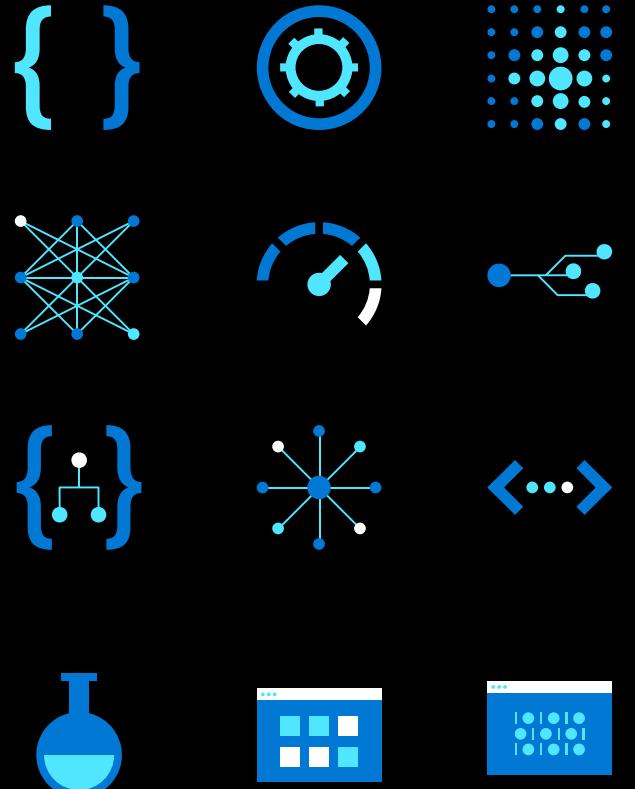


Azure Training Day

Run cloud-native apps with Azure Kubernetes Service





Deploy an app using DevOps and Kubernetes

Part 4 of 4 in the Run cloud-native apps with Azure Kubernetes Service series

About us...

Dave Burnison

 Sr. Program Manager – Azure DevOps Community Team

For questions or help with this series

MSUSDev@Microsoft.com

For the past lab guides and sample code

<https://github.com/MSUSDEV/Run-Cloud-Native-Apps-With-AKS>

For this session we will use Azure DevOps Labs

<https://AzureDevopsLabs.com>

Setting the scene



Overview of the workshop

About the workshop content...

About:

This series is the second half of a longer workshop that teaches how to build a proof of concept (POC) that will transform an existing ASP.NET-based Web application (SimplCommerce) to a container-based application. You can register to view the modules from the first half at <https://aka.ms/web-app-series> You can find all the presentations from the first half at <https://github.com/MSUSDEV/Migrating-web-apps-to-Azure>

At the end of this workshop, you will have a good understanding of container concepts, Docker architecture and operations, Azure Container Services, Azure Kubernetes Services and Azure DevOps tools.

Target Audience:

The workshop is targeted to Cloud Architects, Cloud Solution designers, developers and IT sysadmins, CIO's, CTO's and anybody else who is interested in learning about Azure, containers, application cloud migration and digital transformation.

Focus of the workshop (40%) is getting hands-on experience, complemented with presentations and whiteboard sessions (if in-person delivery).

Time Estimate:

11 hours (+/- 5 hours presentations, 6 hours of optional hands-on labs for attendees)

Workshop Agenda - Presentations

What we will talk about...

Series 1: <https://aka.ms/web-app-series>

- Module 1: Digital App Transformation with Azure
- Module 2: Running Azure Infrastructure and execute Lift & Shift Migrations
- Module 3: Performing proper assessments to smooth Azure Migrations
- Module 4: Why and how migrating databases to Azure PaaS
- Module 5: Migrating to Azure App Services – Azure Web Apps (.NET)

Series 2: <https://aka.ms/cloud-native-series>

- Module 1: Deploying Containers on Azure
- Module 2: Deploying Azure Kubernetes Services
- Module 3: Optimizing Azure Operations and Monitoring
- Module 4: Introduction to Azure DevOps **YOU ARE HERE**

Workshop Agenda – Hands On Labs

From series 1

- **Module 2: Running Azure Infrastructure and execute Lift & Shift Migrations**
Lab 1: Deploy an Azure VM Infrastructure using ARM-Templates

- **Module 3: Performing proper assessments to smooth Azure Migrations**
Lab 2: Using Azure assessment tools

- **Module 4: Why and how migrating databases to Azure PaaS**
Lab 3: Migrating SQL Databases to Azure using Database Migration Assistant

- **Module 5: Migrating to Azure App Services – Azure Web Apps (.NET)**
Lab 4: Publishing application source code to Azure Web Apps using Visual Studio 2019

Workshop Agenda – Hands On Labs

For this series 2

- **Module 1: Deploying Containers on Azure**
Lab 5: Containerizing applications using Docker and running it in Azure Container Instance and Azure WebApp for Containers
- **Module 2: Deploying Azure Kubernetes Services**
Lab 6: Deploying Azure Kubernetes Services and running containerized apps from Azure Container Registry
- **Module 3: Optimizing Azure Operations and Monitoring**
Lab 7: Monitoring and Managing your Azure deployed workloads
- **Module 4: Introduction to Azure DevOps YOU ARE HERE**
Lab 8: Deploying Azure DevOps with CI/CD Pipelines and deploy your applications to Azure WebApps, WebApp for Containers, Azure Container Instance and Azure Kubernetes Services
UPDATE: We will use Azure DevOps Labs: Continuous Integration, Continuous Delivery, CI/CD with Azure Kubernetes Services, CI/CD w/YAML

Technical Requirements

What you need...

- See appendix slides for lab dependencies, Azure DevOps Labs and / or alternate path for workshop
- Client workstation running recent Windows, Linux or Mac OS and latest internet browser
- Access to ports 80 (HTTP), 443 (HTTPS)
- Full Azure subscription ([MSDN](#), AzurePass, Paid subscription, AE, CSP,...), where you have Owner permissions on subscription level
- An Azure DevOps Organization where you can create Team Projects
- Lab consumption estimate: \$15-35

Questions and HOL support

For questions or help with this series

MSUSDev@Microsoft.com

For the past lab guides and sample code

<https://github.com/MSUSDEV/Run-Cloud-Native-Apps-With-AKS>

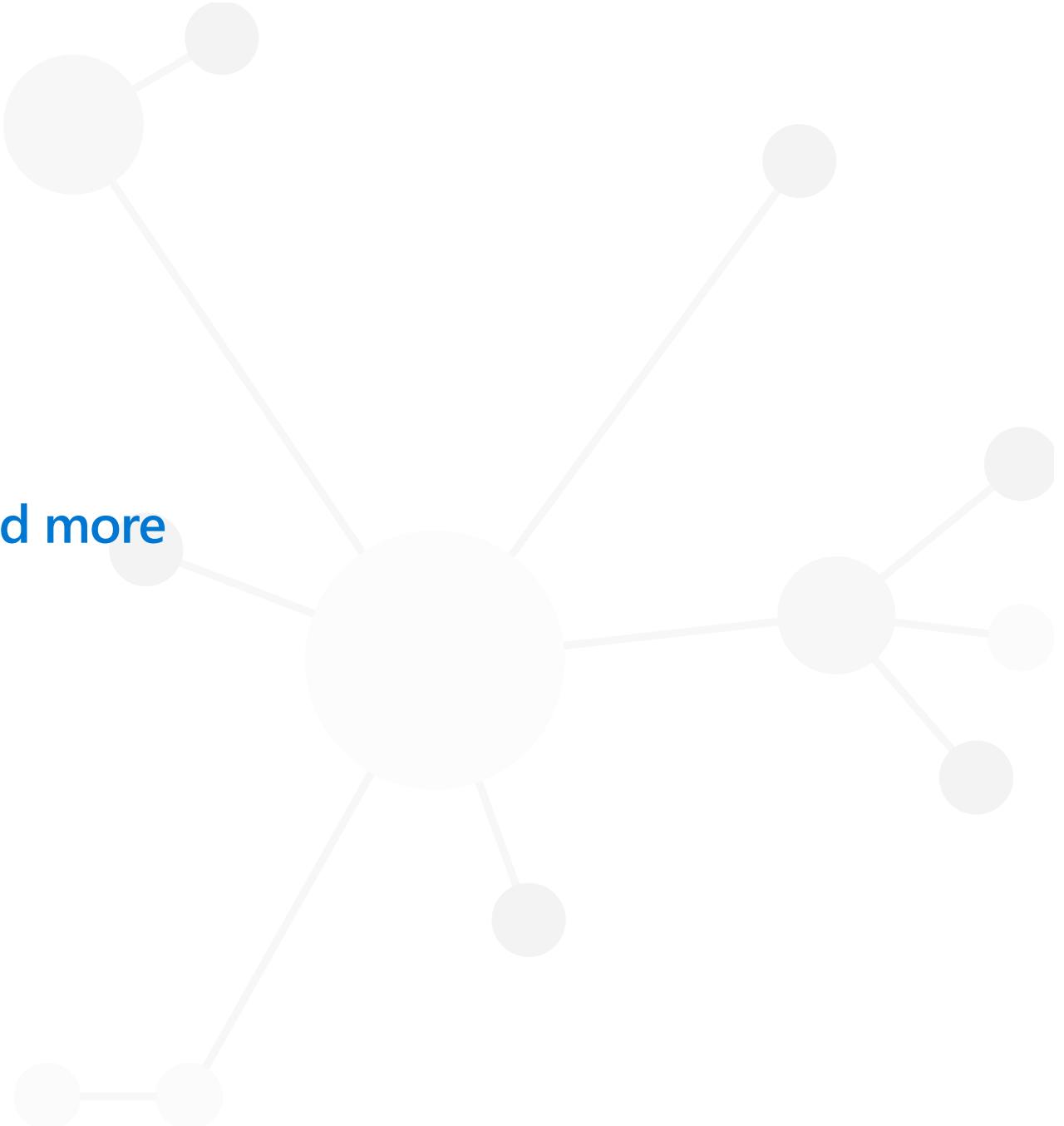
For this session we will use Azure DevOps Labs

<https://AzureDevopsLabs.com>

For information about lab dependencies and alternate approach please see the appendix slides at the end of this presentation.

