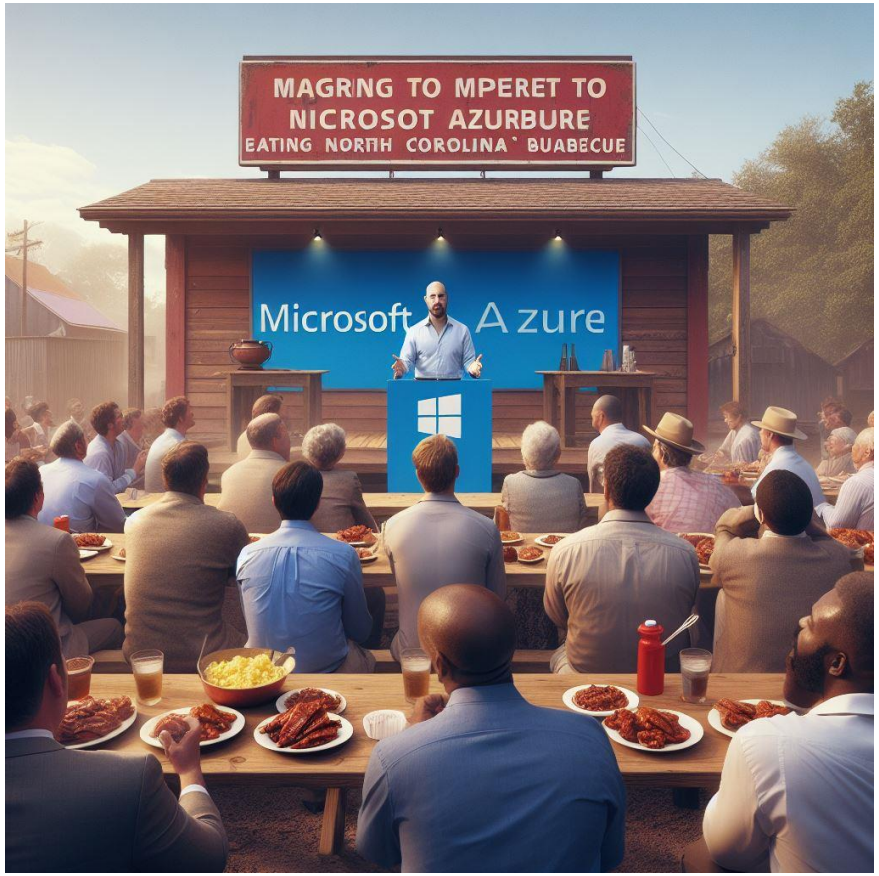
Crushing a Cloud Migration

Moving Mountains While Migrating Data

Matt Gordon

Senior Architect

Centric Consulting



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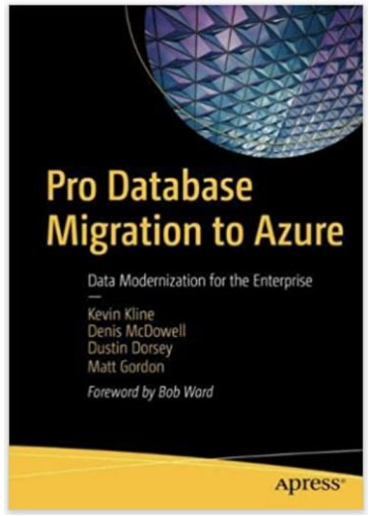
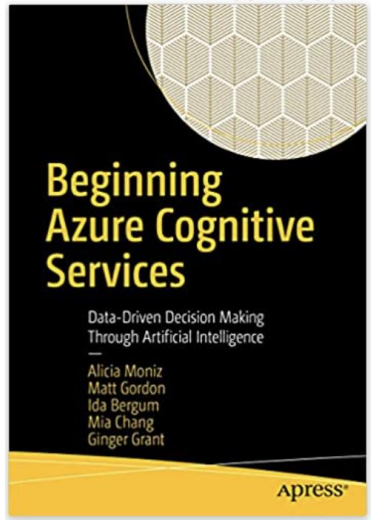




About Me

- 20+ years of SQL Server experience
- Microsoft Data Platform MVP
- Redgate Ambassador
- Managed 24x7 datacenters
- Led cloud migration projects of all sizes
- Leader of Lexington, KY (USA) Data Technology Group

WHY ARE WE MIGRATING DATABASES?

