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Database Migration to Azure

Today's cloud-based business intelligence and predictive analytics are driving agility, efficiency, and competitive advantage. When combined with the explosion of mobile, social, and online information, every enterprise is now in the business of data. But those who don't unlock the value of information and embrace their digital transformation will quickly fall behind.

For those ready to move forward, three themes can guide companies transition to a cloud- and datacentric enterprise:

1. Unstructured data from social, mobile, IOT, and video is undergoing rapid growth and necessitates highly scalable systems, likely in the cloud.
2. Emerging unstructured data solutions, such as NoSQL, Hadoop, and in-memory fabrics must be used to capture the promise of big data.
3. New security frameworks are needed to effectively govern the combined universe of unstructured data and database (DB) systems, both on premise and in the cloud.

Cloud solutions are the foundational technologies across these three themes and enable mobile and social platforms, big data implementations, and modern security frameworks. Leveraging strong cloud providers such as Microsoft Azure, in combination with structured and unstructured data, allows companies to make more informed, real-time business decisions.

Many traditional business applications and relational databases, however, sit outside the cloud, as do various data warehouses. Some of these data stores might benefit from a migration to the cloud on which unstructured data now resides. But since data is so foundational to

operating success, how and when should enterprises make this move with zero interruption to the business?

With the most data center regions worldwide, consistent hybrid offerings, and broad AI functionality, Microsoft Azure is a leading platform for database migration. Azure has comprehensive services and administration tools to deploy and manage critical data stores. Furthermore, Azure's security, compliance, and big data solutions, such as cognitive APIs and machine learning, help companies drive strong business advantage. This Point of View paper presents a perspective on the benefits, considerations, and options for database migration to Azure, and how to integrate this move with broader cloud strategies and execution.

The Benefits of Database Migration to Azure

Big data analysis of unstructured information in the cloud is driving success for upstarts and industry leaders across the globe. The Harvard Public School of Health uses vast DNA sequencing data sets to measure specific genetic markers in a healthy population. And coffee maker Nespresso has gained increased profits and enhanced customer experience using big data to better understand consumer preference and tastes.



To remain competitive, firms absolutely must mine insights from vast and diverse data sets.

— Forrester Research, 2016.1



1 TechRadar™: Big Data, Q1 2016, 3/10/16, www.forrester.com/report/TechRadar+Big+Data+Q1+2016/-/E-RES121460

Highly guarded structured data, however, more often resides on premise, separate from the volumes of cloud-based satellite images, sports videos, and grocery shopping patterns. Yet, traditional relational databases (RDB) such as Microsoft SQL Server can benefit from a move to the cloud in the following ways.

Simplified Administration

Easier cloud RDB management can drive operational efficiencies as upgrades and 24x7 maintenance are handled by cloud providers. In cloud RDBs, leading-edge tools are more accessible, version control is minimized, and available add-on services (i.e. backup and disaster recovery) improve productivity. These benefits allow companies to refocus reduced database administration (DBA) hours on business applications and digital strategies.

Lower Cost

Public cloud-based RDBs, such as Azure SQL Database help shift expenses from upfront hardware and software costs to economical pay-per-use operating fees, often with no long-term commitments. Furthermore, reduced DBA expenses and free open source tools can offset cloud service fees.

Higher Scalability & Availability

Many cloud RDB services offer highly scalable compute and storage resources with minimal capacity constraints as well as quick and low cost DevTest replication. Additionally, industry-leading availability is made possible by automated backups, periodic snapshots, host replacements, and synchronous replication across availability zones (AZs).

Advanced Security

Astutely aware of clients' security concerns, cloud providers RDBs are built with strong threat prevention including robust access control, isolated VM instances, IPSec VPN connections,

and encryption at rest and in transit. Many cloud RDBs also offer industry compliance features, such as PCI governance, that evolve with changing business regulations.

Improved Business Agility

Cloud-based RDBs, like those in Azure, open doors to faster innovation, improved staff and partner access, and quicker time-to-market, often provisioned in minutes verses weeks for on premise solutions. Furthermore, reduced vendor lock-in increases access to advanced tools and best practices that speed development cycles.

Use Case Examples

The following are strong use cases for Azure-based RDBs.

- **Application testing**
needing highly scalable and fast access to DevTest environments, such as Azure DevTest Labs, for both new applications and feature adds to existing applications.
- **Web & mobile applications**
that need high throughput, massive storage, and on-demand scalability to accommodate unpredictable usage patterns.
- **E-commerce applications**
such as online shopping that require the flexibility to quickly add micro-services and PCI compliance updates, and maintain staff focus on the customer experience versus database administration. Legacy custom applications – that have outdated services and need updated integration, backup, and disaster recovery.
- **Data analysis**
that leverages cloud-based business intelligence that can run more effectively next to underlying data also in the cloud.
- **Azure Backup**
to reliably and securely protect and restore data.

Azure Migration Considerations and Options

The important first step of any RDB migration to Azure is a close look at the considerations and options for each on premise data store. This includes careful evaluation of the source database and the many target database options. Whether source and target are the same (homogeneous) or different (heterogeneous), project steps and costs of Azure migrations must be documented.

Database Migration Considerations

Source DB Architecture

Deployment age and supportability both impact a DB's capacity to handle future business requirements, as do end-of-life hardware and software solutions. For these DBs that are ready for retirement, a homogeneous or heterogeneous migration to Azure can quickly remove complexity and improve performance.

