EMC Storage Resource Management

Tim Dell
EMC Solutions Manager
Resource Reporting….Um yeah…
EMC recognized by Gartner as having both the most complete vision and highest ability to execute among those selected for its “Leaders” quadrant.

Source: Gartner, Inc.
Magic Quadrant for SRM and SAN Management Software, June 22, 2009
Challenges Addressed by Storage Resource Management

• How do you understand what you have in your and storage environment and if it’s meeting expectations?
• Can you diagnose problems across your infrastructure?
• How do you improve operational efficiency and maximize ROI on capital investments?
• How do you address change management and compliance requirements?
The World of Element Managers....and API Integration
The Ionix ControlCenter Family

Ionix ControlCenter:
A comprehensive family of storage resource management (SRM) applications that integrates the deepest set of storage administration functions across the broadest set of storage resources

Ionix ControlCenter family overview

• Core package offerings
  SAN Manager
  Performance Manager
  StorageScope

• Add-on options
  StorageScope File Level Reporter
  Automated Resource Manager
  SAN Advisor

Comprehensive storage resource management for:

• Planning
• Provisioning
• Monitoring
• Reporting
What’s New in Ionix ControlCenter V6.1?

• Virtual Provisioning Management
• Symmetrix V-Max Array Support
  – Auto-provisioning groups
  – VLUNs
• Reporting on Fully Automated Storage Tiering
• Enhanced Integration with Symmetrix Management Console
• New SRDF Device Support
• New Ionix ControlCenter Reporting
  – End-to-End Reporting for Invista
  – StorageScope Query Scheduler
  – EDL Discovery
• New standard for SRM security with RSA
• Support for IPv6
• Relationship views for HP EVA and IBM DS Series arrays
ControlCenter Service Level Definition
ControlCenter Service Level Definition

**Service Level Definition**

- **Service Level Name**: Gold

**Define Tier**

<table>
<thead>
<tr>
<th>Array Type</th>
<th>Disk Technology</th>
<th>Disk Size(GB)</th>
<th>Protection</th>
<th>Disk Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Defined</td>
<td>Symmetrix</td>
<td>NA</td>
<td>Any</td>
<td>RAID 1</td>
</tr>
<tr>
<td>User Defined</td>
<td>Symmetrix</td>
<td>NA</td>
<td>Any</td>
<td>RAID 1</td>
</tr>
</tbody>
</table>

**Warning**: Tier overlaps with tier in another Service Level

OK  | Cancel
ControlCenter Service Level Definition

*ControlCenter reports host capacity by storage type to understand where capacity resources are dedicated*

<table>
<thead>
<tr>
<th>Query Name: Host Storage by Service Level</th>
<th>Run Time</th>
<th>View SQL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-10-19 12:00 (GMT-04:00)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Query Results**

<table>
<thead>
<tr>
<th>Hosts: Host Name</th>
<th>Hosts: Host OS</th>
<th>Service Levels: Service Level Name</th>
<th>Service Levels: Raw Allocated Service Level Capacity (GB)</th>
<th>Service Levels: Allocated Service Level Capacity (GB)</th>
<th>Service Levels: Raw Accessible Service Level Capacity (GB)</th>
<th>Service Levels: Accessible Service Level Capacity (GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Losak061</td>
<td>Windows Server 2003 R2</td>
<td>Platinum</td>
<td>0.12</td>
<td>0.04</td>
<td>0.12</td>
<td>0.04</td>
</tr>
<tr>
<td>Losak061</td>
<td>Windows Server 2003 R2</td>
<td>Other</td>
<td>30.94</td>
<td>319.39</td>
<td>30.94</td>
<td>319.39</td>
</tr>
<tr>
<td>Losak061</td>
<td>Windows Server 2003 R2</td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Array Capacity by Storage Type

*ControlCenter reports on allocated/unallocated capacity within an array by storage type to identify when critical array resources are running low*

