Azure Database Options

Jes Borland

SQL intersection

Jes Borland
Premier Field Engineer
Microsoft
jes.borland@microsoft.com
@grrl_geek
LessThanDot.com

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Reminder: Intersect with Speakers and Attendees

- **Tweet tips and tricks that you learn and follow tweets posted by your peers!**
  - Follow: #SQLintersection and/or #DEVintersection
- **Join us – Wednesday Evening – for SQLafterDark**
  - Doors open at 7:00 pm
  - Trivia game starts at 7:30 pm

    Winning team receives something fun!
  - Raffle at the end of the night

    Lots of great items to win including a seat in a SQLskills Immersion Event!
  - The first round of drinks is sponsored by SentryOne and SQLskills

SQLafterDark

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SQLskills immerse yourself in sql server & SentryOne

Let’s talk about

- Current database offerings
- Database offerings in preview
- What’s next

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Current database offerings

SQL Server in VMs

SQL Database

- Single database
- Elastic pools

SQL Data Warehouse

Cosmos DB

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In preview

Azure Database for MySQL

Azure Database for PostgreSQL

Coming soon

Managed instances

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SQL Server in VMs

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Why use SQL Server in VMs?

- Run a full version of SQL Server – all features, all additional services (SSIS, SSAS, SSRS, R)
- Scalable VM size
- Some built-in HA and maintenance

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Scaling

- **You can change your VM size - larger or smaller**
- **Increase capacity when load increases; decrease size and costs when under-utilized**
- **Is everything online?**
  - Yes, if the region and cluster have the available resources.

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Administration

- **What's different from on-premises SQL Server?**
- **Backup to URL is recommended**
  - Backing up to blob storage instead of a locally-attached disk

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High Availability & Disaster Recovery

- **What's supported in Azure?**
  - High Availability
    - Availability Groups
    - Failover Cluster Instances
    - Database Mirroring
  - Disaster Recovery
    - Cross-region Availability Groups
    - Database Mirroring
    - Backup and restore

Performance Tuning

- **What's different from on-prem? Nothing!**
  - Indexes
  - Statistics
  - DMVs
  - Extended Events

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SQL Server in VMs is best for

- **Existing applications and databases**
- **Lift-and-shift into Azure**
- **Running multiple services**

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SQL Database

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Why use SQL Database?

- **Built-in maintenance, monitoring, and HA – worry about code, not maintenance**
- **Easily scale up or down to accommodate load**
- **Cloud-first development**

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Single databases and Elastic Pools

- **Single databases**
  - Resources are dedicated to one database
- **Elastic Pools**
  - A group of databases that share a "pool" of resources
  - Designed for a group of databases with varying, unpredictable workloads
  - Great for SaaS applications!

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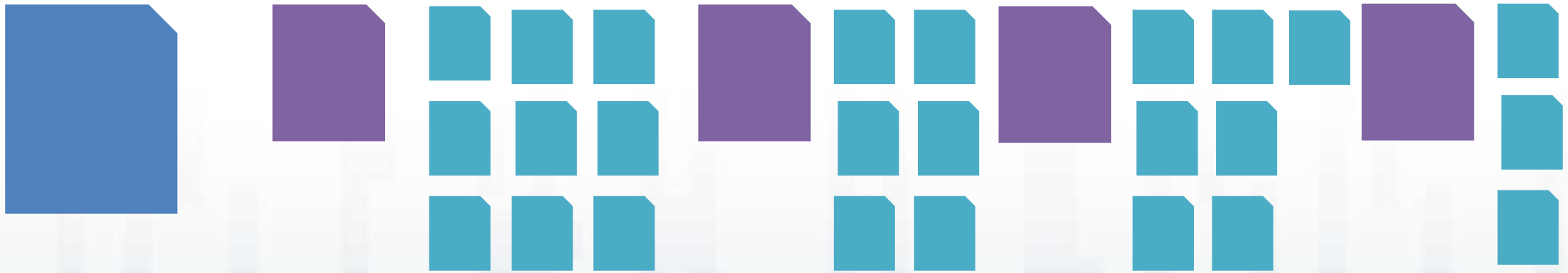
Scaling

