Dell EMC SAN Health
Tips and Tricks
DELL EMC

Table of Contents

A quick guide to optimizing SAN Health

Introduction	3
Installing SAN Health	5
Running SAN Health	7
Entering Site Details	8
Entering Fabric Details	9
Running the Audit	11
Generating the Report	14
Setting Audit and Report Options	17
Interpreting the Report	25
Contact Details	35

© Copyright 2019 Dell Inc.

Dell EMC SAN Health Assessment Tools

Free customer downloadable tool

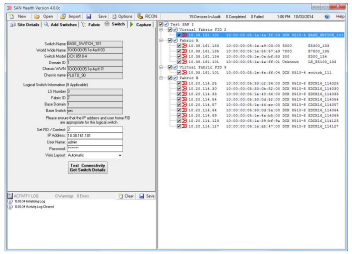
Live Optics uses Dell EMC SAN Health output to create a summary presentation

© Copyright 2019 Dell Inc.

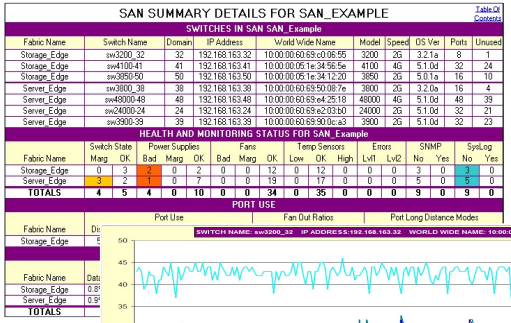
Fast, free and easy-to-use SAN auditing software

SAN Health provides useful results

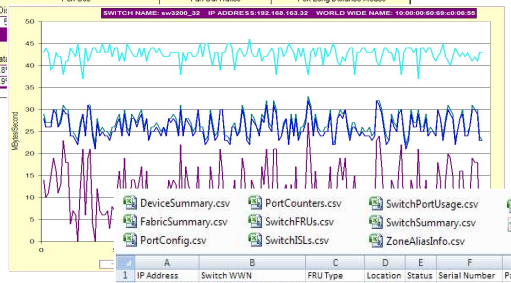
Capture a point in time snapshot of switch logs and diagnostics



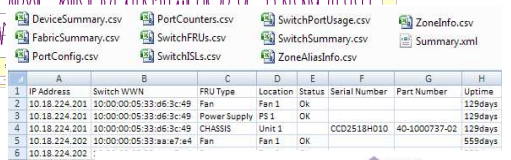
Automated report generation



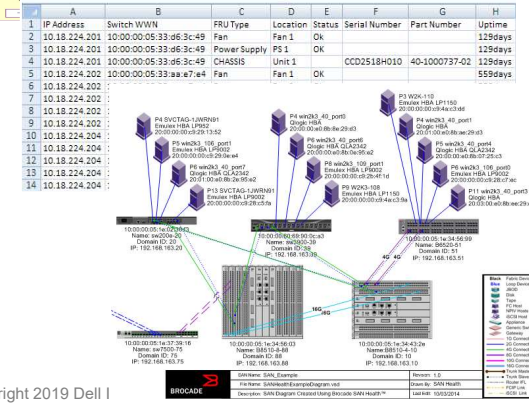
Comprehensive reporting with health and best practice checks



Performance graphs for visualizing activity



Search, filter and sort the audit data



Useful topology diagrams to view physical layout

© Copyright 2019 Dell I

DELL EMC

Installing SAN Health

SAN Health installs easily within 3 minutes

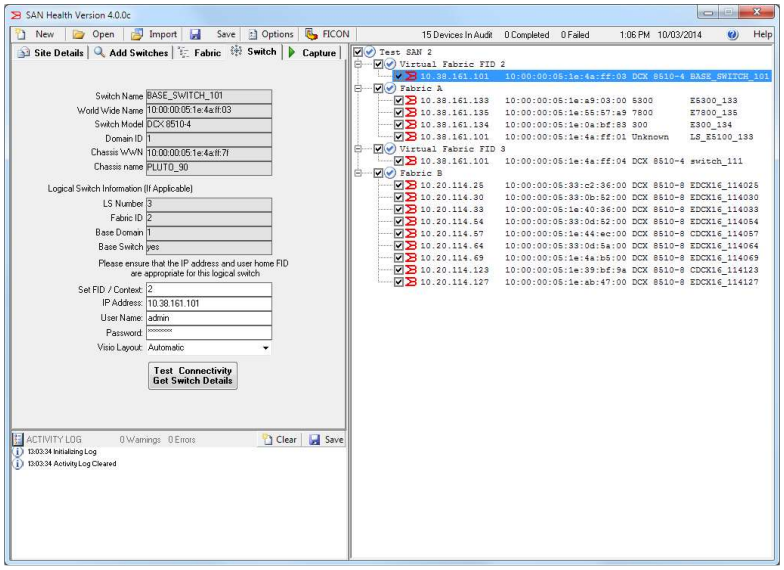
- Select a suitable workstation
- Any Windows box that has TCP/IP connectivity to the management port of the SAN switches
- CPU and memory requirements are dictated by the number of switches that will be audited at any one time
- Less than 20 switches requires an Intel P4 or AMD Equivalent (AMD K7) and 512MB of RAM
- The memory requirement then increases in relation to the switches in the audit. 100 switches , the maximum supported requires 4GB of RAM with a fast, modern CPU

© Copyright 2019 Dell Inc.

SAN Health Diagnostics Capture

Client Side Software

- Quick, easy and intuitive to use
- 5 to 10 minutes to complete an audit
- Connects via telnet/secure shell to the switches and retrieves the output from non-intrusive show commands
- Can run against a single fabric or multiple fabrics at once



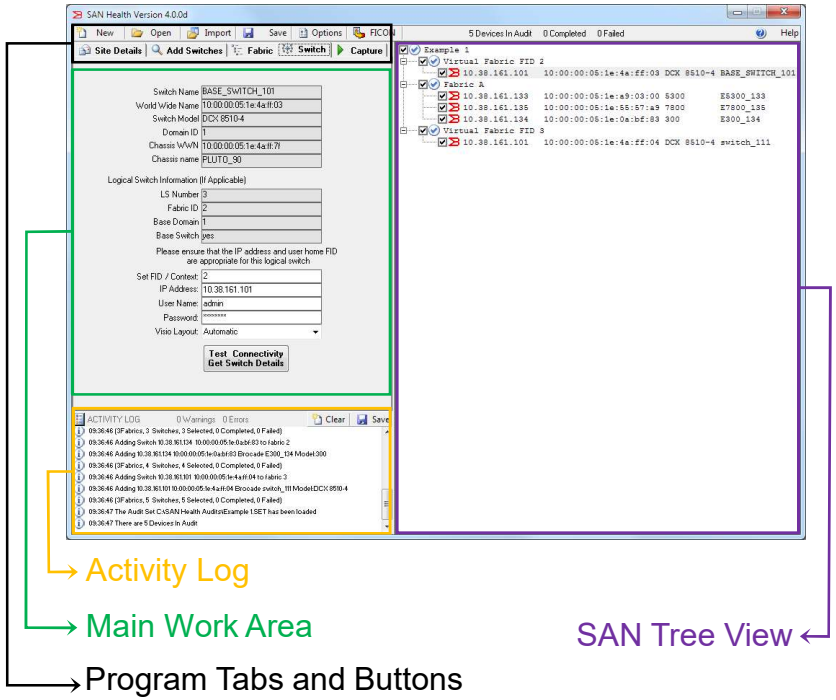
© Copyright 2019 Dell Inc.

