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Guide to Database as a Service (DBaaS)

Part 1 – Transforming Your IT Environment with a Database Cloud

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"Agility is a key motivator here. With DBaaS we can deliver better, faster, more effective IT services to agencies and the citizens that they serve."

-- Todd Kimbriel, Director of E-Government, State of Texas

"A DBaaS environment empowers our DBAs to innovate. They not only are responsible for keeping the systems up and running but for bringing improvements to the business."

-- Eric Zonneveld, Oracle Architect, KPN

Introduction

The *Oracle Guide to Database as a Service (DBaaS)* answers important questions that often arise when planning, designing, deploying and maintaining a private Database as a Service (DBaaS) environment—also known as a database cloud. It will help you understand the advantages of this service-oriented approach, address specific issues related to planning and design, and review the benefits and opportunities associated with this cost-effective IT strategy.

Three Oracle Database customers shared their insight to help bring these guides to life:

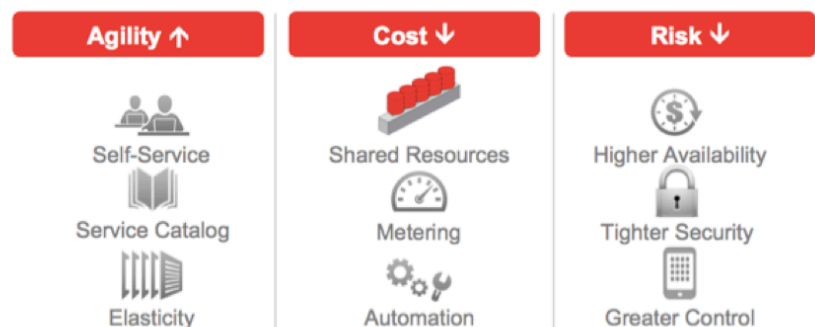
- KPN, a telecommunications firm in the Netherlands
- e-DBA, a technology service provider in the UK
- State of Texas, a U.S government agency

Q – What is Database as a Service?

DBaaS is a cloud model that enables users to request database environments by choosing from a predefined service catalog using a self-service provisioning framework. The key benefits of these database clouds are agility and faster deployment of database services. As databases are provisioned and de-provisioned, the associated computing resources are consumed and then released. Database resources can be consumed for the duration of a project, and then be automatically de-provisioned and returned to the resource pool. Computing costs can be tracked and charged back to the consumer.

Q – What drives organizations to deploy DBaaS environments?

Organizations are drawn to DBaaS because it can simplify IT infrastructures, making it easy to deliver database functionality to many users and multiple divisions from the same hardware and software infrastructure, while automating manual provisioning processes. Provisioning new databases in traditional environments can take days or weeks. DBaaS can compress that down to minutes. A simpler IT infrastructure ensures greater agility for the business with less risk and lower costs, as shown in the figure below.





"We looked at the products our customers were already using. Oracle was far and away the largest footprint from a database perspective. Staying with Oracle accelerated DBaaS adoption since our users were already familiar with it."

-- Todd Kimbriel, Director of E-Government, State of Texas

"We have more than 400 databases and 60 totally distinct applications on six Exadata systems including batch, OLTP, and data warehouse. We have room for many more before we need additional capacity."

- Eric Zonneveld, Oracle Architect, KPN

Q – What are some popular use cases for the DBaaS model?

DBaaS architectures are quickly gaining traction with Dev/Test organizations since they permit developers to set up and tear down databases on an as-needed basis. They can create new instances quickly without IT assistance, avoiding the usual process of procuring and initializing servers. This level of independence and flexibility lets developers and QA experts provision new databases on demand. If they are using a storage environment that has snapshot storage, such as Oracle ZFS, then users can clone an existing pluggable database instantly.

Q – What are the financial motivations for DBaaS?

One of the most appealing aspects of DBaaS is that consolidation results in a smaller hardware footprint, which lowers costs. In addition, many users and departments share the infrastructure while paying for individual database services, which drives down the unit price of those services.

According to Todd Kimbriel, Director of E-Government for the State of Texas, this payment model also makes it easier for customers to obtain database capacity on demand. Smaller agencies and departments can obtain a level of service that they previously could not have afforded. Planning horizons are easier and more predictable, which resonates well with the line of business owners.

