

WHITE PAPER

Reigning in an Ever-Changing Storage Environment: EMC Storage Configuration Advisor

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Introduction

Effective management of a modern data center is becoming increasingly difficult; businesses demand higher service levels, greater flexibility, and increased responsiveness. And, if that weren't enough, given the current economic conditions, IT departments are charged with meeting such requirements leveraging fewer people and a flat or smaller budget. Industry and government compliance regulations add an additional burden. IT organizations are responding with next generation data center architectures—what they need are next generation management tools to help them reign in an increasingly complex environment.

Data centers are transitioning from legacy technology silos to more dynamic, integrated architectures. Service oriented architectures and composite applications accelerate application development, but create multiple layers of interdependencies in and among technology domains. In order to help reduce costs, data centers are consolidating equipment at all layers: server, storage, and networking. As a result, several critical applications could potentially leverage shared infrastructures. Even with fully redundant architectures, such consolidation introduces risk. This risk is magnified by the high number of moves, adds, and changes taking place in data centers every day. Though more flexible, the dynamic data center actually has the potential to introduce greater risk than its legacy counterparts if not managed well.

One of the enabling technologies playing a key role in this transformation is the storage area network (SAN). The SAN enables consolidation of the server and storage environment while enhancing data mobility by providing a high performance deterministic network to connect servers to each other, consolidated enterprise class storage arrays, and even other data centers. As server and storage infrastructures are consolidated, SANs are growing to accommodate the need for connectivity. As new servers and applications are brought online, it is imperative that the appropriate data paths have been configured and data is adequately protected. For those environments with significant industry, government, or internal compliance requirements, the ability to prove appropriate protection and availability may be mandatory.

Challenges in the SAN

Storage area networks are playing a more prominent role in the next generation data center and provide many benefits for a highly dynamic environment. However, the rapid scaling or adoption of SANs will also provide significant challenges for the data center, including:

- **Maintaining Service Level Agreements (SLAs)**

While it is easy to get caught up in the technology and how it works, the focus needs to remain on why the technology is there: to support the business. With all the changes that occur on a daily basis, ensuring that service levels are being met can be a significant challenge. Even more challenging is ensuring that critical business applications receive priority in the event of an outage. In large scale SAN environments, the inability to associate an application to a data path can delay problem resolution. The ability to rapidly identify which applications are affected and prioritize resources to correct the impacted infrastructure is critical to minimizing the impact to the service level and business.

- **Enforcing Best Practices**

It is difficult to enforce best practices in a highly dynamic environment. No one ever architects or designs an environment to fail, yet failures still occur. Typically, as time progresses and the environment grows and changes, the ability to enforce best practices becomes diminished. Even with manual processes and checks implemented, it is still a daunting task, especially with different practices for different applications. Even in the most diligently designed environments, things are certain to slip through the cracks.

- **Managing Change**

Manual efforts to manage change may be sufficient with a small SAN environment, but these practices do not scale. Given that most outages result from a change in the environment, change management must be under control. Tracking changes in Excel spreadsheets, Visio diagrams, and through tribal knowledge is not going to work for a complex, dynamic SAN environment. In many cases, the information is outdated and relying on it only results in extended delays when trying to correct a problem. Reliance on these techniques can also prove detrimental when an employee leaves the company, taking their expertise and knowledge of the environment with them. Typically, manual efforts require individual acts of heroism that are simply not sustainable.

- **Keeping Costs in Check**

ESG research indicates that organizations are trying to reduce costs and increase the efficiency of their existing infrastructure.¹ Optimizing an existing infrastructure investment can not only help to reduce capital costs by avoiding new equipment purchases, but it also helps to limit operational costs through reduced power, cooling, and space requirements. In order to fully optimize existing infrastructure, one must first take stock of what is there and how everything is interconnected. You can't just keep adding new connections—chassis will fill up, especially in fault tolerant environments.

- **Lack of Visibility**

One of the biggest challenges in managing a SAN environment is visibility—it is hard to manage what you cannot see. “Visibility” is not just the view of the day 1 “as designed” environment, but rather a real time, continuous view of the SAN. Because of its very dynamic nature, the ability to view the latest configuration and details will greatly aid the management of these environments.

