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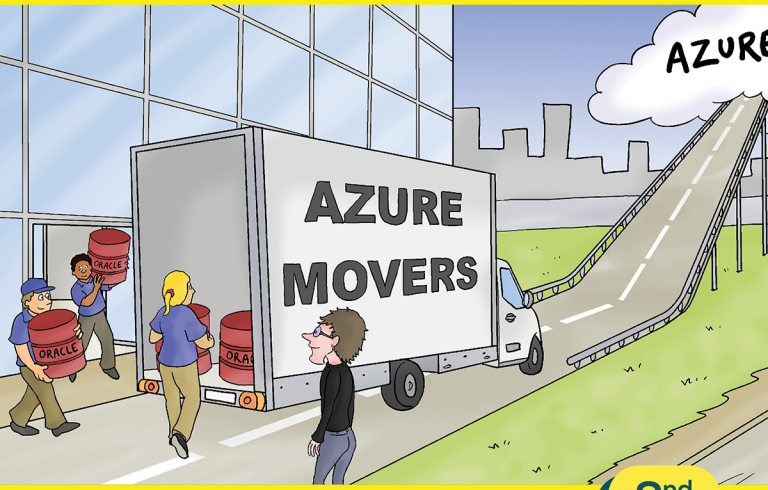
Conversational Oracle Data Migration to Azure

Greg Altman (Enterprise Azure Architect)



2nd MINI Edition

Learn about:

- Why consider moving Oracle data to Azure in the first place
- Practical steps that can be taken to assist in a successful migration of your Oracle data

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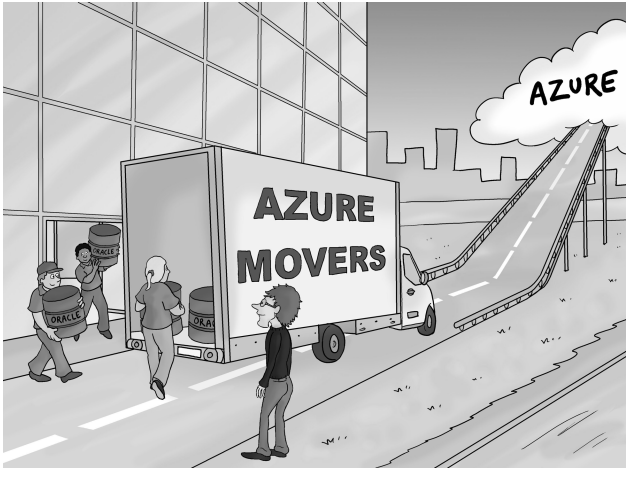

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The “Conversational” Method

We have two objectives when we create a “Conversational” eBook. First, to make sure it’s written in a conversational tone so that it’s fun and easy to read. Second, to make sure you, the reader, can immediately take what you read and include it into your own conversations (personal or business-focused) with confidence.

“Geek in the Mirror” Boxes

We infuse humor and insight into our books through both cartoons and light banter from the author. When you see one of these boxes it’s the author stepping outside the dialog to speak directly to you. It might be an anecdote; it might be a personal experience.

Within these boxes I can share just about anything on the subject at hand. Read ’em!

Why move Oracle data to the cloud?

"They just found out we're moving our Oracle data to Azure."

Databases (Oracle or otherwise) have long resided on-premises. For many reasons, organizations have largely relied on local infrastructure to host their Oracle databases. But in recent years, the opportunity to take advantage of the cloud *for*

Oracle workloads has presented itself, allowing organizations to take advantage of the scalability, availability, processing power, and adjacent services the cloud has to offer. This has led to the need for organizations to determine whether moving their Oracle data to the cloud would be advantageous.

In this eBook, I'll focus mainly on Azure – Microsoft's cloud platform, with its' hundreds of products and services delivered over the internet and billed according to usage – and discuss the *why* and *how* of moving your Oracle database there.

But let's first finish the 'low hanging fruit' in the conversation around "Why Oracle in the cloud?" Like with all discussions of cloud vs on-prem, the cost of hardware and hardware maintenance must be factored in. Most conversations start and end at the cost, but there is much more to be gained by moving your Oracle data to the cloud.

The largest benefits are scalability, flexibility, and big data analytics – and the stats below about the current state of data housed in Oracle help to make the case:

- It's estimated that 85% of on-premises databases are overprovisioned due to having to buy hardware and predict data growth over the next several years. Cloud resources (like CPU, memory, and storage) can scale up and back as needed.
- Replicating Oracle data to Azure allows the interoperability of other data warehousing capabilities like IoT unstructured data.
- 80-90% of all digital data is unstructured (CIO).[1] Text messages, images, emails, videos, and social media posts are all unstructured. But behind all that data are analytics and insights that can help companies gain a competitive edge.
- Using Oracle conventional data and IoT unstructured data in Azure enables tools like Azure Synapse Analytics to empower your

[1] https://www.cio.com/article/220347/ai-unleashes-the-power-of-unstructured-data.html

business intelligence and machine learning initiatives to take off.

