

Pulse2011



After TPC is installed, configured, agents deployed and probes executed....

Ten things for the TPC-SE Administrator to do to make TPC more valuable. (2011)

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BIO

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- ❑ 8 years with Tivoli, first 4 as a Tivoli Storage Systems Engineer
- ❑ Previously worked for Alacritech, Caw Networks, EMC, and Auspex
- ❑ Also spent 13 years at AT&T/Bell Labs as a Systems Manager/Administrator/Programmer
- ❑ Interests include: antique swords, vintage guitars, and classic motorcycles



First of all...

Nothing is more important than the application of

Common Sense!



The Top 10 List

1. Use Configure Devices to verify everything is running as expected within TPC.
2. Verify discovery, probes, scans and quotas are set to run regularly for all managed devices.
3. Set key system-wide thresholds:
 - Disk
 - Fabric
 - Data
4. Identify and define additional thresholds and reports to support two or three “loved ones.”
5. Gather performance baselines.
6. Regularly review the incoming alerts. For alerts occurring frequently – is there a problem or does the threshold need revising?
7. Configure automatic Snapshots (then explore Change History).
8. Test-drive Data Path Explorer, identify potential bottlenecks, look for puzzling paths (try this for your “loved ones” first).
9. Create a volume report filtered on “volume utilization.”
10. Use a thoughtful naming convention for MDGs/MDisks/VDisks/Volumes/Operating System Disk names.





1. Use the Configuration Utility to verify everything is running as expected within TPC

The screenshot shows the IBM TotalStorage Productivity Center Configuration Utility interface. The 'Services' tab is selected in the top navigation bar. The left-hand 'Navigation Tree' lists various management areas, with 'Configuration Utility' highlighted. The main content area displays the status of several components:

- Data Server:** A table with columns for Server, Port, State, Start Time, and Database. The 'State' column shows 'Up' with a green square icon.
- Device Server:** A table with columns for Server, Port, State, Start Time, and Database. The 'State' column shows 'Up' with a green square icon.
- Data Agents:** A table with columns for Agent, IP Address, State, Manufacturer, CPU Architecture, and OS Type. The 'State' column shows 'Up' for most agents, but one agent (odcvm156) is marked as 'Need to upgrade agent software' with a yellow triangle icon. A blue arrow points to this agent.

Buttons for 'Show Data Server Details', 'Show Device Server Details', and 'Show Data Agents Details' are present. Below the Data Agents table are 'Check' and 'Enable' buttons. A summary line at the bottom indicates: 'CIM Agents - 7 total (connection status: 7 successful, 0 unknown, 0 timeout)'.





1. Use the Configuration Utility to verify everything is running as expected within TPC

Navigation Tree

- + Administrative Services
- IBM TotalStorage Productivity
 - Configuration Utility**
 - + Rollup Reports
 - + My Reports
 - + Topology
 - + Monitoring
 - + Analytics
 - + Alerting
 - + External Tools
- + Data Manager
- + Data Manager for Databases
- + Data Manager for Chargeback
- + Disk Manager
- + Fabric Manager
- + Tape Manager
- + Element Manager

+ **Device Server - ODCVM168.wsclab.washington.ibm.com: 9550 is up**

+ **Data Agents - 5 total (4 up, 0 down, 0 unreachable)**

- **CIM Agents**

Service URL	Connection Status	Interoperability Namespace	Display Name	Description
http://9.82.39.161:5988	SUCCESS	/Interop	DS4K-161	
https://9.82.39.162:5989	SUCCESS	/root/ibm	DS6K-162	
https://9.82.39.192:5989	SUCCESS	/root/ibm	SVC-192	
http://9.82.39.240:5988	SUCCESS	/root/ibm	Tape-240	
http://9.82.39.194:5988	SUCCESS	/root/cimv2	Cisco-194	
http://9.82.39.173:5988	SUCCESS	/root/cimv2	Cisco-173	
http://9.82.39.169:5988	SUCCESS	/Interop	Brocade Cimom	

▶ CIM (Common Information Model) agents provide a standard interface to storage devices for storage management applications. The storage devices managed by CIM Agents include IBM TotalStorage Enterprise Storage Servers (ESS), storage area network (SAN) Volume Controllers, DS4000s, DS6000s, DS8000s, fibre channel switches, and tape libraries. SNIA (Storage Networking Industry Association) CTP (Conformance Testing Program) Certified CIM Agents are supported in most cases for storage hardware from other vendors.

▶ A CIMOM discovery job finds CIM Agents and the devices managed by the CIM Agents where credentials are set or security is disabled.

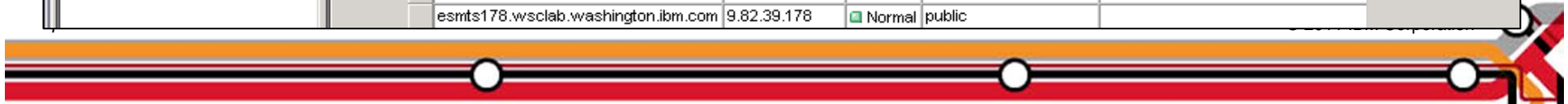
- **Inband Fabric Agents**

Agent	IP Address	State	OS and Version
odcbeta163.wsclab.washington.ibm.com	9.82.39.163	active	Windows 5.2:Service Pack 2
ODCBETA161.wsclab.washington.ibm.com	9.82.39.161	active	Windows 5.2:Service Pack 2

▶ Inband Fabric Agents collect information about the fabric and send this information to the Device server. They gather topology information (the switches and interconnections between switches) for the entire fabric as well as zoning information. To gather host-level and detailed HBA information from all the hosts on the fabric, an agent must reside on each of the hosts connected to the fabric.

- **Out of Band Fabric Agents**

Host Name	IP Address	State	SNMP Community	Advanced Brocade Discovery
esmts173.wsclab.washington.ibm.com	9.82.39.173	Normal	public	
esmts177.wsclab.washington.ibm.com	9.82.39.177	Normal	public	
esmts178.wsclab.washington.ibm.com	9.82.39.178	Normal	public	



1. Use the Configuration Utility to verify everything is running as expected within TPC

Navigation Tree

- Administrative Services
- IBM TotalStorage Productivity Center
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 - Monitoring
 - Analytics
 - Alerting
 - External Tools
- Data Manager
- Data Manager for Databases
- Data Manager for Chargeback
- Disk Manager
- Fabric Manager
- Tape Manager
- Element Manager

Services | Data Manager | **Disk Manager** | Fabric Manager | Tape Manager | Element Manager

Refresh | Launch TotalStorage Productivity Center Assistant

Storage Subsystems

Subsystem	Label	Type	Status	Enabled for Provisioning	Enabled for Performance
DS4400-FastT700-600A0B80000F390F000000004		DS4000	Normal	Yes	Yes
SVC-2145-Sandbox-IBM		SVC	Normal	Yes	Yes
DS6000-1750-13AB24A-IBM		DS6000	Normal	Yes	Yes
DS6000-1750-13AB2XA-IBM		DS6000	Prerequisites Not Met	Prerequisites Not Met	Prerequisites Not Met

Show Storage Subsystem Details | Show Storage Subsystem Asset Report | Storage Topology

- A CIM Agent managing storage subsystem needs to be added and a CIMOM discovery job needs to be run to discover storage subsystems. Information about running a CIMOM discovery job can be found in the CIMOM Discovery section.
- The prerequisite to enabling a storage subsystem for provisioning and performance monitoring is a probe job of the storage subsystem. Detailed information on probe jobs can be found on the Disk Manager tab in the Storage Subsystem Probes section.

Navigation Tree

- Administrative Services
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Services | Data Manager | Disk Manager | **Fabric Manager** | Tape Manager | Element Manager

Refresh | Launch TotalStorage Productivity Center Assistant

Fabrics

Fabric	Physical Fabric	State	VSAN State	Enabled for Zoning
VSAN0001	2001000DEC1900C1	Normal	Active	No
Null_VSAN	2014000DEC1900C1	Normal	Active	No
A_Side_With_Qlogic	26A6000DEC0CE581	Normal	Active	No
B_Side_With_Brocade	26C2000DEC1900C1	Normal	Active	Yes
3000000DEC009880	3000000DEC009880	Normal		No
3000000DEC0CE580	3000000DEC0CE580	Normal		No
3000000DEC1900C0	3000000DEC1900C0	Normal		No

Zoning Configuration | Show SAN Assets (All) System Report | Fabrics Topology

This is the only Fabric with a fabric agent.
Current Brocade Cimom also results in "Enabled for Zoning."

