Microsoft

February 28, 2019 — 8:30 AM - 5:00 PM | Detroit, Michigan

Fundamentals of DevOps

Learn.

Connect.

Explore.

Agenda

Why Organizations Care about DevOps

The fundamentals of Azure DevOps

Why Azure DevOps

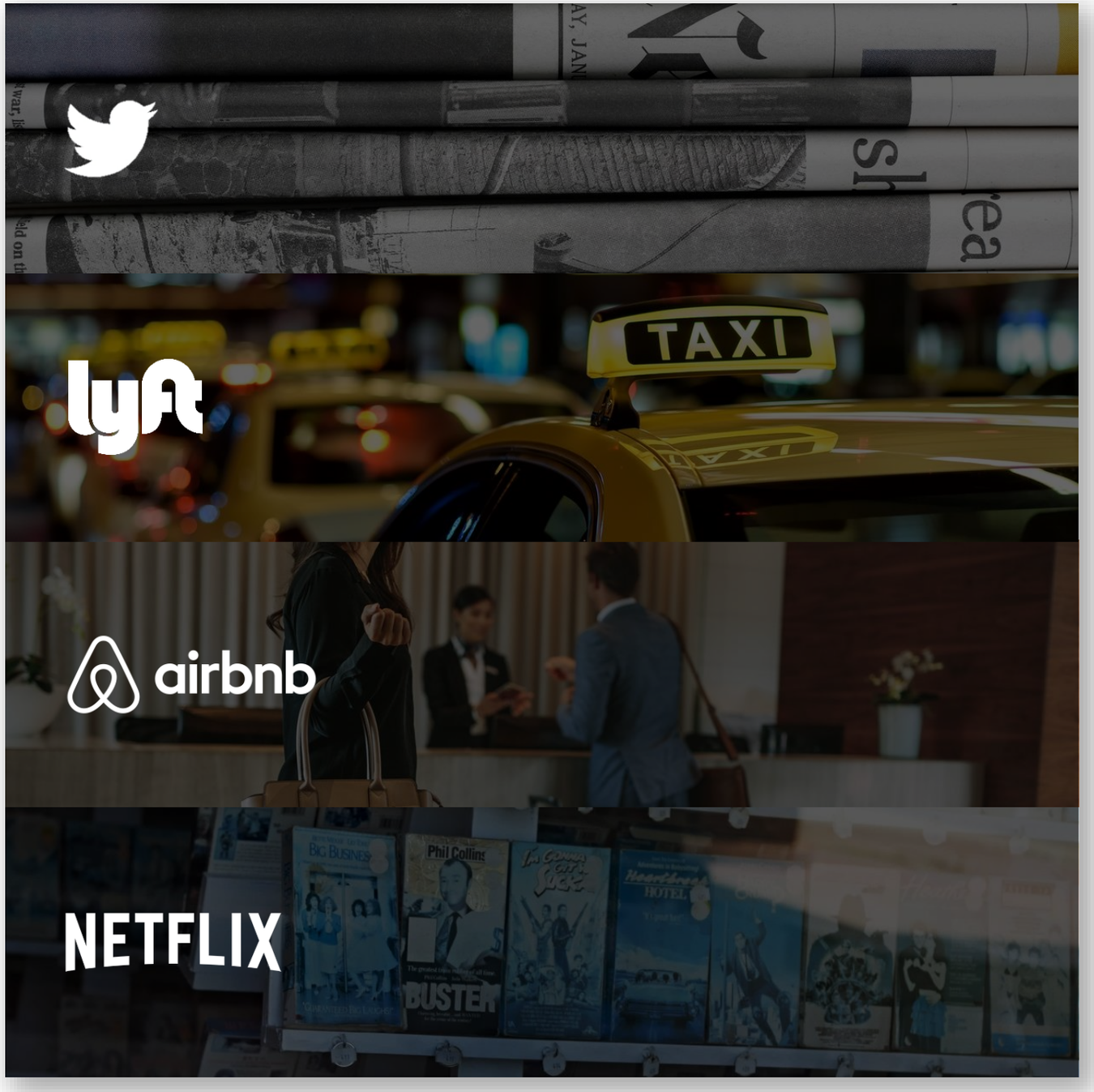
Why GitHub + Azure DevOps

Azure DevTest Labs

Why Organizations Care about DevOps

Nearly 50% of the current S&P 500 will be replaced by 2026

Innosight
Corporate Longevity: Turbulence Ahead
for Large Organizations

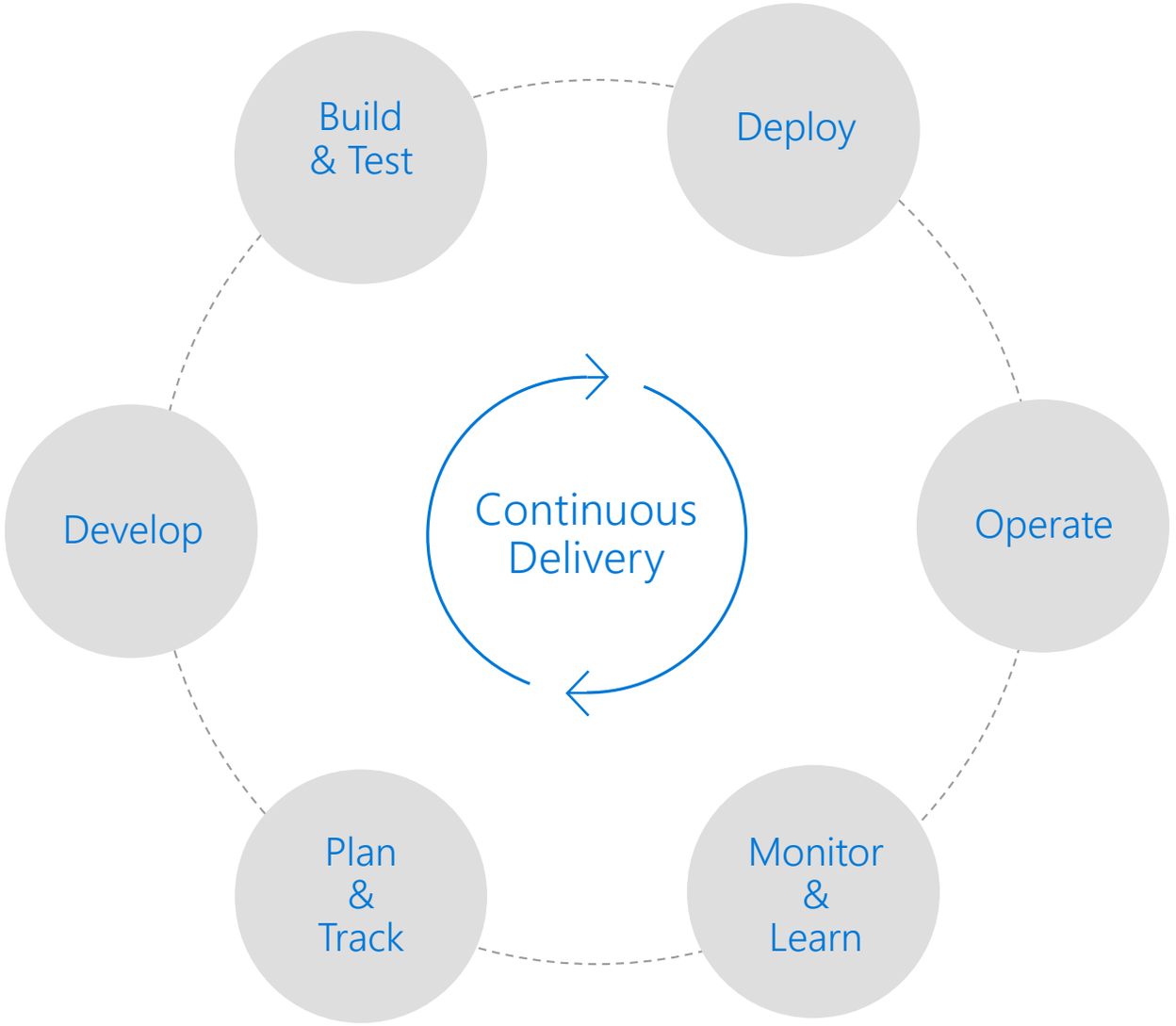


Developers are at the heart of your company's innovation

What is DevOps?

People. Process. Products.

