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

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- Run the dataCollector.bat to install

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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**
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

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
IBM Storage Insights Foundation

Drill into a storage device for detailed tabular views

Block Storage Systems

ds8k020_ncus

IBM DS8870

7.73.69

Get Support

Overview

Events

Tickets

Properties

Capacity

Compression Saving: 5 TiB

Allocation Space

Available Space

60%

75.0 TiB

40%

115.0 TiB

Total: 120.0 TiB

Performance

Response Time

I/O Rate

Data Rate

Allocated Space

Available Space

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Accelerate with IBM Storage.
IBM Storage Insights Foundation

Storage System Tabular View, Event Example
IBM Storage Insights Foundation

The Tickets Tab show all open Tickets For this Device
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 breadth 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
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

- 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 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

- 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

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<tr>
<td>Logical configuration</td>
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<tr>
<td>Performance</td>
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<tr>
<td>Capacity</td>
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<td>Hassle-free log collection</td>
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<td>Fully customizable multi-conditional alerting</td>
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<tr>
<td>Optimize data placement with tiering</td>
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<tr>
<td>Optimize capacity with reclamation</td>
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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.

IBM Spectrum Storage Suite

Virtual Storage Center

Spectrum Control Advanced Edition

- IBM Spectrum Control
  - Standard
- IBM Spectrum Protect
  - Snapshot
- IBM Spectrum Virtualize
  - Base Virtualization & FlashCopy & Metro & Global Mirror

- IBM Spectrum Control
  - Analytics & Optimization & Provisioning

+ IBM Spectrum Virtualize

+ IBM Spectrum Protect

+ IBM Cloud Object Storage

- Protect
- Archive
- Accelerate
- Scale
- Spectrum Virtualize
  - Compression
- Spectrum Virtualize
  - Encryption

1 Free of charge
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

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<th>PPA PID</th>
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IBM integration, innovation and holistic approach

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<th>Incredible Ease of Use</th>
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<td>• Capacity management</td>
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<td>• Storage System Performance management</td>
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<td>• SAN Fabric Performance management</td>
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Storage Networks
• Switches & Directors
• Virtual devices
• ISC & standard ports

Storage
• Multi-vendor storage
• Storage systems
• Flash, SSD & Spinning Disk
• Virtualization / Vol. mapping
• Block, File & Object

Replication
• FlashCopy
• Metro Mirror
• Global Mirror
• Metro Global Mirror
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
Alerts Consolidated for all Storage Components

- Hover over view of all Alerts (Performance in this case)
- Sorted on Last Occurrence
- Categories include Custom and Group Alerts
- Hyperlinks for fast navigation

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Accelerate with IBM Storage.
Custom Alerts are Multi-Conditional

Select Custom

Pick Alert type, Performance here

Add as many conditions as desired, all “anded”

Select operands and values
### Capacity Reporting - Block Storage System Overall

The image shows a dashboard for Block Storage Systems, displaying various metrics such as Name, Condition, Probe Status, Raw Disk Capacity, Pool Capacity, Physical Allocation, Compression Savings, Data Deduplication Savings, and Data Reduction Savings. The table highlights the overall performance and capacity savings for different storage systems.

#### Showing Both Data Reduction and Effective Capacity Savings

- **Data Reduction Savings:** 57.34%
Performance Reporting - Block Storage System Overall

Hover Over for Details
Storage System Reporting Not Limited to IBM Only

**Storage Management Initiative Specification (SMI-S)** used to collect 3rd Party Storage Metrics
Data Collection is just a right click away

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
Copy Data Panels Show Replication Metrics
### Network: Fabrics & Switches