2. Verify discovery, probes, scans and quotas are set to run regularly for all managed devices

Navigation Tree

- Administrative Services
 - Services
 - Data Sources
 - Discovery**
 - CIMOM
 - Out of Band Fabric
 - Netware Filer
 - Windows Domain, NAS, and SAN FS
 - VMWare VI Data Source
- Configuration
- IBM TotalStorage Productivity Center
 - Configuration Utility
 - Rollup Reports
 - My Reports
 - Topology
 - Monitoring**
 - Probes**
 - TPC Server Probes
 - Analytics
 - Alerting
 - External Tools
- Data Manager
 - Monitoring
 - Groups
 - Pings
 - Scans**
 - Profiles
 - Alerting
 - Policy Management
 - Quotas**
 - Network Appliance Quotas

Edit Probe student0.DS6000-7412

Creator: student0 Name: DS6000-7412
Description:

What to PROBE **When to Run** **Alert**

How often to run

- Run Now
- Run Once at:
March 11, 2008 12:30 AM
- Run Repeatedly
Beginning at: March 11, 2008 12:30 AM
 - Repeat Every 1 DAY(S)
 - Run on these days:
 Sunday Monday Tuesday Wednesday Thursday Friday Saturday

How to handle time zones

PROBE

- Local time in each time zone
- Same Global time across all time zones

Specify which time zone to use for Global processing:

- Use the time zone that the server runs in
- Use this time zone: (GMT-5:00) America/New_York US/Eastern

3. Set key system-wide thresholds: Data

- Start with these for Data

The screenshot shows the 'Edit Alert student0.Grown Disk Defects GT 10' configuration page. On the left, the 'Navigation Tree' is expanded to 'Alerting' > 'Computer Alerts', with 'student0.Grown Disk Defects GT 10' selected. The main area shows the alert configuration:

- Alert:** Computers
- Triggering-Condition:** Condition: Grown Disk Defects Exceed, Value: 10, Value Units: [dropdown]
- Warning:** Warning

A dropdown menu is open under 'Condition', listing various conditions, with 'Grown Disk Defects Exceed' selected.

This screenshot shows the same alert configuration page, but with the 'Available' and 'Current Selections' sections visible:

- Alert:** Computers
- Available:** Computer Groups, Computers, Clusters
- Current Selections:** Computers, All computers

The 'Alert' field and the 'Current Selections' list are circled in red.



3. Set key system-wide thresholds: Disk

- Start with these for Disk

The threshold naming convention used in these slides: "Disk Util GT95 90" means:

- The threshold is on the parameter Disk Utilization Percentage.
- The Critical Stress threshold is 95% or greater.
- The Warning Stress level is 90 - 94%.

Tailor the alert suppression options to an "attention getting" level.

- The 5 circled examples above are set pretty high to minimize alerts.
- As you gain experience with your environment, you may want to adjust them. Set them to "attention getting" levels.
- Not all thresholds are supported by all devices. The supported devices initially are listed in "Storage Subsystems" tab -> "Available" column.
- Note: Write-cache Delay Percent is set by default for DS6K/DS8K/SVCs (10%, 3%).
- Note: Port Send/Receive Bandwidth % Thresholds set by default for SVCs (85%, 75%).



3. Set key system-wide thresholds: Fabric

- Start with these for Fabric

Edit Switch Alerts student0.Port Receive Bandwidth GT85 75

Creator: student0 Name: Port Receive Bandwidth GT85 75

Description:

Enabled

Alert **Switches**

Triggering-Condition

Condition: Port Receive Bandwidth Percentage Threshold Critical Stress: 85 Warning Stress: 75

Alert Suppression

The Alert can be suppressed to avoid generating too many Alert log entries or too many actions, when the violation reports.

- Trigger alerts for both critical and warning
- Trigger alerts for critical conditions only
- Trigger no alerts

To suppress the alert if the triggering condition is violated repeatedly in short succession for the same un...

Do not suppress repeating alerts

Port Send/Receive Bandwidth % thresholds are set by default to 85% and 75%. You may want to adjust "Alert Suppression" to "attention getting" levels.

Alert **Switches**

Available:

- + Switches

Current Selections:

- Switches
 - Cisco-9216-173
 - Cisco-9216i-194



4. Identify and define additional thresholds and reports to support two or three “loved ones”

- Define a “My Reports” for volume utilization.

The screenshot displays the IBM Tivoli Storage Productivity Center Reporting console. On the left is a navigation tree with categories like Administrative Services, Reporting, and Monitoring. Under Reporting, 'My Reports' is expanded to show 'student0's Reports', where 'DDCCL163 DSBK Volume Util' is selected and circled in red. The main panel shows 'Report Filter Specifications' with options for 'Display latest performance data' and date/time pickers. Below this are 'Available Columns' and 'Included Columns' lists. 'Volume Utilization' is circled in red in the 'Included Columns' list. An 'Edit Filter' dialog box is open, showing a filter rule: 'Volume LIKE "DS6A_163"', with the entire rule area circled in red. A yellow callout box points to the 'Filter...' button and the 'Volume Utilization' column, containing the text: 'A thoughtful naming convention enhances the functionality of filtering.'

4. Identify and define additional thresholds and reports to support two or three “loved ones”

- Define a “My Reports” for volume utilization.

The screenshot displays the 'Volumes' section of the Storage Subsystem Performance tool. It features a table with columns for Subsystem, Volume, Time, Volume Utilization, Total I/O Rate (overall), and Overall Response Time. Two volumes are listed: BKUP_DS6A_163K (ID:1001) and SHW_DS6A_163M (ID:1000), both showing 39.39% utilization and 105.5 ops/s. A 'Select Charting Option' dialog is open, with 'Volume Utilization' selected under 'Select Metric(s)'. A 'History Chart' window is also open, showing a line graph of volume utilization over time (Dec 6 to Dec 7, 2009). The chart shows two data series: 'Volume Utilization-BKUP_DS6A_163K (ID:1001) (DS6000-1750-13AB24A-IBM)' and 'Volume Utilization-SHW_DS6A_163M (ID:1000) (DS6000-1750-13AB24A-IBM)'. A yellow callout box points to the chart with the text 'Evaluate for trends and changes.'

Subsystem	Volume	Time	Volume Utilization	Total I/O Rate (overall)	Overall Response Time
DS6000-1750-13AB24A-IBM	BKUP_DS6A_163K (ID:1001)	Dec 8, 2009 3:55:24 PM	39.34 %	105.5 ops/s	6.1 ms/op
DS6000-1750-13AB24A-IBM	SHW_DS6A_163M (ID:1000)	Dec 8, 2009 3:55:24 PM	39.39 %	105.43 ops/s	6.2 ms/op

4. Identify and define additional thresholds and reports to support two or three “loved ones”

- Set a threshold for filesystem freespace less than 10 percent

The screenshot shows the IBM TPC configuration interface for an alert. The left pane shows a navigation tree with 'Alerting' > 'Filesystem Alerts' > 'student0.Loved ones FS Freespace LT 10' selected. The main pane shows the configuration for this alert, including the 'Triggering-Condition' set to 'Filesystem Freespace Less Than' with a value of '10' and units of 'Percent'. A yellow callout box points to the 'Enabled' checkbox, which is checked. Below the configuration, a 'Current Selections' pane shows the alert is applied to a computer named 'ODCBETA161.wsclab.washington.ibm.com'. At the bottom, a triggered alert message is shown, with the text circled in red: 'ALR0009W: The free space on file system V:/ on host odcbeta161.wsclab.washington.ibm.com has fallen below the threshold value of 10%. The free space is 75.86MB or 1.48% of the file system capacity.'

Free Space 75.86 MB
Trigger Alert When < 10%

Alert Creator student0
Alert Name Loved ones FS Freespace LT 10

Alert Text ALR0009W: The free space on file system V:/ on host odcbeta161.wsclab.washington.ibm.com has fallen below the threshold value of 10%. The free space is 75.86MB or 1.48% of the file system capacity.

5. Gather performance baselines

➤ 15 minutes is a good starting point which balances records stored, records reported and granularity. It works well for many customers.

➤ Change it to suit your needs.

Storage Subsystems | Sampling and Scheduling | Alert

Available subsystems: [Empty]

Selected subsystem: DS6000-1750-6847

Storage Subsystems | Sampling and Scheduling | Alert

Sampling

Interval length:
Gathered performance data will represent averages over this interval.

Gather data every 15 minutes

Advanced...

Duration:

Continue gathering data for 167 Hours

Continue indefinitely

Scheduling

Begin immediately
Data Collection will begin as soon as you save this monitoring profile.

