

Azure Basics for the IT Professional

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Who Am I?

- Leader of the Louisville SQL Server/Power BI User Group
- Organizer/Speaker of SQL Saturday's & other conferences
- Heavily involved with SQL PASS
- Microsoft Data Platform MVP
- Friend of Redgate 2015 - 2019
- Idera ACE 2016
- SentryOne Product Advisory Council





The vetted and certified experts at Denny Cherry and Associates Consulting assist companies with attaining IT goals such as HA, scalability, SQL Server virtualization, migration, and acceleration reliably while finding ways to save on costs. With clients ranging from Fortune 50 corporations to small businesses, their commitment to each is the same: to provide a deft, high-speed IT environment that leverages every aspect of their platform: from network, architecture, to infrastructure.

Visit DCAC at <http://www.dcac.co>

Quick Check

- How many:
 - DBA's
 - Developers
 - BI/DWH
 - Other
- Please make sure to fill out evaluations
- Ask questions!!!



Agenda

The Cloud

Terminology

Geographies/Regions

Networking

Data Security

Azure Virtual Machines

SQL DB

Managed Instances (MI)

Demos

The Cloud

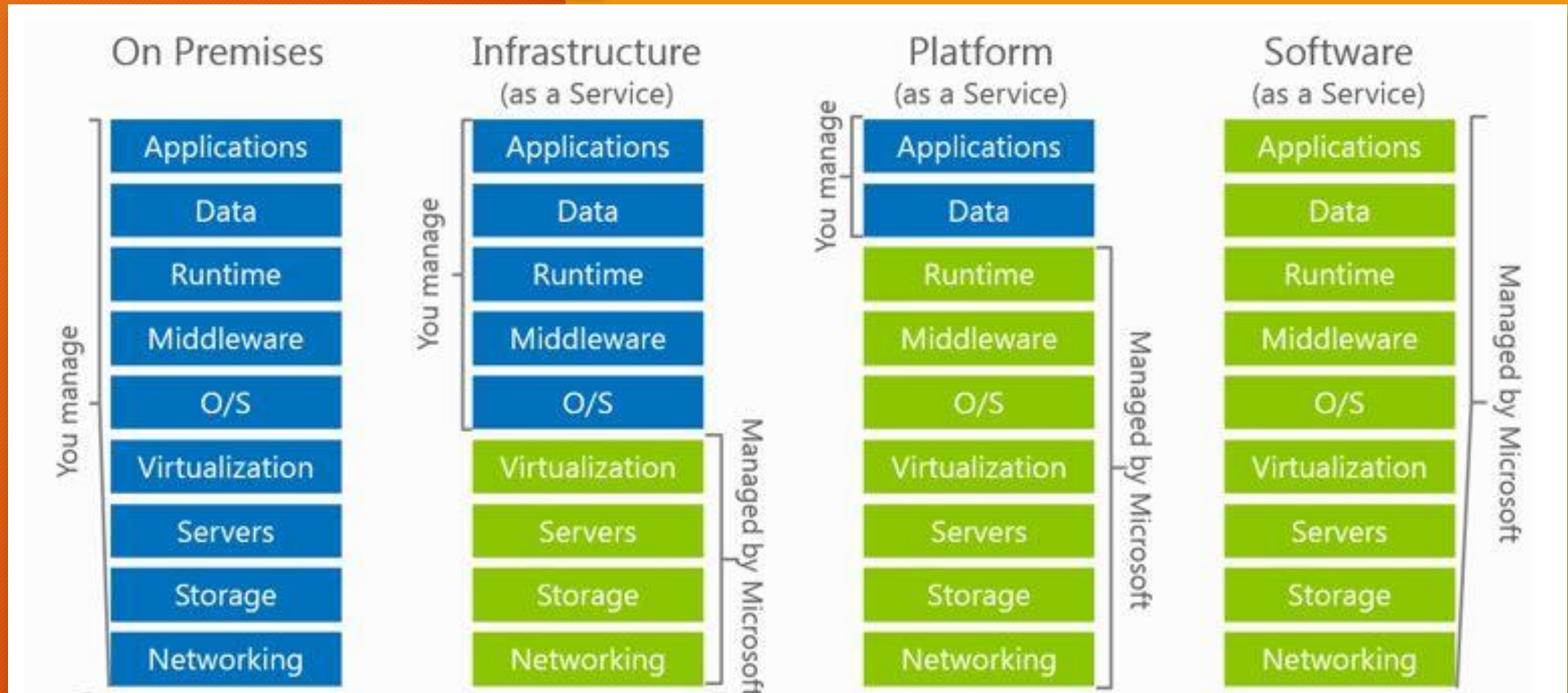


Terminology

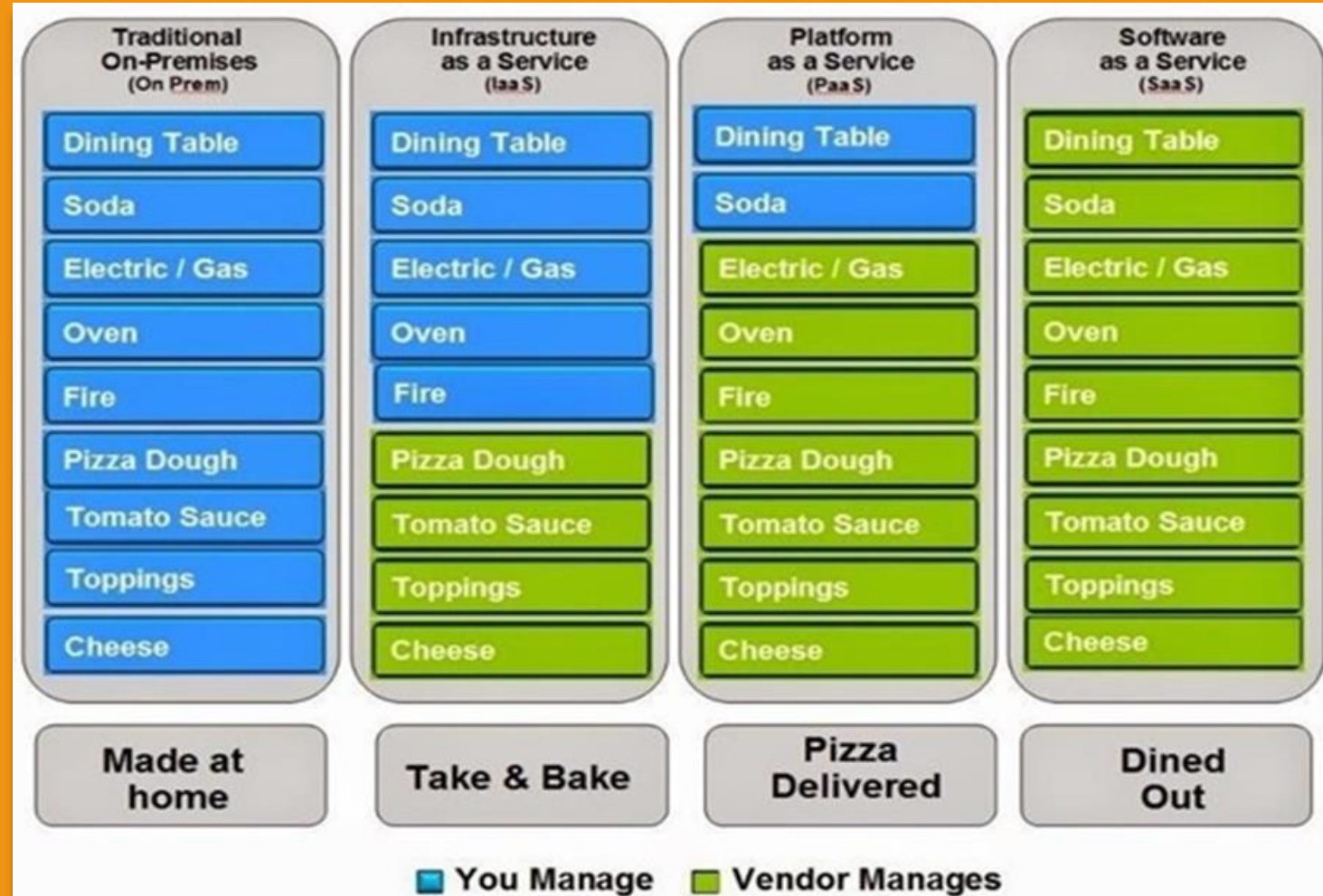
- “On Prem”
- IaaS - Infrastructure as a Services
- PaaS - Platform as a Service
- SaaS - Software as a Service
- AAD - Azure Active Directory
- ARM - Azure Resource Manager
- LRS/GRS/ZRS/RA-GRS
- Resource Groups
- Geographies/Regions



