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Service Optimization:

Delivering More Business Value at Less Cost
With Mainframe Storage Management

Executive Summary

In their quest to deliver higher margins and more shareholder value, senior management teams are scrutinizing all areas of operating expense, including the operations portion of the IT department. Every area of IT operations is under scrutiny, particularly mainframes.

Executives and managers responsible for IT infrastructures face a paradox: deliver higher service levels to support the business while cutting costs. To deliver more service at less cost, IT operations staffs need to become much more efficient — much better at extracting business value from the IT infrastructure. Mainframe infrastructure management activities — especially storage management — are often overlooked as a source of savings and business value, but in truth they are rich with potential.

Service Optimization can help you tap the potential of storage management.

Service Optimization is a disciplined approach to increasing IT performance without increasing cost. It identifies underperforming infrastructure management processes within the data center, and then systematically makes them more effective by means of best practices and intelligent automation.

Service Optimization can:

- > deliver higher service levels, by improving systems availability and performance.
- > leverage productivity gains, by enabling the data center to manage more resources and more workloads with current headcount; and by stripping costs out of the most expensive resources, including storage.
- > reduce risk to the business, by reducing or eliminating system outages.

When applied to storage management, Service Optimization enables storage technicians to prevent outages due to manual errors in allocation (70 percent to 80 percent of all storage-caused outages). It increases the efficient use of tiered and hierarchical storage. It helps delay hardware purchases and thereby helps control the cost of real estate, energy, and manpower. And it dynamically allocates storage to batch and real-time business-critical processes.

BMC Software has developed a Service Optimization Maturity Model that can help you through the process of implementing Service Optimization and moving up the maturity curve. This model includes a brief set of assessment questions for storage management: you can complete the assessment in as little as an hour or two and be on the fast track to Service Optimization.

To learn more, visit the BMC Service Optimization Knowledge Center at www.bmc.com/save.

Managers of IT infrastructures face a paradox: deliver higher service levels to support the business while cutting costs.

For IT managers responsible for managing the storage of the company's information, the paradox creates multiple pressures:

- > Your staff is overworked. Each technician is handling more terabytes every year (data is growing 50 percent per year, according to Forrester¹), and some technicians may have additional responsibilities.
- > Your technicians are usually employing no software tools or are relying on less-than-optimal tools such as Data Facility Hierarchical Storage Manager (DFHSM) and Data Facility Storage Management System (DFSMS).
- > You face the continued problem of the "mainframe brain drain" as your most experienced technicians retire with their critical skills and intimate knowledge of your storage environment.
- > You're responsible for preventing storage-caused outages that will violate the stringent terms of service level agreements (SLAs).
- > You're still getting calls in the middle of the night to fix problems.
- > You face the cost pressures of floor space, energy, and manpower. Senior managers, aware of declining hardware cost per megabyte, sometimes forget that additional storage can increase these associated costs.

To deliver higher service levels at less cost, you need to become much more efficient at storage management and reporting — much better at extracting business value from finite resources.

Any IT organization (and any team within an IT organization) that can become more efficient can deliver significant value to the business, according to recent industry surveys. This value includes not only higher margins, but also freed-up IT dollars that can be channeled to developing new applications or business services that improve the bottom line.

IT managers responsible for storage are in the critical path of business value. After all, storage management and reporting isn't the management of the bytes; it's the management of information. The storage contains the information that the business runs on. If you can't get to the storage, you can't get to the information. So if the storage is not managed properly, the information will not be accessible. If the information is not accessible, the business dies.

The big question: what's the best way to become more efficient and make storage more productive, given the reality of staffing and budget constraints?

Service Optimization: Making Management Processes More Effective

The answer is Service Optimization.

Service Optimization is a disciplined approach to increasing IT performance without increasing cost. It makes you more efficient by improving the effectiveness of underperforming storage management processes. It uses a combination of intelligent automation² and best practices, and it takes advantage of advanced technologies that may already be resident in your shop — or are relatively easy to cost-justify and acquire.

Service Optimization can dramatically increase the business value and cost savings you can deliver from your storage management processes.

It can help you create much more efficient allocations, so you can prevent ABENDs (terminations) and reduce the need to fix them after the fact. It can improve reporting, so you can more readily identify inefficiencies and data anomalies resulting from allocation and make adjustments before they hurt the business. And it can tie reporting and allocation together to create automated management responses, so you can manage growing environments with fewer steps, fewer errors, and fewer staff members. You can control the variable costs of storage — people and environmental footprint — which can be significant in many shops, even as disk space gets cheaper.

