Verified Scale Guide

DANZ Monitoring Fabric (DMF)

Version 8.6

Arista.com

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Chapter 1

DANZ Monitoring Fabric Verified Scale

This document describes the DANZ Monitoring Fabric (DMF) 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 could be improved. Expensive monitoring infrastructure, including application performance monitoring tools, Intrusion Detection Systems (IDS), and forensic tools, could be more efficiently utilized due to a need for more management of monitored traffic.

DANZ Monitoring Fabric (DMF) is an advanced network monitoring solution that alleviates this problem dramatically. DMF leverages high-performance bare metal Ethernet switches to provide the most scalable, flexible, and cost-effective monitoring fabric. Using an SDN-centric architecture, DMF 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 DMF 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 operating system from Arista Networks. DMF 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 DMF Controller allows customers to deploy integrated network monitoring solutions along with the DMF.

Note: This document's scale and performance numbers came from a DMF hardware Controller.

1.2 DMF Verified Scale Values

1.2.1 TCAM Rule Limits

The following tables contain the data for the scalability limits tested and verified for the DANZ Monitoring Fabric (DMF).

Table 1: Verified TCAM Rule Limits

	Match Mode	7280R Series Switches	7280R2 Series Switches	7280R3 Series Switches **Important:** Except the 7280R3 switches referenced in Table 3.
IPv4 TCAM rules per switch (Verified Limit/Max Limit)	Full	6140/6144	6140/6144	8180/8188
	L3-L4	6140/6144	6140/6144	8180/8188
	Offset	6140/6144	6140/6144	8180/8188
IPv6 TCAM rules per switch (Verified Limit/ Max Limit)	Full	6140/6144	6140/6144	8180/8188
	L3-L4	6140/6144	6140/6144	8180/8188
	Offset	6140/6144	6140/6144	8180/8188
Match conditions per policy	Full IPv4/IPv6	6140/6140	6140/6140	8180/8180
	L3-L4 IPv4/ IPv6	6140/6140	6140/6140	8180/8180
	L3-L4 Offset IPv4/ IPv6	6140/6140	6140/6140	8180/8180

Table 2: Verified TCAM Rule Limits

Note: The verified TCAM rule limit applies to the whole chassis, not per line card.

	Match Mode	7800R3 Series Switches
IPv4 TCAM rules per switch (Verified Limit /Max Limit)	Full	8180/8188
	L3-L4	8180/8188
	Offset	8180/8188
IPv6 TCAM rules per switch (Verified Limit /Max Limit)	Full	8180/8188
	L3-L4	8180/8188
	Offset	8180/8188
Match conditions per policy	Full-IPv4/v6	8180/8180
	L3-L4IPv4/v6	8180/8180
	L3-L4 Offset-IPv4/v6	8180/8180

Table 3: Verified TCAM Rule Limits

	Match Mode	7020SR/TR Series Switches	7280SR3, 7280SR3E, 7280TR3 Series Switches
IPv4 TCAM Rules per Switch (Verified Limit / Max Limit)	Full	4084/4088	4084/4088
	L3-L4	4084/4088	4084/4088
	Offset	4084/4088	4084/4088
IPv6 TCAM Rules per Switch (Verified Limit / Max Limit)	Full	4084/4088	4084/4088
	L3-L4	4084/4088	4084/4088
	Offset	4084/4088	4084/4088
Match Conditions per Policy	Full IPv4/IPv6	4084/4084	4084/4084
	L3-L4 IPv4/IPv6	4084/4084	4084/4084
	L3-L4 Offset IPv4/IPv6	4084/4084	4084/4084

Table 4: Verified TCAM Rule Limits

	Match Mode	Dell S4048F-ON	Dell S4048-48T	7050X3 Series Switches / Dell S5248F-ON / Dell S5232F-ON
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 Offset-IPv4/v6	2040/1535	8100/6100	3055/2300

Table 5: Verified TCAM Rule Limits

	Match Mode	7260X3 Series Switches / Dell Z9264F-ON
IPv4 TCAM rules per switch (Verified Limit /Max Limit)	Full	1015/1020
	L3-L4	1015/1020
	Offset	1015/1020
IPv6 TCAM rules per switch (Verified Limit /Max Limit)	Full	760/1020
	L3-L4	760/1020
	Offset	760/1020
Match conditions per policy	Full-IPv4/v6	1015/760
	L3-L4IPv4/v6	1015/760
	L3-L4 Offset-IPv4/v6	1015/760

Table 6: Verified TCAM Rule Limits

	Match Mode	Dell S4112F-ON / Dell S4148F-ON
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 Offset-IPv4/v6	4088/3060

1.2.2 Port Channel Interface Limits

Table 7: Verified Port Channel Interface Limits on Arista 7050X3, 7260X3 and Dell Series Switches

Arista 7050X3 and 7260X3 Series Switches, Dell S4048F-ON, Dell S4048-48T, Dell S5232-ON, Dell S5248F-ON, Dell Z9264F-ON

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

Table 8: Verified Port Channel Interface Limits on Arista 7280R, 7280R2, 7280R3 Series of Switches

Arista 7280R, 7280R2 and 7280R3 Series of Switches

	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 9: Verified VXLAN and L2GRE Tunnel Interface Limits on Arista 7050X3, 7260X3 and Dell Series Switches

Arista 7050X3 and 7260X3 Series of Switches, Dell S4048F-ON, Dell S4048-48T, Dell S5232-ON, Dell S5248F-ON, Dell Z9264F-ON

Table 10: Verified VXLAN Tunnel Interface Limits

	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.

