What's new in Azure DevOps and .NET

November 22nd, 2018

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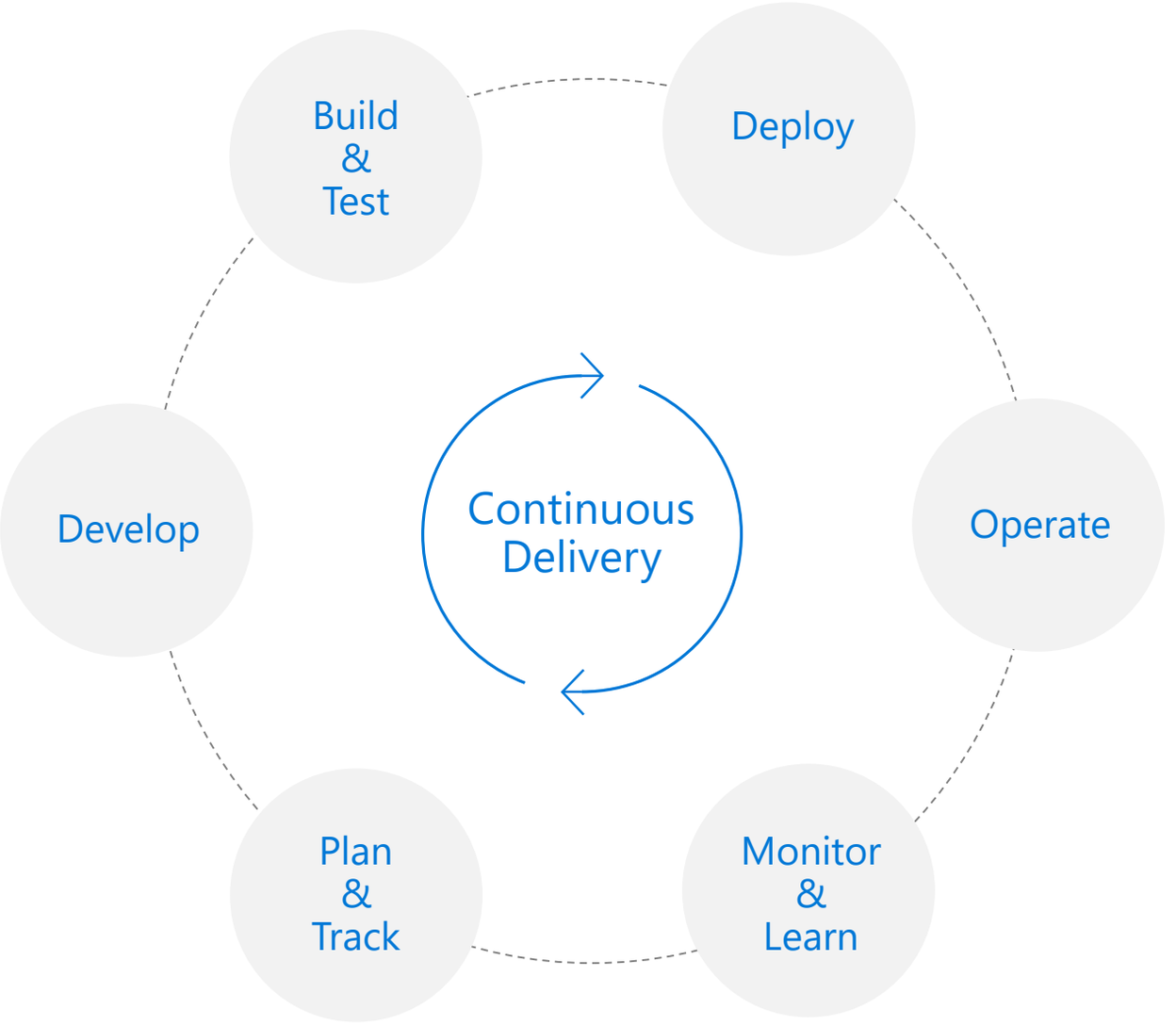
Azure DevOps Overview

What is DevOps?

People. Process. Products.

> DevOps is the union of **people**, **process**, and **products** to enable continuous delivery of value to your end users.

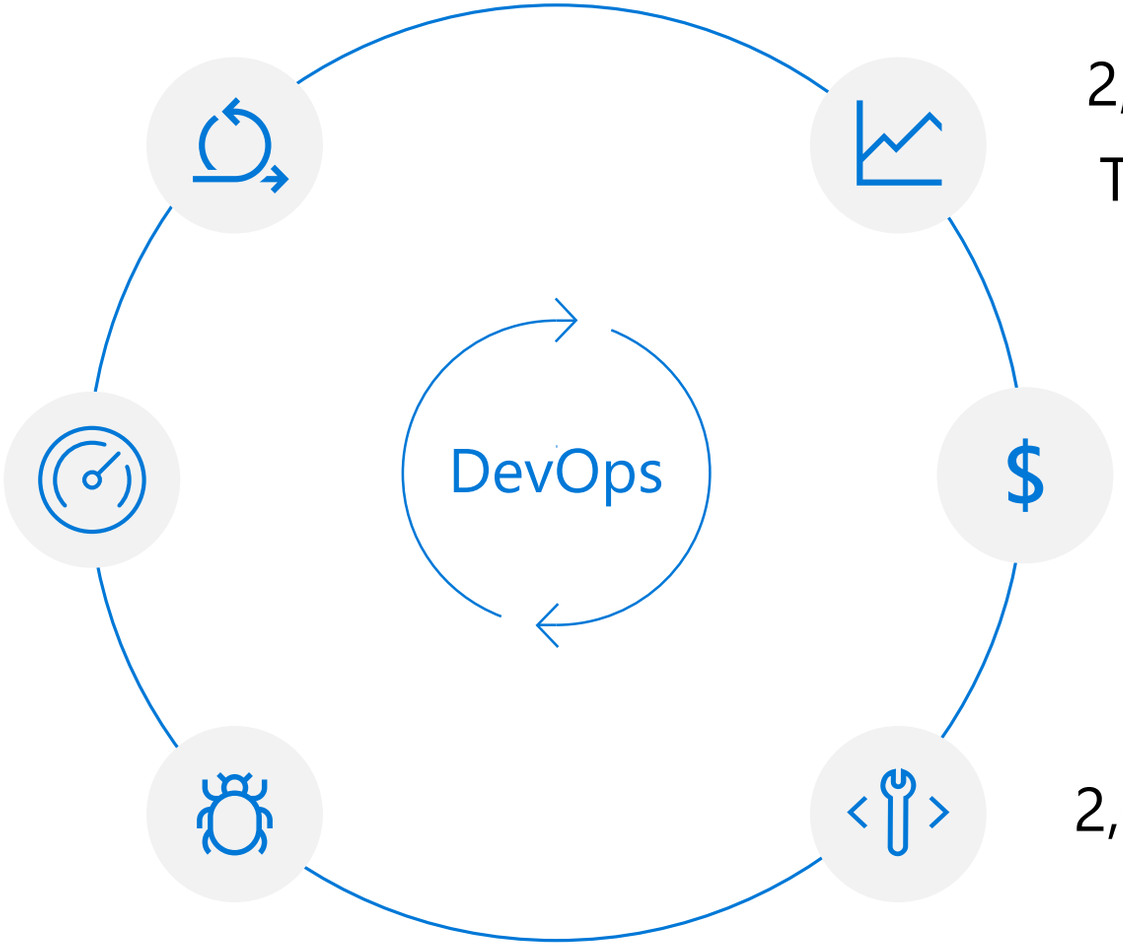


High Performance DevOps Companies Achieve…

46x Deployment Frequency

Faster Time to Market

7x Lower Change Failure Rate



2,555x Faster Lead Time For Changes

Increased Revenue

2,604x Faster Mean Time to Recover

Source: 2018 Accelerate: State of DevOps: Strategies for a New Economy." N. Forsgren, J. Humble, G. Kim. DevOps Research and Assessment (DORA)

How Microsoft can help

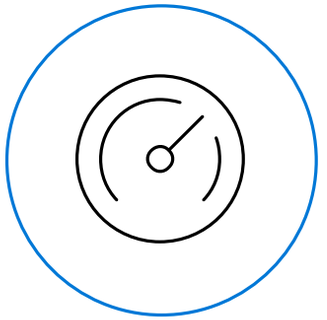
Microsoft Azure is a powerful and flexible foundation for past, present, and future apps – easily build, manage, and deploy any application and any stack on a massive, global network using your favorite tools and frameworks.

Flexible

Choice of IaaS, PaaS, public cloud or hybrid.

Mirror or modernize app infrastructure with VMs, containers, microservices or serverless.

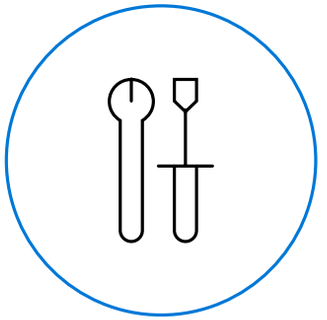
Supports all stages of the app modernization journey – from lift-and-shift to Cloud-Native.



Powerful

Instantly improve the performance, scalability and resiliency of your apps by moving them to the cloud.

Increase business agility with Cloud-Native capabilities and built-in DevOps for continuous innovation.



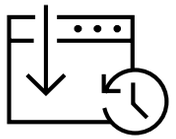
Open

Bring your stack, we bring a cloud that runs any app, on any platform, and any language.

Build applications using the language and tools of your choice - Azure supports what you already use and love so you can get up and running fast – just bring code.

What technologies do I need to support DevOps?

DevOps brings together people, processes, and technology, automating software delivery to provide continuous value to your users. Using Azure DevOps, you can deliver software faster and more reliably - no matter how big your IT department or what tools you're using.



Continuous Integration (CI)

- Improve software development quality and speed.
- When you use Azure Pipelines or Jenkins to build apps in the cloud and deploy to Azure, each time you commit code, it's automatically built and tested and bugs are detected faster.

Continuous Deployment (CD)

- By combining continuous integration and infrastructure as code (IaC), you'll achieve identical deployments and the confidence to deploy to production at any time.
- With continuous deployment, you can automate the entire process from code commit to production if your CI/CD tests are successful.

Continuous Learning & Monitoring

- With Azure Application Insights you can identify how your applications are performing and test if the recent deployment made things better or worse.
- Using CI/CD practices, paired with monitoring tools, you'll be able to safely deliver features to your customers as soon as they're ready.

Introducing Azure DevOps

Azure Boards

Deliver value to your users faster using proven agile tools to plan, track, and discuss work across your teams.

Azure Pipelines

Build, test, and deploy with CI/CD that works with any language, platform, and cloud. Connect to GitHub or any other Git provider and deploy continuously.

Azure Repos

Get unlimited, cloud-hosted private Git repos and collaborate to build better code with pull requests and advanced file management.

Azure Test Plans

Test and ship with confidence using manual and exploratory testing tools.