The State of Texas created a planning tool that lets state agencies compare what it costs to run their current database applications in a traditional technology stack versus a DBaaS environment. They also demonstrated how a simplified pricing structure would be better for each participating organization. For example, each agency could pay a set amount per month for database services, versus the traditional model of paying independently for servers, storage devices, networking gear, software, and support contracts.

Q – How do you sell the concept of DBaaS to the IT department?

IT is continually asked to do more with less. IT leaders are looking for ways to increase agility while reducing cost and risk. To illustrate these business dynamics, KPN created an "Exademo" to demonstrate the performance and resource requirements associated with running various application loads—both in a traditional database environment and in a DBaaS environment based on Oracle Exadata. They emulated users logging in and putting the system through its paces, and also demonstrated how Oracle Exadata could minimize the number of databases, versions and operating platforms. Finally, they simulated disaster recovery scenarios by switching the load between two data centers—first using traditional systems and then using Oracle Exadata systems. KPN performed



"DBaaS environments can be complicated, with lots of moving parts. You need database management software that makes it easy to establish the services that you envision. And you need robust management tools that enable you to maintain those databases."

— Carl Olofson, IDC

"Oracle Multitenant helped us to see the value of offering a DBaaS platform to customers. This has enabled us to avoid what we call the "race to the bottom"—we no longer differentiate ourselves just on price but rather on the value of the capabilities we can offer. We can respond more quickly to customer needs."

-- James Anthony, Technology Director, e-DBA

rigorous testing and demonstrations before going live with a DBaaS environment to ensure that everybody would receive the requisite levels of security and performance.

The State of Texas promoted its new DBaaS environment by offering deep-dive indoctrination sessions to acquaint DBAs with the basic concepts of Exadata and DBaaS. Many DBAs who were skeptical when they arrived became evangelists for this new model.

Q – How do you sell DBaaS to management?

Capital Expenditures (CapEx) are incurred to create future benefit i.e. acquisition of assets that will have a useful life beyond the tax year. Operational expenditures (OpEx) are those expenditures required for the day-to-day functioning of the business. DBaaS generally follows the OpEx model, enabling consumers to avoid large upfront investments in hardware, software and services. This cost structure especially resonates with line of business managers. Not only does the DBaaS model enable more agile database services, it also helps the business to allocate costs. User organizations pay to the degree that they consume each service, incenting those organizations to be more efficient. They can commission databases for particular purposes, then decommission them and return them back to a resource pool that all organizations share. Charging back for database services can transform the IT environment from a cost center to a revenue generator.

Q - What are some of the primary planning considerations for DBaaS?

When planning and designing a DBaaS architecture, Carl Olofson, a research director at IDC, says there are a couple of key things to focus on:

1 – Thorough capacity planning to ensure that you can meet user needs and uphold the service level agreements that you establish, especially as more databases are deployed and the environment gets more popular. Olofson says to be overly generous with capacity. "Instead of doing planning and analysis from the inside out, and then trying to fit everything within those choices, ask yourself: What do users need? What are their performance requirements? Then figure out what kinds of technology you need to meet their future requirements. Once you have DBaaS capabilities and people can request databases, the demand may be higher than you initially expect."

2 - Selecting the right technology. Many customers rely on engineered systems for DBaaS environments. These integrated hardware and software solutions are designed to work together to facilitate extreme performance and availability, while simplifying deployment and maintenance issues. "You also need a database management system that simplifies virtualization and consolidation of IT resources and an integrated set of



management tools to streamline provisioning, monitoring, and chargeback,” Olofson adds.

Q – How does DBaaS simplify activities for DBAs?

DBaaS represents a paradigm shift in IT, from merely “keeping the lights on” to higher value tuning and development work. “The capabilities we bring through DBaaS allow all DBAs and administrators to move away from managing backups and cloning systems and other routine tasks,” explains James Anthony at e-DBA. “They can work with customers to help move the business forward. It’s more interesting work.”