#### Switches

**41 Normal**

**0 Warning**

**2 Error**

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<td>IBM System Storage SA</td>
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<tr>
<td>DS1610_3_8</td>
<td>Normal</td>
<td>Running</td>
<td>SD000027F66119EE</td>
<td></td>
<td>34</td>
<td>34 9 port-chan...</td>
<td></td>
<td>Native</td>
<td>Brocade</td>
<td>Brocade 6510</td>
</tr>
<tr>
<td>DS1610_4_128</td>
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<td>SD000027F66119ED</td>
<td></td>
<td>28</td>
<td>28 2 port-chan...</td>
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<td>Brocade</td>
<td>Brocade 6510</td>
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<tr>
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<td>SD000027F66119EO</td>
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<td>2</td>
<td>2 2 port-chan...</td>
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<td>Brocade</td>
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<tr>
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<td>13</td>
<td>13 9 port-chan...</td>
<td></td>
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<td>Brocade</td>
<td>Brocade 6510</td>
</tr>
<tr>
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<td>2</td>
<td>2 2 port-chan...</td>
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<td>Brocade</td>
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<tr>
<td>DS1610_5_128</td>
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<td>SD000027F66119ED</td>
<td></td>
<td>23</td>
<td>23 2 port-chan...</td>
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<td>Native</td>
<td>Brocade</td>
<td>Brocade 6510</td>
</tr>
<tr>
<td>DS1610_5_15</td>
<td>Normal</td>
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<td>SD000027F66119EO</td>
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<td>2</td>
<td>2 2 port-chan...</td>
<td></td>
<td>Native</td>
<td>Brocade</td>
<td>Brocade 6510</td>
</tr>
<tr>
<td>DS1610_5_10</td>
<td>Normal</td>
<td>Running</td>
<td>SD000027F66119EE</td>
<td></td>
<td>19</td>
<td>19 2 port-chan...</td>
<td></td>
<td>Native</td>
<td>Brocade</td>
<td>Brocade 6510</td>
</tr>
<tr>
<td>DS1610_5_8</td>
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<td>SD000027F66119EE</td>
<td></td>
<td>2</td>
<td>2 2 port-chan...</td>
<td></td>
<td>Native</td>
<td>Brocade</td>
<td>Brocade 6510</td>
</tr>
</tbody>
</table>
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

Two Application Groups

Members of Epic Environment Department

Washington Systems Center - Storage

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Accelerate with IBM Storage.
Servers Are Automatically Discovered and Correlated

Storage Resource Agents (SRAs) can still be deployed for more detailed information.

Automatic Agentless Servers Discovered.
Servers Are Automatically Discovered and Correlated

Agentless Server automatically discovered

SAN storage correlated for both capacity and performance reporting
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.
vmWare ESX Server Drill Down

Pool Performance for this ESX Server

<table>
<thead>
<tr>
<th>Name</th>
<th>Storage System</th>
<th>Total I/O Rate - 0-60sec</th>
<th>Max Total I/O Rate - 0-60sec</th>
<th>Overall Response Time (ms/op)</th>
<th>Max Overall Response Time (ms/op)</th>
</tr>
</thead>
<tbody>
<tr>
<td>vsc-wscshow-tier1p1</td>
<td>FlashSystem AC1-V90</td>
<td>5,401.88</td>
<td>5,771.23</td>
<td>0.79</td>
<td>0.57</td>
</tr>
<tr>
<td>vsc-wscshow-tier2p1</td>
<td>FlashSystem AC1-V90</td>
<td>6,000.19</td>
<td>6,233.46</td>
<td>0.88</td>
<td>0.93</td>
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<tr>
<td>vsc-wscshow-tier3p1</td>
<td>FlashSystem AC1-V90</td>
<td>510.21</td>
<td>516.01</td>
<td>7.37</td>
<td>8.71</td>
</tr>
<tr>
<td>vsc-wscshow-tier4p1</td>
<td>FlashSystem AC1-V90</td>
<td>103.48</td>
<td>160.49</td>
<td>19.36</td>
<td>24.44</td>
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<tr>
<td>vsc-wscshow-tier5p1</td>
<td>FlashSystem AC1-V90</td>
<td>113.16</td>
<td>114.86</td>
<td>14.31</td>
<td>19.06</td>
</tr>
</tbody>
</table>

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Accelerate with IBM Storage
# Reclamation - Identifying Inactive Storage by Volume

## Dashboard Overview

The dashboard provides an overview of reclaimable storage capacity within the system. The main interface includes a pie chart showing the total reclaimable storage (54.48 TiB) and a bar chart depicting the usage across different tiers.

### Pie Chart Details:
- **Reclaimable Capacity**: 54.48 TiB (50.33%)
- **Tiers**:
  - Tier 1: 642.00 GB
  - Tier 2: 50.53 TiB
  - Tier 3: 1,586.21 GB
  - Not Reclaimed: 1,668.25 GB

### Recommendations Table

<table>
<thead>
<tr>
<th>Name</th>
<th>Tier</th>
<th>Time of Last Access</th>
<th>Pool</th>
<th>Storage System</th>
<th>Capacity (GiB)</th>
<th>Allocated Space (GiB)</th>
<th>Unallocated Space (GiB)</th>
<th>Hosts</th>
<th>Applies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table lists various storage objects with details such as tier level, time of last access, pool, storage system, capacity, and space details.