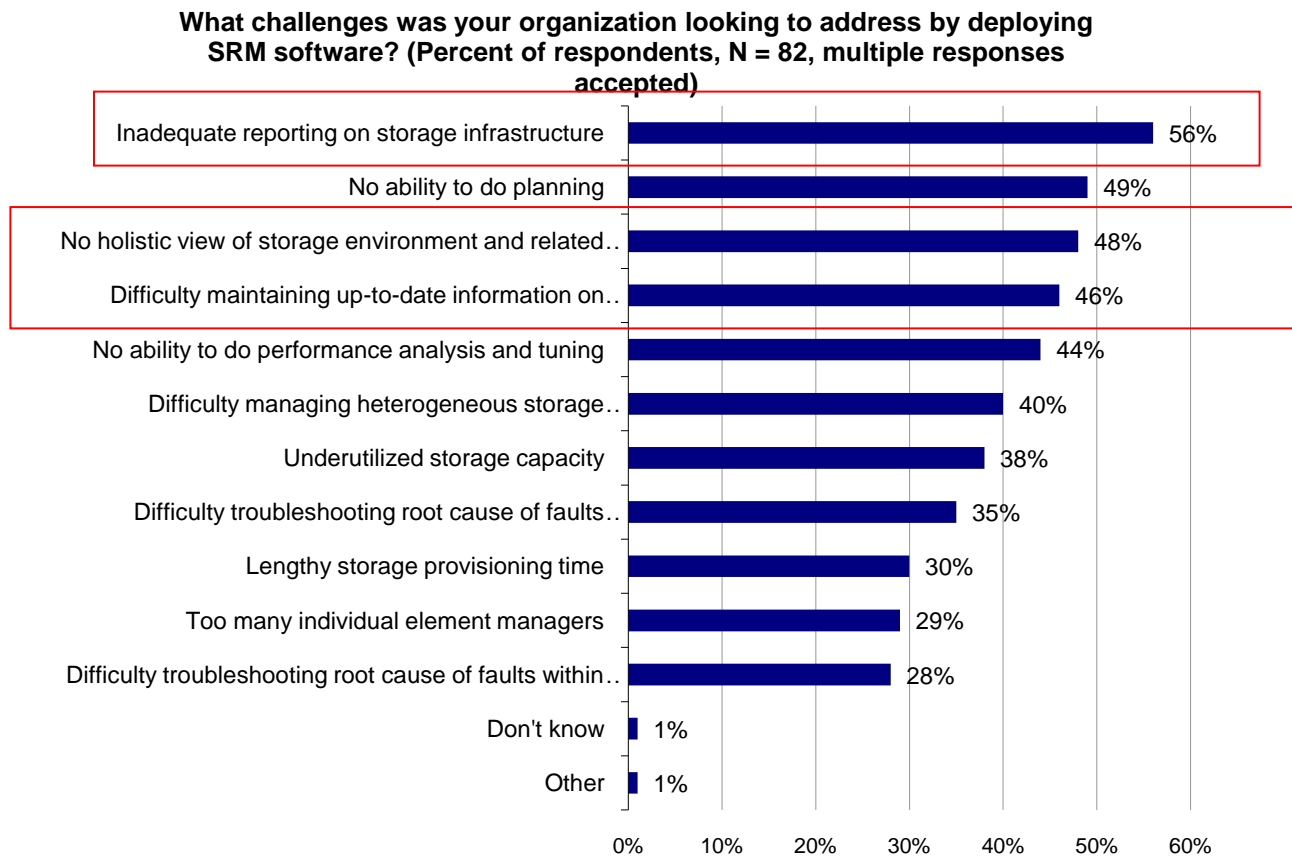
Contextual management is also very important. Without an understanding of how the applications are related to the servers and what path the data takes through the network and into the storage, it becomes very difficult to provide context to change. Without that context, a seemingly unimportant change in one domain can have a dramatic impact to an application.

Recently, ESG asked end-users what challenges they were trying to overcome by deploying Storage Resource Management software. Some of the top challenges were related to the inability to get information about their storage environment, no holistic view of the environment, and difficulty in maintaining up to date infrastructure information. The complete list is shown in Figure 2.²

¹ See: ESG Research Report, *IT Spending Intentions*, March 2009.

² Source: ESG Research Report, *SRM on the Brink*, December 2007.

FIGURE 1. CHALLENGES ADDRESSED BY SRM SOFTWARE



Source: Enterprise Strategy Group, 2009

Keys to Improving Service Levels and Maintaining Compliance

Fortunately, several things can be done to ensure that compliance is maintained and the appropriate service levels are delivered to the business.

Automation

Eliminating as many time-consuming, error-prone, manual activities as possible will help to reduce the risk of human error and improve efficiency. Consider the ability to automate the discovery process for a SAN environment. Replacing countless hours, Excel spreadsheets, and Visio diagrams that are outdated minutes after being completed with technology that can provide an accurate and near real time picture of the environment will help to save time, money, and improve service levels. Software that can quickly and easily identify all components of a SAN will help staff make informed, intelligent decisions regarding changes and planning new services. It will also help to eliminate downtime by quickly identifying infrastructure that is tied to an application for faster problem resolution.

