



Washington Systems Center - Storage

Accelerate with IBM Storage:

Spectrum Storage Management, Control, Insights, Foundation; what's the difference?

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Session objectives

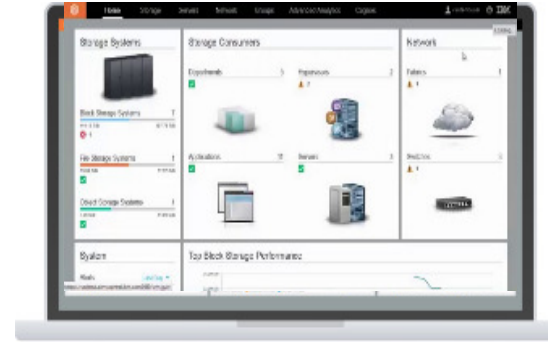
- Name those storage product management options
 - SaaS Products
 - On Premise Products
- Cloud Based SaaS Products
 - Architecture for SaaS
 - Feature Comparison
- Customer Installed On Premise Products
 - Product architecture for on premise solutions
 - How the different options compare
 - What are the bundles?

Meet the Family, A High Level Overview



IBM Storage Insights

Cloud based, cognitive Storage Management and Support Platform



IBM Spectrum Control

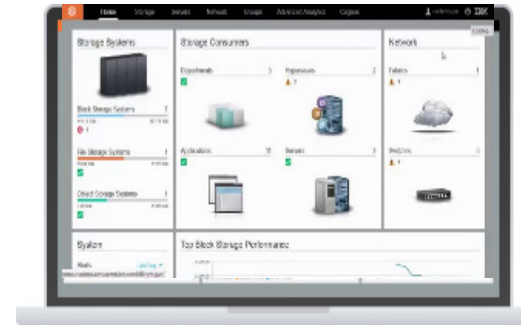
On-premises, performance management, monitoring and reporting tool.

Meet the Family, A more detailed view



IBM Storage Insights Foundation
IBM Storage Insights Pro

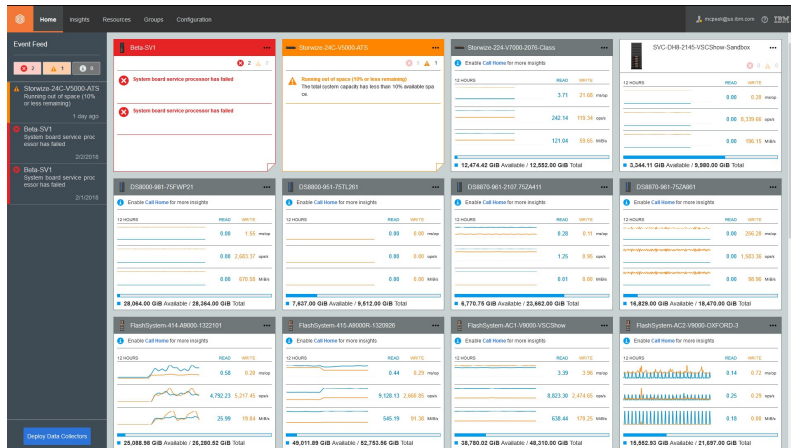
Cloud based, cognitive Storage
Management and Support
Platform



IBM Spectrum Control Standard
IBM Spectrum Control Advanced
IBM Virtual Storage Center
IBM Virtual Storage Center for Storwize
IBM Spectrum Storage Suite

On-premises, performance
management, monitoring and reporting
tool.

Cloud Based Product Offerings



IBM Storage Insights Foundation
License: Entitled



IBM Storage Insights Pro
License: Subscription

- While both of these Cloud based have different functions, their architecture is similar.
- Both of these products show metrics about on premise storage environments in the IBM Cloud.
- There is a requirement to install one or more “Data Collectors” to securely connect to the IBM Cloud.

Deployed instantly from the Cloud

- **Three easy steps** allow IBM Storage Insights to securely connect your storage environment with the cloud-based service.
- **No need for continuous maintenance.** All is taken care of by IBM.

How It Works

1

DOWNLOAD THE DATA COLLECTOR



Configure a secure connection to Storage Insights for sending information about the configuration, capacity, space usage, and performance of the storage systems that you want to monitor.

2

ADD YOUR STORAGE



Add the storage systems and schedule the collection of information about the storage systems that you want to monitor.

3

GET IMMEDIATE INSIGHTS



View charts that show capacity and space usage and performance trends, and view charts that show the space that you can reclaim and the optimum tiering of your data center.



Deployed instantly from the Cloud - The Data Collector












- Data collector connects your on-premises storage environment with the cloud-based service
- Designed for **security and efficiency**
 - All communication between the data collector and the service is **encrypted and compressed**.
 - All communication is **initiated from the collector** only, no LAN-external access to the collector or the storage devices.
 - Various security certifications (FISMA, ISO 2700x)
- **No administration/maintenance effort** for the local data collector.

What the data collector looks like


- The file downloaded from the Storage Insights instance is a zip file (windows example)
- Simply extract the into a new folder

Name ^	Date modified	Type	Size
 DataCollector_windows_May15	7/26/2015 9:17 PM	File folder	
 DataCollector_windows_May15.zip	5/18/2015 1:18 PM	Compressed (zippe...	147,252 KB

- Run the dataCollector.bat to install

Name ^	Date modified	Type	Size
 bin	7/26/2015 9:17 PM	File folder	
 conf	7/26/2015 9:17 PM	File folder	
 jre	7/26/2015 9:16 PM	File folder	
 lib	7/26/2015 9:17 PM	File folder	
 nls	7/26/2015 9:17 PM	File folder	
 dataCollector.bat	7/26/2015 9:17 PM	Windows Batch File	9 KB
 installDataCollectorService.bat	7/26/2015 9:17 PM	Windows Batch File	8 KB
 uninstallDataCollectorService.bat	7/26/2015 9:17 PM	Windows Batch File	5 KB
 version.txt	7/26/2015 9:16 PM	Text Document	1 KB

- A windows service gets created

 IBM Spectrum Control Storage Insights data collector - E:\SI\DataCollector_windows_20150518

IBM Storage Insights Foundation *is*

- Holistic management, optimization and **support** experience
- Anonymous collection of metadata to create a data ocean for AI technologies to exploit
- Empowers both storage admins and IBM support **to deliver better storage outcomes**



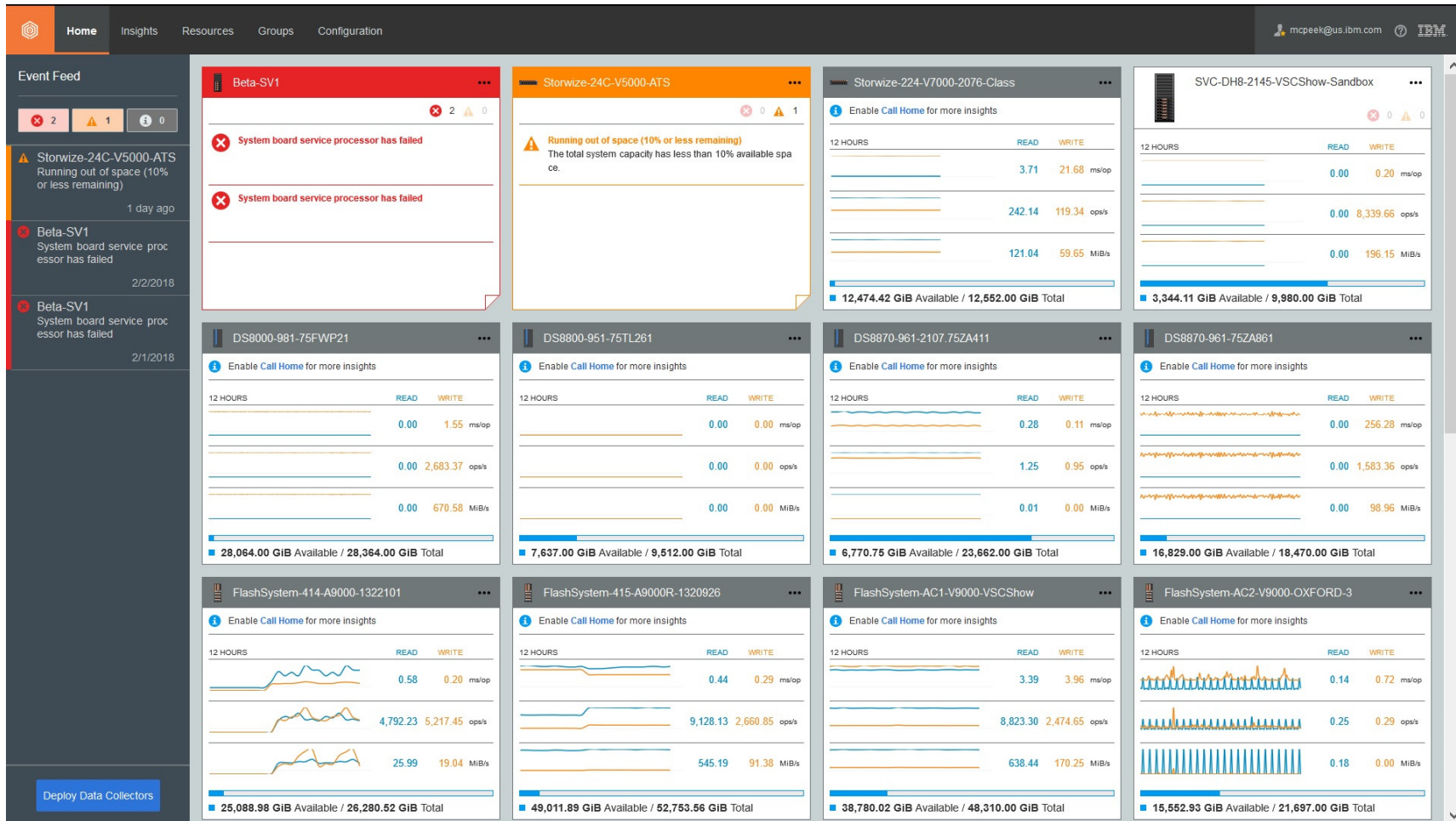
IBM
Storage Insights
Foundation

Storage Insights Foundation is NOT...

- ...A replacement for the device element manager
 - As of now, Storage Insight Foundation is not integrated with element managers
 - Clients will still need to use element managers for basic configuration
- ...A replacement for Call Home
 - Storage Insights Foundation leverages the Call Home function on most storage systems and enhances Call Home with additional metrics
 - In some cases, logs are sent to IBM using the storage system Call Home function
- ...A replacement for Premier Support
 - Storage Insights Foundation enhances the support experience for all IBM storage system clients

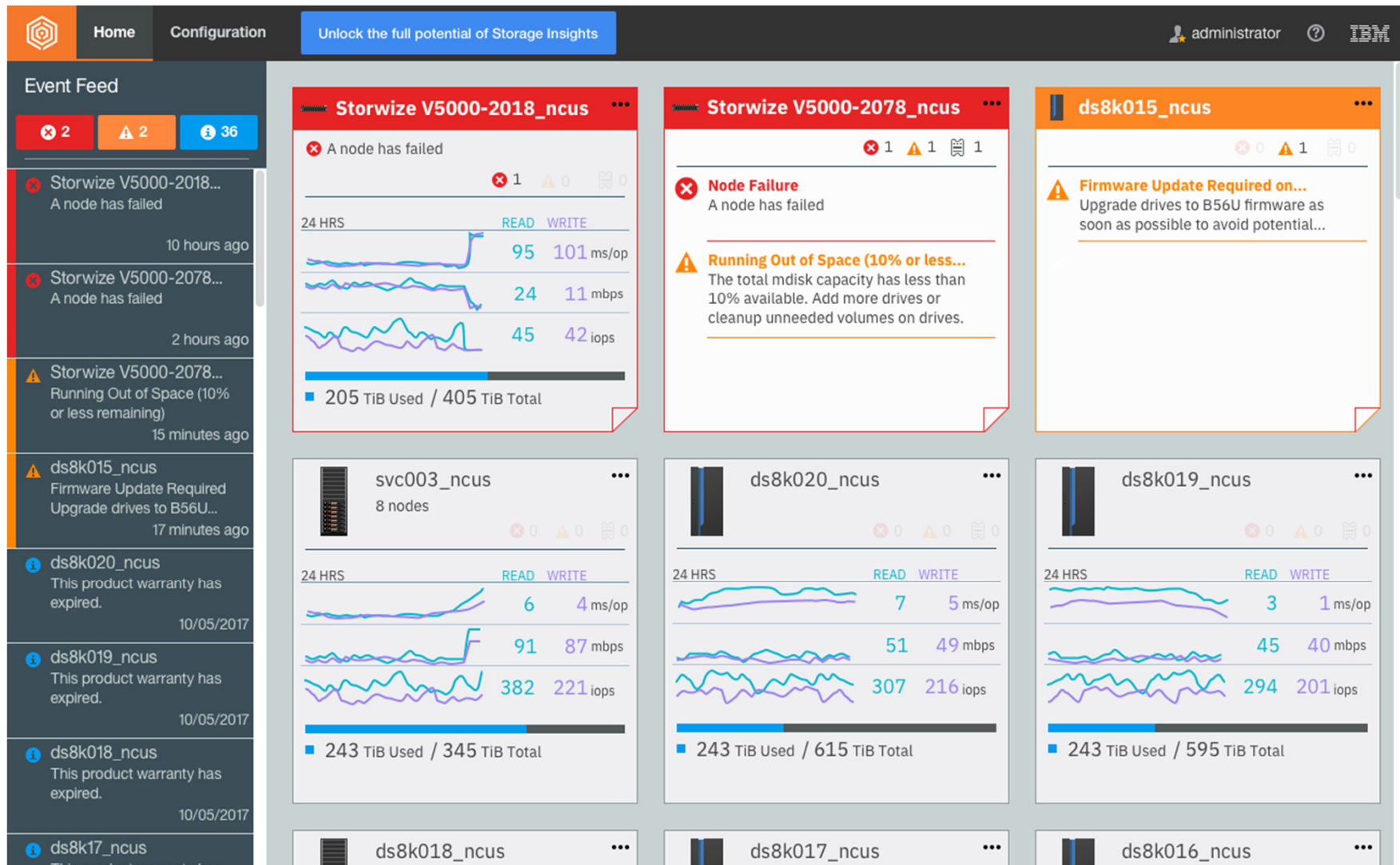
IBM Storage Insights Foundation

IBM Storage Insights Foundation: Dashboard



IBM Storage Insights Foundation

Dashboard: Sorted on Problems, High Level Overview of Status / Activity



IBM Storage Insights Foundation

Drill in capability for a more detailed view, Firmware Update Example

The screenshot displays the IBM Storage Insights Foundation interface. The top navigation bar includes 'Home', 'Configuration', and a button to 'Unlock the full potential of Storage Insights'. The user is logged in as 'administrator'. The main area is divided into several panels:

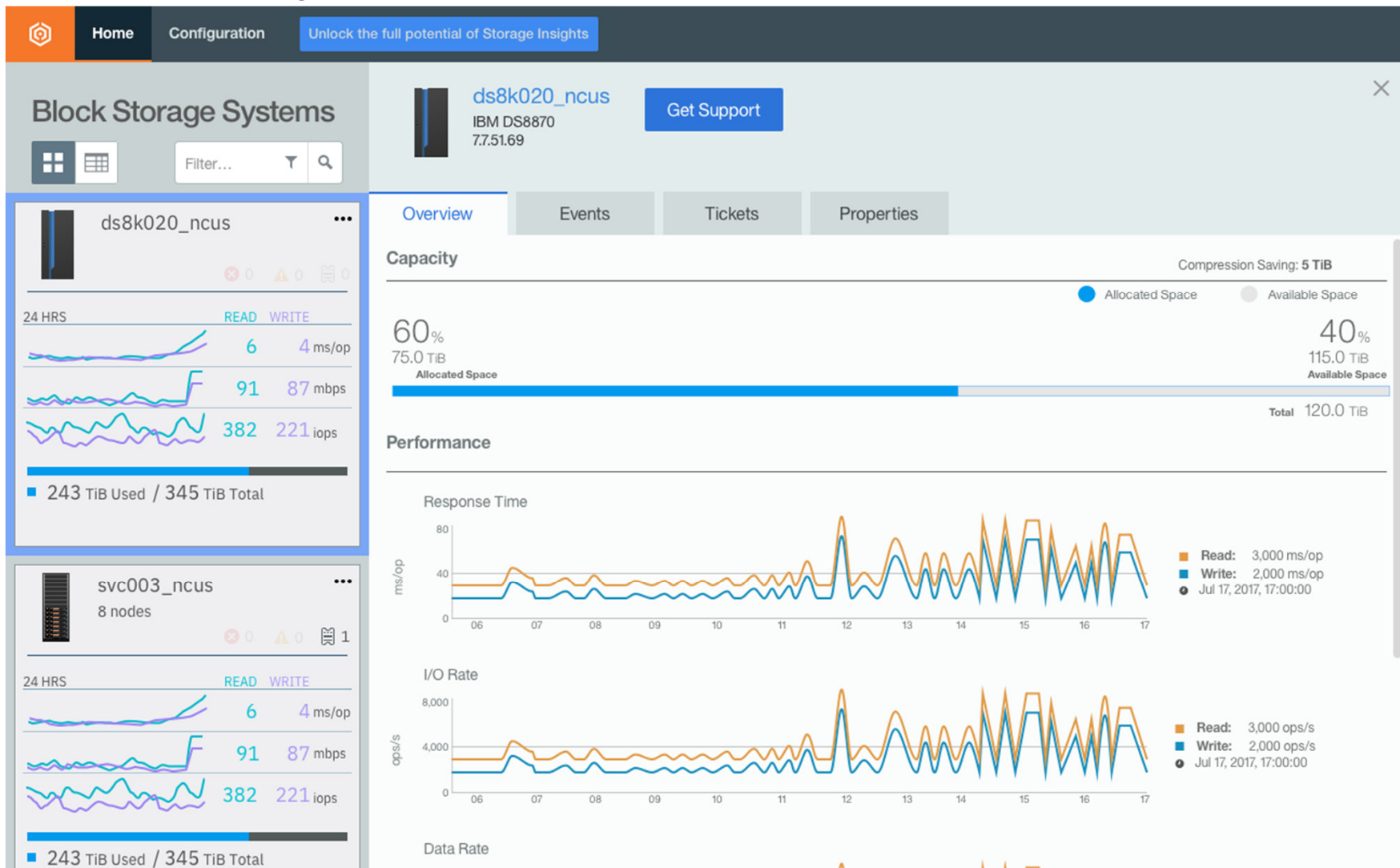
- Event Feed (Left):** A list of events with filters for 2 errors, 2 warnings, and 36 info messages. The most recent event is a 'Firmware Update Required' for 'ds8k015_ncus'.
- System Overview (Top):** Three panels for 'Storwize V5000-2018_ncus', 'Storwize V5000-20178_ncus', and 'ds8k015_ncus'. Each panel shows status indicators (errors, warnings, info), a 24-hour performance graph for READ and WRITE operations, and storage usage bars.
- Firmware Update Alert (Center):** A detailed alert for 'ds8k015_ncus' dated October 23, 2017, at 1:00:32 PM. It states: 'Upgrade drives to B56U firmware as soon as possible to avoid potential problems caused by drives falling when arrays are not redundant.' Below this is a table of affected drives:

Drive	Drive Firmware	Required Firmware
drive 19	B56S	B56U
drive 30	B56S	B56U
drive 60	B56M	B56U
+ 17 more drives		

Additional links include 'Learn more' and 'View Event on System'. Below the alert, storage usage bars are shown for three systems: 'ds8k018_ncus' (243 TiB Used / 345 TiB Total), 'ds8k017_ncus' (243 TiB Used / 615 TiB Total), and 'ds8k016_ncus' (243 TiB Used / 595 TiB Total).

