Naming Conventions

	Minimum Length	Maximum Length	Allowed Pattern
Username	1	255	[a-zA-Z][-0-9a-zA-Z_]*
Password	1	255	[0-9a-zA-Z,./;[]<>?:{} #~!@#\$%^&*()_+ -=]
Group Name	1	255	[a-zA-Z][-0-9a-zA-Z_]*
Filter Interface Name	1	255	[a-zA-Z][-.:0-9a-zA-Z_]*
Delivery Interface Name	1	255	[a-zA-Z][-.:0-9a-zA-Z_]*
Service Interface Name	1	255	[a-zA-Z][-.:0-9a-zA-Z_]*
Service Name	1	255	[a-zA-Z][-.:0-9a-zA-Z_]*

1.3 DMF Service Node Verified Scale Values

1.3.1 NetFlow Scale Values

Table 17: Verified NetFlow Scale Values

DMF Service Node: Netflow	Verified Limits
Service Node Throughput per port ¹	(DCA-DM-SC, DCA-DM-SDL) <ul style="list-style-type: none"> • 10 Gbps for IMIX traffic. (DCA-DM-SEL) <ul style="list-style-type: none"> • 20 Gbps for IMIX traffic.
Max Packets processed per port	(DCA-DM-SC ²) <ul style="list-style-type: none"> • 6.0 million pps per port when 1 port is used. (DCA-DM-SDL ³) <ul style="list-style-type: none"> • 5.5 million pps per port when 1 port is used. (DCA-DM-SEL ⁴) <ul style="list-style-type: none"> • 7.5 million pps per port when 1 port is used. (DCA-DM-SC ²) <ul style="list-style-type: none"> • 5.5 million pps per port when 2 ports on the same NIC are used. (DCA-DM-SDL ³) <ul style="list-style-type: none"> • 5.0 million pps per port when 4 ports on the same NIC are used. (DCA-DM-SEL ⁴) <ul style="list-style-type: none"> • 7.0 million pps per port when 2 ports on the same NIC are used. (DCA-DM-SDL ³) <ul style="list-style-type: none"> • 4.0 million pps per port when 16 ports are used. (DCA-DM-SEL ⁴) <ul style="list-style-type: none"> • 6.0 million pps per port when 16 ports are used.
Expected Netflow Traffic out of per service node port	300Mbps ⁵
Max Number of Flows supported	1 million per port of supported managed-appliances. 16 million per 16 ports of supported managed-appliances.

¹ In push-per-policy mode, a 4-byte internal VLAN tag is added to the traffic and this reduces the maximum bandwidth supported.

² DCA-DM-SC Service Node (4x10G) handles 10 Gbps per port with average packet size >= 210 bytes.

³ DCA-DM-SDL Service Node (16x10G) handles 10 Gbps traffic per port with average packet size >= 285 bytes.

⁴ DCA-DM-SEL Service Node (16x25G) handles 20 Gbps traffic per port with average packet size >= 68 bytes.

⁵ Measured when each service node port sent 1 million flow records at the same time.



Note: All test cases are executed by sending 10Gbps traffic to supported 10G service node ports with 1 million flows.



Note: All test cases are executed by sending 20Gbps traffic to DCA-DM-SEL.

1.3.2 IPFIX Scale Values

Table 18: IPFIX Template Used

IPV4 Template	IPV6 Template
<ul style="list-style-type: none">• key destination-ipv4-address	<ul style="list-style-type: none">• key destination-ipv6-address
<ul style="list-style-type: none">• key destination-transport-port	<ul style="list-style-type: none">• key destination-transport-port
<ul style="list-style-type: none">• key dot1q-vlan-id	<ul style="list-style-type: none">• key dot1q-vlan-id
<ul style="list-style-type: none">• key source-ipv4-address	<ul style="list-style-type: none">• key source-ipv6-address
<ul style="list-style-type: none">• key source-transport-port	<ul style="list-style-type: none">• key source-transport-port
<ul style="list-style-type: none">• field flow-end-milliseconds	<ul style="list-style-type: none">• field flow-end-milliseconds
<ul style="list-style-type: none">• field flow-end-reason	<ul style="list-style-type: none">• field flow-end-reason
<ul style="list-style-type: none">• field flow-start-milliseconds	<ul style="list-style-type: none">• field flow-start-milliseconds
<ul style="list-style-type: none">• field maximum-ttl	<ul style="list-style-type: none">• field maximum-ttl
<ul style="list-style-type: none">• field minimum-ttl	<ul style="list-style-type: none">• field minimum-ttl
<ul style="list-style-type: none">• field packet-delta-count	<ul style="list-style-type: none">• field packet-delta-count



Note: All test cases are executed by sending 10Gbps traffic to all supported 10G service node ports with 1 million flows.

