PIQUE SOLUTIONS

The Value of Oracle Enterprise Manager for Managing Oracle Databases

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Contents

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Pique Solutions is a management consulting and market analysis firm supporting primarily Fortune 500 companies in the information technology sector. Pique is based in San Francisco, California.

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Executive Summary

Multiple studies have proven that, while the business demand for databases grows, operational teams are constrained by traditional, reactive processes. Combined with budgetary pressures, this causes them to fall short in meeting the demand in a timely fashion. In addition, as companies adopt cloud paradigms, operational teams must manage across on-premises and cloud environments with the same resources. To be effective, companies need to shift from a reactive posture to one of standardization and proactive analysis and planning by leveraging intuitive tooling to automate manually intensive and non-value–adding activities and to deliver real-time insights.

Customers we talked with reported that they use Oracle Enterprise Manager to address their most critical business needs—which can span both on-premises and cloud environments—in a progressive manner. The Enterprise Manager features that ensure their success are the foundational Diagnostics and Tuning Packs for performance monitoring and management; Database Lifecycle Management Pack for automated patching, provisioning, and compliance; Real Application Testing for validating performance for environment or SQL changes; and finally Cloud Management Pack for private-cloud self-service provisioning, charge-back, and cloning.

This paper will discuss the progression of benefits as well as the collective, cumulative value of using all the packs. Our study found the following:

⊕ Pique Solutions found a 60% lower operational management cost for companies using Enterprise Manager Database Management Packs, driving nearly $12M in database management cost savings over three years, including in the areas of staff efficiency, resource optimization, and avoided cost to scale (**Figure 1**).

Figure 1. Three-Year IT Operational Management Cost Savings with Oracle Enterprise Manager Database Management Packs ($24B Organization with 1,200 Oracle Databases)
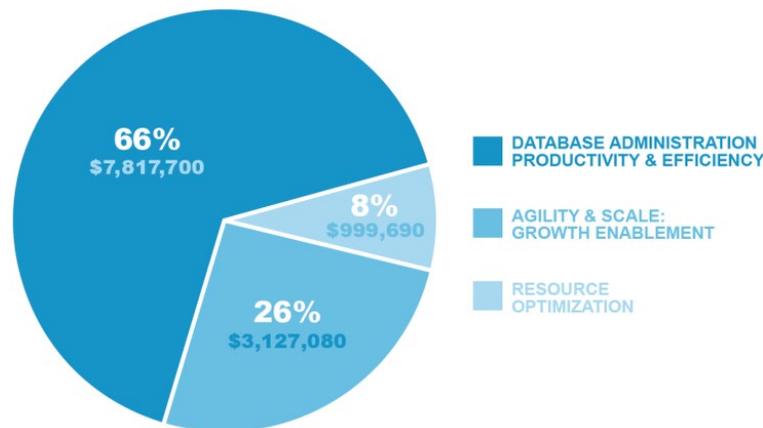
⊕ Beyond cost savings, the proactive planning and cloud migration aspects afforded by the core Enterprise Manager capabilities, along with addressing the impact of change vis-à-vis Real Application Testing, have demonstrated business value and return on investment (ROI) of more than 200% over three years and a payback in less than six months. Perhaps more compelling, companies studied found that they were able to adopt cloud 10 times faster using Real Application Testing.

⊕ For most companies, the starting point in the shift from reactive to proactive IT operations is real-time performance management followed by automation in patching, provisioning, and compliance. Based on customer data we gathered, it is a "no-brainer" to add to the portfolio more proactive services for cloud management and validating performance based on change. In fact, the ability to leverage Cloud Management Pack and Real Application Testing capabilities is largely based on the shift in maturity from standardization, optimization, and time being freed for more proactive efforts.

⊕ Enterprise Manager Database Management Packs dramatically improved the productivity for both senior- and, even more so, junior-level database administrators (DBAs). They were able to manage larger and more dynamic database estates without adding headcount. In some cases, rebalancing the overall staffing profile by automating repetitive operations work and enabling focus on innovation and higher-level strategic projects made the DBA role more critical and better aligned with the business.

