AUTOMATED STORAGE MANAGEMENT: WHY IS IT SO IMPORTANT?

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VERITAS ARCHITECT NETWORK

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Introduction

Enterprise business applications are now expected to be available 24 hours a day, 7 days a week. These applications are also increasingly dependent on data from the corporate storage infrastructure. This presents storage administrators with a daunting challenge. Responsible for day-to-day management of a complex storage environment, they are now faced with availability requirements that leave no room for error.

The labor-intensive and time-consuming job of managing enterprise storage is plagued with the needless mistakes that frequently accompany complicated, manual processes. Tremendous growth in deployed storage capacity and new, complex networked storage architectures are stretching administration resources to the limit. IT storage managers are in acute need of tools to boost administrator productivity and reduce the occurrence of unnecessary errors in the administration process. What IT managers seek is the nirvana of automated storage provisioning.

Automating the task of storage provisioning begins with storage resource management (SRM) software. SRM software tools automate many of the routine, tedious, and error-prone tasks of storage administration. Utilizing these tools to predict when problems will occur allows administrators to head off catastrophes before they happen. Automating storage provisioning helps the administrator deliver continuous, non-disruptive access to enterprise storage resources.

What is Automated Storage Provisioning?

Applications crash, systems panic, and pagers beep: By the time the storage administrator on the receiving end of a pager is notified of a problem, the situation is likely to have become critical for business users. Whether due to degraded performance, resource shortages, or equipment failure, each storage problem risks of loss or corruption of data, and the resulting interruption to application access that can quickly translate into thousands, if not millions of dollars in financial loses for the business.

Automated storage provisioning offers a framework for managing the growing inventory of enterprise storage components. Deploying the tools of SRM software, within an automated storage provisioning framework, the storage administrator gains access to rules-based policies and event-based interventions that can intercept and resolve potential problems before they become critical.

Storage Resource Management

Port binding; switch zoning; disk, logical unit (LUN), and volume configuration; and the management of application storage allocations and use: these are just some of the many manual tasks of storage administration automated by SRM software. The systematized handling of these complex processes allows storage administrators to accomplish more work, with greater confidence in the results being free from errors.

The benefits of automated storage provisioning apply to both day-to-day administration tasks and long-range strategic planning activities. Automation tools continually gather data from around the storage infrastructure, giving administrators feedback on the success of storage policies and providing input to reports on every conceivable aspect of the storage environment. Availability of this accurate and timely data allows storage managers to make informed, intelligent decisions about future storage use.

Figure 1: Automated Storage Provisioning Ecosystem.

Automated storage provisioning, and the SRM software implemented to support it, addresses a wide-range of activities performed by storage administration staff. Central to these activities is the administration of storage policies and the companion functions of asset, capacity, configuration, and security management.

In addition to automating administrative tasks SRM software allows administrators to monitor and report on resource performance and utilization. Event management tools, working alongside monitoring software, are able to predict the likelihood of problems before they occur. Scripted responses can then be triggered to avert potential disasters.

Policy Management

Consciously or not, every organization implements storage policies. Whether formalized as documented procedures, or more commonly the informally enforced guidelines of an experienced storage administrator, storage use policies are essential to the smooth operation of an application infrastructure.

SRM policy management software gives the storage administrator the forum, and the tools, to formally set rules governing storage use. In the event that a rule is broken a predetermined action can be invoked to remedy the situation. Actions can be as simple as notifying an administrator that a disk has exceeded a threshold, or as complex as scheduling the inter-dependant sequence of tasks necessary to reorganize a database tablespace when a fragmentation limit is reached.

Asset Management

Traditionally, tracking storage assets has involved a mind-boggling combination of sources. This typically includes - but is not limited to - hardcopy documents, random computer files, and sundry spreadsheets. Any administrative task requiring details of the physical make-up of the storage infrastructure first requires a cumbersome and time-consuming gathering of scattered data.