Table 19: Verified IPFIX Scale Values

DMF Service Node: IPFIX	IPv4 Verified Limits	IPv6 Verified Limits
Service Node Throughput per port. ¹	(DCA-DM-SC) <ul style="list-style-type: none"> • 10 Gbps for IMIX traffic. (DCA-DM-SEL) <ul style="list-style-type: none"> • 20 Gbps for IMIX traffic. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 10 Gbps for IMIX traffic. (DCA-DM-SEL) <ul style="list-style-type: none"> • 11 Gbps for IMIX traffic.
Max Packets processed per port.	(DCA-DM-SC ²) <ul style="list-style-type: none"> • 7.5 million pps per port when 1 port is used. • 7.0 million pps per port when 2 ports on the same NIC are used. (DCA-DM-SEL ³) <ul style="list-style-type: none"> • 9.5 million pps per port when 1 port is used. • 8.5 million pps per port when 2 ports on the same NIC are used. • 7.0 million pps per port when 16 ports are used. 	(DCA-DM-SC ²) <ul style="list-style-type: none"> • 6.4 million pps per port when 1 port is used. • 6.0 million pps per port when 2 ports on the same NIC are used. (DCA-DM-SEL ³) <ul style="list-style-type: none"> • 7.5 million pps per port when 1 port is used. • 7.5 million pps per port when 2 ports on the same NIC are used. • 6.5 million pps per port when 16 ports are used.
Expected IPFIX Traffic out of per service node port.	300 Mbps ⁴ .	500 Mbps ⁴ .
Max Number of Flows tested per port.	(DCA-DM-SC) <ul style="list-style-type: none"> • 1 million per port. • 4 million when 4 ports are used. (DCA-DM-SEL) <ul style="list-style-type: none"> • 16 million when 16 ports are used. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 1 million per port. • 4 million when 4 ports are used. (DCA-DM-SEL) <ul style="list-style-type: none"> • 16 million when 16 ports are used.

1 In push-per-policy mode, a 4-byte internal VLAN tag is added to the traffic and this reduces the maximum bandwidth supported and recommended.

2 DCA-DM-SC (4x10G) handles 10Gbps traffic per port with average packet size IPv4 >= 160 byte for IPv6 >=190 byte.

3 DCA-DM-SEL (16x25G) handles 20Gbps traffic per port with average packet size IPv4 >= 68 byte and 10Gbps traffic per port with average packet size IPv6 >= 218 bytes.

4 Measured when service node exports ipfix data packets representing 1 million unique flows information with default eviction timers.

1.3.3 Deduplication Verified Scale Values

Table 20: Verified Scale for Deduplication Managed Services

Managed Service	One Service Node Port	4 Service Node Ports	16 Service Node Ports
Deduplication Maximum Packet Rate Processed	(DCA-DM-SC) <ul style="list-style-type: none"> • 2 ms window: 14 million pps. • 4, 6 ms window: 13 million pps. • 8 ms window: 11 million pps. (DCA-DM-SDL) <ul style="list-style-type: none"> • 2 ms window: 14 million pps. • 4, 6 ms window: 13 million pps. • 8 ms window: 11 million pps. (DCA-DM-SEL) <ul style="list-style-type: none"> • 2 ms window: 19 million pps. • 4, 6 ms window: 18 million pps. • 8 ms window: 16 million pps. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 2 ms window: 13 million pps per port when 4 ports are used. • 4, 6 ms window: 13 million pps per port when 4 ports are used. • 8 ms window: 11 million pps per port when 4 ports are used. (DCA-DM-SEL) ¹ <ul style="list-style-type: none"> • 2 ms window: 17.5 million pps per port when 2 ports on the same NIC are used. • 4, 6 ms window: 16.5 million pps per port when 2 ports on the same NIC are used. • 8 ms window: 15.5 million pps per port when 2 ports on the same NIC are used. 	(DCA-DM-SDL) <ul style="list-style-type: none"> • 2, 4, 6, 8 ms window: 8 million pps. (DCA-DM-SEL) <ul style="list-style-type: none"> • 2, 4, 6, 8 ms window: 15.5 million unique pps.