Schedule to begin later
Specify exactly when data collection should start.

January 1, 2008 12:01 AM

This is a recurring task

Recurrence interval: Weekly

➤ 167 = (7 days X 24 hours) - 1

➤ These screenshots show setting up a performance monitor for a DS6000.

➤ Set up monitors for all relevant storage devices.

➤ Also set up performance monitors for your SAN Switches.



5. Gather performance baselines

- This area of the logfile shows you the default thresholds and the thresholds you have set that apply to this monitor. “-1” indicates blank.
- If you have changed or created new thresholds, the performance monitor must be restarted for them to be included.

```
Search for: [ ] [ ] [ ]
\\NTPC\device\log\msg.276524.35.1750.6847412.log
The performance monitor for device DS6000-1750-6847412-IBM (1750.6847412)
Monitor Policy: name="DS6000-7412", creator="student0", description=""
Monitor Policy: retention period: sample data=365 days, hourly data=365 days, daily data=
Monitor Policy: interval length=300 secs, frequency=300 secs, duration=3 hours.
Threshold Policy: name="Default Threshold Policy for DS6000", creator="System", description="Current default performance thresh
Threshold Policy: retention period: exception data=14 days.
Threshold Policy: threshold name=Total I/O Rate Threshold , enabled=no , boundaries=-1,-1,-1,-1 ops/s.
Threshold Policy: threshold name=Total Data Rate Threshold , enabled=no , boundaries=-1,-1,-1,-1 MB/s.
Threshold Policy: threshold name=Write-cache Delay Percentage Threshold, enabled=yes, boundaries=10,5,-1,-1 %.
Threshold Policy: threshold name=Cache Holding Time Threshold , enabled=yes, boundaries=30,60,-1,-1 s.
Threshold Policy: threshold name=Disk Utilization Percentage Threshold , enabled=yes, boundaries=95,90,-1,-1 %.
Threshold Policy: threshold name=Total Port IO Rate Threshold , enabled=no , boundaries=-1,-1,-1,-1 ops/s.
Threshold Policy: threshold name=Total Port Data Rate Threshold , enabled=no , boundaries=160,100,-1,-1 MB/s.
Threshold Policy: threshold name=Overall Port Response Time Threshold , enabled=yes, boundaries=20,10,-1,-1 ms/op.
Successfully retrieved the configuration data for the storage subsystem. Found 2 pools, 2 controllers, 0 device adapters, 8 ports.
Performance data was collected and processed successfully. 102 performance data records were inserted into the database.
Performance data was collected and processed successfully. 102 performance data records were inserted into the database.
Performance data was collected and processed successfully. 102 performance data records were inserted into the database.
Performance data was collected and processed successfully. 102 performance data records were inserted into the database.
Performance data was collected and processed successfully. 102 performance data records were inserted into the database.
Performance data was collected and processed successfully. 204 performance data records were inserted into the database.
Performance data was collected and processed successfully. 102 performance data records were inserted into the database.
Performance data was collected and processed successfully. 102 performance data records were inserted into the database.
Performance data was collected and processed successfully. 102 performance data records were inserted into the database.
```

- This is what you want to see “... records were inserted into the database.” . Note: this sample with 204 records includes records for both the hourly summary and 5 minute records.



Stopping a running Performance Monitor

IBM Tivoli Storage Productivity Center: ODCVM192152.odclass.ibm.com -- Job Management

File View Connection Preferences Window Help

Element Management

Navigation Tree

- Administrative Services
- IBM Tivoli Storage Productivity Center
 - Configuration Utility
 - Configure Devices
 - Job Management**
- Reporting
- Topology
- Monitoring
- Storage Resource Group Management
- Analytics
- Alerting
- Data Manager
 - Data Manager for Databases
 - Data Manager for Chargeback
- Disk Manager
 - Storage Subsystems
 - Storage Optimizer
 - SAN Planner
 - Monitoring
 - Groups
 - Jobs
 - Subsystem Performance Monitor
 - student0.DS4500
 - student0.IBM Storage
 - student0.Storwize V7000
 - Alerting
 - Profile Management
 - Reporting
- Fabric Manager
- Tape Manager
- Element Manager
- Replication Manager

Filters

Entity Type: Show All Entity Name: Show All

Schedules

Creator	Name	Job Type	Last Run Finished	Last Run ...	Status	On Demand
TPCUser	Default Dp Scan	Scan				
student0	DS6000 Optimization - te...	Storage Optimizer	Jan 14, 2011 11:29:3...		Success	On Demand
student0	162	Storage Resource Agent ...	Jan 12, 2011 3:25:37...		Success	On Demand
student0	IBM Storage	Subsystem Performance...	Feb 3, 2011 6:15:41 ...		Success	On Demand
student0	DS4500	Subsystem Performance...	Feb 3, 2011 6:00:01 ...		Success	On Demand
student0	Storwize V7000	Subsystem Performance...			Running	On Demand
student0	All switches	Switch Performance Mon...	Feb 3, 2011 6:00:06 ...		Success	On Demand
student0	TPC_9_82_39 environm...	TPC Server Probes	Jan 14, 2010 1:51:22...		Success	On Demand
TPCUser	VMware VI Data Source	VMware VI Data Source ...	Feb 23, 2010 12:23:4...		Success	On Demand
TPCUser	Windows Domain, NAS, ...	Discovery Schedule			Failed	On Demand
TPCUser	Default Fabric Jobs	Default Fabric Jobs				
		Zone Control Job				

Jobs for Selected Schedule

View Log File(s)

Run	Computer	Device	Status
1 - Feb 10, 2011 9:14:44 AM EST			
2 - Feb 10, 2011 9:18:13 AM EST			

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➤ If you need to stop a running monitor, perhaps because you changed thresholds...

➤ On the "Job Management" console, select the performance monitor job

➤ From the pull-down, select "Stop Now"



6. Regularly review the incoming alerts. For alerts occurring frequently – is there a problem or does the threshold need revising?

- What to do with these?
- System Administration Hint:
 - Delete the alerts when you are finished with them.
 - By default, alerts are retained in the database repository for a period of 90 days. It is recommended to adjust this setting to the lowest value possible that complies with your daily usage and management practices of TotalStorage Productivity Center.

Navigation Tree

- [-] Administrative Services
- [-] IBM TotalStorage Productivity Center
 - [-] Configuration Utility
 - [-] Rollup Reports
 - [-] My Reports
 - [-] Topology
 - [-] Monitoring
 - [-] Analytics
 - [-] Alerting
 - [-] Alert Log
 - [-] All
 - [-] Alerts Directed to student
 - [-] Storage Subsystem
 - [-] Computer
 - [-] Disk
 - [-] Filesystem
 - [-] Directory
 - [-] User
 - [-] OS User Group
 - [-] Fabric
 - [-] Switch
 - [-] Endpoint Device
 - [-] External
 - [-] Tape Library
 - [-] Configuration Analysis
 - [-] Hypervisor
 - [-] External Tools
 - [-] Data Manager
 - [-] Data Manager for Databases
 - [-] Data Manager for Chargeback
 - [-] Disk Manager

Clear
Delete
Clear All
Delete All
Refresh

	Storage Subsystem	Computer	Alert Type ▲	First Triggered	Alert Name
	DS6000-1750-6847412-IBM	ODCV168.ws	NVS Full Percentage Threshold	Mar 29, 2008 3:50:14 PM	wWrite-cache Delay Prcnt GT 10 5
	DS6000-1750-6847412-IBM	ODCV168.ws	NVS Full Percentage Threshold	Apr 7, 2008 5:55:17 PM	wWrite-cache Delay Prcnt GT 10 5
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	NVS Full Percentage Threshold	Apr 11, 2008 6:20:14 PM	wWrite-cache Delay Prcnt GT 10 5
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 3:40:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 3:55:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 4:40:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 5:05:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 6:10:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 10, 2008 3:40:15 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 12, 2008 3:40:15 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:40:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:40:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:45:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:45:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:55:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:55:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 4:30:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 4:40:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 4:45:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 4:45:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCV168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 5:00:14 PM	SVC Backend RT GT 50 25



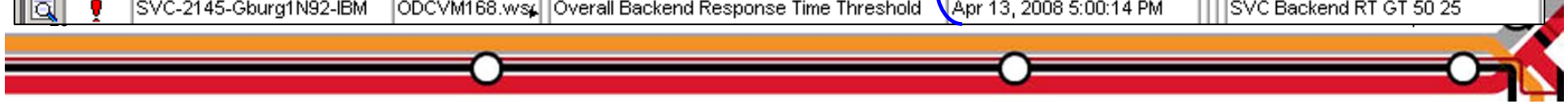
6. Regularly review the incoming alerts. For alerts occurring frequently – is there a problem or does the threshold need revising?