Deploying applications using CI/CD... and more

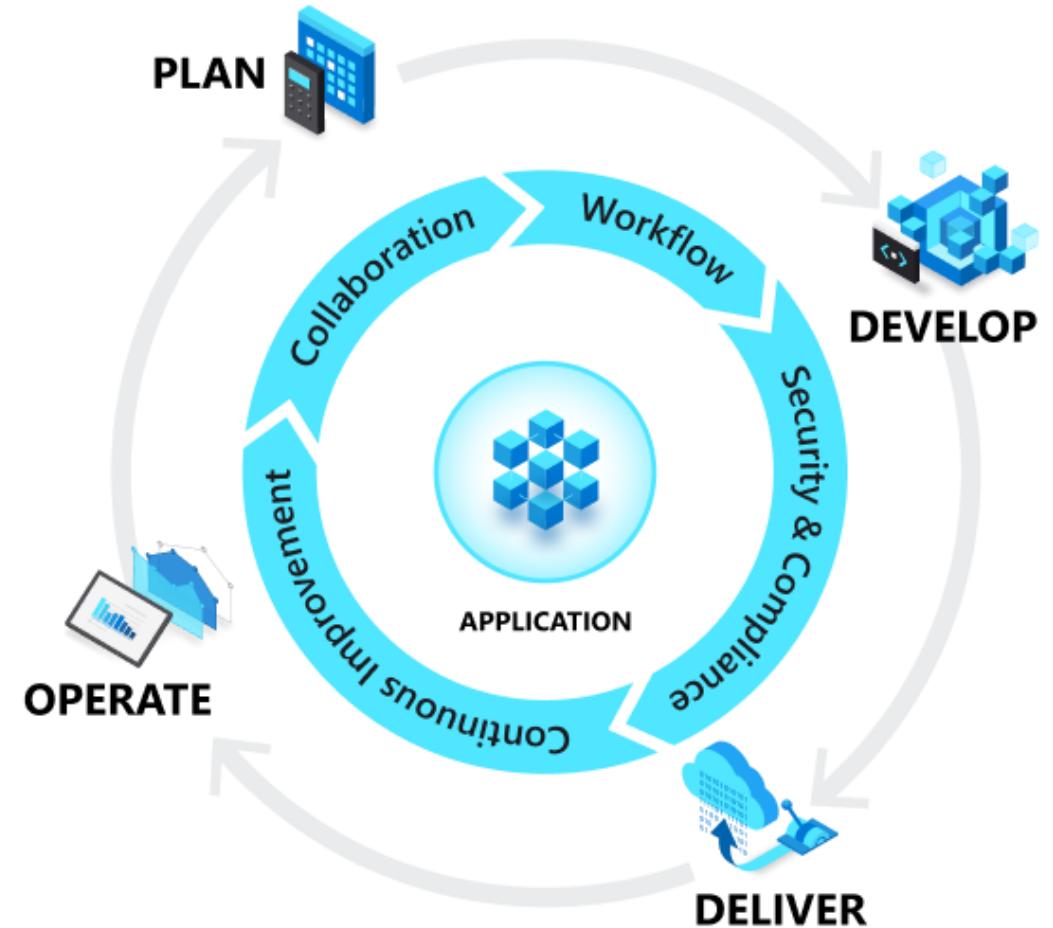
Azure DevOps



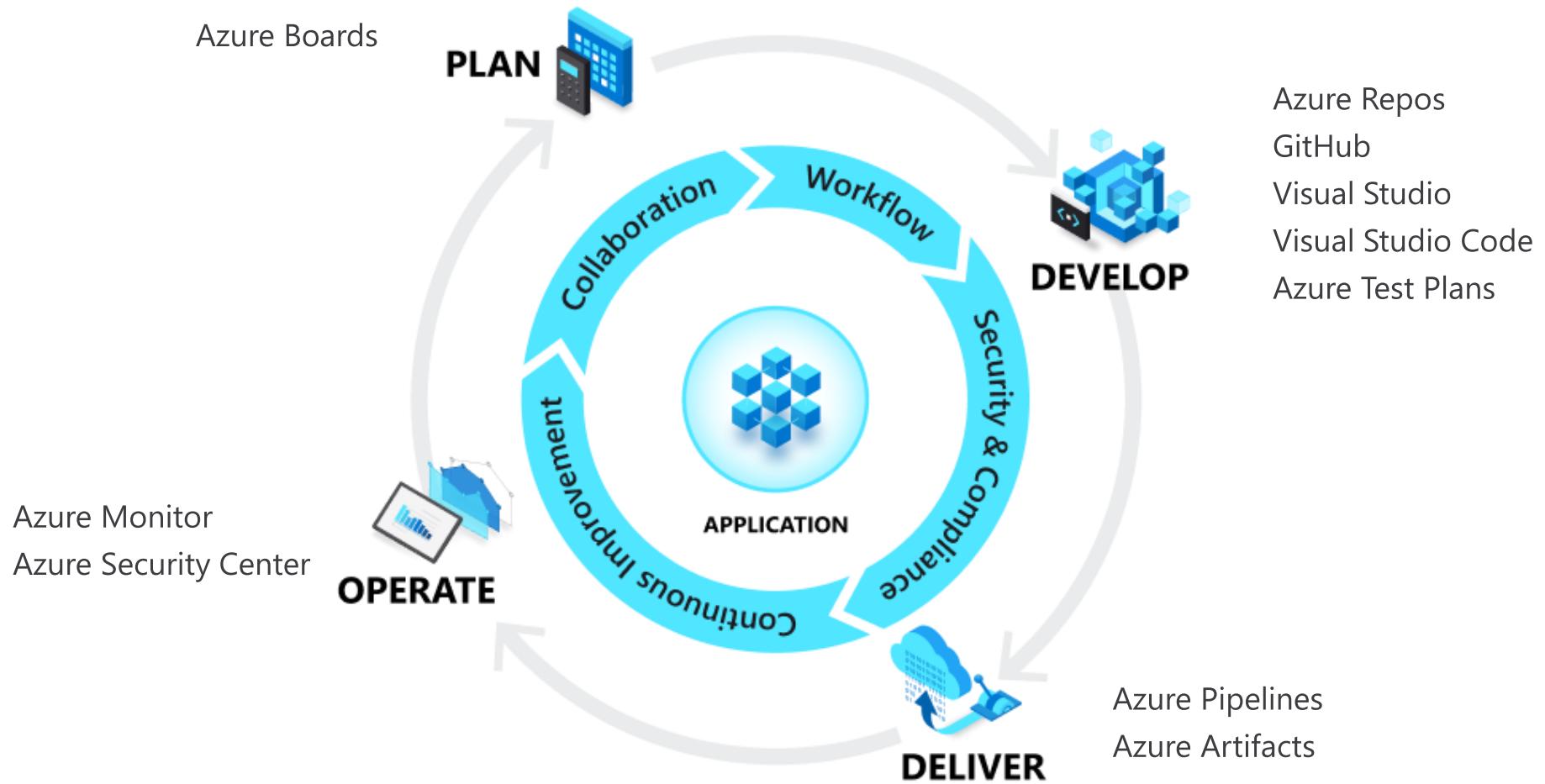
The DevOps methodology

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

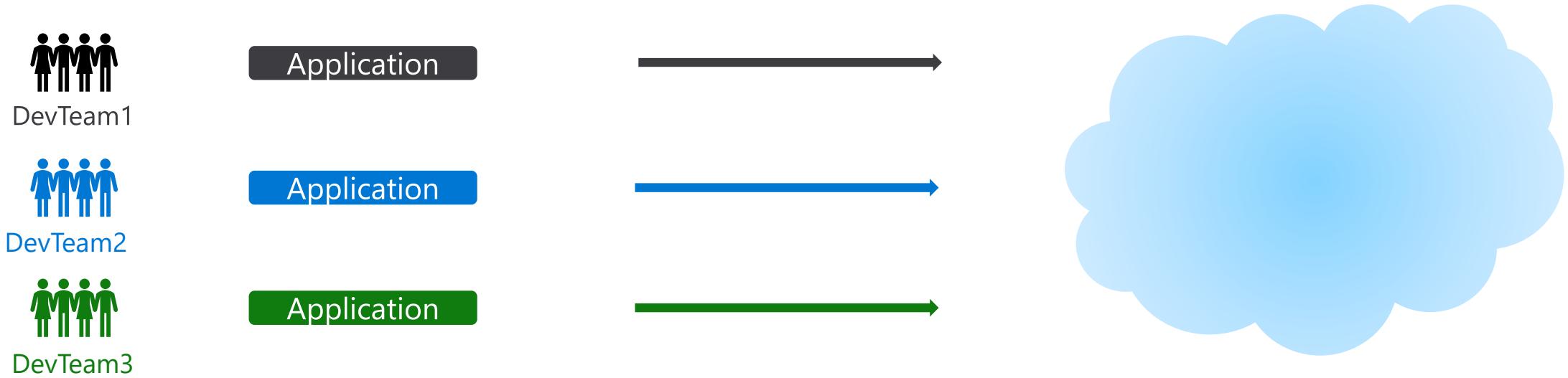
Donovan Brown, Microsoft



The DevOps Toolkit (Microsoft)



Challenge of DevOps: Different approaches, same cloud endpoint



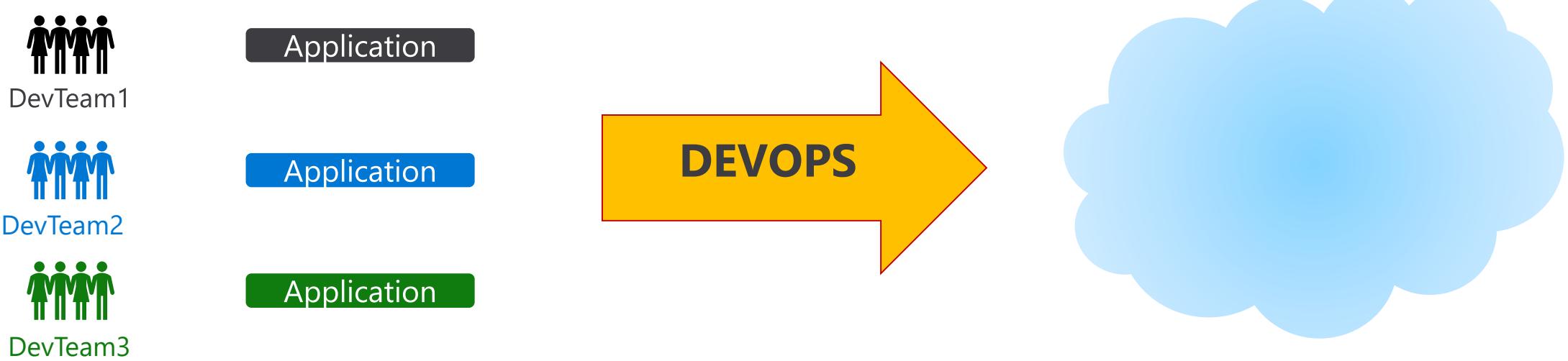
PRO's:

- DevTeams can run independently
- DevTeams are in control
- DevTeams enjoy their work

CON's:

- Different teams = different approaches
- Different teams = different results
- Operational challenges
- Security challenges

Solution of DevOps: Same approach, same toolkit, same cloud endpoint



PRO's:

- DevTeams can run independently
- DevTeams are in control
- DevTeams enjoy their work

More PRO's:

- Different teams = same approach
- Different teams = same results
- Operational benefits
- Governed and Controlled

Introducing Azure DevOps

“... Azure DevOps is a suite of products that allows any organization to do better DevOps...”



Azure Boards

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



Azure Test Plans

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



Azure Pipelines

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



Azure Artifacts

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



Azure Repos

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

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Benefits of Azure DevOps Services

- Quick Set-up
- Maintenance-free operations
- Easy collaboration across domains
- Elastic Scale
- Rock-solid security
- Access to cloud-running build and deployment servers

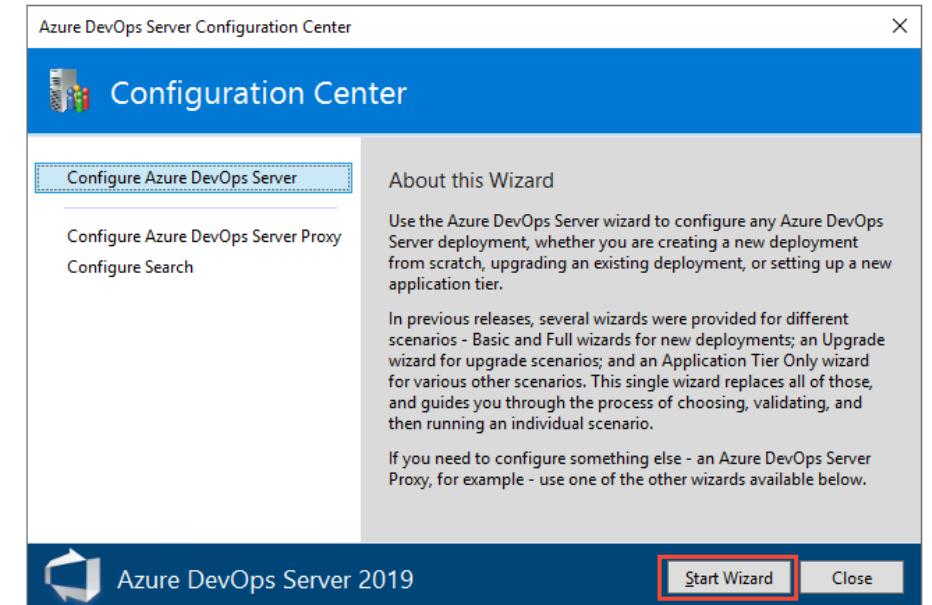
The screenshot shows the Azure DevOps Services interface for a project named 'nopdevops'. The left sidebar includes links for Overview, Summary (which is selected), Dashboards, Wiki, Boards, Repos, Pipelines, Test Plans, and Artifacts. The main content area displays the 'About this project' section with a placeholder for a project description and a 'Add Project Description' button. It also features a cartoon character running on clouds. To the right, there are sections for 'Project stats' (Last 7 days), 'Repos' (0 pull requests opened, 1 commit by 1 author), 'Pipelines' (Builds succeeded at 59%, Deployments succeeded at 69%), and 'Members' (1 member). A search bar and navigation links for pdtit, /nopdevops, /Overview, and /Summary are at the top.

Azure DevOps Server

- Simplicity of Azure DevOps from the cloud, in your on-prem datacenter
- Data always stays in your own datacenters
- Customize the Work process and tracking to meet your needs
- Azure DevOps Build Server supports both on-premises and cloud-hosted builds
- SQL Server and SQL Analysis Server can be added

- Single Server
- Dual Servers
- Multiple Servers

- Express Install Mode
- Custom Install Mode



Demo

Creating your first Azure DevOps Project

Introducing Azure DevOps

“... Azure DevOps is a suite of products that allows any organization to do better DevOps, where you can choose which products you use...”



