



# Reducing the Cost of Operating Enterprise-Scale Middleware Environments

A Customer Study on the Benefits of Oracle Enterprise Manager 12c for Managing Large  
Middleware Environments Powered by Oracle WebLogic Server and Oracle  
Service-Oriented Architecture (SOA)

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PIQUE SOLUTIONS

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## Executive Summary

Middleware deployments are increasing in scale, complexity, and interdependency with elements in the broader IT stack. Supporting key business applications and service-oriented architectures (Oracle SOAs), they are integral to the rapid growth of private and public clouds, providing critically needed scalability, agility, and reliability. Managing these environments in terms of configuration, lifecycle management, and performance is no longer a nice to have. Rather, effective middleware **management** is a foundational requirement. The business stakes are too high and there are simply too many teams involved in these activities to manage middleware in functional silos using disparate “handheld” tools. Numerous IT and business staffing roles must be able to communicate and work together to quickly address any performance or functional concerns across tiers and across production, testing, and development environments. Operating at enterprise scale without a unified management capability results in a huge ongoing management cost and resource burden that snowballs year over year along with expanding middleware deployments.

Oracle Enterprise Manager Cloud Control 12c provides unified and comprehensive management capabilities across the life cycle of the middleware environment and, in many cases, the full application-to-disk IT stack. Benefits include a dramatic increase in middleware (and other IT) staff productivity, quantifiable cost reduction and avoidance, increased business agility, reduction in risk, and new service model enablement. The impact to companies using it is often transformational versus incremental.

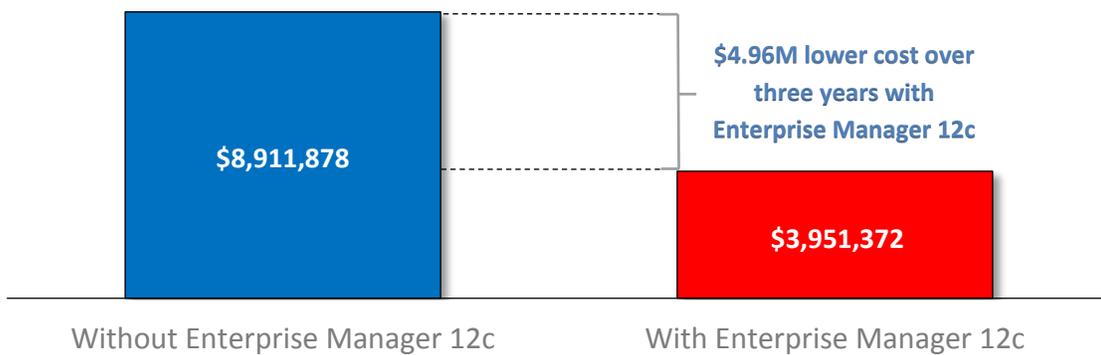
It is important to note that Oracle Enterprise Manager and Oracle Enterprise Manager 12c are brand names referring to a comprehensive family of management products from Oracle. Throughout this report, Pique Solutions uses the preceding names to refer specifically to Oracle Enterprise Manager Cloud Control 12c capabilities for managing Oracle Fusion Middleware and associated technologies.

Pique Solutions interviewed and collected detailed data from eight companies using Oracle Enterprise Manager to manage Oracle WebLogic Server and Oracle SOA Suite and then measured the levels of benefits and management cost savings of two specific products in the Oracle Enterprise Manager 12c portfolio: Oracle WebLogic Server Management Pack Enterprise Edition and Oracle SOA Management Pack Enterprise Edition. Primary research and economic modeling based on a composite profile of study participants found the following key benefits:

- ⊕ 56% Lower management cost with Oracle Enterprise Manager 12c, driving nearly \$5M in middleware management cost savings over three years including areas of staff efficiency, agility, performance, and unplanned downtime (**Figure 1**).
- ⊕ Increased efficiency to manage larger numbers of environments without adding staff and, in some cases, reducing the overall staffing profile and shifting work to lower-cost resources.
- ⊕ Increased agility with dramatically shortened cycle times in the range of 80% to 90% for middleware provisioning and new application deployment in traditional and private cloud environments.
- ⊕ Significant reduction in mean time-to-repair times when resolving middleware issues.

