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ORACLE Diamond Partner

Platform Rationalization

with Private Cloud and Oracle Engineered Systems

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Preface

Today's organizations use only a fraction of the technology that makes up their infrastructure, leading to high costs and inefficiency. The organic growth of many enterprise IT footprints has resulted in costly and hard-to-support-and-maintain environments.

Due to the nature of these organically grown IT footprints, oftentimes the majority of IT budget is spent on running and maintaining the existing landscape instead of being used for improvement and innovation.

With its platform rationalization program offering, Capgemini can help you rationalize your entire IT footprint and, as a result, lower your total cost of ownership. By decreasing the total cost of ownership, budget can be freed for future optimization and innovation to help improve your day-to-day business processes.

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1 Platform Rationalization

With platform rationalization, enterprises take a snapshot of the current state of their IT landscapes, mapping to real business objectives, and conduct project-based rationalization of it. Rationalization includes consolidation, optimization, and standardization to ensure future-ready, stable, and cost-effective service to the business.

1.1 Non-rationalized IT landscapes

In large enterprise IT landscapes, you typically find hundreds of applications with overlapping business processes and functions. It is not uncommon for multiple systems to provide overlapping services to the business even though they are based upon a different technology stack. Operating multiple systems with the same purpose and at the same time it results in unnecessary costs related to staff employment and education.

Enterprise IT landscapes usually grow in an organic manner, which unintentionally results in a diverse collection of technological solutions and implementations. Examples include:

- Multiple applications providing similar business processes and functions
- Deployment of large and diverse middleware portfolios, such as: IBM Websphere, JBoss, and Oracle Weblogic
- Deployment of large and diverse database portfolios, such as: Oracle database, Microsoft SQL, Oracle MySQL and IBM DB2
- Deployment of large and diverse operating system portfolios, such as: Redhat Linux, Oracle Linux, Microsoft Windows and IBM AIX
- A wide variety of hardware implementations for compute, storage, backup and network facilities

Because of this large variety of software and hardware solutions, maintenance costs often take up a large portion of the IT budget, leaving only a small amount of budget for innovation and improvements.

1.2 Reasons for rationalization

Typical incentives for enterprises to rationalize their IT landscapes and, in particular, their application landscapes, include:

- Reduced maintenance costs
- Decreased complexity
- Improved business processes and functions
- Improved stability and availability
- More room for innovation and improvements

1.3 Rationalization goals

In a rationalization project, the primary goals are to ensure that an enterprise IT organization is future-ready, to establish stable and cost-effective services to the business, and to enable continuous innovation to support company growth. With rationalization, this can happen thanks to::

- Reduction of redundant applications, business processes, and functions
- Modernization of remaining applications, business processes, and functions
- Consolidation of technologies into a service-based concept
- Standardization of technology platforms
- Establishment of a future- ready and agile IT landscape
- Decreased costs and improved services that allow for greater innovation

2 Capgemini Approach

Capgemini adopts a standardized approach to platform rationalization. Capgemini uses the most appropriate methodology for each particular situation, leveraging its significant global experience and expertise in business process, application, database and platform rationalization. All approaches have their foundation in the Capgemini Wide-Angle Application Rationalization Program, or WARP, methodology.

2.1 Capgemini project blueprints

For platform rationalization, Capgemini uses project blueprints that are standardized and industrialized to ensure rapid results and a rapid return on investment. The Capgemini WARP methodology is the foundation of Capgemini's overall approach and project blueprints. WARP is a tried-and-tested approach that takes enterprises on a journey towards a rationalized and modernized IT application portfolio in as little as seven weeks. Simply put, WARP enables companies to take the first step in regaining control of their application landscapes.

WARP supplies concrete facts and insight that serve as the tools for making informed decisions about how to simplify, industrialize, standardize and renew application landscapes and IT processes.

WARP comprises four "streams" supported by three "engines." These streams are PATH (vision, architecture and solution), BIZZ (business analysis), CASE (the business case – from both a financial and value perspective) and PLAN (change planning, change scenarios and the roadmap). Experience shows that the effectiveness of any rationalization program is improved considerably by the presence of these four streams.

The three engines – APPS, INFRA and AMBI – are highly industrialized 'lenses' that are employed to analyze the application landscape, the infrastructure components, and also ambient factors. While the APPS engine provides an industrialized analysis of the application portfolio, INFRA identifies rationalization opportunities in the infrastructure landscape. AMBI, on the other hand, goes beyond technology and infrastructure and analyzes the context in which the application is located, including the relationship between the business, the processes, and data harmonization.

2.2 Capgemini deployment bluprints

Capgemini maintains a large set of deployment blueprints that form the basis of an enterprise deployment. The deployment blueprints are part of Capgemini's enterprise architecture library and are updated based upon newly emerged best practices, technological changes, and recent products and solutions.

2.2.1 Private cloud-based deployments

For Oracle-centric enterprise landscapes, Capgemini has a number of technical, functional, and project blueprints for platform rationalization. All platform rationalization blueprints for medium and large enterprises revolve around the use of private or hybrid cloud strategies that are primarily focused on Database as a Service (DBaaS) and Middleware as a Service (MWaaS) solutions within cloud computing.