- **You can give your database more or fewer resources**
- **Is it online?**
  - Yes!
  - No data is lost
  - Some in-flight transactions may be rolled back

Backups

- **Performed automatically - part of the managed services through PaaS**
  - Full backup weekly
  - Differential every few hours
  - Transaction log every 5-10 minutes
- **Uses read-access geo-redundant storage (there are multiple copies of your data!)**



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High Availability

- Fully managed
- At least three copies of your data exist in the same region
- The database can and will be moved for patching and maintenance - applications need built-in resiliency!

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Disaster Recovery

- **Backups**
- **Active geo-replication**
  - Up to four readable secondary databases in different region(s)
  - Failover: manual
- **Failover groups**
  - One or more databases in a group
  - Can have a read-write listener or read-only listener
  - Failover: automatic or manual

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Performance Tuning in SQL Database

- **All the features of SQL Server**
  - Indexes
  - Statistics
  - DMVs
  - Extended Events
- **Plus**
  - Query Performance Insight
  - Automatic Tuning (Indexes)

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Query Performance Insight

- **A real-time view of how queries are affecting your database**
- **View top resource-consuming queries**
  - CPU, data IO, log IO, duration, execution count
- **View long-running queries**
- **Get Performance Recommendations for a query**

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Automatic Tuning

- **Executed queries are monitored for improvements; improvements are applied and measured**
- **Automatic index management**
  - Creates useful indexes
  - Drops duplicate or unused indexes
  - If improvement isn't significant, actions are reverted
- **Automatic plan choice correction**
  - If plan regression is detected, the database will switch to the last known good plan for that query

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SQL Database is best for

- New applications and databases
- When you want to focus on writing code, not managing the database

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SQL Data Warehouse

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Why use SQL Data Warehouse?

- You need a massively parallel processing (MPP) relational database
- You can pause and resume compute resources to save money
- Optimized for data warehouse workloads

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SQL Data Warehouse is best for

- **MPP processing**
- **Replacing Parallel Data Warehouse (PDW) or Analytics Platform System (APS)**

Cosmos DB

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Why use Cosmos DB?

