

Continuous Integration

Modern DevOps with GitHub and Azure DevOps (Part 1)

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Agenda

- What is DevOps?
- Why Does DevOps Matter?
- Continuous Integration
- GitHub and Azure DevOps
- Demo and Discussion
- Resources to learn and do more

What is DevOps?

“DevOps is development and operations **collaboration**”

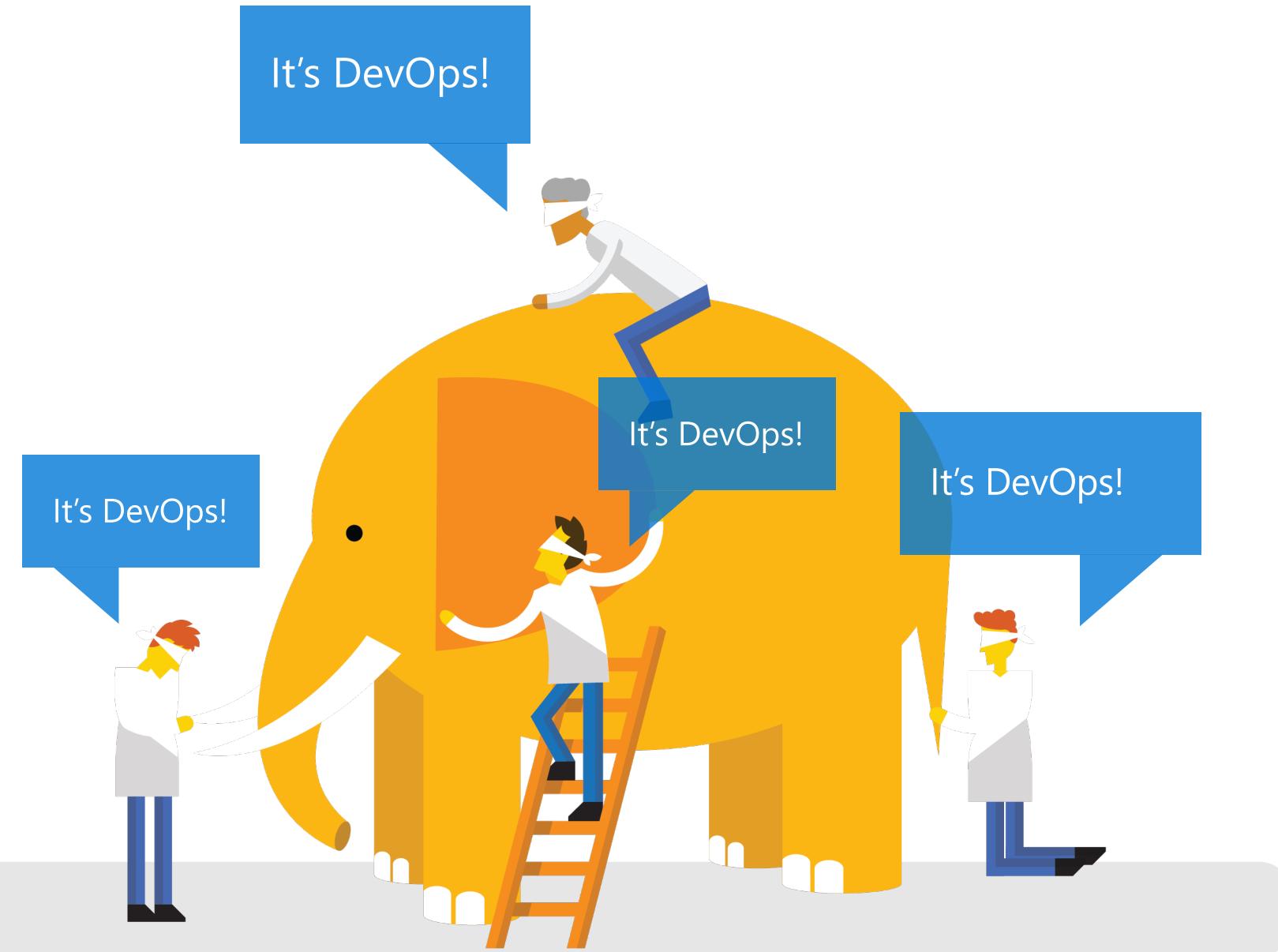
“DevOps is using automation”

“DevOps is **small** deployments”

“DevOps is treating your **infrastructure** as code”

“DevOps is feature switches”

“Kanban for Ops?”

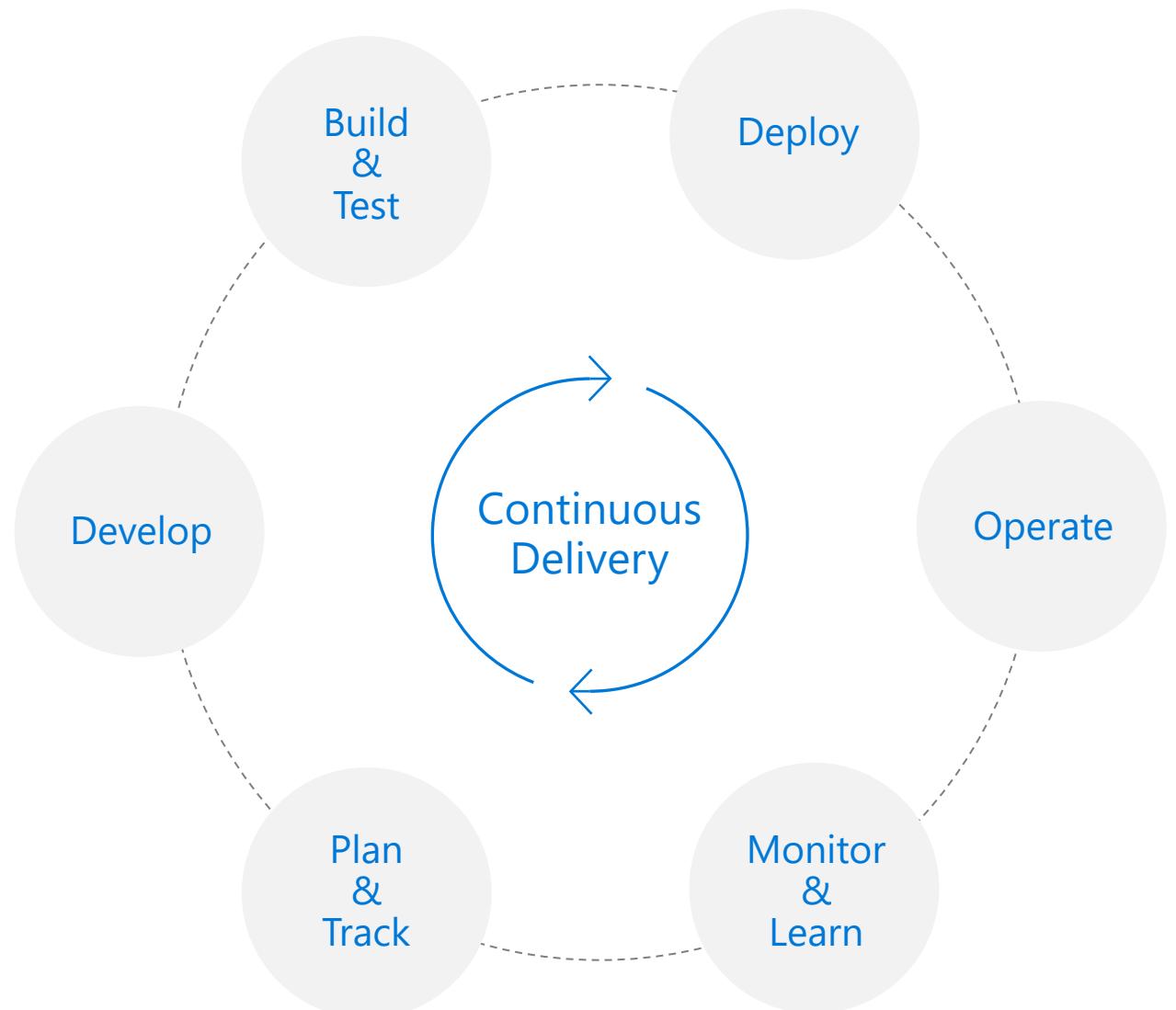


What is DevOps?

People. Process. Products.

“

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



Why Does DevOps Matter?



Business Needs



Drive
innovation



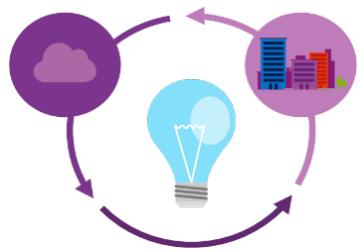
Reach and
engage your
customers



Accelerate
time-to-market while
reducing costs



What needs to change to address those needs?



Shorten cycle times
and deliver value
faster



Improve **quality**
and availability



Optimize resources
and eliminate waste



Deliver **innovation**
and great customer
experience through
experimentation

Lessons from the disruptors



- Ship faster and experiment to learn faster
- Iterate quickly



- Focus on innovation and differentiation
- Leverage open source for the rest
- Push new code confidently & securely



- Collaborate through inner source
- Measure team metrics & optimize processes
- Grow development teams



DevOps and the app of the future

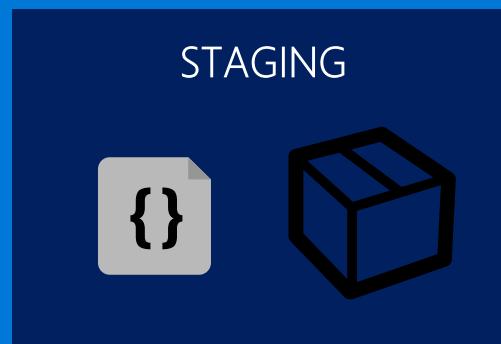
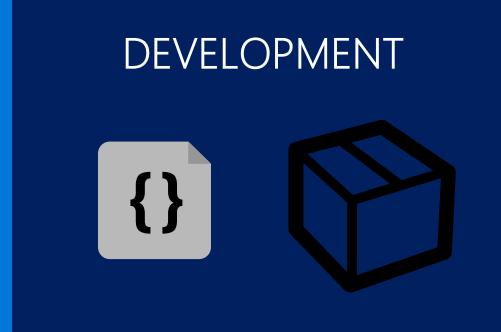
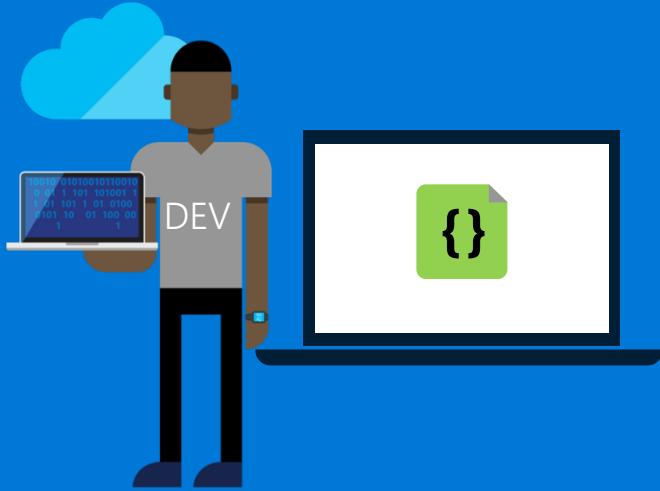
DevOps is to software development what the assembly line is to automobile manufacturing.

It is the logistics to get software to end users like delivery logistics get vehicles to dealers.

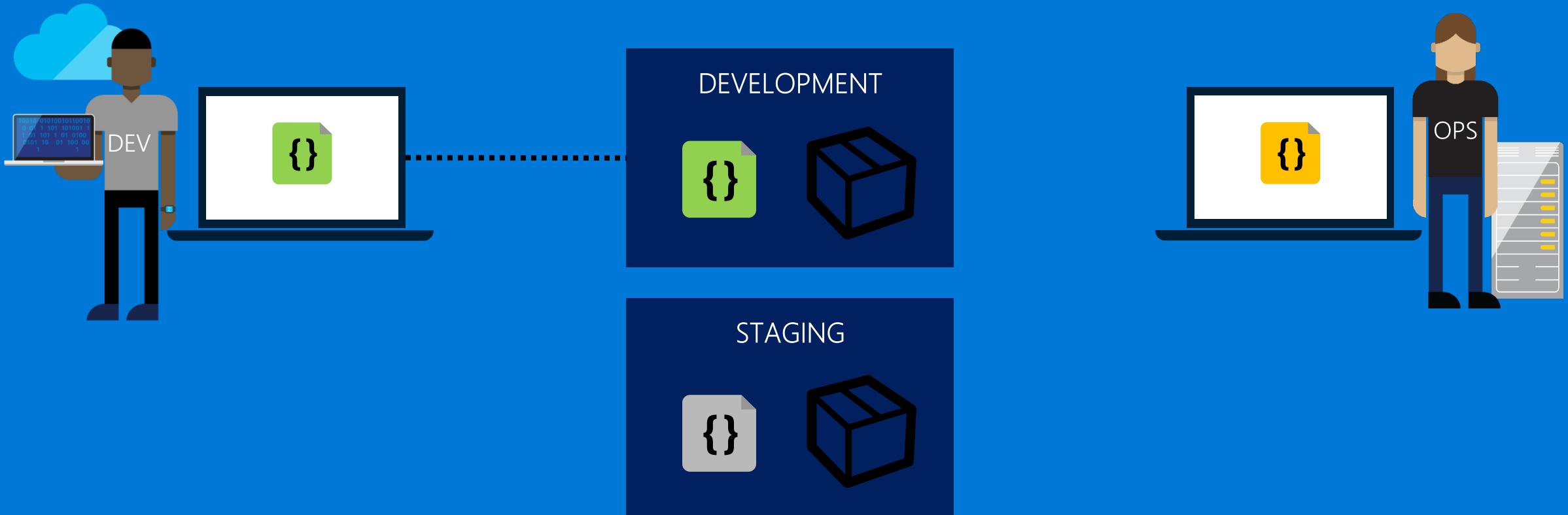
What does this mean for you?

If you setup a secure, efficient, robust, resilient assembly line
you will innovate faster than your competition!

