Continuous Integration

Modern DevOps with GitHub and Azure DevOps (Part 1)

Dave Burnison
Technical Advocate – GitHub & Azure DevOps
DaveBurnisonMS@GitHub.com
@DaveBurnison

Zachary Deptawa
Cloud Advocate – Microsoft
zdeptawa@microsoft.com
@zdeptawa

Milliman

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"

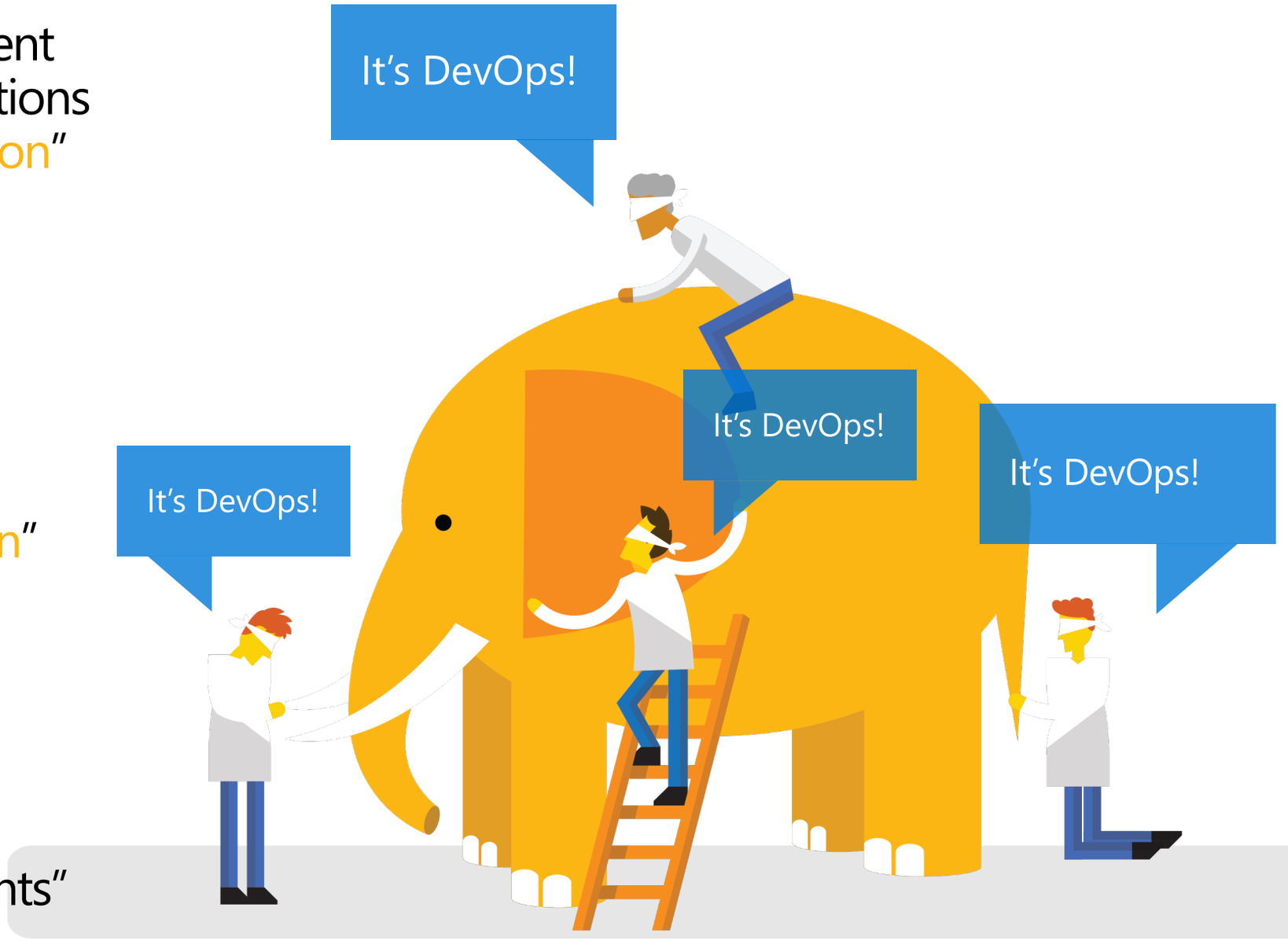
"**DevOps** is treating your infrastructure as code"

"**DevOps** is using automation"

"**DevOps** is feature switches"

"**DevOps** is small deployments"