JIRA

If you do development tracking with Jira instead of Azure Boards, fine, **Azure Devops totally integrates with it, see [Azure Pipelines for Jira](#)**



Azure Test Plans

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



Azure Pipelines

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



Azure Artifacts

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



Git / GitHub

If you don't want to use Azure Repos, fine, use Git / GitHub instead; **Azure DevOps totally integrates with it, see [Azure Pipelines in the GitHub Marketplace](#)**

Main benefit
is the
openness

Azure Boards

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



Drag & Drop Sprint Planning

Flexible work item tracking, using comprehensive traceability to have the perfect environment to manage your development projects and processes



Scrum-ready

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



Integration with GitHub

Boost your teams productivity with Boards, Backlogs and Sprints for easy or most complex projects. Connect your GitHub Repo to Azure Boards and start linking commits and PRs to work items

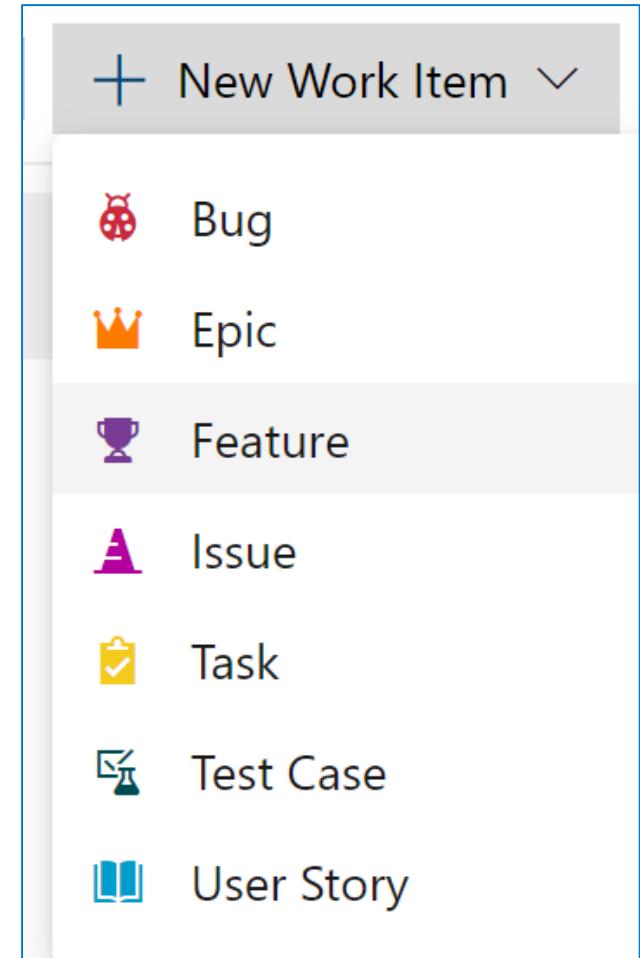
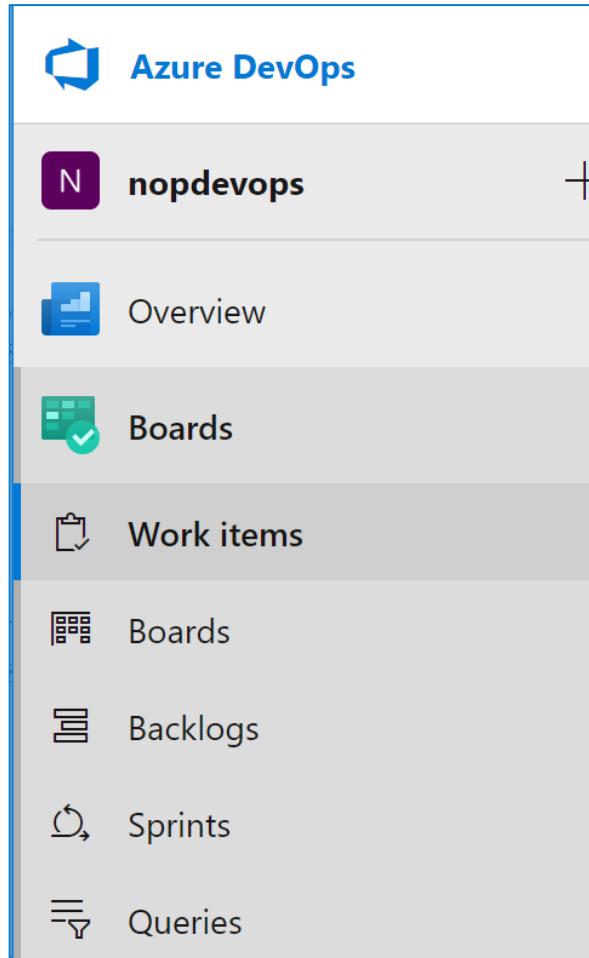
The screenshot shows the Azure DevOps interface for the 'FabrikamFiber' project under 'AdventureWorks Mobile'. The left sidebar includes links for Overview, Boards, Work Items, Backlogs, Sprints, Queries, Plans, Repos, Pipelines, Test Plans, and Artifacts. The main area is titled 'FabrikamFiber Board' and displays a Kanban board with several columns: 'New', 'Active', '5/5', 'Staging', and '15/5'. The 'Active' column contains 5 items, and the 'Staging' column contains 15 items. Each item card includes a title, a small icon, the assignee's name, and a brief description. For example, one item is 'Home page (selected room)' assigned to 'Carlos Slattery'.



<https://azure.com/boards>

Azure Boards

- Work Items
- Boards
- Backlogs
- Sprints
- Queries



Demo

Azure Boards

Azure Repos

Cloud-hosted, unlimited private Git Repositories for your projects



Support for any Git Client

Securely connect with and push code into your Git Repos from any IDE, editor or Git Client



Collaborate to build better code

Perform more effective Git code reviews with threaded discussion and continuous integration for each change. Use forks to promote collaboration with inner source workflows



Protect your code with branches

Keep code quality high by requiring signoff, successful builds, and passing tests before pull requests can be merged. Customize your branch policies to maintain your team's standards

The screenshot shows the Azure DevOps interface for the AdventureWorks Mobile project. The left sidebar includes links for Overview, Boards, Repos (which is selected), Files, Commits, Pushes, Branches, Tags, and Pipelines. The main content area is titled 'Pull requests' and shows a list of pull requests categorized by assignee: 'Created by me', 'Assigned to me', and 'Assigned to my team'. Each pull request card displays the author's name, the title of the PR, and a brief description.

Category	Pull Request	Description
Created by me	Initialize client with .client.init	Celeste Burton requested #238 into master
	Use latest React version	Celeste Burton requested #230 into features/react-update
Assigned to me	Check returned identity for null status	Colin Ballinger requested #212 into master
	[WIP] Add tests for reticulating splines	Robin Counts requested #221 into master
	Add exception mappings for disconnect	Colin Ballinger requested #249 into master
Assigned to my team	Maintain folder structure when converting isomorphs	Robin Counts requested #234 into master
	Testing configuration settings	Robin Counts requested #239 into master
	Hotfix payload to Orion	Robin Counts requested #201 into releases/orion



<https://azure.microsoft.com/en-us/services/devops/repos/>

Demo

Azure Repos

Azure Pipelines

Cloud-hosted pipelines for Linux, Windows and macOS.



Any language, any platform, any cloud

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



Extensible

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



Containers and Kubernetes

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

The screenshot shows the Azure DevOps Pipelines interface for the AdventureWorks Mobile project. It displays three parallel jobs: a Windows Job (Running, 1m 53s), a Linux Job (Running, 3m 29s), and a macOS Job (Running, 3m 07s). The Linux Job is currently selected, showing its detailed steps: Prepare job, Initialize job, Get sources, Cmdline, Nodetool, and Install dependencies. The log output for the Linux job shows the command sequence:

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

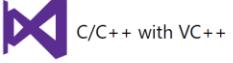
+ Done in 4.89s.
$ node ./postinstall
[#] 2/2 removed './adventureworks/extensions/node_modules/typescript/lib/tsc.js'
removed './adventureworks/extensions/node_modules/typescript/lib/tsserverlibrary.d.ts'
removed './adventureworks/extensions/node_modules/typescript/lib/tsserverlibrary.js'
removed './adventureworks/extensions/node_modules/typescript/lib/typescri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



<https://azure.com/pipelines>

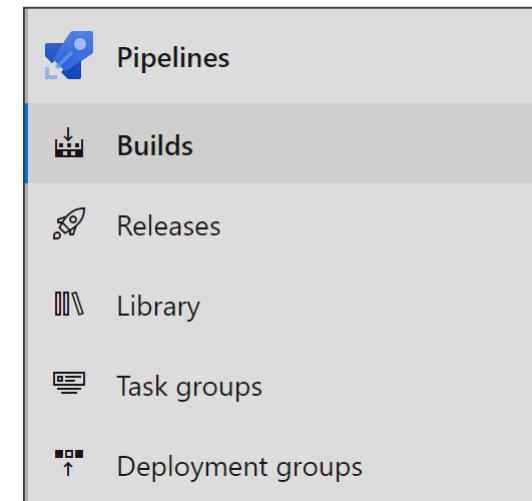
Running a Build with Azure DevOps Pipelines

- Supporting multiple languages
- Prerequisites:
 - A GitHub Account
 - An Azure DevOps Organization
 - Application Source Code
- Based on your source code, Azure DevOps Pipelines “recognizes” the capabilities
- The output of the Pipelines process is a “Azure-Pipelines.yml” file



Building a Pipeline for .NET Core applications

1. New Build Pipeline



Building a Pipeline for .NET Core applications

1. New Build Pipeline

2. Select Source Control environment

Connect Select Configure Review

New pipeline

Where is your code?

-  Azure Repos Git YAML
Free private Git repositories, pull requests, and code search
-  Bitbucket Cloud YAML
Hosted by Atlassian
-  GitHub YAML
Home to the world's largest community of developers
-  GitHub Enterprise Server YAML
The self-hosted version of GitHub Enterprise
-  Other Git
Any generic Git repository
-  Subversion
Centralized version control by Apache

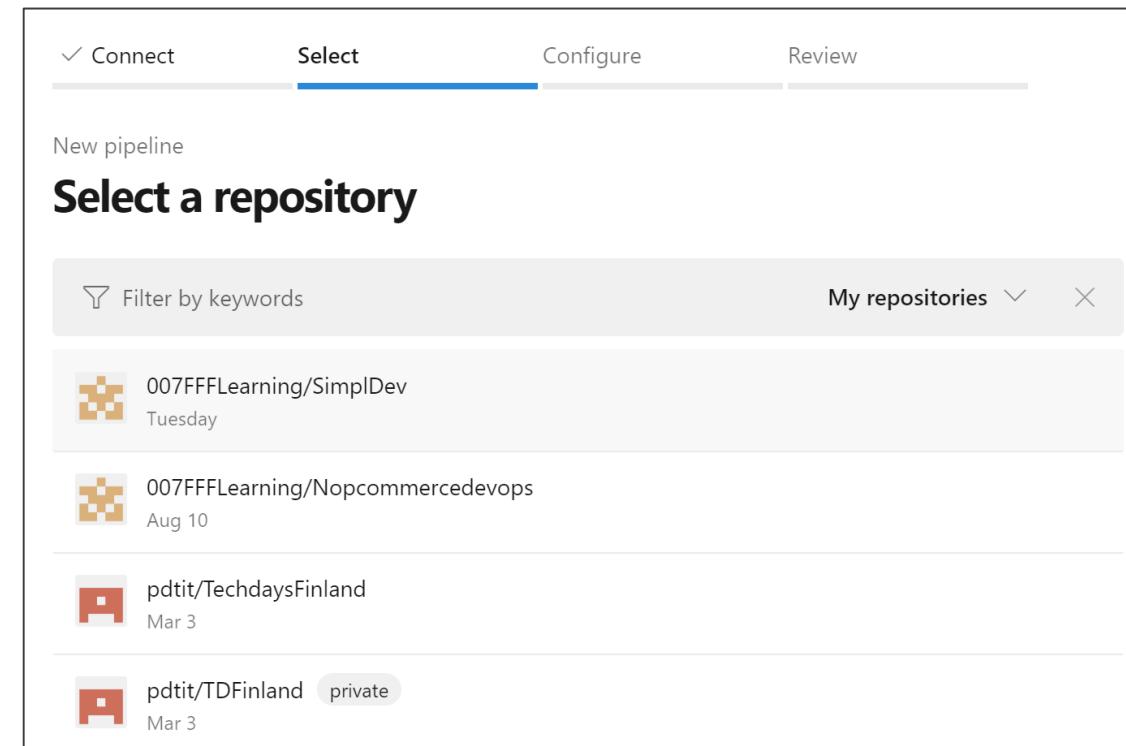
[Use the classic editor](#) to create a pipeline without YAML.

Building a Pipeline for .NET Core applications

1. New Build Pipeline

2. Select Source Control environment

3. Select Repo



Building a Pipeline for .NET Core applications

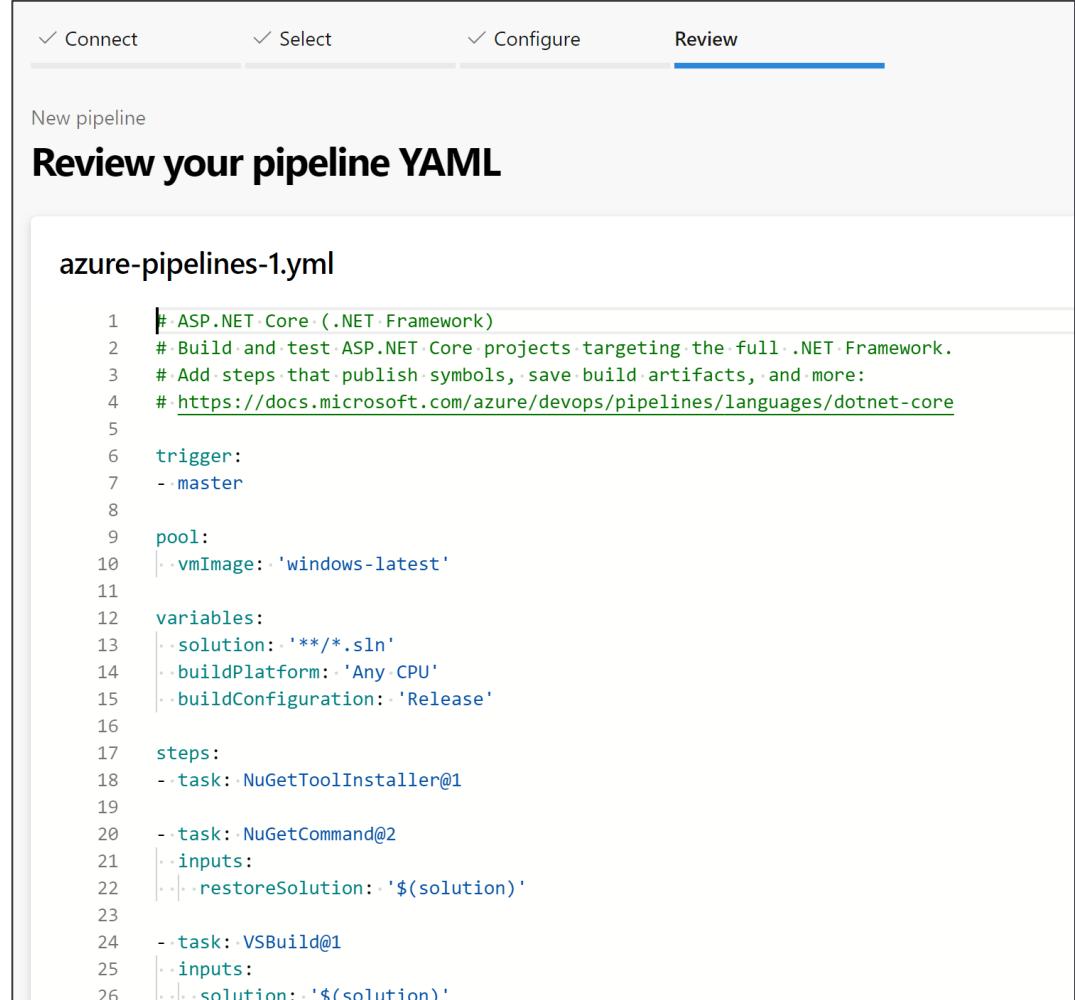
1. New Build Pipeline
2. Select Source Control environment
3. Select Repo
4. Azure Pipelines analyzes the source code, and provides “options” for Build

