WHITEPAPER

How to Lift and Shift Your Oracle DB to AWS Cloud

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Table of Contents

Enterprises are increasingly looking to AWS as a platform for running their business-critical applications. Oracle Database is a hugely popular relational database management system (RDBMS), and many organizations have invested heavily in this technology. However, running Oracle Database on AWS can be challenging due to the high cost of licensing and the lack of integration between Oracle Database and AWS native services.

The cloud has become the new standard for enterprise IT, and Oracle databases are no exception. Moving the Oracle databases to AWS to leverage the cloud's agility, scalability and cost-effectiveness is a natural progression towards digital transformation. In this white paper, we will discuss how to use AWS native services to lift and shift an existing Oracle Database to AWS.

What is Oracle DB on AWS?

Oracle Database is a popular RDBMS that is used by many organizations to store and manage their data. Oracle DB is proprietary software that can be expensive to license and run-on AWS. It is also a multi-user, multi-threaded database that supports most SQL standards. Moreover, it is available on multiple platforms, including Linux, UNIX, and Windows. Oracle DB's features make it the most scalable, reliable, and secure database. Moving to the cloud can be complex and require upskilling on new technology. However, the right tools can make the transition easier. This is where the 'lift and shift' strategy comes in.

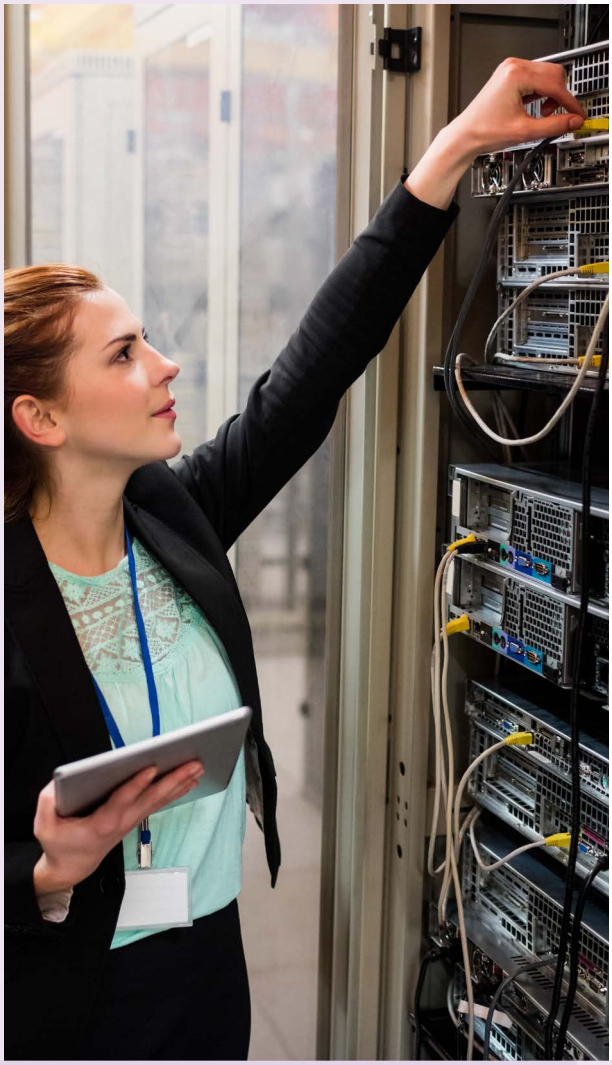
What is Lift and Shift?

'Lift and shift' is a term used to describe a type of data migration where data is moved from one system to another with minimal changes. It is often done when migrating to a new system or platform incompatible with the old system. In many cases, data is simply copied from the old system to the new one without any transformation or modification. In this context, the process of moving an Oracle database from on-premises to Amazon Web Services (AWS) is known as lift and shift. In a lift and shift scenario, an Oracle database is moved to AWS without changing the existing application code or database schema. The goal of lift and shift is to minimize downtime and the risk of data loss during the migration process.