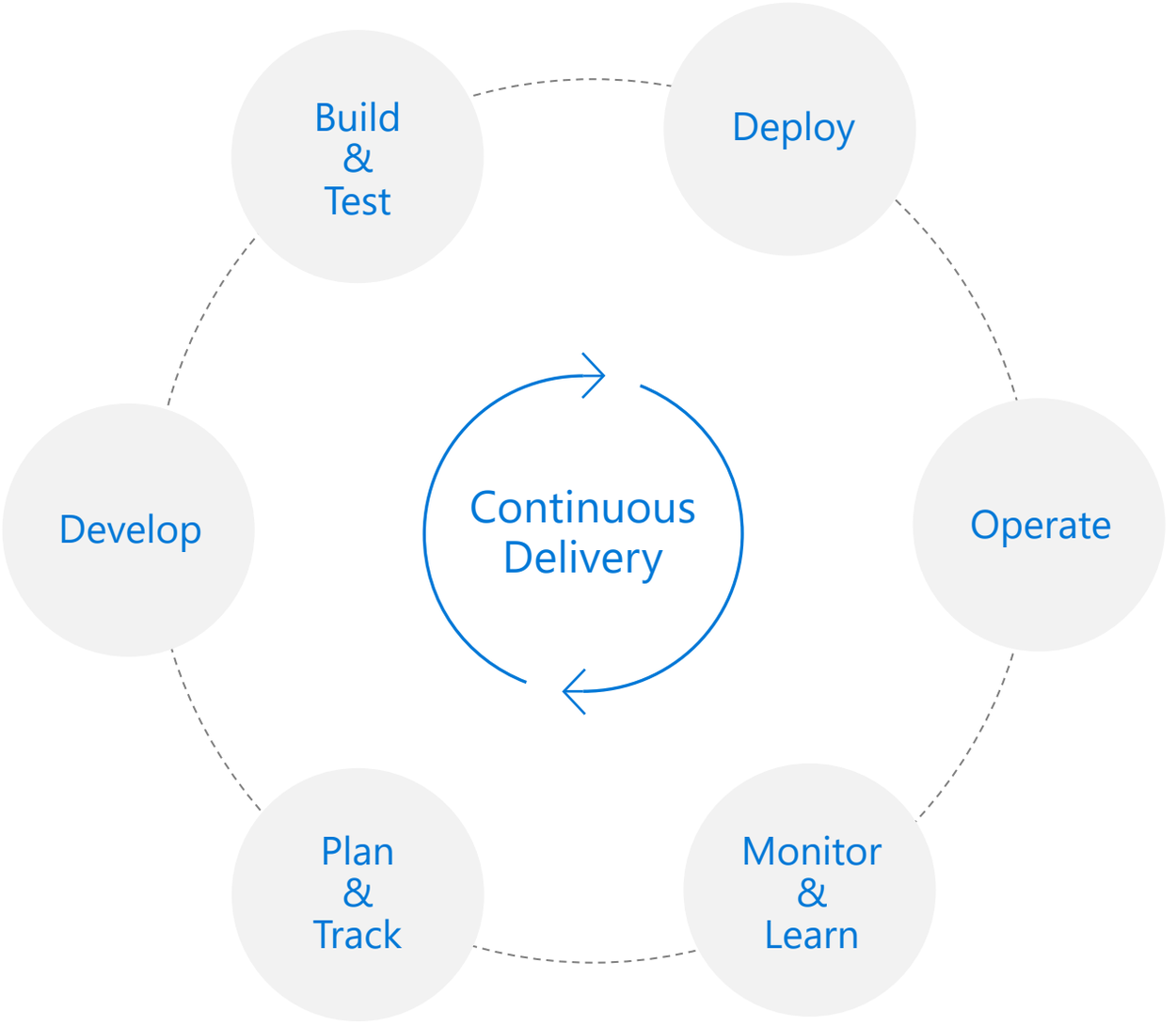
"Kanban for Ops?"



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?

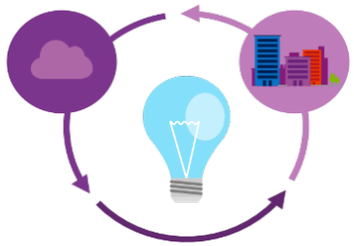
Business Needs

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

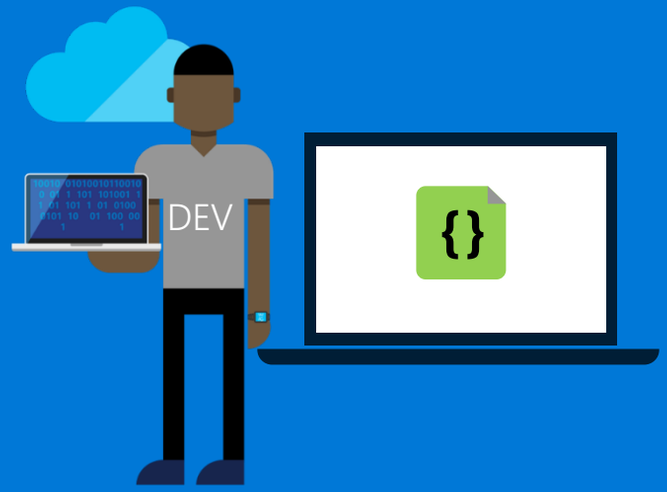
DevOps is to software development what the assembly line is to automobile manufacturing.

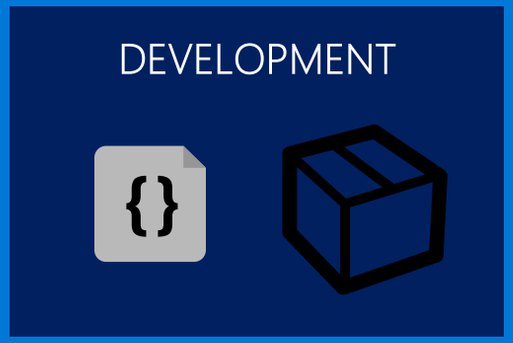
It is the logistics to get software to end users like delivery logistics get vehicles to dealers.

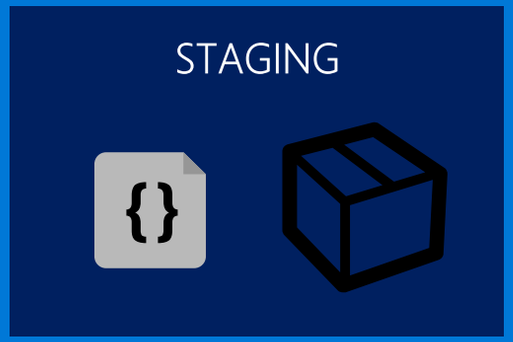
What does this mean for you?