The screenshot shows the 'Configure your pipeline' step in the Azure Pipelines setup process. The top navigation bar includes 'Connect', 'Select', 'Configure' (which is underlined in blue), and 'Review'. The main area is titled 'Configure your pipeline' and displays a list of build options:

- ASP.NET: Build and test ASP.NET projects.
- .NET Core: Build and test ASP.NET Core projects targeting the full .NET Framework.
- .NET Desktop: Build and run tests for .NET Desktop or Windows classic desktop solutions.
- Universal Windows Platform: Build a Universal Windows Platform project using Visual Studio.
- Xamarin.Android: Build a Xamarin.Android project.
- Xamarin.iOS: Build a Xamarin.iOS project.
- Node.js: Build a general Node.js project with npm.
- Node.js Express Web App to Linux on Azure: Build a Node.js Express app and deploy it to Azure as a Linux web app.
- Node.js with Vue: Build a Node.js project that uses Vue.
- Node.js with webpack: Build a Node.js project using the webpack CLI.

Building a Pipeline for .NET Core applications

1. New Build Pipeline
2. Select Source Control environment
3. Select Repo
4. Azure Pipelines analyzes the source code, and provides “options” for Build
5. This results in a “Azure-pipelines.yml” file



The screenshot shows the Azure Pipelines interface at the 'Review' step of creating a new pipeline. The title bar includes '✓ Connect', '✓ Select', '✓ Configure', and 'Review'. Below the title, it says 'New pipeline' and 'Review your pipeline YAML'. The YAML file is titled 'azure-pipelines-1.yml' and contains the following code:

```
1 # ASP.NET Core (.NET Framework)
2 # Build and test ASP.NET Core projects targeting the full .NET Framework.
3 # Add steps that publish symbols, save build artifacts, and more:
4 # https://docs.microsoft.com/azure/devops/pipelines/languages/dotnet-core
5
6 trigger:
7 - master
8
9 pool:
10 - vmImage: 'windows-latest'
11
12 variables:
13 - solution: '**/*.sln'
14 - buildPlatform: 'Any CPU'
15 - buildConfiguration: 'Release'
16
17 steps:
18 - task: NuGetToolInstaller@1
19
20 - task: NuGetCommand@2
21 - inputs:
22   - restoreSolution: '$(solution)'
23
24 - task: VSBuild@1
25 - inputs:
26   - solution: '$(solution)'
```

Building a Pipeline for .NET Core applications

1. New Build Pipeline
2. Select Source Control environment
3. Select Repo
4. Azure Pipelines analyzes the source code, and provides “options” for Build
5. This results in a “Azure-pipelines.yml” file
6. Create and Run your Build

Linux
Pool: Hosted Ubuntu 1604 · Agent: Hosted Agent

✓	Prepare job · succeeded
✓	Initialize job · succeeded
✓	Checkout · succeeded
✓	DotNetCoreInstaller · succeeded
✓	dotnet build · succeeded
✓	run tests · succeeded
✓	Publish Test Results **/*.trx · succeeded
✓	Post-job: Checkout · succeeded
✓	Finalize Job · succeeded

Demo

Using Azure Pipelines to create your Build

- Source Code to Web Apps
- Source Code to Docker Container

Running a Release with Azure DevOps Pipelines

- Supporting multiple languages
- Start from a template, or blank
- Based on a Pipeline build artifact, or other sources
- Single or multi-staged release scenarios

Featured



Azure App Service deployment

Deploy your application to Azure App Service. Choose from Web App on Windows, Linux, containers, Function Apps, or WebJobs.



Deploy a Java app to Azure App Service

Deploy a Java application to an Azure Web App.



Deploy a Node.js app to Azure App Service

Deploy a Node.js application to an Azure Web App.



Deploy a PHP app to Azure App Service and Azure Database for MySQL

Deploy a PHP application to an Azure Web App and database to Azure Database for MySQL.



Deploy a Python app to Azure App Service and Azure database for MySQL

Deploy a Python Django, Bottle, or Flask application to an Azure Web App and database to Azure Database for MySQL.



Deploy to a Kubernetes cluster

Deploy, configure, update your containerized applications to a Kubernetes cluster.



IIS website and SQL database deployment

Deployment Group: Deploy ASP.NET or ASP.NET Core web applications to an IIS Website and SQL database on physical or virtual machines (VM).

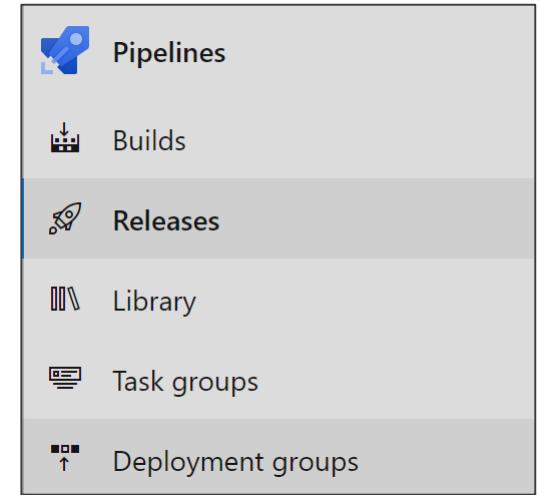
Others



Azure App Service deployment with continuous monitoring

Configuring a Release Pipeline for .NET Core applications

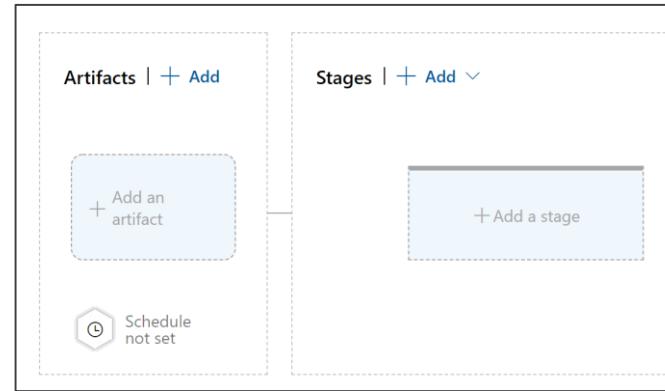
1. New Release Pipeline



Configuring a Release Pipeline for .NET Core applications

1. New Release Pipeline

2. Select Artifacts



Add an artifact

Source type

Build	Azure Repos ...	GitHub	TFVC
Azure Artifacts	GitHub Relea...	Azure Contai...	Docker Hub
Jenkins			

Configuring a Release Pipeline for .NET Core applications

1. New Release Pipeline
2. Select Artifacts
3. Define a Stage Template

Featured



Azure App Service deployment

Deploy your application to Azure App Service. Choose from Web App on Windows, Linux, containers, Function Apps, or WebJobs.



Deploy a Java app to Azure App Service

Deploy a Java application to an Azure Web App.



Deploy a Node.js app to Azure App Service

Deploy a Node.js application to an Azure Web App.



Deploy a PHP app to Azure App Service and Azure Database for MySQL

Deploy a PHP application to an Azure Web App and database to Azure Database for MySQL.



Deploy a Python app to Azure App Service and Azure database for MySQL

Deploy a Python Django, Bottle, or Flask application to an Azure Web App and database to Azure Database for MySQL.



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Deploy, configure, update your containerized applications to a Kubernetes cluster.



IIS website and SQL database deployment

Deployment Group: Deploy ASP.NET or ASP.NET Core web applications to an IIS Website and SQL database on physical or virtual machines (VM).

Others



Azure App Service deployment with continuous monitoring

Configuring a Release Pipeline for .NET Core applications

1. New Release Pipeline
2. Select Artifacts
3. Define a Stage Template
4. Complete Stage Template parameters

Stage name
Stage 2

Parameters ⓘ | [Unlink all](#)

Azure subscription * [Manage](#)

007FFFLearning Labs (0a407898-c077-442d-8e17-71420aa82426) [▼](#) [↻](#)

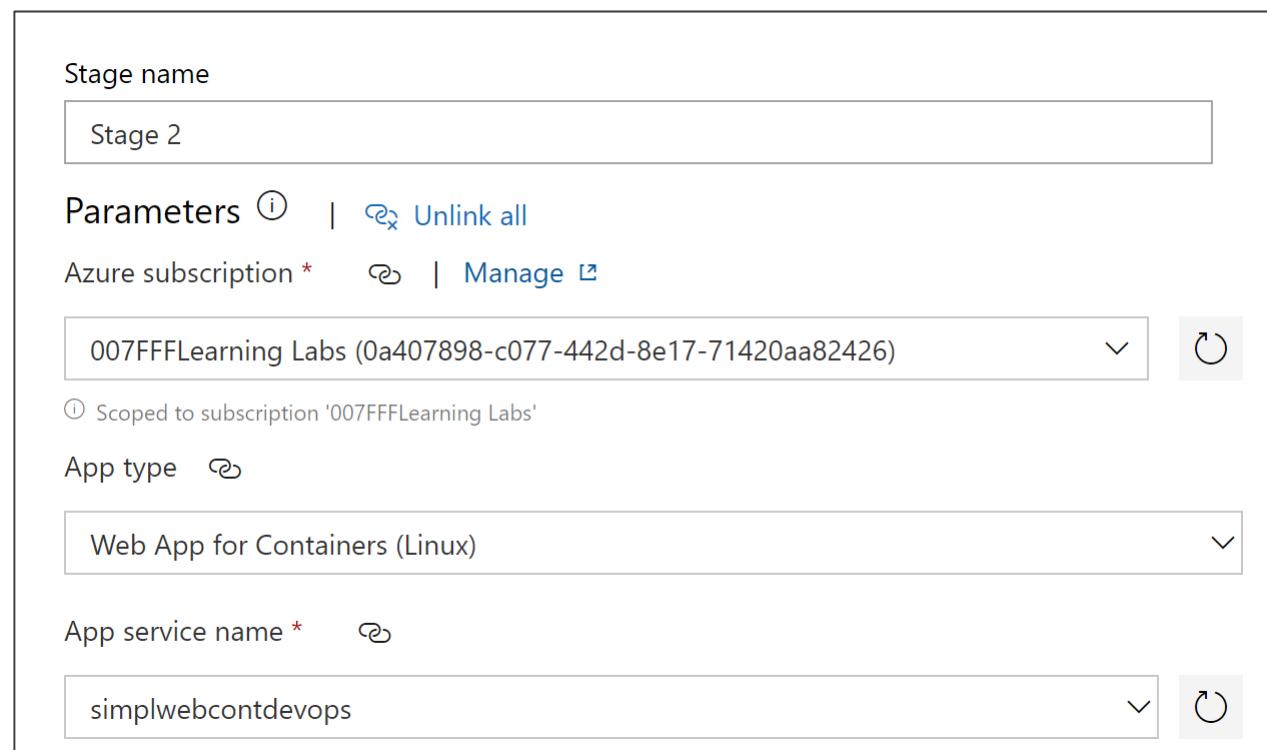
ⓘ Scoped to subscription '007FFFLearning Labs'

App type [Manage](#)

Web App for Containers (Linux) [▼](#) [↻](#)