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



High Performance DevOps Companies Achieve…

46x Deployment Frequency

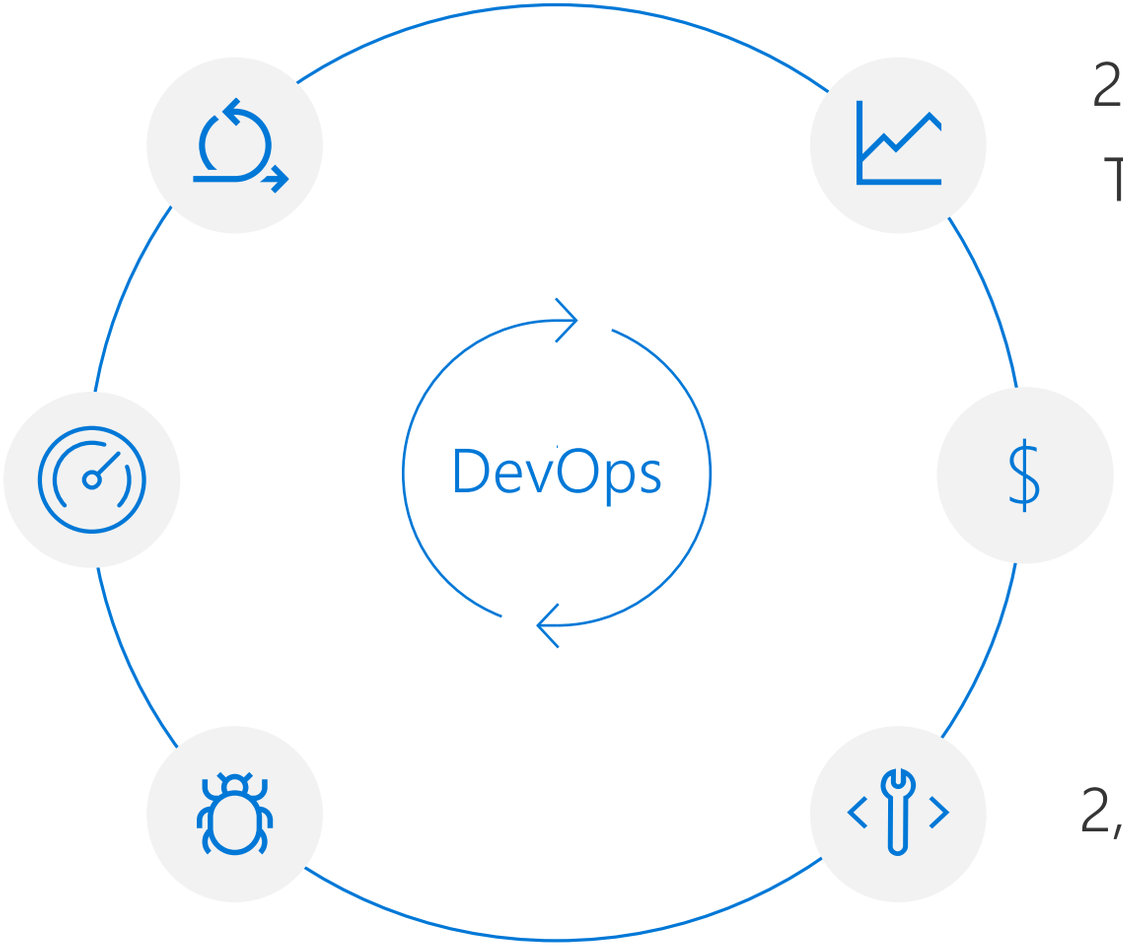
2,555x Faster Lead Time For Changes

Faster Time to Market

Increased Revenue

7x Lower Change Failure Rate

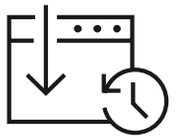
2,604x Faster Mean Time to Recover



Source: 2018 Accelerate: State of DevOps: Strategies for a New Economy." N. Forsgren, J. Humble, G. Kim. DevOps Research and Assessment (DORA)

What technologies do I need to support DevOps?

DevOps brings together people, processes, and technology, automating software delivery to provide continuous value to your users. Using Azure DevOps, you can deliver software faster and more reliably - no matter how big your IT department or what tools you're using.



Continuous Integration (CI)

- Improve software development quality and speed.
- When you use Azure Pipelines or Jenkins to build apps in the cloud and deploy to Azure, each time you commit code, it's automatically built and tested and bugs are detected faster.

Continuous Deployment (CD)

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

Continuous Monitoring (CM)

- With Azure Monitor you can identify how your apps & infra is performing and test if the recent deployment made things better or worse.
- Using CI/CD practices, paired with monitoring tools, you'll be able to safely deliver features to your customers as soon as they're ready.

The fundamentals of Azure DevOps

Introducing Azure DevOps

Azure Boards

Kanban Boards, Backlogs, Dashboards + Reporting

Azure Pipelines

CI/CD platform, FREE for open source projects

Azure Test Plans

Manual and Exploratory Testing Tools

Azure Artifacts

Package Management for Maven, npm, and NuGet

Azure Repos

Private Git repos and collaborate to build better code with pull requests

Azure Lab Services

Self-service DevTest Environments

Azure DevOps

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

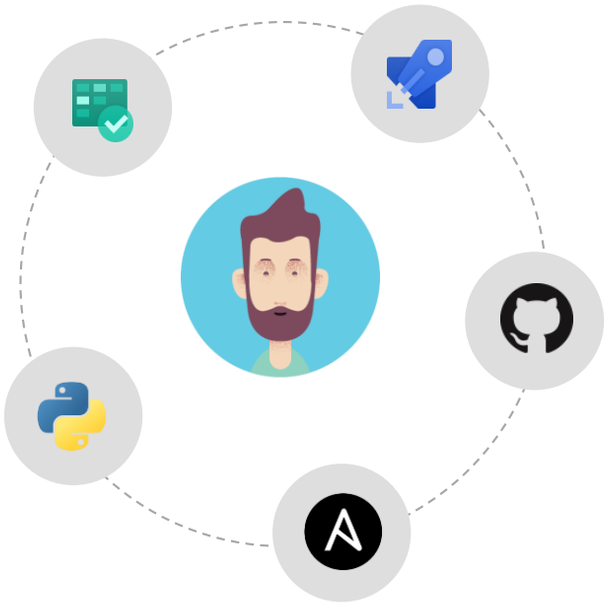
- Fully Integrated with end to end traceability
- Scalable to any team and project size
- Highly available, multi region, hybrid cloud & on-prem
- Customer Support
- Consistent admin and access control

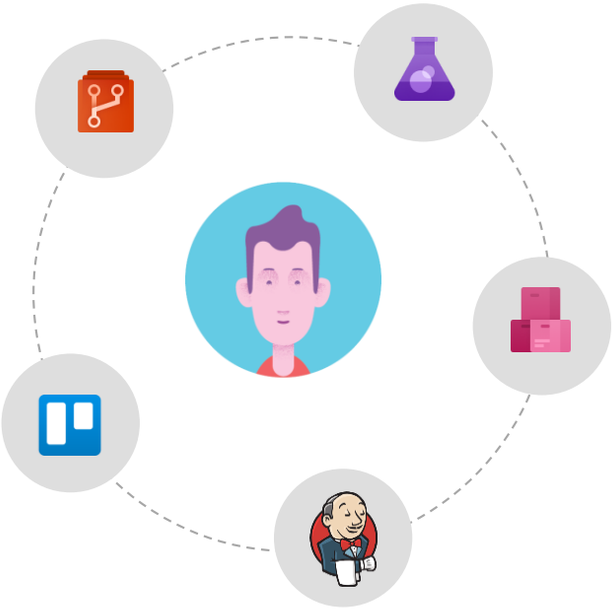
https://azure.com/devops

Azure DevOps: Choose what you love

Any Language, Any Platform

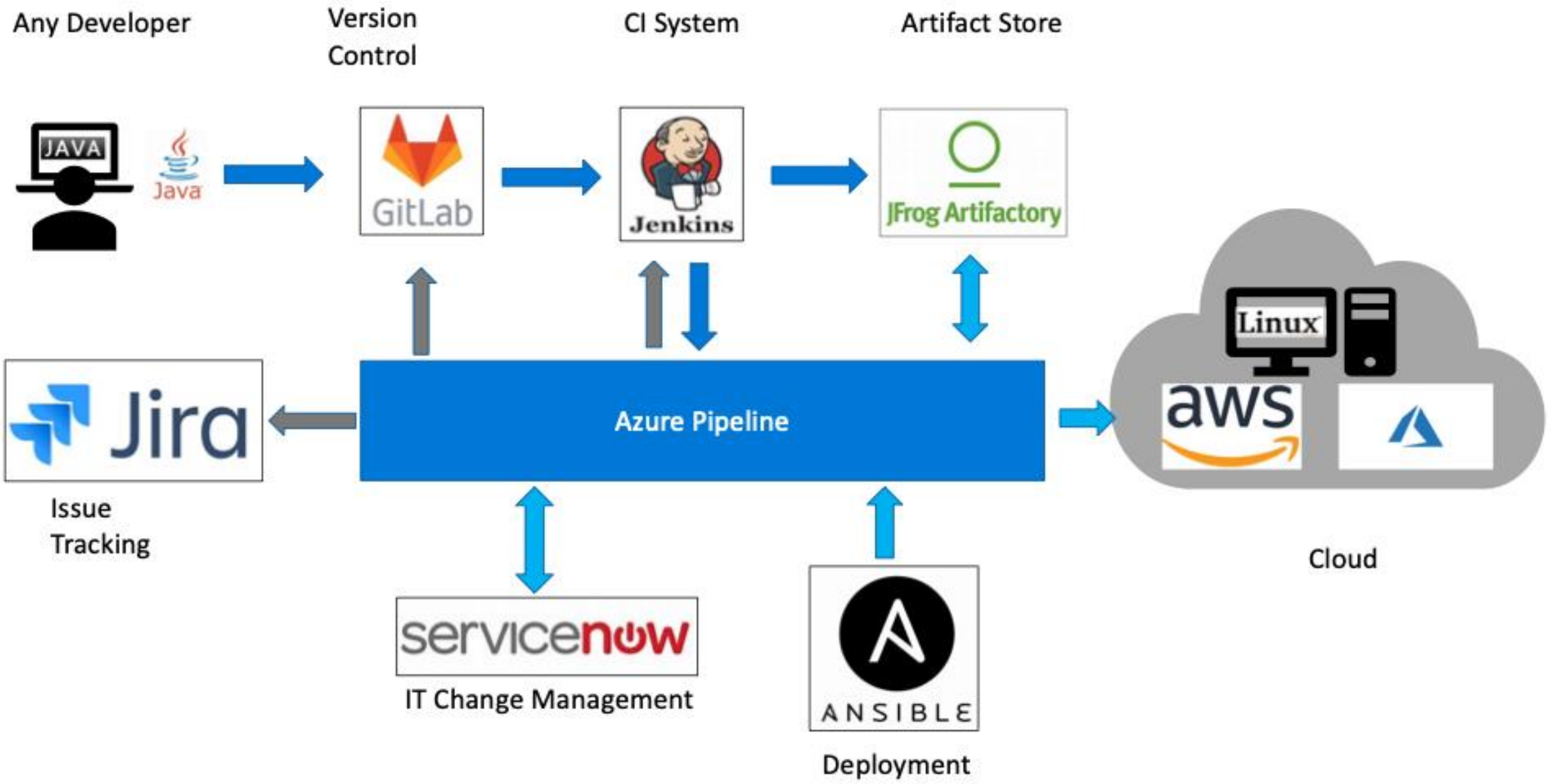
Azure DevOps lets developers choose the tools and languages that are right for them





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

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


Any Developer
Version Control
CI System
Artifact Store
JAVA
Java
GitLab
Jenkins
JFrog Artifactory
Linux
aws
Jira
Azure Pipeline
Issue Tracking
servicenow
IT Change Management
ANSIBLE
Deployment
Cloud

