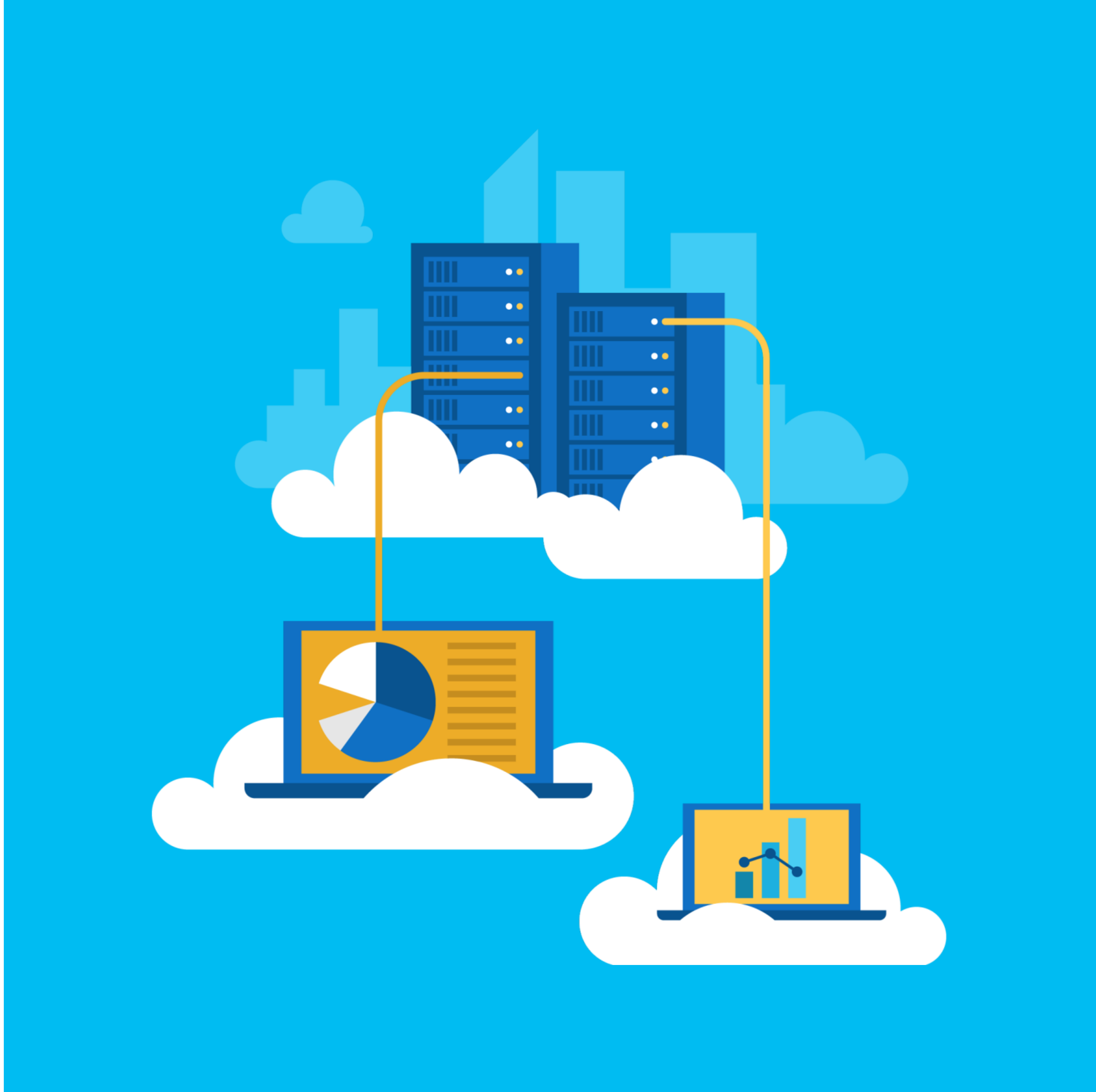
Microsoft

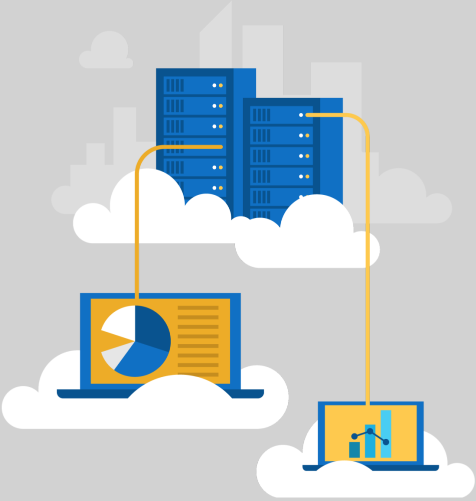
AZ-400.3 Module 2: Set Up a Release Management Workflow



Learning Objectives

- You are familiar with the terminology used in Azure DevOps and other Release Management Tooling
- You know what a Build and Release task is, what it can do, and are familiar with some available deployment tasks
- You know what an Agent, Agent Queue and Agent Pool is and what an agent is all about
- You know what a release job is, and why you sometimes need multiple release jobs in one release pipeline
- You know the difference between multi-agent and multi-configuration release job
- You know what release variables are, what stage variables are and how to best use them in your release pipeline
- You know what a Service Connection is and how you can use them to deploy to an environment securely
- You know what the possibilities for testing are in the pipeline and how to embed testing in the pipeline
- You are familiar with the different ways to inspect the health of your pipeline and release by using, alerts, service hooks and reports
- You know what a release gate is and how to create one

Lesson 01: Create a Release Pipeline



Definitions and Glossary

Term	Description	Synonym
Stage	an isolated and independent target for deployment	Environment
Job	A phase in the release pipeline that can run simultaneously with other phases on different Operating Systems	Phases
Agent	The program that runs the build or release	
Build & Release Task	Tasks are units of executable code used to perform designated actions in a specified order.	Action, Plugin, App
Release pipeline	The process that runs when deploying an artifact. Including triggers, approvals and gates	release process, pipeline, release definition
CI/CD	Continuous Integration / Continuous Deployment	
Release Gate	An automated check that approves the continuation	Quality Gate, Automatic Approval
Service Connection	A secure connection to an environment or service	Service Endpoint