Terminology



Pizza as a Service



Geographies/Regions

The world is divided into geographies

Defined by geo-political boundaries or country borders

Defines the data residency boundary for customer data

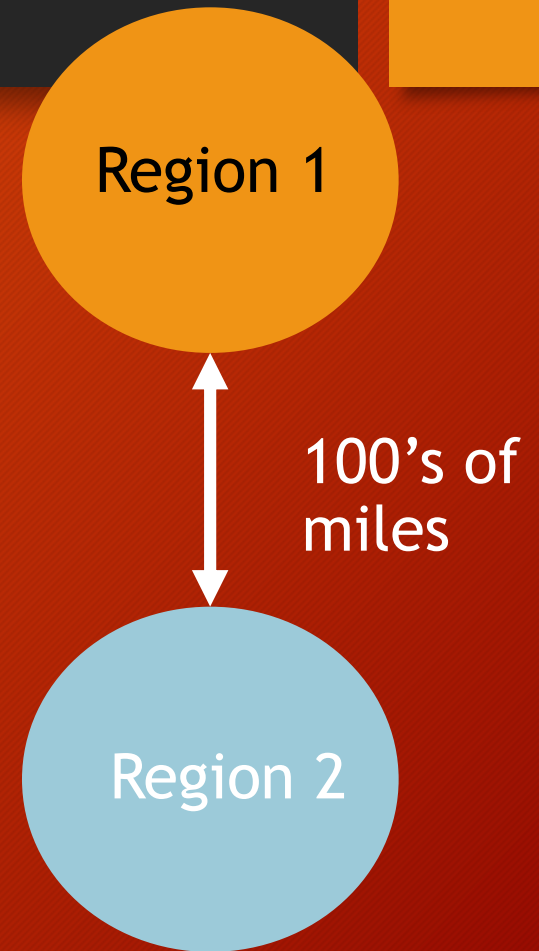
A region is defined by a bandwidth and latency envelope

<2ms latency diameter (round trip)

Customers see regions, not DCs

Different fault and flood zones, electrical grid, hurricane zone

Typically hundreds of miles apart



Quincy, WA



Quincy, WA



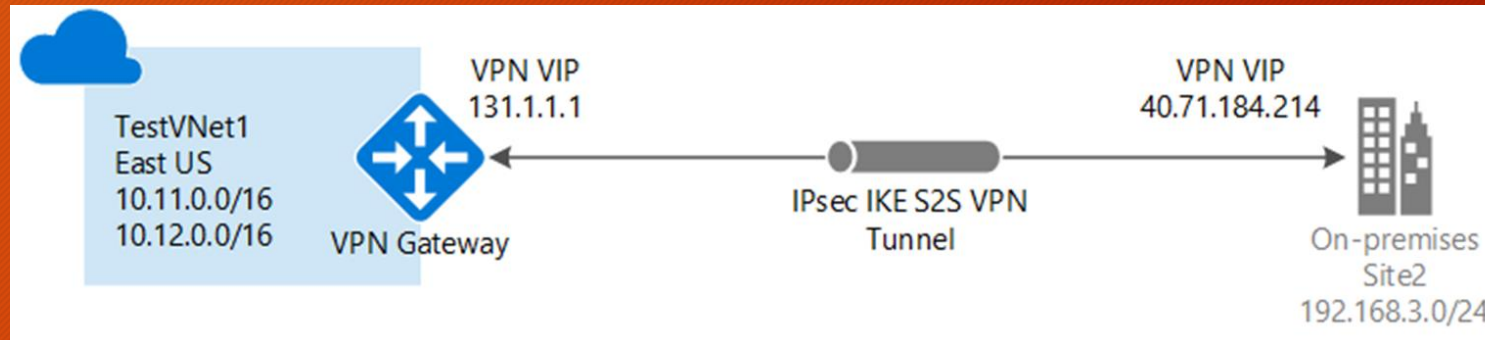
Networking

Virtual Network

- “Bring Your Own Network”
- Segment with subnets and security groups
- Control traffic flow with User Defined Routes

