



Simple ways to get the most from your Blade environment

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Executive summary

Blade servers have ushered in a new era in IT reliability and performance. They have helped enterprises reduce capital expenses and also save time, power, cooling, and floor space. They support server virtualization and consolidation initiatives that control cost and enhance flexibility. These are all clear benefits for an IT organization trying to satisfy the increasing demands of its business and striving to do more with less.

However, to achieve the best results, blade technology needs to be implemented with a view to the overall, end-to-end environment. While blade servers provide an excellent base for building an IT infrastructure that lowers costs and risks, appropriate best practices need to be adopted to help blades fully deliver on their impressive promise.

This white paper outlines some of these required best practices. It provides a “day in the life” glimpse of what happens in an actual environment where such practices have not been implemented and the consequences that ensued. It concludes with a list of benefits and cost savings that can be realized as companies implement each recommended practice.

Controlling a major source of cost and risk

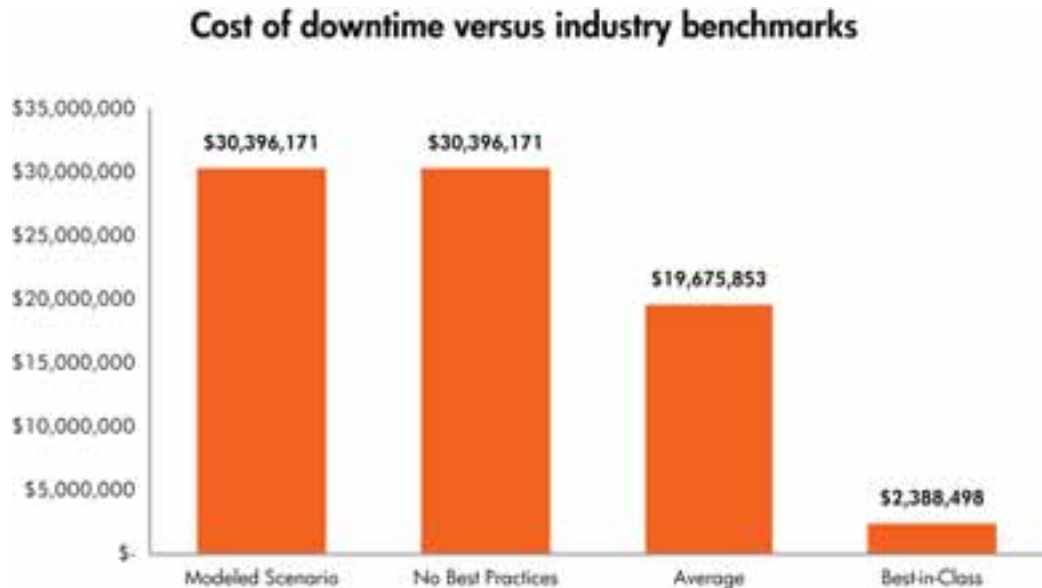
The pressure on CIOs to deliver results has never been greater. For a number of years now, they have been asked to closely align business and IT goals—and operate at lower cost points with fewer resources. They have been tasked with reducing risks to the business while delivering enhanced quality and accelerating business growth.

The recent economic crisis has multiplied the pressure on CIOs to cut costs and made it even more important for them to act quickly and decisively to ensure that business and IT goals are aligned. However, while speed is important, it is also essential to act wisely. Analysts are quick to point out that organizations must shrink their budgets while preserving or enhancing their ability to compete and do business. They also advise that the companies best able to survive the current financial crisis are the ones that position IT as a strong contributor to the firm’s competitive advantage and operational excellence.

So how does a CIO act both quickly and wisely?

Industry analysts such as IDC have pointed out clearly that reducing planned and unplanned downtime is a major factor in cutting costs and removing risks. Based on their extensive experience with enterprise customers, IDC recently developed a Cost of Downtime Tool that highlights the massive impact of unplanned downtime on business. When configured to represent a typical financial services company, the tool shows that a single incident of unplanned downtime can result in a revenue loss of over \$16 million per hour. Figure 1 shows how these losses compare with industry benchmarks.

Figure 1: Financial industry cost of downtime



When configured for other industries, the IDC Cost of Downtime Tool again calculates significant downtime losses. For example, a manufacturing company is projected to lose over \$10 million per hour of unplanned downtime. While retail fares better, two hours of downtime still result in losses of nearly \$2 million.