Data models

Document

Graph

Key-Value

Table

Columnar

APIs

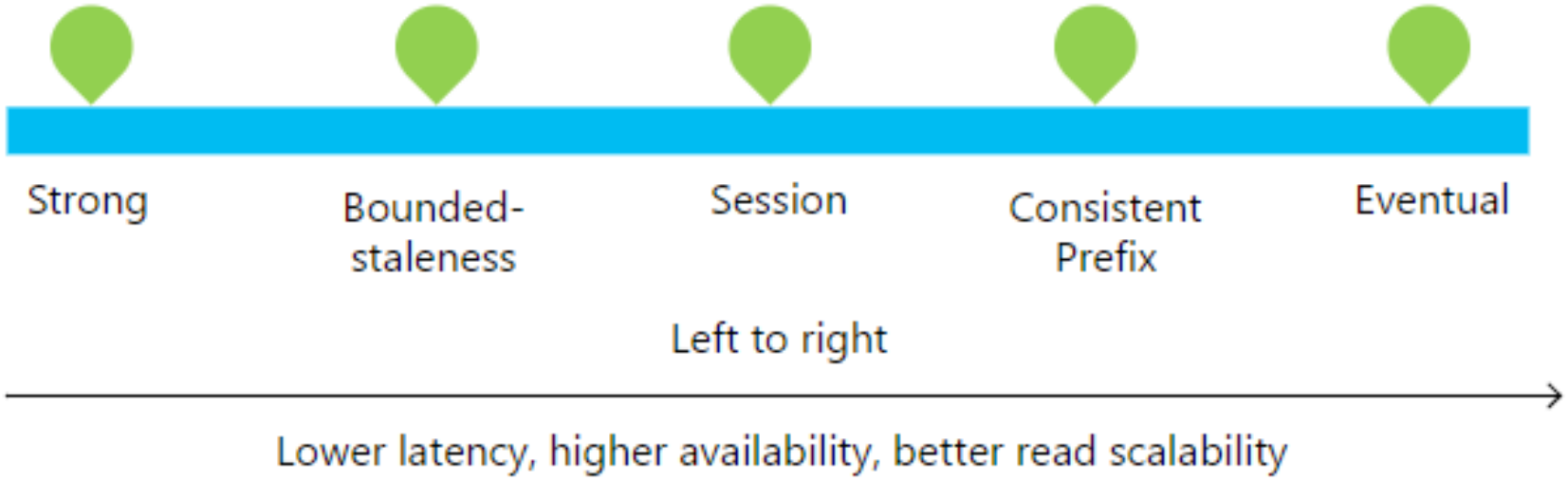
DocumentDB

MongoDB

Table

Graph (Gremlin)

Multiple consistency levels



And with all that, guaranteed performance

- Azure Cosmos DB guarantees less than 10-ms latencies on reads and less than 15-ms latencies on (indexed) writes at the 99th percentile
- 99.99% availability within a single region
- Schema-agnostic –automatically indexes all the data it ingests without requiring any schema or indexes

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Cosmos DB is used for

- Non-relational data
- IoT data querying
- Retail data
- Gaming data

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Azure Database for MySQL

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Why use MySQL as a Service?

- Scale up and down, depending on current workload
- Built-in monitoring and alerting
- 99.99% availability SLA
- Point-in-time restore
- Security - physical security of assets, data secured at-rest, SSL connections required

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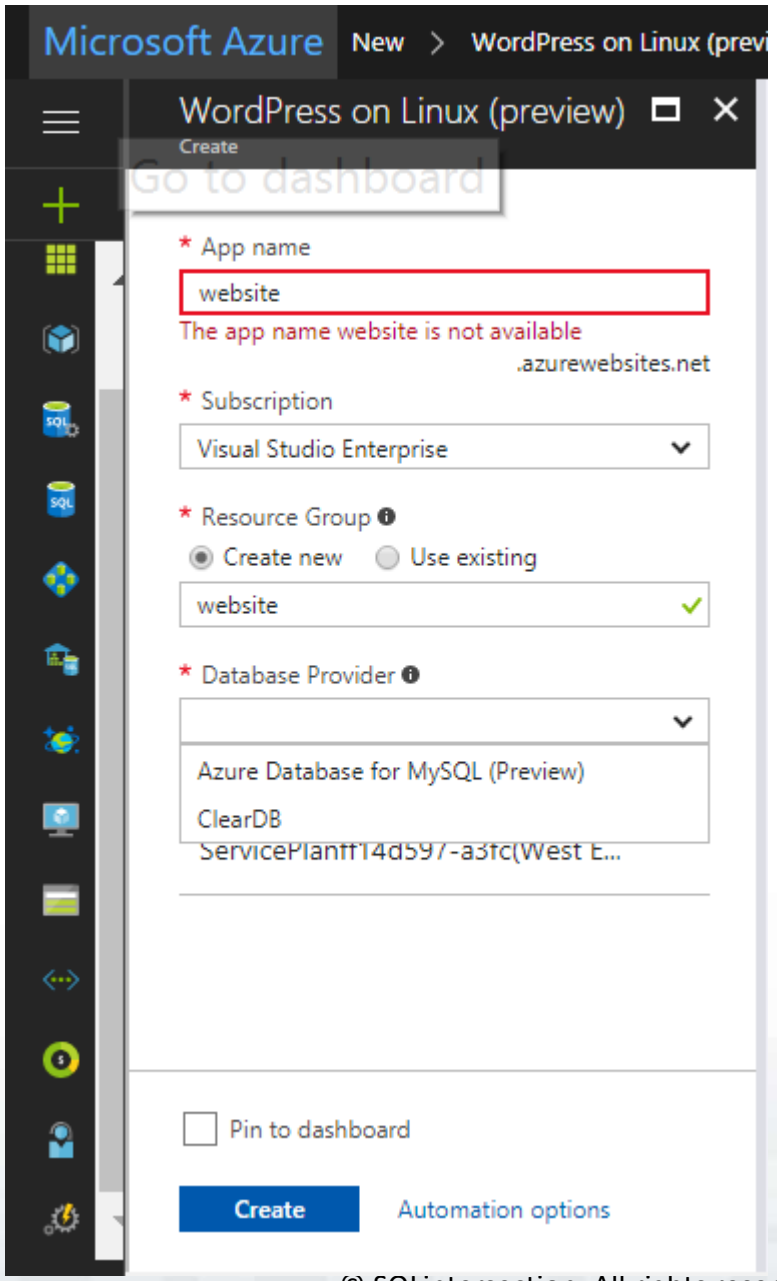
Maintenance

