



An Oracle White Paper  
April 2012

## Realizing the Economic Benefits of Oracle Enterprise Manager Ops Center

Executive Overview .....	1
Approach and Methodology .....	1
Key Study Findings .....	2
Introducing Oracle Enterprise Manager Ops Center.....	3
Increasing Productivity and Competitive Strength .....	5
Boosting Throughput.....	5
Improving Efficiency .....	6
Reducing the Cost Burden of External Business Forces .....	6
ROI Analysis .....	7
Cost Analysis .....	8
ROI Model.....	8
Example Scenario.....	10
Conclusion .....	13

## Executive Overview

In today's competitive economic climate, nearly all organizations are working to reduce their operating costs. Although IT is a key contributor to business productivity, it is also a significant contributor to cost.

With so many companies using multiple types of computers and operating systems, the true financial impact of ongoing activities such as patch maintenance, fault and event management, change control, and policy management can be challenging to track and measure. But all of these costs can be controlled by the use of Oracle Enterprise Manager Ops Center (Ops Center), which is now available at no additional cost with Oracle systems support.

Oracle Enterprise Manager Ops Center 12c allows enterprises to accelerate mission-critical cloud deployment, unleash the power of Solaris 11, the first cloud OS and simplify Oracle engineered systems management. Coupled with optimized business processes, Ops Center can dramatically improve productivity and provide quantifiable ROI. This paper examines areas of potential optimization, shows how day-to-day business processes can contribute to – rather than detract from – that optimization, and provides an ROI model with an example scenario based on actual deployments.

### Approach and Methodology

The findings in this study are based on detailed, in-depth interviews with IT managers, senior analysts, and practitioners in Fortune-500 companies representing global finance, high technology, and pharmaceutical industries. The study participants deploy Oracle's Sun server products managed by Ops Center providing a wide range of mission-critical application, middleware, and database services. Many of the participants use server virtualization technology. The interview results were aggregated and analyzed to produce baselines for efforts, costs, and benefits. Then a hypothetical corporation was created with characteristics representative of the study participants:

- How to reduce costs while growing server footprint
- How to increase efficiency using virtualization and replacing older servers with fewer, multi-core servers

The ROI analysis of these scenarios shows the economic benefits of implementing Oracle Ops Center.

## Key Study Findings

This study concentrated on productivity improvements and economic benefits gained by using Ops Center for managing Oracle's Sun server environments. Key findings include:

- Ops Center streamlines operations using comprehensive, integrated physical and virtual systems management
- The number of systems that can be managed by existing staff increased by as much as 100 percent
- Improvement in the efficiency of every-day, recurring activities resulted in more time devoted to high-value non-recurring activities
- Deployment time of new systems was reduced from hours to minutes
- Automated patch analysis reduced staff time, virtually eliminating patch change control review meetings
- Patch deployment time was cut by an average of 50 percent
- Quality of new virtual machine and OS deployments improved because systems administrators had more time to develop, integrate, and test the "golden" virtual machine images
- Timeliness was improved and the burden of compliance auditing, security patches, and merger and acquisition activities were reduced

When implemented as a comprehensive solution using best practices for systems management and business practices, Ops Center delivers a positive return on investment. A return on investment (ROI) model shows a three-year return on investment of 139 percent. Figure 1 shows the estimated annual savings from the ROI model.

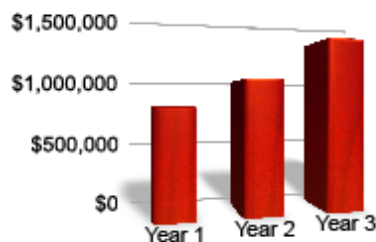


Figure 1. Estimated Annual Savings for Implementing Ops Center.

## Introducing Oracle Enterprise Manager Ops Center

Unlike traditional, silo-oriented management solutions that lack comprehensive integration and severely limit IT's ability to go beyond limited cost efficiency and productivity, Ops Center is a comprehensive, end-to-end systems management solution that dramatically streamlines operations and significantly improves productivity in the data center. Its converged hardware management approach integrates management across Oracle hardware, operating systems, and virtualization technologies, and automates key life-cycle management processes. As part of Enterprise Manager, Ops Center is integrated with complementary application, middleware, and database management features enabling unique application-to-disk management capabilities that further integrate management across IT assets and increase operational efficiency.