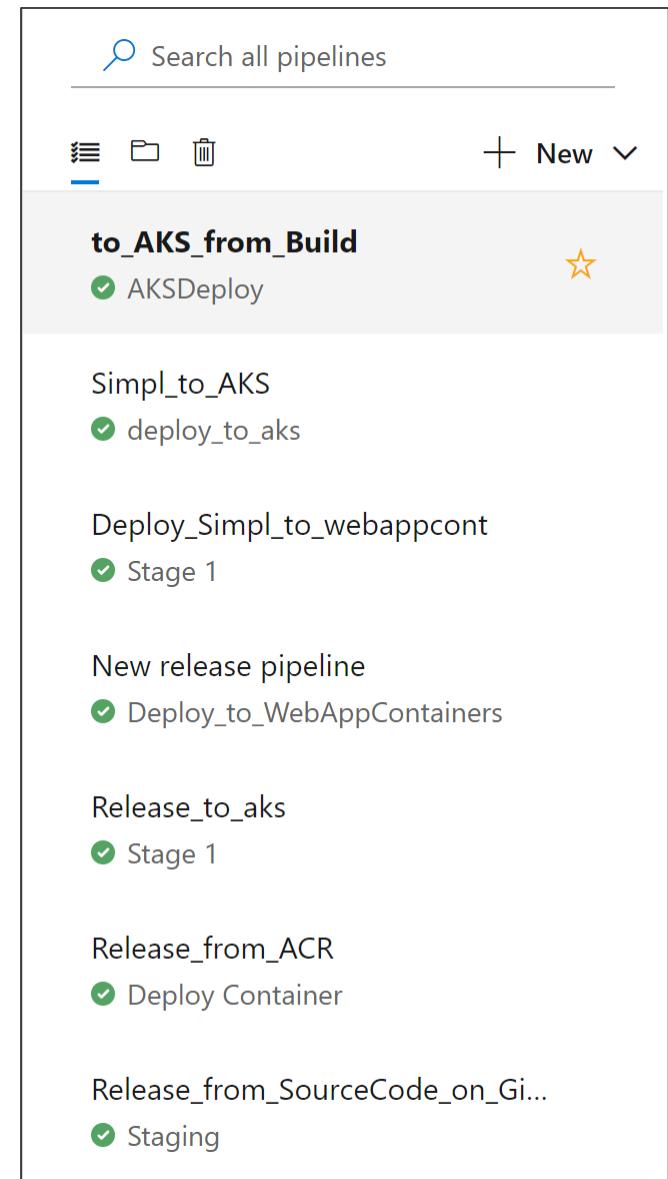
App service name * [Manage](#)

simplwebcontdevops [▼](#) [↻](#)

The screenshot shows the 'Stage Template' configuration screen in the Azure DevOps interface. It's titled 'Stage 2'. Under 'Parameters', there's a link to 'Unlink all'. An 'Azure subscription' dropdown is set to '007FFFLearning Labs (0a407898-c077-442d-8e17-71420aa82426)' with a refresh icon. A note says it's 'Scoped to subscription '007FFFLearning Labs''. The 'App type' is set to 'Web App for Containers (Linux)'. The 'App service name' field contains 'simplwebcontdevops'.

Configuring a Release Pipeline for .NET Core applications

1. New Release Pipeline
2. Select Artifacts
3. Define a Stage Template
4. Complete Stage Template parameters
5. Save & Run



Demo

Using Azure Pipelines to create your Release

- From source code Build to Azure WebApps
- From source container to AKS
- From source code Build to Azure WebApps using YAML

Monitoring a Release Pipeline for .NET Core applications

- Full details of each step in the Release process
- Succeeded / Failed
- Duration of the Pipeline

The screenshot shows the Azure DevOps interface for monitoring a release pipeline. The top navigation bar includes 'Pipeline', 'Tasks', 'Variables', 'Logs' (which is underlined, indicating it's the active tab), 'Tests', and buttons for 'Deploy', 'Cancel', 'Refresh', 'Download all logs', 'Edit', and more.

The main area displays the 'Deployment process' status as 'Succeeded'. A specific step, 'Run on agent', is expanded, showing its details. This step was also successful ('Succeeded').

The expanded 'Run on agent' section shows the following log entries:

- Initialize job · succeeded
- Azure Web App on Container Deploy: contnopwebapp · succeeded
- Finalize Job · succeeded

Monitoring a Release Pipeline for .NET Core applications

- Full details of each step in the Release process

```
✓ Initialize job
1 2019-08-11T18:16:38.0429690Z ##[section]Starting: Initialize job
2 2019-08-11
3 2019-08-11
4 2019-08-11
5 2019-08-11
6 2019-08-11
7
8
9
10
11
12
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26

✓ Azure Web App on Container Deploy: contnopwebapp
1 2019-08-11T18:16:40.7798636Z ##[section]Starting: Azure Web App on Container Deploy: contnopwebapp
2 2019-08-11T18:16:41.0218887Z =====
3 2019-08-11T18:16:41.0219066Z Task      : Azure Web App for Containers
4 2019-08-11T18:16:41.0219314Z Description : Deploy containers to Azure App Service
5 2019-08-11T18:16:41.0219368Z Version   : 1.0.20
6 2019-08-11T18:16:41.0219430Z Author    : Microsoft Corporation
7 2019-08-11T18:16:41.0219492Z Help     : https://docs.microsoft.com/azure/devops/pipelines/tasks/deploy/azure-rm-web-app-containers
8 2019-08-11T18:16:41.0219597Z =====
9 2019-08-11T18:16:42.4716693Z Got service connection details for Azure App Service: 'contnopwebapp'
10 2019-08-11T18:16:42.7336601Z Single-container Deployment to the webapp 'contnopwebapp' as only the image detail was specified.
11 2019-08-11T18:16:43.1923367Z Updating App Service Configuration settings. Data: {"appCommandLine":null,"linuxFxVersion":"DOCKER|nopacr1.azurecr.io/nopcom
12 2019-08-11T18:16:45.1027927Z Updated App Service Configuration settings
13
14
15
16
17
18
19
20
21
22
23
24
25
26

✓ Finalize Job
1 2019-08-11T18:16:53.6649998Z ##[section]Starting: Finalize Job
2 2019-08-11T18:16:53.6694180Z Start cleaning up orphan processes.
3 2019-08-11T18:16:53.6754539Z ##[section]Finishing: Finalize Job
4
```

Demo

Monitoring Azure Pipelines

Azure Test Plans

Test and Ship with confidence using manual and exploratory testing tools



Test across web and desktop

Test your application by executing tests across different environments, from web apps to different desktop applications



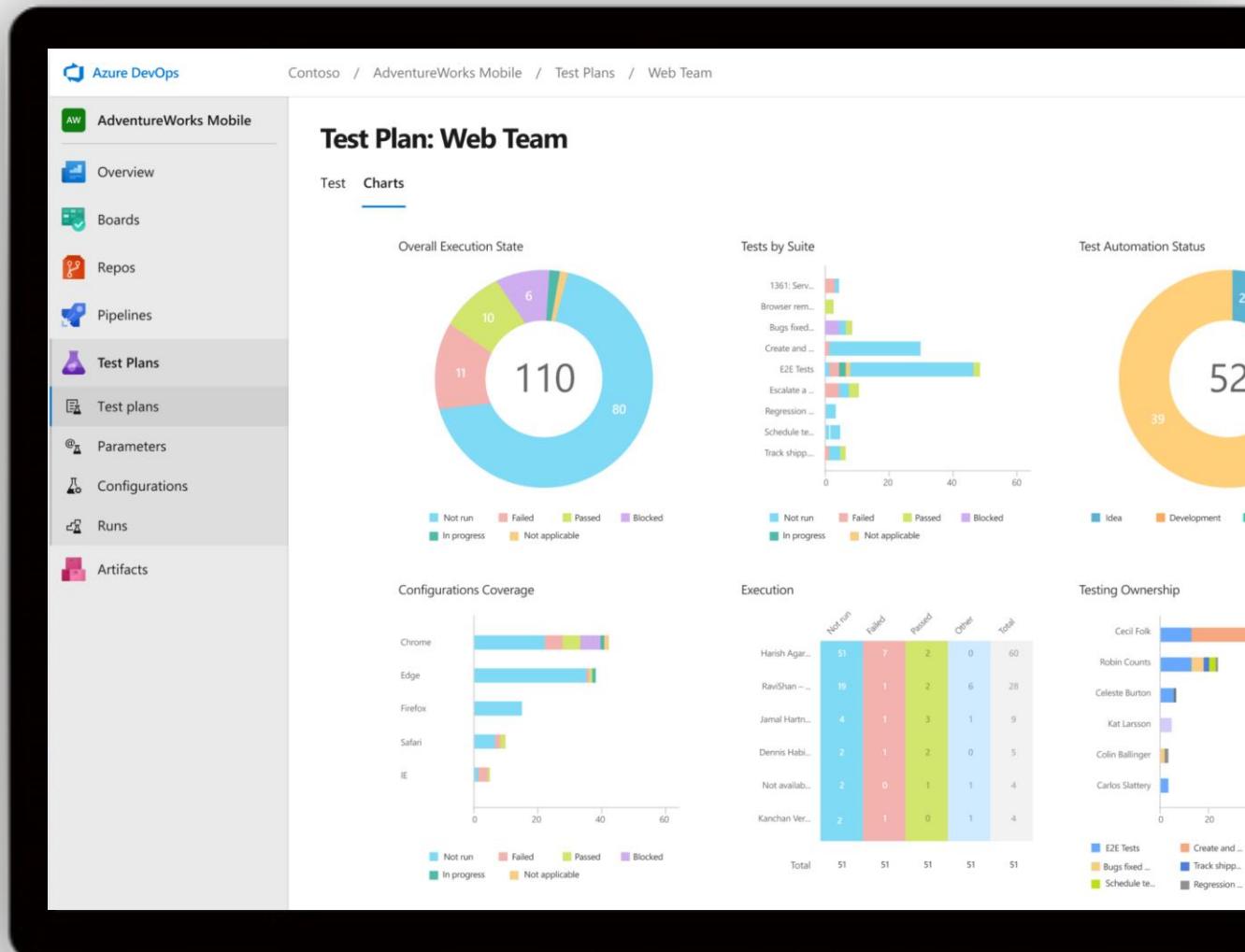
Planned manual and automated tests

Plan, execute and track scripted tests with actionable defects and end-to-end traceability. Assess quality throughout the development lifecycle by testing your desktop and web applications



Unit & Functional Testing (VS2019)

Create a Unit Test project; Run Unit Tests with Test Explorer; Start using IntelliTest; Use code coverage to determine how much code is being tested



<https://azure.microsoft.com/en-us/services/devops/test-plans/>

Azure Artifacts

Create, host and share packages with your team



Support for multiple package languages

Create and share Maven, NPM, NuGet, and Python package feeds from public and private sources



Keep your artifacts organized

Share code effortlessly by storing Maven, NPM, NuGet, Python packages together. And there is no need to store these in Git. Simply store them using Universal Packages in Azure Artifacts



Seamless Package handling

Integrate seamless package handling into your CI/CD Pipeline. Easily access all your artifacts in builds and releases.

The screenshot shows the Azure DevOps interface with the following details:

Left Sidebar: AdventureWorks Mobile, Overview, Boards, Repos, Pipelines, Test Plans, Artifacts (selected).

Top Bar: Contoso / AdventureWorks Mobile / Artifacts / Packages

Header: Packages | Connect to feed | Recycle bin

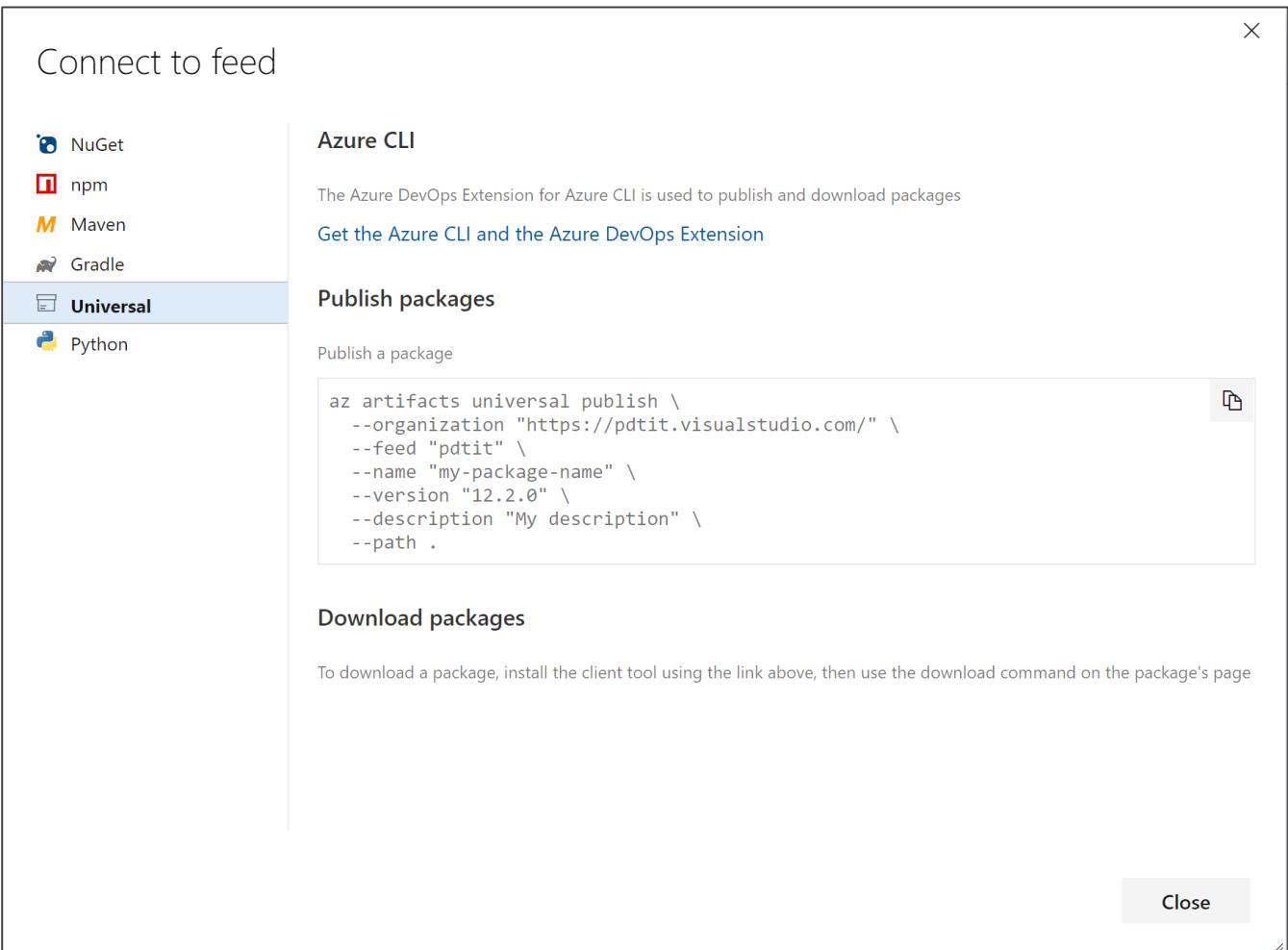
Package	Views	Source	Last pushed	Description
AdventureWorks.Framework Version 1.1.0		MyFeed	Yesterday	AdventureWorks...
adv-lib Version 1.3.3		MyFeed	2 days ago	libs for Adventure...
com.adworks.app Version 2.0.2		MyFeed	2 days ago	AdvWorks Android...
adventure-classifier-model Version 2.2		MyFeed	3 days ago	An object classifier...
adworks-build-tools Version 5.0.3		MyFeed	4 days ago	AdventureWorks...
NUnit Version 3.11.0		NuGet Gallery	6 months ago	Unit testing fram...
Newtonsoft.JSON Version 12.0.2-beta1	prerelease	NuGet Gallery	4 days ago	High-performance...
grunt Version 1.0.4		npmjs	13 days ago	The JavaScript task...
express Version 4.16.4		npmjs	6 months ago	Fast, unopinionate...
com.android.support.design Version 27.1.0		Maven Central	2 months ago	Add APIs for the M...
python-dateutil Version 2.8.0		PyPI	2 months ago	Extensions to the s...
numpy Version 1.16.2		PyPI	2 months ago	Fundamental pack...