Azure Pipelines

Cloud-hosted pipelines for Linux, Windows and macOS, with unlimited minutes for open source

Any language, any platform, any cloud

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

Extensible

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

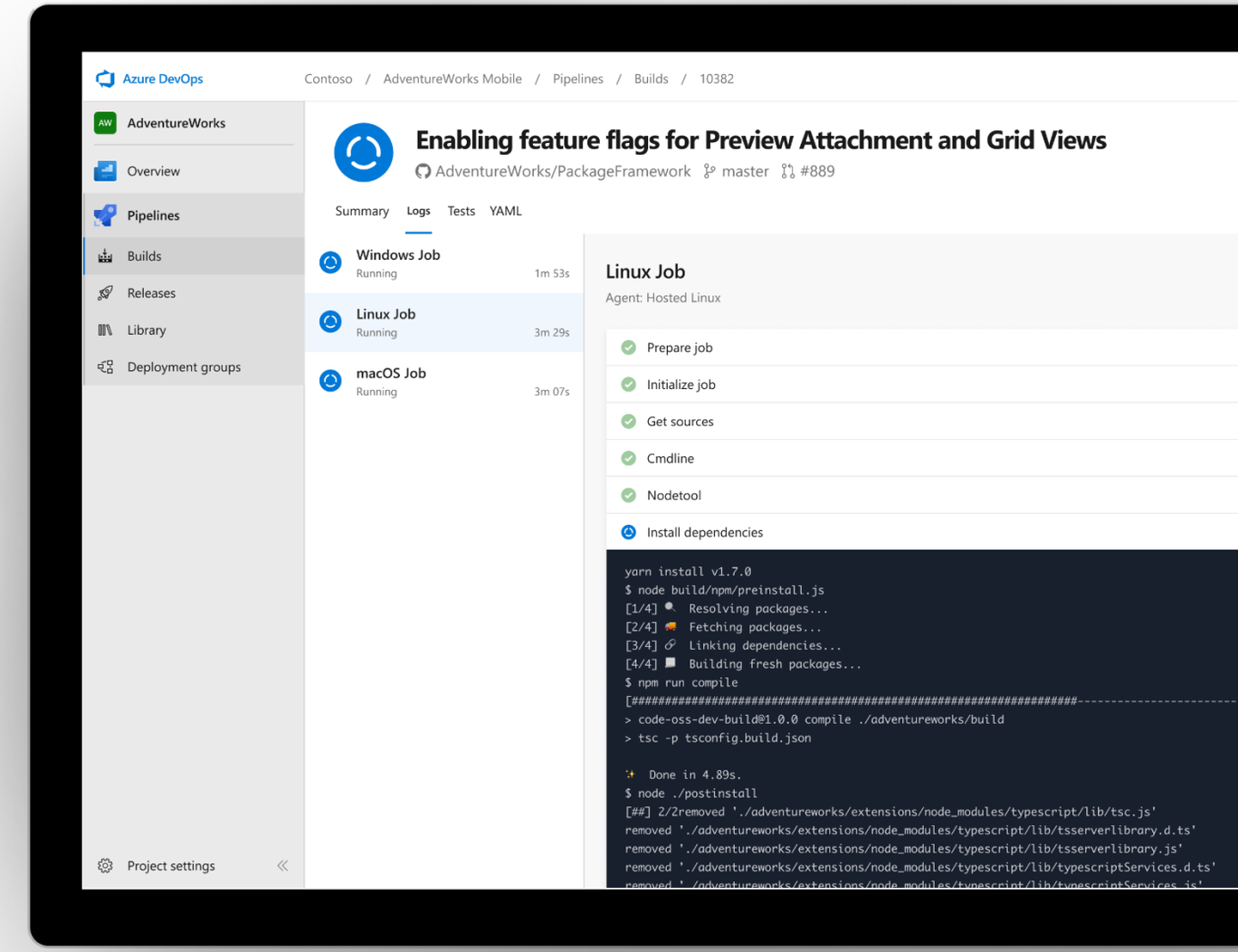
Containers and Kubernetes

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

Best-in-class for open source

Ensure fast continuous integration/continuous delivery (CI/CD) pipelines for every open source project. Get unlimited build minutes for all open source projects with up to 10 free parallel jobs across Linux, macOS and Windows

https://azure.com/pipelines



Azure Boards

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

Connected from idea to release

Track all your ideas at every development stage and keep your team aligned with all code changes linked directly to work items.

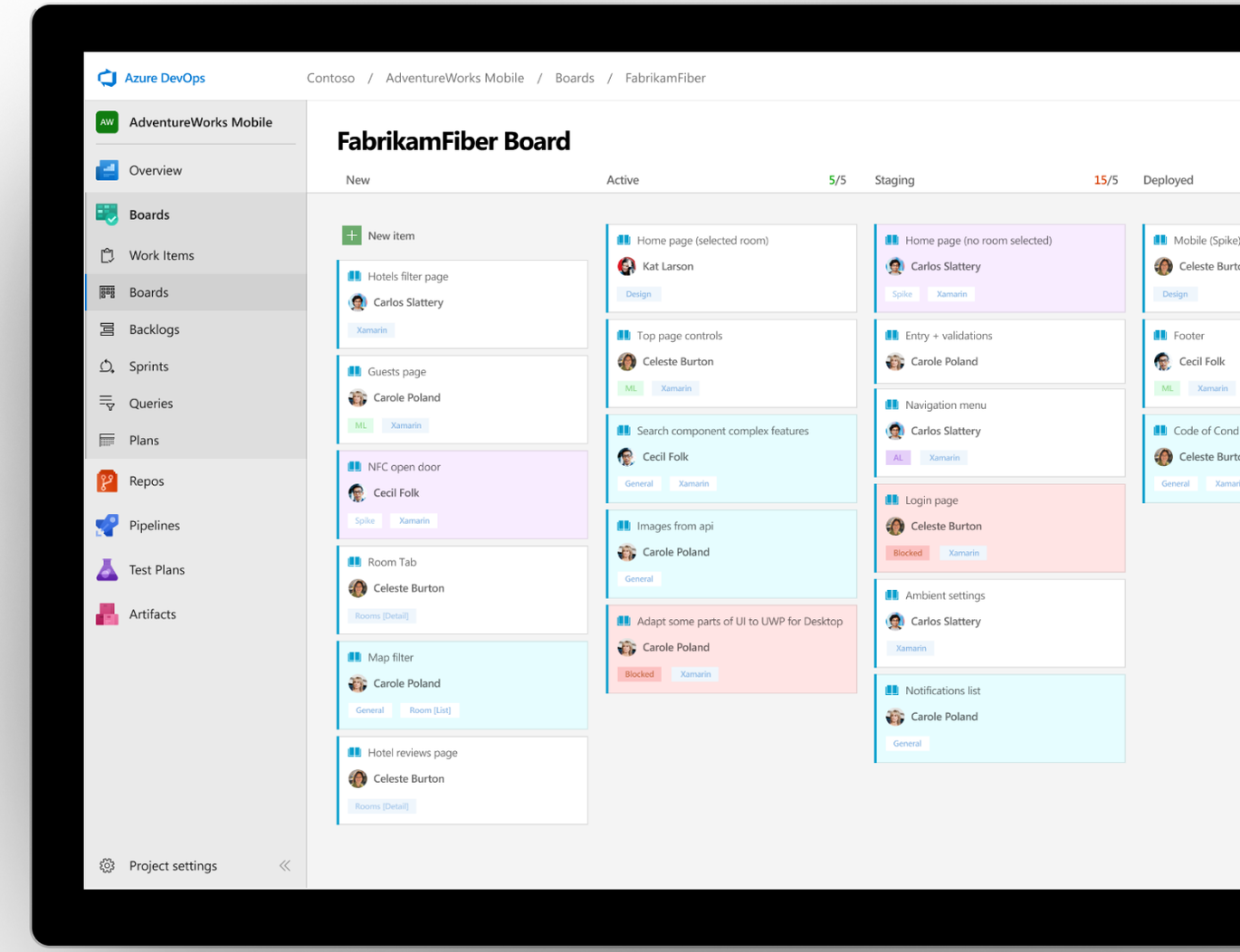
Scrum ready

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

Project insights

Gain new insights into the health and status of your project with powerful analytics tools and dashboard widgets.

https://azure.com/devops



Azure Repos

Unlimited private Git repo hosting and support for TFVC that scales from a hobby project to the world's largest Git repositories

Works with your Git client

Securely connect with and push code into your Git repos from any IDE, editor, or Git client.