Modern computing systems do not have a direct, one-to-one relationship between OS and servers, servers and storage, storage and backup, backup and compliance, or compliance and OS. All of these components have interdependencies that must be managed. For example, a modern server can have a specialized service processor or a collection of blade servers can have a chassis controller. Meanwhile, OS virtualization decouples the OS from the underlying hardware and multiple Oses can run concurrently on the same server. Effective and efficient systems management requires tools that can automatically analyze these complex relationships, automate manual processes, and manage workflow. Ops Center's converged hardware management approach provides the necessary automation and integration to insure these complex environments can be efficiently managed.

Ops Center builds a complete picture of the hardware and software platforms in the enterprise, including: component-level hardware and firmware, system controllers and service processors, servers and storage arrays, hypervisors and virtual machine hosts, operating systems, and Solaris containers. Figure 2 shows how Ops Center scales to manage hardware and software platforms across the entire enterprise, including geographically distributed sites and security zones.

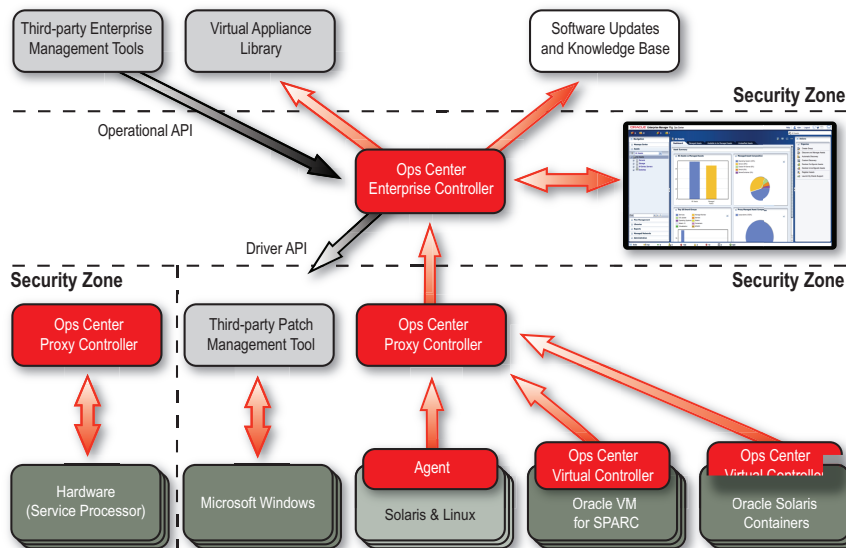
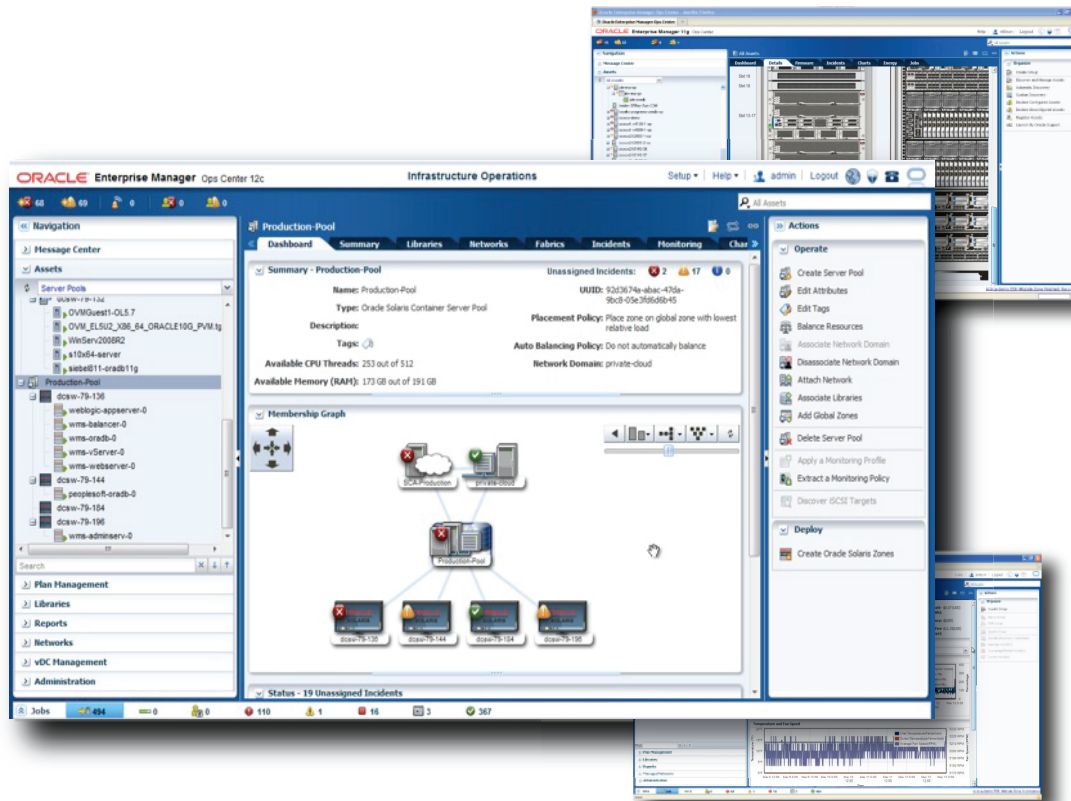


