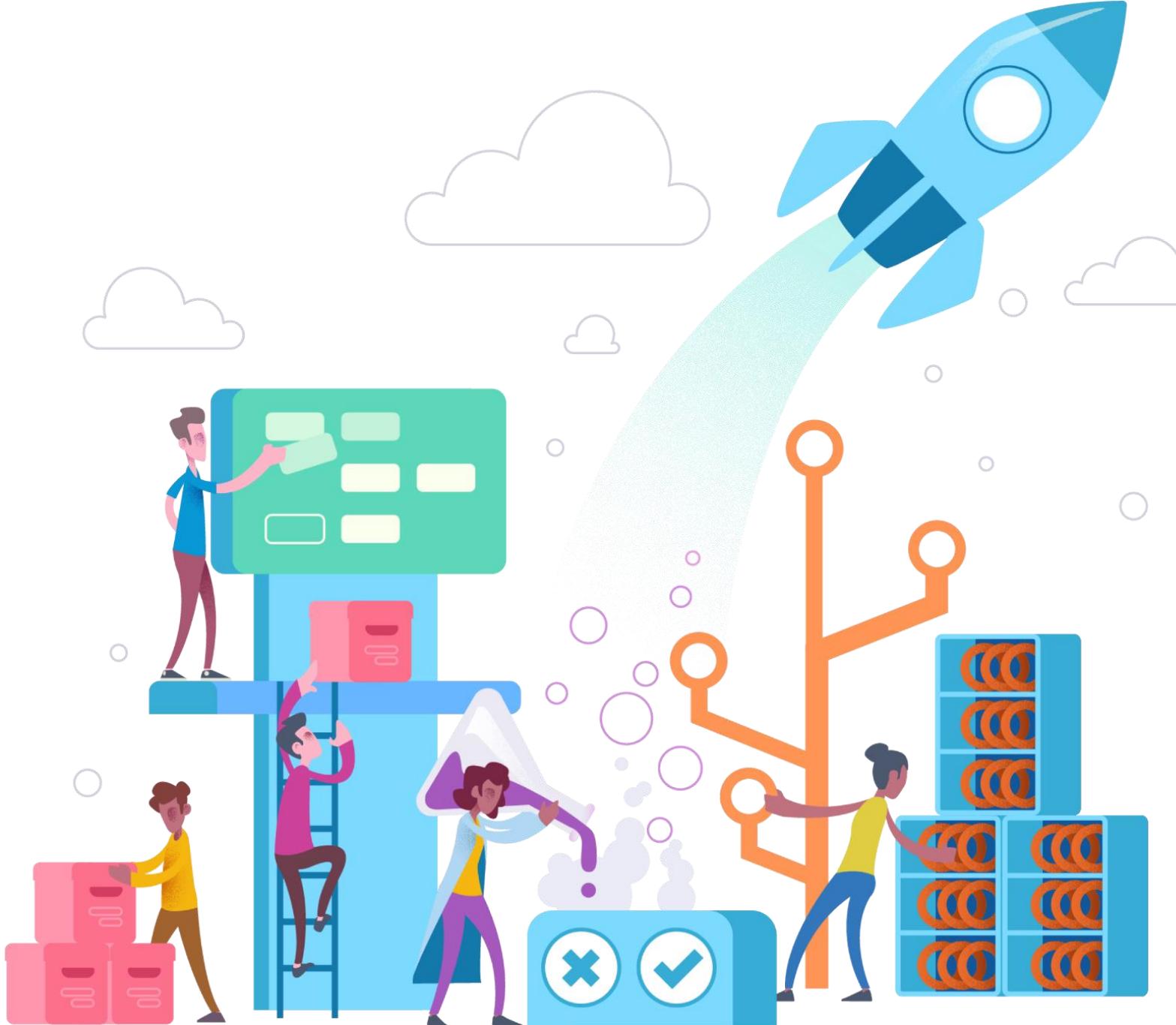


Azure DevOps

René Hézser
July 2019

 [/in/rené-hézser](https://www.linkedin.com/in/rené-hézser)

 [@renehezser](https://twitter.com/renehezser)