Scalability, Availability, & Performance

Azure scalability presents few constraints as the service can grow to meet large RDB needs. Cloud locations and WAN connectivity, however, can impact RDB performance depending on the type of data and user profiles. In all cases, source DB requirements must completely match with

target cloud DB SLAs including metrics for planned maintenance, backups, and recovery RTOs and RPOs.

Security & Governance

Some data governance models can mandate rigid storage locations. Others specify exact security requirements. Business strategy and risk factors will also guide the feasibility of a source DB's migration to Azure. To meet these requirements, it's critical to scope the target cloud DB's security features such as multi-AZs, database snapshots, role base access, and automated backup and host replacements.

Real-time or Near Real-time

In some cases, it may be more prudent to replicate source data on the highly scalable Azure SQL Data Warehouse in near real-time versus conducting a full DB migration. This service can handle large-scale business intelligence and data analysis needs.

Business Goals & Migration Cost

Moving data to Azure can achieve greater accessibility to staff, partners, and customers, and enable big data analysis to meet specific business goals. However, benefits must exceed costs. Before any DB cloud migration, a comprehensive 'rent vs. buy' model, including source, target and migration costs, is the best way to understand the migration TCO and ROI.



Azure Migration Options

Homo- or Heterogeneous Migration

The first task is to assess the feasibility and benefits of a homogeneous migration versus all possible heterogeneous alternatives, for which you should create a list. Then use the above considerations to rank the options.

Depending on the source database, target options may include the following Microsoft cloud services:

- **Azure SQL Server**

fully-managed relational database to accelerate app development with existing SQL tools, simplify maintenance, and maximize performance, reliability, and data protection.

- **Azure SQL Data Warehouse**

highly elastic and fully managed petabyte-scale cloud warehouse with fast set up and independent compute and storage scalability.

- **Azure Cosmos DB**

turnkey global data replication distribution across any number of Azure regions with SLAs that guarantee single-digit -millisecond latencies at 99th percentile anywhere in the world.

- **Azure Database for MySQL and PostgreSQL**

managed app development and deployment service with fast setup, dynamic scaling, and high availability, security, and recovery.

Sizing and Migration Tools

To supplement Azure sizing and migration instruments, Trianz' DataVision+ tool can enable consistent migration and post migration testing. And thoroughly cleaning the source data before migration will reduce the transition time and cost, and subsequent service fees. Migration Services – Trianz Database Migration Services offers an alternative to internally staffed projects. Selecting a third-party provider to assist with database migration can significantly minimize application downtime.

The Microsoft Azure Advantage

Azure offers more than 100 cloud services to build, deploy, and manage a breath of workloads; from simple micro-services to internet-scale applications. Adding 120,000 subscriptions per month, Azure now spans 42 global datacenter regions, more than any other cloud provider.

Azure drives productivity and speeds time-to-market. Integrated tools provide developer flexibility from .NET to open source. Its services support a variety of operating systems, languages, and databases, and its DevTest Labs offer rapid provisioning of development and QA environments.

Common Azure workloads include .Net applications, SQL Server databases, DevOps and DevTest environments, SharePoint collaboration, Office and Exchange productivity, and big data analytics.



Azure uniquely enables data-driven, intelligent applications. Azure's artificial intelligence services support deep learning and real-time analytics. And its market leading security includes 50 compliance offerings, exceeding all other providers.

For these reasons, Azure is recognized as a trusted cloud for U.S. government institutions. And 90 percent of the Fortune 500 companies run their business on the Microsoft cloud.

How Trianz Can Help

Trianz is a Microsoft Gold Partner and Managed Services Provider for Azure. Our experienced professionals maintain numerous Azure Certifications across all critical aspects of Microsoft cloud services.

As a strategic managed services partner, Trianz offers a customized Azure migration roadmap to achieve service-oriented infrastructure and service catalogs.

Our Certified consultants use proprietary tools and templates to discover, assess, analyze, and recommend execution plans for the cloud journey. Our experts enable reference architectures for Azure IaaS, PaaS, and SaaS platforms with a focus on execution success.

We deploy Azure-based hybrid environments by incorporating automation at every possible opportunity and seamless orchestration of workloads across on premise and cloud platforms. Trianz collaborates with clients to monitor Azure performance and align infrastructure to meet ongoing business needs.

A key Azure advantage is agility and innovation. Trianz helps open the possibility for business leaders to test new ideas on Azure, accessing the secure infrastructure without the need for large upfront capital investment.

Based on Trianz' research and experience with Azure, the following expert guidance helps clients better manage their migration to Azure.

Define governance framework - enables oversight of adopted cloud systems and ensures highest postmigration value.

Migrate well-suited workloads - avoids unnecessary complexity of apps with poor Azure compatibility. Automate testing and bug fix - Saves cost and time to complete integration evaluation.

IP and solution driven approach - Adopt Trianz' proven domain templates, tools, and capabilities that help clients smoothly migrate to Azure services.

ABOUT TRIANZ

Trianz simplifies digital evolutions through effective strategies and excellence in execution. Collaborating with business and technology leaders, we help formulate and execute operational strategies to achieve intended outcomes by bringing the best of consulting, technology experiences, and execution models. Powered by knowledge, research and perspectives, we serve Fortune 1000 and emerging organizations across industries and geographies to transform their business ecosystems and achieve superior performance by leveraging Cloud, Analytics, Digital, Infrastructure and Security paradigms.