Figure 2. The Ops Center architecture supports scalability and geographic distribution.

Using an HTML browser-based console, Ops Center automatically discovers and registers IT hardware and software assets. The relationships between the platform components are used to build a comprehensive topology map of the systems. Smart grouping automatically sorts the topology to provide a clear understanding of the interdependencies of the systems and their relationship to business function or organizational hierarchy. The topological view provides a complete view of the datacenter and allows easy drill down into the detailed view of assets and their current status, improving IT staff efficiency. Figure 3 shows the Ops Center topology and operational detail views.



**Figure 3. Ops Center Topology and Detail Views.**

Once the complete picture is known, Ops Center manages the assets during the entire product life cycle:

- Manages the complete life cycle of physical machines, from deployment to retirement
- Discovers assets and maintains an accurate, topological view of the enterprise computing infrastructure
- Monitors system health and performance
- Provisions firmware, operating systems, and application software stacks
- Manages virtual machine hypervisors and their clients

- Automates patch acquisition, analysis, and deployment
- Manages complex dependencies between hardware and software
- Reports system configuration and compliance audit requests

Ops Center provides the most comprehensive management across Oracle servers, operating systems, and Solaris virtualization technologies, and dramatically improves the efficiency of IT operations with its integrated lifecycle management and built-in automation.

## Increasing Productivity and Competitive Strength

Industrial productivity is often measured by throughput (doing more) or efficiency (doing more with less). Methods for improving throughput and efficiency are often complementary, but can be mutually exclusive. However, both combine to deliver a positive ROI, as shown in the model results. In this study, throughput and efficiency are studied separately.

However, not all IT activities are directly productive. External forces can cause extra activity as the enterprise reacts to changes in the business environment. Some activities are needed to meet regulatory or industry standards compliance. Disruptions in the supply chain by external vendors can lead to unscheduled patch or upgrade activities. Finally, mergers and acquisitions can lead to consolidation efforts where only the most efficient IT organizations will survive.

Ops Center offers a consistent and comprehensive solution to the issues confronting productivity improvement and external business forces.

### Boosting Throughput

Throughput is a measure of the amount of material or items moving through a process. The explosive growth of social media, online auction and commerce, cloud computing services, photography, video, and instrumentation data are good examples of cases where enterprises are continuously boosting throughput. In many cases, servers, networks, storage, applications, and even data centers are being added at a rapid rate. To be cost effective, the costs of managing this growth must not grow faster than the capital investment. The solution to managing this growth invariably includes homogenizing the components or services – the marginal cost of adding another server is reduced if the server is configured identically to other servers currently in use.

Growth can be easily accommodated using Ops Center's automated asset discovery feature. As new hardware is physically installed, Ops Center alerts system administrators that new servers are available and ready to be provisioned. System controllers are identified and their relationship to the servers they control is added to the topology view, completing the comprehensive view of the data center. The provisioning and configuration management of the new servers is easily managed by Ops Center for the entire life cycle.