Running SAN Health

Follow this simple process

- Four simple steps:
  1. Enter Site Details
  2. Enter Switch and Fabric Details
  3. Run the Audit
  4. Generate the Report

- Optionally select report content and fine tune audit options

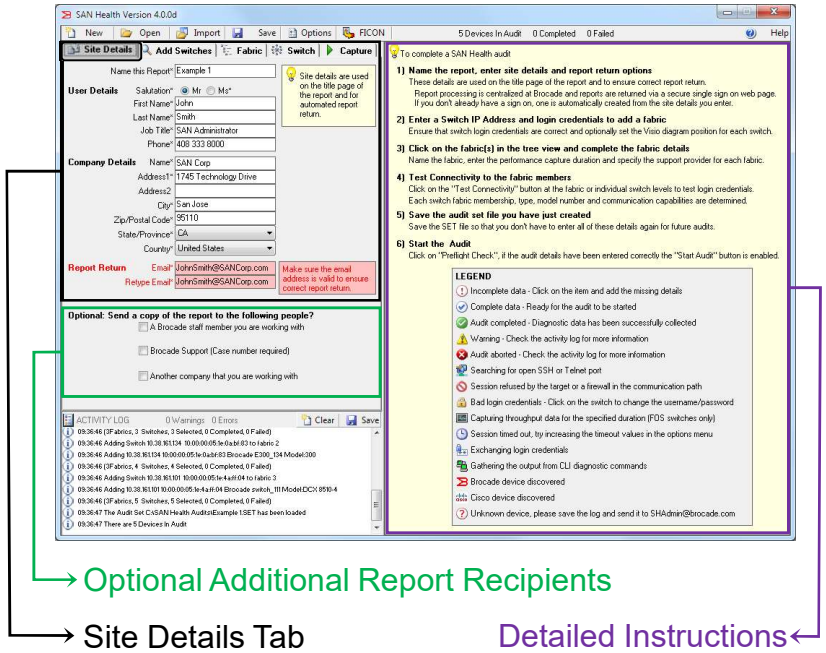


© Copyright 2019 Dell Inc.

Running SAN Health

1. Enter site and contact Information

- This information is used as the report title and to determine the recipients of the completed report
- It is used to create the secure single sign-on account where the completed report will be posted for download
- Optionally, if you wish to share the report with support or someone that you are working with, enter these details here



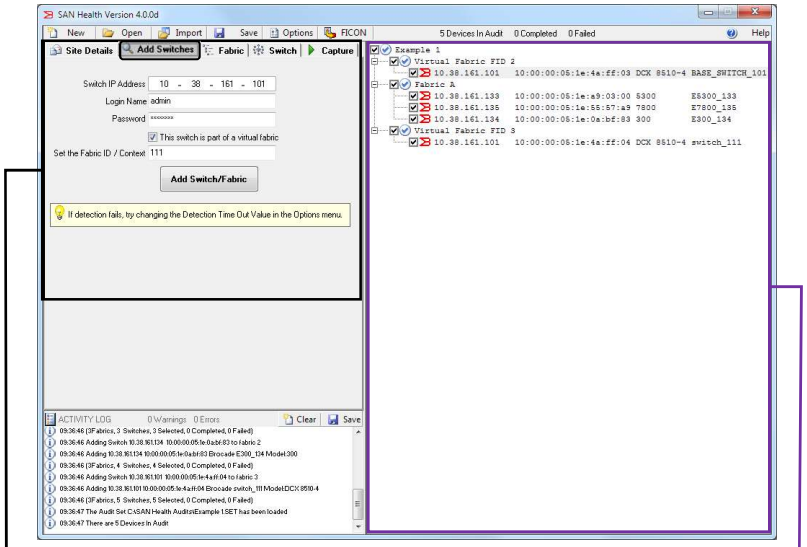
© Copyright 2019 Dell Inc.

Running SAN Health

2. Enter Switch and Fabric Details – Add Switches Tab

- Add switches by inputting their IP address, a username, and a password
- Additional switches in the fabric will be automatically discovered
- SAN Health is Virtual Fabric aware and Fabric ID/Context can be entered here

New for 4.0!



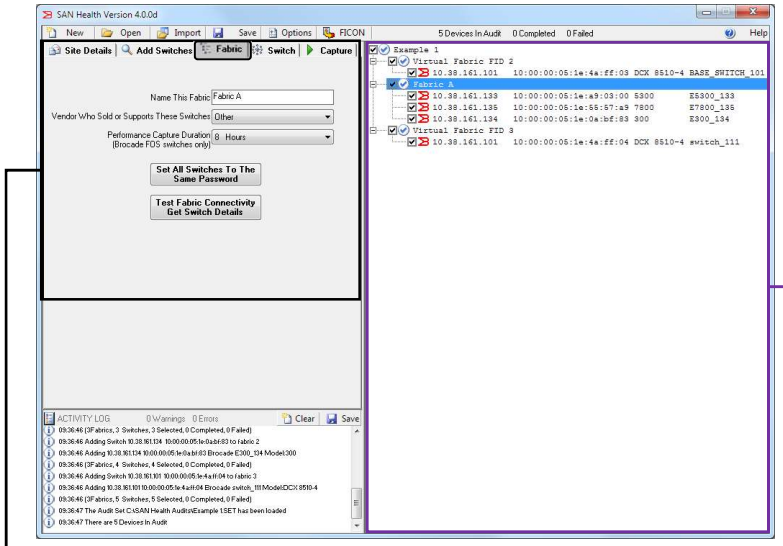
Add Switches Tab
- IP Address
- User Credentials
- Virtual Fabric ID

© Copyright 2019 Dell Inc.

Running SAN Health

2. Enter Switch and Fabric Details (cont.) – Fabric Tab

- Add the fabric details
  - Give the fabric a logical name
  - Enter the support provider
  - Select the duration for capturing port throughput statistics (Brocade FOS based switches only)



Fabric Details Tab
- Fabric Name
- Support Provider
- Performance Capture Duration

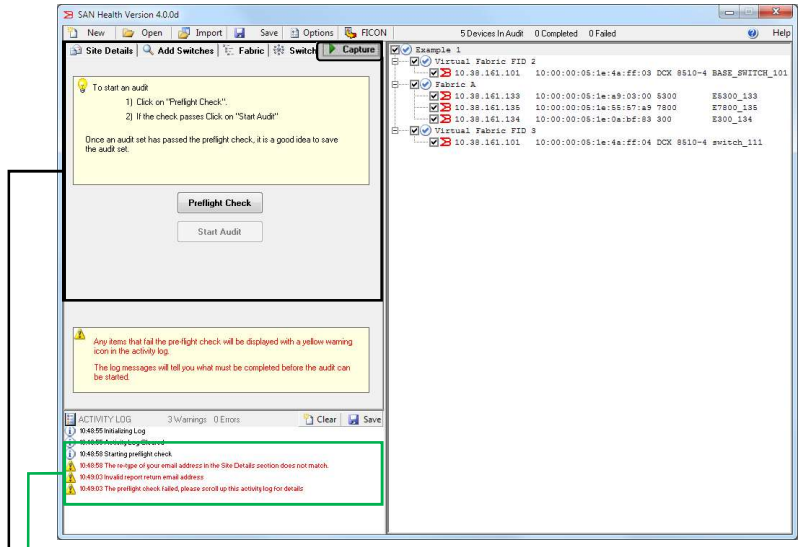
SAN Tree View

© Copyright 2019 Dell Inc.

Running SAN Health

3. Running the Audit – Starting the Audit

- A pre-flight check is conducted before an audit can be started
  - If anything is incomplete or incorrectly formatted, an error will display in the activity log
- Clicking on “Start Audit” launches an individual telnet or SSH session to each switch and the output from diagnostic CLI commands is captured

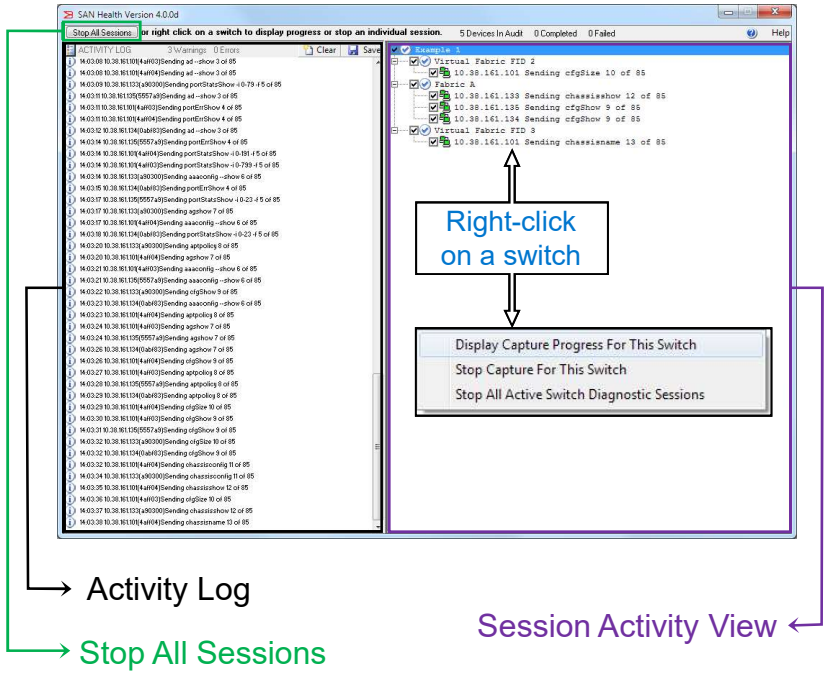


© Copyright 2019 Dell Inc.

