

Migrating data solutions to the cloud: a checklist



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DATA WORK MOM



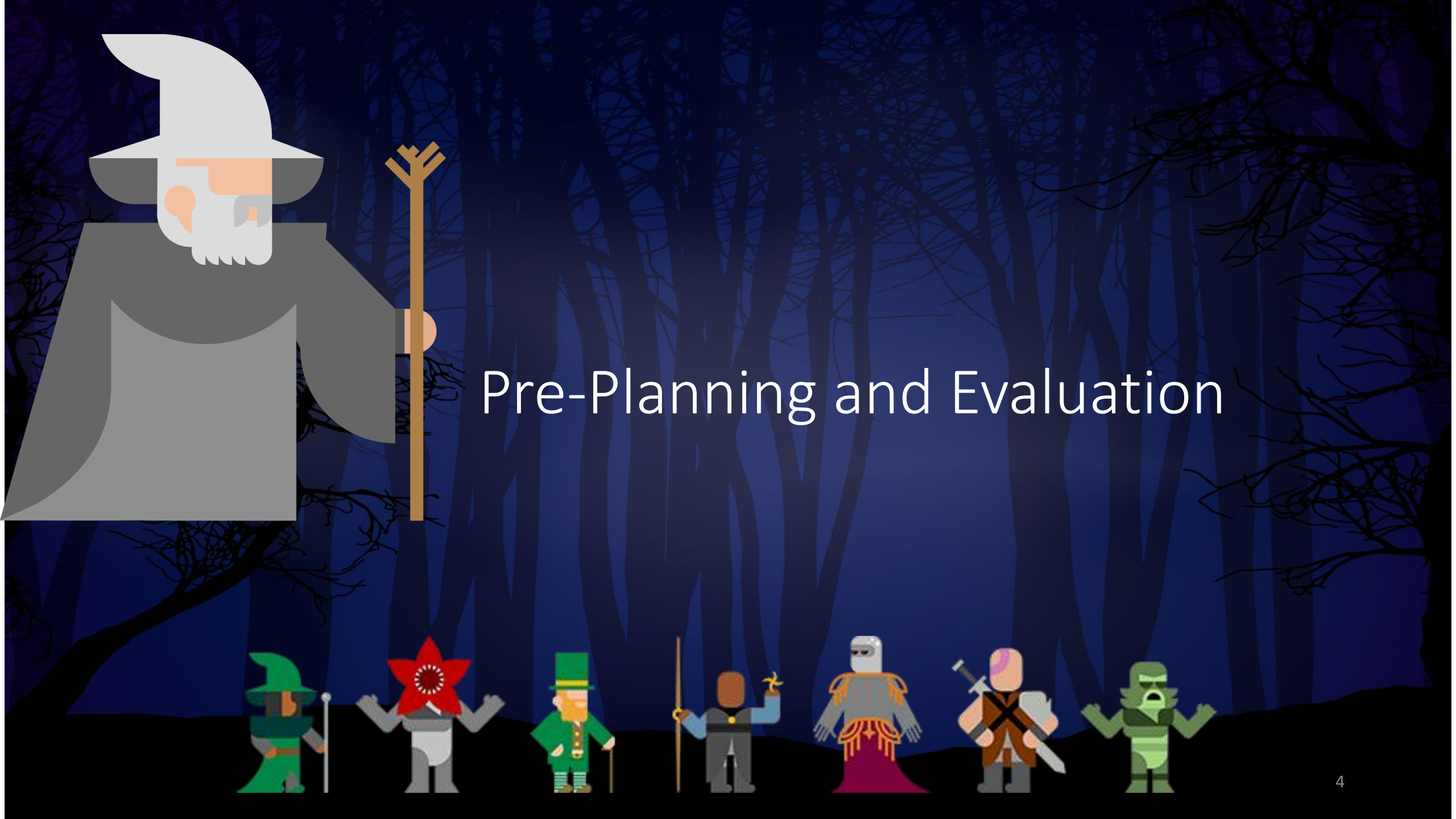
kdmishraSU





Agenda

- Pre-planning and Evaluation
- Discovery
- Assess
- Architecture
- Costs
- Migrate
- Testing
- Post - Migration
- Resources and Closing



Pre-Planning and Evaluation



Pre-Planning and Evaluation : Goal

GOOOOAAAALLLLL:

- Reduction in CapEx
- Decrease reliance on end-of-support technologies
- Optimize internal operations
- Reduction in vendor/technical complexity
- Prep for new capabilities

Problem trying to solve:

- Need to upgrade servers in next year
- End of life on technologies that have dependencies
- Utilizing Resources better
- Reduce costs associated with overly complex infrastructure
- Want to add AI, but need to modernize first.



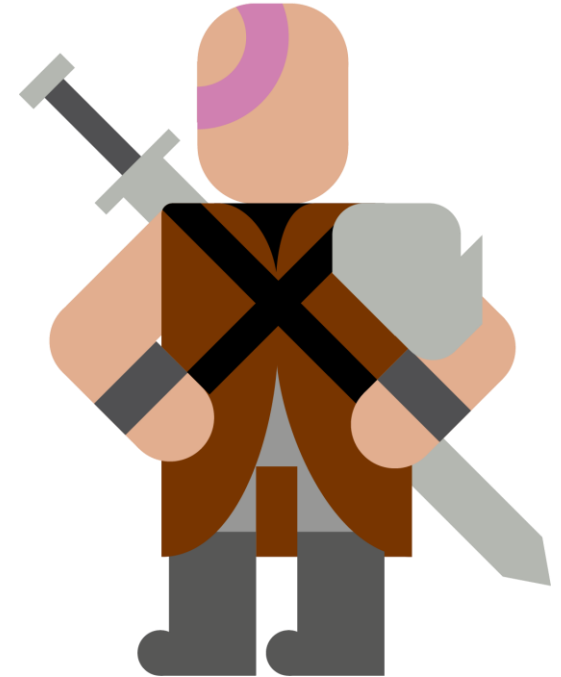


Pre-Planning and Evaluation: Support



Executive
Support

Stakeholder
buy-in





Pre-Planning and Evaluation: Team

Internal Team

- Determine SME Requirements
- Identify key members
- Assign roles
- Assess skills
- Train