Backend Connectivity

- Point-to-site for dev / test
- VPN Gateways for secure site-to-site connectivity
- ExpressRoute for private enterprise grade connectivity



Data Security

- Transport Layer Security (TLS)
- Transparent Data Encryption (TDE)
- Always Encrypted
- Row-level security
- Dynamic Data Masking
- Authentication
 - SQL Authentication
 - Azure Active Directory Authentication








Azure Virtual Machines











- VM hosted on Microsoft Azure Infrastructure (“IaaS”)
- Fast provisioning (~15 minutes). Provision groups of servers with resource templates
- Accessible via RDP and Powershell
- Pay per use
 - Per minute (only when running)
 - Cost depends on size and licensing
 - EA customers can use existing SQL licenses (BYOL)
 - Network: only outgoing (not incoming)
 - Storage: only used (not allocated)
- Elasticity
 - Grow as needed






Azure Virtual Machines

- VM size determines compute capacity
 - # of cores, RAM, # of disks, local SSD
- VM size determines features
 - Auto-scale, load balancing, RDMA, Premium storage support

D11 Standard	
2	Cores
14	GB
	4 Data disks
	4x500 Max IOPS
	100 GB Local SSD
	Load balancing
	Auto scale

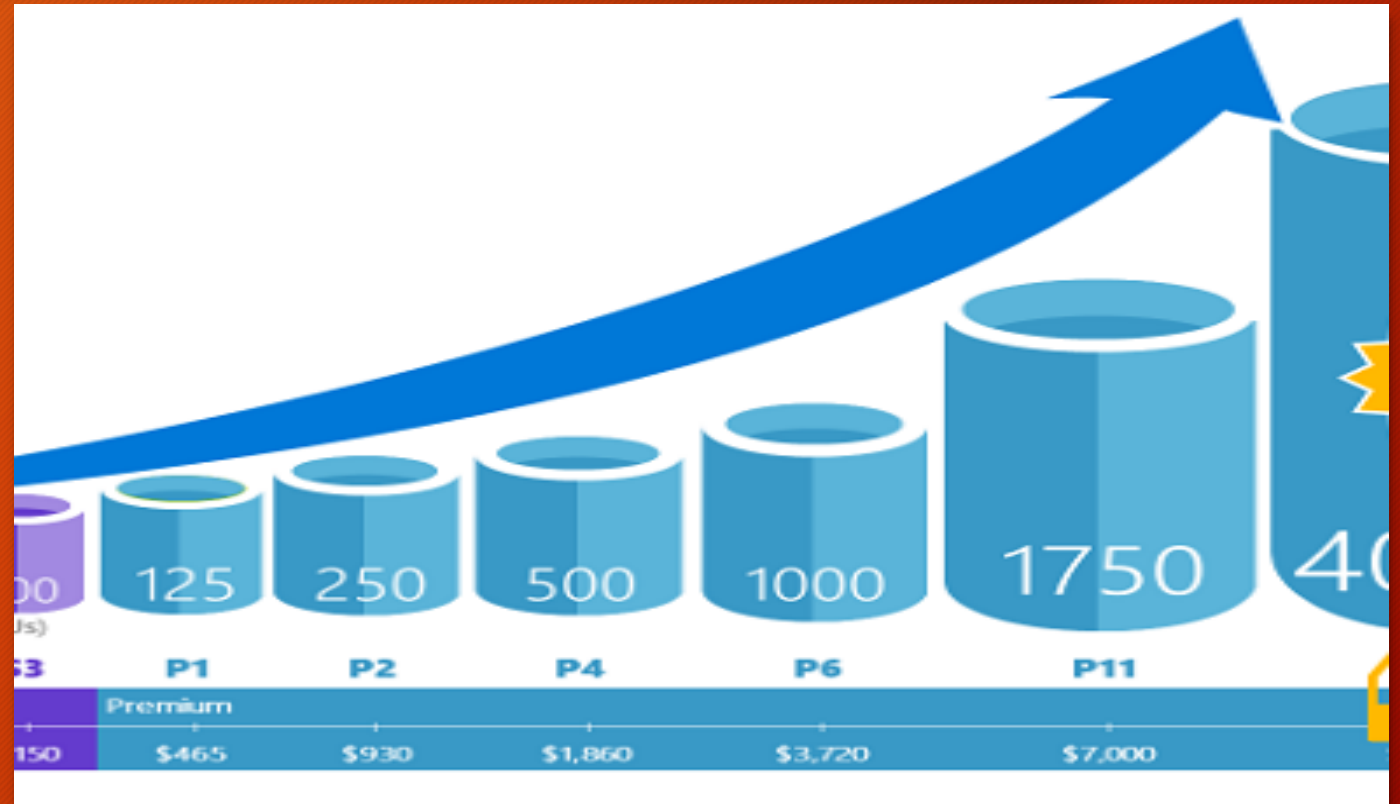
GS1 Standard	
2	Cores
28	GB
	4 Data disks
	5000 Max IOPS
	56 GB Local SSD
	Load balancing
	Auto scale
	Premium disk supp...