<https://azure.microsoft.com/en-us/services/devops/artifacts/>

Azure Artifacts

- Based on “feeds”
- Private & Public
- Multiple packages:
 - Maven, NPM, Nuget, Universal





Azure Pipelines

- Free **unlimited** build minutes for public projects
- Up to 10 free parallel jobs across Windows, Linux and macOS



<https://azure.com/pipelines>

Microsoft ❤️ Open Source



Integrated with GitHub

Azure Pipelines available now to
any developer from the GitHub
Marketplace

The screenshot shows the GitHub Marketplace page for Azure Pipelines. At the top, there's a navigation bar with links for Pull requests, Issues, Marketplace, and Explore. Below the navigation, the page title is "Marketplace / Azure Pipelines". A large green button says "Set up a new plan" and a white button says "Edit your plan ▾". The main content area features a large image of the Azure Pipelines interface with a blue background, showing a pipeline with several stages: "Test" (27 succeeded), "Build Linux" (6 succeeded), "Build Windows" (2 succeeded), and "Build macOS" (64% in progress). Above this image, the text reads "Azure Pipelines" and "Continuously build, test, and deploy to any platform and cloud". It also mentions that Azure Pipelines offers cloud-hosted pipelines for Linux, macOS, and Windows with 10 free parallel jobs and unlimited minutes for open source projects. On the left side of the main content, there's a sidebar with sections for "Categories" (Continuous integration, Deployment), "Supported languages" (Dockerfile, Go, Java and 7 other languages supported), and "Developer links" (Support, Status, Documentation, Privacy Policy).

Demo

GitHub Integration

Azure DevOps Summary

Better together



Azure Boards



Azure Repos



Azure Pipelines



Azure Test Plans



Azure Artifacts

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

Fully Integrated
with end
to end
traceability

Scalable to
any team
and project size

Highly
available,
multi region,
hybrid
cloud &
on-prem

Customer
Support

Consistent
admin
and access
control

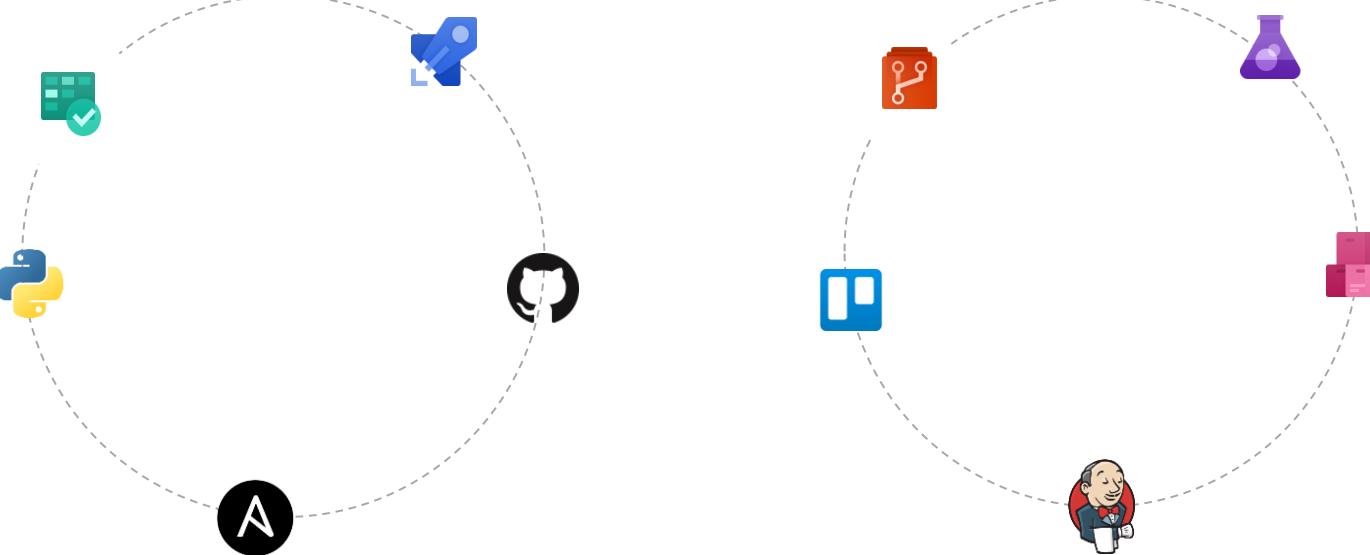


<https://azure.com/devops>

Azure DevOps: Choose what you love

Your tools, languages, and clouds

Any cloud, any platform, whether public, hybrid, on-premises



Developers are still in control of the language and process they want to keep using...

Azure DevOps integrates with existing dev tools, or can replace most of them... you choose!!

Section Take-Aways

1. Azure DevOps helps organizations in adopting and using DevOps... easier and better
2. Azure DevOps covers all aspects of the DevOps cycle: Repos, Build, Release, Artifacts,... end-to-end CI/CD Pipeline
3. Azure DevOps provides massive flexibility, by integrating with your existing Open Source tools you already use today

Resources

Be passionate and bold. Always keep learning. You stop doing useful things if you don't learn.

- Satya Nadella

ACCELERATE - The Science of Lean Software and DevOps

Building and Scaling High Performing Technology Organizations

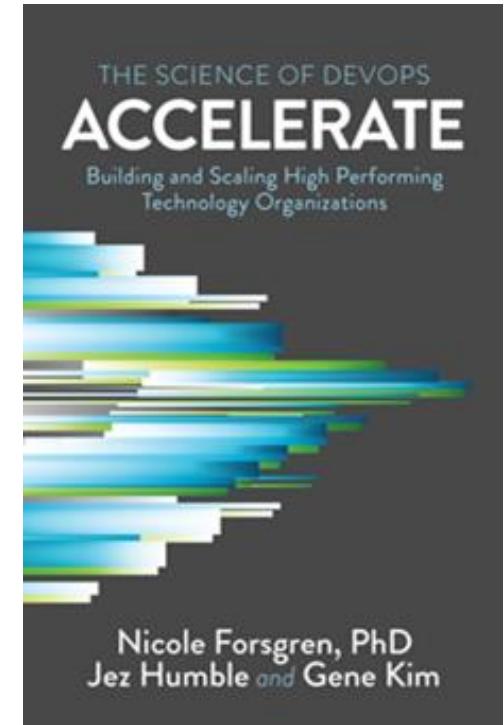
"The organizations that thrive in the future will be those that leverage digital technologies to improve their offerings and operations. ...

We strongly recommend this book to anyone involved in a digital transformation for solid guidance about what works, what doesn't work, and what doesn't matter."

—Tom Poppendieck and Mary Poppendieck, authors of the Lean Software Development series of books

"This is the kind of foresight that CEOs, CFOs, and CIOs desperately need if their company is going to survive in this new software-centric world. **Anyone that doesn't read this book will be replaced by someone who has.**"

— Thomas A. Limoncelli, coauthor of The Practice of Cloud System Administration



<https://itrevolution.com/book/accelerate/>

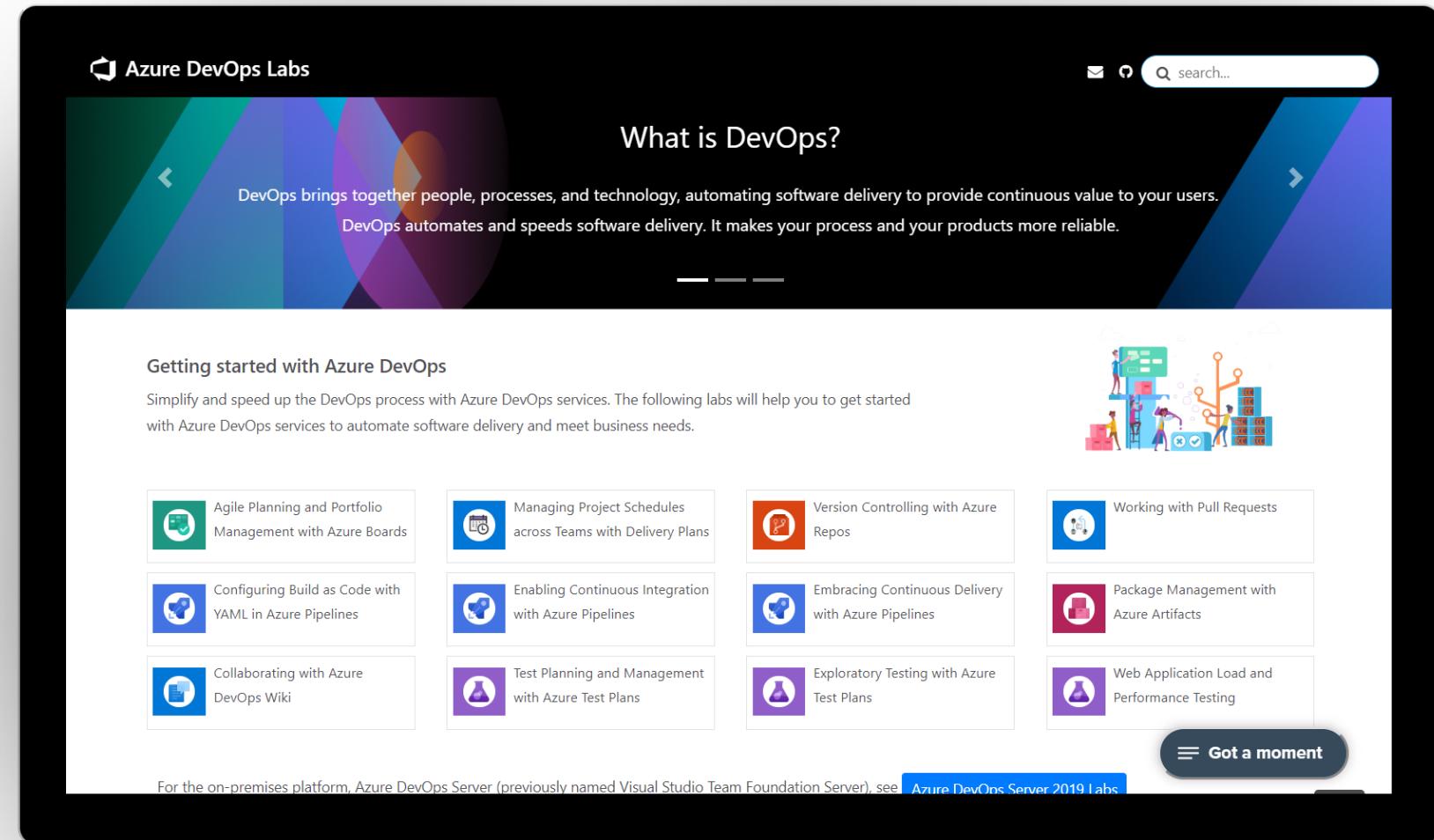
Azure DevOps Hands-On Labs

Learn to plan smartly, collaborate better, and ship faster with a set of modern development services.

→ Get Hands On Experience with Azure DevOps Services – Learn how you can plan better, code together and ship faster with Azure DevOps Services.

→ Getting started - These labs will help you to get started with Azure DevOps services to automate software delivery and meet business needs.

→ Deep Dive into Azure DevOps - Learn how to integrate with popular OSS and 3rd party tools and services. Use the tools and languages you know.