IBM Storage Insights Foundation

Drill into a storage device for detailed tabular views



IBM Storage Insights Foundation

Storage System Tabular View, Event Example

The screenshot displays the IBM Storage Insights Foundation interface. At the top, there are navigation tabs for 'Home', 'Configuration', and a button to 'Unlock the full potential of Storage Insights'. The main area is titled 'Block Storage Systems' and shows a list of systems. The selected system is 'ds8k020_ncus', an IBM DS8870 with 7.751.69 TB capacity. Below this, there are tabs for 'Overview', 'Events', 'Tickets', and 'Properties'. The 'Events' tab is active, showing a list of events. A modal window is open, displaying details for a 'Warning' event: 'Running out of space (5% or less remaining)' on Sep 5, 2017, at 4:12:36 PM. The event description states: 'The total mdisk capacity has less than 5% available.' Below the description is a table with the following data:

Percent Free Space	Total Mdisk Capacity	Total Free Space	Warning DiskSpace Threshold
0.07298	1.44036023238656E13	1051193245696	0.1

Below the event details is a table of other events:

Name	Type	Time	Description
Timeout due to excessive processing time	Error	Sep 6, 2017, 01:10:17	
Drive reporting too many errors	Error	Sep 3, 2017, 04:32:44	
Running out of space (5% or less remaining)	Warning	Sep 5, 2017, 16:12:36	The total mdisk capacity has less than 5% available.
SAS network has too many errors	Error	Sep 3, 2017, 17:09:40	
Failure to bring up Ethernet interface	Error	Sep 7, 2017, 01:59:38	

At the bottom of the interface, there are two 'Volume Created' events, both informational, occurring at 6:09:28 PM on 12/15/15. The interface also shows storage usage metrics for two systems: 'ds8k020_ncus' and 'svc003_ncus', both showing 243 TiB Used / 345 TiB Total. The interface is refreshed 2 minutes ago.

IBM Storage Insights Foundation

The Tickets Tab show all open Tickets For this Device

The screenshot displays the 'Tickets' tab for the device 'SVC-2145-SVC-svc2a-IBM'. The interface includes a left-hand navigation pane with device cards, a top header with the device name and 'Get Support' button, and a main content area with tabs for Overview, Events, Tickets (2), and Properties. The 'Tickets' tab is active, showing a list of tickets. Two open tickets are visible, both with a severity of 3 and opened on August 29, 2017. One ticket is highlighted with a red box, showing its details: Severity 3, Ticket 63517, 227, 000, and APAR: -. A blue button 'Add Log Package to Ticket' is located below the ticket details. The 'Closed Tickets' section shows 20 closed tickets, including two with severity 3 and ticket numbers 64947, 227, 000, and two with severity 3 and ticket numbers 38114.

Severity	Ticket ID	Status	Opened/Closed Date
3	63517, 227, 000	Open	Aug 29, 2017
3	63517, 227, 000	Open	Aug 29, 2017
3	64947, 227, 000	Closed	Sep 11, 2017
3	64947, 227, 000	Closed	Sep 11, 2017
3	38114	Closed	Aug 25, 2017
3	61997, 227, 000	Closed	Aug 25, 2017
3	38114	Closed	Aug 25, 2017
3	61997, 227, 000	Closed	Aug 25, 2017
3	37808	Closed	Aug 1, 2017
3	49845, 227, 000	Closed	Aug 1, 2017

IBM Storage Insights Foundation

Device Support For Initial Rollout

IBM Storwize family - V3700, V5000, V7000; SVC;
Spectrum Virtualize

IBM FlashSystem family - 840, 900, V9000, A9000; XIV;
Spectrum Accelerate + the all-flash Storwize V5030F and
V7000F

IBM DS8000 family

Storage Insights Foundation provides unique value

- ✓ **IBM cognitive assistance.** IBM is the recognized leader in cognitive capabilities.
- ✓ **IBM breadth of devices supported.** Storage Insights can compare system KPI metrics from across the breath of IBM storage devices to quickly identify hotspots.
- ✓ **Dramatically lowers the administrative skill level** required to manage complex enterprise infrastructures.
- ✓ **Learns and applies best practices** from our experience running the most demanding enterprise infrastructures to predict problems before they impact an application
- ✓ **IBM keeps your storage meta data secure**
You can trust the security and privacy of the ISO 27001 certified IBM Cloud.

Storage Insights Pro...

- Convergence of analytics, cloud, and data management
- Designed to
 - Reduce storage costs, without the traditional up-front investments
 - Enable actionable visibility within minutes
 - Provide rapid insights to critical assets



- Deployed instantly from the cloud
- Supports the following:
 - Understand the storage environment and its usage
 - Monitor capacity and performance
 - Reclaim allocated, but unused storage
 - Optimize data placement with advanced analytics

Increasing value over time



Immediate Value

- Quickly see how capacity is broken down at different levels
- View aggregated capacity across entire storage environment
- Compare storage systems
- Capacity reclamation recommendations based on unmapped volumes
- Gain insights into storage infrastructure hierarchies



Value within Hours

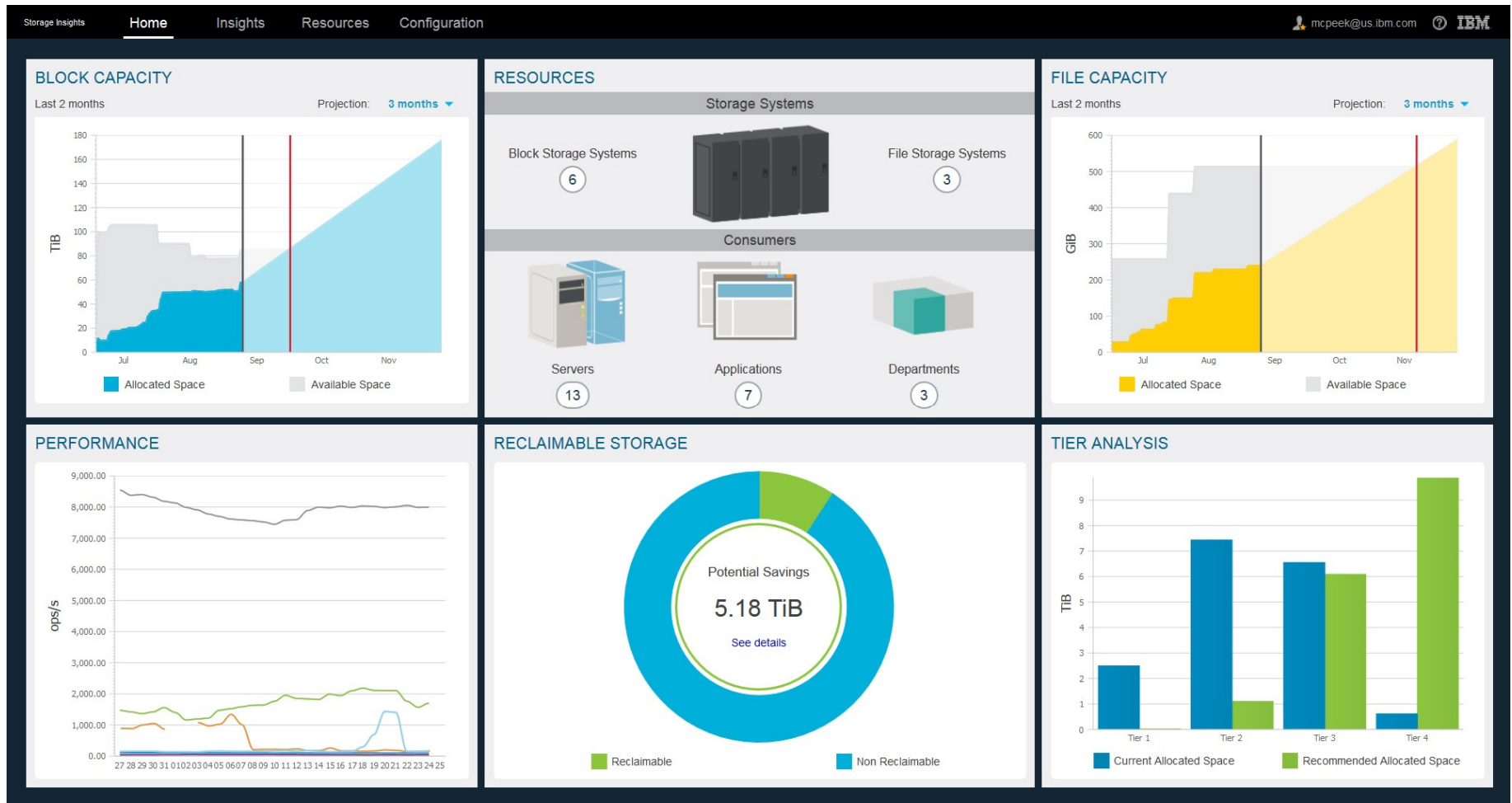
- Performance information that allows identification of hot spots and aids in troubleshooting
- Capacity reclamation for volumes that do not have any I/O



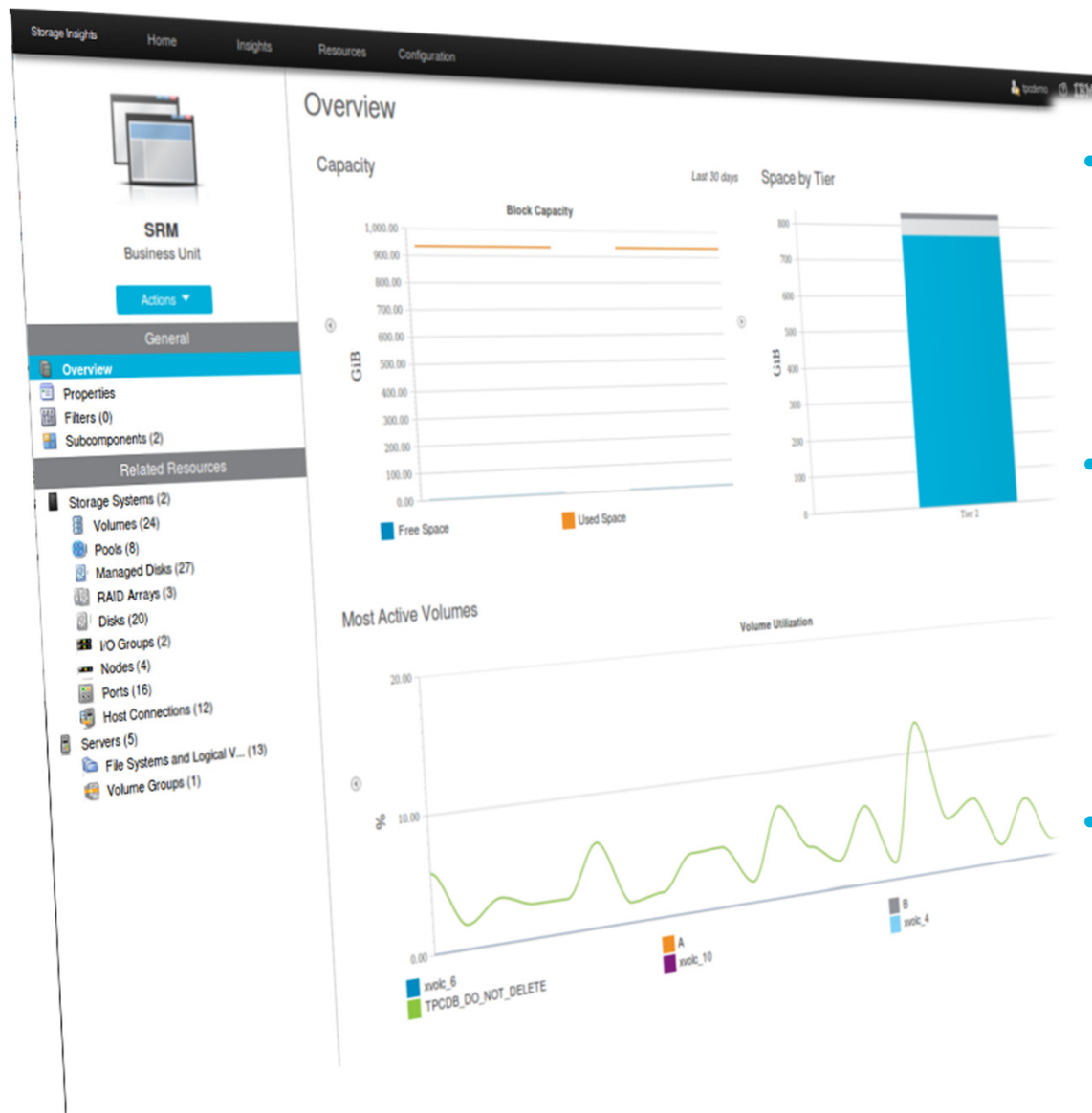
Value within Days and Beyond ...

- Capacity trending with rate of growth to help determine future capacity needs
- Thin provisioning trending shows savings over traditional thick volumes
- Identify optimal placement of data based on performance and capacity trends

Start With The Storage Insights Pro Dashboard

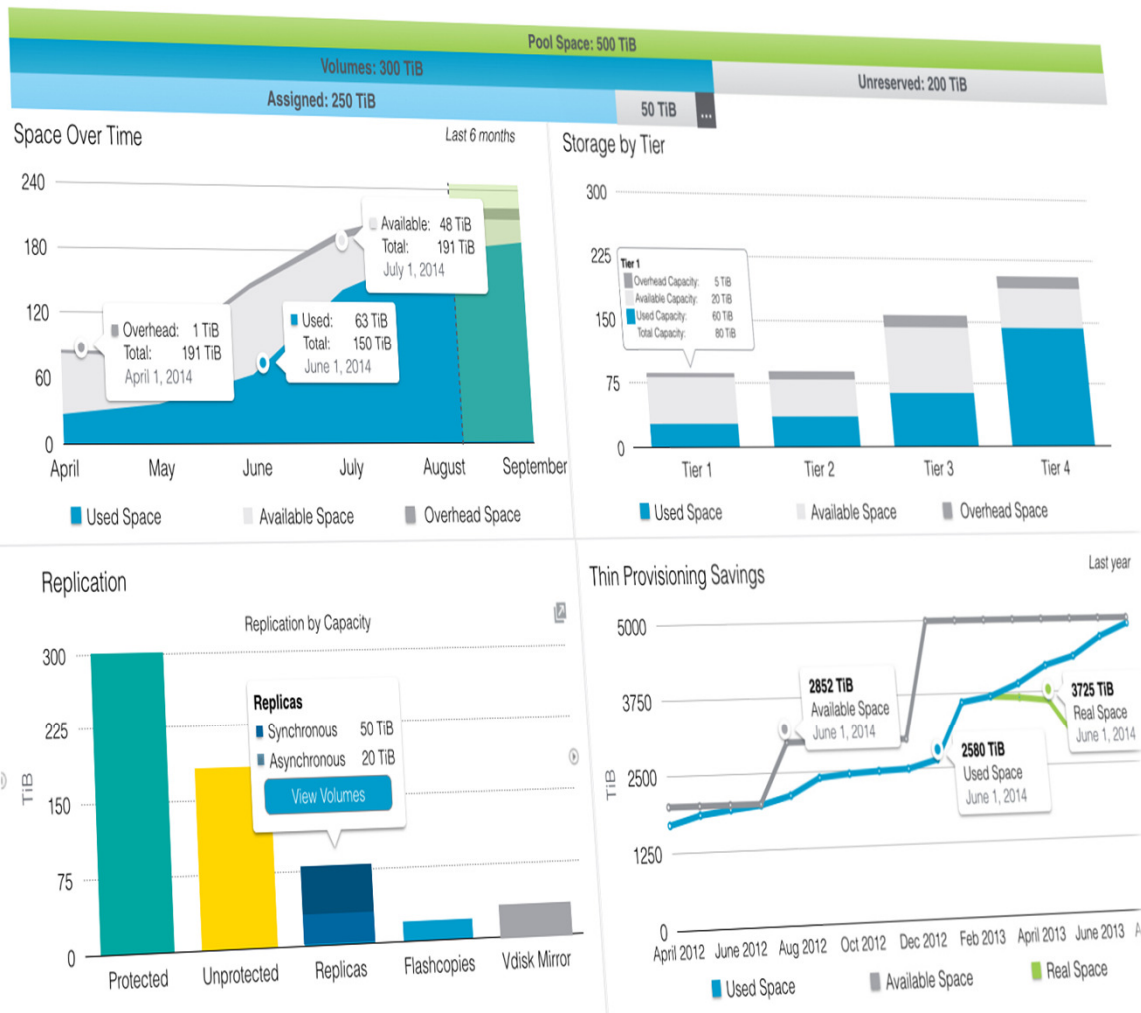


Storage Centric Application and Department Views



- Modeling applications and departments allows to relate storage utilization to business entities
- Application-centric views present all relevant information to understand the utilization of the application storage
- Helps the administrator to understand the “consumer’s view” on storage