There are two main options for running Oracle Database on AWS

1. Use **Amazon Relational Database Service (Amazon RDS)** for Oracle Database. As a managed service, Amazon RDS makes it easy to set up, operate, and scale an Oracle Database on AWS. It offers cost-efficient and resizable capacity while automating time-consuming administration tasks such as hardware provisioning, database setup, patching, and backups. It also offers cost savings due to its multi-AZ deployment option. Amazon RDS for Oracle Database provides you with industry-leading performance, scalability, and availability.

2. Use **Amazon Elastic Compute Cloud (Amazon EC2)** with Oracle Database. Amazon Elastic Compute Cloud (Amazon EC2) provides secure and resizable compute capacity in the cloud, making web-scale cloud computing easier. Amazon EC2's interface allows you to obtain and configure capacity with minimal friction. It helps you control your computing resources and lets you run on Amazon's proven computing environment. Amazon EC2 significantly reduces the time required to obtain and boot new server instances to minutes. It allows you to quickly scale capacity, up or down, as your computing requirements change. Amazon EC2 changes the economics of computing by allowing you to pay only for the capacity that you use. Amazon EC2 will enable developers to build failure-resilient applications and isolate themselves from common failure scenarios.



Why would you Lift and Shift Your Oracle DB to Amazon?

There are many reasons to move your Oracle database to AWS. Perhaps you're looking to take advantage of the cost savings and flexibility of the cloud. Maybe you want to improve your database performance or reduce your Oracle database administration burden. Or, you might want to take advantage of AWS features such as Amazon Relational Database Service (Amazon RDS) or Amazon Elastic Block Store (Amazon EBS). Whatever your reasons, AWS provides several options for running Oracle databases in the cloud. With the "lift and shift" strategy, you move your Oracle database to AWS without changing your database architecture or application code.

Benefits of Lift and Shift of Oracle DB to AWS

There are many benefits to lifting and shifting Oracle databases to Amazon AWS, including but not limited to:

Cost savings

Amazon AWS can provide significant cost savings compared to traditional on-premises Oracle deployments.

Scalability

Amazon AWS can provide on-demand scalability to meet the needs of any workload.

Flexibility

Amazon AWS provides a wide range of options and services that can be customized to meet the specific needs of any Oracle deployment.

Reliability

Amazon AWS offers a highly reliable and available platform that can be used to deploy mission-critical Oracle databases.