Azure DevOps

#AzureDevOps



<https://azure.com/devops>



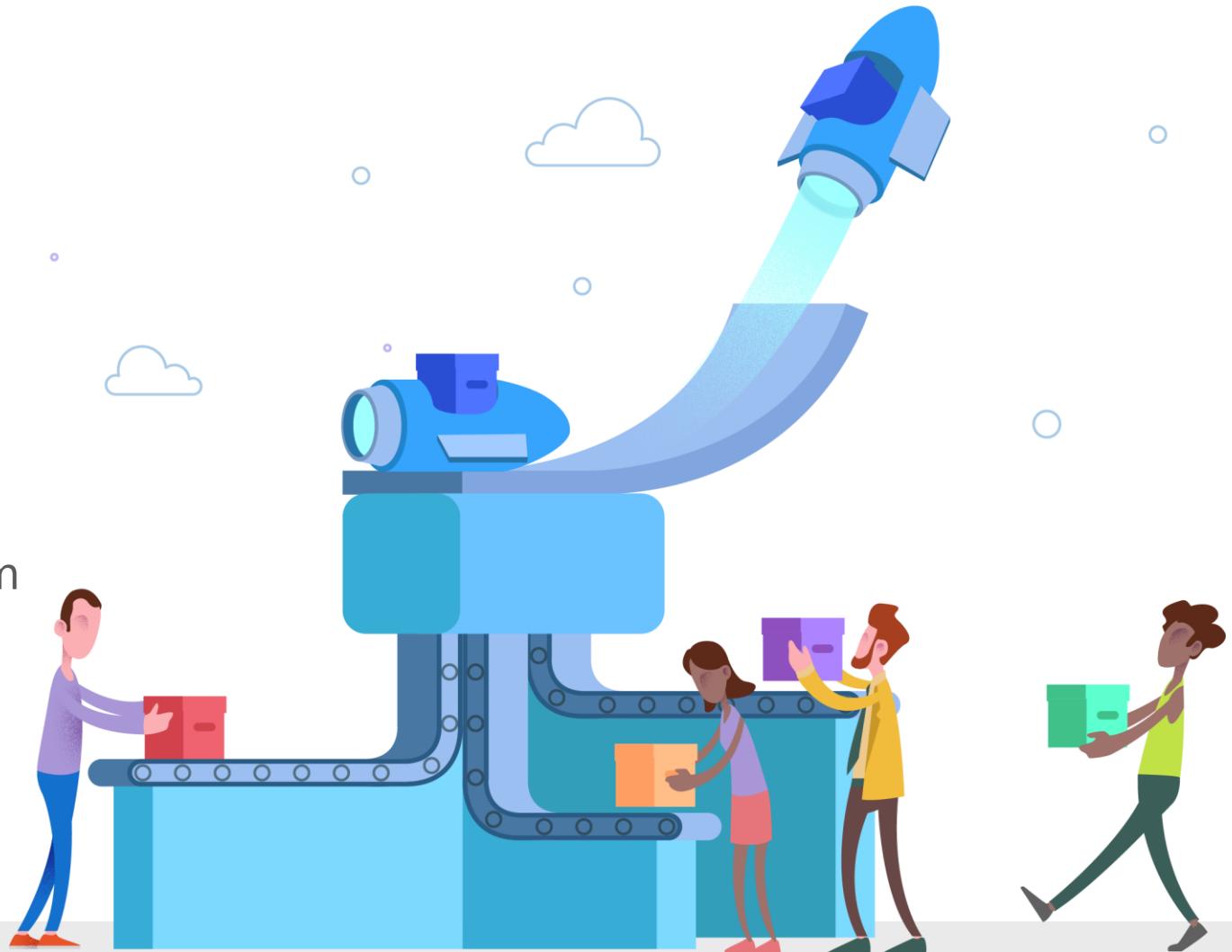
@AzureDevOps



<https://aka.ms/AzureDevOpsForum>



<https://aka.ms/DevOpsBlog/>



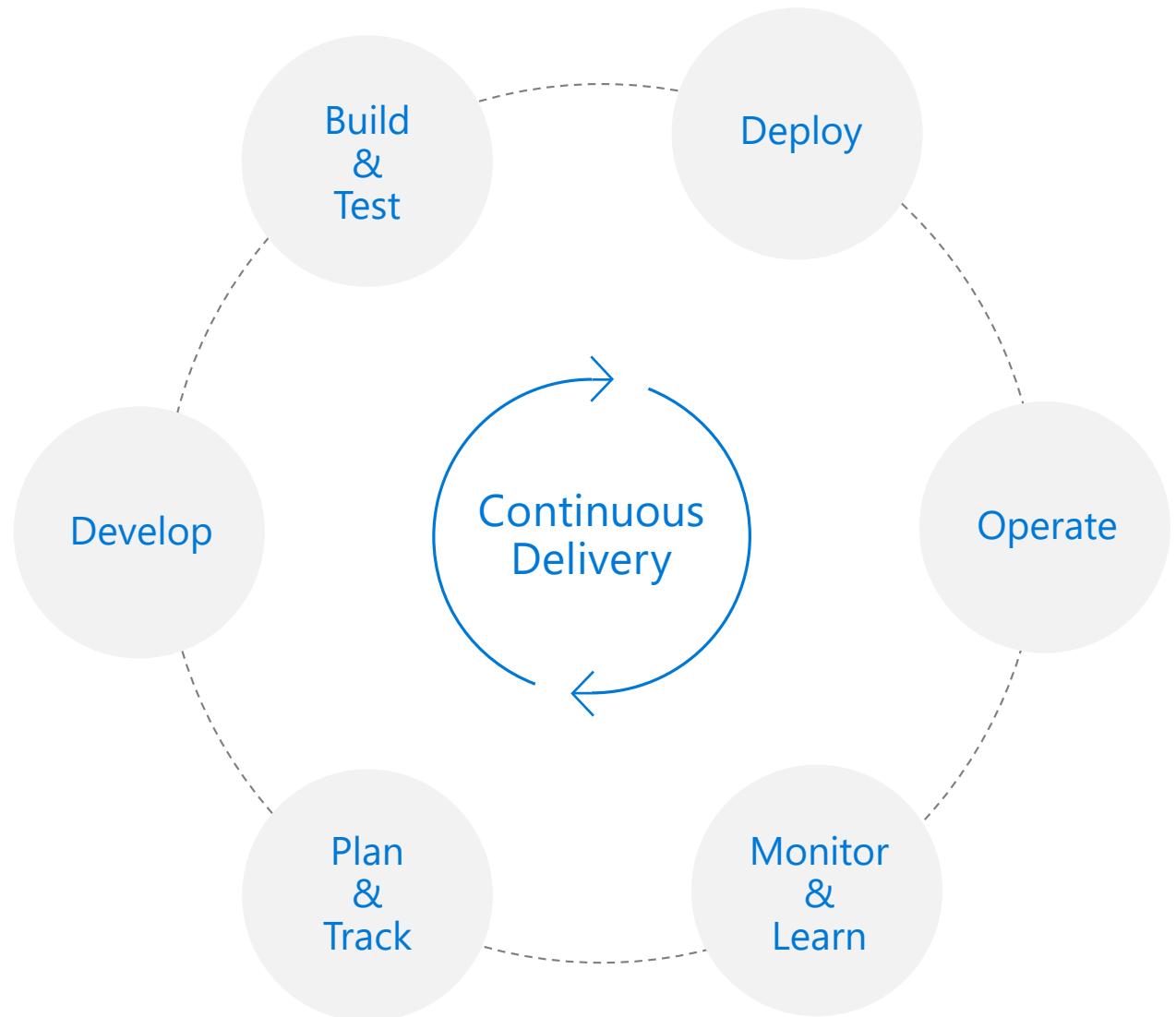
What is DevOps?

People. Process. Products.

“

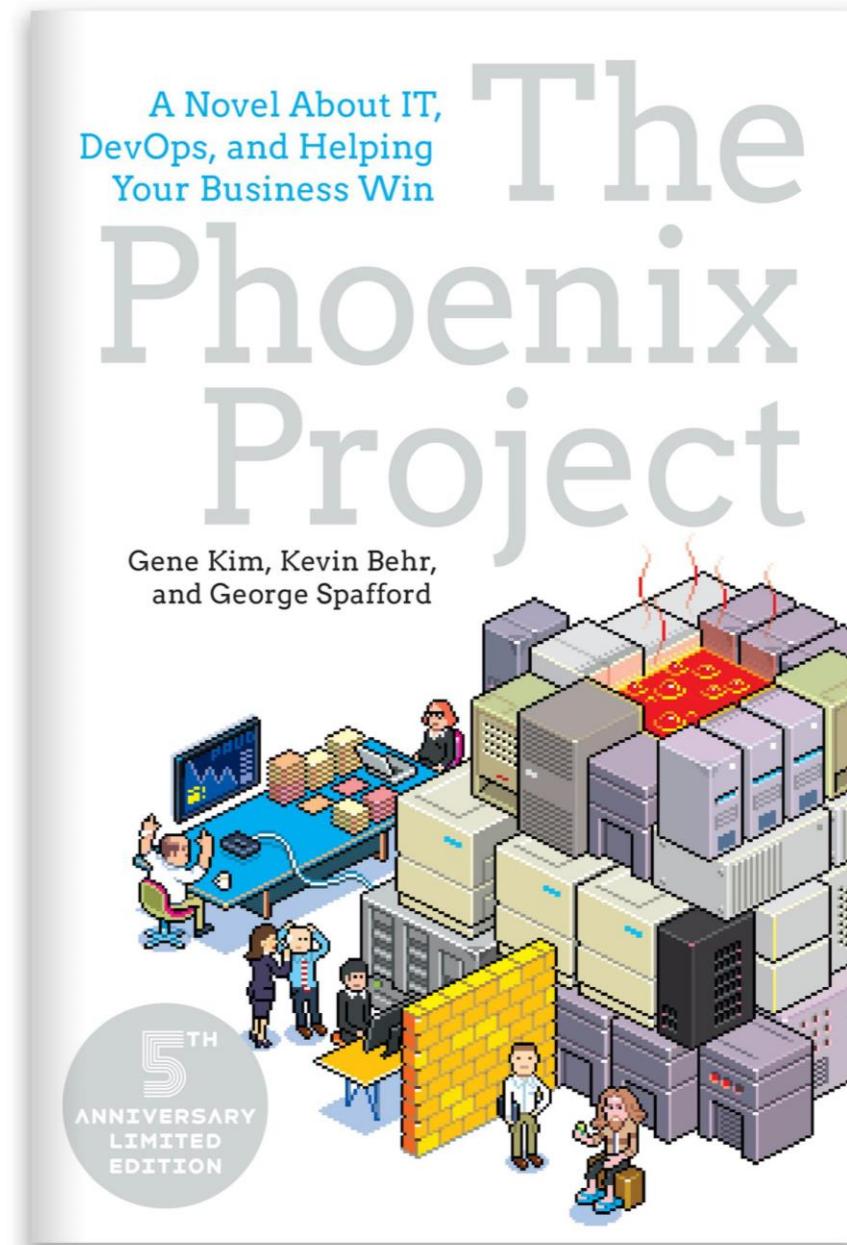
DevOps is the union of **people**,
process, and **products** to
enable continuous delivery of
value to your end users.”

”



Readings

<https://itrevolution.com/book/the-phoenix-project/>

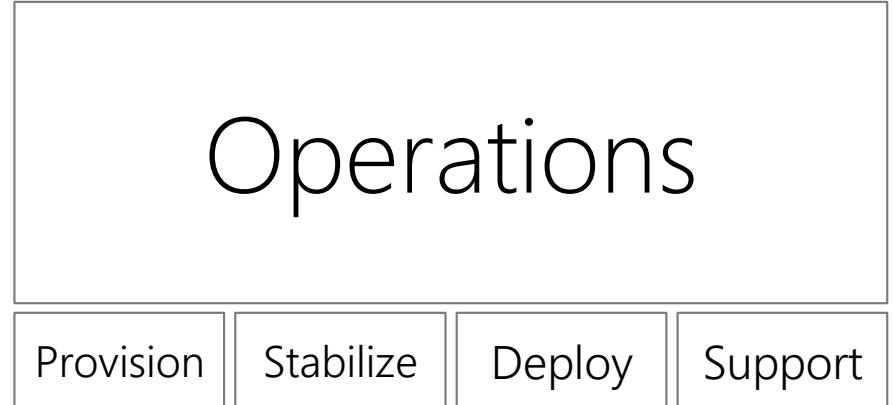


Most enterprises today...



- Translate business requirements to code
- Focus on completing feature work on time with quality

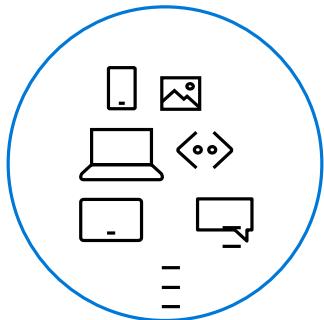
Chasm of Despair!



- Focused on faults, uptime and isolated automation
- Focus on reliability, compliance, and financial management
- Intermediaries, strict control, and long lead times to deploy

How Microsoft can help

Microsoft Azure is a powerful and flexible foundation for past, present, and future apps – easily build, manage, and deploy any application and any stack on a massive, global network using your favorite tools and frameworks.

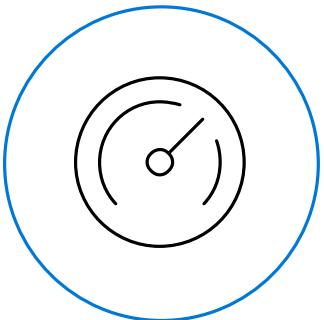


Flexible

Choice of IaaS, PaaS, public cloud or hybrid.

Mirror or modernize app infrastructure with VMs, containers, microservices or serverless.

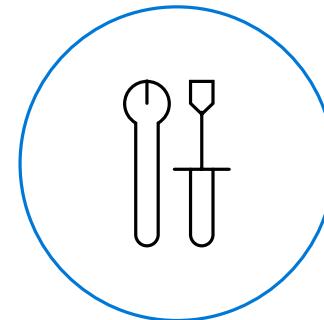
Supports all stages of the app modernization journey – from lift-and-shift to Cloud-Native.



Powerful

Instantly improve the performance, scalability and resiliency of your apps by moving them to the cloud.

Increase business agility with Cloud-Native capabilities and built-in DevOps for continuous innovation.