### Additional Information
- View by options include Reclaimable Capacity and other filtering criteria.
- The dashboard integrates with IBM Storage solutions for efficient data management and optimization.
Reclamation - Identifying Inactive Storage by Storage System

- **54.48 TiB**
- **Reclaimable Storage**

**Storage System**

- **Reclaimable Capacity (GiB)**
- **Inactive Capacity (GiB)**
- **Orphaned Capacity (GiB)**
- **Percent Reclaimable (%)**
- **Volumes**

- XIV-114-1310000
  - Reclaimable: 18.30 TiB
  - Inactive: 18.23 TiB
  - Orphaned: 0.07 TiB
  - Percent Reclaimable: 94%
  - Volumes: 115

- XIV-114-1310115
  - Reclaimable: 10.34 TiB
  - Inactive: 10.17 TiB
  - Orphaned: 0.17 TiB
  - Percent Reclaimable: 35%
  - Volumes: 312

- XIV-214-1340000-214
  - Reclaimable: 5.07 TiB
  - Inactive: 4.97 TiB
  - Orphaned: 0.10 TiB
  - Percent Reclaimable: 35%
  - Volumes: 248

- Storwize-324-V7000-CIX
  - Reclaimable: 1.64 TiB
  - Inactive: 1.64 TiB
  - Orphaned: 0.00 TiB
  - Percent Reclaimable: 73%
  - Volumes: 73

- Storwize-24C-V5700-V5C
  - Reclaimable: 1.64 TiB
  - Inactive: 1.64 TiB
  - Orphaned: 0.00 TiB
  - Percent Reclaimable: 73%
  - Volumes: 73

- SVC-CBG-Sandbox
  - Reclaimable: 904.06 GB
  - Inactive: 904.06 GB
  - Orphaned: 0.00 GB
  - Percent Reclaimable: 30%
  - Volumes: 30

- FlashSystem-AC1-V0000
  - Reclaimable: 607.37 GB
  - Inactive: 607.37 GB
  - Orphaned: 0.00 GB
  - Percent Reclaimable: 15%
  - Volumes: 15

- Storwize-124-V7000-Unified
  - Reclaimable: 555.76 GB
  - Inactive: 555.76 GB
  - Orphaned: 0.00 GB
  - Percent Reclaimable: 15%
  - Volumes: 15

- FlashSystem-AC1-V0000
  - Reclaimable: 34.72 GB
  - Inactive: 34.72 GB
  - Orphaned: 0.00 GB
  - Percent Reclaimable: 33%
  - Volumes: 33

- SVC-CBG-Demo
  - Reclaimable: 15.06 GB
  - Inactive: 15.06 GB
  - Orphaned: 0.00 GB
  - Percent Reclaimable: 99%
  - Volumes: 99

- FlashSystem-415-A0000
  - Reclaimable: 0.06 GB
  - Inactive: 0.06 GB
  - Orphaned: 0.00 GB
  - Percent Reclaimable: 100%
  - Volumes: 100

- FlashSystem-415-A0000R
  - Reclaimable: 0.06 GB
  - Inactive: 0.06 GB
  - Orphaned: 0.00 GB
  - Percent Reclaimable: 100%
  - Volumes: 100

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Accelerate with IBM Storage.
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

<table>
<thead>
<tr>
<th>Incredible Ease of Use</th>
<th>Expanded Flexibility</th>
<th>Automated Data Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IBM Virtual Storage Center</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Enables storage for private cloud computing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Easy to buy and deploy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pay-as-you-go pricing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SAN and Storage Resource Management
Spectrum Control
External Storage Virtualization
(Software License Only)
Snapshot Management
Spectrum Protect Snapshot
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
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 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.
Software Defined Provisioning with a Service Class / Capacity Pool

I Need to Provision Storage!

What Storage System to use?

What Storage Pool?

Is there enough space?

Is the pool already too busy?

Need to adjust Zoning?

Easy Storage Provisioning by Service Classes and Capacity Pool
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

Typical Storage Tier Distribution:

- Tier 0: 70%
- Tier 1: 20-25%
- Tier 2: 15-20%
- Tier 3: 1-5%

Optimal Storage Tier Distribution:

- Tier 0: 50-60%
- Tier 1: 20-25%
- Tier 2: 15-20%
- Tier 3: 1-5%
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.
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.