- What to do with these? Remember, focus on groupings or regularly occurring alerts, not on isolated alerts.

	Storage Subsystem	Computer	Alert Type ▲	First Triggered	Alert Name
	DS6000-1750-6847412-IBM	ODCVM168.ws	NVS Full Percentage Threshold	Mar 29, 2008 3:50:14 PM	Write-cache Delay Prcnt GT 10 5
	DS6000-1750-6847412-IBM	ODCVM168.ws	NVS Full Percentage Threshold	Apr 7, 2008 5:55:17 PM	Write-cache Delay Prcnt GT 10 5
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	NVS Full Percentage Threshold	Apr 11, 2008 6:20:14 PM	Write-cache Delay Prcnt GT 10 5
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 3:40:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 3:55:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 4:40:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 5:05:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 9, 2008 6:10:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 10, 2008 3:40:15 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 12, 2008 3:40:15 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:40:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:40:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:45:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:45:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:55:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 3:55:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 4:30:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 4:40:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 4:45:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 4:45:13 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 5:00:14 PM	SVC Backend RT GT 50 25
	SVC-2145-Gburg1N92-IBM	ODCVM168.ws	Overall Backend Response Time Threshold	Apr 13, 2008 5:00:14 PM	SVC Backend RT GT 50 25

➤ Random dates, probably no reason for concern. Click on the magnifying glass to see details.

➤ This is a grouping and therefore worth investigation.
 ➤ A fast and effective way to look at many threshold (constraint) violations is to use the “Constraints Violations” report.
 ➤ It can be found in two places: Disk -> Reporting and Fabric -> Reporting



6. Regularly review the incoming alerts... use the Constraint Violation Report

Navigation Tree:

- Administrative Services
- IBM Tivoli Storage Productivity Cent
- Data Manager
- Data Manager for Databases
- Data Manager for Chargeback
- Disk Manager
 - Storage Subsystems
 - Storage Optimizer
 - SAN Planner
 - Monitoring
 - Alerting
 - Profile Management
 - Reporting
 - Groups
 - Storage Subsystems
 - Storage Subsystem Performar
 - By Storage Subsystem
 - By Controller
 - By Host Group
 - By Managed Disk
 - By Port
 - Constraint Violations**

Constraint Violations Report (Summary):

Subsystem	Disk Utilization Percentage Threshold	Port P
SVC-2145-Sandbox-IBM		0
DS6000-1750-13AB24A-IBM	2,794	
DS6000-1750-13AB24A-IBM		2

Constraint Violation Details (DS6000-1750-13AB24A-IBM):

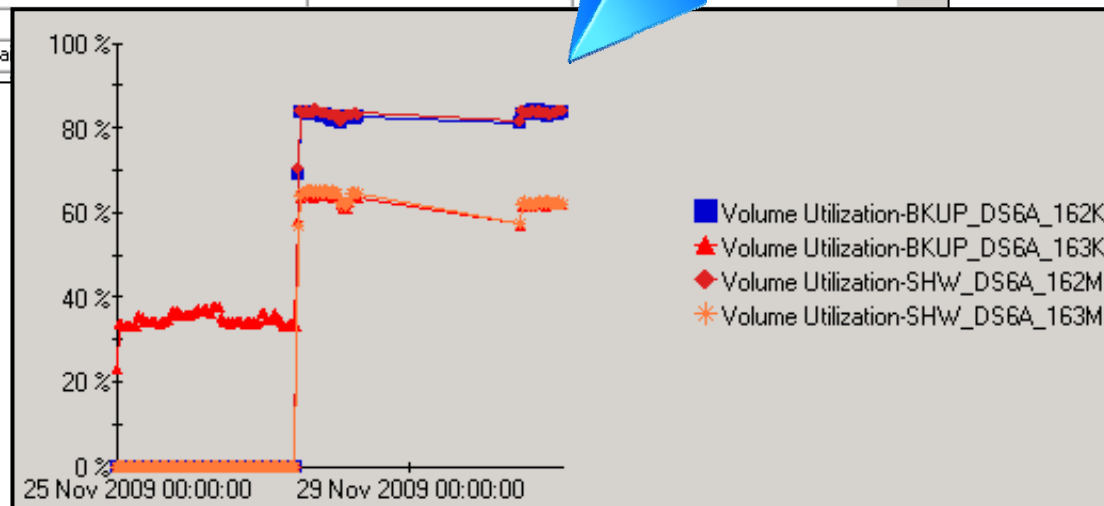
Time	Component	Metric	Measured Value	Type
Nov 27, 2009 3:40:32 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.51	Critical Stress
Nov 27, 2009 3:45:24 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.11	Critical Stress
Nov 27, 2009 3:50:13 PM	1750.13AB24A-A0	Disk Utilization Percentage	94.92	Critical Stress
Nov 27, 2009 3:55:18 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.51	Critical Stress
Nov 27, 2009 4:00:43 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.21	Critical Stress
Nov 27, 2009 4:05:15 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.1	Critical Stress
Nov 27, 2009 4:10:26 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.21	Critical Stress
Nov 27, 2009 4:15:17 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.42	Critical Stress
Nov 27, 2009 4:20:26 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.17	Critical Stress
Nov 27, 2009 4:25:15 PM	1750.13AB24A-A0	Disk Utilization Percentage	95.06	Critical Stress

6. Regularly review the incoming alerts... use the Constraint Violation Report

Selection | Constraint Violations | DS6000-1750-13AB24A-IBM | Affected Volumes Selection | **Affected Volumes: 1750.13AB24A-A0**

Storage Subsystem Performance: By Volume

Subsystem	Volume	Affected Hosts	Time	Interval	Volume Utilization
DS6000-1750-13AB24A-IBM	BKUP_DS6A_162K (ID:1005)	ODDBETA162	Nov 27, 2009 4:41:13 PM	273	84.46 %
DS6000-1750-13AB24A-IBM	SHW_DS6A_162M (ID:1006)	ODDBETA162	Nov 27, 2009 4:41:13 PM	273	83.55 %
DS6000-1750-13AB24A-IBM	BKUP_DS6A_163K (ID:1001)	odcc1163, ODCCL163.odcclass.ibm.com	Nov 27, 2009 4:41:13 PM	273	65.09 %
DS6000-1750-13AB24A-IBM	SHW_DS6A_163M (ID:1000)	odcc1163, ODCCL163.odcclass.ibm.com	Nov 27, 2009 4:41:13 PM	273	64.2 %
DS6000-1750-13AB24A-IBM	SVC_Class_Demo1 (ID:1004)		Nov 27, 2009 4:41:13 PM	273	0 %
DS6000-1750-13AB24A-IBM	WM_ESX_MDG6A_D2 (ID:1003)	Sandbox_SVC, SandboxSVC	Nov 27, 2009 4:41:13 PM	273	0 %
DS6000-1750-13AB24A-IBM	TPCR-1200-SVC170 (ID:1200)	Sandbox_SVC, SandboxSVC	Nov 27, 2009 4:41:13 PM		0 %
DS6000-1750-13AB24A-IBM	TPCR-1201-SVC170 (ID:1201)	Sandbox_SVC, SandboxSVC	Nov 27, 2009 4:41:13 PM		0 %
DS6000-1750-13AB24A-IBM	TPCR-1202-SVC170 (ID:1202)	Sandbox_SVC, SandboxSVC	Nov 27, 2009 4:41:13 PM		0 %
DS6000-1750-13AB24A-IBM	TPCR-1203-SVC170 (ID:1203)	Sandbox_SVC, SandboxSVC	Nov 27, 2009 4:41:13 PM		0 %
DS6000-1750-13AB24A-IBM	TPCR_ESX_B1abkup (ID:1212)		Nov 27, 2009 4:41:13 PM		0 %
DS6000-1750-13AB24A-IBM	TPCR_ESX_B4abkup (ID:1213)		Nov 27, 2009 4:41:13 PM		0 %
DS6000-1750-13AB24A-IBM	TPCR_ESX_B3abkup (ID:1214)		Nov 27, 2009 4:41:13 PM		0 %
DS6000-1750-13AB24A-IBM	TPCR_ESX_B2abkup (ID:1211)		Nov 27, 2009 4:41:13 PM		0 %
DS6000-1750-13AB24A-IBM	TPCR_Oracle_1800 (ID:1800)	odca	Nov 27, 2009 4:41:13 PM		0 %



7. Configure automatic Snapshots (then explore Configuration History)

- Set “Create snapshot every XX hours”
- Set “Delete snapshots older than XX days”

The screenshot shows a web-based configuration interface. On the left is a 'Navigation Tree' with a tree view containing the following items: Administrative Services (expanded), Services, Data Sources, Discovery, Configuration (expanded), Role-to-Group Mappings, License Keys, Alert Disposition, Log-File Retention, Quota and Constraint e-mail Address, Scan/Probe Agent Administration, Manual NAS/Netware Server Entry, Manage Element Manager, Agent Manager Registration, History Aggregator, Data Agent Upgrades, NetWare Tree Logins, Resource History Retention, Removed Resource Retention, Resource History Retention for Data, Removed Resource Retention for Data, Configuration History Settings (highlighted in blue), and IBM TotalStorage Productivity Center. The main panel is titled 'Configuration History Settings'. It contains two checked options: 'Create snapshot every 12 hours' and 'Delete snapshots older than 14 days', both of which are circled in red. Below these are the statistics: 'Total number of snapshots in database: 5' and 'Latest snapshot in database created at: Aug 3, 2007 10:35:32 AM' with an 'Update' button. There is a text input field for 'Title this snapshot (optional):' with a 'Create Snapshot Now' button to its right. At the bottom of the main panel is a 'Reset to defaults' button.