Ops Center can also scale to manage multiple sites as enterprises expand. Local proxy servers are used to cache patches, manage control, and monitor systems in different physical data centers or security zones. Local proxy servers can also be configured to match a firm's organizational structure. Thus Ops Center is able to scale and efficiently manage the growth of the firm's throughput capacity.

"We have expanded to three datacenters being managed by Ops Center today and will be expanding further soon, due to a recent merger"

Systems Administrator, Financial Services Company

## Improving Efficiency

Efficiency is used as a metric to measure the maximum productivity with the minimum effort or expense. Ops Center improves efficiency by easily managing the systems and their dependencies. Routine tasks, such as downloading and staging patches for deployment, are handled with little or no operator intervention. Regularly scheduled activities can be coordinated and orchestrated across the entire enterprise. Power utilization can be monitored and resources reallocated to more efficiently use available computing resources. Processes become standardized, reducing training requirements and increasing the time available for proactive activities.

Ops Center enables system administrators to produce and manage configuration templates that can be used to provision servers. The resulting systems look alike and can be managed as a group with a single set of configuration policies. Reusing platform build recipes improves deployment time and increases the ratio of systems managed per system administrator by up to 100 percent. Patch analysis is amortized over the group and patches can be installed on a subset of the group, to reduce the risk or impact of unexpected patch interactions.

"Using a standard library for platforms within Ops Center has reduced our time spent fire fighting"

Systems Administrator, Large Pharmaceutical Company

## Reducing the Cost Burden of External Business Forces

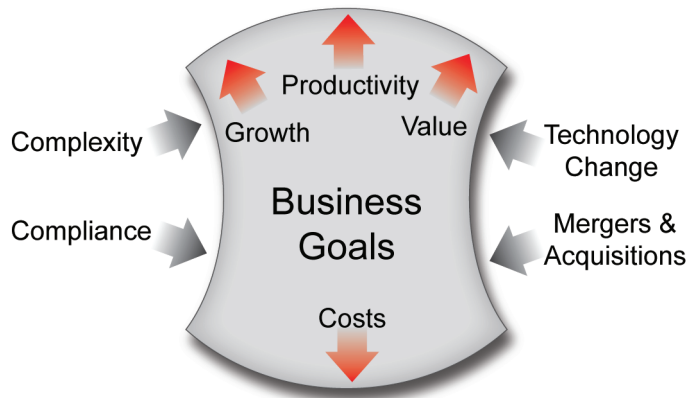
External forces can cause businesses to react to changes in the industry, government regulation, or the supply chain. Mergers and acquisitions can disrupt organizations as the parent company strives to reduce inefficiency and streamline operations. Since the source of these changes is outside of the business, traditional long-term planning processes do not adequately address the business impact. A comprehensive and flexible infrastructure adapts to change, while minimizing the implementation cost of such changes.

- Regulatory compliance challenges, such as Sarbanes-Oxley, HIPAA, and RoHS, are developed over many years, but can have large impacts on business operations. These compliance challenges tend to have no tangible return on the investment.
- Industry standard compliance, such as ISO and PCI-DSS, are continuously changing to adjust to industry conditions. The return on industry standard compliance investments is, at best, maintaining the status quo of the industry.



- Unexpected technology changes, such as software patches or security fixes, can occur with little or no warning and require immediate response. The return on investments to protect against unexpected technology changes is the reduction of risk.
- Mergers and acquisition activity can significantly disrupt business operations, but also represent an opportunity to gain competitive advantages.

Figure 4 shows the internal and external forces that can affect business goals.



**Figure 4. Internal and external business forces can impact business goals**

Compliance costs are real and can negatively impact productivity, yet have intangible returns. Methods for reducing compliance costs resist point solutions, and are best solved by comprehensive changes to the core business processes. Ops Center helps reduce compliance costs by tracking configuration changes over the entire life cycle of systems across the enterprise and producing detailed reports on the current state of the system. Rather than attempting to model intangible returns, the model considers only the value of labor time savings achieved by implementing Ops Center.

## ROI Analysis

This simple ROI model considers the cost of implementing Ops Center and the quantifiable returns on the investment. The model works well for those organizations which track costs using hourly metrics, avoiding the arduous task of collecting detailed task metrics, yet producing results that can easily be communicated throughout the organization.