Monitor block capacity and performance



- Capacity insights dashboards provide insights from multiple perspectives.
- Historical data as well as estimation of future trends help plan storage-related investments
- Savings achieved through thin provisioning or a break-down of capacity >by tier< can easily be determined

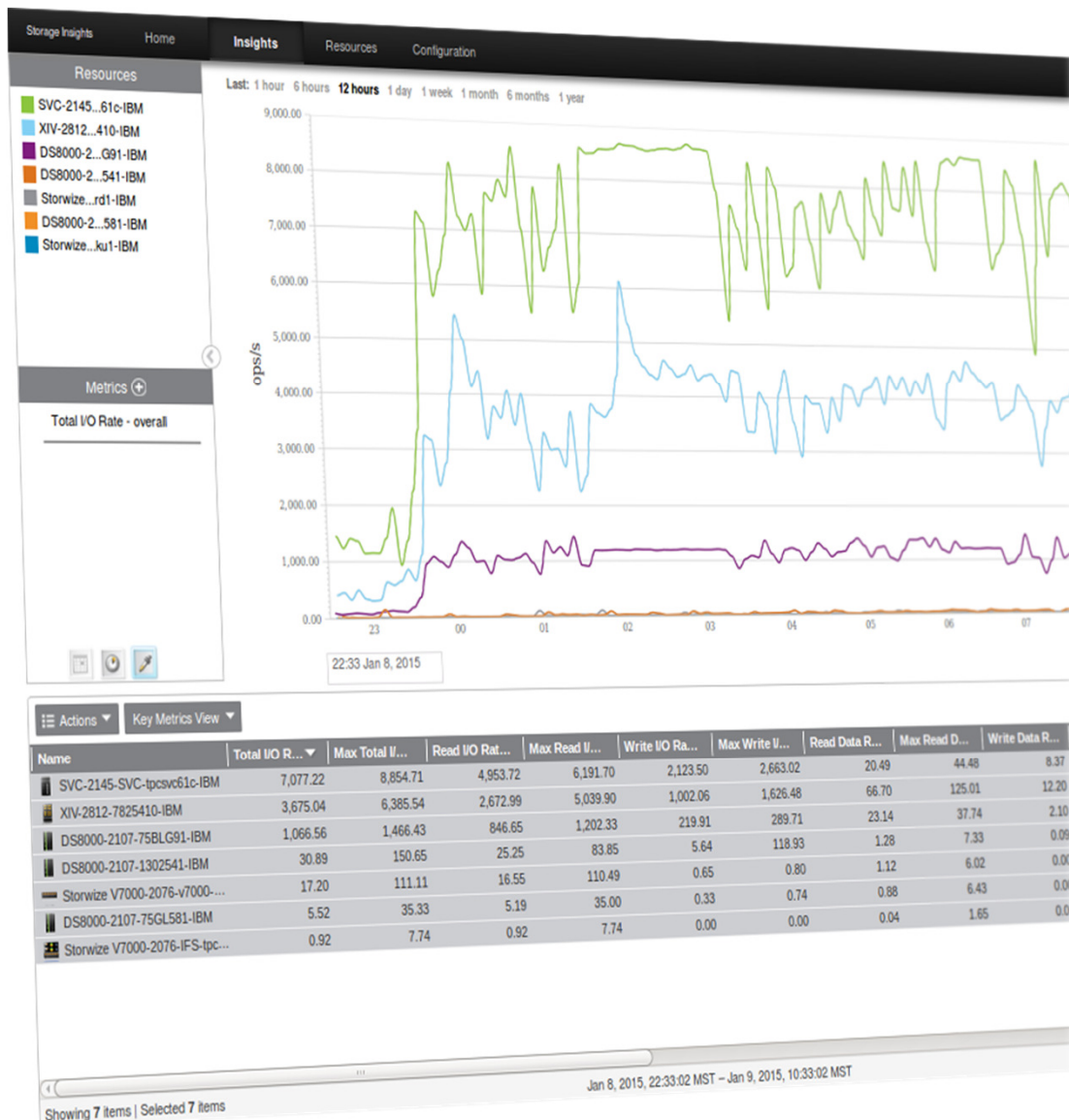
Monitor file capacity and performance

Capacity



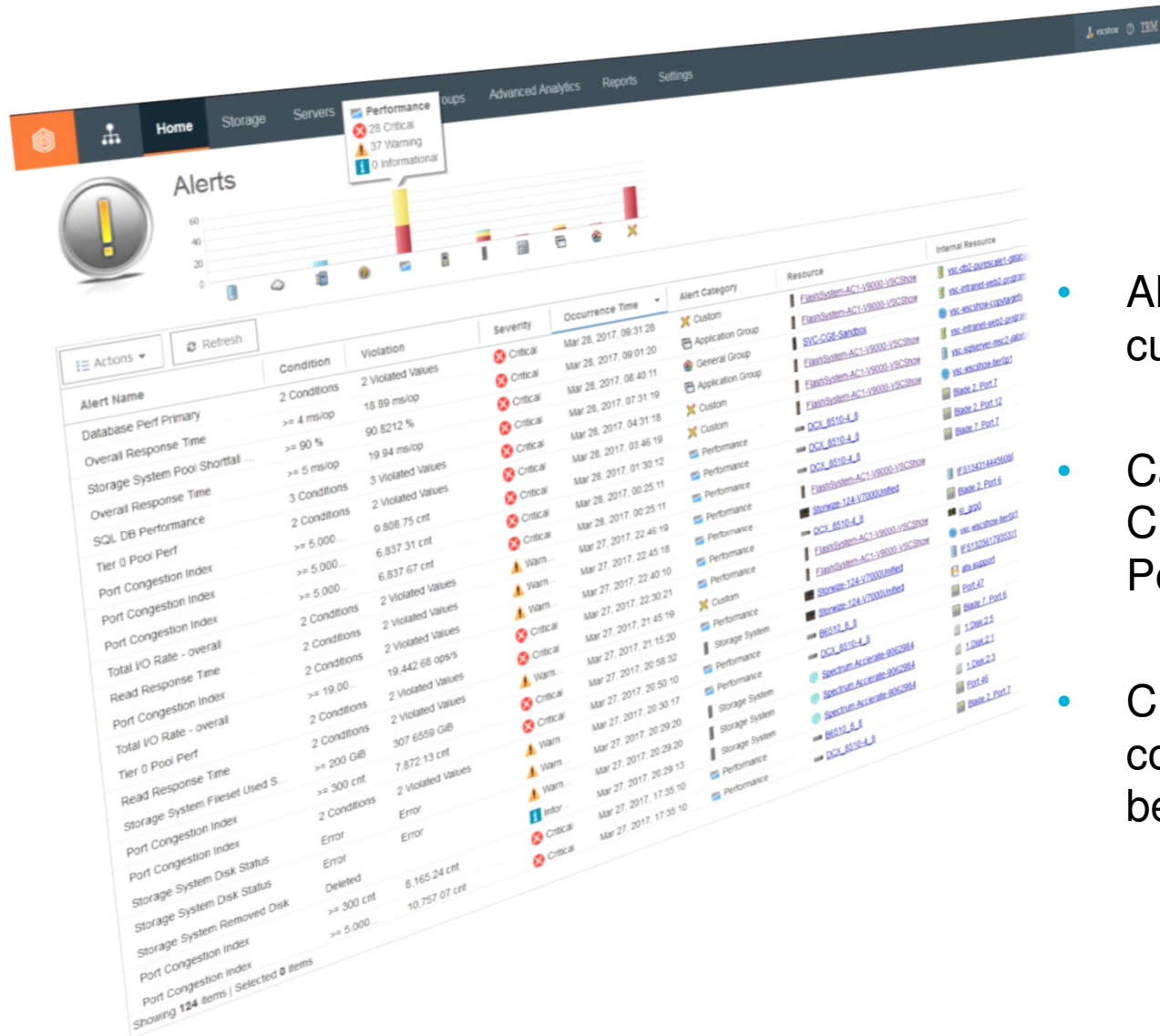
- File-storage oriented views provide equivalent functionality as block-storage oriented views
- Views like >Most Utilized File Systems< show entities potentially needing attention
- Supports IBM Spectrum Scale clusters

The Performance Insights Dashboard



- The performance insights dashboard allows to easily identify the most utilized storage system.
- Data is available at various aggregation levels to support problem determination as well as trend analysis
- Data anomalies (like spikes or unexpected increase of values) are easily visible from the charts

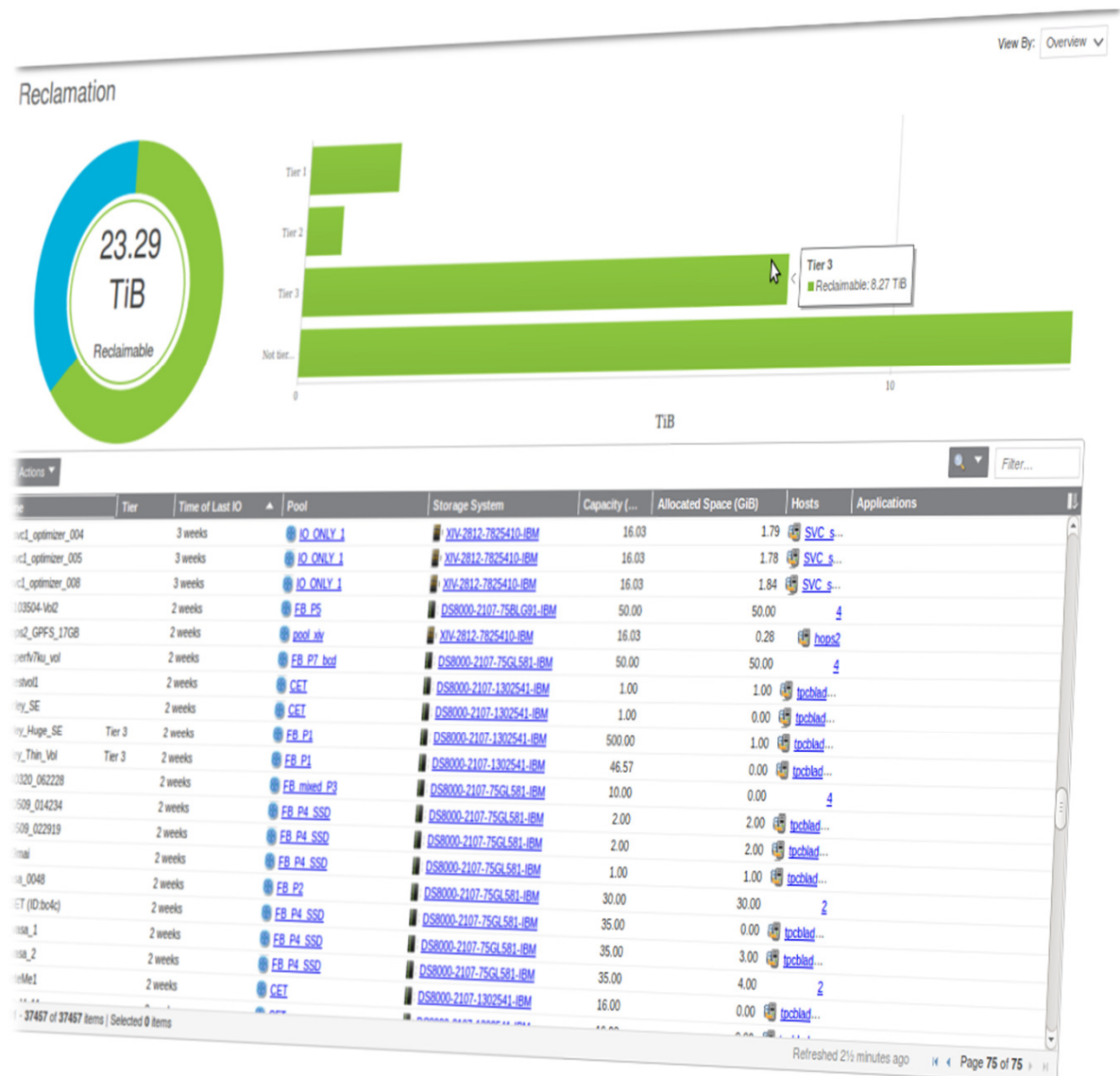
Alerts are now part of Storage Insights Pro



- Alerts are highly customizable
- Can Alert on State Change, Capacity and Performance
- Custom multi-conditional Alerts can be specified

Reclaim allocated, but unused storage

- The reclamation insights dashboard help saving costs by identifying allocated, but unused storage
- Analytics-based identification of unassigned or unused storage supports finding space wasters
- Breakdown by tier allows easy estimation of potentially saved amount

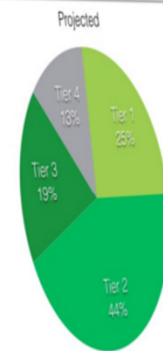
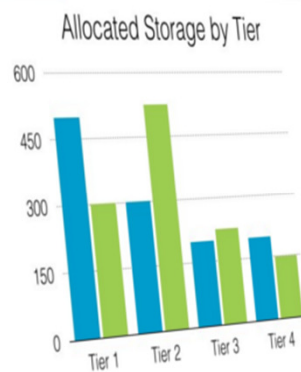
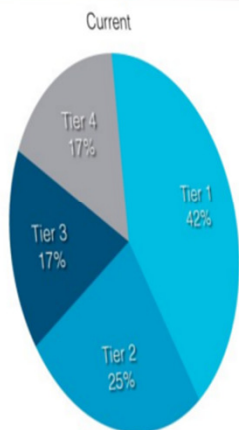


Optimize data placement with analytics

Future Tier Planning

View by: Overview

July 4, 2014 12:03 MST
Not all capacity can be analyzed



Name	Tier	Time of Last IO	Pool	Storage System	Capacity (GB)	Allocated Space (GB)	Years	Applications
svc1_optimizer_004		3 weeks	IO_ONLY_1	XV4-2012-7025410-IBM	16.00	1.79	1.79	svc1_*
svc1_optimizer_005		3 weeks	IO_ONLY_1	XV4-2012-7025410-IBM	16.00	1.84	1.84	svc1_*
svc1_optimizer_008		2 weeks	IO_ONLY_1	XV4-2012-7025410-IBM	50.00	50.00	50.00	+
S103504-Vol2		2 weeks	pool_xv	DS8000-2107-7581GG1-IBM	16.00	0.28	0.28	base*
hops2_GPFS_17GB		2 weeks	FB_P5	XV4-2012-7025410-IBM	50.00	1.00	1.00	hops*
tpcperf7ku_vol		2 weeks	FB_P7_bcd	DS8000-2107-7581GG1-IBM	1.00	0.00	0.00	hops*
testvol1		2 weeks	CET	DS8000-2107-1302541-IBM	1.00	1.00	1.00	hops*
Shirley_SE	Tier 3	2 weeks	FB_P1	DS8000-2107-1302541-IBM	500.00	0.00	0.00	hops*
Shirley_Huge_SE	Tier 3	2 weeks	FB_P1	DS8000-2107-1302541-IBM	46.57			hops*
Shirley_Thin_Vol	Tier 3	2 weeks	FB_P1	DS8000-2107-1302541-IBM				hops*

- Advanced analytics based tier planning predictions help make informed investment decisions
- Tier recommendations represent an optimized configuration based on actual utilization and configuration
- Specific volumes are identified along with source and target tier to provide immediately actionable visibility.

Capability Matrix – Foundation versus Pro

		Foundation	Storage Insights Pro
Price		Entitled	Subscription
Monitoring	Inventory	Basic	✓
	Logical configuration	Basic	✓
	Performance	Basic	100+ metrics
	Capacity	Basic	✓
	Health	Call Home events	Call Home events
Service	Hassle-free log collection	✓	✓
	Active tickets	✓	✓
	Simplified ticket workflows	✓	✓
Cognitive Analytics	Upgrade recommendations	✓	✓
	Best practice violations		✓
	Business impact analysis		✓
	Fully customizable multi-conditional alerting		✓
	Optimize data placement with tiering		✓
	Optimize capacity with reclamation		✓

Storage Insights Pro Trial from Foundations

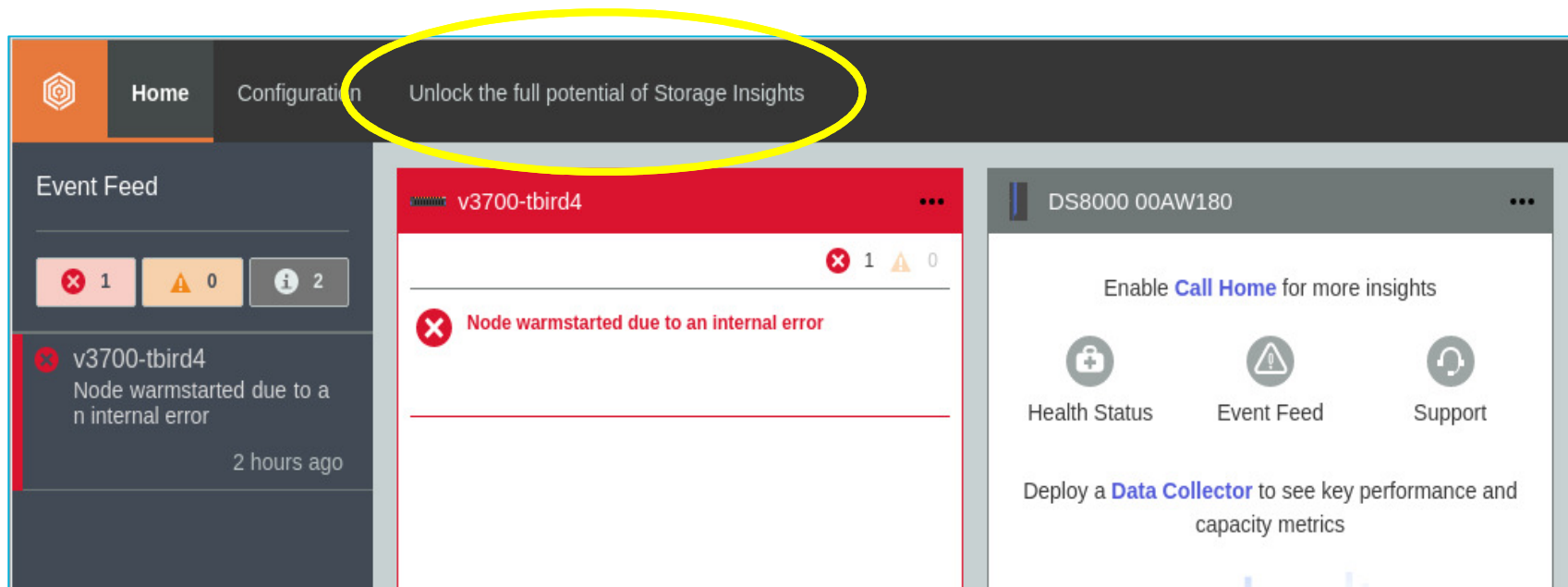
Customers of free Storage Insights Foundation can test the full/paid Storage Insights Pro version for a trial period of 30 days

