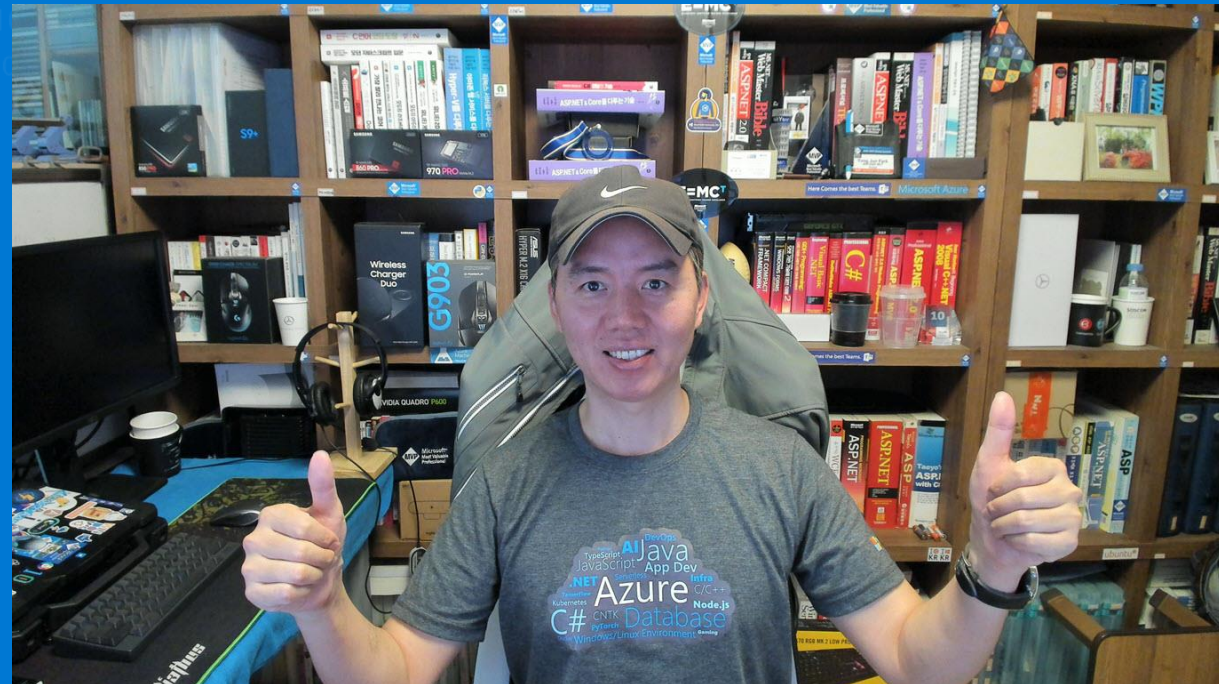


# Azure DevOps Pipelines

박용준(RedPlus)  
Microsoft MVP 2019-2020  
[www.devlec.com](http://www.devlec.com)



# CI/CD 용어 정리

## Continuous Integration

- 자동화 된 빌드 및 테스트 프로세스를 사용하여 코드 변경 사항을 마스터 또는 기본 브랜치로 병합
- 소스 통합/빌드

## Continuous Delivery

- 코드가 변경되고 빌드/테스트가 완료되면, 자동으로 미리 지정한 테스트/스테이징/프로덕션 환경으로 게시
- 게시/배포
- Continuous Deployment

# 마이크로소프트의 DevOps 도구들



Azure Boards



Azure Repos



Azure Pipelines



Azure Kubernetes  
Service



Azure Test Plans



Azure DevTest Labs



Azure Security Center



Azure Artifacts



Visual Studio  
App Center



Azure Policy



Azure Monitor



Azure Key Vault

GitHub



Security



Package Registry



Actions



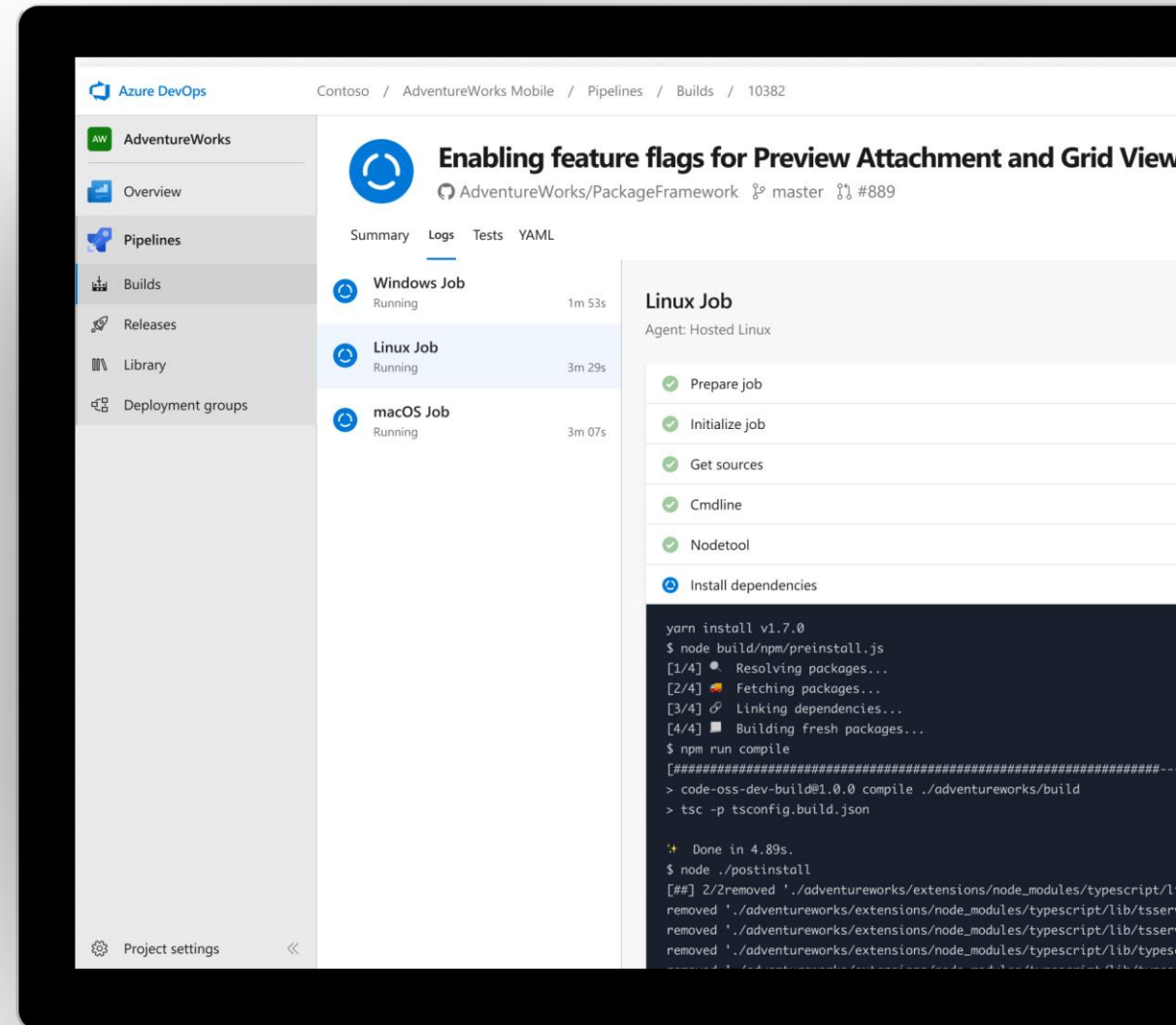
# Azure Pipelines

## 즉시 배포

- 커밋마다 코드를 자동으로 빌드하고 테스트
- 클라우드 호스트된 파이프라인
  - Linux, macOS, Windows
- 모든 언어, 모든 플랫폼, 모든 클라우드
- 컨테이너 및 Kubernetes에 대한 기본 지원