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

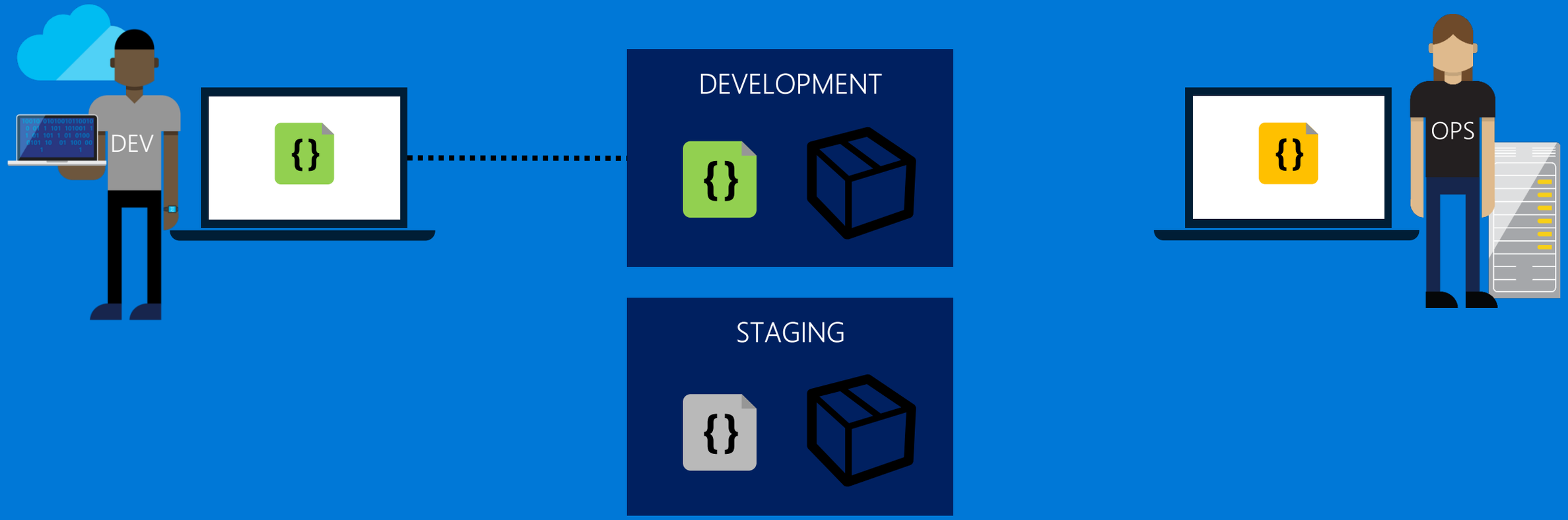
The Old Way



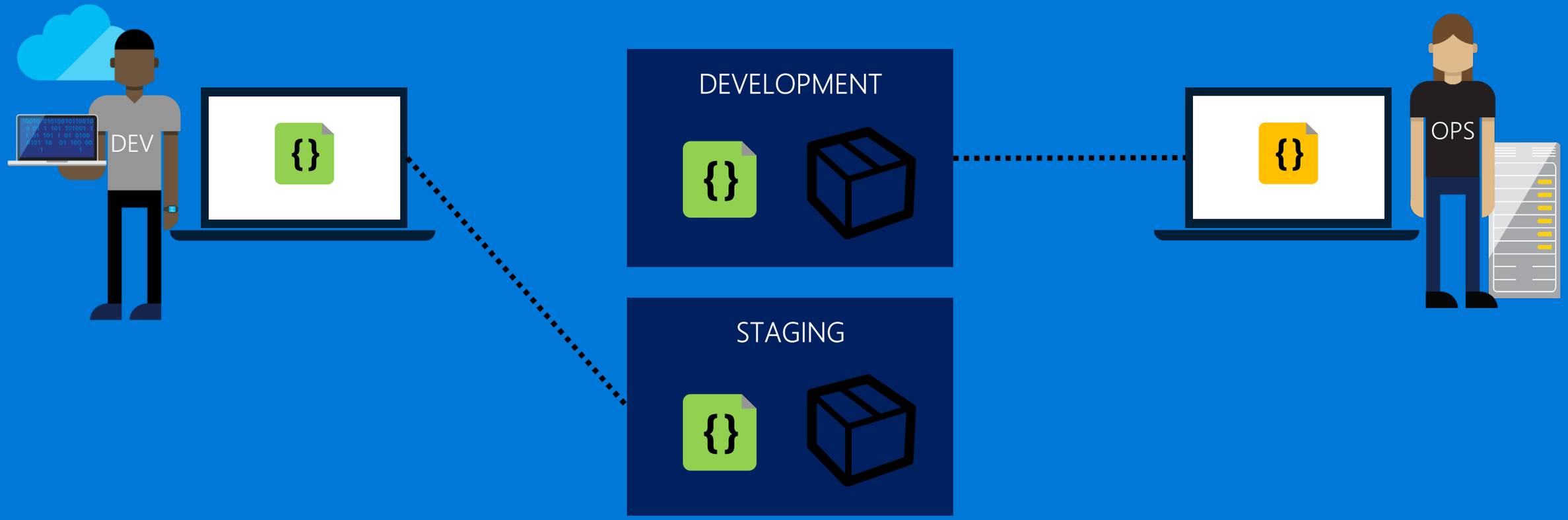