By implementing private cloud solutions with a foundation in Oracle engineered systems for both database and middleware, companies have the option to build the rationalized platform and application landscape on a standardized, available, high-performance platform while at the same time providing flexibility and agility to the business and to developers.

Because enterprise IT landscapes often grow in an organic and evolutionary fashion, it is not uncommon for an enterprise IT landscape to resemble the representation in figure 2.1. This type of landscape is diverse and costly to maintain, requiring a large, skilled staff.

By rationalizing platforms and applications and implementing a standardized private or hybrid cloud-based approach as is represented in figure 2.2, enterprises can significantly reduce complexity. Thanks to standardization , the IT landscape becomes much easier to maintain thanks to a lower number of staff required. At the same time, standardization increases the agility of the enterprise thanks to the flexible nature of cloud-based solutions.

In figure 2.2 the foundations of both databases and applications are based upon a private "as a Service" cloud model and have a technical foundation in Oracle engineered systems. Oracle engineered systems provide extreme performance and form the basis for an Oracle-centric private cloud strategy.

Oracle Enterprise Manager is the standard monitoring and maintenance tooling from Oracle that integrates with most Oracle software and hardware and a growing number of non-Oracle products. In the above model, Oracle Enterprise Manager is used as the only management and monitoring tooling, which provides a single point of control for hardware and software. At the same time, Oracle Enterprise Manager provides self-service portals for users to ensure a full cloud-based self-service concept that can be adopted within the

Figure 2.1: Traditional evolutionarily grown IT footprint

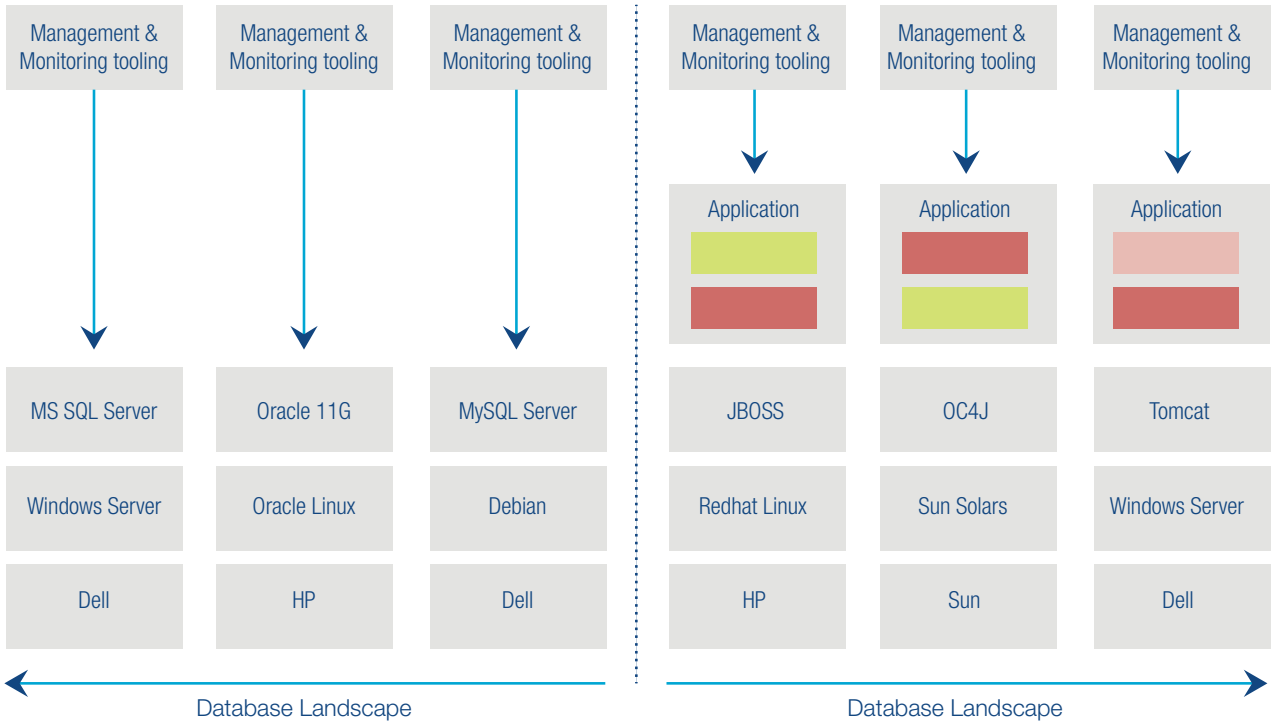
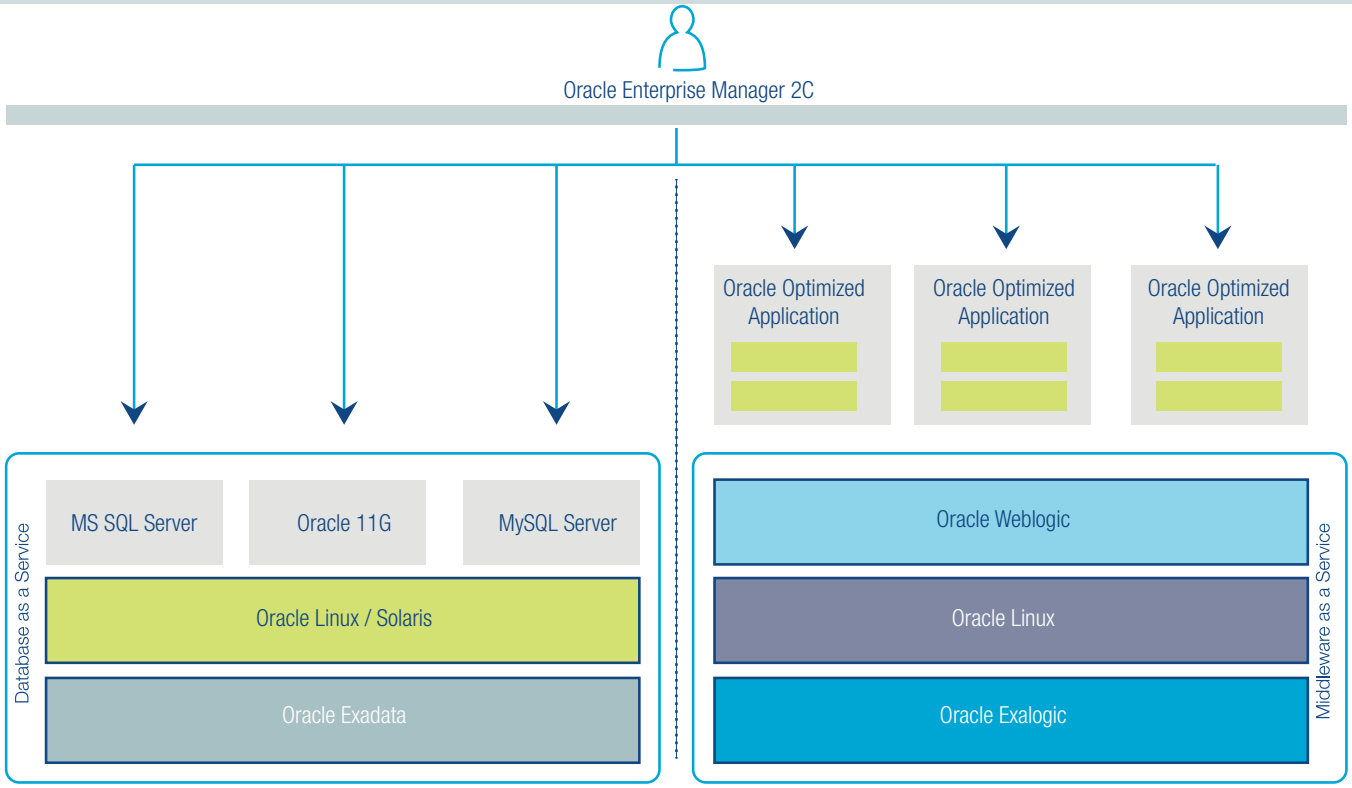


