

# State of .NET

## State of Azure

Markus Egger  
President and Chief Software Architect  
CODE Magazine & Consulting

# Kicking Things Off

## Jim Duffy

- Director of Business Development  
CODE Magazine & Consulting
- Former Developer Now Responsible for Sales & Marketing
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- International Author and Speaker
- Former Microsoft RD (Regional Director) 9 years
- Former 11 time Microsoft Most Valuable Professional (MVP)
- Twitter: @jmduffy



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# About the Presenter

- **Markus Egger**
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# About CODE Consulting

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- User Interface and Interaction Design
- Project Rescue, Legacy Conversions (VB, VFP, Access, etc.)
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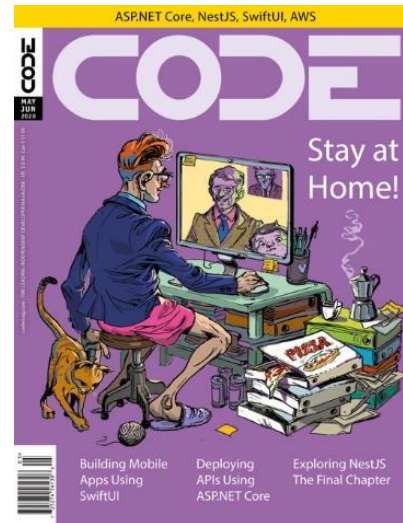
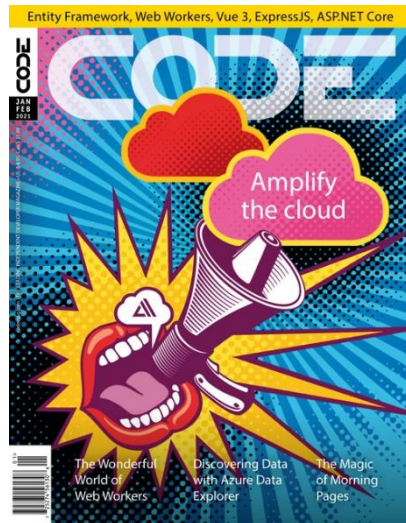
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## CODE Magazine State of .NET - The State of Azure

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\* Required

1. Full Name \*

Enter your answer

2. Company Name \*

Enter your answer

THIS SLIDE WILL BE REPEATED AT THE END AND SURVEY LINK REPEATED IN THE CHAT WINDOW!

# Prior Webinar Recordings

- Slides & Videos:
- [www.StateOfDotNet.com](http://www.StateOfDotNet.com)

## Recent Event Recordings

State of .NET - Blazor Web Development with .NET 5 - with Markus Egger

1/27/2021



State of .NET - .NET 5 In-Depth (.NET Conf Recap)

11/18/2020



State of .NET - .NET 5 (One .NET) Preview

10/28/2020



State of .NET - Cognitive Services, A.I. and Machine Learning

9/30/2020



# Agenda

- Where are we at with Azure?
- What's new in Azure?
- General trends in Cloud Computing
- Services every developer should know...
- ...and some more obscure ones that I find pretty cool