<https://azure.com/pipelines>



# 마이크로소프트의 DevOps 엿보기

➔ <https://aka.ms/DevOpsAtMicrosoft>

110k

Active users inside  
Microsoft

4.6m

Builds per month

28k

Work items  
created per day

2.4m

Private Git commits  
per month

8.8k

Open Source repos  
on GitHub

25k

Employees contributing to  
open source

82,000

Deployments per day

# TODO: Azure DevOps CI/CD

- 자동 빌드

- Azure DevOps를 사용하여 프로젝트를 **자동 빌드** 후 Azure 웹 앱에 게시하기

- 자동 릴리스

- Azure DevOps를 사용하여 프로젝트를 자동 빌드 및 **자동 릴리스** 후 Azure 웹 앱에 게시하기

- 승인

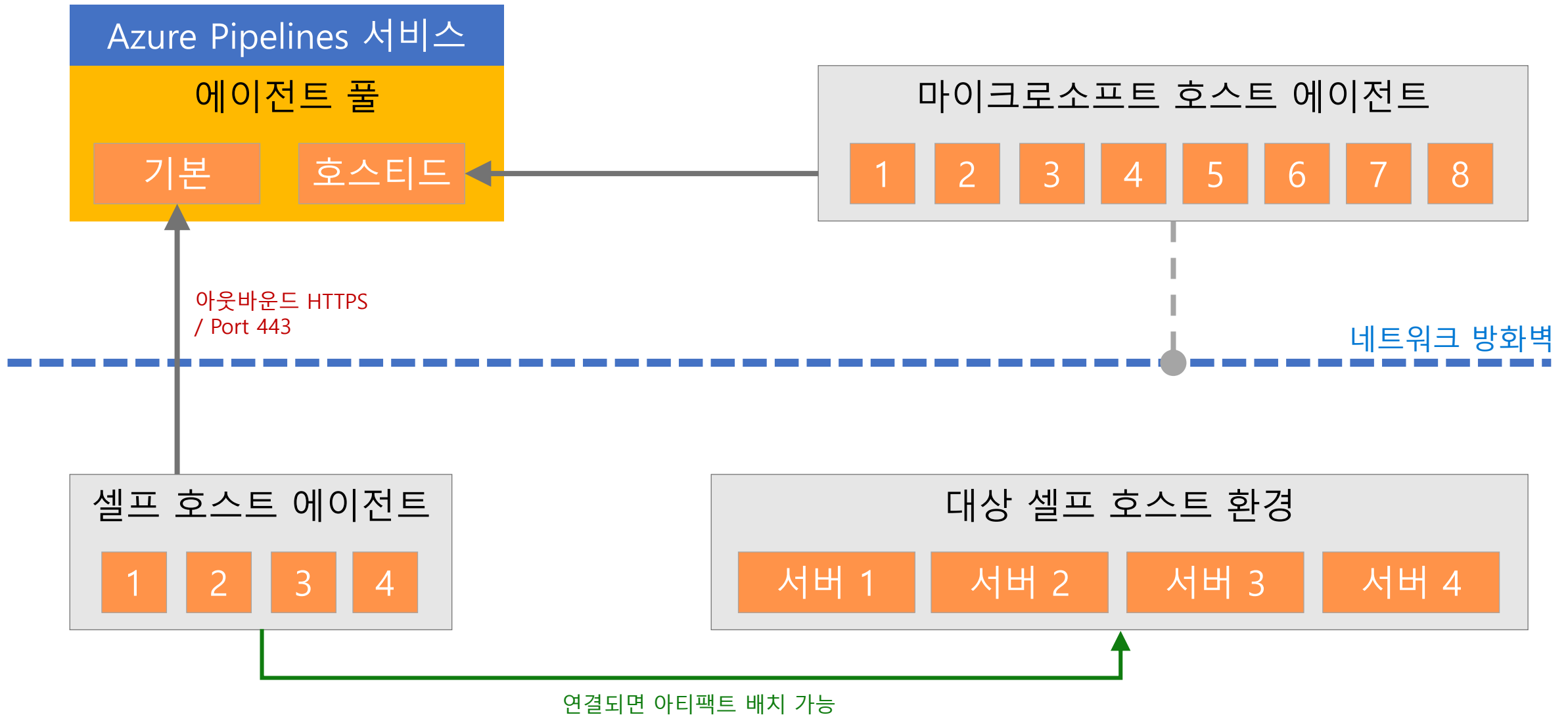
- Azure DevOps를 사용하여 프로젝트를 자동 빌드 및 자동 릴리스 후 Azure 웹 앱에 **스테이징**에 게시 후 **승인** 후 Azure 웹 앱의 **프로덕션**에 게시하기

Demo:

SpringBootHelloWorld  
빌드/릴리스 파이프라인  
살펴보기



# Azure Pipelines 작동 방식: 강의 -> MS







# Azure Pipelines - 빌드

Windows, Linux, macOS 지원 포함



<https://azure.com/pipelines>

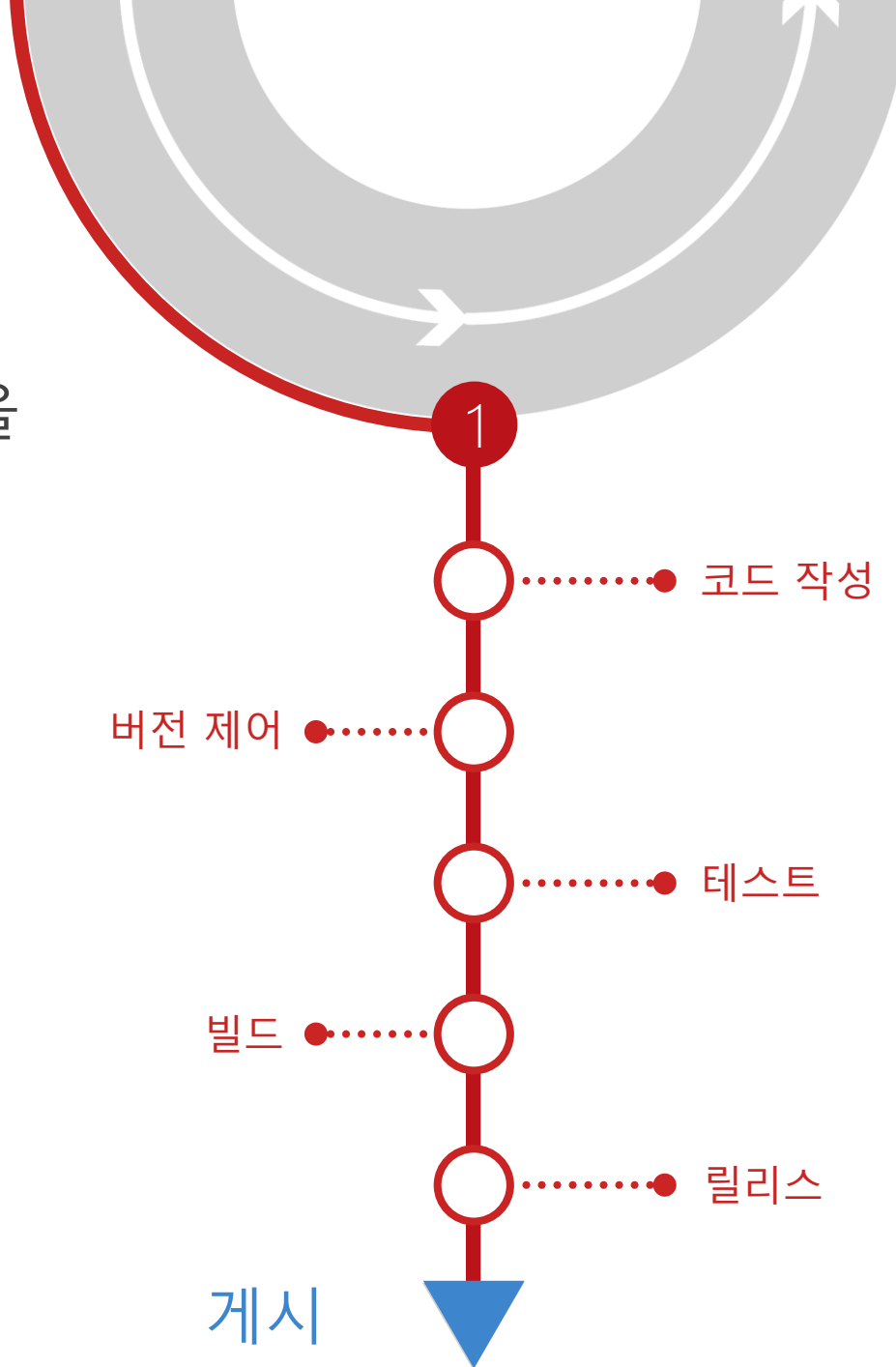
# DevOps



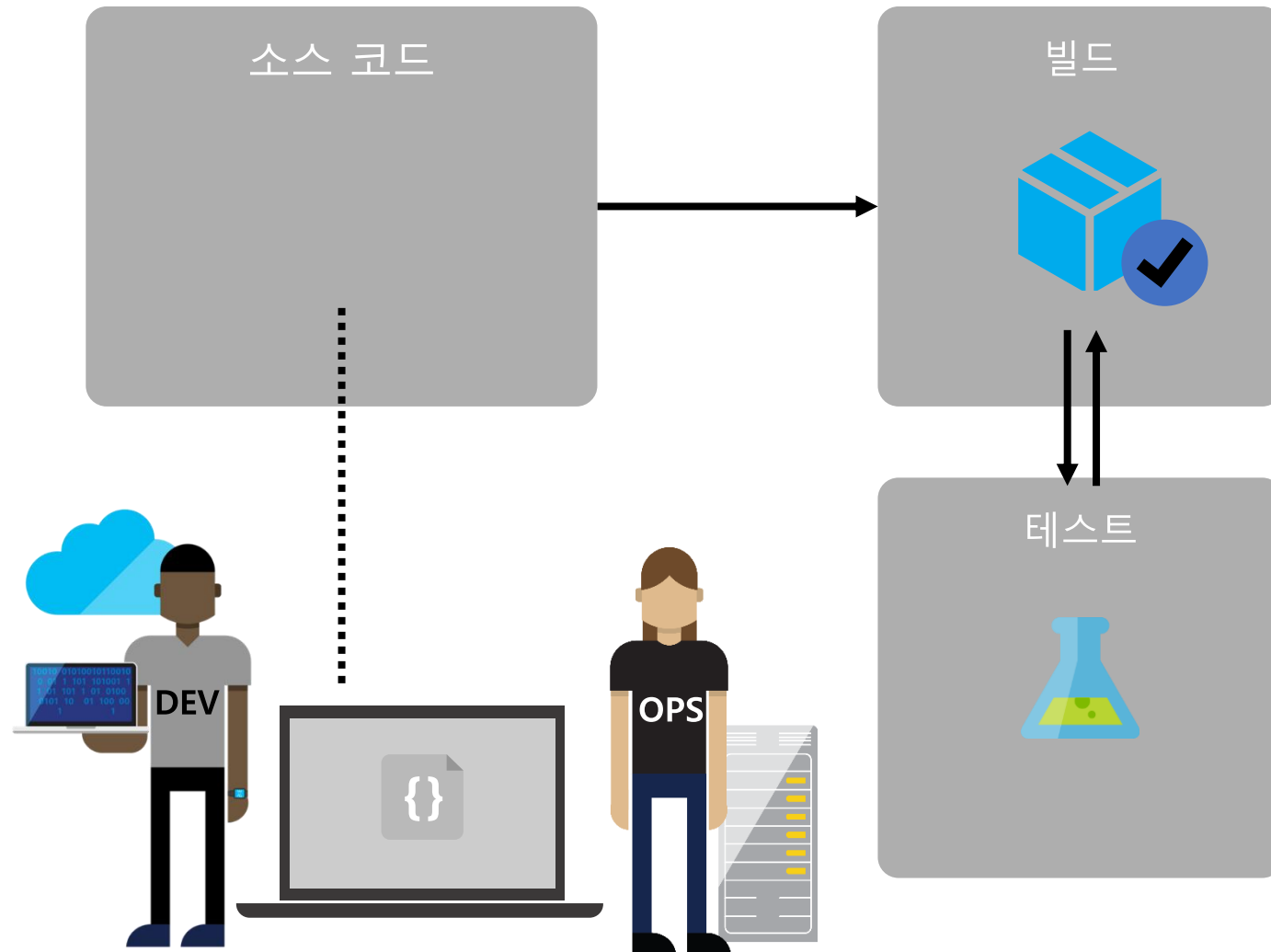


# 개발 + 테스트

개발이 시작되면,  
개발자는 아이디어(요구사항)을  
실제 기능으로 구현



# 지속적인 통합(Continuous Integration)



실습:  
지속적인 통합(Continuous Integration)  
연속적인 통합(?)