7. Configure automatic Snapshots (then explore Configuration History)

The screenshot displays the IBM Configuration Utility interface. On the left is a 'Navigation Tree' with the following structure:

- Administrative Services
- IBM TotalStorage Productivity Center
 - Configuration Utility
 - Rollup Reports
 - My Reports
 - Topology
 - Monitoring
 - Analytics
 - Configuration History**
 - SAN Planner
 - Configuration Analysis
 - Alerting
 - External Tools
 - Data Manager
 - Data Manager for Databases
 - Data Manager for Chargeback
 - Disk Manager
 - Fabric Manager
 - Tape Manager
 - Element Manager

The main area is titled 'Configuration History' and shows an 'Overview' tab. It contains four summary boxes:

- Fabrics:** 3 Fabrics, 4 Virtual Fabrics
- Computers:** 14 Computers, 7 Virtual Computers, 1 Hypervisor
- Switches:** 6 Switches, 15 Virtual Switches
- Storage:** 4 Subsystems, 1 Tape Library

Below these is a detailed 'Configuration History' window. It features a 'Time Range' slider from 7/30/07 to 4/15/08. The 'Snapshots in Range (5)' list includes:

- 7/30/07 11:46 AM (418 Changes) Disk unmapped ...
-
- 8/3/07 9:38 AM (12930 Changes) Normal Status ...** (circled in red)
- 8/3/07 10:09 AM (12806 Changes) Zone change o...
-
- Current Environment

There is a 'Hide Empty Snapshots' checkbox and an 'Apply' button (circled in red) at the bottom. The 'Displaying Now' section shows the selected range: From: 8/3/07 9:38 AM (12930 Changes) Normal Status ... To: 8/3/07 10:09 AM (12806 Changes) Zone change o...



7. Configure automatic Snapshots (then explore Configuration History)

Why is this disk no longer available to ODCBETA161?

It appears to have been removed from ODCBETA161!

Switch	Subsystem	Disk	Pool	Volume	FCPort	Connection	Alert	Zone	Model	Serial#	Capacity (GB)
...
				Group				▼ Label			
				ODCBETA163.wsclab....				Change Summary:			
				ODCBETA161.wsclab....				Operational Status	ok -> Removed		
				ODCBETA161.wsclab.... Disk 4				Capacity (GB)	500 ... 1007	5.0	5.0
				Extent Pool 1				Label	Disk 4 -> Removed		
				Extent Pool 2				Serial#	1007 -> Removed		
				SVC-2145-Gburg1N92...				Vendor	IBM -> Removed		

7. Configure automatic Snapshots (then explore Configuration History)

Action:

Switch | Subsystem | Disk | Pool | Volume | FCPort | Connection | Alert | **Zone**

Group	Label	Entity
Fabric: 26C2000DEC1900C1		
(Active) Zone Set: B_Side_Plus_Brocade		
(Active) Zone: Disk_SVCs		
(Active) Zone: Disk_SVCs	10000000C9260A76	20000000C9260A76
(Active) Zone: Disk_SVCs	210000E08B0210CC	200000E08B0210CC
(Active) Zone: Disk_SVCs	210000E08B033F76	200000E08B033F76
(Active) Zone: Disk_SVCs	210000E08B035375	200000E08B035375
(Active) Zone: Disk_SVCs	210000E08B0474FF	200000E08B0474FF
(Active) Zone: Disk_SVCs	210000E08B091B68	200000E08B091B68
(Active) Zone: Disk_SVCs	210000E08B106FF8	200000E08B106FF8
(Active) Zone: Disk_SVCs	210000E08B11575E	200000E08B11575E
(Active) Zone: Disk_SVCs	200000E08B14136C	200000E08B14136C
(Active) Zone: Disk_SVCs	00100E08B273AB8	00100E08B273AB8
(Active) Zone: Disk_SVCs	00100E08B34616A	00100E08B34616A
(Active) Zone: Disk_SVCs	500A098185B4A8E9	500A098085B4A8E9
(Active) Zone: Disk_SVCs	210000E08B09942B	9.82.39.159
(Active) Zone: Disk_SVCs	10000000C946D019	AIXPower5-10000000C946D019
(Active) Zone: Disk_SVCs	10000000C93A1AAB	BLUEAIX-10000000C93A1AAB
(Active) Zone: Disk_SVCs	210000E08B1070FC	Computer (ODCBETA161.wsclab.washingt..
(Active) Zone: Disk_SVCs	210000E08B88B8AB	Computer (ODCBETA163.wsclab.washingt..
(Active) Zone: Disk_SVCs	201500A0B811A354	DS4800-DS4800_1N92-600A0B80001140..
(Active) Zone: Disk_SVCs	202500A0B811A354	DS4800-DS4800_1N92-600A0B80001140..
(Active) Zone: Disk_SVCs	201400A0B811A354	DS4800-DS4800_1N92-600A0B80001140..

➤ The "little pencil" change indicator shows a change was made to this zone.

➤ The change indicates that ODCBETA161 was removed from this zone.

8. Test-drive Data Path Explorer, identify potential bottlenecks, look for puzzling paths (try this for your “loved ones” first).

The screenshot displays the IBM TotalStorage Productivity Center interface. On the left is the Navigation Tree, with 'Computers' selected under the 'Topology' section. The main area is the Topology Viewer, showing a network diagram of 'L0:Computers'. A context menu is open over a computer icon, with 'Open DataPath View' highlighted. A yellow callout box provides instructions: 'Highlight the desired computer or storage device. Either a “right-click” and chose “Open DataPath View” or select “Data Path Explorer” from the mini-map.' The mini-map in the top right corner has 'Data Path Explorer' and 'Topology Settings' links circled in red.

Navigation Tree

- Administrative Services
- IBM TotalStorage Productivity Cent
 - Configuration Utility
 - Rollup Reports
 - My Reports
 - Topology
 - Computers**
 - Fabrics
 - Switches
 - Storage
 - Other
 - Monitoring
 - Analytics
 - Alerting
 - External Tools
- Data Manager
- Data Manager for Databases
- Data Manager for Chargeback
- Disk Manager
- Fabric Manager
- Tape Manager
- Element Manager

Topology Viewer

Overview L0:Computers

L0:Computers

Computers (Normal) [6]

Computers (Unknown) [16]

9.82.39.1... ebodaix1 ODC

odcbeta1... odcvm156 ODC

Open Detail View

Launch Detail Panel...

Open DataPath View

Pin

Launch Planner...

Show Alerts in Tabular View

Show Computer Alerts

Reports

Expand All Groups

Collapse All Groups

Close View

Close All Views

Refresh View

Refresh All Views

Shortcuts

[Data Path Explorer](#)

[Topology Settings](#)

Action: Open Detail View

Computer Alert

Locate:

➤ Highlight the desired computer or storage device.

➤ Either a “right-click” and chose “Open DataPath View” or select “Data Path Explorer” from the mini-map.