As a result, you can:

- > Deliver the highest levels of quality of service
- > Reduce costs for the business
- > Reduce risk for the business

Deliver the Highest Levels of Quality of Service

In the typical IT shop, almost all outages that originate in storage are caused by planned downtime and manual errors — manual errors alone account for 70 percent to 80 percent of outages. The manual errors usually occur while a technician is making a change.

Example 1

A storage administrator is asked, on short notice, to allocate additional space for a business service. He's supposed to allocate 200 cylinders. But when he types the change, he accidentally types 20 instead of 200.

So, when the user runs the business service, the service quickly runs out of space, and the user experiences an outage.

An intelligently automated storage management solution would prevent this kind of outage from happening at all. The solution would eliminate the need for manual changes. It would receive the request, fulfill it, and then check to see that the request was fulfilled properly.

Example 2

An end-user develops a program. While he's testing the program, it goes into a loop. The loop causes a data set or file to continually expand and occupy additional disk space. Once the available disk space is all gone, nothing else will work. All the other business processes will just quit.

An intelligently automated storage management solution could resolve this problem by pre-emptively adding space into the storage group or pool while notifying the responsible parties that a problem is occurring so that they can shut down the offending program.

In both examples, the end result was an outage of a critical service(s). And in both examples, automated solutions could have prevented the outage — thus maintaining a high level of quality of service.

The whole idea of automated storage allocation and reporting solutions is to reduce the impact of change — to reduce the need for manual intervention and prevent unnecessary outages and maintain high levels of service. The data center and the business itself operate continuously.

A customer success story

The IT department at a global manufacturer was having difficulty meeting service requirements. The department experienced frequent space ABENDs. It was in the middle of a tremendous DASD growth cycle. It could not predict and resolve most storage problems proactively.

The storage management staff was using a mix of different tools — both point products and home-grown tools — and doing almost everything manually. DFSMS was fully implemented but was not easy to use. The staff could not keep up with the planned growth of business requirements. IT personnel turnover multiplied all these problems.

The company deployed BMC MAINVIEW Storage Resource Manager (SRM). Immediately, JCL space ABENDs ceased to occur, resulting in greater productivity for the storage administrators and production control area. Weekly reports tracked the recovery activity and identified any serious abuses of JCL and extremely inefficient allocations. Allocation practices improved.

For the first time, the storage management staff enjoyed real-time analysis of what DFHSM was doing. They could also view performance data across shared LPARs to pinpoint the exact causes of slow I/O and DASD bottlenecks. Space reporting was fully automated, with reports readily available to management. The company could now forecast long-term growth and cut costs on DASD purchases.

Best of all, multi-level automation enabled a response before a situation became critical. Fixes rarely required manual work.

Reduce Costs for the Business

In order to significantly control costs, storage management and reporting must go beyond native tools such as DFHSM and DFSMS.

For example, many IT shops use DFHSM “as is.” This is often very costly: the tiered processes can become very expensive if you frequently have information in the wrong spot (less-expensive disk or even cheaper tape) at the wrong time and have to incur additional cost to get it back on the expensive (primary) disk so that the user can access it.

An intelligently automated storage management and reporting solution can fill the holes in DFHSM and control the cost of the tiered processes. It can apply the right management policies to ensure that information is available at the right time, to the right user.

So, from an IT management perspective, the automated solution reduces cost by preventing additional CPU upgrades, or additional hardware purchases of tape, or less-expensive disk, or even primary disk.

Another cost saving results from the ability to adjust allocations automatically. Often, the allocation of a file is determined by the application itself (which may be offshore), not by a storage technician or storage administrator. Over time, these allocations drift and become incorrect. For example, a data set may have originally occupied 100 cylinders but it's now down to one cylinder of used space. The 99 cylinders of free space are not returned to the system.

Over many different allocations from many different applications, the amount of wasted space becomes very large and very expensive. As long as that space remains allocated, the system believes it doesn't have enough space — and the company may buy more DASD that it doesn't need.

This waste can be prevented by an automated capability called data set size assist. It gathers historical information on the storage that a data set *actually used* and adjusts the allocation based on the history. In the above (extreme) example, it would adjust 100 cylinders down to one. Often it can reduce overall disk spending by 20 percent to 30 percent.

