

Hardware and Software
Engineered to Work Together




Guide to Database as a Service (DBaaS)

Part 2 – Delivering Database as a Service to Your Organization

In association with



ORACLE®



“There are often situations in which you need to spin up a new database. But in a traditional data center this is a nontrivial task. Being able to do this on demand through an online service in moments is an amazing transformation of that situation.”

– Carl Olofson, Research Director, IDC

“DBaaS raises the level of DBA involvement, so they focus more on the business and less on the mechanics.”

-- James Anthony, Technology Director, e-DBA

Introduction

The *Oracle Guide to Database as a Service (DBaaS)* provides important information for planning, designing, deploying and maintaining a private Database as a Service (DBaaS) environment—also known as a database cloud. This document discusses how to set up, manage, provision, and charge back for database usage. It explores the various types of virtualization available, the importance of consolidation, and the concept of tiered database services built on standard templates. It also discusses how to set up a service catalog, develop a chargeback model, and create a user portal for self-service provisioning of database services. The guide concludes with a discussion of how DBaaS deployments impact the internal culture of organizations.

Two Oracle Database customers shared their insights to help bring these documents to life:

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

Q - What software do you need to manage a DBaaS environment?

Oracle Enterprise Manager 12c is a complete cloud lifecycle management solution. It includes tools for self-service provisioning and monitoring with integrated chargeback and capacity planning. Oracle Enterprise Manager 12c offers complete visibility into both the physical and virtual DBaaS environments, from applications to disk. Oracle Enterprise Manager empowers administrators to plan, monitor, and manage DBaaS resource capacity—all from within a single management console.

Oracle Enterprise Manager 12c Cloud Management Pack for Oracle Database lets DBaaS administrators create zones, identify pooled resources, configure role-based access to those resources, and define service catalogs and chargeback plans. Oracle Cloud Management Pack empowers DBaaS users to request database services and scale them up and down in response to changes in the workload. 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 shows the entire topology of the database services being offered, so administrators can monitor the performance and quickly address any issues before they impact business users.

Q - How do you set up a self-service portal for cloud users and administrators?

Oracle Cloud Management Pack for Oracle Database includes a Self Service Portal that enables administrators to configure a database cloud and define policies for how it is



"We are cloning large databases in moments using the snapshot capabilities. We never could have done that before. Once people log into the help desk it's all automated. Our customers love it. It happens as a service. We cut the operator out of the equation."

-- James Anthony, Technology Director, e-DBA

used. These policies determine the total amount of resources people can reserve for personal and departmental use. Users can login to the Self Service Portal and provision the database assets they need, without knowing anything about the inner working of the database management system. They can even define the time when the database will be retired, and then it will happen automatically.

Once the Self Service Portal is online, authorized users can request a database service through a simple selection process. As users create databases they can specify a retirement schedule or keep the provisioned database indefinitely. Oracle Enterprise Manager 12c will automatically retire a database once it reaches its expiration date. Throughout this process they can monitor resource consumption through a graphical user interface.

Q – How do you create service catalogs and establish tiers of service?

Oracle Enterprise Manager 12c lets you specify how you wish to set up instances of databases and applications and then configure the environment according to the business need. For example, a bronze tier might include basic database services using pluggable databases within Oracle Database 12c. A silver tier might also include Oracle Real Application Clusters for instantaneous failover to another server in the case of an outage, and a platinum tier uses Oracle Maximum Availability Architecture to enable automatic failover among clusters in two data centers. Other parameters that may come into play when defining service tiers include geography, disaster recovery levels, and security. Most organizations create simple service catalogs with a few basic tiers, as shown in the figure below:

Sample Business Catalog

		Bronze	Silver	Gold	Platinum
Local Outage	RTO	Best effort	24 hours	8 hours	1 hour
	RPO	0	0	0	0
DR	RTO	Best effort	2 weeks	1 week	3 days
	RPO	80 hours	40 hours	24 hours	1 hour
Reserved capacity for DR		N/A	N/A	50%	100%
Cost Model		Service Tier x Footprint = monthly charge			

DB Size	CPU	RAM GB	Storage GB	Adders
S	2	12	200	Extra RAM, Storage
M	4	24	400	
L	8	36	800	

“Consolidation allows us to pass on performance and manageability benefits to our customers. We have seen an increase in performance and availability even as we reduce the cost of managing and provisioning databases.”