⊕ While there is inherent value in each of the database management packs even for smaller enterprise database deployments, the value increases as the database fleet gets larger, data volumes grow, and the IT environment becomes more complex, especially with on-premises and cloud environments.

⊕ A key aspect beyond cost savings is the faster time for development cycles, which delivers higher-value products and services sooner.

⊕ Finally, improved configuration, compliance and patch management improves the security posture of the database estate. With faster cycle times for patching and updates, companies are staying current and thereby more secure. Enterprise Manager helped companies in our study achieve the previously unthinkable goal of successfully patching thousands of databases on a sustainable, quarterly cycle, all while reducing overhead by 80%.

Benefits of Oracle Enterprise Manager Most Often Cited by Study Participants

- A dramatic increase in DBA and other IT staff productivity
- A quantifiable cost reduction and avoidance
- An increase in business agility, and a reduction in risk
- A "single pane of glass" for monitoring and managing both on-premises and Oracle Cloud deployments
- Sustainable and accurate patching of huge database fleets
- A dynamic shift from reactive to proactive IT processes

Introduction

Oracle Enterprise Manager is Oracle's integrated enterprise IT systems management product line and provides the industry's first complete cloud and on-premises lifecycle management solution designed to be tailored for specific database deployment options.

While the base Enterprise Manager functionality is free with any Oracle Support contract, the power of Enterprise Manager is in its management packs. For the database, these include Diagnostics and Tuning Packs, Database Lifecycle Management Pack, Cloud Management Pack, and Real Application Testing. Enterprise Manager is designed in a manner for customers to map the solution to their needs based on their database management challenges. We will explain the progression of capability as it relates to customer needs and the maturity of their IT operation.

First, it is helpful to define the key Enterprise Manager Database Management Packs and the capabilities they include, as illustrated in **Table 1**.

Table 1. Database Management Packs and Key Features List

Database Management Pack	Key Features
Diagnostics Pack and Tuning Pack	• Automatic Performance Diagnostics • Real-Time Performance Diagnostics • Automatic Workload Repository (AWR) • AWR Warehouse • Active Session History (ASH) • Comparing Performance Periods • Exadata Management • Comprehensive System Monitoring and Notification• Database Operations Monitoring • Real-Time SQL Monitoring • SQL Tuning Advisor • Automatic SQL Tuning • SQL Access Advisor • SQL Profiles • In-Memory Advisor • Object Reorganization
Database Lifecycle Management Pack	• Auto Discovery of hosts • Inventory tracking and reporting • Database provisioning and cloning • Schema and data change management • End-to-end patch management • Fleet maintenance • Upgrade planning and analysis • Configuration management • Compliance management
Cloud Management Pack for Oracle Database	• Out-of-the-box Self Service Portal • Enterprise Service Catalog • RESTful APIs and CLIs for Programmatic Access • Rapid Provisioning of Databases including Data Guard, Schemas, and Pluggable Databases • Rapid Data Cloning–Snap Clone Thin Provisioning and Full Clones with Integrated Data Masking • Subscription Based Software Patching and Upgrades • Resource Management • Role-based Access and Quota Management • Support for Virtual and Physical Infrastructure • Metering, Showback and Chargeback
Real Application Testing	• SQL Performance Analyzer (SPA) • SPA Quick Check • Database Replay • Concurrent Database Replay • Workload scale-up and custom workload creation support • Database Consolidation Workbench

As illustrated in **Figure 2**, the pack architecture allows customers to align their key business needs to the capabilities and value of each of the Enterprise Manager pack offerings.

