



Practical DevOps

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Introductions

- Who are you?
- What do you know about DevOps?
- Expectations?

Agenda:

Day 1

0	Welcome, introduction, organizational matters, brief overview of the workshop	15
0	DevOps Introduction	45
1	Microsoft Developer Platform	45
	<i>HOL time for participants / Q&A / Discussion</i>	30
2	Build and deploy your web app	30
	<i>HOL time for participants / Q&A / Discussion</i>	20
3	Importance of testing your projects	45
	<i>HOL time for participants / Q&A / Discussion</i>	30
4	Operational data: Application Insights	45
	<i>HOL time for participants / Q&A / Discussion</i>	30
5	DevOps capabilites using Azure	45
	<i>HOL time for participants / Q&A / Discussion</i>	30
6	Release Management	60
	<i>HOL time for participants / Q&A / Discussion</i>	45
7	Basics about ARM deployments	45
	<i>HOL time for participants / Q&A / Discussion</i>	30
8	Using Docker to deploy your ASP.NET Core web application	60
	<i>HOL time for participants / Q&A / Discussion</i>	30

Day 2

Team Start-up

Make teams of three or less, try to have both Dev and Ops skills in the team.

Post for all to see

- Pick a team name
- 3 things you want to learn in this class

Team logistics

Each team needs an MSA that has access to TFS

Gather a list of MSAs and email them to your trainer with the subject

"Team [DevOps-MyTeamName] Meet the Team"

→ Send to **mathias.olausson@solidify.se**

Account should have no spaces or special characters

You can:

- Use an existing MSA that is associated with your MSDN
- Use your personal MSA
- Create a new MSA on <http://account.live.com>

Class Content

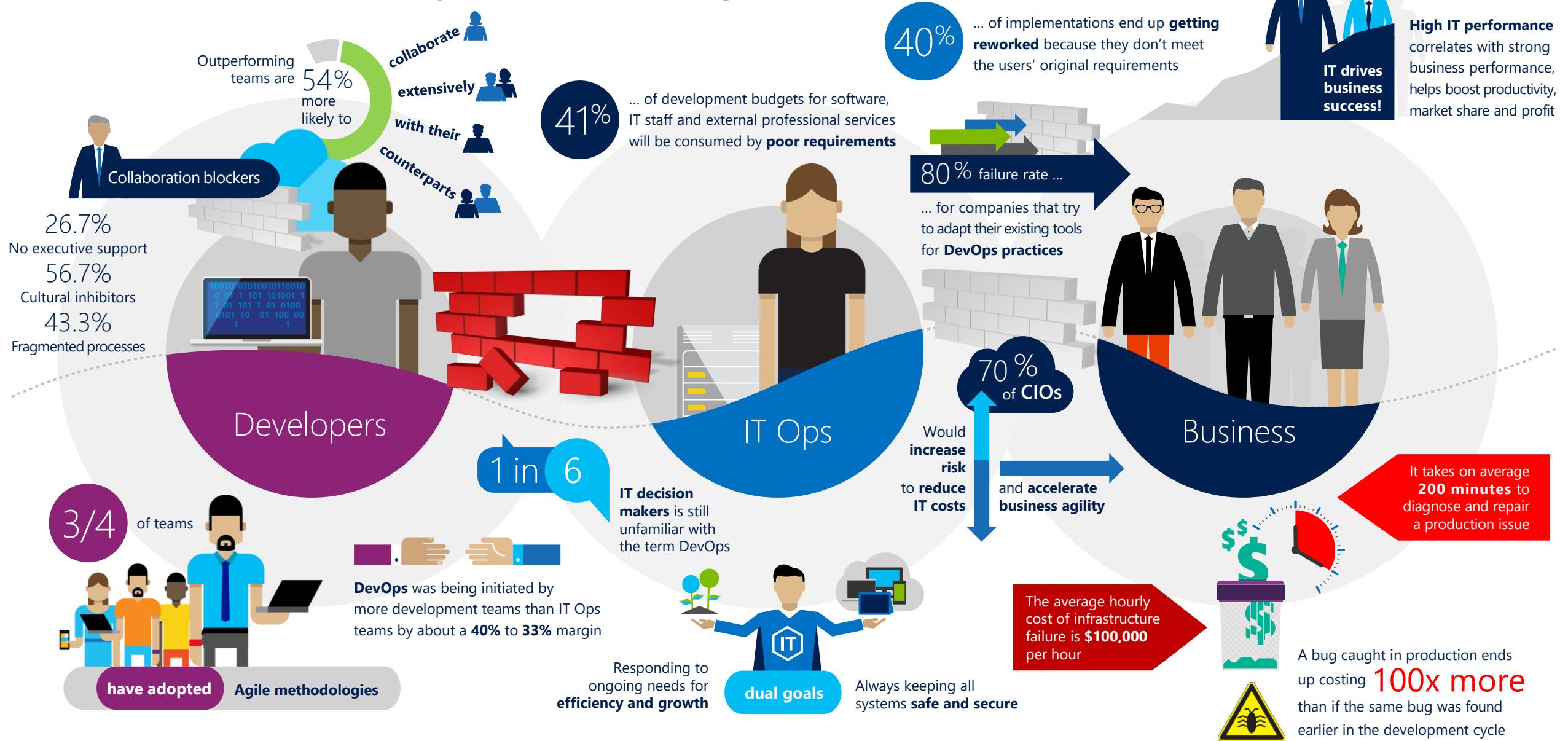
Get the content from Github (clone)

<https://github.com/solidifysv/Practical-DevOps-Workshop>

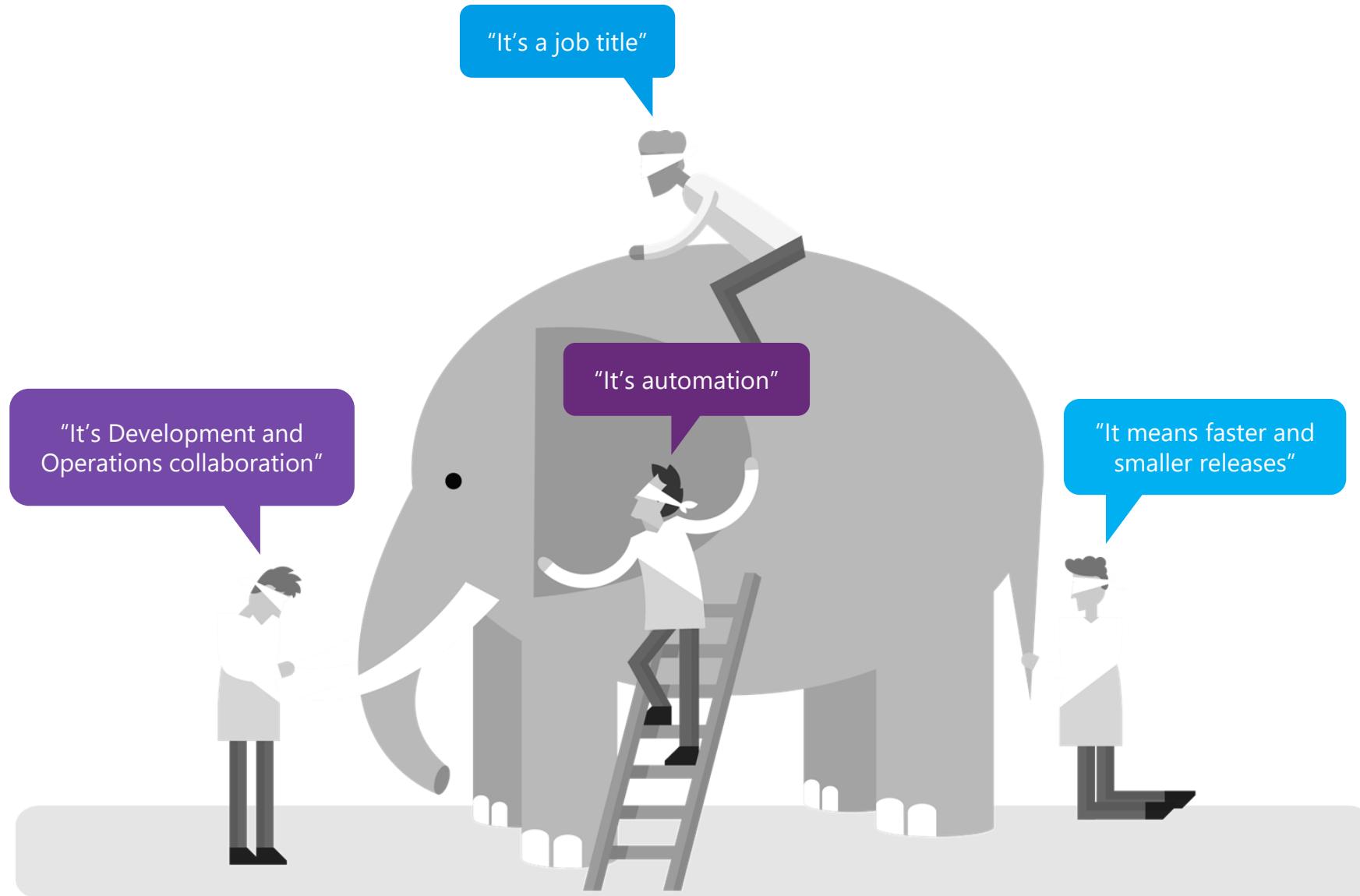
DevOps Introduction



Value delivery challenges



What is DevOps?



The converged DevOps lifecycle



The DevOps conversation



PEOPLE

Collaborate more

Share common goals

Focus on improvement

BRINGING PEOPLE TOGETHER



PROCESS

Eliminate waste

Increase efficiency

Streamline feedback

DELIVERING VALUE FASTER



TOOLS

Enhance productivity

Enable collaboration

Facilitate experimentation

EXECUTING A DEVOPS STRATEGY

DevOps habits and practices

PRACTICES

- Automated Testing
- Continuous Integration
- Continuous Deployment
- Release Management



PRACTICES

- Enterprise Agile
- Continuous Integration
- Continuous Deployment
- Release Management

PRACTICES

- Usage Monitoring
- Telemetry Collection
- Testing in Production
- Stakeholder Feedback



EVIDENCE gathered in PRODUCTION

PRACTICES

- Testing in Production
- Usage Monitoring
- User Telemetry
- Stakeholder feedback
- Feature flags

PRACTICES

- Code Reviews
- Automated Testing
- Continuous Measurement



PRACTICES

- Application Performance Management
- Infrastructure as Code
- Continuous Delivery
- Release Management
- Configuration Management
- Automated Recovery

PRACTICES

- Application Performance Management
- Infrastructure as Code
- Continuous Deployment
- Release Management
- Configuration Management
- Automated Recovery



The shift to DevOps

OLD WORLD

Focus on planning
Compete, not collaborate
Static hierarchies
Individual productivity
Efficiency of process
Assumptions, not data

NEW WORLD

Focus on delivering
Collaborate to win
Fluent and flexible teams
Collective value creation
Effectiveness of outcomes
Experiment, learn and respond

DevOps benefits

Strong IT performance is a competitive advantage

Firms with high-performing IT organizations were 2x as likely to exceed their profitability, market share, and productivity goals

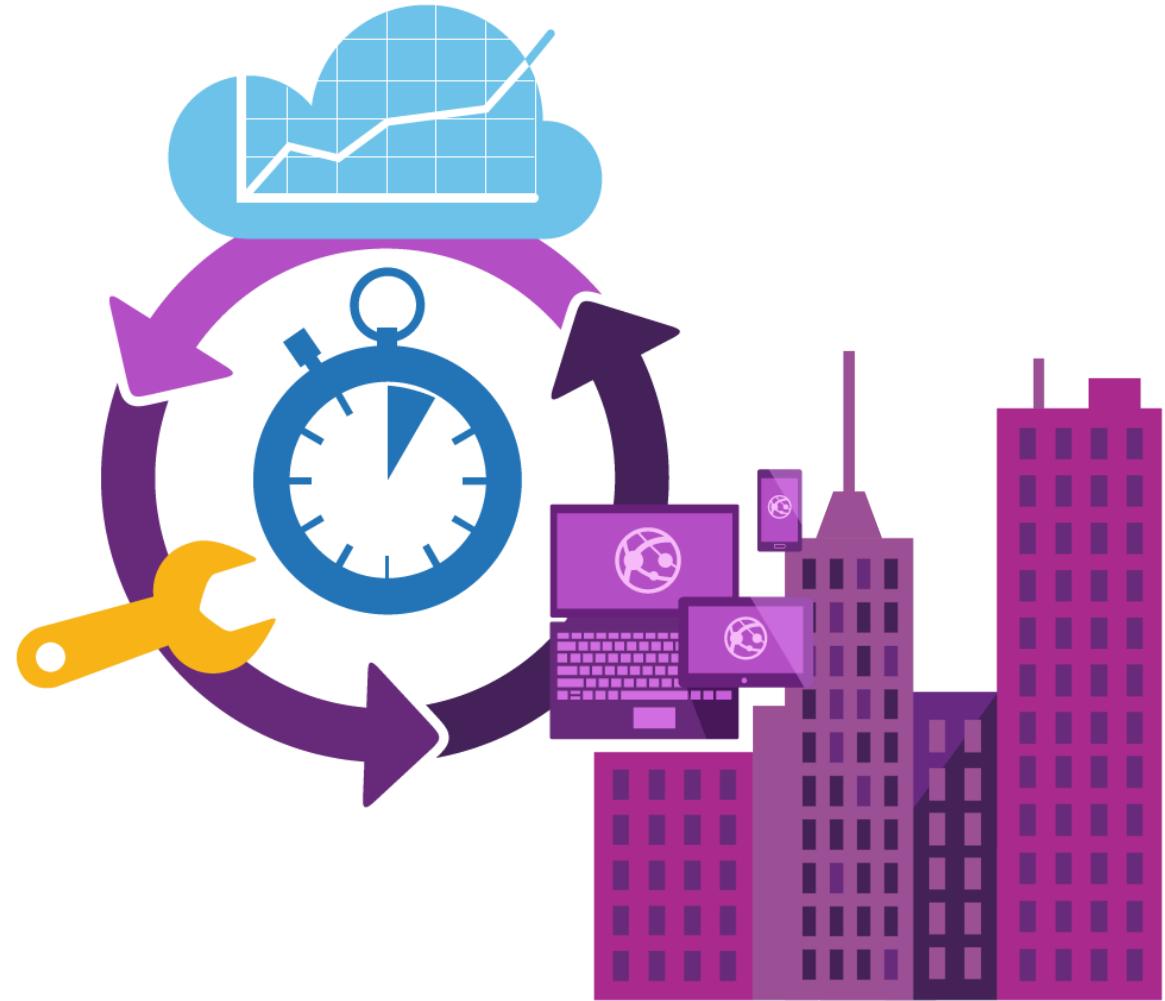
DevOps practices improve IT performance



Deploy code 30x faster
... and with 200x shorter lead time when compared to lower-performing peers

Have 60x fewer failures
... and recover from failure 168X faster when compared to lower-performing peers

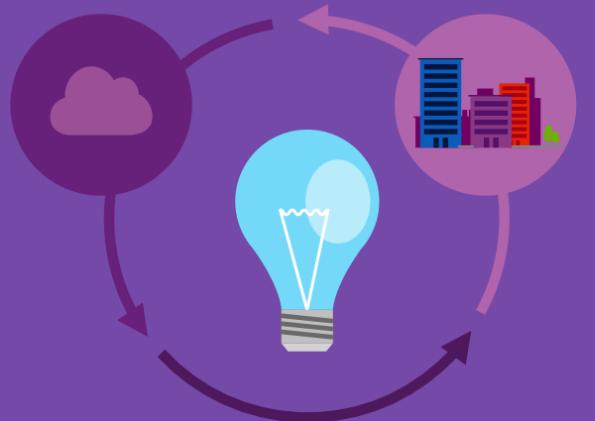
The Microsoft DevOps solution Overview



The Microsoft DevOps solution

An integrated, end-to-end solution for teams of any size to design, build and manage enterprise solutions and cross-platform mobile business apps.

Shorten cycle times
and deliver value faster



Improve quality
and availability



Optimize resources
and eliminate waste



Deliver mobile apps with
digital-era velocity

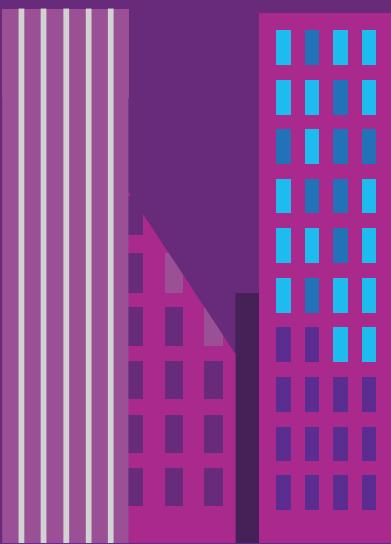




Visual Studio
Team Services



Team Foundation
Server



Open, flexible and extensible
cross-platform DevOps tools

Unlocks a greater ecosystem and
works with what you already use

More agility and flexibility for
continuous value delivery

Hosted by Microsoft
Visual Studio Team Services



Cloud services for teams

Hosted in your data center
Team Foundation Server



Team collaboration server

Getting Visual Studio Team Services

Completely free for small teams

FREE: 5 users + unlimited stakeholders

FREE: 240 minutes cloud build time/month

FREE: 20k virtual user minutes for load testing/month

Pricing for additional team members

No. of users:	5	10	20	50	100	200	1000
Cost per month:	FREE	\$30	\$110	\$350	\$750	\$1,150	\$4,350

Each Team Services paid user also gets a Team Foundation Server CAL (Client Access License)

Free for MSDN and Visual Studio subscribers

Users with the following subscriptions can be added to an unlimited number of VSTS accounts for free, with "Basic" feature access:

- Visual Studio Enterprise - annual
- Visual Studio Enterprise - monthly
- Visual Studio Enterprise with MSDN - including subscriptions offered through BizSpark and the Microsoft Partner Network
- Visual Studio Professional - annual
- Visual Studio Professional - monthly
- Visual Studio Professional with MSDN
- Visual Studio Test Professional with MSDN
- MSDN Platforms

Additional services per account

Cloud Build

FREE: 240 minutes/month on a hosted build agent with 30 mins max runtime for a single build

FREE: 1 private agent (new build system) or XAML controller (legacy build system)

THEREAFTER:

Hosted build agent for \$40/month* (you can upgrade the free agent or buy additional agents)

Private agent for \$15/month

Cloud-based Load Testing*

FREE: 20,000 virtual user minutes per month

THEREAFTER:

\$0.004/virtual user minute for 20,001-2M VUM

\$0.002/VUM for 2,000,001-10M VUM

\$0.001/VUM for usage above 10M VUM/month

* Requires Visual Studio Enterprise

- Services purchased via Microsoft Azure based on actual usage
- Additional services are accessible to all users on the account and shared among them
- Build time is actual computing time required to run the build, and does not include queuing time (if any)
- Load test runs specify the number of virtual users and duration in minutes
Virtual users x minutes = virtual user minutes (VUM)

Getting Team Foundation Server

Completely free for individuals and small teams

Team Foundation Server Express is free for individual developers and small teams of five or less and can easily be installed on a personal desktop or laptop without a dedicated server.

Pricing for additional team members

With **Team Foundation Server**, you license the server and the users connecting to the server. Users who only need access to work items are free, and other users need a user CAL (client access license) for access to most features in Team Foundation Server.

Free for MSDN and Visual Studio subscribers

Users with the following subscriptions get both a Team Foundation Server license and a Team Foundation Server User CAL:

- Visual Studio Enterprise - annual
- Visual Studio Enterprise - monthly
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- Visual Studio Professional with MSDN
- Visual Studio Test Professional with MSDN
- MSDN Platforms

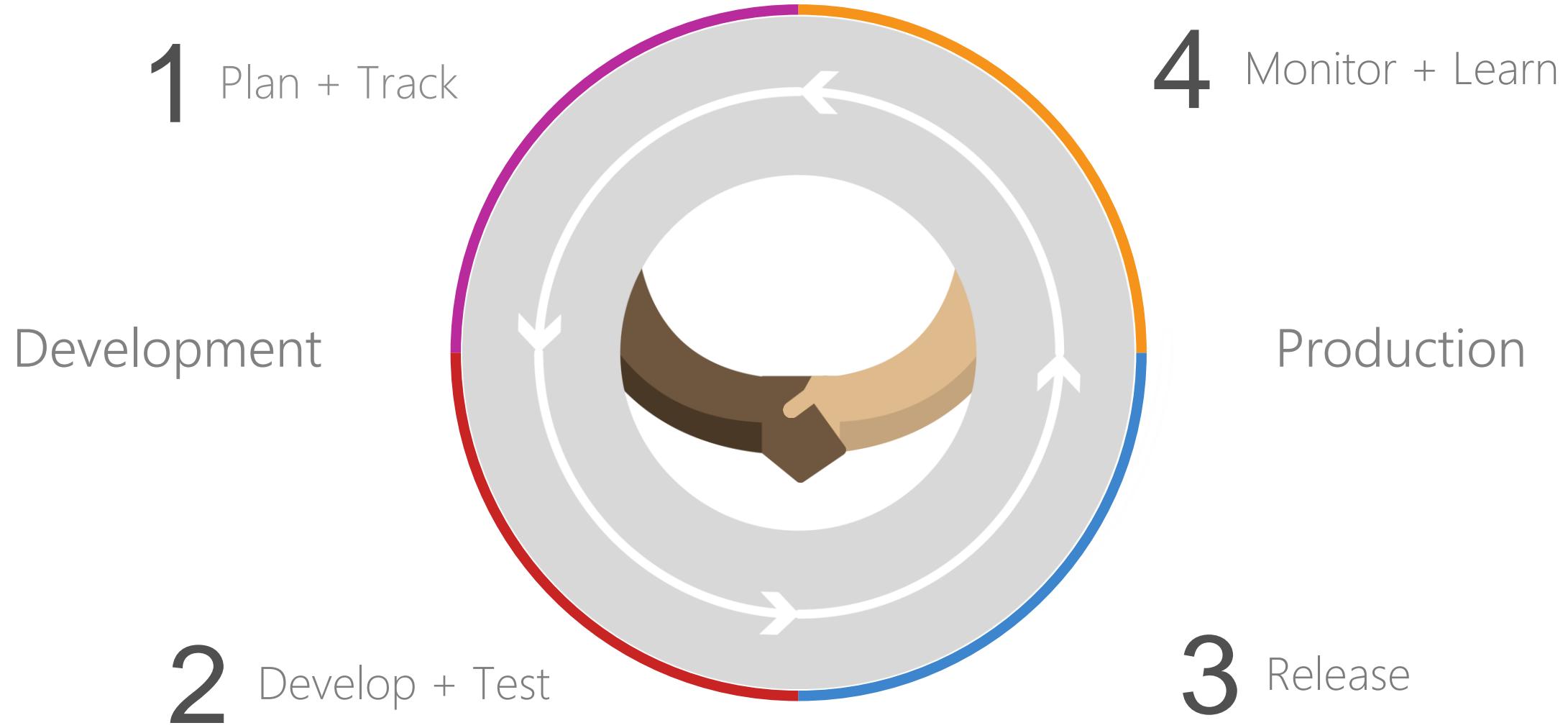
Feature comparison

	Visual Studio Team Services	Team Foundation Server
Plan & Track Work	■	■
Source Code Management	■	■
Package Management	■	■
Test Management	■	■
Cross-Platform Build	■	■
Continuous Deployment	■	■
Release Management	■	■
Application Telemetry	Application Insights/HockeyApp	System Center/PreEmptive Analytics
Reporting	Limited	■
Extend, Customize & Integrate	■	■
Team Structure	1 Collection – Unlimited Projects/Teams	Unlimited Collections/Projects/Teams
Identity & Permissions	Azure Active Directory Microsoft Accounts (Live ID)	Active Directory Integration
Languages	English Only	Multilanguage Support
Data Location	US, Europe, Australia DCs - India (coming soon)	Data Stored On Premises
Backup/Data Migration	Limited support, TFS Import (coming soon)	Backup/Restore Tools Available
Support	Phone, Online and Forums, Engineering Excellence	Phone, Online, Forums, Microsoft Premier Support
Updates	Frequent Updates (~3 weeks) Automatically Upgraded	Periodic Updates (~3 or 4 months) Planning Required

Feature comparison

	Visual Studio Team Services	Team Foundation Server
Version Control		
Team Foundation Version Control	■	■
Distributed Version Control with Git	■	■
Agile Planning & Collaboration		
Scrum, Agile, CMMI	■	■
Custom Process Templates & WIT Customization	Limited	■
Work Item Tagging, Kanban Board, Feedback	■	■
SharePoint, Project Server, System Center Integration		■
Build		
Automated Builds On-Premises with CI	Support for hybrid scenarios	■
Hosted Build Service with Continuous Integration	■	
Application/Platform Support	Many Microsoft platforms and growing (Build Server Software)	Fully customizable
Continuous Deployment to Azure	■	■
Testing		
Test Case Management	■	■
Cloud-Based Load Testing Service	■	
Reporting	Work Item Queries and Favorites Work Item Charting, Power BI	Work Item Queries and Favorites/Work Item Charting/Business Intelligence Warehouse

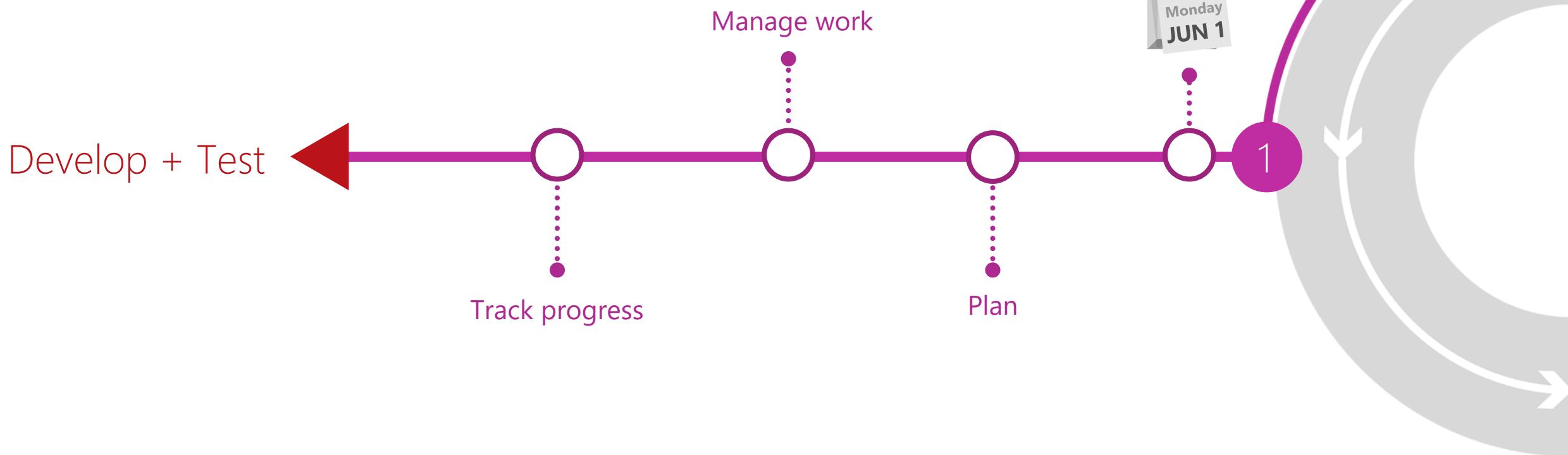
End-to-end DevOps





Plan + Track

It starts with an idea - and a plan how to turn this idea into reality...



Plan & Track Work

Visual Studio Team Services and Team Foundation Server give you the tools you need to effectively create, manage and deliver against your backlog.

Enterprise collaboration



Agile planning tools



Dashboards & charts



Enterprise collaboration

Agile for the enterprise

Effortlessly collaborate and innovate across multiple teams and projects. Keep teams with many stakeholders in sync with lightweight requirements and feedback management tools.

One central location

Build your backlogs, execute sprints and track work and progress from a single location.



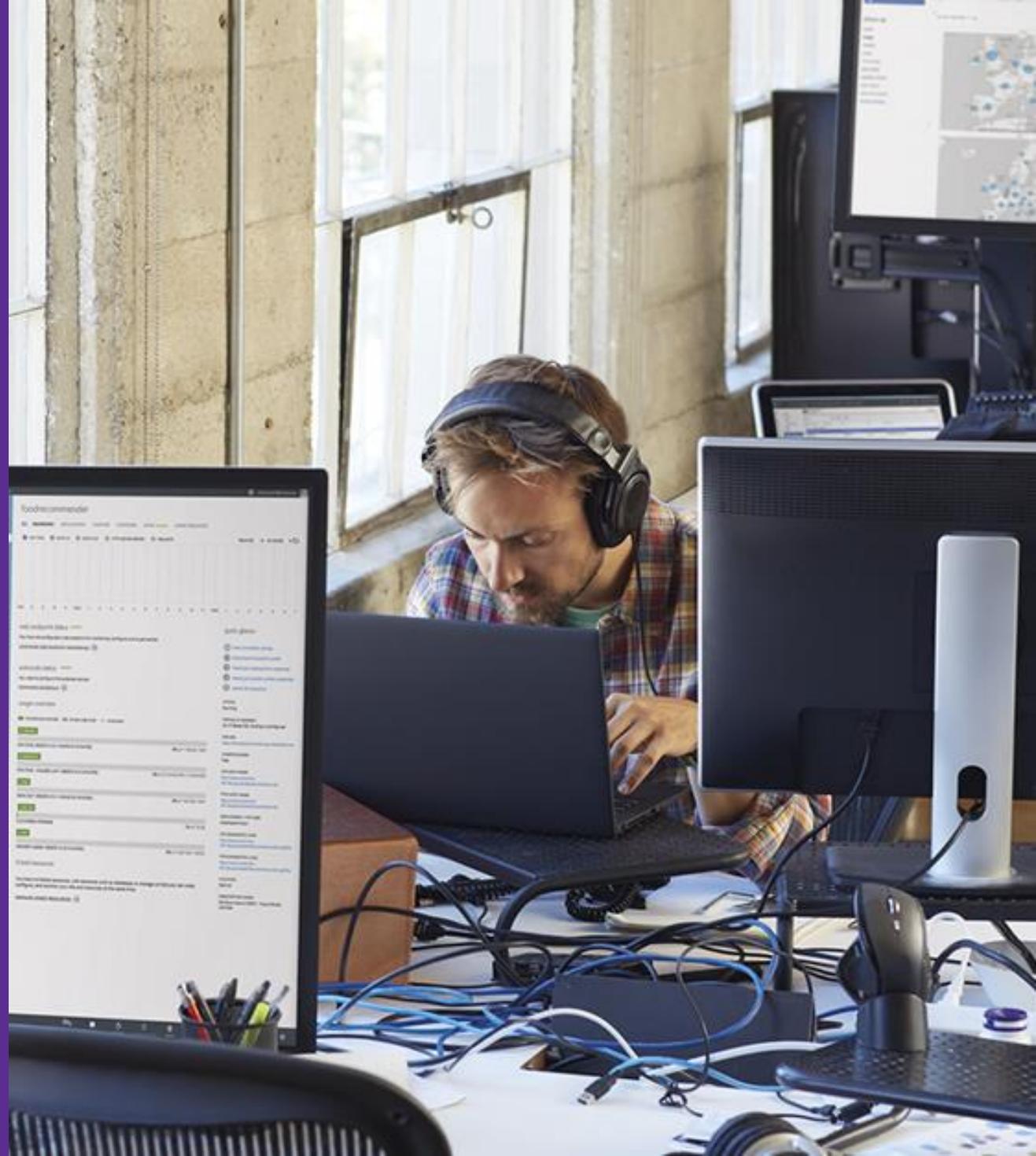
Agile planning tools

Productive

VSTS and TFS give you a drag and drop collaboration experience for managing project and sprint backlog priorities – giving you the confidence that you are working on what really matters.

Fast and easy

With the ability to quickly create new work items, change work item owners, and update work item states through task board and Kanban views you can be confident that VSTS and TFS will never get in the way when you manage your work.



Dashboards & charts

Visibility

Place all work items for your projects in VSTS or TFS and give your stakeholders clear and real time insight into projects and progress without manually generating reports or updates.

Transparency

VSTS and TFS support free, unlimited stakeholder access to view work items, dashboards and charts for your projects, enabling a self-service approach to information sharing that allows you to stay focused on your priorities and deliverables.



Planning Tools



Microsoft Tooling

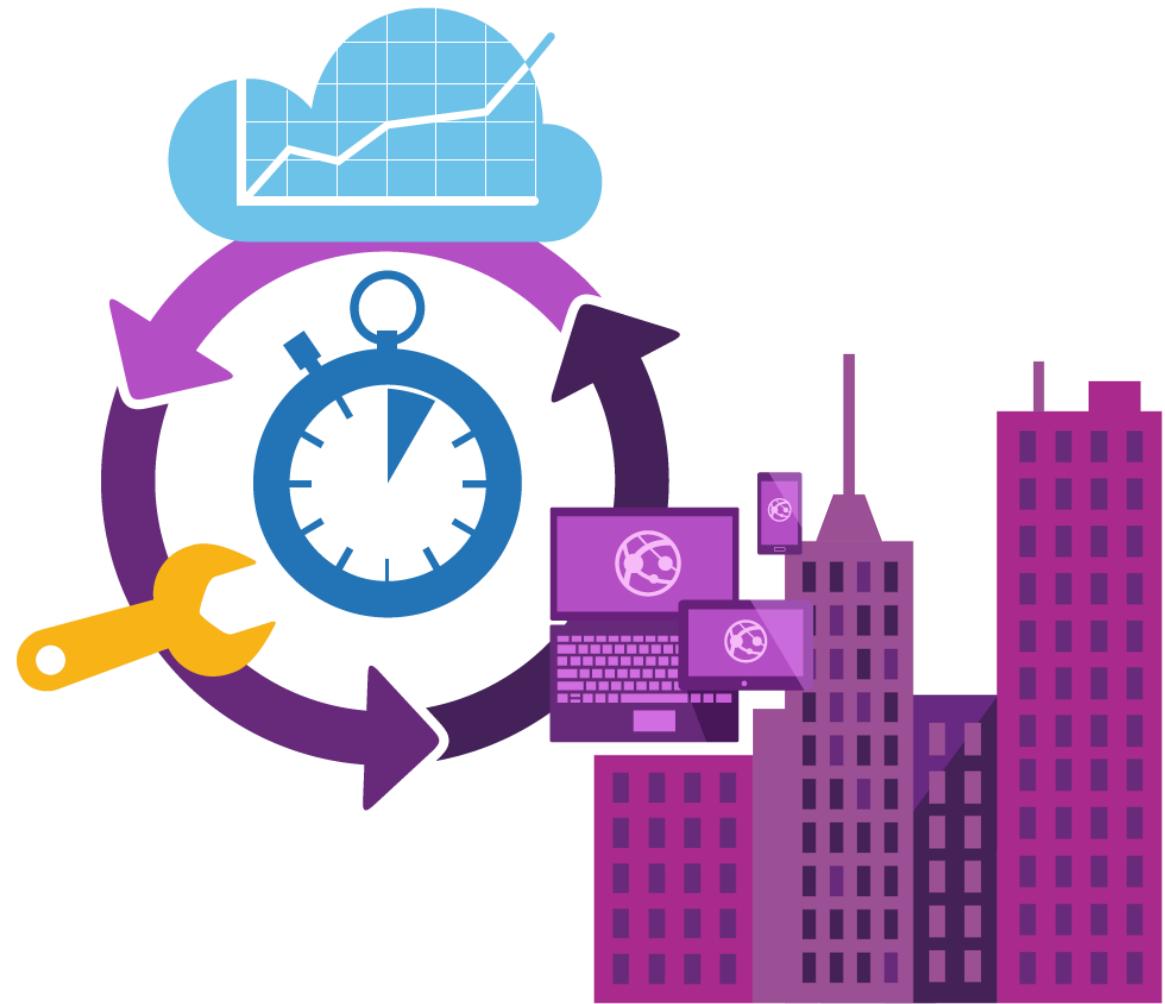


OSS Tooling



Microsoft DevOps

What the analysts say



Gartner

"Microsoft offers a broad suite of functionality available either on-premises or in the cloud. Growing support for open source technologies and community participation aides in opening up the tools for a broader set of platforms."

2015 Gartner Magic Quadrant
Application Development Lifecycle Management



Gartner

"Microsoft combines its proven reputation as an enterprise IT provider and growing acceptance of the vendor as a competent cloud service provider. This coveted dual strength puts Microsoft ahead of most competitors, which typically lack the strength and reputation in either cloud or enterprise computing."