Azure Artifacts

Create, host, and share packages with your team, and add artifacts to your CI/CD pipelines with a single click.

https://azure.com/devops

Azure DevOps

Better together

Azure Boards

Azure Repos

Azure Pipelines

Azure Test Plans

Azure Artifacts

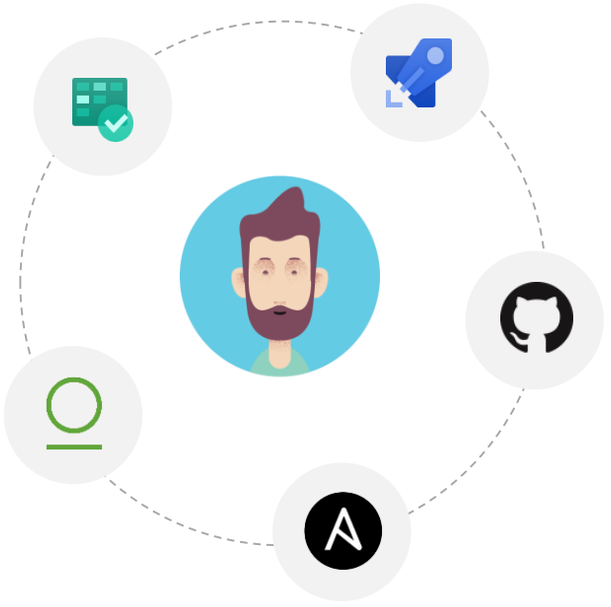
An end-to-end solution for organizations looking for an enterprise-grade toolchain

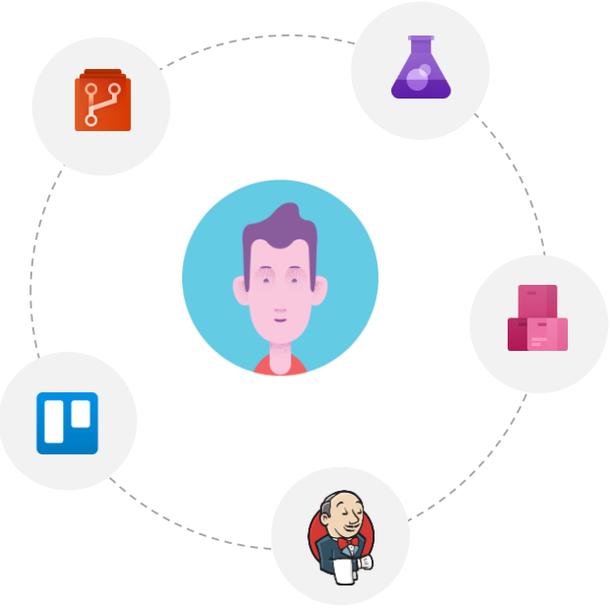
- Fully Integrated with end to end traceability
- Scalable to any team and project size
- Highly available, multi region, hybrid cloud & on-prem
- Customer Support
- Consistent admin and access control

https://azure.com/devops

Azure DevOps: choose the tools and clouds you love

Azure DevOps lets developers choose the tools that are right for them





Mix and match to create workflows with tools from Microsoft, open source or your favorite 3rd party tools

Target any cloud, on-prem or both and deploy to the servers you need

Broadening the Azure Ecosystem

Azure Pipelines

You could deploy from Visual Studio

but...

Azure Pipelines

Cloud-hosted pipelines for Linux, Windows and macOS, with **unlimited minutes** for open source

Any language, any platform, any cloud

Build, test, and deploy Node.js, Python, Java, PHP, Ruby, C/C++, .NET, Android, and iOS apps. Run in parallel on Linux, macOS, and Windows. Deploy to Azure, AWS, GCP or on-premises

Extensible

Explore and implement a wide range of community-built build, test, and deployment tasks, along with hundreds of extensions from Slack to SonarCloud. Support for YAML, reporting and more

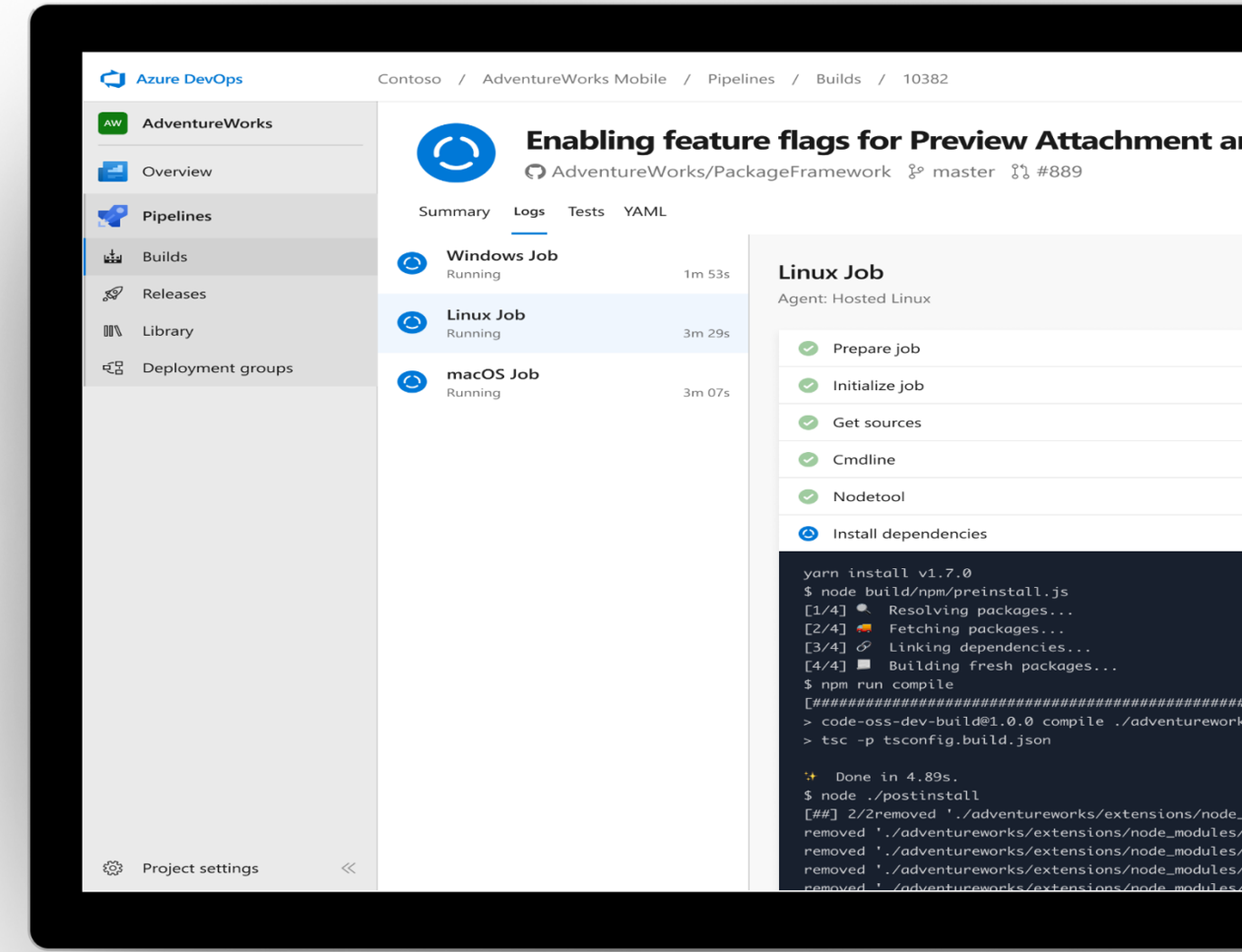
Containers and Kubernetes

Easily build and push images to container registries like Docker Hub and Azure Container Registry. Deploy containers to individual hosts or Kubernetes.

Best-in-class for open source

Ensure fast continuous integration/continuous delivery (CI/CD) pipelines for every open source project. Get unlimited build minutes for all open source projects with up to 10 free parallel jobs across Linux, macOS and Windows

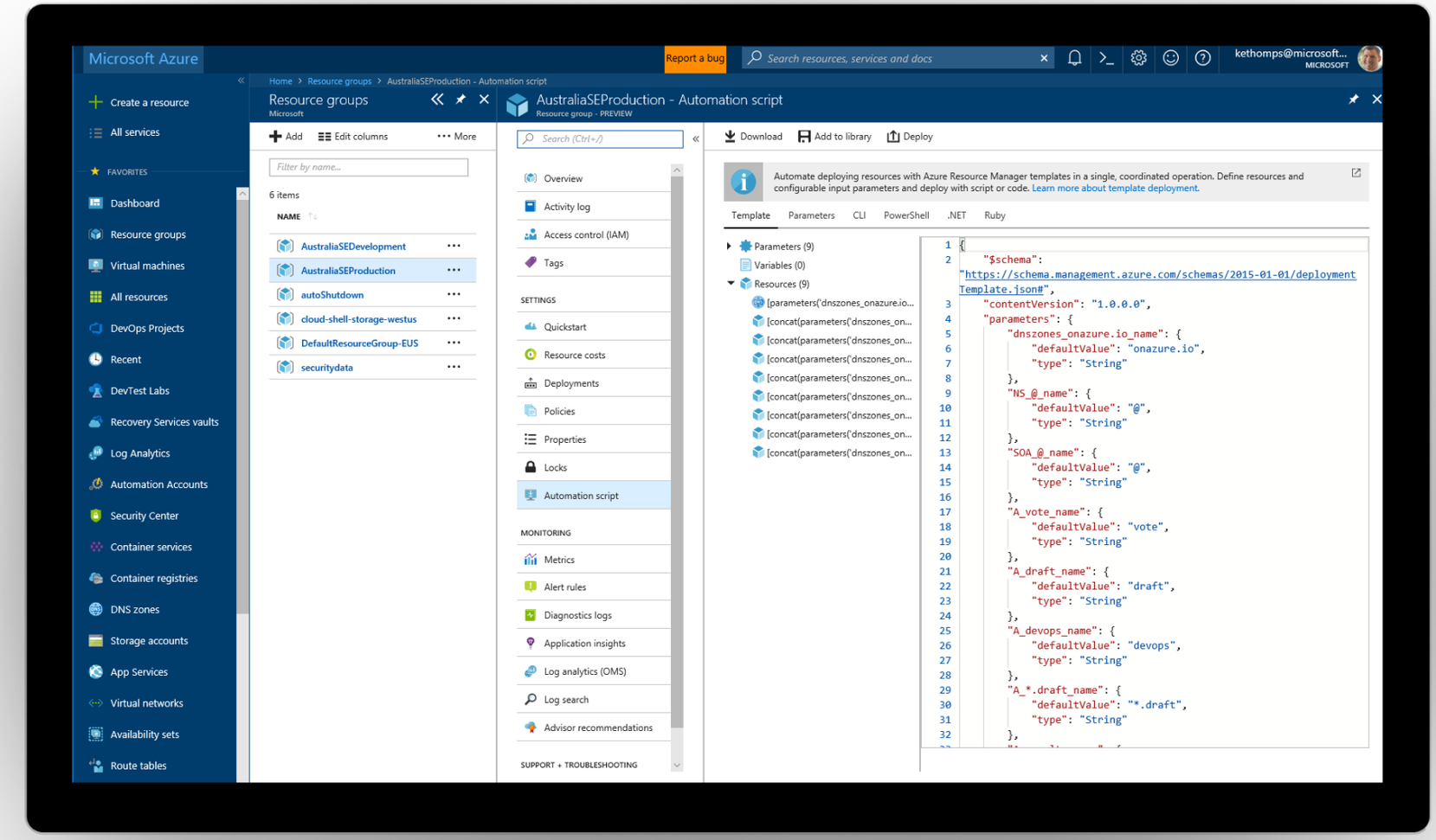
https://azure.com/pipelines



Deploy Repeatedly & Reliably

Azure Resource Manager & DevOps Tools integration

- Infrastructure as Code, built-in with ARM
- Use Azure Config & Automation to automate repetitive tasks
- Support for DevOps tools and OSS tooling such as Terraform, Ansible, Chef, Puppet & SaltStack



