



Azure DevOps and Application Insights



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Agenda

#Introduction to DevOps

#Azure DevOps

#Application Insights

#Continuous Monitoring for Continuous Learning



Introduction to DevOps



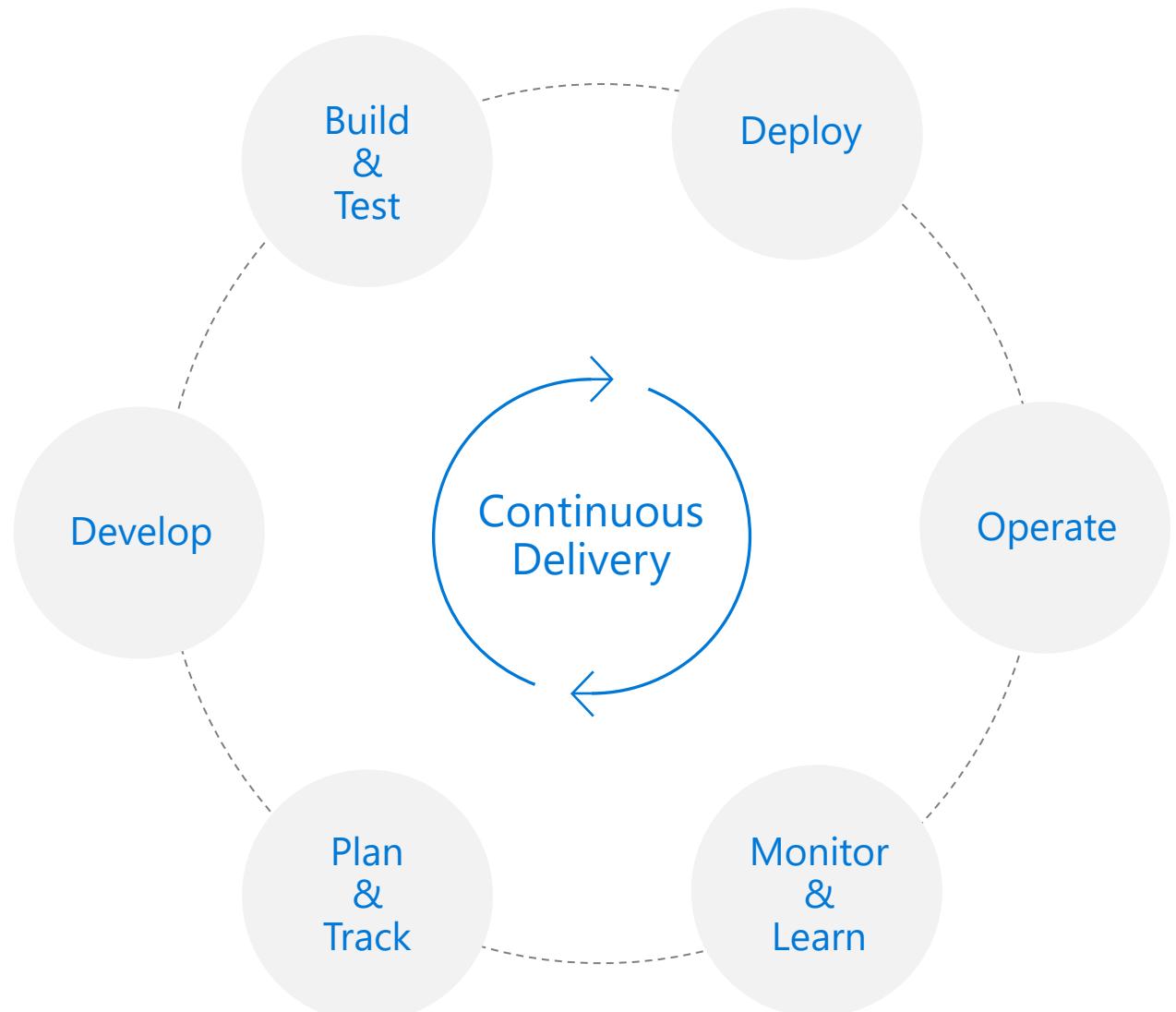
What is DevOps?

People. Process. Products.

“

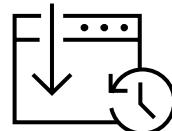
DevOps is the union of **people**,
process, and **products** to
enable continuous delivery of
value to your end users.”

”



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.

101010
010101
101010

Continuous Deployment (CD)

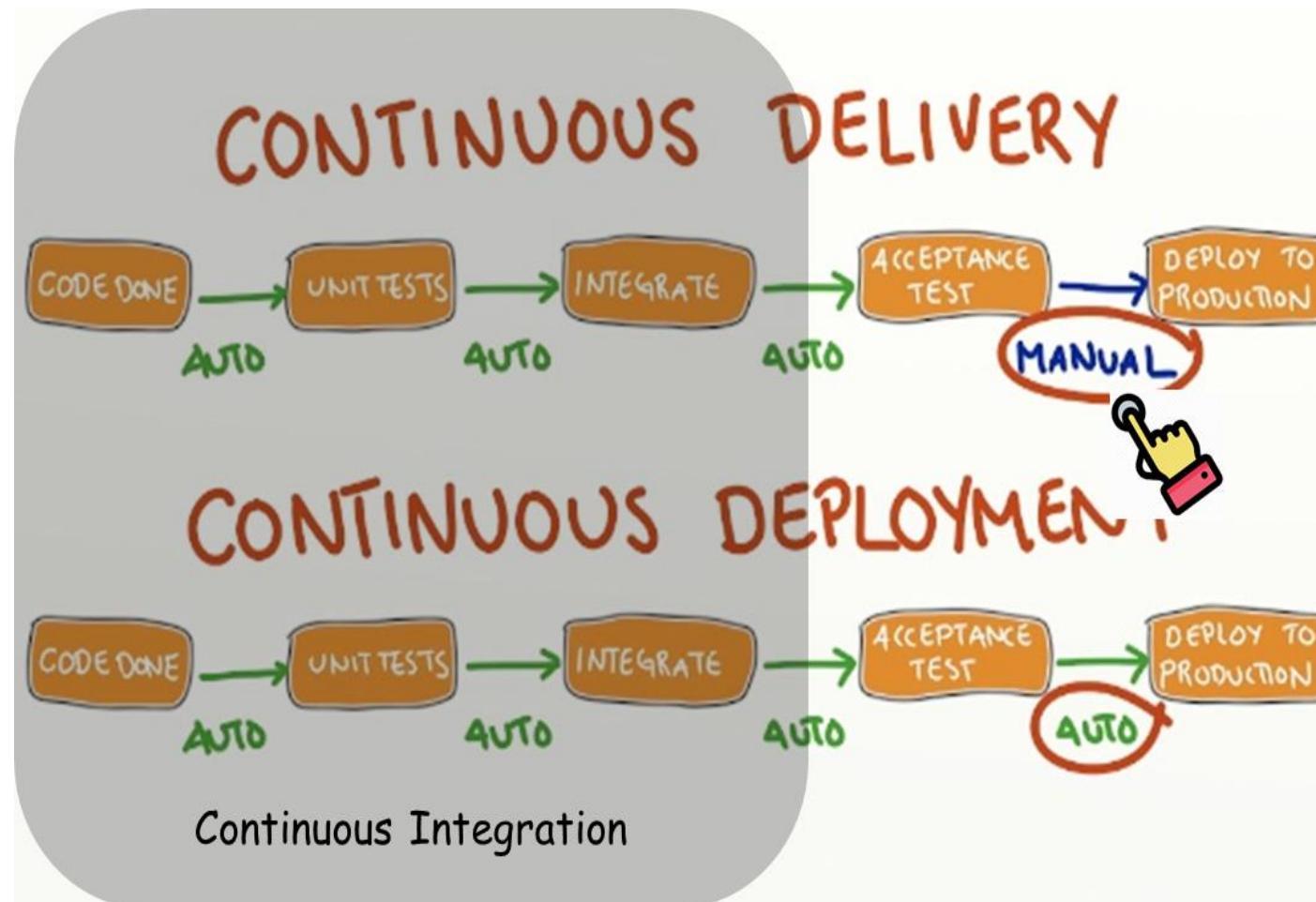
- By combining continuous integration and infrastructure as code (IaC), you'll achieve identical deployments and the confidence to deploy to production at any time.
- With continuous deployment, you can automate the entire process from code commit to production if your CI/CD tests are successful.



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.

What is Continuous Integration?