Projects - Home

+

← → ↺

https://webcamp.visualstudio.com

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Azure DevOps

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☰

📦

👤

My organizations

W webcamp

Create a project to get started

Project name \*

DotNetNoteChats ✓

Description

ASP.NET Core 2.X 프로젝트를 Azure Web App 올려서 테스트하기

Visibility

🌐

Public ⓘ

Anyone on the internet can view the project. Certain features like TFVC are not supported.

🔒

Private

Only people you give access to will be able to view this project.

Public projects are disabled for your organization. You can turn on public visibility with [organization policies](#).

⌵ Advanced

+ Create project

Related pages

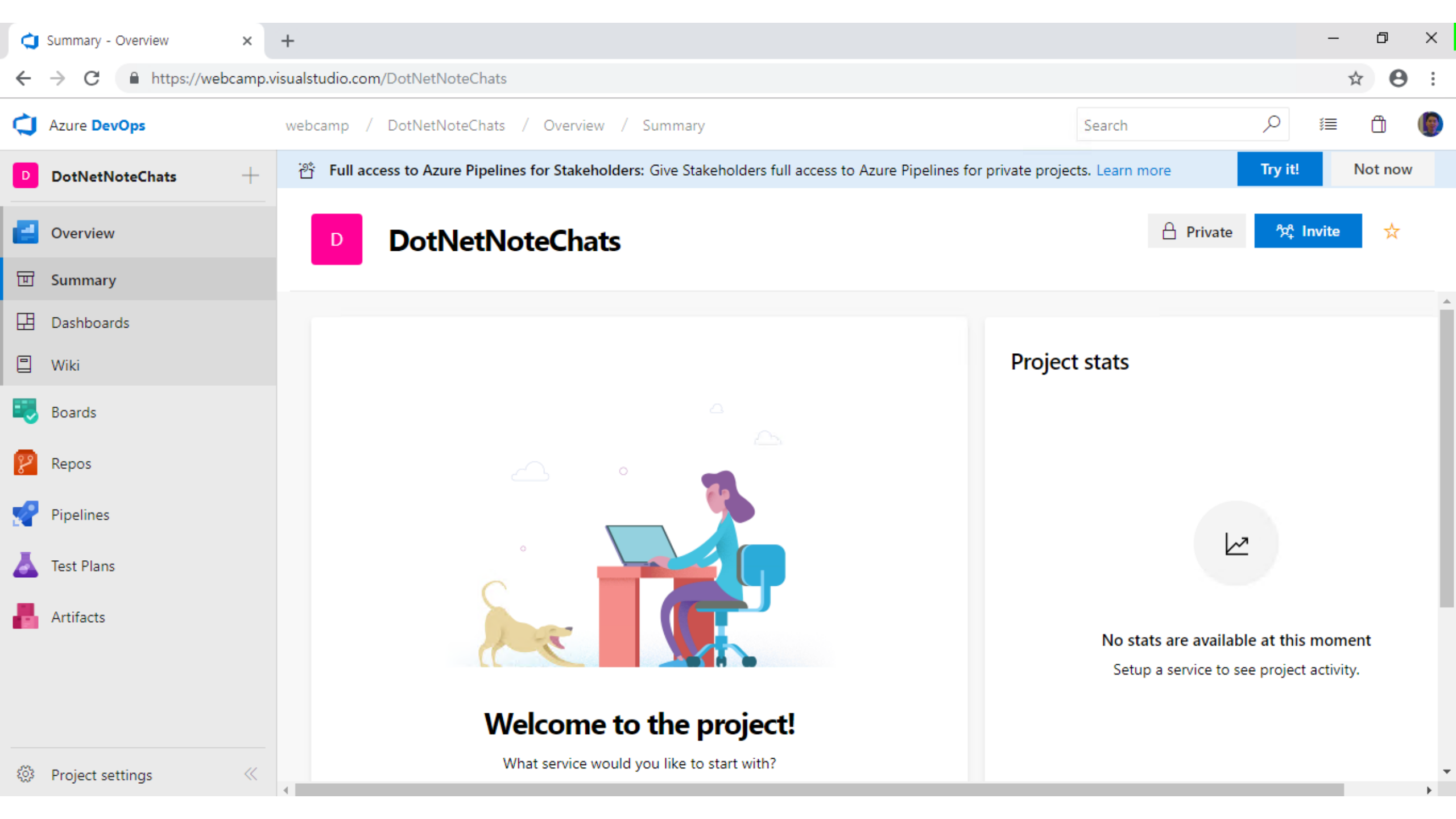
What's new in DevOps

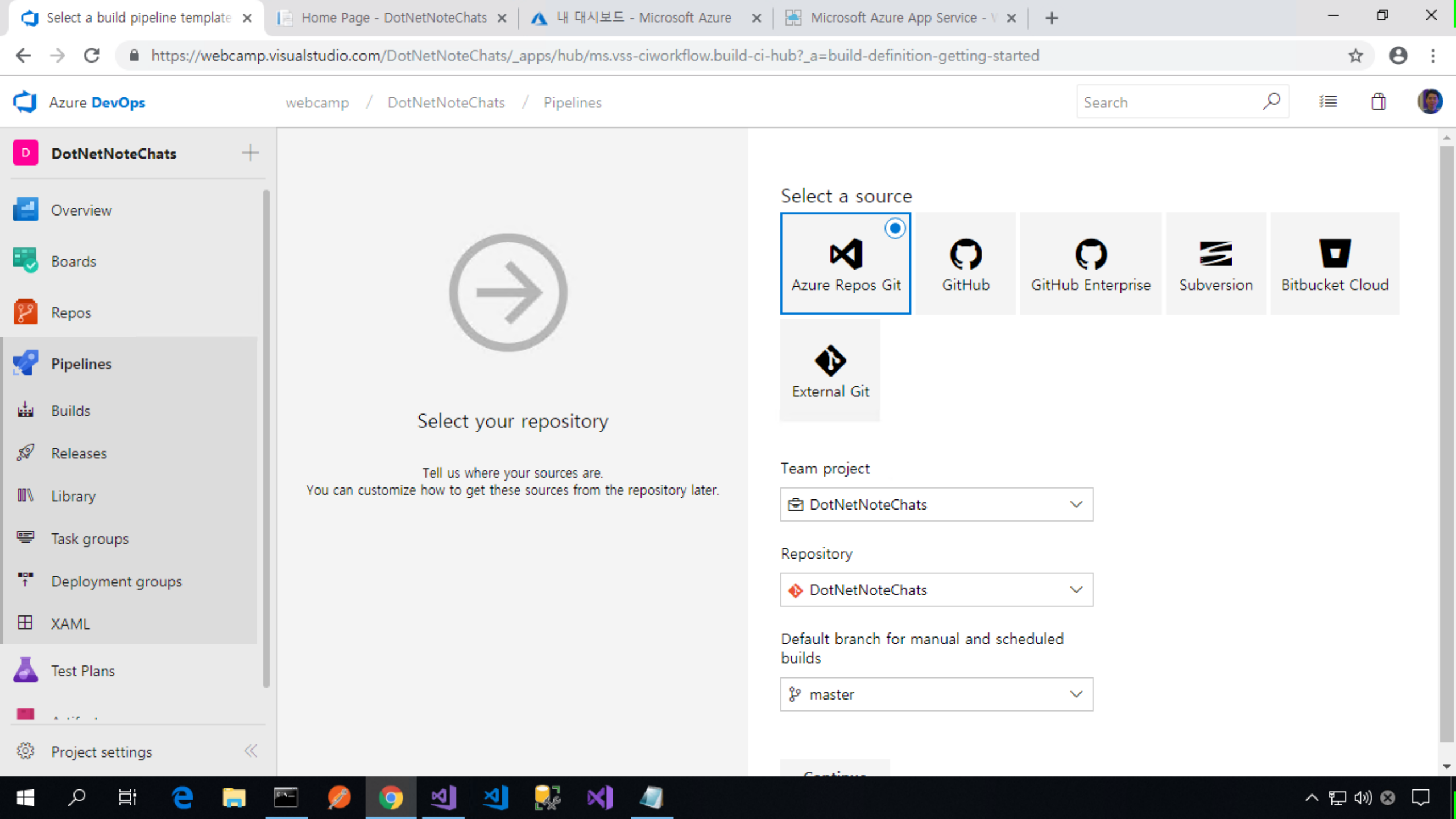
Documentation

Get help

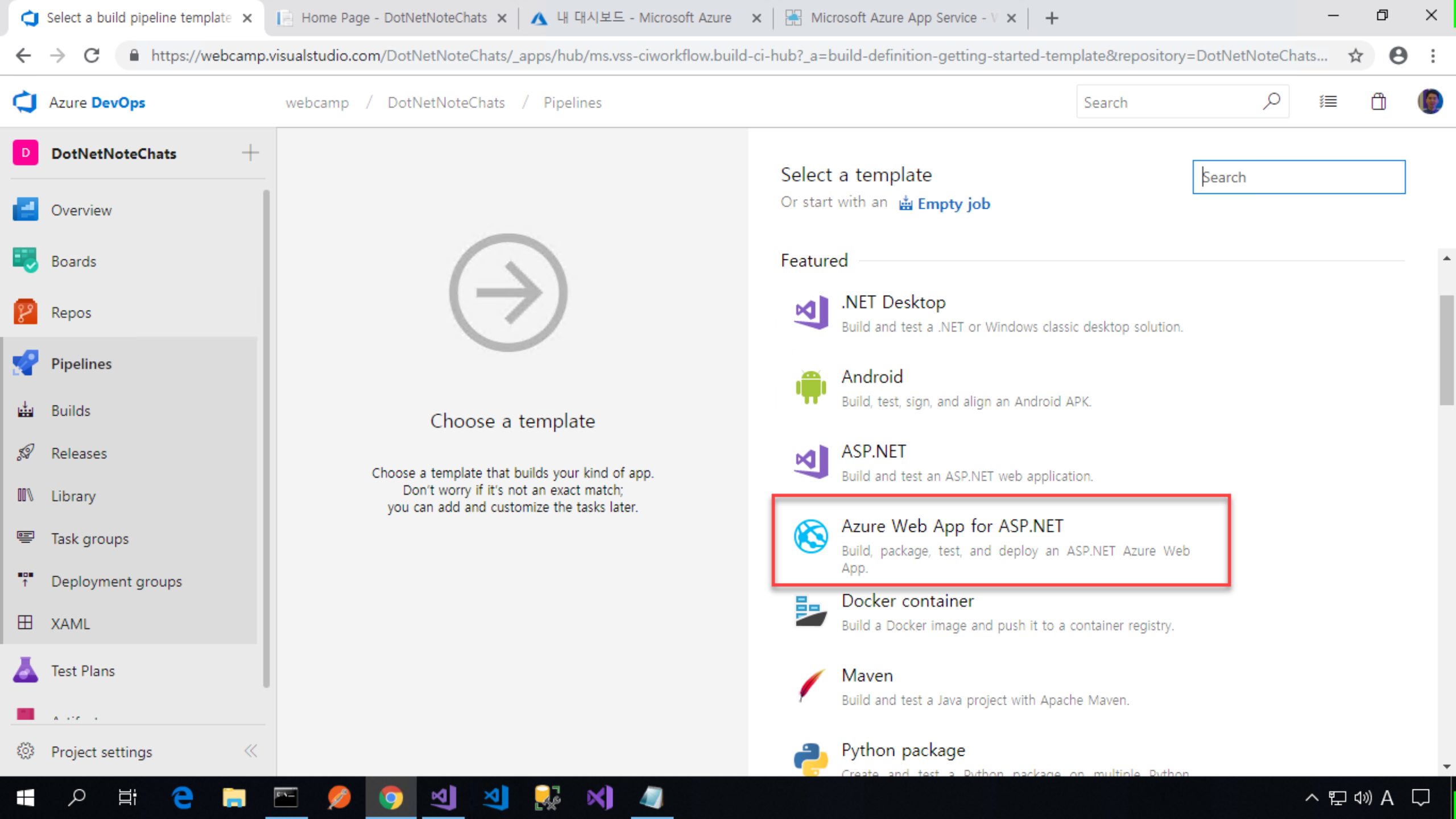
+ New organization

⚙️ Organization settings









## Select a template

Or start with an [Empty job](#)

### Featured



#### .NET Desktop

Build and test a .NET or Windows classic desktop solution.



#### Android

Build, test, sign, and align an Android APK.



#### ASP.NET

Build and test an ASP.NET web application.



#### Azure Web App for ASP.NET

Build, package, test, and deploy an ASP.NET Azure Web App.



#### Docker container

Build a Docker image and push it to a container registry.



#### Maven

Build and test a Java project with Apache Maven.