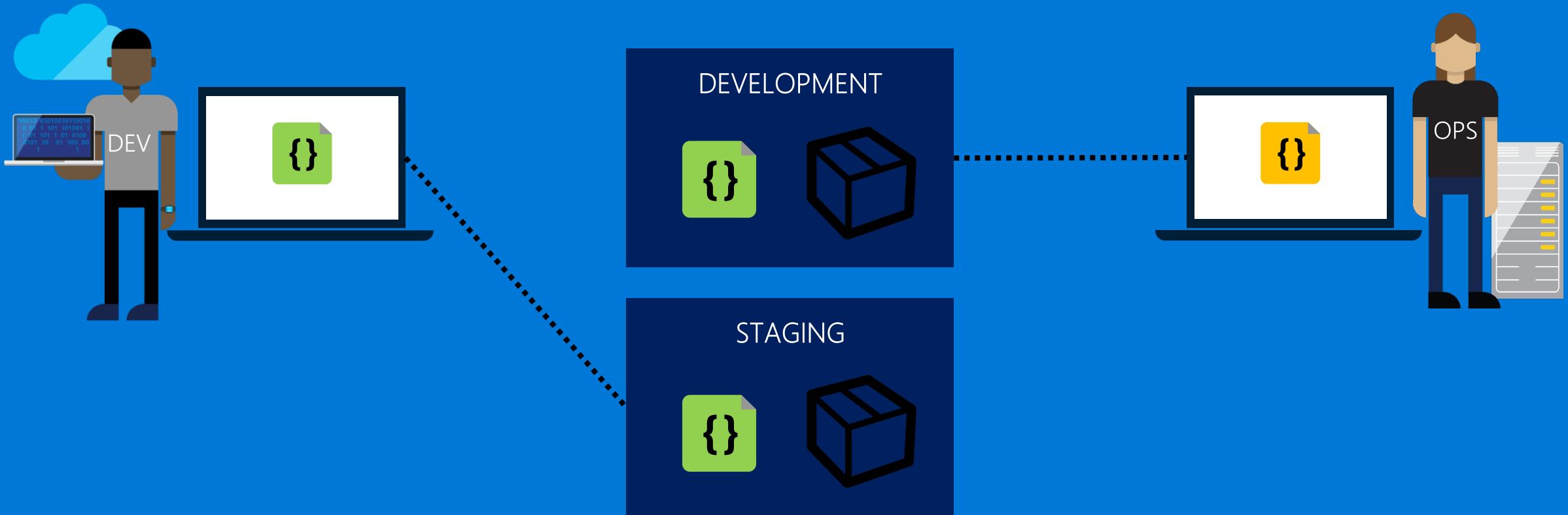
The Old Way



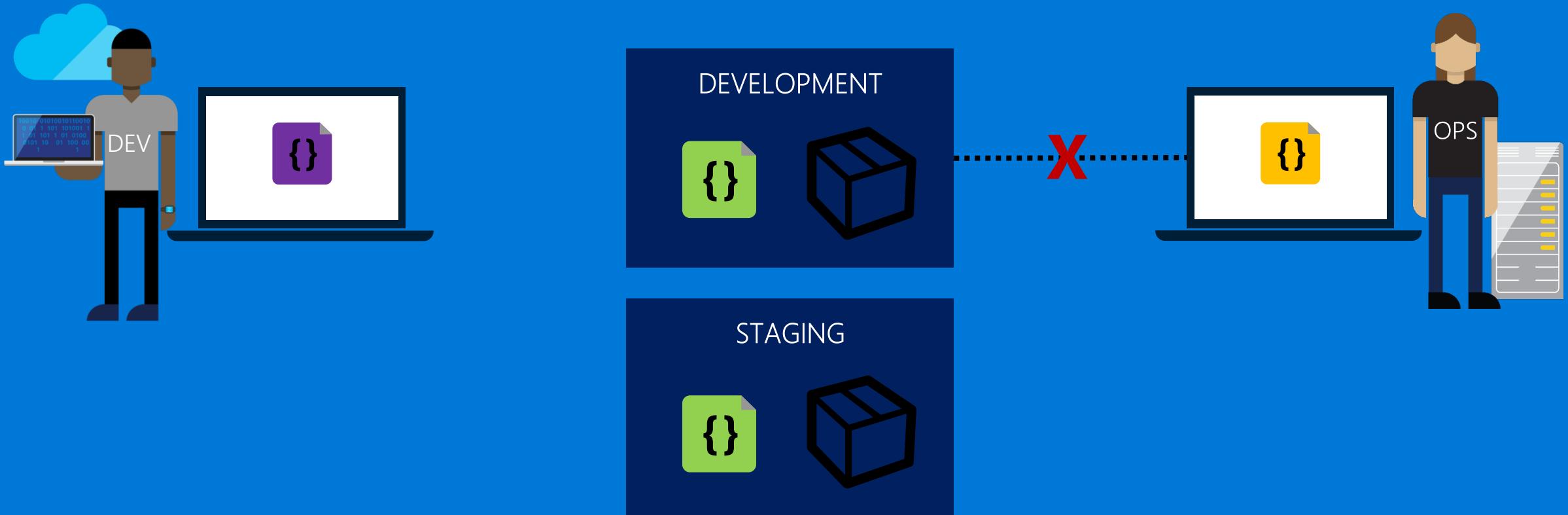
The Old Way



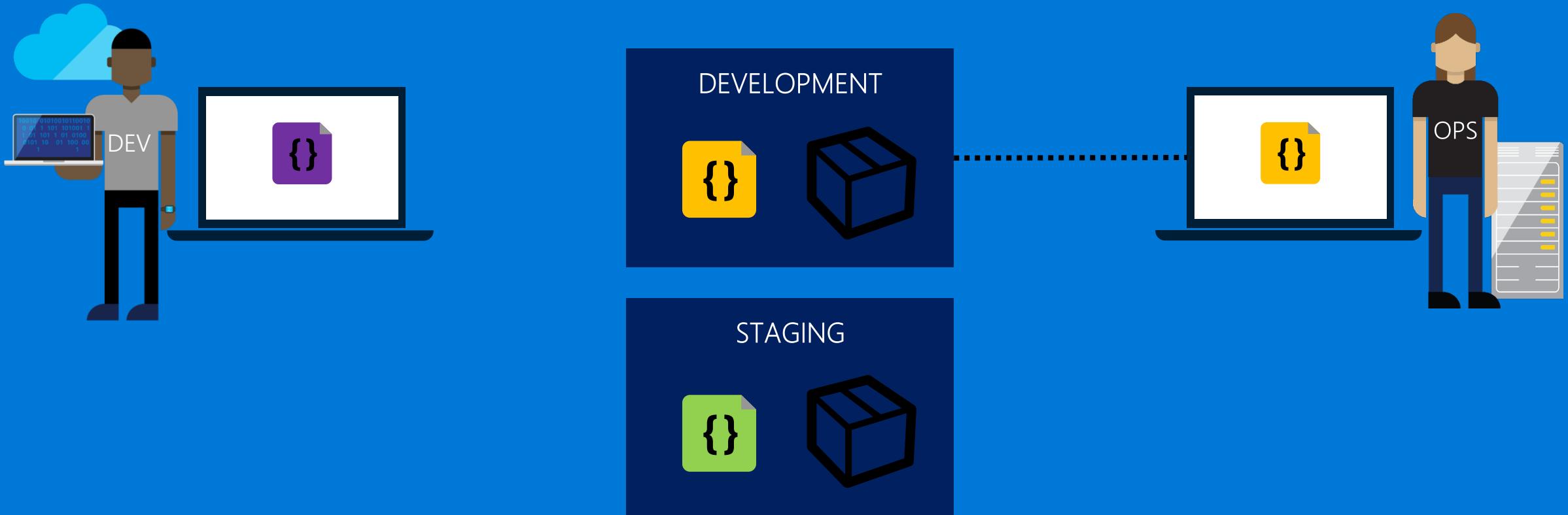
The Old Way



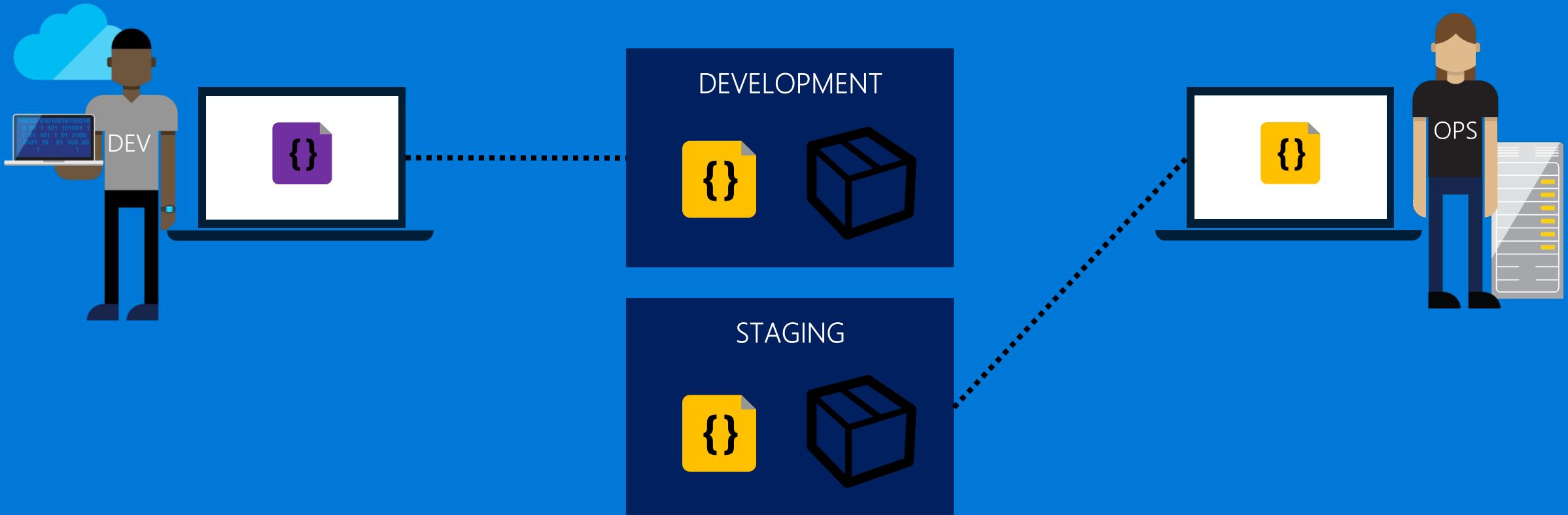
The Old Way



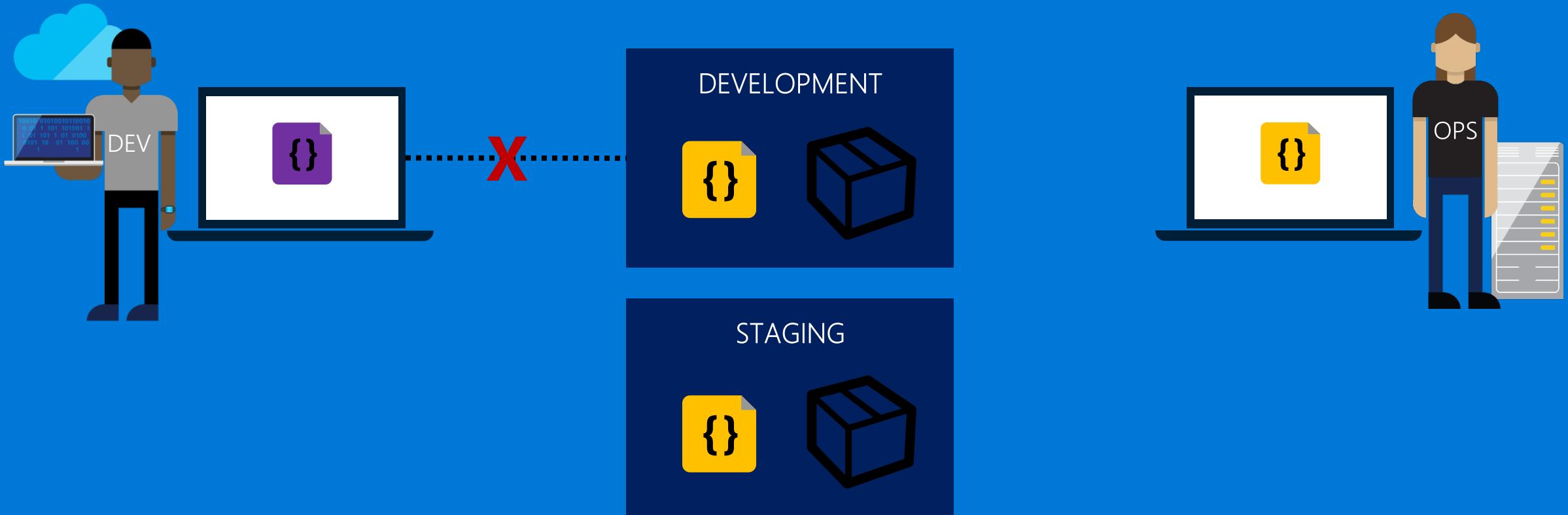
The Old Way



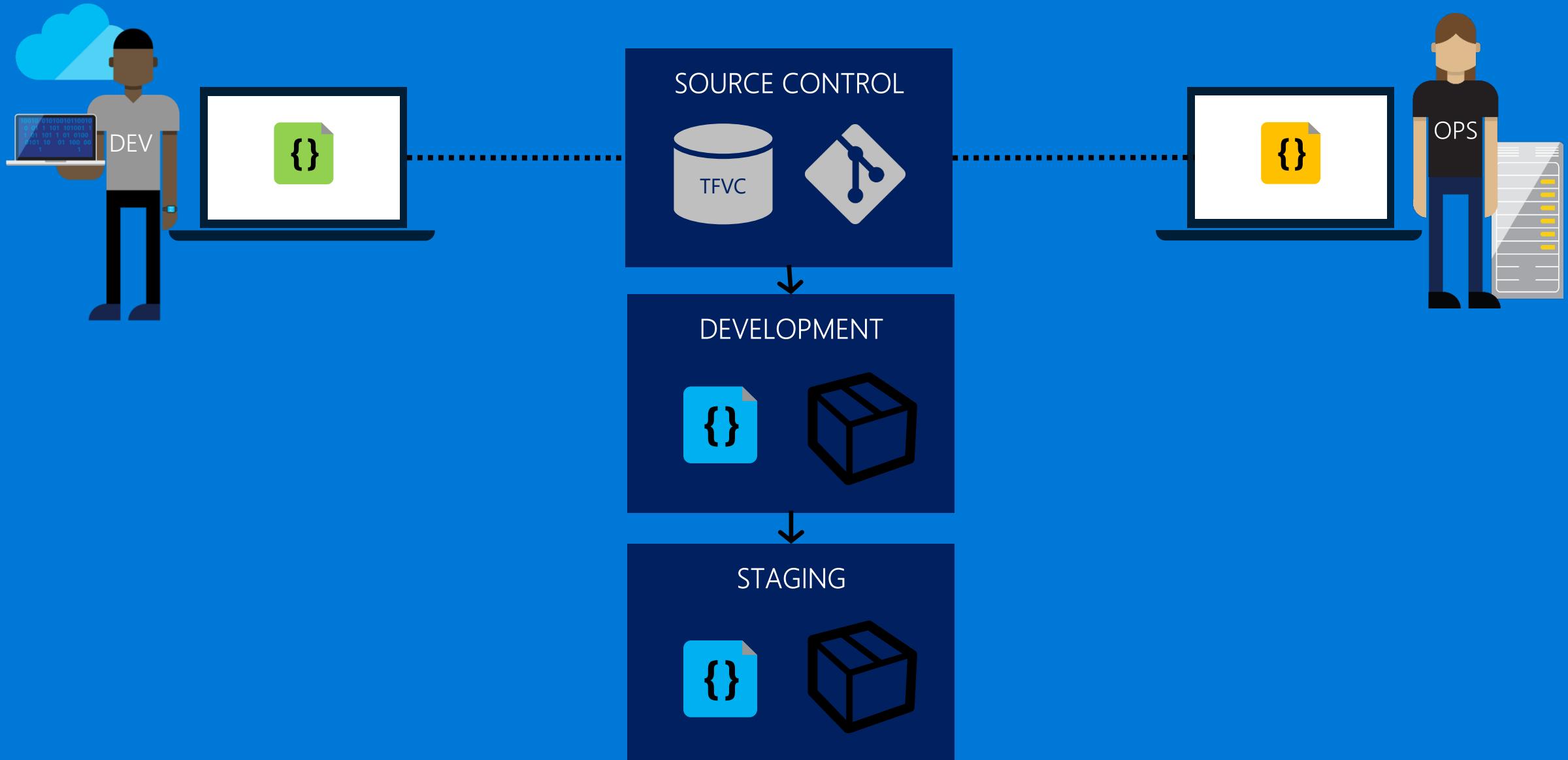
The Old Way



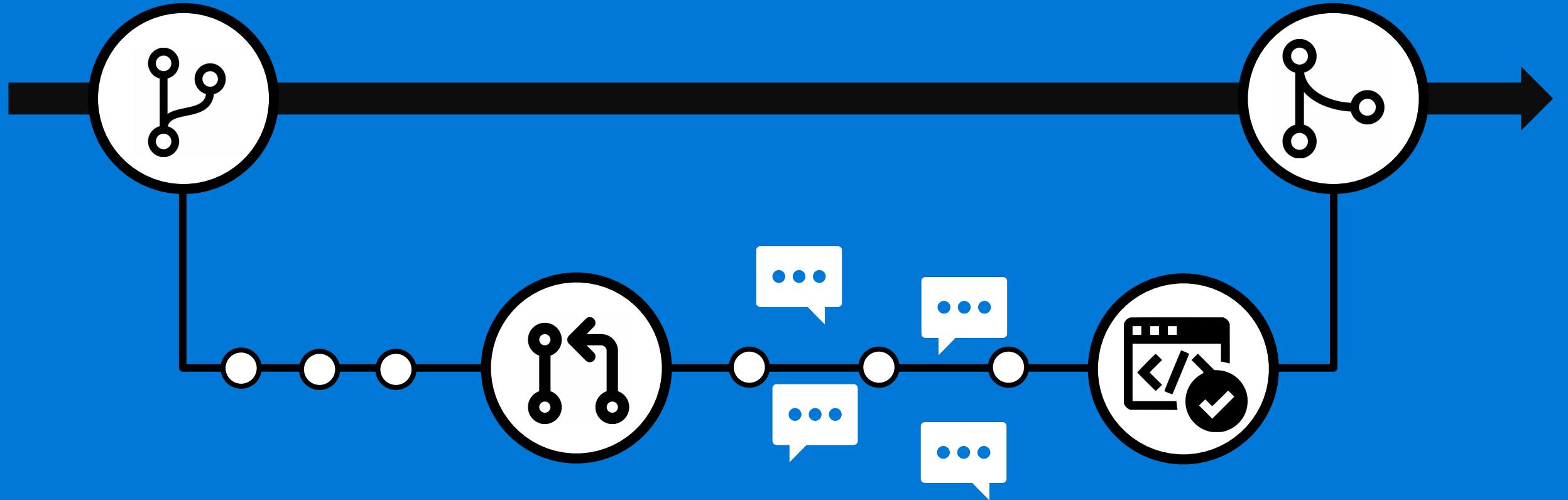
The Old Way



Source Control

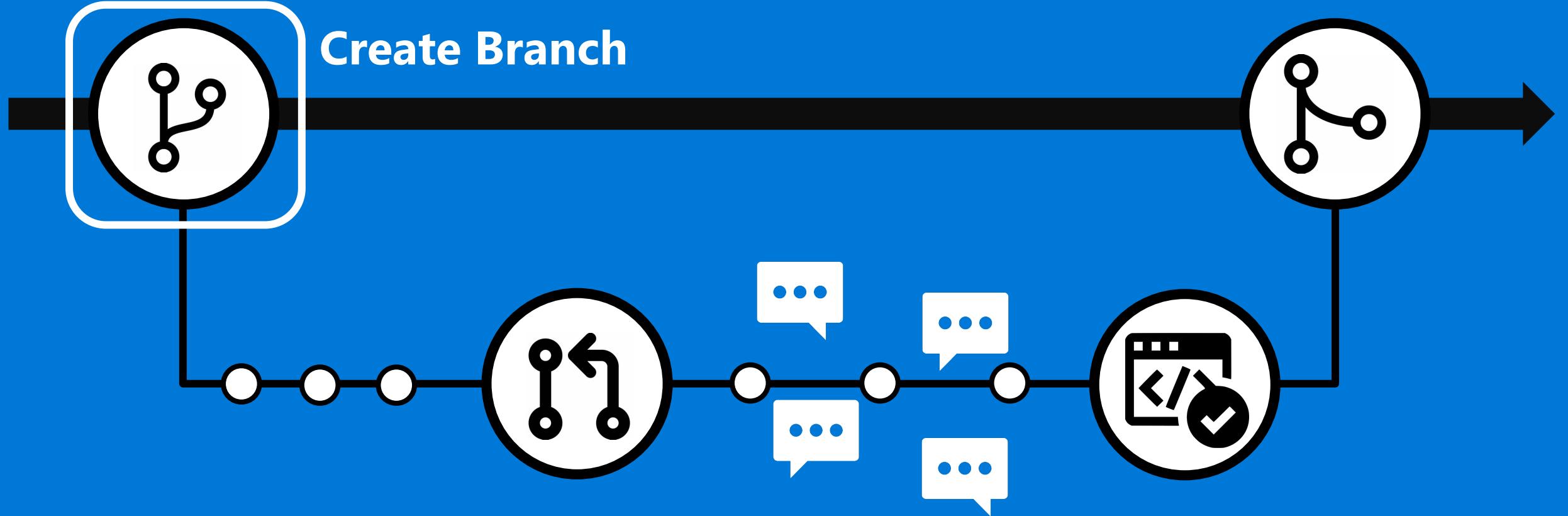


The GitHub Flow



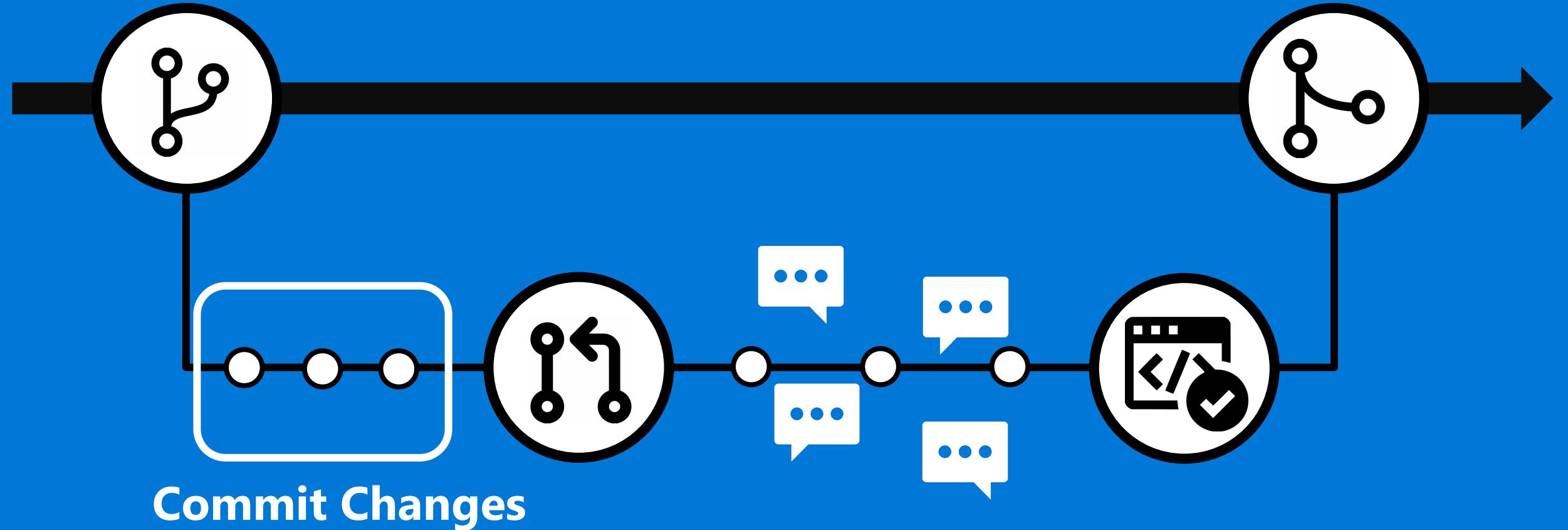