Figure 2.2: Modern architected footprint



enterprise and includes metering and chargeback solutions for pay-per-use model billing to different business units.

2.2.2 Application consolidation

Application consolidation concerns the consolidation of multiple standalone applications into a single operating system holding multiple applications. Note that merging business functionalities from multiple applications into a single application is considered to be application modernization rather than application consolidation.

A Capgemini best practice for application consolidation of Oracle-centric applications concerns consolidation onto an Oracle Exalogic or Sparc Supercluster based upon the application type. For applications that cannot be deployed on these Oracle engineered systems, the Capgemini best practices advises consolidation on an Oracle Private Cloud Appliance.

2.2.3 Database consolidation

Database consolidation concerns the consolidation of multiple standalone databases into a single operating system holding multiple databases. Database consolidation is often considered when schema consolidation is not an option due to the nature of the content of a database and when the database load allows a shared operating system. Capgemini has a specific standardized approach around database consolidation that can be executed in a standalone manner or can be part of an overall platform rationalization program.

When consolidating databases onto the Oracle Exadata platform, it is important to understand the complexity of deciding where to deploy a database inside the Oracle Exadata machine and determining which databases is needed to implement Oracle Real Application Cluster (RAC) clustering when this has not already taken place.

A full rack of Oracle Exadata provides eight compute nodes, all of which can host multiple databases. Some of the questions that need to be asked when deciding where to deploy a database include:

- Do the combined average system utilization and the combined average top utilization stay below the maximum thresholds of a node?
- Are business-critical databases spread evenly over the different nodes to prevent an “all critical systems down” situation in case of a node failure?
- Are business-critical databases using RAC configuration in order to allow rolling upgrades and prevent unavailability of databases during patching cycles?
- Are the different RAC nodes of a RAC cluster placed on different Oracle Exadata nodes?
- Are databases that need to be on different physical nodes from a legal and compliancy point of view placed on the correct nodes?
- Is Oracle Resource Manager configured correctly to provide ensured resource capacity to business-critical databases and processes based upon business criticality at specific moments in time?