## Query Results

**Query Name:** Copy of Array Storage by Service Level

**Run Time:** 2009-10-19 11:32 (GMT-04:00)

<table>
<thead>
<tr>
<th>Arrays: Array Name</th>
<th>Arrays: Array Type</th>
<th>Service Levels: Service Level Name</th>
<th>Service Levels: Service Level Capacity(GB)</th>
<th>Service Levels: Allocated Service Level Capacity(GB)</th>
<th>Service Levels: Unallocated Service Level Capacity(GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>000190300153</td>
<td>Symmetrix</td>
<td>Gold</td>
<td>2,246.12</td>
<td>1,295.46</td>
<td>950.66</td>
</tr>
<tr>
<td>000190300153</td>
<td>Symmetrix</td>
<td>Other</td>
<td>243,347.05</td>
<td>742.39</td>
<td>242,604.66</td>
</tr>
<tr>
<td>000190300153</td>
<td>Symmetrix</td>
<td>Silver</td>
<td>543.98</td>
<td>0.00</td>
<td>543.98</td>
</tr>
<tr>
<td><strong>Subtotal (3)</strong></td>
<td>000190300153</td>
<td></td>
<td>246,137.16</td>
<td>2,037.85</td>
<td>244,099.30</td>
</tr>
<tr>
<td>0001903000645</td>
<td>Symmetrix</td>
<td>Gold</td>
<td>755.37</td>
<td>92.69</td>
<td>662.68</td>
</tr>
<tr>
<td>0001903000645</td>
<td>Symmetrix</td>
<td>Other</td>
<td>44,693.91</td>
<td>172.00</td>
<td>44,521.91</td>
</tr>
<tr>
<td>0001903000645</td>
<td>Symmetrix</td>
<td>Silver</td>
<td>424.01</td>
<td>134.10</td>
<td>289.91</td>
</tr>
<tr>
<td><strong>Subtotal (3)</strong></td>
<td>0001903000645</td>
<td></td>
<td>46,206.29</td>
<td>398.86</td>
<td>45,807.44</td>
</tr>
<tr>
<td>0001949000073</td>
<td>Symmetrix</td>
<td>Gold</td>
<td>3,311.69</td>
<td>2,577.94</td>
<td>733.75</td>
</tr>
<tr>
<td>0001949000073</td>
<td>Symmetrix</td>
<td>Other</td>
<td>1,383.19</td>
<td>0.88</td>
<td>1,322.32</td>
</tr>
<tr>
<td>0001949000073</td>
<td>Symmetrix</td>
<td>Silver</td>
<td>2,060.77</td>
<td>1,518.91</td>
<td>541.86</td>
</tr>
<tr>
<td><strong>Subtotal (3)</strong></td>
<td>0001949000073</td>
<td></td>
<td>6,755.66</td>
<td>4,097.72</td>
<td>2,657.93</td>
</tr>
<tr>
<td>0001949000079</td>
<td>Symmetrix</td>
<td>Bronze</td>
<td>1,200.40</td>
<td>246.17</td>
<td>954.23</td>
</tr>
<tr>
<td>0001949000079</td>
<td>Symmetrix</td>
<td>Gold</td>
<td>750.94</td>
<td>12.91</td>
<td>738.03</td>
</tr>
<tr>
<td>0001949000079</td>
<td>Symmetrix</td>
<td>Other</td>
<td>2,070.33</td>
<td>56.17</td>
<td>2,014.17</td>
</tr>
<tr>
<td>0001949000079</td>
<td>Symmetrix</td>
<td>Platinum</td>
<td>346.16</td>
<td>12.72</td>
<td>333.44</td>
</tr>
</tbody>
</table>
Shared Storage Was Multi-Counted

<table>
<thead>
<tr>
<th>Host(s)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30 GB (1+2+3)</td>
</tr>
<tr>
<td>B</td>
<td>30 GB (2+3+4)</td>
</tr>
<tr>
<td>Total</td>
<td>60 GB</td>
</tr>
</tbody>
</table>
Shared Storage Setting
Shared Storage Setting

Successfully distributed capacity among available hosts. Changes in this option will not be reflected until the next time ETL runs.

Shared Storage Reporting

Choose an option for reporting the device capacity assigned to multiple hosts.
Your current option for reporting device capacity is - Distribute Among Hosts

- Distribute Among Hosts: Allows you to distribute the device capacity equally among all hosts sharing the device.
- Assign to Single Host: Allows you to assign all of the capacity to the first host based on alphabetical order.