These figures do not include the disruption and loss that occur when other essential applications that IT does not typically consider to be “Mission Critical” go down. For example, Microsoft SharePoint and Communicator are quickly becoming as important as email to the functioning of many enterprises. Disruption to the availability of this class of application brings its own cost of downtime, since it reduces the ability of the enterprise to function effectively.

The good news is that blade servers have proven their ability to reduce downtime. Nevertheless, they can achieve even better results through the deployment of appropriate best practices: improved processes and procedures that can measurably enhance the overall manageability of the IT environment. The following case study and the remainder of this paper define exactly what these best practices are and why they are so important to the overall goal of reducing cost and risk.

A day in the life of a financial institution’s IT department—a case study

Consider the case of a thriving financial services enterprise under constant pressure to enhance IT reliability and performance while simultaneously reducing costs.

The IT department had multiple teams managing different parts of the infrastructure. The mission critical teams had a good track record in successfully running their applications on high-end proprietary technology, while other parts of the IT department were responsible for running less critical Wintel-based applications.

Blade technology came along and offered a way for the IT department to respond to these pressures and support the goals of the business. This was technology that could be introduced into the operational environment to run a range of applications—both critical and non-critical. Simple to

purchase and deploy, blades could be plugged in, turned on, and allowed to operate with minimal initial involvement and less on-going management.

However, while blade technology offers unique advantages and delivers impressive benefits, all servers that run critical applications need to operate according to processes that are properly managed. IT staff must be well-trained in supporting and managing blades and the larger environment. The overall data center must be managed to achieve optimum performance from an end-to-end perspective that includes areas such as power and cooling, storage optimization, and network productivity, as well as management of the applications themselves. Otherwise, unpleasant consequences could ensue, as our financial services company discovered.

Looks can be deceiving

It all started with the installation of a firmware patch. The process was supposed to be simple but somehow, installing that patch caused two major outages and had a significant negative impact on the business. That was because no one had taken into account some of the important characteristics of blade environments. Because blades are effectively Wintel servers, the company's IT staff saw no need to develop different procedures or undergo specific training to manage this technology. After all, their blade servers looked much like Wintel servers, which could simply be rebooted if something went wrong.

So the staff tried rebooting the blades, but this had no effect. Unfortunately, when one server was rebooted to recover a particular application, it unexpectedly caused a different one to fail. After staff tried other ad-hoc attempts at recovery, it became clear that greater levels of expertise were needed. They then tried escalating the issue to their next level of support. Unfortunately, they were not able to respond efficiently, since no one had recorded key configuration information.

Meanwhile, time was slipping by, incidents of downtime kept recurring, costs were mounting and there was no resolution in sight.

Then, someone remembered that the blade servers came with a number of management tools. Surely, those could be used to get the servers up and running again. However, a quick survey of the IT staff showed that no one had been trained on how to use these tools. Training sessions were scheduled for some time in the future.

At this point, it was clear that the answers to the downtime issue were not to be found in-house. It was equally clear that the costs of the downtime incident were already in the millions of dollars and that some of the enterprise's important business operations were being impacted. There was nothing else to do but place an urgent call to the hardware vendor. The vendor responded as quickly as possible, fixed the problem, and got the servers up and running again. But this was clearly not a day that the company wanted to relive ever.

Analyzing the factors that made this day go bad

As the financial services company found out, processes and approaches that work fine for non-critical Wintel servers are not sufficient for bladed environments running critical applications. Bladed environments can be very dense, highly consolidated, and extensively virtualized, as was the case in this example. Virtualization can maximize the use of technology, plus reduce real estate and power needs as one server runs multiple applications. However, it creates complexity with multiple components of a company's applications often running on multiple blades scattered across the data center. A blade enclosure could also be functioning as a multifaceted "data center in a box."

Blade technology also allows multiple servers to be deployed quickly, so there is a tendency to just allocate the next available slot to the next service/application requesting a new server. The result may be that within a single enclosure, there are servers supporting several different business applications that have completely different usage patterns and availability requirements. This makes it harder to manage blade enclosures as a single entity, since there may not be a convenient window for planned downtime if the enclosure needs to be taken completely offline.

