

State of .NET

Azure Architecture

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President and Chief Software Architect

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Kicking Things Off

Jim Duffy

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- Former 11 time Microsoft Most Valuable Professional (MVP)
- Twitter: @jmduffy



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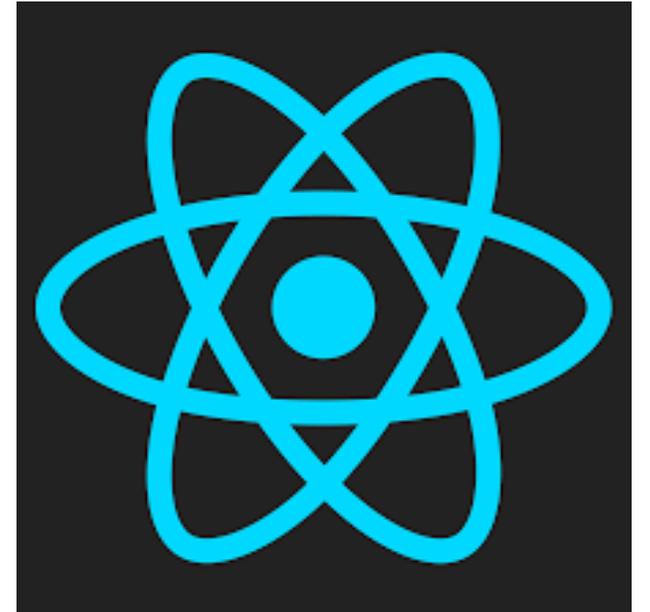


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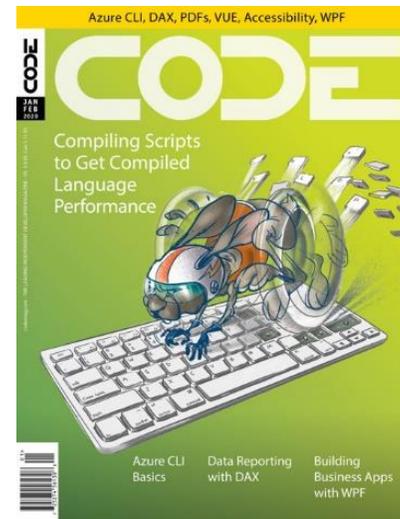
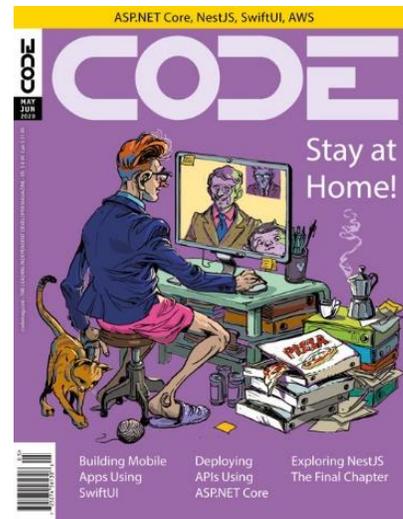
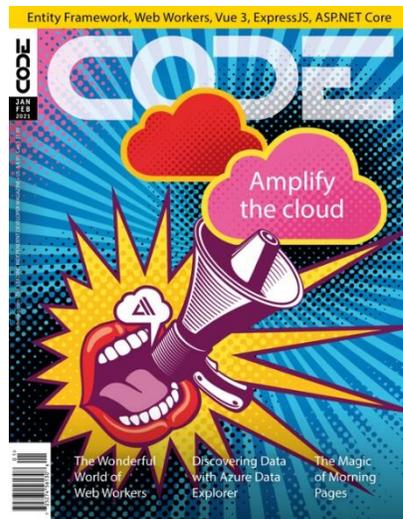
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THIS SLIDE WILL BE REPEATED AT THE END AND SURVEY LINK REPEATED IN THE CHAT WINDOW!