Migration Motivation(s)

- Saving Money
  - IaaS vs. PaaS
- Datacenter Consolidation and/or Decommissioning
- My Boss Told Me I Had To Do It
- My CTO Doesn’t Want The Other CTOs to Make Fun of Them

Migration Motivation(s)

- Extending SQL Server 2008 Support
  - Now also true for SQL Server 2012
- Lifting and Shifting
  - Not always the right choice technology-wise

WHO IS BLOCKING OUR MIGRATION?

Moving Mountains

- What Is Standing In Our Way?
  - Management support
  - Operations team reluctance
  - Development team resistant to change

Moving Mountains

- Who Is Standing In Our Way?
  - Security group
  - Networking team
  - DBA stalling on changes

Moving Mountains

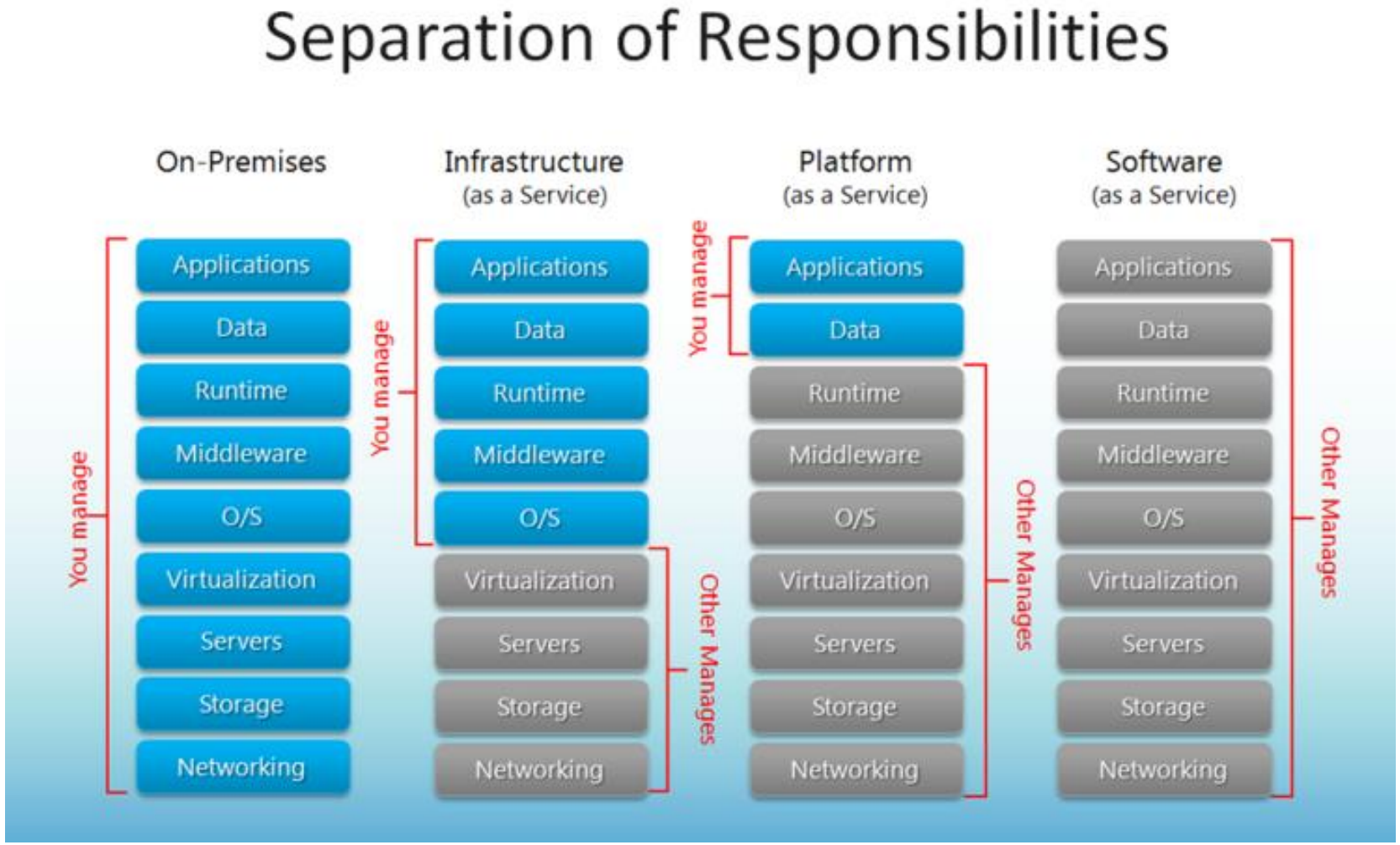
- Executing as an outside consultant
  - Keen sense of organizational politics essential
  - Understand the competing interests at play
  - Learn where the centers of power are in the organization

Moving Mountains

- Executing as a full-time employee
  - Politics potentially less of a concern
  - Likely can work up the org chart for support to move obstacles
  - Great way to expand your knowledge outside the realm of data

WHERE ARE WE MIGRATING DATABASES?