In-house, BMC Software has realized as much as 40 percent savings using its own data set size assist technology (BMC was the first company to offer this technology and remains the only company to offer the technology as of 2008).

But the *hardware* cost of storage is only one component of the total cost. Other components include additional floor space (real estate) to house the storage, additional electricity to operate it, additional electricity to cool it, and in some cases additional employees to manage it.

These additional costs are many times the hardware cost. Industry analysts differ on how large the ratio is, from a low of 3:1 to a high of 7:1.

The total savings from delaying hardware purchases depends on the size of the IT shop: in medium and large shops, it can be very significant.

A customer success story

BMC Software practices what it preaches: the BMC Software@BMC Software initiative uses company products to manage its environment.

One significant success of this initiative was a Storage Space Assessment performed by BMC Software Professional Services utilizing BMC MAINVIEW Storage Resource Manager. This assessment identified more than US\$500,000 in savings through deferring future storage management purchases and an additional US\$1.5 million in potential storage management cost avoidance. (BMC used the most conservative ratio, 3:1.)

Using BMC MAINVIEW Storage Resource Manager will allow BMC Software to manage a growing storage environment without having to increase staff.

Reduce Risk for the Business

As you know from long experience, problems in allocation can shut down your applications and interrupt the continuity of the business. Here are two typical examples.

Example 1

A batch system to generate bills for a retailer can run out of space and terminate. For example, during a period of exceptionally brisk buying, there may be *more customers* than the retailer anticipated and the customers may buy *more items* than the retailer anticipated. With all this additional data, the batch application may exceed its storage allocation. The operating system will simply terminate the job. This termination will obviously affect cash flow: no bills go out.

An intelligently automated storage management solution can intercept the problem and dynamically allocate more storage space. The batch job completes and the bills go out on time.

Example 2

A real-time credit authorization application can suffer the same problem. High activity in a holiday season may cause the credit authorizations file to exceed its allocated space. The service is terminated and the company can no longer do credit authorizations. The company has to set a floor limit for credit purchases at all its stores. Customers who wish to make large purchases would have to wait for authorizations by telephone; but they may not wish to wait and may go elsewhere.

And what kind of money are we talking about? Well, in retail, the average cost of an hour of downtime is US\$1.1 million³. In manufacturing, financial, telecommunications, and energy companies, it is much higher. No business can afford to be

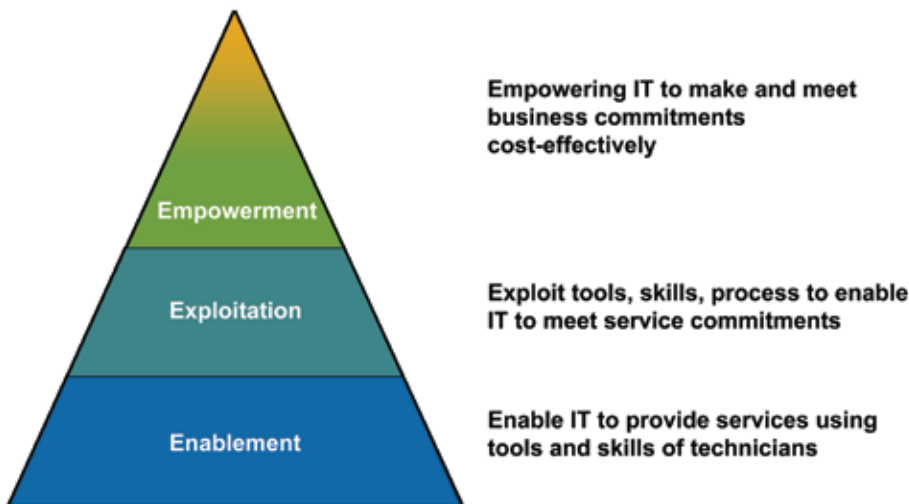


Figure 1: The Service Optimization Maturity Model helps IT operations teams systematically improve the business value of the infrastructure, by making strategic management process improvements.

down for long. That's why intelligently automated storage management is so valuable.

A Service Optimization approach lets you achieve all three business benefits discussed above: deliver high-quality service, reduce costs, and reduce risk.

A Service Optimization Maturity Model

BMC Software has developed a three-step Service Optimization Maturity Model that helps IT management teams identify and improve their highest-leverage management processes. The steps build on one another, taking an IT organization from providing services to providing services with the utmost cost-effectiveness. (See Figure 1.)