- New free Storage Insights Foundation instances can be upgraded once for a 30-day period to the full/paid Storage Insights Pro functionality
- Trial is started from within the Storage Insights Foundation UI and active immediately
- Automatic switch back to Storage Instance Foundation after 30-day period has expired
- Customer can purchase full Storage Insights Pro during or after the trial period to unlock full functionality
- Full Storage Insights Pro Trial is ONLY available from existing Storage Insights Foundation instance

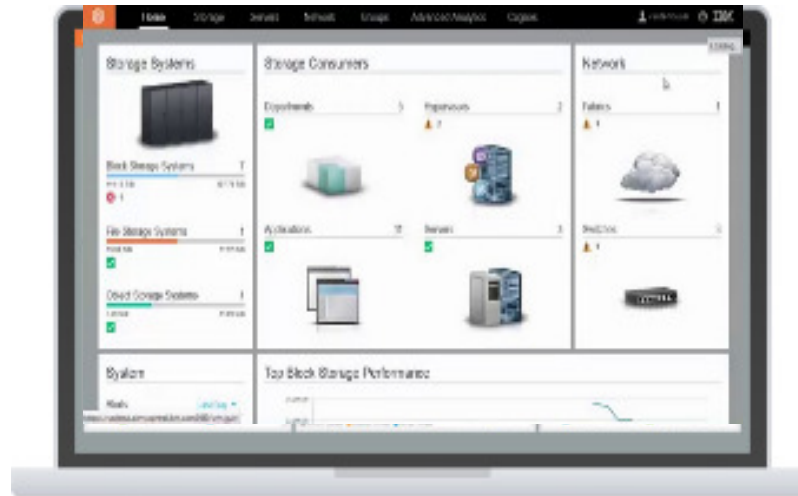
How To Trial Insights Pro from Insights Foundation

From Storage Insights Foundation Dashboard

- Select “Unlock the full potential of Storage Insights”



Spectrum Control On-Premise Storage Management



IBM Spectrum Control Standard Edition

IBM Spectrum Control Advanced Edition

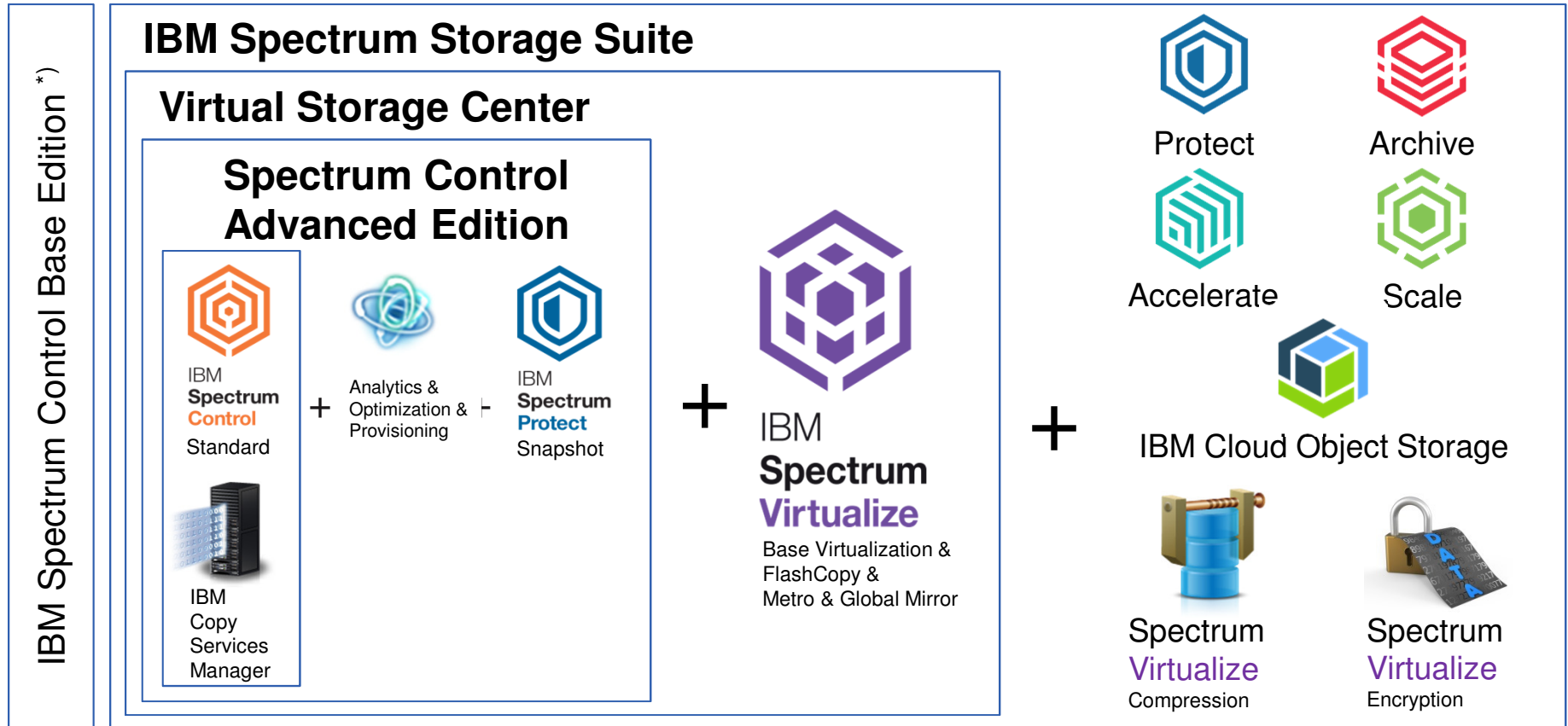
IBM Virtual Storage Center
IBM Virtual Storage Center for Storwize

IBM Spectrum Storage Suite

On-premises, performance management, monitoring and reporting tool.

Spectrum Storage Software Packages

This diagram shows which product is included in which package



*) Free of charge

Product Detail From the Previous Chart

Be aware that there are different “License Types” that can be used:

- SCU – Storage Capacity Units, differential pricing for Flash/SSD / SAS / SATA
- Enclosure – A tray of disks for things like Storwize, FlashSystem & XIV
- TiB – Standard Tera-Byte

Product	AAS PID	PPA PID	License Type	License Information	Sales Manual
IBM Spectrum Control Standard Edition	5608-PC1	5725-F93	SCU	L-KKEY-ANYKCS	EMEA/US
IBM Spectrum Control Standard Select Edition	5608-PC2	5725-G33	Enclosure	L-KKEY-ANYKJK	EMEA/US
IBM Spectrum Control Advanced Edition	5641-AEA	5725-Y23	SCU	L-KKEY-ANYKQF	EMEA/US
IBM Spectrum Control Advanced Select Edition	5641-ASE	5725-Y24	Enclosure	L-KKEY-ANYKT7	EMEA/US
IBM Virtual Storage Center	5608-AE1	5725-F92	SCU	L-KKEY-ANYL28	EMEA/US
IBM Virtual Storage Center Entry Edition	5608-AP1	5725-P45	TiB	L-KKEY-ANYL9R	EMEA/US
IBM Virtual Storage Center For Storwize	5608-ACL	5725-P92	Enclosure	L-KKEY-ANYL66	EMEA/US
IBM Storage Insights	n/a	5725-U02	TiB	Cloud SaaS Terms	EMEA/US
IBM Spectrum Storage Suite (1.0.1)	n/a	5725-Y36	TiB	L-BEBY-AD3T79	EMEA/US
IBM Spectrum Virtualize Software for SVC V7	5641-VC7	5725-M19	SCU	L-SSCZ-AJUTPV	EMEA/US
IBM Spectrum Virtualize Software for SVC Real-time Compression Software V7	5641-CP7	5725-H04	SCU	L-SSCZ-AJUTPV	EMEA/US

IBM integration, innovation and holistic approach

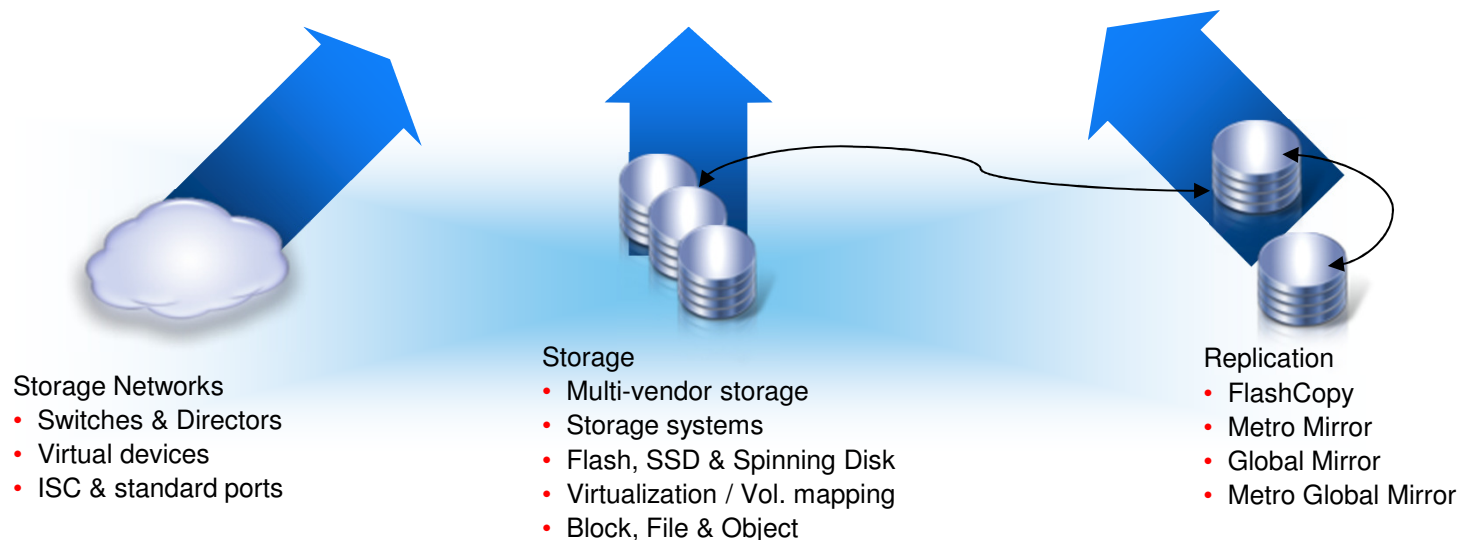
Incredible Ease of Use

Expanded Flexibility

Unparalleled Scalability

IBM Spectrum Control Standard Edition

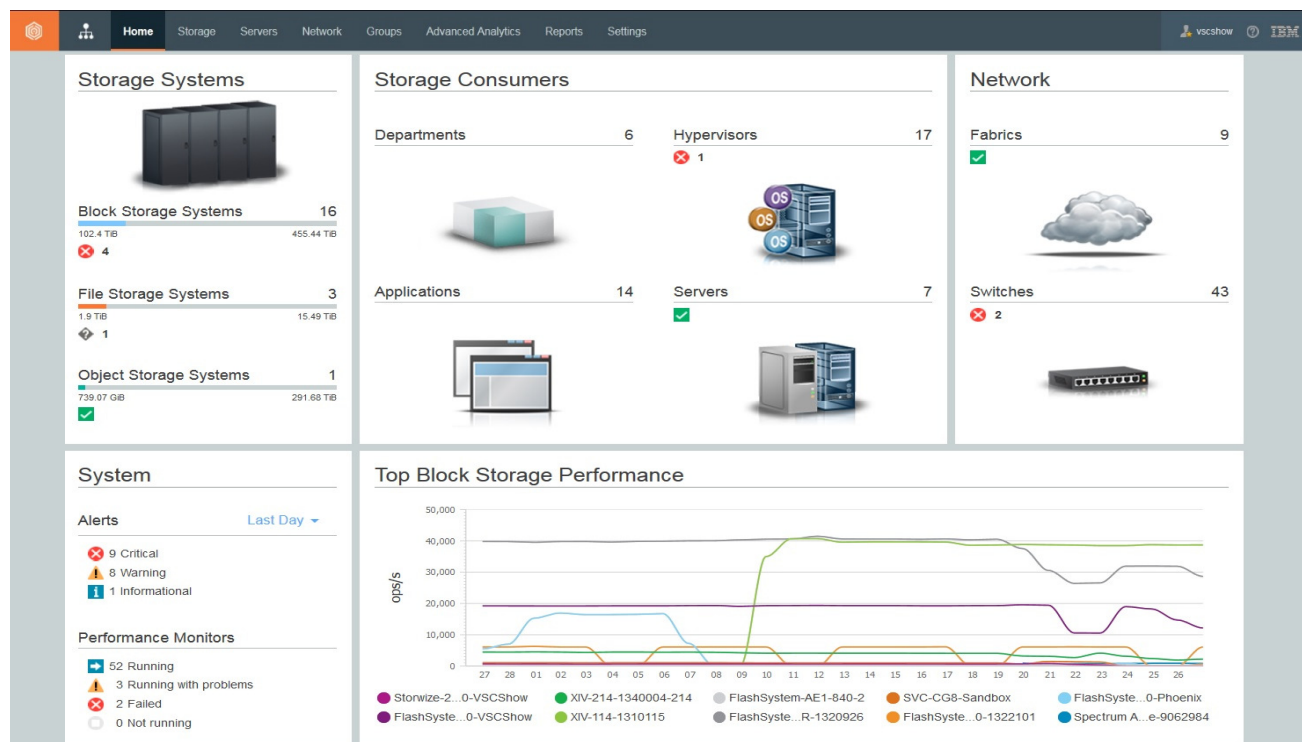
- Single management console
- Heterogeneous storage
- Health monitoring
- Capacity management
- Fabric management
- FlashCopy support
- Application and Department views
- Storage System Performance management
- SAN Fabric Performance management
- Complex event processing (Alerts)
- Historical Trend Analysis
- Cognos Reporting included
- DR & Business Continuity
- Enclosure license available



Spectrum Control Dashboard

What this is

- We have been listening to customer feedback about our current dashboard
 - Previous dashboard was focused on infrastructure
 - Did not embrace the move to consumer based views
- Now supports department and application views in addition to infrastructure items
- Puts important information out front with minimum drill down



Why This Matters

- Faster access to critical information
- Views more configurable to consumer based views
- Puts consumer views “out front” where clients will be able to take greater advantage of them

Washington Systems Center - Storage

Alerts Consolidated for all Storage Components

Alerts

28 Critical
37 Warning
0 Informational

Hover over view of all Alerts (Performance in this case)

Alert Name	Condition	Violation	Severity	Occurrence Time	Alert Category	Resource	Internal Resource	Alert Creator
Database Perf Primary	2 Conditions	2 Violated Values	Critical	Mar 28, 2017, 09:31:28	Custom	FlashSystem-AC1-V9000-VSCShow	vsc-db2-purescale1-database	vscshow
Overall Response Time	>= 4 ms/op	18.89 ms/op	Critical	Mar 28, 2017, 09:01:20	Application Group	FlashSystem-AC1-V9000-VSCShow	vsc-intranet-web2-program	vscshow
Storage System Pool Shortfall ...	>= 90 %	90.8212 %	Critical	Mar 28, 2017, 08:40:11	General Group	SVC-CG8-Sandbox	vsc-wscshow-copytargets	vscshow
Overall Response Time	>= 5 ms/op	18.89 ms/op	Critical	Mar 28, 2017, 07:31:19	Application Group	FlashSystem-AC1-V9000-VSCShow	vsc-intranet-web2-program	vscshow
SQL DB Performance	3 Conditions	3 Violated Values	Critical	Mar 28, 2017, 04:31:18	Custom	FlashSystem-AC1-V9000-VSCShow	vsc-sqlserver-msc2-database	vscshow
Tier 0 Pool Perf	2 Conditions	2 Violated Values	Critical	Mar 28, 2017, 03:46:19	Custom	FlashSystem-AC1-V9000-VSCShow	vsc-wscshow-tier0p1	vscshow
Port Congestion Index	>= 5,000...	9,808.75 cnt	Critical	Mar 28, 2017, 01:30:12	Performance	DCX_8510-4_8	Blade 2_Port 7	vscshow
Port Congestion Index	>= 5,000...	6,837.31 cnt	Critical	Mar 28, 2017, 00:25:11	Performance	DCX_8510-4_8	Blade 2_Port 12	vscshow
Port Congestion Index	>= 5,000...	6,837.67 cnt	Critical	Mar 28, 2017, 00:25:11	Performance	DCX_8510-4_8	Blade 7_Port 7	vscshow
Total I/O Rate - overall	2 Conditions	2 Violated Values	Warn...	Mar 27, 2017, 22:46:19	Performance	FlashSystem-AC1-V9000-VSCShow		vscshow
Read Response Time	2 Conditions	2 Violated Values	Warn...	Mar 27, 2017, 22:45:18	Performance	Storwize-124-V7000Unified	IFS1343144156080	vscshow
Port Congestion Index	2 Conditions	2 Violated Values	Critical	Mar 27, 2017, 22:40:10	Performance	DCX_8510-4_8	Blade 2_Port 6	vscshow
Total I/O Rate - overall	>= 19,00...	19,446.00 cnt	Critical	Mar 27, 2017, 22:30:21	Performance	FlashSystem-AC1-V9000-VSCShow	io_orp0	vscshow
Tier 0 Pool Perf	2 Conditions	2 Violated Values	Critical	Mar 27, 2017, 21:45:19	Custom	FlashSystem-AC1-V9000-VSCShow	vsc-wscshow-tier0p1	vscshow
Read Response Time	2 Conditions	2 Violated Values	Critical	Mar 27, 2017, 21:15:20	Performance	Storwize-124-V7000Unified	IFS1343144156080	vscshow
Storage System Fileset Used S...	>= 200 GiB	307.6559 GiB	Critical	Mar 27, 2017, 20:58:32	Storage System	Storwize-124-V7000Unified	als-support	vscshow
Port Congestion Index	>= 300 cnt	7,872.13 cnt	Critical	Mar 27, 2017, 20:50:10	Performance	B6510_8_8	Port 47	vscshow
Port Congestion Index	2 Conditions	2 Violated Values	Warn...	Mar 27, 2017, 20:30:17	Performance	DCX_8510-4_8	Blade 7_Port 6	vscshow
Storage System Disk Status	Error	Error	Warn...	Mar 27, 2017, 20:29:20	Storage System	Spectrum Accelerate-9062984	1.Disk 2.5	vscshow
Storage System Disk Status	Error	Error	Warn...	Mar 27, 2017, 20:29:20	Storage System	Spectrum Accelerate-9062984	1.Disk 2.1	vscshow
Storage System Removed Disk	Deleted		Infor...	Mar 27, 2017, 20:29:13	Storage System	Spectrum Accelerate-9062984	1.Disk 2.3	vscshow
Port Congestion Index	>= 300 cnt	8,165.24 cnt	Critical	Mar 27, 2017, 17:35:10	Performance	B6510_8_8	Port 46	vscshow
Port Congestion Index	>= 5,000...	10,757.07 cnt	Critical	Mar 27, 2017, 17:35:10	Performance	DCX_8510-4_8	Blade 2_Port 7	vscshow