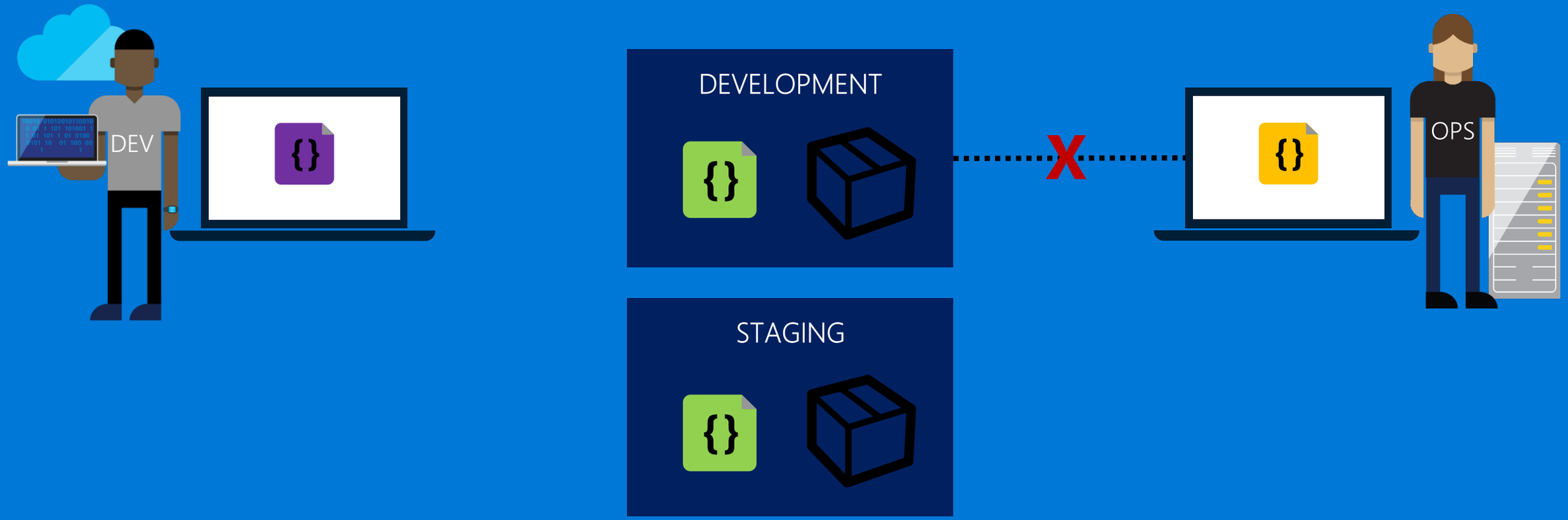
The Old Way



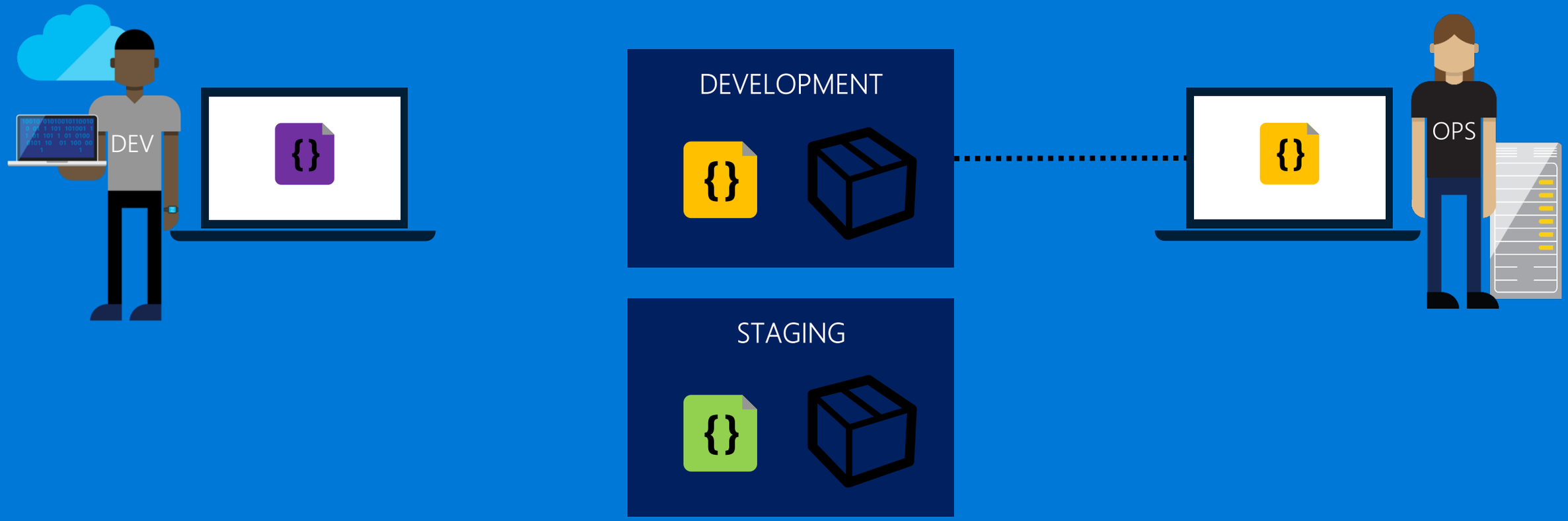
The Old Way



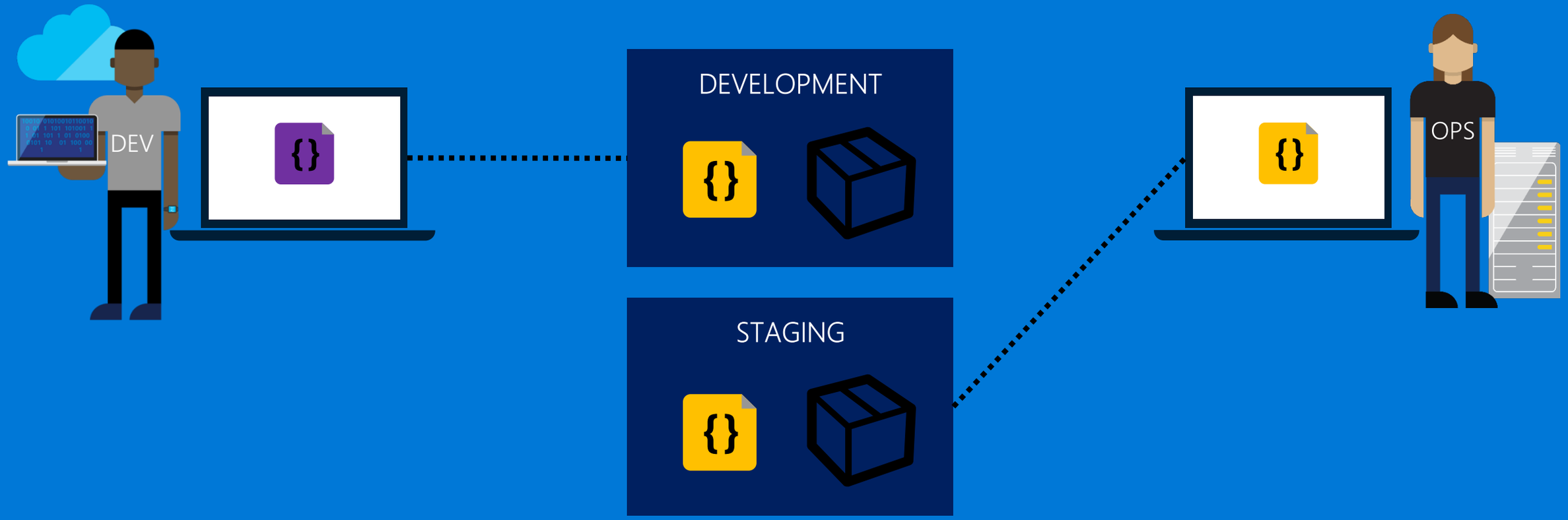