2015 Gartner Magic Quadrant
Enterprise Application Platform as a Service



Microsoft Developer Platform



.NET

Any app, any developer, any platform



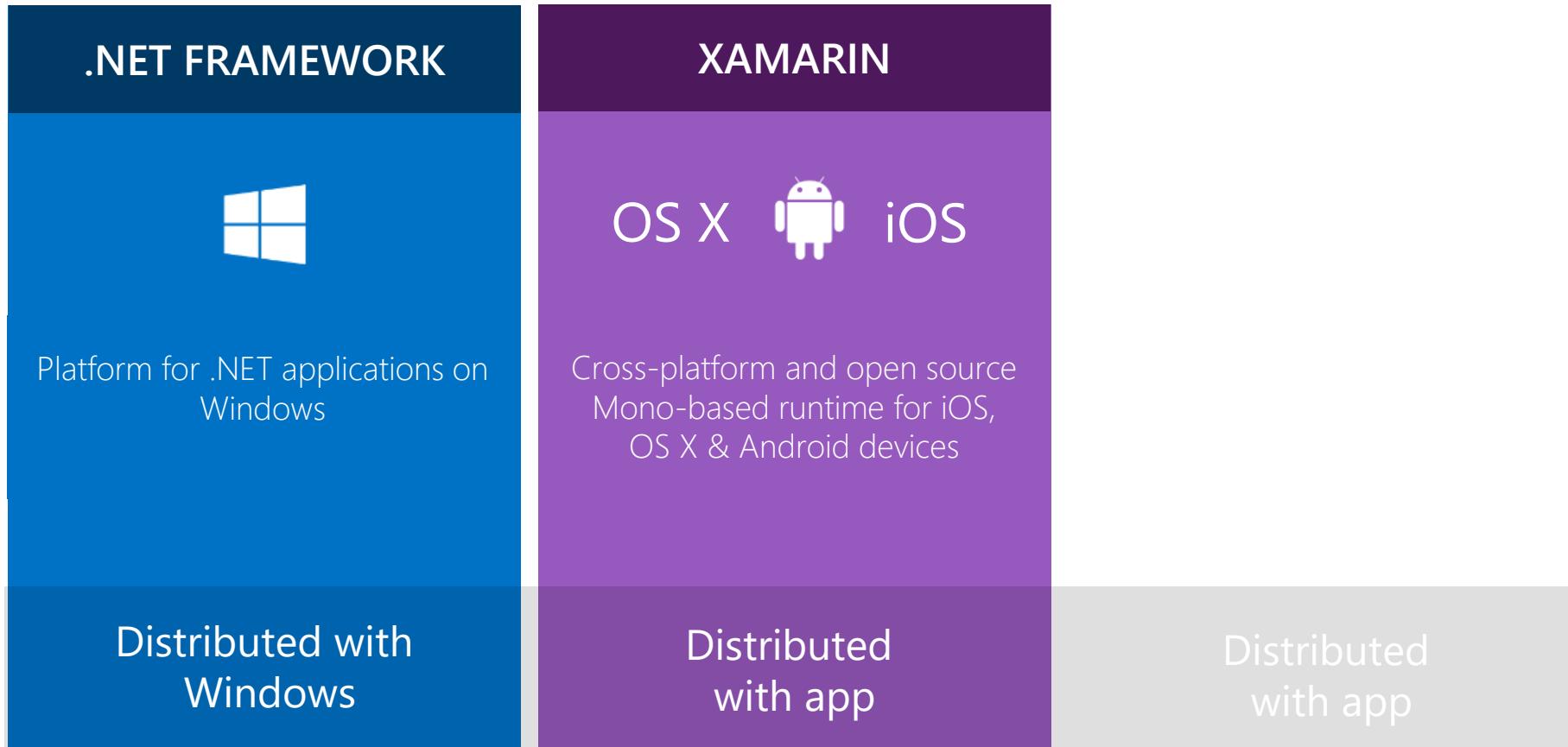
iOS



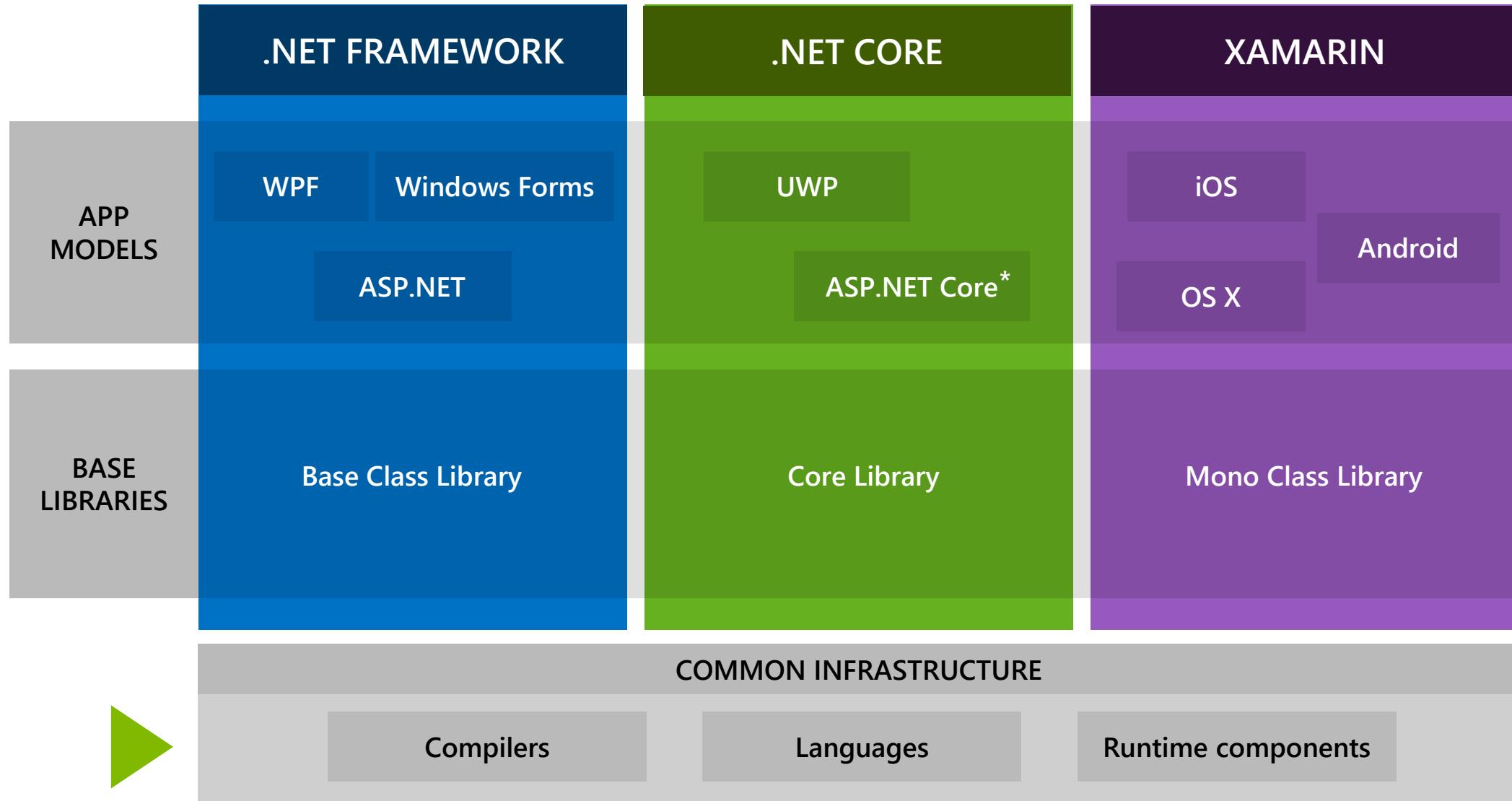
OS X



.NET Today - The family gets bigger



.NET Today



ASP.NET

Improved tooling and frameworks

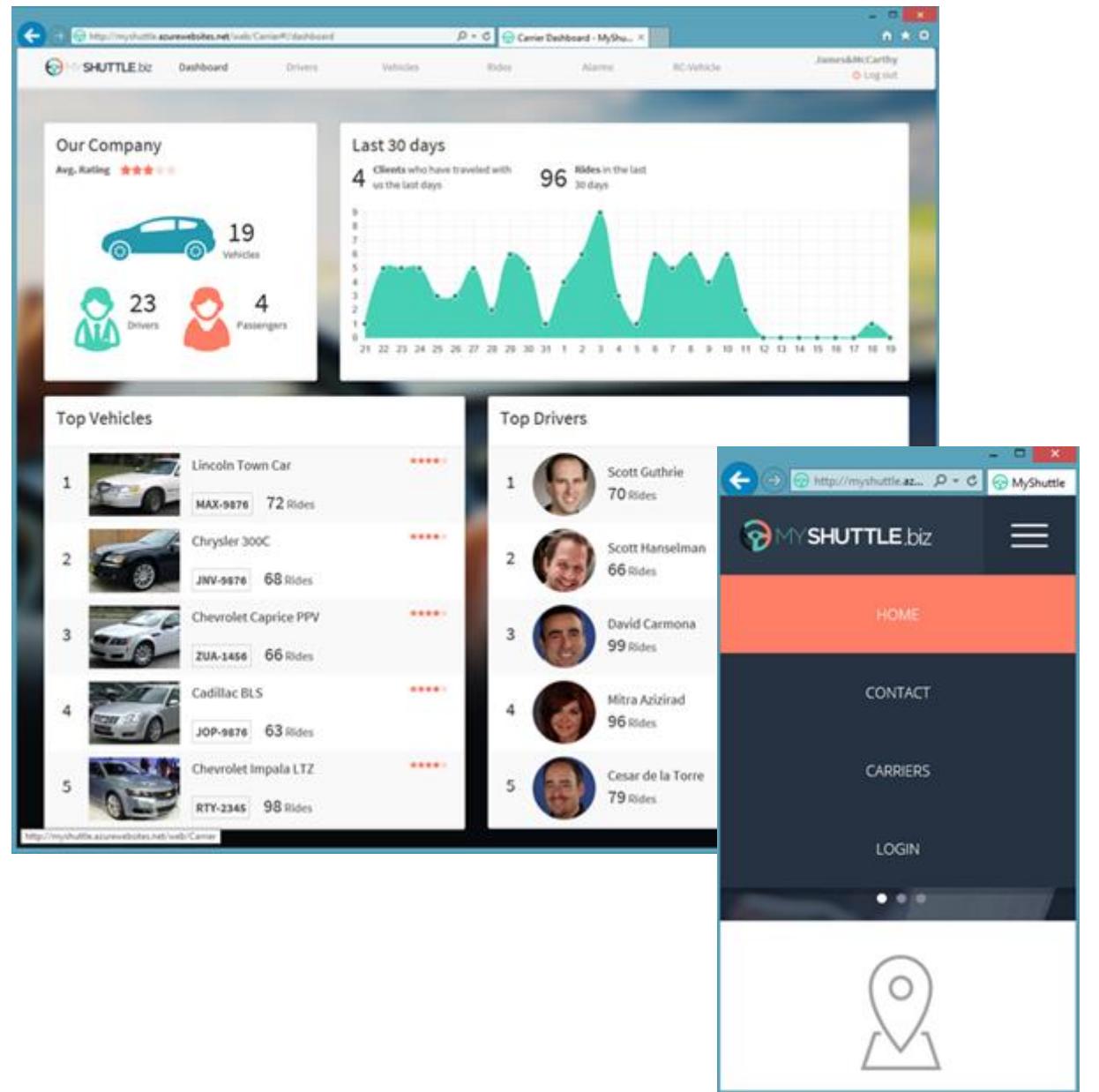
- Deliver value faster with improved tooling and frameworks

ASP.NET Core 1.0

- Smaller footprint
- Modular
- Faster
- Any Platform

Cloud-Ready

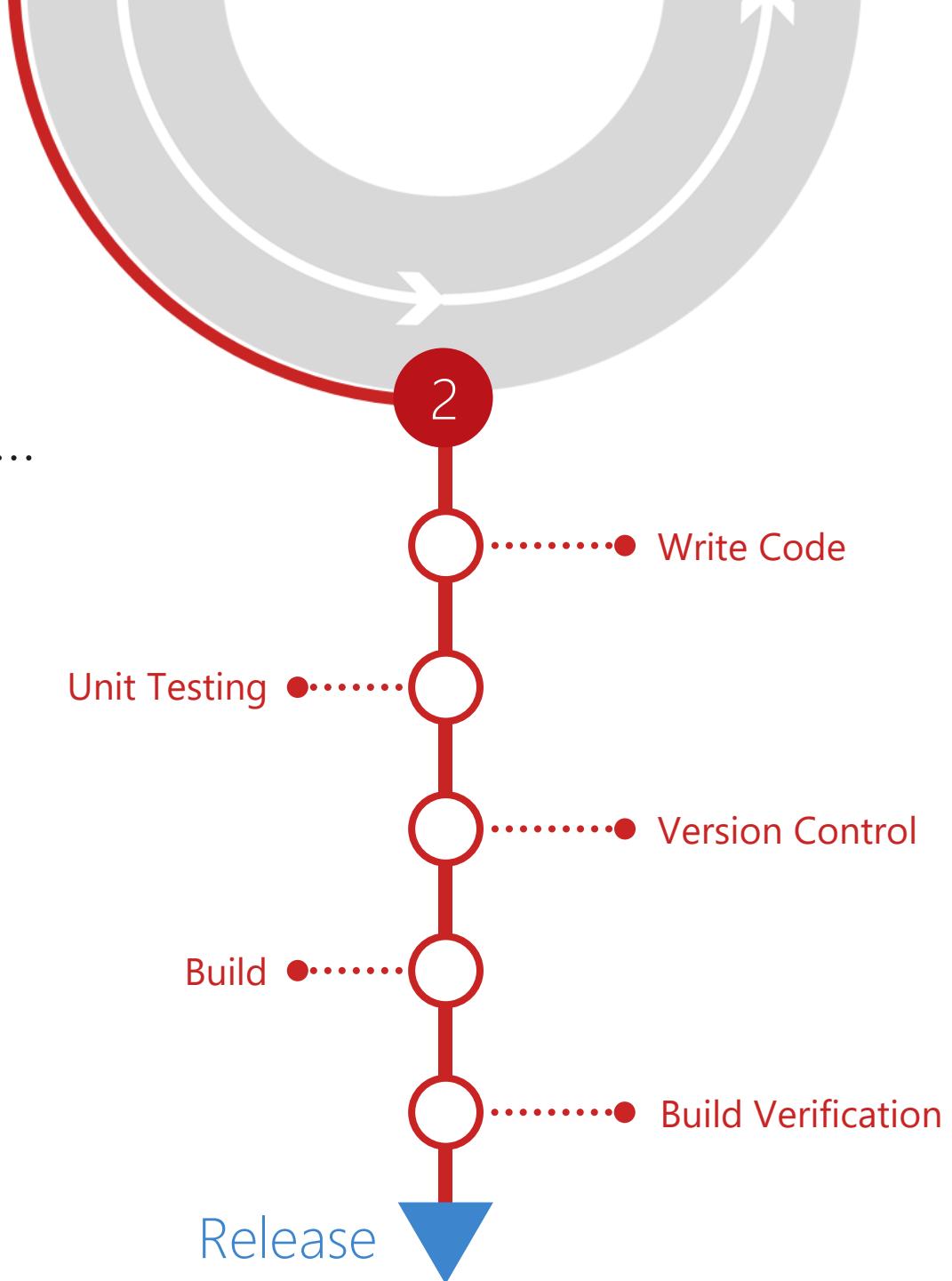
- Tools and frameworks ready for seamless transition to cloud.
- Remote diagnostics on the cloud.
- Container support via Docker.





Develop + Test

After the iteration starts,
developers turn great ideas
into features and functionality ...



Source Code Management

VSTS and TFS provide unparalleled flexibility for your evolving codebase.

All your code is linked directly to the story, bug, or task driving the work.

Flexible version control



Collaborate on code



Any IDE, any code



Flexible and modern source control

Centralized or distributed

Use Git for distributed version control to maximize collaboration or use Team Foundation Version Control (TFVC) for centralized version control. VSTS and TFS offer you not only choice, but also massive scale for large projects and security for your repos via permissions.

Command & control

Sometimes a development project can feel like chaos. Control the chaos with code policies - enforce best practices by requiring all code submissions have code reviews, and eliminate build breaks with gated builds.



Modern code workflows

Branch and pull requests

Branches isolate risk in a development project. Pull requests provide tools that facilitate collaboration and code reviews for changes being merged back into main.

Effortless collaboration

Rich web experiences for leaving comments in code and approving changes make code reviews simpler and more productive than ever.

Package Management

Share and re-use code across the organization with packages. Private, hosted and authenticated feeds let you share, discover & maintain packages and dependencies.



Any IDE, any code

Eclipse, Xcode, and more

Use your favorite language and development tool. VSTS and TFS version control support any language, as well as any Git client (including Xcode). Java teams can access code and work items through free plugins for Eclipse and IntelliJ – and run continuous integration builds based on configuration files from Ant or Maven.

Code search

Semantic code search with syntax highlighting enables you to quickly find code across your repositories, as well as the history and when it was changed and by whom.





Demo: Create New Web App

- Connecting to <https://practicaldevops.visualstudio.com>
- Creating Web API App
- Putting it under Source Control



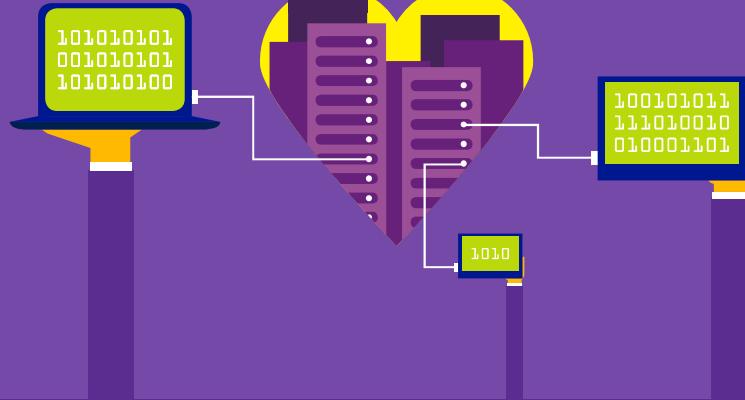
Automated Build



Cross-platform Build

No matter what tools you use or what language you prefer - Team Foundation Build builds your app your way, for your platforms. Just open your browser!

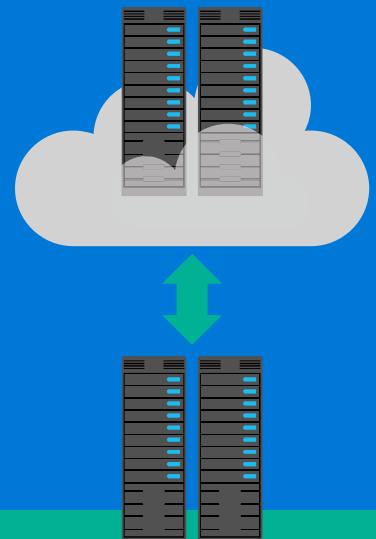
Cross-platform build for
iOS, Java and Android



Flexible, extensible and
customizable builds



Cloud, hybrid or on-
premises infrastructure



No New Build DSL

There are more than enough to go around

Don't make me learn yours just to run mine

ADD BUILD STEPS

 Android Build Run an Android build using Gradle and optionally start the emulator for unit tests		
 Ant Build with Apache Ant		
 CMake Cross platform build system		
 Cmd Script Run a windows cmd or bat script and optionally allow it to change the environment		
 Gradle Run a build using Gra	 VSTest Run tests with VS test runner	
 Jake JavaScript build tool, Node.js.	 Xcode Build Build an Xcode project with xcodebuild tool	
 Maven Build with Apache M	 PowerShell Run a PowerShell script	
 MSBuild Build with MSBuild	 Process Runner Run an executable file	
 Visual Studio Build Build with Visual Studio	 Shell Script Run a shell script using bash	
 VSTest Run tests with VS test	 Azure Cloud Service Deployment via PowerShell Deploy an Azure Cloud Service with PowerShell	
	 Azure PowerShell Run a PowerShell script within an Azure environment	
	 Azure Web Site Deployment via PowerShell Deploy an Azure Web Site with PowerShell	

Cross-platform Build

Any platform, any language

Includes build definition templates to compile .NET, Java, iOS and Android code. A comprehensive library of build steps for a variety of technologies including Ant, CMake, Maven, Xcode and Android enables quick and painless customization of the build process.

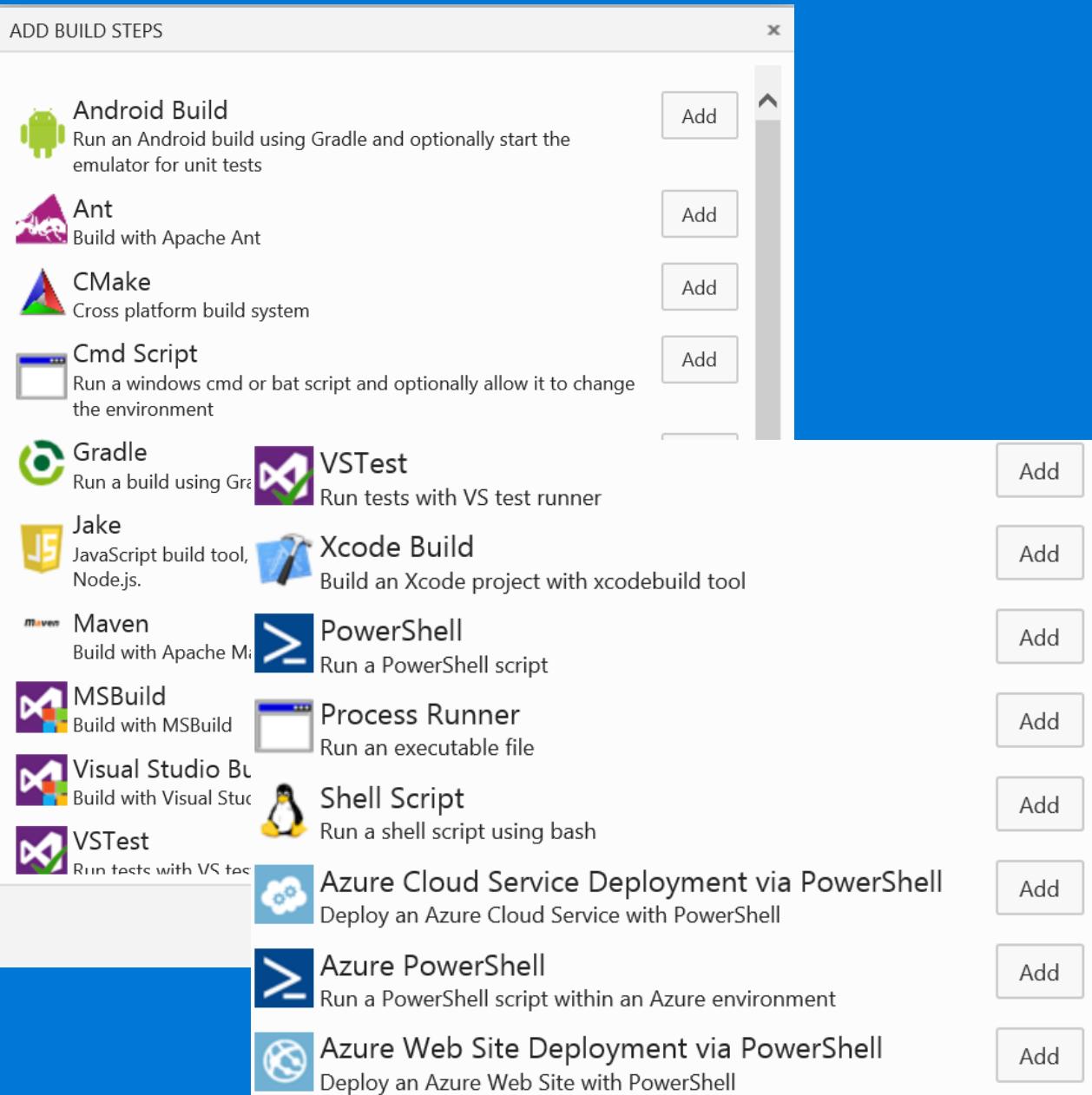


No New Build DSL

Node.js based xplat agent

OOB support for common xplat technologies

Open Source





Demo: Build, Version and Deploy

- Creating builds for Web API App

Security

Each build runs in it's own process

One build can't corrupt the process space for the next build

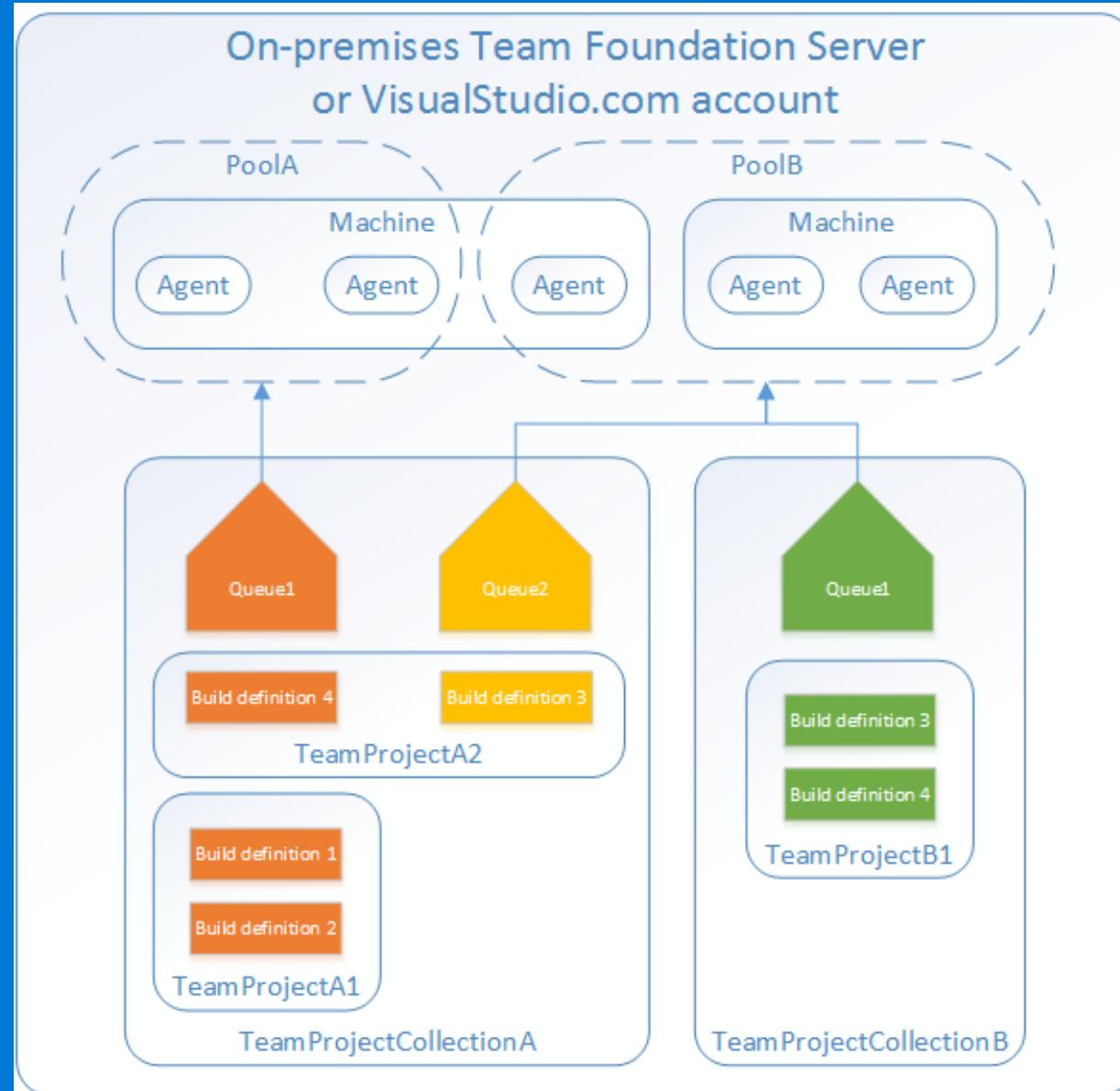
Pool administration can be delegated

You don't need collection or deployment wide permissions to register build resources

Each build get's a unique access token that is limited in both scope and time.

Developer can't write a unit test to access resources they are not supposed to

Administer your build and deployment system



Flexible and extensible

Easy customization

Additional build steps and enhancements are available in the Visual Studio Marketplace or can easily be created and customized based on web standards. Edit them in the browser and leverage existing knowledge of popular script languages.

Our web- and script-based build system works with both your windows build agents and the cross-platform build agent (runs on Mac and Linux systems). The cross-platform agent is an open-source Node.js app.

If you need to add a task we don't currently offer, you can create your own activity using our open source activities as examples of best practices.



Cloud, hybrid or on-premises

Cloud build

VSTS provides hosted build agents to start building your projects immediately, as well as a flexible build system that allows you to install your own agents. Our hosted build agents are pre-configured and flexible and can run custom build activities as well as your own build process templates or custom scripts.

Hybrid infrastructure

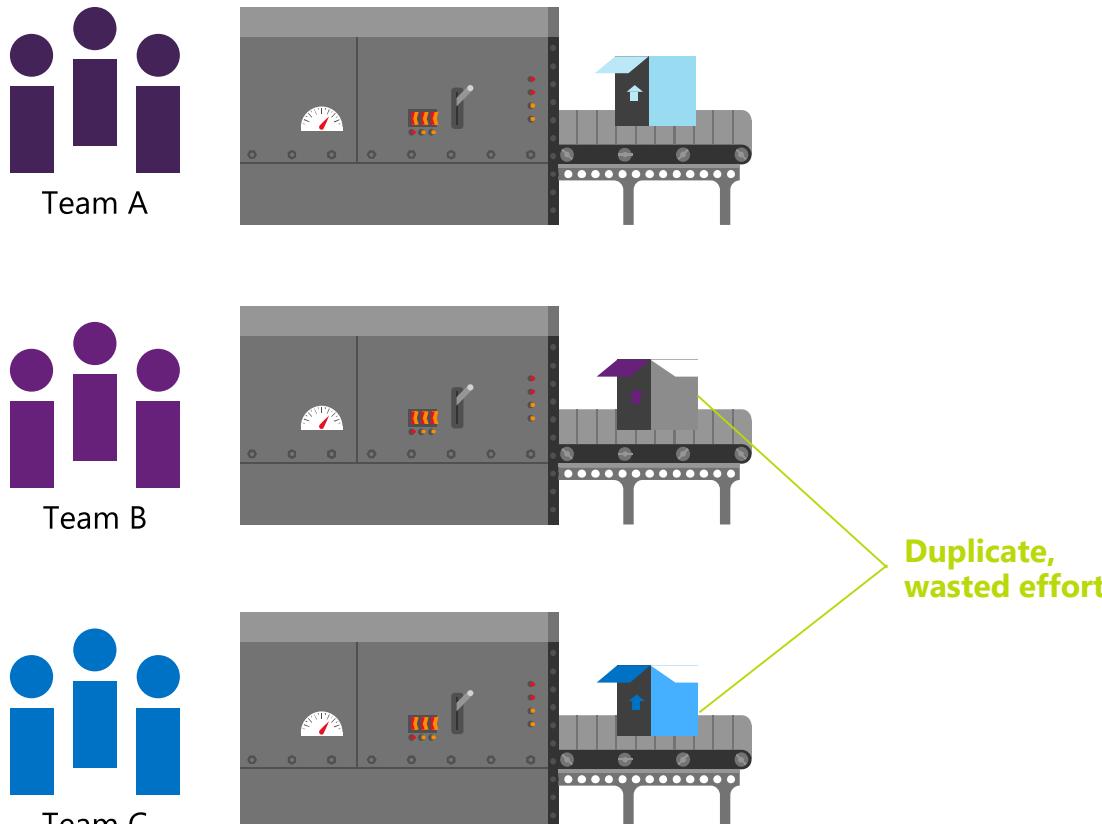
If your build process requires resources outside of the hosted build agents' capabilities, then you can connect on-premises build agents to your hosted team project collection. Or, quickly scale out your on-premises build infrastructure easily by adding hosted build agents.



Package Management

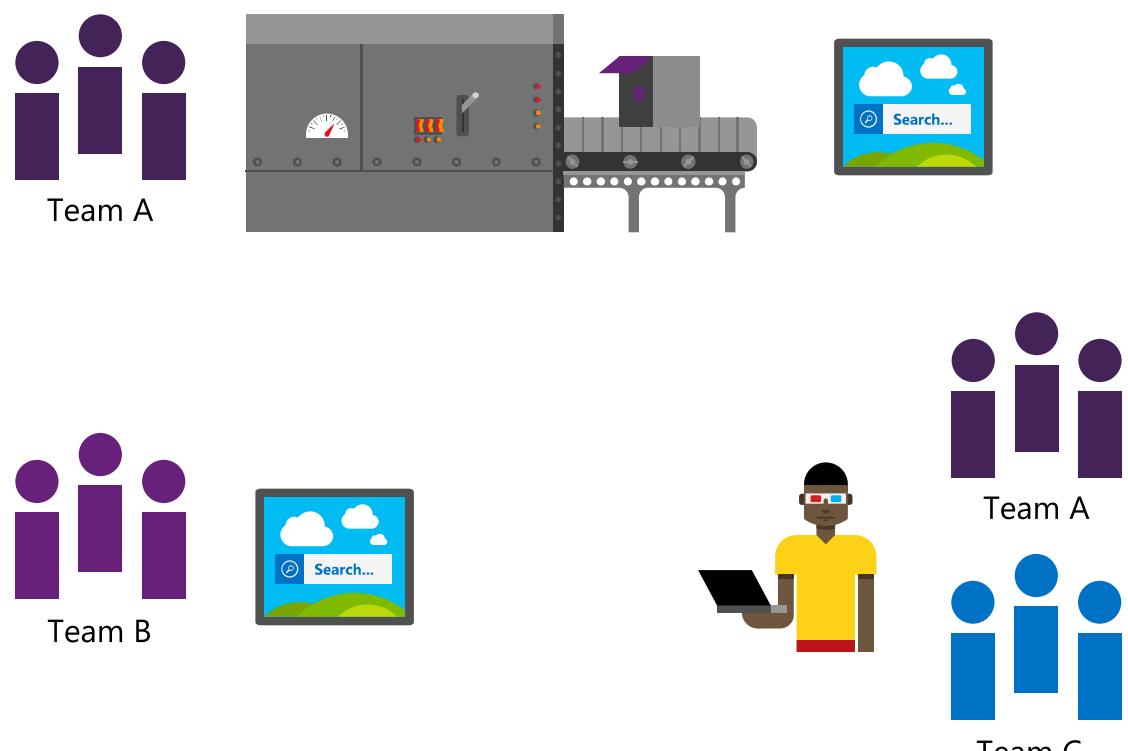
Building a culture of code sharing

How it used to be



Each team writes the common component that they need

How it can be



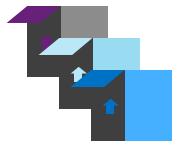
One team writes; others re-use and improve it

What is Package Management?

One place to manage, store, secure, and share your reusable components, deeply integrated with VSTS

What is coming in VSTS?

Produce



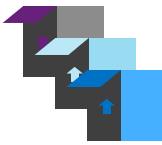
Package management

Discover



Account-wide
VSTS search

Consume



Package
management

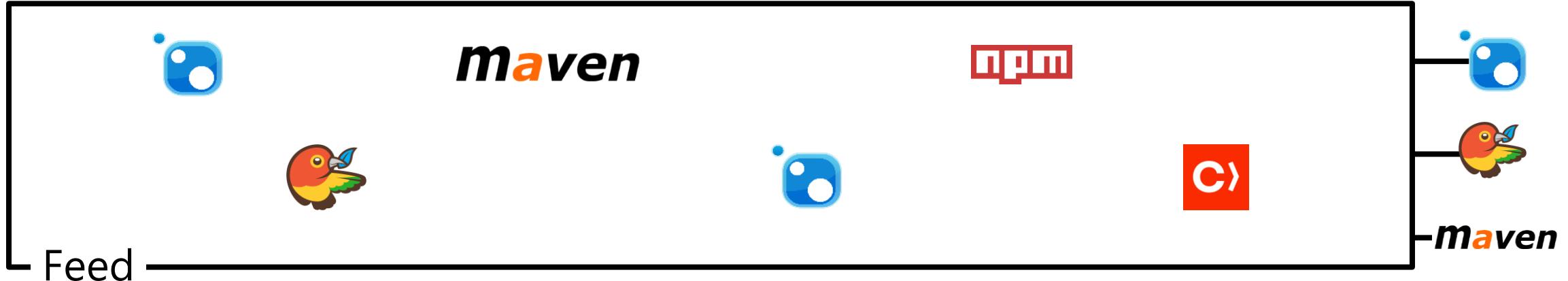


Social coding



Component
governance

Package management hierarchy



- Organize
- Group multiple types of packages logically

- Permission
- You control readers, contributors, and owners

Feeds are independent of VSTS projects/teams



Package management

Packages enable code reuse

- Packages are reusable bits of ready-to-execute code
- Package sharing is a key way to consume 3rd-party libs
- Package managers track and manage dependencies
- In VSTS, packages can be anything
 - NuGet, NPM, Bower, Maven, Ivy, Cocoapods, Docker, ZIP, and more...



Package management

Additional Resources

- [OWIN and Katana](#)
- [NuGet](#)
- [What is package management?](#)
- [ASP.NET Core 1.0 \(Preview\)](#)
- [Source Control and Build](#)



Hand-on-Lab: 1 & 2

- Lab 1: <http://bit.ly/1PkSQDk>
- Lab 2: <http://bit.ly/22yr1JS>

Importance of testing your projects



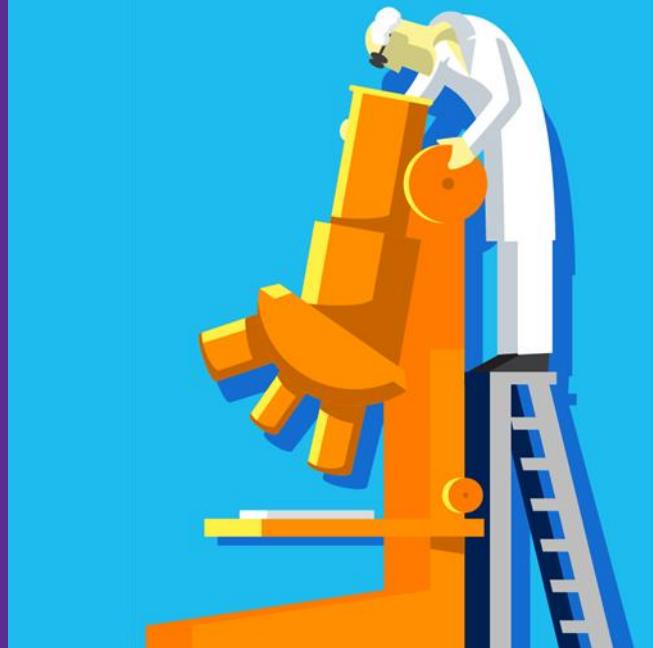
Quality Management

A toolset optimized for QA professionals, giving them flexibility in how they work while at the same time keeping them in sync with the rest of the team.

Test planning
and tracking



Manual and
exploratory testing



Performance and
load testing



Test planning and tracking

Single pane of glass

Coordinate all test management activities including test planning, authoring, execution, and tracking from a central location. The test hub in VSTS and TFS gives product owners and business analysts critical insight into progress against the defined acceptance criteria and quality metrics.



Manual and exploratory testing

Browser-based testing

Improved browser-based manual testing tools helps testers author, manage and execute test cases in any modern web browser.

Exploratory testing

Perform ad-hoc and exploratory testing on multiple devices using our integrated 3rd party services without predefined test cases or test steps. The exploratory testing tool includes action recording, screenshots with annotations, video capture and bug-reporting capabilities. Easily create test cases from exploratory test recordings and add them to test plans or suites for subsequent test runs.



Performance and load testing

Unlimited load testing

VSTS and TFS make integrating load testing into your development process easy and will help you avoid nasty surprises in production.

Use cloud-based load testing capabilities to validate and assess application performance under real-world conditions before you deploy. Generate hundreds of thousands of connections in minutes and run tests from one of many global Azure datacenter locations to minimize latency and simulate users' real-world conditions.



Test Execution Type

Guiding Questions

- What is manual software testing?
- What is a benefit of automated testing?
- How is black box testing different from white box testing?

Manual Testing

- The first testing we experience when we learn to program is manual testing: try the program and see if it works!
- In manual testing, the tester plays the role of a user and check to see if there is any unexpected or undesirable behavior.
- Often, manual testers will use a test plan with specified test cases to ensure a thorough exploration of the project.
- The tester may or may not be part of the programming team that created the code.

Automated Testing

- Automated tests use testing software (such as Microsoft® Test Manager in Microsoft Visual Studio®) to control and track one or more automatically executed tests.
- Automated tests can be created and configured to run each time a new version of the project (or a segment of source code) is created.
- Microsoft Test Manager will provide detailed reporting on the test results for each automated test.

Manual vs. Automated Testing

- Manual and automated test cases are complementary; both types of tests are important for ensuring high quality software.
- Automation is quick and can test many subtle variations in data; it can also easily repeat tests as software evolves. And because it is executed by a computer, the fatigue and mistakes that sometimes accompany repetitive tasks is negated.
- Although manual testing typically takes longer to execute (since it's conducted by a person), it often requires far less set-up time. It is a good choice for tests that only need to be run occasionally, or cases when cost/time of automation setup would outweigh the benefits.

Black Box Testing

- Black box testing is testing conducted without knowledge of the internal workings of the system that is being tested.
- This type of testing simulates end-user experience.
- In general, the tester does not know how the code works - she or he is providing input and examining the output. This person does not necessarily need to know how to program.
- Example scenarios for black box testing include:
 - ✓ Testing that the user interface meets all requirements and is functional.
 - ✓ Testing for a variety of input types (including input outside the expected range, such as entering a negative number for a weight).
 - ✓ Load or stress testing a system.
 - ✓ Testing the security of a project or system.

White Box Testing

- Also know as glass box, clear box, and open box testing.
- White box testing is conducted by examining code for potential failure scenarios.
- White box test cases are created by someone who analyzes the code of the application block and prepares test cases to ensure that the class is behaving in accordance with the specifications.
- White box scenarios include:
 - ✓ Testing internal subroutines that are used “behind the scenes.”
 - ✓ Testing loops and conditional statements for accuracy.
 - ✓ Performance testing of a code path or algorithm

Testing Level

Testing Level

- Unit Test
- Component and Integration Test

Testing Type

Regression Testing

- Whenever any changes are made to a project, it is possible that existing code may no longer work properly, or that previously undiscovered bugs will present themselves. This kind of bug is called a regression.
- To catch these defects, the entire project must be regression tested: a complete retesting of a modified program, rather than a test of only the modified units, to ensure that no errors have been introduced with the modifications.

Stress Testing

- Testing on a small scale, such as a single user running a web application or a database with only a handful of records, may not reveal problems that may occur when the application is used in “real world” conditions.
- Stress testing pushes a system’s functional limits. It is performed by subjecting the system to extreme conditions, such as peak volumes of data or a large number of simultaneous users.
 - ✓ These tests are also referred to as load tests, since they test a system under heavy loads.
- Test automation allows rigorous stress testing without a minimal amount of manual labor.

Performance Testing

- Performance testing determines responsiveness, throughput, reliability, and/or scalability of a system under a given workload.
- In web applications, performance testing is often closely related to stress testing, measuring lag and responsiveness under a heavy load.
- In other applications (desktop and mobile apps, for example), performance testing measures speed and resource utilization, such as disk space and memory.

Security Testing

- Security testing validates an application's security services and identifies potential security flaws.
- Many projects use a black box approach to security testing, allowing security experts with no knowledge of the software to probe the application for holes and weaknesses.

Usability Testing

- Usability testing evaluates a project by studying how real users actually use the software.
- Examples include:
 - ✓ Measuring how long it takes a user to complete a task.
 - ✓ Tracking how many “clicks” or user actions it takes to complete a task or access a feature.