Figure 2. Database Management Packs Progression
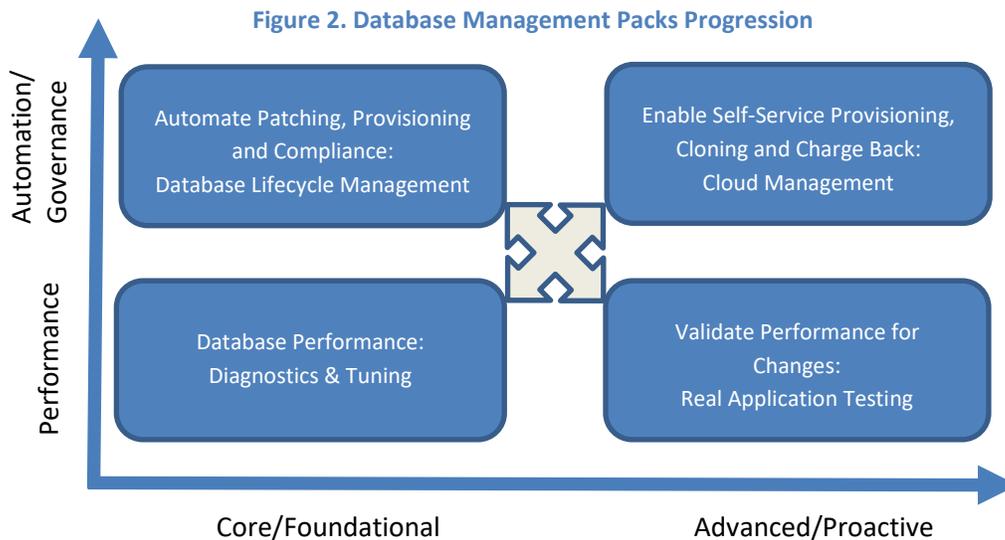
Most customers enter at the point of database performance and then generally progress to the needs of automation for patching, provisioning, and compliance. The management packs on the left represent the "core" of database management. Once companies standardize and stabilize their IT operations with these core capabilities, hence elevating their IT maturity, they then contemplate more proactive and further value-adding activities with the time and effort they have leveraged from automation and the reduction of "issue churn." At that point, if environmental or IT change is a primary concern that could adversely impact performance, Real Application Testing is a natural addition. If a company is looking to deploy private cloud services via self-service provisioning, provide subscription services for patching, or provide show- or charge-back services to business entities, then Cloud Management Pack is an easy choice to layer into the Enterprise Manager portfolio. Customers we spoke with stated that this journey also prepared them for easier public cloud adoption. Ultimately, a company's entire database fleet, regardless of the mode of deployment, can be managed by using "a single pane of glass" with Enterprise Manager.

Our analysis leveraged a survey conducted by the Independent Oracle Users Group on database manageability, which provides evidence for the need for the collective use of the Enterprise Manager database pack portfolio. The top four challenges cited, by percentage of DBAs, were as follows:
- ⊕ 78%: Downtime resulting from untested changes.
- ⊕ 48%: Unpredictable SQL performance impacting service-level agreements.
- ⊕ 46%: Data stores growing by 20+%.
- ⊕ 39%: Handle more than 50 databases each.

The following sections of this paper will explore the capabilities, value, and customer experiences of each management pack and then share the results of a composite ROI study conducted on Enterprise Manager Database Management Packs.

Database Performance: Diagnostics and Tuning

Managing database performance, particularly in real time, is a critical and foundational need for nearly all customers. Oracle Enterprise Manager provides the ability to troubleshoot and resolve performance issues quickly and to enable DBAs of various skill levels to effectively participate in the process using a combination of the Diagnostics and Tuning Packs.

An Oracle systems integrator and managed service provider representing product lines across cloud, software, support, hardware, engineered systems, and appliances shared the key benefits of the Diagnostics and Tuning Packs and the dramatic improvement in DBA productivity as a result. Overall, the provider's VP of Enterprise Transformation shared that having a consolidated, visual interface to database performance data and resulting insights was powerful for both senior-and, even more so, junior-level DBAs. From a diagnostics perspective, an important aspect is the identification of problematic SQL. Enterprise Manager stores detailed data about what SQL was running, what the environment was, storage latency, SGA cache hits, and other relevant data required for effective troubleshooting. AWR reports allow DBAs to compare periods of time visually, which helps to drive additional insights.

> "Typically, I have found a basic report that takes 45 minutes to run can be improved down to 10-15 minutes to run after using the tuning recommendations from the tuning pack."
>
> **VP of Enterprise Transformation**
>
> Systems Integrator and Managed Services Provider

He shared that DBAs use Tuning Pack to gather data (tuning set) and then run that tuning set through the SQL performance analyzer, to obtain recommendations on what needs to be done to improve performance (e.g., add an index). Specifically, he said, "Typically, I have found a basic report that takes 45 minutes to run can be improved down to 10–15 minutes to run after using the tuning recommendations from the tuning pack."