- ⊕ Reduced effort and time for development and operations teams due to effective performance diagnostics in production and consistency among environments for rapidly reproducing and resolving issues.
- ⊕ In many cases, a transformative shift with Oracle Enterprise Manager 12c in the business, allowing for unique staffing models, shared middleware services, private cloud services and the ability to externalize major services and applications.

**Figure 1. Three-Year Management Cost Comparison with vs. without Oracle EM 12c (\$1B Organization with 80 Oracle WebLogic Servers and Oracle SOA Deployments)**



## Study Approach and Methodology

Pique Solutions engaged in the following activities throughout the process of researching for and preparing this study:

- ⊕ Reviewed publicly available information and secondary research regarding the Oracle Enterprise Manager 12c solutions, use cases, and key value drivers.
- ⊕ Conducted interviews with Oracle product management, marketing, and sales staff to collect existing customer data and further validate costs, benefits, and value drivers as experienced by current customers and partners.
- ⊕ Defined a preliminary value framework for management cost savings and value based on Pique Solutions past analyses in the middleware domain, specific research on Oracle Enterprise Manager 12c, and internal interviews.
- ⊕ Identified and qualified eight companies who participated in detailed primary research and data gathering.
- ⊕ Revised the cost/value model based on customer data (primary research) and publicly available secondary research.
- ⊕ Developed this paper to summarize the research findings.

**Table 1** includes the profiles of companies who participated in Pique Solutions research. The research involved one-hour interviews with each company, completion of a detailed data collection instrument, and a 30-minute follow-up interview to discuss the data and findings.

<b>Table 1. Research Participant Company Profiles</b>
A large <b>European federal agency</b> that developed an innovative middleware service platform to service and provide 100 application modules to their 100,000 internal agency workers. The rapidly growing platform includes 6,000 managed Oracle WebLogic servers and an Oracle SOA environment leveraging Oracle Service Bus that handles 20 million messages per day.
A midsize <b>U.S. Healthcare Services Provider</b> with a middleware cloud deployment for software-as-a-service applications heavily used by their customers and partners. They manage 85 Java application modules delivered by a highly efficient deployment of eight Oracle WebLogic servers with a single dedicated JVM per server, each of which handles a load of 10,000 requests per minute per server at peak load.
A large <b>U.S. Laboratory Diagnostics Company</b> with a private cloud deployment of 40 custom Java applications widely used by their employees and customers. They manage 125 physical Oracle WebLogic servers, each of which processes 300 requests per minute per Java virtual machine (JVM), and an Oracle SOA environment using Oracle Service Bus which handles a peak load of 1,000 requests per minute per server.
A large <b>U.S. Oil and Gas Company</b> with an Oracle SOA-based integration architecture delivering 50 custom Java services via composite applications to its internal employees and partners. They manage 25 physical Oracle WebLogic servers across their development, testing, and production environments.
A large <b>European Insurance Provider</b> with a middleware service platform for integration managing 30 Java applications and more than 300 Oracle SOA artifacts serving their internal workforce and partners. They manage 125 physical Oracle WebLogic servers across their development, testing and production environments.

**Table 1. Research Participant Company Profiles**

A large **European Retailer** with an Oracle SOA-based integration architecture supporting 200 Oracle Service Bus endpoints for applications and services for their distributed retail storefronts and workforce. They handle 300,000 messages per day and are forecasting growth to 1,000 endpoints and 1 million messages per day in the next year. The core of their deployment consists of managing six physical Oracle WebLogic servers with a total of 72 cores and 135 JVMs configured across 35 domains.

A midsize **U.S. Financial Services Firm** with a hybrid cloud middleware deployment providing a major trading platform for their banking customers. They manage 125 physical Oracle WebLogic servers with 300 JVMs across six domains.