Managed Service	One Service Node Port	4 Service Node Ports	16 Service Node Ports
Deduplication Maximum Bandwidth by Service Node Port	<p>(DCA-DM-SC)</p> <p>10 Gbps for IMIX traffic.</p> <ul style="list-style-type: none"> • 2 ms window: It handles 10 Gbps traffic per port with average packet size > 70 bytes. • 4, 6 ms window: It handles 10 Gbps traffic per port with average packet size > 76 bytes. • 8 ms window: It handles 10 Gbps traffic per port with average packet size > 94 bytes. <p>(DCA-DM-SEL)</p> <p>20Gbps for IMIX traffic.</p> <ul style="list-style-type: none"> • 2, 4, 6 and 8 ms window: It handles 20 Gbps traffic per port with average packet size > 70 bytes. 	<p>(DCA-DM-SC)</p> <p>40 Gbps for IMIX traffic.</p> <ul style="list-style-type: none"> • 2 ms window: It handles 10 Gbps traffic per port with average packet size > 76 bytes. • 4, 6 ms window: It handles 10 Gbps traffic per port with average packet size > 76 bytes. • 8 ms window: It handles 10 Gbps traffic per port with average packet size > 94 bytes. <p>(DCA-DM-SEL)³</p> <p>40Gbps for IMIX traffic.</p> <ul style="list-style-type: none"> • 2, 4, 6 and 8 ms window: It handles 40 Gbps traffic per port with average packet size > 70 bytes. 	<p>(DCA-DM-SC)</p> <p>160 Gbps for IMIX traffic.</p> <ul style="list-style-type: none"> • Service node ports handles 10 Gbps traffic per port with average packet size > 210 bytes. <p>(DCA-DM-SEL)³</p> <p>320 Gbps for IMIX traffic.</p> <ul style="list-style-type: none"> • Service node ports handles 20 Gbps traffic per port with average packet size > 210 bytes.

1 DCA-DM-SEL NIC Hardware configuration is 2 Port, Published numbers represent NIC card Performance.

2 In push-per-policy mode, 4-byte internal VLAN tags are added to the traffic, which reduces the maximum bandwidth supported to 9.7 Gbps.

3 DCA-DM-SEL maximum supported bandwidth per port is 20 Gig.



Note: Tested for 100%, 50%, 20%, and 0% deduplication by sending 10Gbps traffic with different packet sizes.

1.3.4 Header Stripping Verified Scale Values

Table 21: Header Stripping Verified Scale Values

Managed Service	One Service Node Port	4 Service Node Port	16 Service Node Port
Header Stripping Maximum Packet Rate Processed	(DCA-DM-SC) <ul style="list-style-type: none"> • 14 million pps per port. (DCA-DM-SDL) <ul style="list-style-type: none"> • 12 million pps per port. (DCA-DM-SEL) <ul style="list-style-type: none"> • 29 million pps per port. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 14 million pps per port. (DCA-DM-SDL) <ul style="list-style-type: none"> • 8 million pps per port. (DCA-DM-SEL) <ul style="list-style-type: none"> • 29 million pps per port. 	(DCA-DM-SDL) <ul style="list-style-type: none"> • 7.5 million pps per port. (DCA-DM-SEL) <ul style="list-style-type: none"> • 14.5 million pps per port.
Header Stripping Maximum Bandwidth by Service Node Port ¹	(DCA-DM-SC) <ul style="list-style-type: none"> • 10 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 20 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 70 bytes. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 40 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 40 Gbps² for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 70 bytes.	(DCA-DM-SC) <ul style="list-style-type: none"> • 160 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 160 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 320 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 140 bytes.

¹ In push-per-policy mode, 4-byte internal VLAN tags are added to the traffic, which reduces the maximum bandwidth supported to 9.7 Gbps.

² DCA-DM-SEL NIC Hardware configuration is 2 Port, Published numbers represent NIC card Performance.

Table 22: Header Stripping Verified Scale Values

Managed Service	One Service Node Port	4 Service Node Port	16 Service Node Port
Header Stripping Maximum Packet Rate Processed	(DCA-DM-SC) <ul style="list-style-type: none"> • 14 million pps per port. (DCA-DM-SDL) <ul style="list-style-type: none"> • 12 million pps per port. (DCA-DM-SEL) <ul style="list-style-type: none"> • 29 million pps per port. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 14 million pps per port. (DCA-DM-SDL) <ul style="list-style-type: none"> • 8 million pps per port. (DCA-DM-SEL) <ul style="list-style-type: none"> • 29 million pps per port. 	(DCA-DM-SDL) <ul style="list-style-type: none"> • 7.5 million pps per port. (DCA-DM-SEL) <ul style="list-style-type: none"> • 14.5 million pps per port.
Header Stripping Maximum Bandwidth by Service Node Port ¹	(DCA-DM-SC) <ul style="list-style-type: none"> • 10 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 20 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 70 bytes. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 40 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 40 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 70 bytes. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 160 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 160 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 320 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 140 bytes.