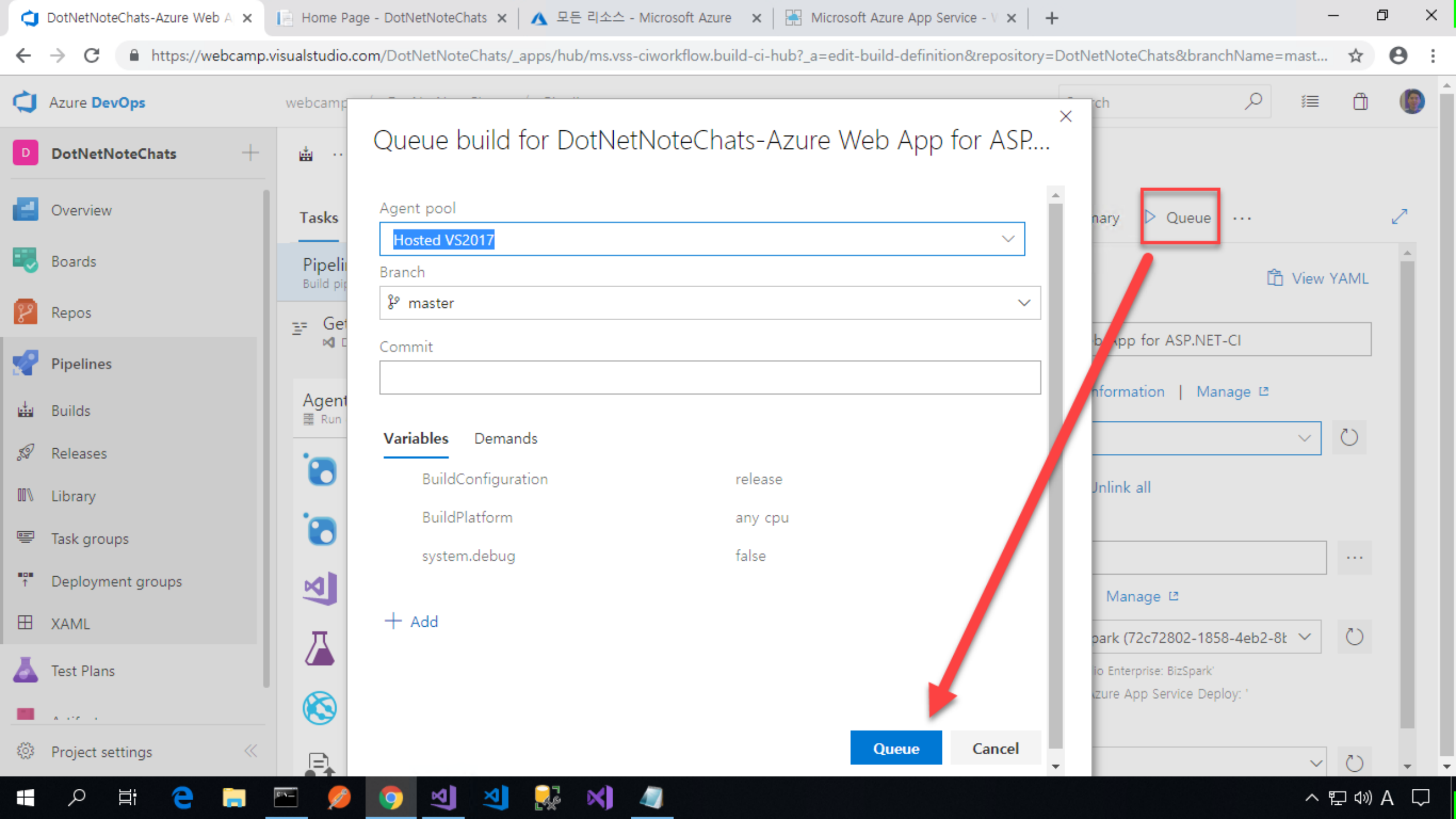


#### Python package

Create and test a Python package on multiple Python







## Queue build for DotNetNoteChats-Azure Web App for ASP...

Agent pool

Hosted VS2017

Branch

master

Commit

### Variables

### Demands

BuildConfiguration

release

BuildPlatform

any cpu

system.debug

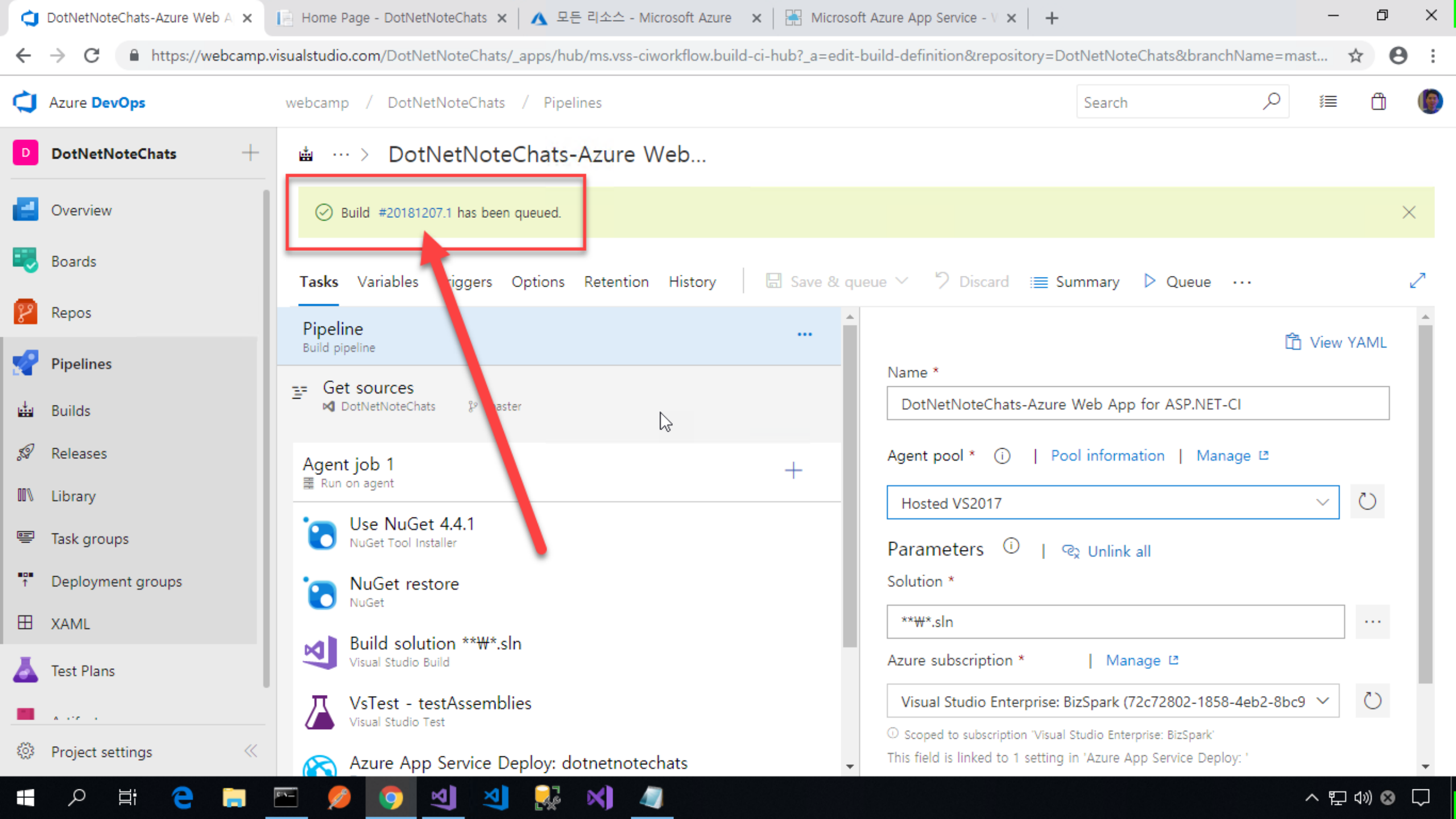
false

+ Add

Queue

Cancel

Queue



20181207.1 DotNetNoteChats-A x

Home Page - DotNetNoteChats x

모든 리소스 - Microsoft Azure x

Microsoft Azure App Service - V x

+

← → ↺

https://webcamp.visualstudio.com/DotNetNoteChats/\_build/results?buildId=6&a=summary

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Azure DevOps

webcamp / DotNetNoteChats / Pipelines / Builds / DotNetNoteChats-Azure W... / #20181207.1

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D

DotNetNoteChats

+

Overview

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Project settings

#20181207.1: ASP.NET Core 프로젝트 생성

Manually run just now by WebCamp · DotNetNoteChats master · f3d4d25

Cancel build ...

Logs Summary Tests

Agent job 1 Job

Pool: Hosted VS2017 · Agent: Hosted Agent

Started: 2018. 12. 8. 오전 7:09:26

20s

Initialize Agent · succeeded

1s

Initialize job · succeeded

8s

Checkout · succeeded

9s

Use NuGet 4.4.1 · succeeded

<1s

NuGet restore

2s

\*\*\*\*\*

Starting: NuGet restore

\*\*\*\*\*

=====

Task : NuGet

Description : Restore, pack, or push NuGet packages, or run a NuGet command. Supports NuGet.org and authenticated feeds like Package Management and MyGet. Uses NuGet.exe and works with .NET Framework apps. For .NET Core and .NET Standard apps, use the .NET Core task.

Version : 2.144.0

Windows Taskbar



**DotNetNoteChats**

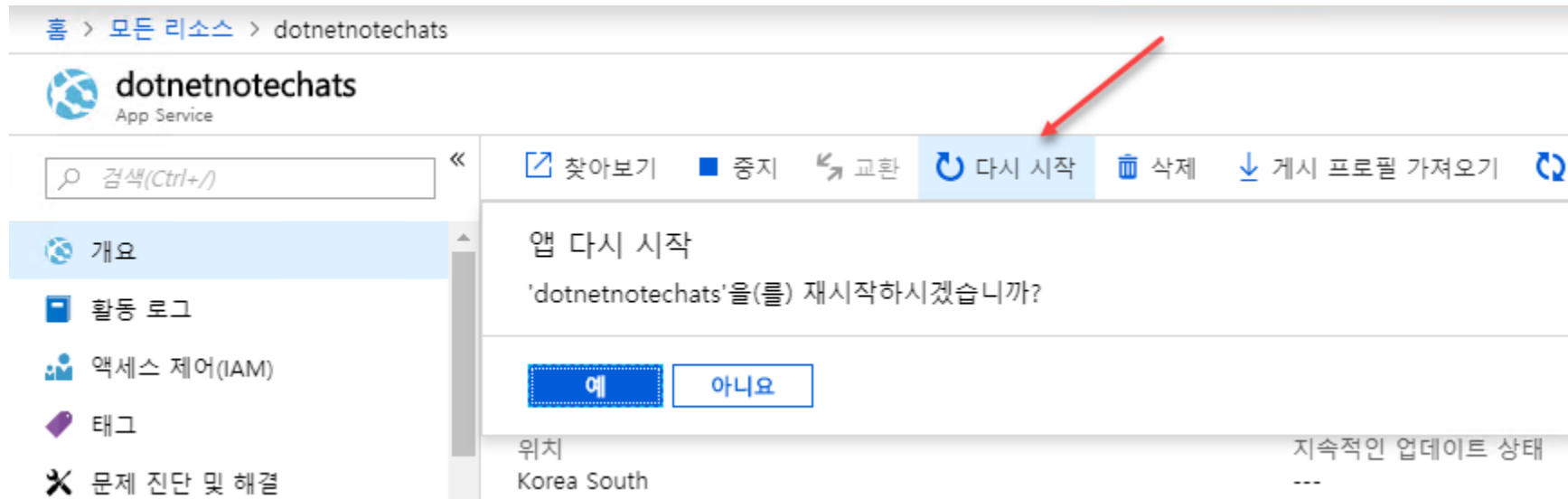
- Overview
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- Pipelines**
- Builds
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- Task groups
- Deployment groups
- XAML
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- Project settings

Logs Summary Tests

✓	Use NuGet 4.4.1 · succeeded	<1s
✓	NuGet restore · succeeded	26s