SRM asset management software automates the discovery of storage resources, recording detailed information in an inventory database. Adding a Host Bus Adapter (HBA), for example, will automatically trigger the write of vendor, model number, version number, and location information to the database. A

storage administrator tasked with identifying all HBA's of a particular vendor, in order to apply a critical update to the adapter's operating software, need only query the asset inventory database to quickly locate each HBA requiring the patch.

Capacity Management

Avoiding unexpected out-of-space problems requires daily monitoring of storage utilization by the storage administrator. Tracking usage over many months also provides answers to long-range capacity planning questions like, what storage have we got and how is it currently used.

Making informed decisions about capacity depends on access to accurate data. SRM software is able to monitor resource allocation and utilization statistics, for all storage assets, giving administrators access to an instant assessment of capacity usage. Reporting on historical data also provides storage managers with the critical background information needed to make decisions about future storage requirements.

Configuration Management

Creating LUNs and zoning switches for new and redeployed storage resources is a time consuming, tedious, and error-prone task. Each change has the potential to impact business applications, and consequently scheduling is frequently deferred to late night and weekend shifts.

SRM software automates a wide variety of configuration management tasks, eliminating the need for storage administrator involvement. The boost in administrator productivity is accompanied by reduced potential for mistakes.

Security Management

As more enterprise storage resources are networked the risk of inadvertent or malicious access, from unauthorized servers, becomes a real problem. Illicit use to business data can have catastrophic consequences for the organization, with commercial, financial, and legal implications.

Safeguarding enterprise storage resources from possible intrusion falls within the domain of the storage administrator. However, many administrators are unprepared for this responsibility, lacking both the tools and background to adequately address security risks.

SRM software tackles the unauthorized access problem with all encompassing security management tools. The software provides administrators with granular control over storage resources and management utilities, to prevent unlawful access.

Performance Monitoring

For many business applications slow I/O is just as bad as no I/O. And, when application performance takes a hit, it is often the storage administrator who is tasked with the time consuming and complicated task of diagnosing the problem. The intricacies of a networked storage environment only further frustrate the task.

Tracking the myriad factors that influence I/O performance, such as disk I/O latency, file system response time, RAID cache hit ratio, and storage network latency is simplified enormously when SRM software acts to monitor and present the performance metrics in clear, easily understood reports. In fact, many performance-related issues can be addressed automatically. Using performance monitoring software, in tandem with an SRM event manager, for example, data files on an identified hotspot can be automatically moved to less frequently accessed disks.

Event Management

The enterprise storage infrastructure generates a continual stream of event notifications as business applications access data. These events range from the informational - requiring no action from the administrator but of potential use for diagnostics and trend analysis - to the critical - requiring the immediate attention of a live operator.

The SRM event management software is designed to receive notification of events and, if appropriate, trigger pre-scripted actions in response. This level of automation substantially improves response time to routine events that might otherwise threaten the stability of a system.

Reporting

The wealth of information captured by SRM software components provides an invaluable resource to storage managers and administrators. Statistics from performance monitoring, event management, asset inventory, and capacity utilization can be analyzed using sophisticated reporting tools to improve understanding of the enterprise storage environment.