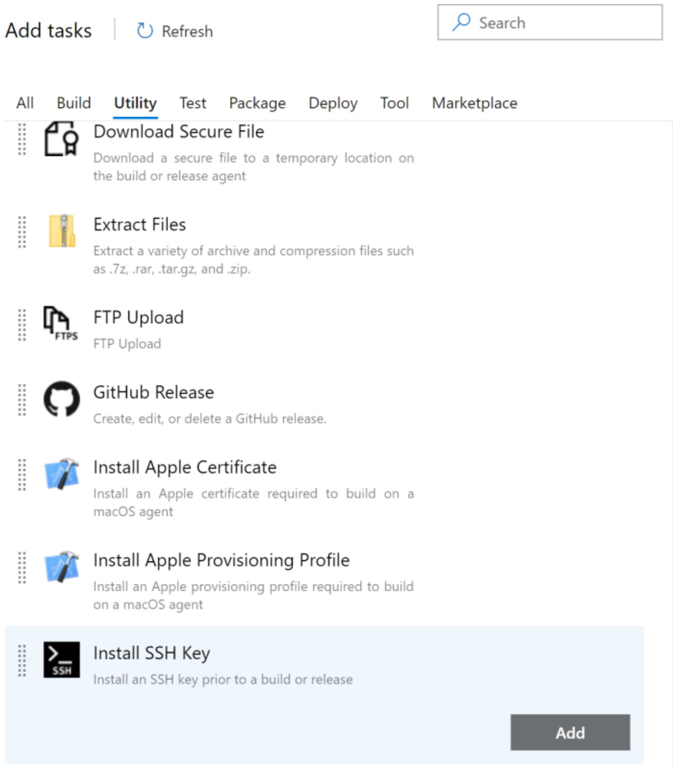
Build and Release Tasks

Units of executable code used to perform designated actions in a specified order

Tasks building, testing, running utilities, packaging, and deploying

Extensible model

Community tasks available in marketplace



Download Secure File
Download a secure file to a temporary location on the build or release agent

Extract Files
Extract a variety of archive and compression files such as .7z, .rar, .tar.gz, and .zip.

FTP Upload
FTP Upload

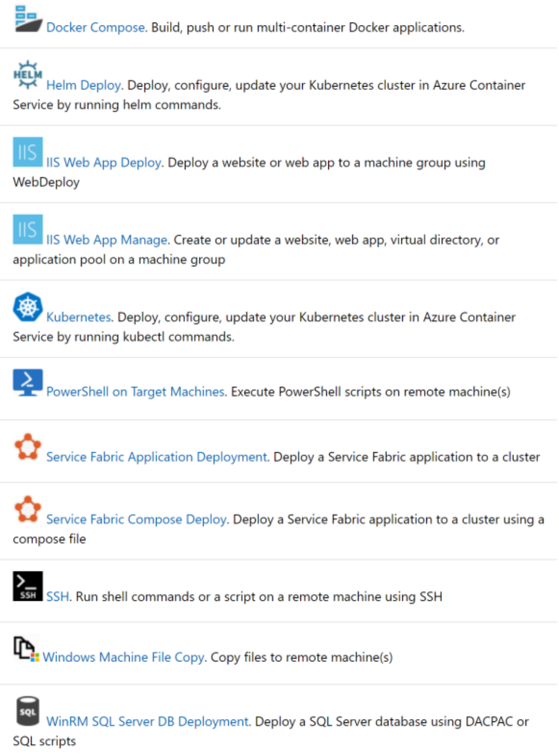
GitHub Release
Create, edit, or delete a GitHub release.

Install Apple Certificate
Install an Apple certificate required to build on a macOS agent

Install Apple Provisioning Profile
Install an Apple provisioning profile required to build on a macOS agent

Install SSH Key
Install an SSH key prior to a build or release

Important Deployment Tasks



Docker Compose. Build, push or run multi-container Docker applications.

Helm Deploy. Deploy, configure, update your Kubernetes cluster in Azure Container Service by running helm commands.

IIS Web App Deploy. Deploy a website or web app to a machine group using WebDeploy

IIS Web App Manage. Create or update a website, web app, virtual directory, or application pool on a machine group

Kubernetes. Deploy, configure, update your Kubernetes cluster in Azure Container Service by running kubectl commands.

PowerShell on Target Machines. Execute PowerShell scripts on remote machine(s)

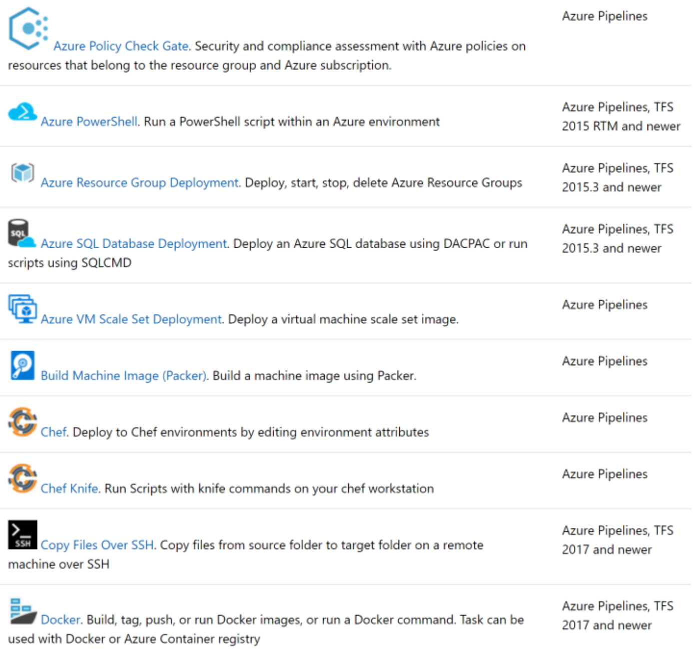
Service Fabric Application Deployment. Deploy a Service Fabric application to a cluster