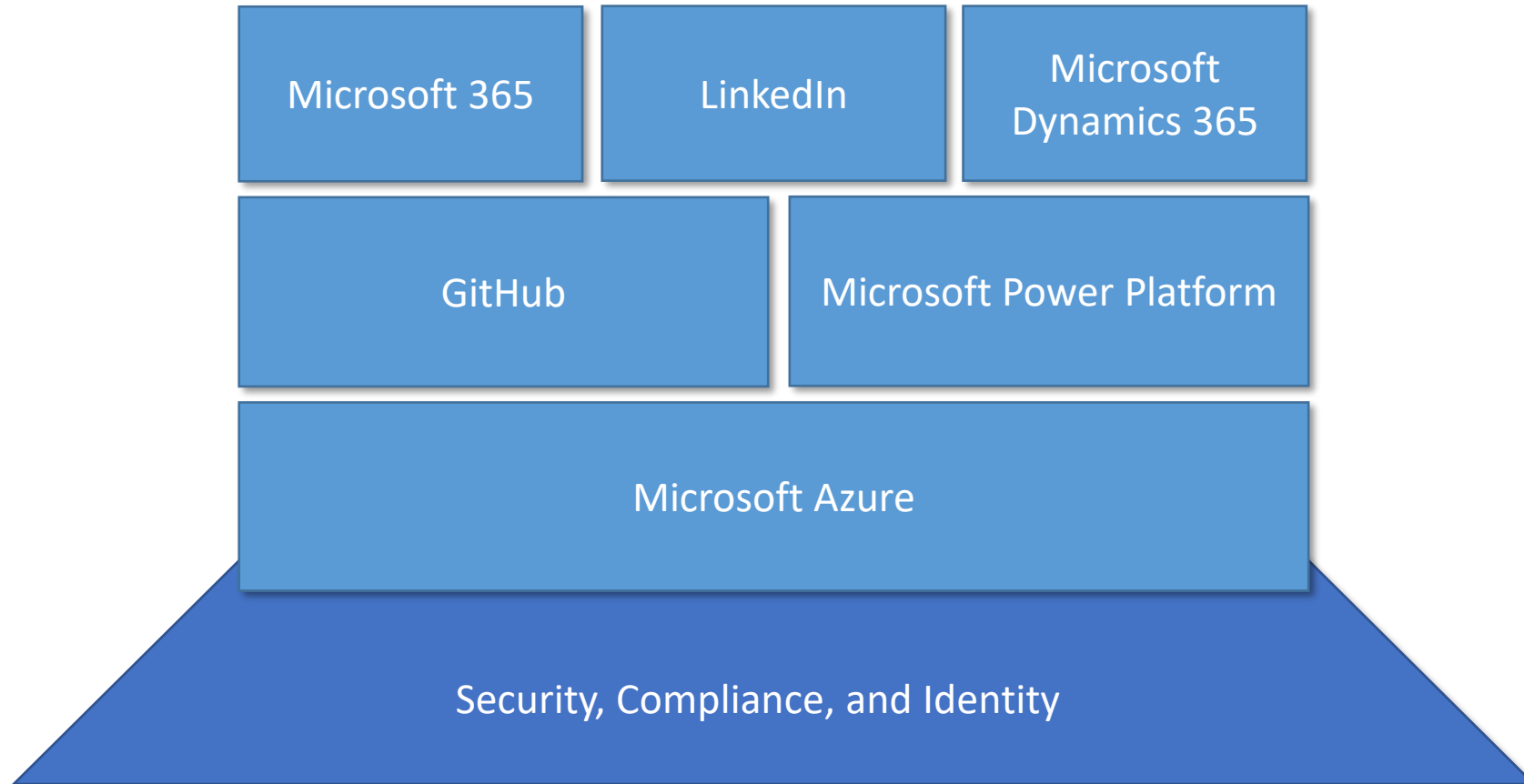


# Azure Overview

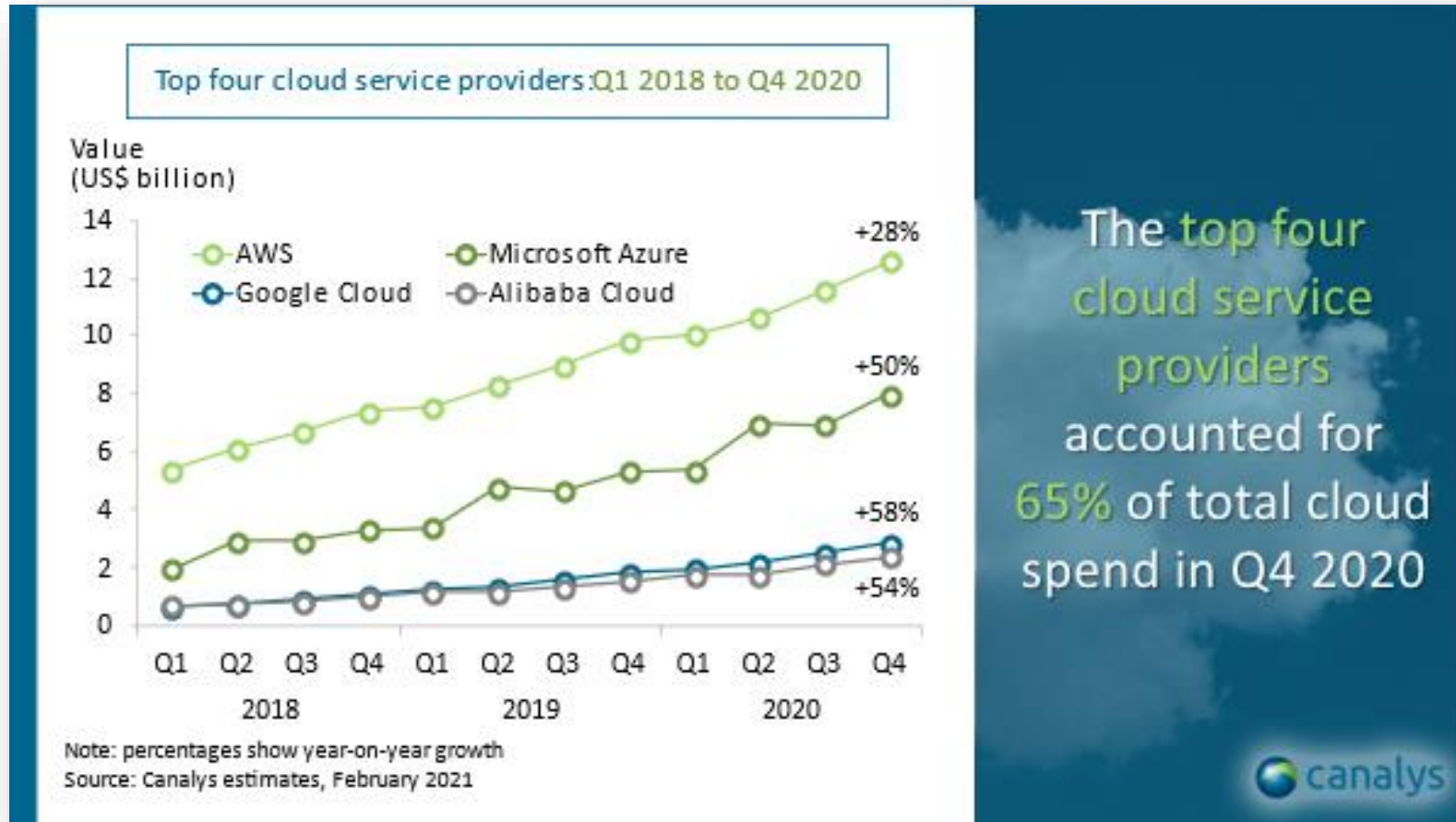
# What is Azure?

- Azure is Microsoft's Cloud offering geared towards developers and system builders
- Collection of 260+ different services
- Microsoft sees Azure as "the World's Computer"

# Microsoft Cloud



# Overall Cloud Market



# Overall Cloud Market

Q4 2020  
worldwide cloud  
infrastructure spend  
grew 32% to US\$39.9  
billion, driven by  
increased digital  
transformation and  
greater use

Worldwide cloud infrastructure services spend



Source: Canalys estimates, February 2021



# Azure – The Bigger Picture

- Azure, O365, Dynamics, GitHub, Power-Platform
- Visual Studio and .NET
- This big picture is unique to Microsoft (especially the developer ecosystem)

# Cloud Native

- “Cloud Native” is first and foremost a way to think about development
- Creating systems that are fundamentally built on cloud concepts
- The Cloud Native Computing Foundation defines it as:
  - *“Cloud-native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.”*

# Has “Peak Cloud” Happened Yet?

- Has everything been done on the Cloud, and do we need to move on to other things?
- Not even close! According to ScottGu, maybe just 15-20% there
- We are now just seeing the beginning of the wave of completely new systems that are built from the ground up for “cloud native”
- We are even earlier in the journey for “edge-based computing”

# The Cloud and Covid

- The current crisis has accelerated many trends we already saw before
  - Estimations range from an acceleration of 2-5 years, or more
- Zero-Trust security as people are working more distributed
- Travel patterns and interaction and meeting patterns have probably changed in a lasting way, even when we do go back to more personal interactions
- Drastically accelerated demand for cloud computing

# Azure – The Infrastructure

Quincy



Cheyenne



Dublin



# Amsterdam



# Modular Datacenters – Resiliency for the Field



# Unbelievable Scale

- It is difficult for us “mere mortals” to understand the scale at which these cloud data centers operate...
- ...and how fast more and more are made
- Aspects such as physical security are not to be underestimated
- Note: This is not just true for Microsoft, but Microsoft is at the forefront to this!