All of these considerations make it essential for the system manager to keep a clear view of the different types of applications that are being mixed in an enclosure. There needs to be a clear strategy for allocating applications and other software based on their criticality and availability requirements. In our “day in the life” case study, this critical planning, deployment, and management practice was overlooked in the haste to deploy the enterprise’s new blades.

As the IT staff realized, the issue might have been prevented or at least mitigated through the use of the excellent management tools that are available to support bladed environments. These tools include capabilities for patch and vulnerability management, integrated lights out (ILO) remote management, and many other key functions that span the blades’ lifecycle (Integrate, Deploy, Monitor, Control, Optimize, Protect). However, as we saw, IT staff members were not properly trained to use these tools. It did not seem to be a priority.

Additional considerations

Within each blade enclosure, there are multiple sets of BIOS, firmware, and associated drivers, which are then multiplied by the number of blade, storage, and network modules. These all need to be managed and kept up-to-date to avoid problems and add new blade modules without issue. Network management presents a similar challenge, since multiple network addresses have to be managed. The actual number of items and areas involved is not the principal issue; rather it is the dependencies that often exist between them. Making a change in one component can impact other components. As a result, projects such as upgrading firmware require careful planning and testing to manage all the interactions.

It is also impossible to expect optimum results from any technology without considering the efficiency of the overall data center environment in which that technology operates. Blades can help enterprises realize dramatic savings in space, power, and cooling costs. However, the best results occur when the data center itself is optimized to respond to the enterprise’s overall realities and requirements.

When things go wrong: The impact on the organization

The day presented a number of surprises to the IT staff, all of them unpleasant, including:

- Encountering a number of on-going issues and problems that they did not expect when they started the blade roll out
- Spending far more money and time managing the environment than expected because they had not done enough upfront planning
- Failing to meet their Service Level Agreements (SLAs) with the business because they had not planned for upgrades in enough detail
- Causing some users to experience unplanned downtime because IT staff had not seen the need to control which applications should be loaded into which blade enclosures

IT staff were unable to implement new functionality quickly enough because they could not find suitable windows for planned maintenance. They could not readily add additional capacity to deal with growth due to firmware incompatibilities and a lack of configuration information. Bottom-line—changes could not be implemented when required by the business.

The IT department became consumed with crisis management, moving from one crisis to the next. This kept them from gaining control of the situation. Costs mounted, customer satisfaction suffered, and the IT staff became demoralized because they felt powerless to fix the problem.

A better day—Seven best practices that can help our financial services enterprise (and any enterprise) get the most from a bladed environment

The solution is fairly simple: blade technology needs to be complemented by appropriate processes and procedures that help minimize service interruptions and reduce unacceptable downtime risks. The following tips can serve as guides for implementing these processes by bringing management and administration best practices to any blade-specific environment.

Best practice #1: Make people and processes the focal points

As we saw in our case study, the issues our financial service organization had with the firmware update were directly related to people and process issues, not hardware problems. Implementing a bladed environment is an ideal time to define an approach based on ITIL¹ best practices that will address the process and people issues effectively.

Best practice #2: Provide IT staff with the know-how to run and manage the environment

People are the front line when it comes to supporting the IT environment. In our example, members of the IT staff were unable to deal with the firmware upgrade and its consequences effectively because they tried to apply non-mission critical processes and procedures to mission critical bladed infrastructure. The staff had also not been properly trained in the use of the excellent management tools available for managing bladed environments that could have easily avoided patch and upgrade problems. IT staff must have the knowledge and skills to provide the right support. This not only helps reduce downtime, it also delivers better performance and a faster ROI through better and wiser use of IT assets.

Best practice #3: Have a clear plan for deploying applications within blade enclosures.

There needs to be a clear strategy for allocating applications and other software across blade enclosures based on their criticality and availability requirements. This will give IT staff clear periods of planned downtime for taking each enclosure off-line for scheduled maintenance without negatively impacting business operations.

Best practice #4: Take charge of change management.

Changes are inevitable in any sizable environment. Firmware levels, for example, change frequently as new server and storage blades are added to enclosures. In addition, there is the difficulty of keeping up with the flood of information about blade firmware revisions, new drivers, new technologies, and new tools. That is why it is essential to design, implement, and continuously improve change and configuration management processes.