Accessibility Testing

- Accessibility testing validates an application's support for users with disabilities.
- Accessibility testing may include:
 - ✓ **Compliance:** Does it comply with legal requirements regarding accessibility?
 - ✓ **Effectiveness:** Can users with disabilities use the application?
 - ✓ **Usefulness:** Does the application expose adequate functionality for users with disabilities?
 - ✓ **Satisfaction:** How is the application perceived by users with disabilities?
- Accessibility testing may include usability tests with disabled users and assistive technology devices.

Additional Resources

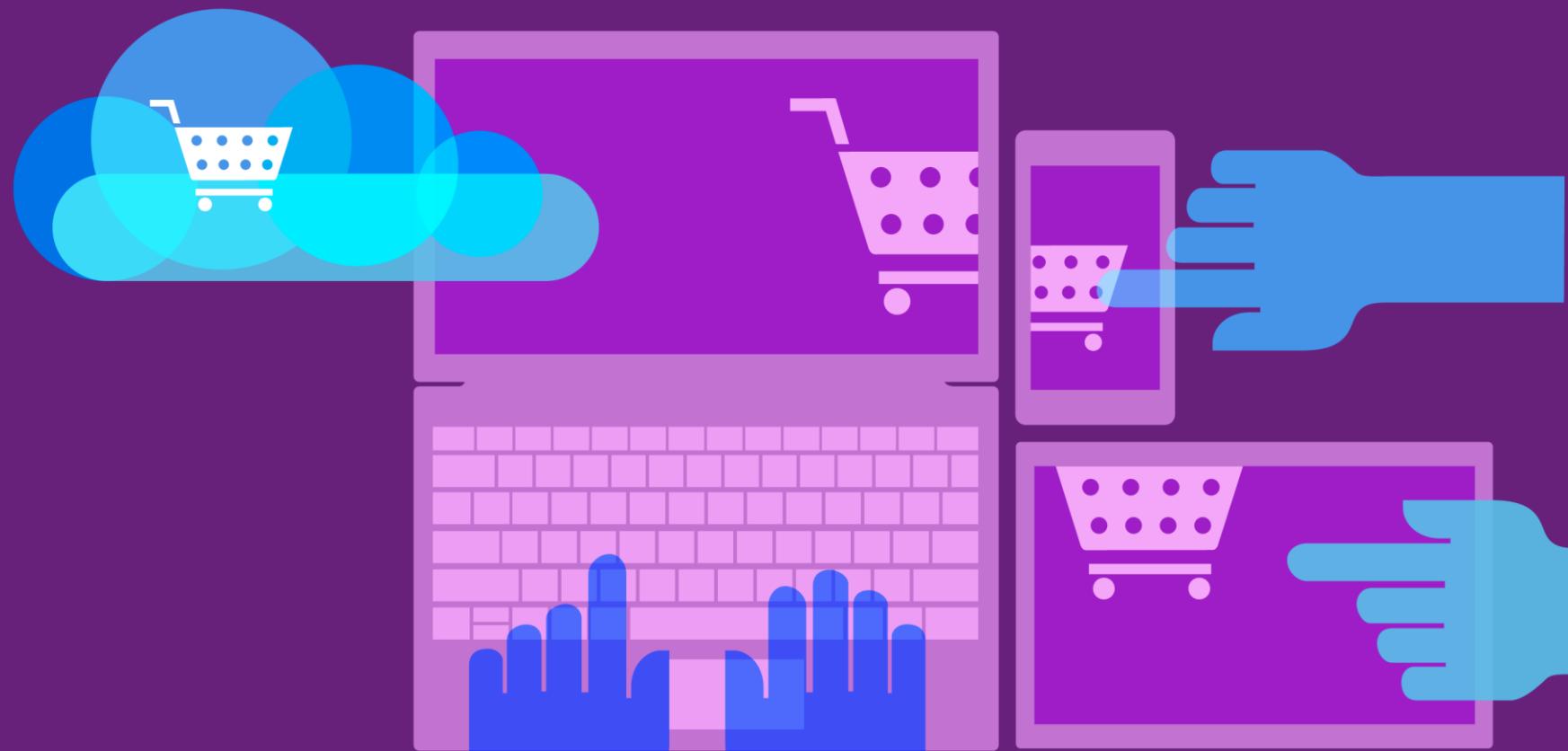
MSDN Software Testing Resources

Testing Process for Application Blocks	http://msdn.microsoft.com/en-us/library/ff649517.aspx
Black Box & White Box Testing for Application Blocks	http://msdn.microsoft.com/en-us/library/ff649503.aspx
Patterns and Practices: Manual System Tests	http://msdn.microsoft.com/en-us/library/jj159334.aspx
Test Early and Often	http://msdn.microsoft.com/en-us/library/vstudio/ee330950.aspx
Unit Testing	http://msdn.microsoft.com/en-us/library/aa292197.aspx
Unit Testing: Testing the Inside	http://msdn.microsoft.com/en-us/library/jj159340.aspx
Integration Testing	http://msdn.microsoft.com/en-us/library/aa292128.aspx
Unit testing, component level testing and UI testing, what to use and when	http://blogs.msdn.com/b/raulperez/archive/2010/04/29/unit-testing-component-level-testing-and-ui-testing-what-to-use-and-when.aspx
Regression Testing	http://blogs.msdn.com/b/narendra_parihar_s_blog/archive/2012/04/20/regression-testing.aspx
Performance and Stress Testing	http://msdn.microsoft.com/library/dd293540.aspx
Security Testing	http://msdn.microsoft.com/en-us/library/aa292190.aspx
Localization Testing	http://msdn.microsoft.com/en-us/library/aa292138.aspx
Testing a User Interface (UI)	http://msdn.microsoft.com/en-us/library/windows/desktop/ff728827.aspx

Testing Tools



LAB #3



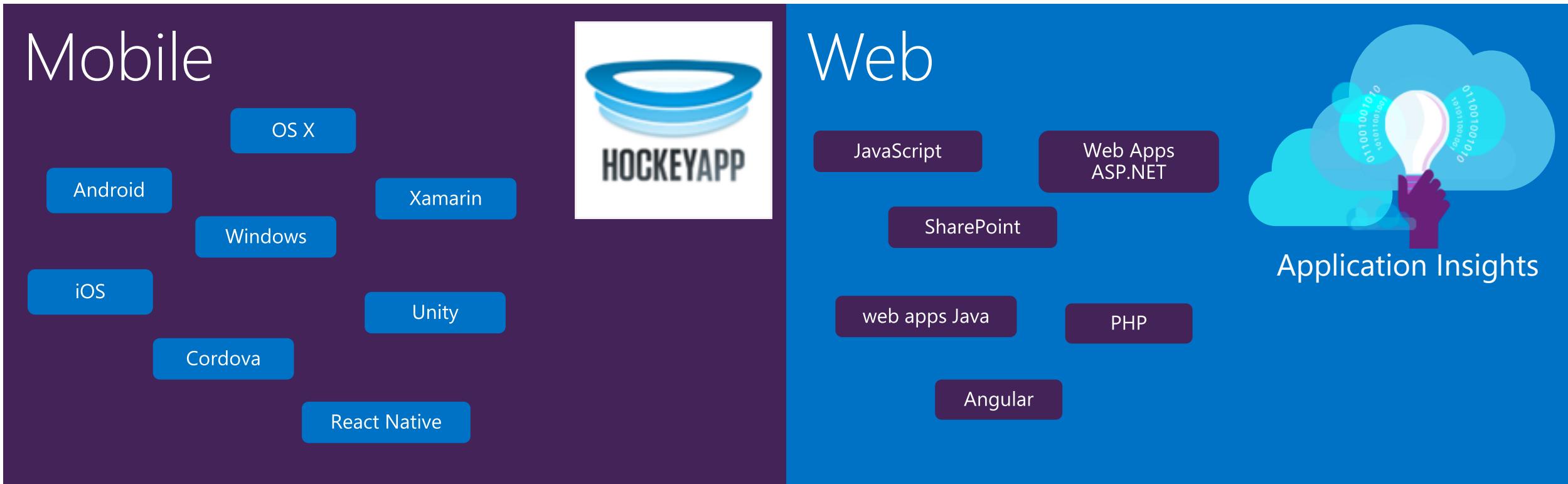
Additional Resources

- [Testing Tools and Services](#)
- [Isolating Code Under Test with Microsoft Fakes](#)
- [Azure DevTest Labs](#)

Application Operations with Application Insights



Application Operations



What is Application Insights?

1

Telemetry is collected at each tier: server applications and browser

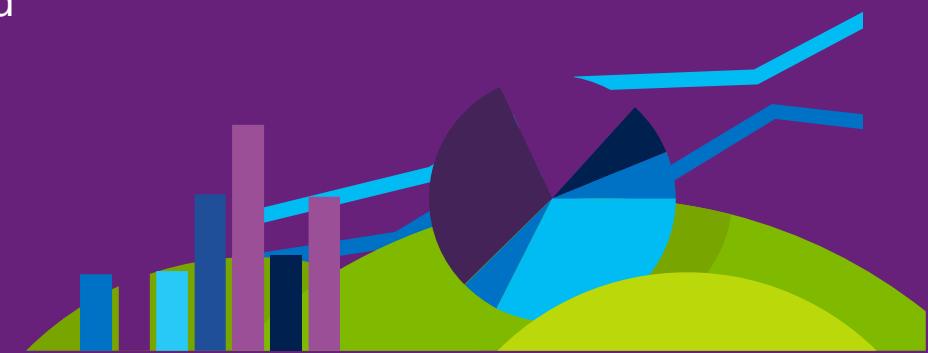
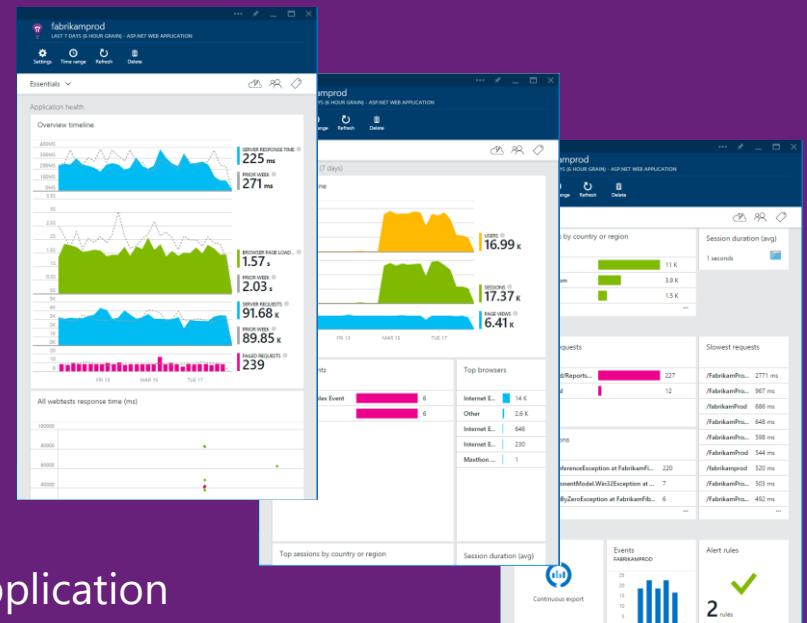


2

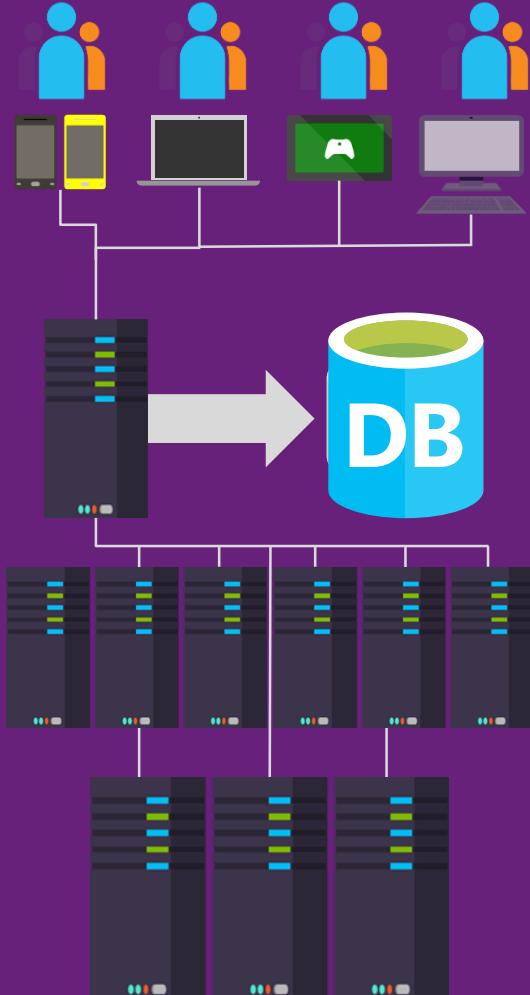
Telemetry arrives in the Application Insights service in the cloud where it is processed & stored

3

Get a 360° view of the application including availability, performance and usage patterns



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

DevOps features

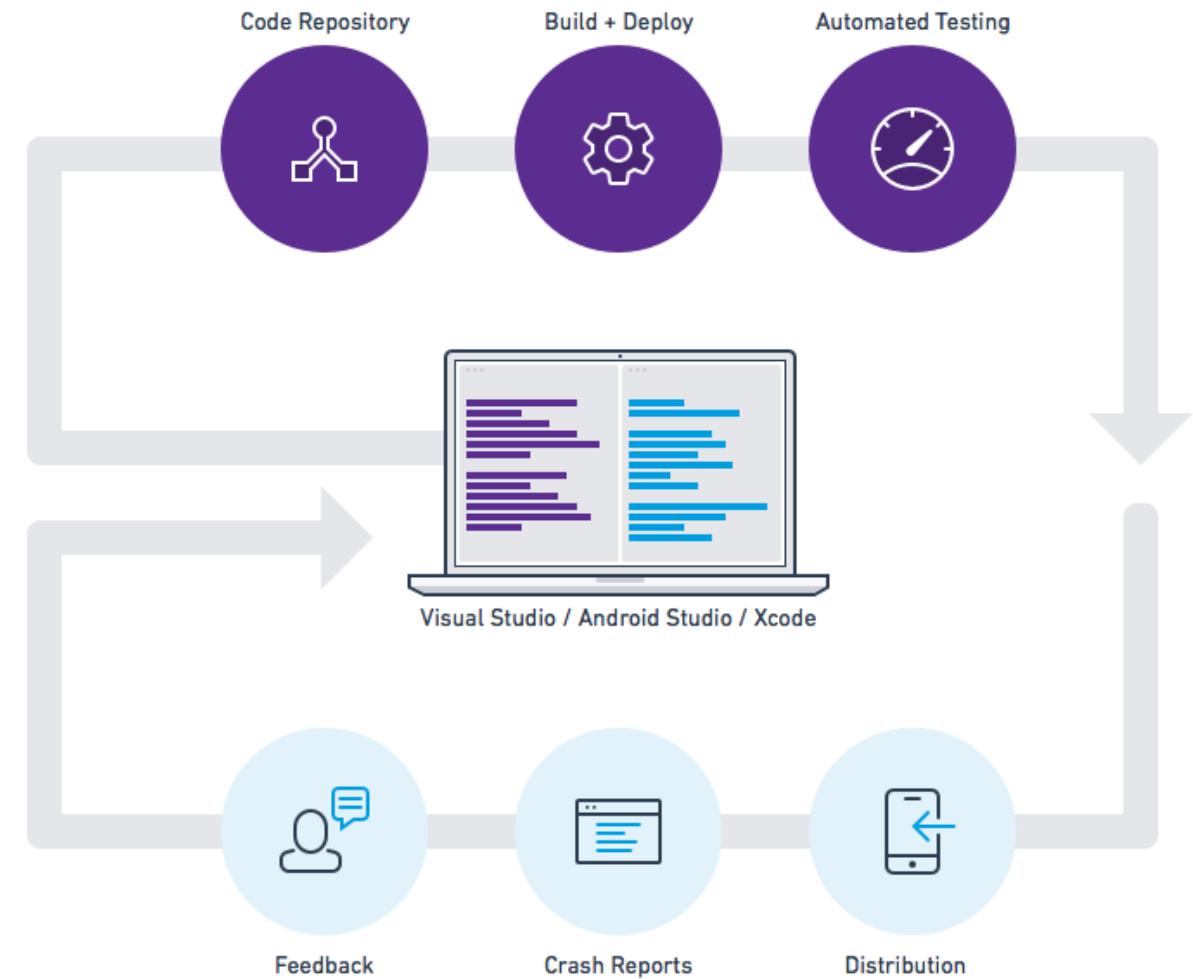
- APM & Availability & Usage
- Release Annotations
- Analytics (Edison and Kusto)



Demo: Application Insight

- Setting up, debug and search
- Application Map

Visual Studio Team Services and HockeyApp



Additional Resources

- [Visual Studio Application Insights](#)
- [Application Insights NLog Target](#)
- [Application Insights Log4Net Appender](#)



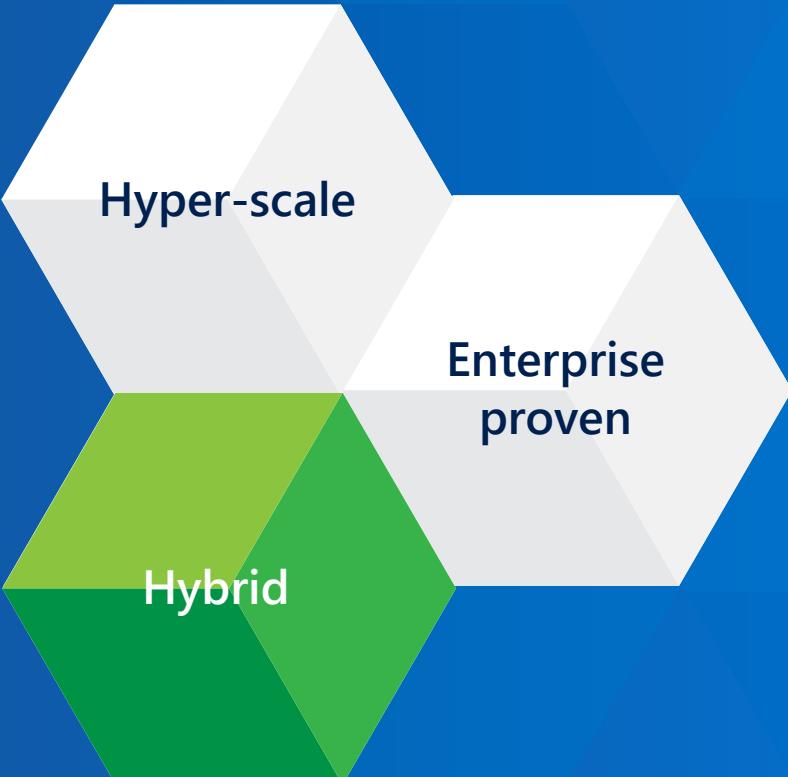
Hand-on-Lab: 4

- Lab 4: <http://bit.ly/1TQtUFC>

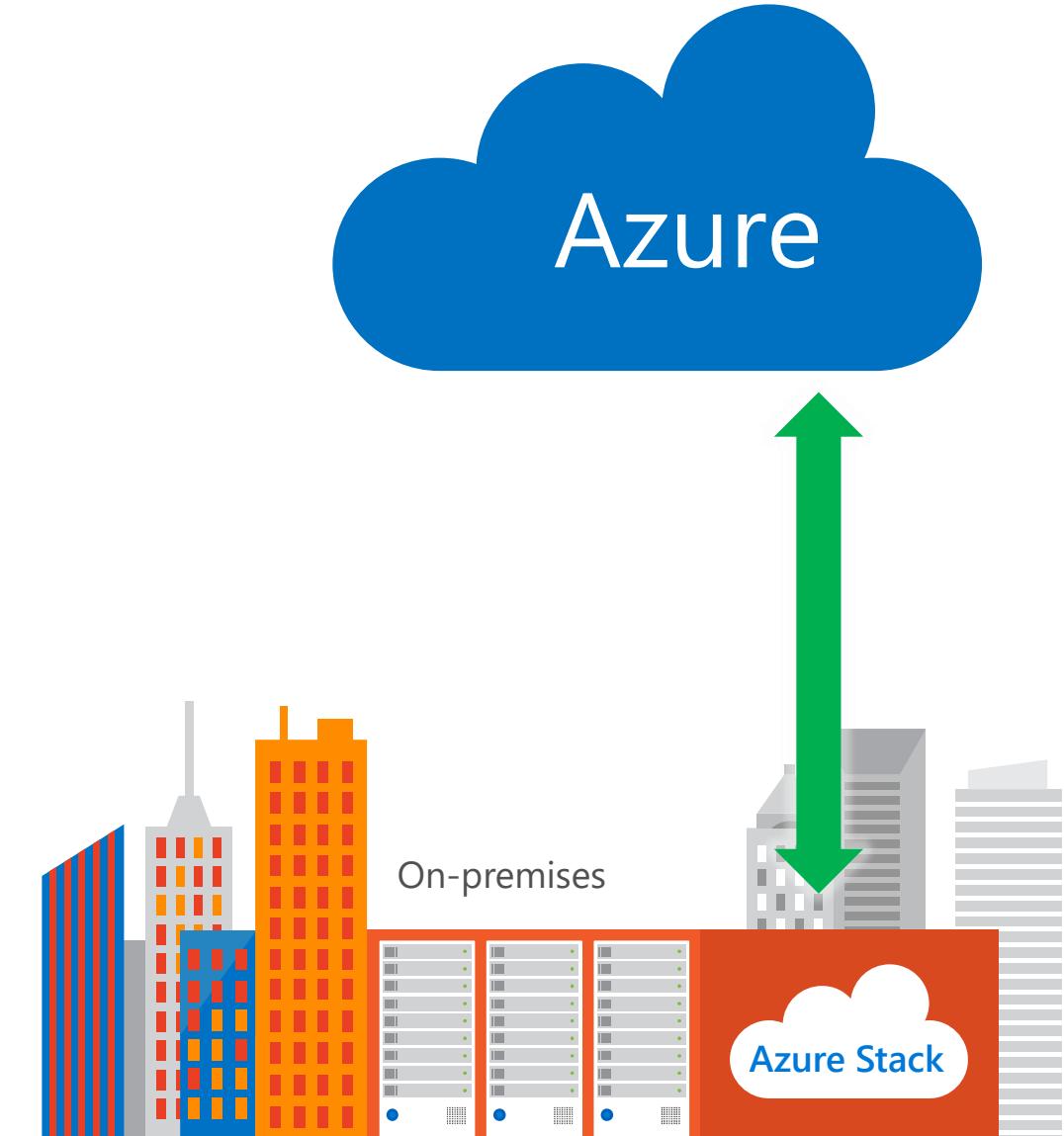
DevOps capabilities using Azure



Azure



Hybrid





Open + Flexible

Management



Applications



App Frameworks



Databases & Middleware



Infrastructure



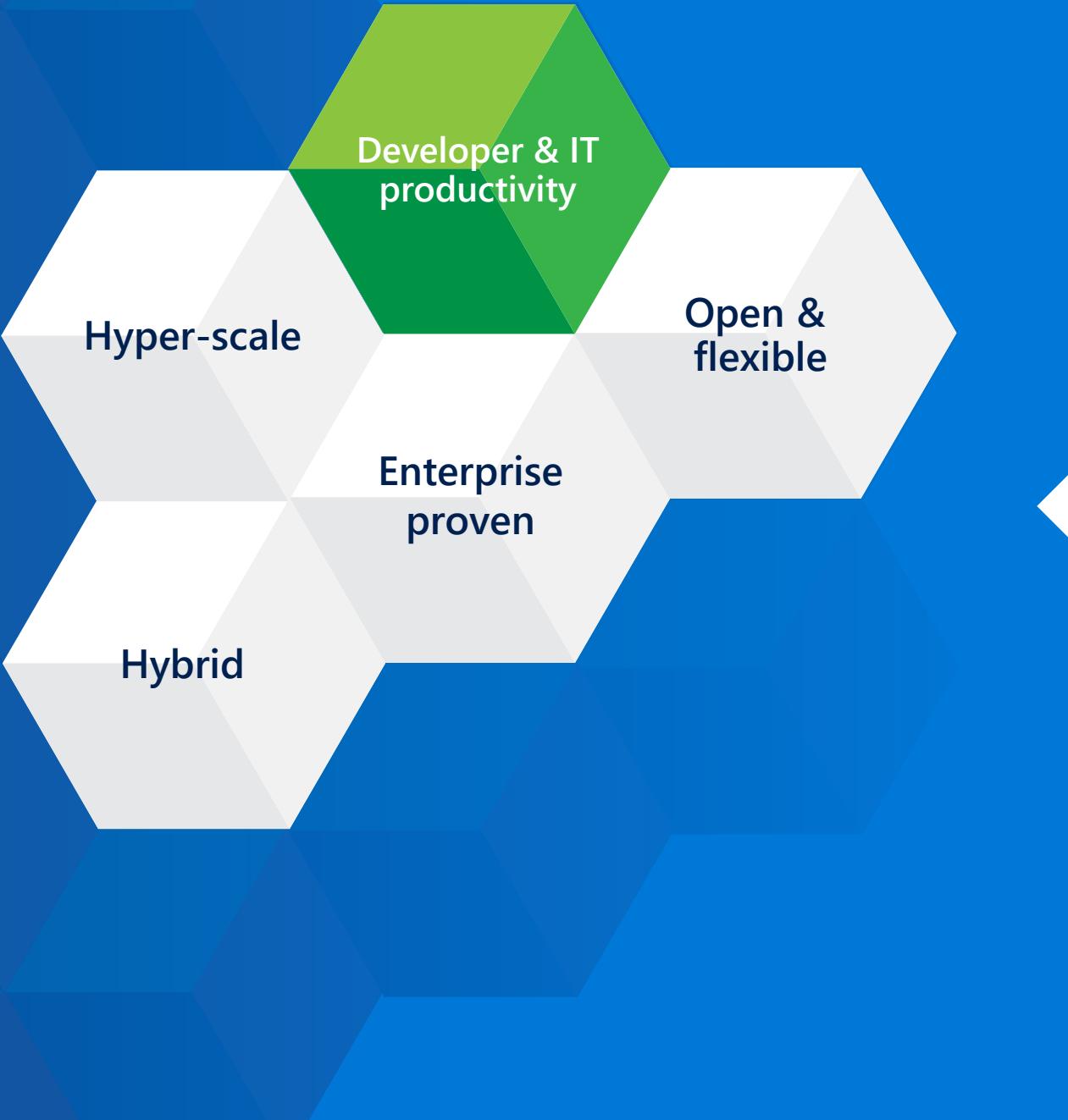
FreeBSD.



Linux

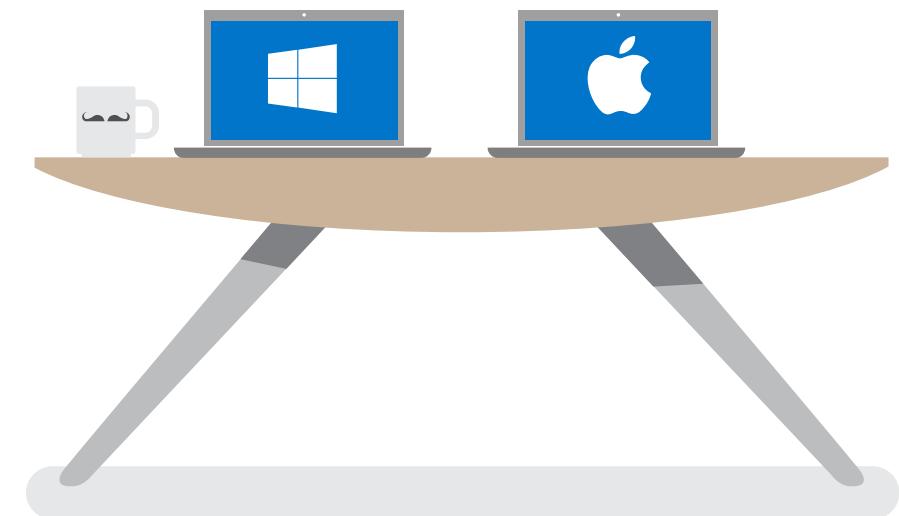


docker



Dev + IT productivity

- Visual Studio
- GitHub
- Eclipse
- Chef + Puppet
- Powershell



24

Azure regions
HyperScale
around the world
footprint

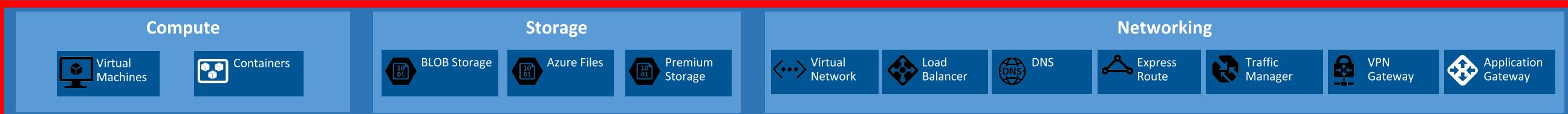
More than AWS and
AZURE REGIONS
Google Cloud combined



Platform Services



Infrastructure Services



Datacenter Infrastructure (24 Regions, 19 Online)



Azure Portal

Azure Portal Capabilities

- Unified management experience and marketplace
- Fine-grained access control
- Personalize your workspace
- Billing insights
- Self-service support and ticket management

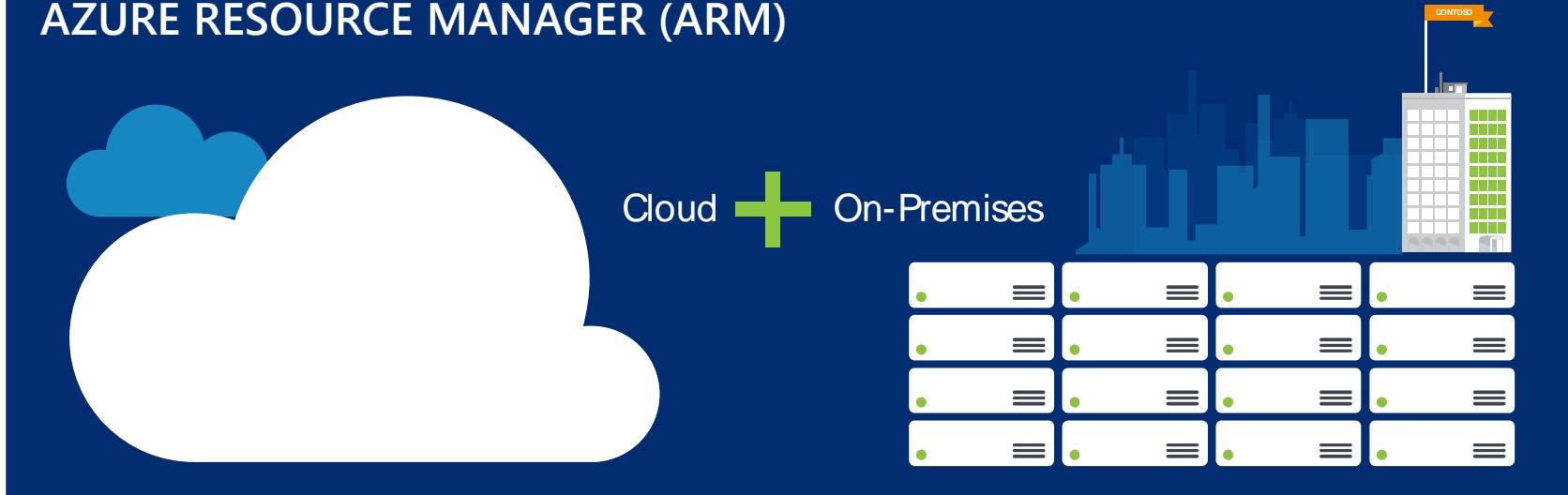
Consistent
management
layer

Tools



SERVICE MANAGEMENT API

AZURE RESOURCE MANAGER (ARM)



RESOURCE PROVIDER CONTRACT

Resource
providers



More consistent APIs

Role based access control

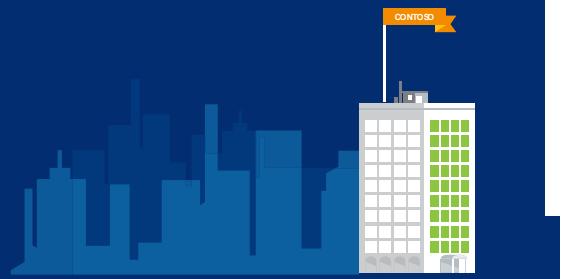
Template based deployment engine

Resource groups, tags, resource cache

SERVICE MANAGEMENT API

AZURE RESOURCE MANAGER (ARM)

Cloud + On-Premises



Azure App Service

Azure App Service

Build and scale great cloud apps



=

 Web Apps

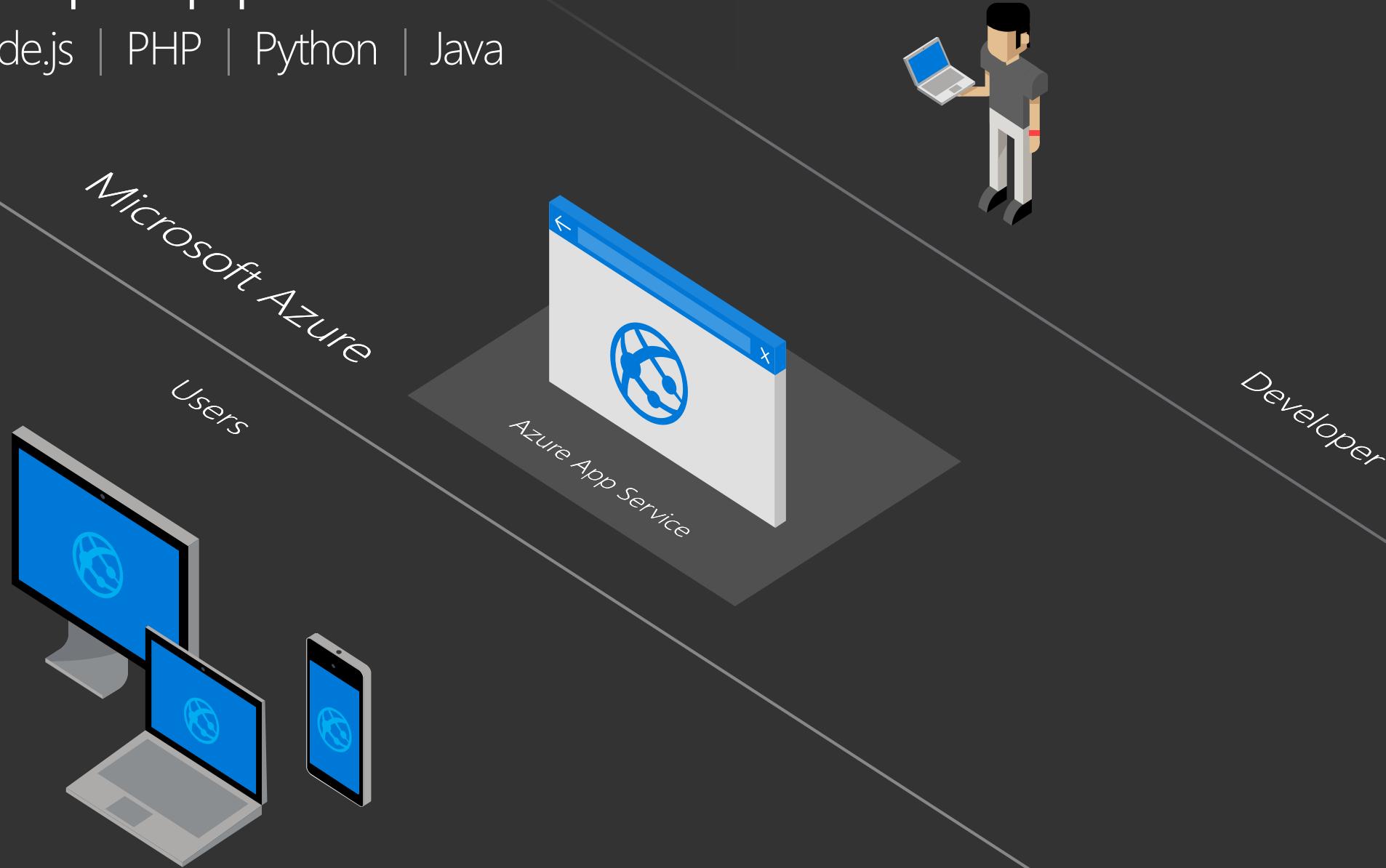
 Mobile Apps

 Logic Apps

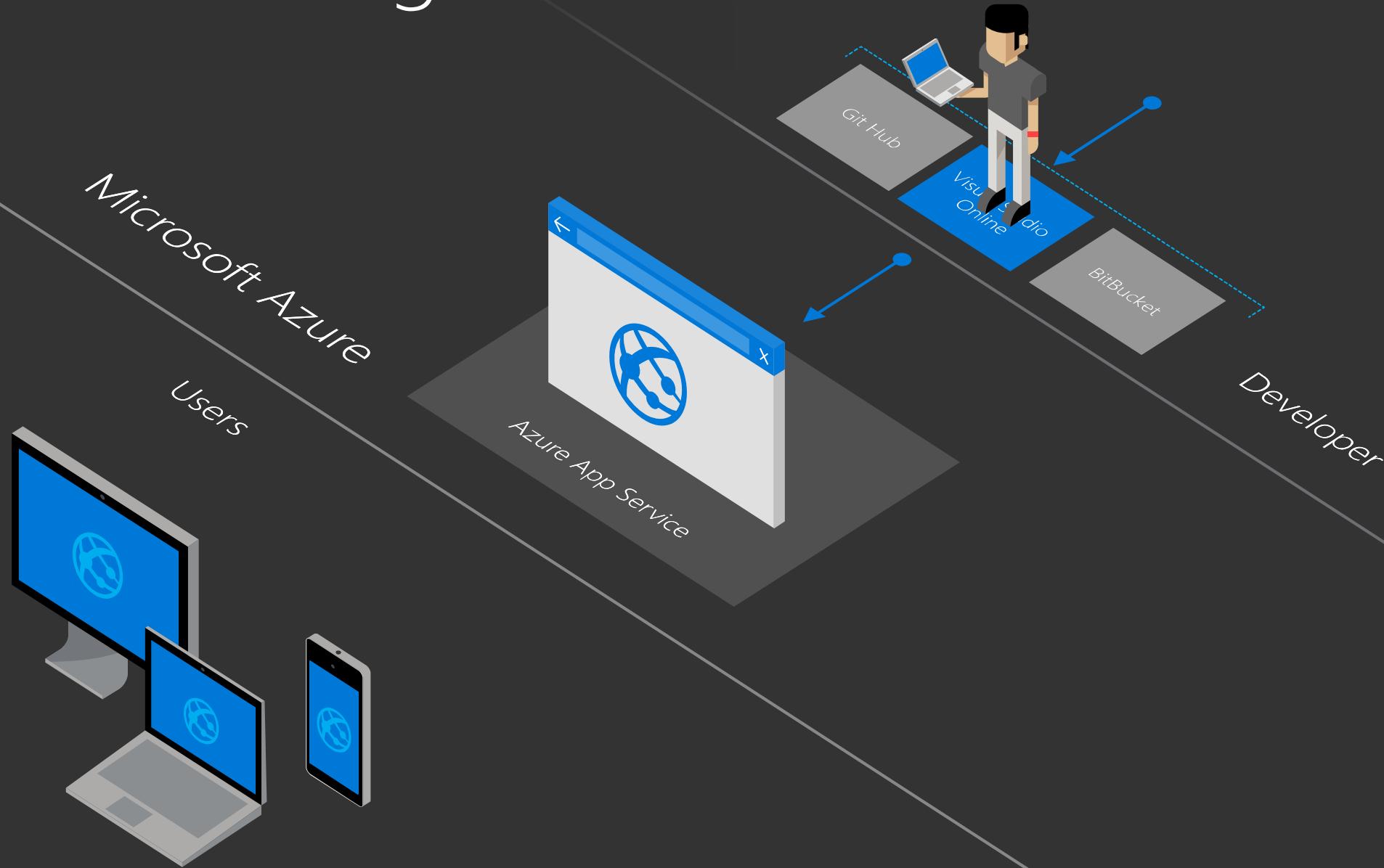
 API Apps

Develop apps with...