Azure Pipelines

Free **unlimited** build minutes for public projects

Up to 10 free parallel jobs across Windows, Linux and macOS

Private projects include 1800 minutes per month

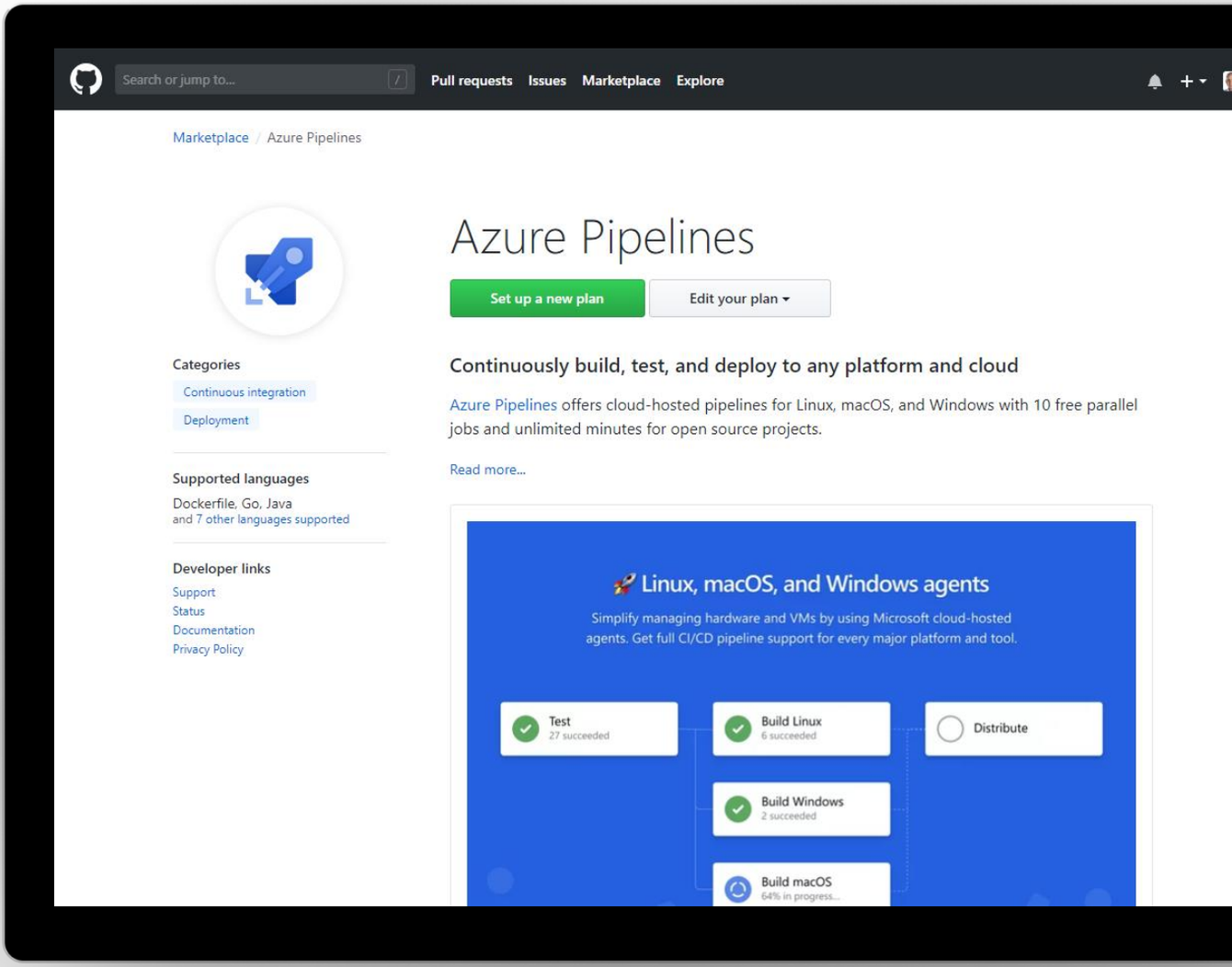
https://azure.com/pipelines

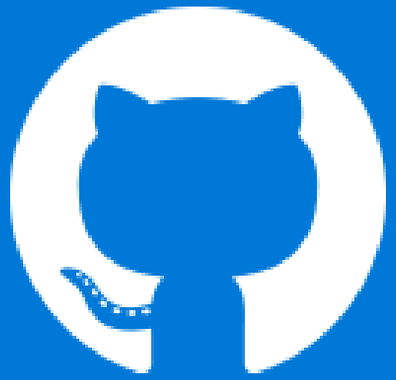
Microsoft ♥ Open Source

Torino Technologies Group

Integrated with GitHub

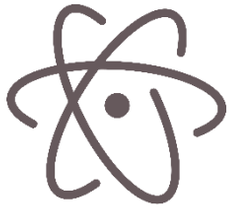
Azure Pipelines available now to any developer from the GitHub Marketplace





Early adopters

GitHub projects already powered by Azure Pipelines for CI



atom/atom

python/cpython

dotnet/reactive

microsoft/vscode

Azure DevOps

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Build, test, and deploy with CI/CD that works with any language, platform, and cloud. Connect to GitHub or any other Git provider and deploy continuously.

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https://azure.com/devops

Azure Boards

Track work with Kanban boards, backlogs, team dashboards, and custom reporting

Connected from idea to release

Track all your ideas at every development stage and keep your team aligned with all code changes linked directly to work items.

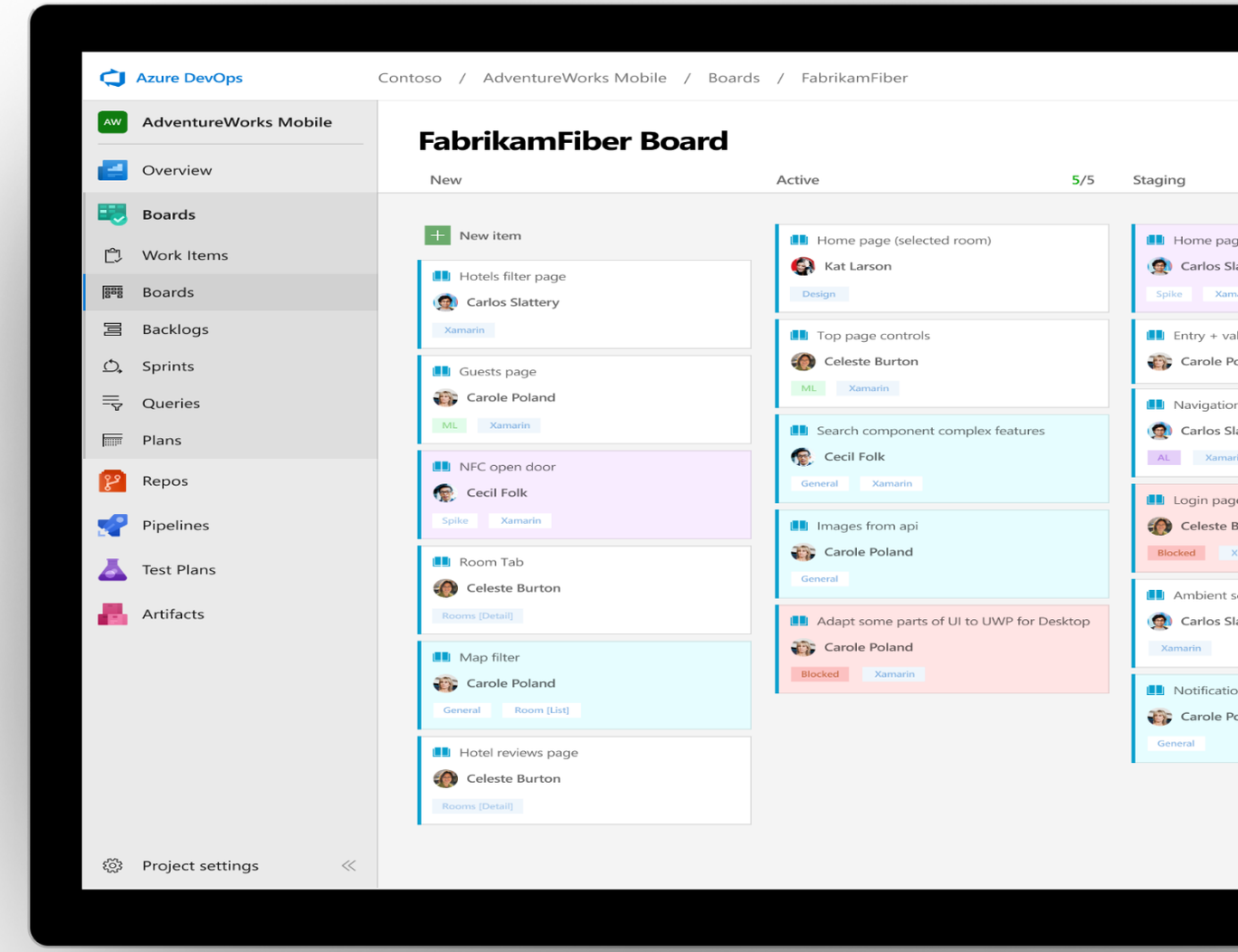
Scrum ready

Use built-in scrum boards and planning tools to help your teams run sprints, stand-ups, and planning meetings.

Project insights

Gain new insights into the health and status of your project with powerful analytics tools and dashboard widgets.

https://azure.com/devops



Azure Repos

Unlimited private Git repo hosting and support for TFVC that scales from a hobby project to the world's largest Git repositories

Works with your Git client

Securely connect with and push code into your Git repos from any IDE, editor, or Git client.