The Old Way



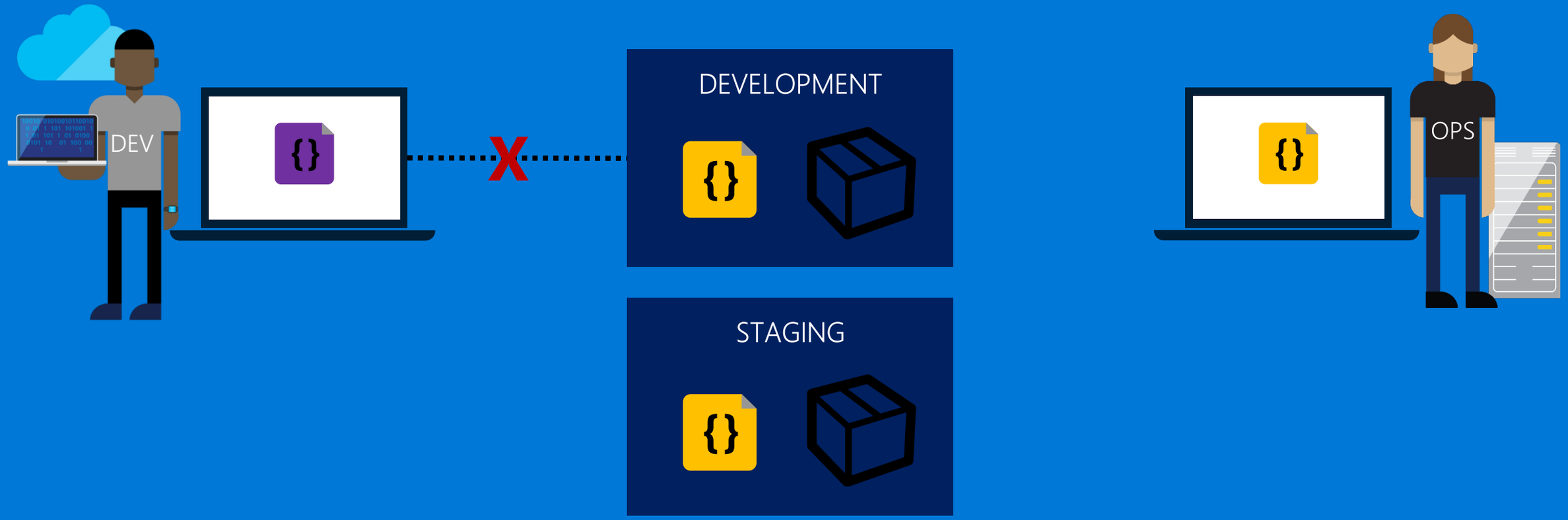
The Old Way



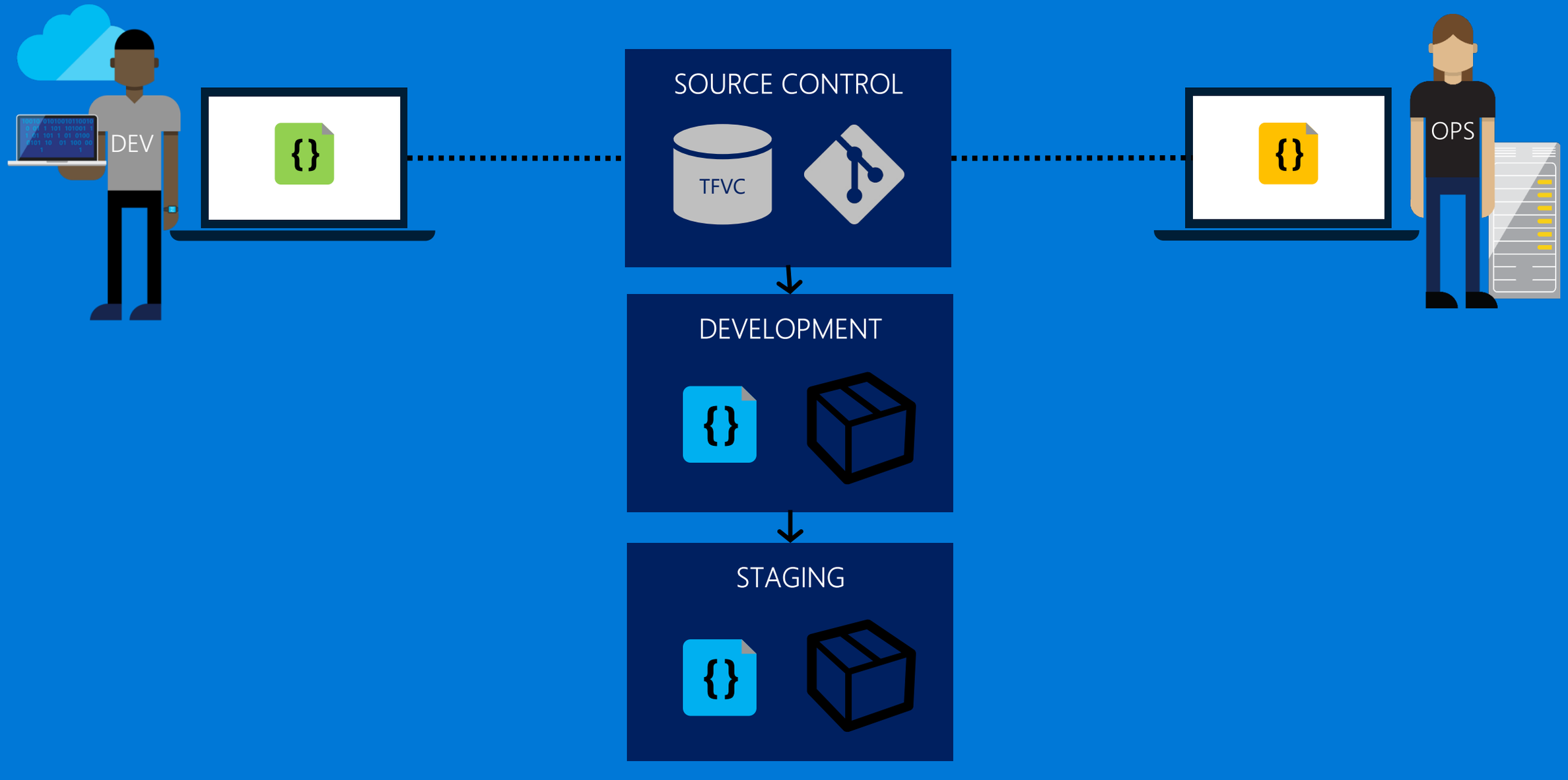
The Old Way



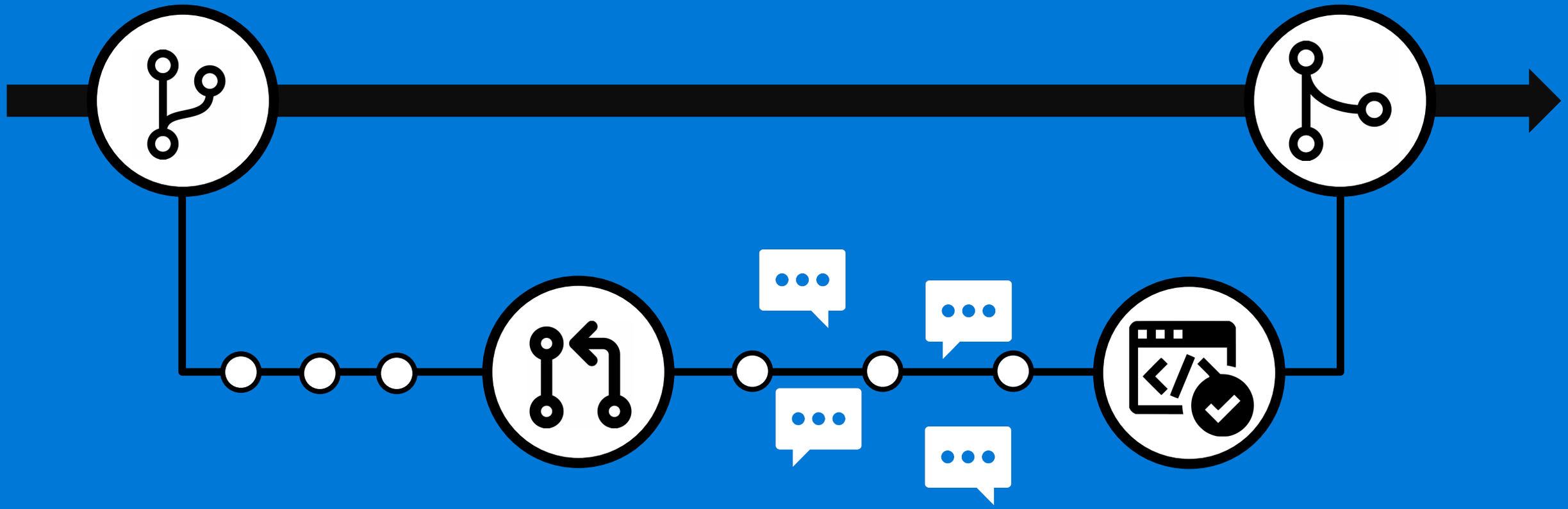