Partner

- Strategy
- Plan
- Ready (support target tasks)
- Migrate
- Innovate
- Govern
- Manage



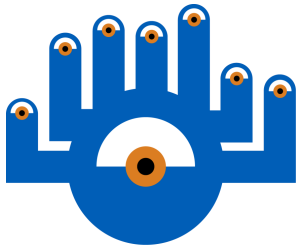
Pre-Planning and Evaluation: Documentation

- Current on-prem data estate and infrastructure
- Business Requirements documentation
- Previous migration planning



Discovery



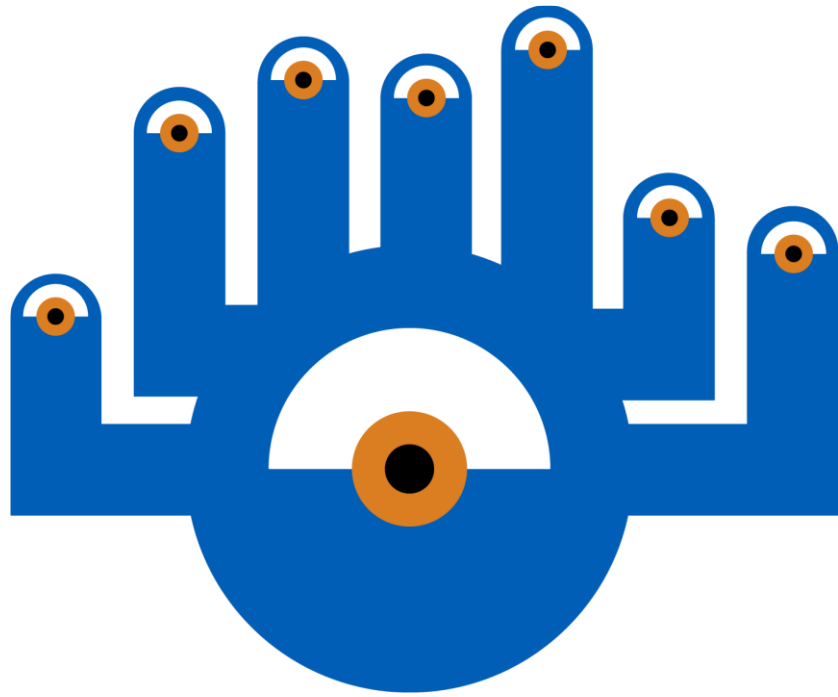


Discovery: Digital Estate

Identify
infrastructure

Identify
applications

Identify
dependencies



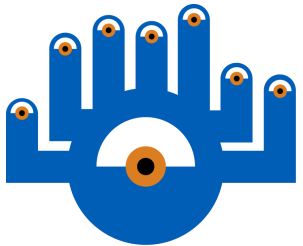
Discovery: Data Management

Data dictionary

Business Glossary

Data Catalog

Data Classification



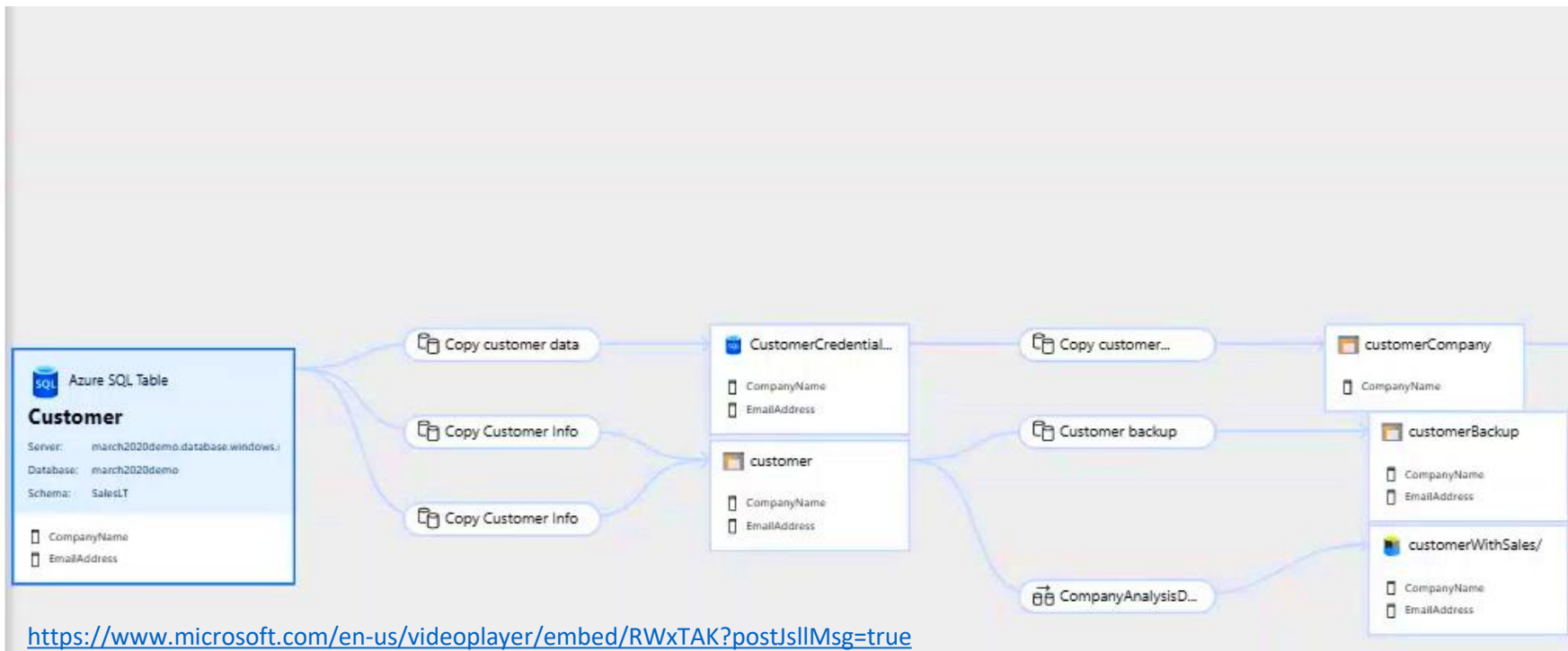
Discovery: Data Lineage

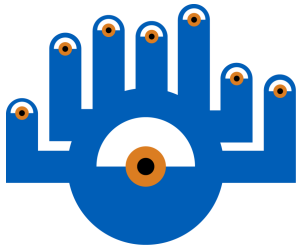
Where it comes from

How it travels

Where it lands

- ☐ Column name
- ☒ CompanyName
- ☐ CustomerID
- ☒ EmailAddress
- ☐ FirstName
- ☐ LastName
- ☐ MiddleName
- ☐ ModifiedDate
- ☐ NameStyle
- ☐ PasswordHash
- ☐ PasswordSalt
- ☐ Phone
- ☐ rowguid





Discovery: Pilot Project