Continuous Integration practices



Mono or Multi-Repo



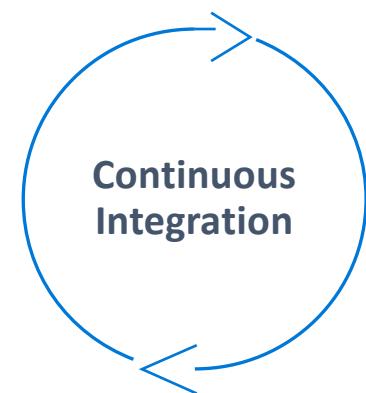
Trunk Based Branching



Branch Policies



Parallel Builds



Culture & Collaboration



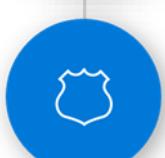
Unit Testing



Pull Requests

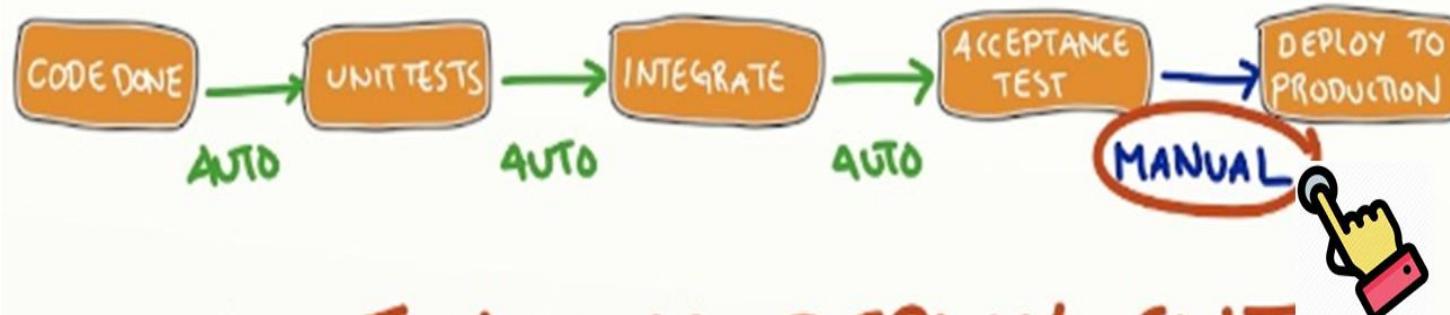


Security Scanning



What is Continuous Delivery

CONTINUOUS DELIVERY



CONTINUOUS DEPLOYMENT



Continuous Delivery practices



Automated Builds



Build Once



Production ready trunk



Fix immediately



Everything in Source Control



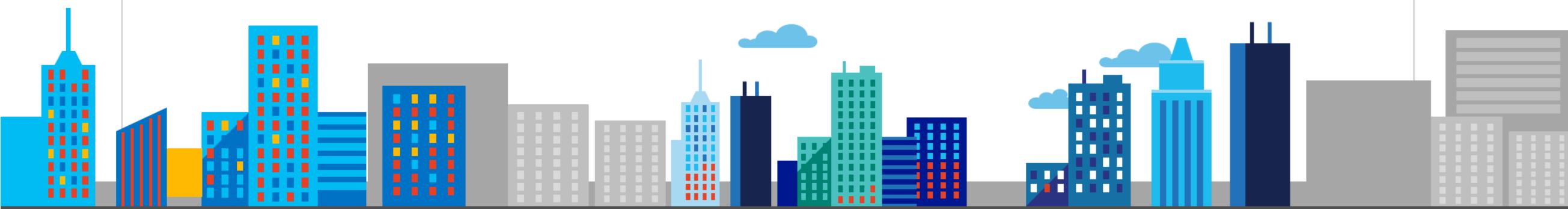
Feature Flags



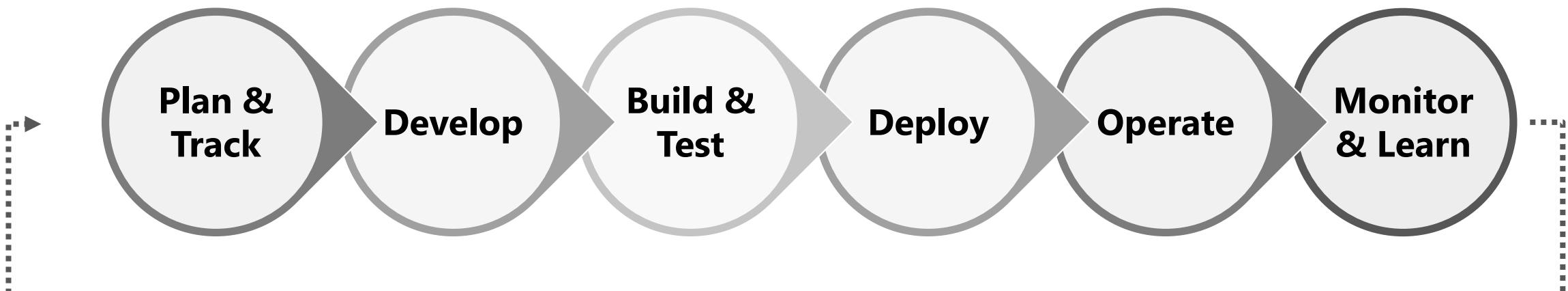
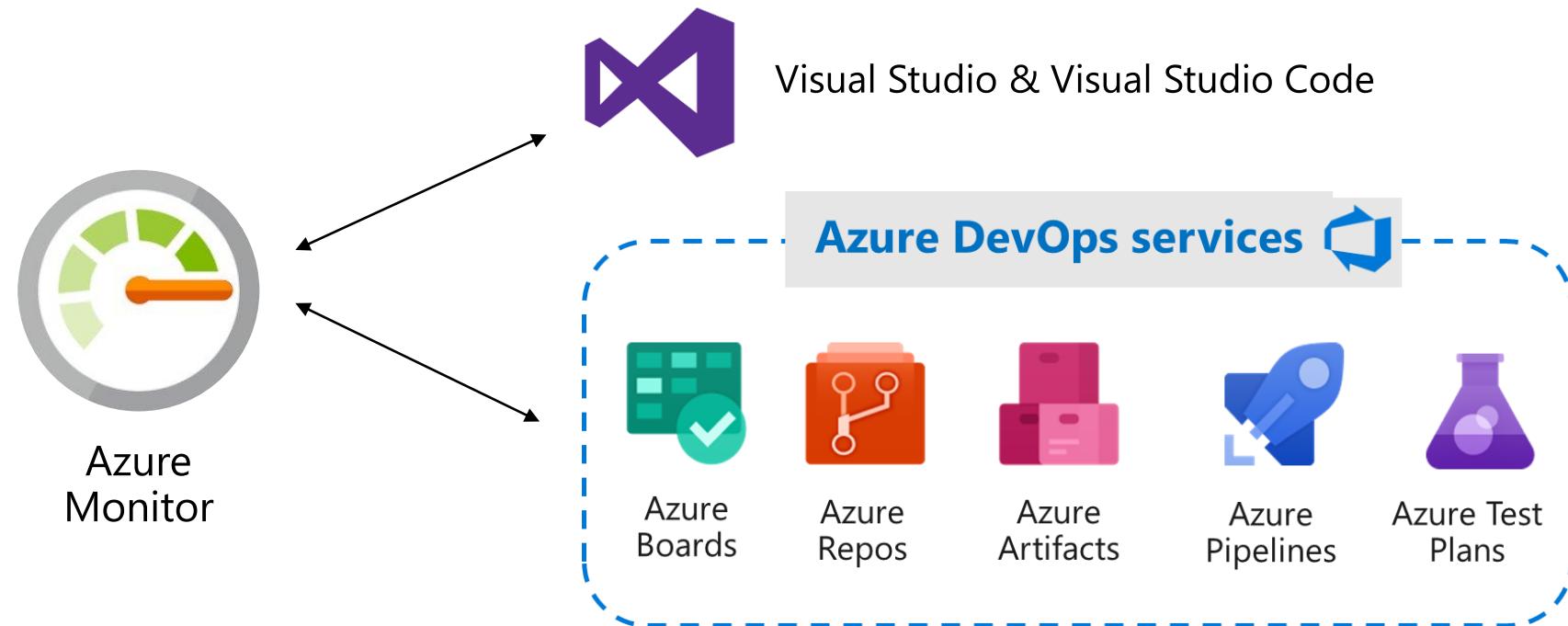
Blue/Green deploy



Canary Deployment



Continuous Monitoring (CM) for DevOps



Azure DevOps

#AzureDevOps



<https://azure.com/devops>



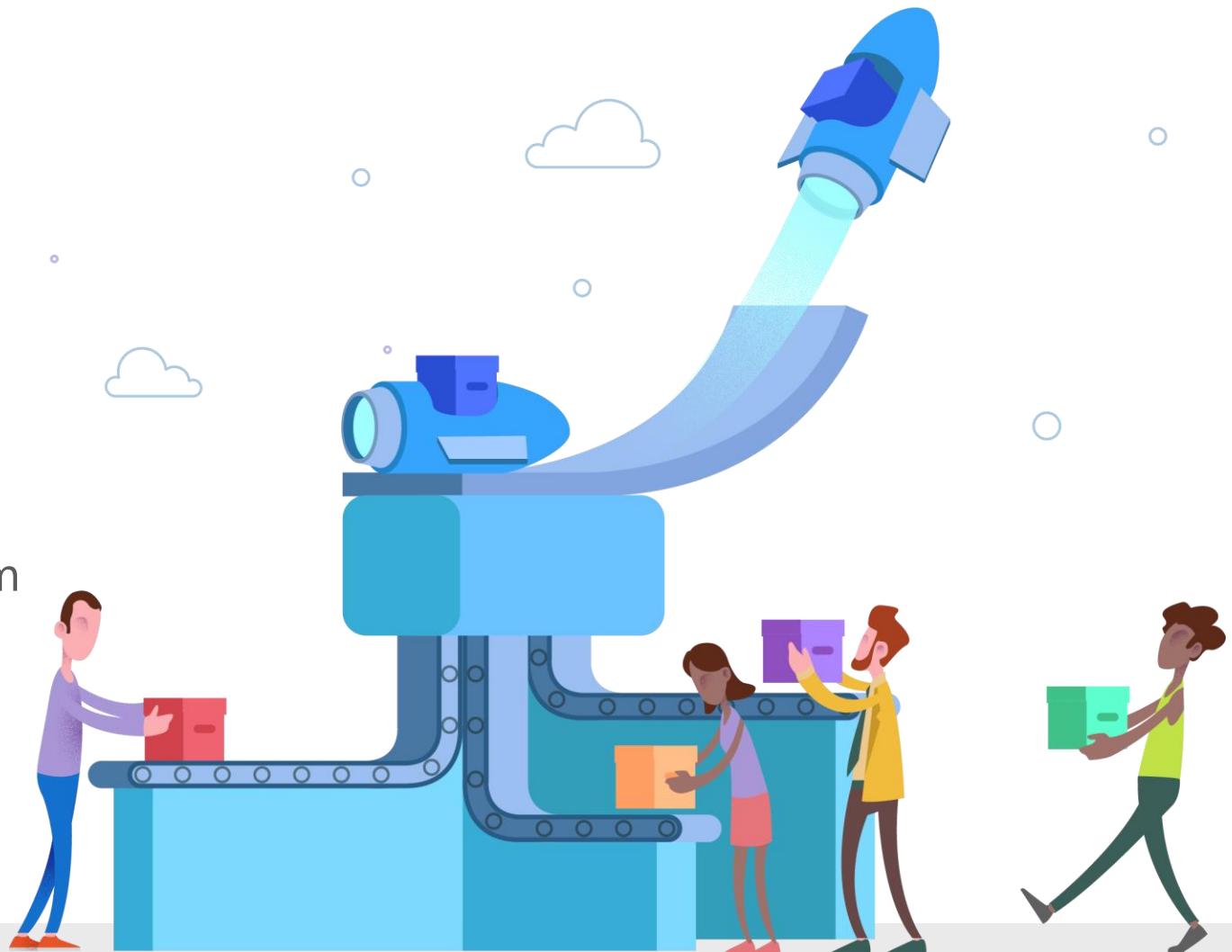
@AzureDevOps



<https://aka.ms/AzureDevOpsForum>



<https://aka.ms/DevOpsBlog/>



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

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.