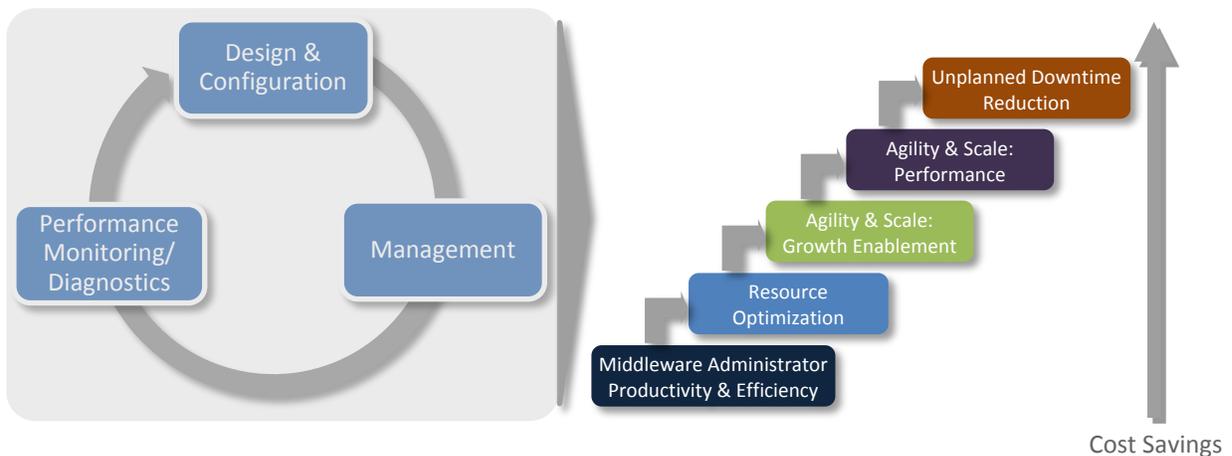
A large **U.S. Systems Integration Firm** with a dedicated consulting practice for Oracle SOA governance for Fortune 1000 customers primarily in the United States.

## A Middleware Management Cost Framework

There is significant potential business value resulting from unified and comprehensive middleware management. From numerous studies in this area, Pique Solutions finds the largest portion of costs associated with middleware—typically in the range of 70% to 80% of total cost—is the ongoing **management cost** associated with the configuration, management, and performance management of the middleware environment. The depth and breadth of capabilities that Oracle Enterprise Manager 12c provides create a significant reduction in the long-term management cost profile.

There is also a distinct flow to the management cost savings based on the utilization of Oracle Enterprise Manager 12c across the numerous teams fully, and even those partially, involved in building, managing, and monitoring middleware deployments. As illustrated in **Figure 2**, the cost savings stemming from the stages of the management life cycle build upon each other and create a cumulative value stream that increases year over year.

**Figure 2. The Middleware Service Life Cycle and the Flow of Management Costs**



First, there is a productivity and efficiency effect on the users of the capabilities in both automating existing manual activities and performing activities that were not heretofore

possible. The teams that benefit most are the middleware administration teams, both Oracle WebLogic Server and Oracle SOA administrators, though similar benefits (not detailed in this study) accrue across every layer of the stack that is managed by Oracle Enterprise Manager 12c.

This productivity and efficiency affect each of the key areas of the middleware services deployment as depicted in **Figure 2**. These three major buckets encompass the majority of activity and effort in the day-to-day experience of a middleware administrator or a business manager of a middleware service deployment. Some of the key activities in each of these areas include the following:

### **Design & Configuration**

- ⊕ Application server design
- ⊕ Configuration management
- ⊕ Compliance

### **Management**

- ⊕ Deploying application servers across physical and virtual environments (development/testing/staging/production)
- ⊕ Cloning/scaling out domains
- ⊕ Cluster management
- ⊕ Patching and patch management
- ⊕ Deploying applications and services
- ⊕ Managing defects

### **Performance Monitoring & Diagnostics**

- ⊕ Setup and initial configuration of performance management and diagnostics
- ⊕ Performance monitoring and diagnostics
- ⊕ Business transaction monitoring

The agility and scale “layer” shown in **Figure 2** represents the impact from a process or cycle perspective. In many cases, the productivity and efficiency result in shortened cycles and/or the ability to scale without adding staffing or compute resources.

The ultimate outcome of the capabilities and automated and faster processes leads to optimized performance and reduced or even eliminated unplanned downtime. These would be measured in terms of revenue, time to revenue, and revenue loss avoidance.