For a more challenging troubleshooting activity, the results were even more dramatic, particularly for less-experienced DBAs who may not be privy to the knowledge of how best to tune databases. He told us, "If you had a tuning task that took your junior DBA 3 weeks to figure out that he needed to add on 2 indexes, using the tuning advisor it could be done in a matter of hours."

Beyond productivity, the impact of effective troubleshooting and proactive performance management is the resolution of problems before they are noticed by end users and before a reduction in downtime.

A senior Oracle DBA at a Fortune 100 U.S. financial services provider with a database estate of 1,200 database instances (40% of which run Oracle RAC One Node and 30% Oracle RAC multi-node, and the remainder are standalone) shared a key impact of Enterprise Manager: "After deploying Oracle Enterprise Manager, we have seen the number of database incidents go down nearly fivefold, from 2,800 per year down to just 600 globally. We are also catching them proactively such that the business doesn't even find out about them. As a result, unplanned downtime has been reduced by up to 40% because we are resolving issues before the business even is aware."

"After deploying Oracle Enterprise Manager, we have seen the number of database incidents go down nearly fivefold. … As a result, unplanned downtime has been reduced by up to 40% because we are resolving issues before the business even is aware."

Senior Oracle DBA

Fortune 100 U.S. Financial Services Provider

Automate Patching, Provisioning, and Compliance: Database Lifecycle Management Pack

Database Lifecycle Management Pack covers the entire lifecycle of the databases, including visual interfaces and automation for the following capabilities:

- ⊕ Discover assets and monitor inventory.
- ⊕ Quickly provision or clone databases at scale.
- ⊕ Maintain fleet to patch and upgrade all supported databases at scale with reduced downtime.
- ⊕ Manage configuration drift and evaluate the compliance of targets and systems as they relate to business best practices and regulatory compliance.

This pack is generally the next step beyond the Diagnostics and Tuning Packs, in that it fulfills needs particularly for larger environments and those with compliance requirements. Similarly, it also enables DBAs of various skill levels to effectively participate in the process.

A major U.S.-based cable and media services provider is leveraging Database Lifecycle Management Pack to address a variety of challenges, including configuration pollution, a growing inventory of more than 2,000 databases, and keeping up with a quarterly patching cycle.

To address this challenge, they used Database Lifecycle Management Pack functionality to standardize their inventory by enforcing database version standards, creating a gold image for each standard configuration, and creating a self-service publish and subscribe patch provisioning model that allowed them to keep up with their quarterly patching requirement. The resulting benefit was their 300-plus person application team being able to manage their own patching schedule, which yielded the following benefits to the business:

> "Database patching is critical, and our goal is to enable all DB DevOps to incorporate patching as a cyclic automated activity. Enterprise Manager Database Lifecycle Management Pack is integral to meeting this goal."
>
> **Principal Solutions Architect**
>
> Fortune 100 Cable and Media Services Provider

- ⊕ More than 2,000 databases patched every quarter improved security posture.
- ⊕ Resource overhead reduced by 80% for patching activities.
- ⊕ Total database downtime requirement for patching reduced drastically.
- ⊕ Push button automation empowered app teams to manage their own patching schedule.
- ⊕ Complete database patching orchestration reduced human error.
- ⊕ Inventory was standardized.

The principal solutions architect shared, "Database patching is critical, and our goal is to enable all DB DevOps to incorporate patching as a cyclic automated activity. Enterprise Manager Database Lifecycle Management Pack is integral to meeting this goal."

Another study participant works at a Fortune 100 insurance company that has grown from a small auto insurer owned by policyholders to one of the largest insurance and financial services companies in the world. With a fleet of more than 3,300 databases in 350 clusters, including RAC with Data Guard Physical Standbys, they were struggling with the sheer volume of manual effort required to patch their fleet. Over

the past several years, they have implemented Oracle Enterprise Manager Fleet Maintenance to create a highly automated solution that patches their entire fleet of databases.