Low risk

Criticality

Small

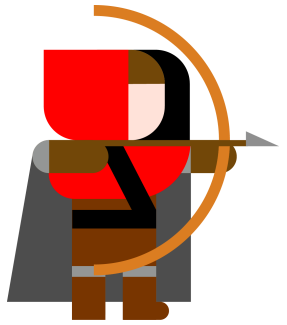
Duration

Previous
Attempts



Assess

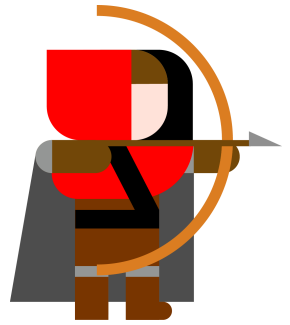




Assess: Scope

Identify what needs to move

- What can be moved in parts and what has to move together?
- What type of data sources do I have?
- Assessment of criticality for what should be migrated first



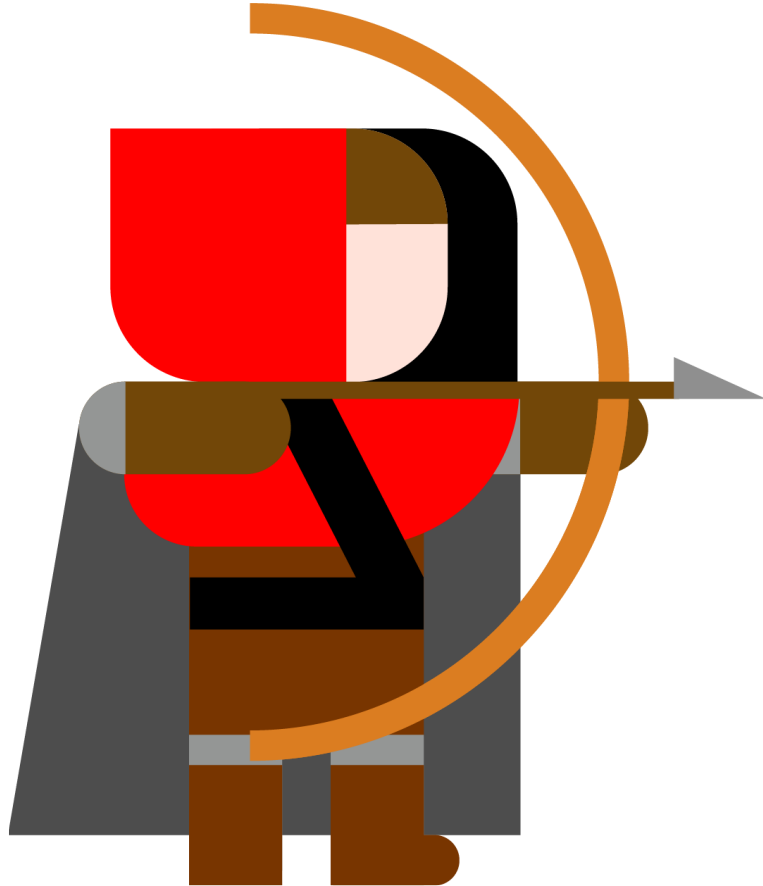
Assess: Readiness

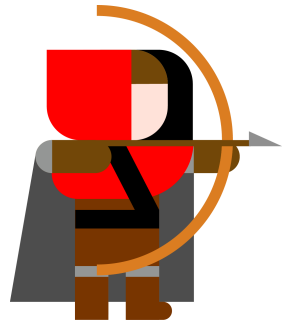


Azure SQL	Rule Title	Level	Category	Details
MI	AnalysisCommandJob	Instance	Warning	SQL Agent Job Step that runs an AS command
MI\SQL DB	BulkInsert	Database	Issue	BULK INSERT statements have to use files from Azure Blob Storage
MI\SQL DB	ComputeClause	Database	Warning	T-SQL using COMPUTE clause need to be rewritten
SQL DB	DatabaseMail		Warning	Database Mail is not supported
SQL DB	LinkedServer		Issue	Not supported
MI	PowerShellJob	Instance	Warning	SQL Agent Job Step that runs a PowerShell script.