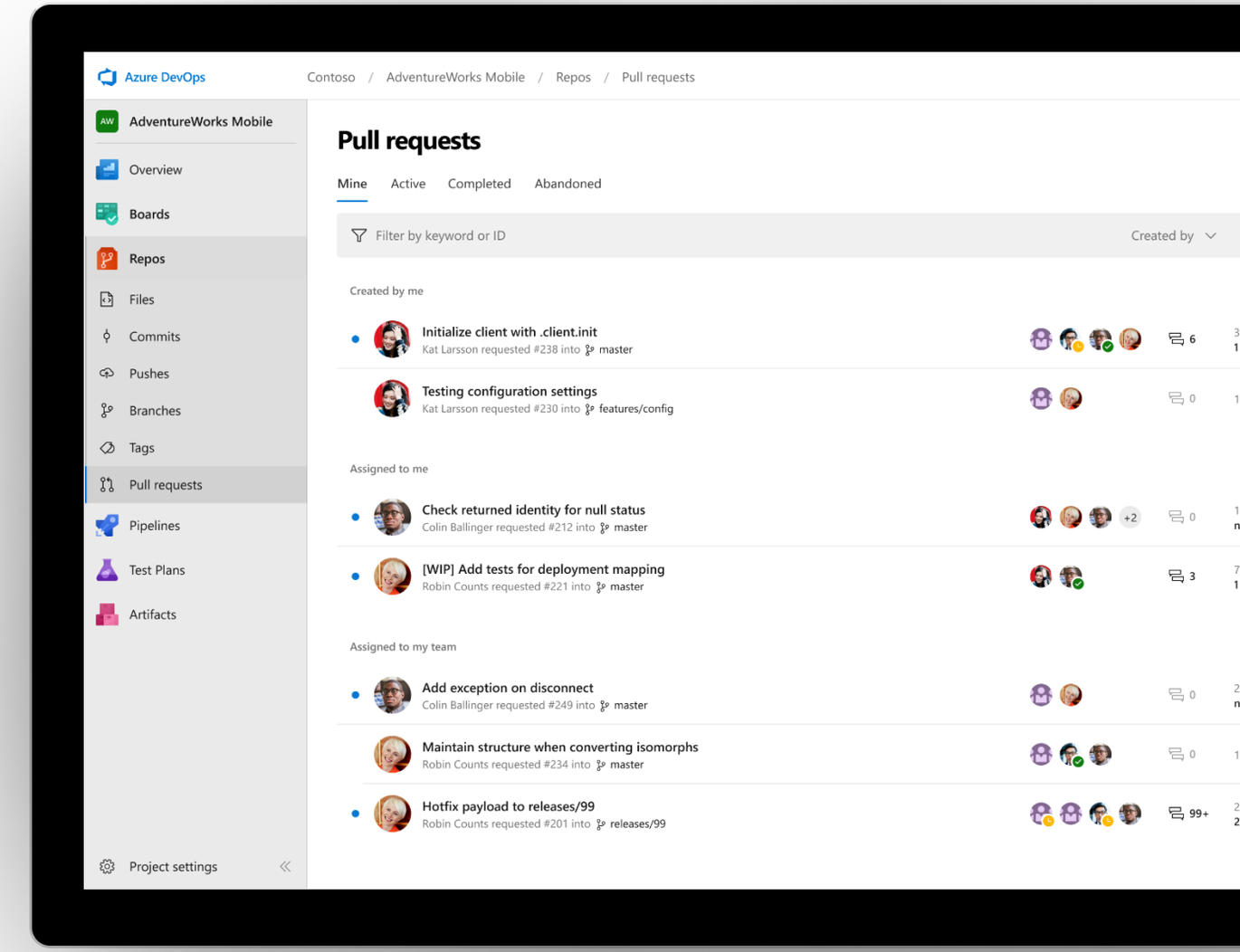
Web hooks and API integration

Add validations and extensions from the marketplace or build your own using web hooks and REST APIs.

Semantic code search

Quickly find what you're looking for with code-aware search that understands classes and variables.

https://azure.com/devops



Azure Artifacts

Create and share Maven, npm, and NuGet package feeds from public and private sources – fully integrated into CI/CD pipelines

Manage all package types

Get universal artifact management for Maven, npm, and NuGet.

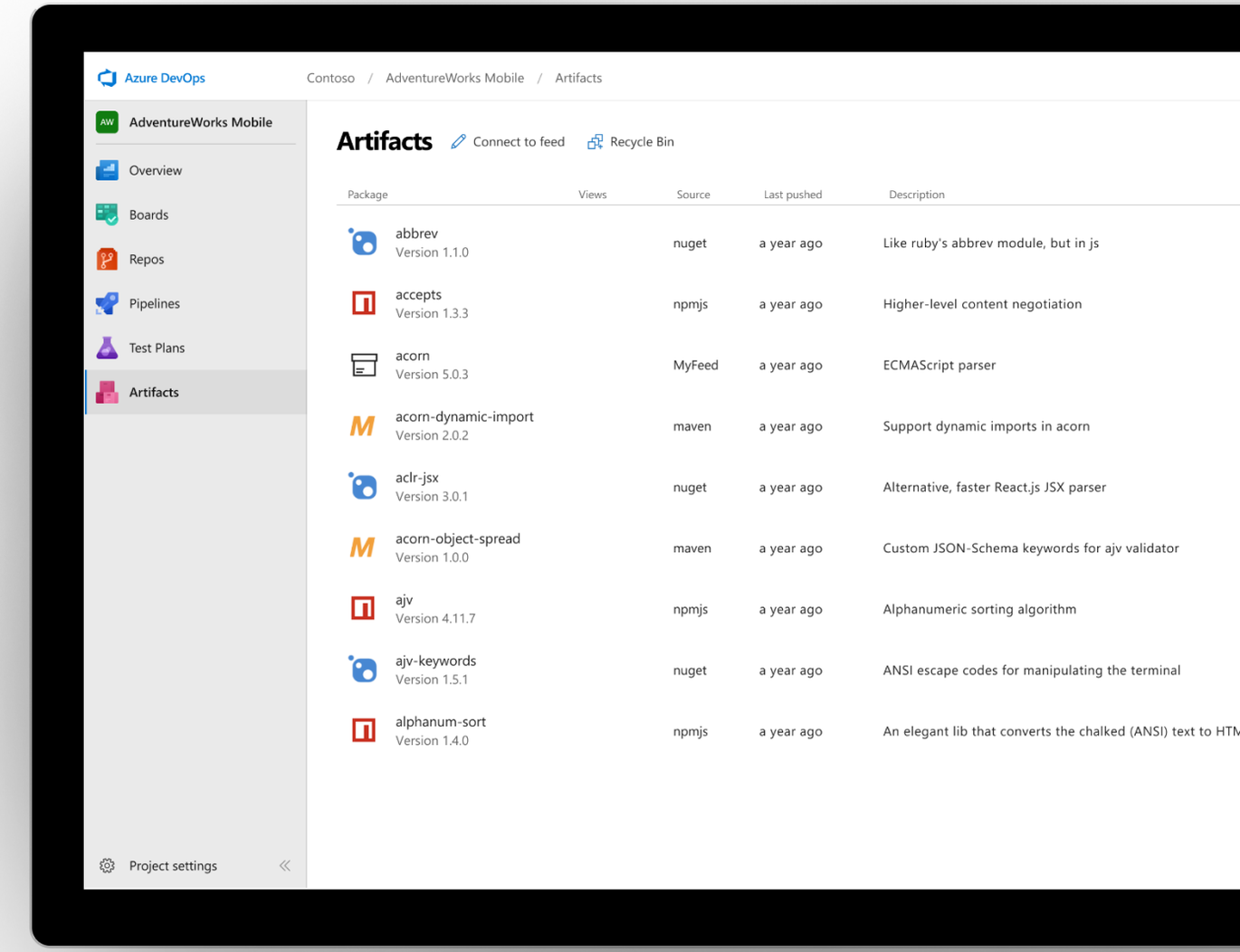
Add packages to any pipeline

Share packages, and use built-in CI/CD, versioning, and testing.

Share code efficiently

Easily share code across small teams and large enterprises.

https://azure.com/devops



Azure Test Plans

Get end-to-end traceability. Run tests and log defects from your browser. Track and assess quality throughout your testing lifecycle.

Capture rich data

Capture rich scenario data as you execute tests to make discovered defects actionable. Explore user stories without test cases or test steps. You can create test cases directly from your exploratory test sessions.

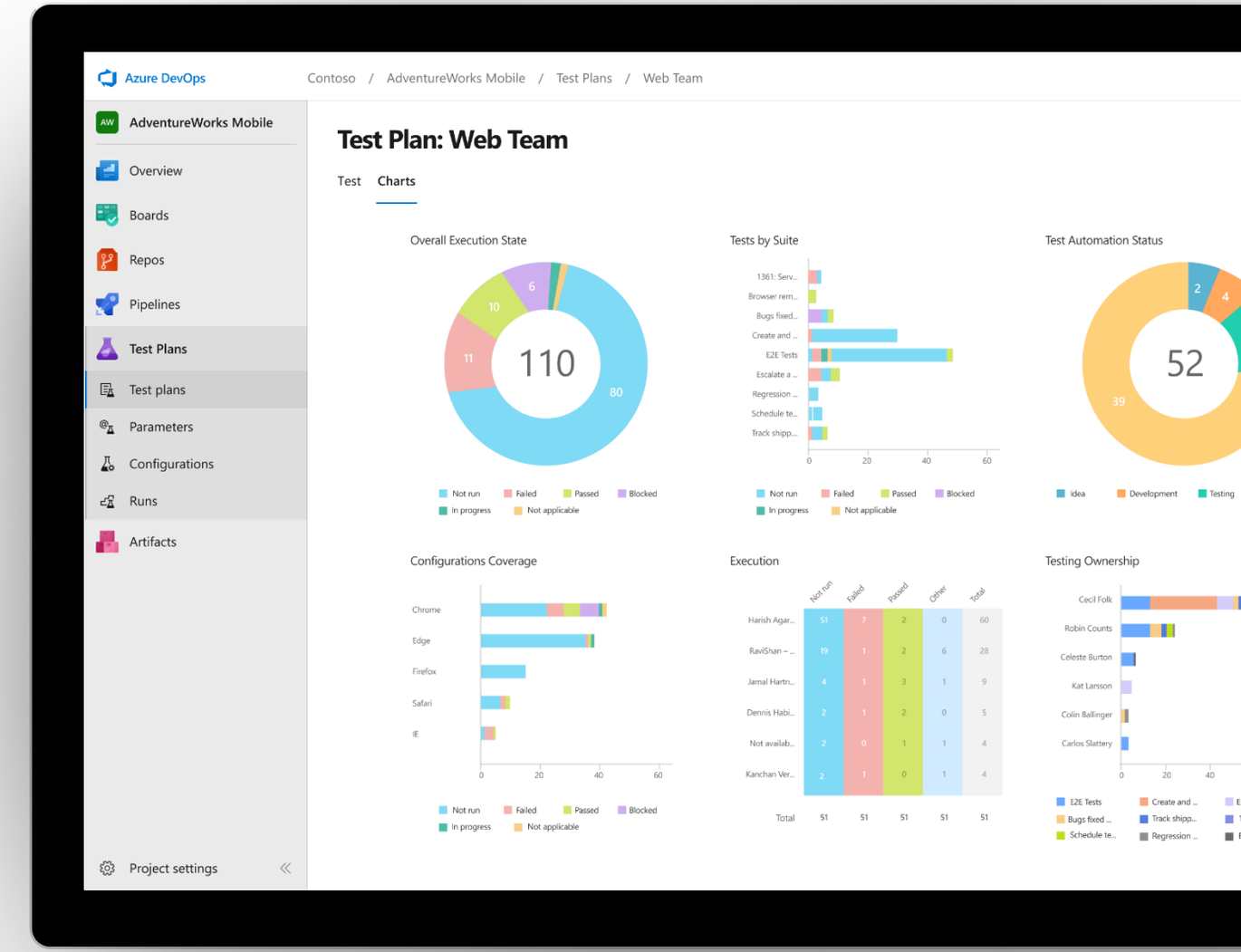
Test across web and desktop

Test your application where it lives. Complete scripted tests across desktop or web scenarios. Test on-premises application from the cloud and vice-versa.