¹ In push-per-policy mode, 4-byte internal VLAN tags are added to the traffic, which reduces the maximum bandwidth supported to 9.7 Gbps.



Note: Tested VxLan, MPLS, ERSPAN¹ and LISP encapsulated packets of different sizes at line rate.

¹ DCA-DM-SEL support of ERSPAN managed-service has limitations.

1.3.5 Slicing, Masking and Pattern Matching Verified Scale Values

This section summarizes the verified scale values for the following DMF Service Node managed services.

- Slicing
- Masking
- Pattern Matching

Table 23: Verified Scale for Packet Slicing as a Managed Service

Processing rate and supported bandwidth 1	One Service Node Port	4 Service Node Ports	16 Service Node Ports
Maximum Packet Rate Processed	(DCA-DM-SC) <ul style="list-style-type: none"> • 14 million pps per port (DCA-DM-SDL) <ul style="list-style-type: none"> • 14 million pps per port (DCA-DM-SEL) <ul style="list-style-type: none"> • 29.5 million pps per port 	(DCA-DM-SC) <ul style="list-style-type: none"> • 13 million pps per port (DCA-DM-SDL) <ul style="list-style-type: none"> • 8 million pps per port (DCA-DM-SEL) <ul style="list-style-type: none"> • 17.5 million pps per port² 	(DCA-DM-SDL) <ul style="list-style-type: none"> • 8 million pps per port. (DCA-DM-SEL) <ul style="list-style-type: none"> • 17.5 million pps per port.
Maximum Bandwidth by Service Node	(DCA-DM-SC) <ul style="list-style-type: none"> • 10 Gbps for IMIX traffic. It handles 10Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 20 Gbps for IMIX traffic. It handles 20Gbps traffic per port with average packet size > 130 bytes. 	(DCA-DM-SC) <ul style="list-style-type: none"> • 40 Gbps for IMIX traffic. It handles 10Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 40 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 130 bytes.² 	(DCA-DM-SC) <ul style="list-style-type: none"> • 160 Gbps for IMIX traffic. It handles 10Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) <ul style="list-style-type: none"> • 320 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 130 bytes.

1 In push-per-policy mode, 4-byte internal VLAN tags are added to the traffic, which reduces the maximum bandwidth supported to 9.7 Gbps.

2 With regex `\d{3}-\d{2}-\d{4}` to match/mask/drop packets with Social Security numbers in a 64 byte packet, DCA-DM-SC can handle 10 million packets/sec. The performance reduces to 5 million pps with 131 byte packet. With regex `\d{4}[s-]*\d{4}[s-]*\d{4}[s-]*\d{4}` to match/mask/drop packets with credit card numbers in a 68 byte packet, DCA-DM-SC can handle 7 million pps. Higher the packet size and position of match string in the packet will influence performance. Performance can be optimized by setting appropriate I4-payload off-set value.



Note: Tested different packet sizes with line rate traffic.

Table 24: Verified Scale for Packet Masking as a Managed Service

Processing rate/ bandwidth supported ¹	One Service Node Port	4 Service Node Ports	16 Service Node Ports
Maximum Packet Rate Processed	Depending on regex pattern DCA-DM-SC supports 40% of 10 Gbps traffic or more per port. DCA-DM-SEL supports 31% ² of 20 Gbps ³ traffic or more per port.		
Maximum Bandwidth by Service Node Port	Depending on regex pattern One Service Node port handles about 40% of 10 Gbps traffic or more. To get 10 Gbps performance, use LAG with 2 or more Service Node ports.		

1 In push-per-policy mode, 4-byte internal VLAN tags are added to the traffic, which reduces the maximum bandwidth supported to 9.7 Gbps.

2 With regex `\d{3}-\d{2}-\d{4}` to match/mask/drop packets with Social Security numbers in a 64 byte packet, DCA-DM-SEL can handle 11 million pps. With regex `\d{4}[s-]*\d{4}[s-]*\d{4}` to match/mask/drop packets with credit card numbers in a 68 byte packet, DCA-DM-SEL supports masking service 11 million pps. Higher the packet size and position of match string in the packet will influence performance. Performance can be optimized by setting appropriate l4-payload off-set value.