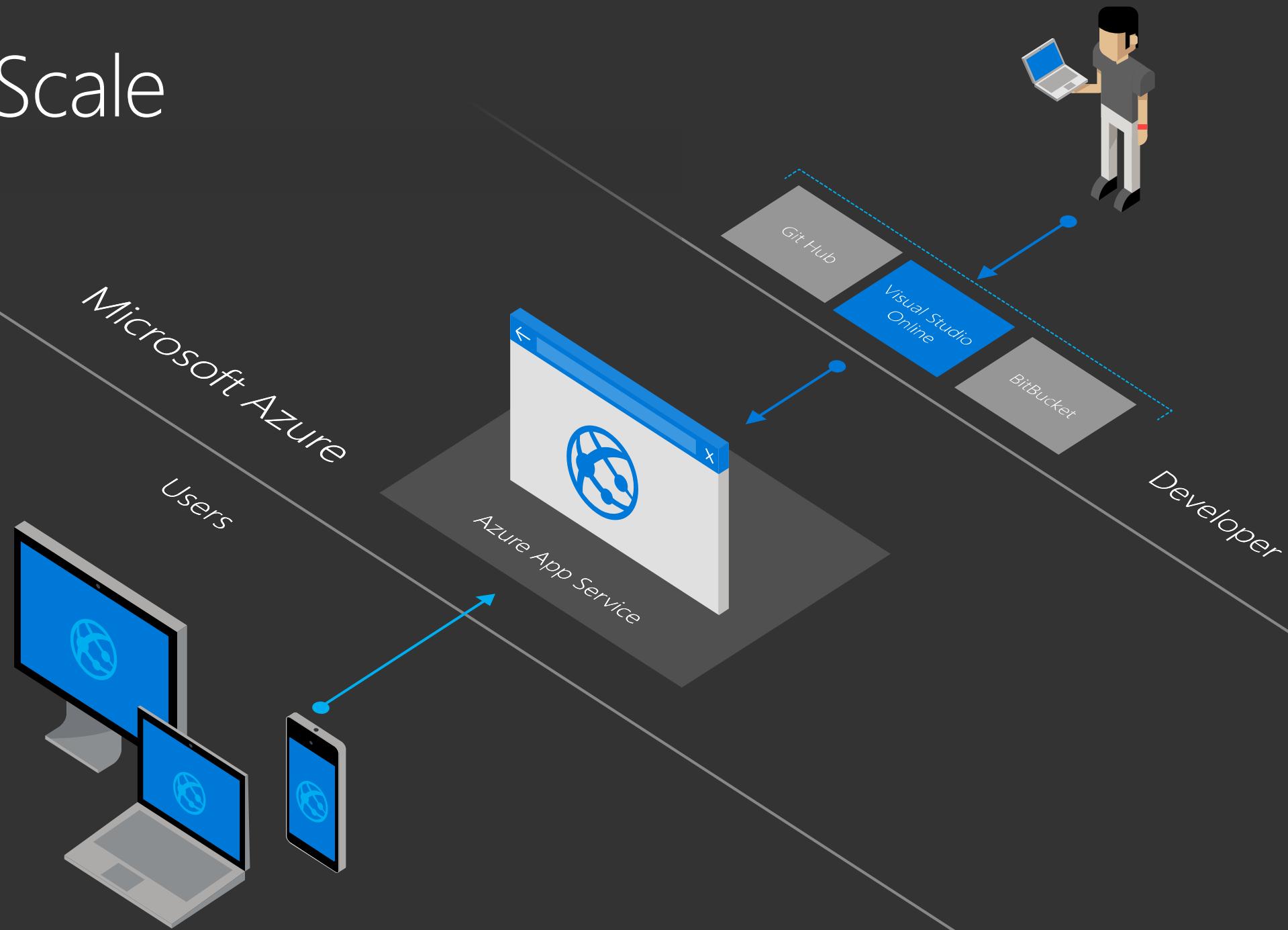
.NET | Node.js | PHP | Python | Java



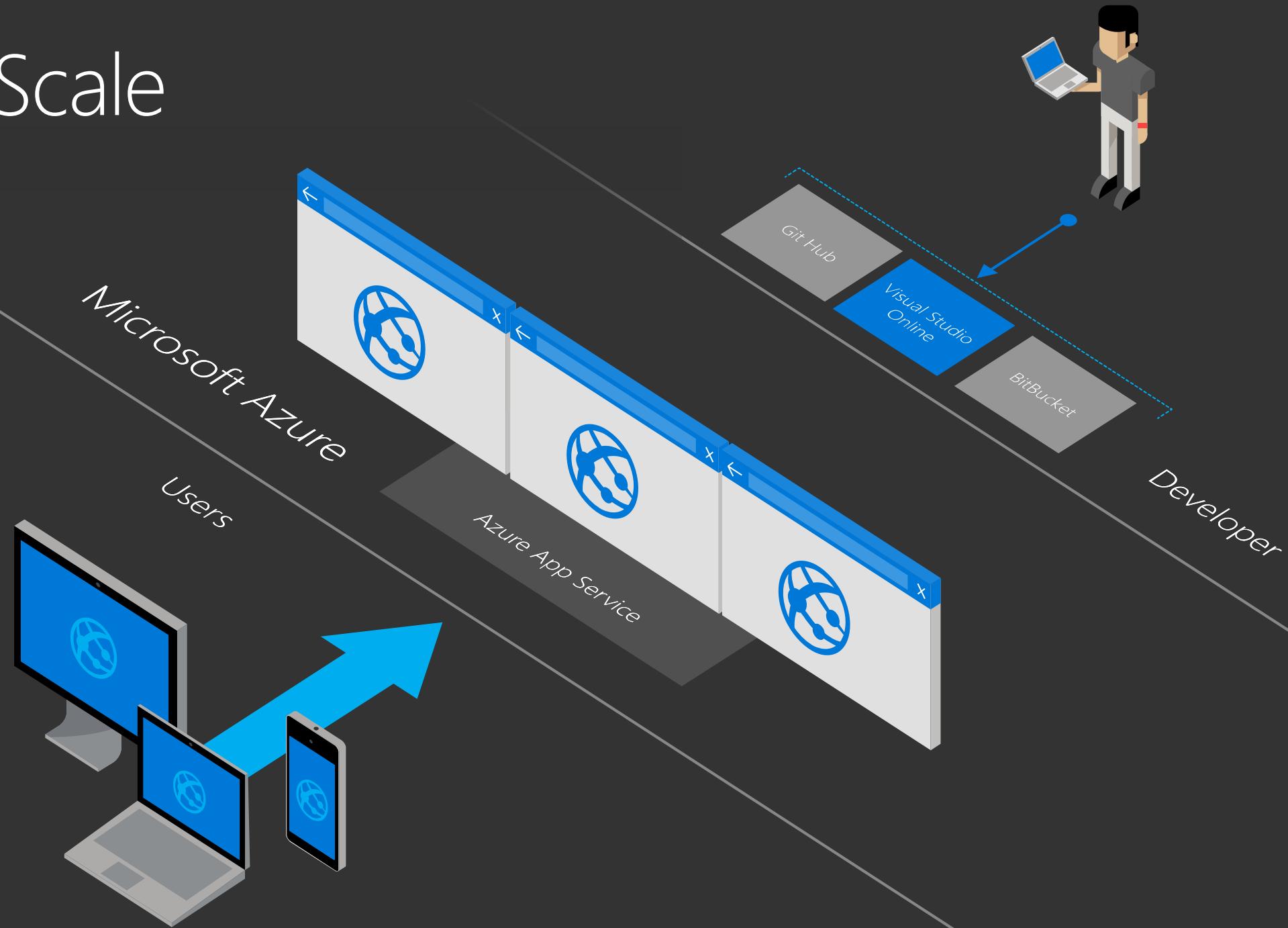
Continuous integration



AutoScale



AutoScale

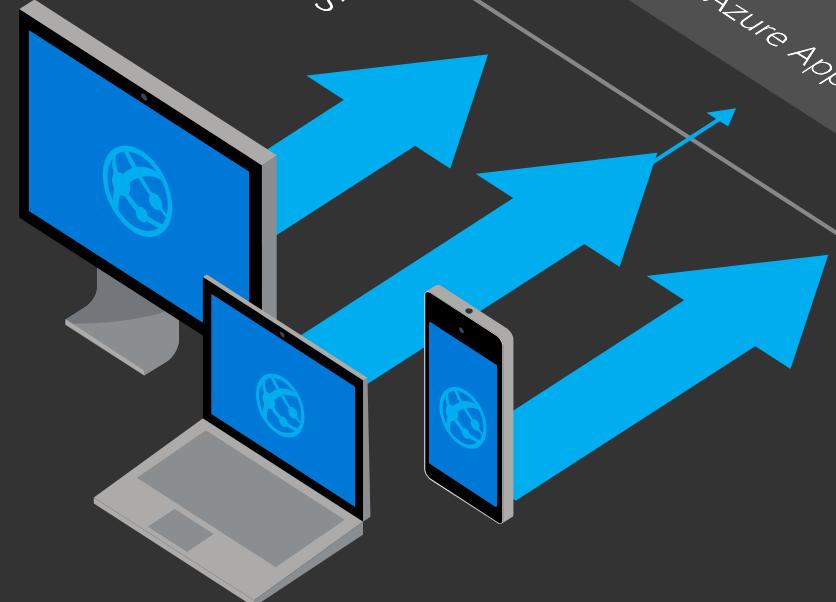


Aus

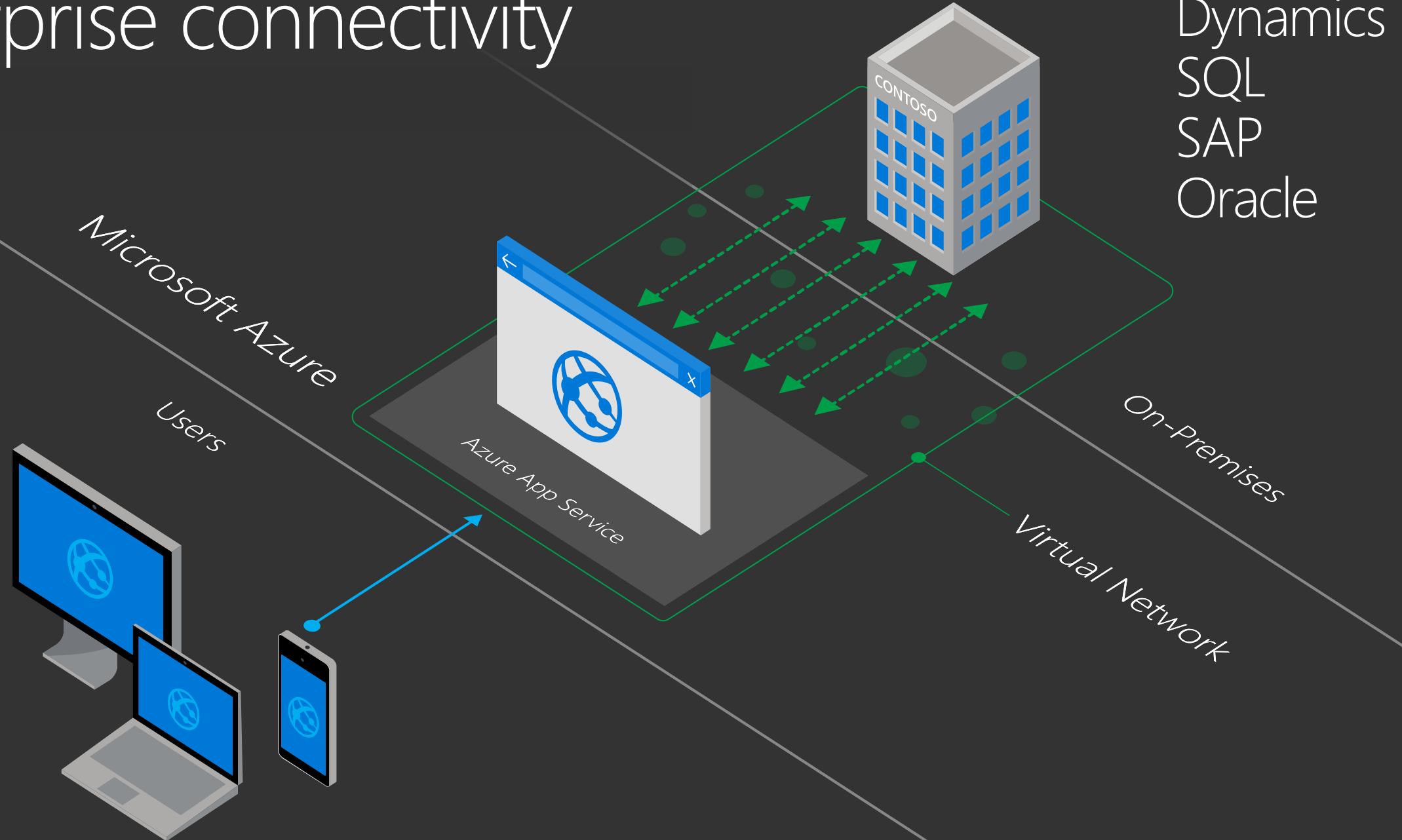
Microsoft Azure

Users

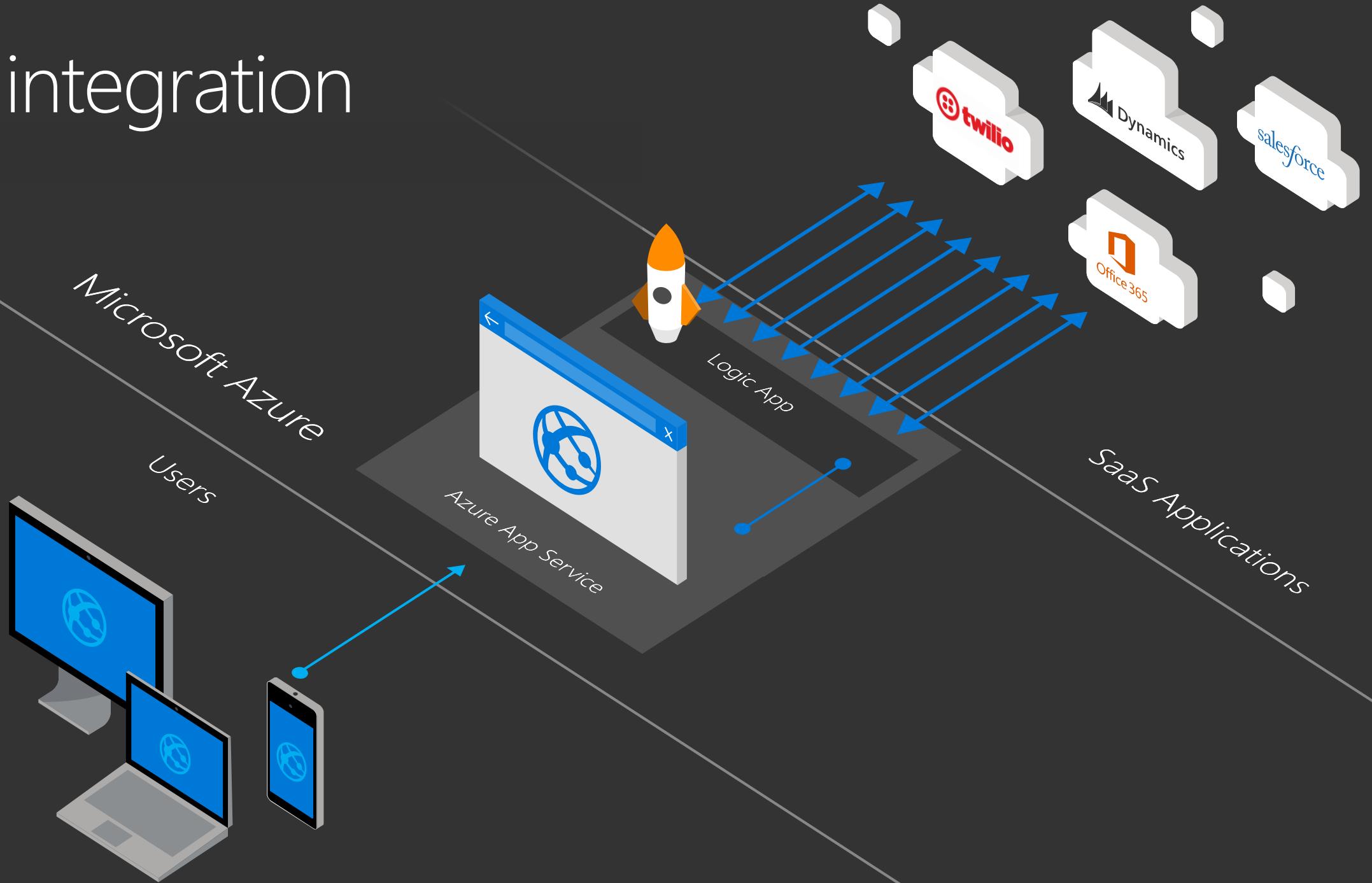
Azure App Service



Enterprise connectivity



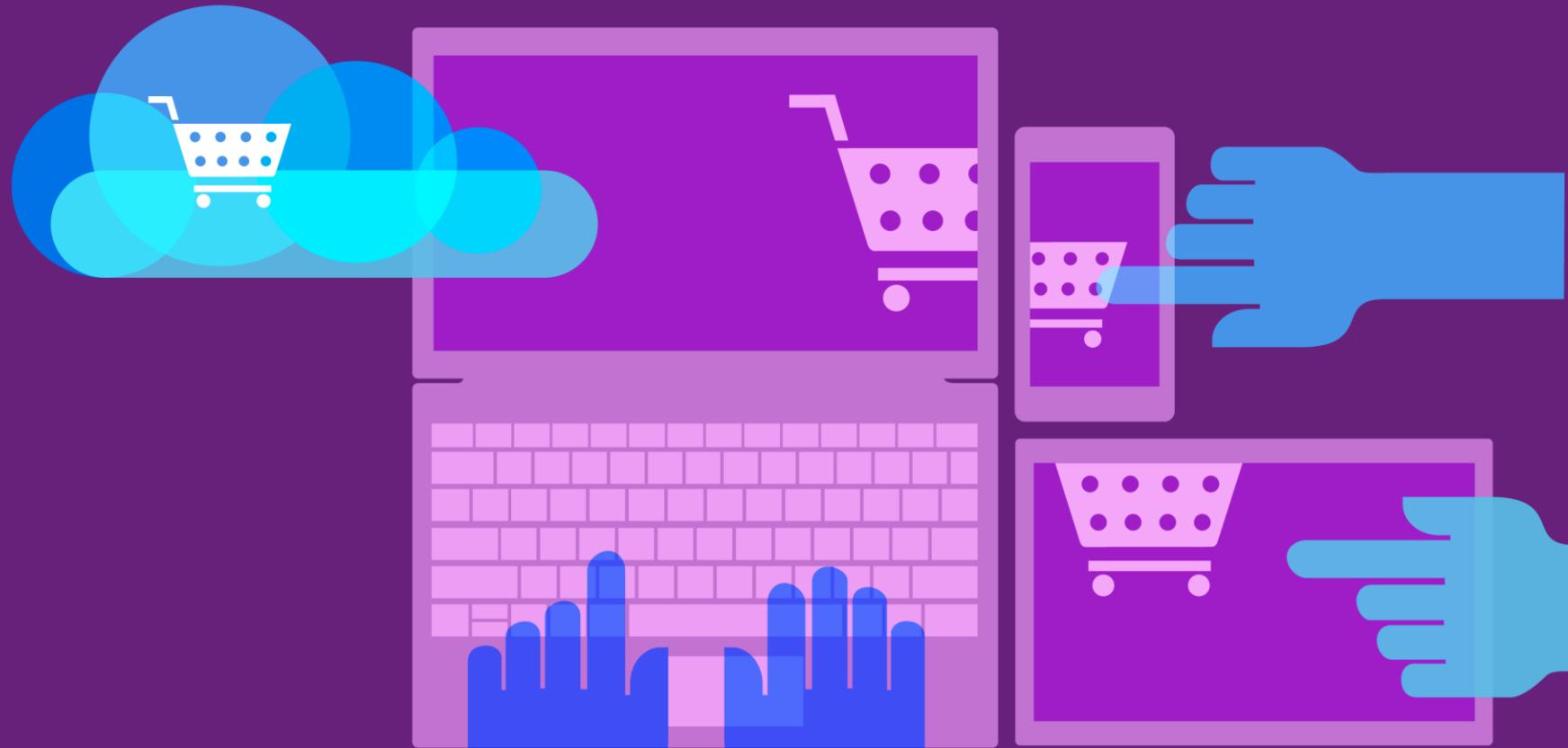
SaaS integration





Azure portal(s)
and services

Lab #5



Additional Resources

- [How to install and configure Azure PowerShell](#)
- [Azure Tools for Visual Studio](#)
- [Azure Storage](#)

Release Management



The Microsoft DevOps solution

An integrated, end-to-end solution for teams of any size to design, build and manage enterprise solutions and cross-platform mobile business apps.

Shorten cycle times
and deliver value faster



Improve quality
and availability



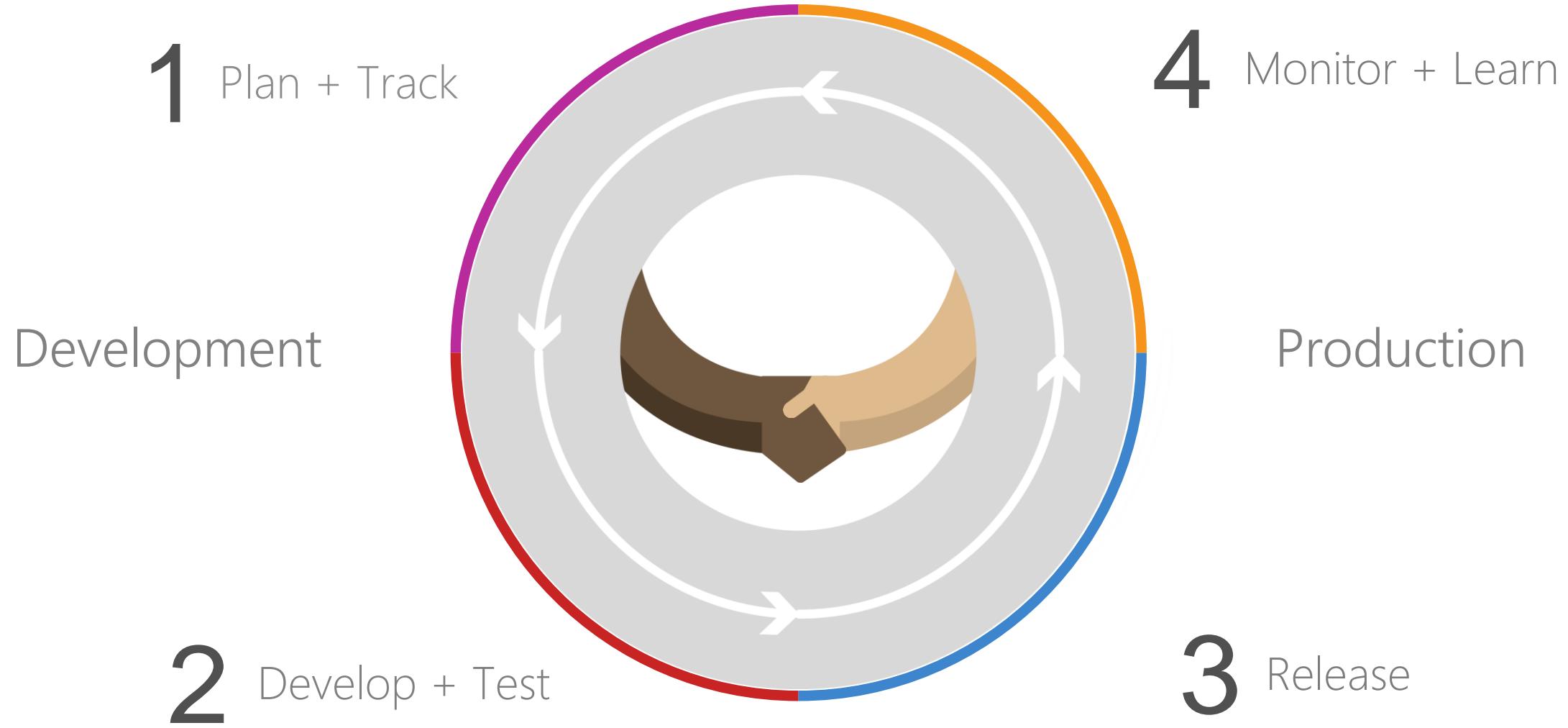
Optimize resources
and eliminate waste



Deliver mobile apps with
digital-era velocity



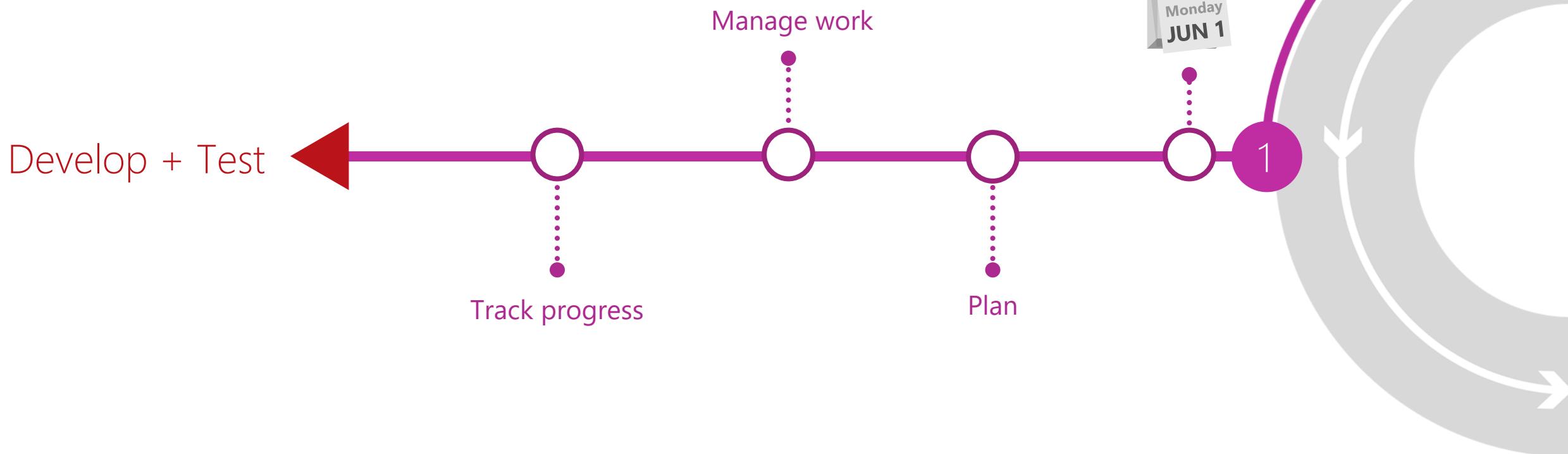
End-to-end DevOps





Plan + Track

It starts with an idea - and a plan how to turn this idea into reality...



Plan & Track Work

Visual Studio Team Services and Team Foundation Server give you the tools you need to effectively create, manage and deliver against your backlog.

Enterprise collaboration



Agile planning tools



Dashboards & charts



Enterprise collaboration

Agile for the enterprise

Effortlessly collaborate and innovate across multiple teams and projects. Keep teams with many stakeholders in sync with lightweight requirements and feedback management tools.

One central location

Build your backlogs, execute sprints and track work and progress from a single location.



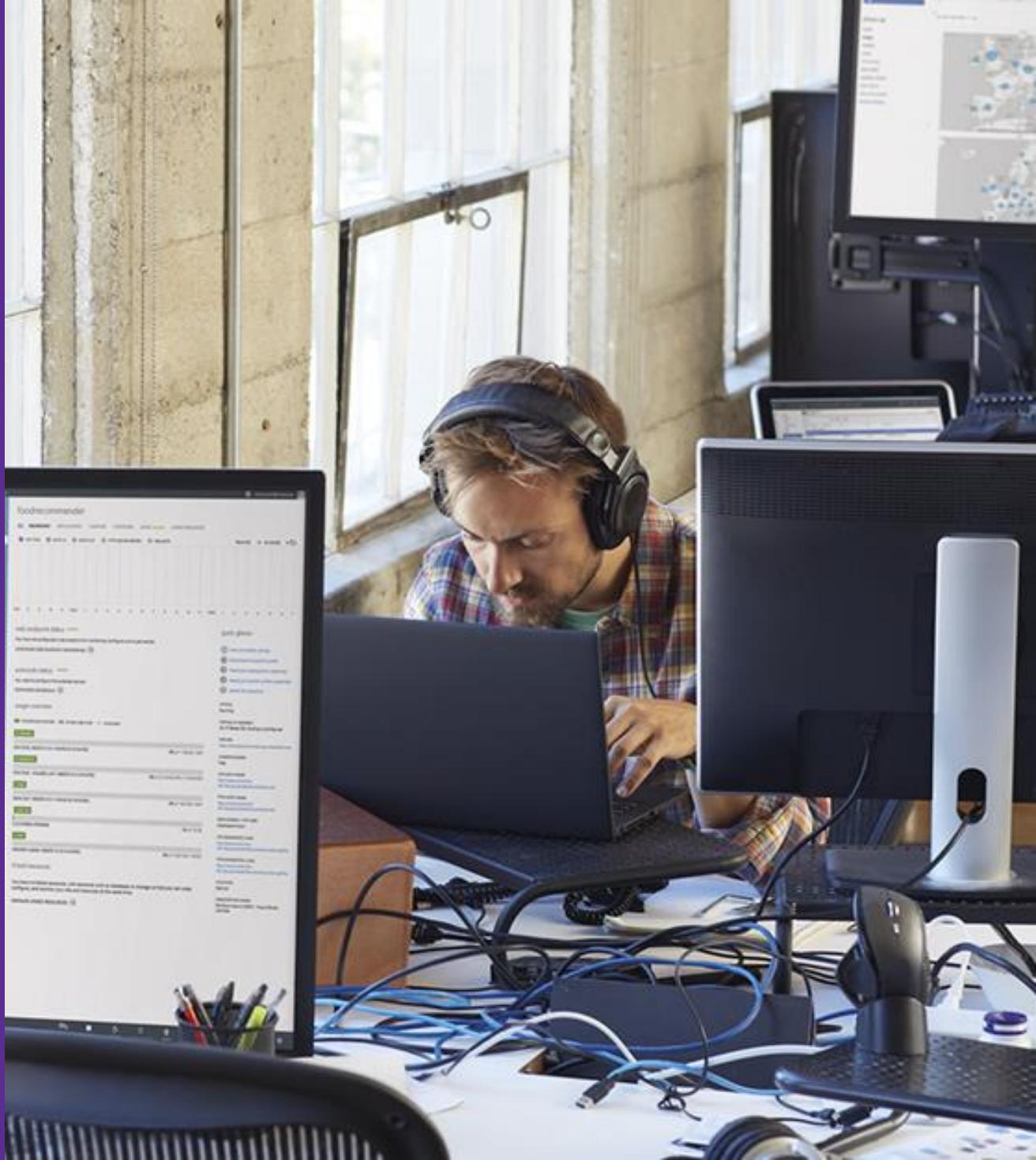
Agile planning tools

Productive

VSTS and TFS give you a drag and drop collaboration experience for managing project and sprint backlog priorities – giving you the confidence that you are working on what really matters.

Fast and easy

With the ability to quickly create new work items, change work item owners, and update work item states through task board and Kanban views you can be confident that VSTS and TFS will never get in the way when you manage your work.



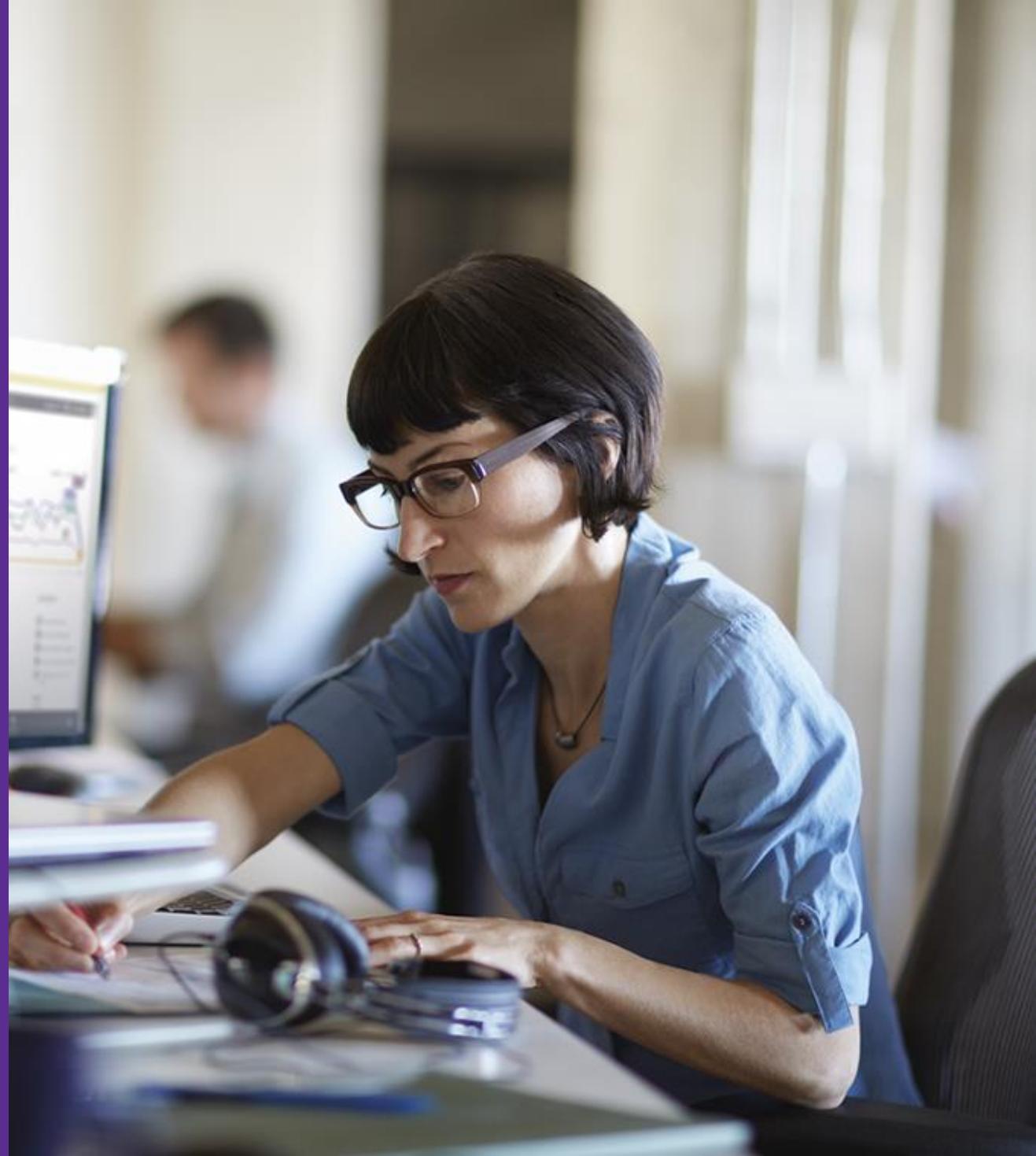
Dashboards & charts

Visibility

Place all work items for your projects in VSTS or TFS and give your stakeholders clear and real time insight into projects and progress without manually generating reports or updates.

Transparency

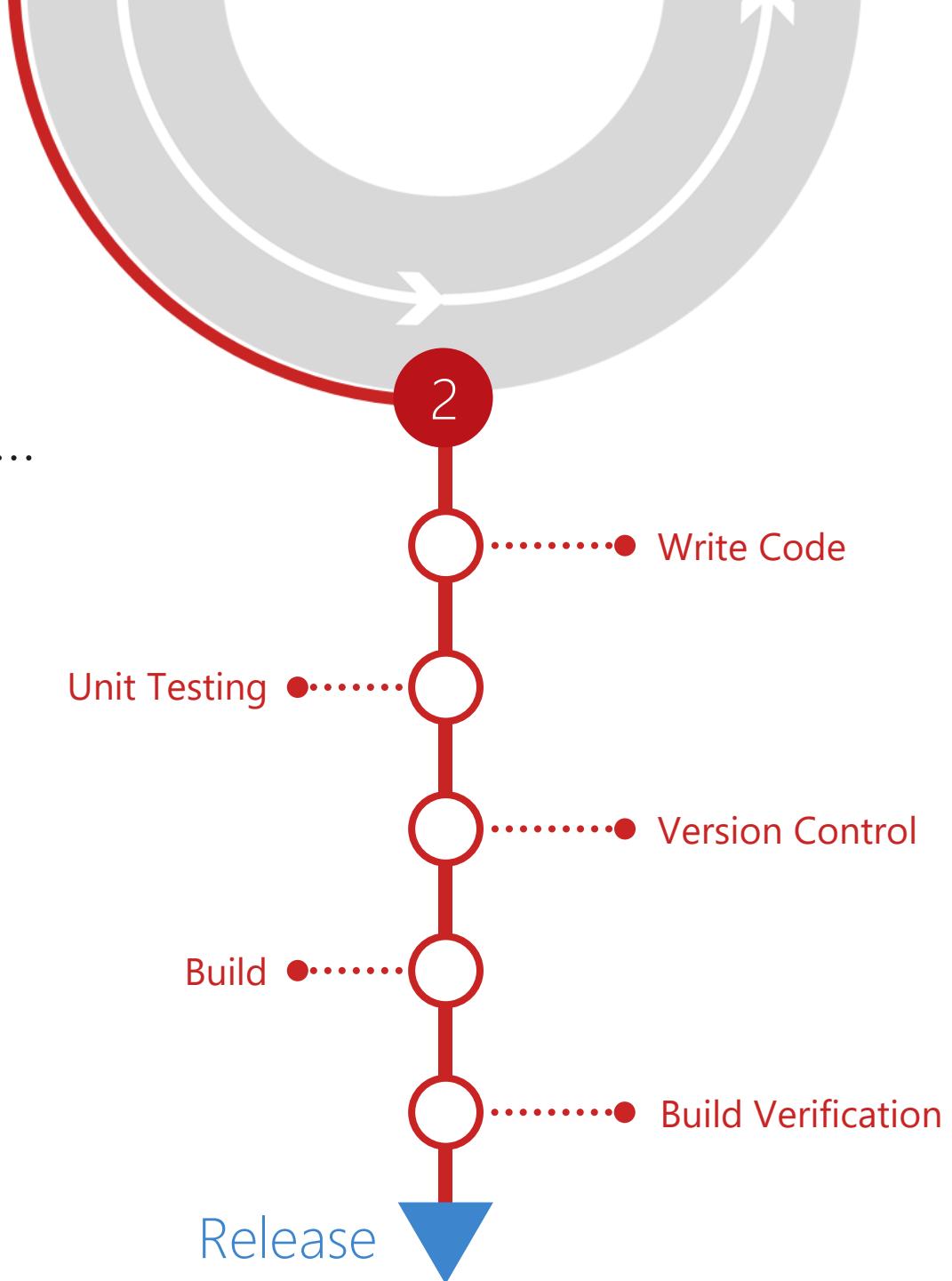
VSTS and TFS support free, unlimited stakeholder access to view work items, dashboards and charts for your projects, enabling a self-service approach to information sharing that allows you to stay focused on your priorities and deliverables.





Develop + Test

After the iteration starts,
developers turn great ideas
into features and functionality ...



Source Code Management

VSTS and TFS provide unparalleled flexibility for your evolving codebase.

All your code is linked directly to the story, bug, or task driving the work.