<https://guides.github.com/introduction/flow/>

The GitHub Flow



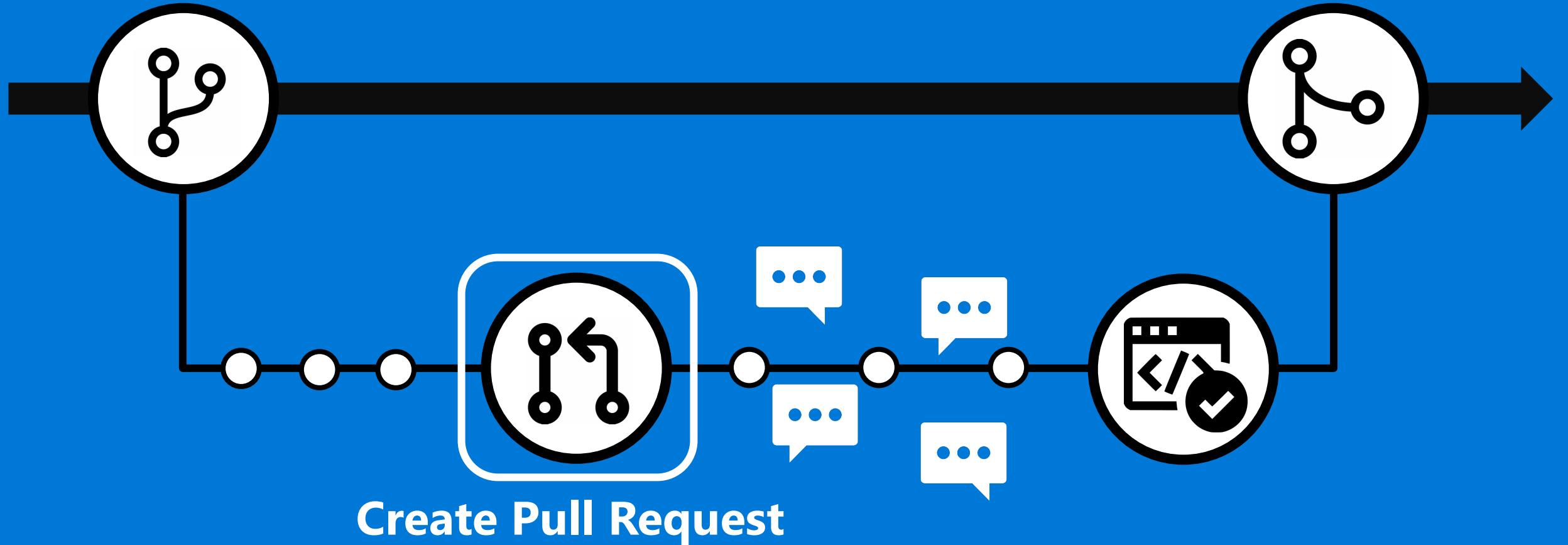
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The GitHub Flow



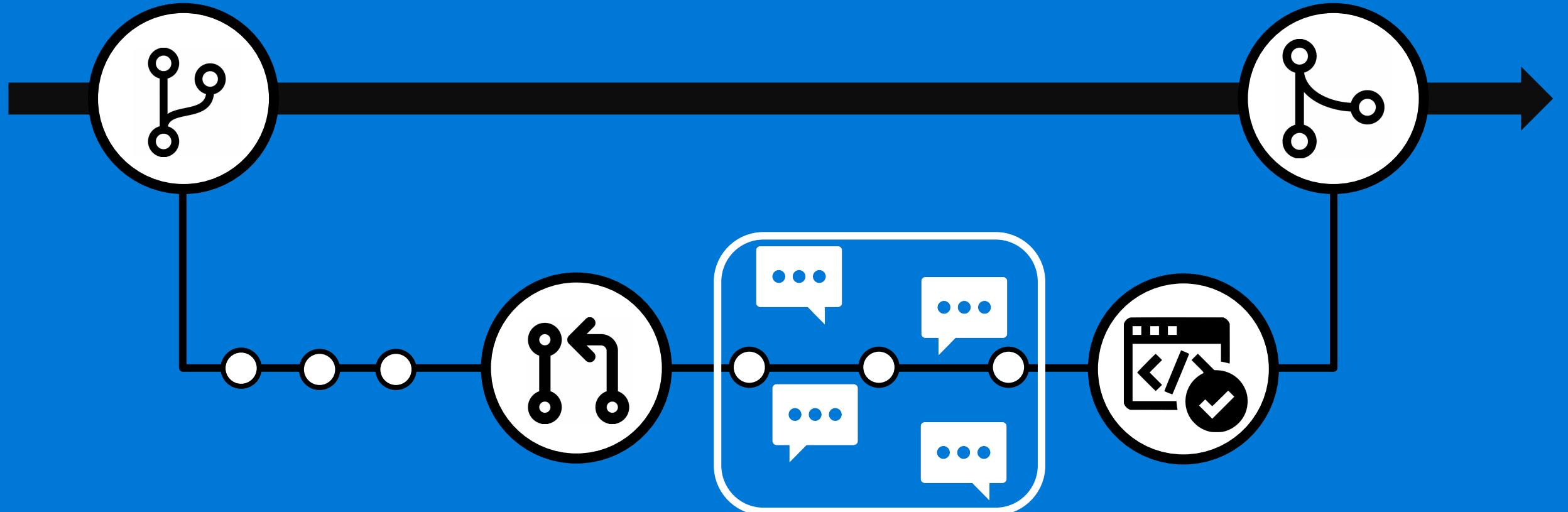
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The GitHub Flow



<https://guides.github.com/introduction/flow/>

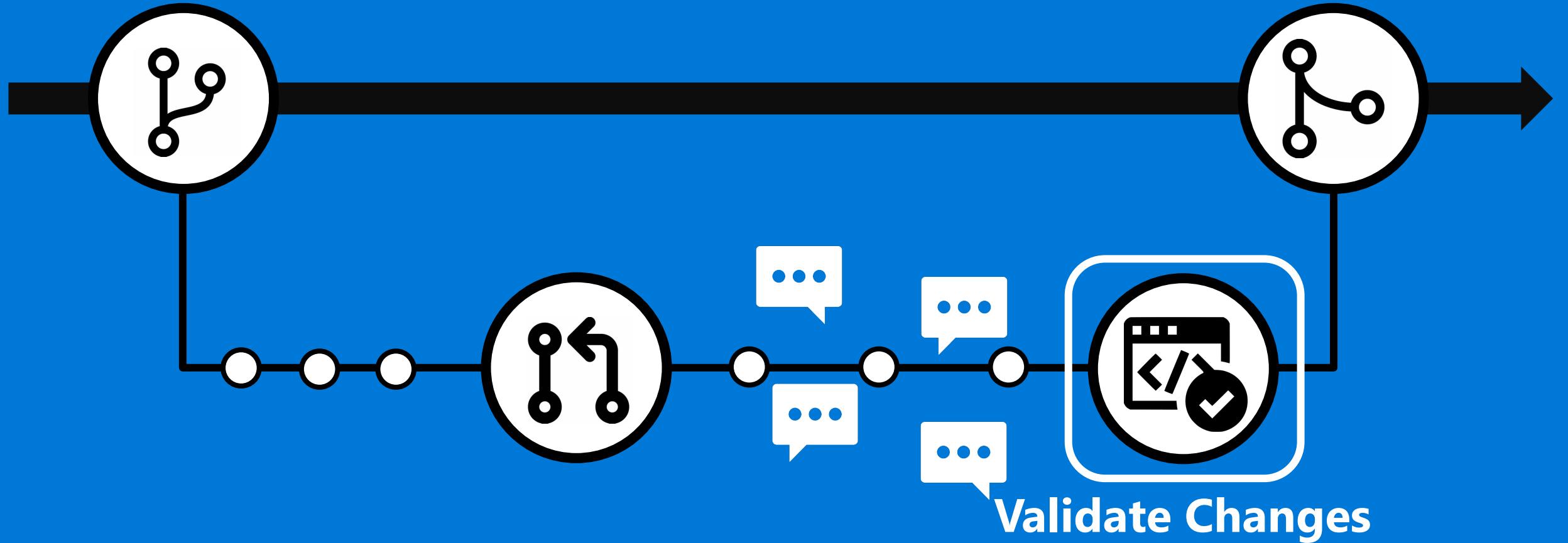
The GitHub Flow



**Discuss and Review
Code**

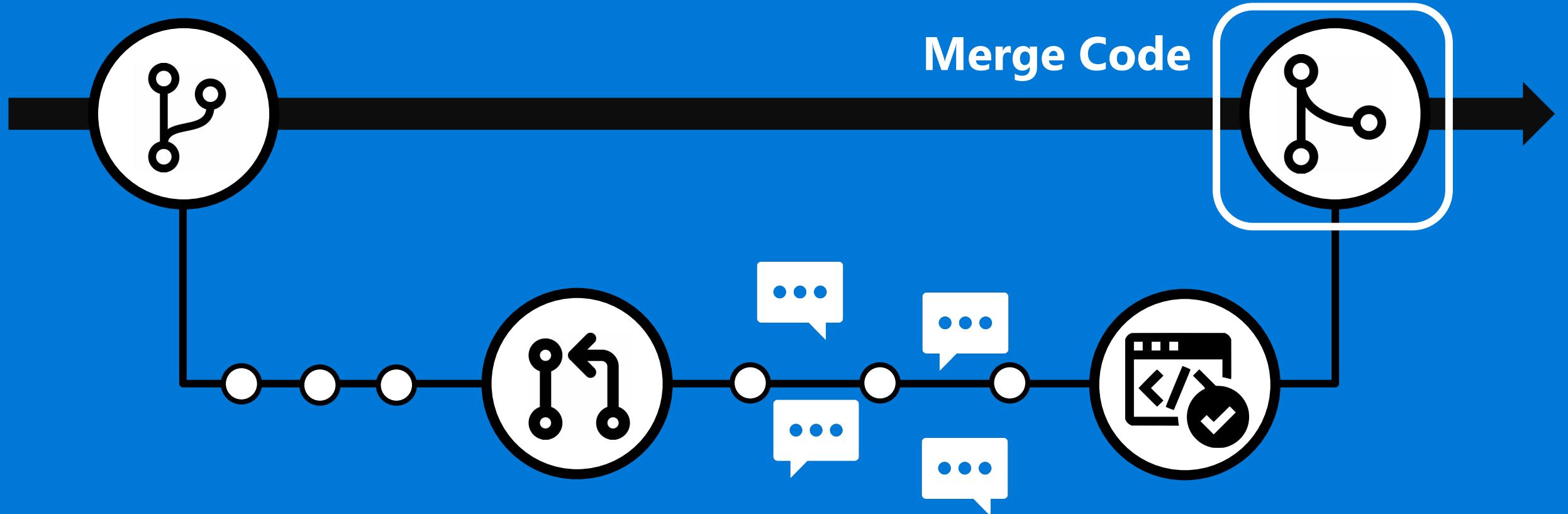
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The GitHub Flow