The list of questions and considerations is a short example of a much wider list of questions and considerations that are included in the Capgemini methodology to ensure the correct distribution of databases across nodes within an Oracle Exadata machine.

When a consolidation project does not take into account these and other questions during the execution of the consolidation project, results will be sub-optimal and project goals will not be met.

2.2.4 Datacenter consolidation

In the last decade, consolidation of IT landscapes has been a key performance indicator for CIOs and CTOs.

In parallel, there has been a significant increase in computing power, now capable of accommodating the most demanding workloads enterprises could possibly run. At the same time, enterprises are looking for reliability, serviceability, and accountability (RAS) with reduced total cost of ownership to run the business.

This has led to the consolidation of applications, platforms, and infrastructure. It should be noted that any consolidation exercise will primarily lead to the consolidation of underlying infrastructure components.The key objectives of infrastructure consolidation include:

- Reduction in infrastructure footprint (locations and devices) with optimal utilization
- Improved reliability, availability, and serviceability of infrastructure by deploying enterprise-grade components
- Reduction in technology footprint with fewer infrastructure components to manage
- Reduction in time to deploy new requirements
- Reduction in total cost of ownership

Capgemini has developed robust database consolidation migration practices to support enterprises in their database consolidation with the help of Oracle engineered systems like Supercluster for the OS and application workloads, Oracle Exadata for database workload, and Oracle Exalogic for middleware. Capgemini has set of accelerators developed to speed up migrations, including the below methodologies, tools, and processes:

- Infrastructure rationalization using WARP for infrastructure
- Application Infrastructure mapping using tools from Oracle and other industry leaders like BMC and HP
- Database consolidation migration Center of Excellence (CoE) comprising of application and infrastructure subject matter experts
- Reusable templates covering different phases: discover, design, define and consolidate database consolidation

3 Cloud Deployment Architecture

Platform rationalization takes all layers of an IT landscape into consideration for rationalization, from the services and processes delivered to the business to networking and storage.

A best practice for platform rationalization in relation to deployment architecture is to provide as much as possible in the form of "as a Service." This enables enterprises to benefit the most from standardization and provide the highest level of agility and cost efficiency.

For Oracle-centric IT landscapes, Capgemini has adopted a significant number of Oracle best practices, to which we have added our own experience and proven deployment blueprints. The combined knowledge of Capgemini and as Oracle provides a full portfolio and proven deployment architecture for platform rationalization in an Oracle-centric IT landscape.

3.1 Cloud concepts

There are numerous definitions that are given to cloud computing. The most widely accepted definition of cloud computing is stated by the U.S. National Institute of Standards and Technology (NIST) and describes cloud computing in the following terms:

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.[1]

While within this document cloud computing will refer primarily to the private cloud concept, it will also touch on public cloud and hybrid cloud.

3.1.1 Private cloud

"Private cloud" refers to the model in which an enterprise creates a cloud within the confines of a datacenter and within its own IT landscape. In this model, the company owns the hardware assets, providing business departments and other internal IT departments with the benefits of cloud computing.

Private cloud solutions are generally used in cases where a company has compelling reasons to not adopt public cloud, including specific technical needs that cannot be fulfilled in the public cloud arena or specific regulatory and compliancy rules and regulations.

3.1.2 Public cloud

"Public cloud" refers to the model in which services are provided to an end-customer from a publicly available multi-tenant cloud. In this model, the provider owns all the assets of the cloud and provides computing and other services on a pay-per-use model.

3.1.3 Hybrid cloud

"Hybrid cloud" refers to the model in which an enterprise makes use of both private cloud as well as public cloud solutions. Often the hybrid cloud is seen as one single cloud from a business point of view. Business rules and workflows allow for automated decisions to deploy applications in a public or private cloud.

1 Mell, Peter and Grance, Timothy (September 2011). The NIST Definition of Cloud Computing. NIST (National Institute of Standards and Technology) Special Publication, 800-145. Retrieved from http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

For many enterprises, hybrid cloud is the solution of choice considering it provides systems with the flexibility and scalability of cloud computing while adhering to internal and external regulatory and compliancy rules and regulations.

3.2 Private cloud models

3.2.1 Single-tenant private cloud

The single-tenant private cloud is a model in which only one tenant makes use of the private cloud. “Tenant” can refer to a department, to a subsidiary of the owner of the private cloud, or to a partner company.

Within the single-tenant private cloud model there is no direct need to ensure that information and services are strictly segregated considering the owner of all the information and the services is the same. Standard security segregation in all cases needs to be implemented based upon the company’s internal security directives and regulatory compliancy rules.