Assess: Business Requirements

- HA/DR
- Uptime
- Security
- Compliance
- Backups
- Storage





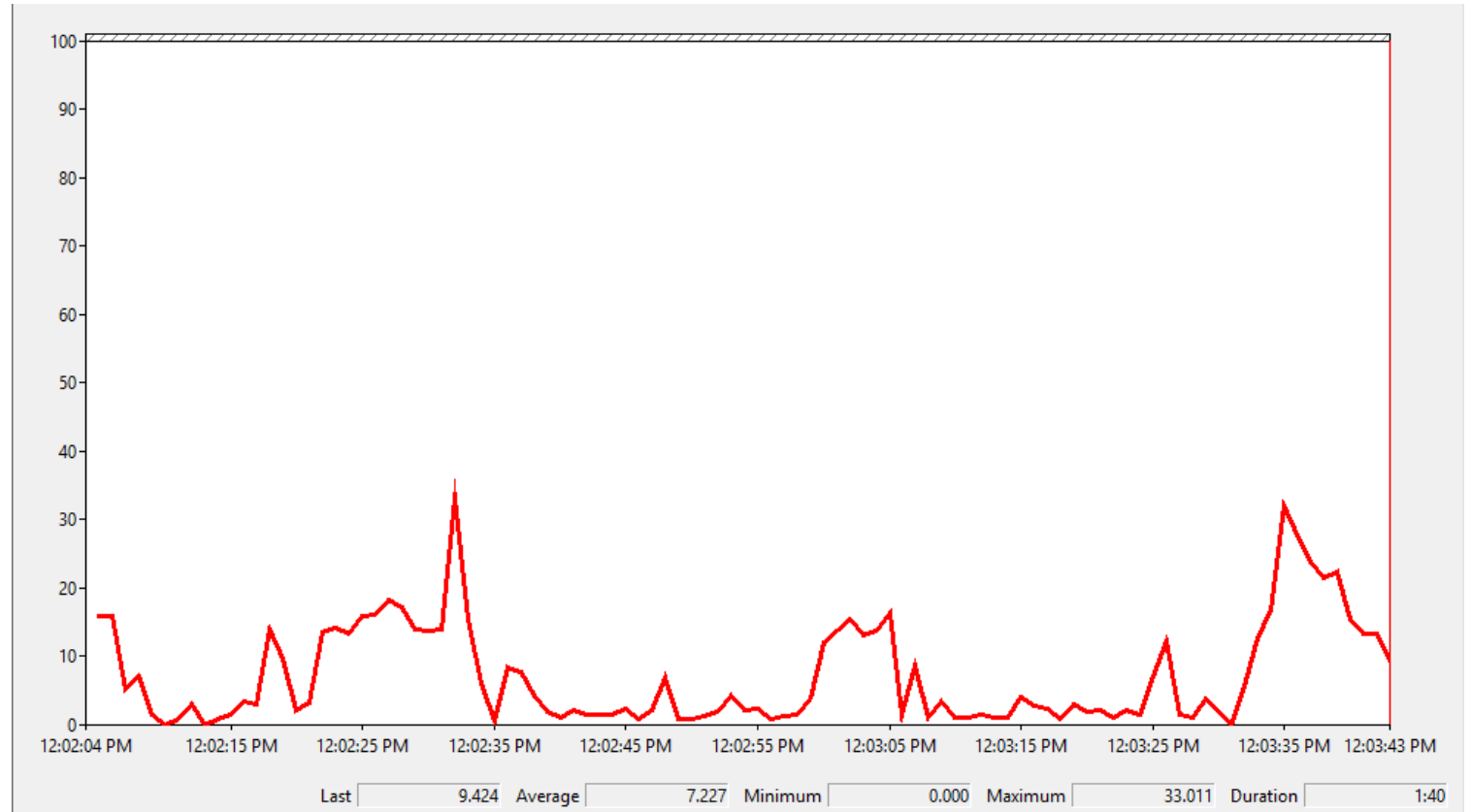
Assess: Workloads – The When

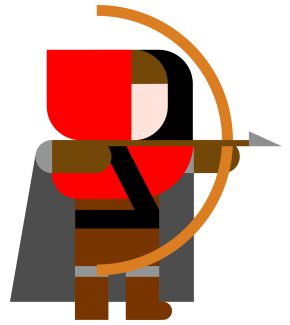
Trends:

Identify Peak and Non-peak Periods

Seasonal:

Bursts that happen at certain periods during a year





Assess: Capture and Review Baselines

Avg/Max CPU

Avg/Max
Memory

Avg/Max I/O
Latency

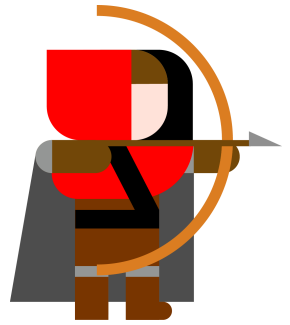
Throughput

Latency

Avg/Max Life
Page
Expectancy

Avg/Max size
of tempdb

Min/Max/Avg
duration



Assess: Risks

Overall Project Risks

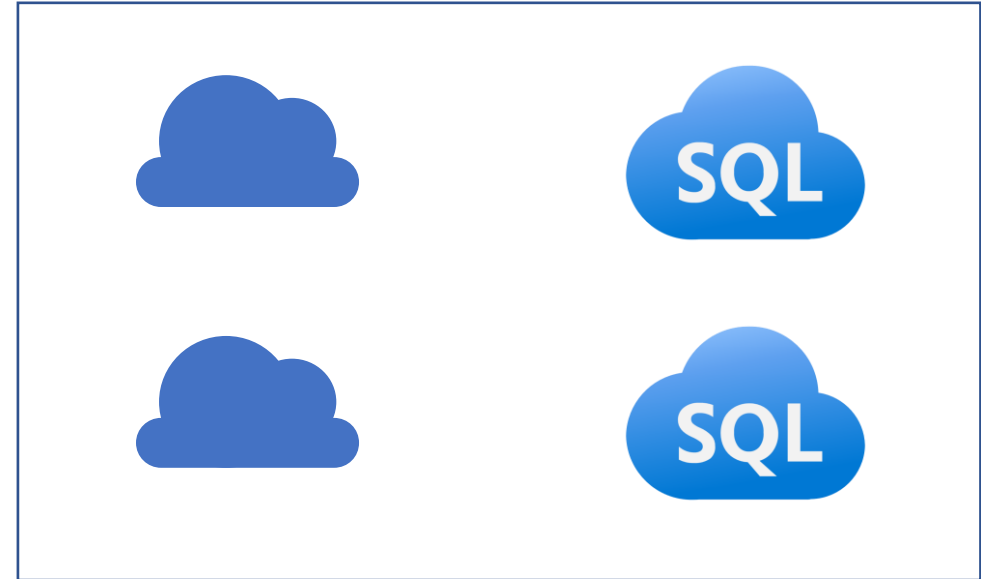
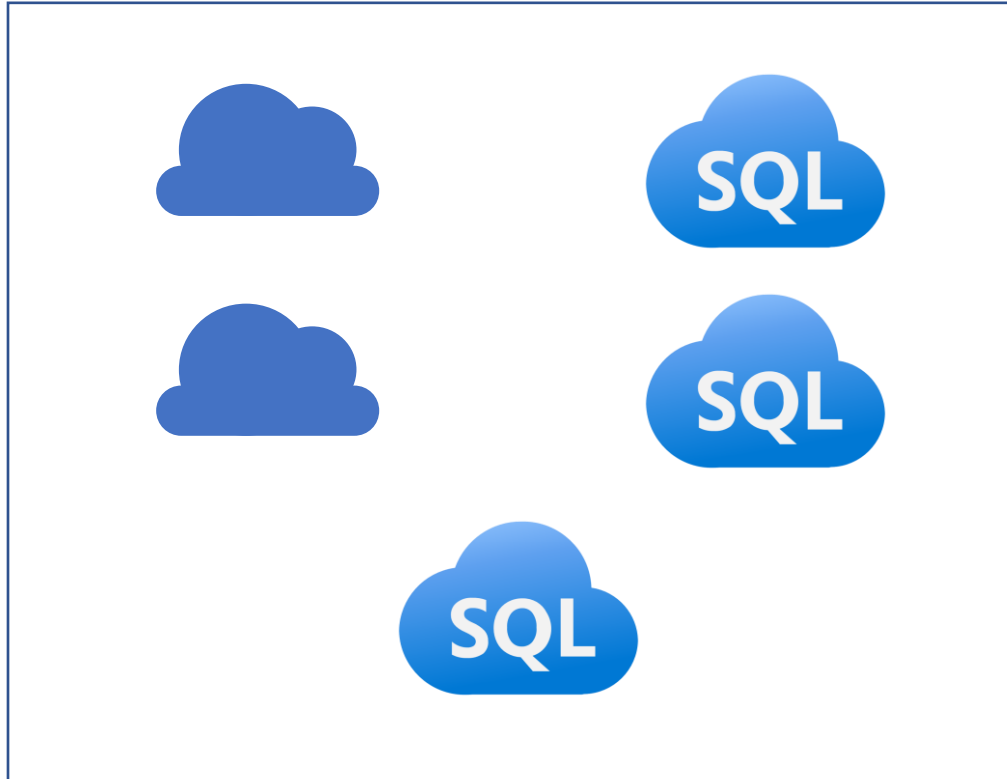
- Disruptive downtime
- Loss of productivity
- Compromised data
- Loss of history
- Inability to use systems
- Infrastructure compatibility

Architecture





Architecture: Cloud or Hybrid?



SQL Server



Architecture: Azure SQL



Azure SQL DB

Best for building new
apps in the cloud



Azure SQL MI

Best for modernizing
existing apps



Azure SQL VM

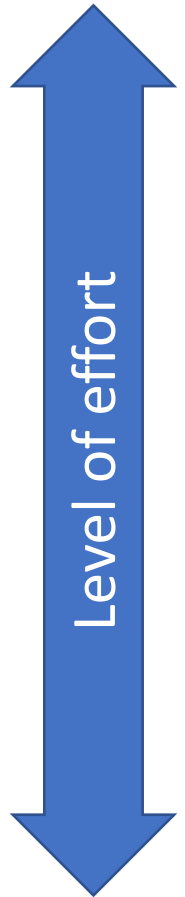
Best for lift-and-shift
scenarios and/or
workloads requiring OS-
level access and control

Platform-as-a-Service

Infrastructure-as-a-Service



Architecture: Changes



Replace

Dump the current app and replace it with a SaaS solution.

Rebuild

Rebuild apps from scratch to support Azure SQL PaaS offerings.

Rearchitect

Modernizing infrastructure to reap benefits of PaaS offerings such as Azure SQL Database.

Refactor

Take current solution and rewrite to take advantage of PaaS offerings such as Azure SQL MI.

Rehost

Standard Lift-And-Shift. Take Current Solution and Move to Azure SQL VM.



Architecture: Additional Considerations



Storage:

Backup files

Log Files from services

Files used in ELT\ETL processes



Security:

Domain Server

Company security policies

Do my 3rd party apps support
AAD?