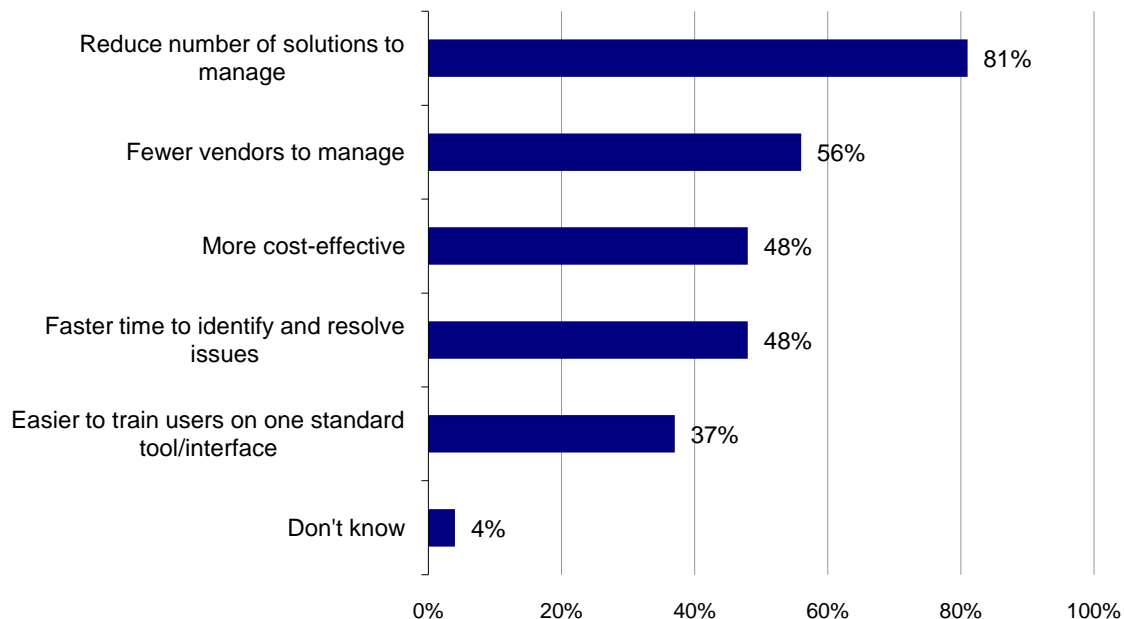
End-to-end Visibility

Providing end-to-end visibility is critical for management of highly dynamic environments. The ability to understand the interdependencies that exist between applications, servers, the network and storage provides context around service levels and enables IT to correlate the infrastructure to the applications. Problems can be rectified faster because the initial root cause can be identified faster. Surveying the whole environment eliminates the cascading alarm storm from one technology domain to the other and allows IT staff to rapidly pinpoint the problem, which, in turn, allows IT to focus time on fixing the problem rather than finding it.

An integrated approach to visibility will also provide many other ancillary benefits, like having a single screen to manage across multiple environments, faster knowledge transfer, greater cost efficiency, etc.

FIGURE 2. INTEGRATED SOLUTION APPROACH

**Why do you believe your organization is more likely to take an integrated solution approach to infrastructure management software?
(Percent of respondents, N=27, multiple responses accepted)**



Source: Enterprise Strategy Group, 2009

Control

Even the best change control process is subject to failure when decisions are based on static, point in time configuration information. In a constantly changing environment, organizations need to leverage technology to provide accurate, near real time configuration information in order to make appropriate decisions. Even armed with this information, there is still the potential for unplanned changes to affect service levels. To help mitigate the damage or risk created from an unplanned change, utilize solutions that can identify a change and create alerts for out of policy changes. In addition to the alerts, it should also keep a record of all changes for analysis and audit purposes.

Demonstrating Compliance

Organizations must be able to effectively demonstrate compliance with internal and external requirements. Internal compliance is typically associated with ensuring best practices are met and applications are protected by appropriate security measures. By leveraging policy based management tools, organizations can be sure that best practices are followed and violations are recognized and rectified immediately. This becomes even more

important when dealing with external compliance regulations. In addition to data being at risk, fines may be levied for noncompliance. IT must provide an audit trail to demonstrate compliance and adopt a repeatable process to identify improper configurations and rapidly bring them back into line.