- 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

<table>
<thead>
<tr>
<th></th>
<th>Foundation</th>
<th>Storage Insights Pro</th>
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<tbody>
<tr>
<td><strong>Price</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td>Entitled</td>
<td>Subscription</td>
</tr>
<tr>
<td>Inventory</td>
<td>Basic</td>
<td>✓</td>
</tr>
<tr>
<td>Logical configuration</td>
<td>Basic</td>
<td>✓</td>
</tr>
<tr>
<td>Performance</td>
<td>Basic</td>
<td>100+ metrics</td>
</tr>
<tr>
<td>Capacity</td>
<td>Basic</td>
<td>✓</td>
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<tr>
<td><strong>Health</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Call Home events</td>
<td>Call Home events</td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hassle-free log collection</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Active tickets</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Simplified ticket workflows</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cognitive Analytics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upgrade recommendations</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Best practice violations</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Business impact analysis</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Fully customizable multi-conditional alerting</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Optimize data placement with tiering</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Optimize capacity with reclamation</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
## Functions in Spectrum Control – full comparison

<table>
<thead>
<tr>
<th>Spectrum Control Features</th>
<th>Editions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spectrum Control</strong></td>
<td><strong>Features</strong></td>
</tr>
<tr>
<td><strong>Deployment method</strong></td>
<td>SaaS</td>
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<tr>
<td><strong>Asset and capacity management</strong></td>
<td>•</td>
</tr>
<tr>
<td><strong>Topology</strong></td>
<td>Basic</td>
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<tr>
<td><strong>Agentless Servers</strong></td>
<td>•</td>
</tr>
<tr>
<td><strong>Non-IBM device support</strong></td>
<td>1)</td>
</tr>
<tr>
<td><strong>Storage Resource Agents</strong></td>
<td></td>
</tr>
<tr>
<td><strong>VMware Hypervisor support/Plug-In/VASA</strong></td>
<td></td>
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<tr>
<td><strong>NAS Discovery</strong></td>
<td>Minimal</td>
</tr>
<tr>
<td><strong>Monitoring/Alerting</strong></td>
<td>•</td>
</tr>
<tr>
<td><strong>Storage and Fabric Performance/Error Reporting</strong></td>
<td>Storage only</td>
</tr>
<tr>
<td><strong>Cloud Configuration (Service Classes/Capacity Pools/...)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Provisioning and Service Classes</strong></td>
<td>File2)</td>
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<tr>
<td><strong>Enable Automatic Zoning for Fabrics/Switches</strong></td>
<td></td>
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<tr>
<td><strong>Custom reporting (including predefined reports)</strong></td>
<td>•</td>
</tr>
<tr>
<td><strong>Rollup reporting</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Reclamation analysis of unused volumes</strong></td>
<td>•</td>
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<tr>
<td><strong>Tiering support across pools</strong></td>
<td>Capacity Planning</td>
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<tr>
<td><strong>Balance workload across pools</strong></td>
<td>2)</td>
</tr>
<tr>
<td><strong>Volume Transformation</strong></td>
<td>• 2)</td>
</tr>
<tr>
<td><strong>Service Management (Chargeback &amp; Consumer reports)</strong></td>
<td></td>
</tr>
</tbody>
</table>

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?

<table>
<thead>
<tr>
<th>Spectrum Control</th>
<th>VSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bundled with</td>
<td>Insights</td>
</tr>
<tr>
<td>Copy Service Manager</td>
<td>·</td>
</tr>
<tr>
<td>Spectrum Protect Snapshot (aka. FlashCopy Manager)</td>
<td>·</td>
</tr>
<tr>
<td>Spectrum Virtualize SAN Volume Controller Software</td>
<td>· 1)</td>
</tr>
<tr>
<td>Spectrum Virtualize SAN Volume Controller Software - FlashCopy</td>
<td>·</td>
</tr>
<tr>
<td>Spectrum Virtualize SAN Volume Controller Software – Metro/GlobalMirror</td>
<td>·</td>
</tr>
<tr>
<td>Spectrum Virtualize SAN Volume Controller Compression Software</td>
<td>Not included</td>
</tr>
<tr>
<td>Spectrum Virtualize SAN Volume Controller Encryption Software</td>
<td>Not included</td>
</tr>
</tbody>
</table>

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 Foundation 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:

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=e87d423c5cccbdefbb61850d54f70f4b
March 27 - IBM FlashSystem A9000/R Technical Update
    Register Here: https://ibm2.webex.com/ibm2/onstage/g.php?MTID=eb3bcbb054f1aabb189ea53c2e8d7926