Sorted on Last Occurrence

Categories include Custom and Group Alerts

Hyperlinks for fast navigation

Showing 124 items | Selected 0 items

Refreshed 2 minutes ago

Custom Alerts are Multi-Conditional

Alerts

- 1 Critical
- 0 Warning
- 0 Informational

Alerts Definitions Notification Settings

Storage System	Volumes	Pools	Managed Disks	RAID Array	Disks	I/O Groups	Nodes	Ports	Host Connections	Custom
11/34	2/9	2/38	2/15	1/3	2/3	1/3	8/18	5/20	0/2	1/1

+ Create Alert

Flash Volume Performance

- Flash Volume Performance

Volumes	Performance	Overall Response Time	>=	1.5	ms/op	-
Volumes	Performance	Total Data Rate	>=	30	MiB/s	-
Volumes	Performance	Read Cache Hits - VC	<=	85	%	-
Pools	General	Tier	<=	1		- +

Save Cancel

Select Custom

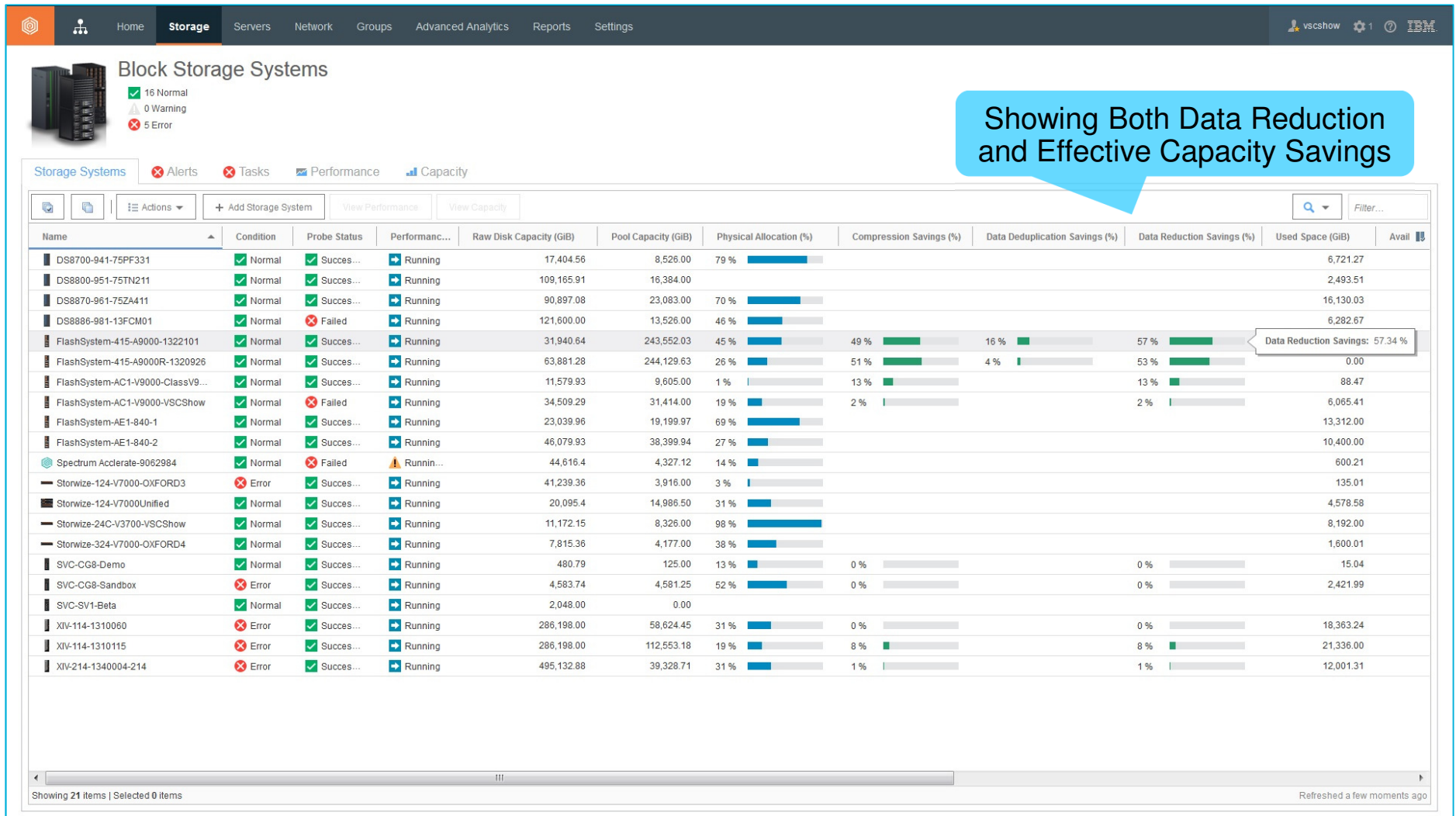
Pick Alert type, Performance here

Add as many conditions as desired, all "anded"

Select operands and values

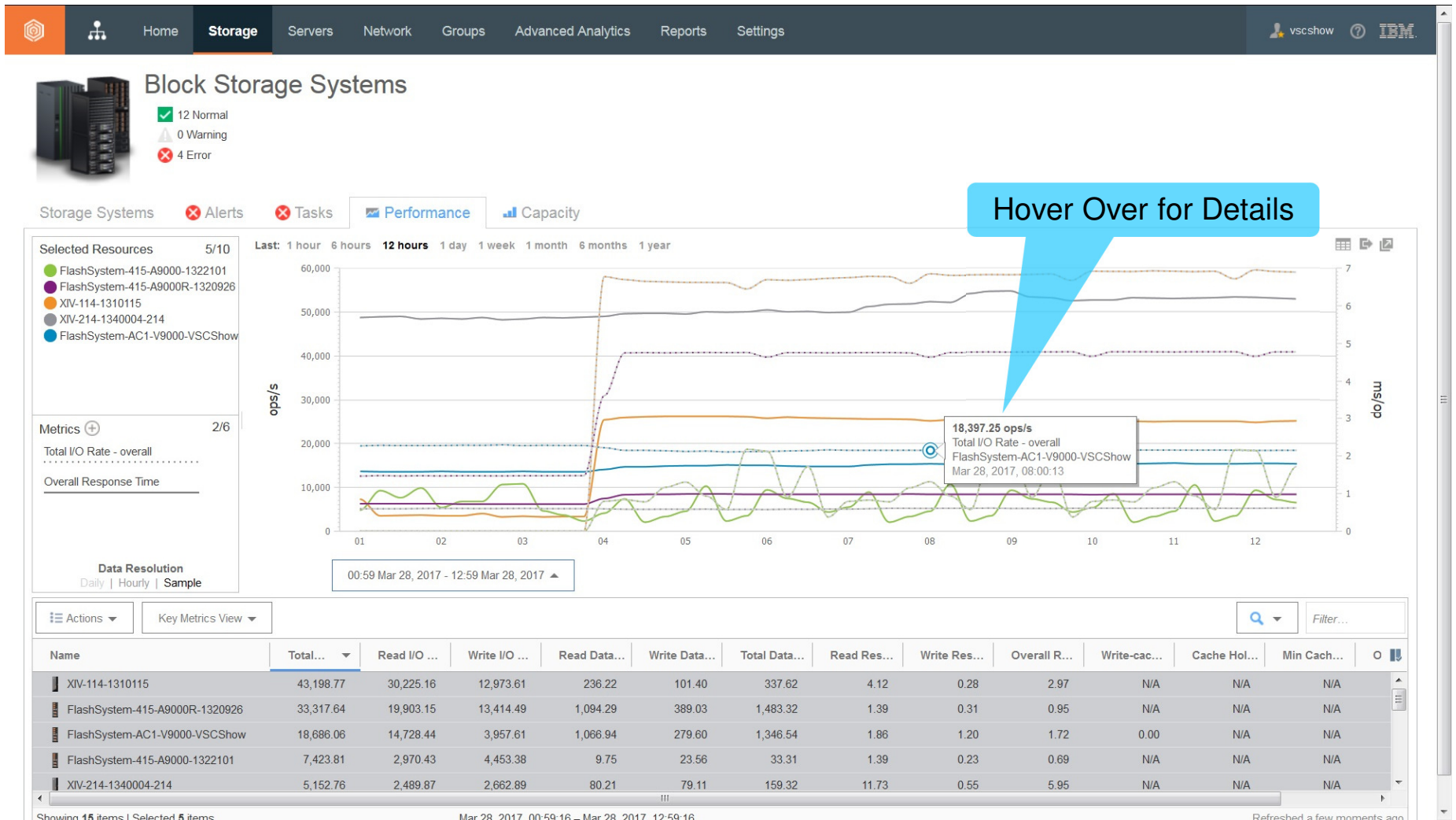
Washington Systems Center - Storage

Capacity Reporting - Block Storage System Overall



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Performance Reporting - Block Storage System Overall



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Storage System Reporting Not Limited to IBM Only

The screenshot displays the IBM Storage Management console interface. At the top, there is a navigation bar with tabs for Home, Storage, Servers, Network, Groups, Advanced Analytics, Cognos, and Settings. The main header area shows 'Block Storage Systems' with a status summary: 9 Normal, 2 Warning, and 9 Error. Below this, there are tabs for Alerts, Tasks, Performance, and Capacity. The main content area features a table of storage systems with columns for Name, Vendor, Condition, Probe Status, Performance, Pool Capacity (GiB), Pool Shortfall (%), Pools, Volumes, Firmware, and Location. A callout box points to the table with the text: 'Storage Management Initiative Specification (SMI-S) used to collect 3rd Party Storage Metrics'. The table lists various storage systems from vendors like EMC, IBM, Fujitsu, Hitachi, and Network Appliance.

Name	Vendor	Condition	Probe Status	Performanc...	Pool Capacity (GiB)	Pool Shortfall (%)	Pools	Volumes	Firmware	Location
APM00114104374	EMC Corporat...	Error	Failed	Disabled	6,509.19		13	155		
DS4700-DS4700-1-600A0B80...	IBM	Error	Successful	Running	6,048.34		3	11		
FlashSystem 900-9840-gui-tex...	IBM	Error	Successful	Disabled	3,839.99		1	9	1.4.2.0 (build ...	
FUJ-DX80S2	FUJITSU	Error	Successful	Disabled	1,835.00		6	134	V10L30-802r	
FUJI_DX200_2	FUJITSU	Error	Successful	Disabled	13,951.49		7	14	V10L30-0000	
SVC-2145-Colbert_9.48.150.6...	IBM	Error	Successful	Running	4,106.00	65%	6	148	7.5.0.4 (build ...	
SVC-2145-samanthabee-IBM	IBM	Error	Successful	Running	9,837.00	0%	4	37	7.1.0.12 (buil...	
Uninitialized Name (HP MSA 2...	HP	Error	Successful	Failed	207.84		4	32		
VNXE Unified 24	EMC Corporat...	Error	Failed	Disabled			2	0		
3PAR_ARR_1	HP 3PAR	Warning	Successful	Running	477.75		9	27		
VMAX Storage Array	EMC Corporat...	Warning	Successful	Failed	19,139.07		10	671		
AMS2100@10.1.134.253	Hitachi	Normal	Successful	Running wi...	2,558.52		3	103		
APM00145042834	EMC Corporat...	Normal	Successful	Failed	8,882.82		6	17		
FNM00135000491	EMC Corporat...	Normal	Failed	Disabled			1	0		
FUJI_DX200_1	FUJITSU	Normal	Successful	Running	23,765.39		13	35	V10L60-210k	
oxide	NetApp Inc.	Normal	Successful	Running	168.95		2	28	Data ONTAP ...	
StorageSystem-VSP-65422	HITACHI	Normal	Successful	Running wi...	59,613.48		18	551		
Storwize V7000-2076-gui-lfs-0...	IBM	Normal	Successful	Running	18,602.00	0%	7	53	7.6.0.4 (build ...	
XIV-2810-MX90007-IBM	IBM	Normal	Successful	Running	5,744.00	0%	2	26	10.2.4.f-internal	
zinc	Network Appli...	Normal	Successful	Running	168.04		1	31	Data ONTAP ...	

Showing 20 items | Selected 1 item

Refreshed 1 1/2 minutes ago

What This Is

Greatly simplified management of jobs related to data collection and management for storage resources

Client Value

Less time spend managing resources and quicker access to information in the event there is an issue

The screenshot shows the IBM Storage Systems management interface. At the top, there's a navigation bar with 'Storage' selected. Below it, a summary for 'Block Storage Systems' shows 12 Normal, 0 Warning, and 4 Error status. A table lists various storage systems with columns for Name, Condition, Probe Status, Performance, and Pool Capacity. A context menu is open over the 'FlashSystem-AC1-V9000-VSC>Show' entry, with 'Data Collection' selected, which has opened a sub-menu with 'Start Probe' selected.

Name	Condition	Probe Sta...	Performa...	Pool Capacity (G...
DS8870-961-75ZA411	Normal	Succ...	Runn...	23,083.00
FlashSystem-415-A9000-1322101	Normal	Succ...	Runn...	259,243.33
FlashSystem-415-A9000R-1320926	Normal	Succ...	Runn...	225,935.42
FlashSystem-AC1-V9000-Phoenix	Normal	Succ...	Runn...	9,599.00
FlashSystem-AC1-V9000-VSC>Show	Normal	Succ...	Runn...	30,390.00
FlashSystem-AE1-840-1			Runn...	19,199.97
FlashSystem-AE1-840-2			Runn...	38,399.94
Spectrum Accelerate-9062			Runn...	4,327.12
Storwize-124-V7000Unifi			Runn...	14,986.50
Storwize-24C-V3700-VSC			Runn...	8,326.00
Storwize-324-V7000-OXF				77.00
SVC-CG8-Demo				25.00
SVC-CG8-Sandbox				31.25
XIV-114-1310060				56.71
XIV-114-1310115			Runn...	73,817.45
XIV-214-1340004-214			Runn...	41,764.71

Washington Systems Center - Storage

Copy Data Panels Show Replication Metrics

The screenshot displays the IBM Storage Copy Data management interface. At the top, a navigation bar includes Home, Storage, Servers, Network, Groups, Advanced Analytics, Reports, and Settings. The main header shows 'Copy Data' with a circular refresh icon and two progress bars: 'Primary data: 11.45 TiB' (blue) and 'Copies of local data: 3.75 TiB' (green).

Below the header, there are tabs for 'Summary', 'Remote Relationships (21)', 'Consistency Groups (2)', 'FlashCopy (18)', 'VDisk Mirrors (6)', and 'HyperSwap (0)'. The 'Remote Relationships (21)' tab is active, showing a table of replication relationships. The table has columns for Name, Status, Type, Source → Target Volume, Consistency Group, Source → Target Pool, and Source → Target Storage Syst. One row, 'rcrel15', is highlighted in red and marked as 'Inconsistent Stopped'.

On the left side, there is a sidebar with a tree view showing 'FlashSystem...0-VSCShow' (IBM FlashSystem V9000 - 9846) and various resource categories like General, Internal Resources, and Related Resources.

At the bottom of the interface, a status bar indicates 'Showing 21 items | Selected 1 item' and 'Refreshed 1½ minutes ago'. A JavaScript URL is visible at the very bottom of the page.