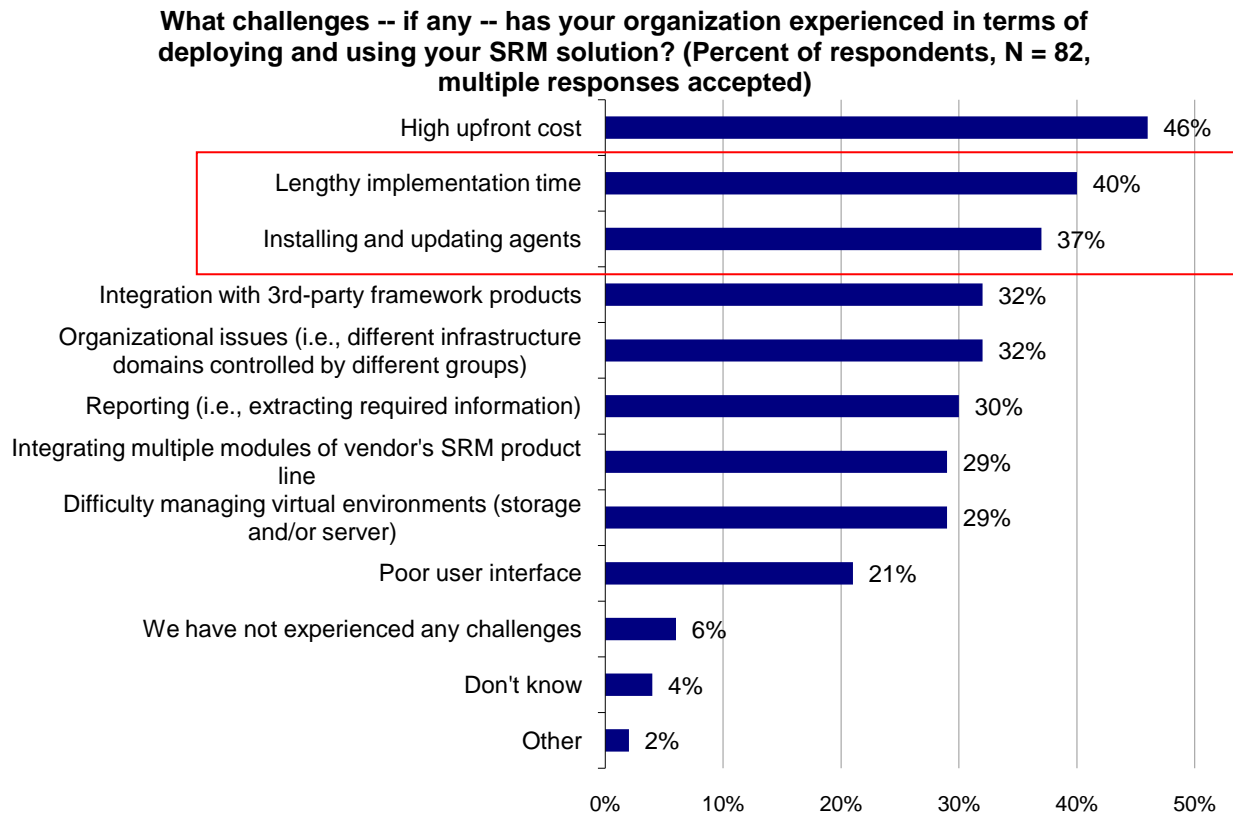
Storage Configuration Advisor Can Help

For those organizations looking to tighten control over their SAN environments in order to ensure service levels are met and comply with internal and external compliance issues, EMC Storage Configuration Advisor can help. EMC's latest addition to its resource management software family has been specifically designed to integrate quickly and easily, and deliver near real time configuration information. More specifically, it delivers:

- **Agentless Technology**

EMC's agentless technology helps accelerate deployment in an environment and dramatically reduces ongoing agent management. ESG research indicated that 2 out of the top 3 challenges in deploying resource management software are lengthy installation times and installing and updating agents (2 and 3 respectively). EMC is able to address both of these challenges by adopting non-intrusive discovery protocols like SSH, WMI, SMI, and SNMP for use with the SAN. The result is a software package that can be quickly and easily deployed for continuous monitoring of a SAN environment—from day one to day one thousand—with very little management overhead.

FIGURE 3. CHALLENGES OF STORAGE RESOURCE MANAGEMENT SOFTWARE



Source: Enterprise Strategy Group, 2009

- **Discovery and Dependency Mapping**

Storage Configuration Advisor provides detailed coverage of the storage area network—including host-based multi-pathing software and HBA firmware—through the SAN switches down to the microcode on the array. Because it is done in near real time, it will be effective even in highly dynamic data centers and will provide users with the ability to view complete, end-to-end data path information. This detailed discovery is critical to understanding how application data is routed through the infrastructure that supports it.