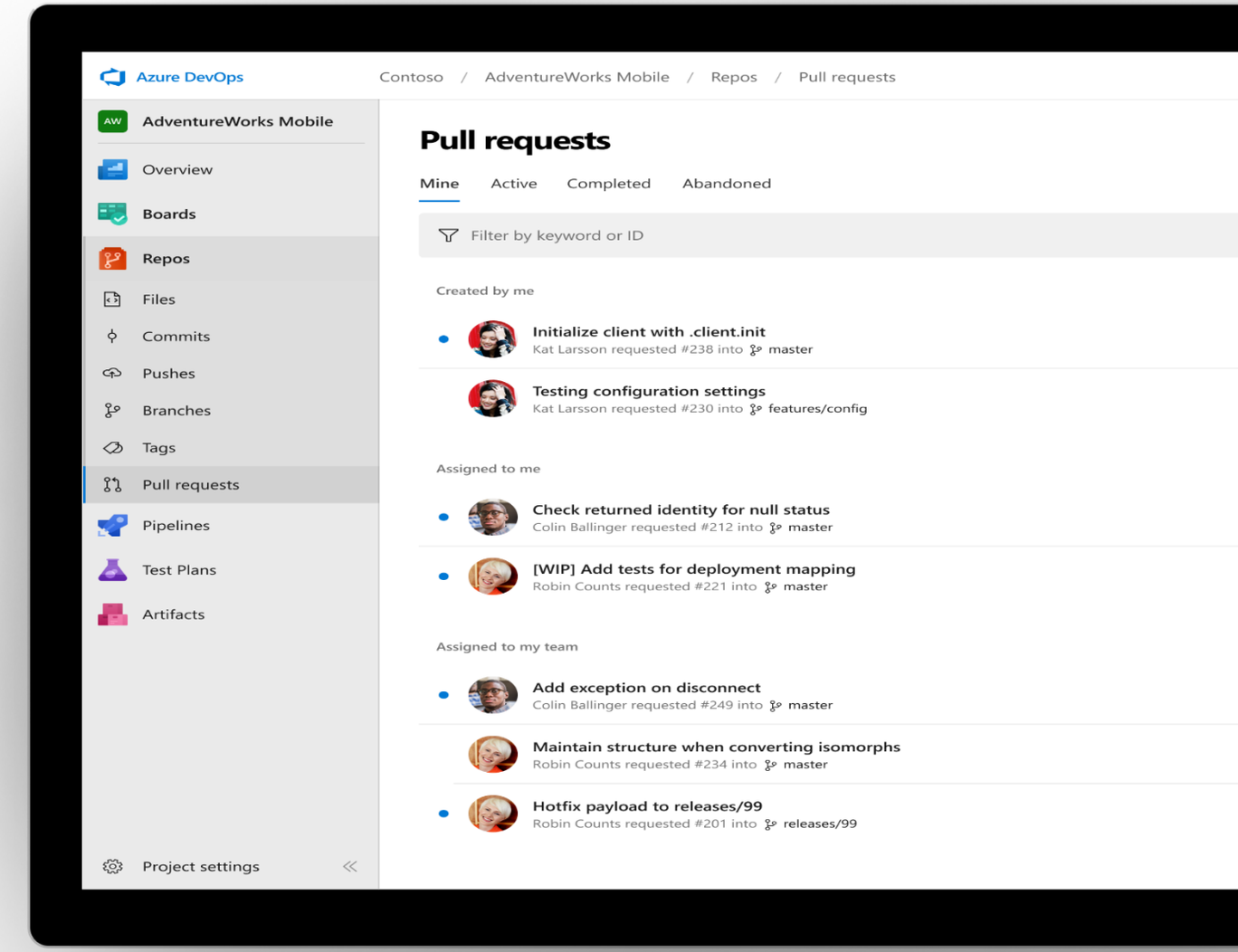
Web hooks and API integration

Add validations and extensions from the marketplace or build your own using web hooks and REST APIs.

Semantic code search

Quickly find what you're looking for with code-aware search that understands classes and variables.

https://azure.com/devops



Azure Test Plans

Get end-to-end traceability. Run tests and log defects from your browser. Track and assess quality throughout your testing lifecycle.

Capture rich data

Capture rich scenario data as you execute tests to make discovered defects actionable. Explore user stories without test cases or test steps. You can create test cases directly from your exploratory test sessions.

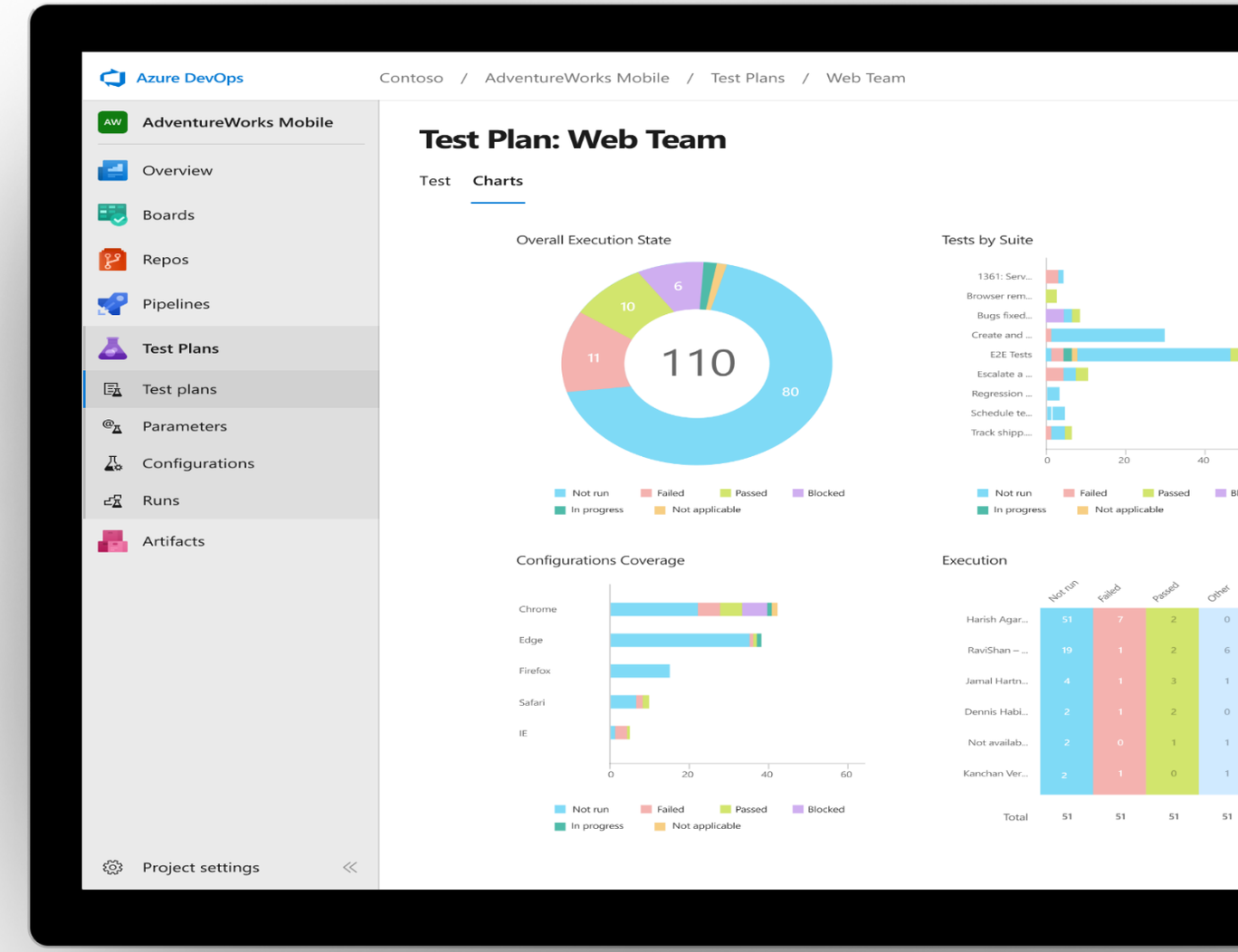
Test across web and desktop

Test your application where it lives. Complete scripted tests across desktop or web scenarios. Test on-premises application from the cloud and vice-versa.

Get end-to-end traceability

Leverage the same test tools across your engineers and user acceptance testing stakeholders. Pay for the tools only when you need them.

https://azure.com/devops



Azure Artifacts

Create and share Maven, npm, and NuGet package feeds from public and private sources – fully integrated into CI/CD pipelines

Manage all package types

Get universal artifact management for Maven, npm, and NuGet.

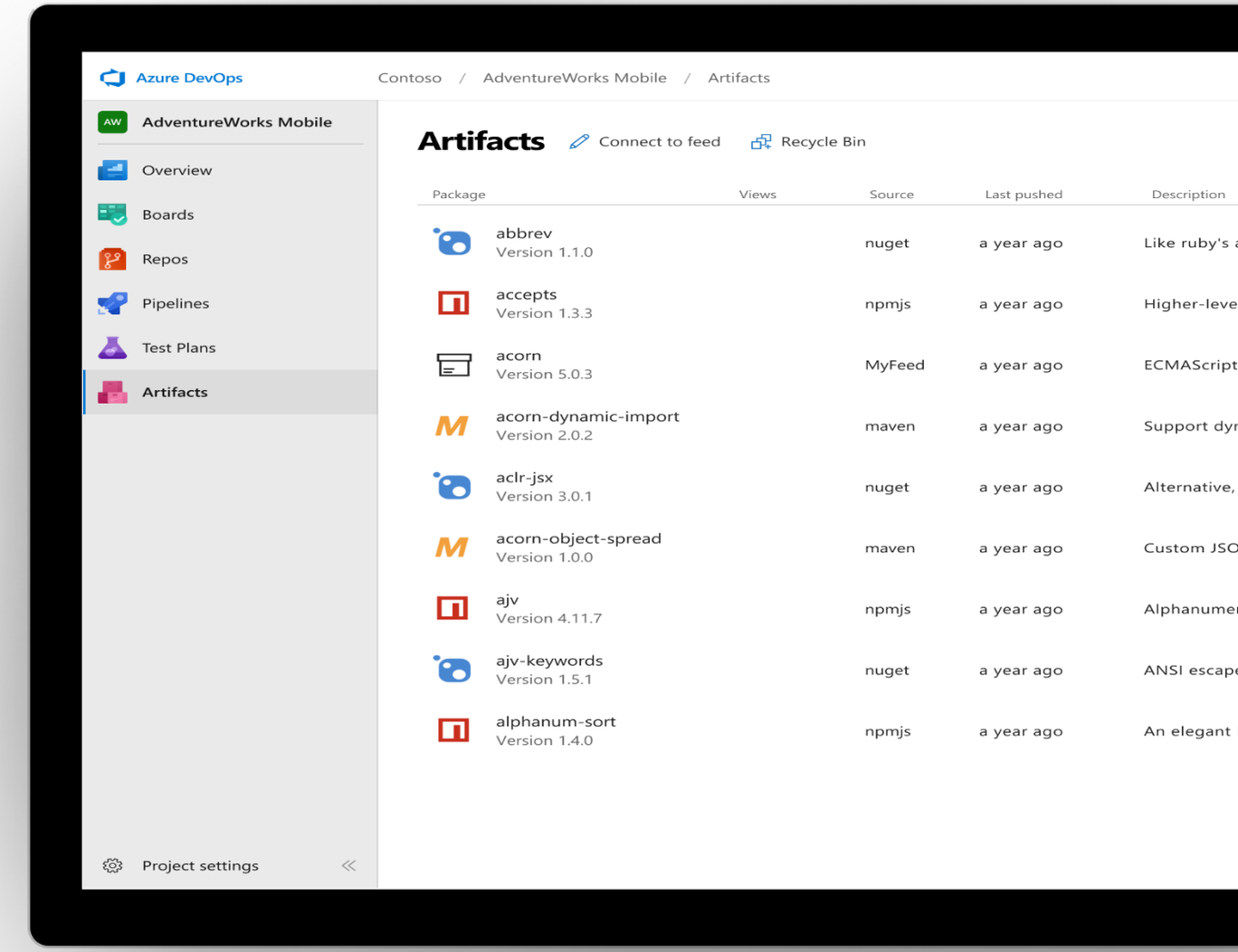
Add packages to any pipeline

Share packages, and use built-in CI/CD, versioning, and testing.