## Cost Savings from Oracle WebLogic Server and Oracle SOA Management Packs

Based on the management cost framework, in this section the primary research data is presented to demonstrate the economic and strategic benefits of using Oracle WebLogic Server Management Pack Enterprise Edition and Oracle SOA Management Pack Enterprise Edition in the Oracle Enterprise Manager 12c portfolio. We begin at a high-level summary analysis and progress to a more detailed comparative pro forma analysis of the management cost savings over a three-year time horizon.

### A Composite Business Case Scenario

Pique Solutions developed a composite profile based on the typical company and mean deployment scope aggregated from the primary research participant data. This data serves as the basis for the calculations in the economic analysis. The details are listed in **Table 2**.

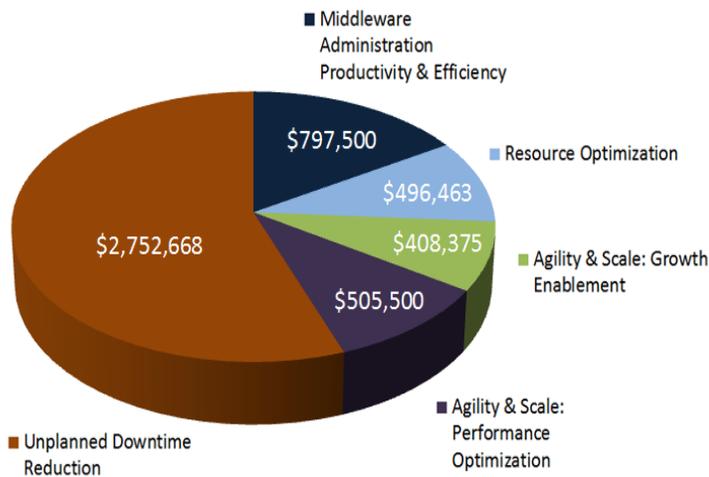
**Table 2. Composite Company Profile**

Element	Values
Deployment Type	Private cloud deployment for custom Java applications and service integration. Conventional deployments for Java applications and application integration. Serving internal workforce, partners, and customers
Company Size	\$1B annual revenue; workforce of 5,500
Number of Applications/Service Modules	75 Java Enterprise Edition (EE) applications/service modules
Annual Growth in Application Users/Usage	30%
Annual Growth in Middleware Infrastructure	15%
Number of Oracle WebLogic Servers	80 Physical servers with 200 JVM instances across 30 domains
Number of Middleware Administration Staff (Level 3)	5 (3.5 Oracle WebLogic Server administrators, 1.5 Oracle SOA administrators)
Number of Operations Staff (Level 2)	12

### Summary Cost-Savings Analysis

**Figure 3** presents the management cost savings for the composite company modeled over a period of three years, a total of nearly \$5M in savings over the time horizon. There are substantial savings in each of the areas of the framework, with the largest savings coming from middleware administration and unplanned downtime reduction. The management cost savings increase each year due in large part to the year-over-year growth in the middleware deployment and usage.

**Figure 3. Three-Year Management Cost-Savings Summary (\$1B Organization with 80 Oracle WebLogic Servers and Oracle SOA Deployments)**



#### Middleware Administration Productivity and Efficiency (Three-Year Cost Savings of \$800K)

Based on the composite environment, the middleware administration team using Oracle Enterprise Manager 12c consists of 5 full-time resources, including 3.5 Oracle WebLogic Server administrators and 1.5 Oracle SOA administrators. Pique Solutions research found that organizations not using the Oracle Enterprise Manager 12c capabilities spent an average of 65% more resource effort to handle their middleware administration workload. This percentage did vary by deployment size with many small and midsize deployments citing the need to double the current staffing while the larger deployments were in the range of 25% to 35%. According to research participants, the successful implementation of the breadth of Oracle Enterprise Manager 12c capabilities did require an initial investment of the equivalent of 50% of effort for a full-time resource in the first year before dropping to a sustainability mode

“We would need at least double the staffing were it not for Enterprise Manager capabilities and they would need to be higher-skilled resources. Managing a WebLogic cluster is very easy, so we can do it with easy-to-find resources.”