In order to further understand the dependencies that exist in the data center, EMC offers a full portfolio of solutions in its resource management family, including ADM, Voyence, SCM, CAM, and Infra. This will allow companies to not only have an accurate view of the storage area network, but also manage it within the context of the business services it supports, eliminating outages caused by making a decision with incomplete information.

- **Change Tracking**

Storage Configuration Advisor monitors discovered objects in the end-to-end path in near real time and quickly identifies any changes that have been made. Change identification is critical to maintaining requisite service levels to the business because a simple change in a SAN switch or array could dramatically impact the performance of an application data path. Identifying that change is the first step in fixing the problem.

The ability to track and store these changes enables IT to keep an audit trail of any change that is made. Having this historical record enables IT to analyze incidents or trends and improve change management processes and planning.

- **Best Practices Policy Management**

Storage Configuration Advisor includes a selection of default policy templates intended to cover more common compliance issues like path management, physical and logical connectivity, hardware and software configuration, and support. These policies can be the basis for building custom policies. To facilitate the creation of these custom policies, EMC has developed policy wizards that guide users with minimal effort required. Policies can be applied to a group of objects in the SAN to ensure service levels and avoid problems

The software actively searches the discovered object to check for policy violations and notifies IT. All breaches are stored to allow users to further investigate, acknowledge, and start the remediation process. Even from day one, scanning all discovered objects and identify violations will provide tremendous value as hidden, previously unknown issues will be exposed and can be rectified. Moving forward, this continuous monitoring capability will enable IT to dramatically reduce service level affecting issues and provide more consistent service to the business. In fact, ESG research has seen significant benefits in terms of cost, time, productivity, and business alignment for those companies using this software. Figure 4 shows the benefits achieved in various areas where organizations have aligned to best practices.³

³ Source: ESG Research Report, *IT Service & Infrastructure Management Survey*, March 2008.

FIGURE 4. BENEFITS ACHIEVED BY ALIGNING WITH BEST PRACTICES

With regard to those process areas where your organization has fully aligned or is actively working to align with ITIL V2 recommendations, what do you believe have been the most significant benefits resulting from process best practice alignment? (Percent of respondents, N=298)

	Capital cost savings	IT staff time savings	Improved business/IT alignment	Improved business application uptime/availability	Improved end-user productivity	No clear benefits to date/Don't know
Incident/event management	53%	46%	29%	28%	24%	14%
Problem management	24%	47%	36%	26%	24%	23%
Change management	24%	31%	33%	31%	19%	25%
Release management	25%	29%	27%	25%	18%	32%
Configuration management	26%	31%	26%	25%	17%	27%
Service level management	20%	22%	32%	26%	25%	23%
Financial management	31%	18%	30%	14%	14%	23%
IT continuity management	18%	30%	26%	21%	24%	20%
Availability management	22%	23%	22%	28%	25%	32%
Capacity management	22%	29%	25%	20%	18%	34%

Source: Enterprise Strategy Group, 2008

Note: Respondents were asked to select up to two benefits from the list of 6 options provided for each process implemented.

- **Service Analytics**

Notifications of policy violations take a number of forms. Organizations can choose to view violations via e-mail, feed them into a management framework via SNMP, or view them through an integrated dashboard. The dashboard provides users with a general summary of all active policy breaches and configuration changes. It also tracks the time required for a breach to be resolved. Additionally, a number of reports are included to provide detailed information about configuration, compliance, trending, and service levels.

Conclusion

Data centers are rapidly evolving in order to provide better support to the business. New technologies and architectures are being introduced that, while providing value, increase complexity. At the same time, the speed of business is forcing IT to be more responsive than ever, placing significant stress on existing staff and processes. As the environment grows, manual processes can't scale and are prone to human error. With moves, adds, and changes proliferating, not even the heroic acts of individual IT staff members will be able to keep up.

Management solutions that automate processes and enforce best practices are required to ensure that IT can deliver higher, consistent levels of service to the business. These solutions need to install with minimal effort and be simple to maintain—the idea being that IT should be focused on leveraging the information the tools generate to improve service levels, not spending time managing the software application.

EMC has been developing and acquiring management solutions to ensure IT organizations can more effectively align their information infrastructures to the business and consistently deliver higher levels of service. Storage Configuration Advisor is the latest example of EMC's commitment to deliver innovative domain solutions that can be integrated into a larger, more comprehensive solution for managing the data center. Its ability to provide end-to-end change management for the SAN environment will help eliminate application outages due to improper or short-sighted changes.



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