✓	Build solution **\*.sln · succeeded	23s
✓	VsTest - testAssemblies · succeeded 1 warning	2s
✗	Azure App Service Deploy: dotnetnotechats · 3 errors 1 warning	47s
<div>✗ Failed to deploy web package to App Service. ✗ Error Code: ERROR_FILE_IN_USE More Information: Web Deploy cannot modify the file 'DotNetNoteChats.dll' on the destination because it is locked by an external process. In order to allow the publish operation to succeed, you may need to either restart your application to release the lock, or use the AppOffline rule handler for .Net applications on your next publish attempt. Learn more at: <a href="http://go.microsoft.com/fwlink/?LinkId=221672#ERROR_FILE_IN_USE">http://go.microsoft.com/fwlink/?LinkId=221672#ERROR_FILE_IN_USE</a>. Error count: 1. ✗ Error: C:\Program Files\IIS\Microsoft Web Deploy V3\msdeploy.exe failed with return code: 4294967295</div>		
⏪	Publish symbols path · skipped ⓘ	
⏪	Publish Artifact: drop · skipped ⓘ	
✓	Post-job: Checkout · succeeded	<1s
✓	Report build status · succeeded	<1s

# 초간단 해결: 다시 시작

- 더 좋은 방법: 스테이징 사용





Builds - Pipelines

Home Page - DotNetNoteChats

내 대시보드 - Microsoft Azure

Microsoft Azure App Service

Home Page - DotNetNoteChats

← → ↺

https://webcamp.visualstudio.com/DotNetNoteChats/\_build?definitionId=3

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DotNetNoteChats

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🔍 Search all pipelines

☰ 📁 + New ▾

❌ DotNetNoteChats-Azure Web A...

🔗 master

DotNetNoteChats-Azure Web App f...

✎ Edit

**Queue**

⌵

History

Analytics\*

Commit

Build #

👤 제목 변경

CI build for WebCamp

❌ 20181207.2

👤 ASP.NET Core 프로젝트 생성

Manual build for WebCamp

✅ 20181207.1

Windows Taskbar

System Tray

Builds - Pipelines

Home Page - DotNetN...

내 대시보드 - Microsof...

Microsoft Azure App S...

Home Page - DotNetN...

Home Page - DotNetN...

+

←

→

↺

https://webcamp.visualstudio.com/DotNetNoteChats/\_build?definitionId=3

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+ New

▼

✔ DotNetNoteChats-Azure Web A...

🔗 master

DotNetNoteChats-Azure Web App f...