**CIO**

Midsize U.S. Healthcare Services Provider

after the first year. This staffing-related investment is accounted for in the savings model. As a result of the staff size and using mean middleware administration salaries, this equates to a savings of nearly \$800K over three years.

The key capabilities cited as driving the savings are as follows:

- ⊕ A unified view and a singular tool used across domains, managed servers, and integration endpoints.
- ⊕ Automation of manual activities for configuration, configuration management, and patching.
- ⊕ An objective source of truth for configurations across the deployment.
- ⊕ Improved collaboration and efficiency among teams, with all using the same tool and data-driven decision making.
- ⊕ Automated deployment, redeployment, and undeployment of middleware software.
- ⊕ The ability to transition previously high-cost work activities to other teams, such as operations, because they can now be performed without high-end skills and knowledge.
- ⊕ The ability to view the health status of large and complex Oracle WebLogic Server environments without having “to go console-to-console using handheld tools”.
- ⊕ The rapid diagnosis of performance issues and bottlenecks using Java Virtual Machine Diagnostics (JVMD) Manager and the newly launched JVM Diagnostics as a Service.
- ⊕ The use of Oracle Business Transaction Management (BTM) for quickly diagnosing and finding root cause in complex service architectures.
- ⊕ Historical performance monitoring, which frees up administrators from actively monitoring servers while still providing the ability to identify performance issues.
- ⊕ Providing self-service monitoring and diagnostics to development and other business teams, which improves software quality and reduces the administration effort and back-and-forth interaction between teams.

#### Resource Optimization (Three-Year Cost Savings of \$500K)

Research participants found savings from Oracle Enterprise Manager 12c by optimizing their middleware IT workforce and breaking down the silos that previously existed among teams due to specialized expertise. Most experienced a shift in work, particularly in the areas of life-cycle management and performance monitoring. Despite a shift in full-time equivalent headcount effort from Senior Middleware Administration (Level 3) to Operations (Level 2), the operations team in using Oracle Enterprise Manager 12c also achieved productivity and efficiency 35% greater than they would have without the Oracle Enterprise Manager 12c capability. As with the middleware administration team, there is a cost savings associated with the ability and agility to accommodate infrastructure growth based on the productivity figures. The three-year cost differential is \$500K.

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"With the automation of Enterprise Manager 12c, we are able to move effort from high-end middleware engineers to the operations team."

**Senior Middleware Administrator**

Large European Insurance Provider

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One particular example of this is from the large European Insurance Provider who, prior to using Oracle Enterprise Manager 12c, required a full-time, high-end engineering resource to support the four major release cycles they deliver each year. They have now been able to shift that work to the operations team, obviating the need for the engineering effort and dramatically reducing costs.

#### Agility and Scale: Growth Enablement (Three-Year Cost Savings of \$410K)

A significant advantage of Oracle Enterprise Manager 12c for every company interviewed was the ability to support scaled middleware environments quickly without adding corresponding effort or additional staffing. All of the companies interviewed were growing in terms of their number of applications, application usage, and middleware capacity and private cloud initiatives.

The composite profile environment, therefore, is growing year over year in terms of the number of applications and services, the usage of those apps and services, as well as in the infrastructure (JVMs, integration endpoints, and so forth) to support them. The growth in applications and services (30% on average) is greater than the growth of infrastructure (15% on average). With Oracle Enterprise Manager 12c, respondents found they could easily scale the environment without adding resources. Without Oracle Enterprise Manager 12c capabilities, growth in environment required the addition of staff with a cumulative impact on the long-term staffing profile. In the composite scenario, this equates to a cost savings of nearly \$410K over three years.

The European federal agency, the largest of the deployments in our study, provides a great example of this. With the capabilities of Oracle Enterprise Manager 12c, they have been able to structure their team in what they term as an *IT Industrialization* staffing model along the dimensions of the broader IT life cycle. This spans functions for design, build to deployment, and performance monitoring, covering all of the elements of their middleware, database and computing environment. The use of Oracle Enterprise Manager 12c allows each team to focus on their specific expertise but across all elements of the IT stack. Combined with the automation capabilities across configuration, life-cycle management, and performance, they provide scale to the business as they expand their service and application portfolio. In fact, due in large part to this scalability they are now in the process of externalizing their applications to create self-service opportunities for their consumer users. This will provide a transformation for the agency by reducing major cost areas as they move processes from the internal workforce to online self-service.