Running SAN Health

3. Running the Audit – Monitoring the Audit

- All activity can be stopped at any time by clicking on “Stop All Sessions”
- The tree view displays the progress for each switch
- Right-click on any switch for more options
  - Display the detailed progress of that switch
  - Stop the capture for the selected switch
  - Stop the capture for all the switches



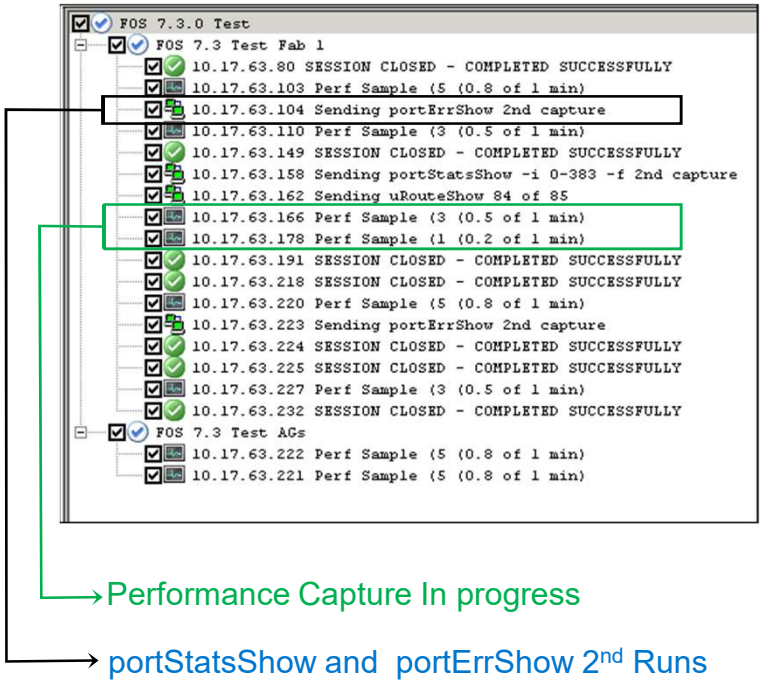
© Copyright 2019 Dell Inc.

Running SAN Health

3. Running the Audit – Performance Capture and 2nd Port Stat Capture

- FOS switches can be set to capture port throughput data for a specified duration
- PortstatsShow and portErrShow will run a second time at the end of the audit to capture the delta in port error counters that occurred over the duration of the audit

New for 4.0!

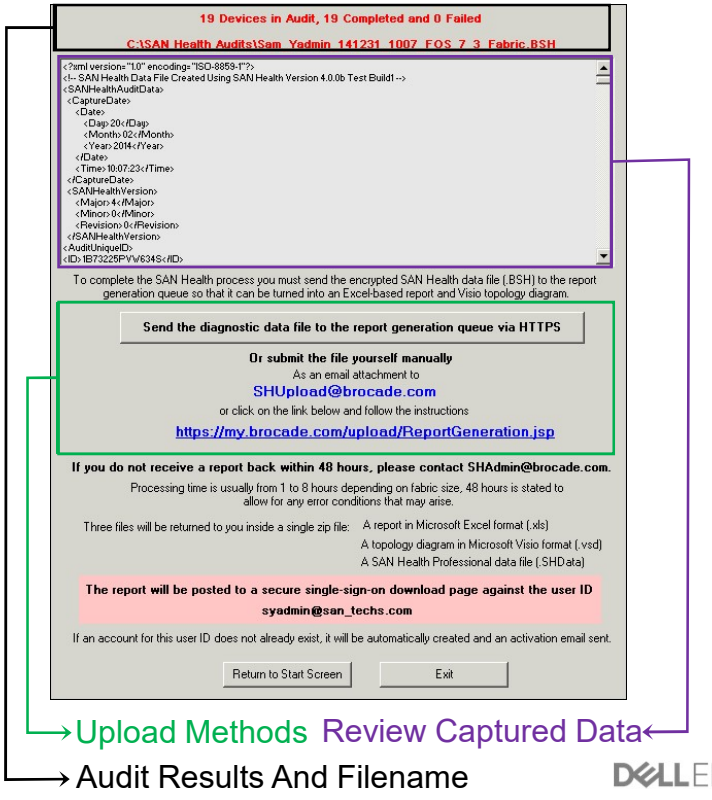


© Copyright 2019 Dell Inc.

Report Generation

4. Generate the Report – Reviewing the Captured Data

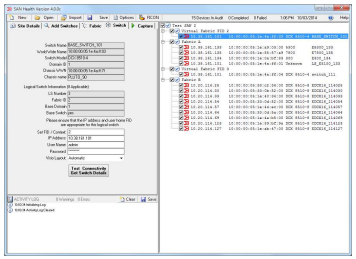
- The final screen displays all captured diagnostic data
- Upload the raw diagnostic data file to the centralized report generators for automated analysis
  - Click the button to automatically send the file via HTTPS
  - Click on the email address to generate an email and attach the file
  - Click on the URL to manually upload via HTTPS



© Copyright 2019 Dell Inc.

SAN Health Report Generation

Automated Processing and Report Return



Diagnostics Capture

Report Generator

Report Return

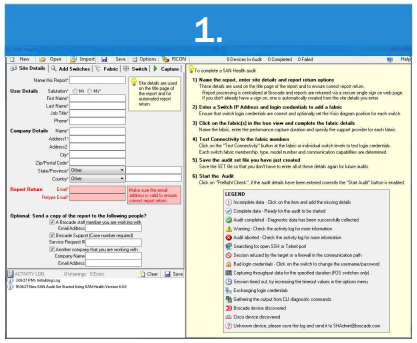
1) Detailed Report (Excel)
2) Topology Diagram (Visio)
3) SAN Health Pro Data File
4) Audit Data as CSV

- The report generators analyze the raw diagnostic data, graph the performance data and generate a detailed report, topology diagram and CSV data files
- Report generation is a real time automated backend process
- Usually 1 to 10 hours to process (48 hour maximum)
- Reports are returned via a single sign on secure download
- Reports are automatically deleted after 30 days

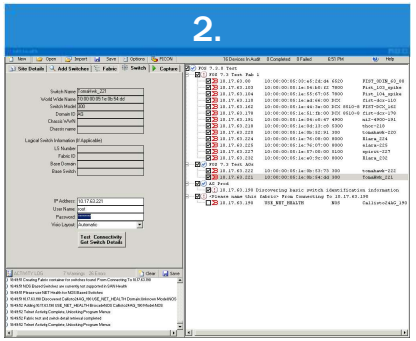
© Copyright 2019 Dell Inc.

Summary of the SAN Health Process

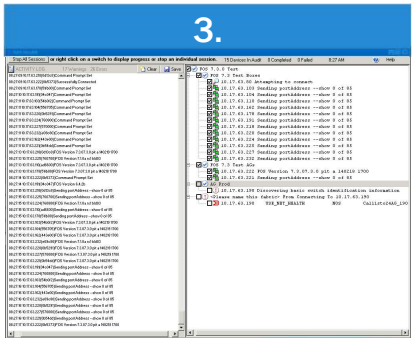
4 Easy Steps



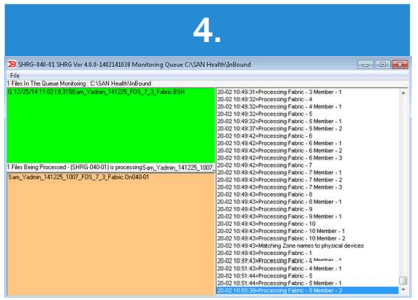
Enter Site Details



Enter Switch and Fabric Details



Run the Audit



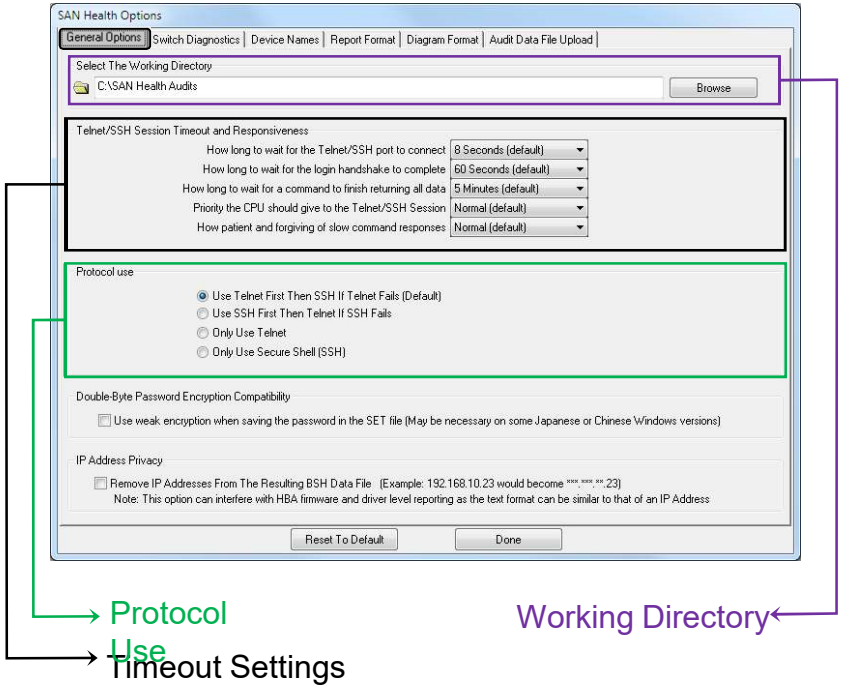
Generate the Report

© Copyright 2019 Dell Inc.

