

Architecting for the cloud

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Architecting for the cloud

- Similar to classic architecture...
- ...with two notable differences:
 - Emphasis on utilization of existing services
 - Emphasis on cost

Using existing services

- The cloud offers hundreds of services

Azure Services Overview

Overview of Azure services. Linked directly to Azure Service 360° for service summary information.

FOCUS: ALL SERVICES

AI + Machine Learning	Analytics	Compute	Databases	Development	Identity + Security	IoT + MR	Integration	Management + Governance	Media + Content	Migration	Networking	Storage
Bot Service	Analytics Services	App Service	Apache Cassandra ML	App Configuration	Azure Active Directory	Azure Maps	API Management	Automation	Azure CDN	Azure Migrate	Application Gateway	Azure vNet
Cognitive Search	Azure Purview	App Service (Linux)	Cosmos DB	Azure DevOps	Azure AD B2C	Azure Sphere	Event Grid	Azure Advisor	Communication Services	Data Box	Azure Bastion	Azure FileSync (File)
Cognitive Services	Data Catalog	Azure IoT Hub	Database for MariaDB	Azure Spring Cloud	Azure AD DS	Digital Twins	Healthcare APIs	Azure Arc	Media Services	DB Migration Service	Azure DNS	Azure Storage
Machine Learning	Data Explorer	Azure Functions	Database for MySQL	DevTest Labs	Azure Defender	IoT Central	Logic Apps	Azure Automanage		Site Recovery	Azure Firewall	Data Lake Storage
Microsoft Genomics	Data Factory	Azure Quantum	Database for PostgreSQL	Lab Services	Azure Key Vault	IoT Edge	Notification Hubs	Azure Backup			Azure Front Door	Data Share
Open Datasets	Data Lake Analytics	Azure Real Time Query (DWH)	Redis Cache	SignalR Service	Azure Sentinel	IoT Hub	Service Bus	Azure Blueprints			Azure Orbital	Managed Disks
	Databricks	Azure VMware Solution	SQL Database	Visual Studio App Center	Cloud Protection	Object Archiver	Web PubSub	Azure Lightbulb			ExpressRoute	Storage Spaces
	Event Hubs	Cloud Services	SQL Server Stretch DB		Dedicated HSM	Remote Rendering		Azure Monitor			Internal Analyzer	
	HDInsight	Container Instances			Information Protection	Spatial Anchors		Azure Policy			Load Balancer	
	Power BI Embedded	Container Registry			Security Center	Time Series Insights		Azure Portal			Network Watcher	
	Stream Analytics	CycleCloud						Cloud Shell			Private Link	
	System Analytics	Delighted Chat						Cost Management			Route Server	
		Education Service						Managed Apps			Traffic Manager	
		Service Fabric						Scheduler			Virtual Network	
		Virtual Desktop									Virtual WAN	
		Virtual Machines									VPN Gateway	
		VM Scale Sets										

Source: <https://azurecharts.com/overview>

Using existing services

- It's usually a better idea to use an existing service instead of building one from scratch

Using existing services

- Built-in cloud services offer:
 - Better SLA
 - Automation
 - Scaling
 - Security
 - And more...

Using existing services

- Example #1:

Using SQL Server in the cloud

Manual setup

1. Create VM in Azure
2. Setup VM with SQL Server
3. Configure backup
4. Configure geo-replication
5. Configure monitoring
6. Pay for VM
7. Pay for SQL Server license



Using Azure SQL

1. Create Azure SQL
2. Use built-in backup, geo-replication, monitoring
3. Pay for DB only



Using existing services

- Example #2:

Run web API to copy data from file to DB

Manual setup

1. Create VM in Azure
2. Install runtime
3. Install web server
4. Deploy code
5. Configure monitoring
6. Install dashboard
7. Pay for VM (~\$100s / month)



Using Azure Functions

1. Create Azure Function App
2. Deploy code
3. Enjoy built-in monitoring and dashboard
4. Pay for actual use (first 1m calls free)



Using existing services

- Not always built-in services are the best option
- For example: Azure Functions won't allow registry access
- Rule of thumb:

The more control and flexibility required –
the more manual labor you'll have

Considering cost

- In the cloud you pay for what you use

CapEx

Capital Expense

Making upfront
investment for future
use / profit

OpEx

Operating Expense

Pay for what you
actually use

Traditional IT – CapEx Oriented

- Major investment for:
 - Building data center
 - Purchasing servers
 - Purchasing air conditioning
 - Purchasing network devices
 - Purchasing software licenses (DB etc.)