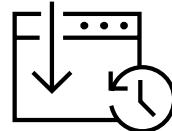
Open

Bring your stack, we bring a cloud that runs any app, on any platform, and any language.

Build applications using the language and tools of your choice - Azure supports what you already use and love so you can get up and running fast – just bring code.

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.

101010
010101
101010

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 Learning & Monitoring

- With Azure Application Insights you can identify how your applications are 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.

Introducing Azure DevOps



Azure Boards

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



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 Repos

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



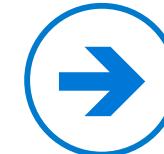
Azure Test Plans

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



Azure Artifacts

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



<https://azure.com/devops>

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.

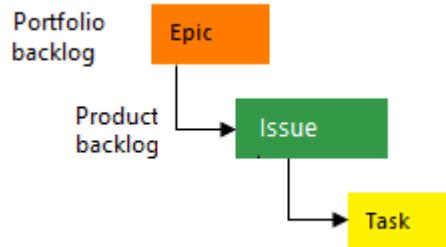


<https://azure.com/devops>

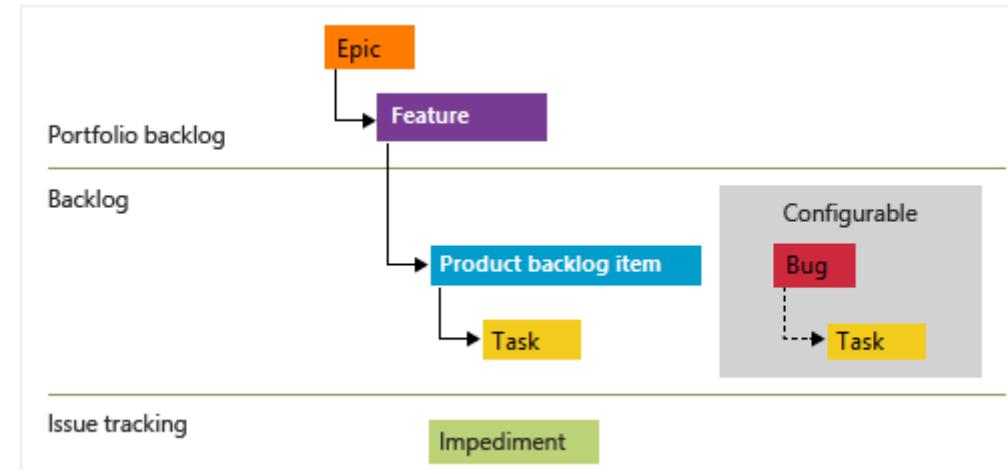
The screenshot shows the Azure DevOps Boards interface for the 'FabrikamFiber' project. The left sidebar includes links for 'AdventureWorks Mobile', 'Overview', 'Boards' (which is selected), 'Work Items', 'Backlogs', 'Sprints', 'Queries', 'Plans', 'Repos', 'Pipelines', 'Test Plans', and 'Artifacts'. The main area is titled 'FabrikamFiber Board' and displays a Kanban board with columns for 'New', 'Active', '5/5 Staging', and '15/5 Deployed'. The 'New' column contains a 'New item' card for 'Hotels filter page' by 'Carlos Slattery' (Xamarin). The 'Active' column contains cards for 'Home page (selected room)' by 'Kat Larson' (Design), 'Top page controls' by 'Celeste Burton' (ML, Xamarin), 'Guests page' by 'Carole Poland' (ML, Xamarin), 'NFC open door' by 'Cecil Folk' (Spike, Xamarin), 'Room Tab' by 'Celeste Burton' (Rooms [Detail]), 'Map filter' by 'Carole Poland' (General, Room [List]), 'Hotel reviews page' by 'Celeste Burton' (Rooms [Detail]), and 'Adapt some parts of UI to UWP for Desktop' by 'Carole Poland' (Blocked, Xamarin). The 'Staging' and 'Deployed' columns also contain several cards related to mobile application components like 'Mobile (Spike)', 'Mobile (Design)', 'Footer', 'Navigation menu', 'Login page', 'Ambient settings', and 'Notifications list'.