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“Before we were very silo’ed with different approaches, teams, and tools. With Oracle Enterprise Manager, we are now able to provide limitless scale to the business by way of our sophisticated middleware staffing model. Without Enterprise Manager, we would never have embarked on our IT industrialization strategy.”

**Senior Middleware Administrator**

Large European Federal Agency

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### Agility and Scale: Performance Optimization (Three-Year Cost Savings of \$505K)

Study participants found that via the capabilities of Oracle Enterprise Manager 12c they were able to greatly optimize the performance of their middleware deployments. In other words, by optimizing performance they avoided the cost of adding hardware and software. There was a range in terms of the impact of having versus not having the management capabilities, with some of the smaller deployments citing a need to double their current infrastructure—including server hardware and software—while some of the larger deployments reckoned a need for 10% to 30% additional infrastructure for their current deployment. There are three components to the performance optimization cost-savings profile. The first is the need to purchase more middleware hardware, and license additional middleware software, to add capacity to their current deployment if they were to take away the performance optimization-related capabilities. In the composite scenario, this would be equivalent to adding 20% capacity in physical Oracle WebLogic servers. The second component is the go-forward need to add servers to accommodate the growth in the middleware environment. In this case, the savings is 50% with the need to add only half of the servers to accommodate the 15% growth in infrastructure, as compared to the 1:1 growth that would be needed without comprehensive management capability. The third component is the annual support and maintenance fees on the new servers, both for hardware and the middleware software. This results in a growing cumulative cost year over year. Over the three years, this is a significant difference in management cost, at nearly \$505K.

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“We have done a phenomenal amount of tuning and optimization with Enterprise Manager 12c. Without it, we would need to at least double the amount of servers to get the performance we are achieving.”

CIO

Midsized U.S. Healthcare Services

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### Unplanned Downtime Reduction (Three-Year Cost Savings of \$2.75M)

The final, and perhaps most important, benefit of Oracle Enterprise Manager 12c was the dramatic reduction of unplanned downtime, which involves several elements. First, a common benefit cited by participants was in the area of extending the use of Oracle Enterprise Manager for DevOps, as a shared service for diagnostics to teams outside of administration such as operations and development. Prior to Oracle Enterprise Manager 12c, these teams used a variety of debugging and testing tools, and different environments would not have the same configurations. Rather than spending time after issues are identified in production, they are performing more of their activities in development and testing environments and resolving potential issues that would only otherwise be found at production scale. The end result is higher-quality applications and services rolled into the production environment, resulting in fewer issues.

Second, when issues did actually come up in production, customers cited the ability to not only diagnose but to also find root cause and resolve performance and middleware issues an average of 80% faster with Oracle Enterprise Manager 12c. The potent combination of these two factors resulted in a dramatic 75% reduction in unplanned downtime. As many past studies have cited, the average cost of unplanned downtime can be huge. A recent report from analyst firm IDC<sup>1</sup> estimated the cost of unplanned downtime at \$225K per hour for companies in the range of 1,000 to 5,000 employees and nearly \$500K per hour for those with 5,000 to 10,000. Based on the composite profile for the Pique Solutions study and using the midpoint of these values based on a company with 5,500 employees—or \$362,000 per hour—the three-year cost savings for a reduction in unplanned downtime is \$2.75M.

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“Our team spends time where we want to spend it. Not only are we finding issues earlier in the cycle in our dev and test environments, we are able to find them 90% faster. The combination of these has led to a drastic reduction in our downtime.”

**Senior Middleware Administrator**  
Large U.S. Laboratory Diagnostics  
Company

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<sup>1</sup> “Measuring Cost of Downtime and Recovery Objectives among U.S. Firms,” *IDC QuickPoll Survey*, July 2013, and *Storage User Demand Study 2013*.