Setting the SAN Health Options

General Options Tab

- **Audit options are typically left as default**
- Some environments may require changes to the timeouts or to the SSH/Telnet order
- IP addresses can be stripped from the raw data if desired



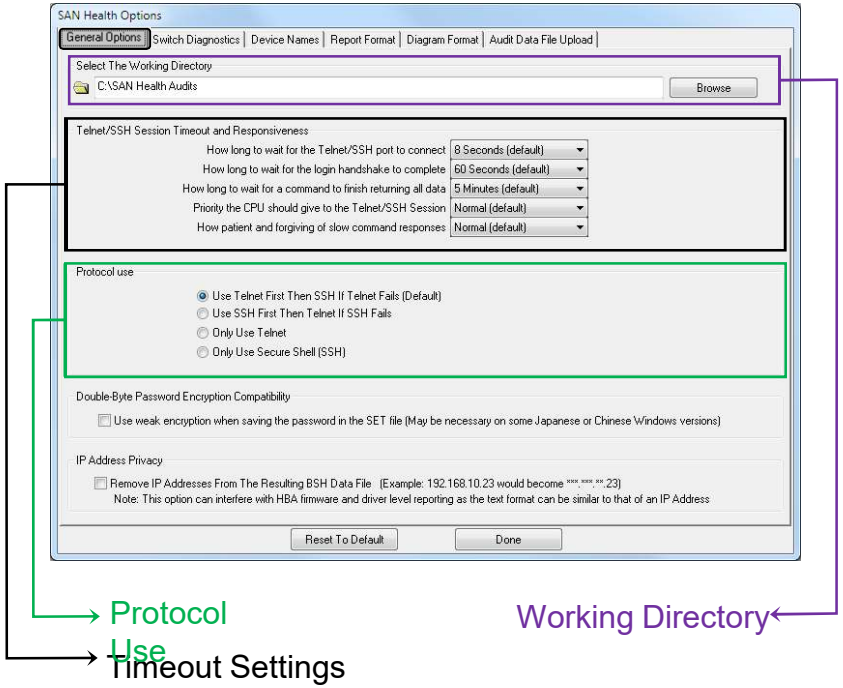
© Copyright 2019 Dell Inc.

Setting the SAN Health Options

Switch Diagnostics Tab

- Review the diagnostic commands that will be sent to the switches during the audit
  - Deselecting commands will result in less information in the final report
- Port Statistics can be automatically reset at the end of the audit to see the changes between reports

New for 4.0!

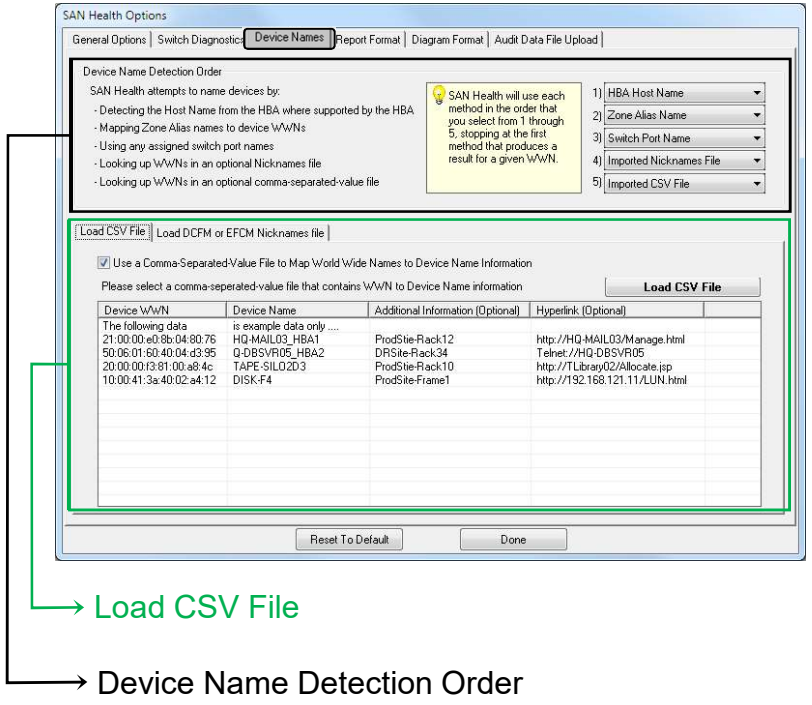


© Copyright 2019 Dell Inc.

Setting the SAN Health Options

Device Names Tab

- Set the method for determining device names here
- An optional CSV file can be loaded
  - Use this CSV to add custom names and any descriptive text
  - A hyperlink can also be added to any device to allow it to be linked in the report (see next page for hyperlink details)

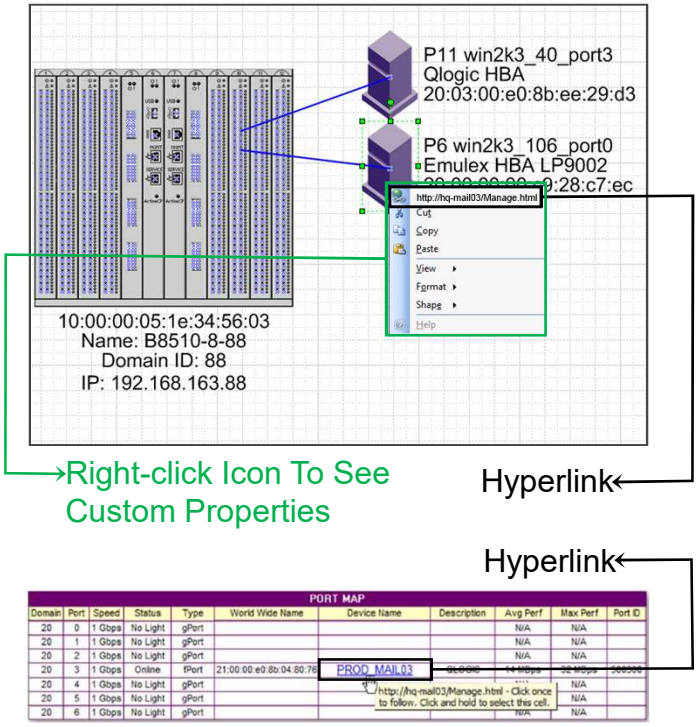


© Copyright 2019 Dell Inc.

Setting the SAN Health Options

Hyperlinks

- Hyperlinks allow external management applications to be launched from the Excel report or Visio diagram
  - Example Hyperlinks
    - http://HQ-MAIL03/Manage.html
    - Telnet://HQ-DBSVR05
    - http://TLibrary02/Allocate.jsp
    - LUN_Allocate.cgi
    - FRAME_DF_Report.txt
  - If the hyperlink is to a file, the file must be in the same directory as the Visio or Excel file.