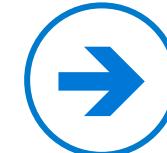
Azure Test Plans

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 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>

The screenshot shows the Azure DevOps Boards interface. On the left, a sidebar menu includes options like AdventureWorks Mobile, Overview, Boards (selected), Work Items, Boards, Backlogs, Sprints, Queries, Plans, Repos, Pipelines, Test Plans, and Artifacts. The main area is titled "FabrikamFiber Board" and displays a Kanban board with several columns: New, Active, 5/5 (Staging), 15/5 (Deployed), and Deployed. The board contains numerous cards representing work items, each with a title, description, assignee, and status. For example, there are cards for "Home page (selected room)" assigned to Kat Larson, "Top page controls" assigned to Carlos Slattery, and "Mobile (Spike)" assigned to Celeste Burton. The interface uses color-coding for categories like ML, Xamarin, and General.

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

The screenshot shows the Azure DevOps Pipelines interface for the AdventureWorks Mobile project. The left sidebar includes links for Azure DevOps, AdventureWorks, Overview, Pipelines (selected), Builds, Releases, Library, and Deployment groups. The main area displays a pipeline titled "Enabling feature flags for Preview Attachment and Grid Views" for the "AdventureWorks/PackageFramework" repository. The pipeline has three parallel jobs: "Windows Job" (Running, 1m 53s), "Linux Job" (Running, 3m 29s), and "macOS Job" (Running, 3m 07s). The "Linux Job" step details are shown on the right, listing tasks such as Prepare job, Initialize job, Get sources, Cmdline, Nodetool, and Install dependencies. The terminal output shows the command "yarn install v1.7.0" followed by a series of npm and yarn commands for dependency resolution and linking. The total duration of the job is 4.89s.

```
yarn install v1.7.0
$ node build/npm/preinstall.js
[1/4] Resolving packages...
[2/4] Fetching packages...
[3/4] Linking dependencies...
[4/4] Building fresh packages...
$ npm run compile
> code-oss-dev-build@1.0.0 compile ./adventureworks/build
> tsc -p tsconfig.build.json

* Done in 4.89s.
$ node ./postinstall
[##] 2/2 removed './adventureworks/extensions/node_modules/typescript/lib/tsc.js'
removed './adventureworks/extensions/node_modules/typescript/lib/tsserverlibrary.d.ts'
removed './adventureworks/extensions/node_modules/typescript/lib/tsserverlibrary.js'
removed './adventureworks/extensions/node_modules/typescript/lib/typescriptServices.d.ts'
removed './adventureworks/extensions/node_modules/typescript/lib/typescriptServices.js'
```



<https://azure.com/pipelines>



Integrated with GitHub

Azure Pipelines available now to
any developer from the GitHub
Marketplace

The screenshot shows the Azure Pipelines page in the GitHub Marketplace. At the top, there's a search bar and navigation links for Pull requests, Issues, Marketplace, and Explore. Below the header, the page title is "Azure Pipelines". There are two buttons: "Set up a new plan" (green) and "Edit your plan ▾" (grey). A main heading "Azure Pipelines" is followed by the subtext "Continuously build, test, and deploy to any platform and cloud". A brief description states: "Azure Pipelines offers cloud-hosted pipelines for Linux, macOS, and Windows with 10 free parallel jobs and unlimited minutes for open source projects." A "Read more..." link is present. On the left, there's a sidebar with a circular icon containing a blue pipeline symbol, sections for "Categories" (Continuous integration, Deployment), "Supported languages" (Dockerfile, Go, Java, and 7 other languages supported), and "Developer links" (Support, Status, Documentation, Privacy Policy). On the right, a large blue box highlights "Linux, macOS, and Windows agents" with the subtext: "Simplify managing hardware and VMs by using Microsoft cloud-hosted agents. Get full CI/CD pipeline support for every major platform and tool." It shows a pipeline diagram with stages: "Test" (27 succeeded), "Build Linux" (6 succeeded), "Build Windows" (2 succeeded), "Build macOS" (64% in progress...), and a final "Distribute" step.

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>

The screenshot shows the Azure DevOps interface for the 'AdventureWorks Mobile' project. The left sidebar has a dark theme with white icons and text. It includes links for Overview, Boards, Repos (which is selected), Files, Commits, Pushes, Branches, Tags, Pull requests (selected), Pipelines, Test Plans, and Artifacts. At the bottom of the sidebar is a 'Project settings' link. The main content area is titled 'Pull requests' and shows a list of pull requests under four categories: 'Mine', 'Active', 'Completed', and 'Abandoned'. The 'Mine' tab is selected. A search bar at the top of the list allows filtering by keyword or ID. Below the search bar are sections for 'Created by me', 'Assigned to me', and 'Assigned to my team', each listing several pull requests with their titles, creators, and IDs. The interface uses a light gray background with dark blue header bars and small profile icons next to each pull request entry.

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.

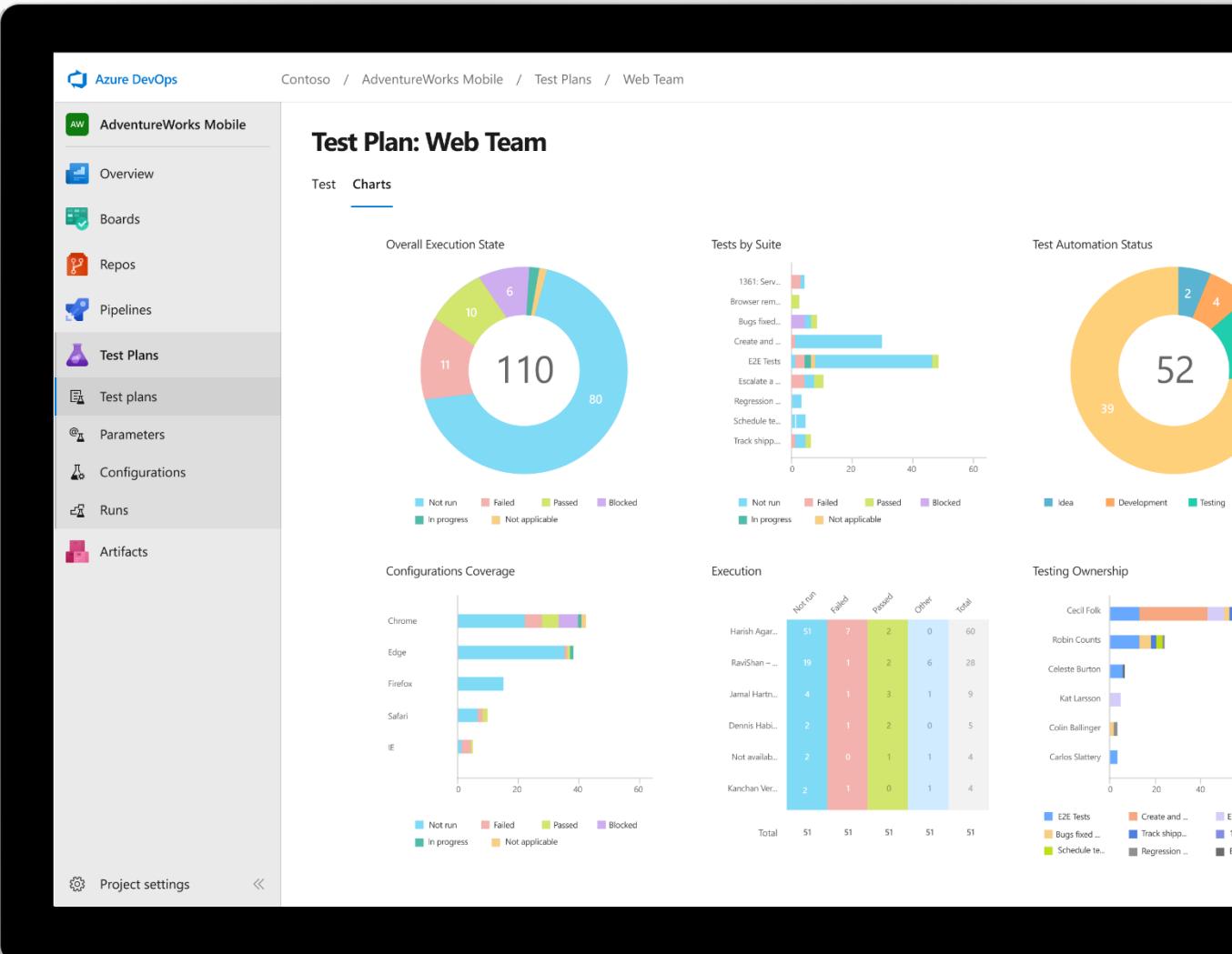


Get end-to-end traceability

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.