Service Fabric Compose Deploy. Deploy a Service Fabric application to a cluster using a compose file

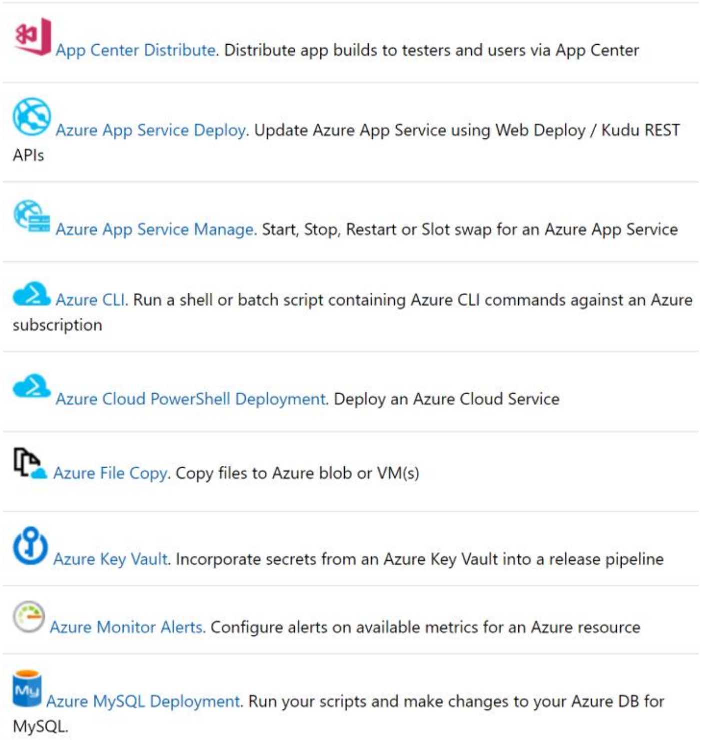
SSH. Run shell commands or a script on a remote machine using SSH

Windows Machine File Copy. Copy files to remote machine(s)

WinRM SQL Server DB Deployment. Deploy a SQL Server database using DACPAC or SQL scripts



Azure Policy Check Gate. Security and compliance assessment with Azure policies on resources that belong to the resource group and Azure subscription.	Azure Pipelines
Azure PowerShell. Run a PowerShell script within an Azure environment	Azure Pipelines, TFS 2015 RTM and newer
Azure Resource Group Deployment. Deploy, start, stop, delete Azure Resource Groups	Azure Pipelines, TFS 2015.3 and newer
Azure SQL Database Deployment. Deploy an Azure SQL database using DACPAC or run scripts using SQLCMD	Azure Pipelines, TFS 2015.3 and newer
Azure VM Scale Set Deployment. Deploy a virtual machine scale set image.	Azure Pipelines
Build Machine Image (Packer). Build a machine image using Packer.	Azure Pipelines
Chef. Deploy to Chef environments by editing environment attributes	Azure Pipelines
Chef Knife. Run Scripts with knife commands on your chef workstation	Azure Pipelines
Copy Files Over SSH. Copy files from source folder to target folder on a remote machine over SSH	Azure Pipelines, TFS 2017 and newer
Docker. Build, tag, push, or run Docker images, or run a Docker command. Task can be used with Docker or Azure Container registry	Azure Pipelines, TFS 2017 and newer



App Center Distribute. Distribute app builds to testers and users via App Center

Azure App Service Deploy. Update Azure App Service using Web Deploy / Kudu REST APIs

Azure App Service Manage. Start, Stop, Restart or Slot swap for an Azure App Service

Azure CLI. Run a shell or batch script containing Azure CLI commands against an Azure subscription

Azure Cloud PowerShell Deployment. Deploy an Azure Cloud Service

Azure File Copy. Copy files to Azure blob or VM(s)

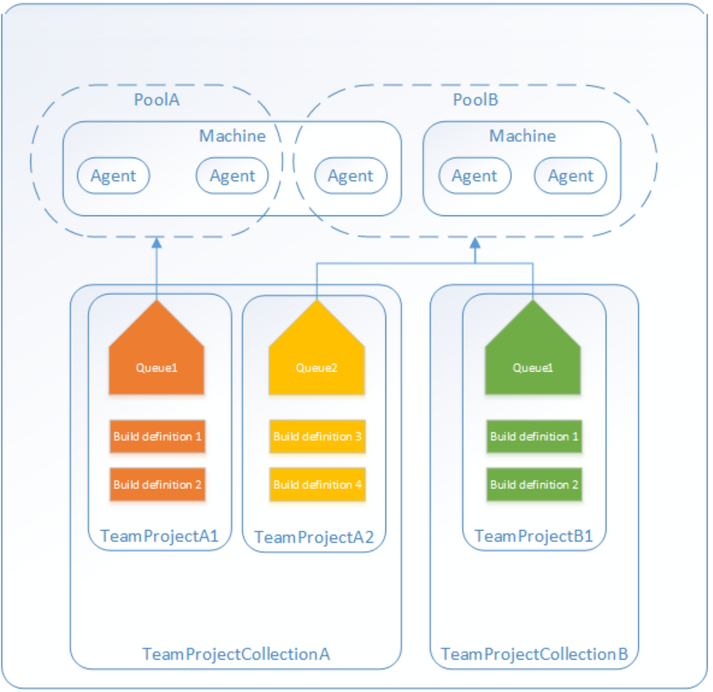
Azure Key Vault. Incorporate secrets from an Azure Key Vault into a release pipeline

Azure Monitor Alerts. Configure alerts on available metrics for an Azure resource

Azure MySQL Deployment. Run your scripts and make changes to your Azure DB for MySQL.