Best practice #5: Focus on addressing issues BEFORE they impact operations

When you are aiming to operate at the speed of business, after-the-fact fixes do not make the grade. These days, you need to anticipate trouble and head it off before it happens. It is important to identify risks across people, process, and technology so that appropriate countermeasures can be implemented. You should also make sure that vendors provide an appropriate level of support including proactive features such as critical patch analysis and change management support.

¹ ITIL - A widely accepted source of industry best practice for IT Service Management: www.itil.co.uk.

Best practice #6: Make sure any technology is properly installed and configured right from the start

A technology solution that is properly implemented in terms of its hardware, firmware, and software will dramatically reduce problems and downtime in the future. Proper initial configuration of blades can also save time and reduce issues with upgrades, hot patches, and other changes.

Best practice #7: Eye the environment—not the device.

Many of today's data centers are experiencing a capacity crisis as they reach the limits of older facilities and legacy infrastructures. Space is tight. Power and cooling resources are over-burdened. Placing new blades in an old, inefficient environment may limit their ability to address these issues. An assessment of the data center that examines and analyzes the IT environment's power/cooling capabilities and requirements can provide valuable information to help improve efficiency.

Measurable and incremental benefits

Implementing these seven best practices can do much to reduce downtime and improve the overall management within an IT department. This is true for our sample financial services organization and just about any IT environment—bladed or not. But what specific payback can companies expect to realize from making these recommendations a reality?

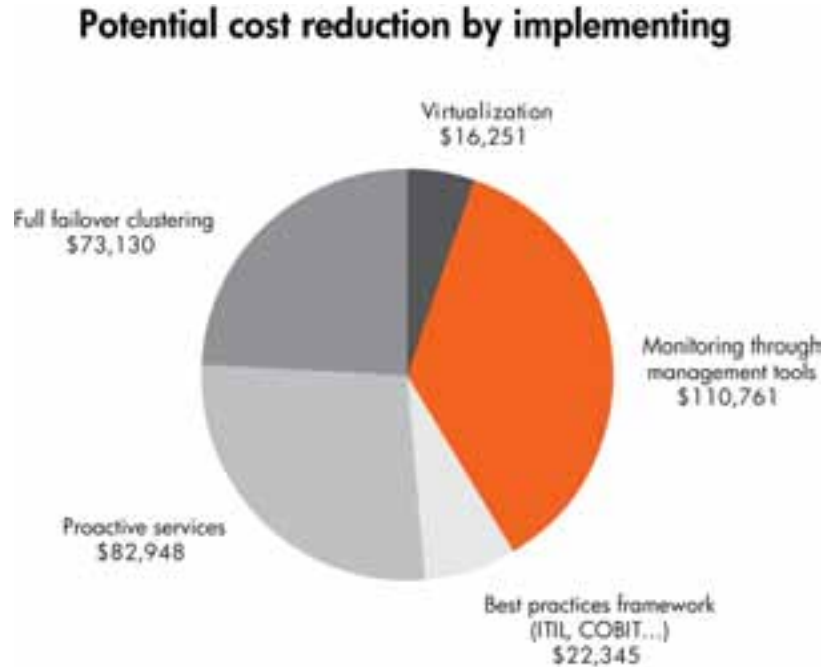
As shown in Figure 1, Best-in-Class enterprises were able to reduce downtime costs by over 90%. The same IDC Cost of Downtime Tool used to generate these figures also includes an extremely valuable capability that shows exactly how much can be saved in terms of reduced downtime by implementing specific tools, processes and procedures.

Based on an average of 1.8 hours of downtime per year at an average cost of slightly over \$16 million per hour for financial services, the following approaches have proven their ability to deliver impressive savings:

- Best Practices Framework (for example, ITIL, COBIT): \$2+ million in savings per year
- Proactive Support Services: \$7.4 Million in savings per year
- Monitoring via Management Tools: Nearly \$10 million in savings per year

Adding an approach like full failover clustering could save an additional \$7.4 million, while Virtualization would save \$1.4 million. A summary of these savings is shown in Figure 2. The final result would be to reduce potential downtime and its associated costs from \$30+ million to \$2+ million per year.

Figure 2. Potential cost reduction per approach—Financial Services example



The conclusion for the sample companies across all industries, including financial services, shows that the cost of downtime can be reduced by 92% by implementing some or all of the seven best practices listed in this white paper.