# The Mission: Delivering the World's Computer!

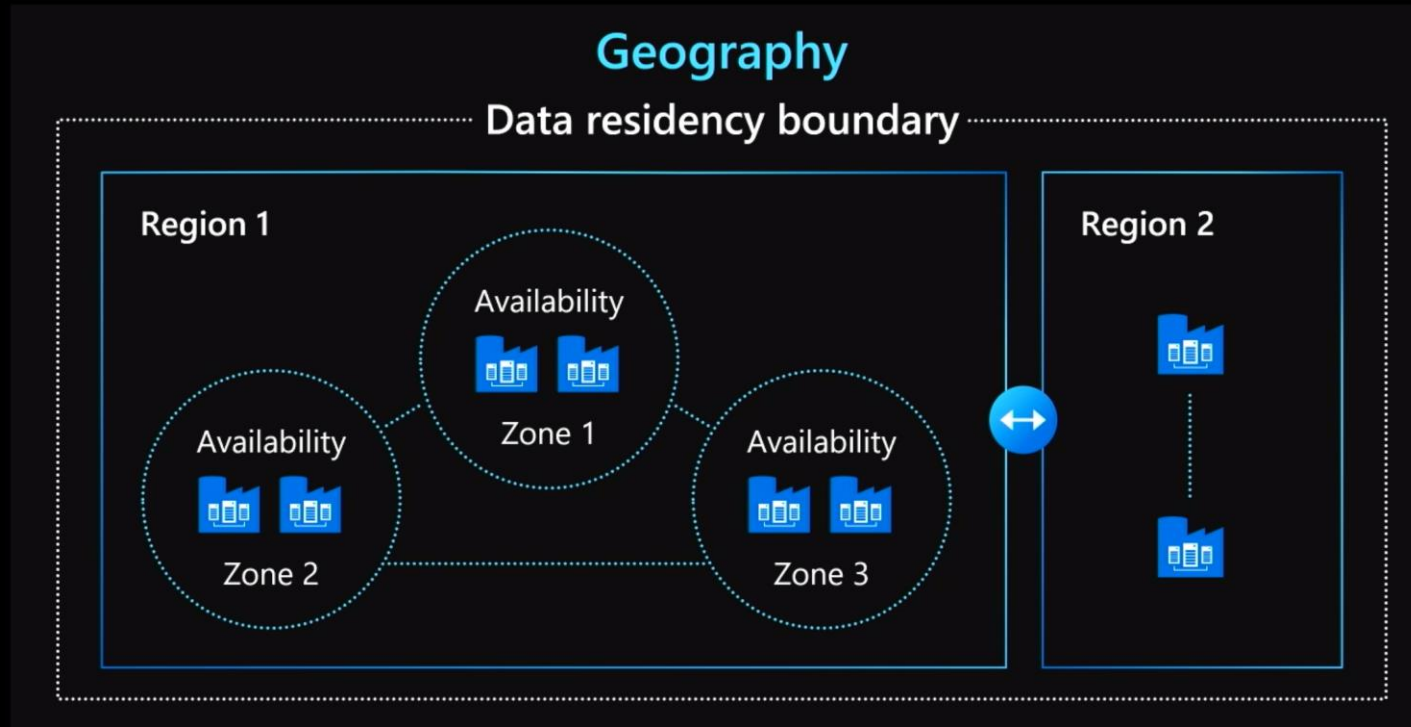


# More Azure Regions and Countries

- 9 new countries added, and 10 additional ones planned
  - Many new countries in Europe
  - Mexico
  - Chile
  - Israel
  - New Zealand
  - Taiwan
  - Indonesia
- Almost no big country in the world without a physical data center
- Solves many data sovereignty and residency needs
- 50-100 data centers added by year

# Availability Zones

## Azure region architecture



# Cloud Security and Privacy

- One trend we are now seeing is a focus on security and privacy beyond what we have seen before
- The ability to put data in the cloud that not even the cloud provider can see
- Microsoft sees that as a unique advantage they want to offer as part of the Azure cloud
- This is not just unique among cloud providers, but goes even beyond of what can often be achieved in private data centers

# Carbon Capture

The background image shows an industrial carbon capture facility at dusk. Two large, dark metal structures, each composed of multiple horizontal panels with numerous circular fans or nozzles, are the central focus. They are illuminated from below, casting a warm glow. In the background, a mountain range is visible under a twilight sky with soft orange and blue hues. To the left, a plume of white steam or smoke rises from the facility. In the foreground, there are various industrial components, including pipes and structural supports.