Name	Status	Type	Source → Target Volume	Consistency Group	Source → Target Pool	Source → Target Storage Syst
rcrel14	Consistent Synchronized	Metro Mirror	vsc-epic-db-bus-objects-archivelog ⇒ vsc-...	VSC_Epic-MMP	vsc-wscshow-tier2...	FlashSystem-AC1-V9000-VSC:
rcrel19	Consistent Synchronized	Metro Mirror	vsc-epic-db-bus-objects-database ⇒ vsc-e...	VSC_Epic-MMP	vsc-wscshow-tier0...	FlashSystem-AC1-V9000-VSC:
rcrel17	Consistent Synchronized	Metro Mirror	vsc-epic-db-bus-objects-log ⇒ vsc-epic-db-bus-c...	VSC_Epic-MMP	vsc-wscshow-easy...	FlashSystem-AC1-V9000-VSC:
rcrel10	Consistent Synchronized	Metro Mirror	vsc-epic-db-cogito-archivelog ⇒ vsc-epic-db-c...	VSC_Epic-MMP	vsc-wscshow-tier2...	FlashSystem-AC1-V9000-VSC:
rcrel20	Consistent Synchronized	Metro Mirror	vsc-epic-db-cogito-database ⇒ vsc-epic-db-c...	VSC_Epic-MMP	vsc-wscshow-tier1...	FlashSystem-AC1-V9000-VSC:
rcrel12	Consistent Synchronized	Metro Mirror	vsc-epic-db-cogito-log ⇒ vsc-epic-db-cogito-l...	VSC_Epic-MMP	vsc-wscshow-easy...	FlashSystem-AC1-V9000-VSC:
rcrel9	Consistent Synchronized	Metro Mirror	vsc-epic-db-cogito-test-archivelog ⇒ vsc-epic-...	VSC_Epic-MMP	vsc-wscshow-tier1...	FlashSystem-AC1-V9000-VSC:
rcrel18	Consistent Synchronized	Metro Mirror	vsc-epic-db-cogito-test-database ⇒ vsc-epi...	VSC_Epic-MMP	vsc-wscshow-tier1...	FlashSystem-AC1-V9000-VSC:
rcrel11	Consistent Synchronized	Metro Mirror	vsc-epic-db-shadow-archivelog ⇒ vsc-epic-...	VSC_Epic-MMP	vsc-wscshow-tier2...	FlashSystem-AC1-V9000-VSC:
rcrel16	Consistent Synchronized	Metro Mirror	vsc-epic-db-shadow-database ⇒ vsc-epic-...	VSC_Epic-MMP	vsc-wscshow-tier0...	FlashSystem-AC1-V9000-VSC:
rcrel13	Consistent Synchronized	Metro Mirror	vsc-epic-db-shadow-log ⇒ vsc-epic-db-sha...	VSC_Epic-MMP	vsc-wscshow-easy...	FlashSystem-AC1-V9000-VSC:
rcrel15	Inconsistent Stopped	Metro Mirror	vsc-epic-db-cogito-test-log ⇒ vsc-epic-db-cogit...	vsc-epic-db-cogito-test-log ⇒ vsc-epic-db-cogilo-test-log-practice	AC1-V9000-VSC:	FlashSystem-AC1-V9000-VSC:
rcrel0	Consistent Copying	Global Mirror with Change ...	vsc-epic-db-failover-archivelog ⇒ vsc-epic-db-f...	VSC_EpicDB-GMC	vsc-wscshow-tier2...	FlashSystem-AC1-V9000-VSC:
rcrel1	Consistent Copying	Global Mirror with Change ...	vsc-epic-db-failover-database ⇒ vsc-epic-d...	VSC_EpicDB-GMC	vsc-wscshow-tier1...	FlashSystem-AC1-V9000-VSC:
rcrel2	Consistent Copying	Global Mirror with Change ...	vsc-epic-db-failover-log ⇒ vsc-epic-db-failover...	VSC_EpicDB-GMC	vsc-wscshow-easy...	FlashSystem-AC1-V9000-VSC:
rcrel6	Consistent Copying	Global Mirror with Change ...	vsc-epic-db-prod-archivelog ⇒ vsc-epic-db-pro...	VSC_EpicDB-GMC	vsc-wscshow-tier2...	FlashSystem-AC1-V9000-VSC:
rcrel5	Consistent Copying	Global Mirror with Change ...	vsc-epic-db-prod-database ⇒ vsc-epic-db-...	VSC_EpicDB-GMC	vsc-wscshow-tier0...	FlashSystem-AC1-V9000-VSC:
rcrel4	Consistent Copying	Global Mirror with Change ...	vsc-epic-db-prod-log ⇒ vsc-epic-db-prod-log-t...	VSC_EpicDB-GMC	vsc-wscshow-easy...	FlashSystem-AC1-V9000-VSC:
rcrel7	Consistent Copying	Global Mirror with Change ...	vsc-epic-db-test-archivelog ⇒ vsc-epic-db-test...	VSC_EpicDB-GMC	vsc-wscshow-tier2...	FlashSystem-AC1-V9000-VSC:
rcrel8	Consistent Copying	Global Mirror with Change ...	vsc-epic-db-test-database ⇒ vsc-epic-db-t...	VSC_EpicDB-GMC	vsc-wscshow-tier1...	FlashSystem-AC1-V9000-VSC:

Washington Systems Center - Storage

Network: Fabrics & Switches

vscshow
Home Storage Servers **Network** Groups Advanced Analytics Reports Settings

41 Normal
0 Warning
2 Error

Switches Alerts Performance

Actions Add Switch View Performance

Name	Condition	Probe Status	Performance...	Fabric	Principal Switch of Fabric	Ports	Connected P...	Links	Mode	Vendor	Model
ATS-VS1-MDS9148S-A	Normal	Successful	Running	san_ATS-VS1-MDS9148S-A		8	8	port-chann...	Native	Cisco Systems, Inc.	DS-C9148S-K9
ATS-VS1-MDS9148S-A	Normal	Successful	Disabled	VS1-VLAN101	ATS-VS1-MDS9148S-A	4	4	port-chann...		Cisco Systems, Inc.	DS-C9148S-K9
ATS-VS1-MDS9148S-B	Normal	Successful	Running	san_ATS-VS1-MDS9148S-B		8	8	port-chann...	Native	Cisco Systems, Inc.	DS-C9148S-K9
ATS-VS1-MDS9148S-B	Normal	Successful	Disabled	VS1-VSAN102	ATS-VS1-MDS9148S-B	4	4	port-chann...		Cisco Systems, Inc.	DS-C9148S-K9
B6510_1_128	Normal	Successful	Running	10000027F80619BD	B6510_7_128	35	11	9	Native	Brocade	Brocade 6510
B6510_1_15	Normal	Successful	Running	10000027F80619BF	B6510_7_15	17	13	7	Native	Brocade	Brocade 6510
B6510_1_16	Normal	Successful	Running	10000027F80619C0	DCX_8510_4_16	17	13	7	Native	Brocade	Brocade 6510
B6510_1_8	Normal	Successful	Running	10000027F80619BE	B6510_3_8	2	2	2	Native	Brocade	Brocade 6510
B6510_2_128	Normal	Successful	Running	10000027F80619BD	B6510_7_128	23	9	9	Native	Brocade	Brocade 6510
B6510_2_15	Normal	Successful	Running	10000027F80619BF	B6510_7_15	23	23	7	Native	Brocade	Brocade 6510
B6510_2_16	Normal	Successful	Running	10000027F80619C0	DCX_8510-4_16	23	23	7	Native	Brocade	Brocade 6510
B6510_2_8	Normal	Successful	Running	10000027F80619BE	B6510_3_8	2	2	2	Native	Brocade	Brocade 6510
B6510_3_128	Normal	Successful	Running	10000027F80619BD	B6510_7_128	47	47	9	Native	IBM	IBM System Storage SA
B6510_3_15	Normal	Successful	Running	10000027F80619BF	B6510_7_15	10	10	7	Native	IBM	IBM System Storage SA
B6510_3_16	Normal	Successful	Running	10000027F80619C0	DCX_8510-4_16	10	10	7	Native	IBM	IBM System Storage SA
B6510_3_8	Normal	Successful	Running	10000027F80619BE	B6510_3_8	4	4	4	Native	IBM	IBM System Storage SA
B6510_4_128	Normal	Successful	Running	10000027F80619BD	B6510_7_128	34	13	9	Native	Brocade	Brocade 6510
B6510_4_16	Normal	Successful	Running	10000027F80619C0	DCX_8510-4_16	28	19	7	Native	Brocade	Brocade 6510
B6510_4_8	Normal	Successful	Running	10000027F80619BE	B6510_3_8	2	2	2	Native	Brocade	Brocade 6510
B6510_5_128	Normal	Successful	Running	10000027F80619BD	B6510_7_128	34	13	9	Native	Brocade	Brocade 6510
B6510_5_15	Normal	Successful	Running	10000027F80619BF	B6510_7_15	28	19	7	Native	Brocade	Brocade 6510
B6510_5_8	Normal	Successful	Running	10000027F80619BE	B6510_3_8	2	2	2	Native	Brocade	Brocade 6510

Showing 43 items | Selected 0 items Refreshed a few moments ago

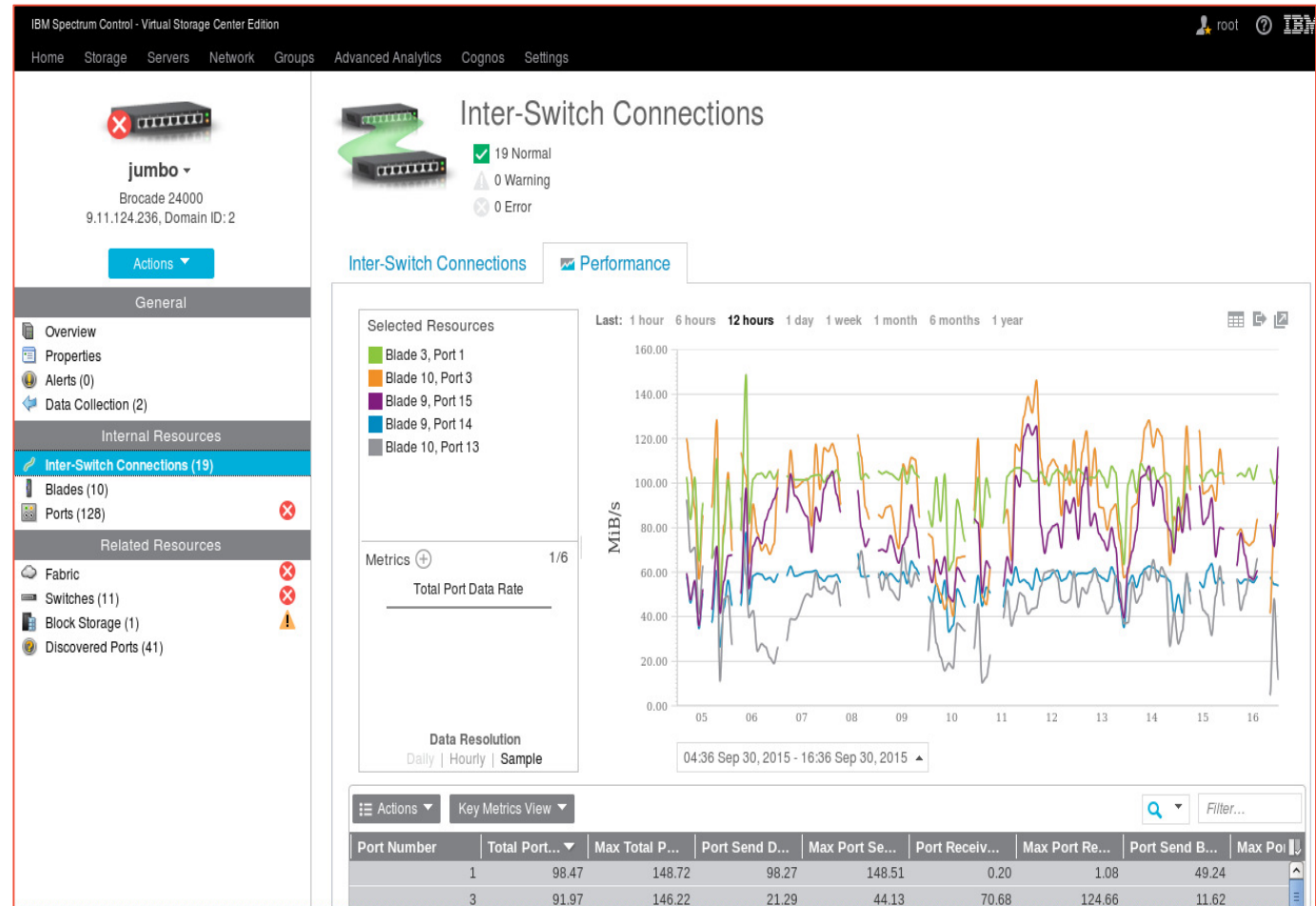
Inter-switch Link Performance Support

What this is

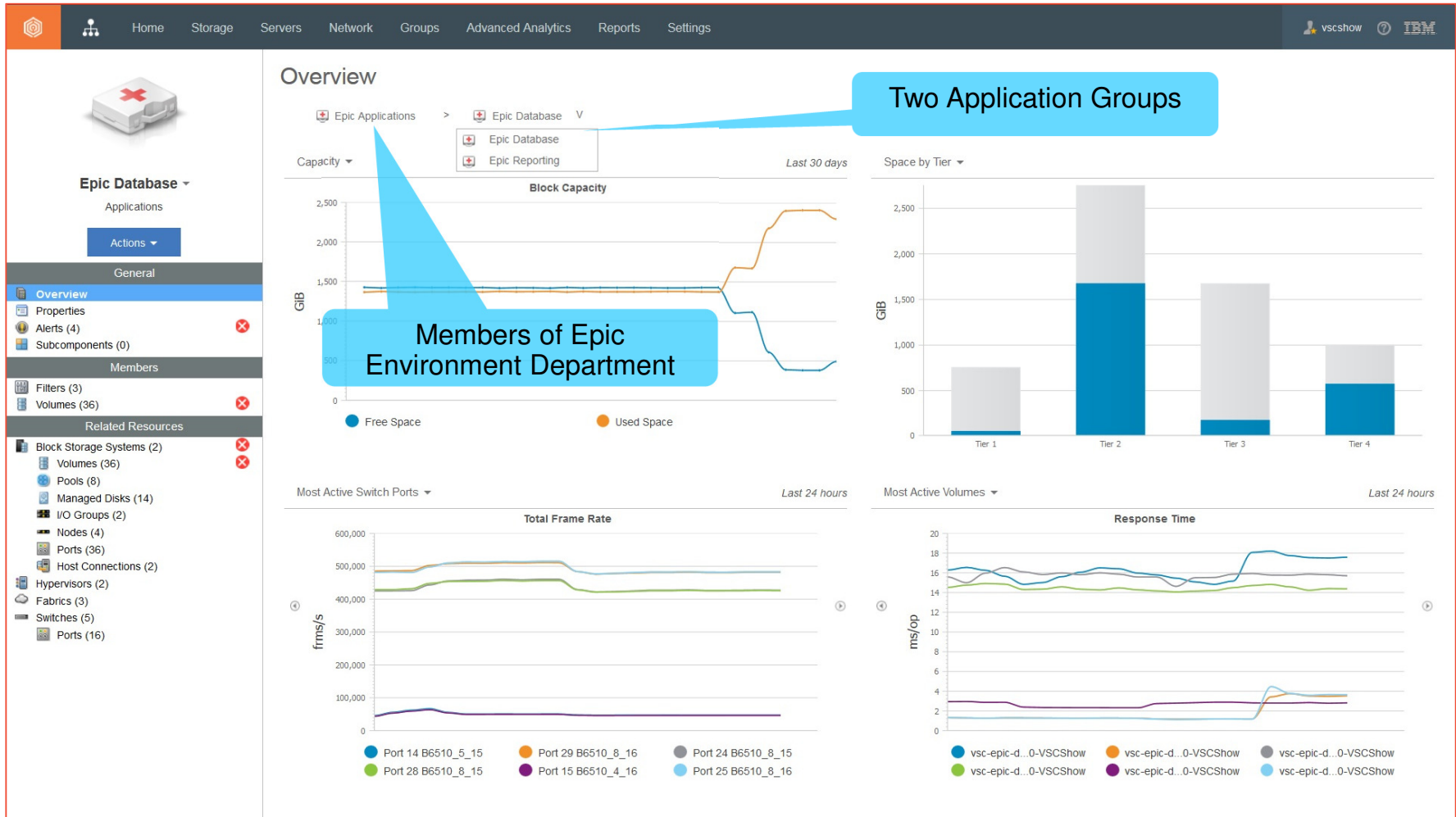
- Additional support for performance monitoring of inter-switch links

Why This Matters

- Improves awareness of the conditions within the fabric
- Greater insights into performance away from the edges



Application Group Monitoring



Servers Are Automatically Discovered and Correlated

Servers

- 16 Normal
- 1 Warning
- 0 Error
- 278 Agentless

Servers Alerts Tasks

Actions + Deploy Agent

Name	Con...	Probe Sta...	Agent State	OS Type	OS Version	IP Address	Virtual Machine	Hypervisor	Used Space (%)	Total Disk Space (GiB)
hub1	Normal	Warn...	Up	Linux	3.10.0-327.el...	192.168.62.12	No		57 %	2,367.22
newton02	Normal	Warn...	Up	Linux	3.10.0-327.el...	192.168.62.41	No		30 %	3,214.38
plato01	Normal	Warn...	Up	Linux	3.10.0-693.1...		No		30 %	2,501.95
gpfsnsd410.digital...	Normal	Warn...	Up	Linux	3.10.0-327.el...		No		18 %	3,214.38
plato08	Normal	Warn...	Up	Linux	3.10.0-327.el...		No		30 %	3,214.38
specprotect-1.v7u.gb...	Normal	Warn...	Up	AIX	7.1.4.30		No	Unknown	11 %	8,748.00
X3650m4-1	Agent...	N/A		Other	Unknown		No			25,806.30
zCG_P8_Broker	Agent...	N/A		AIX	Unknown		No			15,717.38
SVC6 to p7	Agent...	N/A		Other	Unknown		No			14,116.43
V7kU-7	Agent...	N/A		Other	Unknown		No			8,192.00
CG_Broker	Agent...	N/A		AIX	Unknown		No			8,143.91
SAN3550-3	Agent...	N/A		Other	Unknown		No			6,144.00
ats-vs1-v7u	Agent...	N/A		Other	Unknown		No			5,120.00
CG_san3650_15	Agent...	N/A		Other	Unknown		No			4,801.95
SAN3650-12	Agent...	N/A		Other	Unknown		No			3,072.00
MY_OXFORD6	Agent...	N/A		Other	Unknown		No			1,987.27
atssan35509loc	Agent...	N/A		Other	Unknown		No			1,811.56
atssan35502loc	Agent...	N/A		Other	Unknown		No			1,400.82

Storage Resource Agents (SRA's) can still be deployed for more detailed information

Automatic Agentless Servers Discovered

Servers Are Automatically Discovered and Correlated

The screenshot displays the IBM Storage Management console interface. The top navigation bar includes Home, Storage, Servers, Network, Groups, Advanced Analytics, Reports, and Settings. The main content area is titled 'Volumes' and shows a status summary: 28 Normal, 0 Warning, and 0 Error. A callout box points to this summary with the text 'Agentless Server automatically discovered'. On the left, a sidebar shows the 'CG_Broker' server selected, with a list of 'Related Resources' including 'Block Storage Systems (3)', 'Volumes (28)', 'Pools (4)', 'RAID Arrays (6)', 'Disks (48)', 'Nodes (2)', 'Modules (7)', 'Ports (44)', and 'Host Connections (3)'. A callout box points to the 'Volumes (28)' item with the text 'SAN storage correlated for both capacity and performance reporting'. The main area features a 'Performance' tab with a line chart showing 'Overall Response Time' over a 24-hour period. A tooltip for a data point on June 26, 2017, at 21:00:00 indicates a response time of 6.00 ms/op. Below the chart is a table with columns for Name, Storage System, Total I/O Rate - overall, Max Total I/O Rate - overall, and Overall Response Time...