Working with work items

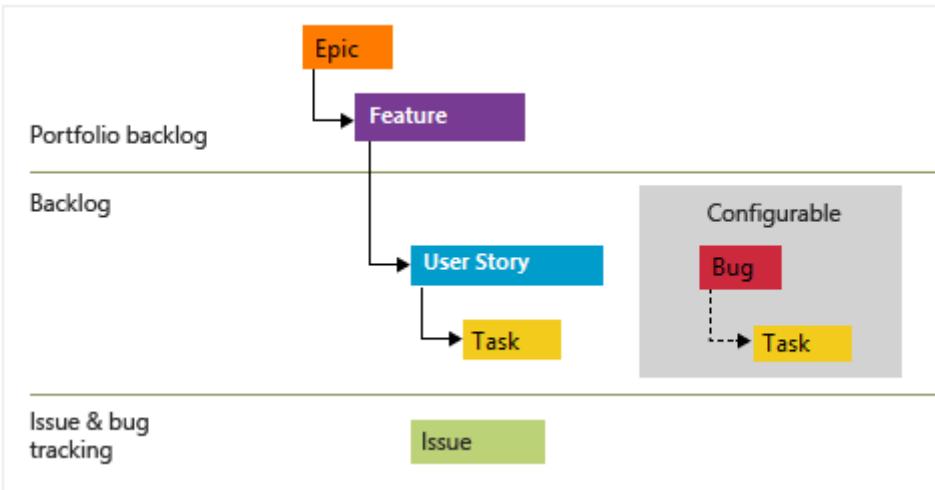
Basic



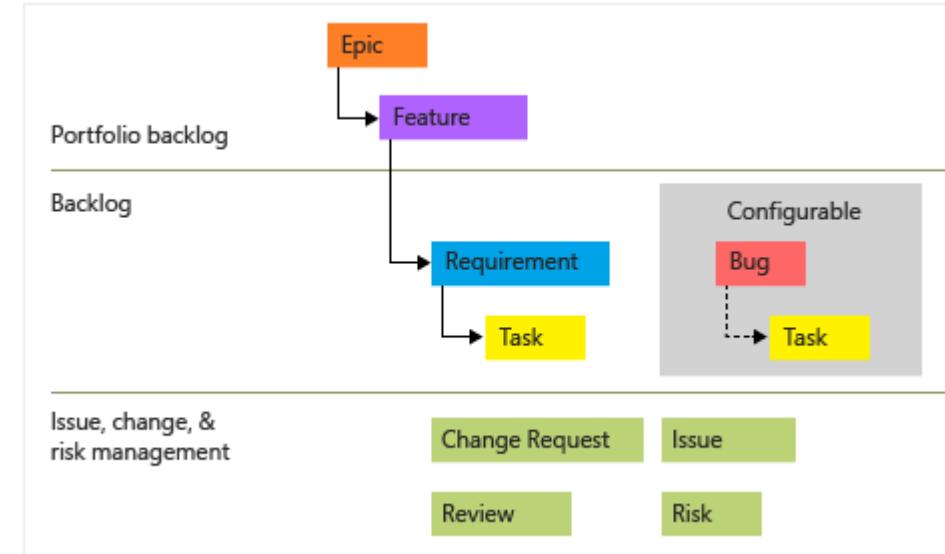
Scrum



Agile



CMMI



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

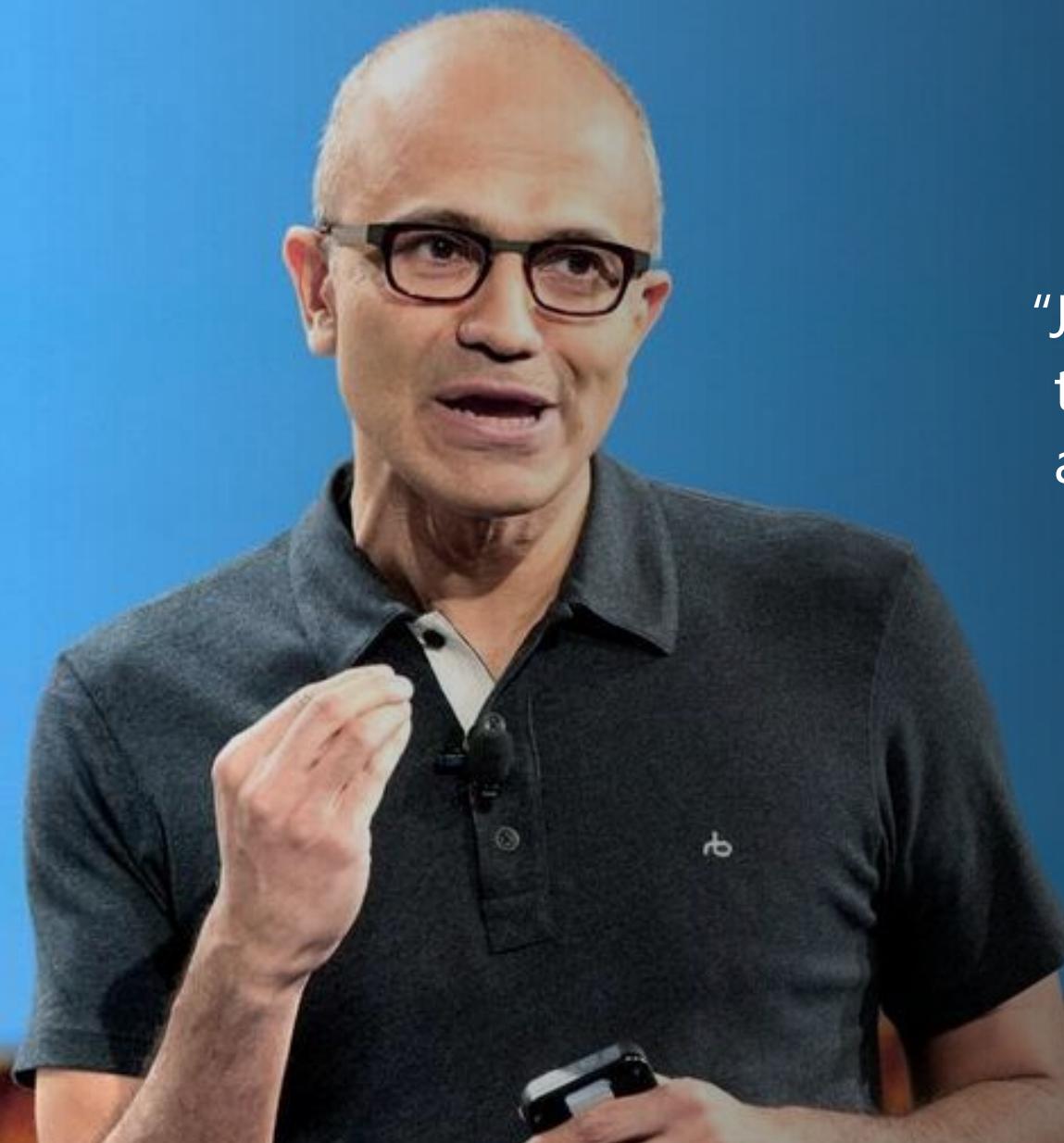
The screenshot shows the Azure DevOps Pipelines interface for the 'AdventureWorks Mobile' project. The pipeline is titled 'Enabling feature flags for Preview Attachment and Grid Views'. It includes three parallel jobs: 'Windows Job' (Running, 1m 53s), 'Linux Job' (Running, 3m 29s), and 'macOS Job' (Running, 3m 07s). The 'Logs' tab is selected, displaying the command-line output for the Windows job:

```
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/typescriptServices.js'
```



<https://azure.com/pipelines>

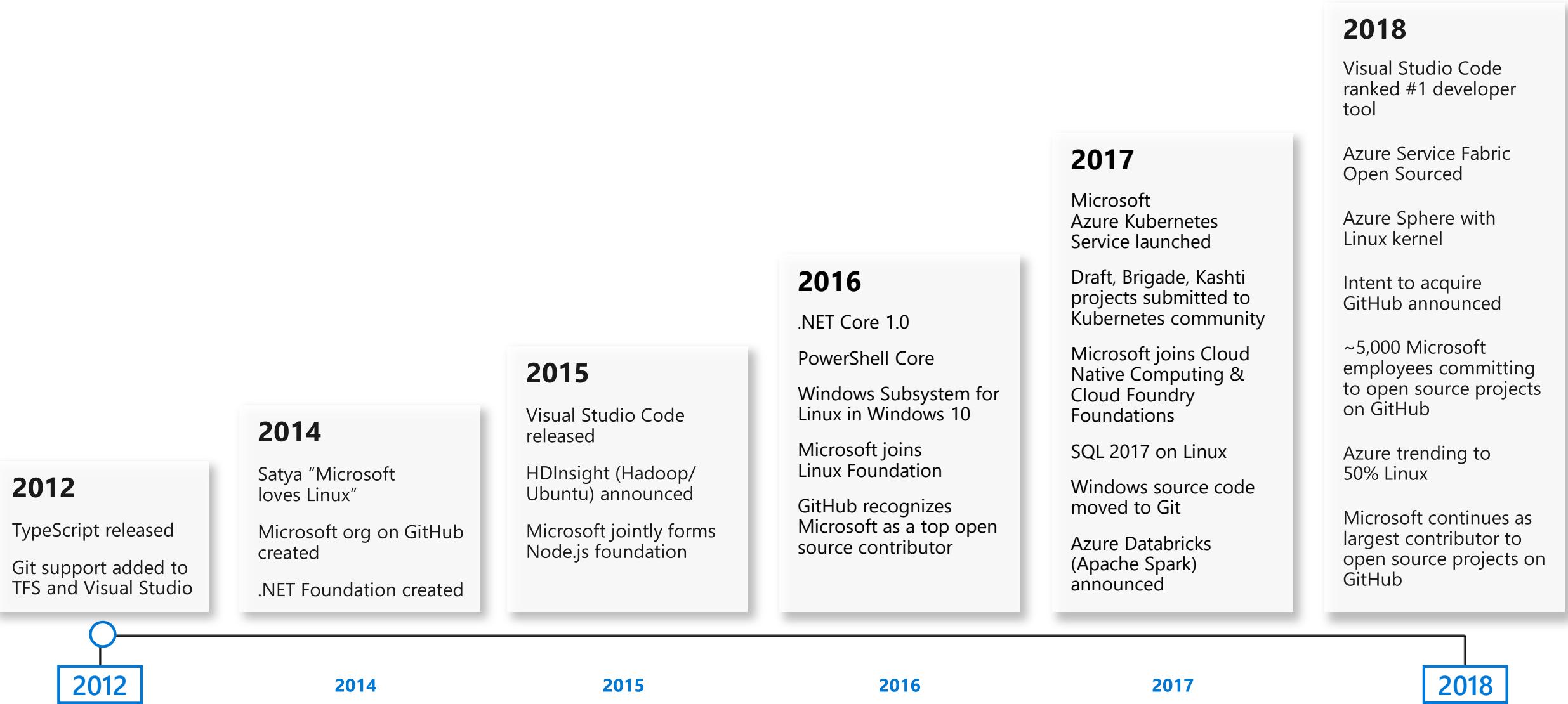
A photograph of Satya Nadella, CEO of Microsoft. He is a middle-aged man with short, light-colored hair, wearing dark-rimmed glasses and a dark grey polo shirt. He is gesturing with his right hand, pointing his index finger upwards. A small Microsoft logo is visible on the left chest of his shirt. The background is a solid blue.

"Judge us by the actions we have
taken in the recent past, our
actions today and in the future"

—Satya Nadella, CEO
Microsoft

2018

Microsoft ❤️ Open Source





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



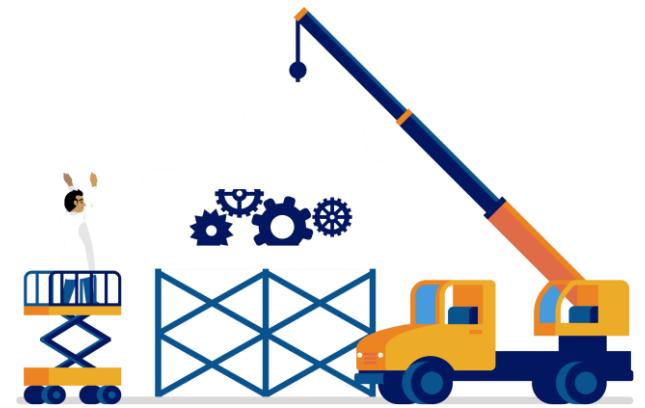
Integrated with GitHub

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 search bar and navigation links for Pull requests, Issues, Marketplace, and Explore. Below the header, the page title is "Marketplace / Azure Pipelines". A large circular icon contains the Azure Pipelines logo (a blue gear with a white arrow). To the right of the icon, the text "Azure Pipelines" is displayed, followed by two buttons: "Set up a new plan" (green) and "Edit your plan ▾" (grey). Below these buttons, a descriptive text reads: "Continuously build, test, and deploy to any platform and cloud". It continues: "Azure Pipelines offers cloud-hosted pipelines for Linux, macOS, and Windows with 10 free parallel jobs and unlimited minutes for open source projects." There's also a "Read more..." link. On the left side of the main content area, there are sections for "Categories" (Continuous integration, Deployment), "Supported languages" (Dockerfile, Go, Java, and 7 other languages supported), and "Developer links" (Support, Status, Documentation, Privacy Policy). On the right, a large blue box highlights "Linux, macOS, and Windows agents" with the subtext: "Simplify managing hardware and VMs by using Microsoft cloud-hosted agents. Get full CI/CD pipeline support for every major platform and tool." Below this, a flowchart illustrates a CI/CD pipeline: "Test 27 succeeded" leads to "Build Linux 6 succeeded", which then leads to "Build Windows 2 succeeded" and "Build macOS 64% in progress...". Finally, an arrow points to a "Distribute" step.

Demo

GitHub Integration



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>

The screenshot shows the Azure DevOps interface for managing pull requests. On the left, a sidebar menu lists various options: Overview, Boards, Repos (which is selected), Files, Commits, Pushes, Branches, Tags, Pull requests (selected), Pipelines, Test Plans, and Artifacts. The main content area is titled "Pull requests" and includes filters for "Mine", "Active", "Completed", and "Abandoned". A search bar allows filtering by keyword or ID. Below the filters, there are sections for "Created by me", "Assigned to me", and "Assigned to my team", each listing several pull requests with their titles, creators, and details. At the bottom of the page, there is a footer with links for "Project settings" and "Help & feedback".