**1400 metric tons**  
Permanently removed this year

**10,000 years**  
Contracted storage durability

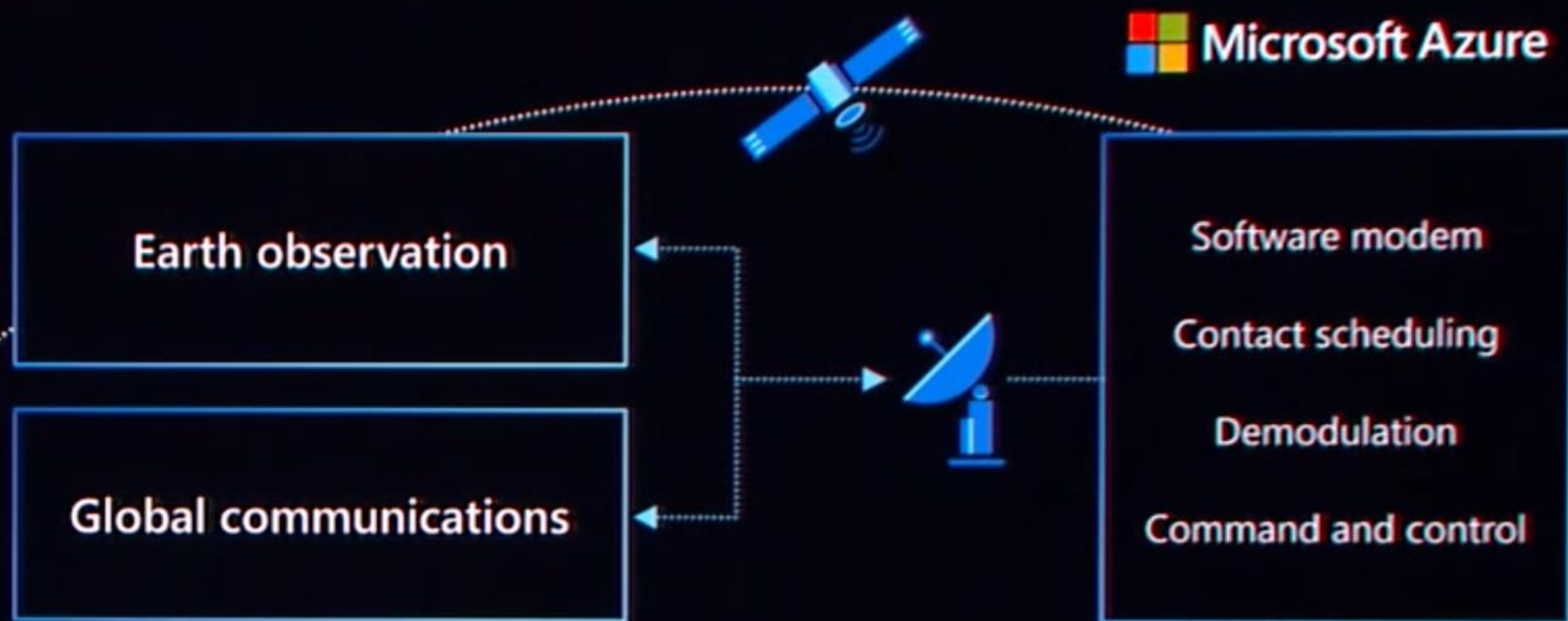
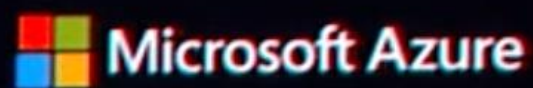
Credit: Climeworks

# Azure Orbital



# Azure Orbital

## Ground Station as a Service



# Azure Hands-On

# Azure Services Developers Should Know

- Azure is a very large collection of services, making it very difficult to keep up with all of them
- It is my goal in this session to point out some services every developer should know...
- ...and some that are just plain cool 😊

# App Services

- Web Apps, Mobile Apps, API Apps, etc.
  - Think “I want to run a web site on Azure”
- Fully managed: OS patching, high availability, scaling
- First class Visual Studio integration