...And only then –
it can be used...

Traditional IT – CapEx Oriented

- There's also OpEx involved:
 - Electricity
 - Salaries
 - Maintenance
 - And more...

**BLACK
FRIDAY**

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

CapEx



**BLACK
FRIDAY**

OpEx:

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov



CapEx

Capital Expense

Making upfront
investment for future
use / profit

- Non optimal
- Not flexible

*This is what you get with
the cloud*



OpEx

Operating Expense

Pay for what you
actually use

- Extremely flexible
- Most optimal


Considering cost


- Always consider the cost of the architecture
- A constant tradeoff

Considering cost

- Example #1:

Expose REST API to write logs

 App service

 Azure function

Azure Functions

REGION: West Europe TIER: Consumption

The first 400,000 GB/s of execution and 1,000,000

Executions

Memory size: 128 x Execution time (in milliseconds) 100 x

Requests

500,000 Execution count

But...

- App service works better with long requests
- More flexible
- No warmup

Tradeoff!

= \$0.00

= \$0.00

\$73.00

Considering cost

- Example #2:

Store 500GB of unstructured data

Storage account

Storage Accounts

REGION: West Europe TYPE: Block Blob Storage

ACCESS TIER: Hot REDUNDANCY: LRS

Capacity

500 GB

Savings Options

Save up to 38% on pay-as-you-go prices with 1-year or 3-year Azure Storage reserved capacity. [Learn more about Azure Storage reserved capacity pricing.](#)

☒ Pay as you go

☐ 1 year reserved

☐ 3 year reserved

\$9.80

Average per month (\$0.00 charged upfront)

Cosmos DB

But...

- CosmosDB has better performance...
- ...and querying capabilities...
- ...and transactional support

Tradeoff!