OK  Cancel
Example: A Basic Cluster

<table>
<thead>
<tr>
<th>Host(s)</th>
<th>Total</th>
<th>Shared</th>
<th>Not Shared</th>
<th>Chargeable</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30 GB (1+2+3)</td>
<td>20 GB (2+3)</td>
<td>10 GB (1)</td>
<td>20 GB</td>
</tr>
<tr>
<td>B</td>
<td>30 GB (2+3+4)</td>
<td>20 GB (2+3)</td>
<td>10 GB (4)</td>
<td>20 GB</td>
</tr>
</tbody>
</table>

- **Distributed**
- **Single Host**

\[ \text{Chargeable} = \text{Not Shared} + \frac{1}{2} \text{Shared} \]
Example: A Basic Cluster

<table>
<thead>
<tr>
<th>Host(s)</th>
<th>Total</th>
<th>Shared</th>
<th>Not Shared</th>
<th>Chargeable</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30 GB (1+2+3)</td>
<td>20 GB (2+3)</td>
<td>10 GB (1)</td>
<td>30 GB</td>
</tr>
<tr>
<td>B</td>
<td>30 GB (2+3+4)</td>
<td>20 GB (2+3)</td>
<td>10 GB (4)</td>
<td>10 GB</td>
</tr>
</tbody>
</table>

Chargeable = Not Shared + All/None Shared
Next Generation Storage Resource Management
Enterprise Storage Management - Future

Business Intelligence Framework

Critical Business Metrics

Storage Resource Management
- Capacity Analysis
- Performance Diagnostics
- Configuration Compliance

Data Protection
- Replication
- Backup

End to End Resource Discovery and Monitoring

Heterogeneous Enterprise Management
- Unified Infrastructure Management

Standalone Element Management
- SMC
- Unisphere
- Data Domain / Avamar
- SAN Fabric Managers
- 3rd Party Array & Backup Managers

3rd Party Array & Backup Managers

Network & Ops Management
- IP

Security

Unified Infrastructure Management
Strategic Drivers for Next-Generation Ionix Storage Software

• Performance and Scalability

• Ease of Use, Ease of Deployment
  – Central UI experience; use case focus
  – Agent-less discovery options

• Integration with EMC Ionix and Storage Solutions
  – Information sharing through open architecture
  – Element management will be managed in-context

• Extend Broad Platform Coverage via Standard Interfaces
Strategic Drivers: Ease of Use, Ease of Deployment

Choose this option if the source OVF template (*.ovf) is on the local file system. For example, your C: drive, a network share, or a CD/DVD drive.

Choose this option to download the OVF template from the Internet and enter a URL such as http://www.example.com/template.ovf
OVF Template Details
Verify OVF template details.

Product: EMC Ionix Storage Resource Manager
Version: 1.0.0.0
Vendor: EMC
Download Size: 3488 MB
Size on disk: 46438 MB
Description: EMC Ionix Storage Resource Manager (SRM) manages your storage environment and simplifies many of your common storage management tasks. SRM is designed for use in heterogeneous environments containing multi-vendor networks, hosts, and storage devices. The information it collects and the functionality it manages can reside on technologically disparate devices in geographically diverse locations.
Name and Location

Specify a name and location for the deployed template

Name:
EMC Ionix Storage Resource Manager

The name can contain up to 80 characters and it must be unique within the inventory folder.

Inventory Location:
LGLOR151
Hopkinton
Properties

Customize the software solution for this deployment.

Networking Properties

Discovery Appliance Hostname

Discovery Appliance Network 1 IP Address

Enter an IP address.

Historical Database Hostname

Historical Database Network 1 IP Address

Enter an IP address.

Storage Resource Manager Hostname

Storage Resource Manager Network 1 IP Address

Enter an IP address.

Not all properties have valid values. The vApp will not be able to power on.
# Agentless Discovery Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| Passive                 | Host identity inferred from other sources (i.e. switch)                     | No host credentials needed                                           | • No host attributes available  
• Host device to LUN link not determined                                      |
| **WMI / WS-MAN**        | • Remotely access WMI or WS-MAN services                                     | • No script pushed to host                                           | • Windows only  
• WMI services must be enabled  
• WS-MAN not available on all Windows OSes                                    |
| Agentless without root access | • Linux/Unix - SRM7 remotely logs into host and executes script to collect data  
• Windows – SRM7 uses WMI to collect information | • Root access not needed  
• Can collect majority of host attributes                                      | • Host device to LUN link not determined  
• Requires ssh & scp enabled (linux/unix)                                       |
| Agentless with root access | • Linux/Unix - SRM7 remotely logs into host and executes script to collect data  
• Windows – SRM7 uses WMI to collect information | • All necessary host information collected                           | • Requires root equivalent access  
• Requires ssh & scp enabled (linux/unix)                                       |
| Host Agent              | • Agent installed on host that manages data collection                       | • Can customize what information is collected  
• Can collect data as frequently as needed                                     | • Requires agent to be pushed to each host  
SRM7 will manage  
• Maintenance of host agent via customer procedures                            |
Element Manager Integration
Element Manager Integration
SRM Architecture