✎ Edit

🚀 Queue

⋮

History

Analytics\*

🔍

Commit

Build #

제목 변경

Manual build for WebCamp

✔ 20181207.3

제목 변경

CI build for WebCamp

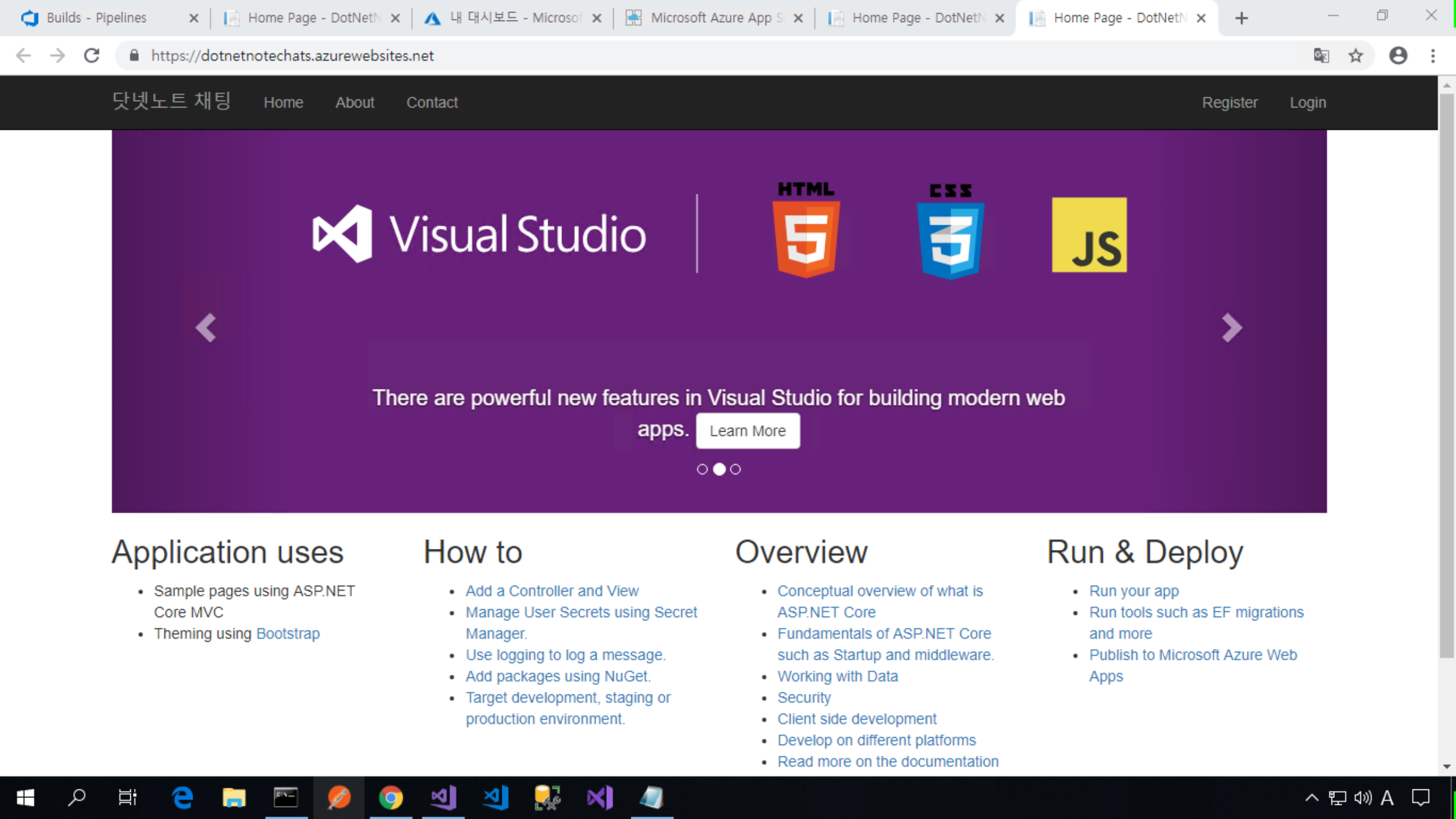
✖ 20181207.2

ASP.NET Core 프로젝트 생성

Manual build for WebCamp

✔ 20181207.1

Windows taskbar with icons for Start, Search, Task View, Edge, File Explorer, PowerShell, Chrome, VS Code, Docker, and other background applications.



Visual Studio



There are powerful new features in Visual Studio for building modern web apps.

[Learn More](#)

## Application uses

- Sample pages using ASP.NET Core MVC
- Theming using [Bootstrap](#)

## How to

- [Add a Controller and View](#)
- [Manage User Secrets using Secret Manager.](#)
- [Use logging to log a message.](#)
- [Add packages using NuGet.](#)
- [Target development, staging or production environment.](#)

## Overview

- [Conceptual overview of what is ASP.NET Core](#)
- [Fundamentals of ASP.NET Core such as Startup and middleware.](#)
- [Working with Data](#)
- [Security](#)
- [Client side development](#)
- [Develop on different platforms](#)
- [Read more on the documentation](#)

## Run & Deploy

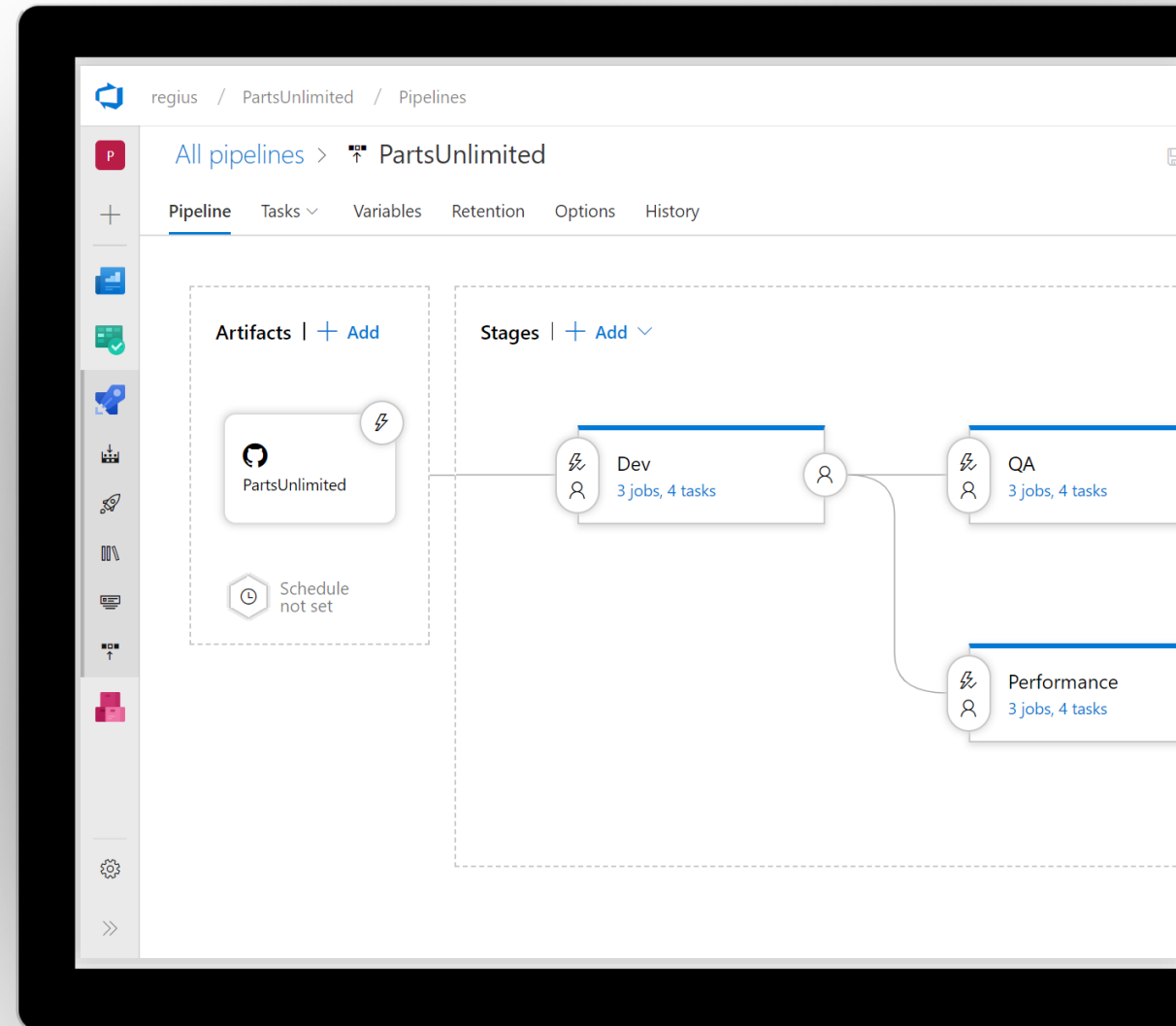
- [Run your app](#)
- [Run tools such as EF migrations and more](#)
- [Publish to Microsoft Azure Web Apps](#)



# Azure Pipelines - 릴리스

## 더 많은 지원으로 더 빠르게 배포

- 모든 클라우드 또는 온-프레미스로 배포
- 승인 및 추적 가능
- Kubernetes, Serverless, ML 또는 VM에 대한 기본 지원
- Classic UI -또는- YAML 기반 워크플로
- GitHub 통합