Section	Pull Request Title	Creator	Details
Created by me	Initialize client with .client.init	Kat Larsson	Requested #238 into master
	Testing configuration settings	Kat Larsson	Requested #230 into features/config
	Check returned identity for null status	Colin Ballinger	Requested #212 into master
Assigned to me	[WIP] Add tests for deployment mapping	Robin Counts	Requested #221 into master
	Add exception on disconnect	Colin Ballinger	Requested #249 into master
	Maintain structure when converting isomorphs	Robin Counts	Requested #234 into master
Assigned to my team	Hotfix payload to releases/99	Robin Counts	Requested #201 into releases/99

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.

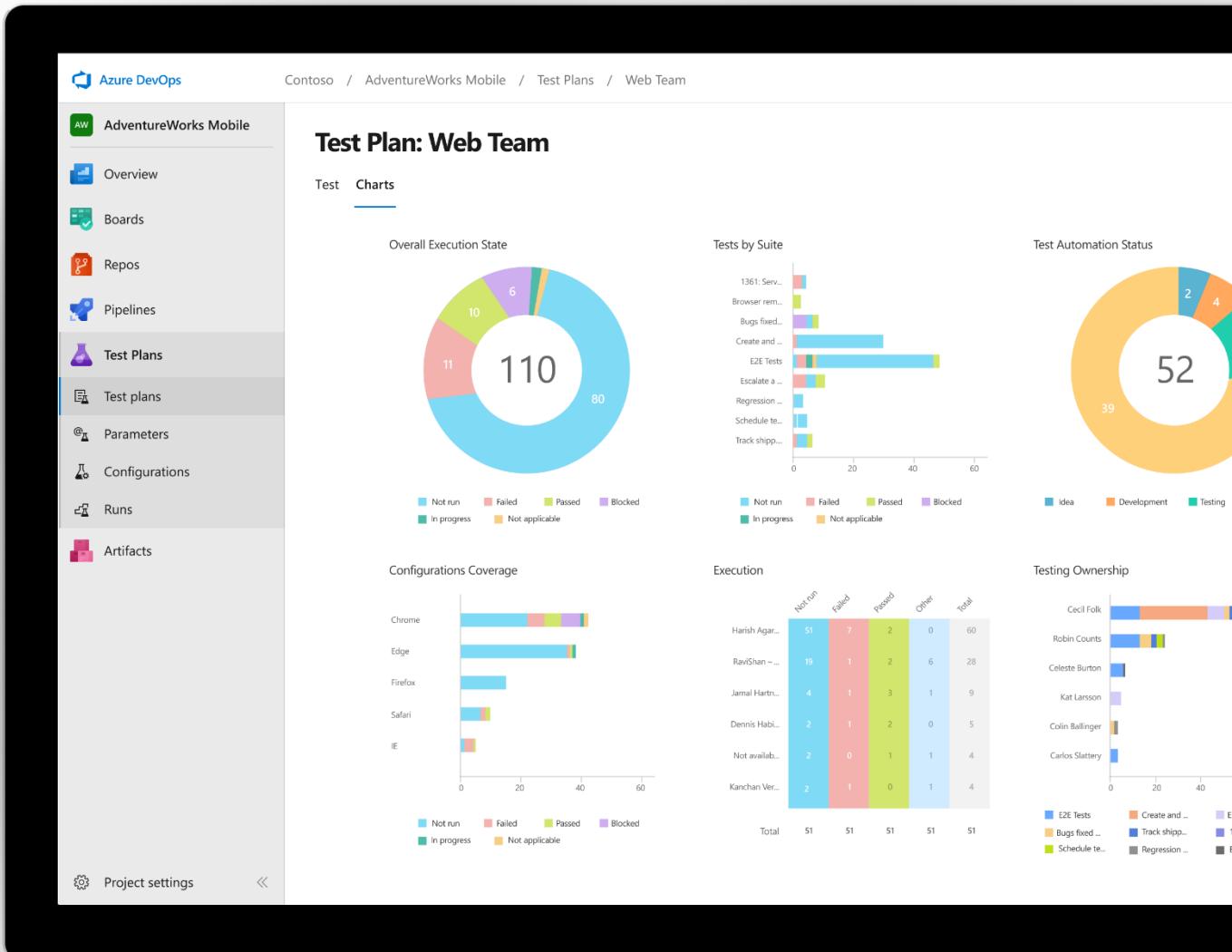


Get end-to-end traceability

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 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>

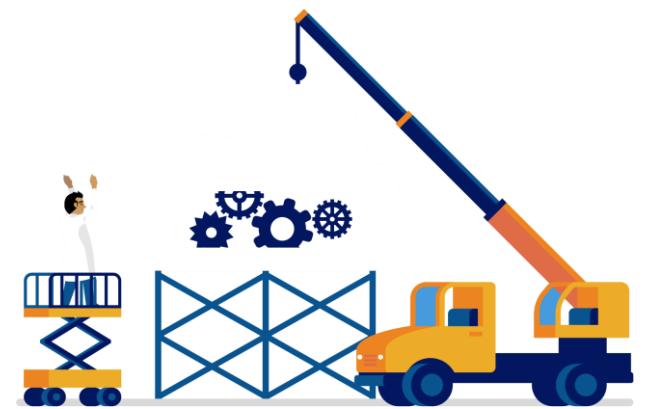
The screenshot shows the Azure DevOps interface for managing artifacts. On the left, there's a sidebar with links for 'AdventureWorks Mobile' (selected), 'Overview', 'Boards', 'Repos', 'Pipelines', 'Test Plans', and 'Artifacts'. The main area is titled 'Artifacts' and shows a table of packages. The columns are 'Package', 'Views', 'Source', 'Last pushed', and 'Description'. The packages listed are:

Package	Views	Source	Last pushed	Description
abbrev		nuget	a year ago	Like ruby's abbrev module, but in js
accepts		npmjs	a year ago	Higher-level content negotiation
acorn		MyFeed	a year ago	ECMAScript parser
acorn-dynamic-import		maven	a year ago	Support dynamic imports in acorn
aclr-jsx		nuget	a year ago	Alternative, faster React.js JSX parser
acorn-object-spread		maven	a year ago	Custom JSON-Schema keywords for ajv validator
ajv		npmjs	a year ago	Alphanumeric sorting algorithm
ajv-keywords		nuget	a year ago	ANSI escape codes for manipulating the terminal
alphanum-sort		npmjs	a year ago	An elegant lib that converts the chalked (ANSI) text to HTM