Agents, Agent Pools and Queues

- Agents are tasked with performing the builds and releases
- Agent pools are used to organize and define permission boundaries around your agents
- Agent queue provides access to a pool of agents



Private and Hosted Agents

Hosted agents. These agents exist within their own hosted pool and are maintained and upgraded by the vendor. Hosted agents have specific limitations and advantages:

- Hosted agents have no cost and are immediately available, and have most common software and libraries installed.
- Do not have an interactive mode.
- Do not allow administrative privilege or allow logon.

Private (or Custom) agents. Private agents are provisioned on private virtual machines (VMs) and are custom built to accommodate the project's needs.

Deployment Groups

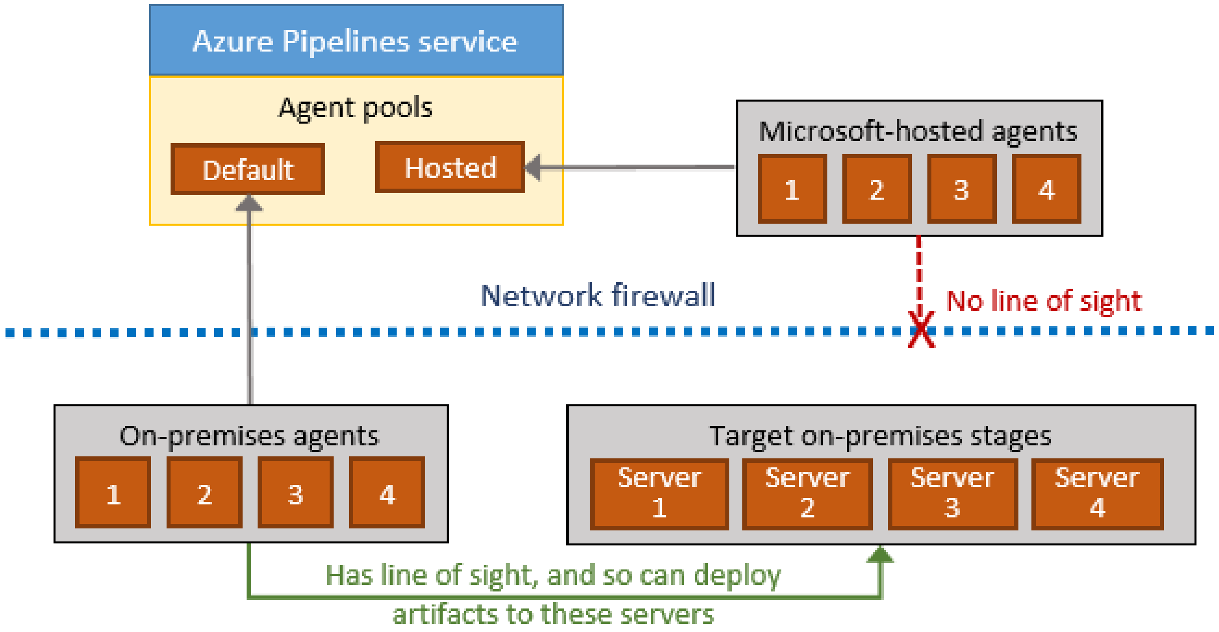
A deployment group is a logical set of deployment target machines that have agents installed on each one.

Can solve the firewall issues because you pull sources from a central server

Specify the security context and runtime targets for the agents.

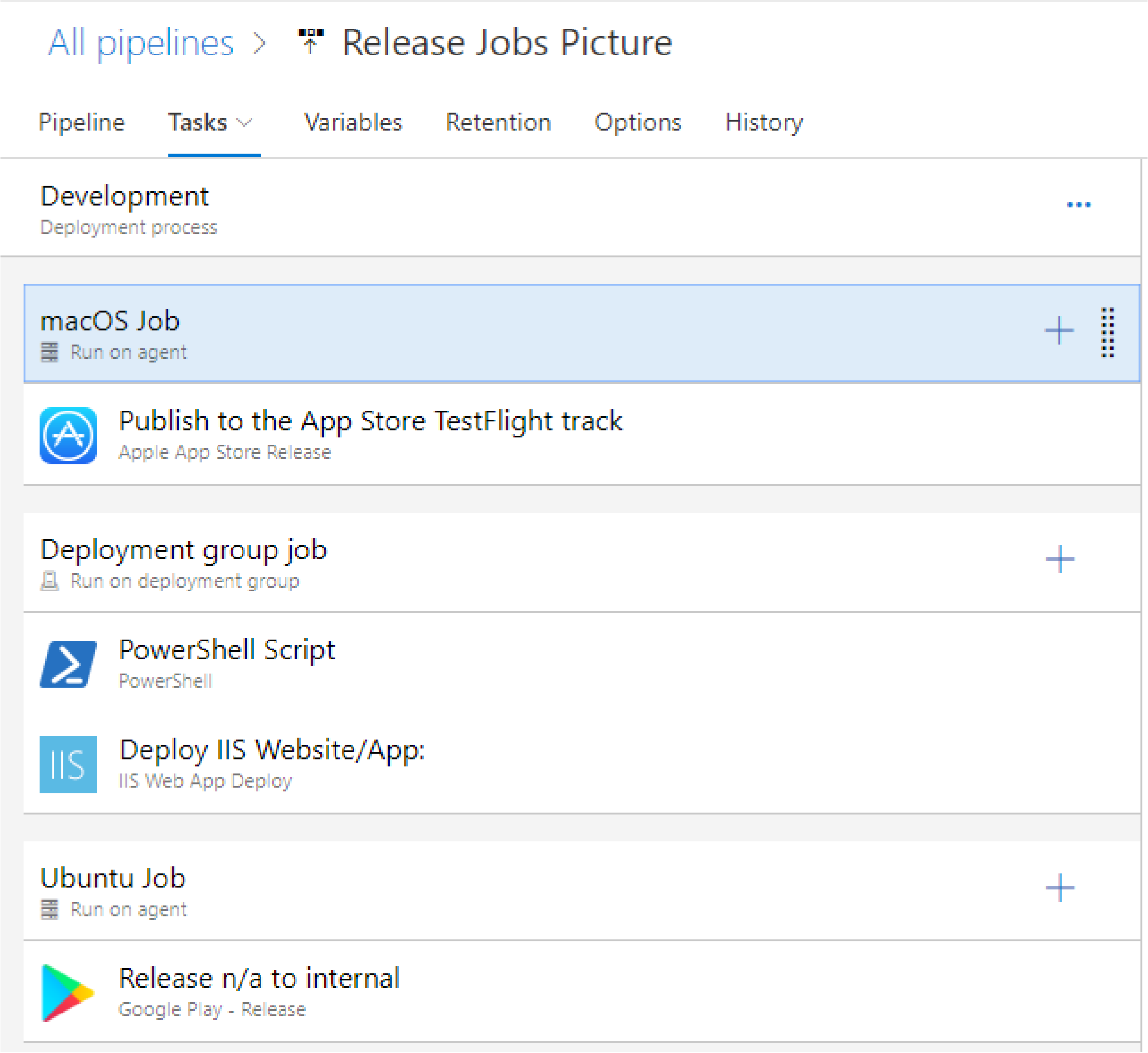
Let you view live logs for each server as a deployment takes place.