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The GitHub Flow

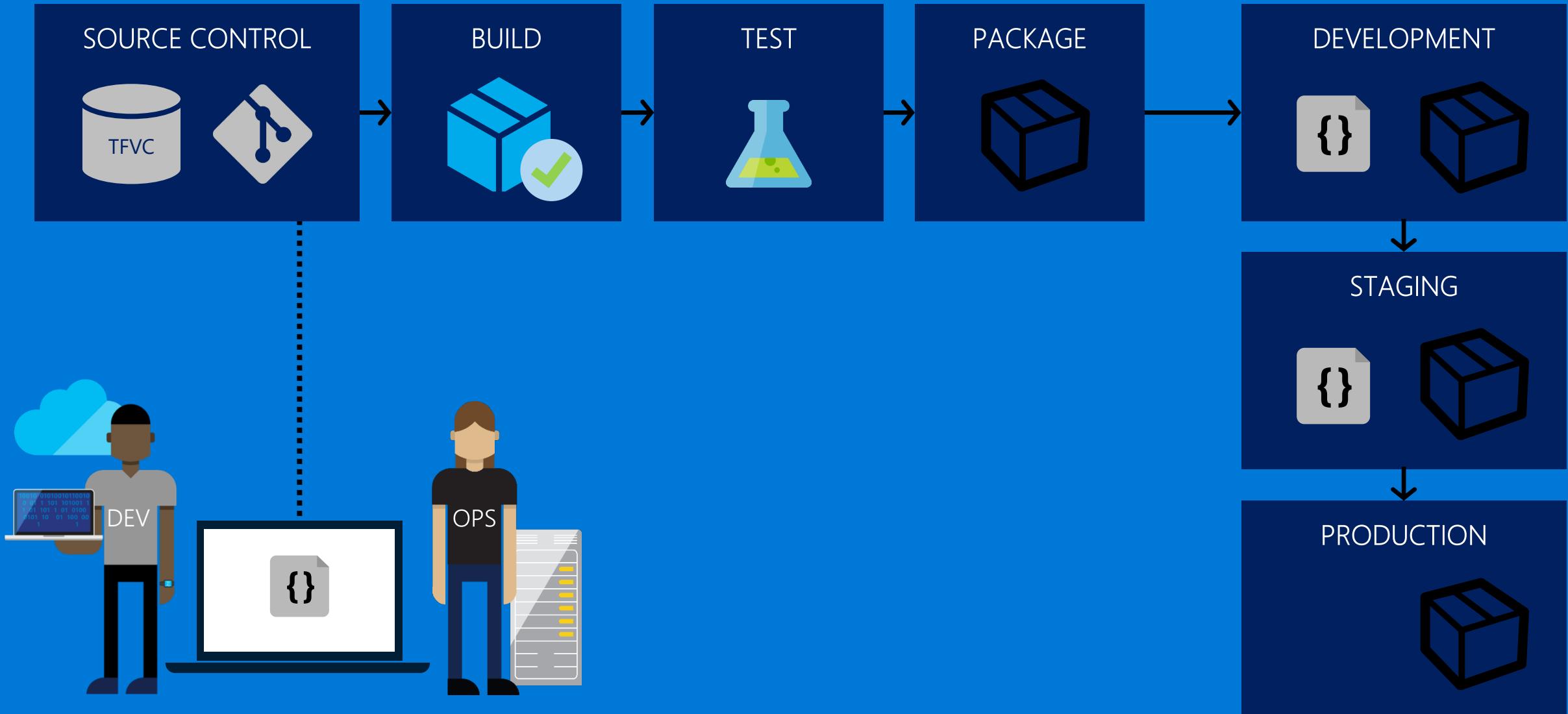


<https://guides.github.com/introduction/flow/>

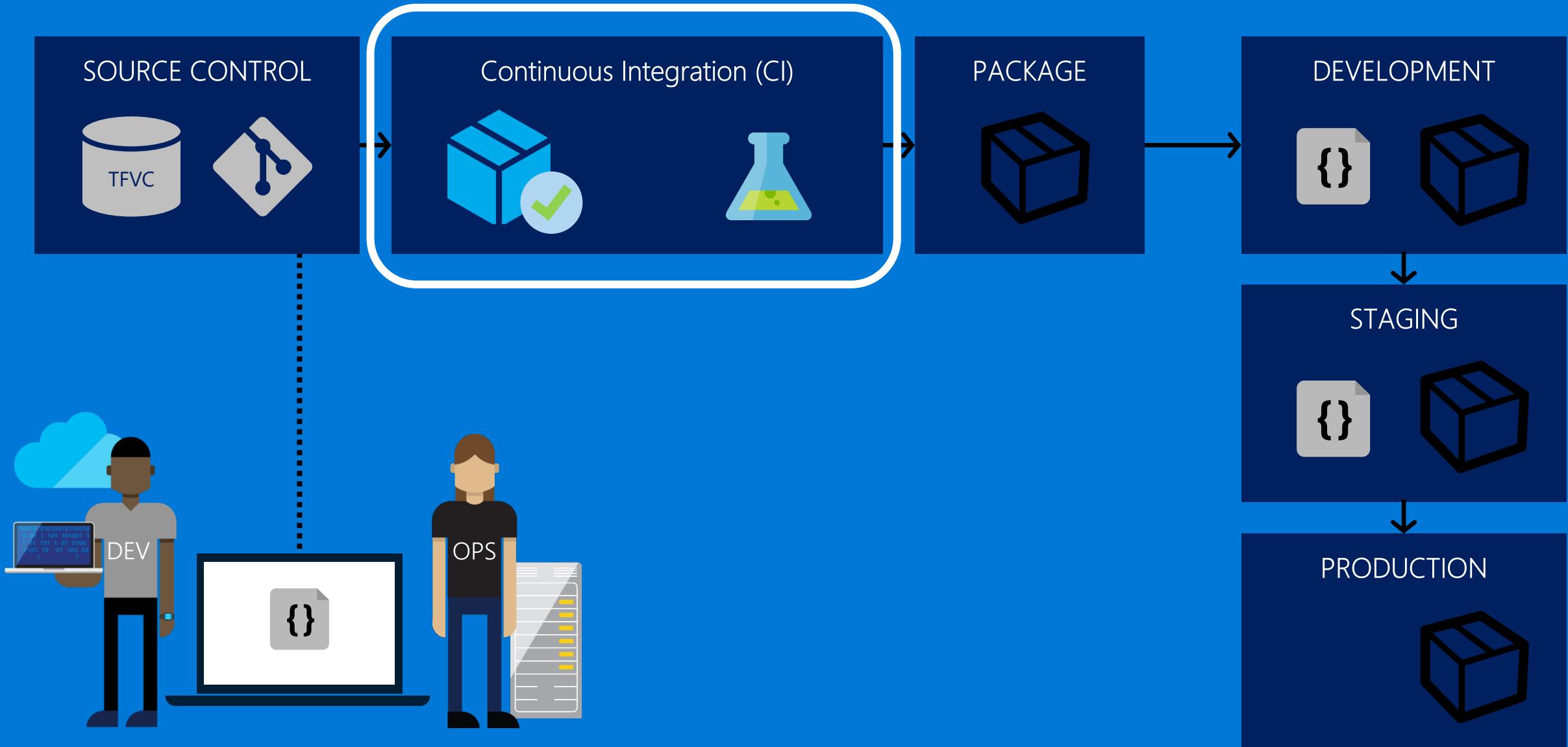
Pull Request Best Practices

- PR early, PR often, and keep them small
- A PR doesn't HAVE to be merged
- Use PR templates
- Automate automate automate!
- Use Protected Branches

DevOps Pipeline

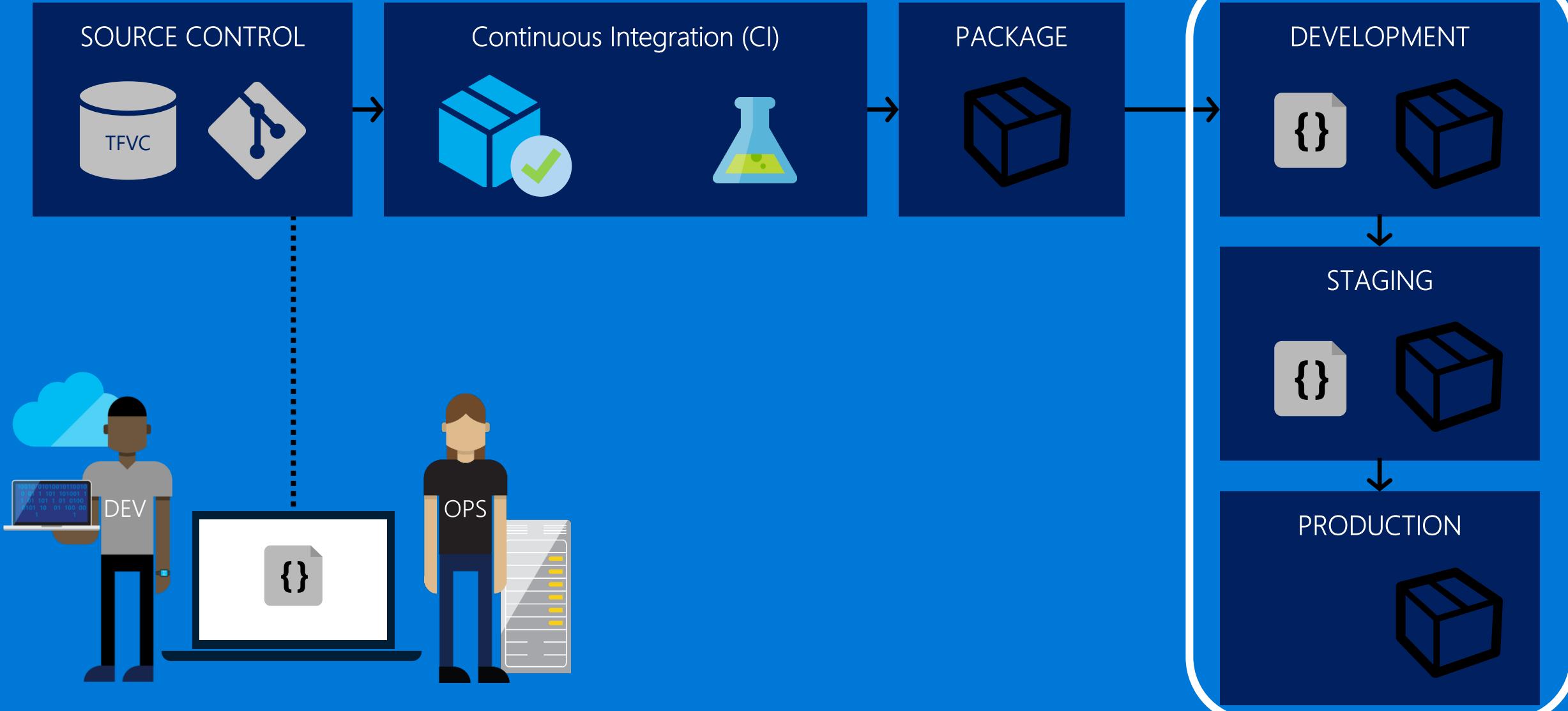


DevOps Pipeline



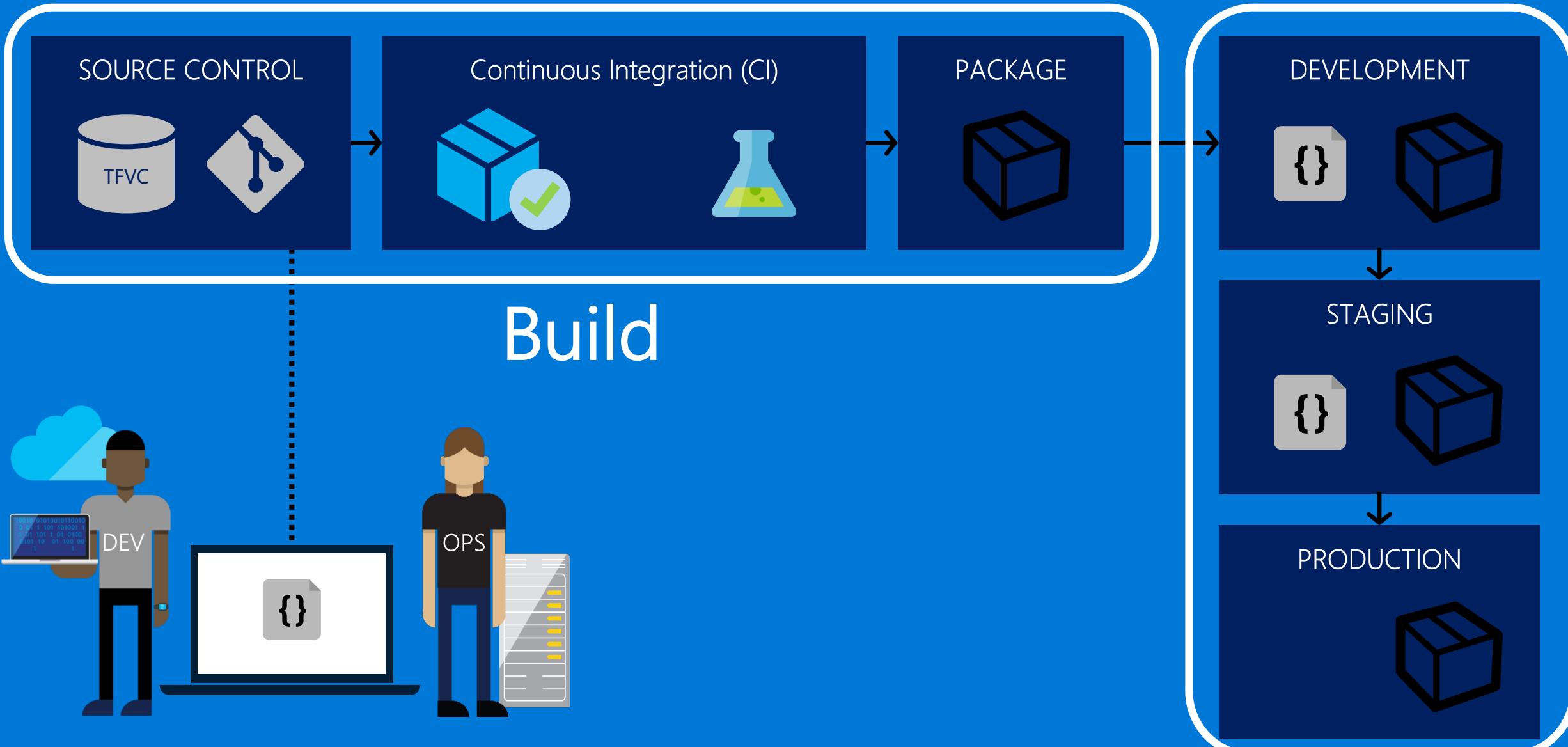
DevOps Pipeline

Deploy

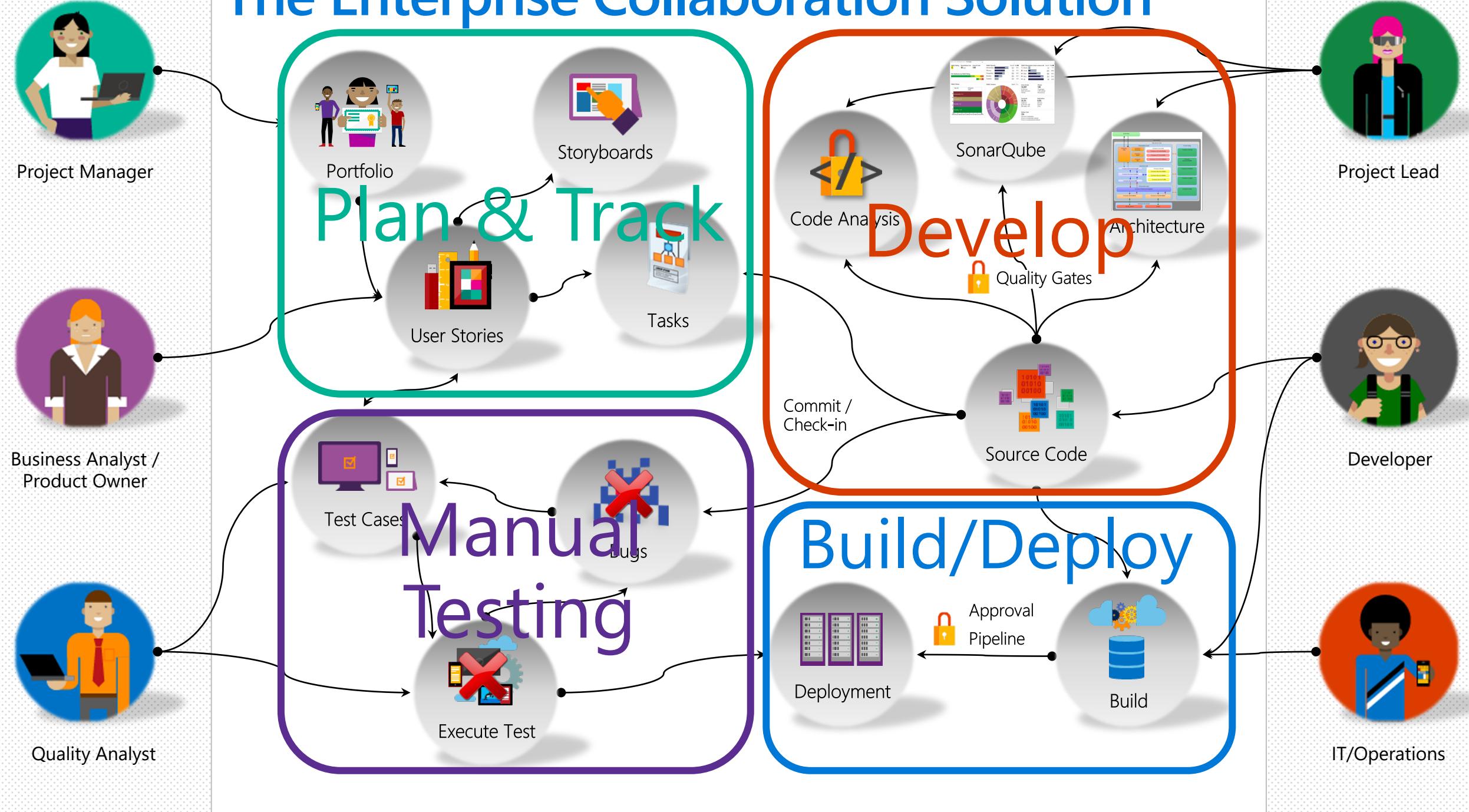


Continuous Delivery

Deploy



The Enterprise Collaboration Solution



The Enterprise Collaboration Solution



Project Manager



Business Analyst /
Product Owner



Quality Analyst



Project Lead



Developer



IT/Operations

Plan & Track



Develop



Manual Testing



Build/Deploy



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 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.