Demo

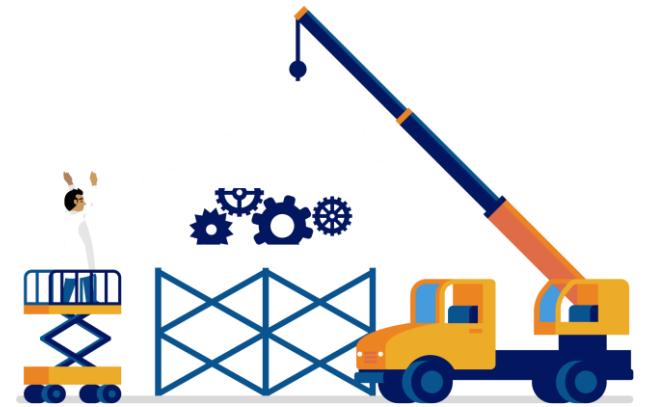
Parts Unlimited

<https://azureddevopslabs.com>



Demo

Create CI/CD



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

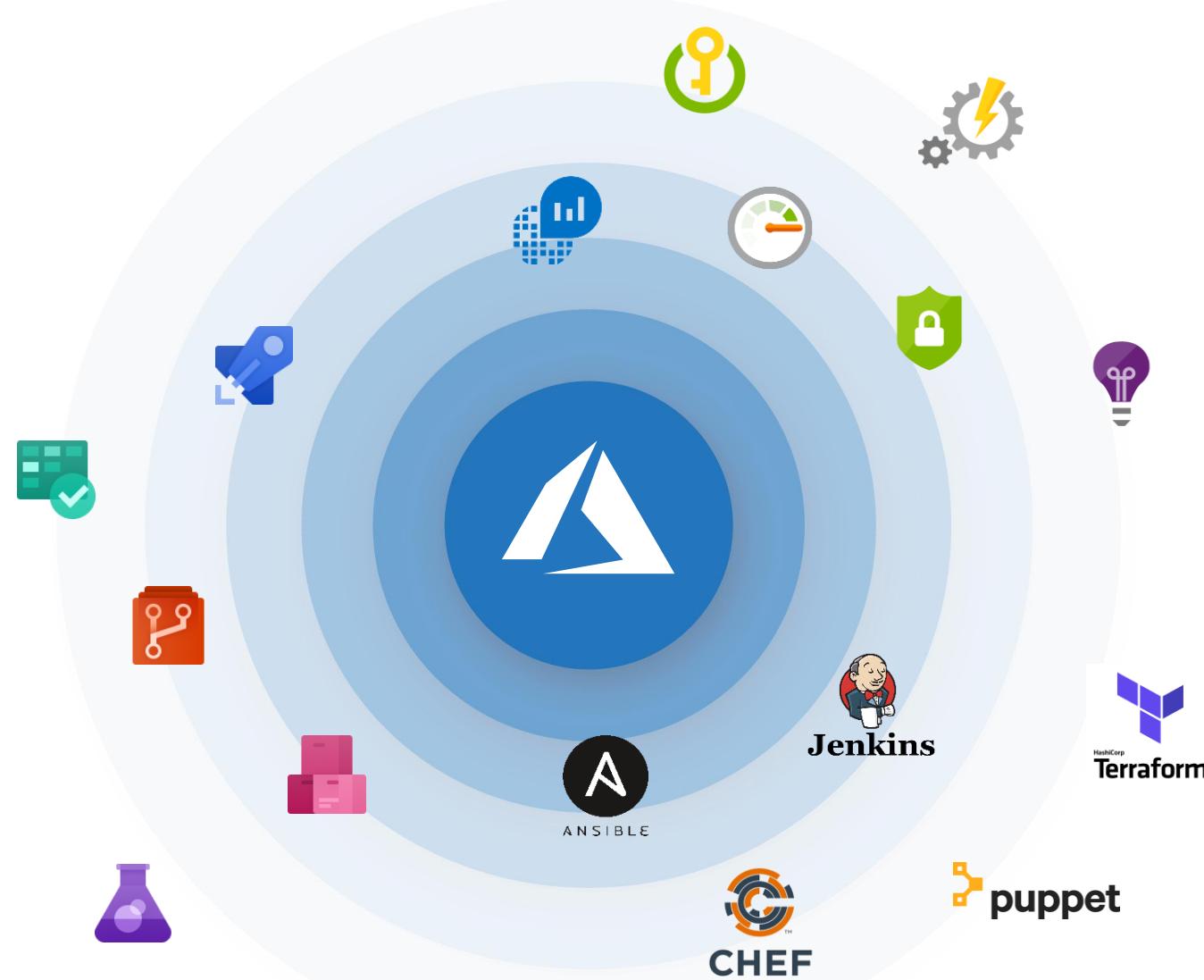
Customer
Support

Consistent
admin
and access
control



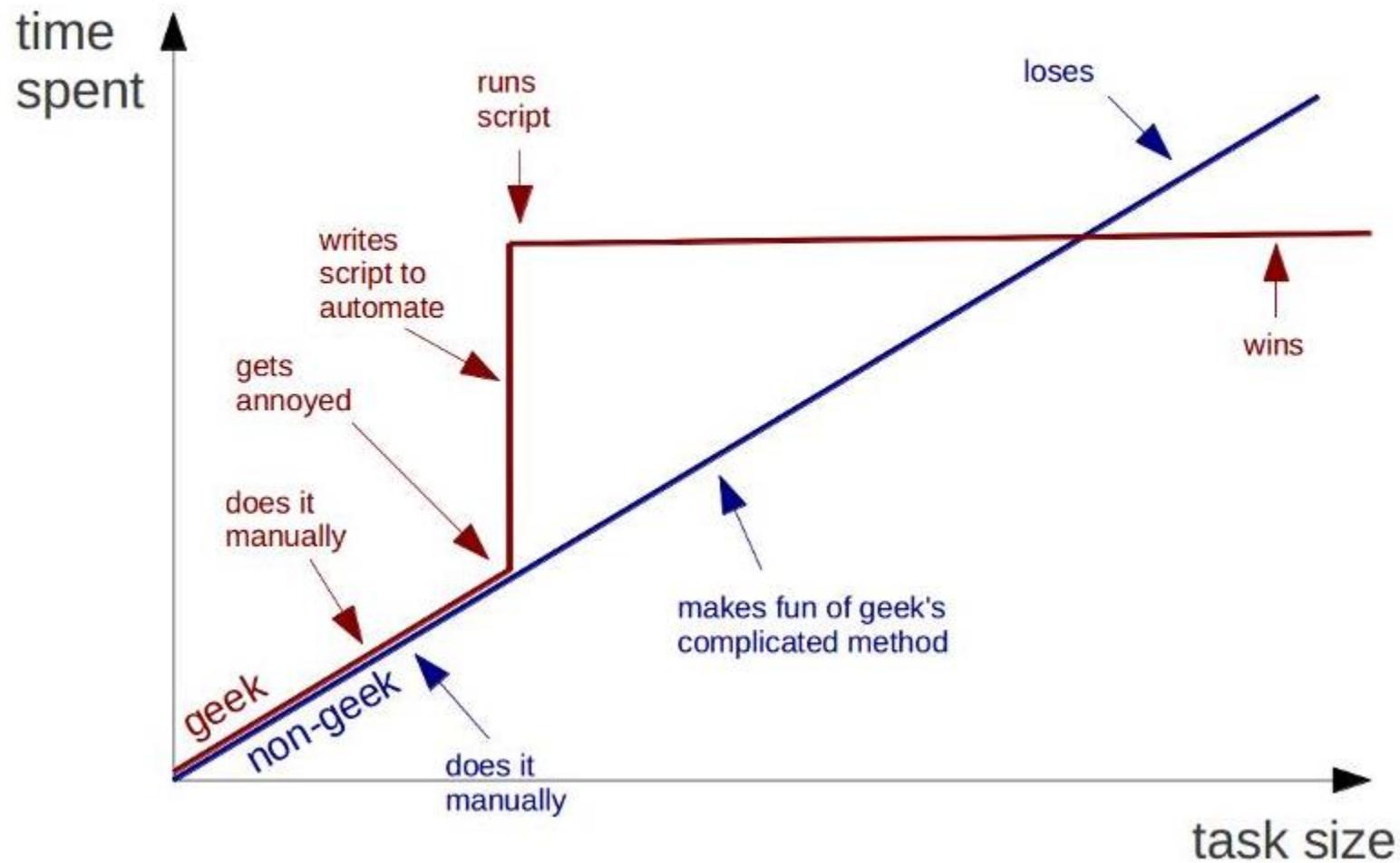
<https://azure.com/devops>

Broadening the Azure Ecosystem



Motivation

Geeks and repetitive tasks



Self-Service Dev/Test Environments

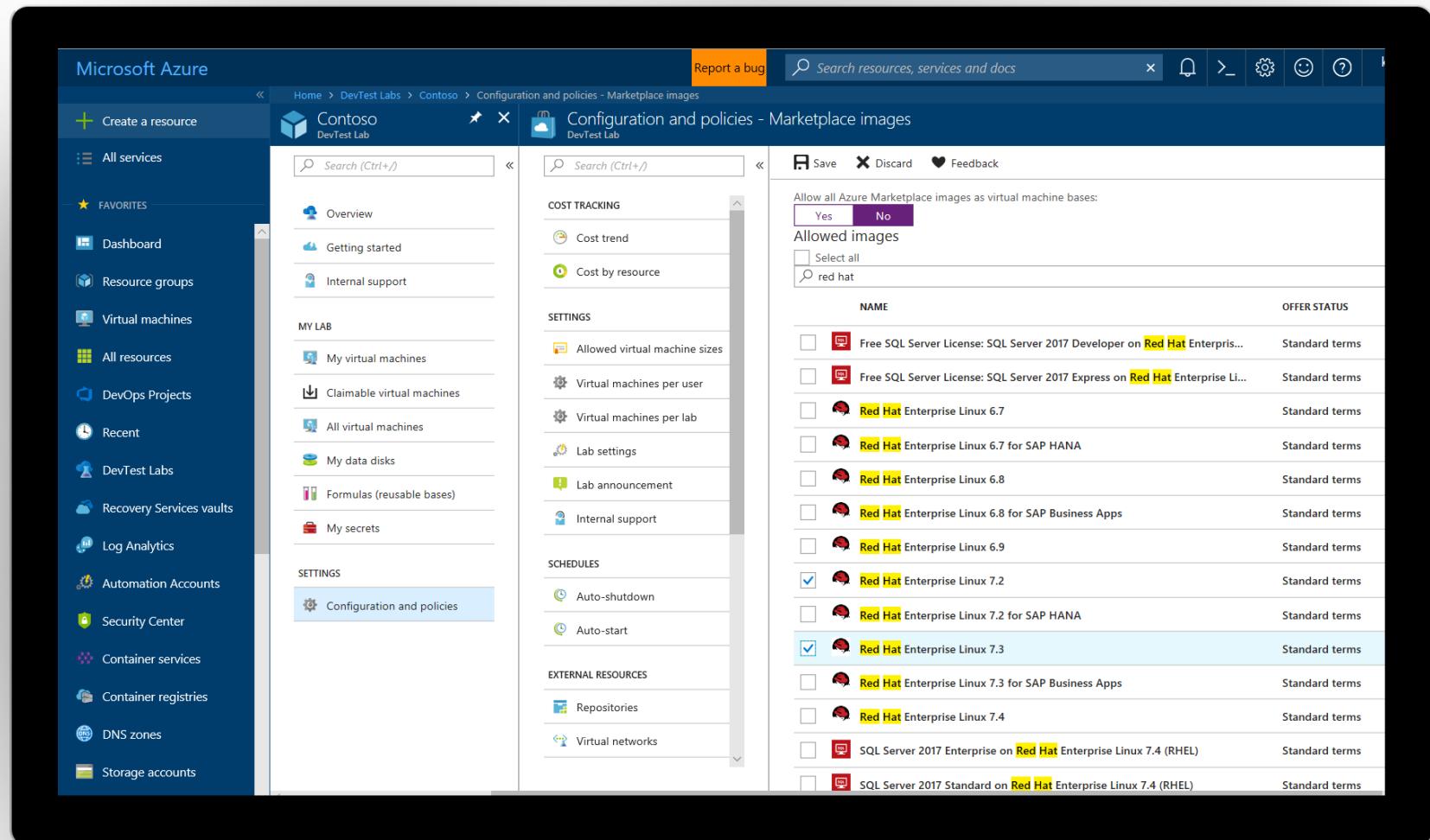
Azure Lab Services

→ 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



Infrastructure and Configuration as Code

Azure Resource Manager, Automation & 3rd Party Integrations

→ Infrastructure as Code,
built-in

→ Azure Config & Automation

→ Support for 3rd party and OSS
tooling such as Terraform,
Ansible, Chef, Puppet &
SaltStack