This study showed significant reduction in the time and effort required to manage the patch process. The comprehensive patch analysis also led to reduced downtime, because systems could be patched more efficiently and only those patches requiring reboots contributed to downtime. These savings can be quantified in a cost analysis showing the hours saved by implementing Ops Center. The labor hours saved can then be applied to more valuable, non-recurring activities that deliver higher return than mundane recurring activities. The model provides an economic value variable for the value of the nonrecurring activities.

## Cost Analysis

When IT processes are automated, operational efficiency increases and productivity improves. The TCO for a typical enterprise is analyzed by deconstructing efforts into recurring and non-recurring costs. For IT, non-recurring activities tend to have high value, while recurring activities can be improved using automation.

Study participants noted that by using Ops Center to reduce the time consumed by recurring activities, more time is available to tackle non-recurring activities, yielding higher business benefits.

Non-recurring activities include:

- Capital asset evaluation, testing, and acquisition
- Lifecycle milestone management
- Virtual machine image development, integration, and testing
- System performance analysis
- Incident response
- Training

Recurring activities include:

- Provisioning
- Software upgrades
- Patch management
- Security, compliance, and policy audits
- System performance monitoring

In the most productive scenarios described by survey participants, the recurring activities can be almost completely automated, allowing staff to concentrate on high-value, non-recurring activities.

## ROI Model

The ROI model assigns value to both recurring and non-recurring costs. The model uses the list price for Oracle Ops Center software and includes software maintenance for a three-year term. The hours saved by automating the recurring patch analysis and deployment, server deployment, and compliance activities are calculated. The saved hours are applied to nonrecurring activities delivering a tangible business benefit. The annual cash flow is the sum of the downtime savings and the value of the nonrecurring activities, offset by the annual Ops Center maintenance cost. These cash flows are discounted back to the time of initial investment to derive the Net Present Value (NPV) of the investment. A positive NPV indicates that the investment is worthwhile. The model also calculates the ROI, and Internal Rate of Return (IRR), assuming the implementation is an independent project and resources are available for the implementation.

TABLE 1. ROI MODEL PARAMETERS

PARAMETER	TYPICAL RANGES	DESCRIPTION
Cost of capital	10% to 20%	Used to calculate the discounted cash flow. At a minimum, this is the weighted average cost of capital for the firm. This value can be increased to represent additional business risk.
Total number of servers	100+	Server population at the beginning of the term and is used to calculate the total number of OS instances.
Total number of cores	100+	Used to calculate the cost of Oracle Ops Center.
Server growth rate	-25% to 25%	Represents the expected annual growth in the number of servers. This is used to calculate the number of OS instances, where each server contains at least one OS instance. A negative rate can be used to model server consolidation scenarios.
Core growth rate	0% to 100%	As CPUs add more cores over time, the core growth rate can be different than the server. Core growth rate represents the expected annual growth in the number of server CPU cores. This is used to calculate the cost of core-based software licenses.
OS deployment time	2 to 4 hours	Average number of hours needed to deploy a new OS.
OS deployment time savings per server	50% to 75%	Average percentage of time saved when using Ops Center to manage OS deployment.
Total number of virtual machines	0 to hundreds	Total number of virtual machine or OS guest instances.
Virtual machine instance growth rate	Varies widely	The expected annual growth in Virtual Machine OS instances. Before virtualization became widely accessible and popular, the OS instance growth rate was the same as the server growth rate. With virtualization, the OS instance growth rate is often greater than the server growth rate. The amount of time needed to patch an OS is dependent on the number of OS instances and not the number of servers or cores.
Value of nonrecurring activity per hour	\$74 to \$200	The value of work spent on nonrecurring activity. This value should be larger than the labor cost.
Loaded labor cost	\$50 to \$130	Average hourly cost for labor, including wages and benefits. This can vary by geographic areas and required skill levels.
Labor cost growth rate	3%	Expected annual increase of labor cost.
Patch hours per OS per year	1 to 4 hours	Time required to analyze and deploy patches per OS instance.
Patch hours savings	50% to 75%	Reduction in time gained by using Ops Center for analyzing and deploying patches.
Patch downtime per OS per year	4 to 16	Average amount of downtime due to the OS patch process.
Patch downtime savings per OS	75% to 90%	The savings gained by reducing the amount of downtime caused by the patch process. Survey respondents noted that using Ops Center allowed them to separate patch installation that did not require downtime from those that did require downtime.
Cost of downtime per OS per hour	\$5 to \$50	Average cost of scheduled downtime due to patching activities.
Compliance cost per server per year	1 to 5 hours	Time spent per server performing compliance-related activity.
Compliance hours savings	50% to 75%	Percentage of time saved per server per year by implementing Ops Center.