Enable you to use machine tags to limit deployment to specific sets of target servers.



Release Agent Jobs

- A job is a series of tasks that run sequentially on the same target
- Can be combined in one pipeline to enable multi-platform deployment
  - E.g. Deploy .Net backend via Windows, IoS app via MacOS and Angular frontend via Linux
- Jobs run on the host machine where the agent is installed



All pipelines > Release Jobs Picture

Development
Deployment process

macOS Job
Run on agent

Publish to the App Store TestFlight track
Apple App Store Release

Deployment group job
Run on deployment group

PowerShell Script
PowerShell

Deploy IIS Website/App:
IIS Web App Deploy

Ubuntu Job
Run on agent

Release n/a to internal
Google Play - Release

Different Agent Job Types

Jobs or Agent Jobs

Server or Agentless Jobs

Container Jobs

Deployment Group Jobs

Multi-Agent and Multi-configuration

Multi-configuration: Run the same set of tasks on multiple configurations

- Run the release once with configuration Setting A on WebApp A and setting B for WebApp B
- Deploy to different geographic regions.
- Multi-configuration testing: run a set of tests in parallel - once for each test configuration.

Multi-agent: Run the same set of tasks on multiple agents using the specified number of agents

- Deploy same bits to a farm of servers

Discussion

How to use Release jobs

- Do you see a purpose for Release Jobs in your pipeline and how would you set it up?

- Topics you might want to consider are:
- Do you have artifacts from multiple sources?
- Do you want to run deployments on different servers simultaneously?
- Do you need multiple platforms?
- How long does your release take?
- Can you run your deployment in parallel or does it need to run in sequence?

Release Variables

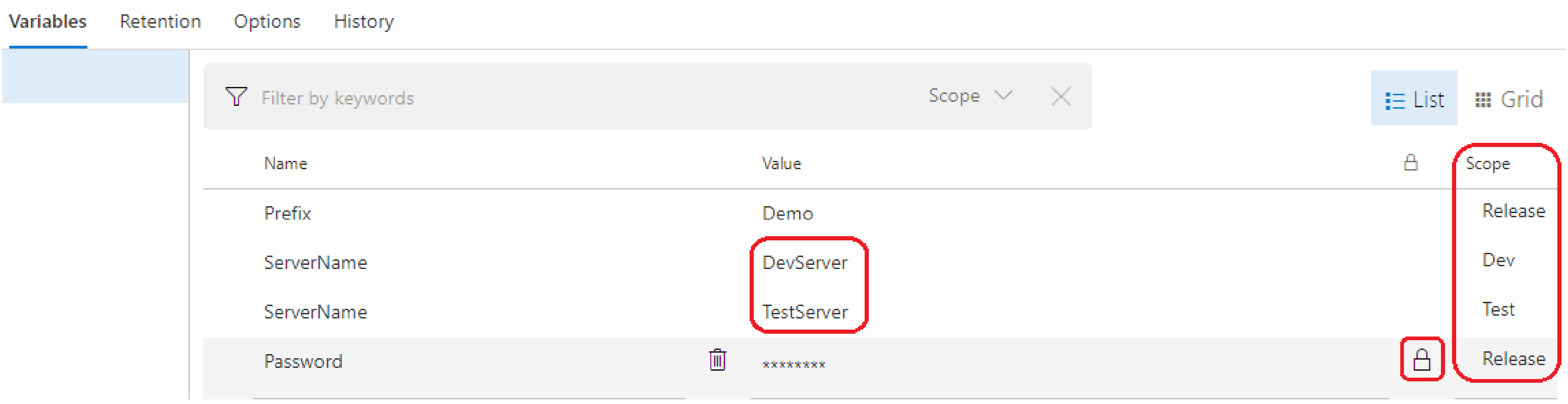
Predefined Variables

Release pipeline variables

Stage Variables

Variable groups

Normal and Secret variables



Name	Value	🔒	Scope
Prefix	Demo		Release
ServerName	DevServer		Dev
ServerName	TestServer		Test
Password	********	🔒	Release

Lesson 02: Provision and Configure Environments

Provision and Configure Target Environments

- On-Premises servers
- Cloud servers or Infrastructure as a Service (IaaS). For example Virtual machines or networks.
- Platform as a Service (PaaS) and Functions as a Service (FaaS). For example Web apps or storage accounts.
- Clusters.