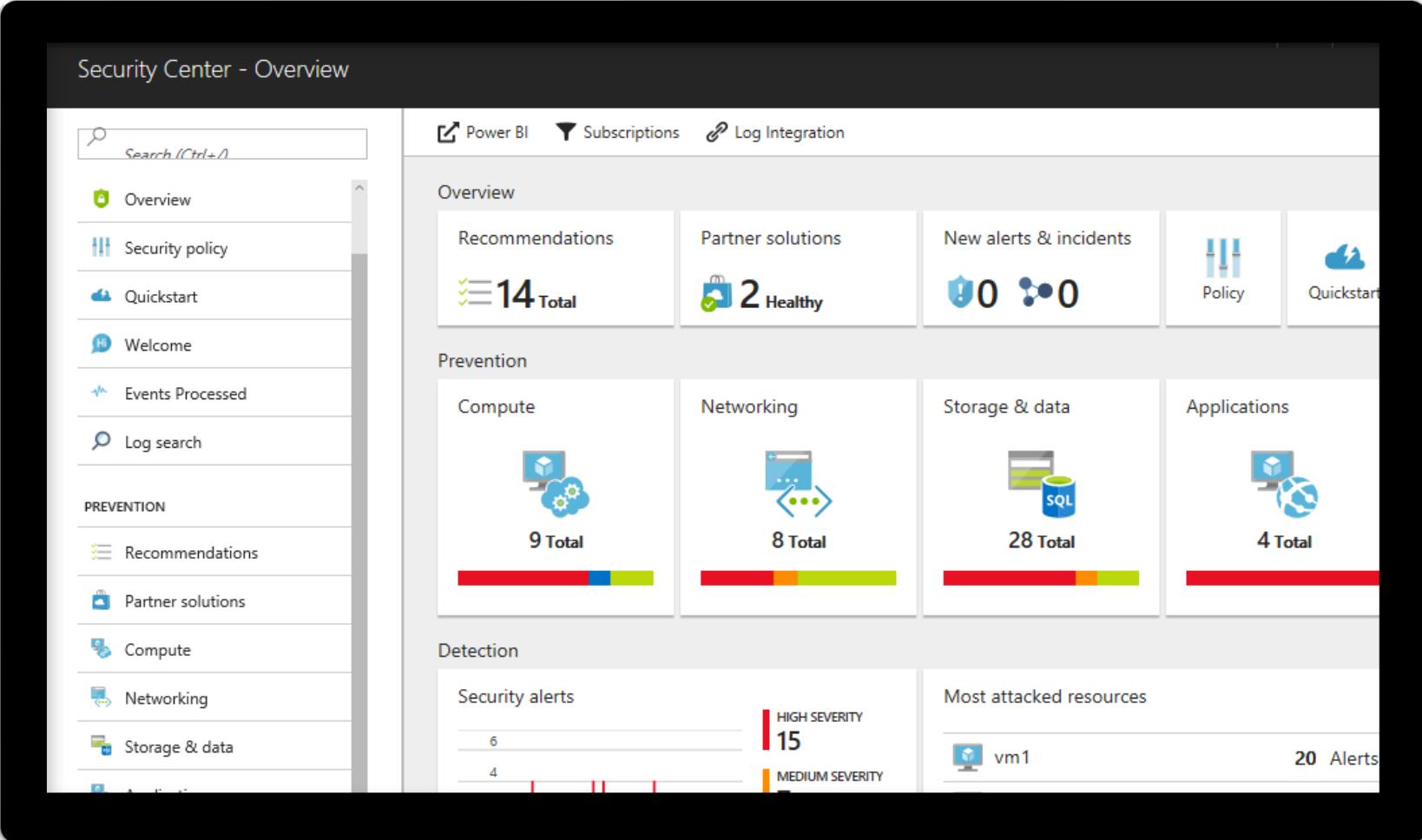
The screenshot shows the Microsoft Azure portal interface. On the left, the navigation menu includes 'Create a resource', 'All services', and various Azure services like 'Resource groups', 'Virtual machines', and 'Automation Accounts'. The main area displays a 'Resource groups' list with items such as 'AustraliaSEDevelopment', 'AustraliaSEProduction' (which is selected), 'autoShutdown', 'cloud-shell-storage-westus', 'DefaultResourceGroup-EUS', and 'securitydata'. To the right, the 'AustraliaSEProduction - Automation script' blade is open. It shows an 'Overview' section with tabs for 'Template', 'Parameters', 'CLI', 'PowerShell', '.NET', and 'Ruby'. The 'Template' tab displays a JSON template for deploying resources. The template defines parameters for DNS zones, including 'dnszones_onazure.io_name' and 'SOA @_name', and properties for 'A_vote_name' and 'A_draft_name'.

```
$schema: "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#"
contentVersion: "1.0.0.0"
parameters:
  dnszones_onazure.io_name: {
    defaultValue: "onazure.io",
    type: "String"
  },
  NS @_name: {
    defaultValue: "@",
    type: "String"
  },
  SOA @_name: {
    defaultValue: "@",
    type: "String"
  },
  A_vote_name: {
    defaultValue: "vote",
    type: "String"
  },
  A_draft_name: {
    defaultValue: "draft",
    type: "String"
  },
  A_devops_name: {
    defaultValue: "devops",
    type: "String"
  },
  A_*_.draft_name: {
    defaultValue: "*.draft",
    type: "String"
  }
```

Continuous Security

Azure Security Center

- Gain full visibility and control of your cloud security state
- Leverage ML to Proactively identify and mitigate risks to reduce exposure to attacks
- Quickly detect and respond to threats with advanced analytics



The screenshot shows the Azure Security Center - Overview dashboard. The top navigation bar includes Power BI, Subscriptions, and Log Integration. The main area is divided into three main sections: Overview, Prevention, and Detection.

- Overview:** Includes a search bar, a sidebar with links like Overview, Security policy, Quickstart, Welcome, Events Processed, Log search, PREVENTION (Recommendations, Partner solutions, Compute, Networking, Storage & data, Applications), and DETECTION (Security alerts, Most attacked resources). It displays 14 Total recommendations, 2 Healthy partner solutions, 0 alerts, and 0 incidents.
- Prevention:** Shows the total number of findings for Compute (9 Total), Networking (8 Total), Storage & data (28 Total), and Applications (4 Total). Each category has a red progress bar indicating severity levels.
- Detection:** Displays security alerts with a count of 15 (High Severity) and 4 (Medium Severity). It also shows the most attacked resource, vm1, with 20 alerts.

Smarter Insights, Faster

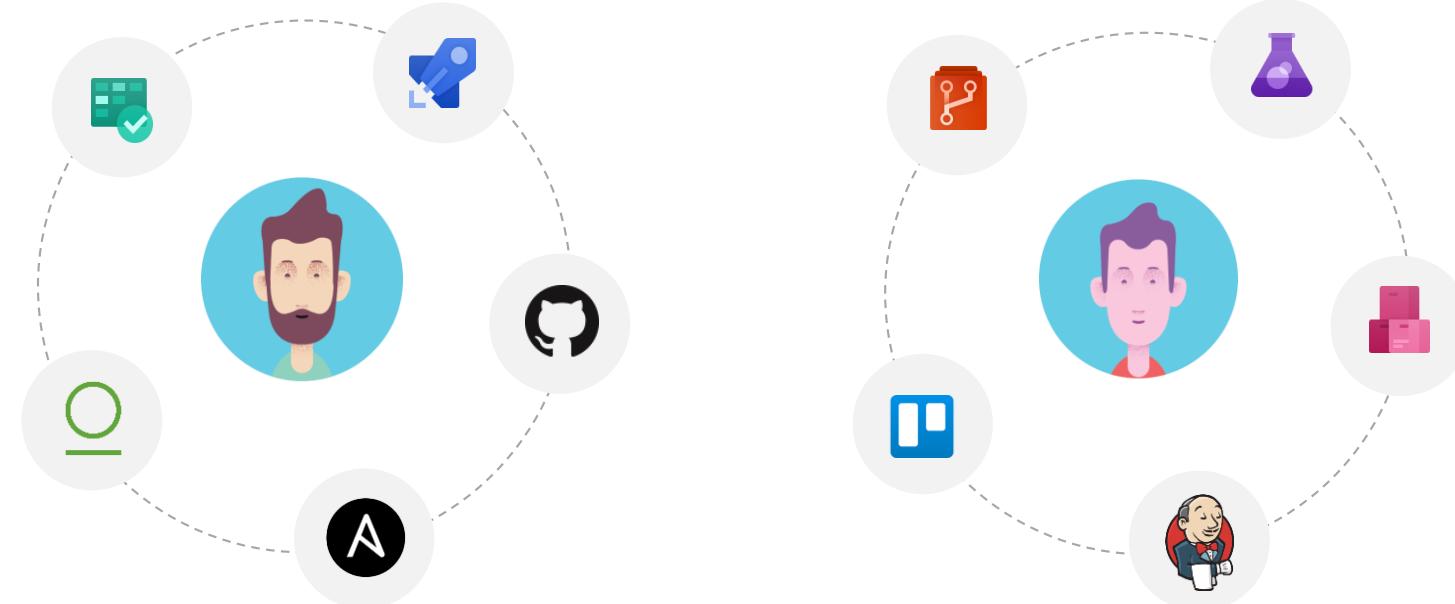
Azure Monitor, Application Insights & Log Analytics