- **Backups**
  - Every 5 minutes
- **Retention**
  - Basic - 7 days
  - Standard - 35 days
- **Restore through Portal**

Features

- **Using Community Edition**
- **Can use existing tools to connect**
  - Workbench
  - mysql.exe
- **Configurable server parameters**
  - Control behavior of MySQL features, such as InnoDB lock wait times
- **Works directly with other Azure Services**



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Azure Database for MySQL is best for

- **A fully managed database service – you write code, we manage the database**

Azure Database for PostgreSQL

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Why use PostgreSQL as a Service?

- Scale up and down, depending on current workload
- Built-in monitoring and alerting
- 99.99% availability SLA
- Point-in-time restore
- Security - physical security of assets, data secured at-rest, SSL connections required

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Maintenance

- **Backups**
  - Every 5 minutes
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- **Restore through Portal**

Features

- **Versions 9.5.7 and 9.6.2 (as of July 2017)**
  - Goal is n-2
- **Same tools are supported for development and administration**

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Azure Database for PostgreSQL is best for

- **A fully managed database service – you write code, we manage the database**

Managed Instances

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The benefits of SQL Database

- Automatic management of patches, updates, and backups
- Easy scalability
- Cloud-first feature development

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The drawbacks of SQL Database

- Limited surface area - major features missing
- No way to tie to a virtual network
- Lack of cross-database communication

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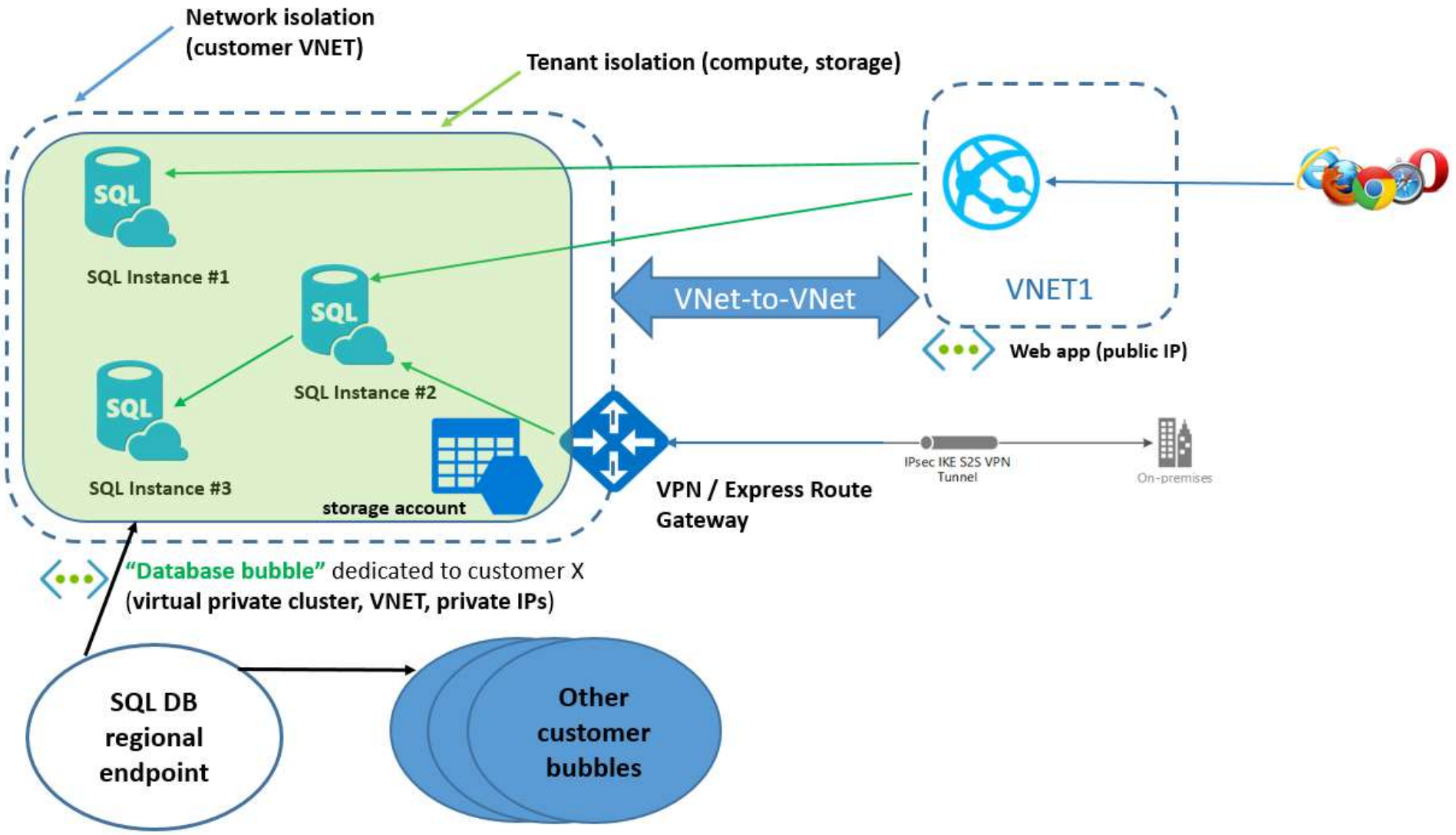
Solving the problem