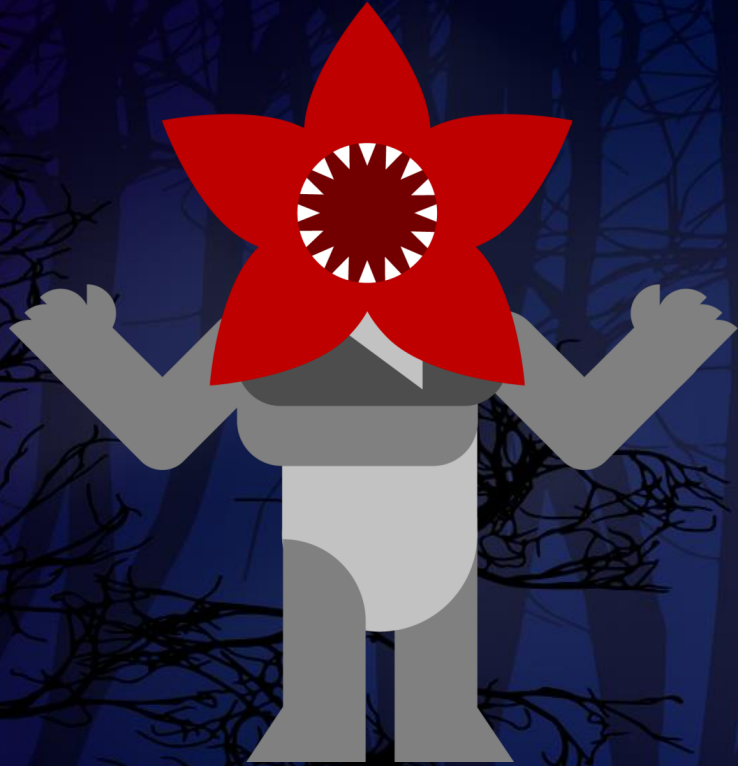
Network:

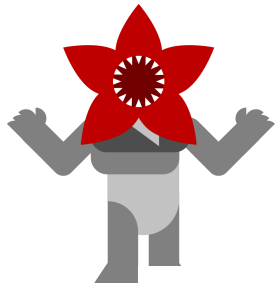
Private endpoint vs public

IP Firewall Rules

Different methods of connecting

Costs





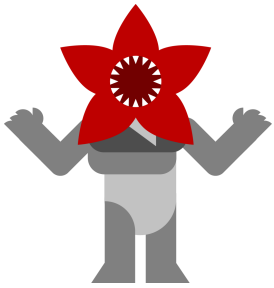
Your Estimate

Costs: Creating Estimates

Azure Pricing Calculator



✓ Azure SQL Database	ⓘ	Single Database, vCore, General Purpose, Provision...	🔍 🗑️	Upfront: \$0.00	Monthly: \$372.97
✓ Azure SQL Managed Instance	ⓘ	Managed Instance, LRS, General Purpose, Single Ins...	🔍 🗑️	Upfront: \$0.00	Monthly: \$1,472.85
✓ Azure Database Migration Service	ⓘ	Premium pricing tier, 4 vCore, 1 Instances X 1 Hours	🔍 🗑️	Upfront: \$0.00	Monthly: \$0.31
✓ Storage Accounts	ⓘ	Block Blob Storage, General Purpose V2, Flat Name...	🔍 🗑️	Upfront: \$0.00	Monthly: \$21.84
✓ Azure Active Directory (Azure AD)	ⓘ	Premium P1 - 1 users, Premium P2 - 1 users, Enterp...	🔍 🗑️	Upfront: \$0.00	Monthly: \$599.00
✓ Azure Migrate	ⓘ	There is no charge to use Azure Migrate.	🔍 🗑️	Upfront: \$0.00	Monthly: \$0.00
✓ Azure Monitor	ⓘ	Log analytics: Log Data Ingestion: 0 GB Daily Analyti...	🔍 🗑️	Upfront: \$0.00	Monthly: \$47.53
✓ Key Vault	ⓘ	Vault: 0 operations, 0 advanced operations, 0 renew...	🔍 🗑️	Upfront: \$0.00	Monthly: \$0.00
✓ Azure Synapse Analytics	ⓘ	Tier: Compute Optimized Gen2, Dedicated SQL Pool...	🔍 🗑️	Upfront: \$0.00	Monthly: \$6,418.94
✓ Microsoft Purview	ⓘ	Elastic Data Map: 1 Capacity Unit hour, 730 hours, A...	🔍 🗑️	Upfront: \$0.00	Monthly: \$453.67
✓ Power BI Embedded	ⓘ	1 node(s) x 730 Hours, Node type: A1, 1 Virtual Cor...	🔍 🗑️	Upfront: \$0.00	Monthly: \$735.91
✓ Azure Analysis Services	ⓘ	Standard S1 (Hours), 1 Instance(s), 730 Hours	🔍 🗑️	Upfront: \$0.00	Monthly: \$1,481.90