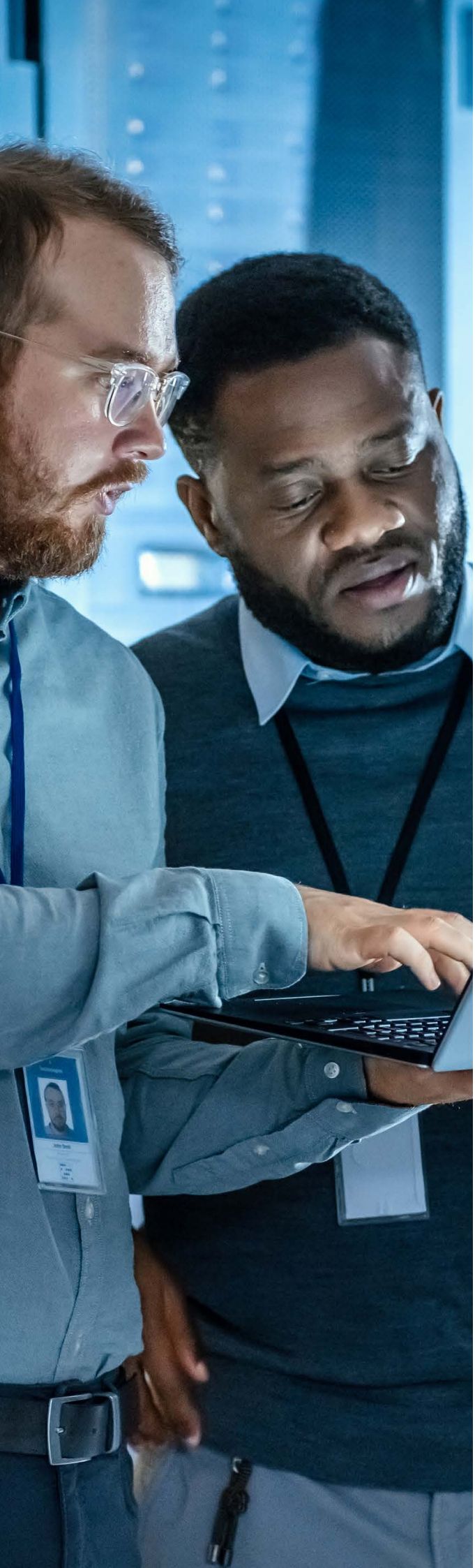
Security

Amazon AWS provides a secure platform that can be used to deploy Oracle databases.

How to Lift and Shift Your Oracle DB to AWS?

If you are looking to move your Oracle database to Amazon, there are a few steps you need to take to make the shift.

- Make sure you have a backup of your Oracle database. This is essential in case anything goes wrong during the move.
- Export your Oracle database using the expdp utility. This will create a dump file of your database, which you can then import into Amazon.
- Create an Amazon RDS instance. This will be where you will import your Oracle database.
- Import your Oracle database dump file into your Amazon RDS instance using the impdp utility.
- Configure your applications to use the Amazon RDS instance as the new database location.
- Test your applications to ensure they work with the new RDS instance.
- Optionally, replicate your Oracle database to Amazon S3 for disaster recovery.



Move Oracle DB to AWS via AWS Database Migration Service (DMS)

The most common way to move Oracle DB to AWS is using the database Migration Service. DMS can help you migrate your Oracle database to AWS quickly and easily, with minimal downtime. Now, we will take the next few steps on how to use DMS to lift and shift your Oracle database to AWS. Before you begin, you'll need an AWS account and an Oracle database that you want to migrate. Creating an IAM user with permissions to use DMS is an essential step in this process.

Once you have your AWS account and IAM user set up, you can begin migrating your Oracle database using DMS. The first step is to create a DMS replication instance. A replication instance is a managed AWS resource used to migrate databases. With PostgreSQL compatibility, you can use AWS Database Migration Service to migrate your data to Amazon Aurora. AWS DMS can also migrate your data from an Oracle Database on Amazon EC2, on-premises Oracle Database, or Amazon RDS for Oracle to an Amazon Aurora DB cluster.

You will need to create a DMS task, which you can do through the AWS Management Console. You will need to specify the source and target databases and the migration type (full or partial). You will also need to specify any necessary transformation rules. Once the task is created, you can start the migration. However, the migration process starts with pre-planning.

Pre–Migration planning

Before you begin migrating your Oracle database to AWS, there are a few things you need to do for a successful migration.

First, you need to determine which AWS service you will use to host your Oracle database. There are different options, each with its benefits and drawbacks. You'll need to decide which service is right for your particular use case.

Next, you must create an Amazon Virtual Private Cloud (VPC) to host your Oracle database. A VPC is a private, isolated section of the AWS cloud that you can use to launch AWS resources in a pre-defined virtual network. You'll need to create a VPC and subnets and configure security groups and route tables.

Finally, you will create an Amazon Relational Database Service (RDS) instance to host your Oracle database. Once you've created your RDS instance, you'll need to choose the right instance type and configure the instance.

Lifting the Oracle Database

1. Migration

Once you've completed the pre-migration planning, you're ready to begin migrating your Oracle database to AWS. As mentioned earlier, the first step is to export your Oracle database to an Amazon Simple Storage Service (S3) bucket. You can export your database to an S3 bucket by using the Oracle Data Pump utility. Once your database is exported to S3, you can import it into your RDS instance. When you import your Oracle database into RDS, you'll need to choose the suitable character set and collation for your database. You'll also need to create a new database user and grant the appropriate permissions. Once your database is imported into RDS, you'll need to configure the database parameters. You can configure the database parameters by using the RDS console or the AWS Command Line Interface (CLI).