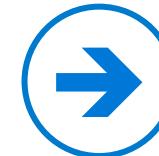
Azure Artifacts

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.



<https://aka.ms/micd/AzureDevOps>

The Enterprise Collaboration Solution



Plan & Track



Project Manager



Business Analyst /
Product Owner



Quality Analyst

Develop

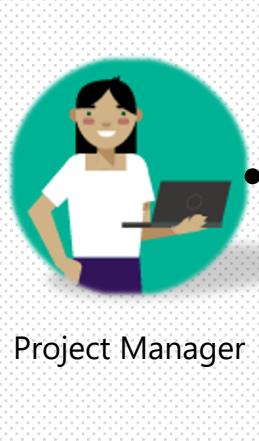


Project Lead



Developer

Manual Testing



Build/Deploy



IT/Operations

Better Together: GitHub and Azure 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.



GitHub Actions & 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. Automate any workflow.



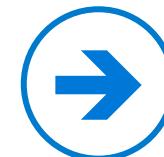
GitHub Packages

Create, host, and share packages with your team, and add artifacts to your CI/CD pipelines. Use as a Container Images



GitHub Repos

The #1 Developer platform on the planet. Home to the most important and popular open source projects on the planet, e.g. the Linux kernel, Kubernetes, Go, Angular, React and .NET core.



<https://github.com/features>

<https://aka.ms/micd/AzureDevOps>

Azure loves GitHub

Providing a native cloud experience
for GitHub



Unified authentication

Sign into Azure with your GitHub credentials and authenticate to GitHub Enterprise with Azure AD



End-to-end traceability and governance

Plan and track work in Azure Boards linked to GitHub, and monitor your code deployed to Azure from GitHub Actions



Automated workflows with Azure

GitHub Actions for Azure with native support for deployments to Azure Kubernetes Service, Azure Web Apps, Azure Container Registry, and more actions planned

Update workflow.yml

master d4340bf

Build and deploy to Azure Kubernetes Service (AKS)
on: push

Run

GitHub Actions / Run success

- ✓ Set up job
- ✓ Run actions/checkouts
- ✓ Docker login using az
- ✓ Docker build
- ✓ Set Context for Azure
- ✓ Create secret in Kube
- ✓ Deploy manifests to AKS
- ✓ Complete job

Better Together: GitHub and Azure Boards



Azure Boards allow organizations to identify what is most important for their customers and objectively measure & track how they are delivering value to their customers.



Azure Boards is an interactive planning & tracking tool which provides visualization of the flow of work from concept to completion.



When using GitHub with Azure Boards, it's easy to keep all your work connected. See traceability between GitHub and Azure Boards in one place!

BUG 2627
2627 Home Page Crashed
Dave Burnison 0 comments Add tag Save & Close Follow ...
State: Resolved Reason: Fixed Area: DotNetCoreFromGitHubOnAppService Iteration: DotNetCoreFromGitHubOnAppService\Iteration 1 Updated by Azure Boards: 25m ago
Repro Steps
2019-08-26 9:01 PM Bug filed on "Home Page should say, "Better Together GitHub and Azure DevOps!"
Step Result Title no.
1. Passed Go to <https://dotnetcorefromgithubonappservice.azurewebsites.net>
2. Failed Review Home Page Text.
Expected Result
Text in the middle of the page should be:
Better Together GitHub and Azure DevOps!
Comments: Something bombed.
Attachment(s):
System Info
Browser - Name: Google Chrome 76
Browser - Language: en-US
Planning
Resolved Reason: Fixed Story Points: Pull Request Merge Commit Test Case Requirement
Priority: 2 Severity: 3 - Medium Activity: Effort (Hours): Remaining: Completed: Related Work
Test Case
Requirement
Related
Requirement
System Info
Found in Build Integrated in Build

Better Together: GitHub and Azure Pipelines



Build, test, and deploy Node.js, Python, Java, PHP, Ruby, Go, C/C++, C#, Android, and iOS apps. Run in parallel on Linux, macOS, and Windows.



Deploy to cloud providers like Azure, AWS, and GCP. Distribute mobile apps through beta channels and app stores.



Easy build chaining and multi-phased builds. Support for YAML, test integration, checks & approvals, reporting, and more.



Track which code changes have been deployed to each stage in your pipeline!

The screenshot shows the Azure Pipelines interface for a pipeline named 'PartsUnlimited'. The top navigation bar includes 'Search', 'Cancel', and a 'View 14 changes' button. The main content area displays the details of a specific run: #20200413.2, triggered by 'DaveBurnisonMS'. It shows the repository and version information ('Repository and version: DaveBurnisonMS/PartsUnlimitedGitHub master 1e00172'), the time started and elapsed (Yesterday at 4:02 PM, 17h 19m 8s), and related work items (2 work items, 1 published). Below this, there are sections for 'Errors' (3) and 'Warnings' (3), and a note that '1 approval needs your review before this run can continue to Production'. The bottom section, 'Stages', shows a four-stage pipeline: CI, Dev, QA, and Production. Each stage has its status (green for CI, Dev, and QA; blue for Production), duration, and results. A 'Rerun failed jobs' button is located at the bottom of the stages section.

Secure your complete software lifecycle with GitHub



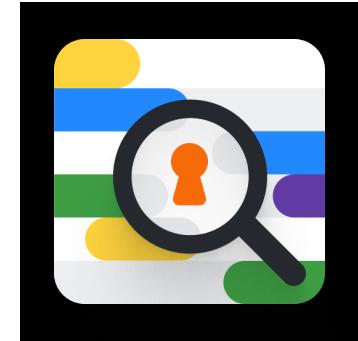
Dependency updates

Identify vulnerable dependencies, and update them to secure versions automatically



Code scanning

Scan your code for vulnerabilities, powered by CodeQL, and the work of the security research community



Secret scanning

Prevent secrets from leaking into code, including automatic remediation with 20+ providers

Codespaces

Your instant dev environment

Code without compromise

Code, build, test, debug, and deploy with a complete development environment in your browser.

Simplify your workflow

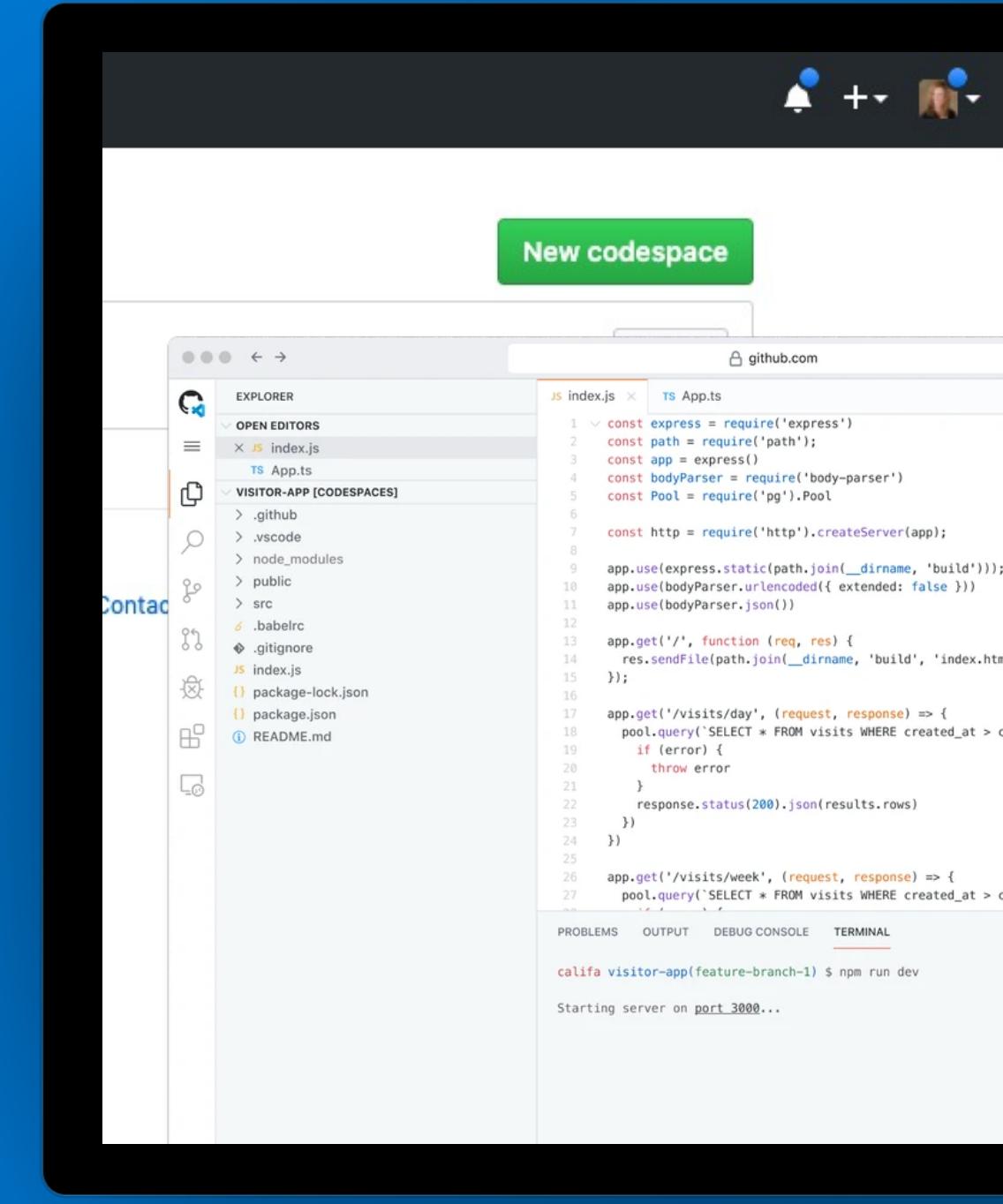
Automatically set up dependencies and SSH keys.

Go from code to commit faster on any project.

Extend and customize

Configure your editor with dotfiles and VS Code extensions to create a consistent environment in every codespace.

<https://github.com/Features/Codespaces>



GitHub Actions for Azure

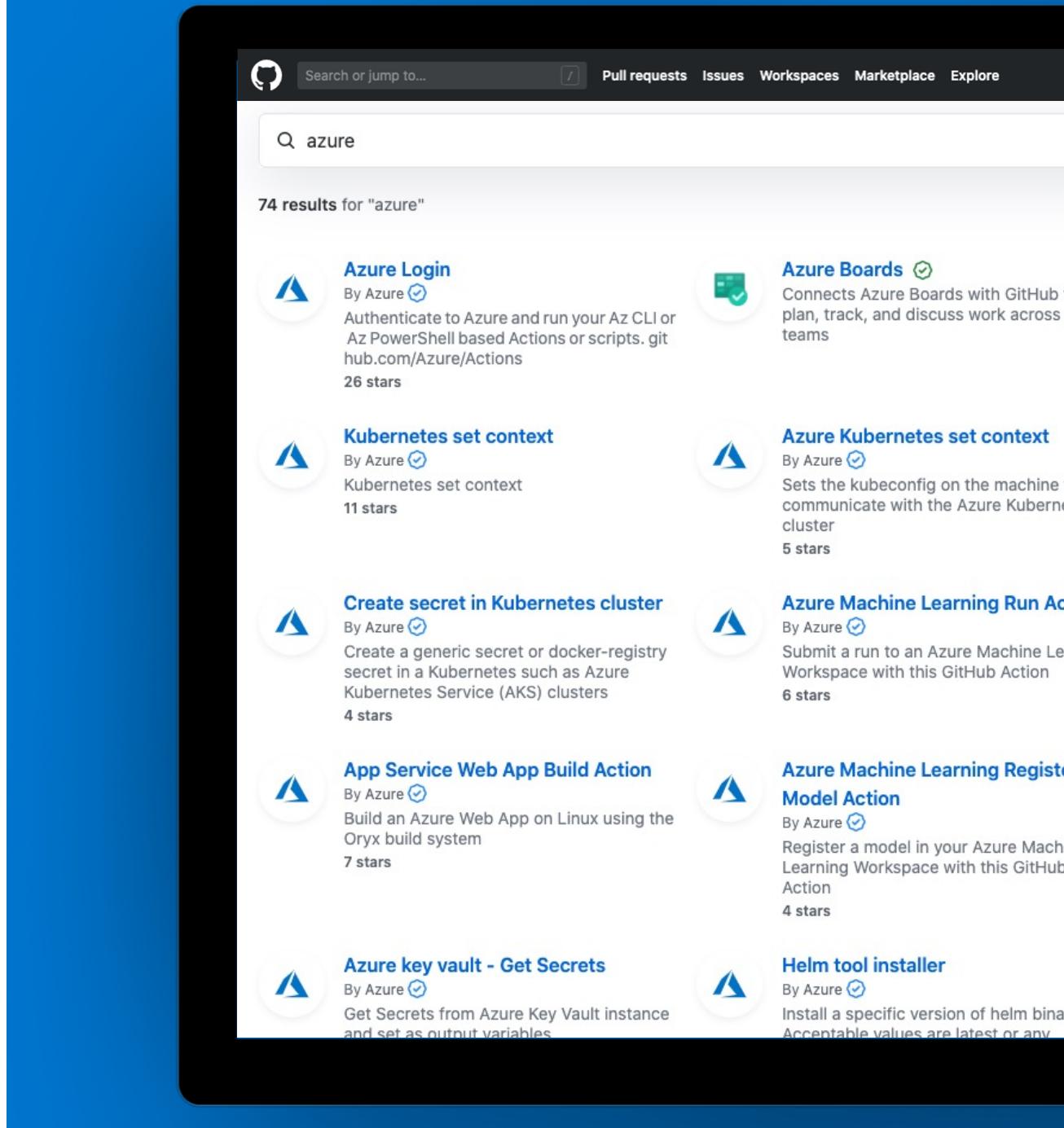
Over 70 ready-to-use actions for Azure

Deployment actions to Azure include:

- **Deploy to Kubernetes Cluster** – deploy a Kubernetes cluster, including AKS clusters
- **Azure WebApp** – deploy Web Apps or Containerized Web Apps to Azure.
- **Azure Functions Action** – deploy Function App to Azure Functions.
- **Azure SQL Deploy** – deploy a DACPAC or a SQL script to Azure SQL Database
- **Azure Machine Learning Deploy** – deploy a registered model in your Azure ML Workspace

Other popular Azure actions:

- **Azure CLI** – automate your workflow by executing Azure CLI commands to manage Azure resources inside of an Action
- **Azure Key Vault** – get secrets from Azure Key Vault instance and set as output variables.
- **Azure Policy Assignment with Azure CLI** - apply a policy to new infrastructure using Azure Policy (HIPAA, PCI-DSS, etc).
- **and many, many more...**



GitHub Mobile

Collaborate and develop, on-the-go

Stay connected

Stay in touch with your team and the GitHub Community, right from your mobile device

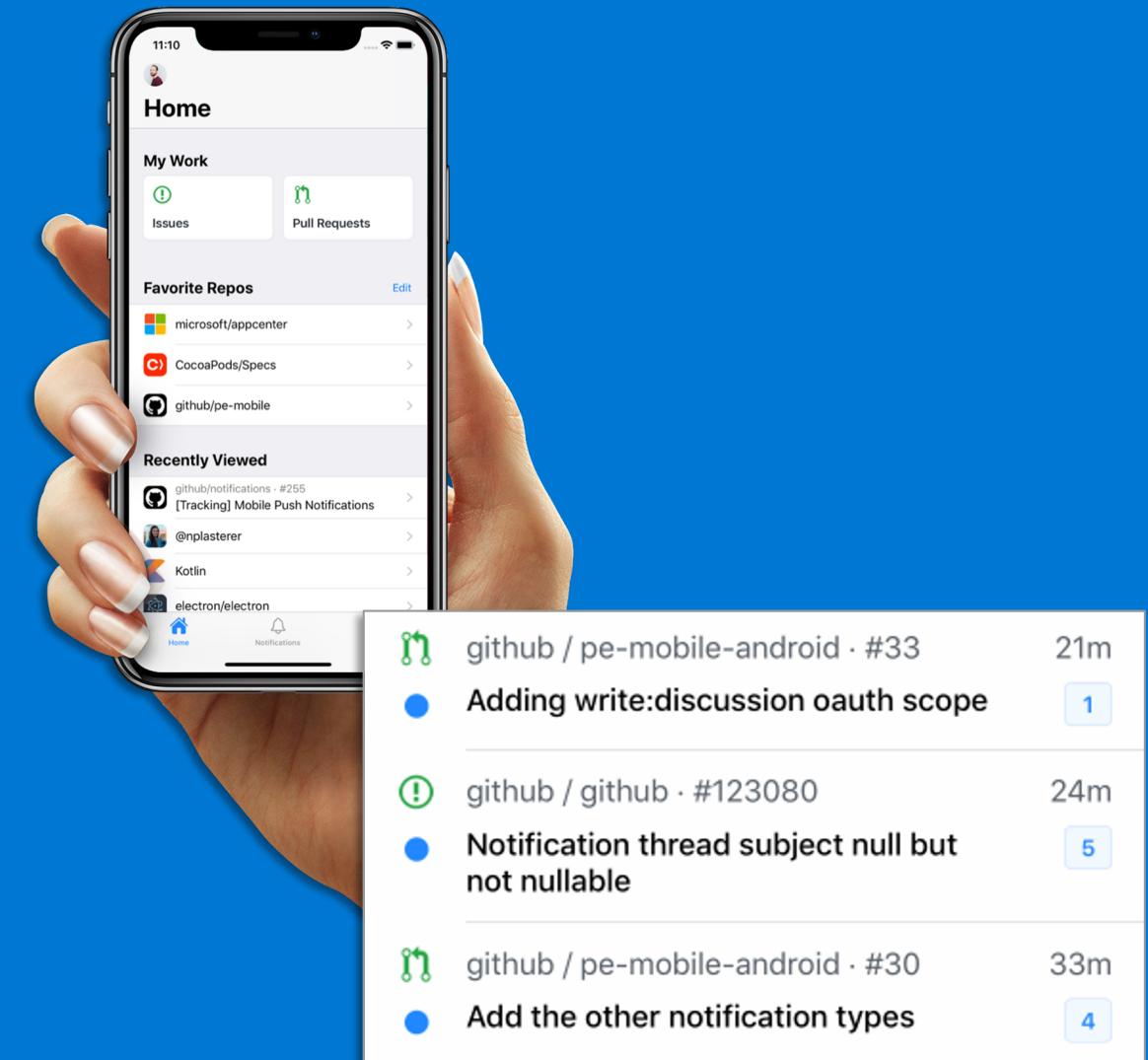
Collaborate from anywhere

Collaborate on Issues and Pull Requests with a totally redesigned experience. Comment, react, and merge code.