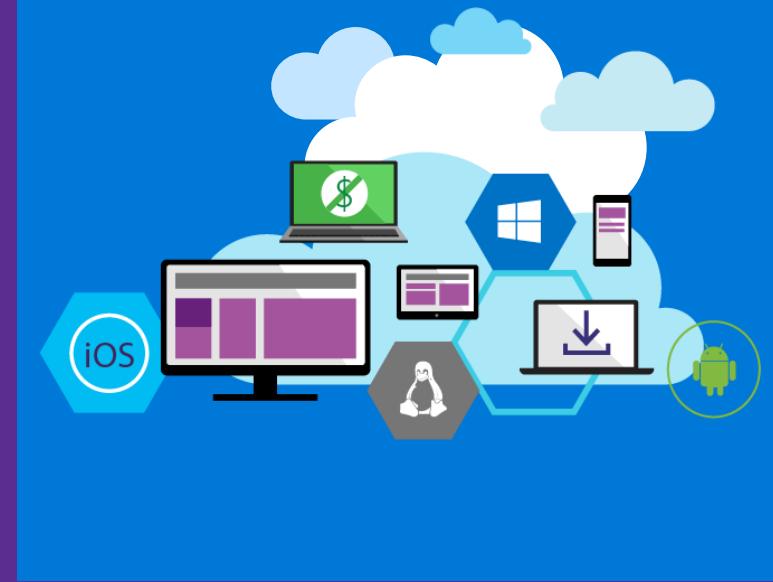
Flexible version control



Collaborate on code



Any IDE, any code



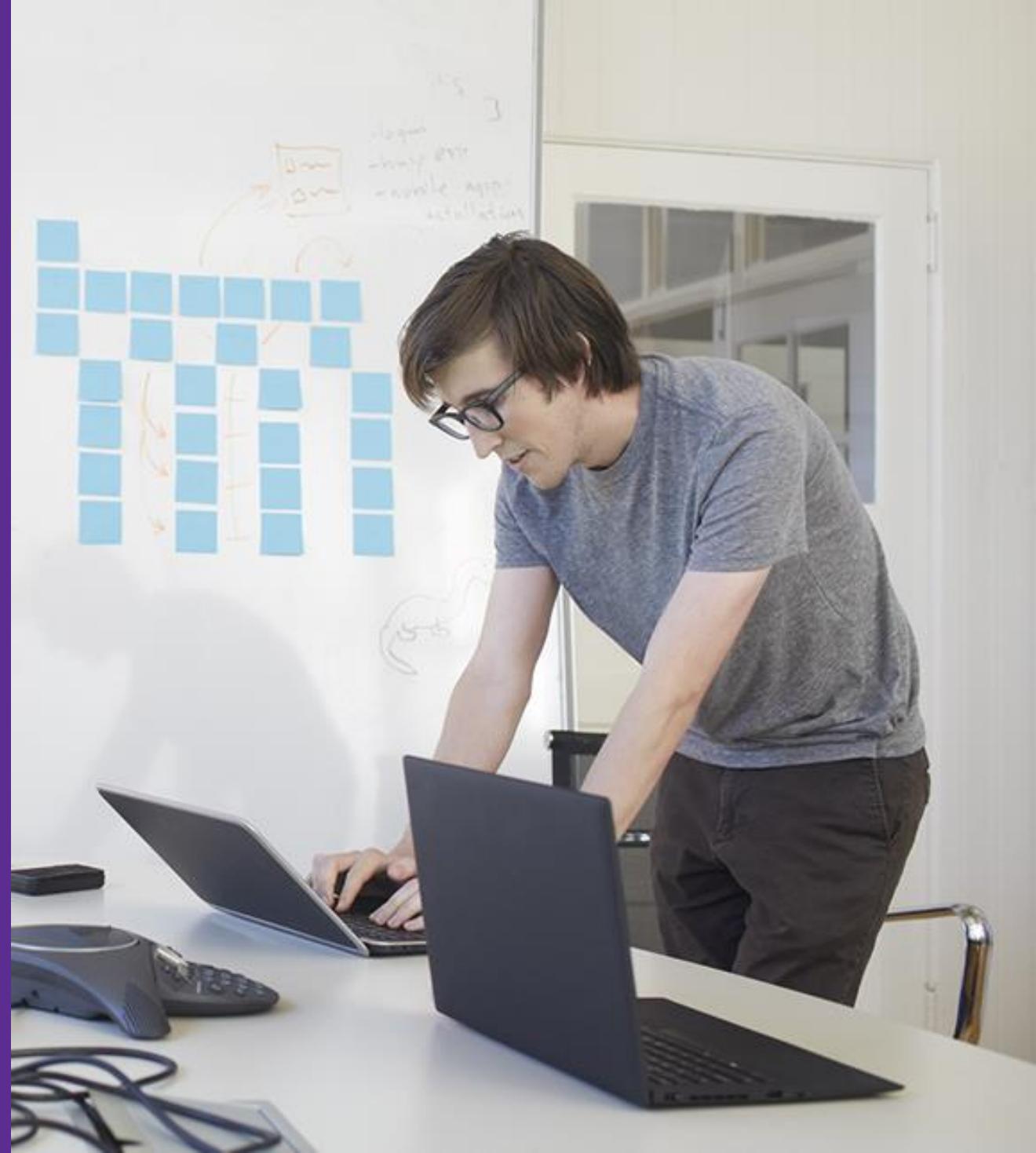
Flexible and modern source control

Centralized or distributed

Use Git for distributed version control to maximize collaboration or use Team Foundation Version Control (TFVC) for centralized version control. VSTS and TFS offer you not only choice, but also massive scale for large projects and security for your repos via permissions.

Command & control

Sometimes a development project can feel like chaos. Control the chaos with code policies - enforce best practices by requiring all code submissions have code reviews, and eliminate build breaks with gated builds.



Modern code workflows

Branch and pull requests

Branches isolate risk in a development project. Pull requests provide tools that facilitate collaboration and code reviews for changes being merged back into main.

Effortless collaboration

Rich web experiences for leaving comments in code and approving changes make code reviews simpler and more productive than ever.

Package Management

Share and re-use code across the organization with packages. Private, hosted and authenticated feeds let you share, discover & maintain packages and dependencies.



Any IDE, any code

Eclipse, Xcode, and more

Use your favorite language and development tool. VSTS and TFS version control support any language, as well as any Git client (including Xcode). Java teams can access code and work items through free plugins for Eclipse and IntelliJ – and run continuous integration builds based on configuration files from Ant or Maven.

Code search

Semantic code search with syntax highlighting enables you to quickly find code across your repositories, as well as the history and when it was changed and by whom.



Quality Management

A toolset optimized for QA professionals, giving them flexibility in how they work while at the same time keeping them in sync with the rest of the team.

Test planning
and tracking



Manual and
exploratory testing



Performance and
load testing



Test planning and tracking

Single pane of glass

Coordinate all test management activities including test planning, authoring, execution, and tracking from a central location. The test hub in VSTS and TFS gives product owners and business analysts critical insight into progress against the defined acceptance criteria and quality metrics.



Manual and exploratory testing

Browser-based testing

Improved browser-based manual testing tools helps testers author, manage and execute test cases in any modern web browser.

Exploratory testing

Perform ad-hoc and exploratory testing on multiple devices using our integrated 3rd party services without predefined test cases or test steps. The exploratory testing tool includes action recording, screenshots with annotations, video capture and bug-reporting capabilities. Easily create test cases from exploratory test recordings and add them to test plans or suites for subsequent test runs.



Performance and load testing

Unlimited load testing

VSTS and TFS make integrating load testing into your development process easy and will help you avoid nasty surprises in production.

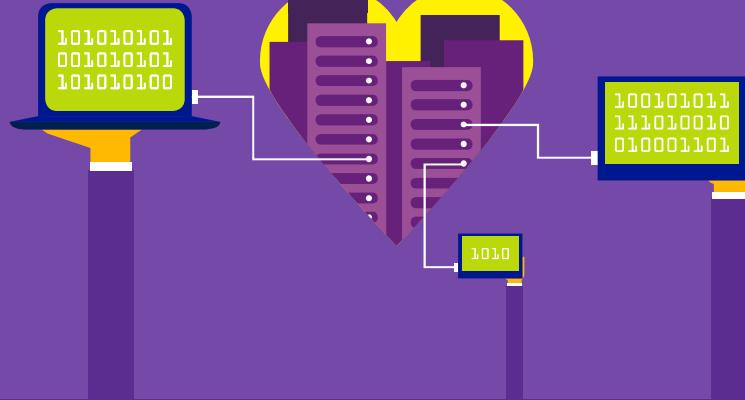
Use cloud-based load testing capabilities to validate and assess application performance under real-world conditions before you deploy. Generate hundreds of thousands of connections in minutes and run tests from one of many global Azure datacenter locations to minimize latency and simulate users' real-world conditions.



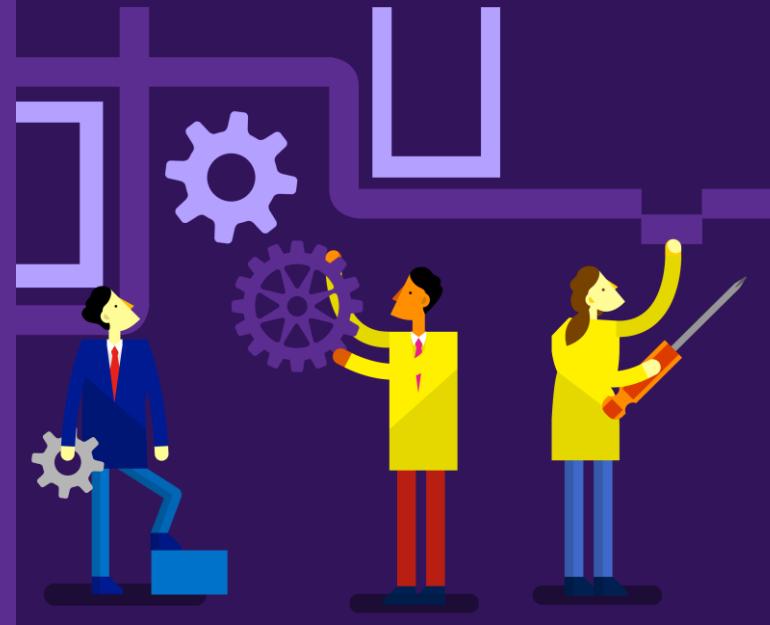
Cross-platform Build

No matter what tools you use or what language you prefer - Team Foundation Build builds your app your way, for your platforms. Just open your browser!

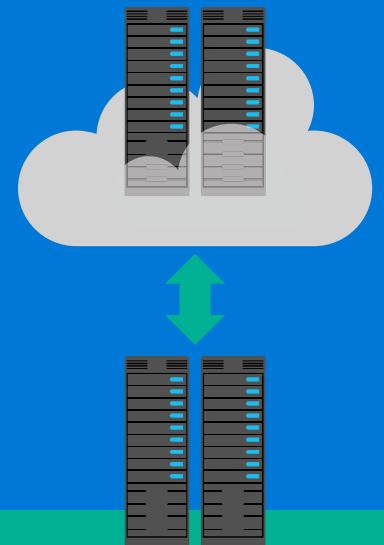
Cross-platform build for
iOS, Java and Android



Flexible, extensible and
customizable builds



Cloud, hybrid or on-
premises infrastructure



No New Build DSL

There are more than enough to go around

Don't me learn yours just to run mine

ADD BUILD STEPS

 Android Build Run an Android build using Gradle and optionally start the emulator for unit tests		
 Ant Build with Apache Ant		
 CMake Cross platform build system		
 Cmd Script Run a windows cmd or bat script and optionally allow it to change the environment		
 Gradle Run a build using Gra	 VSTest Run tests with VS test runner	
 Jake JavaScript build tool, Node.js.	 Xcode Build Build an Xcode project with xcodebuild tool	
 Maven Build with Apache M	 PowerShell Run a PowerShell script	
 MSBuild Build with MSBuild	 Process Runner Run an executable file	
 Visual Studio Bu Build with Visual Stuc	 Shell Script Run a shell script using bash	
 VSTest Run tests with VS tes	 Azure Cloud Service Deployment via PowerShell Deploy an Azure Cloud Service with PowerShell	
	 Azure PowerShell Run a PowerShell script within an Azure environment	
	 Azure Web Site Deployment via PowerShell Deploy an Azure Web Site with PowerShell	

Cross-platform Build

Any platform, any language

Includes build definition templates to compile .NET, Java, iOS and Android code. A comprehensive library of build steps for a variety of technologies including Ant, CMake, Maven, Xcode and Android enables quick and painless customization of the build process.

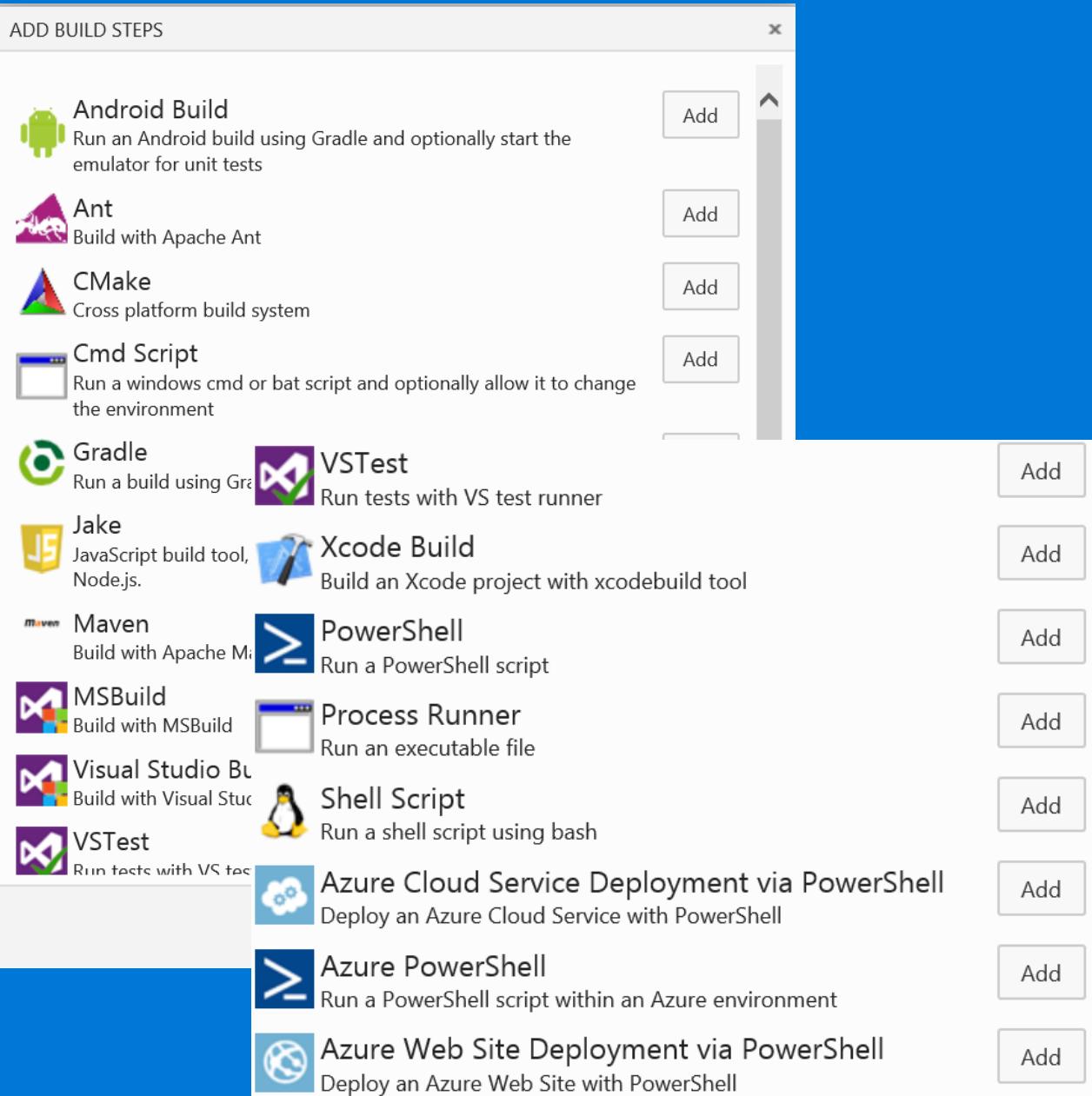


No New Build DSL

Node.js based xplat agent

OOB support for common xplat technologies

Open Source



Security

Each build runs in it's own process

One build can't corrupt the process space for the next build

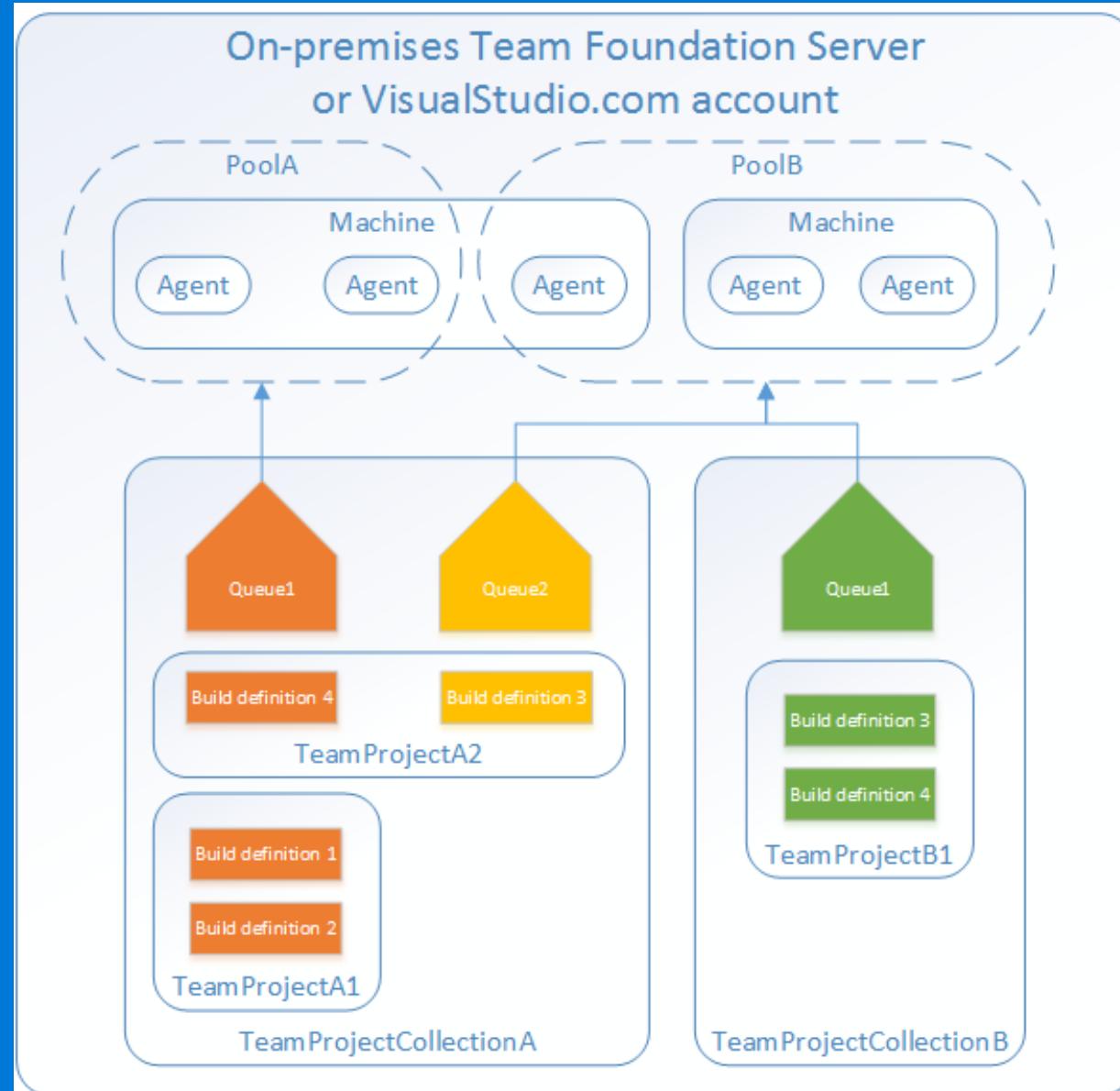
Pool administration can be delegated

You don't need collection or deployment wide permissions to register build resources

Each build get's a unique access token that is limited in both scope and time.

Developer can't write a unit test to access resources they are not supposed to

Administer your build and deployment system



Flexible and extensible

Easy customization

Additional build steps and enhancements are available in the Visual Studio Marketplace or can easily be created and customized based on web standards. Edit them in the browser and leverage existing knowledge of popular script languages.

Our web- and script-based build system works with both your windows build agents and the cross-platform build agent (runs on Mac and Linux systems). The cross-platform agent is an open-source Node.js app.

If you need to add a task we don't currently offer, you can create your own activity using our open source activities as examples of best practices.



Cloud, hybrid or on-premises

Cloud build

VSTS provides hosted build agents to start building your projects immediately, as well as a flexible build system that allows you to install your own agents. Our hosted build agents are pre-configured and flexible and can run custom build activities as well as your own build process templates or custom scripts.

Hybrid infrastructure

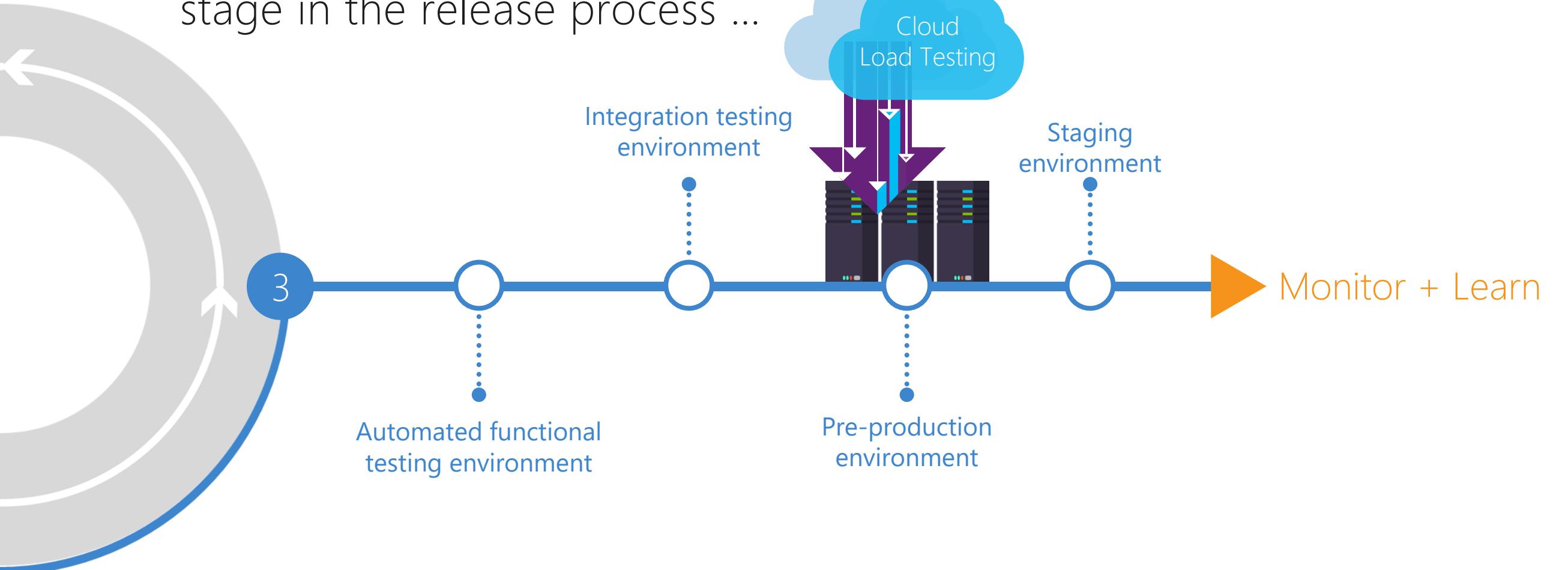
If your build process requires resources outside of the hosted build agents' capabilities, then you can connect on-premises build agents to your hosted team project collection. Or, quickly scale out your on-premises build infrastructure easily by adding hosted build agents.





Release

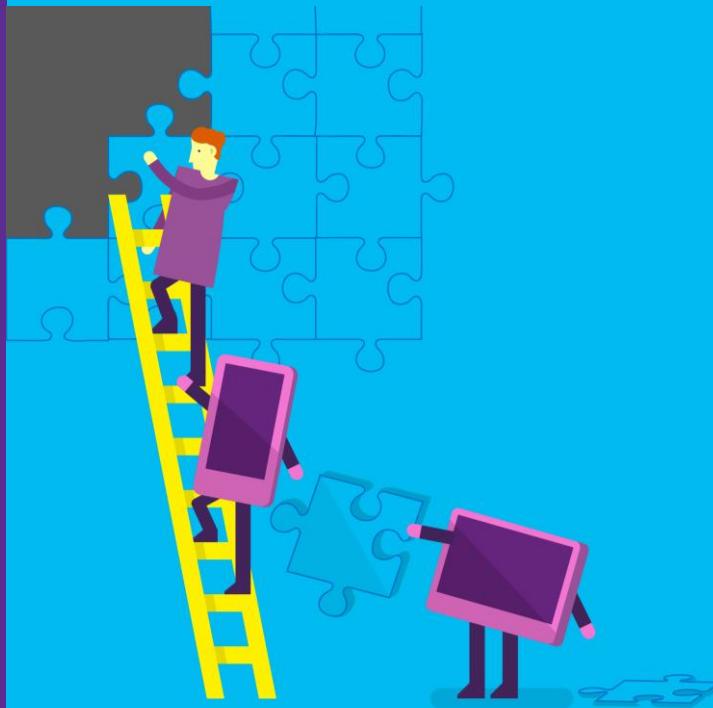
When all tests pass, the build is deployed to testing environments for each stage in the release process ...



Continuous Delivery

Streamline and automate the workflow between development and IT Ops and deliver higher quality software more frequently with less risk.

Continuous Integration



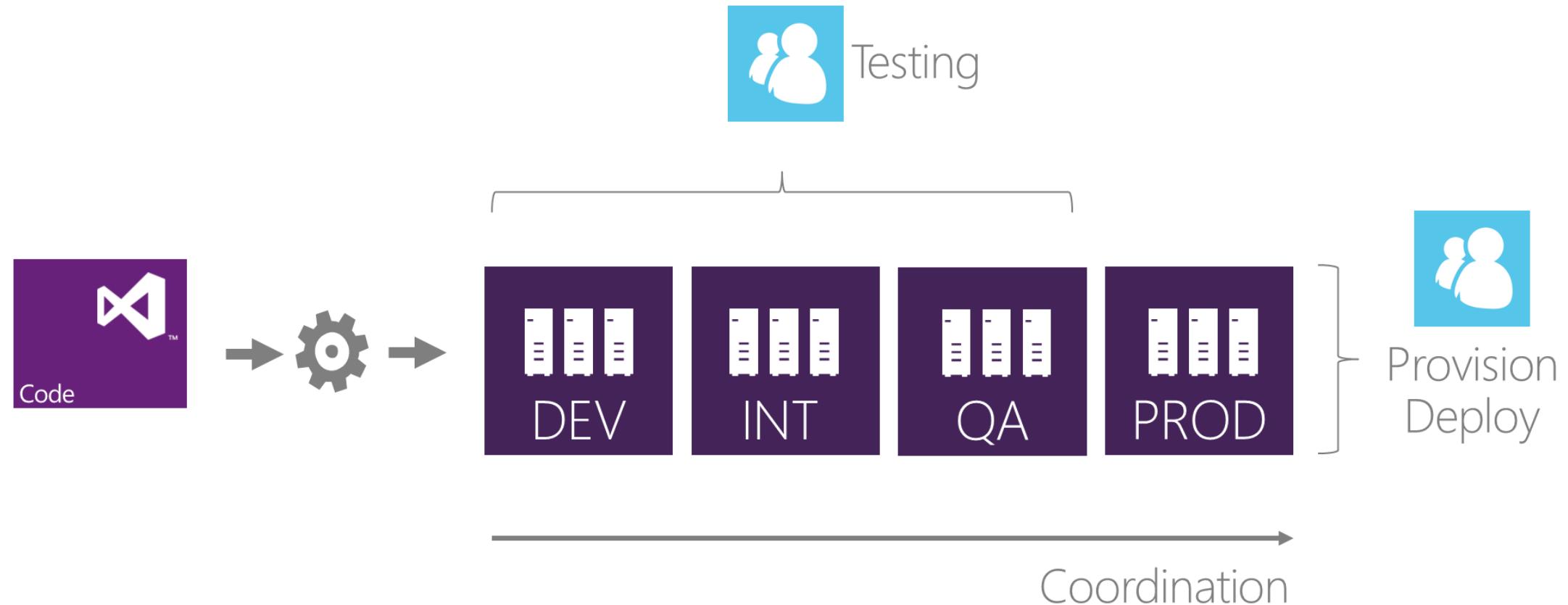
Release Management



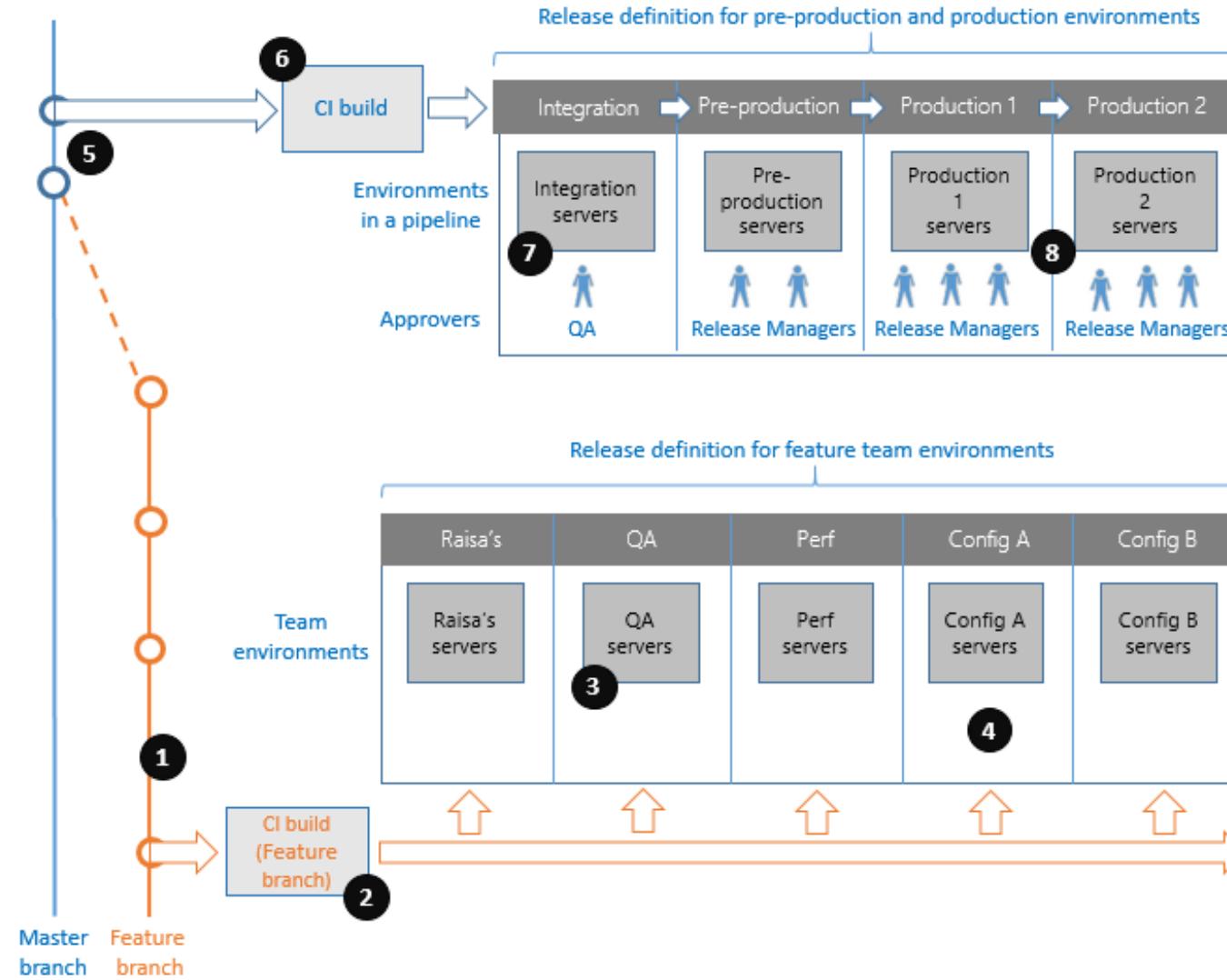
Continuous Quality



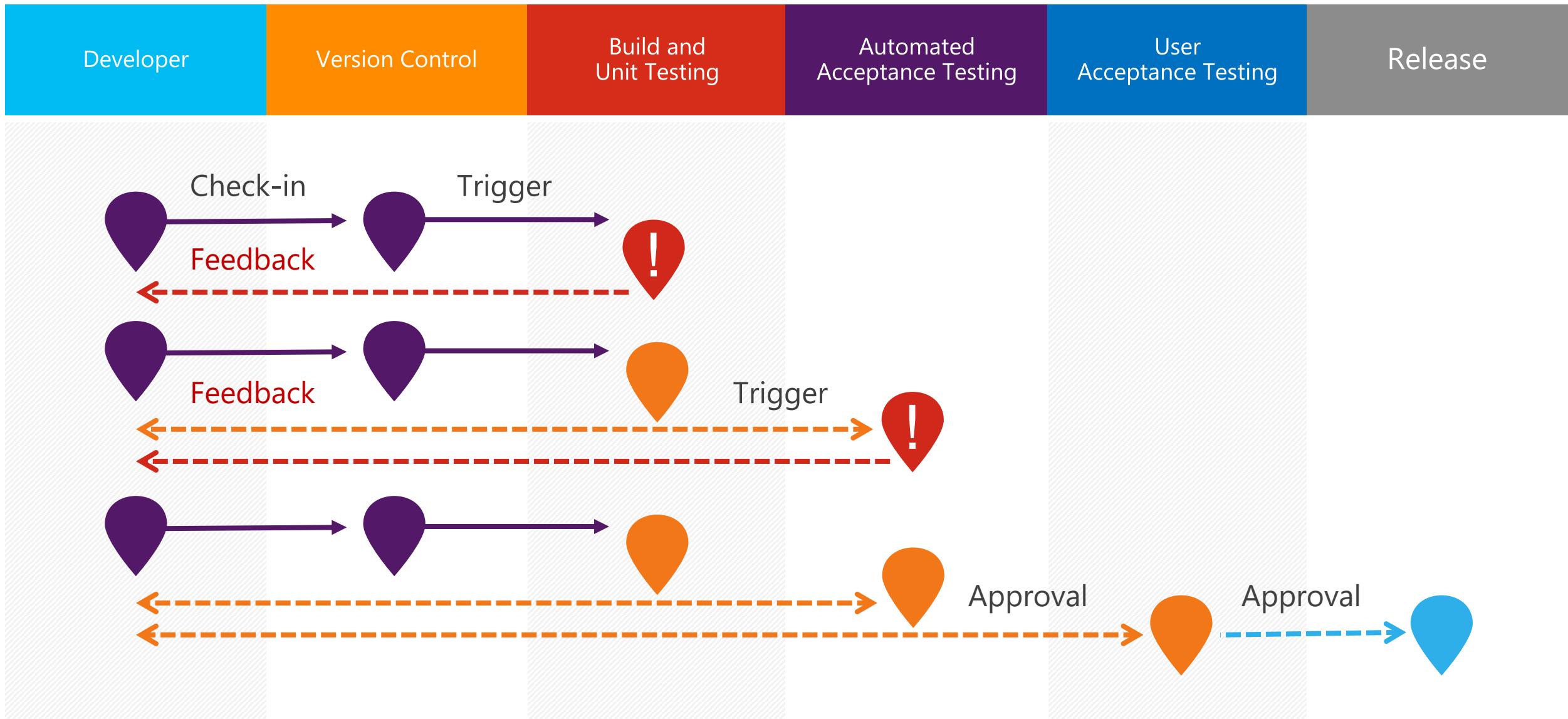
Release Management Overview



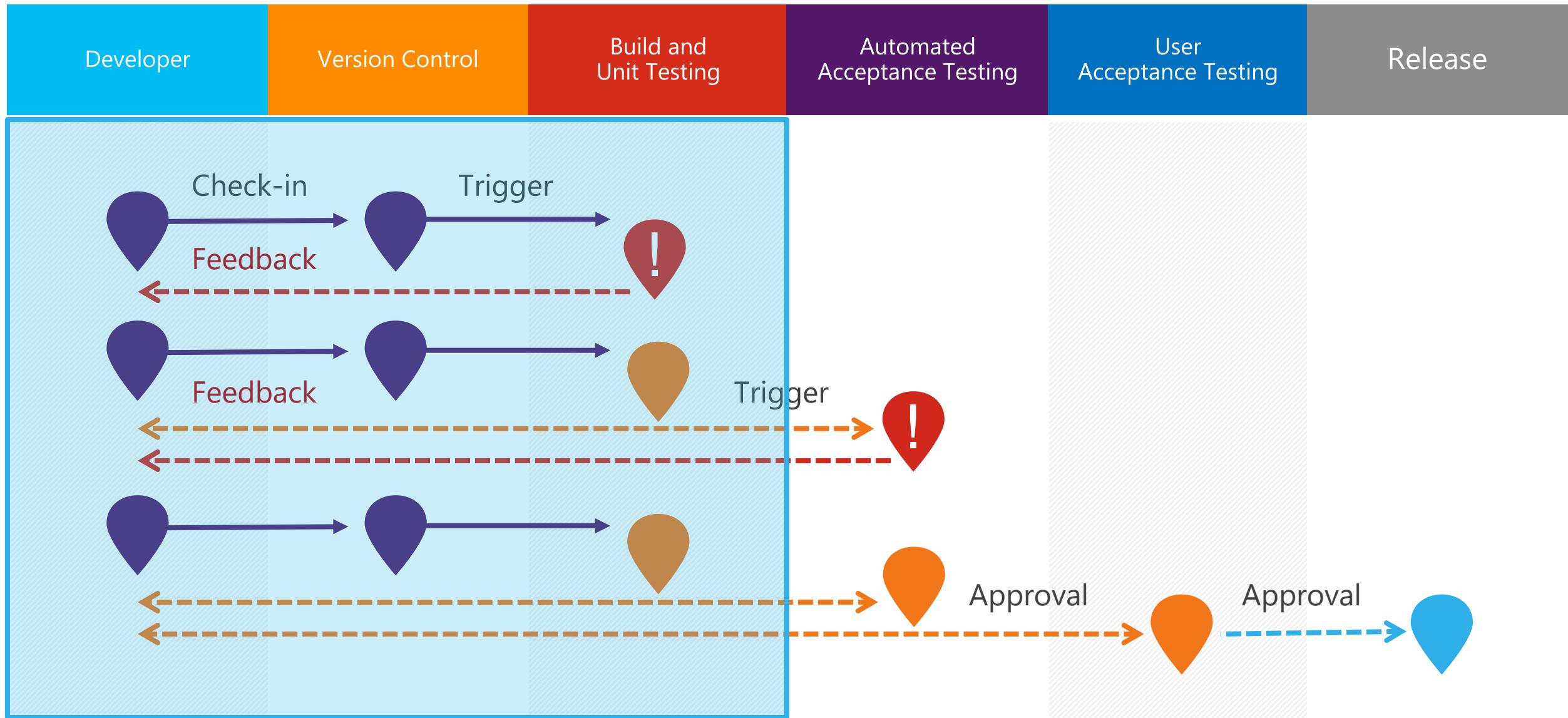
Use case for Release Management



Enabling continuous value delivery



Continuous integration (CI)



Continuous Integration

Build automation

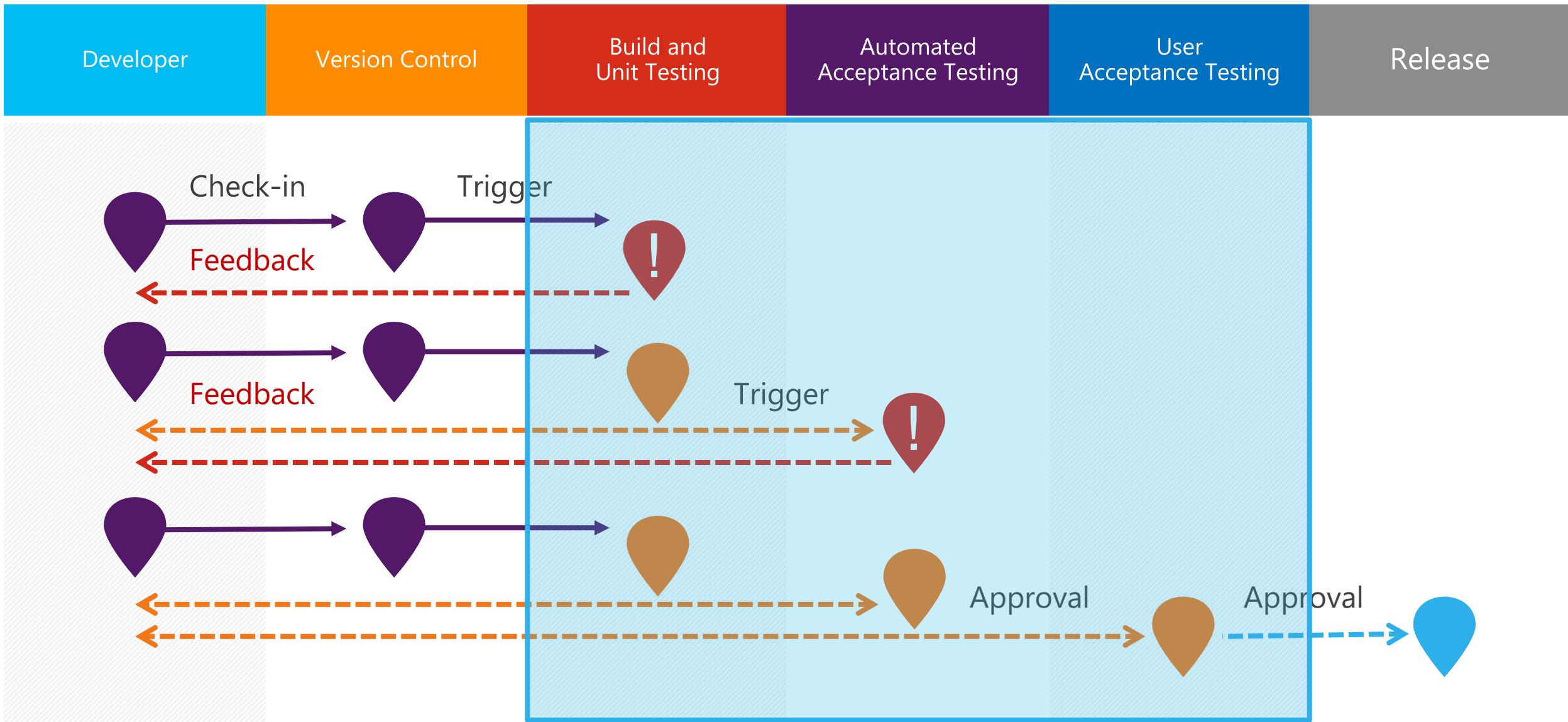
Create and manage build processes that automatically compile and test your application in the cloud or on premises, either on demand or as part of an automated continuous integration strategy.