The values for these parameters can be measured or estimated from routine business accounting or planning documents. The savings are representative of survey respondents.

## Example Scenario

Oracle customer surveys show an example scenario spanning multiple industries, business models, and countries: growth of online services requiring more physical servers and operating system virtualization. Both growth and consolidation are observed concurrently in larger corporations. As virtualized systems are deployed, the number of physical servers can decline as the utilization of the servers increases and older, single-core processors are replaced with newer, multi-core processors. The popularity and ease of deploying virtual machines has also contributed to increasing the burden on IT operations for deployment and patch management. Ops Center solves these complex problems by providing a comprehensive view of the entire environment and workflow tools designed to streamline activities.

This example scenario is representative of corporations where there is both server growth and server consolidation with virtualization. This scenario shows how Ops Center provides significant overall ROI for the corporation.

In this case study, a small team of systems administrators manages more than 300 servers, supporting hundreds of applications and thousands of end users. Internal business units provide system requirements and service level agreements are negotiated on a case-by-case basis. Some business units are implementing server consolidation using virtualization while others are growing their servers as they expand into the market with new services. The team uses Ops Center to help bring order to the chaos and manage their customers' requirements.

One of the most time-consuming aspects of server maintenance is applying the latest software patches to a production environment. The relationship of systems controllers, servers, storage, and OS is crucial for providing a stable platform for applications. Virtualization exacerbates patch complexity as multiple OS instances depend on the underlying hypervisors and server firmware. IT operations teams manage these relationships as technology evolves, older systems are retired, and newer systems are brought online. In modern computer systems, patch analysis and deployment spans the entire system from application to disk, placing further demands on IT staff.

The most damaging and costly potential outcome of patching is when a specific patch unexpectedly and adversely affects a particular OS, infrastructure service, or application. Simply relying on a software vendor's "recommended patch list" is not sufficient for understanding the broader implications of patching on the whole system. Ops Center's comprehensive patch analysis module manages the complexity of patching by automating the patch analysis process, allowing systems administrators to focus on minimizing the risk of patching. Ops Center is tightly integrated with the Solaris LiveUpgrade feature, which enables administrators to create alternate boot environments, allowing patches to be safely applied to live systems while automatically managing active, upgrading or patching, and rollback boot environments.

"With Ops Center, we can apply a critical security patch to all of our systems in just 20 minutes, instead of the full day it used to take, reducing our patch time more than 90%"

Systems Architect, Major Retail Company

In some cases, patches can be applied without causing any system downtime. If there is no need to reboot an OS, then Ops Center can apply the patch and manage the system configuration without rebooting.

Ops Center's automated patch analysis reduced costs and improved quality by:

- Downloading and staging patches for deployment to multiple sites
- Automated patch dependency analysis scans vendor-supplied patch information for changes, saving time spent by systems analysts pouring over the hundreds of pages of patch documentation released monthly
- Avoids needlessly patching systems unaffected by a patch
- Improves overall system quality and availability by focusing patch deployment based on critical need or business rules
- Tracks all patch changes and upgrades applied to a system over its lifetime

As server virtualization becomes more pervasive, the savings in hardware capital cost are weighed against the increased risk and cost of systems management. Virtualization provides greater organizational flexibility during peak usage periods, improved system and application load predictability, and the deferment of hardware purchases.

However, in virtual environments, server downtime affects more than one OS instance and the applications that run on the OS instances, increasing the impact of server or storage downtime. Meanwhile, the cost of patch management is directly proportional to the number of OS instances.