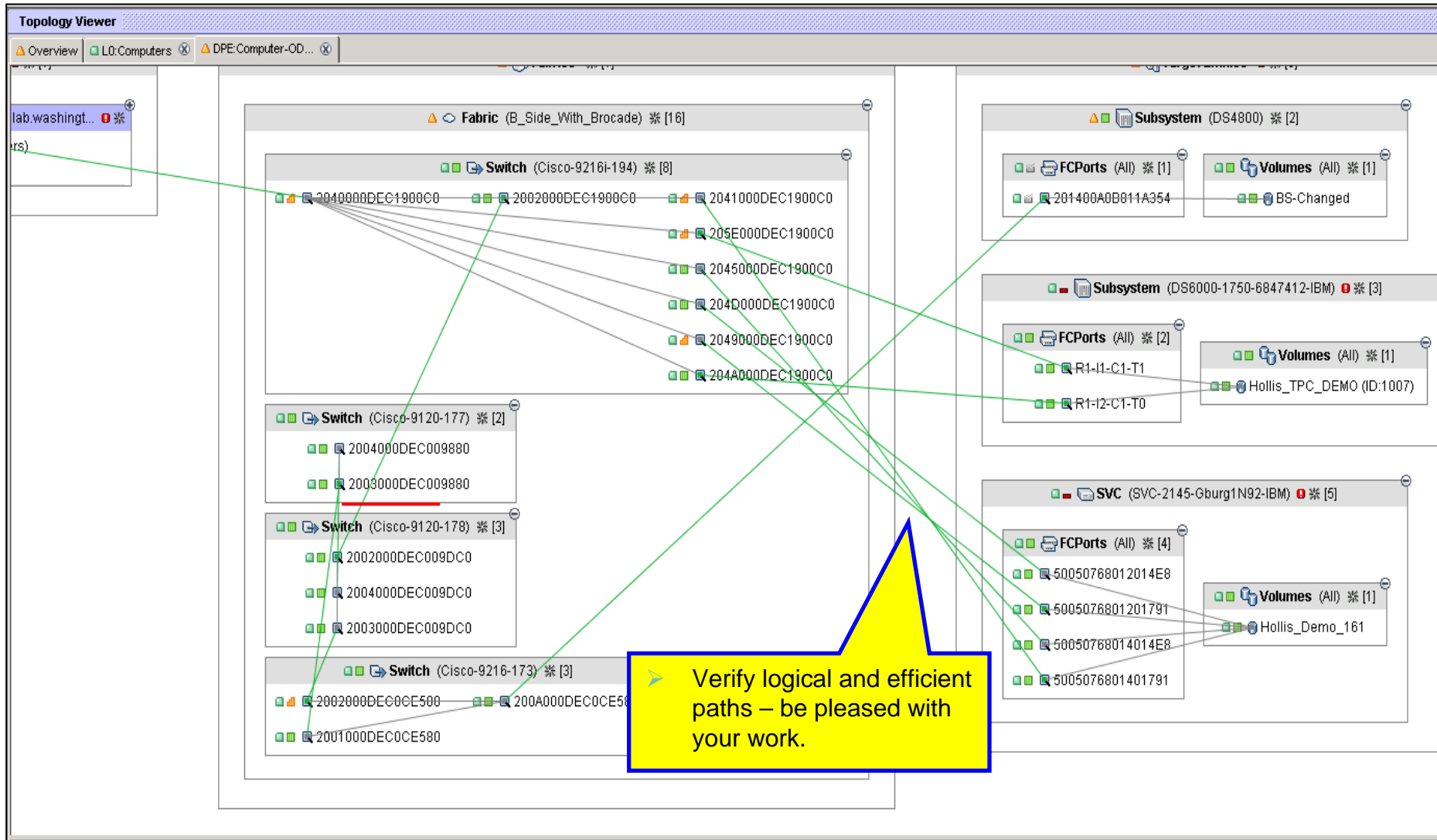
8. Test-drive Data Path Explorer, identify potential bottlenecks, look for puzzling paths (try this for your “loved ones” first).



➤ Identify critical path and/or potential performance bottlenecks.

➤ Identify unexpectedly convoluted paths through the SAN.

8. Test-drive Data Path Explorer, identify potential bottlenecks, look for puzzling paths (try this for your “loved ones” first).



9. Create a volume report filtered on “volume utilization”

Report Filter Specifications

Generate Report

Selection... **Filter...**

Display latest performance data

Display historic performance data using absolute time

From: February 9, 2010 2:39 PM

To: February 10, 2010 2:39 PM

Display historic performance data using relative time

15 days ago until now

Summation Level: By Sample

Available Columns

- Interval
- Read I/O Rate (normal)
- Read I/O Rate (sequential)
- Read I/O Rate (overall)
- Write I/O Rate (normal)
- Write I/O Rate (sequential)
- Write I/O Rate (overall)
- Total I/O Rate (normal)
- Total I/O Rate (sequential)
- Total I/O Rate (overall)
- Total Cache Hits Percentage (sequential)
- Total Cache Hits Percentage (overall)

Included Columns

- Subsystem
- Volume
- Time**
- Volume Utilization**

↑

↓

➤ Define the data columns you want to report on.

➤ Performance management experts may add columns for data used in diagnosing performance problems. (for example I/O rates and response times)

9. Create a volume report filtered on “volume utilization”

Column	Operator	Value 1
Volume Utilization (%)	>=	70
Volume	NOT LIKE	

Note: 70% was just a useful number for this presentation. Adjust it to be useful in your environment. Consider starting with 80% or 90% and adjust it as you resolve issues with or eliminate from consideration the volumes initially identified.

As you gain experience in your environment, add the names of volumes you want excluded from this report.

For example: volumes that you have seen as always violating the threshold, their situation is such that they will not be fixed and you just do not want to see them in this report any more.

In performance management, there is a concept called “Population.” It is “Total IO rate” multiplied by “Overall Response Time” divided by 1000.

The calculation for “Volume Utilization” is [Population divided by (1 + Population)]

Techniques for analyzing “Volume Utilization” are covered in course SGA17.

Press the save icon to save the report in “My Reports”

9. Create a volume report filtered on “volume utilization”

Selection **Volumes**

Storage Subsystem Performance: By Volume

Number of Rows: 2500

Subsystem	Volume	Time	Volume Utilization	Total I/O Rate (overall)
DS6000-1750-13AB24A-IBM	SHW_DS6A_162M (ID:1006)	Nov 27, 2009 10:00:50 AM	85.1 %	555.36 ops/s
DS6000-1750-13AB24A-IBM	SHW_DS6A_162M (ID:1006)	Nov 27, 2009 9:55:49 AM	82.91 %	579.84 ops/s
DS6000-1750-13AB24A-IBM	SHW_DS6A_162M (ID:1006)	Nov 27, 2009 9:50:57 AM	83.51 %	592.26 ops/s
DS6000-1750-13AB24A-IBM	SHW_DS6A_162M (ID:1006)	Nov 27, 2009 9:45:58 AM	85.41 %	579.58 ops/s
DS6000-1750-13AB24A-IBM	SHW_DS6A_162M (ID:1006)	Nov 27, 2009 9:41:03 AM	82.89 %	586.28 ops/s
DS6000-1750-13AB24A-IBM	SHW_DS6A_162M (ID:1006)	Nov 27, 2009 9:35:46 AM	84.91 %	609.04 ops/s
DS6000-1750-13AB24A-IBM	SHW_DS6A_163M (ID:1000)	Nov 28, 2009 2:43:41 AM	70.94 %	330.37 ops/s
DS6000-1750-13AB24A-IBM	WM_ESX_MDG6A_D2 (ID:1003)	Nov 28, 2009 1:42:10 AM	71.58 %	115.45 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 9:09:09 AM	84.65 %	814.45 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 9:04:08 AM	84.05 %	816.23 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:59:07 AM	84.75 %	805.5 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:54:06 AM	84.05 %	812.02 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:49:05 AM	84.05 %	819 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:44:04 AM	84.05 %	859 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:39:03 AM	84.05 %	835 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:34:02 AM	84.05 %	807 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:29:03 AM	84.43 %	810.59 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:24:02 AM	82.35 %	772.68 ops/s
SVC-2145-Sandbox-IBM	PRF_MDG6A_163P	Nov 27, 2009 8:19:01 AM	83.71 %	797.42 ops/s

➤ This volume had many occurrences of high utilization so it is a “volume of performance interest”

➤ This volume had only one occurrence of high utilization so it is not yet a “volume of performance interest”

➤ Use the “Drill up” option to go to reports that may provide insight to the root cause.





SGA17 Course description: Storage Subsystem Performance, Monitoring and Capacity Planning for Open Systems

- www.ibm.com
- -> Services
 - -> Training
 - -> “Training Finder – US”
 - -> Search By Course Code
 - -> SGA17
- 1-800-IBM-TEACH (1-800-426-8322)



Storage Subsystem Performance, Monitoring and Capacity Planning for Open Systems (SGA17)

Learn both theoretical foundations in storage performance as well as specific monitoring techniques using IBM TotalStorage® Performance Center (TPC). The course discusses essential performance characteristics of cached disk subsystems, the essential performance metrics, and enough theory to help understand why storage products perform as they do. Moreover, the course covers the practical use of TPC to monitor performance, to spot performance issues, and to investigate the causes. Specific TPC reports and interpretation of the reports are covered, as well as application of the data to long term capacity planning.