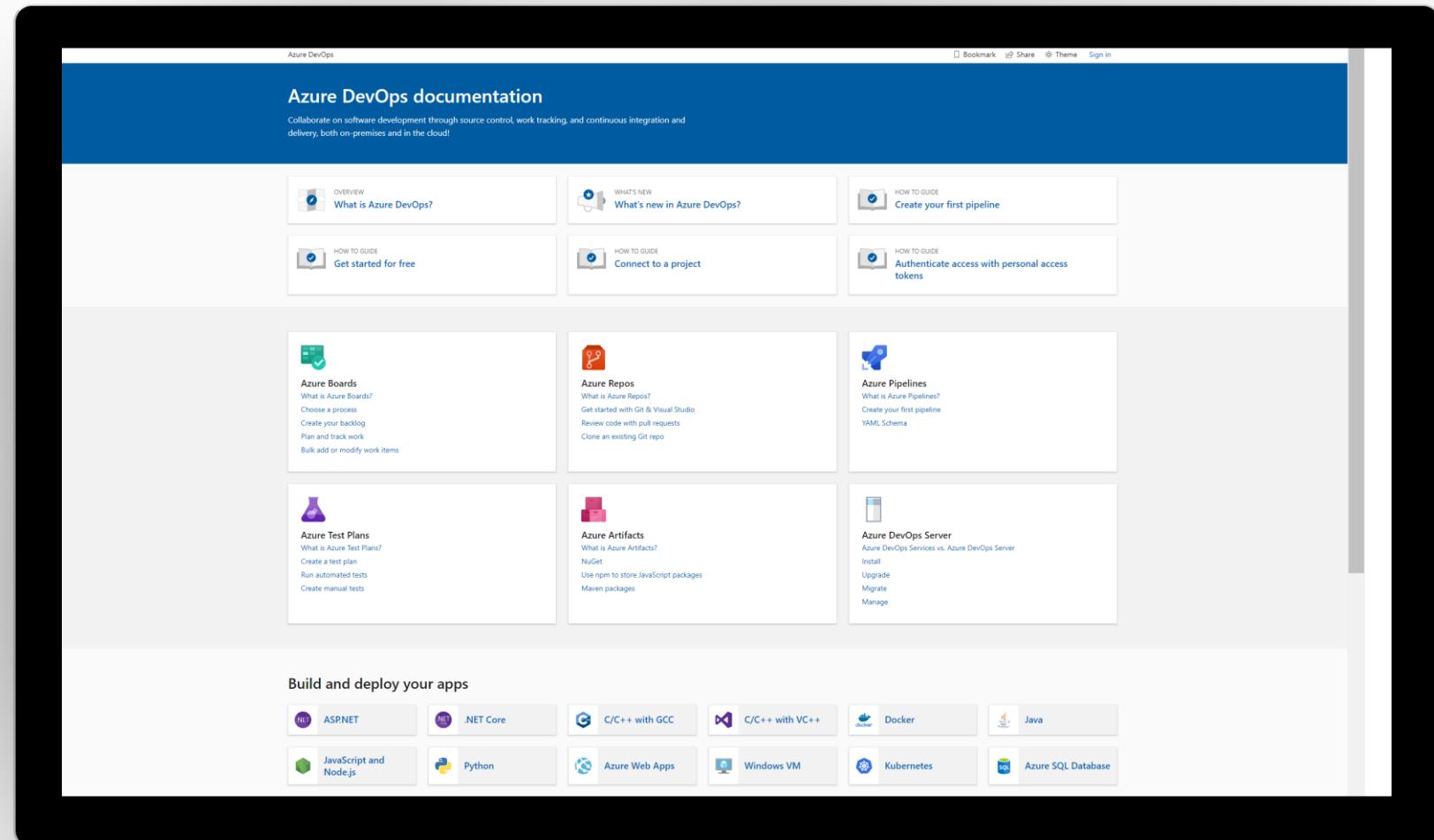


→ <https://www.AzureDevOpsLabs.com>

Documentation - Azure DevOps Landing Page

Use this landing page to learn about all the features available in Azure DevOps

- If you're new to Azure DevOps Services or TFS, see the [Key concepts](#)
- For a description of the core services supported through the web portal, see [Essential services](#)
- If you only save one Favorite in your browser related to Azure DevOps, this is the link to save as a favorite!



<https://docs.microsoft.com/en-us/azure/devops>

Azure DevOps Features Timeline

Azure DevOps Features Roadmap and Release Notes

→ Take a peek into our roadmap. See the significant features we are working on and a rough timeframe for when you can expect to see them

→ We deploy updates frequently. Review the release notes for each three week sprint

→ Subscribe to this page to get notified when we provide new release notes and roadmap updates

The screenshot shows the 'Azure DevOps Features Timeline' page. The top navigation bar includes links for Microsoft, Azure, DevOps, Services, Pricing, News, Support, and Subscriber Access, along with 'Try for free' and 'Sign in' buttons. Below the navigation is a search bar and a 'Filter by title' input field. A sidebar on the left lists years from 2012 to 2018 under 'Features timeline', with '2018' selected. It also includes a 'Subscribe to updates' button and a 'Download PDF' link at the bottom. The main content area features a large heading 'Azure DevOps Features Timeline' with a subtitle '12/12/2018 • 45 minutes to read • Contributors'. To the right is a sidebar titled 'In this article' with sections for 'Features under development', 'Current features', and 'Feedback'. The main content area below the heading contains a section titled 'Features under development' with a detailed description of the roadmap. A table titled '2018 Q4' is shown, listing a single feature: 'Azure DevOps Server Support for Move work item to another team project / Change work item type' under the 'Area' column, with 'Boards' listed under 'Server' and '2019' under 'Planned date'.

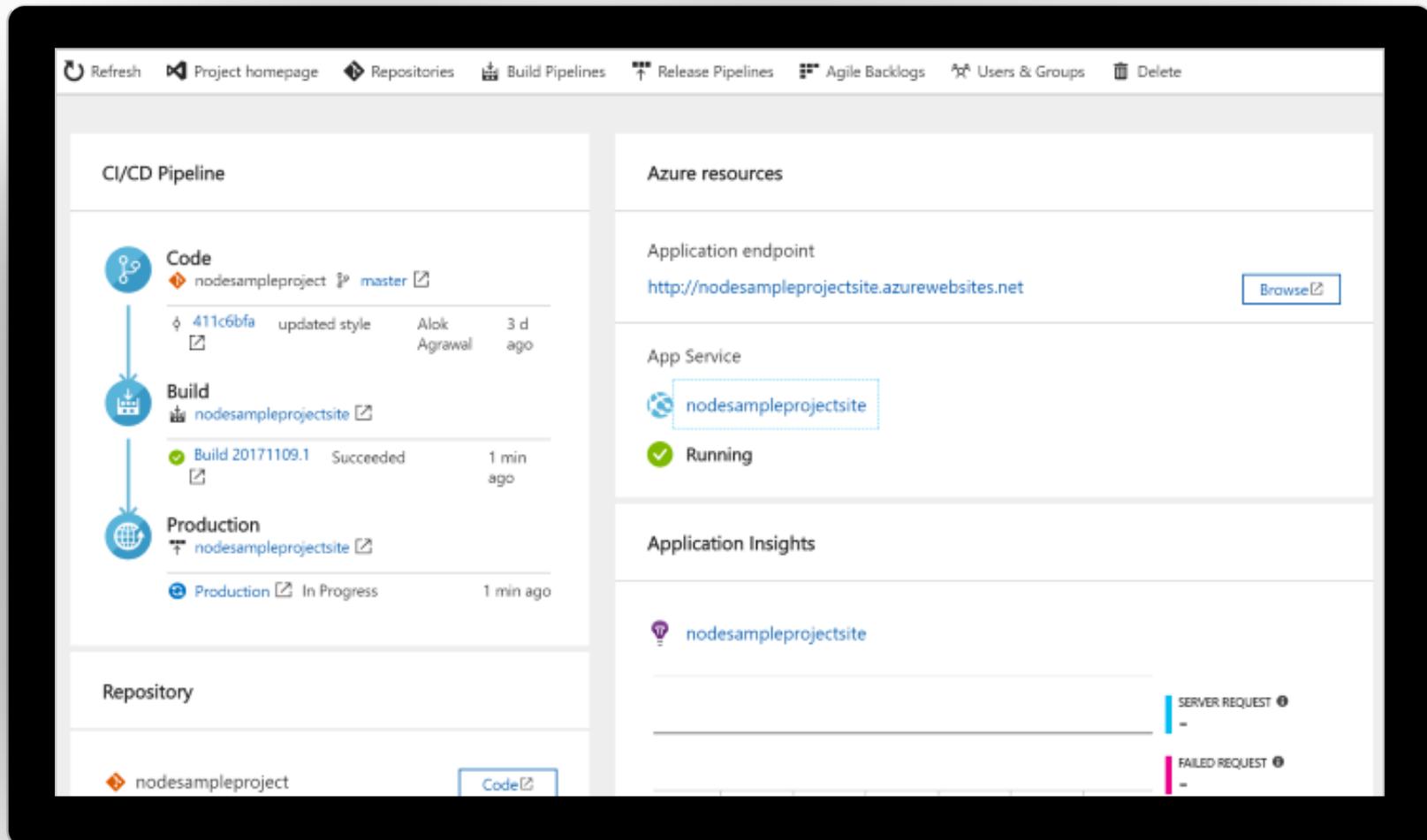
Feature	Area	Server	Planned date
Azure DevOps Server Support for Move work item to another team project / Change work item type	Boards	2019	

→ <https://Docs.Microsoft.com/en-us/Azure/DevOps/Release-Notes/>

DevOps Pipelines in Minutes

Azure DevOps Projects

- Create a full DevOps pipeline with 3 easy steps from the Azure Portal
- Start with a Git repo and any source language
- Deploy to Web apps, VMs, App Services, Kubernetes, Functions and more.
- Customize, extend and scale when needed.



<https://docs.microsoft.com/en-us/azure/devops-project/>

DevOps at Microsoft

Learn from our DevOps journey and share our lessons learned with your team

- Create a series of “Lunch & Learn” sessions. Watch a video and have a follow up discussion with your team
- Or, treat it like a book club, i.e. have everyone watch a video and read the related narrative, then discuss it over lunch
- Either way, discuss with your team what is/is not applicable to your company, (or, what should be applicable in the future!)

The screenshot shows a Microsoft web page titled "DevOps at Microsoft". The page includes a sidebar for "DevOps Resource Center" with links to "DevOps at Microsoft", "How We Work with Azure DevOps", "How We Architect Azure DevOps", "One Engineering System at Microsoft", "Microsoft Research on DevOps Productivity", "Learn DevOps", "Learn Git", "Learn Agile", and "Events and Talks". The main content area features the title "DevOps at Microsoft" with a subtitle "09/09/2018 • 4 minutes to read" and author "By: Sam Guckenheimer". It describes the center's purpose of keeping users current on DevOps practices across Microsoft. Below this is a section titled "Why We Do DevOps at Microsoft" with a video thumbnail of Martin Woodward speaking. The video thumbnail has the O'Reilly logo and the title "Why Microsoft does DevOps - Martin Woodward (Microsoft)".

→ <http://aka.ms/DevOpsAtMicrosoft>

Azure DevOps Team Blog

Get the latest news from the team that builds Azure DevOps

→ Learn about new and upcoming features

→ Get a weekly listing of the top Stories from the Microsoft DevOps Community

→ Look for past posts on specific topics such as CI/CD, Git, Open Source, etc.

The screenshot shows the Microsoft DevOps Blog homepage. At the top, there's a navigation bar with links for Latest, CI/CD, Git & Version Control, Agile, Azure & Cloud, Test, Open Source, Community, and TFS. Below the navigation is a large blue header section featuring three circular icons representing DevOps concepts: Deploy, Agile, Build, Test, and Integrate. Below these icons are three stylized illustrations of people working on laptops. The main content area has a white background and displays a blog post titled "Azure DevOps Agents on Azure Container Instances (ACI)" by Máté Barabás, posted on January 7, 2019. The post summary indicates it provides a solution for running Azure DevOps agents on Windows Server Core based containers hosted on Azure Container Instances. To the right of the post is a search bar with the placeholder "Search the blog" and a "Search" button. Below the search bar is a "Other Resources" section containing links to Documentation, DevOps in Microsoft, and Visual Studio Home.

→ <https://Blogs.MSDN.Microsoft.com/DevOps/>

Get Certified! - Azure DevOps Engineer Expert

To earn this certification, you must earn either the "Azure Administrator Associate" or "Azure Developer Associate" certification and pass the AZ-400 exam

→ Step 1: Review the skills and knowledge required to certify

→ Step 2: Train for certification exams

→ Step 3: Take a practice exam

→ Step 4: Schedule your exams and get certified.

The screenshot shows the Microsoft Learning website with the following content:

- Header:** Microsoft Learning, Training, Certifications & exams, Special offers, More, All Microsoft, Search, Print icon.
- Section:** NEW Microsoft Certified Azure DevOps Engineer Expert
- Description:** Azure DevOps professionals combine people, process, and technologies to continuously deliver valuable products and services that meet end user needs and business objectives.
- Requirement:** To earn this certification, you must earn either the Azure Administrator Associate or Azure Developer Associate certification and pass the AZ-400 exam.
- Recommended approach:** Step 1: Review the skills and knowledge required to certify. Step 2: Train for certification exams.*
- Callout:** Start by Proving that You Know the Fundamentals. Just starting in technology, thinking about a career change, or want to explore one of the technologies that will drive digital transformation in organizations? Prove that you have the basic knowledge to get started with an optional
- Expert badge:** Microsoft Certified EXPERT with three stars.