3.2.2 Multi-tenant private cloud

The multi-tenant private cloud is a model in which multiple tenants make use of the private cloud. Just as for the single-tenant private cloud, a department, a subsidiary of the owner of the private cloud, or even a partner company or customers can be tenants of this cloud.

In the multi-tenant private cloud model, it is of vital importance that all tenants are segregated strictly from each other. This requires a radically different technical and security implementation strategy in comparison to that associated with a single tenant private cloud.

3.2.3 Oracle Engineered Systems

For enterprises with an Oracle-centric deployment footprint, Capgemini recommends creating private cloud that is both single- tenant and multi-tenant and is based upon Oracle engineered systems. Oracle engineered systems provide the foundation, both in terms of hardware and software, for the creation of a private cloud.

Depending on the type of private cloud services required by the customer, the deployment of one or more of the following Oracle engineered systems is considered valid:

- Oracle Exadata
- Oracle Exalogic
- Oracle SPARC Supercluster
- Oracle Private Cloud Appliance

A common model used is a combination of the aforementioned Oracle engineered systems. For management and cloud enablement, Oracle Enterprise Manager plays a vital role. Oracle Enterprise Manager provides the building blocks to create a private cloud including self-service portals, metering, and chargeback solutions to ensure that a consumption-based model and internal billing can be accommodated.

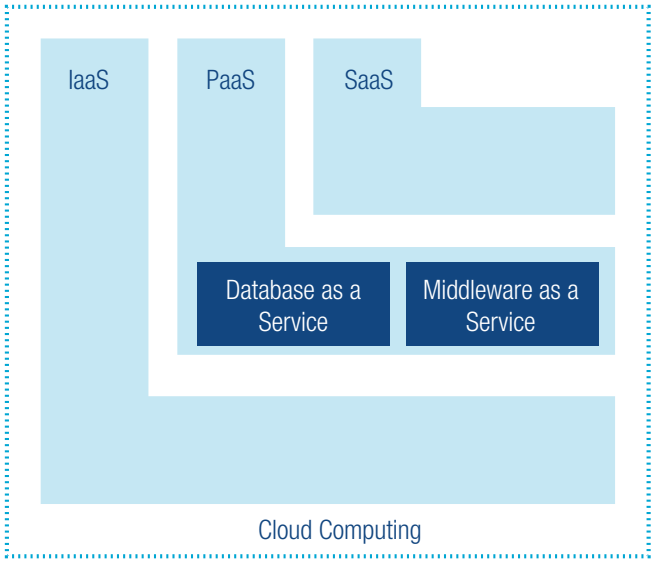
The use of Oracle Enterprise Manager is included in all the Capgemini blueprints for Oracle engineered systems deployments.

3.3 Cloud as a Service models

Within cloud computing, a common aim among vendors, implementation parties, and enterprises is to ensure that as much as possible is delivered in a “as a Service” model that allows for pay-per-use.

The three main “as a Service” concepts that are used within cloud computing are Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).

Figure 3.1: Standard cloud models



Within the overall Capgemini strategy for platform rationalization, IaaS and PaaS are standard components that provide the stepping stones for an enterprise to enable private enterprise-wide SaaS capabilities.

3.4 IaaS

IaaS provides computing power in a self-service manner to end users, allowing virtual machines to be delivered directly to an end user based upon a pre-defined template. When an IaaS component is requested by an end user, all related components like storage, backup, and networking are directly configured and the end user is presented with a workable virtual machine.

When deploying a private IaaS solution as part of a platform rationalization project using Capgemini architecture blueprints and best practices, users will take advantage of the Oracle Enterprise Manager self-service portals to request a new IaaS component. Metering and chargeback will be done via Oracle Enterprise Manager.

Depending on the primary goal and sizing of the enterprise private cloud, new virtual machines can be deployed on Oracle Exalogic, Oracle Sparc Supercluster, or Oracle Private Cloud Appliance.

3.5 PaaS

PaaS provides computing power and a solution stack in a self-service manner to end users. It often makes use of IaaS to provide computing via a pre-defined solution stack. PaaS includes solutions like middleware as a Sevice (MWaaS) and database as a service (DaaS).

When deploying a private PaaS solution as part of platform rationalization project using Capgemini architecture blueprints and best practices, users will leverage the Oracle Enterprise Manager self service portal to request a new PaaS. Metering and chargeback will be done via Oracle Enterprise Manager.

Depending on the sub-components and primary goal of the private PaaS solution, deployment can be done with several Oracle engineered systems. For private DaaS solutions, Oracle Exadata is the preferred solution for deployment. For MaaS, the preferred solution is weblogic deployments on Oracle Exalogic.

Depending on enterprise-specific needs and platform sizes, Oracle Sparc Supercluster and/or Oracle Private Cloud Appliance implementations can be used as the foundation of PaaS solutions.

3.5.1 MaaS

MaaS occurs when middleware is provided as a service to the end user. With MaaS, users can request provisioning and de-provisioning of middleware including, for example, Oracle Weblogic, in the same manner they would request a virtual machine within the IaaS concept or a database in the DaaS concept.