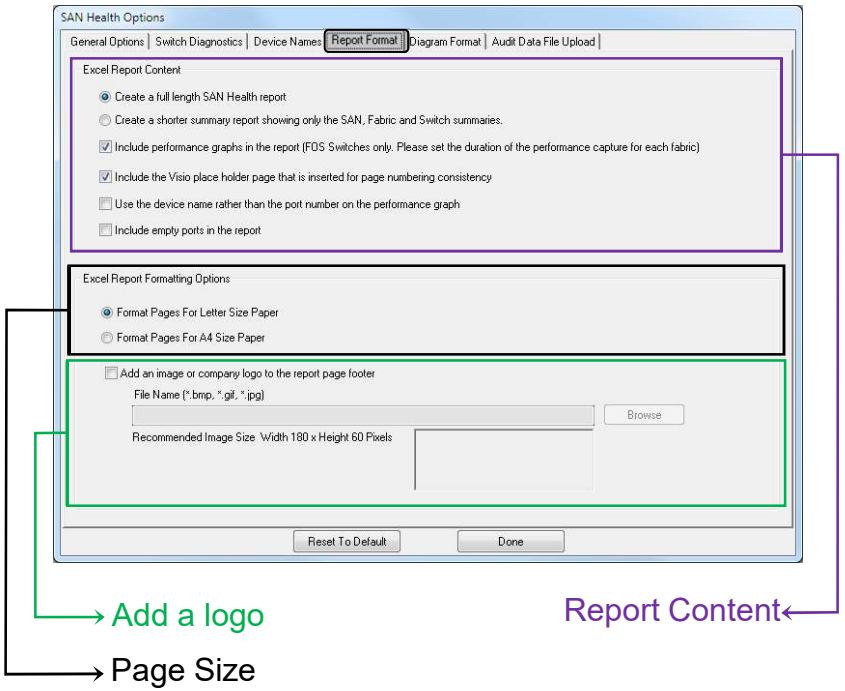


© Copyright 2019 Dell Inc.

Setting the SAN Health Options

Report Format Tab

- Select report content
- Set report page size (Letter or A4)
- Add a company logo to the report footer

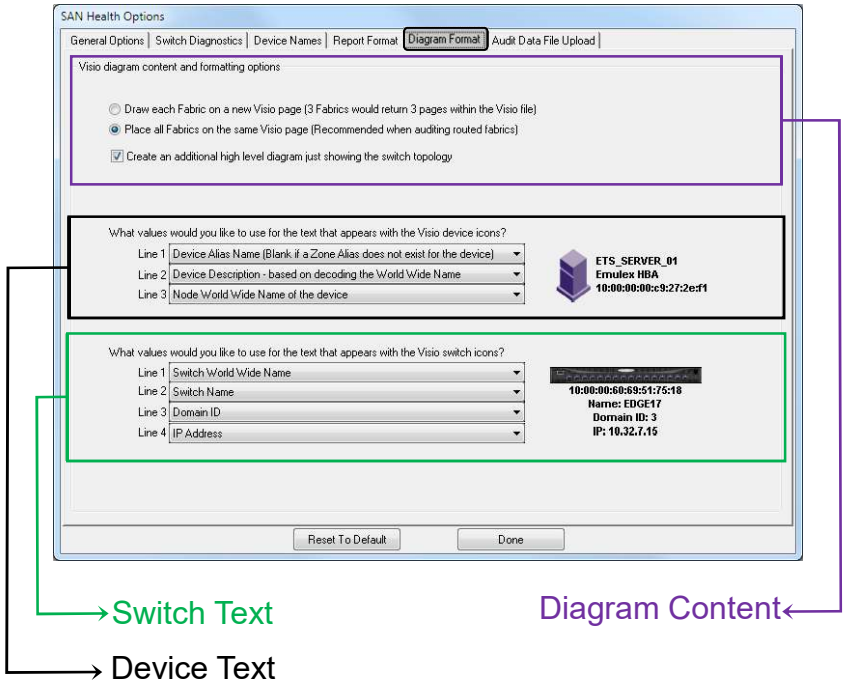


© Copyright 2019 Dell Inc.

Setting the SAN Health Options

Diagram Format Tab

- Set whether fabrics are drawn on one page or multiple pages
- Set whether an additional high-level diagram consisting of just switches is created
- Set what data fields populate the text next to device icons and the text under switch icons

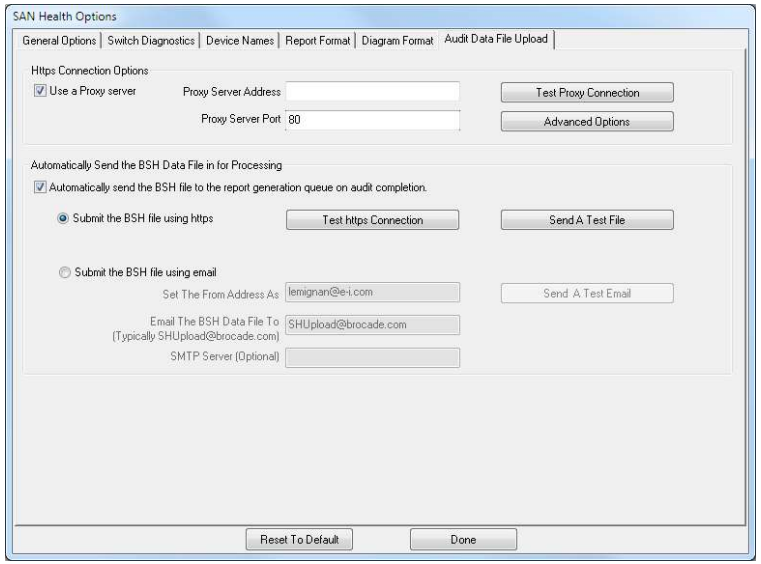


© Copyright 2019 Dell Inc.

Setting the SAN Health Options

Automatic Data Upload Tab

- Auto upload of diagnostic data file can be set to occur at the end of each audit
  - HTTPS upload can be set and tested
  - Email settings can be set and tested
  - Set SAN Health to use a proxy server if required

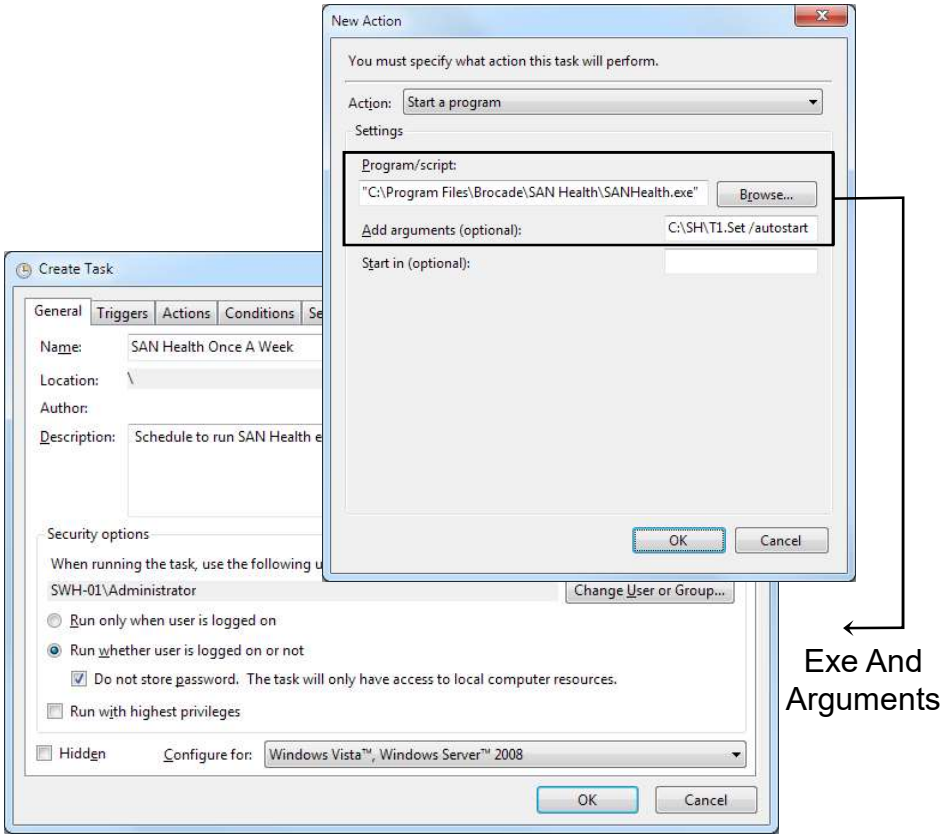


© Copyright 2019 Dell Inc.

Running SAN Health

Scheduling Audits

- Windows Scheduler can run audits on a set schedule
  - Run SANHealth.exe as the program
  - Use the .SET file as one argument
  - Add /autostart as a second argument
  - Password does not need to be stored
  - User does not need to be logged in for SAN Health to run



© Copyright 2019 Dell Inc.

© Copyright 2019 Dell Inc.