Name	Storage System	Total I/O Rate - overall	Max Total I/O Rate - overall	Overall Response Time...
zLisa_Work_002	FlashSystem-A9000R-...	4,976.68	7,833.20	0.54
zLisa_Work_001	FlashSystem-A9000R-...	4,976.64	7,834.53	0.77
zLisa_Work_004	FlashSystem-A9000R-...	4,976.54	7,832.56	0.71

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We Can Also See the vmWare Environment

Under Servers we can look at both individual Servers and vmWare Hypervisors

Support views based on ESX Servers, Clusters, vCenters or Hypervisors

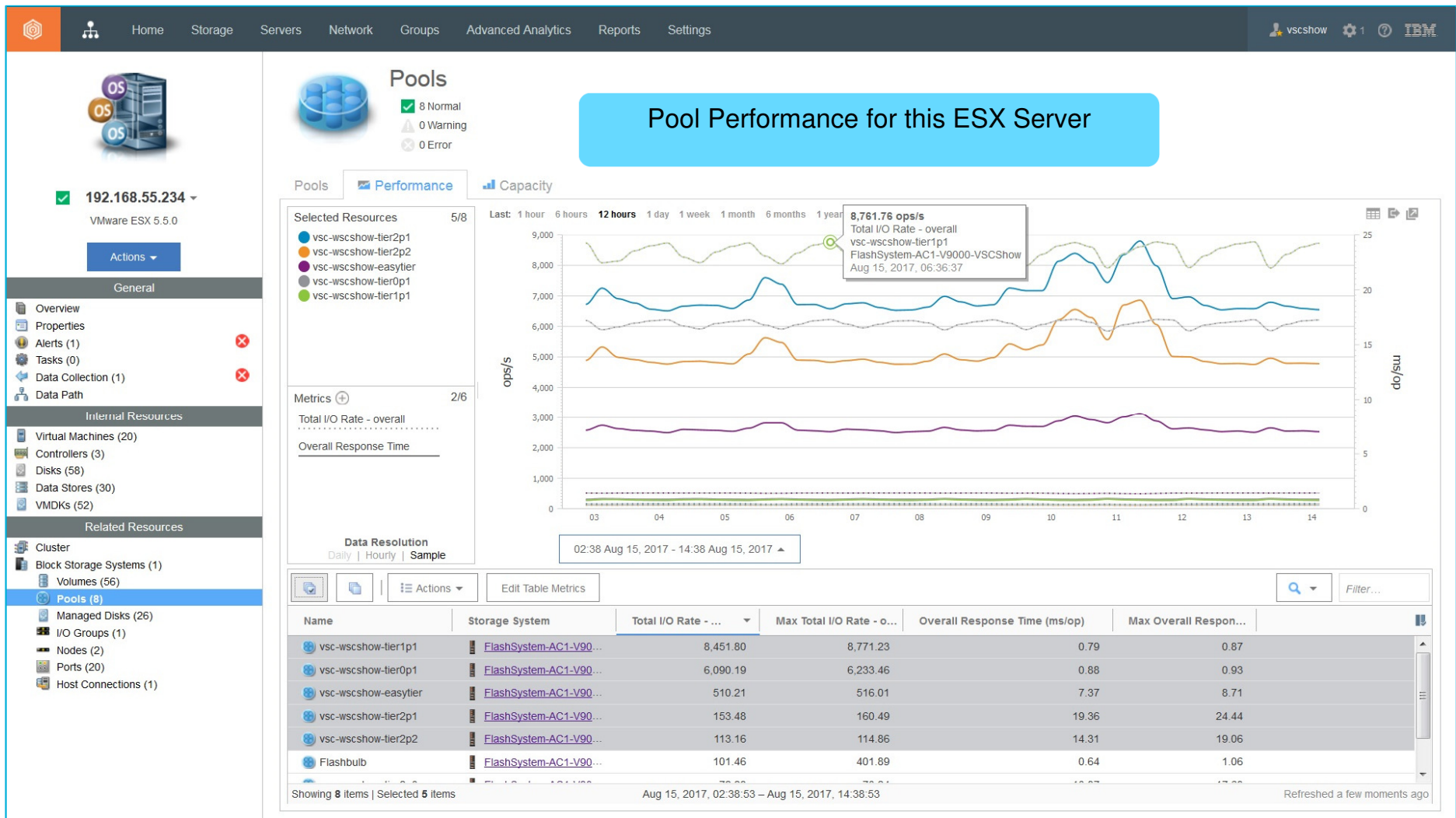
Name	Cluster	vCenter	Probe Status	OS Type	OS Versi...	Used Space (%)	Total Disk Space (...)	Available Disk Space (G...	RAM (GiB)	Vendor
192.168.55.234	VSC_Demo_Cluster	VSC_Show vCenter	Failed	VMware ESX	5.5.0	49%	6,643.82	1,323.03	127.97	IBM
192.168.55.233	VSC_Demo_Cluster	VSC_Show vCenter	Failed	VMware ESX	5.5.0	42%	5,316.82	608.02	31.97	IBM
192.168.55.231		VSC_Show vCenter	Successful	VMware ESX	5.5.0	17%	3,537.76	0.00	127.97	IBM
192.168.58.105	VersaStack_Management	VersaStack vCenter	Successful	VMware ESX	5.5.0	27%	15,348.00	10.01	255.74	Cisco Systems Inc
192.168.58.104	VersaStack_Management	VersaStack vCenter	Successful	VMware ESX	5.5.0	27%	15,348.00	10.01	255.74	Cisco Systems Inc
192.168.58.103	VersaStack_Management	VersaStack vCenter	Successful	VMware ESX	5.5.0	27%	15,348.00	10.01	255.74	Cisco Systems Inc
192.168.58.102	VersaStack_Management	VersaStack vCenter	Successful	VMware ESX	5.5.0	27%	15,348.00	10.01	255.74	Cisco Systems Inc
192.168.19.71		SC_Class vCenter	Successful	VMware ESX	5.5.0	25%	390.46	0.00	23.96	IBM
192.168.19.158		SC_Class vCenter	Successful	VMware ESX	5.5.0	25%	6,772.90	0.04	128.00	IBM
192.168.61.5		SC - CDM vCenter	Warning	VMware ESX	5.5.0	21%	2,759.04	217.32	191.99	IBM
192.168.55.250		SC - CDM vCenter	Successful	VMware ESX	5.5.0	21%	465.76	0.00	127.97	IBM
192.168.55.241		SC - CDM vCenter	Successful	VMware ESX	5.5.0	15%	3,307.82	1,948.91	127.97	IBM
192.168.55.239		SC - CDM vCenter	Successful	VMware ESX	5.5.0	16%	557.86	0.00	127.97	IBM
192.168.54.238		CSM vCenter	Successful	VMware ESX	5.1.0	55%	615.97	0.00	128.00	IBM
192.168.21.10		CSM vCenter	Successful	VMware ESX	5.0.0	65%	2,857.97	0.01	191.99	IBM
192.168.21.200			Failed	VMware ESX	5.0.0		951.00	951.00	71.99	IBM
192.168.19.70			Failed	VMware ESX	5.5.0	34%	683.46	5.00	23.96	IBM

Showing 17 items | Selected 0 items

Refreshed 1½ minutes ago

Washington Systems Center - Storage

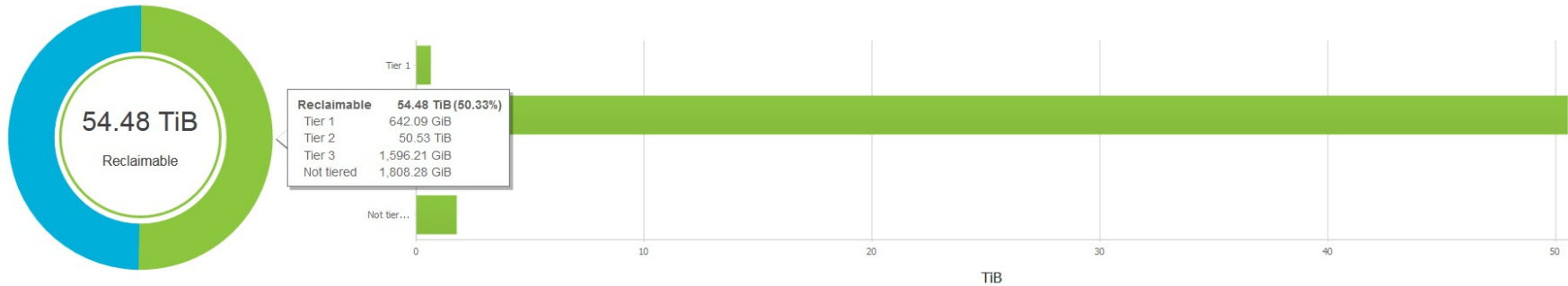
vmWare ESX Server Drill Down



Reclamation - Identifying Inactive Storage by Volume

Reclamation

View By: Reclaimable Capacity



Recommendations Excluded

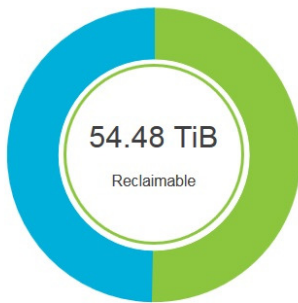
Name	Tier	Time of Last...	Pool	Storage System	Capacity (GiB)	Allocated Space (GiB)	Unallocated Space (GiB)	Hosts	Applic:
115_snaps.snap_group_00001.TEAM06_M...	Tier 2	None observed	TEAM06_SNAPSHOT	XIV-114-1310115	16.03	0.00	16.03		
115_snaps.snap_group_00001.TEAM06_M...	Tier 2	None observed	TEAM06_SNAPSHOT	XIV-114-1310115	16.03	0.00	16.03		
A9000_snapshot.snap_group_00001.zCSM...	Tier 1	None observed	zCSMPool	FlashSystem-415-A90...	192.53		0.00		
A9000_snapshot.snap_group_00001.zCSM...	Tier 1	None observed	zCSMPool	FlashSystem-415-A90...	192.53		0.00		
ABCDEFGHIJ123456789012345678901234...	Tier 2	None observed	MY_TPCR_POOL	SVC-CG8-Sandbox	3.00	3.00	0.00		
aEWH_1031_13_635.ECX_TEST17	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	16.03	0.00	16.03		
aEWH_1031_13_635.ECX_TEST34	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	32.05	0.00	32.05		
aEWH_1031_13_635.ECX_TEST51	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	16.03	0.00	16.03		
aEWH_1031_13_644.ECX_TEST17	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	16.03	0.00	16.03		
aEWH_1031_13_644.ECX_TEST34	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	32.05	0.00	32.05		
aEWH_1031_13_644.ECX_TEST51	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	16.03	0.00	16.03		
aEWH_1031_13_653.ECX_TEST17	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	16.03	0.00	16.03		
aEWH_1031_13_653.ECX_TEST34	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	32.05	0.00	32.05		
aEWH_1031_13_653.ECX_TEST51	Tier 2	None observed	Catalogic-Thin-Pool	XIV-214-1340004-214	16.03	0.00	16.03		

Showing 1 - 500 of 1869 items | Selected 0 items Refreshed 4 minutes ago Page 1 of 4

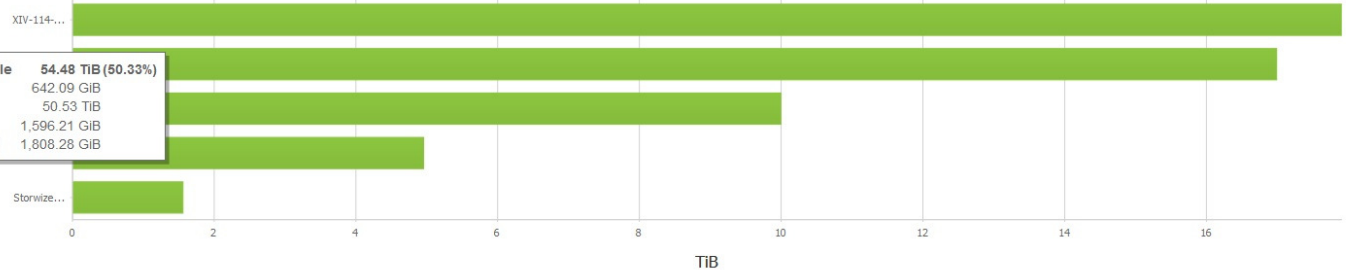
Reclamation - Identifying Inactive Storage by Storage System

Reclamation

View By: Storage Systems



Reclaimable 54.48 TiB (50.33%)
 Tier 1 642.09 GiB
 Tier 2 50.53 TiB
 Tier 3 1,596.21 GiB
 Not tiered 1,808.28 GiB



Actions

Storage System	Reclaimable Capacity (GiB)	Inactive Capacity (GiB)	Orphaned Capacity (GiB)	Percent Reclaimable (%)	Volumes
XIV-114-1310060	18,340.80 GiB	18,287.98 GiB	52.82 GiB	94	115
DS8870-961-75ZA11	17,398.72 GiB	17,398.72 GiB	0.00 GiB	91	312
XIV-114-1310115	10,236.06 GiB	10,182.83 GiB	53.22 GiB	42	438
XIV-214-1340004-214	5,073.42 GiB	4,979.64 GiB	93.78 GiB	35	249
Storwize-324-V7000-OXF...	1,596.19 GiB	1,596.19 GiB	0.00 GiB	99	73
Storwize-24C-V3700-VSC...	1,024.00 GiB	1,024.00 GiB	0.00 GiB	13	2
SVC-CG8-Sandbox	904.08 GiB	904.08 GiB	0.00 GiB	30	45
FlashSystem-AC1-V9000-...	607.37 GiB	607.37 GiB	0.00 GiB	9	6
Storwize-124-V7000Unified	555.70 GiB	555.70 GiB	0.00 GiB	16	9
FlashSystem-AC1-V9000-...	34.72 GiB	34.72 GiB	0.00 GiB	33	18
SVC-CG8-Demo	15.50 GiB	10.50 GiB	5.00 GiB	99	10
FlashSystem-415-A9000-...	0.00 GiB	0.00 GiB	0.00 GiB	0	412
FlashSystem-415-A9000R...	0.00 GiB	0.00 GiB	0.00 GiB	0	180

Showing 13 items | Selected 1 item

Refreshed a few moments ago

IBM Spectrum Control – Advanced Edition

Includes the Virtual Storage Center

Knowledge Center:

<https://www-01.ibm.com/support/knowledgecenter/SS5R93/welcome>

IBM integration, innovation and holistic approach

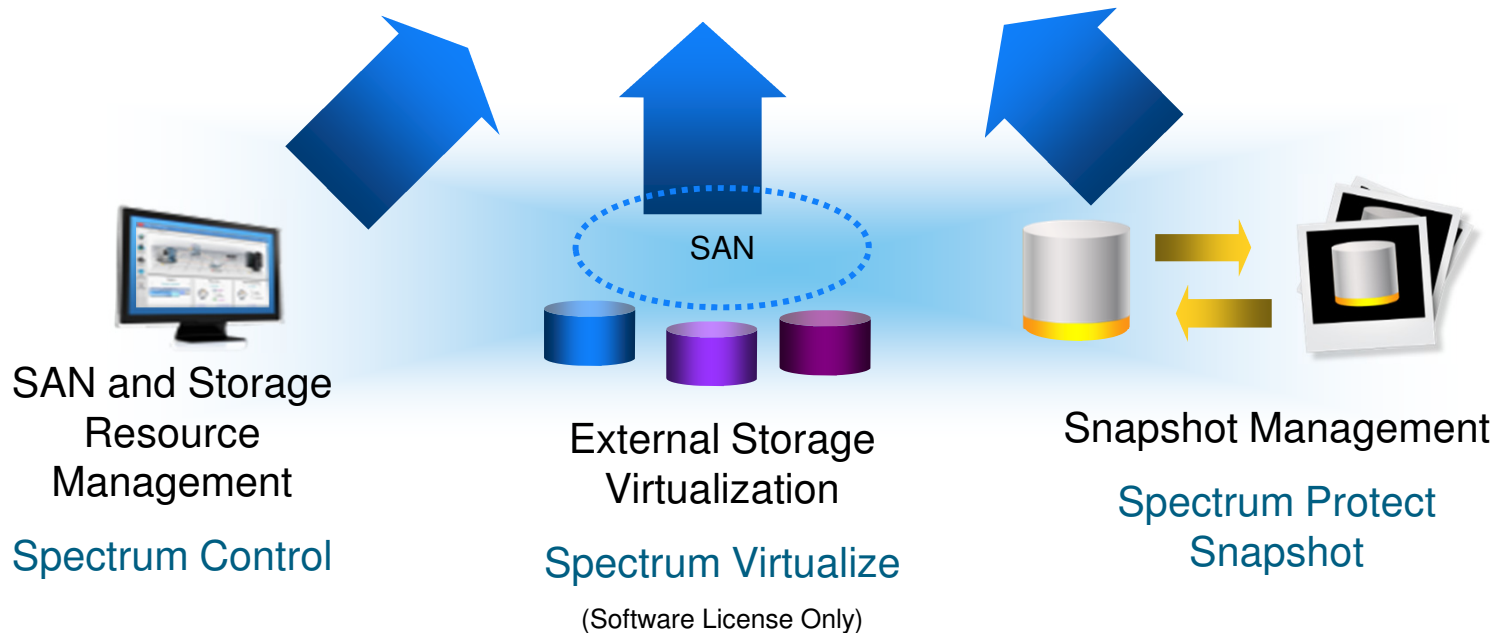
Incredible Ease of Use

Expanded Flexibility

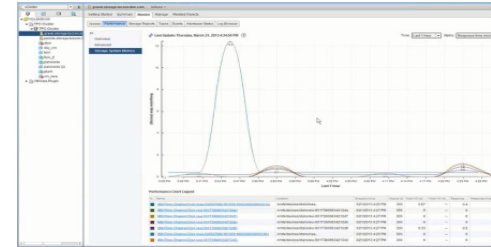
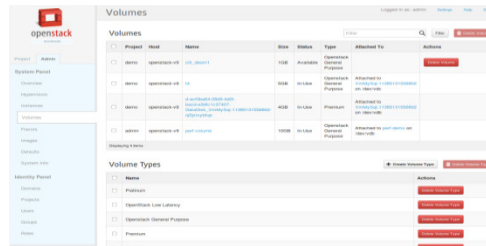
Automated Data Protection

IBM Virtual Storage Center

- Enables storage for private cloud computing
- Easy to buy and deploy
- Pay-as-you-go pricing



IBM Virtual Storage Center / Spectrum Control Advanced



- Integration and support for OpenStack, Vmware and private storage cloud
- Standardized storage services from service catalog
- Mobility of storage volumes
- Self service storage cloud
- Policy-based analytics and optimization of storage resources

OpenStack

VMWare



The Old Way to Provision



In larger environments, how do you really know which storage system and which pool in that storage system is the best place to provision new volumes?