The Old Way



Source Control

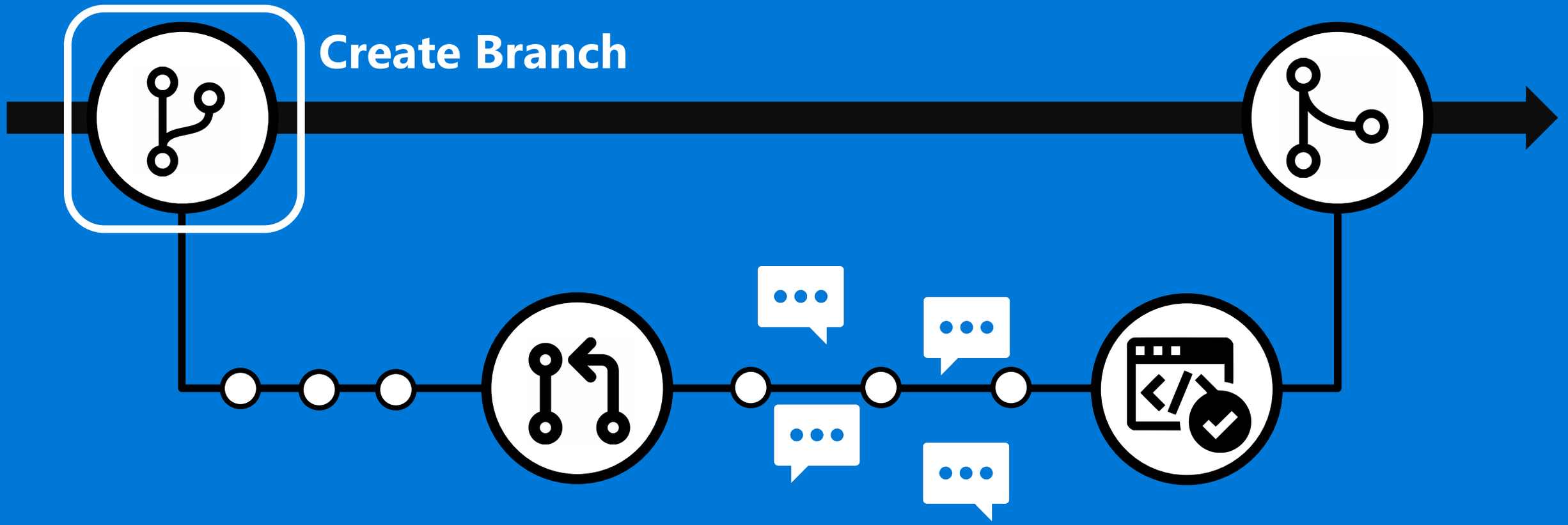


The GitHub Flow



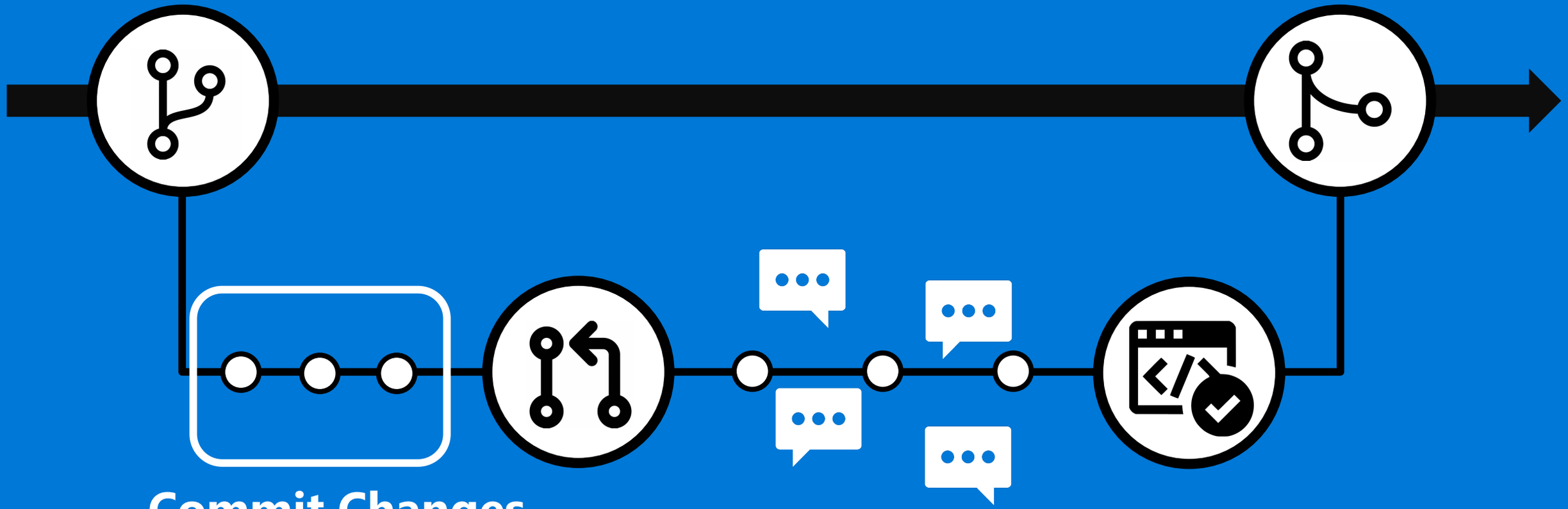