Today, all patching operations are fully automated. A team of only two DBAs, working part-time, has been able to achieve a patching success rate exceeding their goal of 99%. The solution incorporates built-in error handling and target dependency resolution, allowing the team to achieve secure and predictable operations while significantly reducing operating expenses and improving business continuity with minimal downtime.

The following key benefits resulted from the use of Database Lifecycle Management Pack:

⊕ Reduced 29 distinct configurations down to five gold images.

⊕ Exceeded the patching success rate goal of 99%.

⊕ Patched 3,300 databases and 350 clusters in a single quarter.

A leading indicator of their success was the simplification of their database estate by standardizing on a small set of gold image configurations, which enabled efficient patching and, thus, ensuring compliance. The senior database administrator shared that "Oracle Enterprise Manager has a great standardization advisor that can make recommendations on how to eliminate configuration sprawl. For our environment, it found that we could reduce 29 distinct configurations down to just 5. This is a great tool to reduce clutter while enhancing compliance."

"Oracle Enterprise Manager has a great standardization advisor that can make recommendations on how to eliminate configuration sprawl. For our environment, it found that we could reduce 29 distinct configurations down to just 5. This is a great tool to reduce clutter while enhancing compliance."

Senior Database Administrator

Fortune 100 Insurance Company

Validate Performance before Key Changes: Real Application Testing

For those organizations with business-critical databases with a requirement to validate changes in a proactive fashion, Real Application Testing for Oracle Enterprise Manager provides the ability to assess and optimize the impact of IT changes prior to implementation.

A director of database management at another large insurance firm shared several scenarios for which this pack delivers value for its end customers, including cloud migration/adoption, proactive performance management for production systems, and upgrades or new feature adoption. They found the key value of evaluating and testing the impact of planned changes in the environment (e.g., hardware/software upgrades, infrastructure) or changes in the database or storage tiers was the assurance that performance would meet expectations after planned changes are made.

He shared with us, "If I am contemplating any change to my environment—application version, storage, compute platform, et cetera—Real Application Testing allows me to anticipate the impact of the change. It is a powerful tool for those companies that are concerned with change."

While the business benefits of Real Application Testing vary by organization based on specific use cases (see Table 2, below), the key value drivers include significantly increased DBA productivity, increased availability and uptime of business applications, and reduced capital expenditures via optimization. Relative to the improved DBA productivity, the following areas are where specific improvements were realized:

> "If I am contemplating any change to my environment—application version, storage, compute platform, et cetera —Real Application Testing allows me to anticipate the impact of the change. It is a powerful tool for those companies that are concerned with change."
>
> **Director, Database Management**
>
> Large Insurance Firm

- ⊕ Risk-free performance tuning with an improved QoS.
- ⊕ 10× reduction in time and effort for testing any changes.
- ⊕ Load and performance testing for throughput.
- ⊕ Increases in staff productivity, thus less "firefighting."

Relative to the investment in Real Application Testing Pack, studies have demonstrated an aggregate return on investment of more than 200% percent over three years and a payback in fewer than two quarters. Table 2 summarizes the experience and benefits achieved by several Real Application Testing customers who participated in our study.

Table 2. Real Application Testing Customer Experiences

Participant	Elements Used	Benefits
U.S.-Based Cable and Media Services Provider	SQL Performance Analyzer (SPA) for call center system upgrade and address 109K unique SQL statements	• Improved service level agreements, staff productivity, and customer satisfaction • Workload SQL response time improved by 25% • No SQL incidents after upgrade
Fortune 100 U.S. Financial Services Provider	Database Replay to validate new commodity hardware, platform strategy by capturing batch and online transaction processing workload peak periods	• Achieved 2× to 10× increase in process performance • Validated new hardware platform to be deployed • Up to 67× reduction in space through Advanced Compression
Oracle Systems Integrator and Managed Service Provider	Move database workloads to Oracle Database Cloud Services, Oracle Exadata Cloud Services, or any cloud environment quickly and safely	• Adopt Oracle Cloud 10× faster and with less effort with Real Application Testing

Self-Service Provisioning, Cloning, and Charge-Back: Cloud Management Pack

Cloud Management Pack for Oracle Enterprise Manager provides the value of self-service provisioning, cloning, and charge-back. Our research found this to be a compelling but perhaps underutilized capability, particularly relative to its cost to value ratio.