Integrated

Link builds to test results, work items, code and releases and stop wondering if a bug was fixed in a particular build. By associating work items to code, the work items are listed in the build summary along with code changes and test results.



Continuous quality



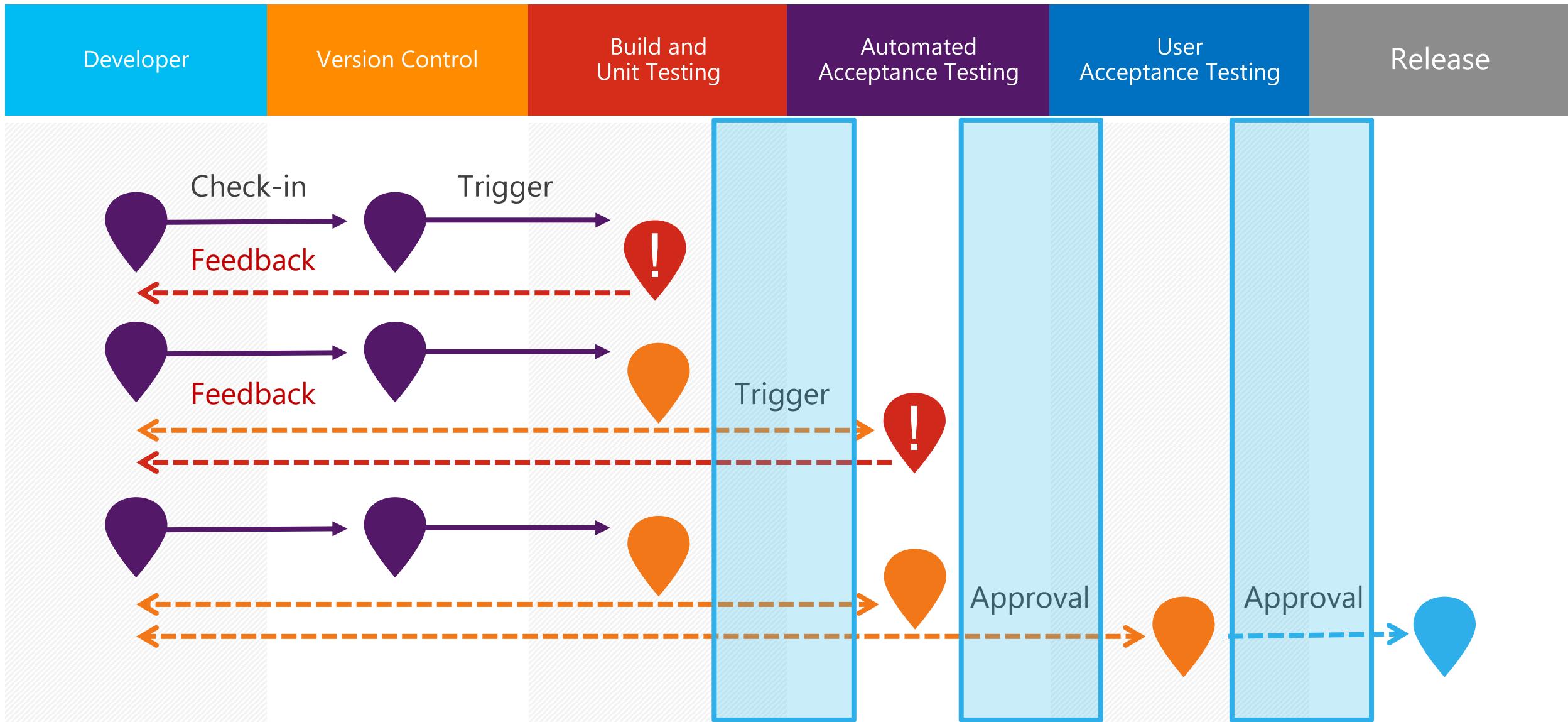
Continuous Quality

Test automation

Choose the technologies and frameworks and test changes continuously in a fast, scalable, and efficient manner. Whether your app is on-premises or in the cloud, you can automate build-deploy-test workflows. Build your TFVC, Git, and GitHub projects from a rich gallery of reusable open source and extensible build tasks that support Ant, Maven, Gradle, etc., and run JUnit, NUnit, xUnit, MSTest, Jasmine, and other types of test frameworks. Use continuous delivery to automatically deploy applications or websites that pass automated test runs and model your release pipelines to match your existing release processes.



Continuous deployment



Release Management

Ship better apps, faster

The Release Management capabilities in VSTS and TFS make it easier to automate deployment and testing of your applications in multiple environments. Teams can author release definitions and automate deployment in repeatable, reliable ways while tracking simultaneous in-flight releases all the way to production.

Full traceability with audit trails

Track the status of recent deployments in each of the environments and retain detailed audit history of all activities performed on a release. Connect to code to see commits and work items that are associated with each release.



Release visibility

Continuous delivery

Eliminate uncertainty, lower risk and get visibility on deployments with Release Management. Easily create automated and repeatable workflows and integrate with any build system to release applications faster with less risk. Audit progress of your release at every stage of the deployment pipeline, all the way to production.

Definition: Main | [Releases](#)

Environments Artifacts Configuration Triggers General History

Save | [Release](#) ▾

+ Add environments

DEV

6 / 6 tasks enabled

2 |

QA

2 / 2 tasks enabled

2 |

PROD

2 / 2 tasks enabled

0 |

+ Add tasks

Azure PowerShell

Azure PowerShell script: \$(System.DefaultW...

Azure Web App Deployment

Deploy Website to Azure

Azure SQL Database Deployment

Deploy Azure SQL DACPAC: Dacpac

Docker

Docker Deployment: namespace/repo_name

Visual Studio Test

Run Tests

PowerShell

Powershell: Post Release Steps

Deploy Website to Azure

Azure Subscription

VSU

Web App Name

DevToolsMa...

Web App Location

Central US

Slot

\$(System.Def...

Web Deploy Package

Set DoNotDelete flag

Additional Arguments

-connectionS...

Control Options

Enabled

Continue on error

Always run

[More Information](#)

CONFIGURE - 'DEV' ENVIRONMENT

Approvals Queue View

Approvers

Select the users who can approve

Pre-deployment approver

ADD TASKS

All

Azure Cloud Service Deployment

Deploy an Azure Cloud Service

Add

Build

Azure File Copy

Copy files to Azure blob or VM(s)

Add

Utility

Azure PowerShell

Run a PowerShell script within an Azure environment

Add

Test

Azure Resource Group Deployment

Deploy, start, stop, delete Azure Resource Groups

Add

Package

Azure SQL Database Deployment

Deploy Azure SQL DB using DACPAC

Add

Deploy

Azure Web App Deployment

Publish a Visual Studio Web project to a Microsoft Azure Web App using Web Deploy

Add

Chef

Deploy to Chef environments by editing

Add

Cloud Dev/Test environments

Agile, flexible, scalable

React faster to business changes and keep up with dev and test infrastructure demands. Reduce effort and lower cost for dev and test infrastructure resources. Get the compute, storage, and network resources you need, in minutes instead of hours or days. Test applications in a 'production-like' environment to uncover bugs and issues earlier in the development cycle.

The screenshot shows the Microsoft Azure Dev/Test Lab Settings page for a resource group named 'FabrikamLabs'. The top navigation bar includes links for 'Report bug' and 'Search resources'. The main content area is titled 'FabrikamLabs PREVIEW' and contains sections for 'Essentials' and 'My VMs'. The 'My VMs' section has columns for NAME, STATUS, and TEMPLATE, with a message stating 'Nothing to display'. Below this are three tiles: 'Getting started' (cloud icon), 'MSDN forum' (Windows logo icon), and 'Feedback' (heart icon). A 'Cost policies' sidebar on the right lists 'Properties', 'All VMs', 'Templates', and 'Artifact repositories'. Another sidebar on the far right lists 'Cost thresholds', 'VM policies' (with options for 'Allowed VM sizes', 'Maximum VMs per user', 'Total VMs allowed', and 'Auto shutdown'), and 'Resource management' (with options for 'Users' and 'Tags').

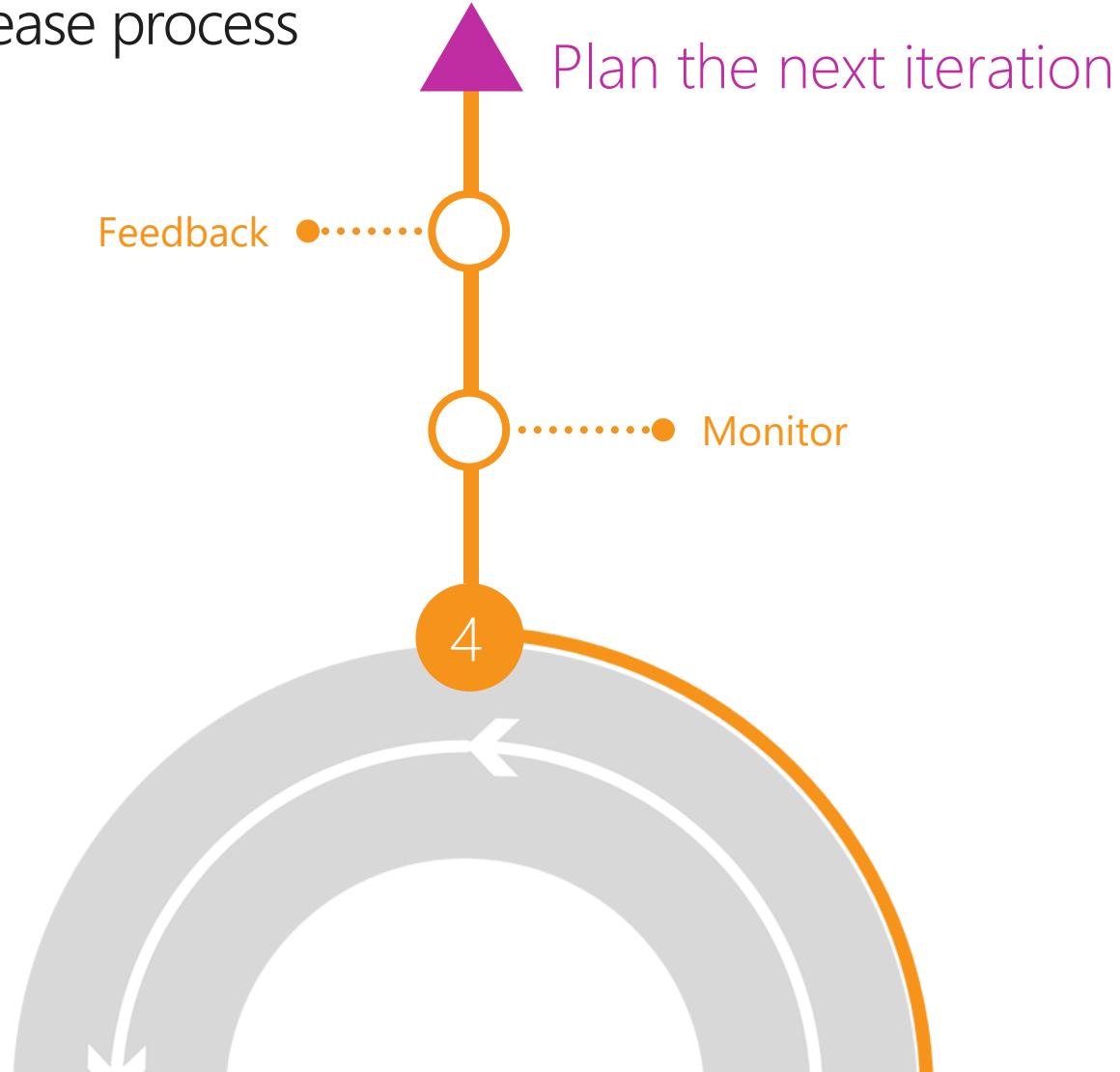
Release Management





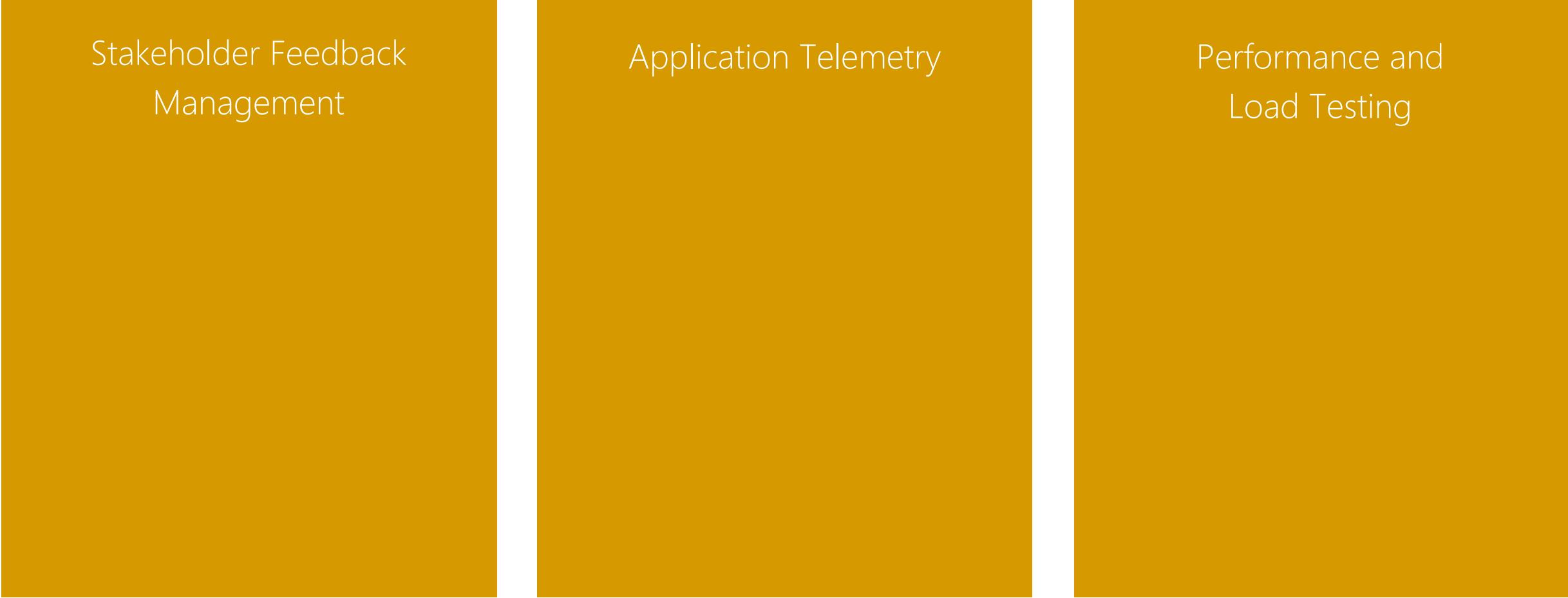
Monitor + Learn

When all tests pass, the build is deployed to testing environments for each stage in the release process



Monitor + Learn

Streamline and automate the workflow between development and IT ops and deliver higher quality software more frequently with less risk.



Stakeholder Feedback Management

Application Telemetry

Performance and Load Testing

Feedback management

Actionable feedback

Once you have working software, you're ready to get feedback from your stakeholders. You can ask reviewers to provide videos, screenshots, written comments and ratings. Their feedback is captured into work items that you can review and use to create a bug or suggest a new backlog item.

The screenshot shows the Microsoft Feedback Client interface within Visual Studio Online. It displays two main sections:

- Select Stakeholders:** A text input field contains the email address "bkeller@microsoft.com". Below it is a dropdown menu labeled "Display Name or Windows Live ID" with a "Browse" and "Check name" button.
- Tell Stakeholders How to Access the Application:** This section includes a radio button for "Web Application" (selected), "Remote Machine", and "Client Application". It also shows the URL "http://fabrikamfiber.com" and instructions to "Please launch your browser and go to the URL".

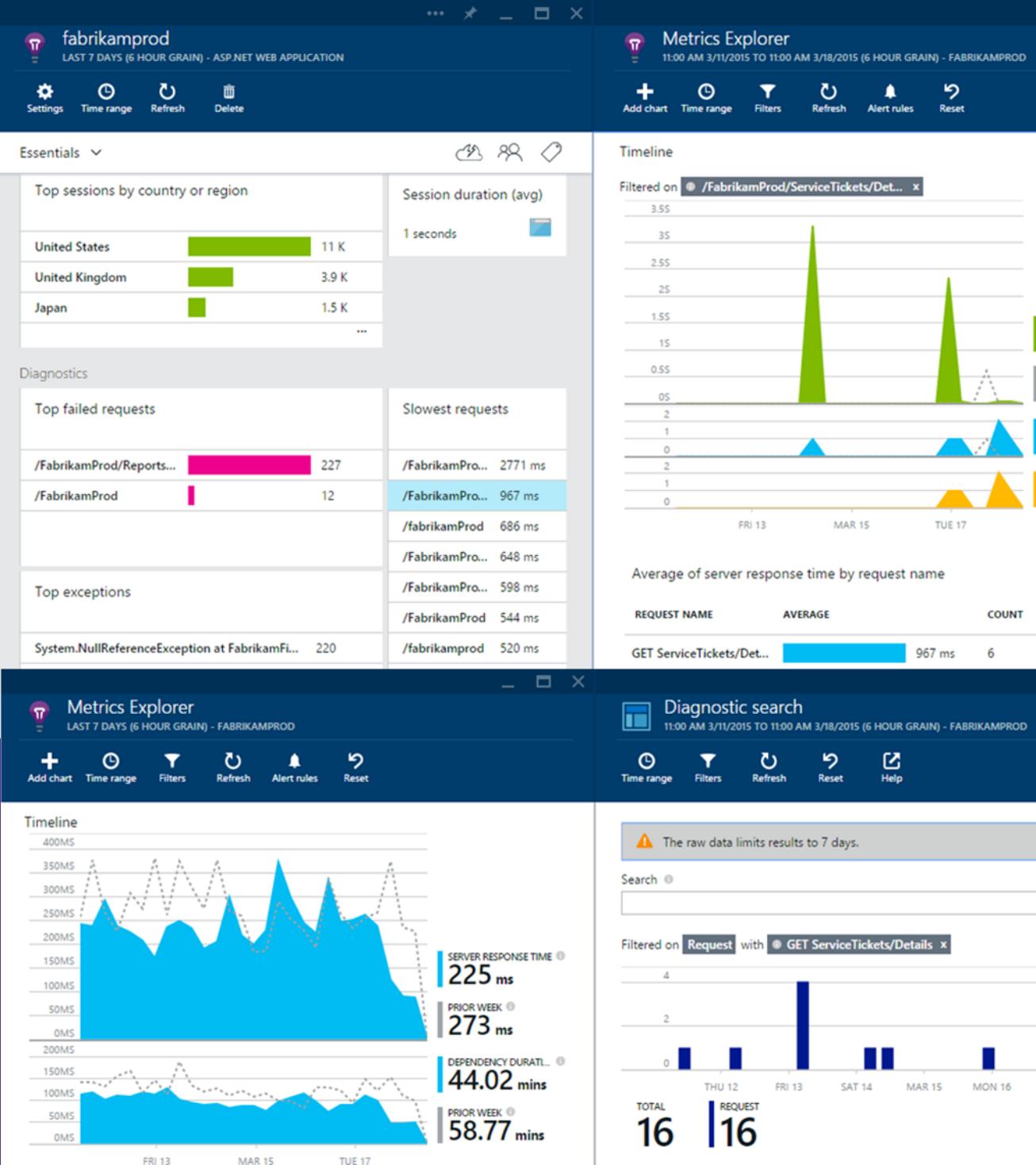
At the bottom, there are buttons for "Start", "Provide" (which is highlighted with an orange oval), and "Submit". The "ITEM: 1" is listed under "Customers page changes". Below this, there are options for recording video or audio, taking screenshots, and attaching files.

On the right side of the interface, there is a preview window showing the FF Intranet Portal with a large orange logo and the text "FABR Support".

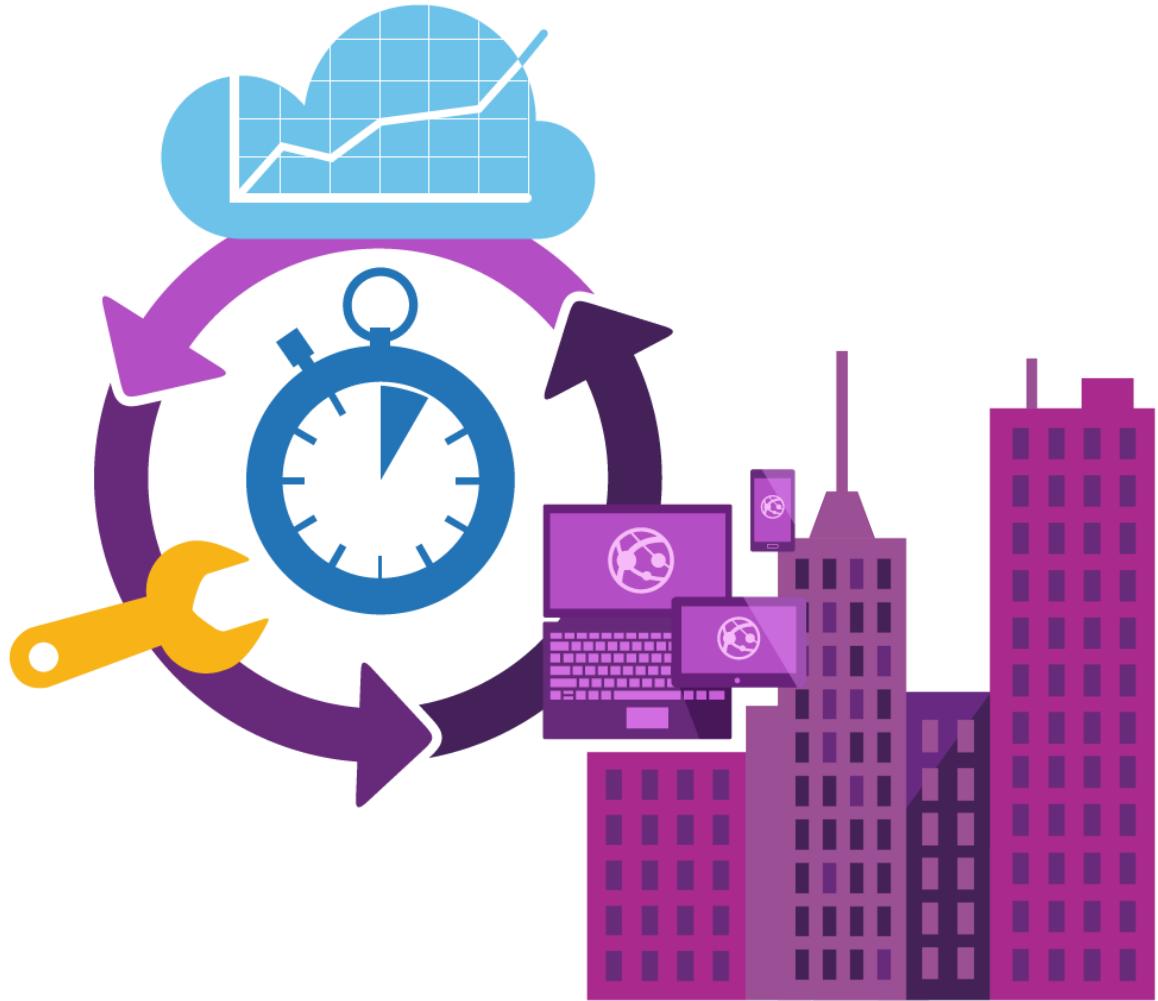
Application Insights

Track usage and performance

Get a 360° view of your app that includes availability, performance and user behavior. Use a powerful and easy-to-use experience to track and improve the success of your application. Analyze data across dimensions and make informed decisions about your product's future.



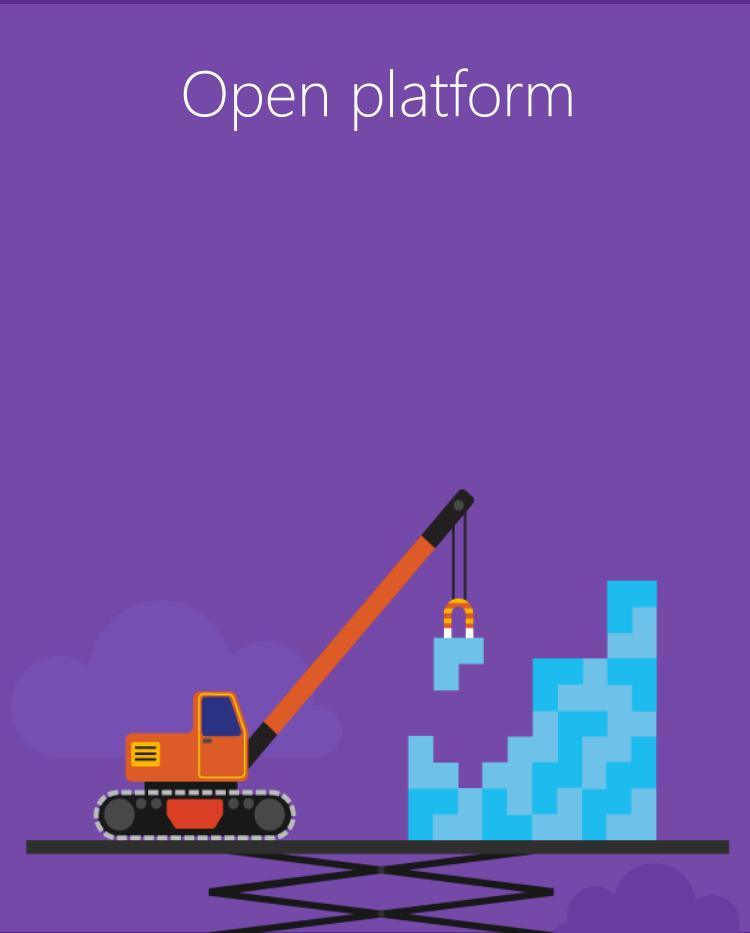
The Microsoft DevOps solution
Open and extensible



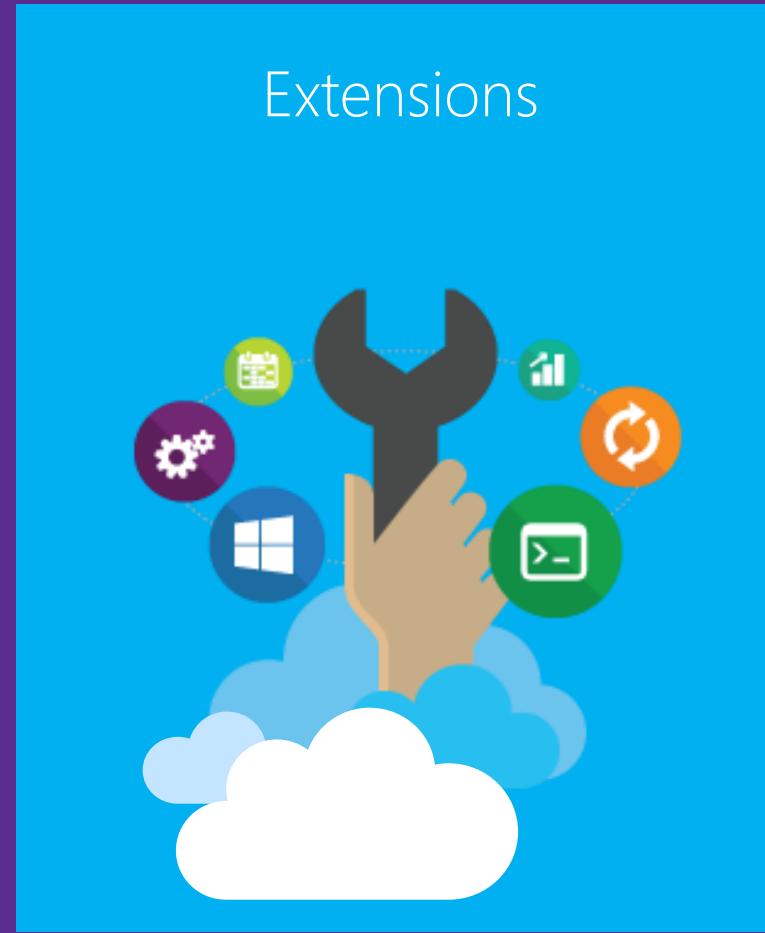
Extend, Customize & Integrate

Customize and extend the Visual Studio platform and create the perfect development environment that you'll love as much as your code.

Open platform



Extensions



Visual Studio Marketplace



Open platform

Extend the power of VSTS and TFS

Industry-standard **RESTful APIs** allow you to integrate from virtually any device, platform or stack, including Windows, Android, iOS, Node.js, and more.

Web UI extensibility enables you to create immersive and tailored experiences that are indistinguishable from built-in features and functionality.

Service hooks enable robust and fast integration between VSTS and TFS and services.

Target both VSTS and TFS at the same time with common APIs between cloud and on-premises



Extensions

Create new experiences

Extensions enable individual developers, partners, and teams to create first-class, integrated experiences within Visual Studio Team Services. Users and customers can discover and install extensions through the new **Visual Studio Marketplace**.

Partner program

The **Visual Studio Partner Program** enables you to maximize your commercial success by providing you with extensive technical resources, previews of upcoming technologies, and a broad marketing reach for your Visual Studio platform extensions.



Visual Studio Marketplace

Browse, discover and install

The **Visual Studio Marketplace** is a new destination and the exclusive place for purchasing subscriptions and for discovering extensions for Visual Studio Team Services and Visual Studio Code. You can find extensions from within the product or on the web and you can install them with a few clicks.



**Code Search**

Microsoft

Code Search provides fast, flexible and accurate search across all your code

7035 PREVIEW**Exploratory Testing - Create**

Microsoft

Exploratory Testing for everyone

3723 PREVIEW**Package Management**

Microsoft

Build, manage, secure, and share your team's software components.

3245 PREVIEW**TFS Timetracker**

Berichthaus Software

Track and manage working time on work items, with rich features and reports.

1870 PREVIEW**Folder Management**

Microsoft DevLabs

Quickly create a folder in your Visual Studio Team Services source repositories from the

1541 FREE**Work Item Visualization**

Microsoft DevLabs

Visualize relationships between work items from within the work item form.

1369 FREE**Codenvy Agile Plugin for Codenvy**

Codenvy

Codenvy's team workspaces allow developers, stakeholders and users

22 FREE**GitHub Integration**

Microsoft

Continuous integration and deployment for your .NET, Java, Node.js, Android, iOS,

FREE**Slack Integration**

Microsoft

Team communication for the 21st century integrated with your software development

FREE

Visual Studio Extensions

972

Visual Studio Code
Extensions

5,910

Visual Studio
Gallery Extensions

834

VS Team Services
Extensions

**HockeyApp**

Microsoft

Distribute your builds, collect crash reports, and get feedback from your users.

847 FREE**Octopus Deploy Build and Release**

Octopus Deploy

Build and Release tasks for integrating with Octopus Deploy

410 FREE**Mobile Testing Lab**

Perfecto Mobile

Extend your CI and execute your tests on real devices.

169 FREE**GitHub Widget**

Gordon Beeming

An unofficial GitHub widget to show some general information for your GitHub

81 PREVIEW**GitHub Stats Widget**

Yod Labs

Dashboard widget to show stats from a GitHub public repository.

42 FREE**Azure Service Bus Integration**

Microsoft

Make events happening in Visual Studio Team Services projects instantly available to

FREE**Task Sync**

Tasktop

Connect Microsoft TFS and Visual Studio Online to JIRA, HP ALM and QC, IBM RTC,

FREE**Azuqua Integration**

Microsoft

Connect the services your teams and customers use, automating business

FREE**Zapier Integration**

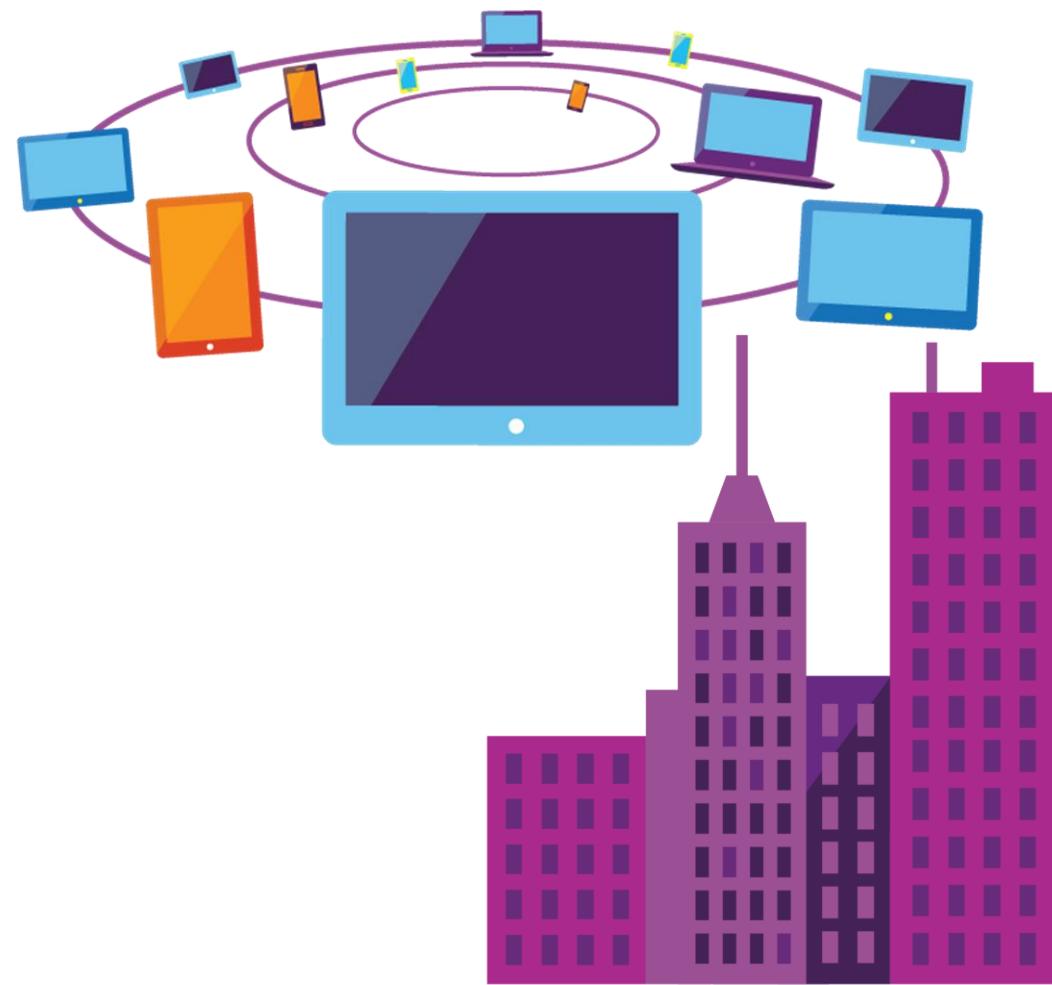
Microsoft

Connect and automate tasks between Visual Studio Team Services and hundreds of

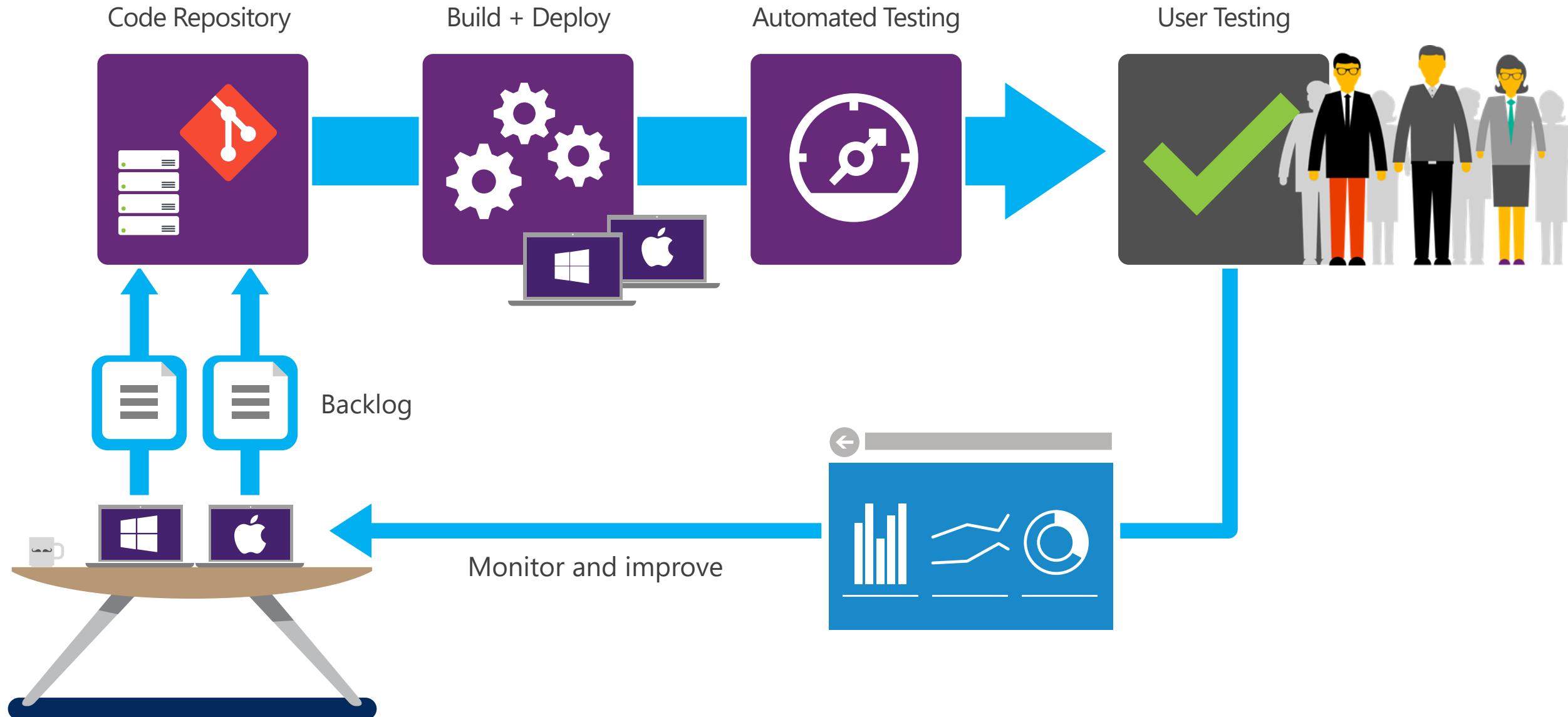
FREE

The Microsoft DevOps Solution

DevOps for the digital era



Mobile app CI and CD



Our solution for mobile DevOps

Tools for continuous integration, beta deployment, crash analytics and monitoring of mobile applications that are distributed through app stores.