Share code efficiently

Easily share code across small teams and large enterprises.

https://azure.com/devops



DevOps at Microsoft

Azure DevOps is the toolchain of choice for Microsoft engineering with over 90,000 internal users

https://aka.ms/DevOpsAtMicrosoft

372k
Pull Requests per month

4.4m
Builds per month

5m
Work items viewed per day

2m
Git commits per month

500m
Test executions per day

500k
Work items updated per day

78,000
Deployments per day

Data: Internal Microsoft engineering system activity, August 2018

Changes for existing VSTS / TFS customers

The same functionality you know and love today, with greater openness, flexibility and focus

Existing Accounts

- Existing **https://contoso.visualstudio.com** URL continues to work. **https://dev.azure.com/contoso** available for opt-in.
- New **UI opt-in** per user as preview feature. Will start advertising new UI once feedback from new accounts and early adopters has been incorporated.
- Can disable services on a per project basis for new UI
- New Azure branding in communications and documentation (emails, alerts etc).
- Websites and documentation will move from Visual Studio to Azure based locations (with redirects in place).
- Redirects available for some time.
- TFS will remain the on-premises brand until the next major version in 2019. The new UI will be enabled in that release.
- Existing TFS branded information and downloads remain in Visual Studio locations until next release.

Pricing

- **Public project usage is now free.**
- The free tier for Pipelines now includes **1,800** minutes per month, up from 240.
- Pipelines can be used independently from Repos — so if you are only using Pipelines and your repos are hosted on GitHub you don't need to pay for Repos or Boards (Basic) users.

New Accounts

- https://dev.azure.com/contoso based URL.
- New navigation & branding by default.

https://azure.microsoft.com/en-us/blog/introducing-azure-devops-server-2019-rc1/

Migrating from TFS to Azure DevOps

Move from Team Foundation Server to Azure DevOps and bring your data along

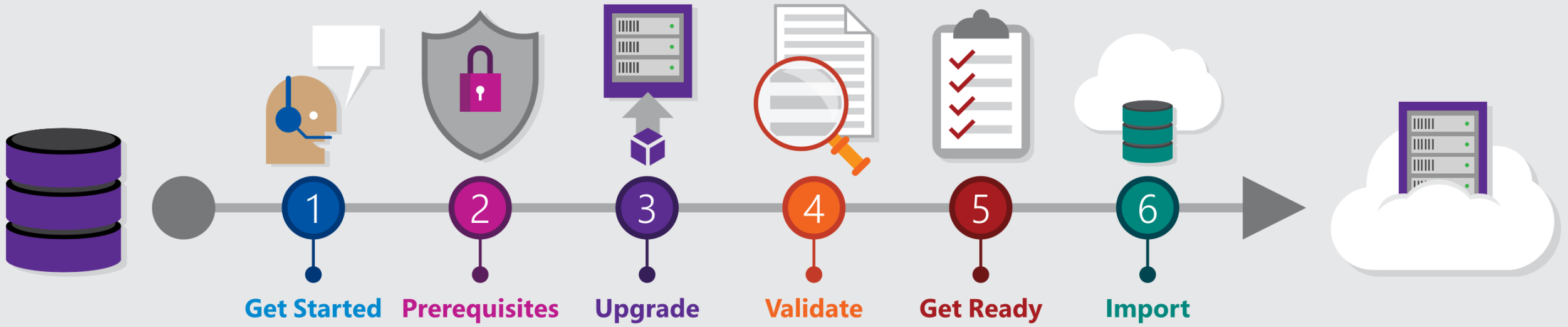
Benefits of Cloud Hosted Azure DevOps Services

- Global availability
- Hosted and maintained by Microsoft with 99.9% uptime guarantee and 24x7 support
- Immediate access to latest features
- Simplified deployment to Azure

TFS Import Service

- Fully supported high fidelity migration path
- Trusted by many large enterprises
- Now faster and easier to use

https://aka.ms/tfsimport



Azure DevOps Services Pricing

Open Source Projects

Free

Unlimited users and build time

- **Azure Pipelines:** 10 parallel jobs with unlimited minutes for CI/CD
- **Azure Boards:** Work item tracking and Kanban boards
- **Azure Repos:** Unlimited public Git repos

Small Teams

Free

Start free with up to 5 users

- **Azure Pipelines:** Run 1 Microsoft-hosted job for 1,800 minutes per month and 1 self-hosted job for any amount of time
- **Azure Boards:** Work item tracking and Kanban boards
- **Azure Repos:** Unlimited private Git repos
- **Azure Artifacts**: package management
- Load testing (20,000 VUMs/month)
- Unlimited stakeholders

Teams of any size

Starts at €5

per user, per month for Boards & Repos*

Easy pricing that grows with your team

- **Azure Pipelines:** Run 1 Microsoft-hosted job for 1,800 minutes per month and 1 self-hosted job for any amount of time
- **Azure Boards:** Work item tracking and Kanban boards
- **Azure Repos:** Unlimited private Git repos
- **Azure Artifacts**: package management
- Load testing (20,000 VUMs/month)
- Unlimited stakeholders
- Visual Studio subscribers included free

https://azure.com/pricing/details/devops/

* 5 Boards & Repos users and 5 Artifacts users free. Pipelines with unlimited minutes, Test Plans users and additional Artifacts users also available. Please see the Azure pricing calculator for details.

Demo

Azure DevOps

Azure DevOps

Azure Boards

Azure Repos

Azure Pipelines

Azure Test Plans

Azure Artifacts

Plan smarter, collaborate better, and ship faster with a set of modern dev services

Any developer, any platform, any cloud. Full support for hybrid cloud, on-premises & containers.

Use all the Azure DevOps services or choose just what you need to complement your existing workflows

Best in class builds for open source. Free unlimited build minutes for public projects and up to 10 free concurrent jobs across Windows, Linux and macOS

Get started for free for small teams, scales to support the largest enterprises

Start free today

https://azure.com/devops

Azure DevOps

#AzureDevOps

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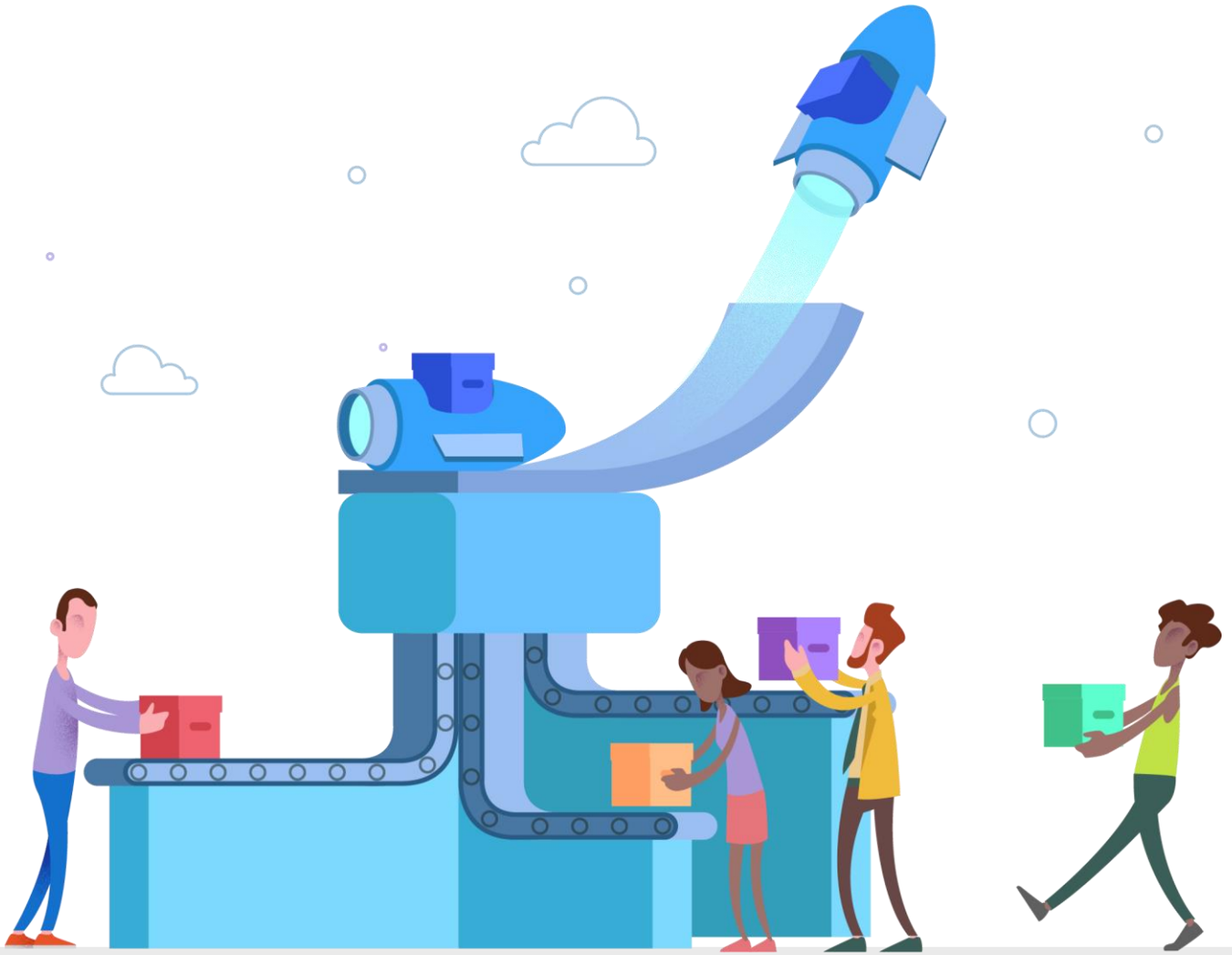
https://aka.ms/AzureDevOpsForum