Table 11: Verified L2GRE Tunnel Interface Limits

	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 12: 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 13: 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 14: Verified NetFlow Scale Values

DMF Service Node: Netflow	Verified Limits
Service Node Throughput per port [1]	(DCA-DM-SC, DCA-DM-SDL) • 10 Gbps for IMIX traffic. (DCA-DM-SEL) • 20 Gbps for IMIX traffic.
Max Packets processed per port	(DCA-DM-SC[2]) • 6.0 million pps per port when 1 port is used. (DCA-DM-SDL[3]) • 5.5 million pps per port when 1 port is used. (DCA-DM-SEL[4]) • 7.5 million pps per port when 1 port is used. (DCA-DM-SC[2]) • 5.5 million pps per port when 2 ports on the same NIC are used. (DCA-DM-SDL[3]) • 5.0 million pps per port when 4 ports on the same NIC are used. (DCA-DM-SEL[4]) • 7.0 million pps per port when 2 ports on the same NIC are used. (DCA-DM-SDL[3]) • 4.0 million pps per port when 16 port are used. (DCA-DM-SEL[4]) • 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 executed test cases send 10Gbps traffic to supported 10G service node ports with 1 million flows.

Note: All executed test cases send 20Gbps traffic to the DCA-DM-SEL.

1.3.2 IPFIX Scale Values

Table 15: IPFIX Template Used

IPV4 Template	IPV6 Template
• key destination-ipv4-address	• key destination-ipv6-address
• key destination-transport-port	• key destination-transport-port
• key dot1q-vlan-id	• key dot1q-vlan-id
• key source-ipv4-address	• key source-ipv6-address
• key source-transport-port	• key source-transport-port
• field flow-end-milliseconds	• field flow-end-milliseconds
• field flow-end-reason	• field flow-end-reason
• field flow-start-milliseconds	• field flow-start-milliseconds
• field maximum-ttl	• field maximum-ttl
• field minimum-ttl	• field minimum-ttl
• field packet-delta-count	• field packet-delta-count

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

Table 16: Verified IPFIX Scale Values

DMF Service Node: IPFIX	IPv4 Verified Limits	IPv6 Verified Limits
Service Node Throughput per port. [1]	(DCA-DM-SC) • 10 Gbps for IMIX traffic. (DCA-DM-SEL) • 20 Gbps for IMIX traffic.	(DCA-DM-SC) • 10 Gbps for IMIX traffic. (DCA-DM-SEL) • 11 Gbps for IMIX traffic.
Max Packets processed per port.	(DCA-DM-SC[2]) • 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]) • 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]) • 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. (DC-DM-SEL[3]) • 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) • 1 million per port. • 4 million when 4 ports are used. (DCA-DM-SEL) • 16 million when 16 ports are used.	(DCA-DM-SC) • 1 million per port. • 4 million when 4 ports are used. (DCA-DM-SEL) • 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 17: 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) • 2 ms window: 14 million pps. • 4, 6 ms window: 13 million pps. • 8 ms window: 11 million pps. (DCA-DM-SDL) • 2 ms window: 14 million pps. • 4, 6 ms window: 13 million pps. • 8 ms window: 11 million pps. (DCA-DM-SEL) • 2 ms window: 19 million pps. • 4, 6 ms window: 18 million pps. • 8 ms window: 16 million pps.	(DCA-DM-SC) • 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] • 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) • 2, 4, 6, 8 ms window: 8 million pps. (DCA-DM-SEL) • 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	(DCA-DM-SC) 10 Gbps for IMIX traffic. • 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. (DCA-DM-SEL) 20Gbps for IMIX traffic. • 2, 4, 6 and 8 ms window: It handles 20 Gbps traffic per port with average packet size > 70 bytes.	(DCA-DM-SC) 40 Gbps for IMIX traffic. • 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. (DCA-DM-SEL)[3] 40Gbps for IMIX traffic. • 2, 4, 6 and 8 ms window: It handles 40 Gbps traffic per port with average packet size > 70 bytes.	(DCA-DM-SC) 160 Gbps for IMIX traffic. • Service node ports handles 10 Gbps traffic per port with average packet size > 210 bytes. (DCA-DM-SEL)[3] 320 Gbps for IMIX traffic. • 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 18: 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) • 14 million pps per port. (DCA-DM-SDL) • 12 million pps per port. (DCA-DM-SEL) • 29 million pps per port.	(DCA-DM-SC) • 14 million pps per port. (DCA-DM-SDL) • 8 million pps per port. (DCA-DM-SEL) • 29 million pps per port.	(DCA-DM-SDL) • 7.5 million pps per port. (DCA-DM-SEL) • 14.5 million pps per port.
Header Stripping Maximum Bandwidth by Service Node Port[1]	(DCA-DM-SC) • 10 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) • 20 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 70 bytes.	(DCA-DM-SC) • 40 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) • 40 Gbps[2] for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 70 bytes.	(DCA-DM-SC) • 160 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 160 bytes. (DCA-DM-SEL) • 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 19: 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) • 14 million pps per port. (DCA-DM-SDL) • 12 million pps per port. (DCA-DM-SEL) • 29 million pps per port.	(DCA-DM-SC) • 14 million pps per port. (DCA-DM-SDL) • 8 million pps per port. (DCA-DM-SEL) • 29 million pps per port.	(DCA-DM-SDL) • 7.5 million pps per port. (DCA-DM-SEL) • 14.5 million pps per port.
Header Stripping Maximum Bandwidth by Service Node Port[1]	(DCA-DM-SC) • 10 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) • 20 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 70 bytes.	(DCA-DM-SC) • 40 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) • 40 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 70 bytes.	(DCA-DM-SC) • 160 Gbps for IMIX traffic. It handles 10 Gbps traffic per port with average packet size > 160 bytes. (DCA-DM-SEL) • 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, ERSPAN[1] 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 DMF Service Node managed services.