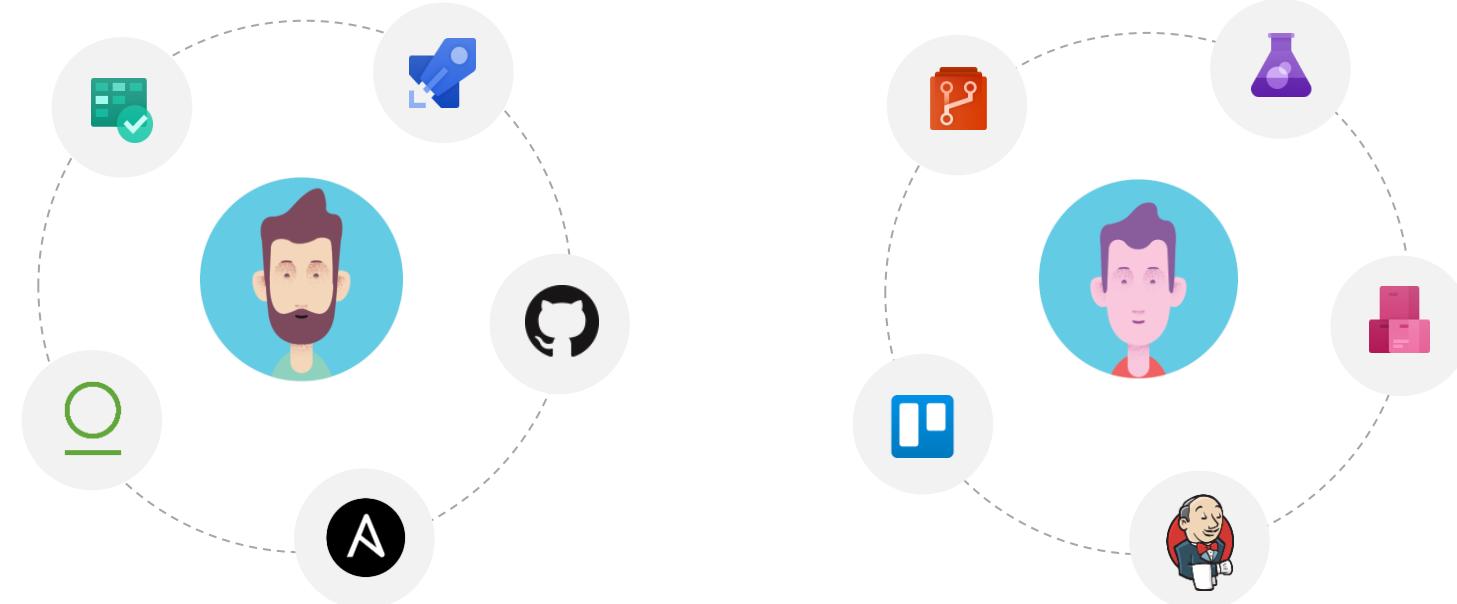
<https://azure.com/devops>

The screenshot shows the Azure DevOps interface for managing artifacts. On the left, there's a sidebar with links for 'AdventureWorks Mobile' (selected), 'Overview', 'Boards', 'Repos', 'Pipelines', 'Test Plans', and 'Artifacts'. The main area is titled 'Artifacts' and shows a table of packages. The columns are 'Package', 'Views', 'Source', 'Last pushed', and 'Description'. The packages listed are:

Package	Views	Source	Last pushed	Description
abbrev		nuget	a year ago	Like ruby's abbrev module, but in js
accepts		npmjs	a year ago	Higher-level content negotiation
acorn		MyFeed	a year ago	ECMAScript parser
acorn-dynamic-import		maven	a year ago	Support dynamic imports in acorn
aclr-jsx		nuget	a year ago	Alternative, faster React.js JSX parser
acorn-object-spread		maven	a year ago	Custom JSON-Schema keywords for ajv validator
ajv		npmjs	a year ago	Alphanumeric sorting algorithm
ajv-keywords		nuget	a year ago	ANSI escape codes for manipulating the terminal
alphanum-sort		npmjs	a year ago	An elegant lib that converts the chalked (ANSI) text to HTM

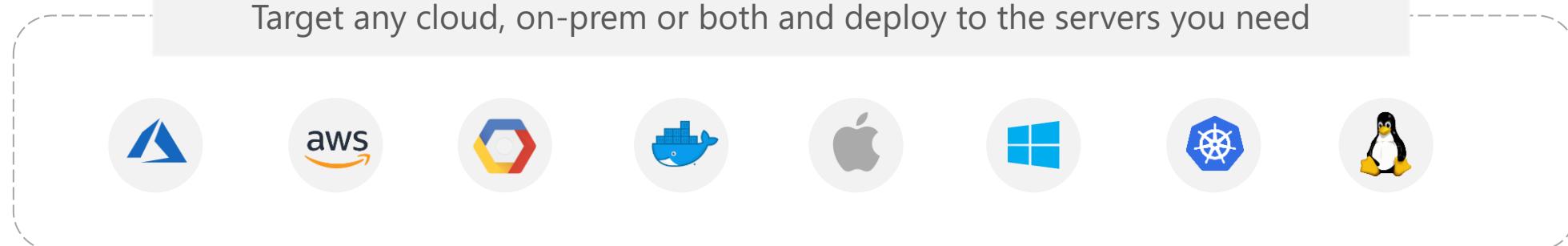
Azure DevOps: Choose the tools and clouds you love

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



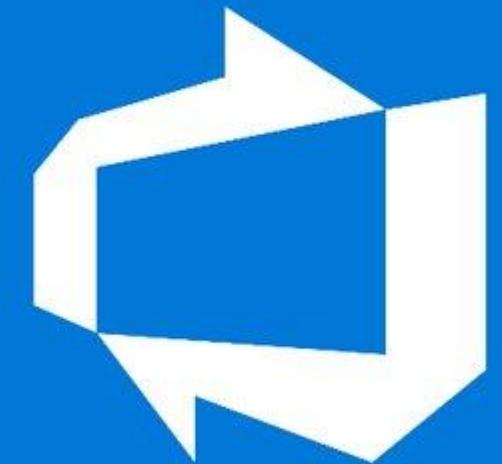
Mix and match to create workflows with tools from Microsoft, open source or your favorite 3rd party tools

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





Azure DevOps - Demo



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 public Git repos
- **Azure Artifacts:** package management
- Unlimited stakeholders

Teams of any size

Starts at \$6

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 public Git repos
- **Azure Artifacts:** package management
- Unlimited stakeholders
- Boards & Repos included for Visual Studio subscribers



<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.

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

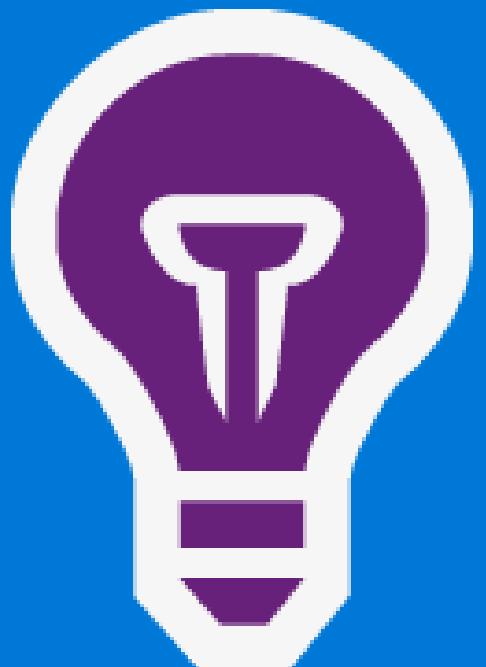
Start free today



<https://azure.com/devops>



Gain visibility into your apps with Azure Application Insights



Agenda

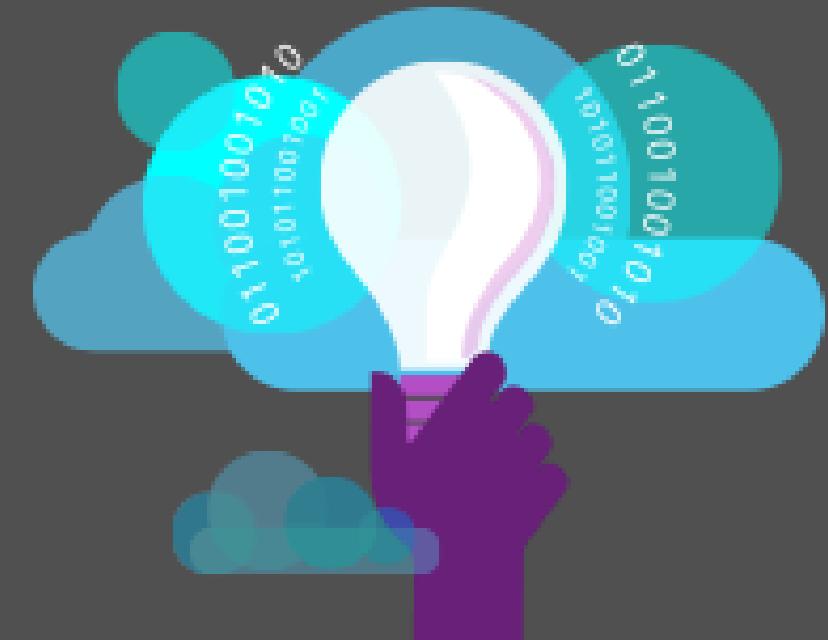
Why do I need Application Insights?