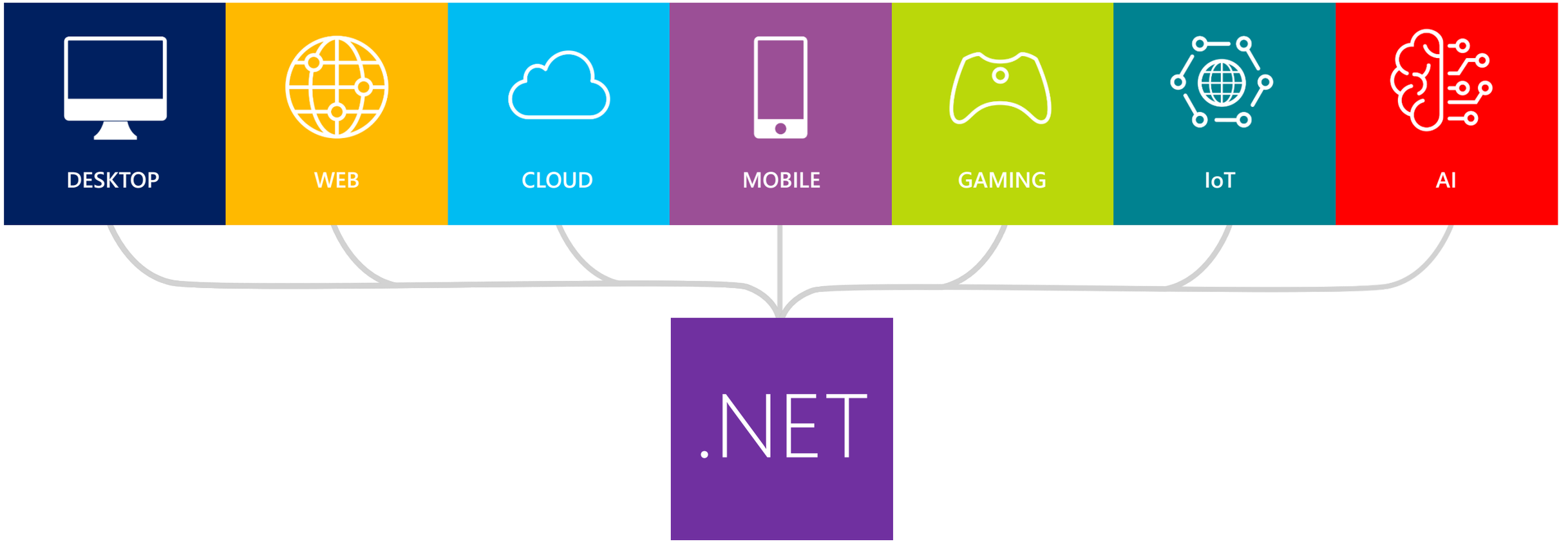
https://aka.ms/DevOpsBlog/



Q&A

What’s new in .NET ecosystem

Your platform for building anything



.NET Core 2.1

.NET Core 2.1

Major Features

.NET Core

Global Tools
Span<T>
Sockets
HttpClient Performance
Windows Compatibility Pack

EF Core

Lazy Loading
Value conversions
Query types
Data seeding

ASP.NET Core

HTTPS
Razor UI as a library
IHttpClientFactory
ASP.NET Core SignalR

www.dot.net

https://blogs.msdn.microsoft.com/dotnet/2018/05/30/announcing-net-core-2-1/

.NET Core 2.1

Global Tools

A .NET Core Global Tool is **a special NuGet package that contains a console application**. A Global Tool can be installed on your machine on a default location that is included in the PATH environment variable or on a custom location.

```
dotnet tool install -g $packageId
```

https://github.com/natemcmaster/dotnet-tools

.NET Core 2.1

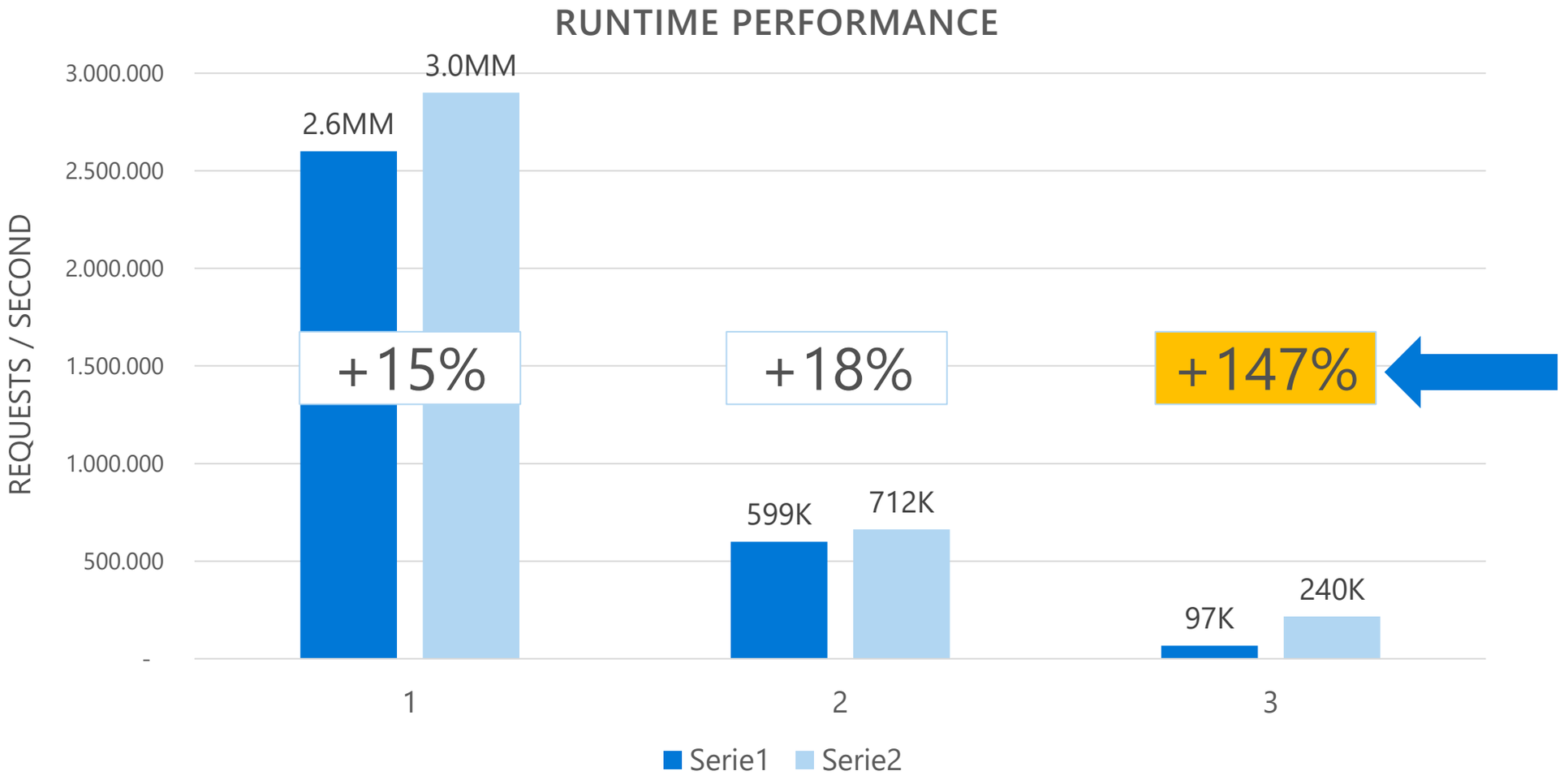
Span<T>

A **new value type** at the heart of .NET. It enables the representation of **contiguous regions of arbitrary memory**, regardless of whether that memory is associated with a managed object, is provided by native code via interop, or is on the stack. And it does so while still providing **safe access** with **performance** characteristics like that of arrays.

https://msdn.microsoft.com/en-us/magazine/mt814808.aspx
https://channel9.msdn.com/Events/Connect/2017/T125

.NET Core 2.1

Performance improvements



Data sourced from tests on TechEmpower round 16

.NET Core 2.1

Windows Compatibility Pack

When porting **existing code** from the .NET Framework to .NET Core, you can use the Windows Compatibility Pack.

It provides access to an additional 20,000 APIs, compared to what is available in .NET Core. This includes System.Drawing, EventLog, WMI, Performance Counters, and Windows Services.

If you plan to make your code **cross-platform**, use the new API Analyzer to ensure you don't accidentally *depend on Windows-only APIs*.

https://blogs.msdn.microsoft.com/dotnet/2017/11/16/announcing-the-windows-compatibility-pack-for-net-core/

ASP.NET Core 2.1

HttpClientFactory

Helps to solve some common problems that developers may run into when using HttpClient instances to make external web requests from their applications.

https://www.stevejgordon.co.uk/introduction-to-httpclientfactory-aspnetcore

Azure SignalR General Availability

Add real-time web functionalities easily with Azure and .NET Core

Enable via “services.AddSignalR().AddAzureSignalR()”

Fully managed service

No more worries about capacity provisioning, scaling, or persistent connections

Native SignalR development

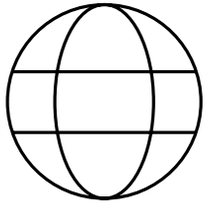
Use ASP.NET Core SignalR to build real-time experiences such as chat, stock tickers, live dashboards, and instant broadcasting

https://azure.microsoft.com/en-us/services/signalr-service/

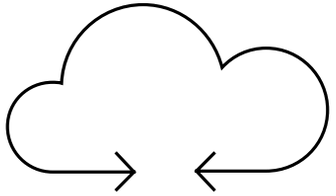
.NET Core 2.2

.NET Core 2.2

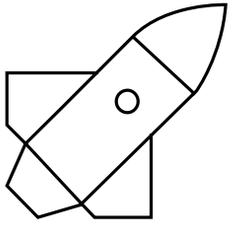
Main Themes



Improved Web API Development



Microservices and Azure



Continued Performance Improvements

.NET Core 2.2 Preview 3 Now Available

https://aka.ms/DotNetCore22

.NET Core 2.2

Major Features

.NET Core

Multi-tier JIT compilation

SQL Connection token auth

EF Core

Cosmos DB provider

Spatial extensions for SQL Server and SQLite providers

Reverse engineering of database views

Collections of owned entities

Query tagging

ASP.NET Core

Template updates: Bootstrap 4, Angular 6

Web API improvements, including API security

HTTP/2

IIS in-process hosting

Health checks

Endpoint routing

SignalR Java client

https://blogs.msdn.microsoft.com/dotnet/2018/08/02/tiered-compilation-preview-in-net-core-2-1/

.NET Core v.Next

Visual Studio 15.9 and .NET Core Tooling support

Up to 15.8.x., installing a preview version of the .NET Core SDK would cause **all** Visual Studio tooling for .NET Core to use that SDK because it had a higher version.

Starting with Visual Studio 2017 version 15.9, there is a compatibility check in the .NET Core SDK that allows for a given SDK to mark a minimum required Visual Studio version. This ensures that the Visual Studio tools for .NET Core **will not try to use an SDK that requires a newer Visual Studio version**.

So, **Preview SDKs will not be consumed by default**.