https://guides.github.com/introduction/flow/

The GitHub Flow



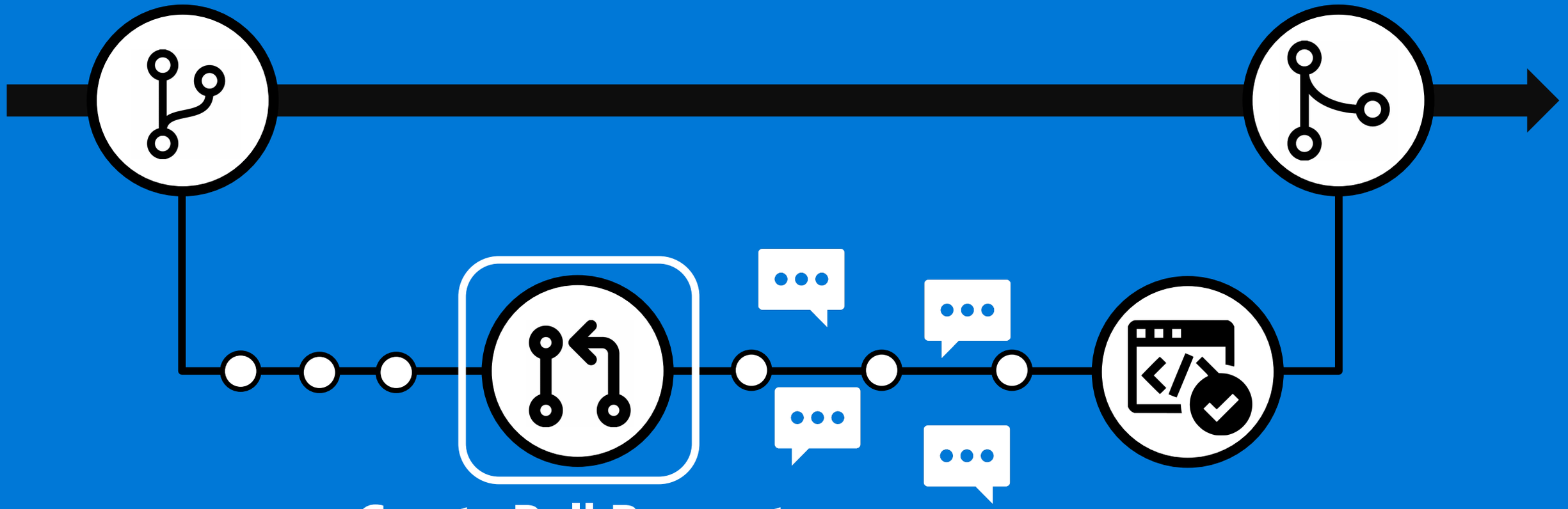
https://guides.github.com/introduction/flow/