What is it?

See it in action!!!

Summary

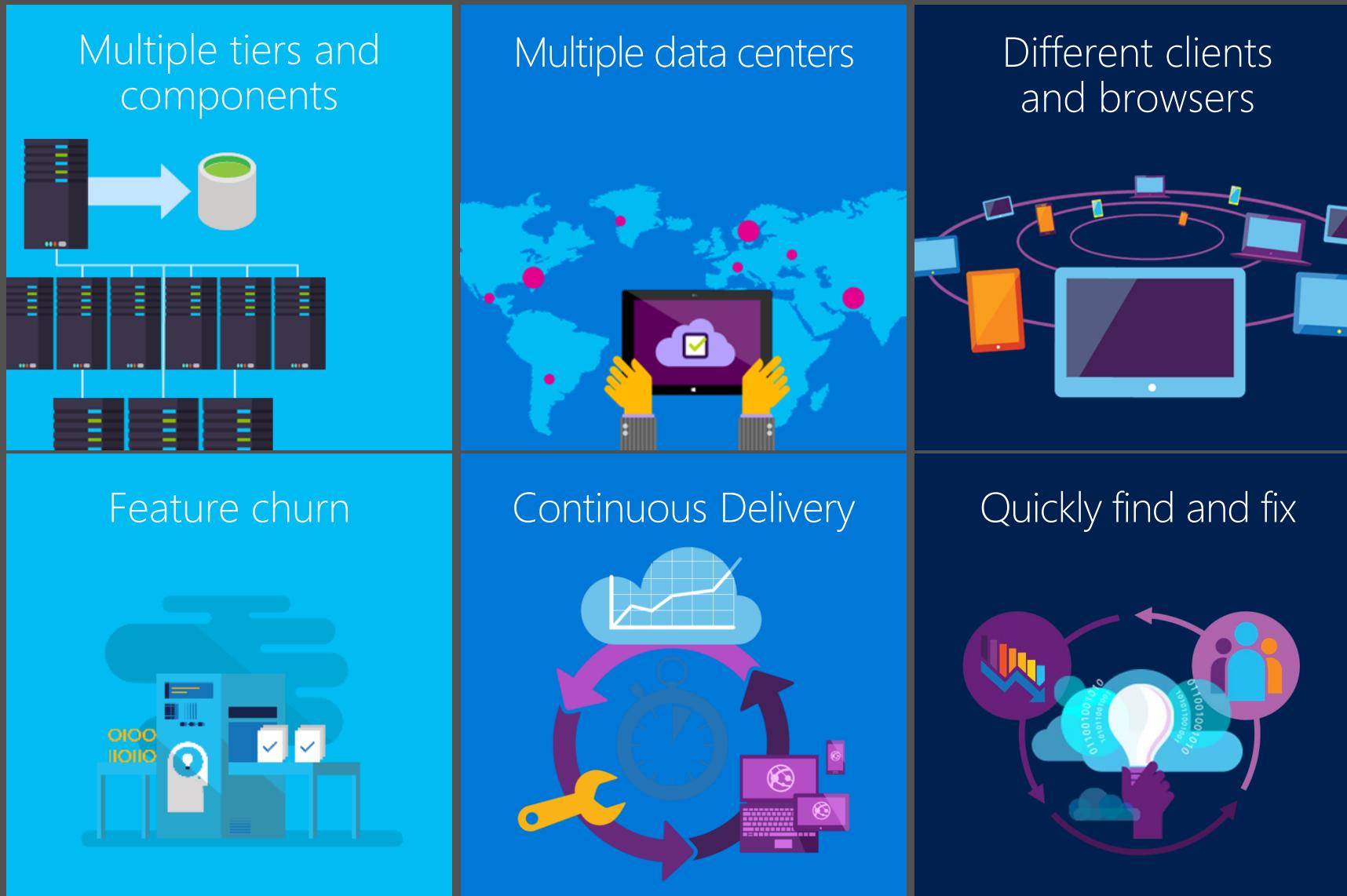
Questions...



What does visibility mean to you?



Diagnostics for modern applications



What is Application Insights?

1

Telemetry is collected at each tier: server backend, middleware, web service & browser

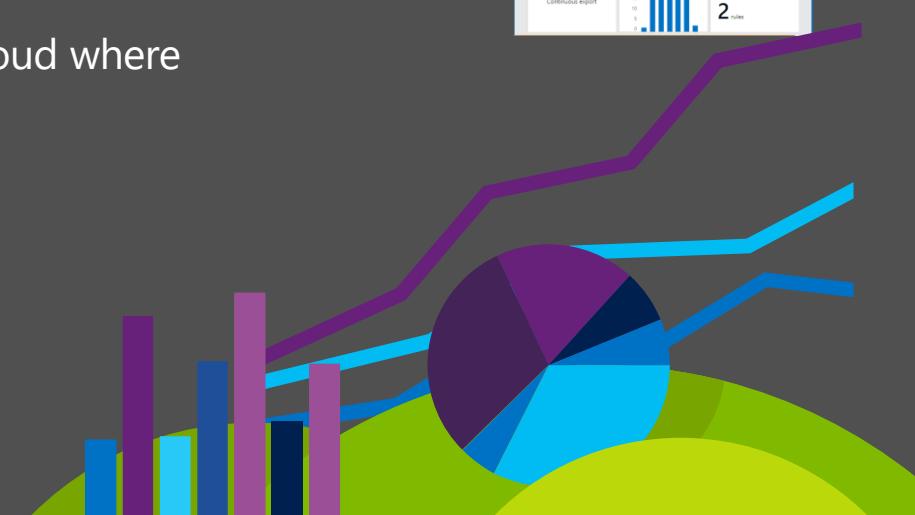
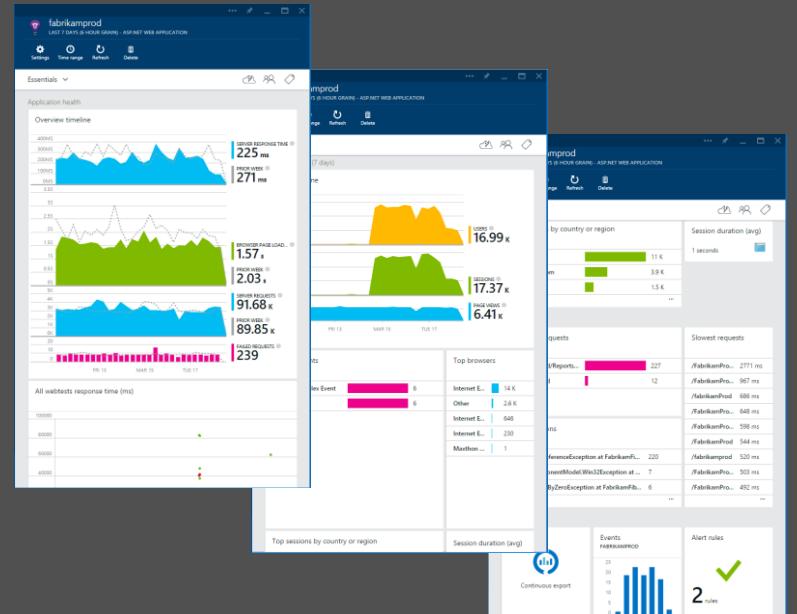


2

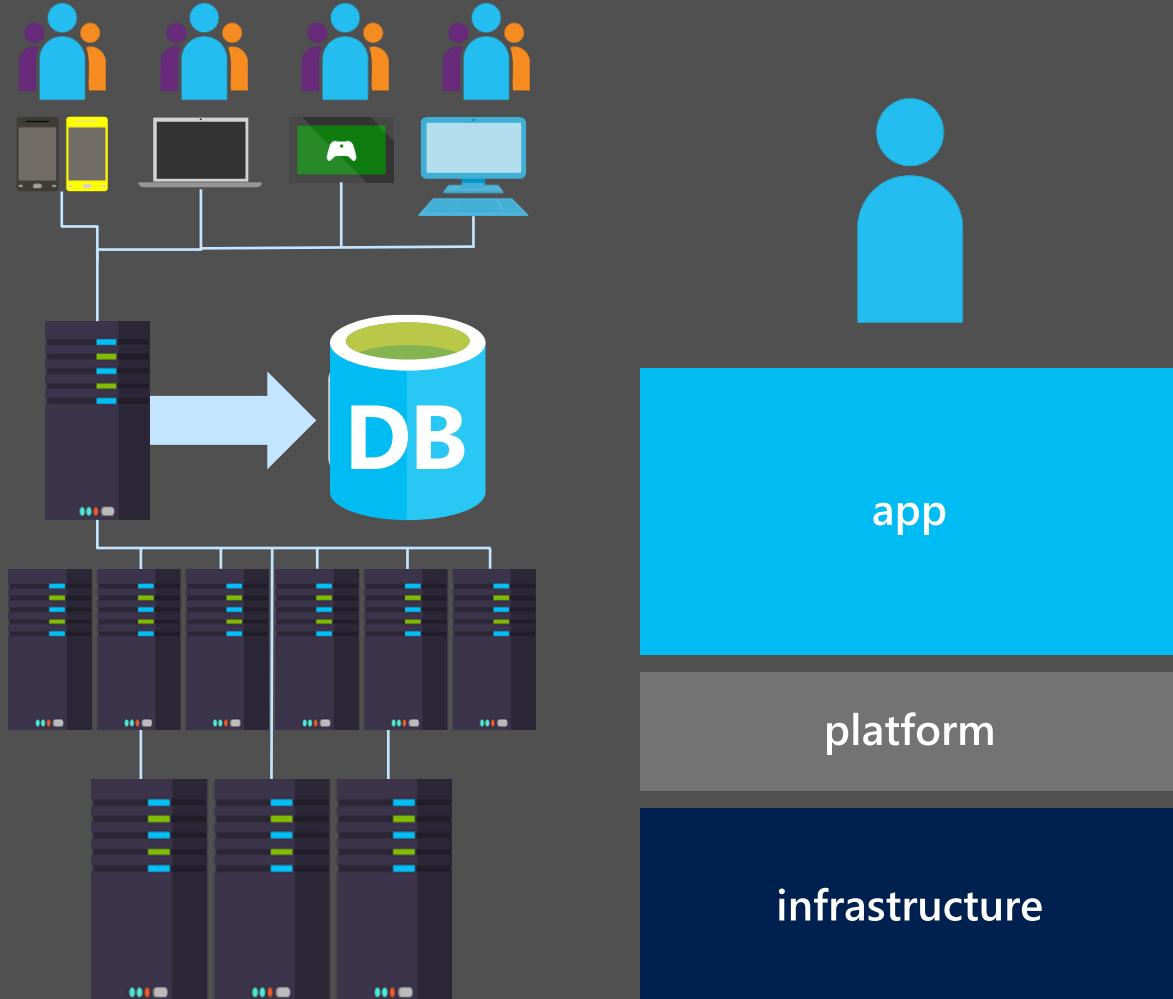
Telemetry arrives in the cloud where it is stored & processed