A1 Basic	
1	Core
1.75	GB
	2 Data disks
	2x300 Max IOPS

A9 Standard	
16	Cores
112	GB
	16 Data disks
	16x500 Max IOPS
	Load balancing
	Auto scale
	RDMA support

SQL DB

- Just a database in the cloud
- Sized differently than VMs
 - Different Size Labels
 - Database Transaction Unit (DTU)
- <https://sqlperformance.com/2017/03/azure/what-the-heck-is-a-dtu>
- Vcore licensing



<https://docs.microsoft.com/en-us/azure/sql-database/sql-database-technical-overview>

SQL DB

No physical
access to
database files

No need to
upgrade

No need to
patch

No need to
reboot/restart

Automatic
backups (yay!)

- TDE Enabled by
default

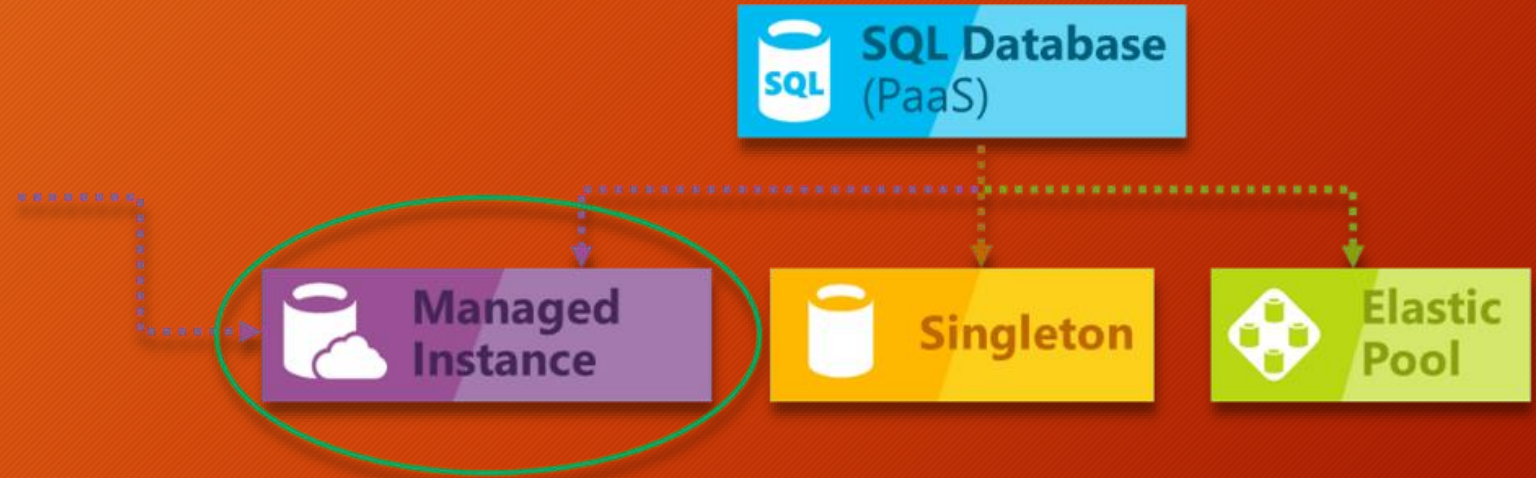
Things get
tested here first

SQL DB

The screenshot displays the SQL Server Enterprise Manager interface. On the left, the Object Explorer shows the hierarchy of the 'sqldbtest1.database.windows.net' server. The 'Databases' folder is expanded, and the 'master' database is highlighted with a red rectangle. The 'Test1' database is also visible. On the right, the 'SQLQuery1.sql' window shows a query: `SELECT * FROM sys.databases`. Below the query, the 'Results' tab is active, displaying a table with the following data:

	name	database_id	source_database_id	owner_sid	create_d
1	master	1	NULL	0x01060000000001640000000000000000754F3E15CC1DC...	2018-01-
2	Test1	5	NULL	0x01060000000001640000000000000000754F3E15CC1DC...	2018-01-