Depending on sizing, middleware requirements, and the overall enterprise IT landscape requirements, Capgemini has blueprints for deploying a private MaaS cloud on Oracle Exalogic, Oracle Sparc Supercluster or the Oracle Private Cloud appliance. For small-footprint MaaS landscapes, standard x86 Sun Oracle servers can also be used; however, in all cases Oracle Exalogic is preferred as the foundation for a private MaaS cloud for Oracle Weblogic Middleware.

Most Fortune 1000 companies have deployed multiple middleware software that has overlapping functions and is poorly integrated. We believe that most of this middleware software can be combined to remove the overlap and to enable product standardization and consolidation of overlapping software.

For example, Oracle Weblogic has added an Enterprise Application Integration (EAI), functionality, thereby eliminating the need for separate EAI products and the difference between application servers and EAI products. Similarly, function activations can be done by any of the middleware systems like EAI, application servers, portals, etc.

In the application discovery phase of Capgemini's methodology, we identify the middleware components and map them to the key functionalities for which they are used, like function activation, transform adaptors, messaging, and process flow. We then examine each of the overlapping functions and the reason why each of the middleware products exists in the enterprise portfolio at hand. The conclusions of this mapping are fed into the architecture committee to decide which of the middleware components can be consolidated and standardized into the finalized middleware product. For example, Weblogic can be used as the consolidated middleware layer.

We recommend avoiding having more than one middleware component for webservers like IIS, Web sphere, and Apache, which can be merged into a single product easily.

A pre-rationalized enterprise IT landscape is often as diverse as shown in figure 3.2.

Among the characteristics of an enterprise IT landscape before rationalization, the following are the most noticeable and have the most negative impact on IT and business capabilities:

- Dedicated hardware and software stack per application
- Heterogeneous application components
- Lack of unified monitoring and management capabilities
- Complex and costly maintenance
- Difficulty determining true costs

Figure 3.3 shows a post-rationalized enterprise IT landscape in which IT landscape components are reused and shared Linux and Weblogic are implemented based upon automated