3

Identify, understand and resolve issues with powerful out-of-the-box and custom telemetry



Sources of Telemetry



1

Outside-in monitoring

URL pings and web tests from 16 global points of presence

2

Observed user behavior

How is the application being used?

3

Developer traces and events

Whatever the developer would like to send to Application Insights

4

Observed application behavior

No coding required – service dependencies, queries, response time, exceptions, logs, etc.

5

Infrastructure performance

System performance counters

Supported Platforms & Languages

- Any Platform - Any App

On-Prem, Azure, AWS, Google Cloud, App Stores...



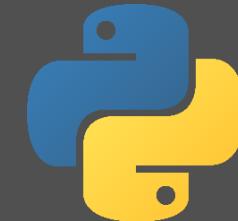
- Open Source SDKs

<https://github.com/Microsoft/ApplicationInsights-Home>



- Logging Frameworks

Log4Net, nLog, System.Diagnostics, Log4J, Logback



Microsoft

node.js

php

Intelligent APM: Detect, Triage & Diagnose

Detect

Proactive alerts, dashboards and live metrics stream

Triage

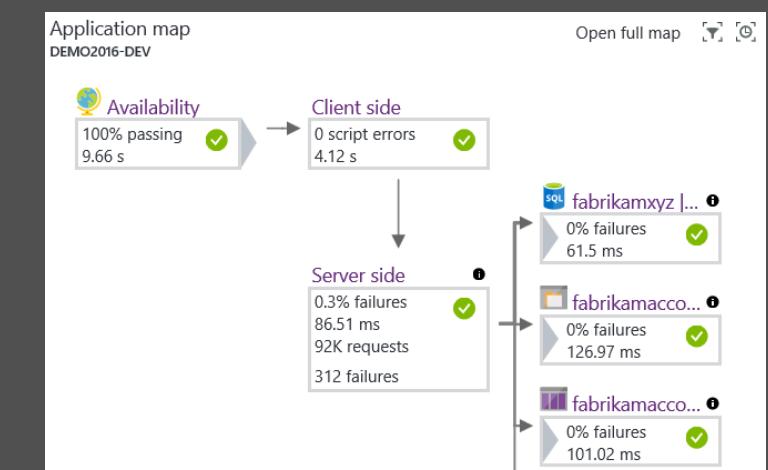
Application map and real user impact

Diagnose

Exceptions, performance issues, dependency failures and Azure role lifecycle issues

Operationalize

Alerts based on metrics/events/APM data with Webhooks support

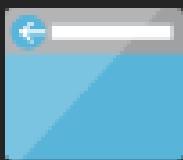


What can Application Insights do?



MONITOR AND DIAGNOSE SERVER SIDE APPLICATION

Detect server side performance issues and failures. Diagnose with correlated exceptions, dependency calls and your application traces.



MONITOR AND DIAGNOSE CLIENT SIDE APPLICATION

Add our JavaScript snippet to analyze usage patterns and to detect and diagnose client side performance issues and failures.

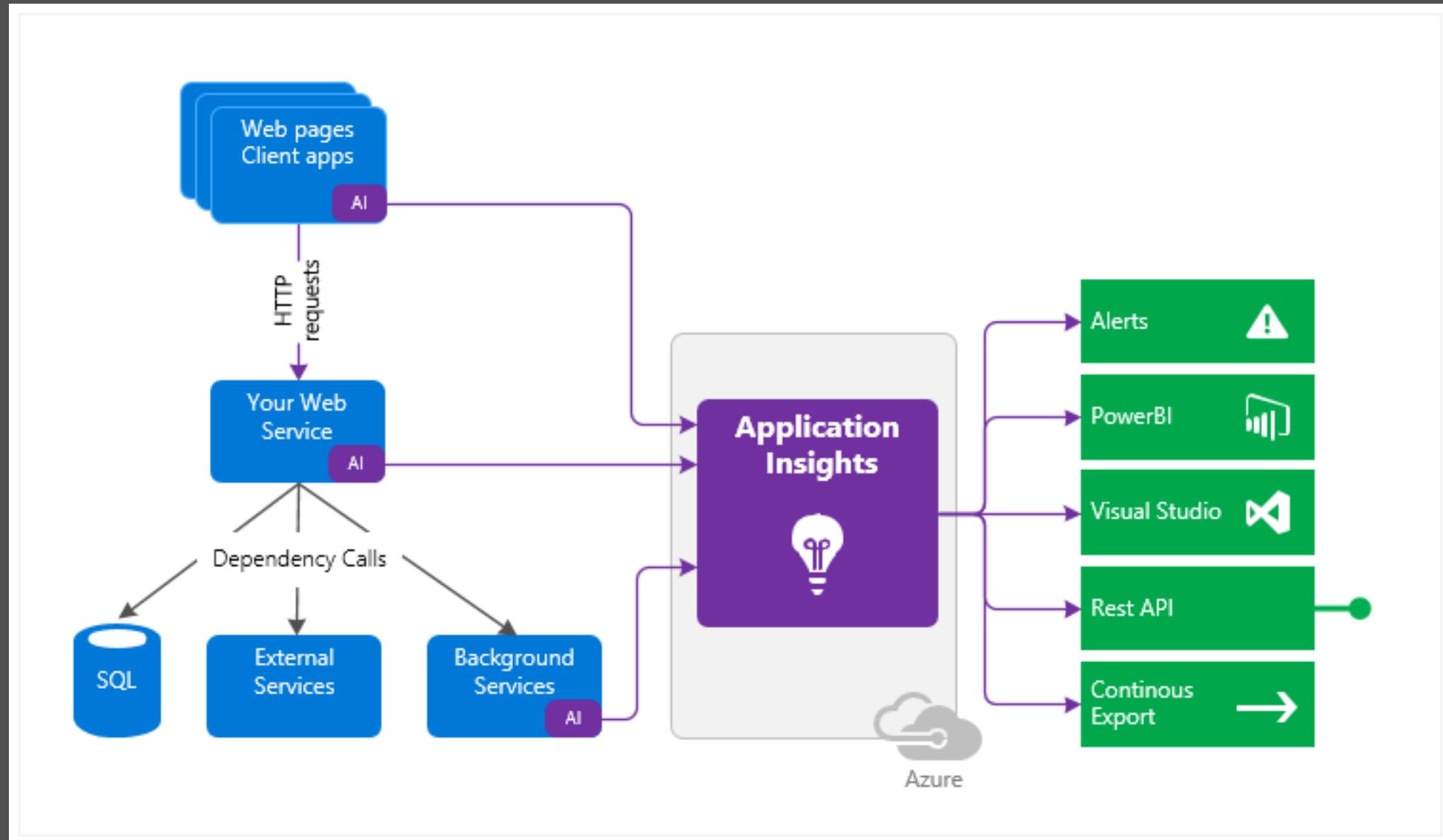


ENRICH TELEMETRY WITH CUSTOM METRICS AND EVENTS

How many red apples were sold today? How many users clicked the "Try-Now" button? How good is the new feature?



How does Application Insights work?



Getting started is easy!

Monitor without
re-deployment

Azure extensions
Status Monitor agent

Visual Studio local debugger

Instrument
and re-deploy

Visual Studio
Eclipse
JavaScript snippet
Open Source SDKs

ASP.NET, Java, HTML/JS, Ruby, PHP, Node.JS, Python, etc.