- Pre-defined solutions with smart thresholds
- Visualize data in intuitive and customizable dashboards
- Separate the signal from the noise and accelerate root-cause analysis
- Integrate your existing processes & tools like Service Now



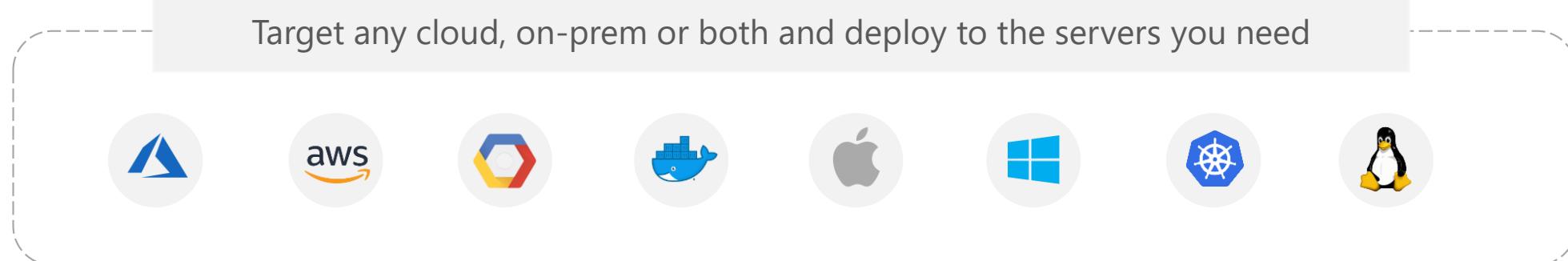
Azure DevOps: Choose the tools and clouds you love

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

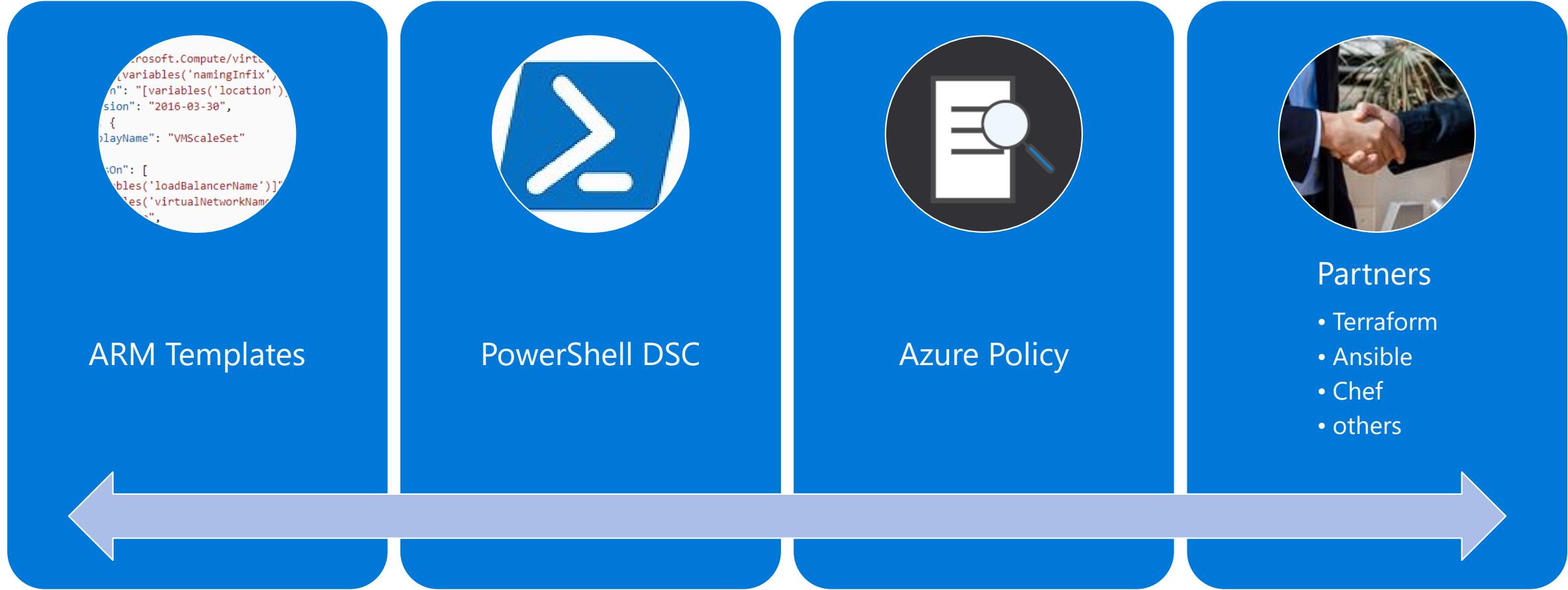


Mix and match to create workflows with tools from Microsoft, open source or your favorite 3rd party tools

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



Provisioning and configuration



Azure DevOps (or similar)

Capture scripts/templates/artifacts, orchestrate provisioning and configuration, track throughout the lifecycle, and manage gates and approvals



Azure Policy and DevOps

Govern your Azure resources with simplicity

Apply management and security at scale

Enforce policies and audit compliance

Monitor compliance continuously

Build custom policies with flexibility

Apply built-in policies from Microsoft and community

The screenshot shows the Azure DevOps Pipelines interface for a project named 'ContosoCloudService / ContosoWeb / Pipelines'. The pipeline is titled 'Contoso Web Continuous Delivery > Release-2'. The 'Pipeline' tab is selected. On the left, there's a sidebar with various icons for different stages like 'Code', 'Build', 'Test', 'Release', etc. The main area is divided into 'Stages'. The first stage, 'Test', is highlighted with a red border and has a status message: 'Test Failed' with a timestamp 'on 11/4/2018, 10:00 PM'. Below the stages, the 'Summary' tab is active, showing a timeline of events: 'Deployment failed on 11/4/2018, 10:00 PM' (Agent job - Failed), 'Automatic trigger Deployment triggered on 11/4/2018, 9:59 PM', and 'Associated changes View commits and work items' (two entries for '_ContosoWeb / e92d08b0' on 'master').

DevOps at Microsoft

Azure DevOps is the toolchain of choice for Microsoft engineering with over 100,000 internal users



<https://aka.ms/DevOpsAtMicrosoft>

442k

Pull Requests per month

4.6m

Builds per month

28k

Work items created per day

2.4m

Private Git commits per month

3.5k

Open Source repos

12k

Employees contributing to open source

82,000

Deployments per day

Data: Internal Microsoft engineering system activity, March 2019

TFS - Prod Config Change X +

https://dev.azure.com/mseng/VSOnline/_releaseProgress?releaseId=5536521&a=release-pipeline-progress

Azure DevOps mseng / VSOnline / Pipelines

V VSO Online Pipeline Variables History + Deploy Cancel Refresh Release (old view) Edit release ... Help

Release

Manually triggered by Shady Ibraheem 30/08/2018 21:01

Artifacts

VSO.Release.CI VSO.Release.CI_M139_20180 830.30 releases/M139

Stages

Ring 0 ✓ Succeeded on 30/08/2018 21:24

Ring 1 ✓ Succeeded on 30/08/2018 21:44

Ring 2 ⏲ Pending intervention... Job 1/2 1/1 tasks Waiting on Pause Between Rings 08:49

Ring 5 ⏲ Not deployed

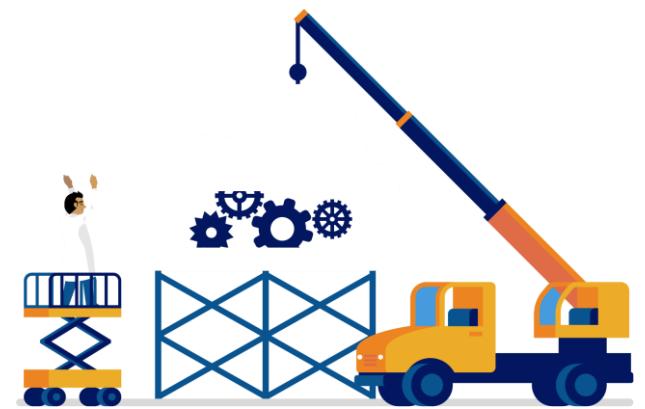
Resume

Project settings

Demo

Azure DevOps labs

<https://azureddevopslabs.com>



What about IoT??



Remember Microsoft ❤️ Open Source?

- A living repository of best practices and examples for developing [AzureIoT Edge](#) solutions doubly presented as a hands-on-lab.

<https://github.com/toolboc/IoTEdge-DevOps>

Demo

[Azure DevOps](#)

[Azure Portal](#)