Costs: Tools

Azure Pricing Calculator

- builds estimates for your migration

Total Cost of Ownership (TCO) Calculator

- tool to estimate cost savings

Azure Pricing guide

- view detailed information for the pricing around any Azure service

Retail Rates Prices API

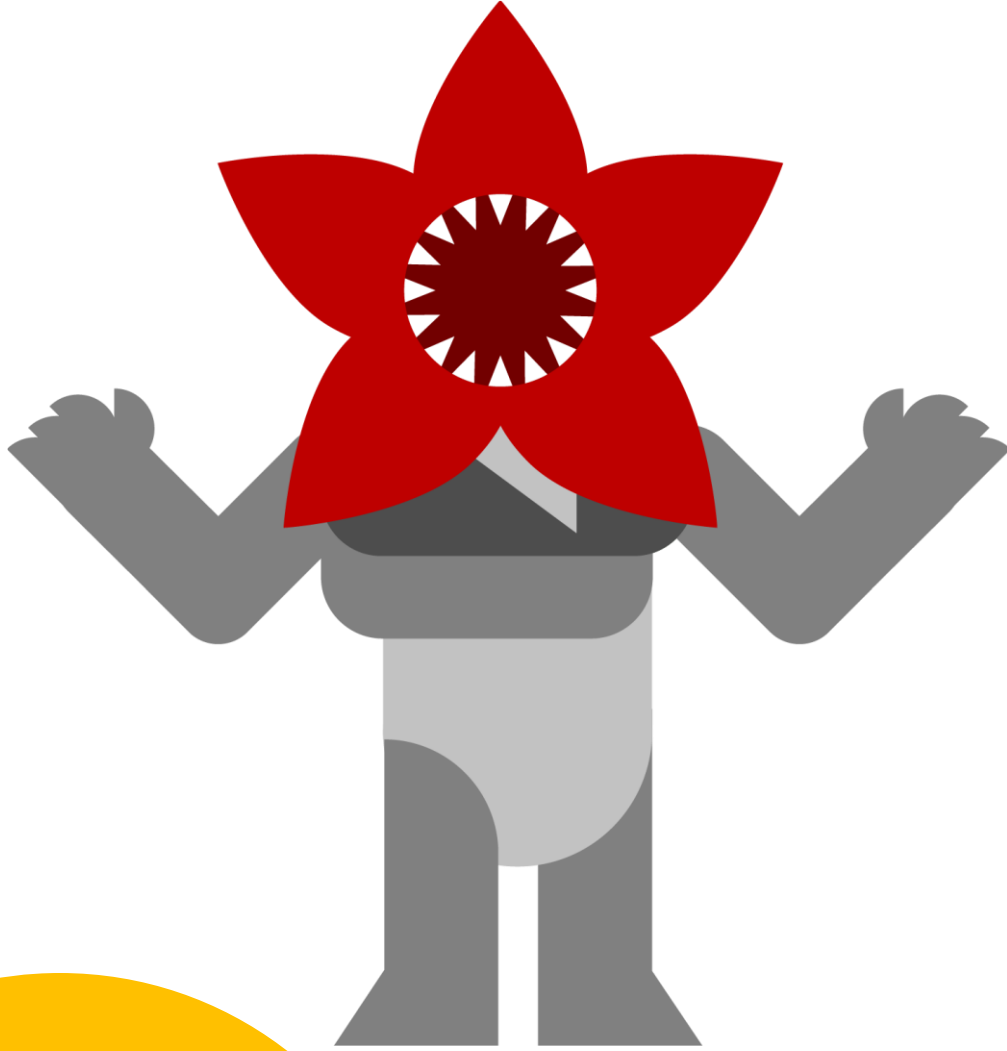
- programmatic way to get Azure retail prices for Azure Services

Partner toolsets

- various tool from Azure marketplace

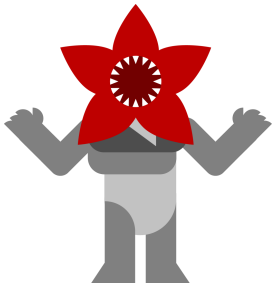
Solution Assessments

- from a MS solutions assessment expert or qualified partner



Costs: Things That Can Cost You Money

- Determine region
- Correct database and correct size
- Thresholds and scaling
- Egress
- Network Costs



Costs: Ways to Save

Programs:

- Visual Studio discounts
- Azure Hybrid Benefit
- Azure Reservations
- Azure Migration and Modernization Program

Infrastructure:

- Target Regions
- HA/DR free secondaries
- Burstable Azure Machines
- VM uptime

Resource Tasks:

- Create a Baseline
- Cloud governance
- Training Staff
- Reevaluate Architecture

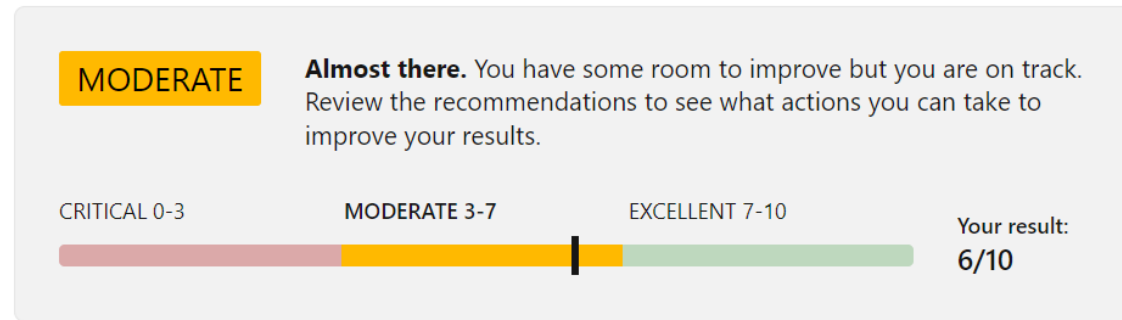
Migrate





Migrate: Planning

Your overall results



Categories that influenced your results



You can find out how to improve on individual categories by reviewing the [recommendations](#) below in the report.

[Export to CSV](#)

Migrate: Tools



Azure Migrate

MAP - Microsoft Assessment and Planning Tool

DMS - Database Migration Service

DMA - Data Migration Assistant

DME – Database Experimentation Assistant

SSMA - SQL Server Migration Assistant



Migrate: Deployment Methods

Azure Portal

Command-line

Replication

Log Shipping

Bulk load

Azure Data
Factory

SQL Data Sync

Native backup
and restore

Log Replay
Service

Managed
Instance Link

Export from
SSMS

Offline



Testing



Testing:

Does apples = apples

- Test your workload on source and target.
- Compare your baselines
- Check for Connection