Automating your infrastructure deployments in the Cloud with Terraform and Azure Pipelines

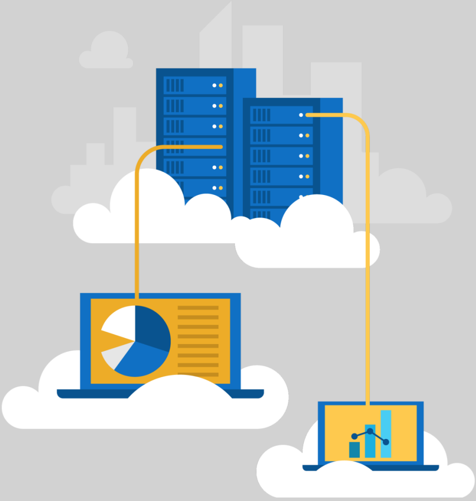
HANDS-ON

Deploying to Azure VM using Deployment Groups

HANDS-ON

Setting up an Service Connection to Azure

Lesson 03: Manage Secrets with the Release Pipeline



Manage And Modularize Tasks and Templates

Task Groups

Variable Groups

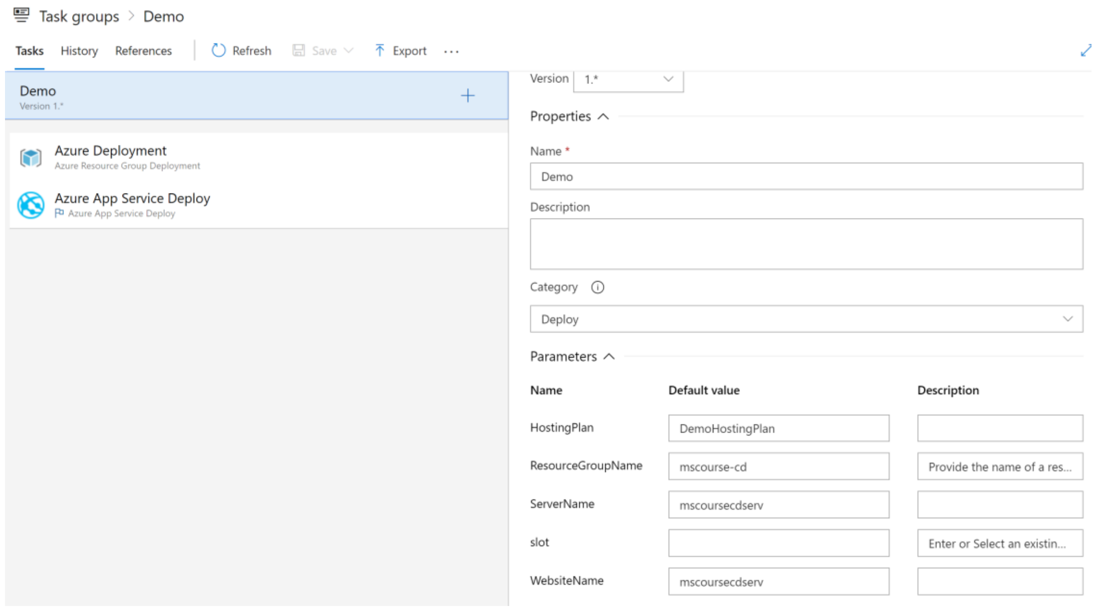
Custom Build and Release Tasks

Task Groups

Encapsulate a sequence of tasks in one reusable task

Parameterization of task group to make reuse easier

Standardize and centrally manage deployment steps for all your applications



Demo
Version 1.*

Azure Deployment
Azure Resource Group Deployment

Azure App Service Deploy
Azure App Service Deploy

Version: 1.*

Properties

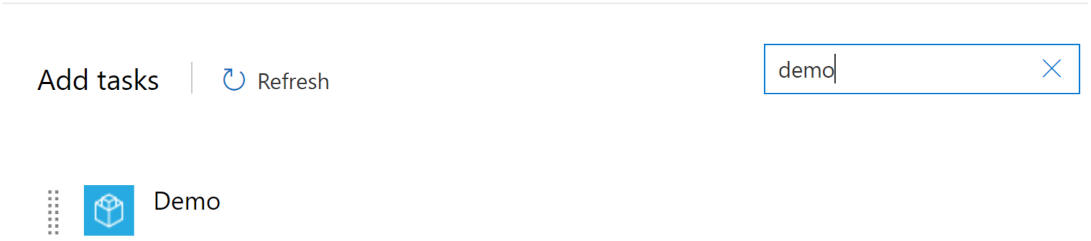
Name *: Demo

Description:

Category: Deploy

Parameters

Name	Default value	Description
HostingPlan	DemoHostingPlan	
ResourceGroupName	mscourse-cd	Provide the name of a res...
ServerName	mscoursecdserv	
slot		Enter or Select an existin...
WebsiteName	mscoursecdserv	



demo

Demo

Variable Groups

A variable group is used to store values that you want to make available across multiple builds and release pipelines.

- Store the username and password for a shared server
- Store a share connection string
- Store the geolocation of an application
- Store all settings for a specific application