According to the research and interviews conducted by Pique Solutions, relative to the modest investment required to acquire Cloud Management Pack, the value of the capabilities make it a "no-brainer" to add the pack to the management portfolio. A database services manager at a global U.S.-based food service company shared with us that the self-service provisioning was particularly powerful along with the pluggable databases, including the ability to tear down instances after a set expiration time. Furthermore, he told us that often in DevOps teams his customer organizations might start looking into third-party tools such as Chef, Puppet, or Ansible, but he advises them that they can achieve the same automation via Enterprise Manager without the cost and configuration of those third-party tools. Lastly, he touted the charge-back (show-back) capability that "allows you to show what resources particular databases are using based on consumption of CPU, storage, et cetera, for various environments (e.g., dev, test, QA). And this is another area where companies invest in third-party tools but are pleasantly surprised when they find that they can do this natively with Cloud Management Pack."

A large European federal agency that participated in our study has an Oracle Database estate of 620 instances, with 200 in production and 420 in development and test. They are growing at the rate of roughly 120 database instances per year. Leveraging the capabilities of Enterprise Manager, in particular Cloud Management Pack, they have reduced provisioning cycle time by 99%, from 10 days to just 18 minutes. Not only that, the new process is largely self-service for the developers, so the effort required on the DBA side is just a validation step. With a team of only five DBAs, they can support the 20+% growth in the database estate with the same number of resources.

> "With Oracle Cloud Management Pack, we have reduced the database provisioning process from 10 days down to 18 minutes."
>
> **Database Manager**
> European Federal Agency

Several other benefits have been achieved by using Cloud Management Pack. One is the ability to automatically clone and provision, within minutes, terabyte-sized databases through the pack's unique Snap Clone capability, followed by deprovisioning the databases to prevent database sprawl and the associated management costs with inactive databases. Second, through the charge-back and metering capabilities, the organization's IT executives and managers were able to gain visibility into the cost associated with each database provisioning request in terms of size of database and other factors. While they had initially considered fully shifting the cost to the various lines of business, they instead provided them with the visibility to help drive better decisions for application services and deployments.

In the words of the database manager, "If we did not have Oracle Enterprise Manager, I would easily have to double to triple the size of my DBA team. With Oracle Cloud Management Pack, we have reduced the database provisioning process from 10 days down to 18 minutes."

The Compelling Business Value of Oracle Enterprise Manager Database Management Packs

While there are individual value streams for each Enterprise Manager Database Management Pack, there is compelling value in using all of them together, in terms of both cost savings and agility à la dramatic reduction in cycle time. To that end, a Pique Solutions study evaluated 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 3**.

Table 3. Composite Company Profile

Element	Values
Deployment Type	On-premises private cloud deployment of development and test databases with traditionally deployed production databases
Company Size	$24B annual revenue; workforce of 33,000
Annual Growth in Database Infrastructure	20%
Number of Database Instances	1,200
Number of DBAs	22
Number of Operations Staff (Level 2)	12
DBA Annual Salary (5–10 years' experience, full time + benefits)	$150,000 (Source: salary.com)

Figure 3 presents the management cost savings for the composite company modeled over a period of three years, a total of nearly $12M in savings over the time horizon. There are substantial savings in each of the framework areas, with the largest savings coming from database administration and growth enablement. The management cost savings increase each year due in large part to the year-over-year growth in the database environment.