Breeze through your workflow

Get your inbox to zero in no time—swipe to finish a task or save the notification to return to it later.

<https://github.com/mobile/>



Discussions

Join the conversation

Open conversations about code and community

New threaded format makes it easy to brainstorm feature ideas, help new users get their bearings, and collaborate on software.

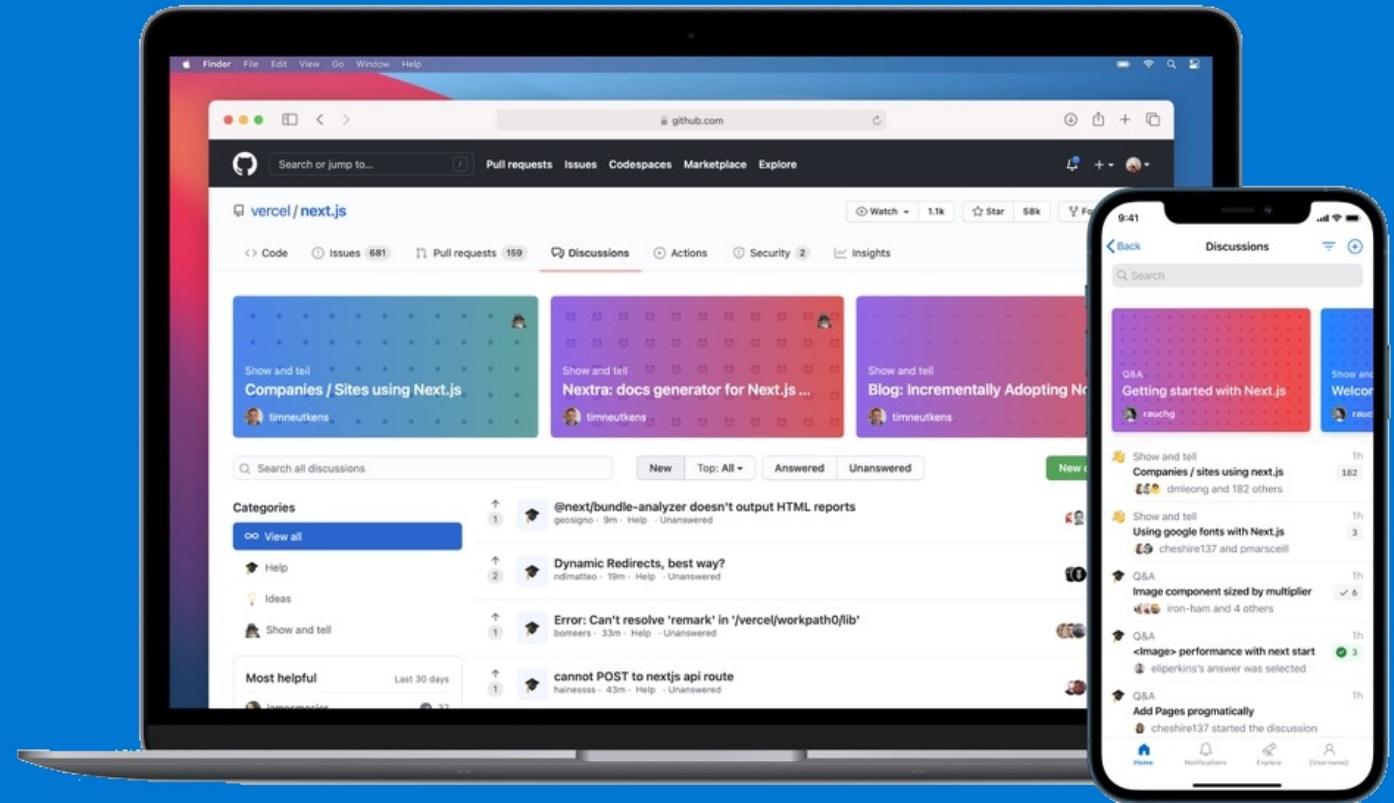
Perfect for Q&A

Questions can be marked as answered, so over time a community's knowledge base grows naturally

Familiar GitHub experience

Discussions live in your project repository, so they're accessible where your community is already working together.

<https://github.blog/2020-12-08-new-from-universe-2020-dark-mode-github-sponsors-for-companies-and-more/#discussions>



Demo

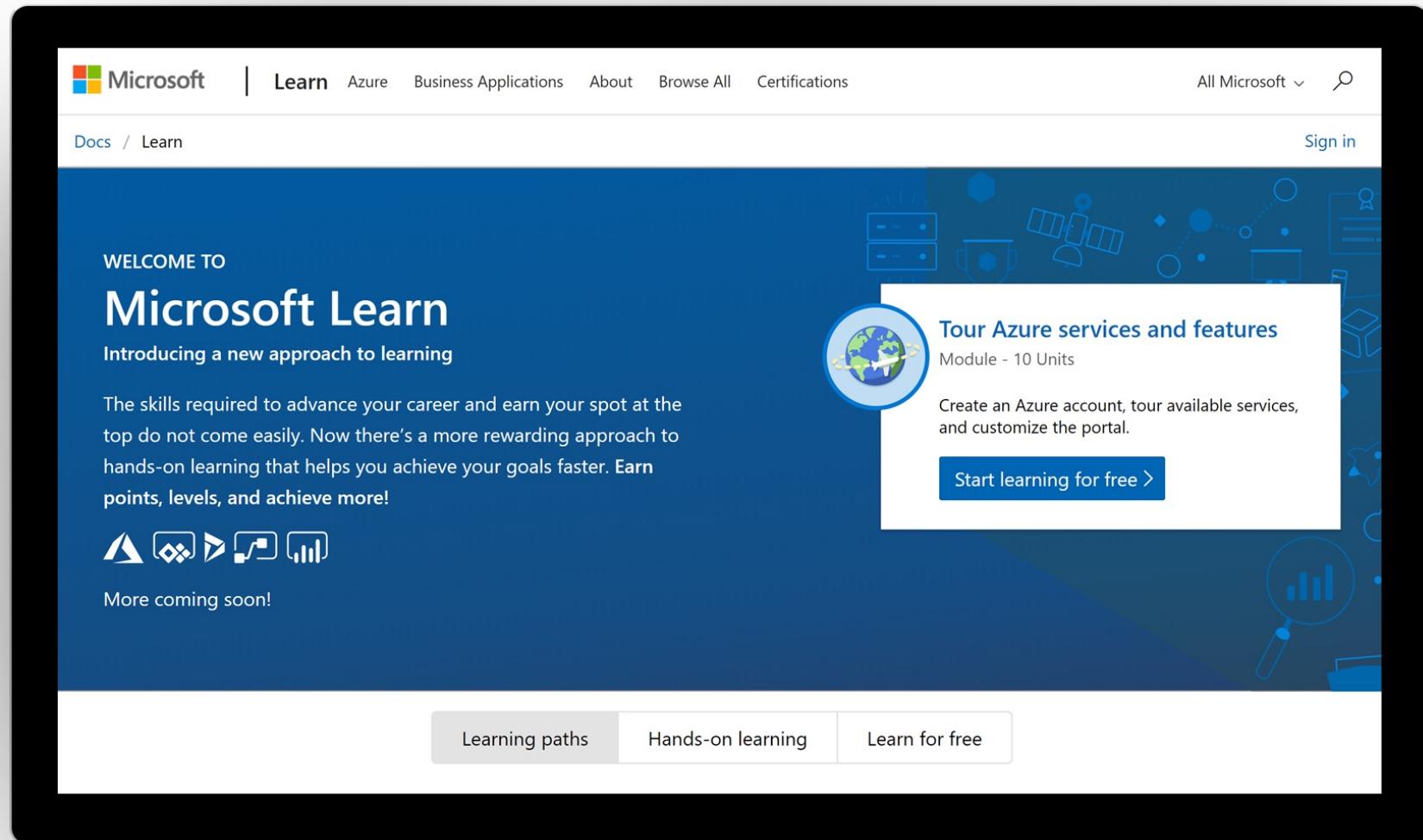
Continuous Integration with GitHub and Azure DevOps

Resources

Microsoft Learn

Build your skills fast with free, interactive tutorials at Microsoft Learn, a new training experience for technical users.

- Step-by-step training to fit your schedule
- Interactive coding environments for hands-on experience
- Earn achievements and recognition for your Azure skills
- For many modules we provide free Azure sandboxes, free virtual machines, etc. so there is nothing to setup ahead of time

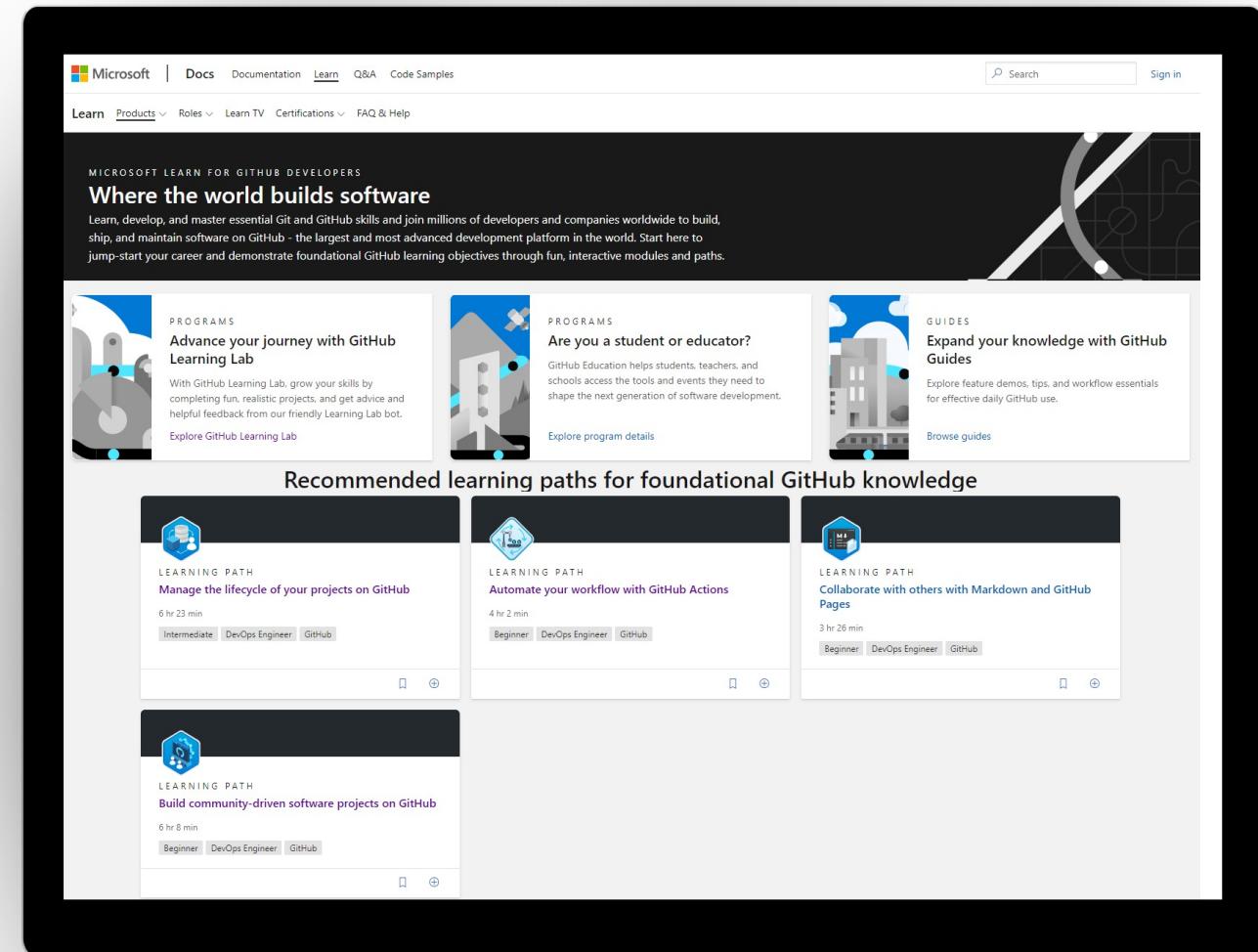


→ <https://aka.ms/micd/Learn>

Microsoft Learn

Check out the growing collection of DevOps & GitHub related Learning Paths

- Take full control of your GitHub projects.
Through work planning and tracking, effective branching strategies.
- Extend GitHub through its API, manage releases all the way from idea to working software in the hands of your users
- Learn how GitHub Actions enables you to automate your software development cycle and deploy applications to Azure.
- Whether you manage enterprise or open-source software projects, learn how GitHub enables you to build communities that foster communication and collaboration while reinforcing recommended guidelines, codes of conduct, and security best practices.



<https://aka.ms/micd/LearnGitHub>

GitHub Learning Lab

Grow your skills by completing fun, realistic projects. Get advice and helpful feedback from our friendly Learning Lab bot.

- Hands-on lessons created by the GitHub community and taught by the Learning Lab bot.
- Learn new skills while working in your own copy of a real project.
- Our friendly bot provides instructions and feedback throughout your journey.
- Real workflow - Everything happens in GitHub Issues and Pull Requests.

The screenshot shows the GitHub Learning Lab homepage. At the top, there's a navigation bar with the GitHub logo, 'Learning Lab', a search bar, and links for 'For Organizations' and 'Teach on Learning Lab'. A prominent blue button says 'Start learning'. Below the header, a large heading reads 'Advance your journey' with a subtext: 'With GitHub Learning Lab, grow your skills by completing fun, realistic projects. Get advice and helpful feedback from our friendly Learning Lab bot.' A cartoon cat wearing a developer's cap is surrounded by code snippets. A blue button labeled 'Find your first course' is visible. The main area features three course cards: 'Introduction to GitHub' (Created by The GitHub Training Team), 'GitHub Actions: Hello World' (Created by The GitHub Training Team), and 'Communicating using Markdown' (Created by The GitHub Training Team). Each card includes a brief description and a list of topics.

Our most popular courses

- Introduction to GitHub**
Created by The GitHub Training Team
If you are looking for a quick and fun introduction to GitHub, you've found it. This class will get you started using GitHub in less than an hour.
• Git • GitHub Pages • Branches
• Commits • Pull Requests
- GitHub Actions: Hello World**
Created by The GitHub Training Team
Create a GitHub Action and use it in a workflow.
• GitHub Actions • Workflows
• Hello World
- Communicating using Markdown**
Created by The GitHub Training Team
This course will walk you through everything you need to start organizing ideas and collaborating using Markdown, a lightweight language for text formatting.
• GitHub • Markdown

→ <https://lab.github.com/>

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.