Get end-to-end traceability

Leverage the same test tools across your engineers and user acceptance testing stakeholders. Pay for the tools only when you need them.

https://azure.com/devops

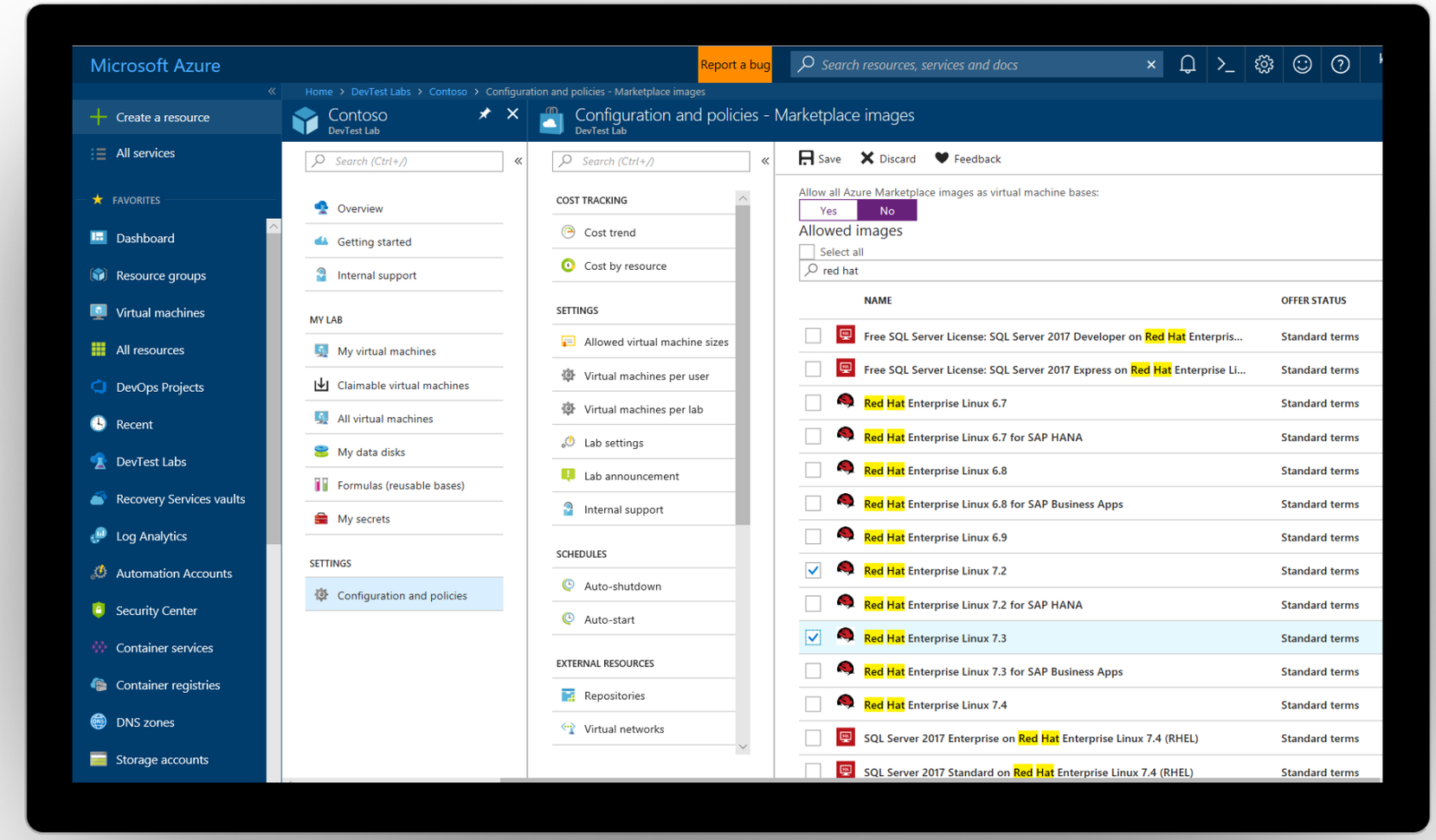


Azure DevTest Labs

Azure Lab Services

Self-Service Dev/Test Environments

- Simplify cloud environment management for developers and testers.
- Enforce policies and control costs with full visibility
- Use templates, custom images and formulas to reproduce environments.
- Orchestrate with Azure Pipelines or integrate using REST API



Self-service provisioning

Users

Dev VM (i.e. Visual Studio)

Test VM (i.e. Selenium)

Environments (i.e. Dev, Test, …)

Azure DevOps agents (i.e. Build)

Configuration & policies

Team Lead

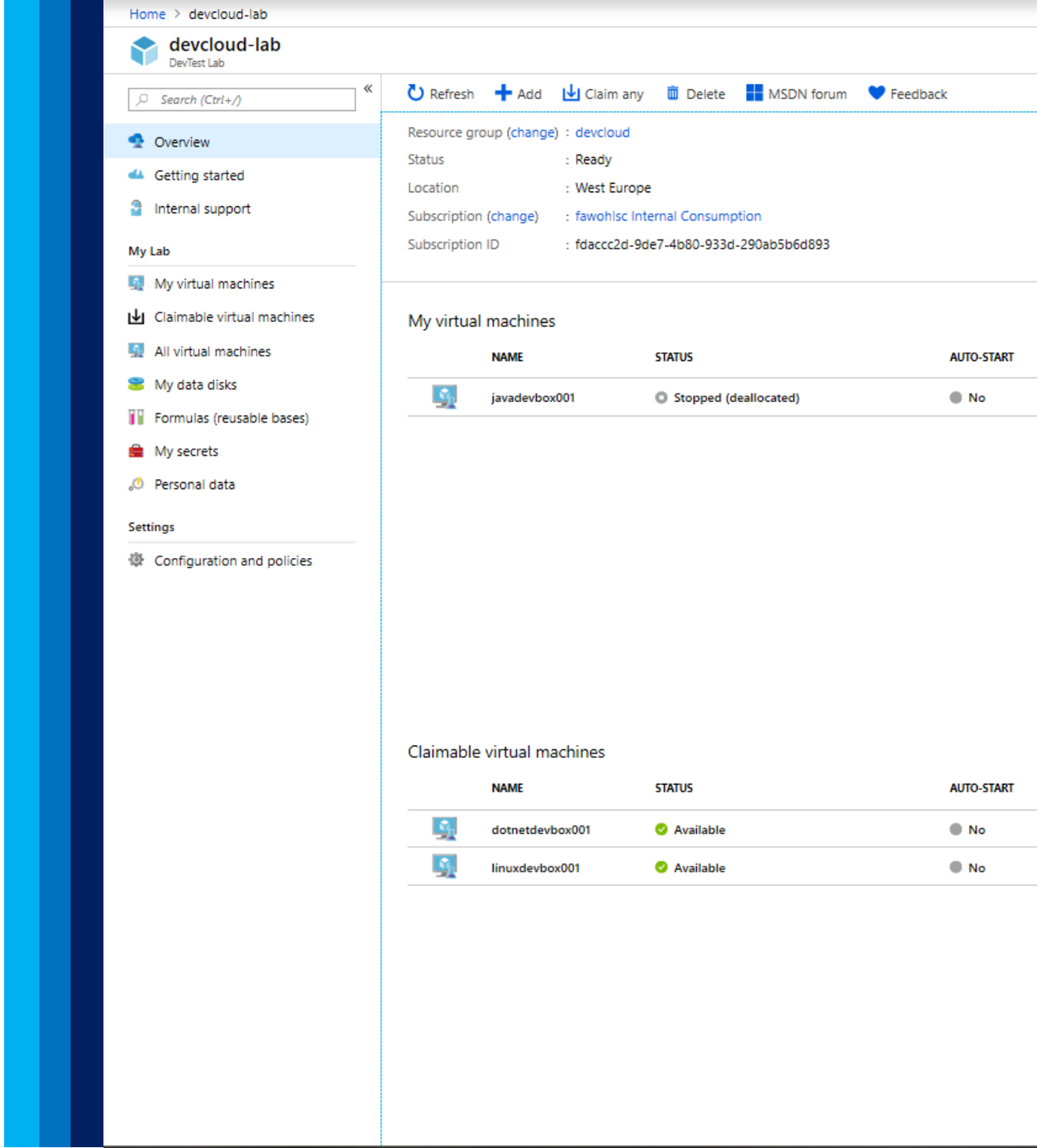
Control & analyze costs

Auto shutdown / start

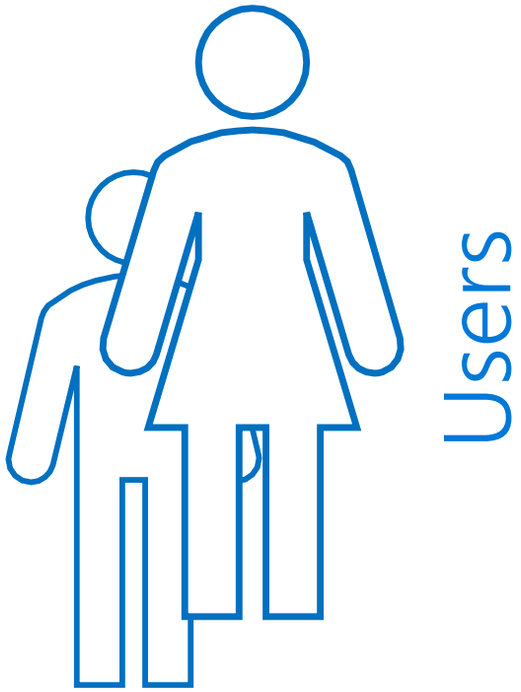
Set policies (#VMs, VM sizes, …)