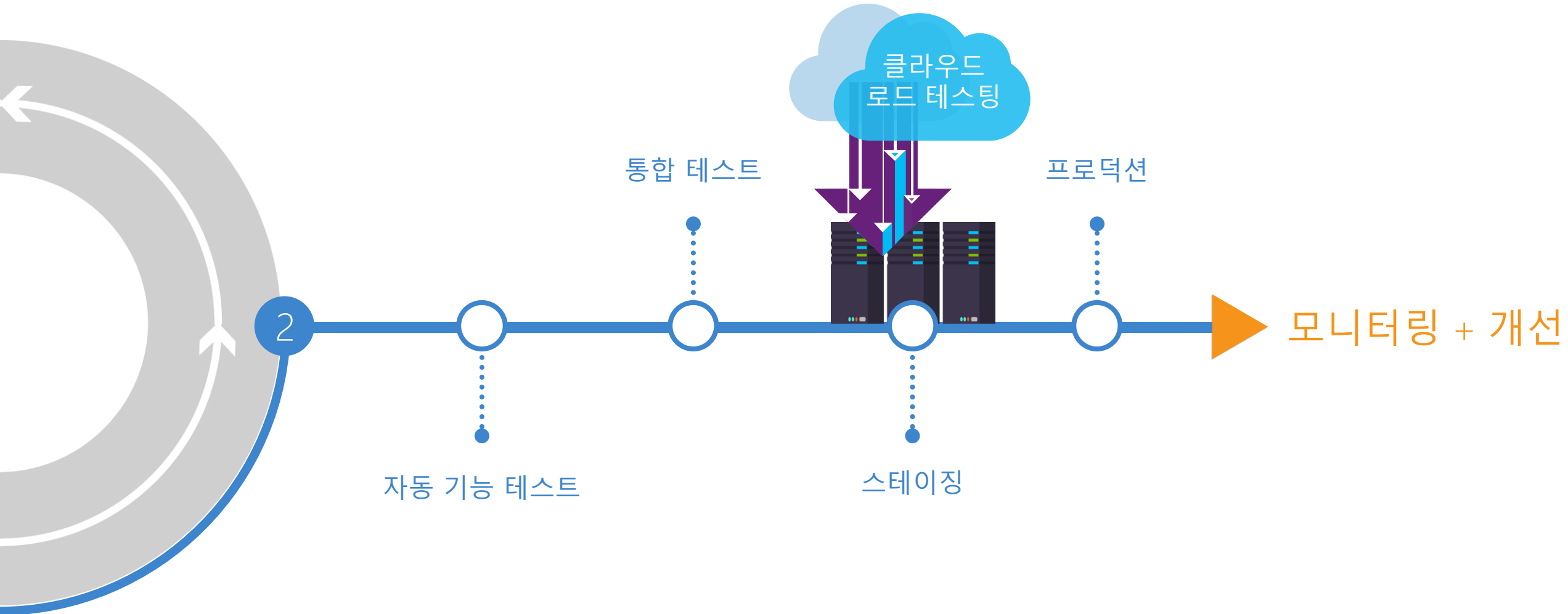


<https://azure.com/pipelines>

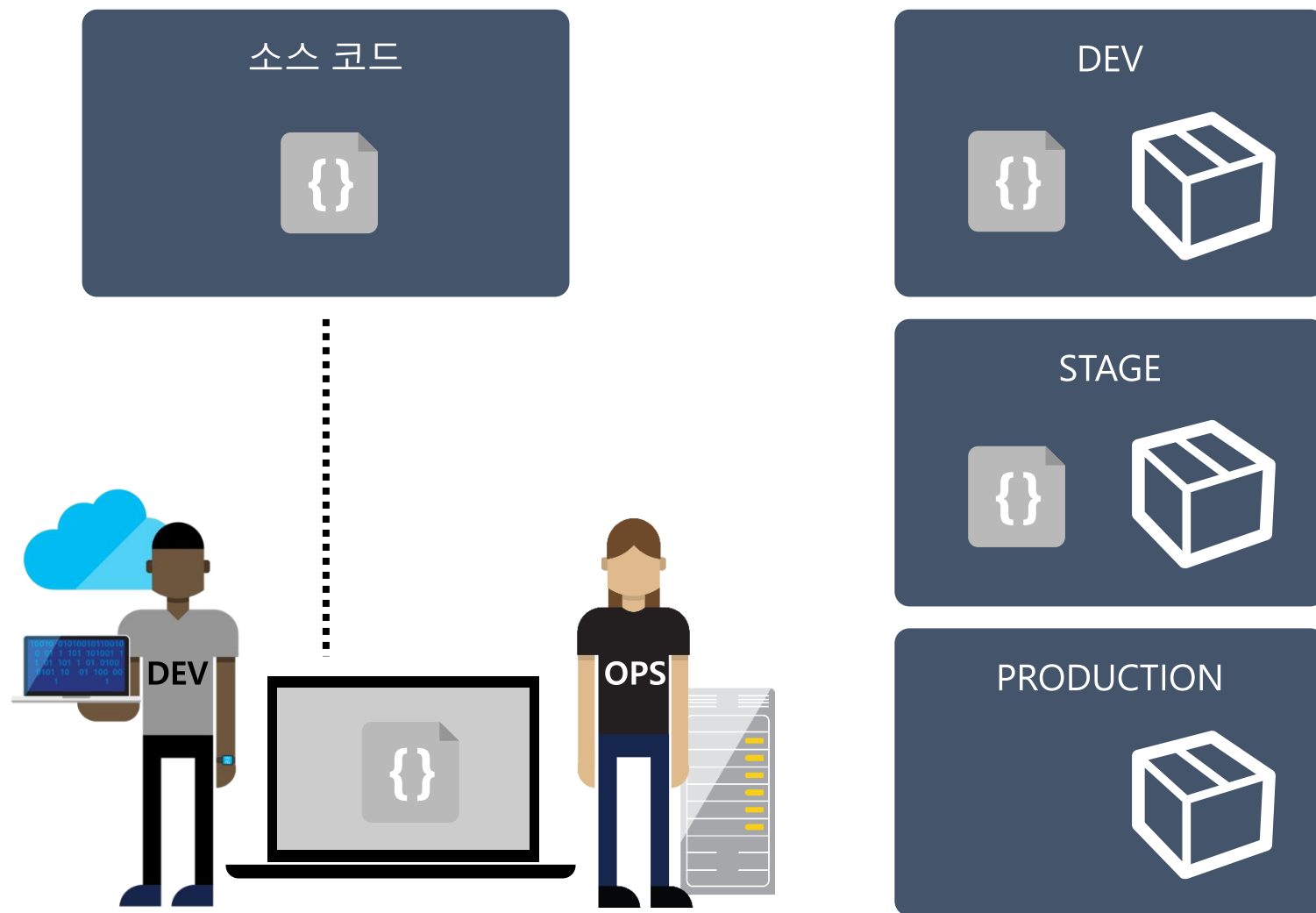


# 릴리스

모든 테스트가 통과되면 빌드는 릴리스 프로세스의 각 단계에 대한 테스트 환경에 배포됩니다.



# 릴리스



Demo:  
지속적인 배포  
(Continuous Deployment, Continuous Delivery)





**DotNetNoteChat** +

Overview

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## No release pipelines found

Automate your release process in a few easy steps with a new pipeline

New pipeline



Azure DevOps

redplus / DotNetNoteC

DotNetNoteChat

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Add

Stage 1

Select a template

All pipelines >

Pipeline Tasks

## Select a template

Or start with an Empty job

### Featured



#### Azure App Service deployment

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

[Apply](#)

#### 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



**DotNetNoteChat**



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All pipelines > **New release pipeline**

Save

+ Release



**Pipeline**

Tasks

Variables

Retention

Options

History

+ Add



**Stage 1**



1 job, 1 task

**Stage**

Stage 1

Delete

Move



Properties

Name and owners of the stage

Stage name

Stage 1

Stage owner



RedPlus





## DotNetNoteChat



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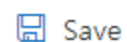
Task groups

Deployment groups

Test Plans

Artifacts

## All pipelines &gt; New release pipeline



Save



Release



Pipeline

Tasks

Variables

Retention

Options

History

## Stage 1

Deployment process



## Run on agent

Run on agent



## Deploy Azure App Service

Azure App Service Deploy

## Stage name

Stage 1

## Parameters



Unlink all

Azure subscription \*

Manage

Azure Sponsorship



Managed Service Identity service connection scope is limited to access granted to the Azure virtual machine running the agent. Ensure that the VM has access to specified resources.

## App type

Web App



App service name \*

dotnetnotechat





## DotNetNoteChat



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Artifacts

## All pipelines &gt; New release pipeline



Save



Release



Pipeline

Tasks

Variables

Retention

Options

History

## Stage 1

Some settings need attention

## Run on agent

Run on agent



## Deploy Azure App Service

Some settings need attention

## Stage name

Stage 1

## Parameters



Unlink all

Azure subscription \*

Manage

Microsoft Azure Sponsors

Authorize



Click Authorize to configure an Azure service connection



## App type

Web App



## App service name \*



This setting is required.

Save



Folder \*

Comment

OK

Cancel

**DotNetNoteChat**



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**Pipelines**

Builds

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Task groups

Deployment groups

All pipelines > **New release pipeline**

Save

+ Release



Pipeline

**Tasks**

Variables

Retention

Options

History

Stage 1

Deployment process



Run on agent

Run on agent



Deploy Azure App Service

Azure App Service Deploy



+ Create a release



+ Create a draft release

Azure App Service Deploy

Version

3.\*



Display name \*

Deploy Azure App Service

Azure subscription \*

| [Manage](#)

Azure Sponsorship

ⓘ Managed Service Identity service connection scope is limited to access granted to the Azure virtual machine running the agent. Ensure that the VM has access to specified resources.

App type \*




## Create a new release

New release pipeline

 Pipeline ^

Click on a stage to change its trigger from automated to manual.

 Stage 1

Stages for a trigger change from automated to manual. 

✓ Stage 1



☒ Stage 1

Release description

[All pipelines](#) > **New release pipeline**

Save



Release

 Release [Release-1](#) has been created

Pipeline

**Tasks**

Variables

Retention

Options

History

**Stage 1**

Deployment process

**Run on agent**

Run on agent

**Deploy Azure App Service**

Azure App Service Deploy

**Azure App Service Deploy** 

Version

3.\*



Display name \*

Deploy Azure App Service

Azure subscription \*

| [Manage](#)




↑ New release pipeline > Release-1 ▾

Pipeline Variables History | + Deploy ▾ ⓧ Cancel ↺ Refresh ✎ Edit release ...

### Release

Manually triggered

by  RedPlus  
2018. 12. 7. 오전 5:29

Artifacts

① No artifacts

### Stages

Stage 1

○ Not deployed



**DotNetNoteChat**



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Test Plans

Artifacts

New release pipeline > Release-1

Help

Pipeline

Variables

History

+ Deploy

Cancel

Refresh

Edit release

...



**Release**

Manually triggered

by RedPlus  
2018. 12. 7. 오전 5:29

Artifacts

No artifacts

**Stages**

Stage 1

Not deployed

Deploy

Logs



**DotNetNoteChat**



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Artifacts

New release pipeline > Release-1

Help

**Pipeline**

Variables

History

+ Deploy

Cancel

Refresh

Edit release

...



## Stage 1

Deploy release

### Overview

**To be deployed** (Deploying for the first time)  
Release-1

### Artifacts

No artifact is associated with this release.