- Customers who gain 10% more value from their data can result in millions in additional revenue[2]

So, there are definitely benefits to moving Oracle data into the cloud… but what about Azure specifically?

Why move Oracle data to Azure?

As you probably already know, there are three major public cloud players: Microsoft Azure, Amazon AWS, and Google Cloud. Of these, Azure and AWS battle back and forth between the largest and the most innovative. Let's focus on Azure to keep things a little simpler and look at some details that provide some context around why Azure is a solid choice:

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[2] https://www.quest.com/webcast-ondemand/migrate-your-oracle-workload-to-azure-with-no-risk-and-almost-zero-downtime/

1) Gartner's latest magic quadrant report has Azure ahead in 'Completeness of Vision.'

2) Microsoft and Oracle now have a joint offering, *Oracle Database@Azure* which delivers Oracle database services running on Oracle Cloud Infrastructure (OCI) *inside* Azure datacenters.

3) Azure has over $1B invested in security R&D

4) Over 3500 cybersecurity experts are employed to keep your data safe

5) Geographically diverse data centers - 140 countries

6) Azure has 10 US data centers

Beyond hardware savings and security, one other major benefit to moving your data to Azure is *flexibility*. DBAs today are rarely afforded the luxury of managing only one type of database. Azure offers the flexibility of

running Oracle, SQLServer, PostgreSQL, MySQL, Cosmos DB or other databases. This is in addition to the myriad of real-time analytics allowed by having your data in the Azure cloud.

84% of DBAs manage more than one database platform and 27% of DBAs oversee more than 100 databases[3].

High-speed streaming tools like Azure Event Hubs offer the ability to quickly ingest large amounts of transactional data into your cloud data warehouse; speed is king in the modern world. Gone are the old days of batching up your transactions for the day, uploading to an online service, and then processing the data for use. Your competition is scaling up and moving fast, and so should you.

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[3] Quest, "Database Professionals Look to the Future: 2020 Trends in Database Administration" (2020)

Even if you are happy with your Oracle online transaction processing, you can offload the reporting, business intelligence, and other analysis to the cloud. This will reduce the load on your production databases and servers as well as allow the BI team to work with their own copy of the raw data. However, for the analysts to offer the most useful information to business leaders, the data has to be replicated as close to real-time as possible.

I'm sure some of you are thinking, "It takes BI too long to process it for them to need real-time data replication." With on-premises tools, you may be right. With modern data analysis tools like Azure Data Factory, the data flow into Synapse can be automated to gain insights from all your data through integration with Power BI and Azure Machine Learning.

Many of the big data tools scale down as well as up. Too many enterprises fail to fully utilize their available data because they think, "We're too small to have Big Data."

In addition to the data engineering benefits of replicating your databases to Azure, there are significant IT resilience benefits as well. IT resilience is essential to business continuity, given that businesses fail when data stops flowing. Our goal as data professionals is to prevent that single point of failure leading to disruption of data and business. Traditionally this has been done with two data centers in an active/active matrix. As mentioned earlier, this approach doubles the hardware cost.

Not only is there flexibility in what databases you use, but there is also flexibility in how you handle your migration to the cloud. It doesn't have to be, and probably shouldn't be a "big bang" all-at-once conversion. Why not start off with a hybrid solution? You can replicate your data to a cloud database, get comfortable with the tools and then slowly retire your backup data center, for example. This allows you to utilize tools in Azure without sacrificing the investment already made in local hardware.

Making the move!

Once the decision is made to "go cloud," the real work begins. How do you pull this off without data loss or downtime?

All IT professionals are risk-averse, and DBAs are the most risk-averse of all, for good reasons! The integrity and availability of the business' data is our responsibility, so we must tread carefully in an undertaking like a migration. So, it's necessary to consider how your Oracle data will be migrated through a few lenses.

What could go wrong??

Migrating and upgrading databases and associated software applications have historically been synonymous with risk, downtime, and long weekends at the office for database administrators. The Infrastructure Teams are on high alert until the process is over, then resume normal operations with an eye out for glitches and anomalies. A stressful process for everyone, even if everything goes well, but disaster is literally a keystroke or mouse click away. Even a minor error could take days to recover

from, while you have angry users ringing the phone off the hook and a business that is losing revenue.

This sounds like the stuff of nightmares, but sadly, database migrations and upgrades have almost always been risky and stressful. What if it didn't have to be that way? What if you could complete your operational goals with zero downtime and zero data loss and without impacting the flow of business?

Planning is key

Let's start by revisiting some nightmare-inducing pitfalls and see how you can avoid them. Some say there are 5 or 8 or 10 reasons migrations fail. There really is only one – poor planning. Poor planning leads to poor execution, causing issues like downtime and data loss. Unfortunately, there is a parallel path that can cast your migration in a poor light, and that is poor communication. Even if the migration goes well from a technical standpoint, failing to effectively communicate the process plan or failing to report progress can lead to the perception of failure by business leaders.

What constitutes a good plan? In addition to the obvious parts of mapping the migration steps, testing is critical.