Create formulas / templates

Claimable VMs



Self-service provisioning



Home > Resource groups > lab > lab > Choose a base > Virtual machine > Add artifacts

Choose a base

windows 10

NAME	PUBLISHER	OS TYPE	TYPE
Windows 10 Pro, Version 1803	Microsoft	Windows	Gallery image
Windows 10 Pro N, Version 1803	Microsoft	Windows	Gallery image
Windows 10 Pro N, Version 1709	Microsoft	Windows	Gallery image
Windows 10 Pro, Version 1709	Microsoft	Windows	Gallery image

Virtual machine

Configure settings

* Virtual machine name: devbox1
* User name: fawohlsc

Password

Use a saved secret

* Type a value

Save as default password

Disk and size

Virtual machine disk type: HDD | SSD

Virtual machine size: Standard_DS1

More options

Artifacts: 0 artifact(s) selected

Advanced settings

* Image: Windows 10 Pro N, Version 1803

View ARM template

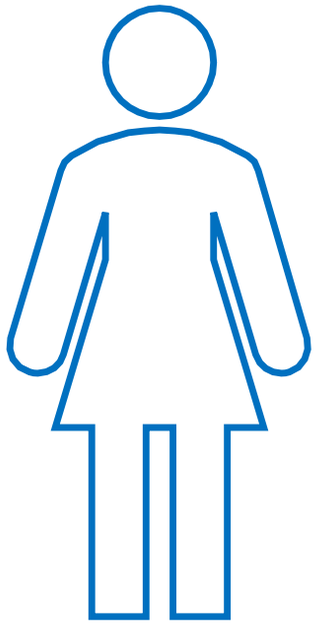
Add artifacts

Feedback

Applying artifacts cases

Create web s...
Docker
Download fil...
Download VS...
Eclipse
Enable local...
Firefox
git
gVim (Cream...
Install Chocol...
Install RuckZ...
IntelliJ IDEA (...
Internet Infor...
JHipster
Join Active D...
Microsoft .N...
MongoDB
Node JS
No-Op
Notepad++
NVM
PowerShell 3....
PowerShell D...
PuTTY

Configuration & policies



Team Lead

Home > lab > Configuration and policies - Auto-shutdown

Configuration and policies - Auto-shutdown

DevTest Lab

Search (Ctrl+/)

COST TRACKING

- Cost trend
- Cost by resource

SETTINGS

- Allowed virtual machine sizes
- Virtual machines per user
- Virtual machines per lab
- Lab settings
- Lab announcement
- Internal support

SCHEDULES

- Auto-shutdown
- Auto-start

EXTERNAL RESOURCES

- Repositories
- Mandatory artifacts
- Virtual networks

Save | Discard | Feedback

Enabled

On | Off

Scheduled shutdown

19:00:00

Time zone

(UTC+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna

Send notification before auto-shutdown?

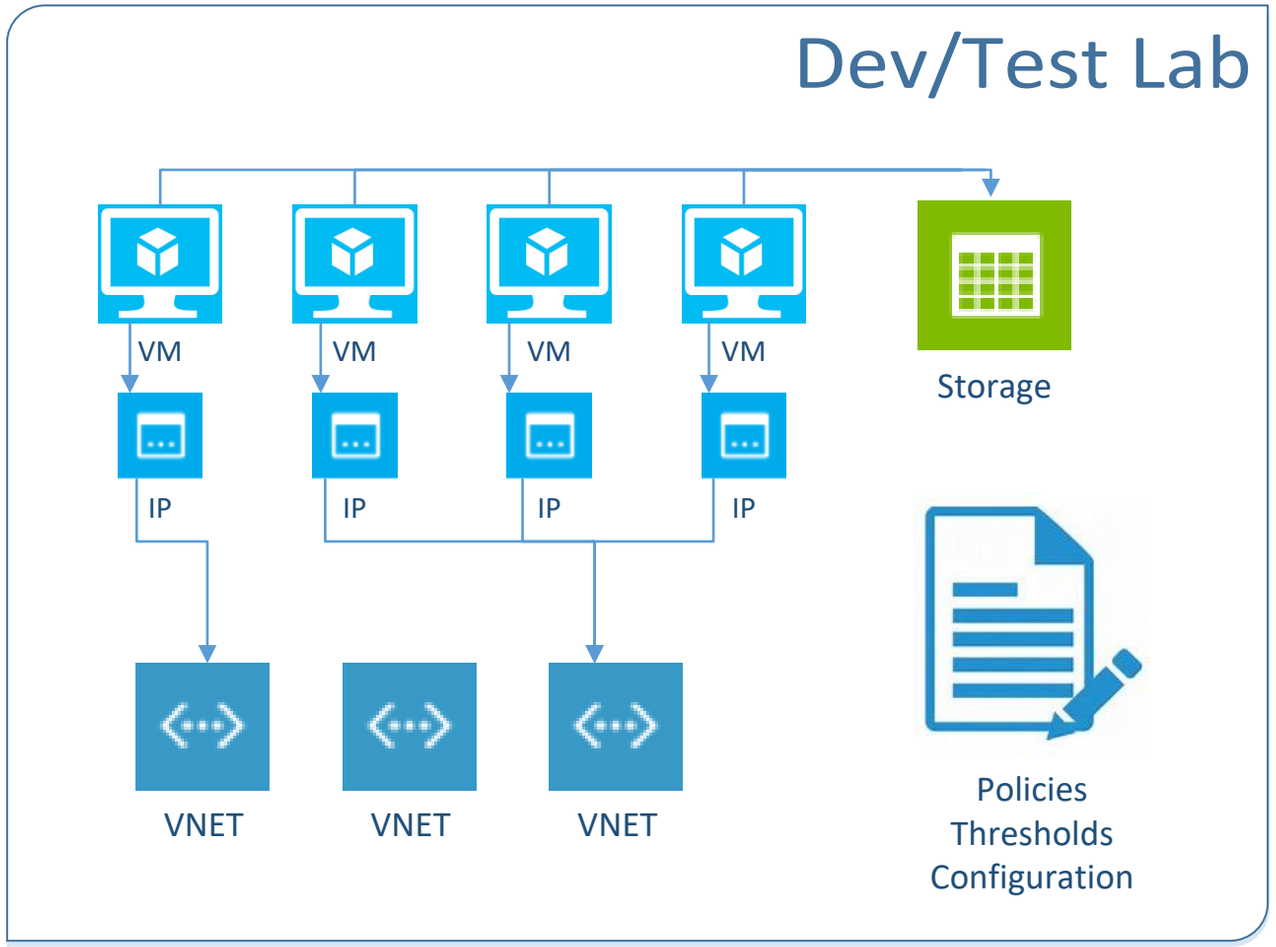
Yes | No

Webhook URL

Email address

This policy automatically applies auto-shutdown to all the virtual machines in the lab
the virtual machine blade.

Big Picture


Dev/Test Lab
VM
VM
VM
VM
IP
IP
IP
IP
VNET
VNET
VNET
Storage
Policies
Thresholds
Configuration