2. Testing and validation

Once your Oracle database is up and running on AWS, testing and validating the migration is essential. You'll need to test the performance of your database on AWS and ensure that it meets your SLAs. You'll also need to test the connectivity between your on-premises applications and your database on AWS. For instance,

Use Amazon's Relational Database Service (RDS).

RDS is easy to set up and gives you access to MySQL, MariaDB, Oracle, or Microsoft SQL Server database capabilities. RDS automatically backs up your database and stores the backups for some time. You can use these backups to restore your database to a point in time.

Use Amazon's Elastic Compute Cloud (EC2).

Another way to test your database on AWS is to use Amazon's EC2. The web service EC2 provides resizable compute capacity in the cloud. With EC2, you can launch virtual servers, or "instances," pre-configured with a specific operating system and applications. You can use EC2 to launch as many or as few instances as you need and scale your compute capacity up or down as needed. Once you've launched your database on AWS, you can use Amazon's CloudWatch service to monitor the performance of your database.

CloudWatch to monitor AWS resources and applications.

CloudWatch can help you troubleshoot issues with your database. To test the connectivity between your on-premises applications and your database on AWS, you can use Amazon's Simple Storage Service (S3). S3 provides storage for data in the cloud. You can use S3 to store your application data and access your data from anywhere in the world.

Data Pipeline service to migrate your database to AWS

Once you've tested your database on AWS, you can use Amazon's Data Pipeline service to migrate your database to AWS. Data Pipeline helps you move data between different AWS resources.

CloudFormation service for automation

Aou could also consider using Amazon's CloudFormation service to automate the provisioning of your Oracle database on AWS. CloudFormation is another web service that helps you create and manage AWS resources. With CloudFormation, you can define your Oracle database infrastructure as code and provision and manage your infrastructure using templates.

Identity and Access Management (IAM) to control access

Once you've migrated your Oracle database to AWS, you can use Amazon's IAM service to control access to your database. IAM helps you manage users and permissions for AWS resources. IAM can help you control who can access your database and what they can do with it.

Testing and validating your Oracle database on AWS is vital to ensure that your database runs correctly and that your applications can connect to it. Amazon's RDS, EC2, and CloudWatch services can help you test and validate your database on AWS.

Ongoing Management and Monitoring

After an Oracle database is successfully lifted and shifted to Amazon AWS, it is crucial to monitor and manage the database to ensure optimal performance and availability. Some of the key management and monitoring tasks include

01 **Connectivity and security:** Ensure that the database is properly connected to the Amazon AWS environment, including all the necessary security measures.

02 **Backup and recovery:** Configure backup and recovery procedures to protect the data in the event of an outage or disaster

03 **Capacity planning:** Monitor database performance and usage to ensure that sufficient capacity is available to meet future needs

04 **Monitoring and troubleshooting:** Monitor the database for any issues and troubleshoot any possible problems

Final Thoughts

Moving data, applications, and other IT services to the cloud is a way to future-proof the business. AWS leads the way in cloud adoption with its scalable, reliable, and cost-effective services. Oracle databases are a standard workload that is often migrated to AWS. The lift and shift approach involves minimal changes to the existing database environment and can be completed quickly and easily. It is the most straightforward way to move an Oracle database to the cloud, proven by enterprises of all sizes.

Authored by

Technical Architects

Rajkumar Murugesan

Siva Chandrababu

Contact Us

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For more info contact: info@aspiresys.com or visit www.aspiresys.com

USA
+ 1 630 368 0970

SINGAPORE
+65 3163 3050

INDIA
+91 44 6740 4000

UK
+ 44 203 170 6115

NETHERLANDS
+ 31 (0)30 800 92 16

POLAND
+48 58 732 77 71

MEXICO
+52 222 980 0115