Test, test, then test again

Ideally, before the actual migration, you'll be able to create a test environment to test your applications thoroughly before making changes to the production environment. Some organizations try to save time by limiting testing, which increases the risk of failure. A better approach to testing is to replicate the activity on production databases, with the volume and variety of transactions that would take hours of work to duplicate. Use replication for at least two days as the only form of test against the instance. Then run read-only tests to check your reports and queries for accuracy and compatibility. Finally, begin to implement some of the new features and bring in some early adopters from the BI team to begin integrations.

Prepare for failure

The other critical portion of a good plan is to have a fallback plan in case something terrible happens. In the instance of migration to the cloud, this is the strength of a hybrid approach. If there is a problem getting the data flowing, you haven't changed your current production databases. Just remember – fail forward if possible.

When you set out to make your plan, one of the first things to consider is the tools at hand to accomplish the task. What 'traditional' tools do you have and are they enough? Do you need an enterprise solution?

Planning for the right tools

The traditional Oracle migration methods can accomplish your data migration to the cloud, provided you have lots of time. The old export and import method may work for seeding the initial data, but how good is it when it's out of date before the upload is done? Oracle Data Pump was designed to speed up the process, but it's still too slow. Additionally, it only works from Oracle Database to Oracle Database, reducing the flexibility of the

databases mentioned earlier. Other traditional tools like Oracle RMAN and Oracle Data Guard can also accomplish the initial seeding but again fail to manage the ongoing replication with the speed needed for real-time analytics.

All of this adds up to one thing – new tools are needed. So, what do you need to look for in a replication tool?

Searching for the perfect toolset can be daunting. It's usually easier if you have a sort of bucket list of things that a good toolset must have as well as a more narrowly defined list of features that would be 'nice to have'.

The toolset you choose must-have list of features that look something like this:

- Simple to implement and use.
- Monitoring and reporting of replication.
- Platform agnostic so that you can utilize the same tools for replicating from on-premises

databases on various platforms like Windows or Linux or others.

- Multiple cloud replication targets allowing for true multi-cloud scalability.

- Automated methods of conflict resolution to compare and repair on live tables.

- Resynchronization tool also helps in case of losing connectivity with the source database. Ideally, it should be able to do the resync while new data is flowing in.

- Of course, a decent tool will also have good support for those times when, against all your planning, you wind up in the weeds.

The Big Takeaways

Migrating your data workloads to the cloud is a big undertaking with big potential payoffs. Business leaders are asking for more analytics, and they want them in real-time. At the same time, database professionals are increasingly concerned about the exponential growth of data, and how to securely store and analyze this data. A cloud solution will help to solve these problems.

Azure enables flexibility as well as analysis tools. PostgreSQL, MySQL, Cosmos DB, and SQL Server allow DBAs to use the best tool for the job at hand. Not just database flexibility but also the ability to reduce hardware costs all the while improving IT resiliency and business continuity.

The actual move to the cloud can be daunting. Many companies get paralyzed at this point for fear of downtime, or worse, data corruption. One key to moving forward is to have a good plan with a failback option and a rigorous testing phase. The other big key is to invest in proper tooling. This is

not something that you can have your DBAs script up in their spare time!

A proper toolset is not just for the initial migration but should also manage ongoing replication between your on-prem data store and your cloud data. It should enable you to automate the process of conflict resolution and be able to manage this on live data tables without data loss. To round it out, a good solution should have a support team that can understand your issues and help you find solutions, not just read from a “have you tried rebooting?” script. Ideally, you can check most of these things off with a single comprehensive tool or at least suite of tools.

SharePlex by Quest: A better way to quickly move your Oracle data into Microsoft Azure

What if you had access to a solution that supports multiple pathways in Azure and provides an insurance policy against downtime? One that would give you the flexibility you need to do more with your Oracle data by leveraging the Azure ecosystem and moving your data to maximize its value.

With SharePlex, Oracle data can be continuously replicated to Oracle databases in Microsoft Azure to maximize its benefits with lower cost and risk. Specific replication use cases include:

- Moving Oracle data continuously into Azure SQL Database for access to Microsoft system-provided business intelligence tools and lower-cost reporting solutions.

- Leverage Microsoft Azure services, like Synapse, by streaming Oracle data into

Microsoft Azure Event Hubs for Kafka as a gateway into the Azure ecosystem.

- Moving Oracle data continuously into SQL Server databases for lower-cost reporting that is offloaded from production systems.

- Speed up the implementation of your multi-cloud initiatives by simplifying the process of moving Oracle data continuously between different cloud providers (like Amazon AWS and Microsoft Azure).

Easily achieve high availability, increase scalability, integrate data, and offload reporting with this flexible solution that supports multiple business use cases. Move your data – not your budget – with affordable database replication.

Learn more at
www.quest.com/products/shareplex

Oracle data has been on-prem forever. But new advances in the cloud give reason to either replicate or migrate this data to Azure. In this eBook we'll look at the reasoning behind migrating Oracle data to Azure and tell you how.

About Greg Altman

Greg Altman has 30 years of experience in infrastructure management, certifications in Microsoft server and Azure, a blog at TheHoundTech.com, and two Iron Butt certifications for long distance motorcycle rides (so far).