Figure 3.2: Evolutionarily grown application deployment

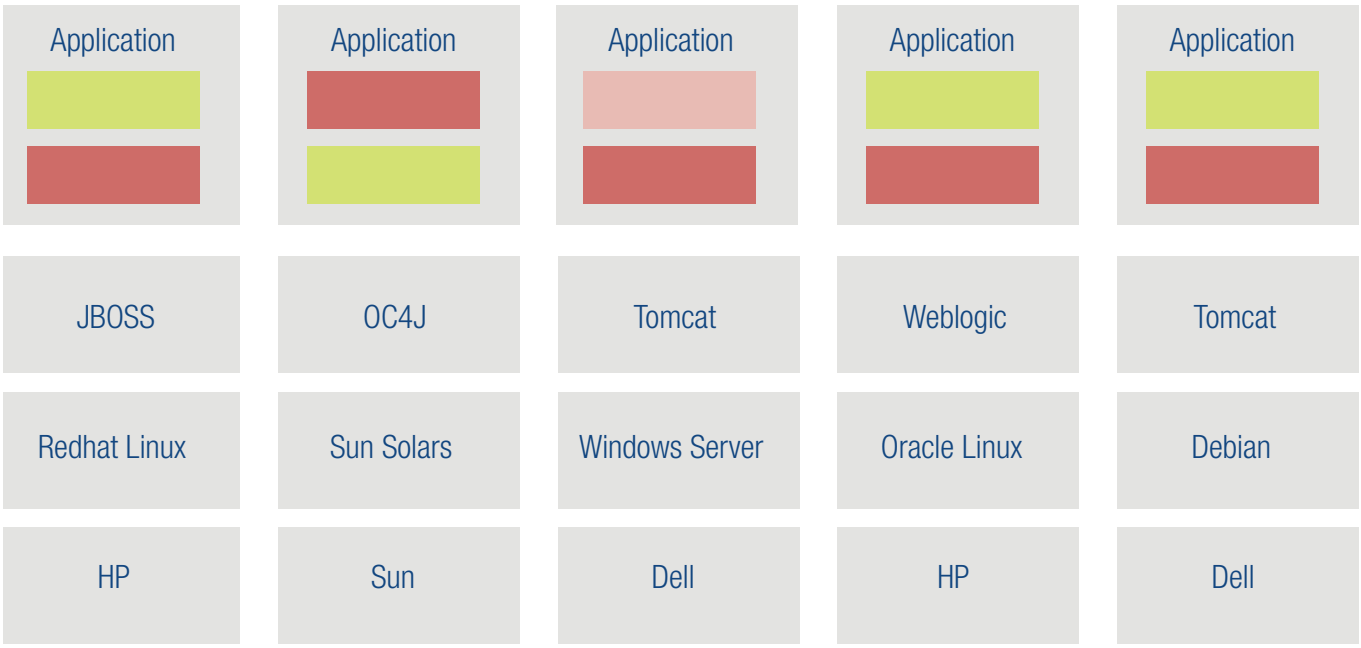
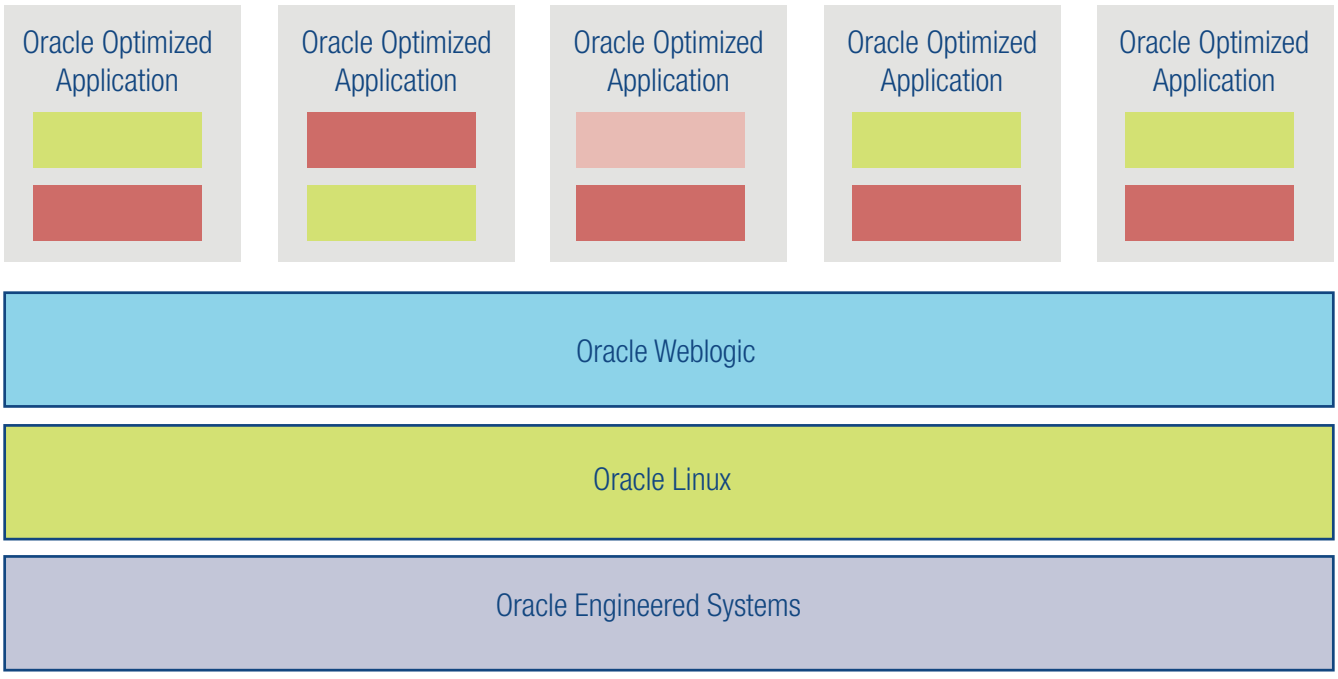


Figure 3.3: Modern architected application landscape



deployments that make use of standardized and optimized templates.

Among the characteristics of a post-rationalized enterprise IT landscape the following are the most noticeable and have the most positive impact on IT and business capabilities:

- Shared resources
- Homogeneous and reusable application components
- Unified monitoring and management capabilities with Oracle Enterprise Manager
- Pay-per-use internal billing options
- Lower complexity and reduced and more predictable maintenance costs

Enterprises need to carefully plan platform middleware consolidation. For example, a platform such as Oracle Fusion middleware has the ability to merge different middleware technology into one easy-to-migrate platform. Because this platform can be customized for any Java application, it reduces the complexity of migrating any one product to Oracle Fusion Middleware. Each of the tenants gets a dedicated Oracle Weblogic cluster with built-in high availability.

3.5.2 Database as a Service

In DBaaS, the database is provided as a service to the end user. Within the DBaaS concept, the user can request provisioning and de-provisioning of database in the same manner as they would request a virtual machine for IaaS or a middleware component for MaaS.

Depending on sizing, database requirements, and overall enterprise IT landscape requirements, Capgemini has blueprints for deploying a private DBaas cloud on Oracle Exadata, Oracle Sparc Supercluster, and the Oracle Private Cloud appliance. While for small-footprint DBaaS landscapes, standard x86 Sun Oracle servers can also be used, in all cases Oracle Exadata is preferred as the foundation for a private DBaaS.

Before rationalization takes place, the traditional enterprise IT database landscape is dominated by a diverse assortment of hardware, operating systems, and databases, all of which require costly maintenance, associated support tools, procedures, and processes in addition to associated staff training.

Among the characteristics of databases in a non-rationalized enterprise IT landscape, the following are the most noticeable and have the greatest negative impact on IT and business capabilities:

- Dedicated hardware and software stack per database
- Lack of unified monitoring and management capabilities
- Complex and costly maintenance
- Difficulty determining true costs
- Expensive and time-consuming deployment of new databases
- Absence of standardized database platform.