.NET Core v.Next

Visual Studio 15.9 and .NET Core Tooling support

Up to 1 ause
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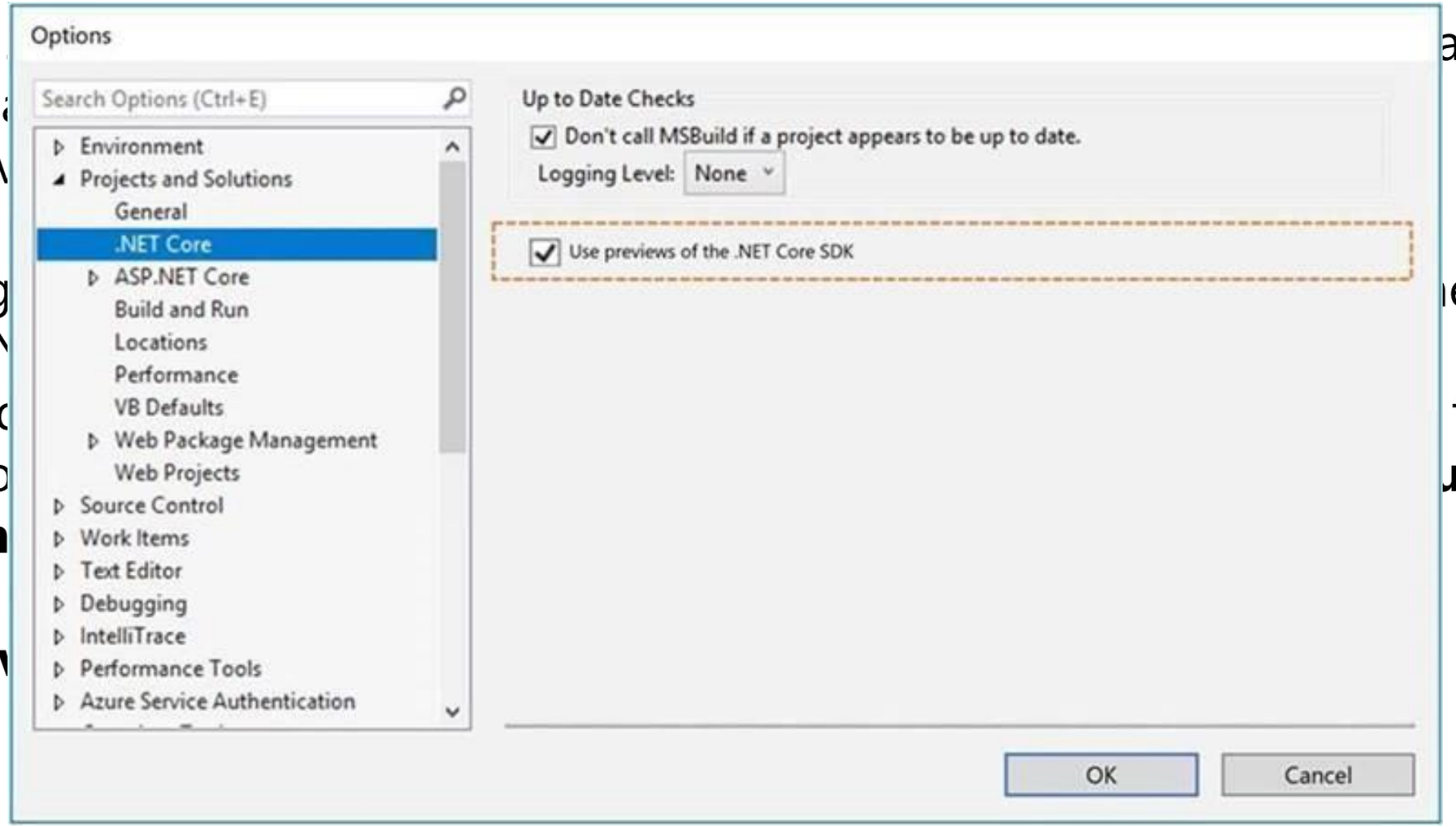
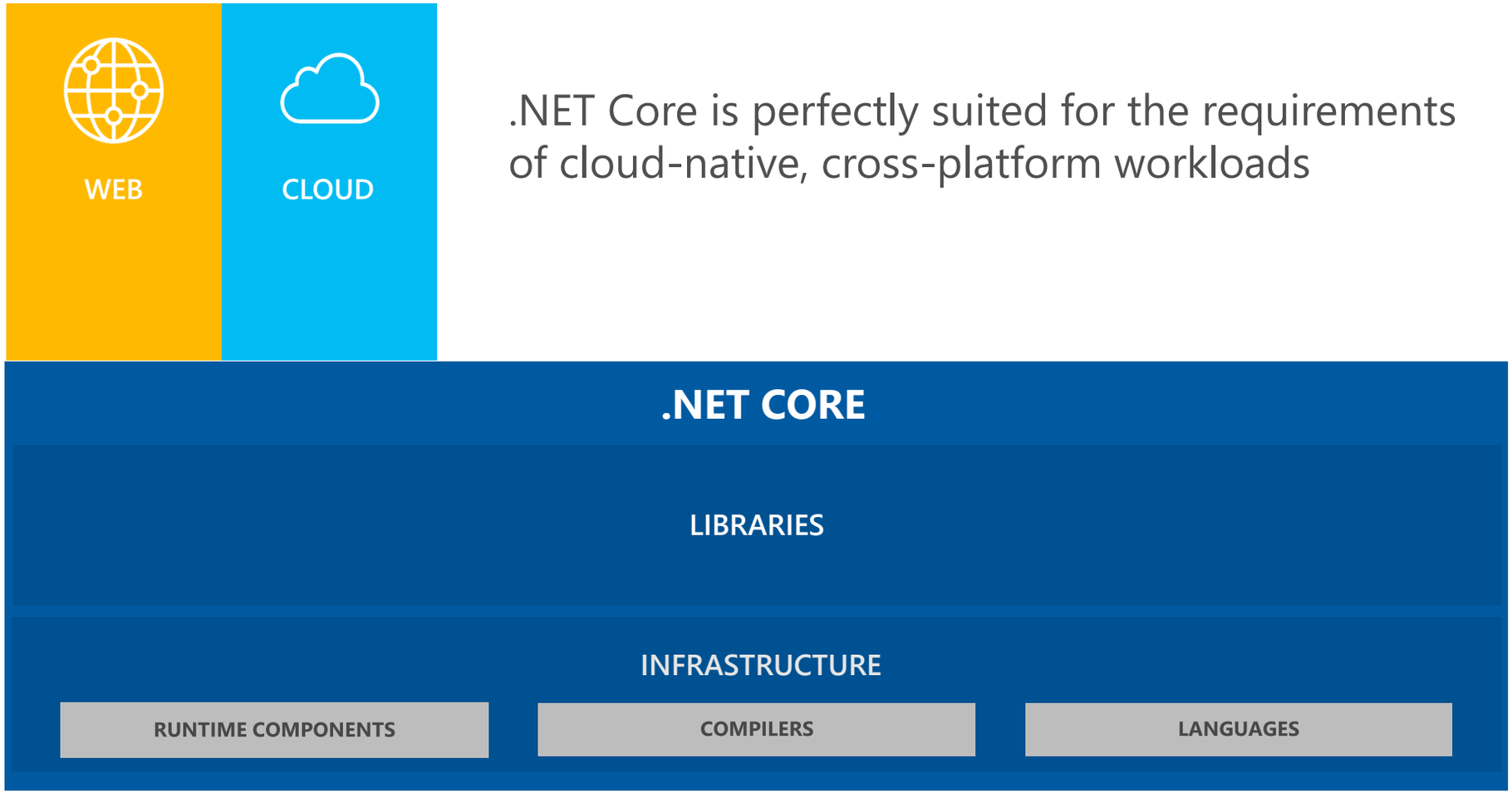
.NET Co udio
version

So, **Prev**



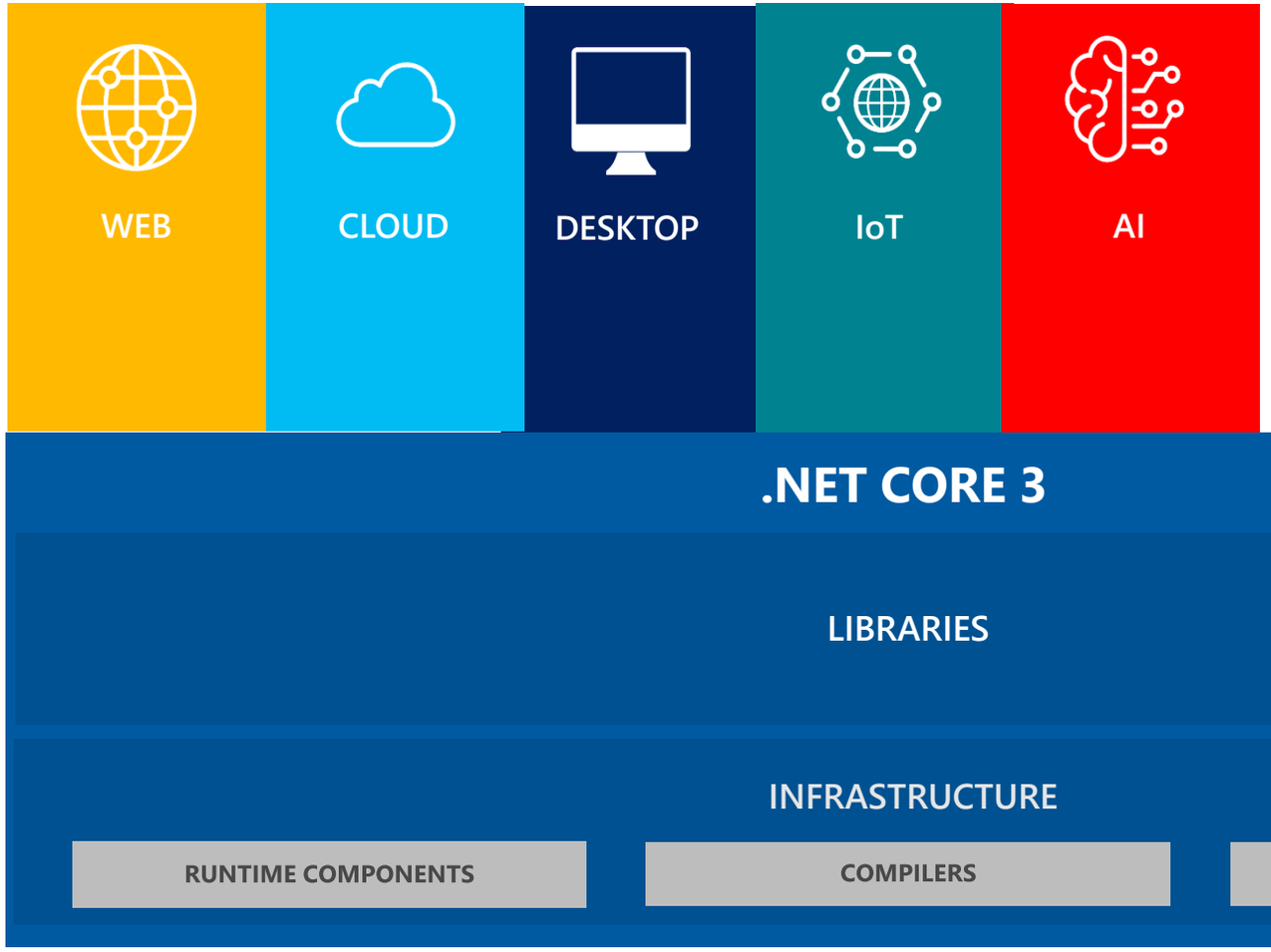
.NET Core 3.0
.NET Standard 2.1
.NET Framework 4.8

.NET Core 2



.NET Core is perfectly suited for the requirements of cloud-native, cross-platform workloads

.NET Core 3



.NET Core 3 expands supported workloads to include Windows Desktop, IoT & AI

.NET Core 3

Why Windows Desktop on .NET Core?