-- James Anthony, Technology Director, e-DBA

When requesting the service, users specify a service tier and storage size. The service catalog might also be set up to identify a specific purpose for the service, such as, application development or testing. For example, the requirements of a developer are very different from those of a DBA. And the requirements of a DBA are different from those of a quality assurance engineer. Using this approach the State of Texas, established four different sizes and four different classes of database service, with differentiated levels of availability, disaster recovery, and backup options.

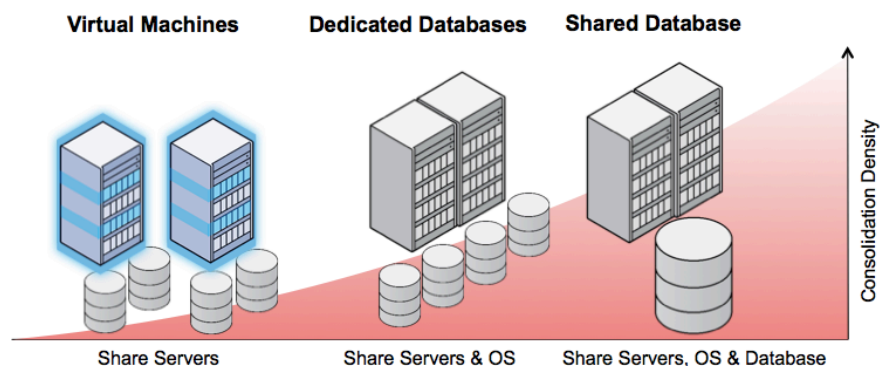
Q – How do you meter and chargeback for database usage?

Oracle Enterprise Manager 12c lets you manage cloud resources as business services rather than as a collection of technical components. You can control not only the database resources, but also the associated network and CPU resources as well. Collecting usage metrics provides hard data that charts usage patterns, enabling better planning and budgeting while identifying underutilized assets. Users and departments can be charged for usage (chargeback) or simply apprised of that usage (showback). Read a [white paper](#) on metering and chargeback to learn more.

Q - How does DBaaS facilitate consolidation?

The traditional approach to reducing unused capacity is to migrate the database environment into virtual machines—logical partitions of each physical server. Alternately, you can reduce the number of virtual and physical environments by consolidating databases into a shared database infrastructure. This can be an important component of DBaaS. Combining database assets into one consolidated platform makes the overall IT environment easier to manage and lowers IT operational costs.

Oracle Exadata supports many types of consolidation scenarios including running multiple application schemas in one single database, hosting multiple databases on a single platform, or a hybrid of the two configurations. These converged environments enable a uniform set of IT services that can be deployed quickly and managed easily, reducing operating costs. Individual databases are consolidated on physical servers and clustered together into cloud pools for maximum density. Any server in the pool can host one or multiple database instances.



"User expectations change when everything is virtualized. You end up creating a more demanding customer base, along with customer-focused DBAs who can act as advocates and work together to solve problems."

-- Carl Olofson, Research Advisor, IDC

Oracle Multitenant, an option of Oracle Database 12c Enterprise Edition, offers all the benefits of managing many databases as one, yet retains the isolation and resource control of separate databases. The multitenant container architecture enables organizations to set up one cloud environment with dozens or even hundreds of pluggable databases in each container database. Each pluggable database in a multitenant container database appears to applications as a single database. This high-density architecture enables servers, operating systems, and databases to be shared and lets system administrators manage many databases as one database.

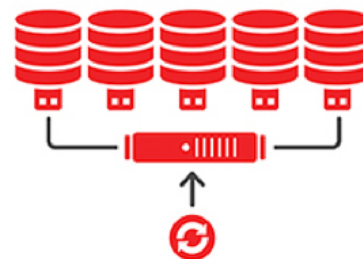
Existing Database Architecture:

Patch and upgrade **multiple** databases



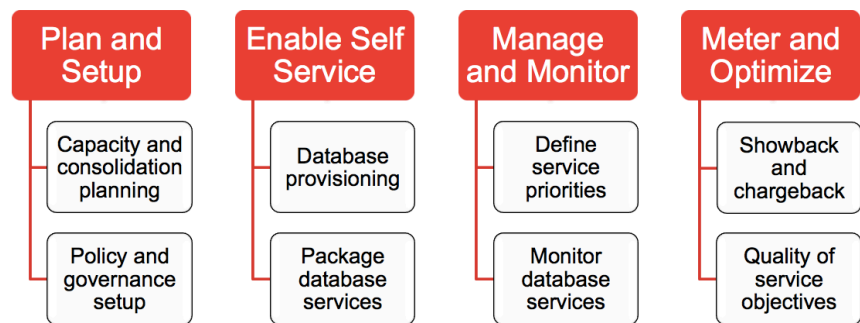
Oracle Multitenant:

Patch and upgrade **one** multitenant container database



Q - How do you monitor usage once database instances have been provisioned?