3 Two ports belongs to single NIC card.

Table 25: Verified Scale for Pattern Matching as a Managed Service

Processing rate/ bandwidth supported ¹	One Service Node Port	4 Service Node Ports	16 Service Node Ports
Maximum Packet Rate Processed	Depending on regex pattern One Service Node port handles about 50% of 10 Gbps traffic or more. DCA-DM-SEL supports 36% of 20 Gbps traffic or more per port.		
Maximum Bandwidth by Service Node Port	Depending on regex pattern One Service Node port handles about 50% of 10 Gbps traffic or more. To get 10 Gbps performance, use LAG with 2 or more Service Node ports.		

1 In push-per-policy mode, 4-byte internal VLAN tags are added to the traffic, which reduces the maximum bandwidth supported to 9.7 Gbps.



Note: Performance of packet masking or packet matching depends on the packet length and the complexity of the regular expression used.

1.4 Analytics Node Verified Scale Values

This section lists the tested scalability values for the Analytics Node.

Table 26: Analytics Node Scale Performance Results

	Single Node Cluster	Three Node Cluster	Five Node Cluster
ARP	20,000 pkts/sec	60,000 pkts/sec	100,000 pkts/sec
DHCP	15,000 pkts/sec	30,000 pkts/sec	60,000 pkts/sec
ICMP	15,000 pkts/sec	40,000 pkts/sec	80,000 pkts/sec
DNS	8,000 pkts/sec	20,000 pkts/sec	32,000 pkts/sec
TCPFlow	6,000 flows/	18,000 flows/sec	30,000 flows/sec
sFLOW	12,000 flows/sec	30,000 flows/sec	70,000 flows/sec
Netflow v5 without Optimization ¹	15,000 flows/sec	35,000 flows/sec	65,000 flows/sec
IPFIX without Optimization ¹	12,000 flows/sec	34,000 flows/sec	65,000 flows/sec
Netflow v9 without Optimization ¹	12,000 flows/sec	34,000 flows/sec	65,000 flows/sec
All the Above Cases Combined: ²	ARP: 800 pkts/sec DHCP: 500 pkts/sec ICMP: 300 pkts/sec DNS: 3,000 pkts/sec TCPFlow: 300 flows/sec sFLOW: 3,000 flows/sec Netflow ver 5: 5,000 flows/sec	ARP: 1,800 pkts/sec DHCP: 900 pkts/sec ICMP: 1,200 pkts/sec DNS: 6,000 pkts/sec TCPFlow: 400 flows/sec sFLOW: 6,000 flows/sec Netflow ver 5: 10,000 flows/sec	ARP: 2,000 pkts/sec DHCP: 1,200 pkts/sec ICMP: 2,000 pkts/sec DNS: 8,000 pkts/sec TCPFlow: 500 flows/sec sFLOW: 8,000 flows/sec Netflow ver 5: 13,000 flows/sec

¹ The Netflow with optimization test cases yield a result of 100,000 flows/sec for a single analytics node cluster. For more details about Netflow optimization, please refer to the Arista Analytics User Guide.

² The rate of traffic chosen is for testing purposes only. In production network the rate of traffic for each protocol may vary.



Note: The above test measurements were performed with 60% average CPU Utilization.

1.5 Recorder Node Verified Scale Values

This section lists the tested performance numbers for the Recorder Node with no-drop packet capture characteristics.

Table 27: Maximum packets recorded on a DCA-DM-RA3 Recorder Node

Packet Size (Bytes)	Packets per second	Maximum Bandwidth (Gbps)
1500 Bytes or greater	~1.98 million	24 Gbps
512 Bytes or greater	~4.7 million	20 Gbps
IMIX	~6.3 million	19 Gbps
256 Bytes or greater	~8.6 million	19 Gbps



Note: IMIX is a 7:4:1 distribution of Ethernet-encapsulated packets of sizes 64, 570, and 1518 bytes. This leads to a 353-byte packet-size average.

REFERENCES

A.1 Related Documents

The following documentation is available for **DANZ Monitoring Fabric**:

- *DANZ Monitoring Fabric Release Notes*
- *DANZ Monitoring Fabric User Guide*
- *DANZ Monitoring Fabric Deployment Guide*
- *DANZ Monitoring Fabric Hardware Compatibility List*
- *DANZ Monitoring Fabric Hardware Guide*
- *DANZ Monitoring Fabric Verified Scale Guide*
- *DANZ Monitoring Fabric SNMP MIB Reference Guide*