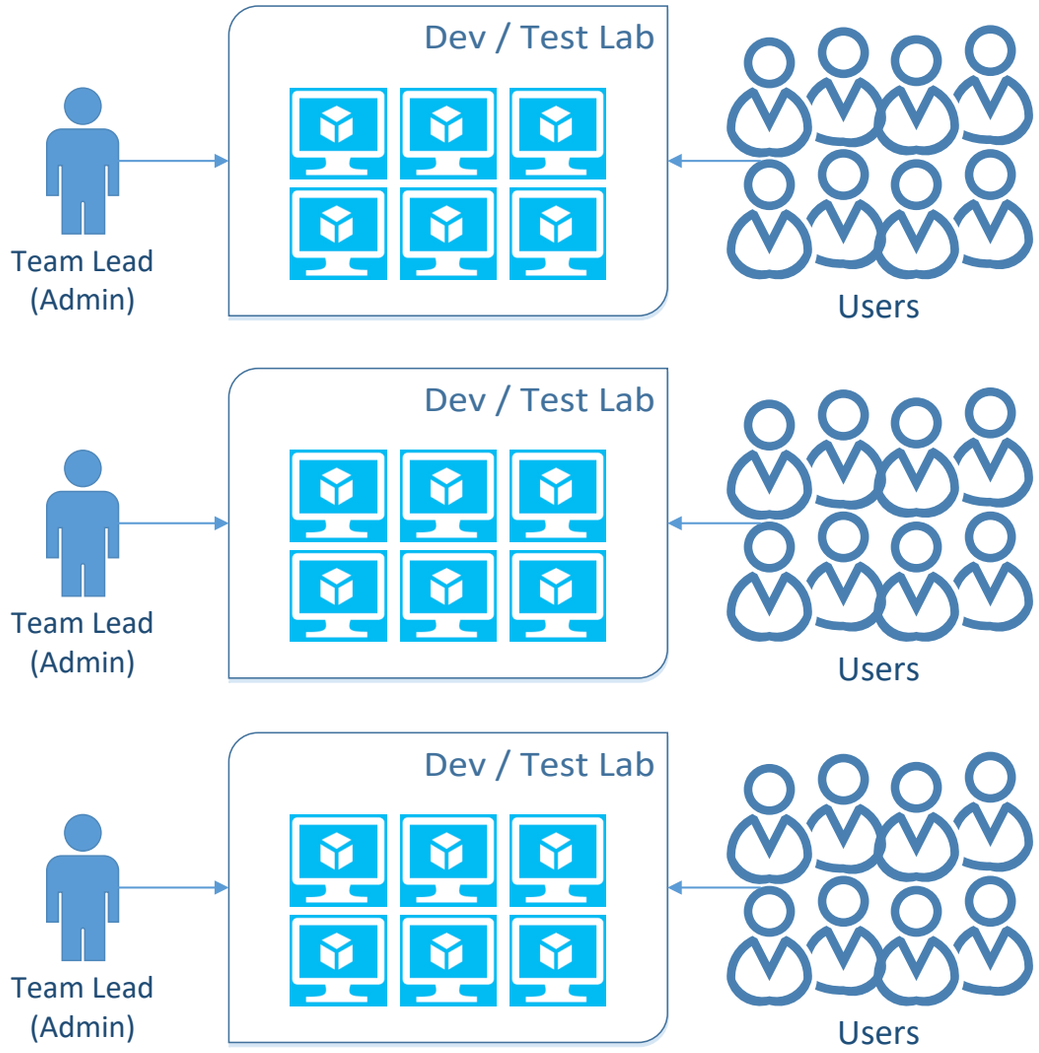
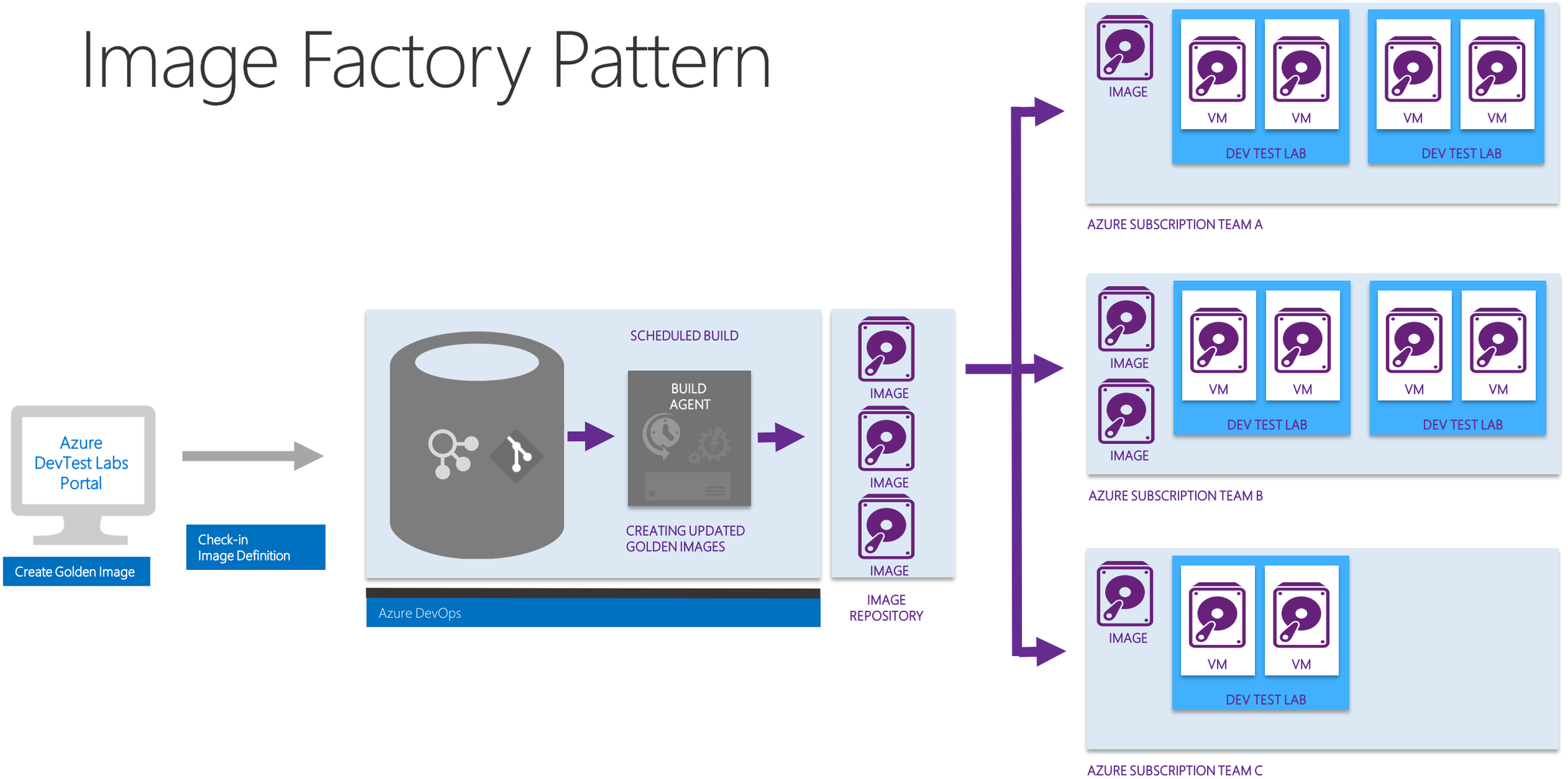

Dev / Test Lab
Team Lead
(Admin)
Users
Dev / Test Lab
Team Lead
(Admin)
Users
Dev / Test Lab
Team Lead
(Admin)
Users

Image Factory Pattern



Migrating from TFS to Azure DevOps

Move from Team Foundation Server to Azure DevOps and bring your data along

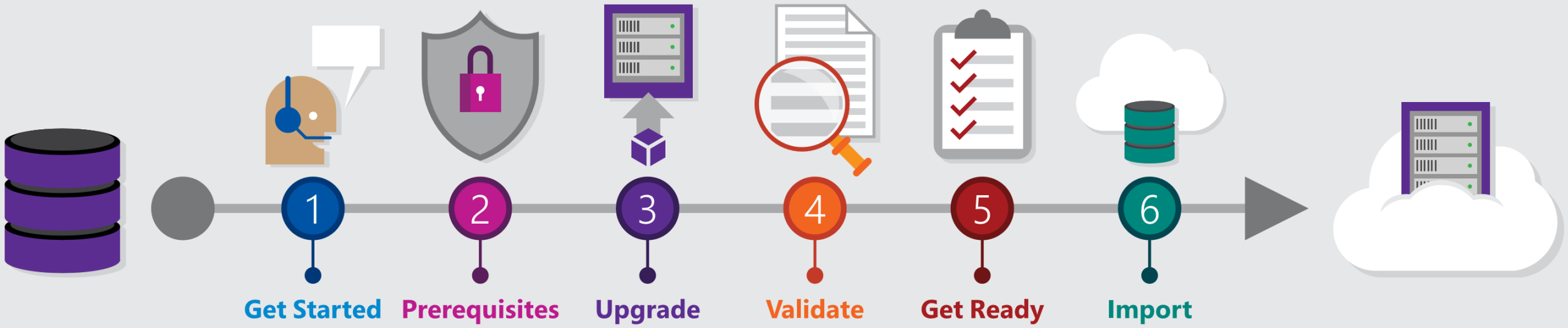
Benefits of Cloud Hosted Azure DevOps Services

- Global availability
- Hosted and maintained by Microsoft with 99.9% uptime guarantee and 24x7 support
- Immediate access to latest features
- Simplified deployment to Azure

TFS Import Service

- Fully supported high fidelity migration path
- Trusted by many large enterprises
- Now faster and easier to use

https://aka.ms/tfsimport



Azure DevOps Services Pricing

Open Source Projects

Free

Unlimited users and build time

- Azure Pipelines: 10 parallel jobs with unlimited minutes for CI/CD
- Azure Boards: Work item tracking and Kanban boards
- Azure Repos: Unlimited public Git repos

Small Teams

Free

Start free with up to 5 users

- Azure Pipelines: Run 1 Microsoft-hosted job for 1,800 minutes per month and 1 self-hosted job for any amount of time
- Azure Boards: Work item tracking and Kanban boards
- Azure Repos: Unlimited public Git repos
- Azure Artifacts: package management
- Unlimited stakeholders

Teams of any size

Starts at $6

per user, per month for Boards & Repos*

Easy pricing that grows with your team

- Azure Pipelines: Run 1 Microsoft-hosted job for 1,800 minutes per month and 1 self-hosted job for any amount of time
- Azure Boards: Work item tracking and Kanban boards
- Azure Repos: Unlimited public Git repos
- Azure Artifacts: package management
- Unlimited stakeholders
- Boards & Repos included for Visual Studio subscribers

https://azure.com/pricing/details/devops/

* 5 Boards & Repos users and 5 Artifacts users free. Pipelines with unlimited minutes, Test Plans users and additional Artifacts users also available. Please see the Azure pricing calculator for details.

Azure DevOps & GitHub

The #1 Developer platform on the planet

Most contributions 1.1B in 2018

Most developers 33M

Highest growth 8M new devs in 2018

Most Repos 96M

Most activity 200M PRs, 800M API requests daily

Most students 1.1M

Most organizations 2.2M

Most secure 5M vulnerability alerts in 2018

Home to the most important and popular open source projects on the planet

GitHub and Azure DevOps

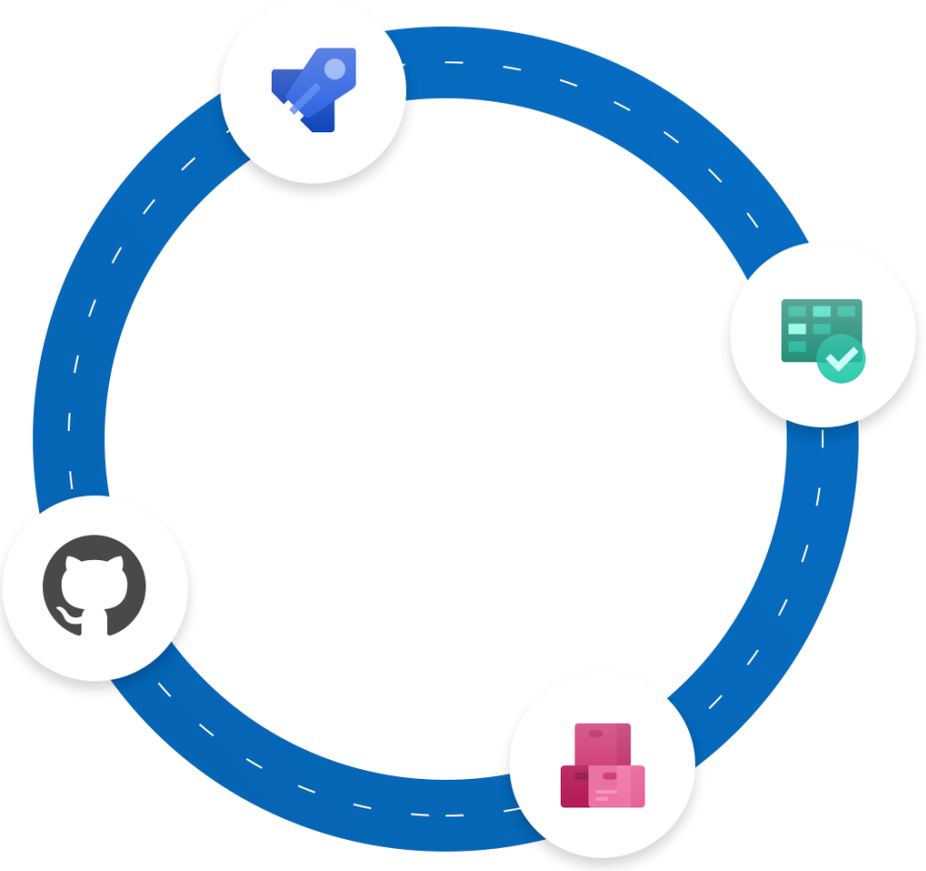
Keep GitHub independent, open and loved by developers