Define Your Terms



SQL Server on IaaS VM

- Easy to lift and shift using Azure Migrate
- Think about whether lift and shift is the right strategy
- Did we choose this for comfort or for technical reasons?

Azure SQL Database - Deployment Models

- "Single"
  - Fully-managed
  - Isolated (by logical server)
- Elastic Pool
  - Collection of single databases
  - Shared set of resources (CPU, memory, etc.)
- *Managed Instance*

Azure SQL Database - Details

- T-SQL support nearly equivalent to on-premises SQL Server
  - Does not support cross-database queries
  - No SQL Server Agent
- Basic/Standard/General Purpose service tiers separate compute and storage (99.99% SLA)
- Premium/Business Critical service tier co-locates compute and storage

Azure SQL Database – Cost Information

- DTU-based purchasing model (not valid for MI)
  - https://docs.microsoft.com/en-us/azure/sql-database/sql-database-service-tiers-dtu
  - What is a DTU?

- vCore-based purchasing model
  - https://docs.microsoft.com/en-us/azure/sql-database/sql-database-service-tiers-vcore

Azure SQL Database Hyperscale – Basic Info

- Different service tier of Azure SQL Database
- Looks and acts just like Azure SQL Database
- Backed by Hyperscale scale-out storage technology
  - Targeted to and optimized for very large workloads
  - Max capacity of 100 TB
- Resiliency provided at the storage level
  - For true HA, you should provision at least 2 compute nodes

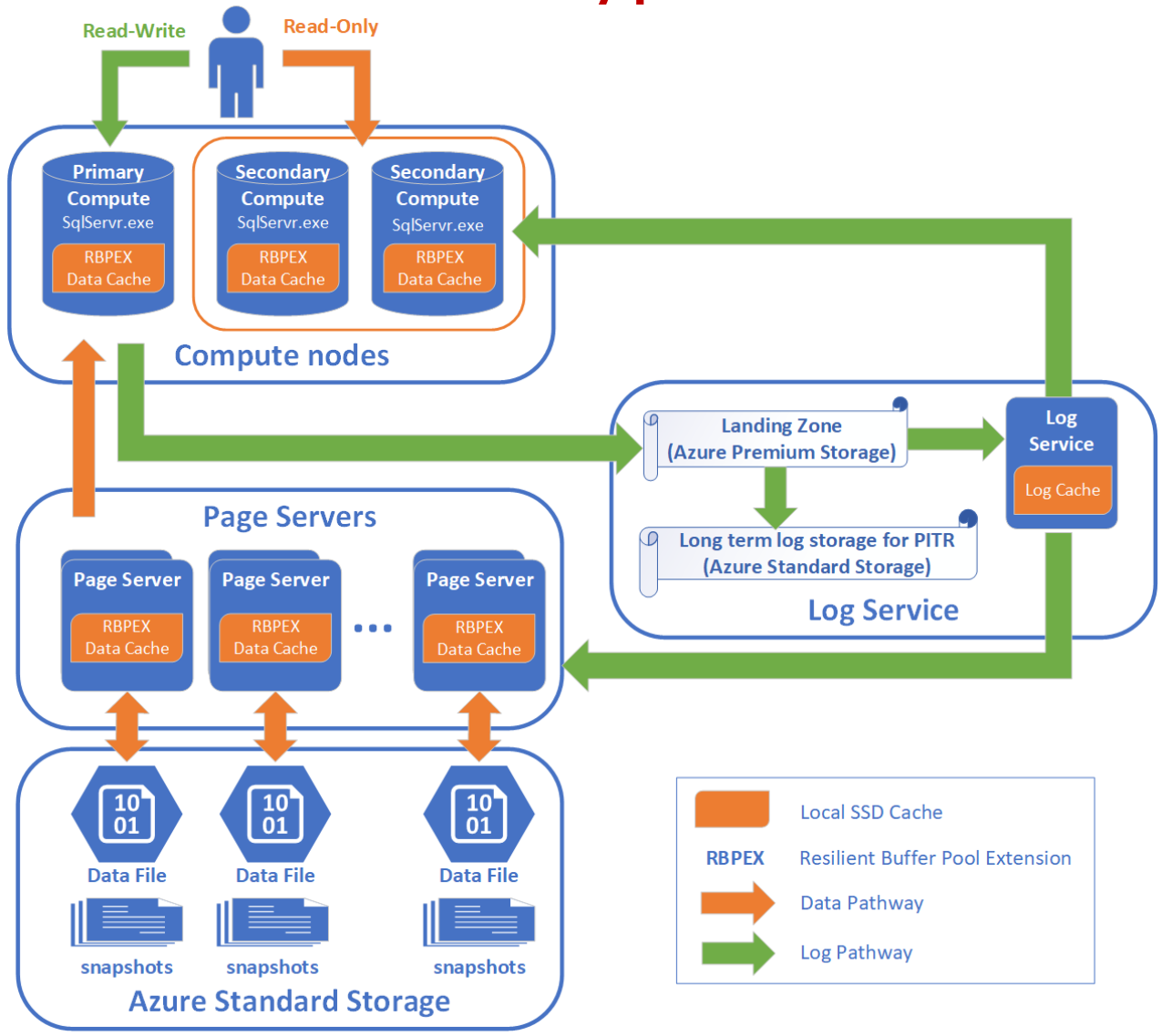
Azure SQL Database Hyperscale – More Details