The screenshot shows the Azure DevOps Labs website. At the top, there's a navigation bar with icons for mail, notifications, and search, followed by a search bar labeled "search...". Below the header, a large banner features the text "Azure DevOps Labs" and "What is DevOps?". It explains that DevOps brings people, processes, and technology together to automate software delivery. A sub-section titled "Getting started with Azure DevOps" provides an overview of how labs help simplify and speed up the DevOps process. A grid of twelve lab cards is displayed, each with an icon and a title:

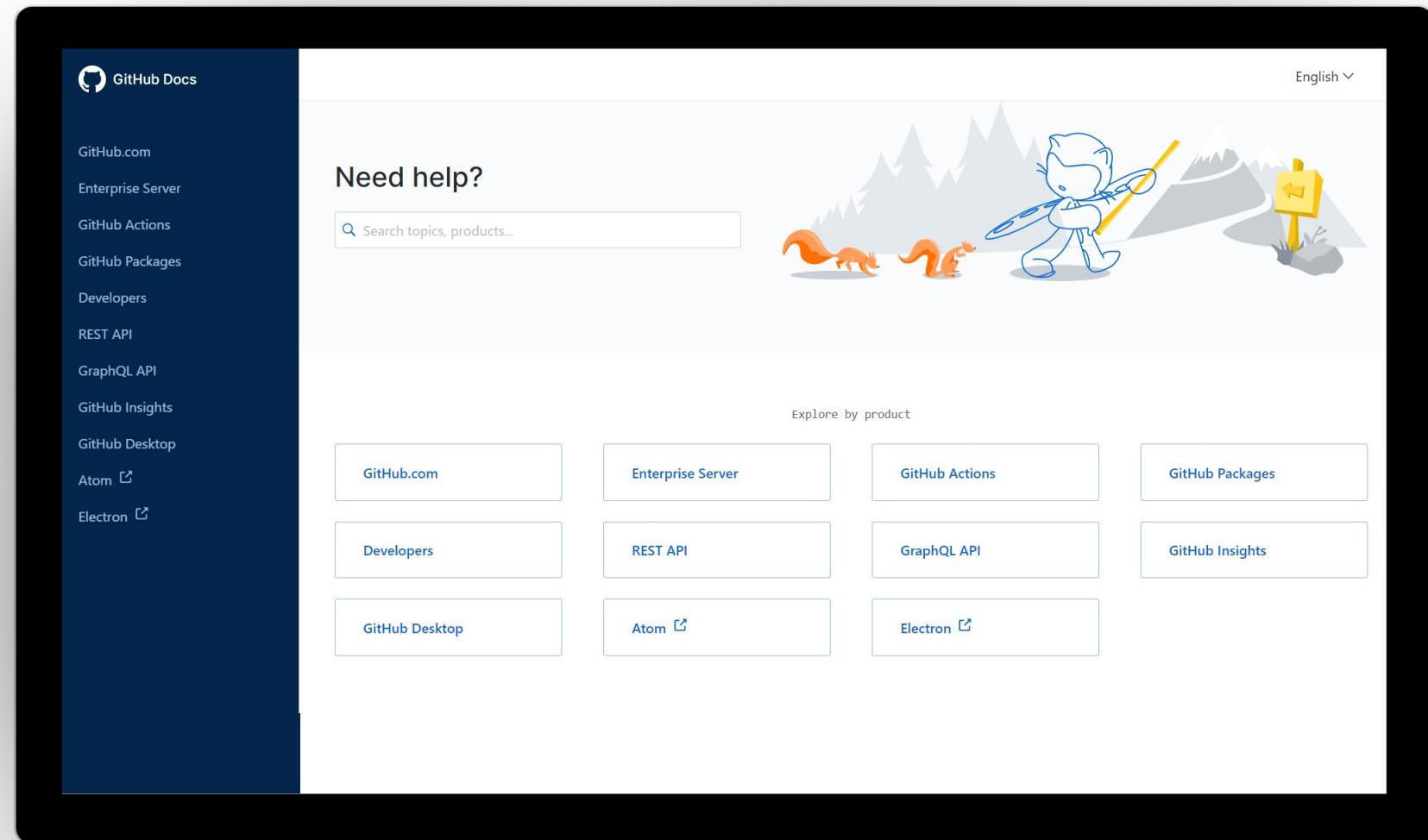
Agile Planning and Portfolio Management with Azure Boards	Managing Project Schedules across Teams with Delivery Plans	Version Controlling with Azure Repos	Working with Pull Requests
Configuring Build as Code with YAML in Azure Pipelines	Enabling Continuous Integration with Azure Pipelines	Embracing Continuous Delivery with Azure Pipelines	Package Management with Azure Artifacts
Collaborating with Azure DevOps Wiki	Test Planning and Management with Azure Test Plans	Exploratory Testing with Azure Test Plans	Web Application Load and Performance Testing

At the bottom of the page, a note states: "For the on-premises platform, Azure DevOps Server (previously named Visual Studio Team Foundation Server), see [Azure DevOps Server 2019 Labs](#)". A "Got a moment" button is located in the bottom right corner.

Documentation - GitHub

Discover all of GitHub's product documentation!

- If you only save one Favorite in your browser related to GitHub, this is the link to save as a favorite!

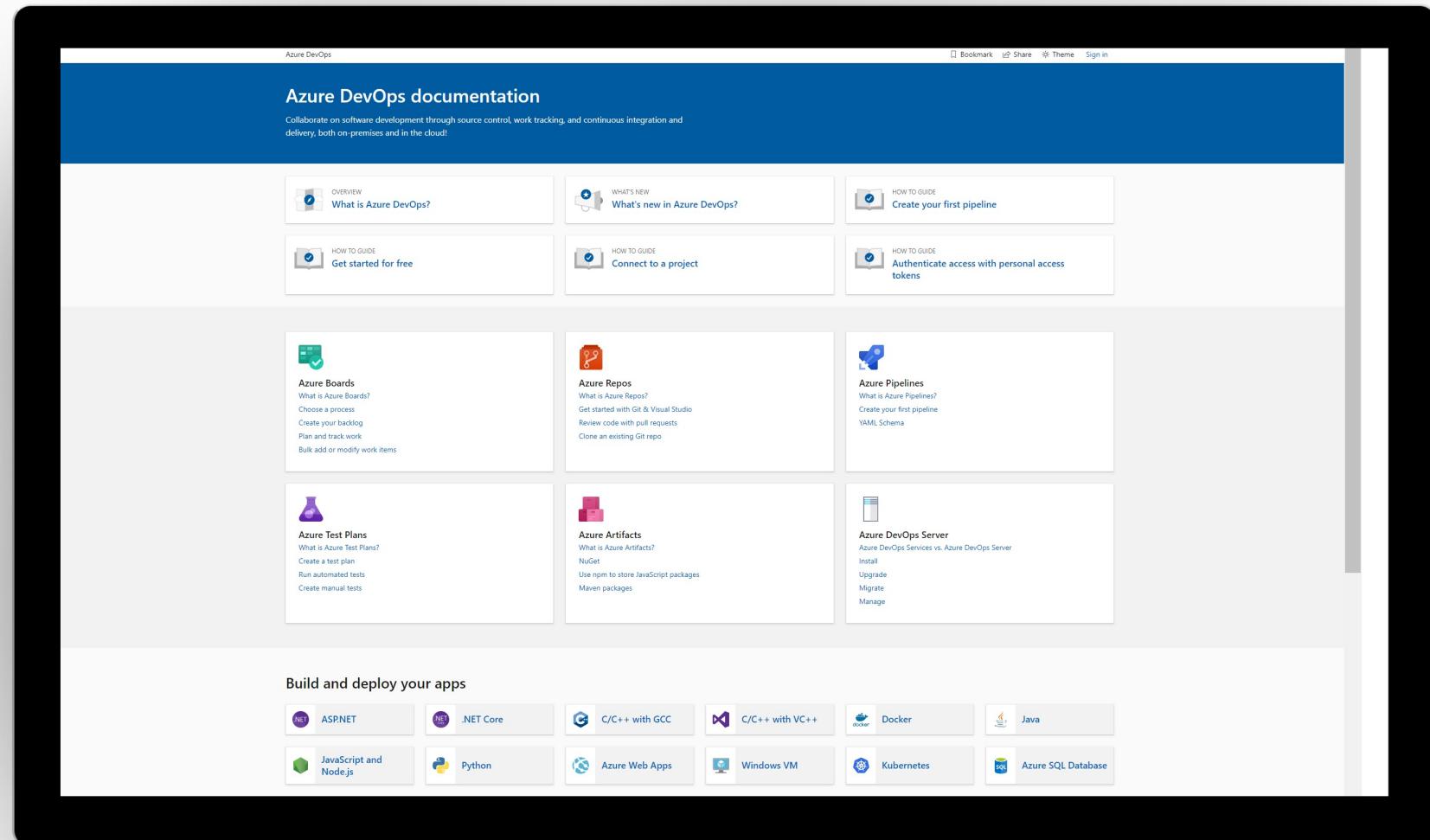


<https://docs.github.com>

Documentation - Azure DevOps

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

→ If you only save one Favorite in your browser related to Azure DevOps, this is the link to save as a favorite!

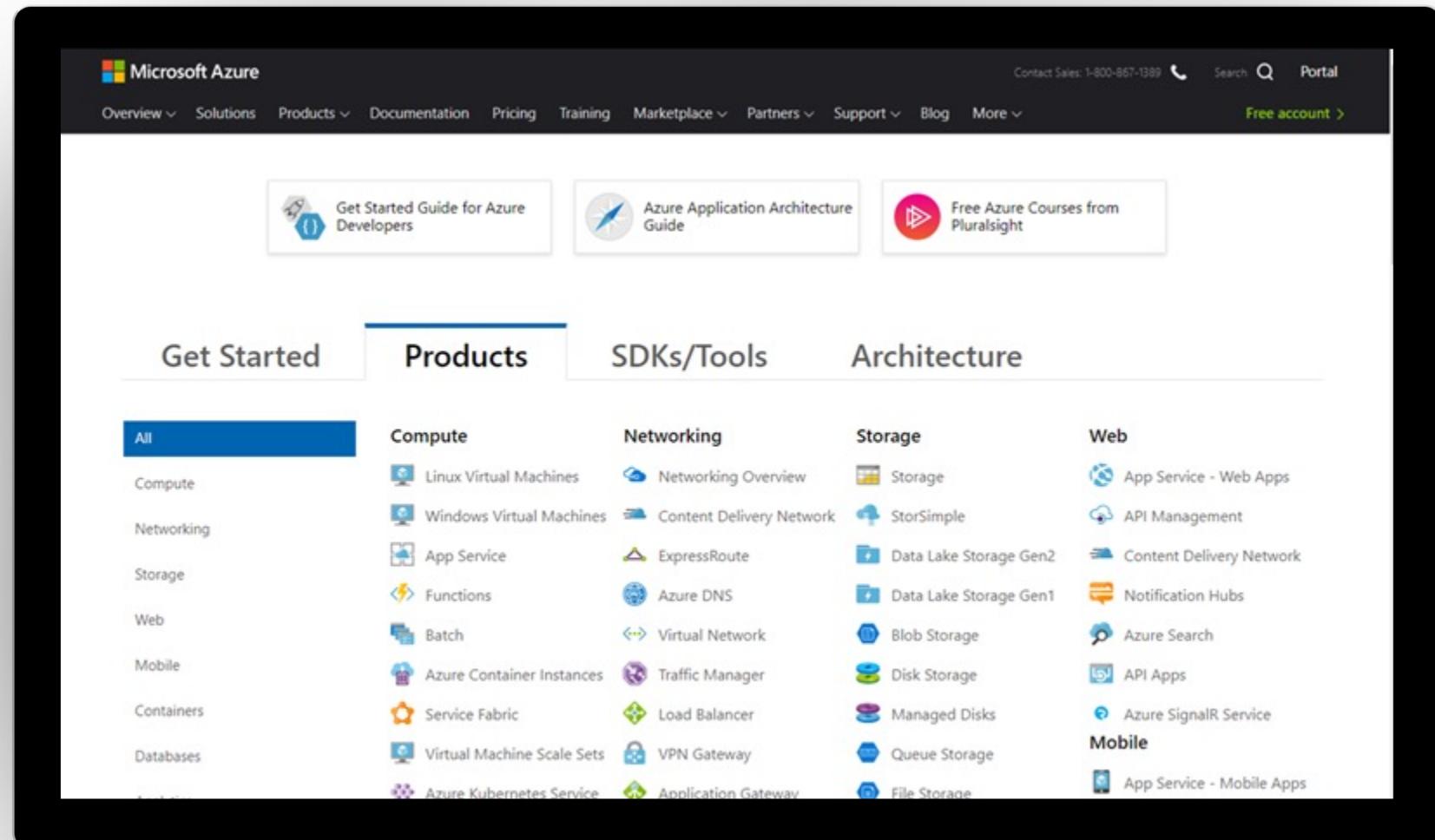


<https://aka.ms/micd/AzureDevOpsDocs>

Documentation - Azure

Use this end-to-end index to learn about all the services available in Azure

- Use this end-to-end feature index to learn about all Azure services.
- If you only save one Favorite in your browser related to Azure, this is the link to save as a favorite!
- Most topics contain Quickstarts and Tutorials allowing you to gain hands-on experience quickly
- Take advantage of the *FREE* training from Pluralsight!



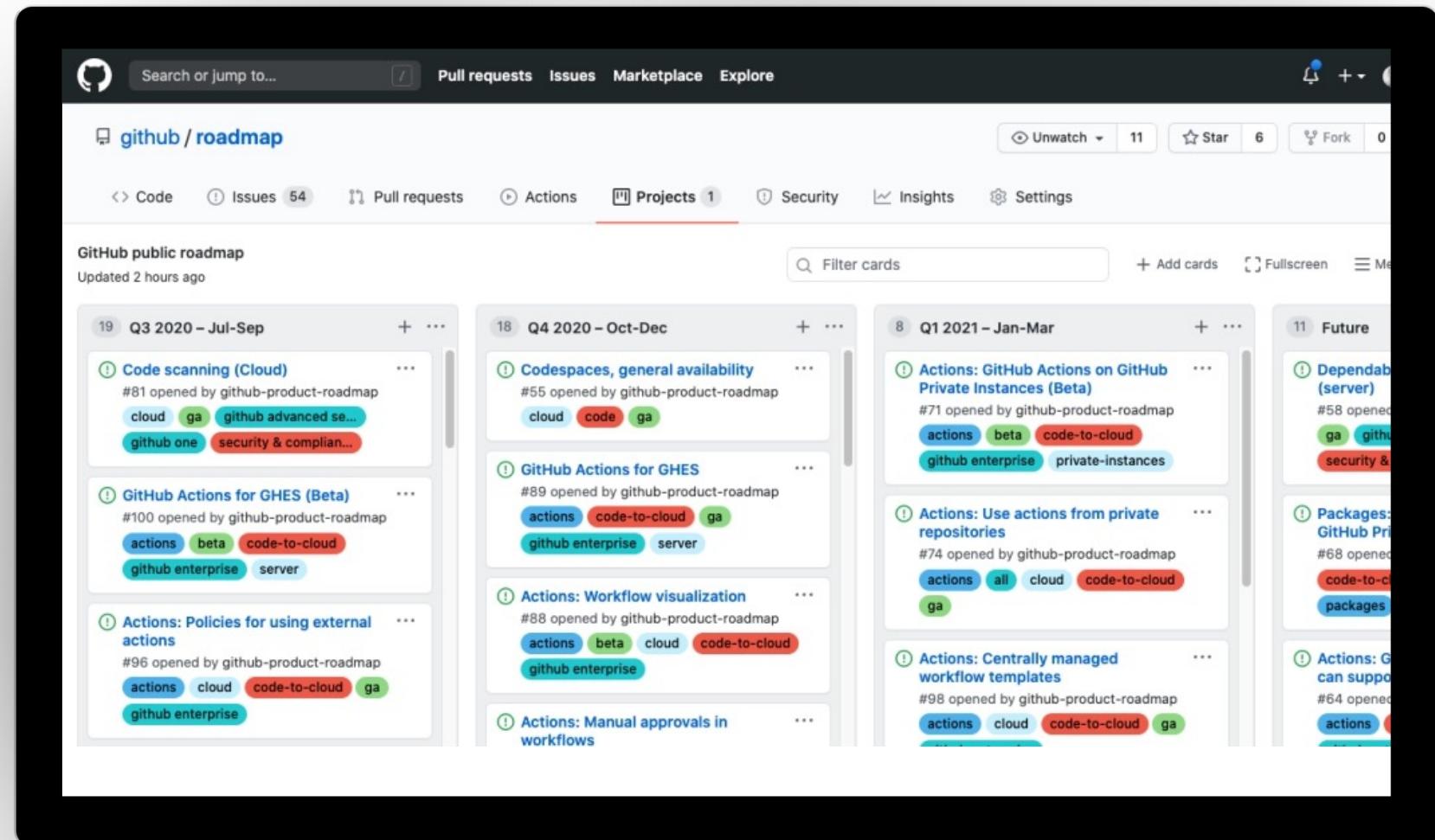
→ <https://aka.ms/micd/AzureDocs>

GitHub Public Roadmap

A public repository on GitHub that anyone can access.