Who Should Attend This Course?

This advanced class is intended for storage professionals and managers who want to understand the tools and techniques. IBMers and Business Partners will also find this material useful and relevant as they support customers with storage related issues.

Prerequisites

There are no prerequisites for this course.

What you will learn:

- The Essential Metrics of Storage Performance
- Performance Considerations for Disk Drives and Cached Subsystem Architectures
- IO Ports, Switches, SANs, and multipathing as they affect performance
- Some Queuing Theory
- Applications to Disks, Ports, and HBAs
- Extreme Response Times
- Rules of Thumb for performance
- Performance Monitoring with TPC
- What to Monitor and Some Graphical Presentation Techniques
- Capacity Planning Techniques
- Other Storage Performance Tools
- Performance Modeling
- Data Layout, Striping, Storage Tuning
- Resource Sharing vs Isolation, Service Level Agreements
- Troubleshooting Storage Performance

Course code	Duration	Date	City
SGA17	2 days	March 8-9, 2011	Atlanta, GA
SGA17	2 days	May 17-18, 2011	Chicago, IL

For additional information or to enroll in this course or any of our other Storage courses, please visit our website at ibm.com/training/us/catalog/storage and search for SGA17 or call 1-800-IBM-TEACH (1-800-426-8322).





10. Use a thoughtful naming convention for MDGs/MDisks/VDisks/Volumes/Operating System Disk names - Look familiar....?

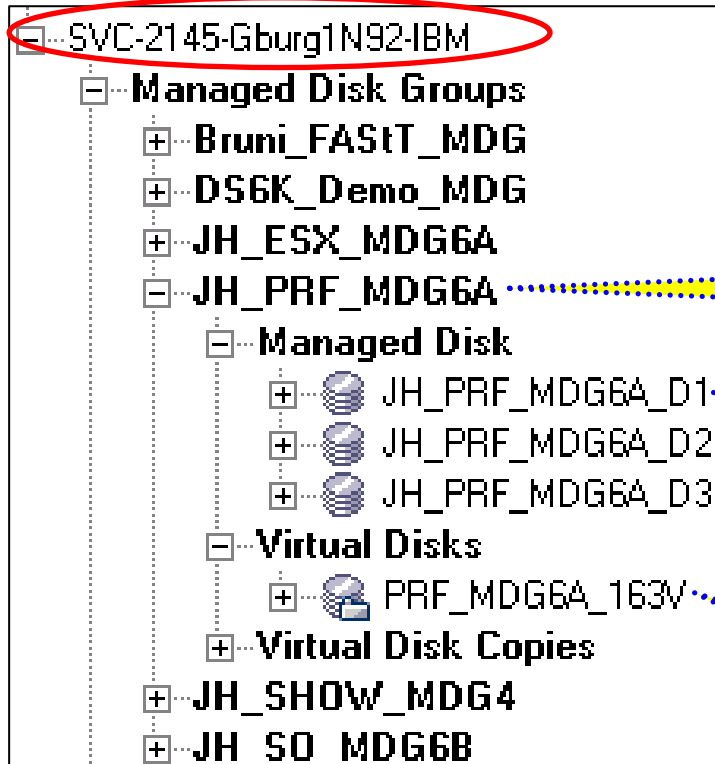
Handwritten examples of naming conventions for disk types:

MDG	MDisk	LUN	VDISK
Hollis_SHOW_MDG	Hollis_DS4800-1	Hollis_SVC-1	Hollis_SHOW_160
	2	2	
	3	3	
	4	4	
<u>MDG</u>	<u>MDisk</u>	<u>LUN</u>	<u>VDISK</u>
DSCK_4_HOLLIS.	Hollis_DS6000-2	SVC_CLEAN	Hollis_ESX-159
	3	5	
	4	6	
	5	Hollis_SVC_LUN-2	SVC-VDISK(U)
	6	1	
Hollis_PRT_MDG6	Hollis_MDGK-11	Hollis_SVC_LUN-11	
	12	12	
	13	13	

H → V



10. Use a thoughtful naming convention for MDGs/MDisks/VDisks/Volumes/Operating System Disk names



➤ MDG Name: JH_PRF_MDG6A

Initials of the 'owner' of this MDG
The application this MDG supports
Storage tier / device type / device

➤ Managed Disk Name: JH_PRF_MDG6A_D1

MDG Name
Disk number

➤ VDisk Name: PRF_MDG6A_163V

Partial MDG Name (w/o the owner)
Last octet of the server TCP/IP address

Operating system drive letter / number

- Build the naming convention to meet YOUR needs!!!!
- This sample is designed for managing storage from TPC



10. Use a thoughtful naming convention for MDGs/MDisks/VDisks/**Volumes**/Operating System Disk names

DS6000-1750-6847412-IBM

- + Array Sites
- + Ranks
- + Storage Pools
- + Disks
- Volumes
 - + AIX_Backup (ID:112c) (IBM.1750-6847412-112c)
 - + Brian160_LUN1tg (ID:1019) (IBM.1750-6847412-1019)
 - + CLUS2 (ID:1100) (IBM.1750-6847412-1100)
 - + dan (ID:1014) (IBM.1750-6847412-1014)
 - + DD_CLS1_2_111B (ID:111b) (IBM.1750-6847412-111b)
 - + DD_CLS1_2_111C (ID:111c) (IBM.1750-6847412-111c)
 - + DD_CLS1_2_111D (ID:111d) (IBM.1750-6847412-111d)
 - + Demo_SVC1 (ID:1018) (IBM.1750-6847412-1018)
 - + Demo_SVC2 (ID:101a) (IBM.1750-6847412-101a)
 - + H80 TSM Vol01 (ID:1000) (IBM.1750-6847412-1000)
 - + JH_ESX_MDG6A_D1 (ID:1105) (IBM.1750-6847412-1105)
 - + JH_ESX_MDG6A_D2 (ID:1106) (IBM.1750-6847412-1106)
 - + JH_ESX_MDG6A_D3 (ID:1107) (IBM.1750-6847412-1107)
 - + JH_ESX_MDG6A_D4 (ID:1119) (IBM.1750-6847412-1119)
 - + JH_ESX_MDG6A_D5 (ID:1118) (IBM.1750-6847412-1118)
 - + JH_PRF_MDG6A_D1 (ID:111e) (IBM.1750-6847412-111e)
 - + JH_PRF_MDG6A_D2 (ID:1126) (IBM.1750-6847412-1126)
 - + JH_PRF_MDG6A_D3 (ID:1127) (IBM.1750-6847412-1127)

➤ Volume Name for volumes backing MDisks: the SAME name as used for the MDisk

- Build the naming convention to meet YOUR needs!!!!
- This sample is designed for managing storage from TPC
- Verify the maximum string length of names in your storage devices before designing your naming convention.



10. Use a thoughtful naming convention for MDGs/MDisks/VDisks/Volumes/Operating System Disk names

DS6000-1750-6847412-IBM

- + Array Sites
- + Ranks
- + Storage Pools
- + Disks
- Volumes
 - + SHOW_DS6A_160S (ID:1002) (IBM.1750-6847412-1002)
 - + SHOW_DS6A_160T (ID:1009) (IBM.1750-6847412-1009)
 - + SHOW_DS6A_161S (ID:1007) (IBM.1750-6847412-1007)
 - + SHOW_DS6A_162S (ID:101b) (IBM.1750-6847412-101b)
 - + SHOW_DS6A_163H (ID:1012) (IBM.1750-6847412-1012)
 - + SHOW_DS6A_163S (ID:1008) (IBM.1750-6847412-1008)

Application this volume supports
 Storage tier / device type
 Last octet of the server TCP/IP address
 Operating system drive letter / number

> Volume Name for volumes mapped to servers: SHOW_DS6A_163S

- Build the naming convention to meet YOUR needs!!!!
- This sample is designed for managing storage from TPC



10. Use a thoughtful naming convention for MDGs/MDisks/VDisks/Volumes/Operating System Disk names

Volume	Layout	Type	File System	Status	Capacity	Free Space	% Free
(C:)	Partition	Basic	NTFS	Healthy (System)	136.73 GB	95.71 GB	69 %
PRF_MDG6A_163V (V:)	Partition	Basic	NTFS	Healthy	32.99 GB	20.42 GB	61 %
SHOW_DS6A_163H (H:)	Partition	Basic	NTFS	Healthy	19.99 GB	6.32 GB	31 %
SHOW_DS6A_163S (S:)	Partition	Basic	NTFS	Healthy	1020 MB	139 MB	13 %
SHOW_MD... 163W (W:)	Partition	Basic	NTFS	Healthy	3.00 GB	2.98 GB	99 %
VMWare Im... 163A (D:)	Partition	Basic	NTFS	Healthy	136.73 GB	32.96 GB	24 %
VMWare Im... (E:)	Partition	Basic	NTFS	Healthy	136.73 GB	15.79 GB	11 %

> For SAN volumes: same name as volume or VDisk

- Build the naming convention to meet YOUR needs!!!!
- This sample is designed for managing storage from TPC.