The screenshot displays the IBM FlashSystem V9000 management interface. The main window shows a list of storage pools with columns for Name, Capacity, and Used Capacity. A 'Create Volumes' dialog box is open, allowing the user to select a pool and specify volume parameters. The dialog includes options for 'Basic', 'Mirrored', and 'Custom' volume creation, a 'Pool' dropdown menu, and a 'Quantity' field. A table of available pools is shown in the background, listing various storage pools and their capacity usage.

Pool Name	Capacity	Used Capacity
Flashbulb	9 Volume copies	2.08 TiB Allocated / 11.71 TiB
Protect-Plus	1 Volume copy	1.05 TiB Allocated / 16.17 TiB
vsc-wcshow-cop...	42 Volume copies	2.09 TiB Allocated / 4.17 TiB
vsc-wcshow-dat...	1 Volume copy	109.00 GiB Allocated / 945.00 GiB
vsc-wcshow-eas...	27 Volume copies	1.55 TiB Allocated / 4.82 TiB
vsc-wcshow-iso...	1 Volume copy	301.00 GiB Allocated / 2.34 TiB
vsc-wcshow-tie...	16 Volume copies	621.00 GiB Allocated / 2.34 TiB
vsc-wcshow-tie...	10 Volume copies	400.00 GiB Allocated / 962.00 GiB
vsc-wcshow-tie...	6 Volume copies	363.00 GiB Allocated / 945.00 GiB
vsc-wcshow-tie...	11 Volume copies	561.00 GiB Allocated / 945.00 GiB
vsc-wcshow-tie...	11 Volume copies	494.00 GiB Allocated / 945.00 GiB

The Software Defined Storage way: Use Service Classes



What This Is

Service Classes are the basis of the software abstraction layer for the provisioning of storage. Service Classes are created based on workload characteristics which enables objects to be placed on the appropriate tier with the appropriate characteristics.

Any number of Service Classes can be created to represent both file and block targets for provisioning requests.

The screenshot displays the IBM Storage Management console interface. The main area shows the 'Service Classes' configuration page. A table lists existing service classes:

Name	Type
Bronze	Block
EnhancedIsolation	File
Gold	Block
NormalIsolation	File
Platinum	Block
Silver	Block

The 'Platinum Properties' dialog is open, showing the following configuration options:

- Name: Platinum
- Description: Virtualized Uncompressed Flash Storage
- Storage tier: 10 (selected)
- RAID level: Any
- Virtualization: On
- VDisk mirroring: Off
- Thin provisioning: On
- Compression: Off
- Overallocation limit: 100 %
- Redundant fabrics: Off

The dialog also includes sections for 'Storage Constraints', 'Users', 'Volumes', and 'Candidate Storage'. A 'Close' button is visible at the bottom of the dialog.

Software Defined Provisioning with a Service Class / Capacity Pool

System Administrator



I Need to Provision Storage!

Storage Administrator



What Storage System to use?

What Storage Pool?

Is there enough space?

Is the pool already too busy?

Need to adjust Zoning ?

The screenshot shows the 'Provision Storage' dialog box in the IBM Storage management console. The dialog is titled 'Define Volumes' and asks the user to specify the characteristics of the volumes to create. It features a table with columns for Name, Capacity, Service Class, and Capacity Pool. Two volumes are listed: 'Epic-DB-UnitTest_1' and 'Epic-DB-UnitTest_2', both with a capacity of 13 GIB. The Service Class is set to 'Platinum' and the Capacity Pool is set to 'Database'. There are also buttons for '+ Add More', 'Ticket', 'Need Help', 'Back', 'Next', and 'Cancel'.

Name	Capacity	Service Class	Capacity Pool
Epic-DB-UnitTest_1	13 GIB	Platinum	Database
Epic-DB-UnitTest_2	13 GIB	Platinum	Database

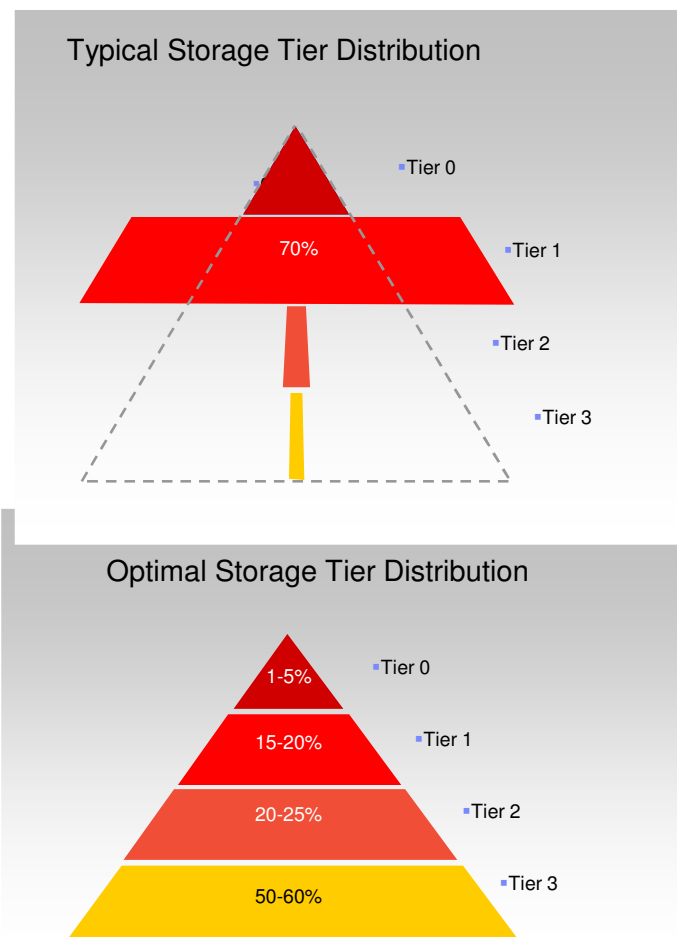
Easy Storage Provisioning by Service Classes and Capacity Pool

Storage Optimization: Tiering Overview

Is your data on the 'right' storage tier?

Challenges:

- Requirements change over time
 - Data owners are risk averse
 - Users don't see the total cost
 - Rationing resources is unpopular
- ... but the biggest challenge has been:
- No objective way to determine what the 'right tier' should be!
- ...so data stays on top tier storage (expensive)
- Resources that should be spent on innovation are wasted on infrastructure inefficiencies



SVC Easy Tier V3 versus VSC Tiering Analysis I

- Why should you not simply create one hybrid storage pool in SVC?
Here are some reasons that might prevent you from using the most easiest setup of a tiering implementation with just one large hybrid storage pool:
 - You might have more than one location, so you will need more than one storage pool
 - You might have to separate internal customers from one another (multi tenancy) so you need more than one pool
 - If availability is a concern for you, than you probably don't want to add more than one storage system into one pool
 - Workload isolation

If you have:

- A small number of pools
- Only hybrid pools (with mirroring)



You will likely use:

Use Easy Tier

or a combination of Easy Tier and VSC Tiering because the two are *complementary*

- Many different disk drive technologies:
SSD/Flash, 146GB 15krpm, 600GB 10krpm, 1,2TB 10krpm,
2TB NL-SAS, 4 TB NL-SAS
and/or multiple RAID levels



Use VSC Tiering

Storage Optimization: Tiering across pools

Spectrum Control (VSC) Optimization can help determine the best place to move the volumes based on the real work load



Spectrum Control (VSC) will only give one recommendation per volume.

Volume movement could be up or down multiple tiers based on performance data analysis.

Pool Optimization: Analyze Tiering

- Define how many days worth of data to be analyzed.
- Define which days to be included in the analysis
- Define which times of the day to be included in the analysis
- Co-locate volumes assigned to the same server or hypervisor.
- Volume I/O Rate or Volume I/O Density
- Maximum pool I/O rate

Analyze Tiering

Optimize the Placement of Volumes

Analyze pool activity over the previous days

On the following days of the week:

Su M Tu W Th F Sa

During the following times:

— 8:00 AM — 7:00 PM

Specify the days of the week to be included in the analysis

Specify the times during the day to be included in the analysis

Restrict Volume Placement

Colocate volumes assigned to the same server or hypervisor: Yes

Volume I/O Rate Thresholds

Threshold: I/O per second

Above: **Tier 2** Maximum Pool I/O Rate:

Below: **Tier 3** Maximum Pool I/O Rate:

Pool Optimization: Balance Pools

Spectrum Control (VSC) can help you balance your work load across pools within a tier.



Optimize Pools

Select one or more pools and use the optimization actions in the menu. These actions are available in all tables of pools.

Name	Storage System	Status	Physical Allocation (%)	Capacity (GiB)	Shortfall (%)	Tier
⊕ DONOTDELETE-SVC ES...	Storagewise V7000a	✓ Online	39%	552.00	14%	
⊕ VSC Tier 1 Pool 3	SVC-2145-tpcSVC02-IBM	✓ Online	44%	99.50	0%	1
⊕ VSC Tier 1 Pool 1	SVC-2145-tpcSVC02-IBM	✓ Online	100%	200.00	0%	1
⊕ vCenter ESX01 Pool 1	SVC-2145-tpcSVC02-IBM	✓ Online	100%	200.00	0%	1
⊕ VSC Tier 1 Pool 2	SVC-2145-tpcSVC02-IBM	✓ Online	100%	100.00	0%	1
⊕ vCenter ESX01 Pool 2	SVC-2145-tpcSVC02-IBM	✓ Online	100%	400.00	0%	1

- Identify the pool(s) you want to balance
- Right click the pool(s) and select Balance Pools

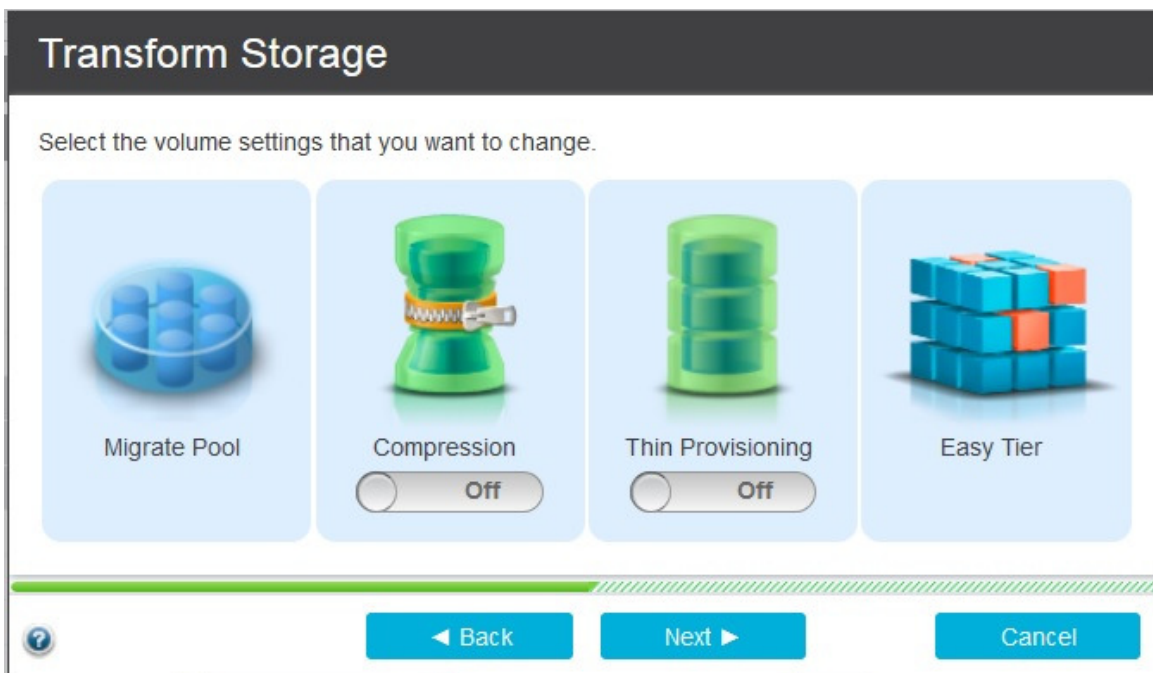
Storage Volume Transformation

What This Is

Ability to transform an existing storage volume into a different type of volume to take advantage of built-in efficiency features of the storage virtualization layer within Spectrum Control Advanced / VSC

Client Value

Automated, transparent volume management without having to manually perform multiple actions



Recap of Capability Matrix for Storage Insights

		Foundation	Storage Insights Pro
Price		Entitled	Subscription
Monitoring	Inventory	Basic	✓
	Logical configuration	Basic	✓
	Performance	Basic	100+ metrics
	Capacity	Basic	✓
	Health	Call Home events	Call Home events
Service	Hassle-free log collection	✓	✓
	Active tickets	✓	✓
	Simplified ticket workflows	✓	✓
Cognitive Analytics	Upgrade recommendations	✓	✓
	Best practice violations		✓
	Business impact analysis		✓
	Fully customizable multi-conditional alerting		✓
	Optimize data placement with tiering		✓
	Optimize capacity with reclamation		✓

Functions in Spectrum Control – full comparison

Spectrum Control		Editions	
Features	Insights	Standard	Advanced
Deployment method	SaaS	On premises	On premises
Asset and capacity management	•	•	•
Topology	Basic	•	•
Agentless Servers	•	•	•
Non-IBM device support	• ¹⁾	•	•
Storage Resource Agents		•	•
VMware Hypervisor support/Plug-In/VASA		•	•
NAS Discovery	Minimal	Basic	Basic
Monitoring/Alerting	•	•	•
Storage and Fabric Performance/Error Reporting	Storage only	•	•
Cloud Configuration (Service Classes/Capacity Pools/...)		•	•
Provisioning and Service Classes		File ²⁾	File ²⁾ and Block
Enable Automatic Zoning for Fabrics/Switches			•
Custom reporting (including predefined reports)		•	•
Rollup reporting			•
Reclamation analysis of unused volumes	•		•
Tiering support across pools	Capacity Planning		Recommend and implement ³⁾
Balance workload across pools			• ²⁾
Volume Transformation			• ²⁾
Service Management (Chargeback & Consumer reports)			•

¹⁾ Supported devices: Dell EMC VNX, VNXe and VMAX

²⁾ Only IBM Storwize V7000 Unified and IBM SONAS ³⁾ requires IBM Spectrum Virtualize

Functions in Spectrum Control – What else is included?

Spectrum Control			VSC	
Bundled with	Insights	Standard	Advanced	SVC
Copy Service Manager		•	•	
Spectrum Protect Snapshot (aka. FlashCopy Manager)			•	
Spectrum Virtualize SAN Volume Controller Software				• ¹⁾
Spectrum Virtualize SAN Volume Controller Software - FlashCopy				•
Spectrum Virtualize SAN Volume Controller Software – Metro/GlobalMirror				•
Spectrum Virtualize SAN Volume Controller Compression Software				Not included
Spectrum Virtualize SAN Volume Controller Encryption Software				Not included

¹⁾ Compression and Encryption are not part of VSC

Key Points To Take Away

- If your organization can not or will not allow configuration data in an IBM Cloud datacenter, then you should look at Spectrum Control
- Storage Insights Foundation is FREE to all IBM customers with hardware under maintenance and support.
- Storage Insights Foundations is really not storage management per se, but instead an enhancement to the hardware support experience
- Storage Insights Pro is a very capable cloud based storage management product that is cost effective, but has some limitations
- Spectrum Control, the on premise products has a number of priced versions that also bundle additional product licenses
- If you own a FlashSystem V9000, you should at the very least also have a VSC for Storwize (Enclosure) license

Accelerate with IBM Storage Webinars

The Free IBM Storage Technical Webinar Series Continues in 2018...

Washington Systems Center – Storage experts cover a variety of technical topics.

Audience: Clients who have or are considering acquiring IBM Storage solutions. Business Partners and IBMers are also welcome.

To automatically receive announcements of upcoming Accelerate with IBM Storage webinars, Clients, Business Partners and IBMers are welcome to send an email request to accelerate-join@hursley.ibm.com.

Located in the Accelerate with IBM Storage Blog:

<https://www.ibm.com/developerworks/mydeveloperworks/blogs/accelerate/?lang=en>

Also, check out the WSC YouTube Channel here:

https://www.youtube.com/playlist?list=PLSdmGMn4Aud-gKUBCR8K0kscCiF6E6ZYD&disable_polymer=true

2018 Webinars:

January 9 – DS8880 Easy Tier

January 17 – Start 2018 Fast! What's New for Spectrum Scale V5 and ESS

February 8 - VersaStack - Solutions For Fast Deployments

February 16 - TS7700 R4.1 Phase 2 GUI with Live Demo

February 22 - DS8880 Transparent Cloud Tiering Live Demo

March 7 - Spectrum Storage Management, Control, Insights, Foundation; what's the difference?

March 15 - IBM FlashSystem A9000/R and SVC Configuration Best Practices

Register Here: <https://ibm2.webex.com/ibm2/onstage/g.php?MTID=e87d423c5cccbdefbbb61850d54f70f4b>

March 27 - IBM FlashSystem A9000/R Technical Update

Register Here: <https://ibm2.webex.com/ibm2/onstage/g.php?MTID=eb3bcbb054f1aabb189ea53cf2e8d7926>