New deployment option that enables frictionless migration for SQL apps and modernization in a fully managed service



Easy lift and shift

- Fully-fledged SQL

Fully managed PaaS

- Built on the same

Full isolation and security

- Native VNET

New business model

- Competitive

Managed Instances (MI)

SQLQuery2.sql - DESKTOP-IDT80C5.master - Microsoft SQL Server Management Studio

File Edit View Project Debug Tools SQL Prompt Window Help

master Execute Debug

Object Explorer

Connect

DESKTOP-IDT80C5 (SQL Server 14.0.1000.169)

- Databases
- Security
- Server Objects
- Replication
- PolyBase
- Always On High Availability
- Management
- Integration Services Catalogs
- SQL Server Agent
- XEvent Profiler

SQLQuery2.sql - SQLQuery1.sql - DE... (79))* SQLQuery10.sql - not connected

```
1  
2  
3 SELECT * FROM sys.databases  
4 WHERE database_id < 6
```

100 %

Results Messages

	name	database_id	source_database_id	owner_sid	create_date	compatibility_level	collation_name
1	master	1	NULL	0x01	2003-04-08 09:13:36.390	140	SQL_Latin1_General_CP1_CI
2	tempdb	2	NULL	0x01	2018-04-06 08:15:19.090	140	SQL_Latin1_General_CP1_CI
3	model	3	NULL	0x01	2003-04-08 09:13:36.390	140	SQL_Latin1_General_CP1_CI
4	msdb	4	NULL	0x01	2017-08-22 19:39:22.887	140	SQL_Latin1_General_CP1_CI

It really looks like...