- Slicing
- Masking
- Pattern Matching

Table 20: 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) • 14 million pps per port (DCA-DM-SDL) • 14 million pps per port (DCA-DM-SEL) • 29.5 million pps per port	(DCA-DM-SC) • 13 million pps per port (DCA-DM-SDL) • 8 million pps per port (DCA-DM-SEL) • 17.5 million pps per port[2]	(DCA-DM-SDL) • 8 million pps per port. (DCA-DM-SEL) • 17.5 million pps per port.
Maximum Bandwidth by Service Node	(DCA-DM-SC) • 10 Gbps for IMIX traffic. It handles 10Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) • 20 Gbps for IMIX traffic. It handles 20Gbps traffic per port with average packet size > 130 bytes.	(DCA-DM-SC) • 40 Gbps for IMIX traffic. It handles 10Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) • 40 Gbps for IMIX traffic. It handles 20 Gbps traffic per port with average packet size > 130 bytes.[2]	(DCA-DM-SC) • 160 Gbps for IMIX traffic. It handles 10Gbps traffic per port with average packet size > 70 bytes. (DCA-DM-SEL) • 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 l4-payload off-set value.

Note: Tested different packet sizes with line rate traffic.

Table 21: 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}[\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 22: 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: The performance of packet masking or packet matching depends on the packet length and the complexity of the regular expression.

1.3.6 Session Slice Scale Values

This section summarizes the verified scale values for TCP and UDP session-slicing configured as a managed service action.

Session-Slice Scale Values for UDP

Service Node Port	IPv4 UDP Session	IPv6 UDP Session	IPv4/6 UDP Session
One	524000 Max sessions	524000 Max sessions	1 Million Max sessions
4 Port	2 Million Max sessions	2 Million Max sessions	4 Million Max sessions

Session-Slice Scale Values for TCP

Service Node Port	IPV4 TCP Session	IPV6 TCP Session	IPv4/6 TCP Session
One	524000 Max sessions	524000 Max sessions	1 Million Max sessions
4 Port	2 Million Max sessions	2 Million Max sessions	4 Million Max sessions

Each service node port supports 524000 maximum sessions for each traffic type - TCP/UDP/TCP6/UDP6. With mixed traffic (TCP,TCP6,UDP,UDP6), each service node port supports a maximum of 2 million sessions.

1.4 Analytics Node Verified Scale Values

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

Table 23: 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®[1]	12,000 flows/sec	30,000 flows/sec	70,000 flows/sec
Netflow v5 without Optimization[2]	12,000 flows/sec	32,000 flows/sec	60,000 flows/sec
IPFIX without Optimization[2]	9,000 flows/sec	27,000 flows/sec	45,000 flows/sec
Netflow v9 without Optimization[2]	9,000 flows/sec	27,000 flows/sec	45,000 flows/sec
All the Above Cases Combined: [3]	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 version 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 version 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 version 5: 13,000 flows/sec

1 sFlow® is a registered trademark of Inmon Corp.
2 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.
3 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 displays the tested performance numbers for the Recorder Node with no-drop packet capture characteristics.

Table 24: 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 64, 570, and 1518-byte Ethernet-encapsulated packets, leading to a 353-byte packet size average.

Appendix A

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*