Build Cross Platform Apps With Photino



- Build native, cross-platform desktop apps that are lighter than light.
- Lightweight **open-source** framework for building native, cross-platform desktop applications with Web UI technology.
- Photino is maintained by the CODE Magazine team with the help of the open-source community.
- tryphotino.io
- [Github.com/tryphotino](https://github.com/tryphotino)

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- Slides & Videos:
- State of .NET Webinar Series
 - <https://www.codemag.com/StateOfDotNet>
- CODE Presents Webinar Series
 - <https://www.codemag.com/CODEPresents>

Recent Event Recordings

State of .NET - .NET 6 Preview

10/27/2021



State of .NET - Azure Architecture

9/29/2021



State of .NET - Windows 11 for Developers

7/28/2021



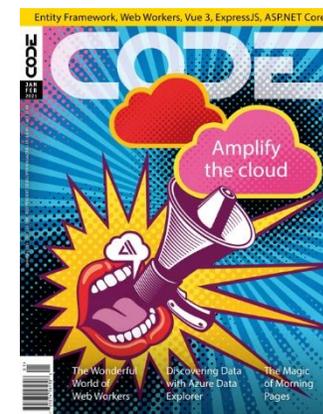
State of .NET - .NET 5 and .NET 6 Preview - with Markus Egger

6/30/2021



About the Presenter

- **Markus Egger**
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Agenda

- Architecting for Azure
- Services worth using...
- ...and in what scenarios

Azure Architecture

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.”*

“Conventional Apps”

- Your system doesn't have to be “cloud-native” to take advantage of many of the cloud offerings
- It is perfectly fine to use bits and pieces of Azure (or any other cloud) to enhance your current apps and systems

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

Various Azure Services

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

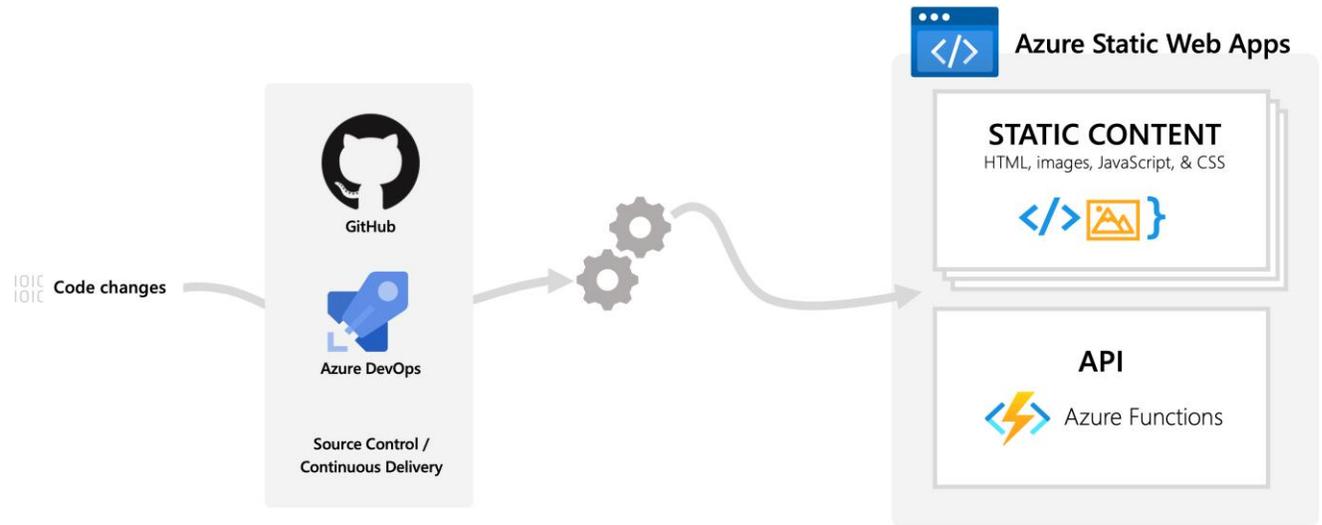
- Web Apps, Mobile Apps, API Apps, etc.
 - Think “I want to run a web site on Azure”
- Fully managed: OS patching, high availability, scaling
- First class Visual Studio integration

App Services – Architectural Thoughts

- It is perfectly fine to use Azure App Services “as is”
 - You do not always need to “containerize” your system, or add advanced orchestration
- Consider Linux as a possible alternative scenarios
 - We managed to reduce expenses considerably by moving from Azure Windows App Services to Azure Linux App Services
 - In our case, the savings are roughly 75%
 - Moving to Linux is relatively easy. We only encountered some relatively minor issues (mostly around line-feeds).