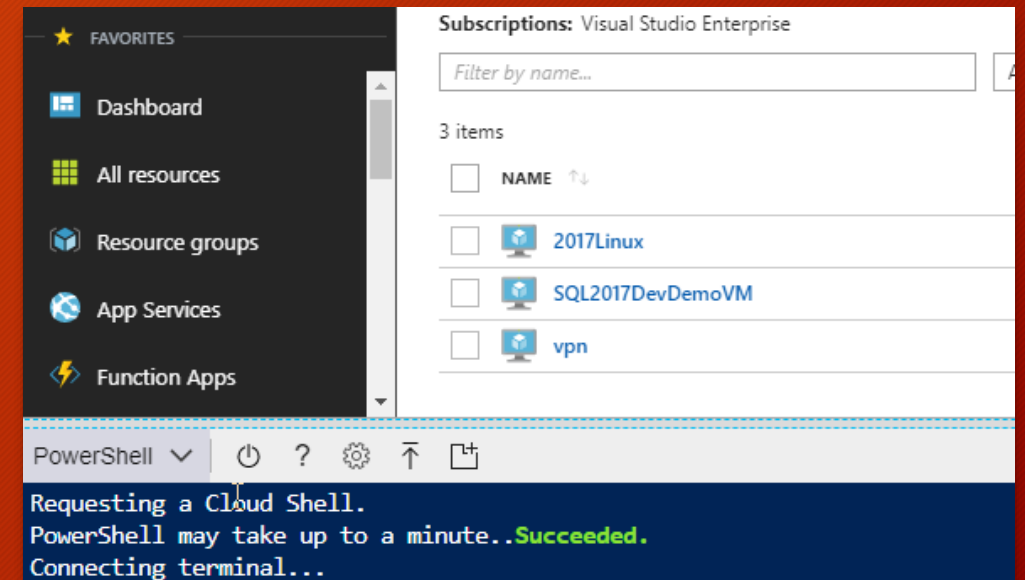
Command Line

- Powershell
 - Locally
 - Azure Powershell (Cloud Shell)
- Azure Command Line Interface (CLI)

```
C:\WINDOWS\system32\cmd.exe
{
  "id": "/subscriptions/.../resourceGroups/myResourceGroup",
  "location": "eastus",
  "managedBy": null,
  "name": "myResourceGroup",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null
}

C:\Users\john>az vm create --resource-group myResourceGroup --name myCLIDemo --image MicrosoftSQLServer:SQLDEV:14.0.1000204 --admin-username localadmin --admin-password Passw0rd12345
{
  "fqdns": "",
  "id": "/subscriptions/.../resourceGroups/myResourceGroup/providers/MicrosoftVirtualMachines/myCLIDemo",
  "location": "eastus",
  "macAddress": "00-0D-3A-1C-A9-A9",
  "powerState": "VM running",
  "privateIpAddress": "10.0.0.4",
  "publicIpAddress": "52.168.169.44",
  "resourceGroup": "myResourceGroup",
  "zones": ""
}

C:\Users\john>
```



Demo

- Configuring a virtual machine (VM)
- Configuring SQL DB
- Powershell/Azure CLI

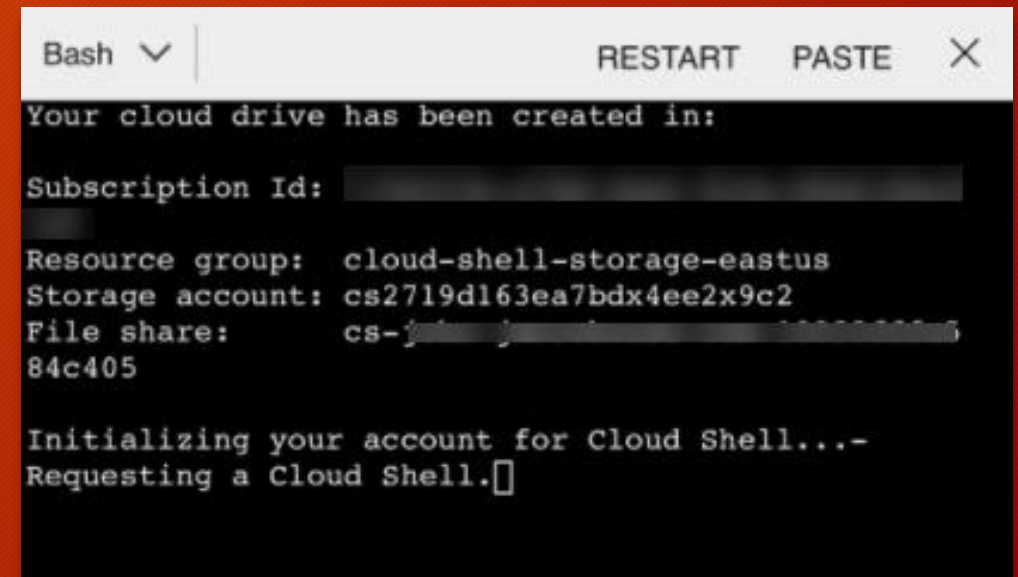
Gotchas

- VMs
 - Auto shut off
 - Storage - Spinning vs SSD
 - \$\$\$\$
- SQL DB
 - Where are the backups?
 - Ronco - Set it, Forget it



Mobile Capabilities

- Start/Stop VMs
- BASH Scripts
- PoSH



Getting Started

- Free trial
 - [//azure.com/free](https://azure.com/free)
- 12 months of
 - Compute
 - Storage
 - Network
 - Database
- Always free access to 25+ services including app service and functions
- \$200 US credit to try it out within 30 days

Resources

- Azure CLI
 - <https://docs.microsoft.com/en-us/cli/azure/?view=azure-cli-latest>
- Azure PowerShell
 - <https://docs.microsoft.com/en-us/powershell/azure/overview?view=azurermps-5.6.0>
- Storage Replication
 - <https://docs.microsoft.com/en-us/azure/storage/common/storage-redundancy>
- Windows VM Sizes
 - <https://docs.microsoft.com/en-us/azure/virtual-machines/windows/sizes>
- PaaS vs IaaS
 - <https://docs.microsoft.com/en-us/azure/sql-database/sql-database-paas-vs-sql-server-iaas>
- Azure SQL DB DTU Resource Limits
 - <https://docs.microsoft.com/en-us/azure/sql-database/sql-database-dtu-resource-limits>
- Azure SQL DB Service Tiers
 - <https://docs.microsoft.com/en-us/azure/sql-database/sql-database-service-tiers>



Questions

THANK YOU!!!!



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