Virtualization software and hypervisors also represent a downtime risk and increase the complexity of patch management by adding another critical layer of software into the system. In order to achieve the cost savings promised by virtualization, the quality and management of the virtualization software is an important consideration.

"Patching has been very, very good with Ops Center – if a system doesn't require a reboot, just click and go"

Systems Administrator, Financial Services Company

In this case study, the enterprise is also engaged in a server consolidation effort. The goal is to decrease the number of servers (negative server growth rate) and increase the utilization of the remaining servers (positive virtual machine (VM) instance growth rate). Ops Center is used to manage the virtualized environments by managing the patch and provisioning processes.

Non-recurring activities include:

- Lifecycle milestone management
- Virtual machine image development, integration, and testing
- Virtual machine migration to another server
- System performance analysis
- Incident response

Recurring activities include:

- Provisioning
- Software upgrades
- Patch management
- System performance monitoring

The ROI model shows an ROI of 139 percent and a positive NPV of \$1,171,842 for solving the management costs associated with server consolidation and growth using Ops Center.

**TABLE 2. ROI MODEL RESULTS FOR SERVER GROWTH AND VIRTUALIZATION**

PARAMETER	VALUE	
Server Growth	Total number of servers	150
	Server growth rate	10%
	Total number of cores	300
	Server core growth rate	10%
	OS deployment time per server (hours)	2
	OS deployment time savings per server	75%
Server Consolidation and Virtualization	Total number of servers	150
	Server growth rate	-20%
	Total number of cores	250
	Server core growth rate	25%
	Total number of VMs	225
	VM growth rate	50%
	OS deployment time per server (hours)	1
OS deployment time savings per server	50%	
Cost of capital	12%	
Value of nonrecurring activity (\$/hour)	\$150	
Labor cost (\$/hour)	\$81	
Labor cost growth rate	3%	
Patch hours per OS per year	2	
Patch hours savings	59%	
Patch downtime per OS per year (hours)	16	
Patch downtime savings per OS	75%	
Cost of downtime per OS per hour	\$100	
Compliance cost per OS per year (hours)	1.5	
Compliance hours savings	80%	
NPV of investment in Oracle Ops Center	\$1,171,842	
Three year ROI	139%	

By deploying Ops Center for patch management, the team is able to track patch releases, analyze the impact of patching on the entire ecosystem, and schedule patching activities in the most efficient manner. The overall quality of the systems is vastly improved by using Ops Center.

By using Ops Center for server consolidation using virtualization, the costs of provisioning and downtime are reduced. The overall system quality is improved and system administrators can spend more time developing, integrating, and testing virtual machine images.

## Conclusion

As businesses find their operating costs spiraling upward, it is only natural they look for ways to reduce these costs. Although necessary to run nearly any type of business, tracking and measuring the increasing cost of IT activities such as change control, patch analysis and management, provisioning, and deployment can be challenging. Combining Ops Center with best practices for systems management can control these costs.

This study found that using Ops Center for managing Oracle's Sun servers improved productivity and economic benefits in several ways. Operations were streamlined by a combination of comprehensive, integrated physical and virtual management provided by the Ops Center. The number of systems that could be managed by existing staff increased by as much as 100 percent, with more time devoted to high-value, non-recurring activities. Deployment time, patch analysis, compliance auditing, and other routine activities were reduced, improving other systems as administrators found more time to develop, integrate, and test future environments.

A simple ROI model can be used to show the return on investment delivered when implementing Ops Center as a comprehensive solution using best practices for both system management and business.

For the case study in this report, the model shows a three-year ROI of 139 percent, an example of the strong economic returns that can be achieved when implementing Ops Center.



Realizing the Economic Benefits of Oracle  
Enterprise Manager Ops Center  
April 2012  
Author: Oracle Corporation

Oracle Corporation  
World Headquarters  
500 Oracle Parkway  
Redwood Shores, CA 94065  
U.S.A.

Worldwide Inquiries:  
Phone: +1.650.506.7000  
Fax: +1.650.506.7200

oracle.com



Oracle is committed to developing practices and products that help protect the environment

Copyright © 2012, Oracle and/or its affiliates. All rights reserved. This document is provided for information purposes only and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. UNIX is a registered trademark licensed through X/Open Company, Ltd. 0412

**Hardware and Software, Engineered to Work Together**