Custom build/release tasks

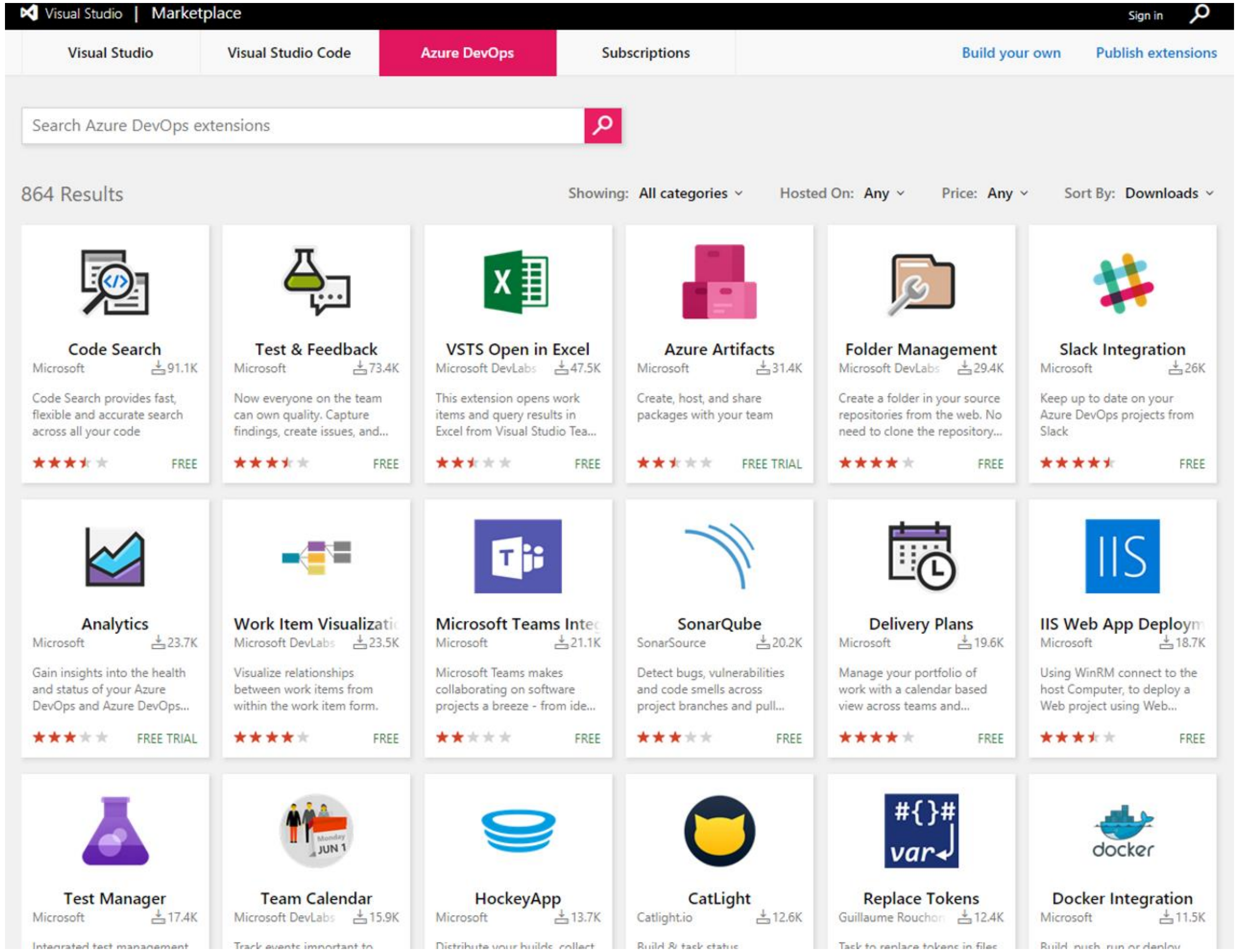
Private or public accessible

Access to variables that are otherwise not accessible

Use and reuse secure endpoint to a target server

Safely and efficiently distribute across your whole organization

Users do not see implementation details.



864 Results

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Microsoft 91.1K
Code Search provides fast, flexible and accurate search across all your code
★★★½☆ FREE

Test & Feedback
Microsoft 73.4K
Now everyone on the team can own quality. Capture findings, create issues, and...
★★★½☆ FREE

VSTS Open in Excel
Microsoft DevLabs 47.5K
This extension opens work items and query results in Excel from Visual Studio Tea...
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Azure Artifacts
Microsoft 31.4K
Create, host, and share packages with your team
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Team Calendar
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HockeyApp
Microsoft 13.7K
Distribute your builds, collect

CatLight
Catlight.io 12.6K
Build & task status

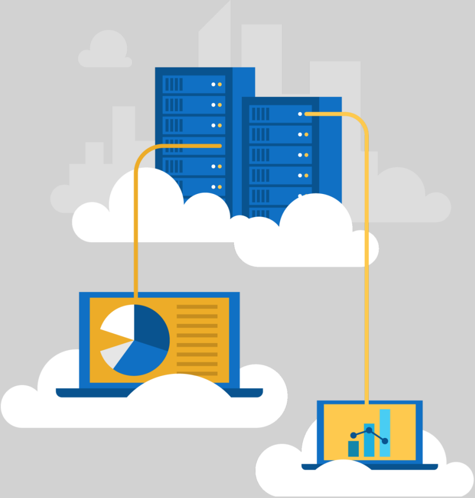
Replace Tokens
Guillaume Rouchon 12.4K
Task to replace tokens in files

Docker Integration
Microsoft 11.5K
Build, push, run or deploy

Demo
Creating and managing variable groups

Creating and managing task groups

Lesson 04: Integrate Secrets with the Release Pipeline



Secrets are needed

Secrets to access the target environment (servers, storage accounts)

Secrets to access resources (connections strings, tokens, username/passwords)

Secrets that your application uses (config files)

Secrets in your release pipeline

Service Connections

Using secret variables

Storing secrets in a key vault

- Retrieve with a variable group
- Accessing Keyvault from within the pipeline

Setting up Secrets in the pipeline

DEMO

Setting up secrets in the pipeline with Azure Key vault

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Lesson 05: Configure Automated Integration and Functional Test Automation