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



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
- Can be used for APIs

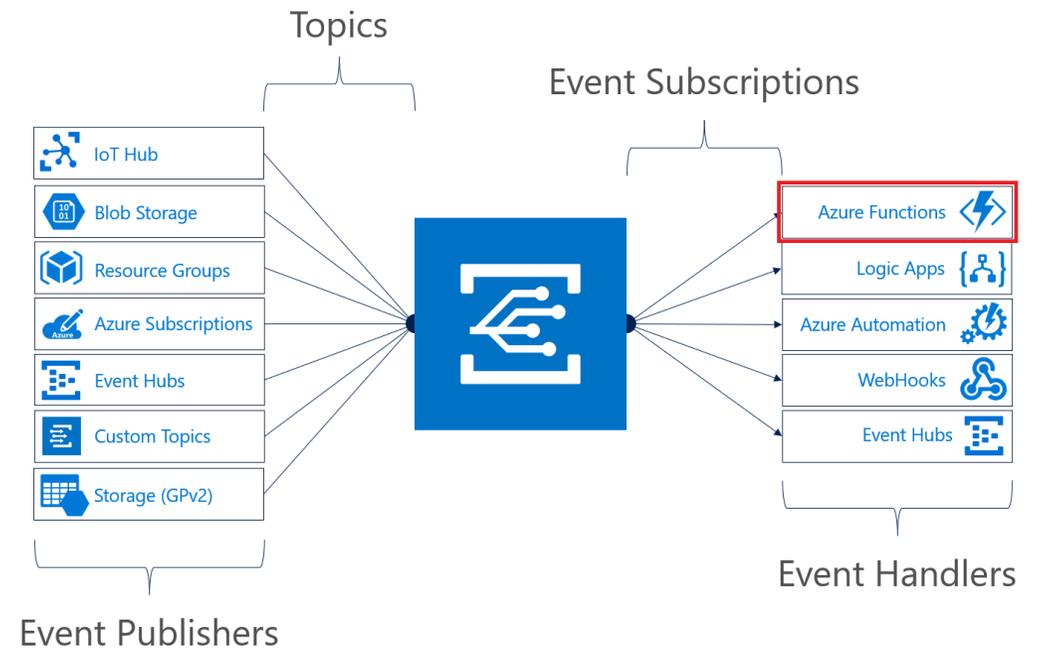


Azure Functions – Architectural Thoughts

- Azure Functions can be a low-expense alternative to APIs hosted in App Services
- Using the right architecture, you can host conventional services/APIs in Functions with no code changes on the client or server
- Note that there is a “cold-start penalty”, so this may not be ideal in scenarios where you need an always-on, quick response

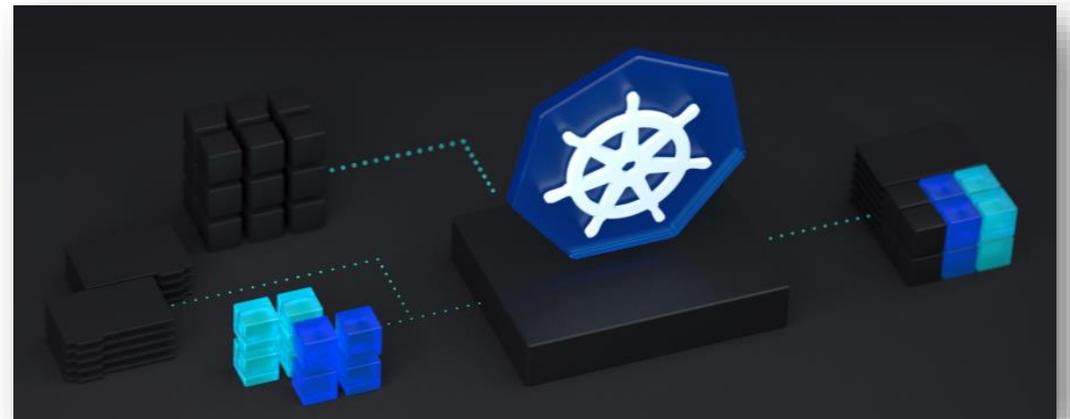
Related Topic: Azure Event Grid

- 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



Azure Kubernetes Service – Architectural Thoughts

- Azure Kubernetes Services is an incredibly powerful offering that is very useful for many scenarios...
- ...however, be aware that this adds a considerable amount of complexity, and the overall setups for this are generally much larger
- Not every system needs an orchestrated Kubernetes cluster!