→ Give your team more information about what features and functionality you can expect from GitHub over the coming quarters.

→ With more transparency into what we're building, you can also plan better.

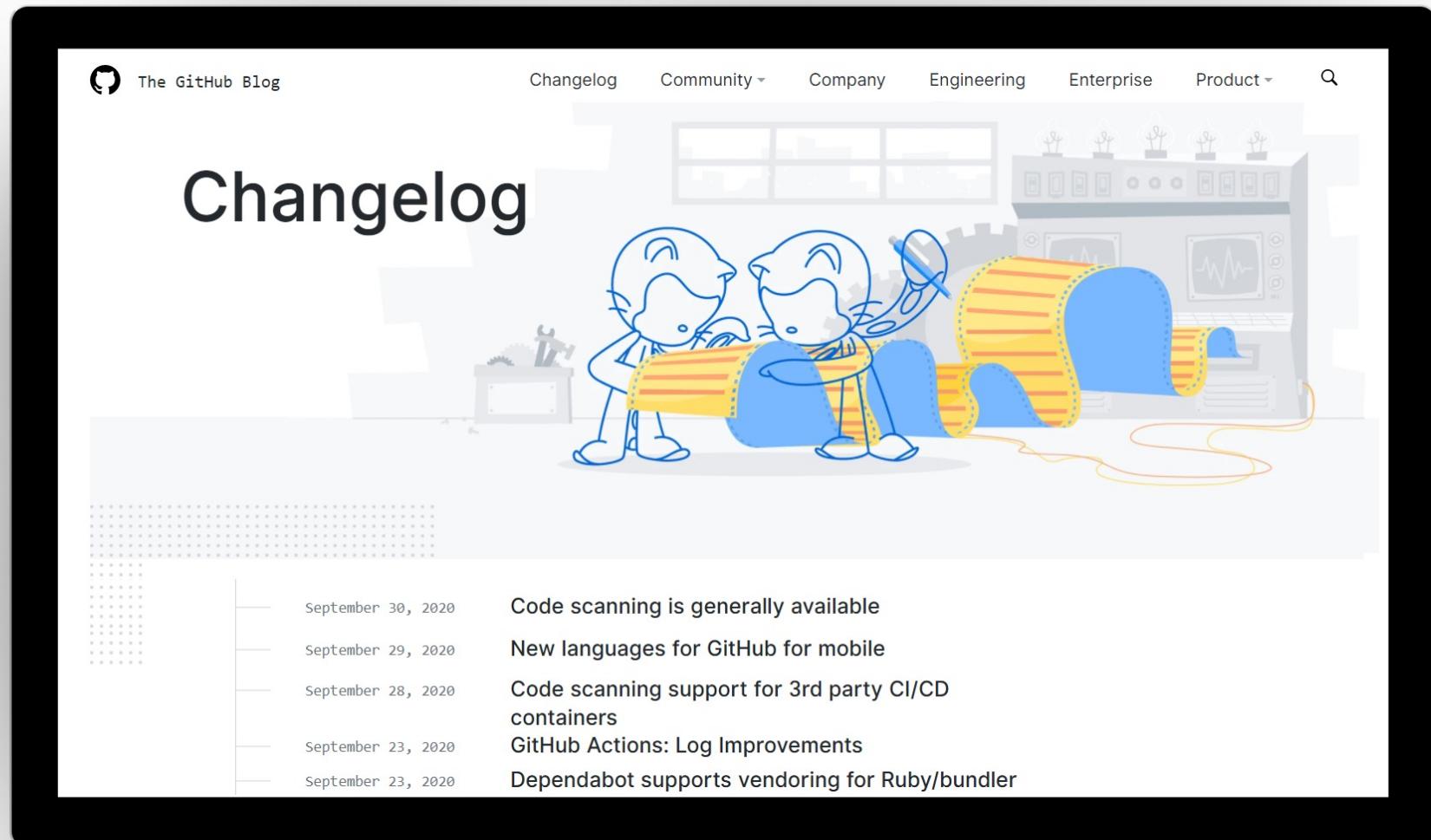


<https://github.com/github/roadmap/projects>

GitHub Changelog

<https://github.blog/changelog/>

- Track the release of new features. These are the GitHub "Release Notes".
- Go to <https://github.blog/> and click on "Changelog".



Learn DevOps in the DevOps Resource Center

This center combines our resources on learning DevOps practices, Git version control, Agile methods, how we work with DevOps at Microsoft, and how you can assess your own DevOps progression

- Learn DevOps - DevOps is the union of people, process, and products to enable continuous delivery of value to our end users
- DevOps at Microsoft - This center will keep you current on how we adopt DevOps at Microsoft
- DevOps Self-Assessment - Get tailored recommendations on how to improve your organization's ability to develop and deliver value to customers, pivot when necessary, and beat competitors to market

The screenshot shows the Microsoft DevOps Resource Center landing page. At the top, there's a navigation bar with links for Microsoft, Visual Studio, Visual Studio Team Services, Features, Pricing, News, Support, Subscriber Access, and a Free Account button. To the right are links for All Microsoft, Search, and Sign in.

The main content area is titled "DevOps Resource Center". It features a sub-header: "This center combines our resources on learning DevOps practices, Git version control, Agile methods, how we work with DevOps at Microsoft, and how you can assess your own DevOps progression. Alternatively, you can jump to documentation on [getting started with DevOps on Azure](#) or to dive in, [start your own Azure DevOps project](#). If you're interested in practices, read on."

The page is organized into several sections with corresponding illustrations:

- Learn DevOps:** DevOps is the union of people, process, and products to enable continuous delivery of value to our end users.
- Learn Git:** Git is a distributed version control system to track changes you make in your code over time.
- Learn Agile:** Agile approaches to software development emphasize incremental delivery, team collaboration, continual planning, and continual learning.
- DevOps at Microsoft:** This center will keep you current on how we work with DevOps at Microsoft.
- DevOps Events and Talks:** Take a look at some of our recent events and talks.
- DevOps Self-Assessment:** Get tailored recommendations on how to improve your organization's ability to develop and deliver value to customers, pivot when necessary, and beat competitors to market.



<http://aka.ms/micd/DevOps>

The DevOps journey at Microsoft

See how teams across Microsoft are transforming through DevOps adoption

- 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 the Microsoft Azure website with a dark theme. At the top, there's a navigation bar with links for Overview, Solutions (which is selected), Products, Documentation, Pricing, Training, Marketplace, Partners, Support, Blog, and More. On the far right, there are links for Contact Sales, Search, My account, Portal, and a user profile for Dave. A green "Free account" button is also visible.

The main content area has a dark header with the title "The DevOps journey at Microsoft" and a subtitle "See how teams across Microsoft are transforming through DevOps adoption". Below this, there's a section titled "The promise and challenge of DevOps" with some text and a video thumbnail. The video thumbnail shows three people in an office setting, one pointing at a laptop screen, with the caption "DevOps at Microsoft: Learn from teams... Watch later Share".

Below the video, there are three sections with icons and titles: "How Microsoft does DevOps" (with a bar chart icon), "Collaborating across teams" (with a hexagonal icon), and "Adopting a growth mindset" (with a beaker icon). Each section has a brief description and a link to "Read more".

At the bottom right, there's another section titled "Enabling change through technology" with a beaker icon and a short description.



<https://aka.ms/micd/DevOpsStories>

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!)

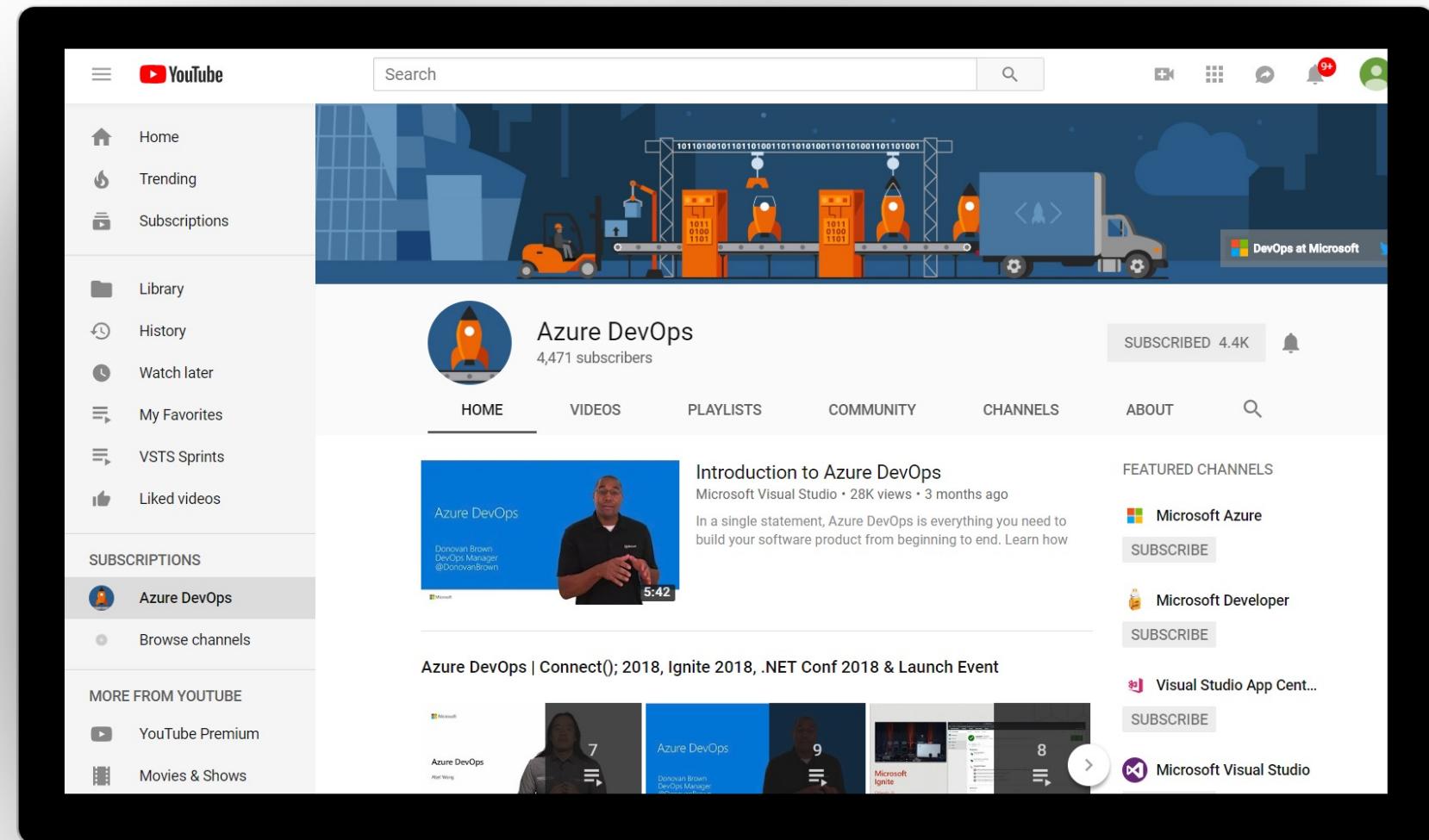
The screenshot shows a Microsoft web page titled "DevOps at Microsoft". The page includes a sidebar with a "DevOps Resource Center" menu containing links like "How We Work with Azure DevOps", "How We Architect Azure DevOps", and "One Engineering System at Microsoft". The main content area features a video player showing a presentation by Martin Woodward titled "Why Microsoft does DevOps - Martin Woodward (Microsoft)". The video player has a play button and a "Share" icon. The page also includes a search bar, navigation links for Azure DevOps & TFS, and a "Feedback" link.

→ <https://aka.ms/micd/DevOpsAtMicrosoft>

"Azure DevOps" YouTube channel

Learn more about Azure DevOps through videos

- Events - Keynotes and break out sessions from events such as Connect(); Ignite, .NET Conf and //Build
- DevOps Interviews (Channel 9 Shows) - DevOps Interviews from around Microsoft and the community hosted by Microsoft's Donovan Brown
- DevOps Labs (Channel 9 Shows) - Damian Brady goes deep into various DevOps Pipelines topics
- DevOps On Azure - OSS Projects, Jenkins, Terraform & more

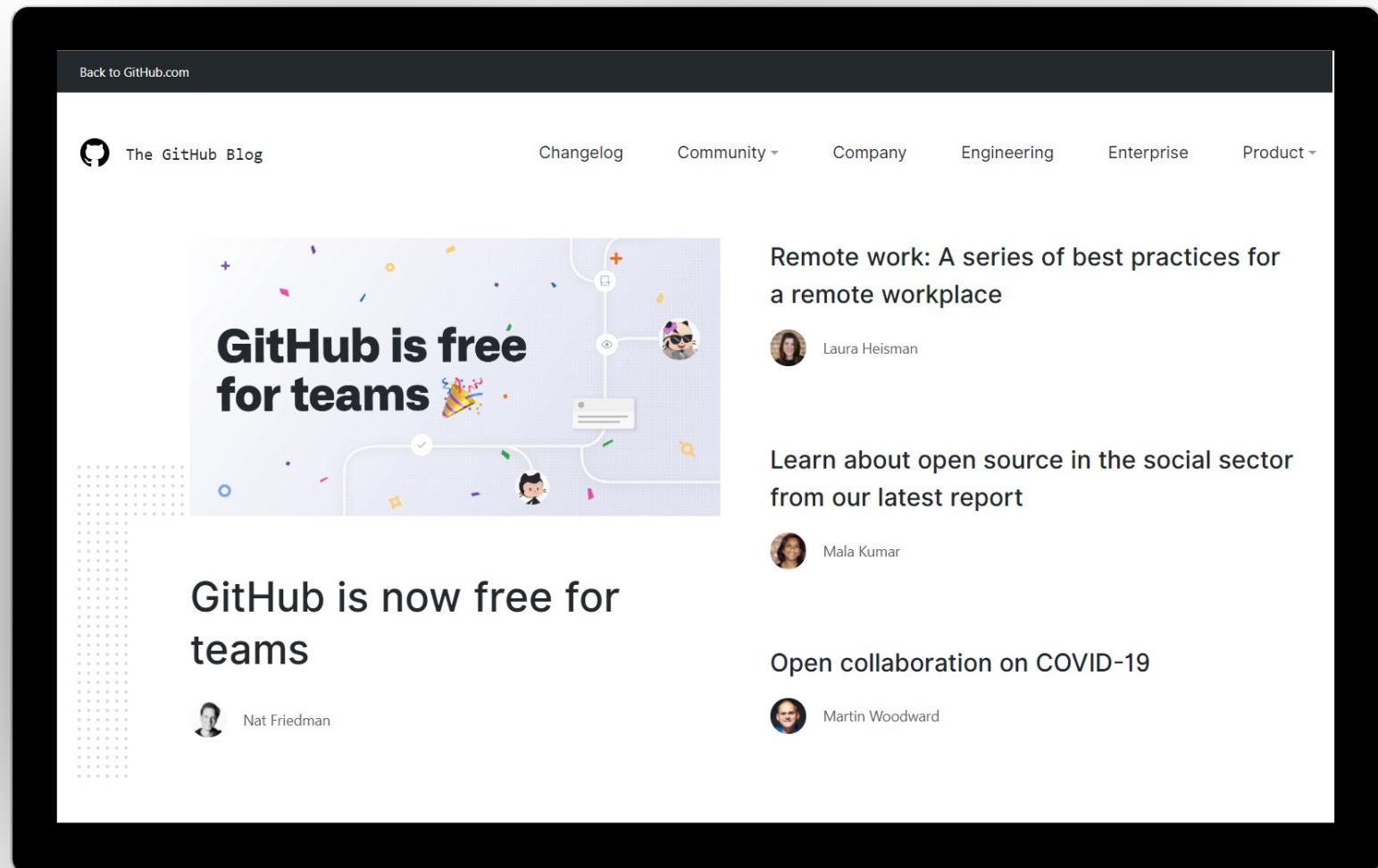


→ <https://aka.ms/micd/AzureDevOpsYouTube>

GitHub Blog

Get the latest news on all things related to GitHub

- Learn about everything GitHub such as...
- Community - Education, Events, Insights, Open source
- Company - Policy, Remote work, Updates
- Product - Editor tools, Features, Security



→ <https://github.blog/>

Azure DevOps Blog

Get the latest news from the teams that build and work with 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 to 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 people working on laptops. Three thought bubbles above them contain icons related to DevOps, Git, and Agile. The text "DevOps, Git, and Agile updates from the team building VSTS" is displayed in the center of the blue area. Below this, a blog post card for "Azure DevOps Agents on Azure Container Instances (ACI)" by Máté Barabás on January 7, 2019, is shown. The post summary indicates it provides a solution for running Azure DevOps agents on Windows Server Core based containers. To the right of the post card is a search bar and a "Search" button. A sidebar titled "Other Resources" includes links to Documentation, DevOps in Microsoft, and Visual Studio Home.

→ <https://aka.ms/micd/DevOpsBlog>

<https://aka.ms/optc/5-devopsing-everything-as-code>

Questions?

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Thank you

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