Oracle Enterprise Manager 12c helps you manage the entire DBaaS lifecycle including performance, consolidation and capacity planning, patching, self-service provisioning, monitoring, and metering/chargeback. It includes tools for efficient, end-to-end monitoring and management of the entire hardware and software stack, with a discrete level of control over DBaaS environments based on common metrics such as CPU consumption and storage consumption. You can easily allocate CPU and I/O bandwidth to different workloads or databases, which simplifies administration of a consolidated database environment. The primary capabilities of Oracle Enterprise Manager for DBaaS environments are summarized in the following figure.



Oracle Enterprise Manager 12c makes it easy to allocate CPU resources between database containers, providing fine-grained control over the processing workload. For example, you can shift resources to accommodate customer-facing applications during the day and large reporting jobs at night. Oracle Enterprise Manager can also monitor and charge for the types of technologies being utilized, such as Oracle RAC. Click [here](#) to read more.

Q – How can Enterprise Architecture (EA) help with DBaaS Deployments?

For successful adoption and sustainable execution, it is important to understand how DBaaS fits into the overall environment. You will achieve the greatest value when the DBaaS strategy is considered along with your organization's overall enterprise architecture and IT strategy. Enterprise architecture helps to structure DBaaS projects through a series of overlapping steps, or iterations. A systematic process determines how these environments should be created, with attention to the business, technical, and operational implications.

For example, if the HR department wants to implement a new payroll service and share it with other departments, the EA team begins by creating use-cases that reflect the needs of each department. They consider the profiles of the various departments and develop a service catalog that lists the functions these agencies need. Then each department can provision as little or as much of each service as is needed and also specify the degree of availability, disaster recovery, and uptime requirements.

Oracle has developed a complete Database as a Service Reference Architecture that consists of artifacts, tools and samples to help you understand how to operationalize DBaaS with attention to the correct strategy, people, processes, and technology. Click [here](#) to read more.

"The sheer labor involved in maintaining many different databases and servers can become overwhelming. Once you standardize on a single environment you can take it to the next level and make it easier to spin up databases when users need them. Then you are well on your way to a DBaaS scenario. Simplicity is the operative word."

-- Carl Olofson, IDC



Q - How does the DBaaS model save time or simplify activities for DBAs?

Creating database configurations based on standard templates enables a self-service model that relieves IT professionals and DBAs from having to manually configure and tear down databases in response to each individual request. Once the DBaaS environment is established, users can perform simple provisioning activities without engaging a DBA to allocate the resources, set access restrictions, and handle other common tasks.

"Oracle is completely committed to the success of the DBaaS platform. They helped us develop programs to get us going and refine our communication strategy."

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

In Oracle Exadata environments, instead of the usual division of labor between storage people and networking people and OS people, there is the opportunity to cultivate a new type of administrator that knows about all of these things. This integrated level of knowledge not only diversifies their work but also makes these IT professionals responsible for end-to-end management of the entire environment. For example, they no longer have to consult with many different people to troubleshoot issues. "One person understands how to resolve issues," remarks James Anthony at e-DBA. "This enables them to be more in control of their own destiny. DBAs can turn away from the technology and face the customer."

Summary

As e-DBA and the State of Texas demonstrate, many customers that adopt DBaaS report lower overall costs, greater autonomy for business users, and reduced risk within IT planning scenarios. Other important benefits include greater predictability and agility, which enables the business to innovate and change. Finally, IT professionals experience new levels of creativity and innovation. "Creative juices start flowing with the application developers," says Olofson. "They are free to ask themselves, what else can we do? They can challenge themselves to improve the applications. They are more likely to take advantage of business opportunities."

Click [here](#) to learn more about how to establish a DBaaS environment for your organization.



ORACLE®

Oracle Corporation

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

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200

oracle.com



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

Copyright © 2014, Oracle and/or its affiliates. All rights reserved. This document is provided for information purposes only, and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document, and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

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

Intel, the Intel logo, Xeon, and Xeon Inside are trademarks or registered trademarks of Intel Corporation in the US and/or other countries. 0314

Hardware and Software, Engineered to Work Together