Configure Automated Integration and Functional Test Automation

Do not automate all your manual tests

Rethink test strategy

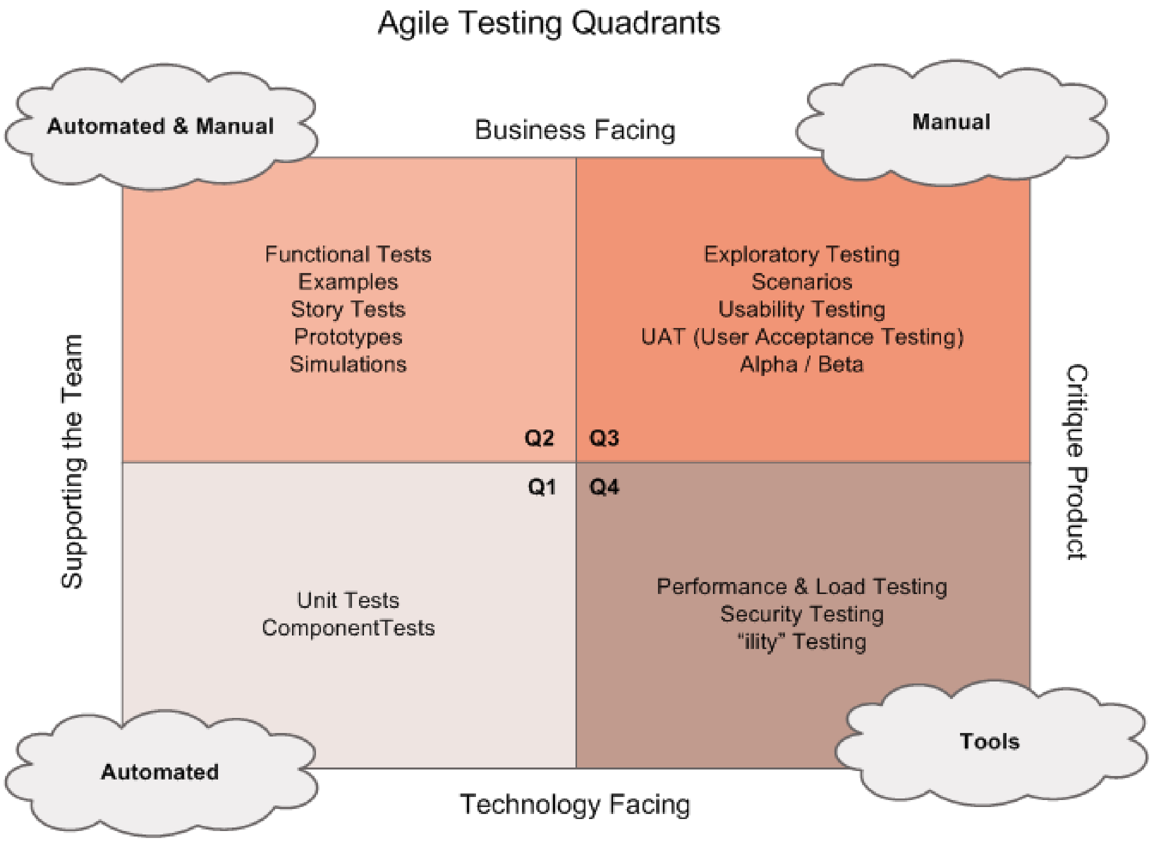
Tests should be written at the lowest level possible

Write once, run anywhere including production system

Product is designed for testability

Test code is product code, only reliable tests survive

Test ownership follows product ownership



Agile Testing Quadrants

Automated & Manual

Business Facing

Manual

Functional Tests
Examples
Story Tests
Prototypes
Simulations

Q2

Exploratory Testing
Scenarios
Usability Testing
UAT (User Acceptance Testing)
Alpha / Beta

Q3

Supporting the Team

Critique Product

Q1

Unit Tests
ComponentTests

Q4

Performance & Load Testing
Security Testing
"ility" Testing

Automated

Tools

Technology Facing

Source: https://lisacrispin.com/2011/11/08/using-the-agile-testing-quadrants/

Setting up Test Infrastructure

Test Agents are needed to run tests on target servers

Run on your own servers or target servers

Run in the cloud

Setting up and Running Load Tests

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Setting up and Running Functional Tests

HANDS-ON

Setting up and Running Availability Tests

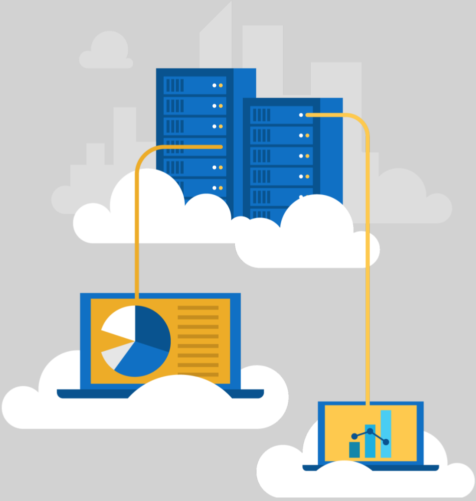
Create Health endpoints in your application

Use tools, e.g. availability tests in Application Insights, to test health endpoints

Two types of availability tests

- URL ping test
- Multi-step web test

Lesson 06: Automate Inspection of Health



Automate Inspection of Health

Stay informed about your process and releases

Release Gates

Events, subscriptions, and notifications

Service Hooks

Reporting

Release Gates

- As a quality gate or as an automatic approval
- Can be configured pre- and post stage
- Keeps evaluating for success for a timeframe
- Ships out of the box in Azure DevOps
- Different types of Release Gate
  - Call an Azure Function
  - Call a REST API
  - Azure Monitor
  - Query Work Items
  - Publish to Azure Service Bus

Using Azure Monitor as Release Gate

HANDS-ON

Events, Subscriptions, and Notifications

- Actions in Azure DevOps trigger events
- Users can subscribe to events and get notified
  - Calling a SOAP url
  - Getting an email
- Notifications can be managed centrally and personally

Service Hooks

Service hooks enable you to perform tasks on other services when events happen

Out of the Box integrations

Build and release	Collaborate	Customer support	Plan and track	Integrate
AppVeyor	Campfire	UserVoice	Trello	Azure Service Bus
Bamboo	Flowdock	Zendesk		Azure Storage
Jenkins	HipChat			Web Hooks
MyGet	Hubot			Zapier
Slack				

Setting up service hooks to monitor the pipeline

DEMO

Creating a Release Dashboard

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Wrap Up

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You are familiar with the different ways to inspect the health of your pipeline and release by using, alerts, service hooks and reports

You know what a release gate is and how to create one

Module 2: Review Questions

1. How many deployment jobs can be run concurrently by a single agent?
2. What should you create to store values that you want to make available across multiple build and release pipelines?
3. How can you provision the agents for deployment groups in each of your VMs?