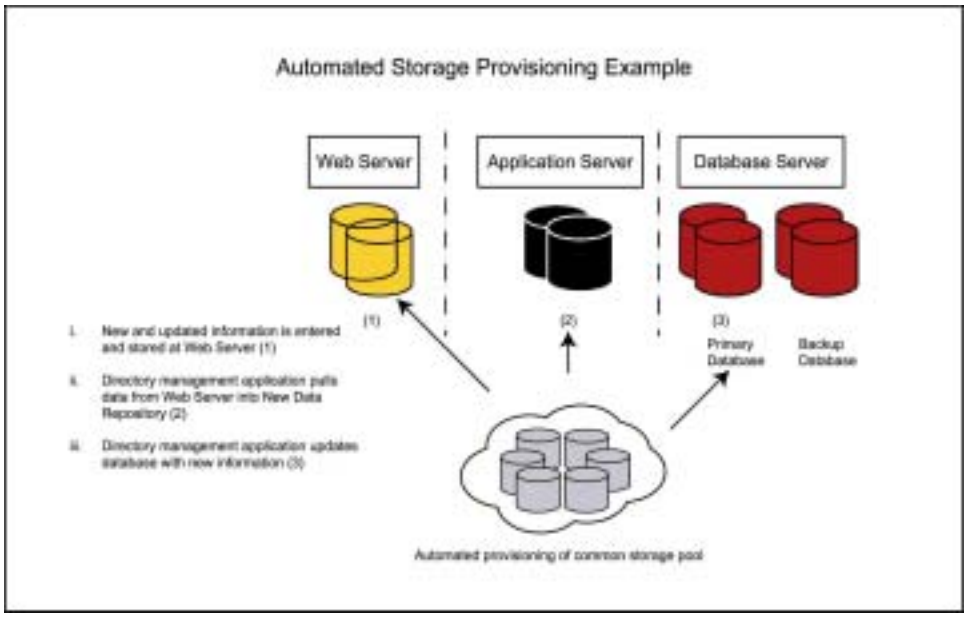
How Automated Storage Provisioning Works

The following example demonstrates how automated storage provisioning improves application infrastructure availability and reliability. In this fictitious scenario (see Figure 2.) a telecommunications provider has developed an application to assist telephone operators in processing directory assistance calls.

Figure 2: Directory Management Application Configuration

The Application

The web-based directory assistance application consists of a data-entry component, running on a web server, and a sophisticated directory management application, hosted on a separate application server. Directory assistance data is entered and updated on the web server, staged to a repository on the application server, and then transferred asynchronously by the directory management application to a relational database housed on yet another server. Fault tolerance for the application is provided at the database server where a duplicate copy of database tables is populated periodically using a point-in-



time snapshot of the primary database.

The Problem

Although the directory assistance application was sized adequately when first implemented, the success of the service has left it vulnerable to failures. On several occasions the call volume has become dangerously high, threatening to exhaust the space allocated to the web server, repository and databases. Unfortunately a failure in any of these storage locations will bring down the system, requiring extensive manual intervention resolve the problem.

Applying Automated Storage Provisioning Techniques

Configuring automated storage provisioning policies, the storage administrator has safeguarded the system from failure. The administrator set a capacity threshold on data volumes allocated to the web server, monitored by an event manager. When the threshold is met, a utility is scheduled to run, during off-peak hours, increasing allocations to the web server, application server and database server files. Another automated policy monitors the database files and schedules a reorganization utility to run when fragmentation reaches a pre-set percentage. The SRM software has also been configured to perform periodic snapshot copies of the primary database, saving the administrator an off-hours visit to the office to perform the copy.

Using automated storage provisioning capabilities: policy management, capacity management, event management, and performance monitoring the administrator is able to avoid being caught off-guard by unscheduled events, and has improved his ability to service the business application.

Conclusion

Organizations, regardless of size and industry, are now so dependent on the enterprise technology infrastructure that failure of a single component can have disastrous availability repercussions on the entire organization. The need for automation of storage management processes, to avert such events in the enterprise storage infrastructure, is urgent.

Automated storage provisioning, and the SRM software that implements the vision, offers to solve many of the problems of storage management. Applying rules-based automation of storage policies, the administrator's daily routine of manually intensive ministering to storage resources is significantly streamlined, improving productivity, system availability, and reducing the potential for needless errors. Automation has an immediate impact on business application availability, and on the viability of many business activities. Organizations can no longer afford to delay the implementation of automated storage provisioning.

Related Resources

For additional information on Automated Storage Provisioning see the VERITAS Storage Management Solutions web page at:

http://www.veritas.com/products/category/ProductFamily.jhtml;vrtsid=HBY1CW0P0JDZ1QFIYBTSFEQ?baseId=2053

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