### Comment

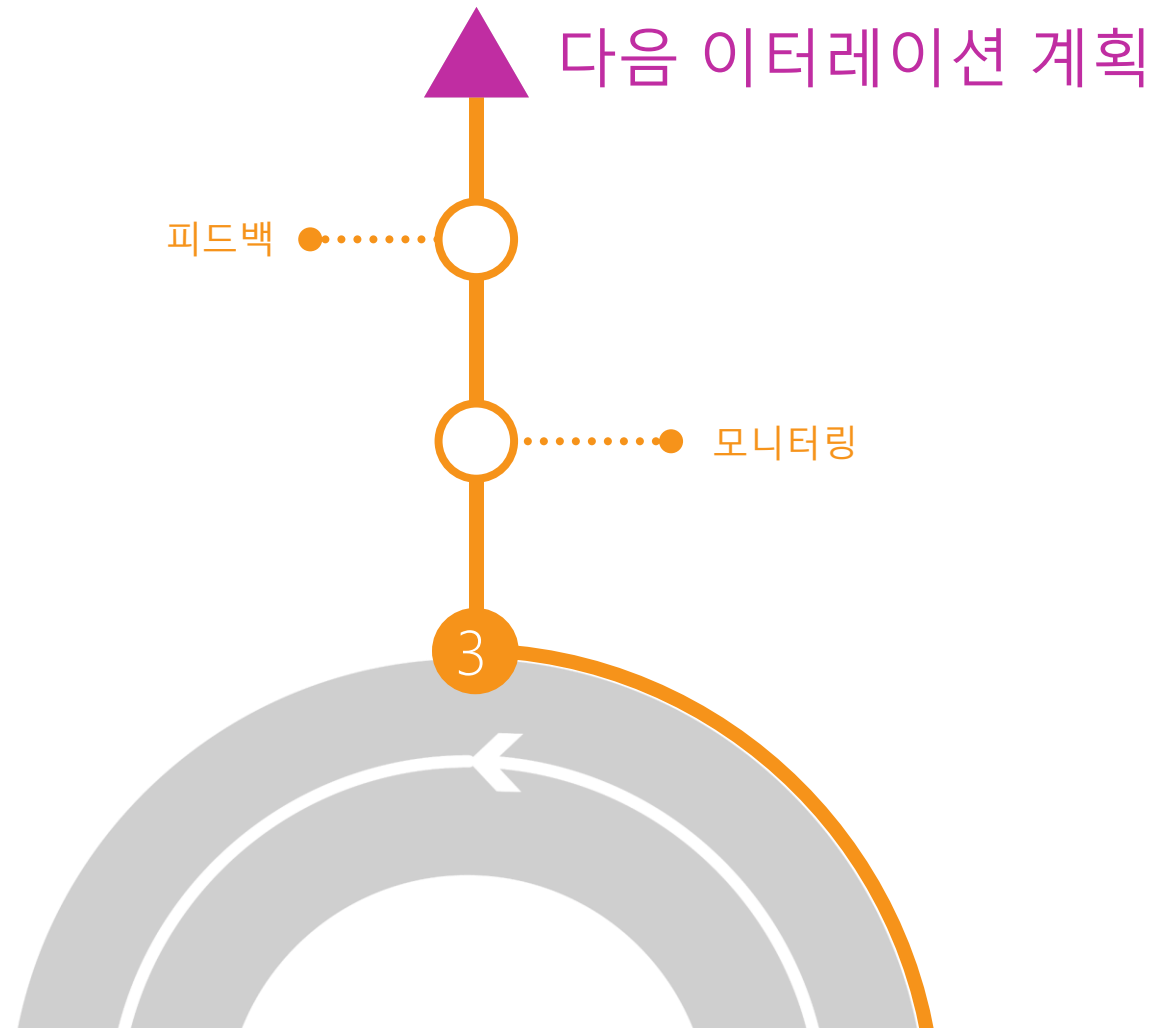
Deploy

Cancel



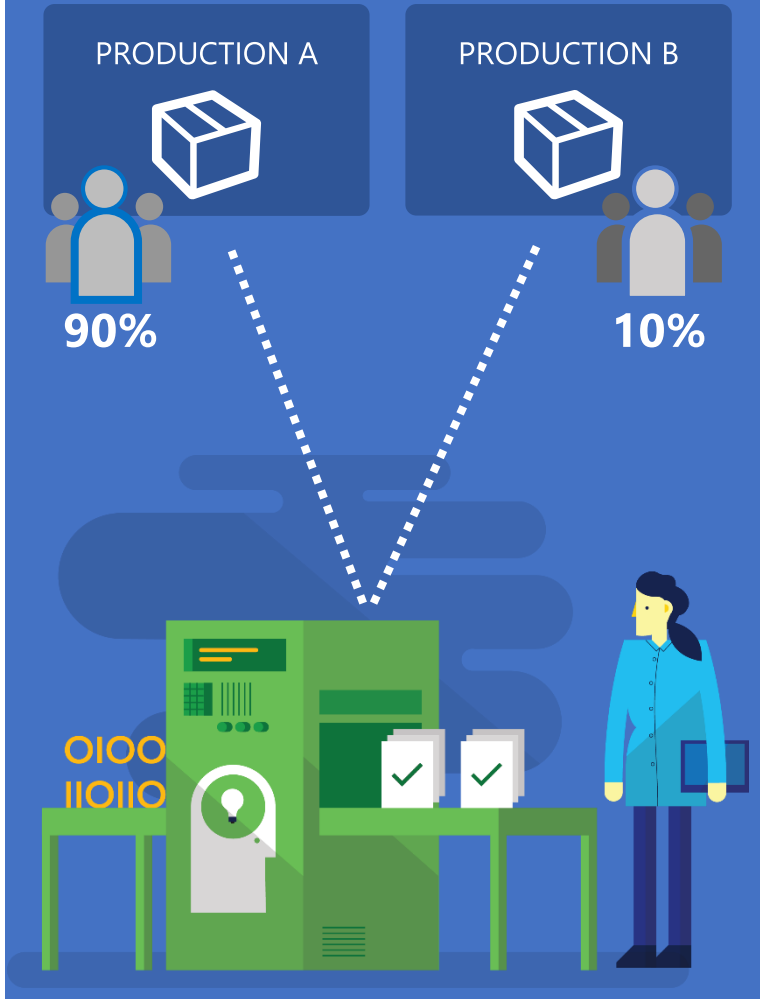
# 모니터링 + 피드백

사용자가 앱을 사용하는 방법 및  
앱에 대한 문제 및 버그에 대한 피드백 제공

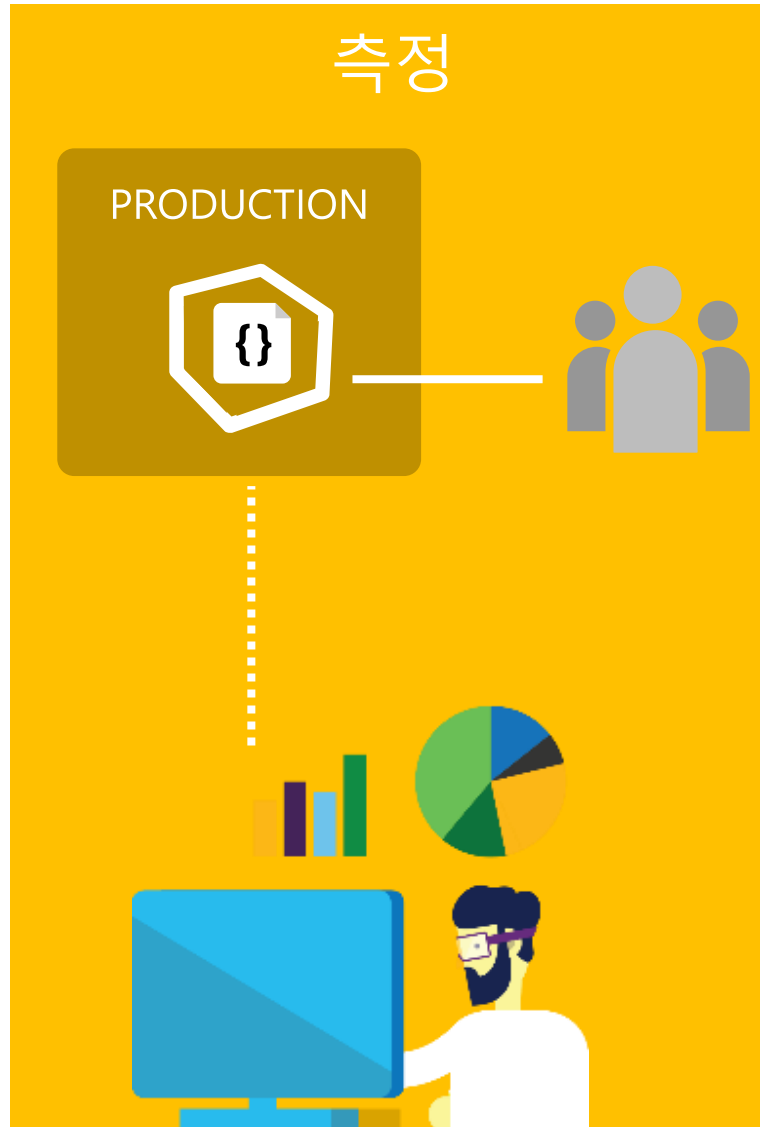


# 모니터링 + 피드백

## 프로덕션에서 테스트



## 측정



## 결합 주입



# 집에서 더 학습하기

- Azure Pipelines – Build
  - <https://channel9.msdn.com/Shows/Visual-Studio-Toolbox/Azure-Pipelines-Build>
- Azure Pipelines – Release
  - <https://channel9.msdn.com/Shows/Visual-Studio-Toolbox/Azure-Pipelines-Release>