Application Insights Ecosystem

Ingestion

Application Insights

Open Source SDKs
Status Monitor
Azure Extensions



SCOM MP

Open Schema

Exploration

Microsoft Azure Portal

Azure Monitor
Application Map
Live Metrics Stream
Profiler & Debugger



Visual Studio IDE

Analytics Portal

Export & Correlation



OMS Connector



Power BI



Microsoft Flow



Blob storage



Stream Analytics



Visual Studio Team Services

Support

ASP.NET

ASP.NET Core **NEW!**

Java - J2EE

Windows Desktop

WCF

JavaScript

Node.js **NEW!**

PHP

Python

Ruby

Angular

Docker

Kubernetes **NEW!**

Dynamics CRM

Azure Web Apps **NEW!**

Azure Cloud Services

Azure VMs

Azure Functions **NEW!**

Azure Service Fabric **NEW!**

Glimpse

Spring

Log4Net/NLog

Log4J/Logback

System.Diagnostics

Semantic Logging (SLAB)

ETW/EventSource **NEW!**

LogStash

Collectd

Concrete

Drupal

Joomla

SharePoint

WordPress

Orchard

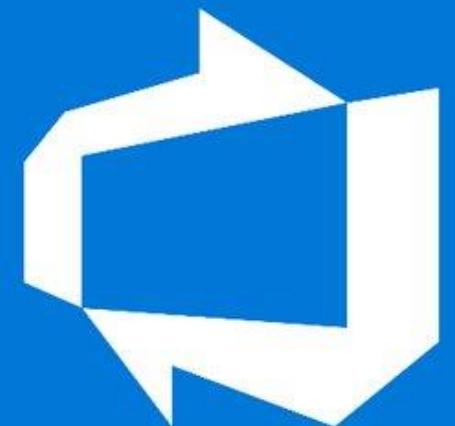
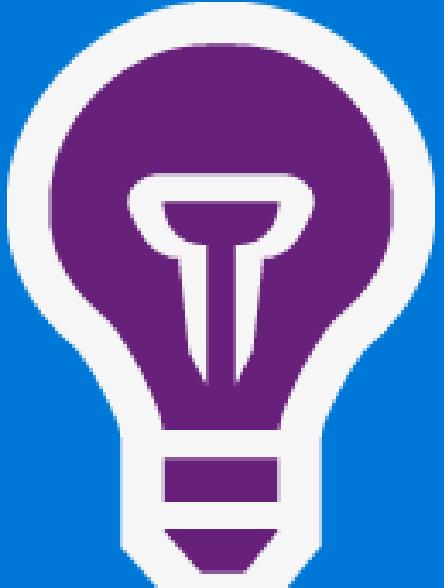
OSS/Public Endpoints ...

Application Insights - Demo





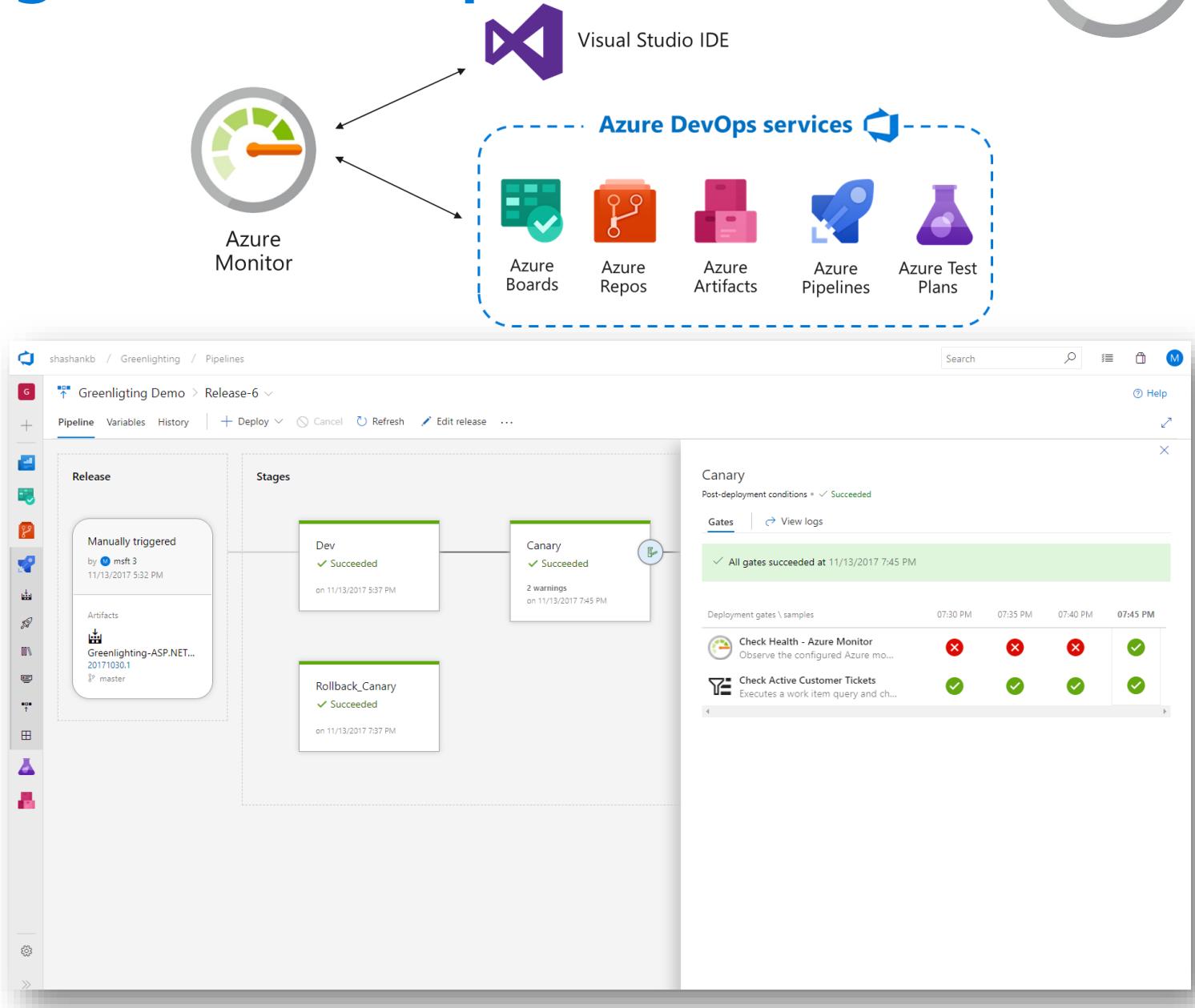
Connecting DevOps to Application Insights



CM with Application Insights for DevOps

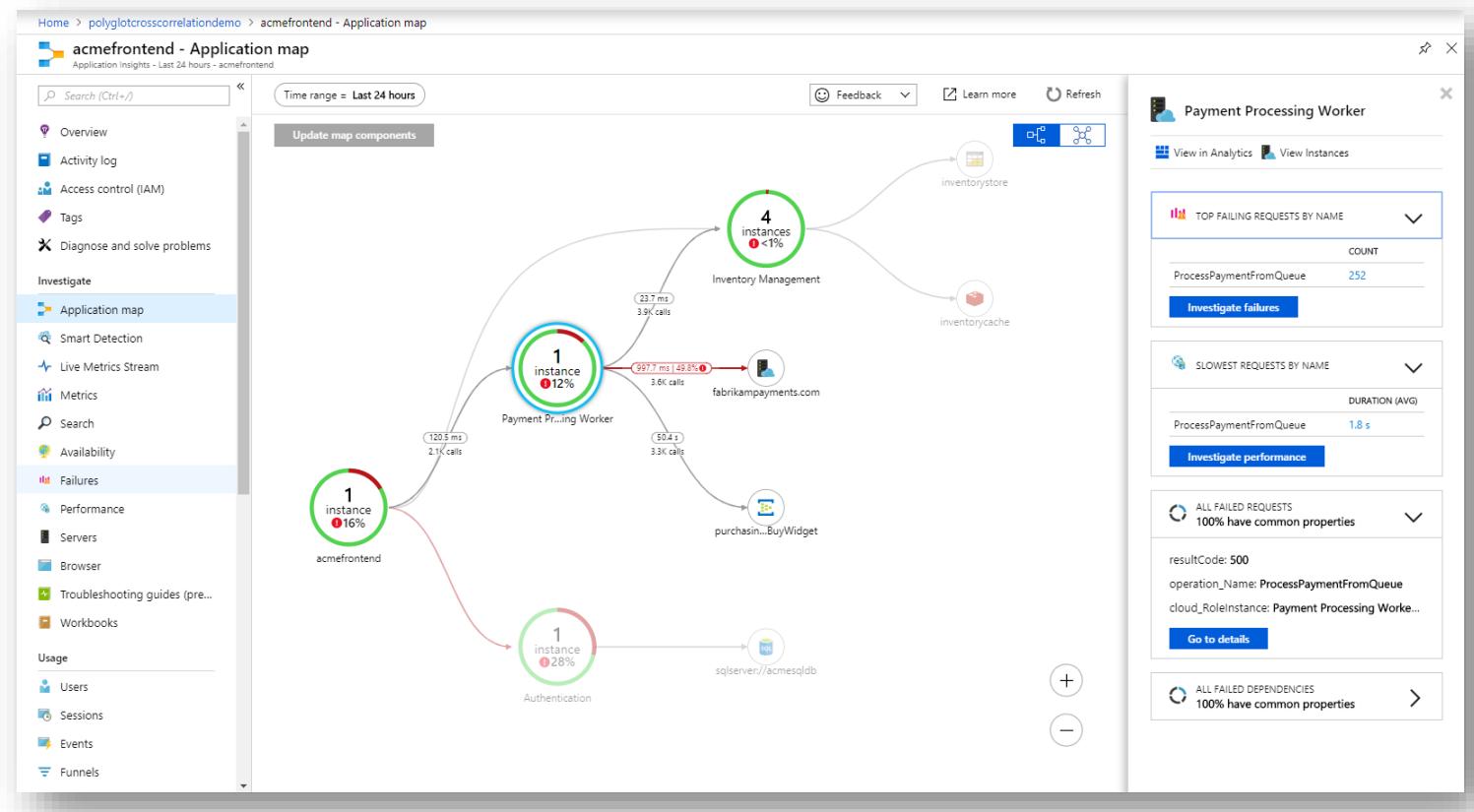


- Native IDE integrations in **VS** (.NET) and **VS Code** (Node.js)
- Configure Pre- or Post- Deployment **Quality Gates** with Metrics/Alerts
- Run Load Tests, Ping Tests or Multi-Step Web Tests for **Synthetic Perf Monitoring**
- File & track **bugs/work items** with Azure Boards/GitHub
- Run **code-level analyses** in production with Snapshot Debugging & Profiling