The three steps are:

- > Enablement
- > Exploitation
- > Empowerment

Here is an example of how the Service Optimization Maturity Model could help the storage management team dramatically improve the efficiency of storage allocation and changes in storage allocation.

Enablement

In the Enablement step, you deploy the base tools and processes that allow your technical staff to be more productive and effective in the delivery of their day-to-day administration tasks, and establish the baseline for further process improvements.

In the case of allocating storage space, technicians usually work manually, relying on their own skills and knowledge. As long as they can fully understand the requirements of an application, they will be able to perform their task adequately. But if their understanding is limited, they will eventually create problems, including business-damaging outages, and will have to respond manually. So, this step is almost entirely manual and reactive.

Exploitation

In the Exploitation step, you make process improvements. For example, automatic allocation and automatic recovery can enable your staff to be more proactive in preventing or fixing allocation problems. By intercepting an ABEND and recovering the allocation process, storage staff enables IT to meet their service commitment, which is to complete the job.

But your staff is still somewhat reactive: they detect some problems only after the fact — only when an ABEND is about to occur. And the process only fixes problems; it does not optimize the use of storage.

Empowerment

In the Empowerment step, your staff uses intelligent automation such as a data set size assist capability. It enables storage technicians to look at historical usage and determine that a group is allocating too much space. In addition to preventing or fixing allocation errors, the staff can ensure that the allocations are optimized and that you're spending as little money as possible on storage — and that your biggest spending is on business units and applications that are responsible for large revenues.

At this level, the data set is 100 percent optimized, there is no wasted space, and human error is effectively zero. There are no ABENDs. This enables IT to meet business commitments cost-effectively, which includes the service level but also includes cost targets.

There is almost no need for staff to understand requirements or do any coding. The allocation is done correctly the first time.

With each level of Service Optimization maturity you attain, you become more effective. You can deliver higher service levels while saving money — often significant amounts of money.

As your management approach evolves from reactive to proactive to service-oriented, you and your staff become a much more valuable partner to the business. It becomes much easier to achieve ever-more-strategic alignment with business goals, including Business Service Management, and to demonstrate this progress to senior management.

Getting Started: Service Assessments

To get started with Service Optimization, you should first assess your portfolio of storage management processes. Ask yourself these kinds of questions:

- > "How or when do we detect that a space-related problem has occurred?"
- > "How do we correct space-related outages?"
- > "How do we determine that proper placement of data is enforced?"
- > "Do we have processes in place to conduct predictive modeling or trending of our storage data?"
- > "How do we plan for storage support for application growth?"

By asking yourself these and other questions, you can start to identify underperforming processes that could most likely benefit from Service Optimization. BMC Software can help you complete a formal storage management assessment in as little as an hour or two. You'll begin moving up the maturity curve.

You can move beyond DFHSM and DFSMS. You can use best-in-class tools and established best practices (including

ITIL® or COBIT) to streamline these processes and automate them to make them more efficient.

BMC solutions were built to provide high availability and performance of even the largest, most complex data centers. Today, BMC solutions are used by 98 of the *Forbes* Global 100 companies, as well as by numerous small and medium-sized enterprises. Our Service Optimization Maturity Model is based on our extensive field experience working with customers since 1980 to make their IT infrastructures more responsive to business needs.

To learn more, visit the BMC Service Optimization Knowledge Center at www.bmc.com/save.

End Notes

- 1 *Trends 2006: Database Management Systems*, by Noel Yuhanna, published by Forrester, November 29, 2005.
- 2 Intelligent automation is automation that has native intelligence of the environment and uses technologies such as data set size assist.
- 3 Sources: *IT Performance Engineering and Measurement Strategies: Quantifying Performance and Loss*, Meta Group, Oct. 2000; Fibre Channel Industry Association.



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About BMC Software

BMC Software delivers the solutions IT needs to increase business value through better management of technology and IT processes. Our industry-leading Business Service Management solutions help you reduce cost, lower risk of business disruption, and benefit from an IT infrastructure built to support business growth and flexibility. Only BMC provides best-practice IT processes, automated technology management, and award-winning BMC Atrium technologies that offer a shared view into how IT services support business priorities. Known for enterprise solutions that span main-frame, distributed systems, and end-user devices, BMC also delivers solutions that address the unique challenges of the mid-sized business. Founded in 1980, BMC has offices worldwide and fiscal 2008 revenues of \$1.73 billion. Activate your business with the power of IT. www.bmc.com

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