Report Content

Easy to Navigate Spreadsheet

- The Microsoft Excel-based reports are structured in a hyperlinked, drill-down hierarchy of SAN to Fabric to Switch to Port
- Each page as a hyperlink back to the Table Of Contents to make navigation through large reports easier

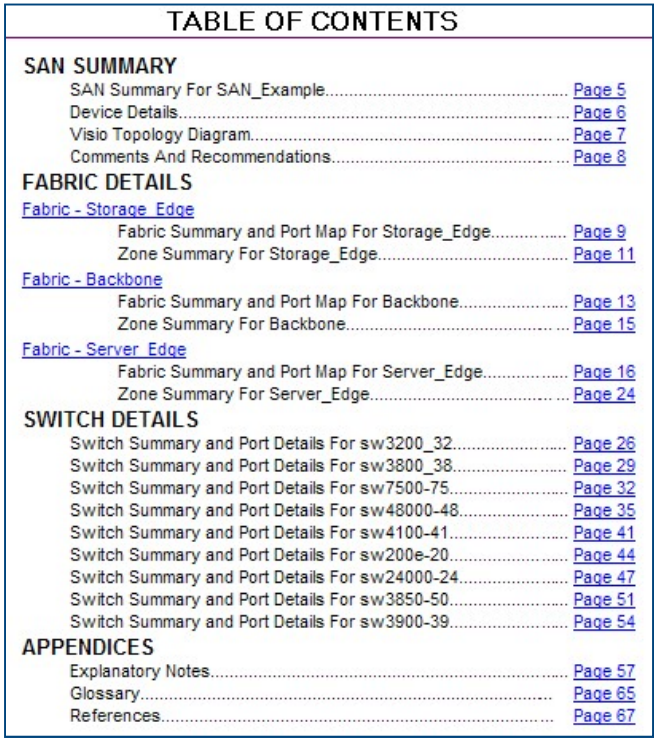


TABLE OF CONTENTS

SAN SUMMARY
- SAN Summary For SAN_Example ... Page 5
- Device Details ... Page 6
- Visio Topology Diagram ... Page 7
- Comments And Recommendations ... Page 8

FABRIC DETAILS

Fabric - Storage_Edge
- Fabric Summary and Port Map For Storage_Edge ... Page 9
- Zone Summary For Storage_Edge ... Page 11

Fabric - Backbone
- Fabric Summary and Port Map For Backbone ... Page 13
- Zone Summary For Backbone ... Page 15

Fabric - Server_Edge
- Fabric Summary and Port Map For Server_Edge ... Page 16
- Zone Summary For Server_Edge ... Page 24

SWITCH DETAILS
- Switch Summary and Port Details For sw3200_32 ... Page 26
- Switch Summary and Port Details For sw3800_38 ... Page 29
- Switch Summary and Port Details For sw7500-75 ... Page 32
- Switch Summary and Port Details For sw48000-48 ... Page 35
- Switch Summary and Port Details For sw4100-41 ... Page 41
- Switch Summary and Port Details For sw200e-20 ... Page 44
- Switch Summary and Port Details For sw24000-24 ... Page 47
- Switch Summary and Port Details For sw3850-50 ... Page 51
- Switch Summary and Port Details For sw3900-39 ... Page 54

APPENDICES
- Explanatory Notes ... Page 57
- Glossary ... Page 65
- References ... Page 67

© Copyright 2019 Dell Inc.

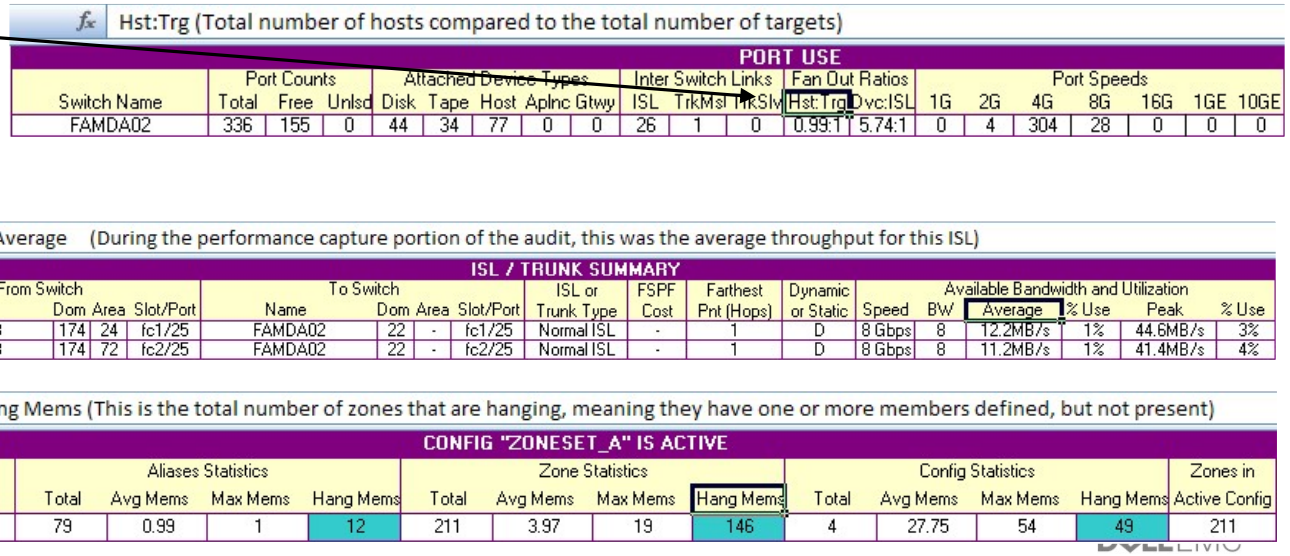
Report Content

In Report Explanations

- Many cells in the report can be selected to see more info in the formula bar
- Learn more about report content such as zone membership, hanging zones, etc

Select the cell you would like Information on

Look in the formula bar for explanatory details



Hst:Trg (Total number of hosts compared to the total number of targets)

PORT USE

Switch Name	Port Counts			Attached Device Types					Inter Switch Links			Fan Out Ratios		Port Speeds						
	Total	Free	Unlsd	Disk	Tape	Host	ApInc	Gtwy	ISL	TrkMst	TrkSlv	Hst:Trg	Dvc:ISL	1G	2G	4G	8G	16G	1GE	10GE
FAMDA02	336	155	0	44	34	77	0	0	26	1	0	0.99:1	5.74:1	0	4	304	28	0	0	0

Average (During the performance capture portion of the audit, this was the average throughput for this ISL)

ISL / TRUNK SUMMARY

From Switch				To Switch				ISL or	FSPF	Farthest	Dynamic	Available Bandwidth and Utilization					
Name	Dom	Area	Slot/Port	Name	Dom	Area	Slot/Port	Trunk Type	Cost	Pnt (Hops)	or Static	Speed	BW	Average	% Use	Peak	% Use
FAMDA03	174	24	fc1/25	FAMDA02	22	-	fc1/25	Normal ISL	-	1	D	8 Gbps	8	12.2MB/s	1%	44.6MB/s	3%
FAMDA03	174	72	fc2/25	FAMDA02	22	-	fc2/25	Normal ISL	-	1	D	8 Gbps	8	11.2MB/s	1%	41.4MB/s	4%

Hang Mems (This is the total number of zones that are hanging, meaning they have one or more members defined, but not present)

CONFIG "ZONESET_A" IS ACTIVE

Zone	Aliases Statistics				Zone Statistics				Config Statistics				Zones in
Database Use	Total	Avg Mems	Max Mems	Hang Mems	Total	Avg Mems	Max Mems	Hang Mems	Total	Avg Mems	Max Mems	Hang Mems	Active Config
1.2%	79	0.99	1	12	211	3.97	19	146	4	27.75	54	49	211

© Copyright 2019 Dell Inc.