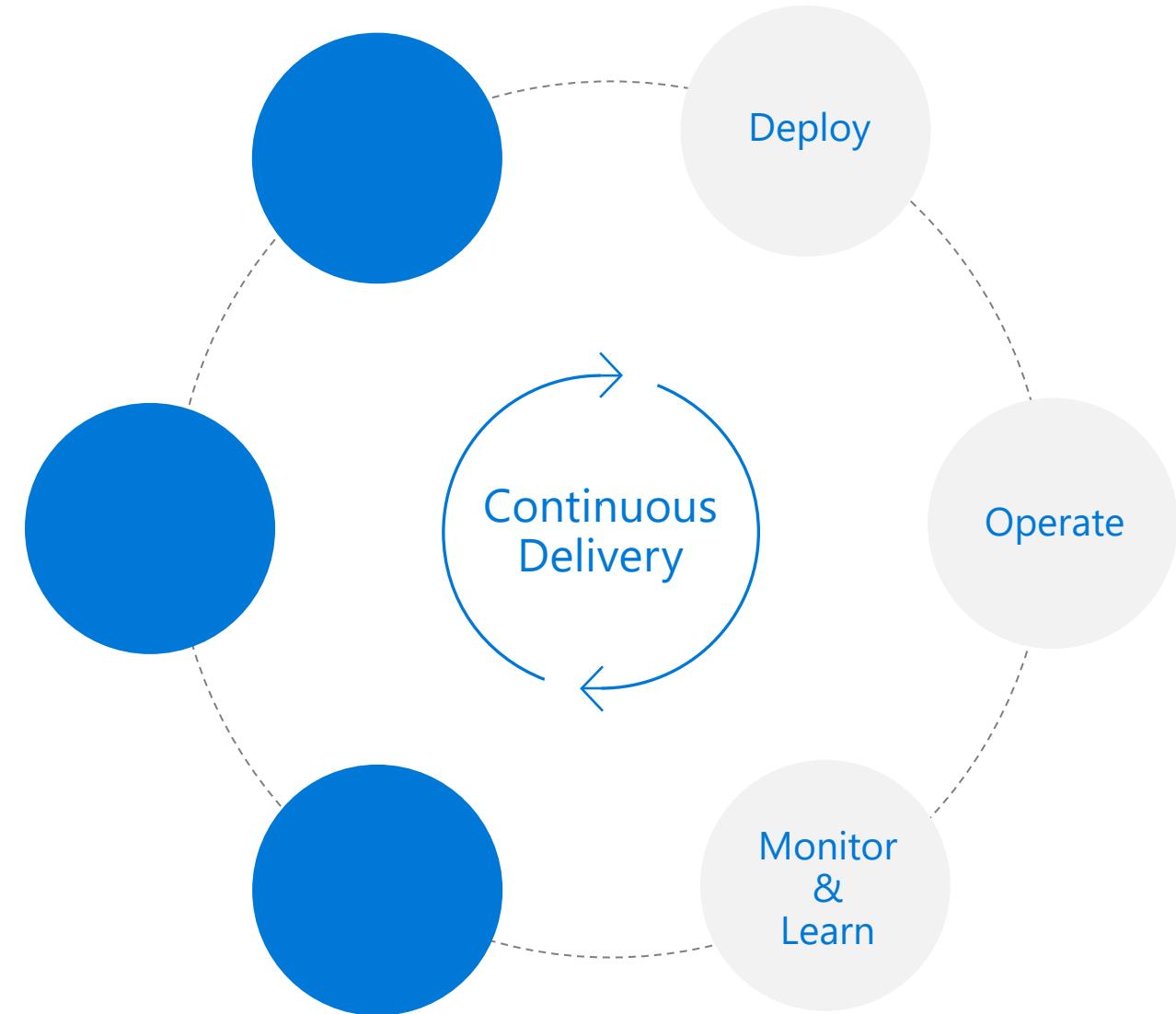
Diagnose E2E issues with Application Insights

- Monitor apps in .NET, JS, Java, Node.js or any language with OSS SDKs
- Visualize server/client connections & dependencies with App Map
- Track E2E distributed transactions (including for Python & Go)
- Drill down to code-level with Snapshot Debugging & Profiling
- Understand end-user cohorts, behavior & engagement for planning

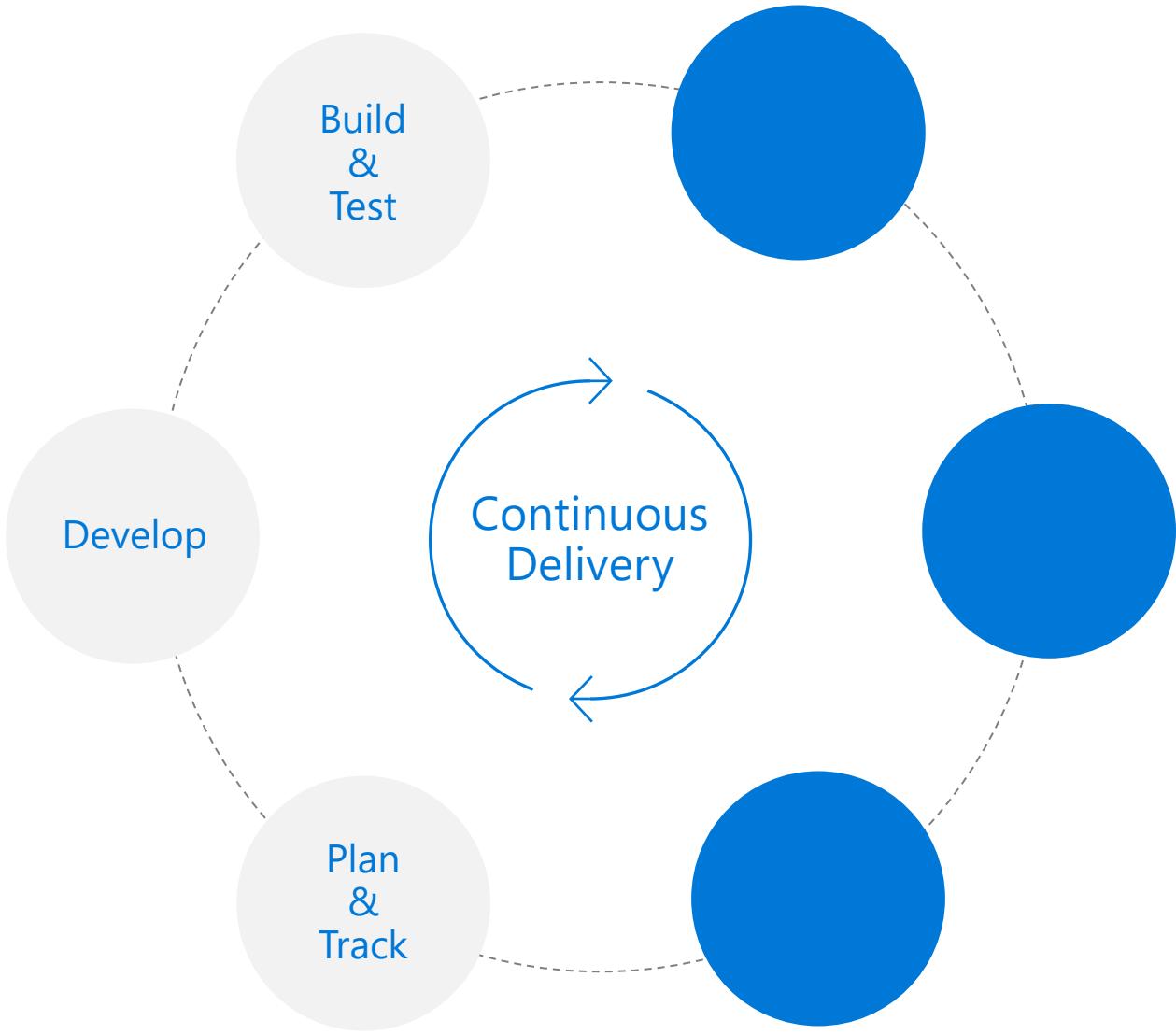


Continuous Monitoring – Development Phase

- Onboard through OSS SDKs, Packages or APIs
[Any App](#) | [Any Dev](#) | [Any Platform](#)
- Native [IDE integrations](#) in VS (.NET) and VS Code (Node.js)
- Track [production telemetry](#) in VS through CodeLens integration
- Local [debug session](#) Diagnostics & Performance Monitoring in VS
- Run [Load Tests](#) from Azure Test Plans & VS Multi-Step Web Tests for Synthetic Monitoring
- File & track [bugs/work items](#) in Azure Boards from Azure Monitor



Continuous Monitoring – Operations Phase



- Onboard through Azure Pipelines [Release Management](#) or [DevOps Projects](#)
- Setup Pre- or Post-Deployment [Quality Gates](#) with Azure Monitor Metrics/Alerts
- [Monitor & Manage](#) Health, Availability, Reliability & Performance of App & Infra
- Run [code-level analyses](#) in production with Snapshot Debugging & Profiling
- Setup Alerts & Notifications with [automated actions & remediations](#)
- Continuously optimize Perf & Usage metrics with "[Build Measure Learn](#)"

Thank You

ευχαριστώ Salamat Po متشرّم شكرًا Grazie

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

ឃុំបញ្ជីណូរវាំប Obrigado شكريه Terima Kasih Dziękuję

Hvala Köszönöm Tak Dank u wel дякую Tack

Mulțumesc спасибо Danke Cám ơn Gracias

多謝晒 Ďakujem הַתֵּה දෙන්ගි Děkuji 감사합니다