Figure 3.5 shows a rationalized enterprise IT landscape for databases. It demonstrates how components are reused and shared. It also shows how new database implementation can be completed based upon automated deployments that make use of standardized and optimized templates via Oracle Enterprise Manager. The full database lifecycle is managed via Oracle Enterprise Manager and enables users to make use of self-service portals and lower operational costs.

Key advantages:

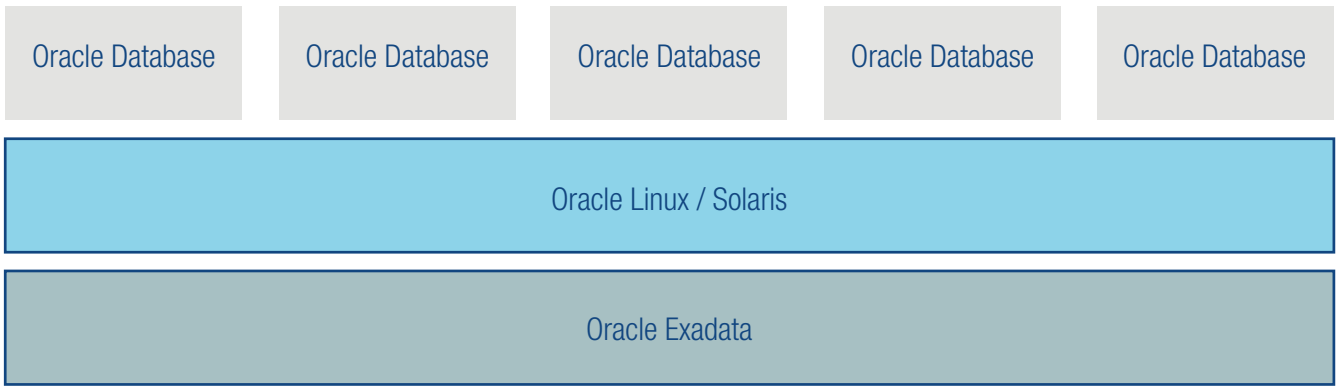
- Shared resources
- Unified monitoring and management capabilities with Oracle Enterprise Manager
- Lower complexity
- Reduced and more predictable maintenance costs
- Pay-per-use billing options are available for internal billing
- New databases deployed on demand and within minutes
- Standardized and reliable platform for developing new database-driven applications

DaaS models provide customers with a standardized, easy-to-maintain, and stable platform that is future-ready and provides the flexibility and agility needed for modern organizations to operate their day-to-day business.

Figure 3.4: Evolutionarily grown database landscape

Oracle 10G	IBM DB-2	MS SQL Server	Oracle 11G	MySQL
Redhat Linux	AIX	Windows Server	Oracle Linux	Debian
HP	IBM	Dell	HP	Dell

Figure 3.5: Modern architected database landscape



4 Conclusion

Because of the organic, evolutionary growth of many organizations' IT footprints over the years, their technology has become inflexible and more costly than is necessary. In most cases, enterprises are unaware of the quick wins, the structural changes, and modernizations that can be achieved to make their technology landscapes more flexible, agile, and future-ready while operating at a lower total cost of ownership.

Capgemini's approach can help enterprises as well as small and medium business to understand their current deployments as well as improvement opportunities. By implementing a more architected and modern footprint companies can become more competitive for years to come.

To start a journey towards modernization you can contact one of the authors of this whitepaper or a local Capgemini representative.

About the Authors

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Johan Louwers has worked as a developer, administrator, manager, project manager, managing consultant and senior architect within several IT companies and IT departments. He specializes in Oracle technology, infrastructure technology, and IT strategy and has been advising and actively working with a large range of customers and companies to help enterprises excel in their day-to-day operations and provide them with cutting-edge technology and solutions.

His is currently a managing consultant and global lead architect Oracle technology at Capgemini. Specialized in Oracle technology, infrastructure solutions and cloud computing, Johan has been selected by Capgemini to be one of the global Capgemini Experts and thought leaders, providing active advice and support to enterprises around the globe.

He is one of Capgemini's leading global resources on Oracle Engineered Systems and converged infrastructure in combination with Big-Data and high availability database and application solutions.

He spearheads Capgemini cloud initiatives around Oracle public cloud and Oracle Run, a cloud-based hosting platform specifically designed within the Capgemini datacenters to provide an Oracle optimised cloud platform for customers using Oracle VM, Oracle Linux and Oracle Enterprise Manager.

Johan actively maintains a blog, johanlouwers.blogspot.com, and he is an active developer and researcher in the fields of big-data, map-reduce, hadoop, HDFS, Linux technology and datacenter optimization and has interest in security, database technology and open source technology.

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Sanjiv spearheads the Oracle engineered systems centre of excellence from India and involved in multiple initiatives to reduce the total cost of ownership for Clients by optimizing the current architecture and the support models. He is one of the thought leaders within Capgemini for managing and consulting Outsourcing Engagements.

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