cost \$0.00

cost \$148.36

= \$9.80

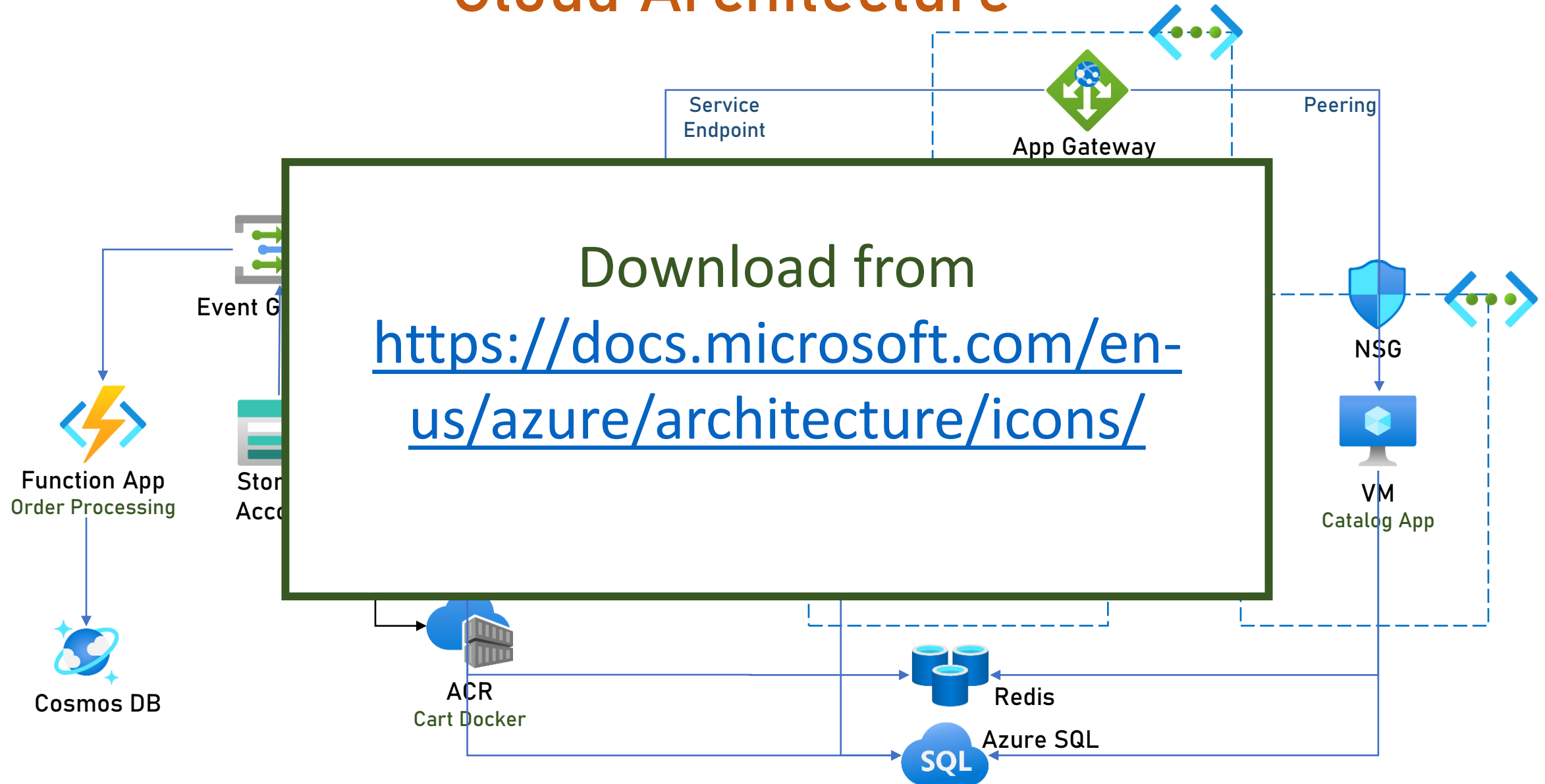
Average per month (\$0.00 charged upfront)

Using Azure icons

- Use Azure icons in the architecture diagram
 - Universal
 - Easily understandable
 - Aesthetic

ReadIt!

Cloud Architecture



AI + Machine Learning	✓	11/16/2020 4:53 PM	File folder
Analytics	✓	11/16/2020 4:53 PM	File folder
App Services	✓	11/16/2020 4:53 PM	File folder
Azure Stack	✓	11/16/2020 4:53 PM	File folder
Azure VMware Solution	✓	11/16/2020 4:53 PM	File folder
Blockchain	✓	11/16/2020 4:53 PM	File folder
Compute	✓	11/16/2020 4:53 PM	File folder
Containers	✓	11/16/2020 4:53 PM	File folder
Databases	✓	11/16/2020 4:53 PM	File folder
DevOps	✓	11/16/2020 4:53 PM	File folder
General	✓	11/16/2020 4:53 PM	File folder
Identity	✓	11/16/2020 4:53 PM	File folder
Integration	✓	11/16/2020 4:53 PM	File folder
Internet of Things	✓	11/16/2020 4:53 PM	File folder
Intune	✓	11/16/2020 4:53 PM	File folder
IoT	✓	11/16/2020 4:53 PM	File folder
Management + Governance	✓	11/16/2020 4:53 PM	File folder
Migrate	✓	11/16/2020 4:53 PM	File folder
Mixed Reality	✓	11/16/2020 4:53 PM	File folder
Monitor	✓	11/16/2020 4:53 PM	File folder
Networking	✓	11/16/2020 4:53 PM	File folder
Other	✓	11/16/2020 4:53 PM	File folder
Preview	✓	11/16/2020 4:53 PM	File folder
Security	✓	11/16/2020 4:53 PM	File folder
Storage	✓	11/16/2020 4:54 PM	File folder
Web	✓	11/16/2020 4:54 PM	File folder