- Support for up to 100 TB of database size
- Nearly instantaneous database backups (based on file snapshots stored in Azure Blob storage)
  - no IO impact on compute resources
- Fast database restores (based on file snapshots)
- Higher overall performance due to higher log throughput and faster transaction commit times regardless of data volumes
- Rapid scale out
  - provision one or more read-only nodes for offloading your read workload and for use as hot-standbys
- Rapid scale up

Azure SQL Database – Hyperscale Limits

- Elastic pools not supported
- Compute and storage billed separately
- What does it look like?

Azure SQL Database – Hyperscale Architecture



Azure SQL Database - Serverless

- It’s not actually serverless!
- Configuration settings:
  - Min vCores
  - Max vCores
  - Autopause delay

- Intermittent, unpredictable usage patterns are best suited
- Billed per second
- Not the most responsive on scaling

Azure SQL Database - Managed Instance

- Provides near 100% compatibility with on-premises Enterprise Edition
- Preserves PaaS capabilities
  - Automatic patching & version updates
  - Automated backups
  - High availability
- Managed Instance Link or LRS could be good migration paths to MI

Azure SQL Database MI – How to Connect

- Secure public endpoint
  - Best for app access
- ExpressRoute/VPN
  - Cross-region or access from different Vnet
- Jumpbox
  - Need to be on same Vnet as managed instance

HOW ARE WE MIGRATING DATABASES?

Migration Methods

- Replication to Azure SQL
- Replication to SQL Server on Azure VM
- Log shipping to SQL Server on Azure VM
- Export data-tier application in SSMS and save to Azure
- MI Link to Managed Instance (2016+)

More Migration Methods

- Scale Availability Group to Azure for Failover-based Migration
- Azure Migrate
- Log Replay Service (LRS)
- Smart Bulk Copy tool
- Azure Data Studio migration extension

Azure Migrate

- Best suited to enterprise-wide moves
- A “unified approach” of individual tools
- Experience is tailored to individual server roles

LRS - (kinda) Log Shipping to Managed Instance

- SQL Server 2008+
- Full/diff/log backups w/ CHECKSUM enabled
- Azure Blob Storage container
- Autocomplete or continuous mode

WHAT DID WE LEARN?

Takeaways

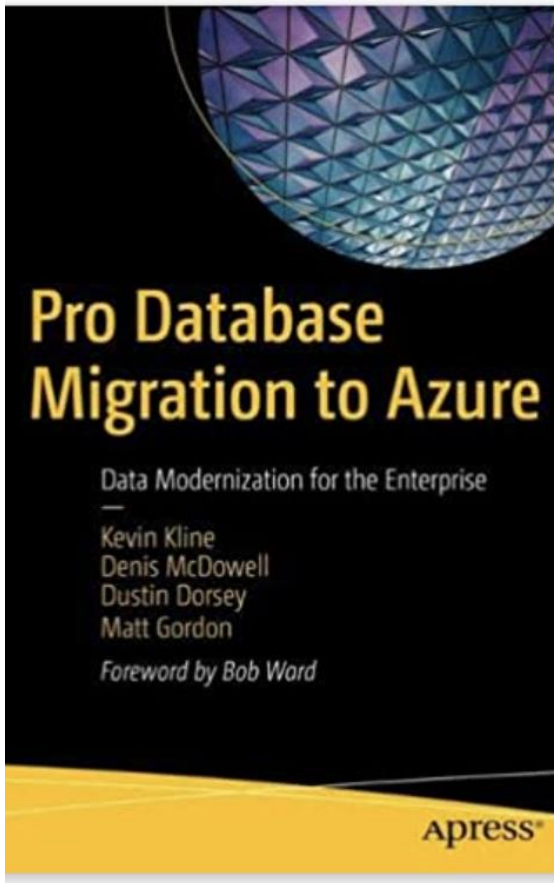
- Understand how licensing is handled in your organization
  - Azure Hybrid Benefit real financial incentive to choose Azure
- Ensure DBAs and devs understand proper connection methods for migrated databases
- Modify your maintenance procedures depending on chosen migration target