10. Use a thoughtful naming convention for MDGs/MDisks/VDisks/Volumes/Operating System Disk names

➤ This is a filtered volume report as described earlier. It is from an environment using the naming convention described in this presentation.

➤ Remember: “Drill up” and “Drill down” can also be used.

Selection Volume Drill up from ESX_MDG6A_159_2 | Drill down from JH_ESX_MDG6A_159_2

Storage Subsystem Performance: By Volume

Number of Rows: 484

	Subsystem	Volume	Time ▼
🔍	SVC-2145-Gburg1N92-IBM	ESX_MDG6A_159_2	
🔍	DS6000-1750-6847412-IBM	JH_ESX_MDG6A_D4 (ID:1119)	
🔍	DS6000-1750-6847412-IBM	JH_ESX_MDG6A_D2 (ID:1106)	Jul 14, 2009 7:00:00
🔍	DS6000-1750-6847412-IBM	JH_ESX_MDG6A_D5 (ID:1118)	Jul 14, 2009 7:00:00
🔍	DS6000-1750-6847412-IBM	SHOW_DS6A_160S (ID:1002)	Jul 14, 2009 3:22:44
🔍	DS6000-1750-6847412-IBM	SHOW_DS6A_160S (ID:1007)	Jul 14, 2009 3:17:00

➤ Based on the name I know:

- The application is ESX
- It is a VDisk backed by volumes on our DS6000-A
- It is the second drive mapped to the ESX server
- To find the root cause I may want to check the MDisks (“Drill up” and “Drill down”)
- The next three volumes displayed happen to be among those backing the MDG of this VDisk.

➤ Based on the name I know:

- The application is SHOW
- It is a volume on our DS6000-A
- It is on computer 9.82.39.160 (ODCBETA160)
- It is the “S” drive



11. ???

- Since there were more than 3 books in the trilogy:
Hitchhiker's Guide to the Galaxy...
- Since there was a 5th Beatle...
- Since there are 13 doughnuts in a baker's dozen...



11. ???

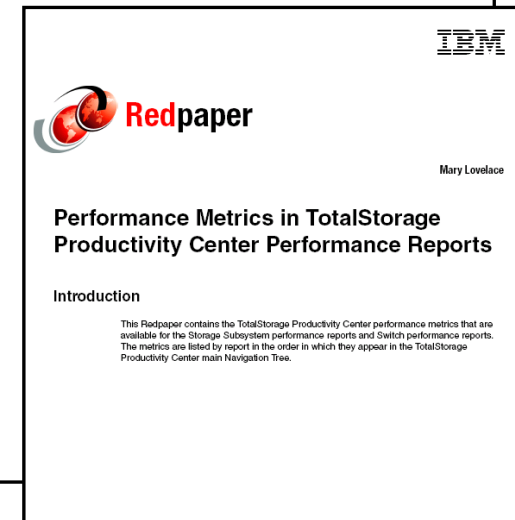
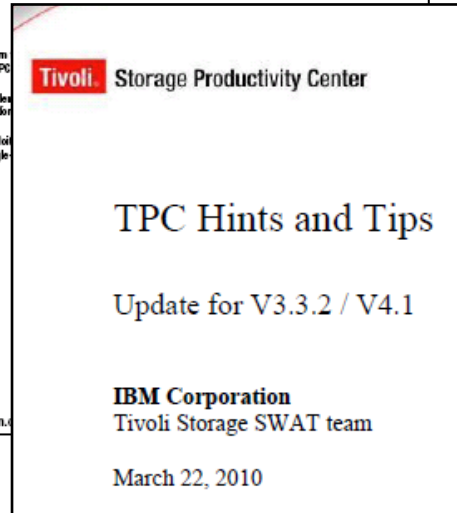
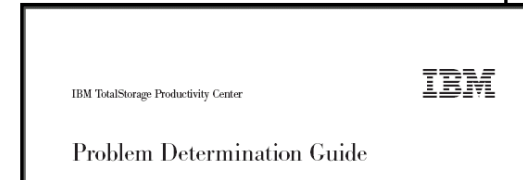
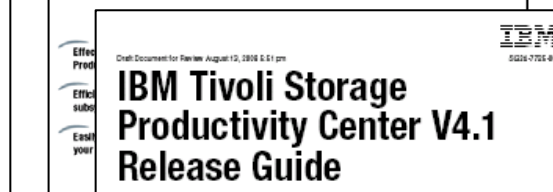
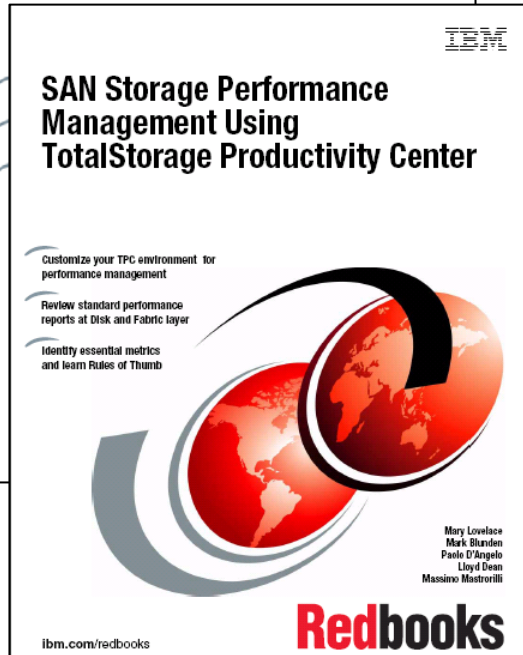
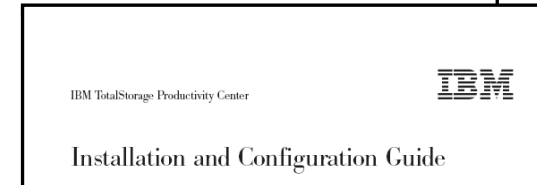
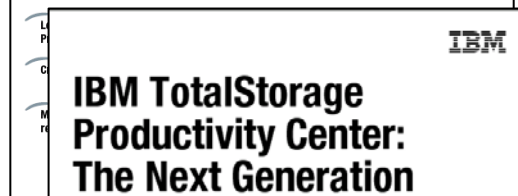
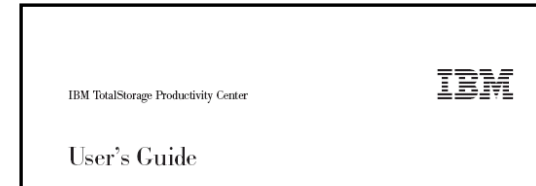
- Since there were more than 3 books in the trilogy: *Hitchhiker's Guide to the Galaxy*...
- Since there was a 5th Beatle...
- Since there are 13 doughnuts in a baker's dozen...

I have an 11th point for the Top Ten...

Use groups within TPC!



You should have and use....



- <http://publib.boulder.ibm.com/infocenter/tivihelp/v4r1/index.jsp>



TPC HealthCheck

- This services offering will provide a health check and performance analysis of your current TPC environment. It will help ensure that your storage management solution related to data, disk and fabric is operating effectively and efficiently, and meeting your growth and performance requirements. It will also ensure that those requirements are in line with IBM guidance for best practices. It includes a formal assessment of your TPC server and associated clients, written TPC Assessment Report detailing any changes IBM proposes to the software configuration, suggested method of implementing recommended changes and their impact to the environment, and transfer of skills and information to your staff, gained through working side by side with our experts.

- Contact Mike Benanti, "Services Sales Rep" for Lab Services (ISST), mbenanti@us.ibm.com



Extrapolate

- We only went over 10 things – but please:
 - Adjust these to your environment
 - Extrapolate the processes described and apply them to additional needs

- And remember:

Nothing is more important than the application of

Common Sense!





innovation that matters



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