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

Azure API Management

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

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 Storage – Architectural Thoughts

- Architecturally speaking, this is about as much of a no-brainer as it gets!
- It's cheap and reliable storage
- You can make it remote-accessible (public), or lock it away
- You can easily integrate it with just about any app or system
- It's considerably less expensive than other storage options (like storing files in a database)
 - Consider different "temperature" levels of storage

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

SQL Server – Architectural Thoughts

- Running SQL Azure is less expensive than a “conventional” instance in a virtual machine
- Note that there are some limitations (which – hopefully – should not matter in modern apps 😊)
 - No database diagrams
 - Certain (old) field types are not available
 - No Windows Authentication

Azure SQL Elastic Pool

- Great when you have multiple databases with widely varying performance needs (over time)
- In an Elastic Pool, multiple databases share a common pool of resources
- Expenses are calculated for the entire pool combined

Cosmos DB

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



Cosmos DB – Architectural Thoughts

- There are many scenarios with Cosmos DB is a great fit
 - Examples: Weakly structured data, geographic distribution, very large databases,...
- Not every database needs that size and/or flexibility
- SQL is often just fine!



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 our prior State of .NET focusing on DevOps*

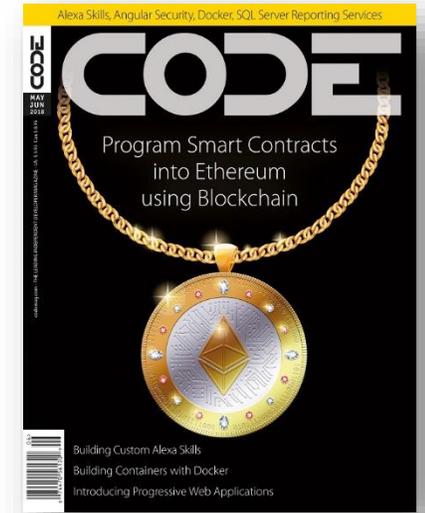
Azure Communication Services

- 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 Cognitive Search Service

- Powerful, intelligent search service
- Search is one of those things that every developer needs at some point, but it's actually really hard to do well
- This service provides ranked search over your data (structured and unstructured)
- The service also provides additional features, such as predictive typing and suggestions

Computer Vision

- Includes services for image and video recognition
- Surprisingly easy to use
- Surprisingly useful in a large percentage of apps
- *Check out our prior State of .NET on Cognitive Services to get some specific examples*

Azure Key Vault

- A great place to store secrets, such as keys and certificates
- Helps with tasks such as encryption
- Allows an app to use keys, without actually having access to those keys directly

A Thought About Security in Azure

- Things in Azure are probably more secure than what most of us can do in our own data centers...
- ...but that does not mean that security isn't an issue!
- You are still responsible for security best practices
- Make sure you understand the configuration of your systems
- Pay attention to Azure recommendations
- Make security a fundamental element of your architecture and implementation, as it isn't possible to just "make it secure later"