GitHub WILL and MUST stay independent and open

GitHub & Azure DevOps are complementary

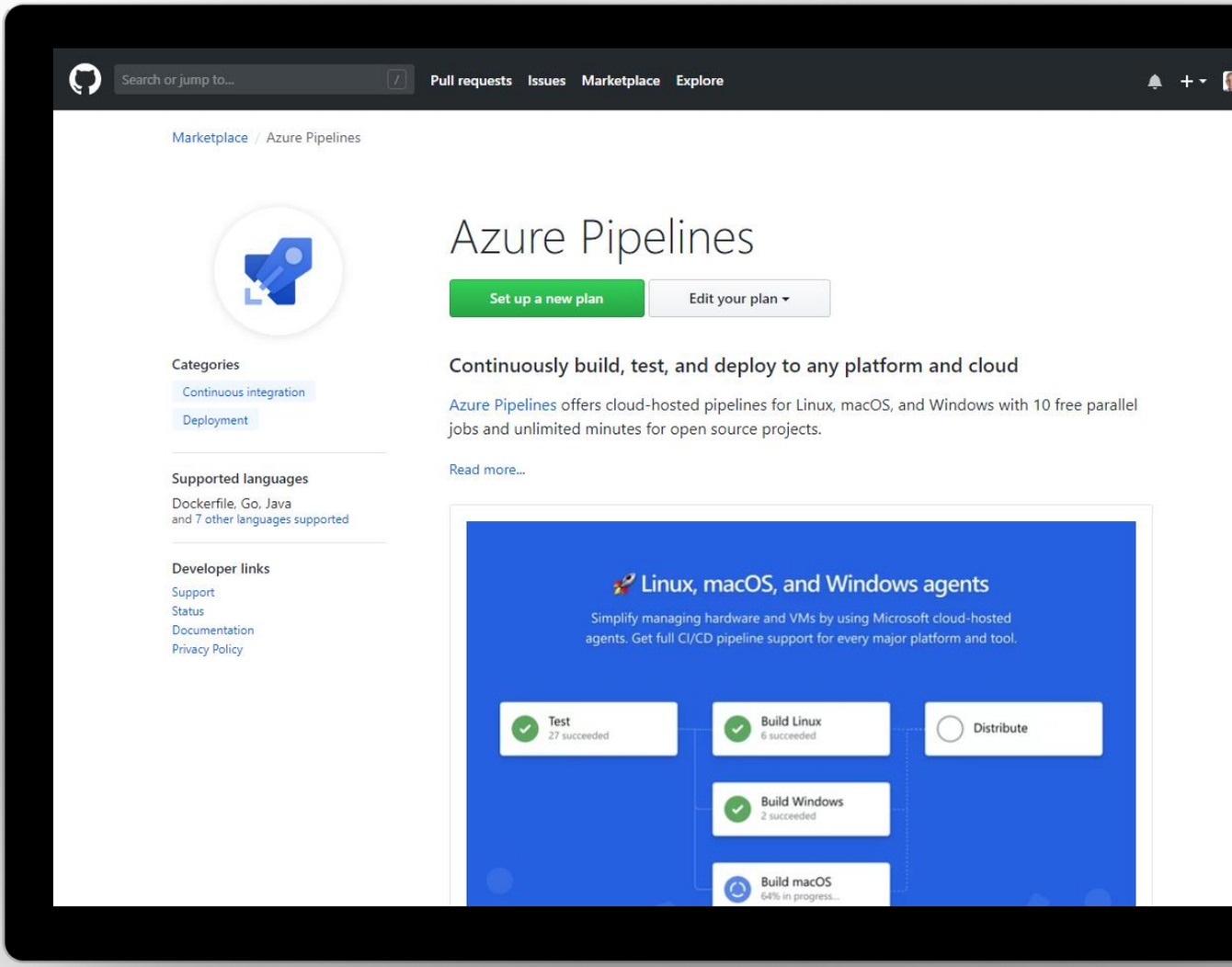
Azure DevOps is how we bring customers to Azure

Azure Pipelines, Boards and Artifacts bring GitHub users into Azure DevOps



Azure Pipelines Integrated with GitHub

Azure Pipelines available now to any developer from the GitHub Marketplace



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

OSS Projects using Azure Pipelines

- Azure/IoT-Pi-Day
- desktop/desktop
- git-for-windows/git
- Microsoft/VFSForGit
- webpack/webpack
- libgit2/libgit2
- Microsoft/vscode
- appium/appium-desktop
- webpack/webpack-cli
- pypa/pipenv
- atom/atom
- tox-dev/tox
- PowerShell/PowerShell
- ehcache/ehcache3
- python/cpython
- esy/esy
- ibis-project/ibis
- GitTools/GitVersion
- InsightSoftwareConsortium/ITKExamples
- jhipster/generator-jhipster
- Microsoft/lightGBM
- graphql-rust/juniper
- nteract/nteract
- commitizen/cz-cli
- wireapp/wire-ios
- parcel-bundler/parcel
- crate/crate
- zeit/next.js
- ukoethe/vigra
- OptiKey/OptiKey
- sympy/sympy
- pandas-dev/pandas
- node-modules/urllib
- reactiveui/ReactiveUI
- oatpp/oatpp
- nuxt/nuxt.js
- alexaubry/BulletinBoard

Azure IoT-Pi-Day 3.14

Visual Studio Code

ATOM

TS

webpack

python

PARCEL

nteract

OptiKey

NEXT.JS

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$

Ahhhhh…but what about…

GitHub Code & Azure Repos?

GitHub Issues & Azure Boards?

GitHub Actions & Azure Pipelines?

GitHub Code & Azure Repos

GitHub is the premier social coding experience and the Git experience that most developers are familiar with. But there are significant enterprise & 1ES gaps addressed by Azure Repos that are not yet addressed by GitHub. Over time GitHub is expected to gain more enterprise capabilities & integrations into rest of Azure DevOps continue to improve.

GitHub

Fantastic forking and PR workflow
(leading inner-source and open-source workflows)

Easy collaboration with people outside the company & open source

Much loved brand & conversation starter with developers

Usage share and momentum

Azure Repos

Integration with AAD

Supports larger repos and larger teams

Has support for Git and TFVC

Wide support for Data-Sovereignty requirements

Existing customers, no need to change and migration path will be well supported in the future.

Be customer driven

Help them select the tool that will make them most happy, knowing that there is an easy migration path from Azure Repos to GitHub and tight integration that will continue to improve.

GitHub Issues & Azure Boards

GitHub issues provide a simple but powerful mechanism for developers to track bugs and issues close to the code which is loved by developers. Azure Boards provides the agile tooling and reporting capabilities to track and manage work across teams.

GitHub Issues

Bug and issue tracking co-located with code stored in GitHub

Great for OSS community discussion

Developer friendly interface

Labelling features to quickly filter lists of work

Issue alerting integrated with-in GitHub UI and visible in developers workflow on GitHub

Azure Boards

Easy to use agile tooling including backlogs, Kanban boards & delivery plans

Scales to teams of any size and any volume of work

Powerful querying and reporting capabilities

Scale to the largest of teams

Available as a stand-alone service suitable for stakeholders and PMO

Integration soon between Azure Boards and GitHub Issues

For bug and issue tracking with-in the code base (especially for public projects) GitHub issues provides all the tooling individual developers need without adding the friction associated with tools such as Jira. To manage work performed by the team use Azure Boards and make use of the integration between GitHub and Azure DevOps to ensure traceability across the entire project.

GitHub Actions (Beta) & Azure Pipelines

Think of GitHub Actions as a full serverless project automation suite (like Zapier or IFFT for your GitHub projects). Azure Pipelines is a dedicated CI/CD platform with support for Linux, Mac and Windows and the most generous free build allowance for open source projects.

GitHub Actions

Automation across a number of activities including issues, pull requests, pushes and commits

Lightweight serverless automation capabilities with limited logging

Pre-build automation workflows and actions (such as performing an action when a comment is left on an issue)

Limited run time & concurrency (58 min, 2 concurrent actions)

Powerful graphical editor built into directly into GitHub UI

Azure Pipelines

Dedicated CI/CD service with support for unlimited numbers of concurrent jobs

Detailed build reporting including integration with unit testing and code coverage

Choice of Linux, Windows and Mac for hosted builds & ability to self-host hardware

Deployment options to on-premises, Azure, AWS and GCP (Windows, Mac and Linux)

Rich deployment approvals, UI, traceability, monitoring and logging

When ready for wide release, GitHub Actions will provide a platform to automate actions with-in the project. Azure Pipelines is the largest hosted cloud build provider providing compute intensive resources needed for build and deployment along with the reporting and monitoring tooling necessary to scale to any size of build and deployment needs.

Demo of Azure DevOps

Break – 15 min

Thank you!