- **Managed Instances: a PaaS offering combining the managed services of SQL Database with the compatiblity and server-level options of SQL Server**



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Compatibility being introduced

- Cross-database queries
- Cross-instance queries
- Global temp tables
- CLR
- R services
- SQL Audit
- SQL Agent
- Database mail
- Change Data Capture
- Service Broker
- Transactional Replication
- Log Shipping
- Resource Governor

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Scaling

- **Managed Instances will offer the same ability to scale up/down as SQL Database does**

High Availability & Disaster Recovery

- **Matches SQL Database features**
  - Automatic backups
  - Point-in-time restore
  - Geo-replication

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Performance tuning tools

- **Matches SQL Database options**
  - Query Performance Insight
  - Automatic Tuning
  - Threat Detection

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Summary

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Database Options

Roadmap

- https://azure.microsoft.com/en-us/roadmap/

Resources

- SQL Server in VMs: https://docs.microsoft.com/en-us/azure/virtual-machines/windows/sql/virtual-machines-windows-sql-server-iaas-overview
- SQL Database: https://docs.microsoft.com/en-us/azure/sql-database/sql-database-technical-overview
- SQL Data Warehouse: https://docs.microsoft.com/en-us/azure/sql-data-warehouse/sql-data-warehouse-overview-what-is
- Cosmos DB: https://myignite.microsoft.com/sessions/54947
- Azure DB for MySQL: https://docs.microsoft.com/en-us/azure/mysql/overview
- Azure DB for PostgreSQL: https://docs.microsoft.com/en-us/azure/postgresql/
- Managed Instances: https://myignite.microsoft.com/videos/53442

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Questions?

Don’t forget to complete an online evaluation!

Azure Database Options

Your evaluation helps organizers build better conferences and helps speakers improve their sessions.

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Thank you!