Report Use Examples

Zone and Configuration Checking

15 ALIASES

Alias Name	Alias Member(s)
dell_4_3bwwn	10:00:00:00:c9:29:04:77
dell_4_4bwwn	10:00:00:00:c9:29:04:32
demotestalias	156,5
hitachi_00	50:00:60:e8:02:ee:78:00
dmx800_16c1	50:06:04:8a:cc:c8:8c:6f
dmx800_16d1	50:06:04:8a:cc:c8:8c:7f

ZONING METRICS

		Aliases Statistics				Zone Statistics				Config Statistics			
Fabric Name	Zone Database Use	Aliases	AvMem	MaxMem	Hanging	Zones	AvMem	MaxMem	Hanging	Configs	AvMem	MaxMem	Hanging
Prod-1	6.1% of 127k	72	1.8	2	7	62	2.9	6	7	1	62	62	1
Prod-2	6.1% of 127k	84	1.1	2	3	64	3.8	8	5	1	64	64	1
DR-1	6.6% of 127k	128	1.3	2	17	28	4.8	13	9	1	28	28	1
DR-2	9.5% of 127k	182	1	2	27	41	6.2	14	20	2	40.5	41	2
TOTALS		**466**	**1.3**	**2**	**54**	**195**	**4.4**	**14**	**41**	**5**	**48.6**	**64**	**5**

- Hanging zones are identified, these are most likely historical zones where the device has moved or has been decommissioned
- Alerts are provided for zones with too many members and these should also be examined

Domain	Port	Speed	Status	Type	World Wide Name	Alias Name	Desctiption	Avg Perf	Max Perf	Port ID
4	0	2 Gbps	Online	F-Port	10:00:00:00:c9:2b:50:a5	ETS_FILE01_2	EMULEX	37.6 MB/s	69 MB/s	040000
4	1	2 Gbps	Online	F-Port	10:00:00:00:c9:2d:03:71	NOT ZONED	EMULEX	0 MB/s	0 MB/s	040100
4	2	2 Gbps	Online	F-Port	10:00:00:00:c9:2b:9d:ac	ETS_BOOTP01	EMULEX	22.6 MB/s	65 MB/s	040200
4	3	2 Gbps	Online	F-Port	10:00:00:e0:02:02:88:24	IT_TAPE	CROSSROADS	25.4 MB/s	68 MB/s	040300
4	4	2 Gbps	Online	E-Port	10:00:00:60:69:51:73:1b	To CORE15	ISL	14.9 MB/s	44 MB/s	
4	5	2 Gbps	Online	E-Port	Trunk Slave		ISL	14.8 MB/s	44 MB/s	

- Devices that you forget to zone will not be able to communicate

© Copyright 2019 Dell Inc.

Report Use Examples

Switch Setting Consistency

- Ensure consistency of management settings
- Easily identify configuration anomalies
- Check monitor and alert settings

HEALTH STATUS AND MONITORING

Switch Name	Switch State		Power Supplies			Fans			Temp Sensors			Errors		SNMP		SysLog	
	Marg	OK	Bad	Marg	OK	Bad	Marg	Ok	Low	OK	High	Lvl1	Lvl2	No	Yes	No	Yes
SHRF001	0	1	0	0	2	0	0	4	1	3	0	0	0	0	1	0	1
SHRF002	0	1	0	0	2	0	0	4	1	3	0	0	0	1	0	0	1
SHRF003	0	1	0	0	2	0	0	4	1	3	0	0	0	0	1	1	0
SHRF004	0	1	0	0	2	0	0	4	1	3	0	0	0	0	1	1	0
TOTALS	**0**	**2**	**0**	**0**	**4**	**0**	**0**	**8**	**2**	**6**	**0**	**0**	**0**	**1**	**3**	**2**	**2**

SHRF001 IN FABRIC FP_1Z UNIX

Switch Name	SHRF001	Brocade Model	DCX 8510	FOS Version	7.3.0
IP Address	10.125.233.12	WWN	10:00:00:60:69:81:3f:1a	FOS Build Date	N/A
FC IP address	0.0.0.0	Domain ID	70	Port Count	64
Vendor	Hitachi Data Systems	Serial Number	FS010014205	Unused Ports	8
Switch Status	HEALTHY/OK	MAC Address	N/A	ISL Ports	5
Active Config	ON (ZoneConfig)	Ethernet Port	AUTO	Switch Speed	2G
Zone DB Use	8.1 % of 127 kbytes	Switch Date	N/A	Switch State	Online
POST	Enabled	QuickLoop	Disabled	Switch Mode	Native
Telnet Timeout	0 minutes	Fabric Watch	Alarms are disabled	Role in Fabric	Subordinate

MONITORING AND ALERTING

FABRIC WATCH	SYSLOG SETTINGS						
Status	Syslog Status	IP Address 1	IP Address 2	IP Address 3	IP Address 4	IP Address 5	IP Address 6
disabled	Not In Use	N/A	N/A	N/A	N/A	N/A	N/A

SNMP SETTINGS						
Switch Description		Switch Location			Contact Information	
FibreChannelSwitch.		EndUserPremise.			FieldSupport.	
Community Strings :	SecretC0de(rw)	OrigEquipMfr(rw)	private(rw)	public(ro)	common(ro)	FibreChannel(ro)
Access Control List :	Not Configured	Not Configured	Not Configured	Not Configured	Not Configured	Not Configured

© Copyright 2019 Dell Inc.

Report Use Examples

Fan-Out-Ratios and Potential Oversubscription

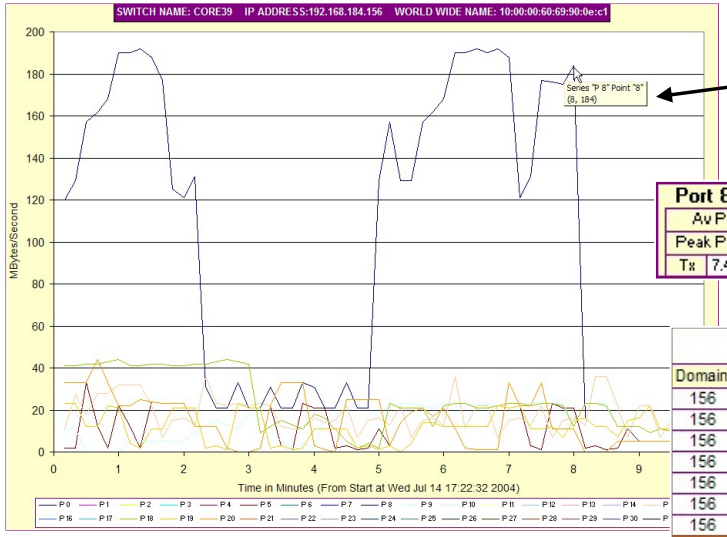
PORT USE														
	Port Use						Fan Out Ratios			Port Long Distance Modes				
Fabric Name	Disk	Tape	Host	ISL	Free	Total	Host:Disk	Port:ISL	Device:ISL	10km	25km	50km	100km	Auto
Prod-1	6	11	48	28	83	176	8:1	5.29:1	1.32:1	176	0	0	0	0
Prod-2	2	18	62	32	78	192	31:1	5:1	1.56:1	192	0	0	0	0
DR-1	28	0	91	42	79	240	3.25:1	4.71:1	1.83:1	240	0	0	0	0
DR-2	30	5	101	54	66	256	3.37:1	3.74:1	1.52:1	256	0	0	0	0
TOTALS	**66**	**34**	**302**	**156**	**306**	**864**	**4.58:1**			**864**	**0**	**0**	**0**	**0**

- High Host to Disk ratios implies that the disk port may be oversubscribed
  - Check the traffic pattern on the disk ports
  - Use Fabric Watch to monitor the buffer credits alerts on that port
  - Check the disk vendors recommended fan-out-ratio
- High Device to ISL ratios may be indicative of a poor design or a higher potential for congestion

© Copyright 2019 Dell Inc.

Report Use Examples

High levels of Traffic and Unusual Spikes



Mouse over the data to display the port number

Identify the device from the port details page

Port 8	dmx800_1d1 EMC Symmetrix [98] EMC SYMMETRIX 000187900465 SAF-17b EMUL B61F0000 0F25FD10																							
Av Perf	96.8MB/s	Port WWN	50:06:04:8a:cc:c8:8c:70		Speed	2 Gbps		Port ID	9c1300		Media	ShortWave		SFP Type	IBM									
Peak Perf	192 MB/s	NodeWWN	50:06:04:8a:cc:c8:8c:70		Type	F-Port		Status	Online		LD level	L0		Bound	SCSCI									
Tx	7.4m	Rx	7.4m	Ecln	0	crc	0	Shrt	0	Lng	0	EOF	0	Eout	9	Sync	0	Link	0	C3D	0	Lsig	0	Rjct	0	Bsy	0

PORT MAP FOR ALL SWITCHES IN FABRIC ETS-FABRIC-B (Table Of Contents)

Domain	Port	Speed	Status	Type	World Wide Name	Alias Name	Desctiption	Avg Perf	Max Perf	Port ID
156	0	2 Gbps	No_Light							
156	1	2 Gbps	No_Light							
156	2	2 Gbps	No_Light							
156	3	2 Gbps	No_Light							
156	4	1 Gbps	Online	F-Port	21:00:00:d0:b2:00:42:40	xiotech_1	XIOTECH	18.2 MB/s	36 MB/s	9c0f00
156	5	2 Gbps	Online	L-Port	21:00:00:04:cf:d5:35:7a	demotestalias	SEAGATE	10.2 MB/s	33 MB/s	9c05cd
156	6	2 Gbps	In_Sync							
156	7	2 Gbps	Online	L-Port	21:00:00:20:37:d9:78:37	NOT ZONED	SEAGATE	0 MB/s	0 MB/s	9c07cd
156	8	2 Gbps	Online	F-Port	50:06:04:8a:cc:c8:8c:60	dmx800_1c1	EMC	96.8 MB/s	192 MB/s	9c0800
156	9	2 Gbps	Online	L-Port	21:00:00:20:37:c8:7d:e6	euro_1_10bwwn	SEAGATE	12.4 MB/s	23 MB/s	9c09d6