- Side by side
- Machine global or app local framework
- Core runtime and API improvements
- SDK based .csproj project system

https://blogs.msdn.microsoft.com/dotnet/2018/05/07/net-core-3-and-support-for-windows-desktop-applications/

.NET Standard 2.1

- New 3000 APIs are planned to be added
- Targets *.NET Core 3.0*, the open-source, cross-platform and fast-moving version of .NET.

  Supporting side-by-side, *.NET Core will get new APIs and language features over time that .NET Framework cannot.*

https://blogs.msdn.microsoft.com/dotnet/2018/11/05/announcing-net-standard-2-1/

.NET Framework 4.8

- **Modern browser and modern media controls**
- **Access to touch and UWP Controls**
- **High DPI improvements**

Will move at a slower pace than .NET Core

WILL NOT SUPPORT .NET Standard 2.1

https://blogs.msdn.microsoft.com/dotnet/2018/10/30/announcing-net-framework-4-8-early-access-build-3673/

.NET Core 3

Desktop Improvements

.NET Core 3 supports WinForms and WPF frameworks

- XAML Islands - WinForms & WPF can host UWP
- XAML Controls – WinForms & WPF browser and media UWP controls
- High DPI fixes for WinForms

Access to all the Windows 10 API's

.NET Core App Bundler

- Precompiled, fast startup
- Small apps by removing unused dependencies, link away unused IL
- Single self-contained .exe

.NET Core 3.0 Preview Soon Available https://github.com/dotnet/core-sdk

C# 8.0

C# 8.0

New Features

Planned to ship with .NET Core 3.0 and Visual Studio 2019

Nullable reference types

References must be declared nullable, to be null-assigned

```
string? s = null;
```

Async streams

Introduce **IAsyncEnumerable<T>**, an asynchronous version of IEnumerable<T>, with `await foreach` and `yield return` support

https://www.infoq.com/articles/Async-Streams

C# 8.0

New Features

Ranges, Indices and Recursive Patterns

New index '^' and range '..' operators, similar to Python behavior
https://www.infoq.com/articles/cs8-ranges-and-recursive-patterns

Default implementations of Interface members

https://www.infoq.com/articles/default-interface-methods-cs8

C# 8.0

New Features

Ranges, Indices and Recursive Patterns

New index '^' and range '..' operators, similar to Python behavior

https

Def

https

```
interface IDefaultInterfaceMethod
 {
   public void DefaultMethod()
   {
     Console.WriteLine("I am a default method in the interface!");
   }
 }

 class AnyClass : IDefaultInterfaceMethod
 {
 }
```

C# 8.0

New Features

Ranges, Indices and Recursive Patterns

New index '^' and range '..' operators, similar to Python behavior
https://www.infoq.com/articles/cs8-ranges-and-recursive-patterns

Default implementations of Interface members

https://www.infoq.com/articles/default-interface-methods-cs8

https://channel9.msdn.com/Events/dotnetConf/2018/S103

Blazor

Blazor

.NET in the Browser (EXPERIMENTAL)

Build client-side Web UI in .NET

You don't need to know AngularJS, React, Vue, etc.
Take advantage of stability and consistency of .NET

Runs in all browsers

Native performance
Strongly typed on client and server
Requires no plugin or code *transpilation*
Share C# code with the client and the server

https://blazor.net/docs/index.html
https://channel9.msdn.com/Events/dotnetConf/2018/S207

Blazor Components

“Server-side Blazor”

- Blazor programming model integrated into ASP.NET Core
- Runs server-side on .NET Core
- Handle client UI interactions using SignalR

Same code can run client-side on WebAssembly with *no code changes*
WebAssembly support remains *experimental* while runtime matures

Shipping in ASP.NET Core 3.0

Demo

Blazor

Machine Learning .NET

ML.NET

Machine Learning Framework for .NET developers & apps

Just announced ML.NET 0.7
https://blogs.msdn.microsoft.com/dotnet/2018/11/08/announcing-ml-net-0-7-machine-learning-net/

Support for many ML scenarios

- Binary/Multiclass Classification
- Clustering
- Regression
- Recommendation
- Anomaly detections
- Deep Learning (e.g. Image Classification with TensorFlow)

Helpful data readers, learners and transforms

- Learners: FFM, LightGBM, Ensemble, SymSGD, …
- Transforms: LightLDA, Word Embeddings, …

Data Pipeline customization

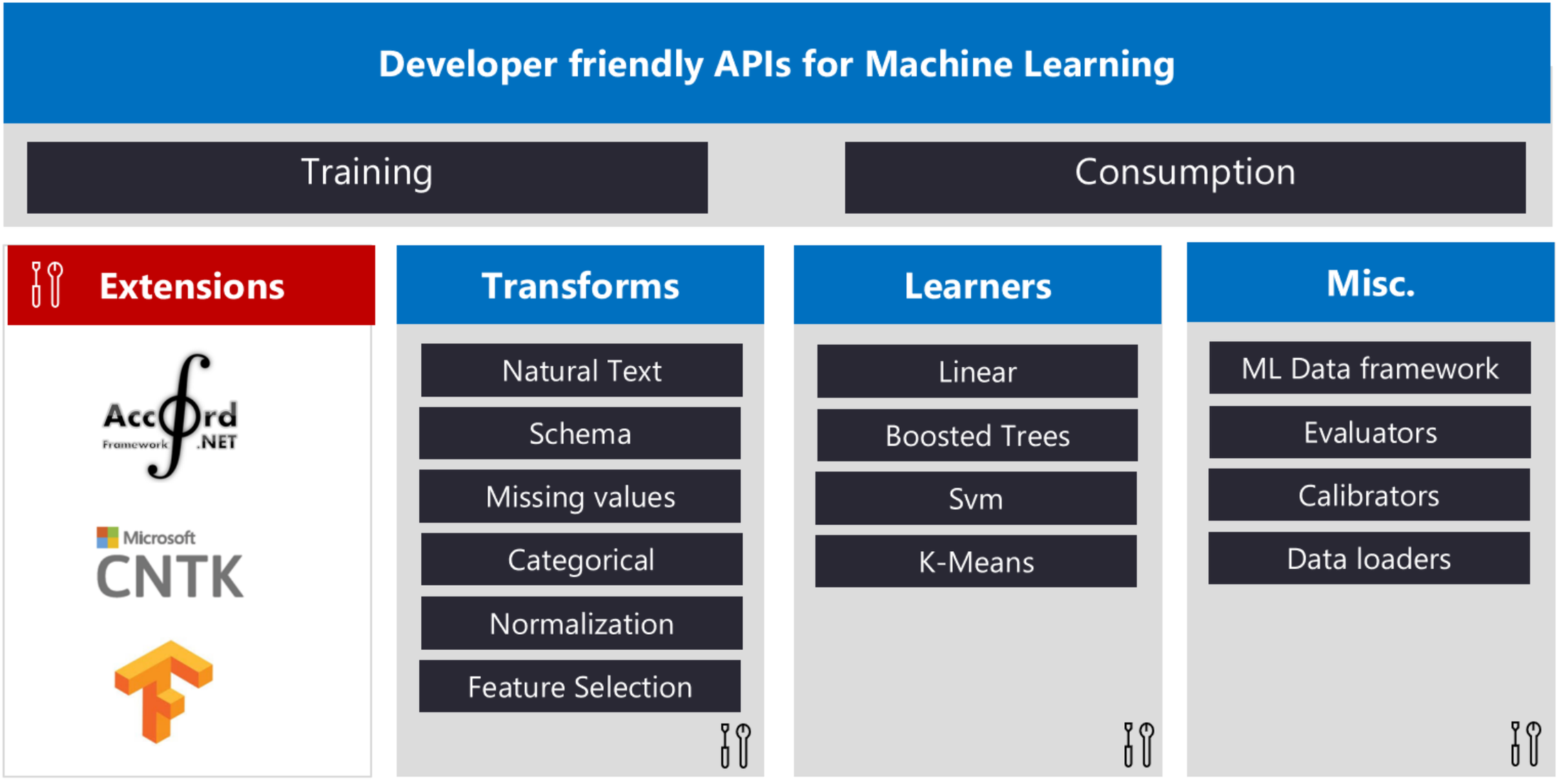
ONNX, F# Support, Python bindings (experimental)

ML.NET Samples repo

https://github.com/dotnet/machinelearning-samples

ML.NET

Machine Learning Framework for .NET developers & apps



Demo

Machine Learning .NET

Tuesday, December 4
8.30 – 17.30 PST

Microsoft Connect(); 2018

https://www.microsoft.com/en-us/connectevent/

Q&A

Thank You

ευχαριστώ Salamat Po متشكرم شكراً Grazie

благодаря ありがとうございます Kiitos Teşekkürler 谢谢

ขอบคุณครับ Obrigado شكريه Terima Kasih Dziękuję

Hvala Köszönöm Tak Dank u wel дякую Tack

Mulţumesc спасибо Danke Cám ơn Gracias

多謝晒 Ďakujem תודה நன்றி Děkuji 감사합니다

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- .NET application development (Visual Studio, C#, ASP.NET)
- SQL Server
- WCF, Web Services
- Microsoft Azure

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- AI, Machine Learning (Google/Microsoft ML APIs, PyTorch, Fast.AI)
- Virtual Reality (Oculus Rift, Gear VR, WinMR, Unity 3D)
- Augmented/Mixed Reality (HoloLens, Magic Leap)
- Immersive video streaming and 3D graphics for sport events
- NUI Prototypes (Microsoft Kinect, Leap Motion)
- Mobile App developer (Windows / Android / Xamarin)
- Cloud solutions with Microsoft Azure (serverless, video workflow)

MVP Microsoft Most Valuable Professional

Microsoft Specialist
Programming in C#
Programming in HTML5 with JavaScript & CSS3

Microsoft CERTIFIED Solutions Developer
Windows Store Apps Using C#
Web Applications

unity Certified Programmer

PLURALSIGHT Author

http://gianni.rosagallina.com

Microsoft Azure