When a user, department, or line of business needs a database in a traditional database environment, they must make a formal request to the IT department, wait for that request to be approved, and then wait for IT to procure the equipment, install the necessary software, and provision the database resources. This cycle involves management approvals, purchasing, and a series of discrete tasks for DBAs, system administrators, and storage administrators.

A DBaaS environment speeds up this entire cycle by empowering users to provision their own database resources. IT defines different “tiers” or classes of database service based on standard templates. An online catalog defines varying sizes, service levels and appropriate levels of chargeback for each tier. Authorized users can select the databases they need from this catalog, consume those services for the duration of a project, and then automatically de-provision the databases and return them to the resource pool.

According to Kimbriel, DBaaS deployments “polarize” the day-to-day activities of those who are consuming those services and those who are operationalizing those services. “The daily housekeeping chores are handled automatically as part of the basic service,” he explains. “DBAs have a new focus on handling value-added tasks.”


Q – How do traditional database provisioning processes differ under the DBaaS model?

In a traditional database environment, each database typically resides on a dedicated server. Procuring, implementing, and provisioning these hardware/software environments requires careful coordination among the groups of people who use and maintain the software. In addition, many different IT specialties arise to deal with the equipment, operating systems, databases, security, applications, and compliance policies. Different administrators may approach common tasks in different ways, so there may be little consistency or standardization in IT processes.

With DBaaS, business users are pre-authorized to select the database services they need from an online catalog. They can create new database services and dispose of

“When we started off with DBaaS we had many, many databases and many, many versions. We needed a new platform to drive us forward into the future. By consolidating on to fewer servers we can offer more cost-effective services with higher availability.”

-- Eric Zonneveld, Oracle Architect, KPN



“Our customers have all seen better performance and agility thanks to the consolidation density available through Oracle Multitenant. We spent 75 percent of what we expected to spend on hardware. It’s been a huge savings.”

-- James Anthony, Technology Director, e-DBA

“We used to have to manage physical servers, virtual machines and different database and storage requirements. Now with Oracle Multitenant we consolidate everything down to a few Oracle Database Appliances.”

-- James Anthony, Technology Director, e-DBA

resources when they no longer need them—without relying on the IT department for assistance.

Q – How do you track costs and charge them back to consumers of database services?

System management software such as Oracle Enterprise Manager 12c provides visibility into actual usage so that people only pay for what they use—instead of paying up-front for more capacity than they might otherwise need. This proven cloud management solution includes tools for integrated chargeback and capacity planning. A key component of this solution is Oracle Enterprise Manager 12c Cloud Management Pack for Oracle Database, which lets DBaaS administrators identify pooled resources, configure role-based access, and define service catalogs and chargeback plans. It keeps both users and administrators apprised of the costs of the services delivered, and establishes accountability for consumption of resources. A graphical user interface makes it easy to provision database services.

Q - What is the ideal Oracle private DBaaS configuration? For much of the Oracle customer base, the desired future state environment includes the following technologies:

Oracle Database 12c has been designed to enable DBaaS as part of a comprehensive cloud strategy. It uses a multitenant architecture in which a single “container” database can handle many “pluggable” databases. Collections of pluggable databases can be easily managed as a single entity, which maximizes consolidation density and simplifies administration.

Oracle Enterprise Manager 12c is a complete DBaaS management solution. It allows administrators to manage the entire lifecycle of a database cloud, from planning, testing and deployment to monitoring performance. It includes tools for integrated chargeback and capacity planning, with visibility into both the physical and virtual IT environment.

Oracle Exadata is an engineered system that provides an exceptional deployment platform for DBaaS. It supports multiple deployment models, multiple workloads, and multiple service levels from one integrated platform. Optimizations in storage, storage-compute interconnects, and I/O resource management allow for flexible tiered server and storage resource configurations.



Summary

In this first installment of this *DBaaS Guide* we have answered common questions related to planning, designing, deploying and maintaining a private DBaaS environment. In Part 2 we will discuss how to set up, manage, provision, and charge back for database usage. We will consider various types of virtualization, the importance of consolidation, and the concept of tiered database services built on standard templates. We will also explain how to set up a service catalog, develop a chargeback model, and create a user portal for self-service provisioning of database services.

For more information on Oracle Private Database as a Service, please visit Oracle.com/database.



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