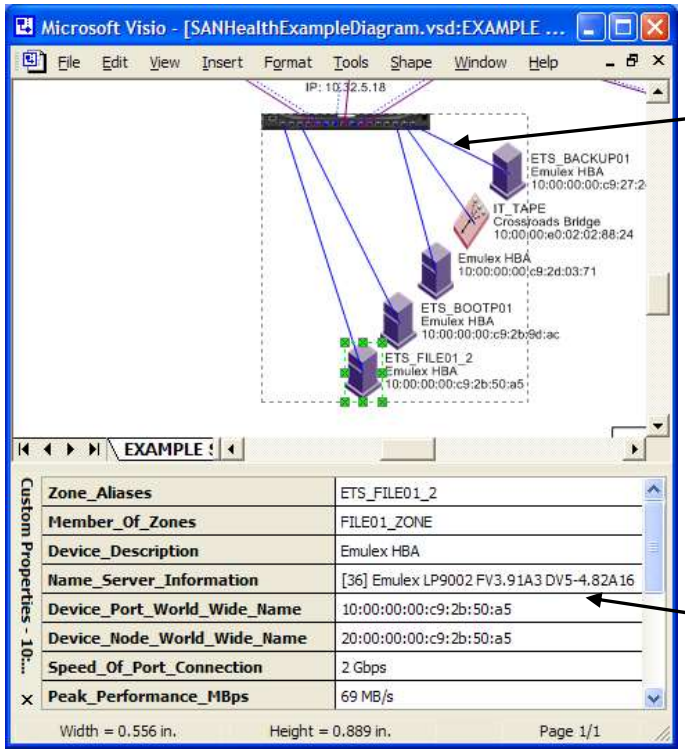
May be normal, most commonly seen on ISLs and target ports

Use the Port Map to identify the traffic partner devices

© Copyright 2019 Dell Inc.

Diagram use Case Examples

Finding Embedded Data Within Visio Icons



Color coded connectors that represent the link's bandwidth

- Microsoft Visio based topology diagram
- Point in time accurate diagram
- User selectable device text

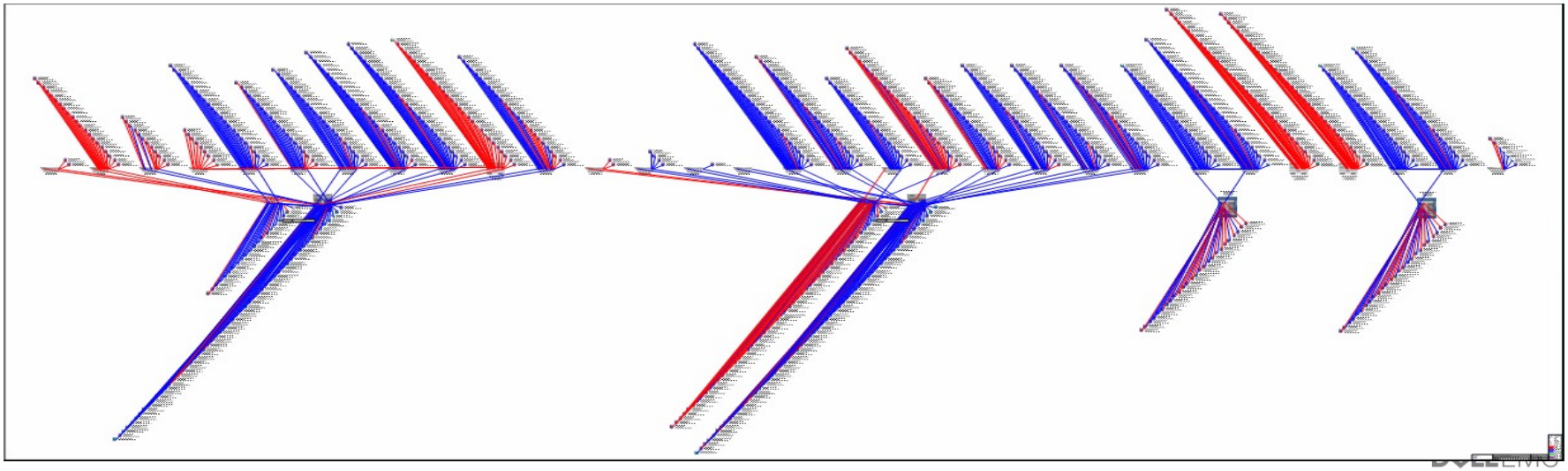
Custom Properties Window displays the attributes of every component in the diagram

© Copyright 2019 Dell Inc.

Diagram use Examples

Migration Planning

A point in time snapshot of the environment assists when planning a migration
Additional snapshots during the migration are useful milestone or documentation checkpoints

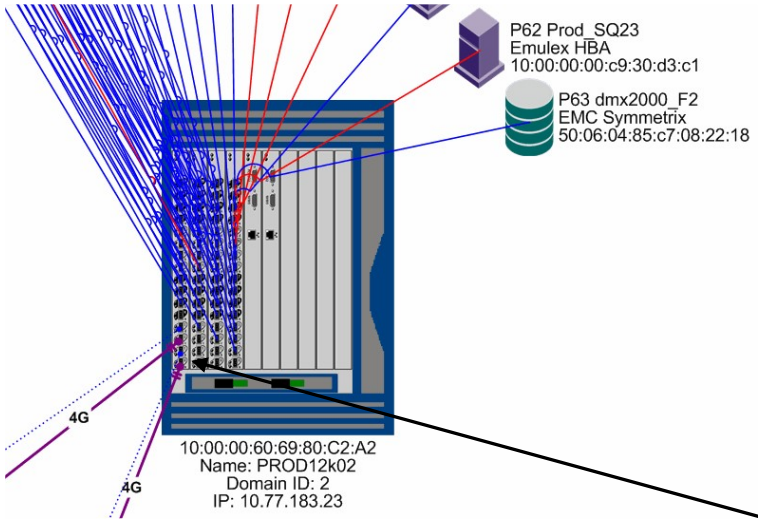


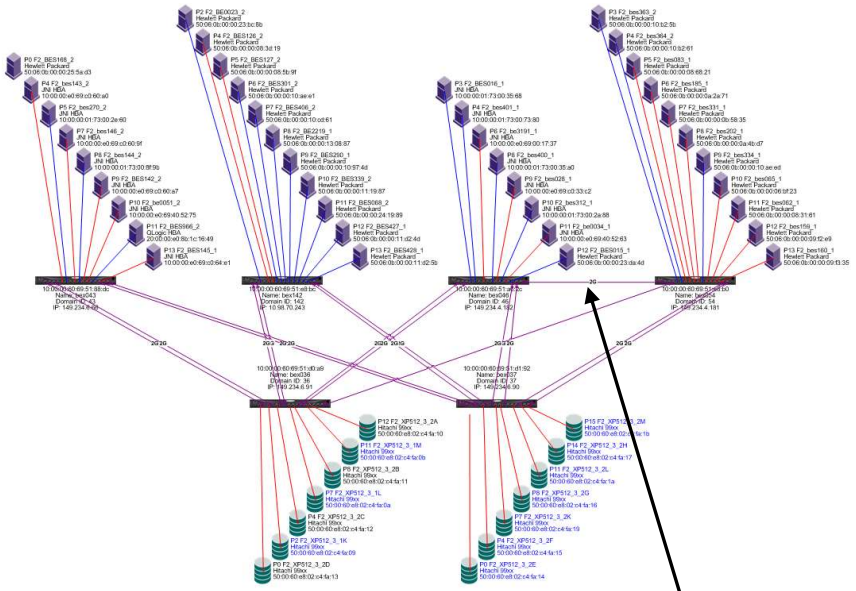
© Copyright 2019 Dell Inc.

Diagram Use Examples

Physical Configuration Review

- Problems are sometimes only obvious when you look at a diagram





Poorly configured ISL placement may be easier to see on a diagram

Multiple ISLs going to a single blade may not be by-design

© Copyright 2019 Dell Inc.

DELL EMC