# Related Topic: Static Web Apps

- Many modern web apps do not require server-side processing
  - Examples: Angular, Vue,...
- Azure Static Web Apps provide a streamlined environment for hosting such sites
- Tight GitHub integration

# SQL Server Databases

- There are several different ways to host an SQL Database right on Azure
- The most "native" is to run an "SQL Azure" database
  - This is a service that is fully managed for you. You just create the database and tables you want
  - This is a cloud-optimized version of SQL Server that you do not have to maintain
- You can also run "SQL Server on Azure"
  - This is essentially a pre-configured virtual machine that you can host your database on
  - It's much like your local SQL Server, but hosted in the cloud for you

# Azure Storage

- Blobs, tables, queues & files
- Auto replicated & backed up
- Optional Geo-replication
- Think of this as a “limitless, high-performance, high-reliability file system in the cloud”
- Different tiers are available for cost-efficient storage

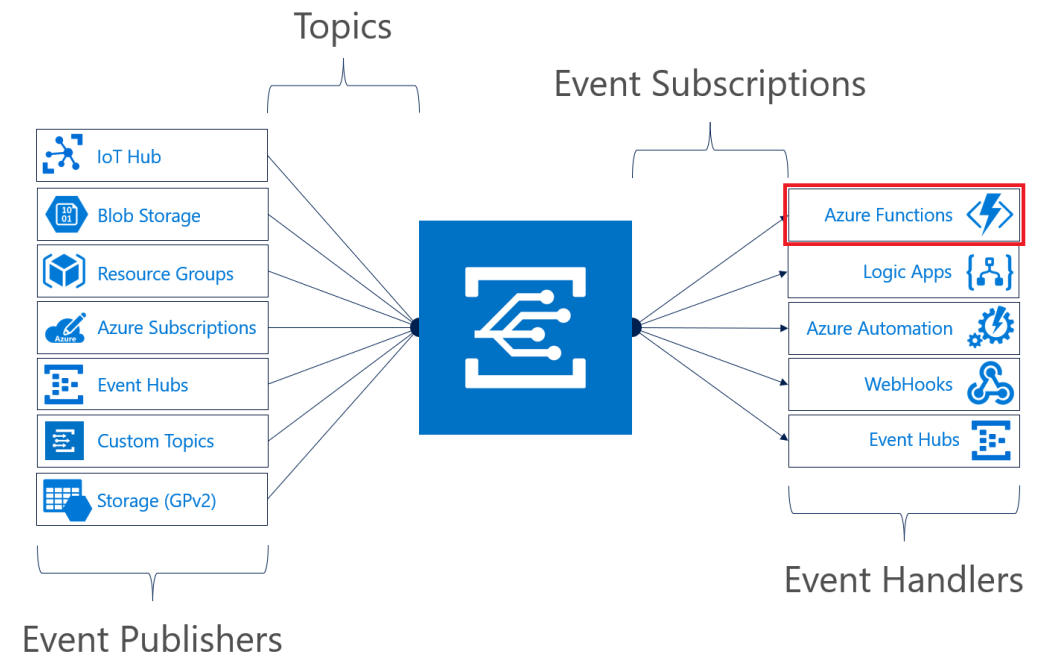
# Azure Functions

- Serverless
  - Which most def. does NOT mean “no servers”. It just means you do not have to worry about the servers involved.
  - You will never be exposed to server provisioning or management
  - You simply say “Go ahead, Cloud!... Run this stuff of mine!”
- Event driven off HTTP, Queues, Timers, etc.
  - Great for simple jobs & workers
- Pay for resource usage