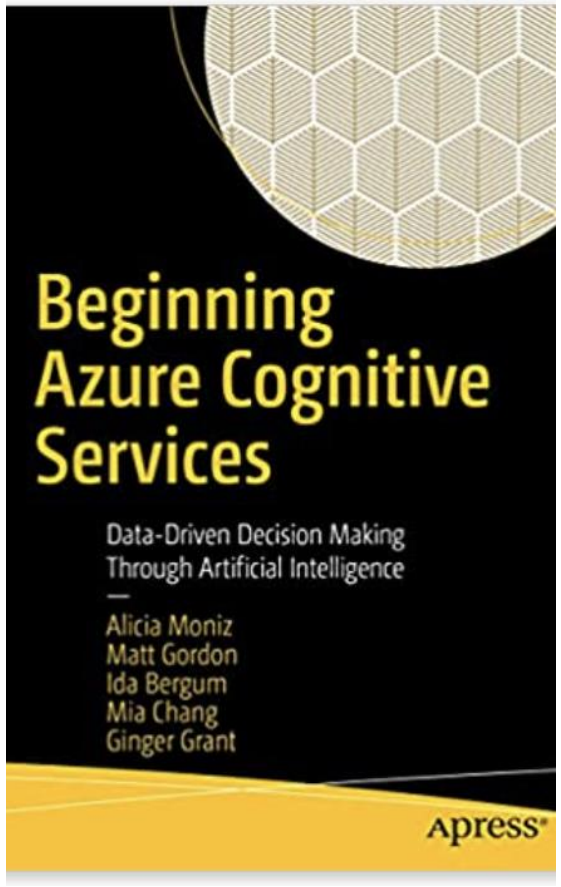
Takeaways

- Lift and shift isn’t always the right choice
- Knowing the motivation for migration is critical to making the correct technical target decision
- Knowledge of organizational politics may be important to moving those mountains
- Don’t forget to test (WorkloadTools is free and straightforward)!

How To Buy My Books

- Cognitive Services book
- Database Migration book





Resources

- Azure Security and Compliance
- Microsoft Ground to Cloud Workshop
- Creating Your First Azure SQL Database
- Leveling Up Your Azure SQL Database Deployments
- SQL Server 2008 Extended Support
- Running Data Migration Assistant Enterprise-Wide
- Smart Bulk Copy
- Azure Data Studio Migration Extension

Thanks For Attending!

((CENTRIC))

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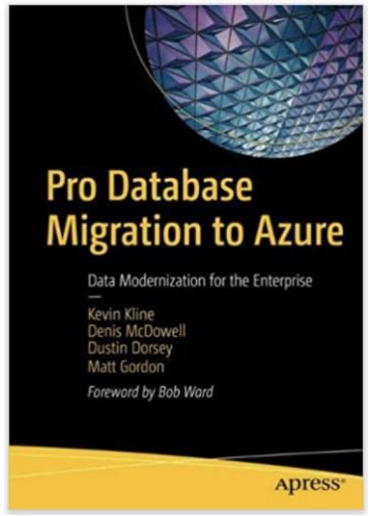

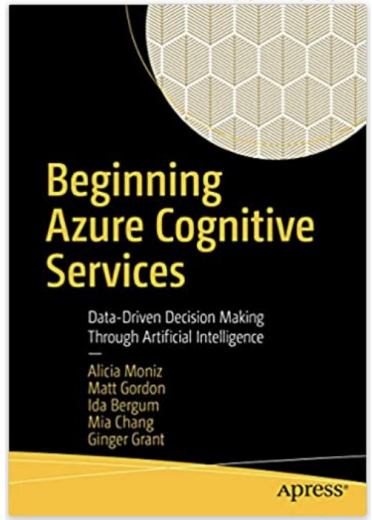

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https://github.com/sqlatspeed/2024_presentations

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