Automate and orchestrate
build, test and release

Friction-free mobile app
deployment and beta testing

Close the loop between
Development and Operations

Xamarin Test Cloud

2,000+ devices

Automate your app testing and run them on over 2,000 different real devices. Test everything users do, as well as any performance problems with step-by-step memory and performance tracking.

Real devices, real quality

- Ensure higher quality by testing on real devices
- Automate app testing on over 2,000 real devices
- Use C#, Ruby, or Cucumber to build automated tests
- Integrates with any continuous integration system

The screenshot shows the Xamarin Test Cloud interface. At the top, it displays the URL "testcloud.xamarin.com" and the navigation path "Xamarin test cloud > Xamarin CRM > master > Aug 23, 2015 10:03:59 PM". Below this is a sidebar with sections like "Overview", "TEST RESULTS", and "Customer tests". A red alert icon indicates a failed step: "Then I tap 'Sales'". The main area lists various test steps with green checkmarks, except for the failed step which has a red lightning bolt icon. To the right, there are 12 smartphone icons representing different devices and iOS versions, each showing a screenshot of a bar chart from the "Xamarin CRM" app. The devices shown are Apple iPhone 5C (iOS 8.2), Apple iPhone 5 (iOS 8.3), Apple iPhone 5C (iOS 8.3), Apple iPhone 6 (iOS 8.2), Apple iPhone 5S (iOS 8.1.3), Apple iPhone 6 (iOS 8.1.3), Apple iPhone 5 (iOS 7.1.1), Apple iPhone 5C (iOS 7.1.1), Apple iPhone 5S (iOS 7.1.1), Apple iPhone 5 (iOS 7.1.1), Apple iPhone 5C (iOS 7.1.1), and Apple iPhone 5S (iOS 7.1.1).

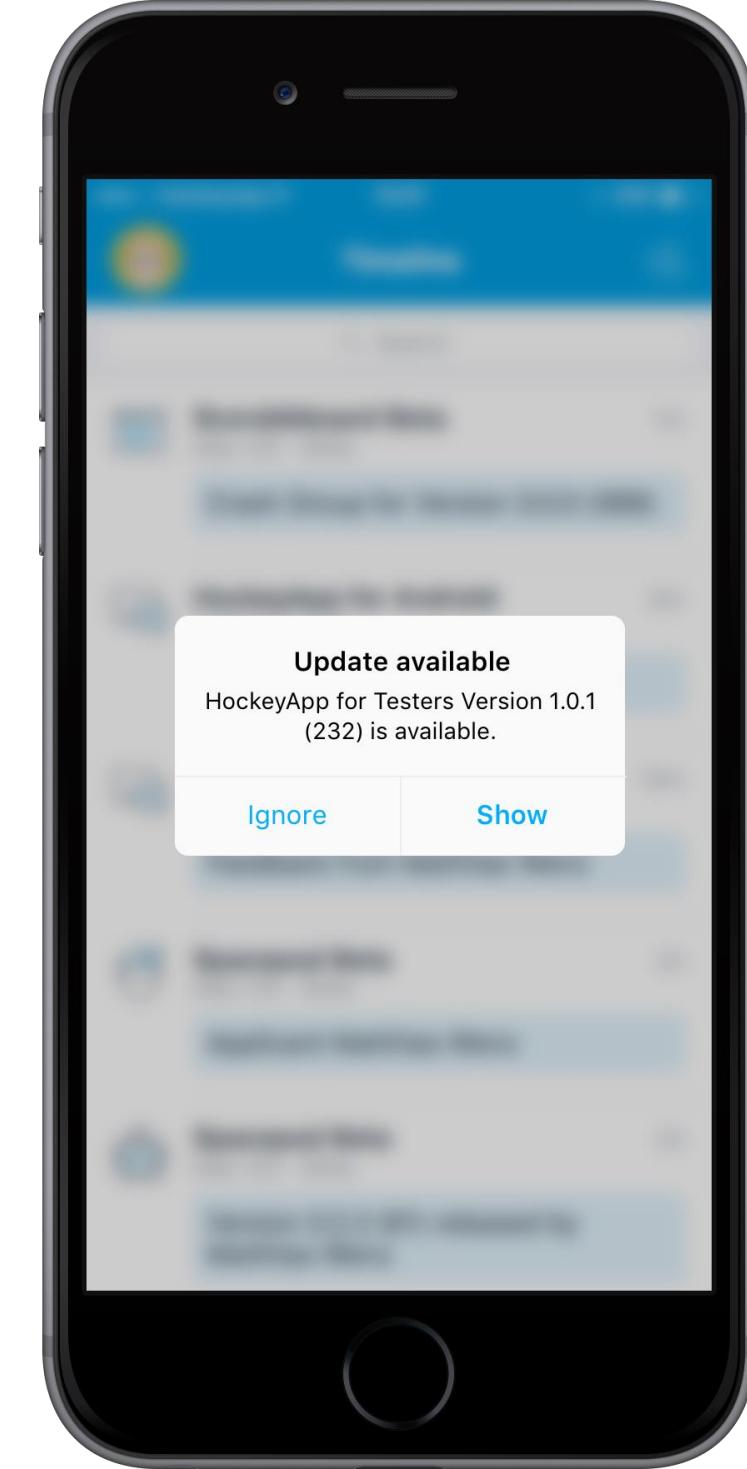
HockeyApp Beta Distribution

In-house App Store for testers

Upload beta versions of your application to the HockeyApp store to allow testers to install and test beta versions on actual devices.

Deployment made easy

HockeyApp's desktop application automatically tracks all necessary information about your latest build in order to make uploading beta versions easy.



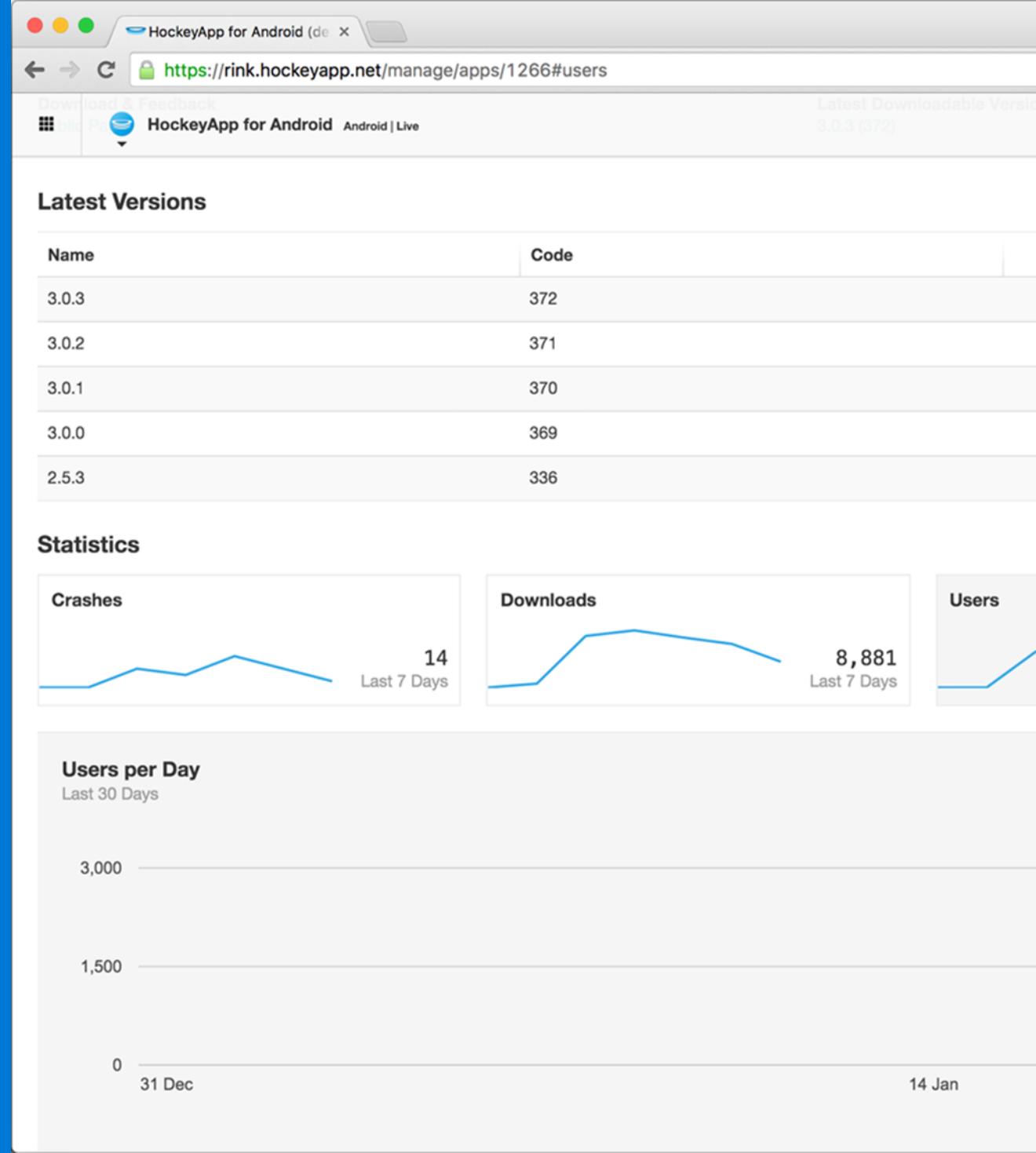
Beta test coverage

Real usage matters

Advanced metrics to see which devices were used, how long the app was used for, and which language was tested. No additional setup.

Detailed charts

HockeyApp features both raw data from analytics as well as live, interactive charts for the most important metrics.



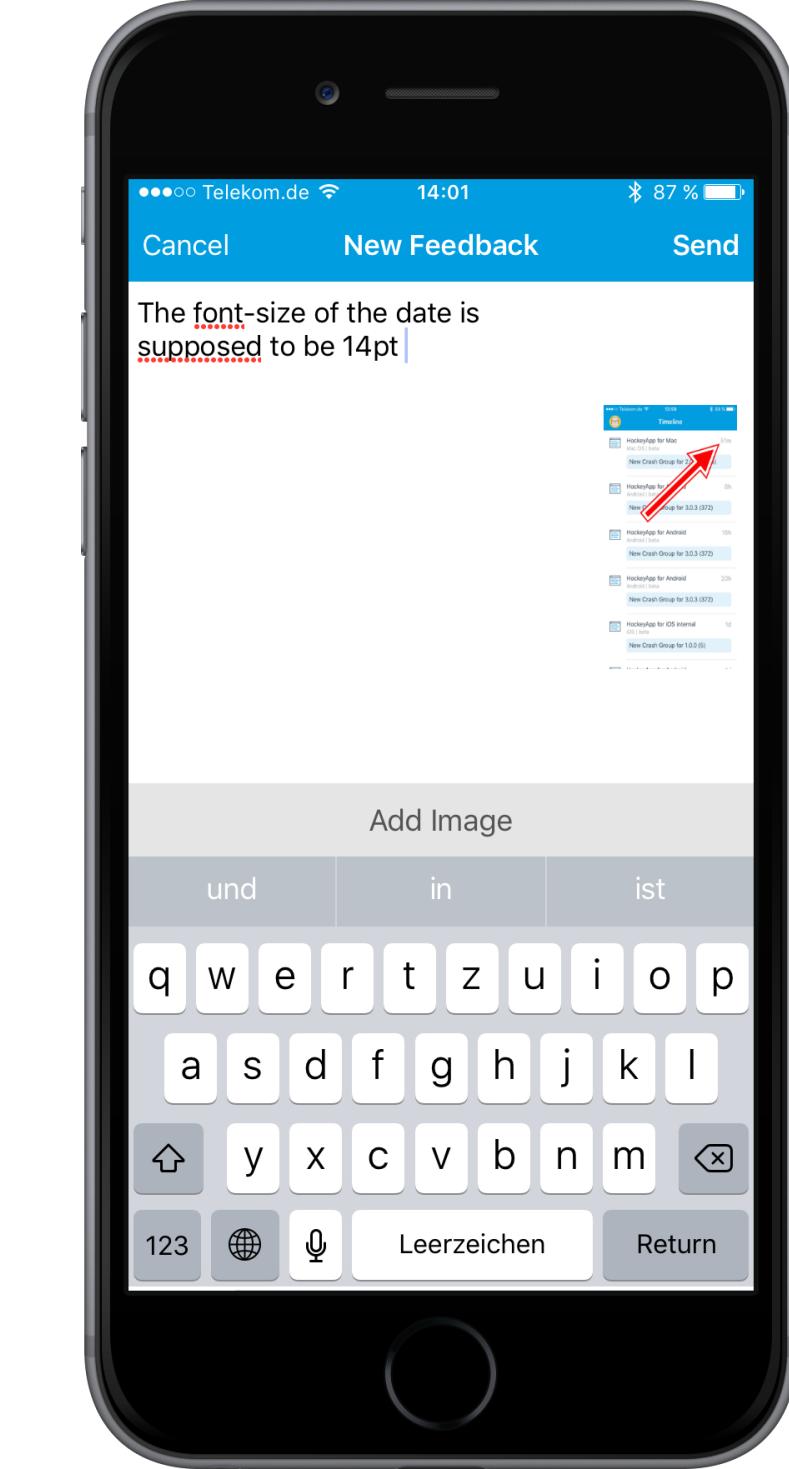
User feedback management

A conversation with your users

All feedback is handled as discussions. You can manage discussions in the web interface or through email. Search discussions, mark them as completed or create work items based on them. Give your users a voice outside of the app store.

For all development phases

You can use the feedback feature for all builds of your app or just beta versions. Either way, HockeyApp makes it easy for users to tell you what's what. Let them post ideas right from within your app.



HockeyApp Crash Analytics

No additional code

By integrating HockeyApp's open source SDK for Android, iOS, Mac, and Windows your apps can send crash reports directly to HockeyApp, no additional code needed.

Powerful crash analytics

HockeyApp processes and symbolicates all crash reports. This gives you meaningful stack traces with friendly class names, methods, and accurate line numbers.

The screenshot shows the HockeyApp web interface at <https://rink.hockeyapp.net/manage/apps/>. The main navigation bar includes 'Crash Group', 'Overview', 'Crash Logs 132', 'App Traces 1', and 'Bug Tracker'. Below this, there are buttons for 'Add Annotation' and 'Status: open'. The main content area displays a crash report for 'net.hockeyapp.client.HomeActivity\$3.onErrorResponse' in 'HomeActivity.java' at line 267. The reason for the crash is listed as 'java.lang.NullPointerException'. Key statistics shown include 'Number of Crashes' (132), 'Percentage for Version' (20.89%), and a 'First Crash' section. At the bottom, tabs for 'Stacktrace' (selected), 'Histogram', 'Devices', and 'OS Versions' are visible. The full stack trace is listed below:

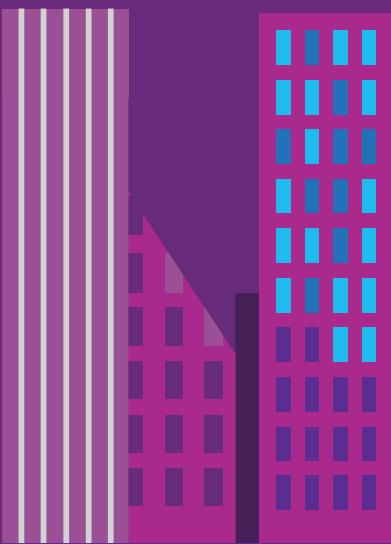
```
1 net.hockeyapp.client.HomeActivity$3.onErrorResponse
2 com.android.volley.Request.deliverError
3 com.android.volley.ExecutorDelivery$ResponseDeliveryRunnable.run
4 android.os.Handler.handleCallback
5 android.os.Handler.dispatchMessage
6 android.os.Looper.loop
7 android.app.ActivityThread.main
8 java.lang.reflect.Method.invokeNative
```



Visual Studio
Team Services



Team Foundation
Server



Open, flexible and extensible
cross-platform DevOps tools

Unlocks a greater ecosystem and
works with what you already use

More agility and flexibility for
continuous value delivery

Hosted by Microsoft
Visual Studio Team Services



Cloud services for teams

Hosted in your data center
Team Foundation Server



Team collaboration server

Getting Visual Studio Team Services

Completely free for small teams

FREE: 5 users + unlimited stakeholders

FREE: 240 minutes cloud build time/month

FREE: 20k virtual user minutes for load testing/month

Pricing for additional team members

No. of users:	5	10	20	50	100	200	1000
Cost per month:	FREE	\$30	\$110	\$350	\$750	\$1,150	\$4,350

Each Team Services paid user also gets a Team Foundation Server CAL (Client Access License)

Free for MSDN and Visual Studio subscribers

Users with the following subscriptions can be added to an unlimited number of VSTS accounts for free, with "Basic" feature access:

- Visual Studio Enterprise - annual
- Visual Studio Enterprise - monthly
- Visual Studio Enterprise with MSDN - including subscriptions offered through BizSpark and the Microsoft Partner Network
- Visual Studio Professional - annual
- Visual Studio Professional - monthly
- Visual Studio Professional with MSDN
- Visual Studio Test Professional with MSDN
- MSDN Platforms

Additional services per account

Cloud Build

FREE: 240 minutes/month on a hosted build agent with 30 mins max runtime for a single build

FREE: 1 private agent (new build system) or XAML controller (legacy build system)

THEREAFTER:

Hosted build agent for \$40/month* (you can upgrade the free agent or buy additional agents)

Private agent for \$15/month

Cloud-based Load Testing*

FREE: 20,000 virtual user minutes per month

THEREAFTER:

\$0.004/virtual user minute for 20,001-2M VUM

\$0.002/VUM for 2,000,001-10M VUM

\$0.001/VUM for usage above 10M VUM/month

* Requires Visual Studio Enterprise

- Services purchased via Microsoft Azure based on actual usage
- Additional services are accessible to all users on the account and shared among them
- Build time is actual computing time required to run the build, and does not include queuing time (if any)
- Load test runs specify the number of virtual users and duration in minutes
Virtual users x minutes = virtual user minutes (VUM)

Getting Team Foundation Server

Completely free for individuals and small teams

Team Foundation Server Express is free for individual developers and small teams of five or less and can easily be installed on a personal desktop or laptop without a dedicated server.

Pricing for additional team members

With **Team Foundation Server**, you license the server and the users connecting to the server. Users who only need access to work items are free, and other users need a user CAL (client access license) for access to most features in Team Foundation Server.

Free for MSDN and Visual Studio subscribers

Users with the following subscriptions get both a Team Foundation Server license and a Team Foundation Server User CAL:

- Visual Studio Enterprise - annual
- Visual Studio Enterprise - monthly
- Visual Studio Enterprise with MSDN - including subscriptions offered through BizSpark and the Microsoft Partner Network
- Visual Studio Professional - annual
- Visual Studio Professional - monthly
- Visual Studio Professional with MSDN
- Visual Studio Test Professional with MSDN
- MSDN Platforms

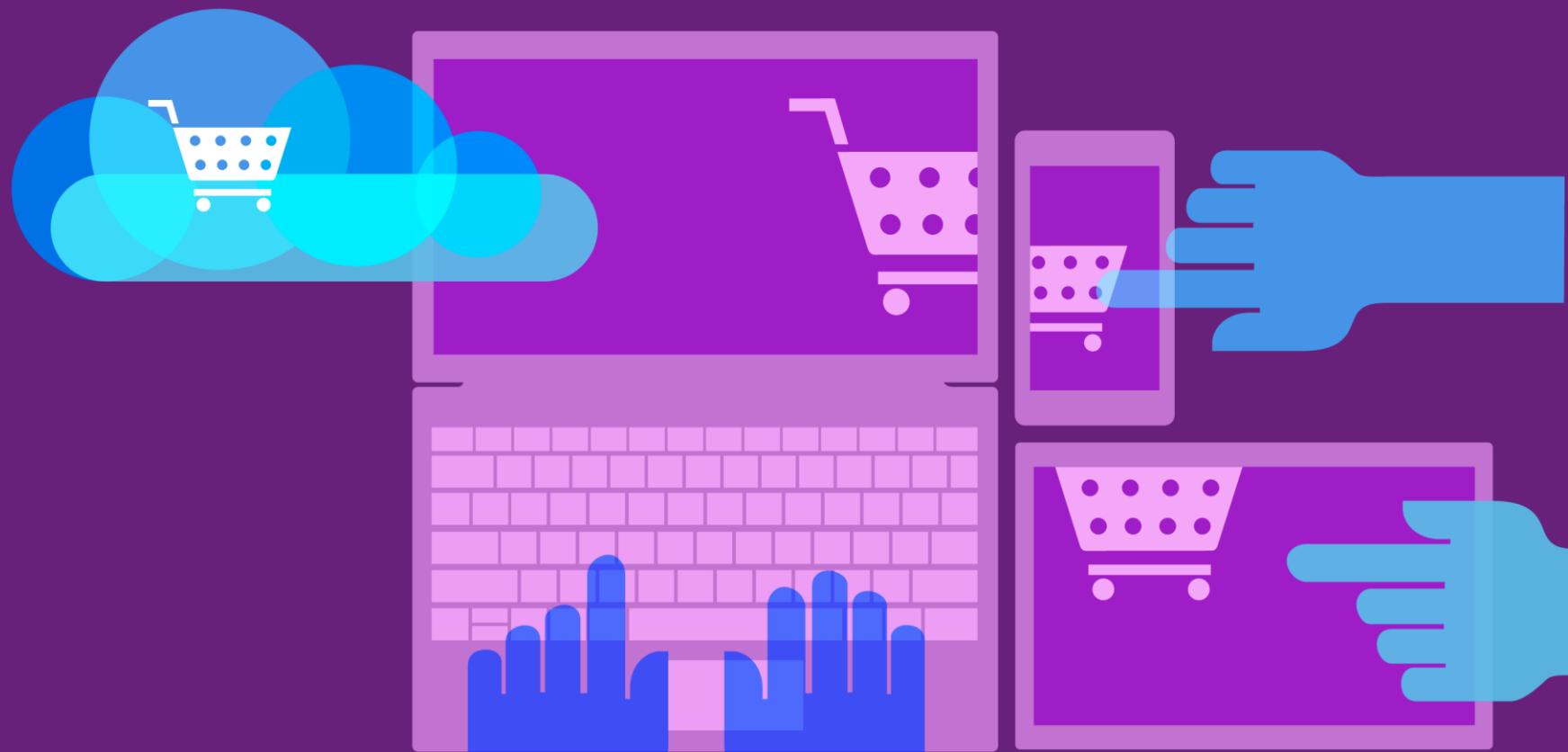
Feature comparison

	Visual Studio Team Services	Team Foundation Server
Plan & Track Work	■	■
Source Code Management	■	■
Package Management	■	■
Test Management	■	■
Cross-Platform Build	■	■
Continuous Deployment	■	■
Release Management	■	■
Application Telemetry	Application Insights/HockeyApp	System Center/PreEmptive Analytics
Reporting	Limited	■
Extend, Customize & Integrate	■	■
Team Structure	1 Collection – Unlimited Projects/Teams	Unlimited Collections/Projects/Teams
Identity & Permissions	Azure Active Directory Microsoft Accounts (Live ID)	Active Directory Integration
Languages	English Only	Multilanguage Support
Data Location	US, Europe, Australia DCs - India (coming soon)	Data Stored On Premises
Backup/Data Migration	Limited support, TFS Import (coming soon)	Backup/Restore Tools Available
Support	Phone, Online and Forums, Engineering Excellence	Phone, Online, Forums, Microsoft Premier Support
Updates	Frequent Updates (~3 weeks) Automatically Upgraded	Periodic Updates (~3 or 4 months) Planning Required

Feature comparison

	Visual Studio Team Services	Team Foundation Server
Version Control		
Team Foundation Version Control	■	■
Distributed Version Control with Git	■	■
Agile Planning & Collaboration		
Scrum, Agile, CMMI	■	■
Custom Process Templates & WIT Customization	Limited	■
Work Item Tagging, Kanban Board, Feedback	■	■
SharePoint, Project Server, System Center Integration		■
Build		
Automated Builds On-Premises with CI	Support for hybrid scenarios	■
Hosted Build Service with Continuous Integration	■	
Application/Platform Support	Many Microsoft platforms and growing (Build Server Software)	Fully customizable
Continuous Deployment to Azure	■	■
Testing		
Test Case Management	■	■
Cloud-Based Load Testing Service	■	
Reporting	Work Item Queries and Favorites Work Item Charting, Power BI	Work Item Queries and Favorites/Work Item Charting/Business Intelligence Warehouse

LAB #6



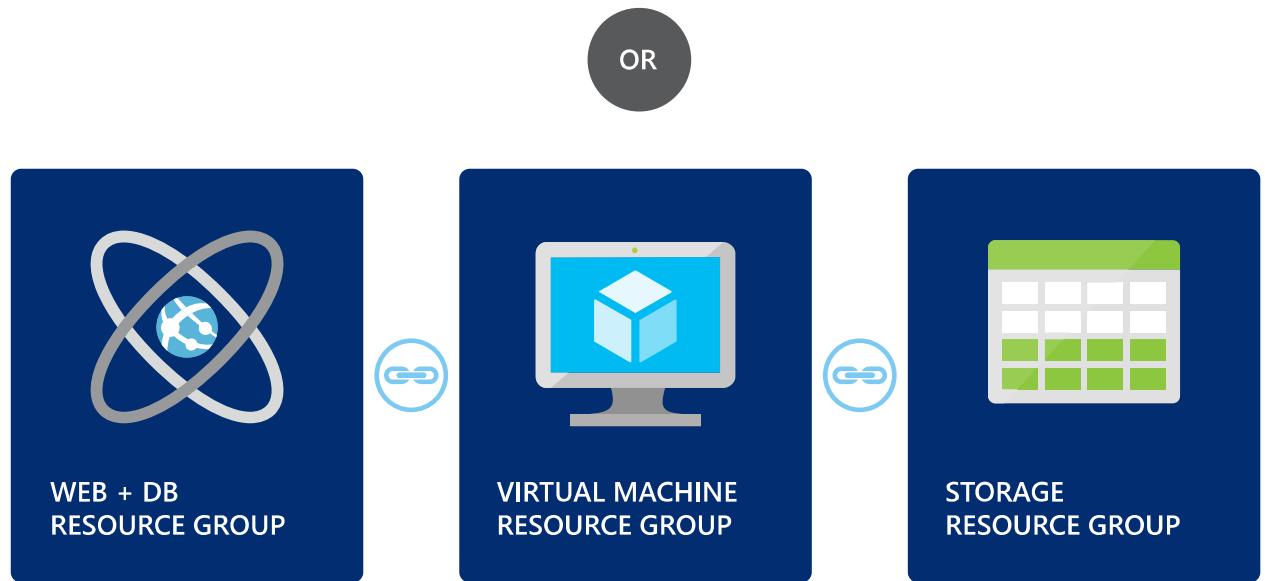
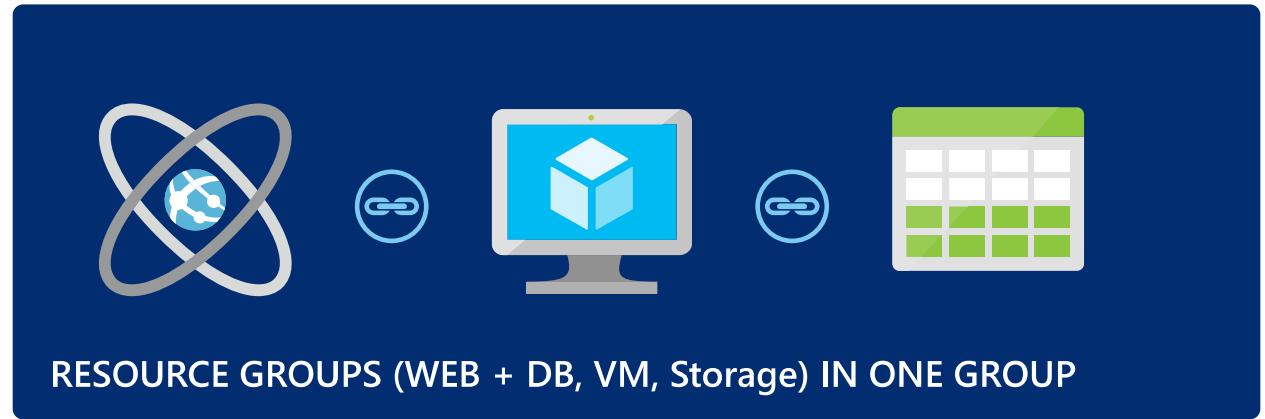
Additional Resources

- [Visual Studio Team Services](#)
- [Getting started](#) (link to important chapters in VSTS docs)

Basics about ARM deployments



Azure Resource Manager



Describe

WHERE
Resource Inventory

WHAT
Component Relationships

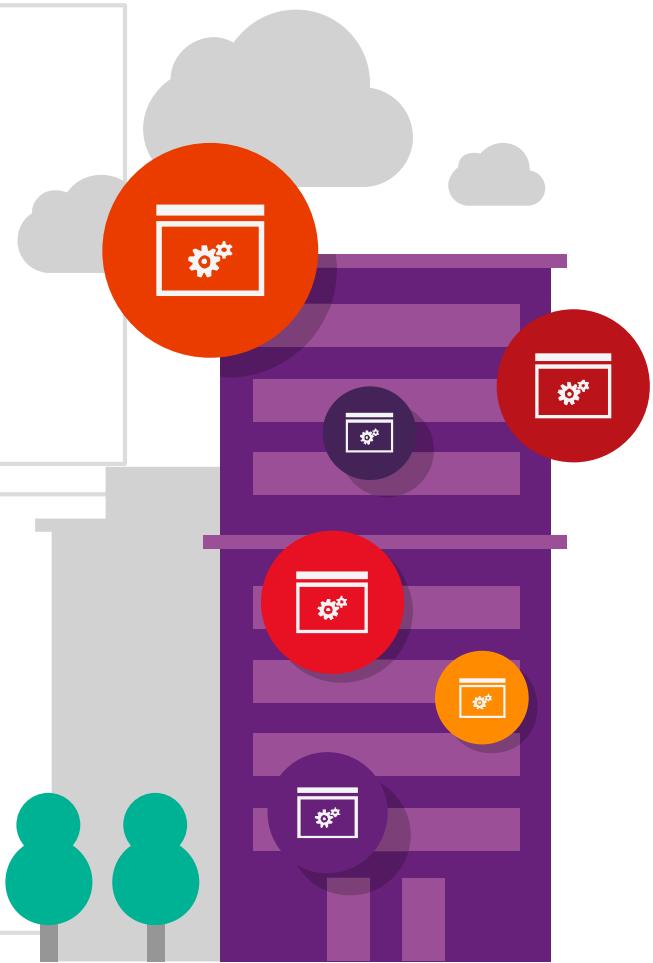
HOW
Tags + links + groups

Provision

WHERE
Across Regions

WHAT
Across Resources

HOW
In service and in guest



Control

WHO
Access control

WHAT
Changes

HOW
RBAC

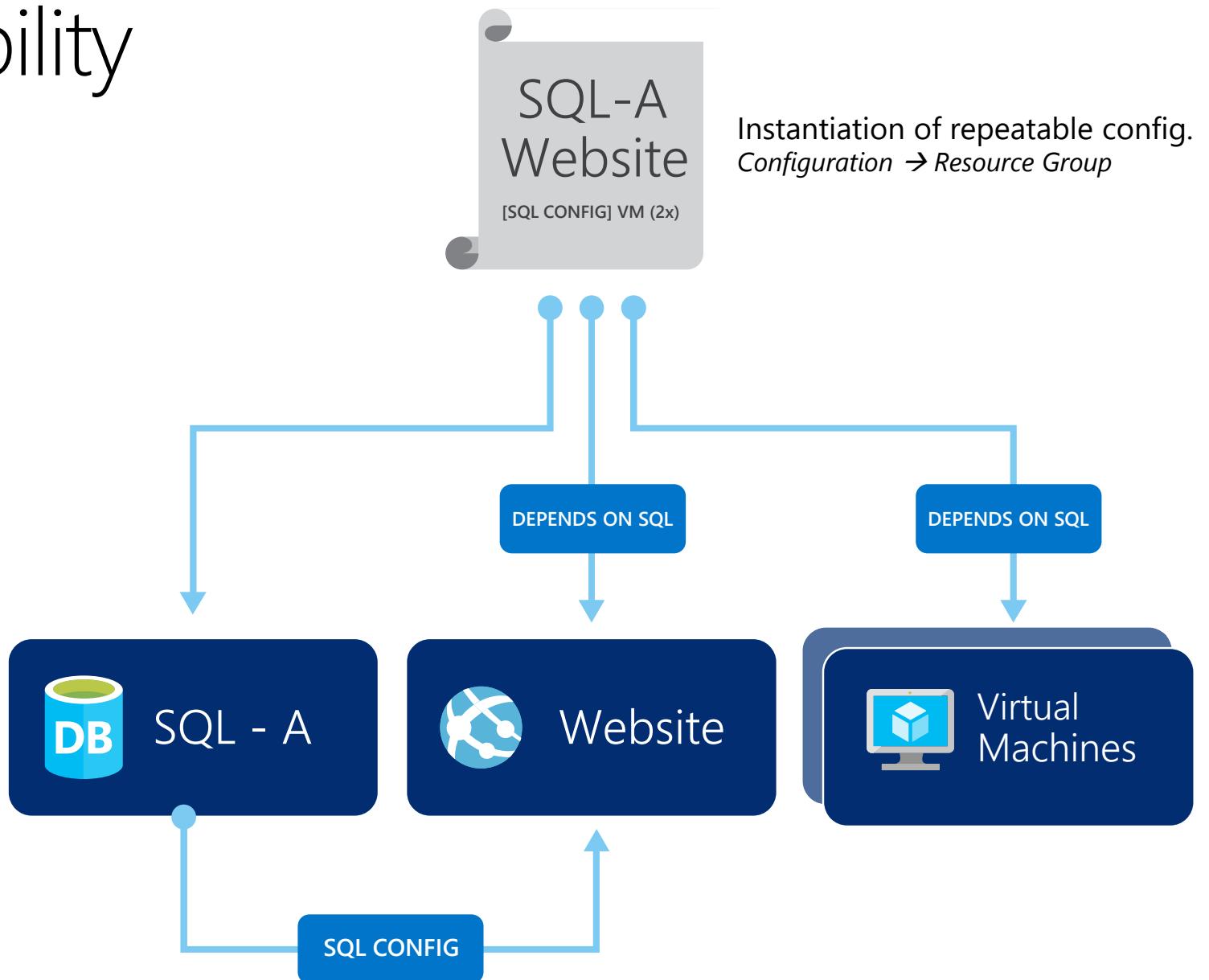
Power of Repeatability

Azure Templates can:

- Ensure Idempotency
- Simplify Orchestration
- Simplify Roll-back
- Provide Cross-Resource Configuration and Update Support

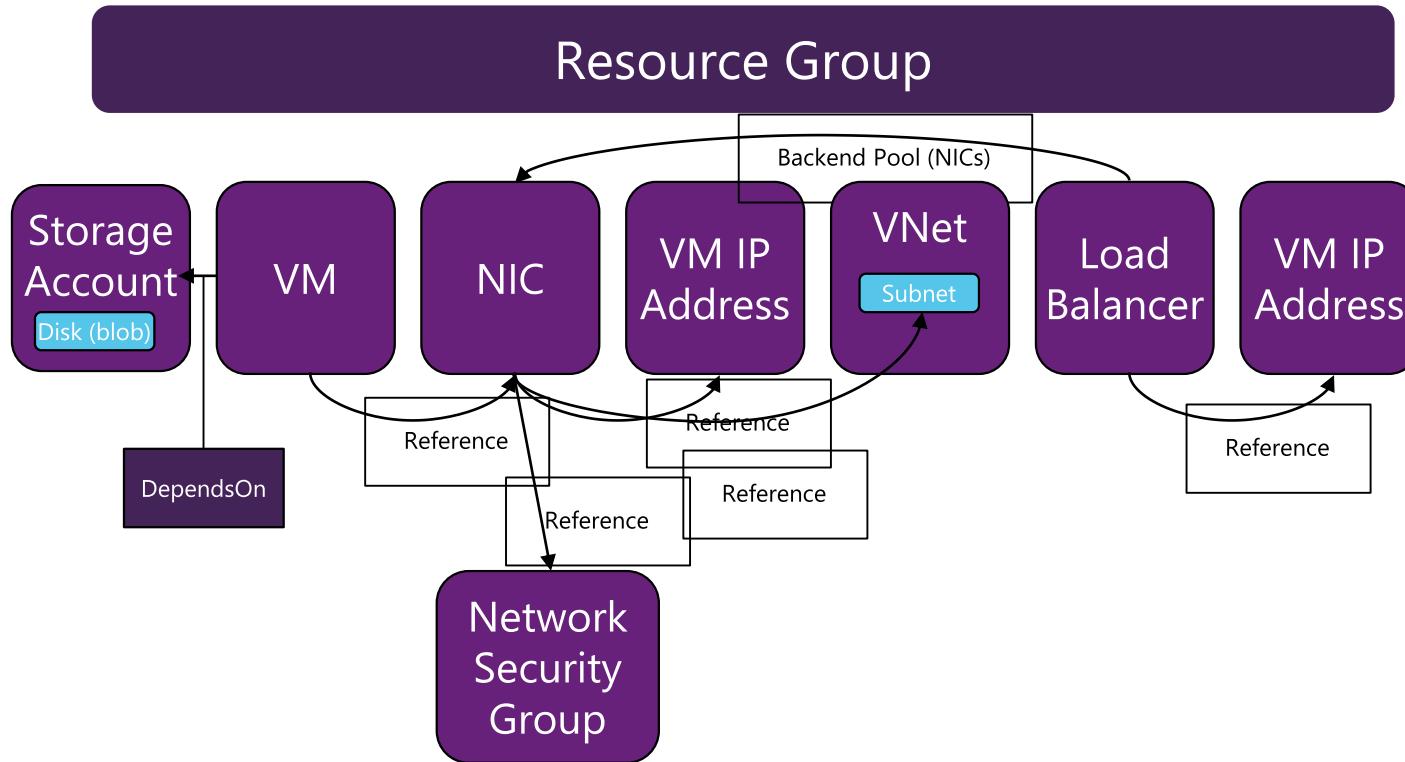
Azure Templates are:

- Source file, checked-in
- Specifies resources and dependencies (VMs, WebSites, DBs) and connections (config, LB sets)
- Parametrized input/output

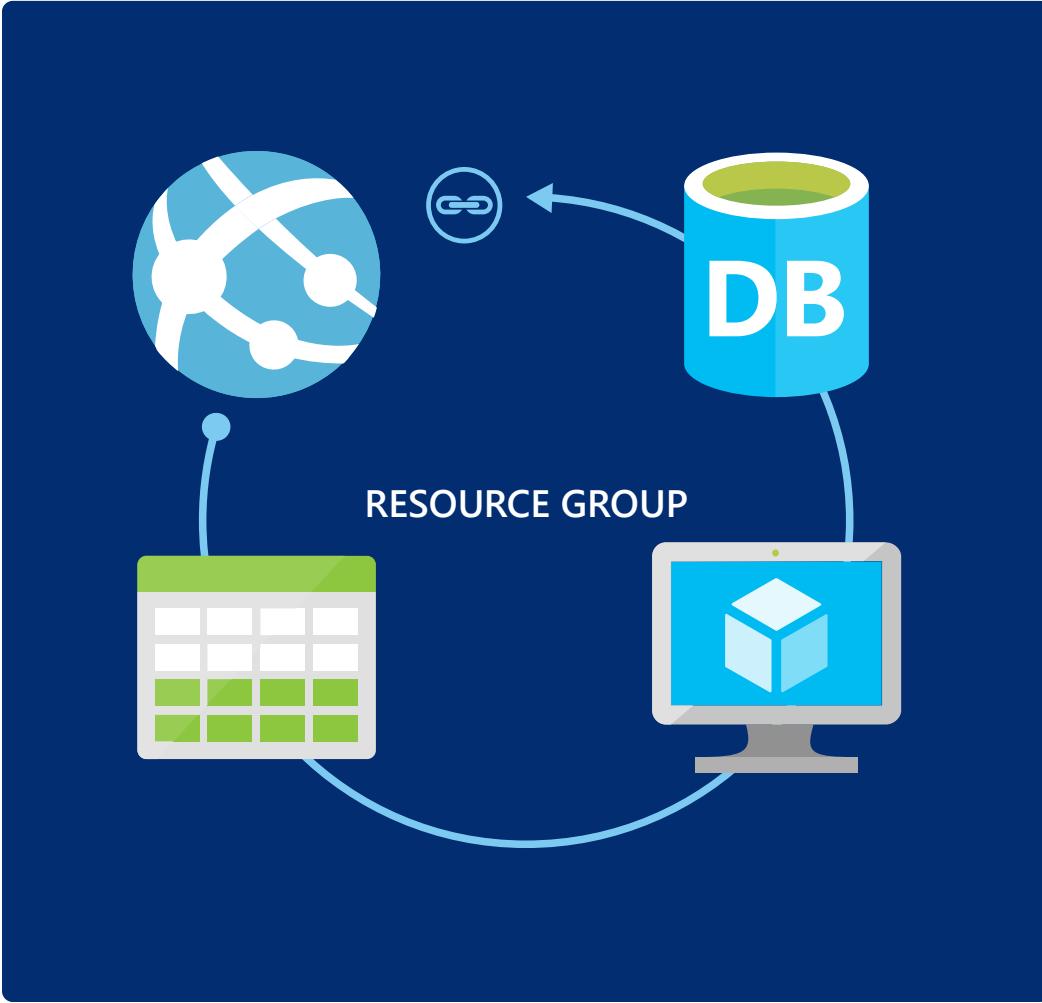


Model Structure

Resource Manager (V2)



Resource Groups



Manage resources as a single unit

Role based access and control (RBAC) on groups or resources

Billing integrated tagging on groups or resources

Why IaaS under ARM?