Summary

Bladed environments have proven their ability to reduce complexity and costs, while also delivering an impressive level of flexibility to help organizations of all types and sizes quickly adapt to evolving requirements and realities. They have also shown that they can help CIOs respond to the pressures to deliver on specific “business outcomes.” As a result, blades have made their way into a growing number of IT environments. What’s more, this is a trend that is projected to continue for the foreseeable future.

However, any enterprise implementing blades should also be prepared to implement specific best practices that are now available to help ensure that a bladed infrastructure will deliver on its impressive promises. Tools and approaches such as ITIL-based processes and procedures, staff training, a proactive approach to support, and proper configuration and implementation not only help the enterprise get the most from blades, they also enhance the performance and management of the entire IT environment, allowing it to play the critical role that today’s business demands.

Appendix

Services from HP to help you get the most from your blades investment

While some organizations may have the expertise, resources, and time to implement the seven best practices outlined in this white paper on their own, others may prefer to engage external experts. HP can provide targeted assistance to help you get the most from your bladed environment.

HP offers proven knowledge of blade technology, tools, software, and related storage and networking products. Our service experts are trained to support more than 20,000 product lines from more than 1,300 vendors, and products that range from industry-standard platforms to networks and operating systems. And we bring industry leadership in ITIL best practices to your environment. A number of our Mission Critical and Proactive Services combine the capabilities below into one convenient service. For more information, www.hp.com/services/missioncritical

Here are specific ways HP can help implement the seven best practices listed in the white paper:

1. HP offers service management assessments that start with an exploration of your business requirements and how they are reflected in your service-level objectives and day-to-day operations. As part of this service, HP:
 - Evaluates your processes against ITIL and other industry sources of best practice
 - Identifies potential availability and performance shortfalls in your mission-critical blades infrastructure
 - Spotlights high-priority areas for improving management effectiveness, delivering better business value, and cutting costs
2. Experienced consultants for HP can work with you to design, implement, and continuously improve change and configuration management processes. You gain deeper visibility into change, reduce change-management costs, improve market sensitivity, and decrease change-related downtime.
3. HP can help you fine-tune your blade-based operations and make sure they stay tightly aligned with your business requirements. And we can keep your people up-to-speed with flexible service management education and training options.
4. HP Data Center Services can help transform the data center and remove barriers to business growth. These services address Data Center design, operations, and optimization.
5. Because energy use is such a critical cost factor, HP has developed a specialized set of Energy Efficiency Services that can assess current consumption and improve power usage effectiveness. These services can also help you:
 - Devise and implement a sustainable energy-efficiency strategy
 - Cut costs by eliminating over-provisioning of power and cooling resources
 - Analyze the impact of prospective changes in layout, equipment, or cooling capacity
 - Transition to “greener” data center operations
 - Identify the ROI of moving to industry benchmark best practice
6. Deployment Services include a variety of installation and startup services designed to ensure immediate and trouble free hardware implementations. Specialized services for HP BladeSystems include complete configuration services available through HP Factory Express. Proper configuration and deployment are essential if blades are to function properly and deliver true cost and complexity reduction.
7. HP has a number of services that provide personalized, proactive support from an account support manager who keeps your people up-to-date with the latest best practices. This personalized approach also helps you implement measures to prevent future problems and gives you

specialized advice on topics such as power and cooling, virtualization and security that are particularly relevant to blade implementations.

8. Regardless of how effective your proactive approach, some problems will occur. To minimize the downtime that those problems will cause, it is important to complement a proactive support contract with expert, reactive services. The HP portfolio includes reactive services with a range of coverage windows and response times, making it easy for you to select the one that best matches your requirements. The HP six-hour call to repair service is an industry exclusive and ensures repairs (not simply an on-site response) within six hours after your call is received. It is an excellent choice for companies with little or no tolerance for unplanned downtime.
9. Many of HP Mission Critical and Proactive services apply the comprehensive, whole-environment approach today's bladed infrastructures demand. HP has the ability to address the entire IT "chain" and this is further enhanced by our multi-vendor support leadership, as well as long-standing service alliances with major players across today's technology landscape.

For more information

- To learn more about HP Mission Critical Services, contact your HP Representative today; or visit www.hp.com/services/missioncritical
- To learn more about HP BladeSystem, contact your HP Representative today; or visit <http://h71028.www7.hp.com/enterprise/cache/80316-0-0-225-121.html>

Technology for better business outcomes

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