- SRM Appliance
  - Capacity
  - Compliance
  - Performance
  - Discovery & Monitoring

- Database Appliance
  - RDBMS

- Information Grid
  - RDF
  - XML

- Web UI
  - SRM Application
  - Element Manager

- HTTP/S
  - Discovery Appliance
  - Discovery Appliance

- SMI, WMI, SSH, etc.

- Element Managers
  - Storage Environment

- CC 6.1 Migration
SRM 7 Federation

Data Center 1

Data Center 2

Web UI

HTTPS

HTTPS

Replicated Objects

SRM Appliance
Capacity
Compliance
Performance
Discovery & Monitoring

Database Appliance
RDBMS

Information Grid

SRM Appliance
Capacity
Compliance
Performance
Discovery & Monitoring

Database Appliance
RDBMS

Information Grid
EMC Ionix Storage Capacity Insight

Understand how much storage you have, who’s using it, and when you’ll need to buy more.

- Monitor and Investigate Storage Utilization
- Reclaim Wasted Storage
- Improve Capacity Planning
EMC Ionix Storage Performance Insight

Actionable management of end-to-end performance issues within your heterogeneous storage environment.

- Detect & predict performance problems
- Resolve issues quickly
- Optimize storage performance
- Intelligent Performance Data Collection
EMC Ionix Storage Configuration Advisor

Detects improper configurations through change tracking and policy validation to reduce configuration issues associated with human error.

- **Best Practice Policy Validation**
- **Change Tracking**
- **Service Analytics**
Example: Path Redundancy Policy Breach

Select “Breach Causes” to view SCA’s analysis of the source of the breach.

Highlight violation to drill down and see details.
Example: Path Redundancy Policy Breach

Select "Breach Causes" to view SCA's analysis of the source of the breach.

Example: Path Redundancy Policy Breach

Select "Map" to see the breach in a topology view.

Quickly view associated objects and breach source in context.
6.x to SRM7 – Migration

1. **Data Collection Policies**
   - Create access profile for unique id, password, method combinations
   - Create discovery jobs from DCP entries

2. **Performance Data**
   - One time extract from existing .btp files on SRM7 setup
   - Daily extract of .btp files to get new perf stats

3. **Historical Capacity**
   - One-time extract of DSS data on SRM7 setup
   - Going forward SRM7 will collect the necessary capacity attributes
   - User defined STS queries translated to work with SRM7 data model

4. **User Defined Groups**
   - Existing groups converted to static SRM7 groups
   - Objects not discovered by SRM7 will not be added to UDG

5. **Alerts** - More work needed on what can be migrated

6. **Host agents** – to be transitioned

7. **User Defined Fields**

8. **User Defined / Custom Names**


10. **Element Manager Integration**

11. **User Management (Authentication)**

12. **Configuration History**
Storage Resource Management Software Release Schedule

Q1 2010
- CC 6.1 UB8

Q2 2010
- Early Feedback Program: Performance

Q3 2010
- Beta: Performance

Q4 2010
- Configuration Advisor 3.0

1H 2011
- CC 6.1 UBx

v6
- Next Gen
- Configuration Advisor 2.0
- Configuration Advisor 2.1

Next Gen
- Performance

Beta
- Capacity

Investigating
- Configuration Advisor 3.x
Please evaluate this session:
EMC Ionix Control Center For Simplified Management

• Text to **32075**
• In the message body, type: **EMC2 space 23** then letters from the table below to indicate each response
• Provide additional comments by adding an * after the response letter and then type to comment
• Example: **EMC2 23a*The speaker did a great job explaining the steps to reaching the cloud**

<table>
<thead>
<tr>
<th>Overall rating of this session</th>
<th>Highly Valuable</th>
<th>Valuable</th>
<th>Neutral</th>
<th>Somewhat Valuable</th>
<th>No Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please indicate how valuable you found this session.</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
</tr>
</tbody>
</table>
THANK YOU