Jes Borland
Premier Field Engineer
Microsoft
jes.borland@microsoft.com
@grrl_geek
LessThanDot.com

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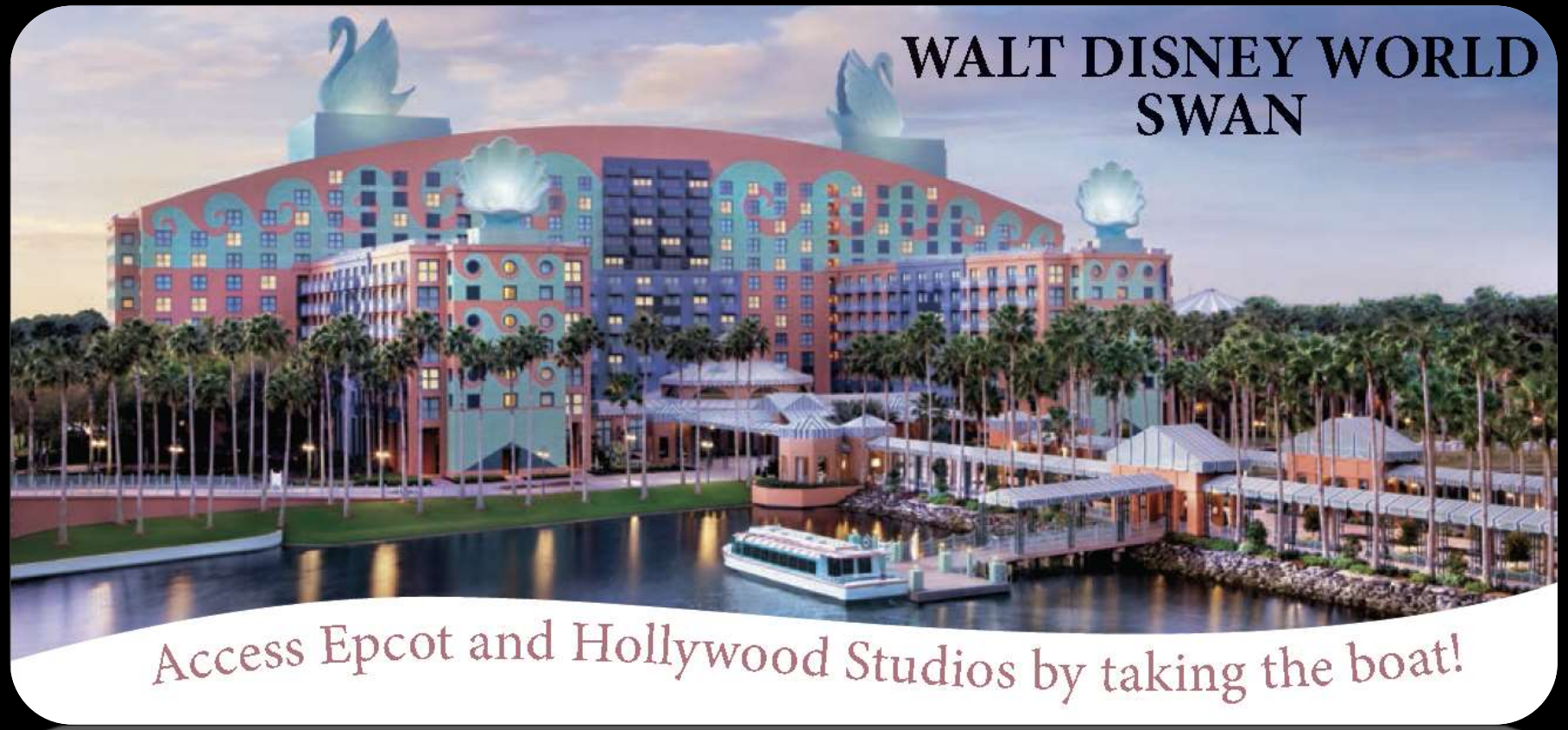
Save the Date!

www.SQLintersection.com



2018

Mar 25-28

We're back in Orlando!

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Leave the every day behind and enter a world of wonder and enchantment at the Walt Disney World® Resort. Located in the heart of the most magical place on earth, the Walt Disney World Swan and Dolphin Resort provides a truly extraordinary backdrop for our event! Beautiful tropical landscaping, tranquil waterways, and classic art and architecture work together to create a stunning landmark!