Figure 3. Three-Year Management Cost-Savings Summary
($24B Organization with 1,200 Oracle Database Instances with 20% YoY Growth)
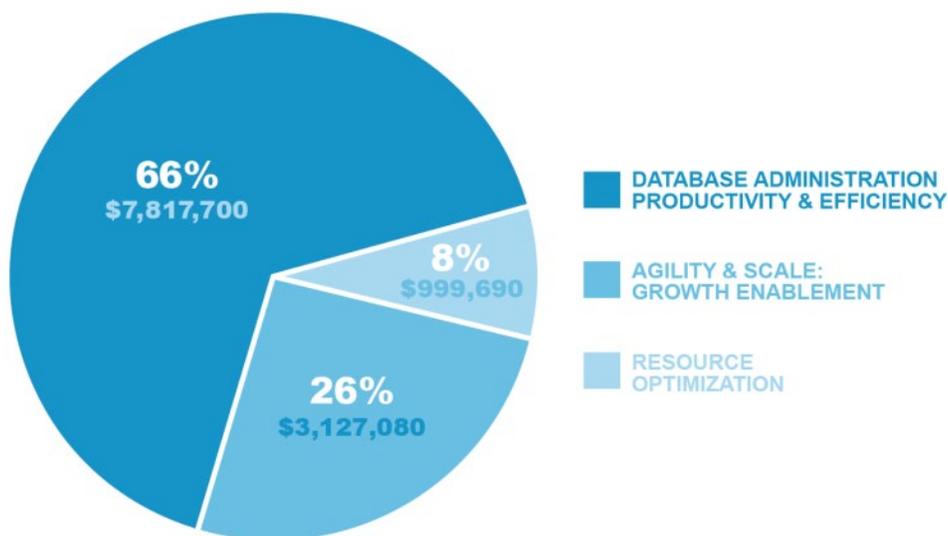
The key capabilities cited by study participants as driving the database administration savings are as follows:

- ⊕ A unified view and a singular tool used across databases, including standalone and more complex cluster environments.

- ⊕ Streamlined and consistent provisioning of databases based on a standard "gold image" with automated inheritance of configuration and profiles for monitoring and alerts.

- ⊕ Automation of manual activities for configuration, configuration management, and patching.

- ⊕ An objective source of truth for configurations across the production, development, and testing deployment environments.

- ⊕ Improved collaboration and efficiency among teams, with all using the same tool- and data-driven decision-making.

- ⊕ Automated deployment, redeployment, and decommissioning of database instances.

- ⊕ 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 maximize database performance by detecting and preventing issues.

- ⊕ Forecasting enabled by performance monitoring over longer time periods, which frees up administrators from actively monitoring servers in real time while still providing the ability to identify and remediate performance issues before customers are impacted.

- ⊕ Dramatic reduction in the number of issues, resulting in less time spent processing and resolving them.

- ⊕ Easier adoption and onboarding of, and migration to, cloud database environments.

Agility: A Dramatic 92% Average Shorter Database Deployment Cycle Time

Implied in the previous sections discussing administrator efficiency and enabled by the automation provided by Enterprise Manager, every company interviewed cited dramatically shorter cycle times for lifecycle management activities such as database cloning, patching, and provisioning. In nearly every case, this ranged from significant to an order-of-magnitude difference as compared to using other tools or manual efforts. What was typically measured in hours, days, or, in a few cases, weeks was reduced to 20 minutes or less. Consider the data gathered in **Table 4** on the cycle time for database provisioning and deployment.

Table 4. Database Cycle Time Savings Data

Participant	Savings
European Federal Agency	Database provisioning cycle reduced 99%, from 10 days to 18 minutes.
Global U.S.-Based Systems Integration Firm	Database provisioning cycle reduced 97%, from 2.5–3 weeks to 3 hours. Weekly refresh from production for each of 120 DBs reduced from 24 hours to 25 minutes with Snap Clone.
Fortune 100 U.S. Financial Services Provider	Database deployment cycle time down 77%, from 30 minutes to several hours to 15–20 minutes.
U.S. Global Systems Integration Company	Cloud database provisioning cycle reduced 95%, from 7 hours to 20 minutes.

Conclusions and Other Considerations

The business impact of Oracle Enterprise Manager for database environments 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 at enterprise scale by 60%, or nearly $12M in our composite scenario when using Enterprise Manager Database Management Packs versus the traditional do-it-yourself, manually intensive, and reactive approach.