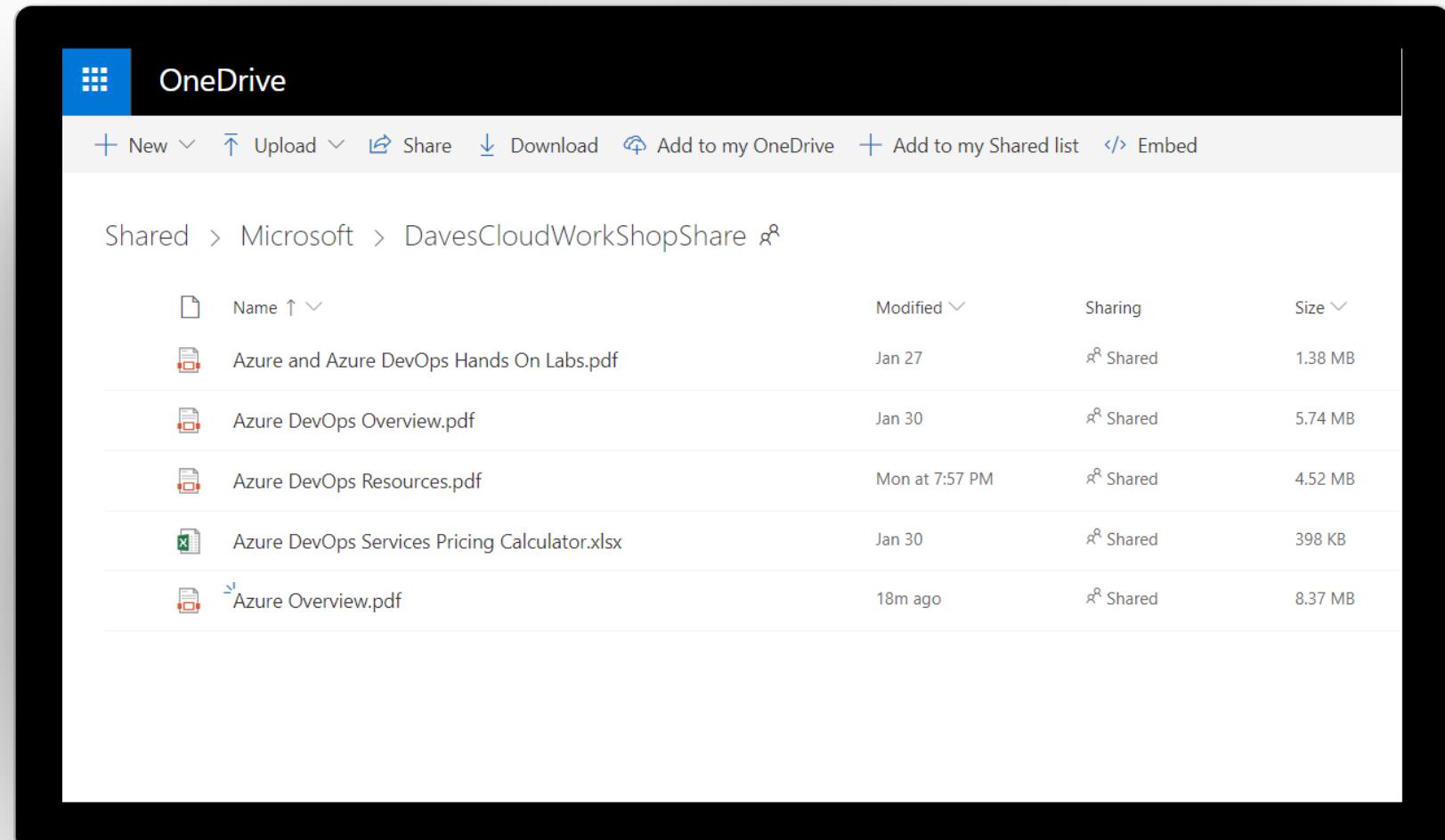


<https://www.Microsoft.com/en-us/Learning/Azure-DevOps.aspx>

Download This Presentation and Other Resources

- An Azure DevOps Overview Presentation
- Azure DevOps Resources – Links to many resources to learn more
- This Presentation:
Session 4 - Deploy an app using DevOps and Kubernetes 100919 v1.pdf

- Links to the labs are on page 67



The screenshot shows a OneDrive interface with a dark theme. At the top, there are navigation icons for New, Upload, Share, Download, Add to my OneDrive, Add to my Shared list, and Embed. Below the header, the path is shown as Shared > Microsoft > DavesCloudWorkShopShare. The main area displays a list of files:

Name	Modified	Sharing	Size
Azure and Azure DevOps Hands On Labs.pdf	Jan 27	Shared	1.38 MB
Azure DevOps Overview.pdf	Jan 30	Shared	5.74 MB
Azure DevOps Resources.pdf	Mon at 7:57 PM	Shared	4.52 MB
Azure DevOps Services Pricing Calculator.xlsx	Jan 30	Shared	398 KB
Azure Overview.pdf	18m ago	Shared	8.37 MB

→ <http://aka.ms/DaveOpsResources>,
Download "Session 4 - Deploy an app using DevOps and Kubernetes 100919 v1.pdf"

Questions?

Contact Dave Burnison
Dave.Burnison@Microsoft.com
@DaveBurnison

<http://aka.ms/DaveOpsResources>



Appendix

Lab dependencies, Azure DevOps Labs and alternate path

We will use [Azure DevOps Labs](#) today instead of Lab 8

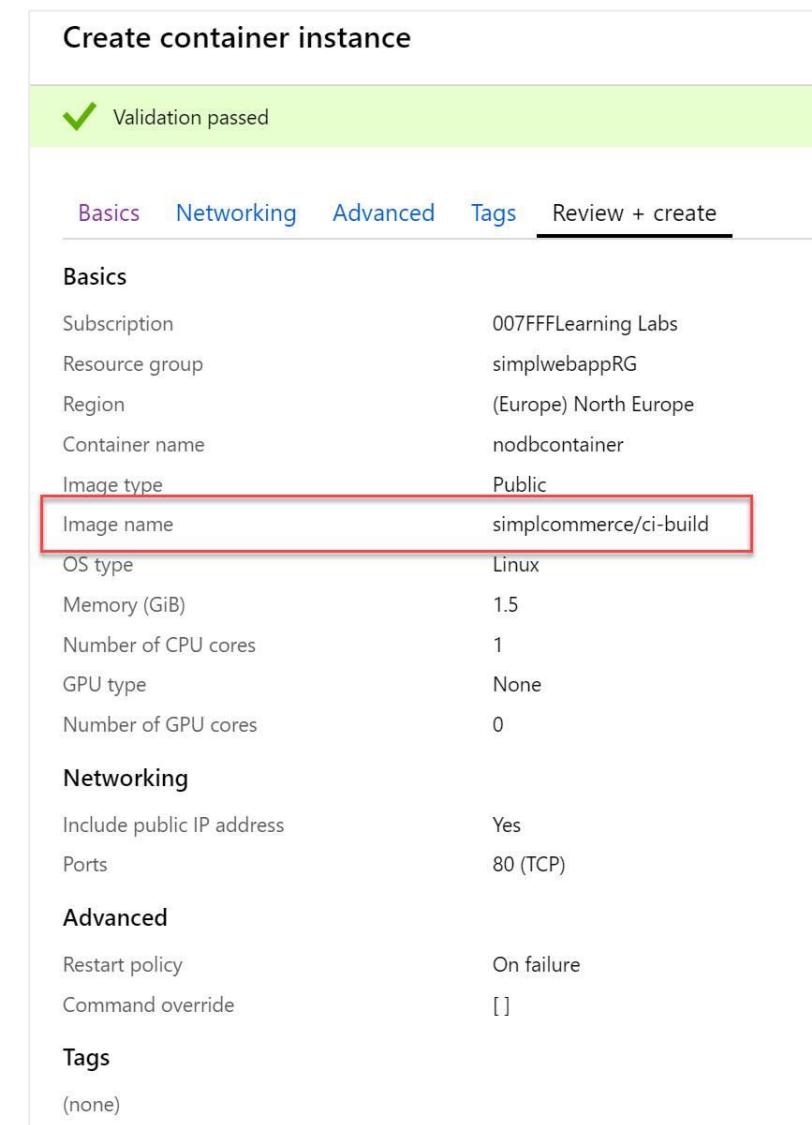
Hands on labs to help you to get started with Azure DevOps services to automate software delivery and meet business needs. There are more than 40 available labs. Here are the labs relevant to this webinar:

- [Enabling Continuous Integration with Azure Pipelines](#)
- [Embracing Continuous Delivery with Azure Pipelines](#)
- [Deploying a multi-container application to Azure Kubernetes Services](#)
- [Configuring CI/CD Pipelines as Code with YAML in Azure DevOps](#)

Alternate path

To avoid the SQL dependencies from the first series labs

- SimplCommerce offers a Docker container that uses a built-in non-SQL database
- <https://hub.docker.com/r/simplcommerce/ci-build>
- If you run this locally (or in ACI or AKS) it will spin up the web app and give you the option to select “sample products” (phones or fashion)



Full workshop

Dependencies from first series

The lab guide assumes that the learner has completed the first 3 labs from the previous series “[Migrate a web app to Azure](#)” and the first 3 labs from this series

[Deploying VM baseline using ARM Templates](#)

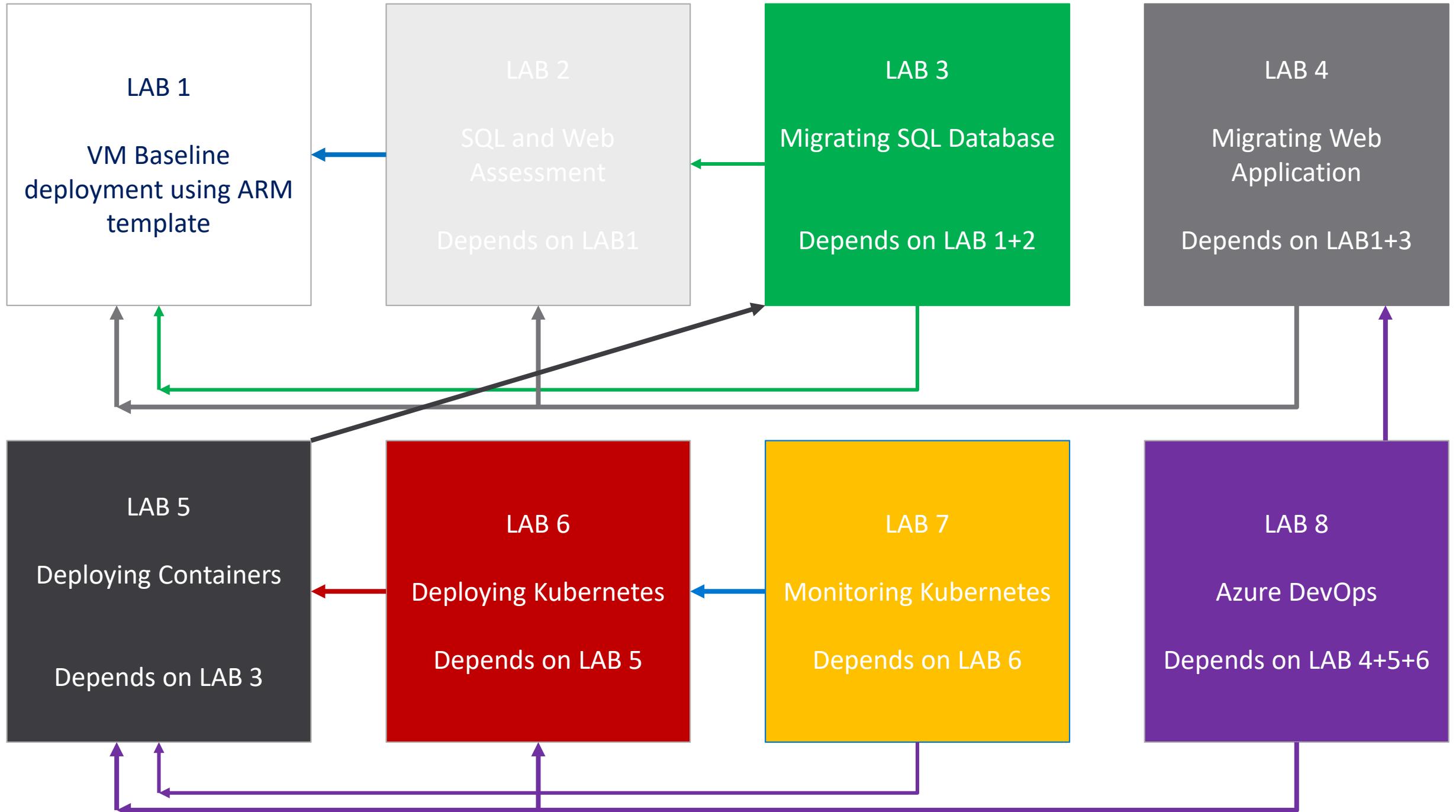
[Performing Assessments](#)

[Migrating SQL Databases](#)

[Deploying and running Azure containers](#)

[Deploying and running Azure Kubernetes Services](#)

[Optimize Operations and Monitoring](#)





Thank You