Role based Access Control

Enterprise grade security

Tags based billing

Superior cost management on the Cloud

Deep Integration with Azure Services

Ex: Websites with Virtual Machines

Azure Key Vault Integration

Azure Marketplace Solution templates

Regional Architecture/Isolation

Increased Subscription Scale

Increased throttling scale

Engineering Agility for features/fixes

Decoupled network model

Clean separation of compute and network concepts

Network model resembles traditional physical devices

Reduced locking semantics

Massively parallel deployment of virtual machines

Enhanced Compute Capabilities

Improved SSH Experience

3 fault domains and 20 update domains

Unified Azure Stack

One single model to interact with the Microsoft Cloud



DEMO

- Creating a Resource Group
- Deploying Resource Groups
- Managing Resource Groups in Azure Portal

Additional Resources

- [Azure Resource Manager overview](#)
- [Authoring ARM Templates](#)
- [Azure Quickstart Templates](#)



Hand-on-Lab: 7

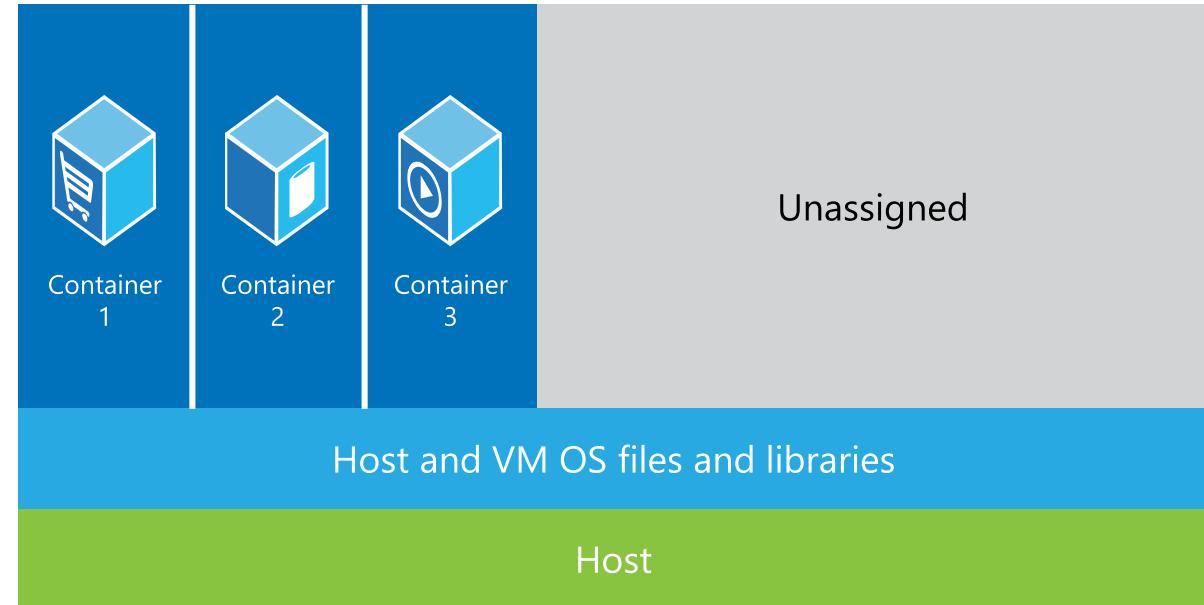
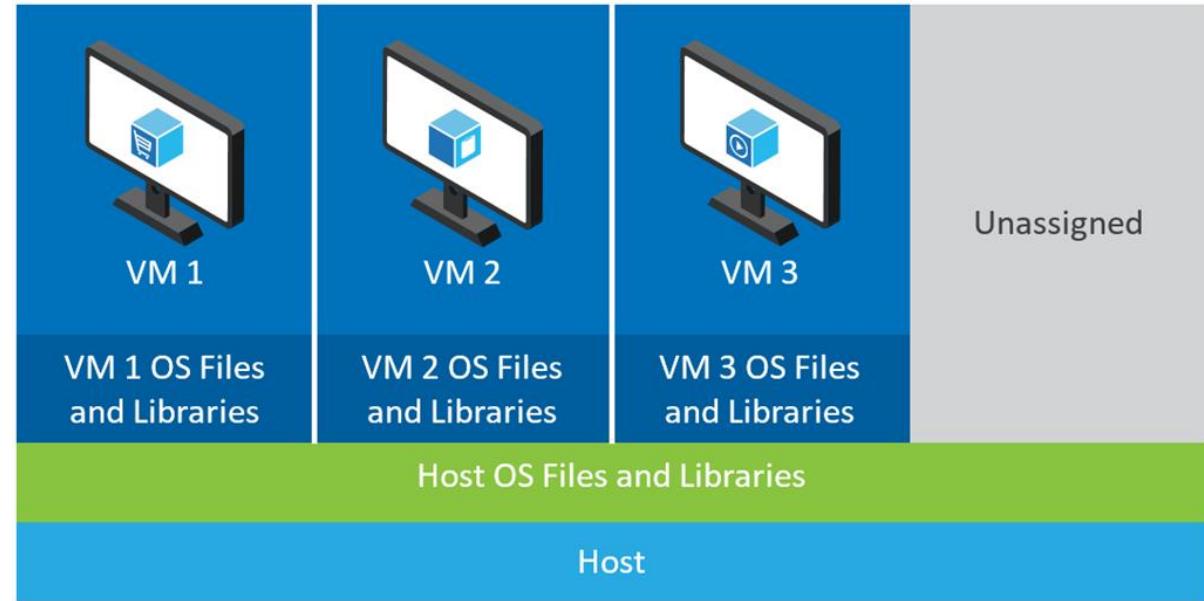
- Lab 7: <http://bit.ly/1Uvh7p5>

Using Docker to deploy your ASP.NET Core web application



What are containers?

- Virtualization technology
- Isolated and independent
- Resource governance



Containers

Technical overview

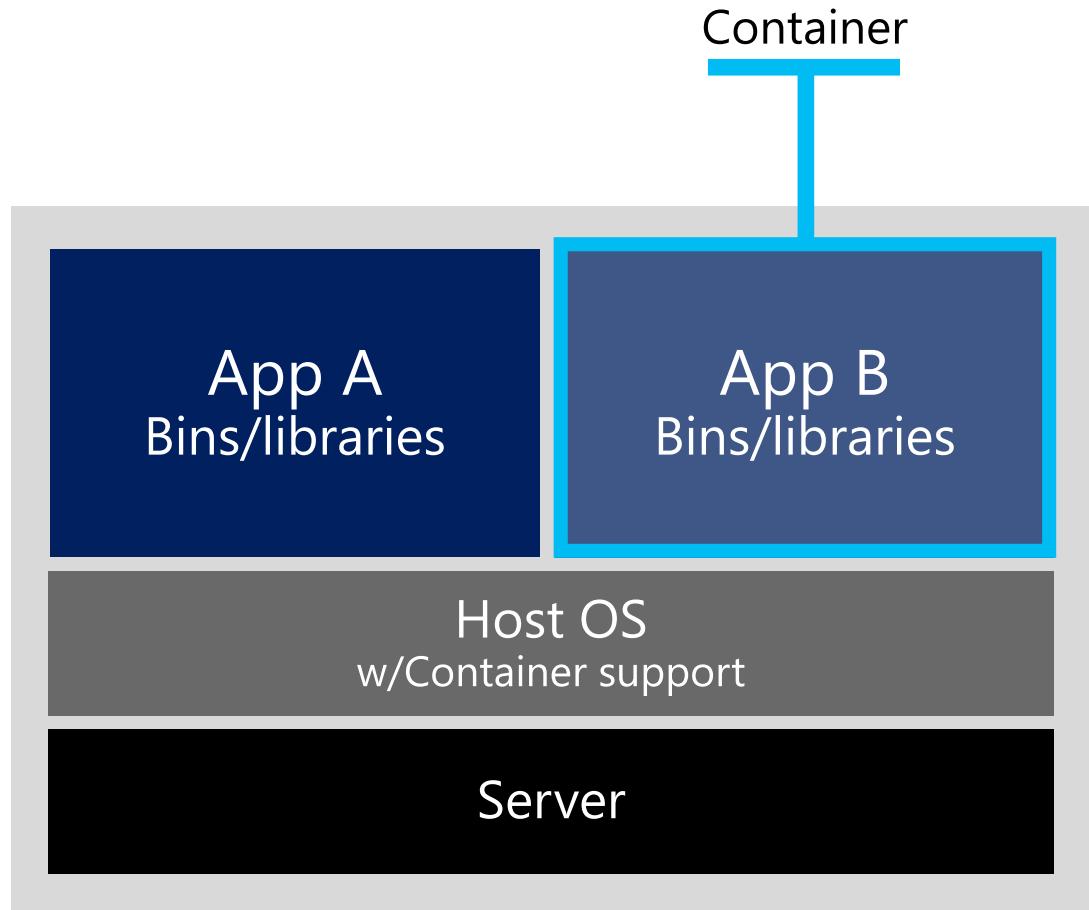
Dependencies: Every application has its own dependencies which includes both software (services, libraries) and hardware (CPU, memory, storage)

Virtualization: Container engine is a light weight virtualization mechanism which isolates these dependencies per each application by packaging them into virtual containers

Shared host OS: Processes in containers are isolated from other containers in user space, but share the kernel with the host and other containers

Flexible: Differences in underlying OS and infrastructure are abstracted away, streamlining “deploy anywhere” approach

Fast: Containers can be created almost instantly, enabling rapid scale-up and scale-down in response to changes in demand



Containers

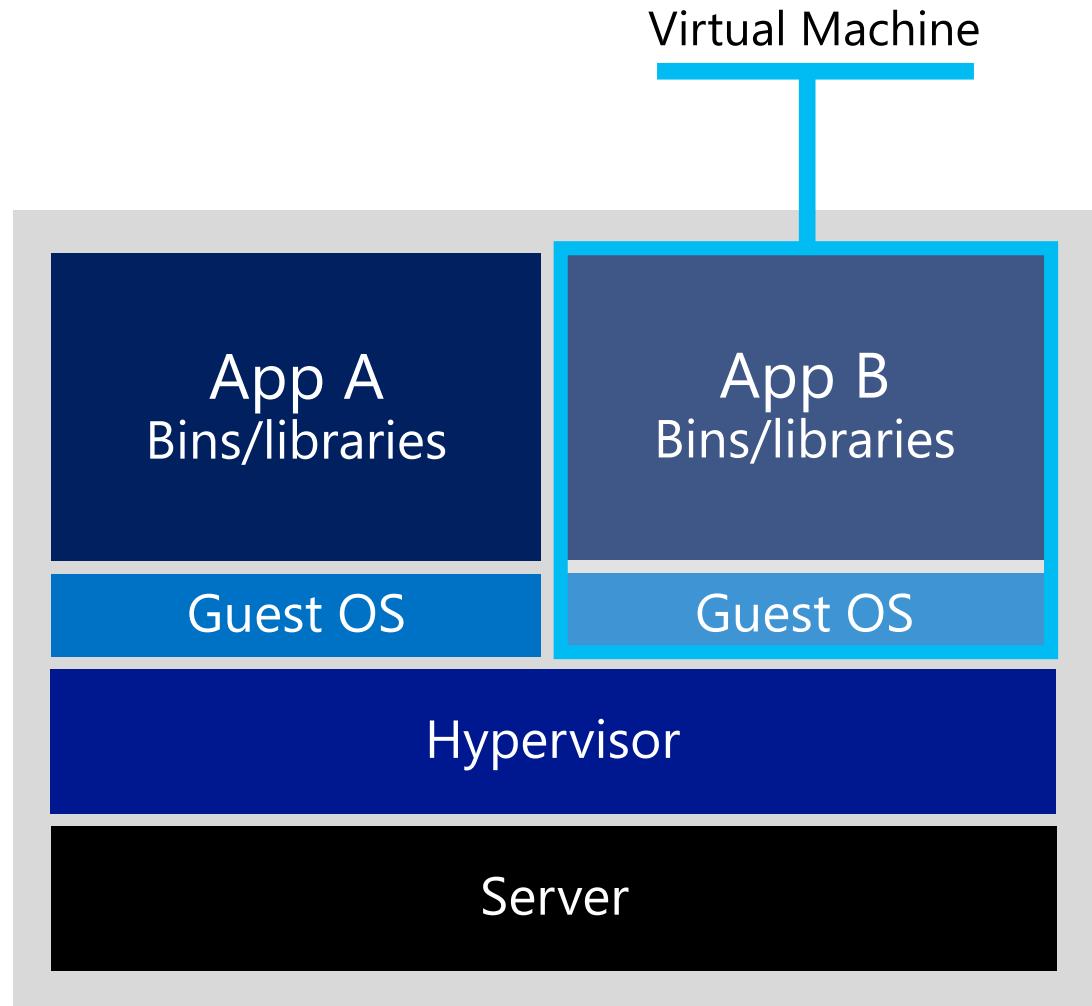
How do they differ from virtual machines?

Dependencies: Each virtualized app includes the app itself, required binaries and libraries and a guest OS, which may consist of multiple GB of data

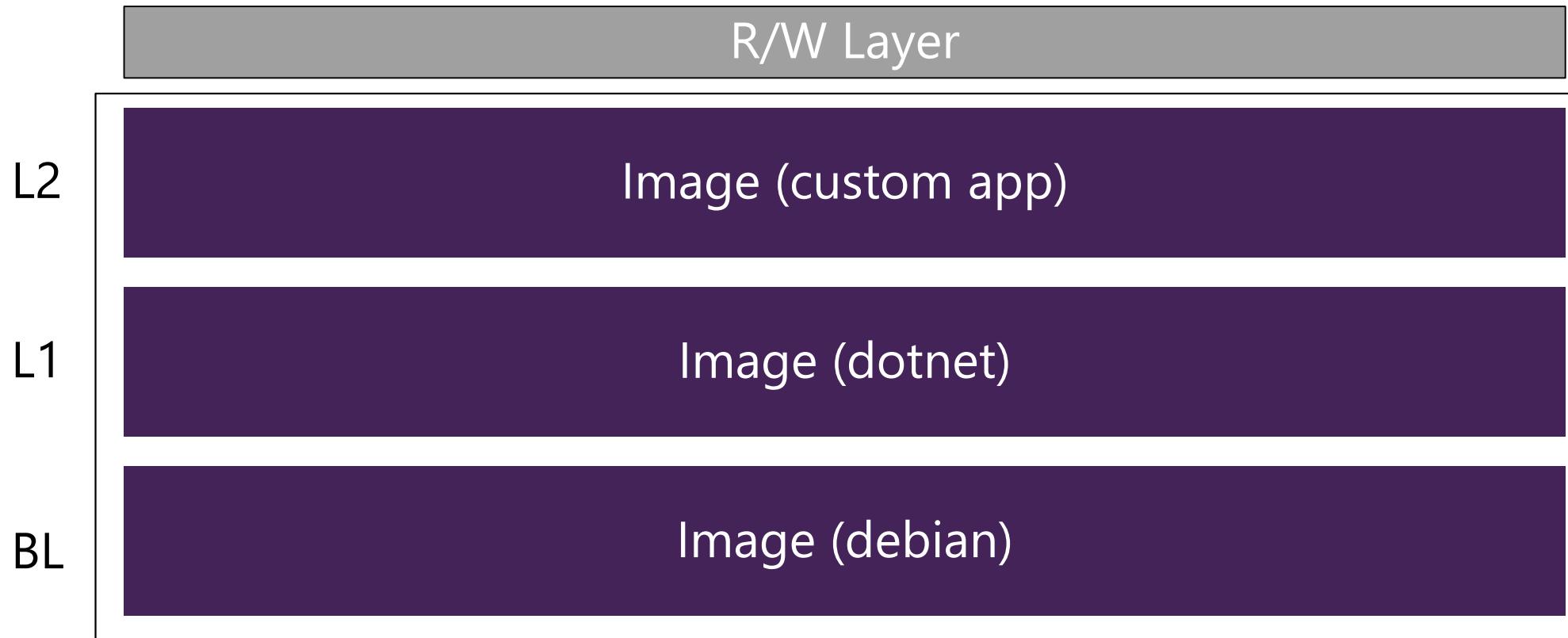
Independent OS: Each VM can have a different OS from other VMs, along with a different OS to the host itself

Flexible: VMs can be migrated to other hosts to balance resource usage and for host maintenance without downtime

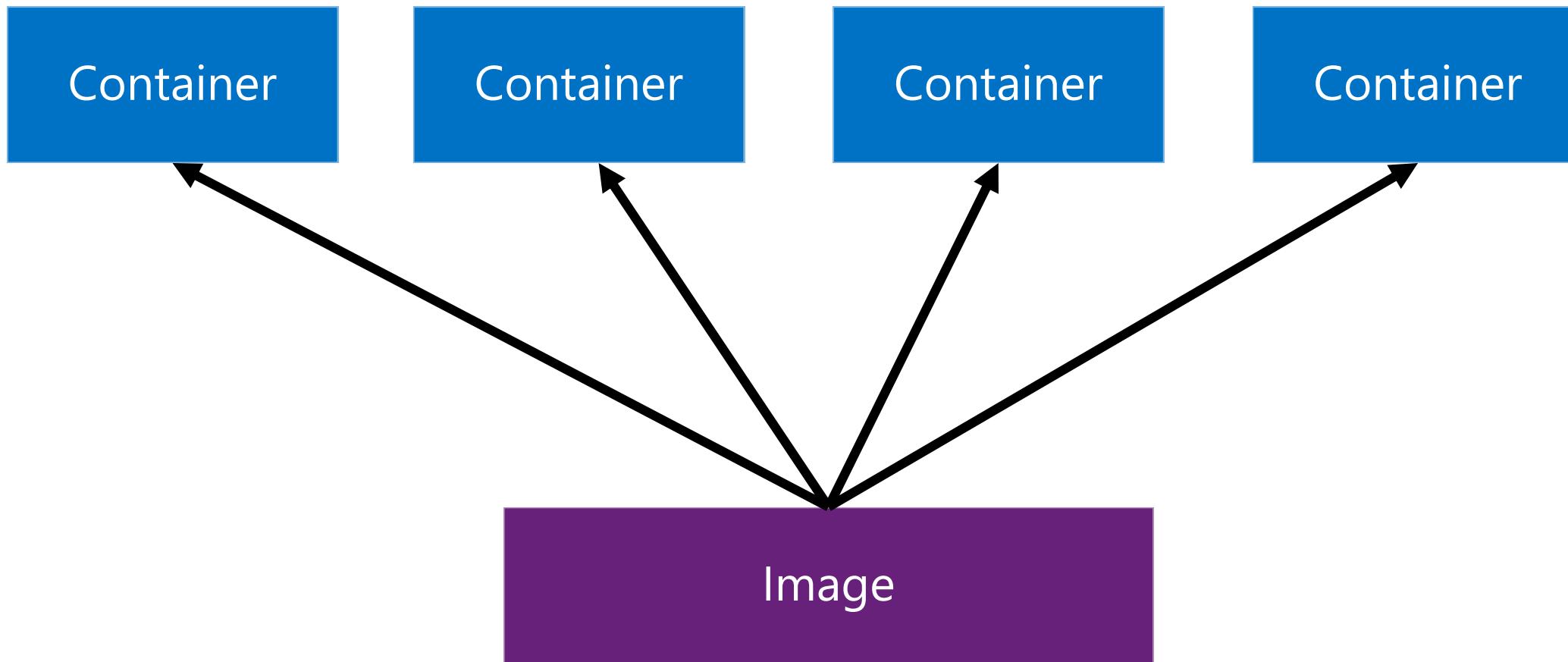
Secure: High levels of resource and security isolation for key virtualized workloads



Docker image and layers



Same image many containers



Containers and virtual machines

Deployment options suited to many scenarios



Spotlight capabilities

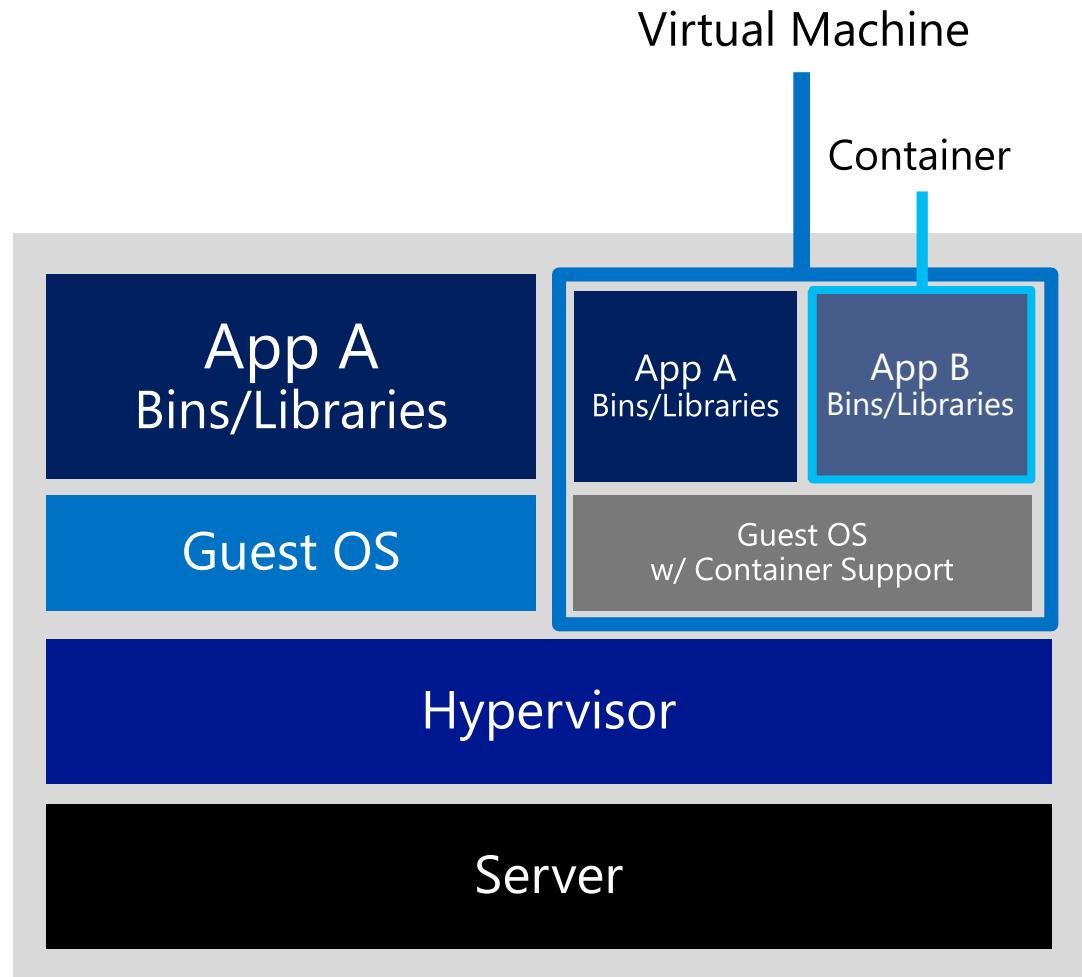
Containers in VMs: By combining containers with VMs, users can deploy multiple, different VM operating systems, and inside, deploy multiple containers within those guest OSs.

By combining containers with VMs, fewer VMs would be required to support a larger number of apps.

Fewer VMs would result in a reduction in storage consumption.

Each VM would support multiple isolated apps, increasing overall density.

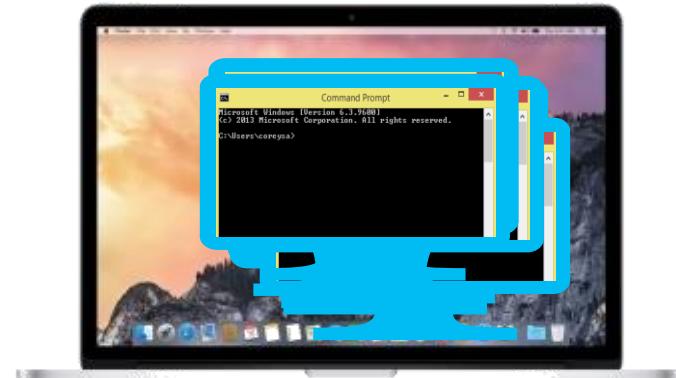
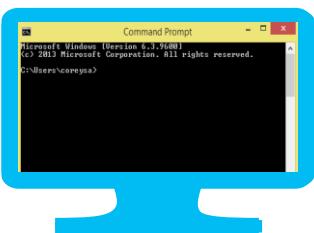
Flexible: Running containers inside VMs enables features such as live migration for optimal resource utilization and host maintenance.



Advantages of containers

Why is everyone so excited?

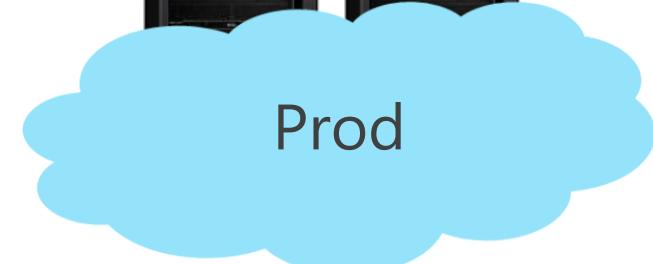
- Fast and agile!!!
- Unified deployment technology
- Unified packaging format
- Huge community



Dev



Test



Usage scenarios for containers

Where does it make sense?

- **Make dev/test/prod-cycle more productive**
 - Developers build containers, not apps
 - Containerize build-, test- and CI-tools
- **Segregation of duties**
 - Dev cares for app running in container, ops cares for managing containers
- **Microservices**
 - Isolate services
 - Consistency across stages (dev/test/prod)
- **Test even complex environments locally**
 - Containers are lightweight → run on rather small dev boxes

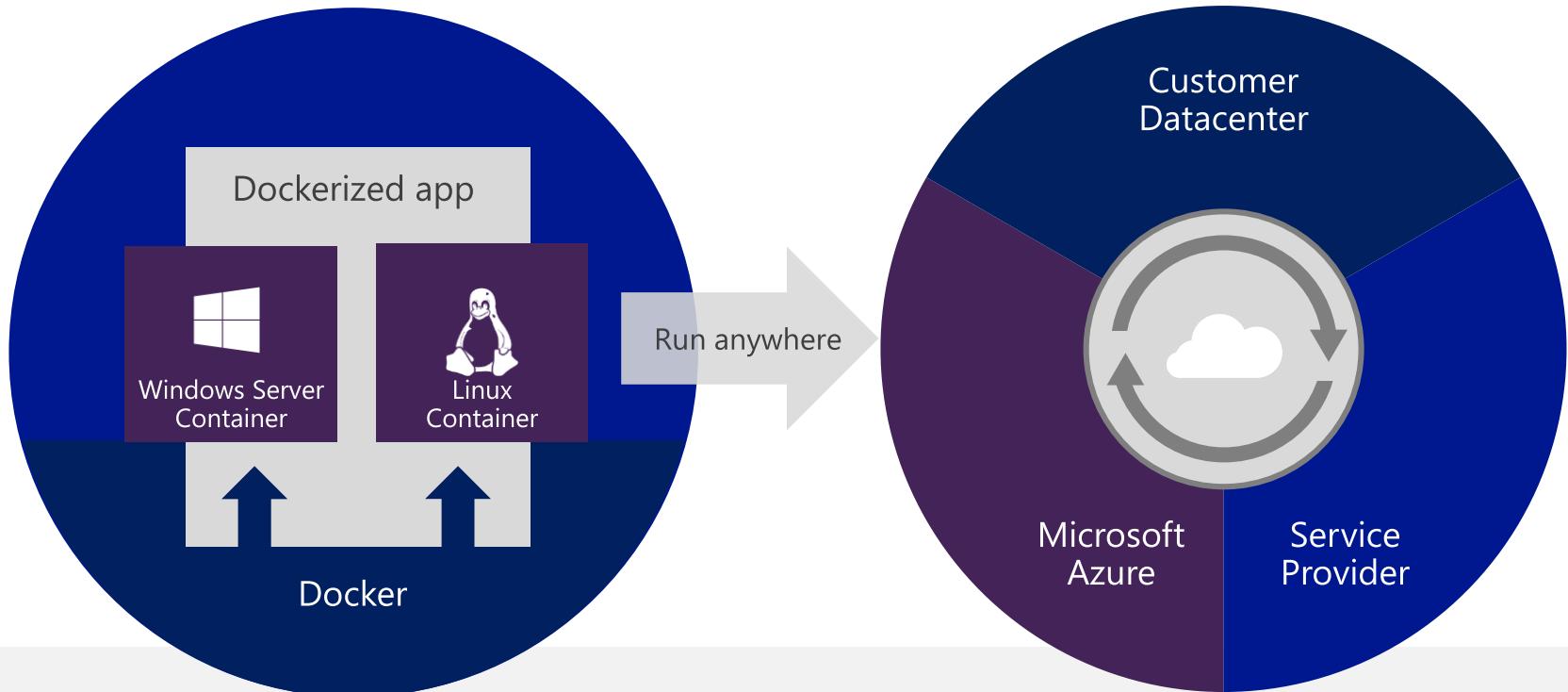
Docker integration

Joint strategic investments to drive containers forward

Docker: An open source engine that automates the deployment of any application as a portable, self-sufficient container that can run almost anywhere

Partnership: Enable the Docker toolset to manage multi-container applications using both Linux and Windows containers, regardless of the hosting environment or cloud provider

Strategic investments



Investments in the next wave of Windows Server

Open source development of the Docker Engine for Windows Server

Azure support for the Docker Open Orchestration APIs

Federation of Docker Hub images into the Azure Gallery and Portal

Docker integration

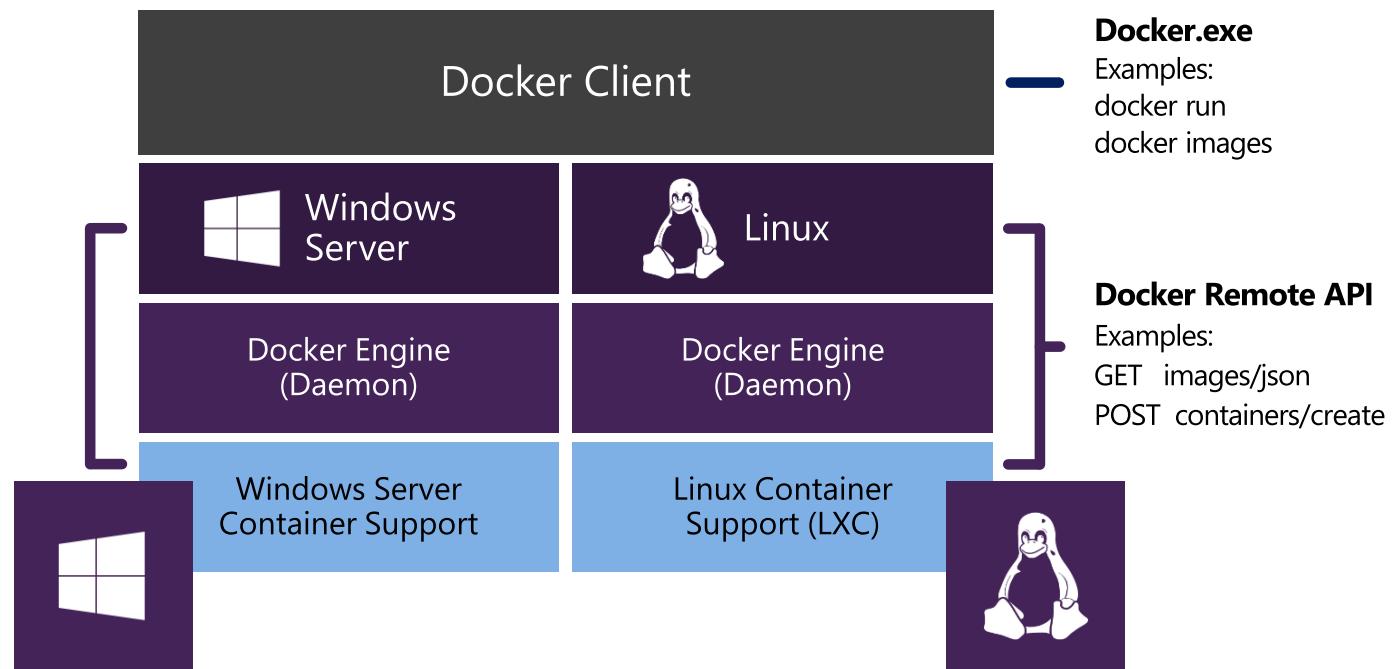
Joint strategic investments to drive containers forward

Docker Hub in Azure: Huge collection of open and curated applications available for download

Collaboration: Bring Windows Server containers to the Docker ecosystem to expand the reach of both developer communities

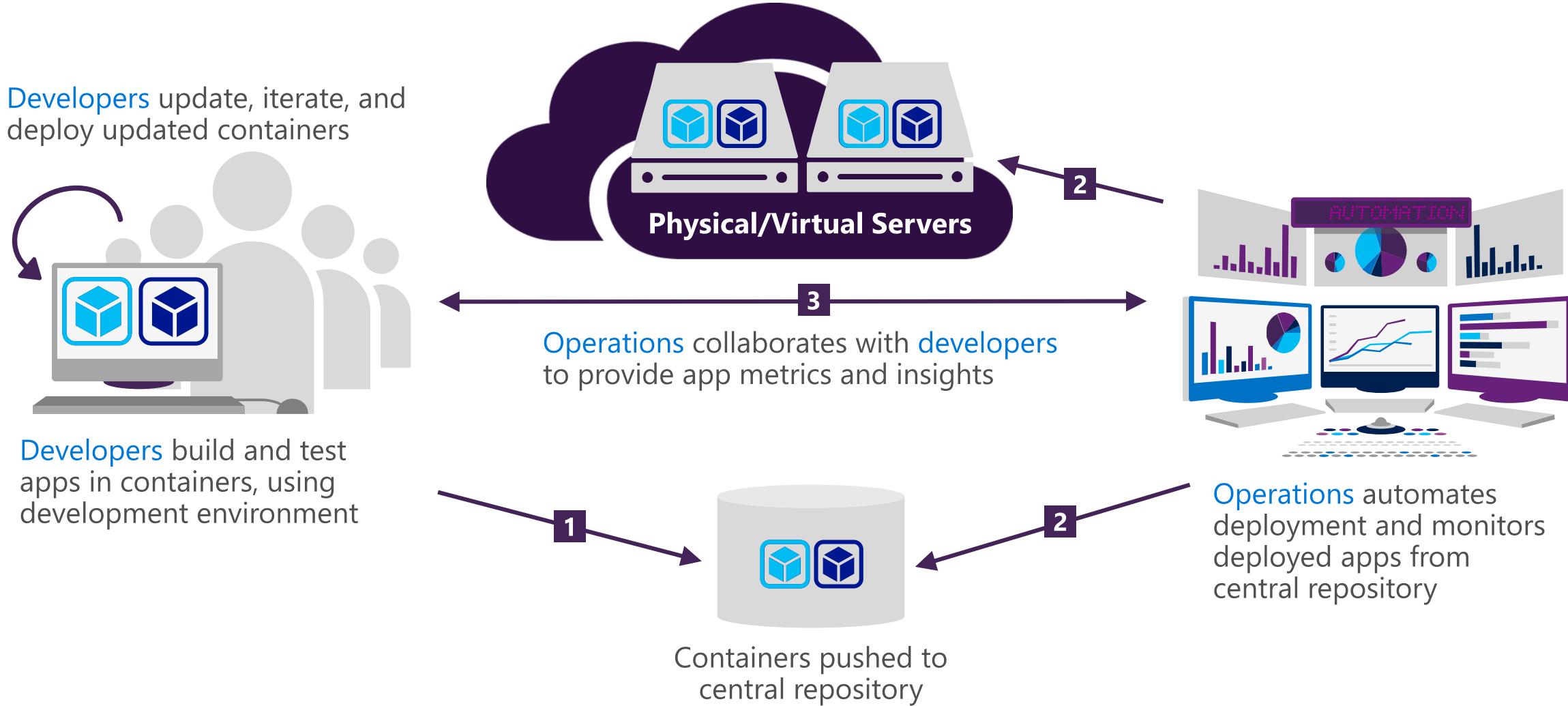
Docker Engine: Docker Engine for Windows Server containers will be developed under the aegis of the Docker open source project

Docker client: Windows customers will be able to use the same standard Docker client and interface on multiple development environments



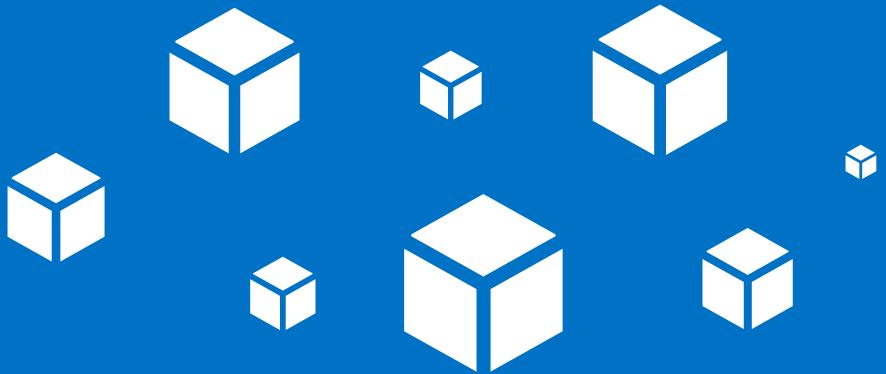
Containers

Creation, deployment and management



The DevOps experience

- Fast iteration
- Rapid deploy
- SysAdmin ease



How do you empower developers to create innovative applications at a competitive rate without disrupting IT's ability to manage servers and maintain control?



Containers

Docker Tools

Docker and Microsoft

Useful tools and hints

- Docker Toolbox

Docker environment for Windows and Mac incl. VirtualBox
Docker Machine: Support for Hyper-V and Microsoft Azure

- Container virtualization in Windows

Announced for next version of Windows Server
Windows Containers Quick Start

- Use Azure to play with Docker

Existing VM image (Docker on Ubuntu server) in Azure marketplace
Use Docker container to run Azure tools (e.g. <https://hub.docker.com/r/microsoft/azure-cli/>)

Visual Studio & Docker

Leveraging containers in VS

- Docker Extension for Visual Studio Code

<https://code.visualstudio.com/Docs/languages/dockerfile>

- Visual Studio 2015 Tools for Docker

<https://visualstudiogallery.msdn.microsoft.com/0f5b2caa-ea00-41c8-b8a2-058c7da0b3e4>

Step-by-step description for [deploying an ASP.NET Web App](#)



Demo: Docker, .NET Core and Azure

Create Docker Host
Intro Docker & .NET Core

Additional Resources

- [ASP.NET Core 1.0 Docs](#)
- [.NET Core](#)
- [Docker](#)

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