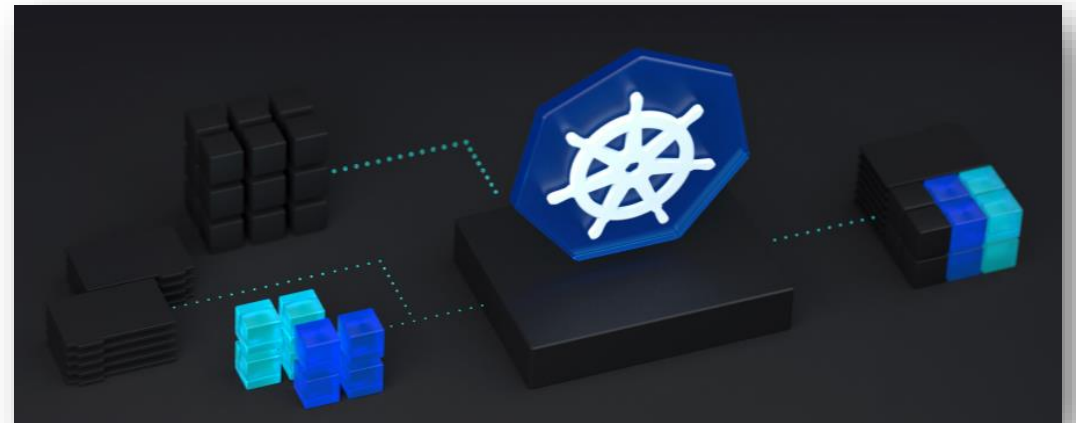
# Related Topic: Azure Event Grid

- Generic service that can link all kinds of event publishers to all kinds of event handlers
- Think of this as “the reactive cloud”
- Cross-Cloud
- Includes IoT events



# Azure Kubernetes Service

- Managed, serverless Kubernetes Service
- Great service to deploy and orchestrate container deployments
- Now also supports Windows Containers
- Azure Arc-enabled Kubernetes supports spanning clusters across data-centers, multi-cloud, and Azure Stack



# Related Topic: Azure Arc

- Azure Arc is a cross-cloud management service
- You can use it to manage all your Azure services...
- ...as well as things that sit in other clouds...
- ...and even servers in your own on-premise datacenter

# Related Topic: Dapr



- Distributed Application Runtime
- Dapr is a further layer of abstraction for building cloud-native applications
- Without Dapr, developers still have to understand a lot of the underlying infrastructure and APIs
- Dapr removes that dependency and provides a higher level of development target that keeps systems more independent
- Dapr is not Azure specific, but Microsoft is putting a lot behind it

# Cosmos DB

- NoSQL Database specifically engineered for the cloud
- Limitless scale
- Fully managed
- Serverless
- Multi-APIs (MongoDB, Casandra,...)



# DevOps

- Microsoft has significant DevOps offerings:
  - Azure DevOps
  - GitHub
- Both will be supported into the future, although GitHub is where most of the future investment will be
- Note: Check out the recording of last month's State of .NET

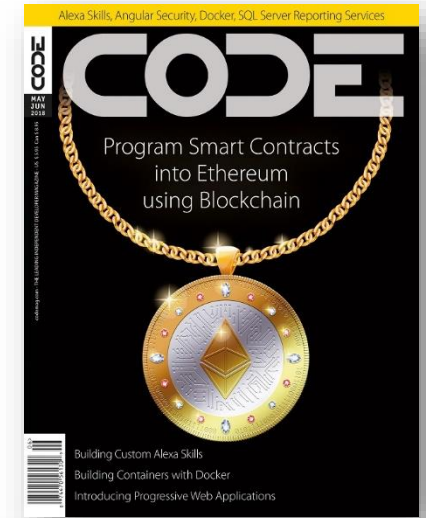
# Azure Communication Services

- This service aids in building communication features into your applications and systems
- Voice and Video chat
- SMS APIs
- Integrate with MS Teams
- \* *Built on Teams tech*



# Microsoft Cognitive Services

- Vision
- Speech
- Language
- Knowledge
- Search
- <https://azure.microsoft.com/en-us/try/cognitive-services/>
- <https://www.codemag.com/Article/1805031/Identify-Faces-with-Microsoft-Cognitive-Services>
- <https://www.codemag.com/Article/1807031/Identify-Voices-with-Microsoft-Cognitive-Services>



# Azure Digital Twins

- Create digital representations of real-world objects and things
  - Places, machines, processes, people,...
- Models the relationships between entities
- Enables tracking and modeling of these entities
- Allows running simulations



# ARM and Bicep

- ARM = Azure Resource Manager
  - This has nothing to do with the ARM hardware architecture
- ARM is a way to manage all your Azure resources
  - Automate resource creation
  - Organize and visualize your resources
  - Control access to resources
- Bicep is a new domain specific language that makes it easier to write ARM Templates
  - There is a VS Code add-in that makes it very easy to create Bicep scripts



# Azure API Management

- Multi-cloud management platform for APIs
- Deployment and management of APIs
- Helps with Security and Compliance
- Usage Limits
- Policies
- API Discoverability
- ...