Testing: Data validation

Row Counts

Calculatable
Columns

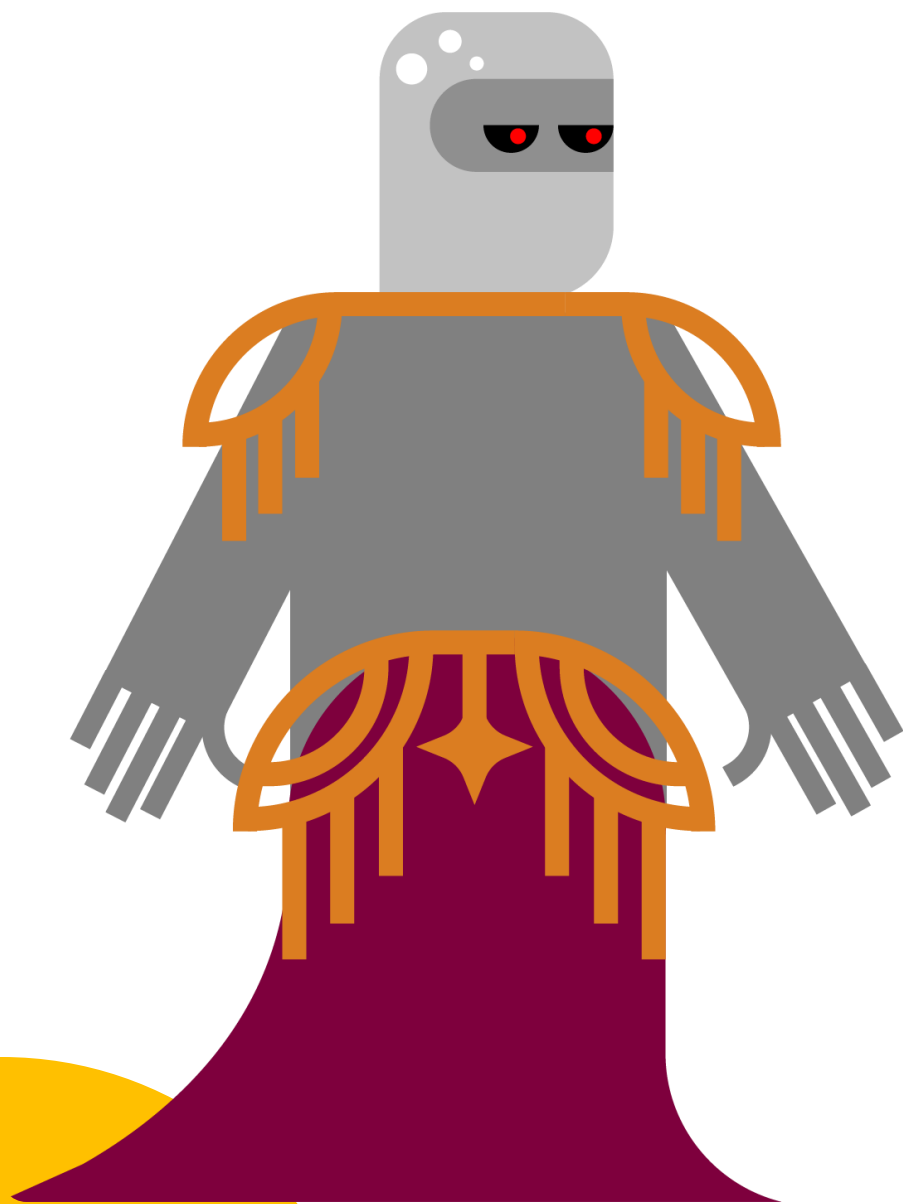
Data
Dictionary
Comparison

Sample
Reports

Stored Proc

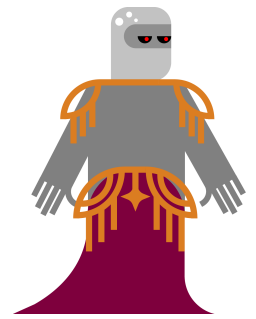
Post Migration





Post Migration: Tasks

- Check Status of the Database/Instance
- Review Logs for Failures or Issues
- Confirm Connection
- Decommission on-prem infrastructure
- Document all your work and findings



Post Migration: Measure, Plan, & Monitor

Monitor and cross-check with KPIs

Continuously check performance

Create an ongoing monitoring plan

Asses and Plan for MORE modernization



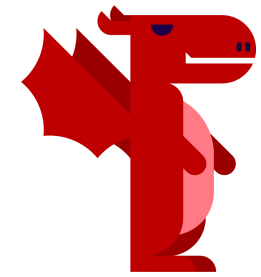
Resources



Resources:
WHERE'S MY CHECKLIST?

[https://github.com/kdmishraISU/
PublicPresentations/tree/main/
SQLBits](https://github.com/kdmishraISU/PublicPresentations/tree/main/SQLBits)





Resources: Training

Free:

Microsoft Learn For Azure: https://docs.microsoft.com/learn/azure/?ocid=CM_Discovery_Checklist_PDF

Microsoft Data Exposed

MS Virtual Training Days

Free Days at Conferences (like SQLBits!!!)

YouTube videos from known speakers / conferences / companies

Meetup – lots of SQL Community events all over the world. In-person and remote options.

Paid:

Pre-Cons and paid days at Conferences (like SQLBits!!!)

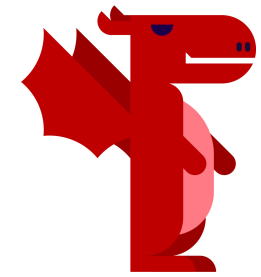
Subscriptions to videos from conferences

PluralSite – free trial options

Udemy – reasonable priced / specifically targeted

O'Reilly Website Subscription – videos and books

Books – Pro Database Migration to Azure by Kevin Kline, Denis McDowell, Dustin Dorsey, Matt Gordon



Resources: Migration Presentations

Microsoft Azure Virtual Training Day: Migrating On-Premises Infrastructure and Data (sign up)

Tips and Tricks for Azure Migrations - Melody Zacharias

[Assess, Get Recommendations & Migrate SQL Server to Azure using Azure Data Studio | Data Exposed](#)

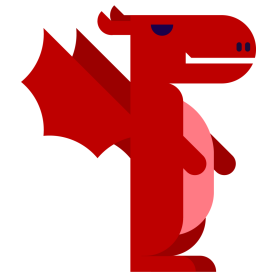
Ike Ellis YouTube Playlist: [Migrate SQL Server to Azure](#)

SQL Governor YouTube Playlist: [Mastering SQL Server Migrations](#)

Matt Gordon has several videos online regarding Migrations

DataGrillen has many resources available on their [GitHub](#) page

Look at your favorite conferences online: past years often have some great videos



Feedback

**Migrating data solutions to the cloud:
a checklist.**

Speaker: **Kristina Mishra**
Regular 50-minute session
Sat 14:10 GMT
Room: MR 1B

<https://sqlb.it/?9831>