## Beyond Management Cost: A Return-on-Investment Example

The economic case discussed in the prior sections demonstrates the significant management cost savings experienced by customers of the Oracle Enterprise Manager 12c Oracle WebLogic Server and Oracle SOA Enterprise Edition Management Packs. One area from our research not explicit in the economic analysis was the acquisition-related cost of Oracle Enterprise Manager 12c. Many of the companies interviewed, in fact, did not formally measure the return on investment based on their acquisition costs. There were several reasons for this. First, Oracle Enterprise Manager 12c was included in a broader Oracle Enterprise License Agreement (ELA) for many of the respondents, so there was no incremental investment. Second, for those that did purchase licenses for Oracle Enterprise Manager 12c, their purchase cost basis varied widely in terms of the specifics of their deployment and relationship with Oracle and Oracle partner organizations. Last, many consider Oracle Enterprise Manager 12c a foundational capability that they simply could not manage without. This was even more evident for those organizations with both Oracle WebLogic Server and Oracle SOA-based environments.

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"It is just not possible to effectively manage or govern SOA without a tool such as Enterprise Manager. You can't reap the underlying benefits [of SOA] without it."

**SOA Team Lead**

Fortune 200 Systems Integrator

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With that said, all companies when asked considered their experience with Enterprise Oracle Manager 12c to provide a significant and, in many cases, transformational return to their organization. The management cost-savings model can be extended to demonstrate the return on investment using the unique details and benefit streams from several of the study participants.

One of the research participants listed in **Table 1** is a midsize U.S. Healthcare Services Provider with a middleware cloud deployment for software-as-a-service applications heavily used by their customers and partners. The company manages 85 Java application modules delivered by a highly efficient deployment of just eight physical Oracle WebLogic servers with a single dedicated JVM per server, each of which handles a load of 10,000 requests per minute per server at peak load.

Without Oracle Enterprise Manager 12c, the company would require a dramatic increase in its middleware staffing, operations effort, and middleware infrastructure. The three-year savings in just these areas alone, excluding the cost of unplanned downtime, totals \$2.3M. Accounting for the acquisition cost of the Oracle Enterprise Manager 12c software and annual support, using full-list pricing for both Oracle WebLogic Server and Oracle SOA management packs, they achieved a substantial return on investment of 134% over the three years based on comparing the savings figures to the investment. The company is currently in the process of doubling the number of JVMs for each server, which will even further optimize performance but at the same time, through Oracle Enterprise Manager 12c automation, make it easy to manage. This is another step in helping them to be agile to support the growth in the business.

## Conclusions and Other Considerations

The business impact of Oracle Enterprise Manager 12c for middleware environments based on Oracle WebLogic Server and Oracle SOA Suite is both economically compelling and transformational for companies utilizing the capabilities. Pique Solutions research demonstrates that management cost—the largest element of long-term cost of ownership—can be reduced by more than half when using Oracle Enterprise Manager Cloud Control 12c versus other options.

Some companies with modest-size deployments have gotten by using native or home-grown capabilities developed and managed by a team of highly skilled experts. However, the rapid growth, nonlinear scale, and increasing IT stack complexity have created resource and cost profiles untenable and unsustainable over the long term. Throwing more human and compute a resource at the problem increases cost, lengthens cycle time, and ultimately leads to slower issue resolution and unplanned downtime.

### **Three major takeaways summarize the findings of Pique Solutions research and analysis:**

1. Effective middleware management is no longer a nice-to-have capability: It is a foundational requirement for enabling larger enterprise private and public cloud applications and service-oriented deployments.
2. An obvious benefit to focus on with Oracle Enterprise Manager 12c is a dramatic reduction in long-term management cost, but cycle time reduction on the order of 80% to 90% in areas such as middleware deployment and mean time-to-repair cannot be understated. It provides critical business agility and the ability to scale.
3. The benefits of effective and unified management extend beyond just the middle tier. With Oracle Enterprise Manager 12c, each management pack has its own individual value stream, but collectively the value of providing management across elements of the IT stack is far greater than the “sum of the parts.” As illustrated in this study, this results in transformational impacts to the business via creating innovative IT staffing models, exposing services to business users, and enabling entirely new business services.

Pique Solutions is a management consulting and market-analysis firm working primarily with Fortune-500 companies in the Information Technology and Entertainment sectors. Pique is based in San Francisco, California.

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