We also found benefits we did not quantify, including completing development cycles faster by the companies we studied, thereby delivering more value sooner. Additionally, database security posture is improved by controlling configurations and staying current with patches and updates for database fleets numbering in the thousands, and thus ultimately delivering higher-value services sooner and more securely.

Enterprise Manager Database Management Packs lay down a compelling path to move companies to a dynamic and proactive IT operational posture that leverages extensive automation, machine learning, and proactive planning capabilities to achieve standardization, compliance, and efficiency to enable growth and scale for both on-premises and cloud deployments.

With Enterprise Manager, each Database Management Pack has its own individual value stream, but collectively the value of providing comprehensive management across all elements of the database and IT estate is far greater than the sum of the parts. Enterprise Manager dramatically reduces long-term operational cost by more than 60% and lowers mean time–to–repair cycle times by as much as 92%. This includes database administrative tasks and areas for performance, lifecycle management, and cloud management. The solution provides both critical business agility and the ability to scale. Validating changes to the environment related to the database itself has proven an ROI of more than 200% and payback in less than six months.

Appendix: Primary Research Participant Company Profiles

The companies who participated in Pique Solutions' research were each interviewed for 1 hour and completed a detailed data collection instrument.

A **Fortune 100 insurance company** that has grown from a small auto insurer owned by policyholders to one of the largest insurance and financial services companies in the world. They have a fleet of more than 3,300 databases in 350 clusters, including RAC with Data Guard Physical Standbys, and are leveraging Oracle Lifecycle Management Pack for configuration, compliance, and fleet maintenance.

A **major U.S.-based cable and media services provider** that is leveraging Database Lifecycle Management Pack to address a variety of challenges, including configuration pollution, a growing inventory of more than 2,000 databases, and keeping up with a quarterly patching cycle. They are using Oracle Lifecycle Management Pack and Oracle Real Application Testing.

A **large European federal agency** that manages an estate of 620 Oracle Database instances deployed in a private cloud environment. Two-thirds of the databases are development and test instances supporting a development team creating and maintaining applications used by the 20,000-agency workforce. Five DBAs are involved in the implementation and administration of the entire Oracle Database estate, using Oracle Diagnostics Pack and Oracle Tuning Pack along with Oracle Cloud Management Pack for Oracle Database.

An **Oracle systems integrator and managed service provider** representing product lines across cloud, software, support, hardware, engineered systems, and appliances. The database team is experienced with all Oracle Enterprise Manager Database Management Packs, including Oracle Diagnostics Pack, Oracle Tuning Pack, Oracle Lifecycle Management Pack, Oracle Real Application Testing, and Oracle Cloud Management Pack.

A **global U.S.-based systems integration company** with expertise in database administration, development, and engineered systems. The database team is experienced with all the Oracle Enterprise Manager Database Management Packs, including Oracle Diagnostics Pack, Oracle Tuning Pack, Oracle Lifecycle Management Pack, Oracle Real Application Testing, and Oracle Cloud Management Pack.

A **global U.S.-based food service company** with 2,000 database instances on 380 database servers in 100 different locations in 40 countries. The estate is managed by a global management and administration team. Every Oracle Database is managed by Oracle Enterprise Manager, using Oracle Diagnostics Pack, Oracle Tuning Pack, and Oracle Lifecycle Management Pack for Database. A total of 49 DBAs are involved in the "run" and "change" teams, with the run team focused on production and change on development and testing.

A **Fortune 100 U.S. financial services provider** with a database estate of 1,200 database instances, 40% of which run Oracle Real Application Clusters One Node and 30% Oracle Real Application Clusters multi-node, and the remainder are standalone. A team of 22 DBAs manages the environment, using Oracle Diagnostics Pack, Oracle Tuning Pack, and Oracle Lifecycle Management Pack for Database, with half the DBAs on the development team and the other half on the production team.

A **large U.S. systems integration firm** with a consulting practice that includes cloud management and DevOps for Fortune 1000 customers primarily in the United States.

A **large insurance firm** with a database estate of 1,500 instances running on-premises and in process of migrating to cloud. The database team is experienced with Oracle Diagnostics Pack, Oracle Tuning Pack, Oracle Real Application Testing, and Oracle Cloud Management Pack.