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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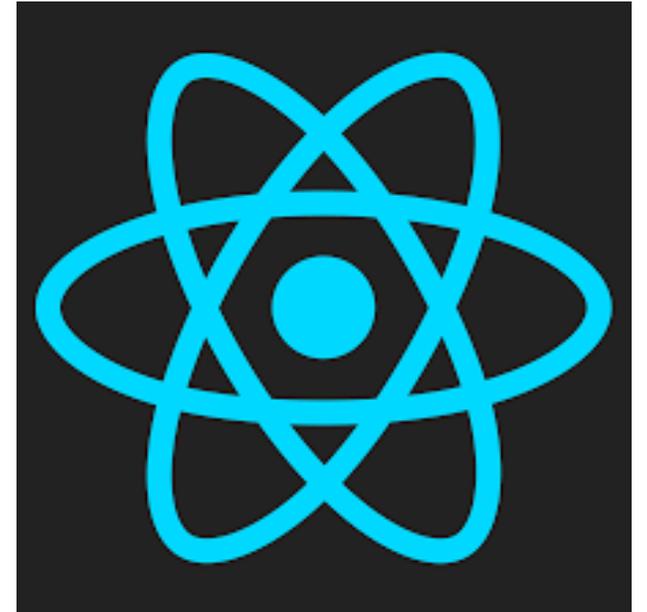
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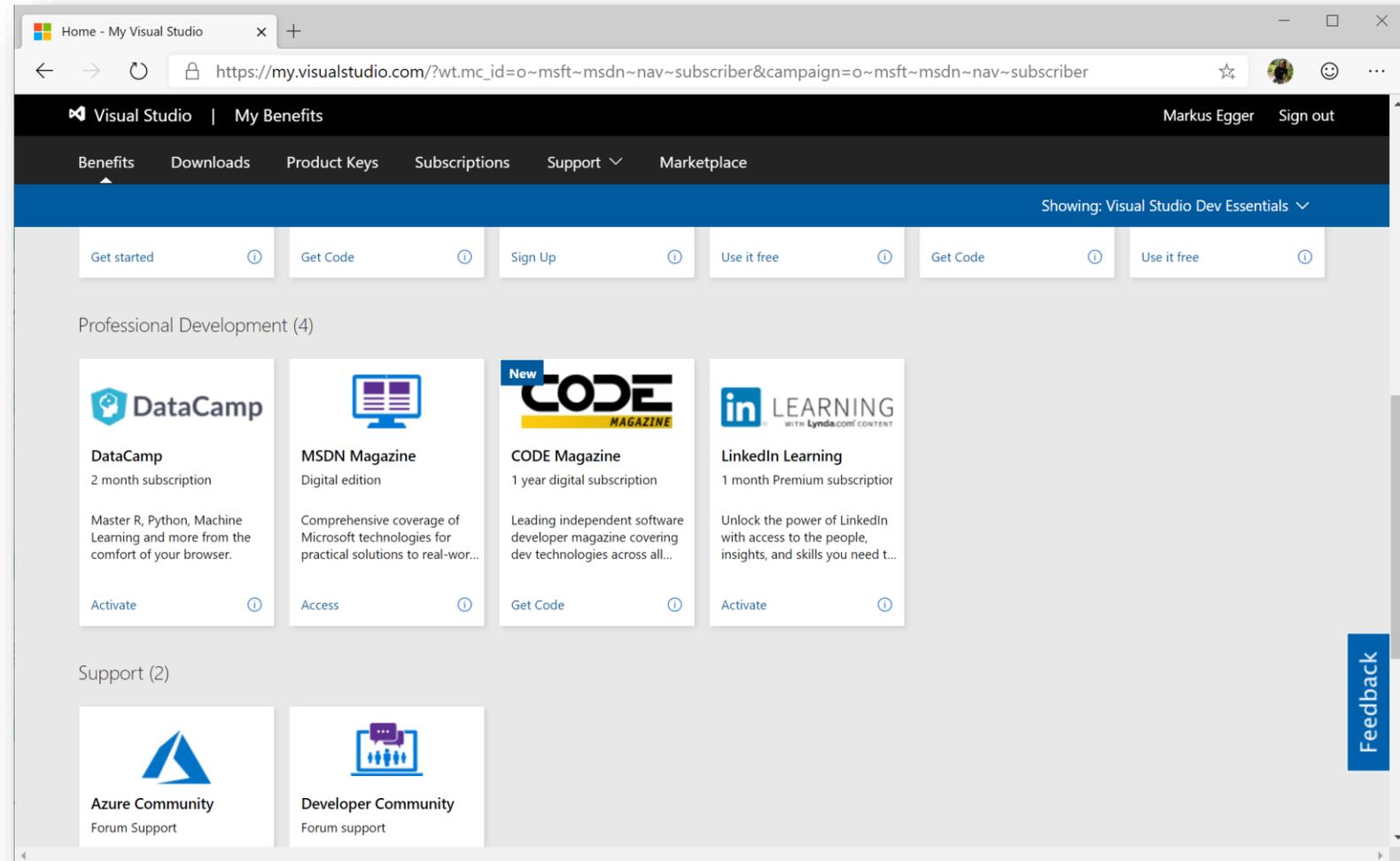
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State of .NET - .NET 6 Preview

October 27, 2021

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3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Q&A

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