# And the list goes on and on and on...

- This is just a small sampling of some services I picked out for this talk
- There are 260+ services overall...
- ...and the list is growing very rapidly

# Other Announcements

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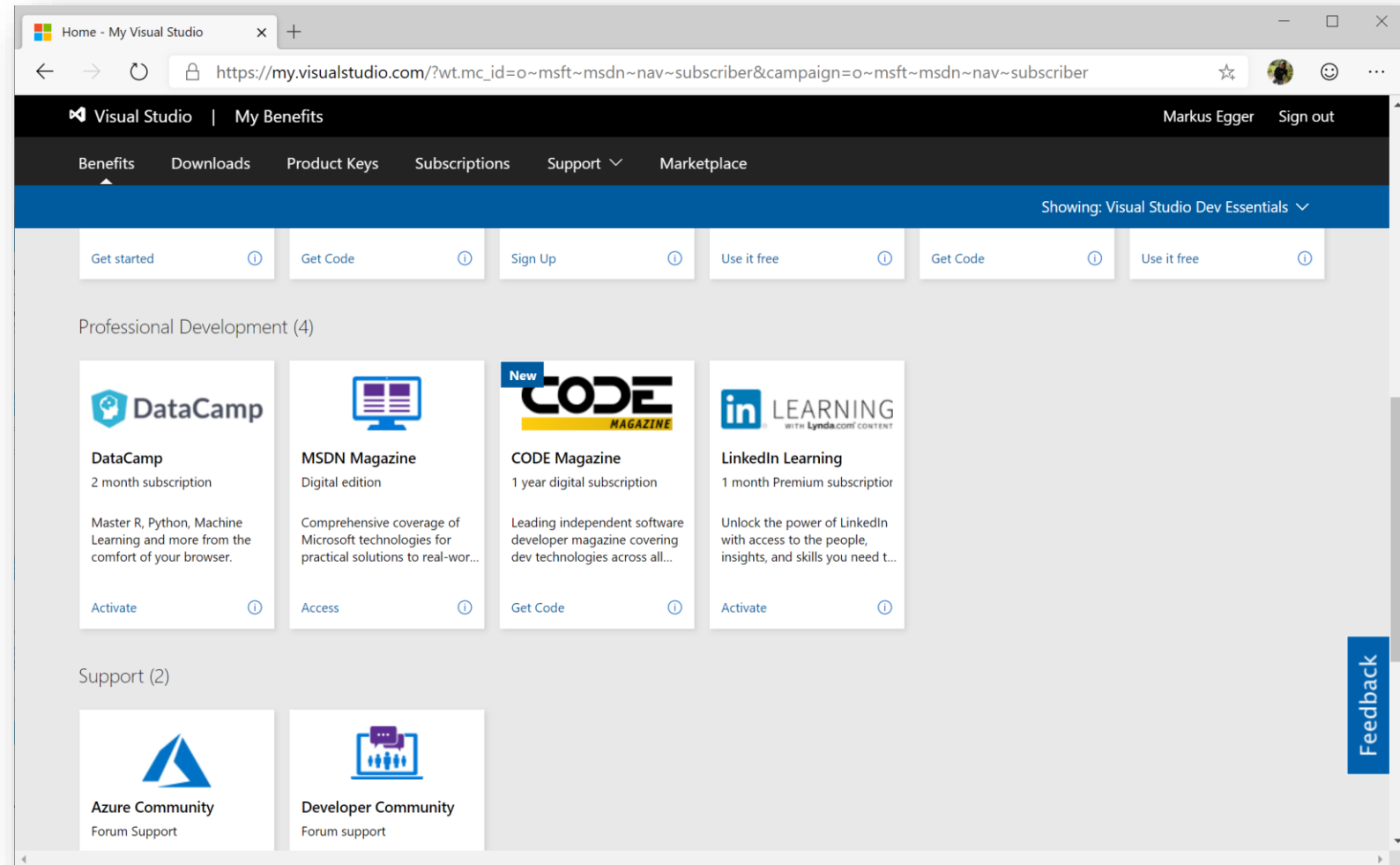
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# Q&A

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