The GitHub Flow



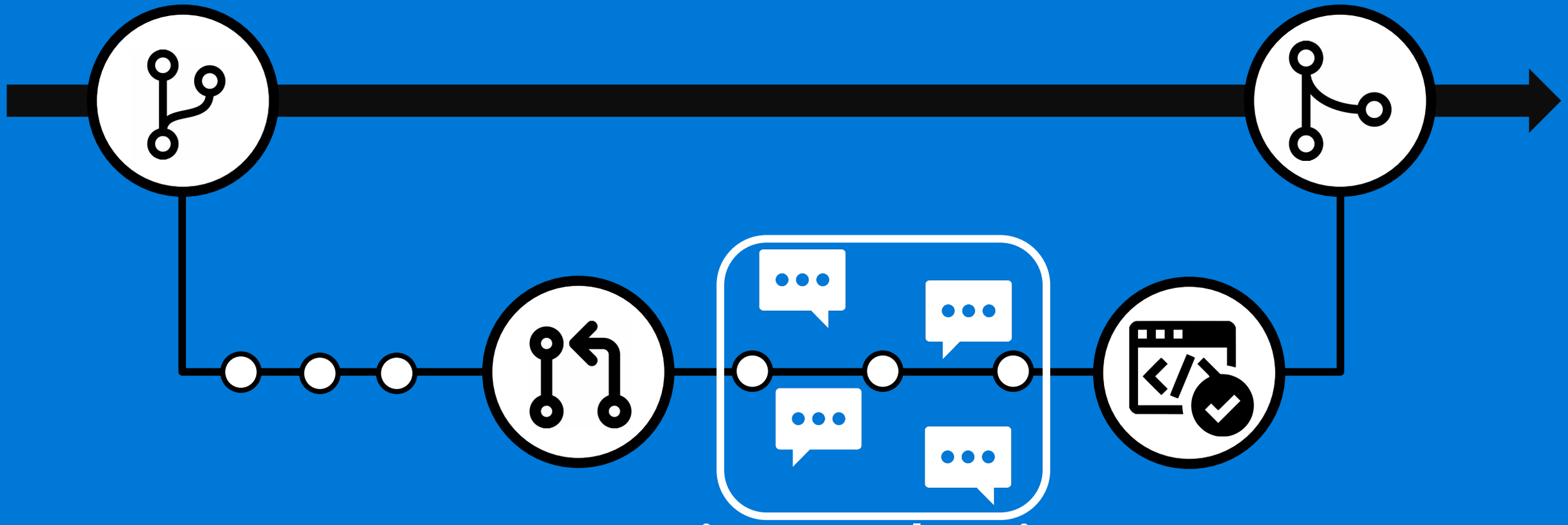
https://guides.github.com/introduction/flow/

The GitHub Flow



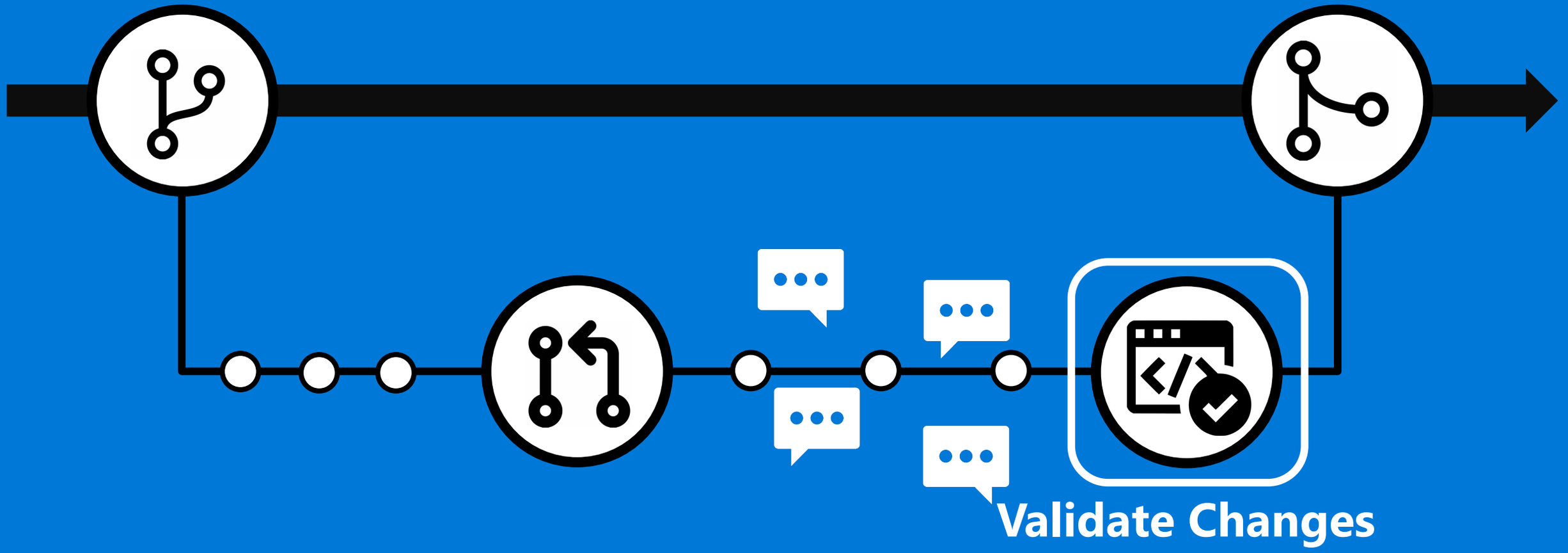
https://guides.github.com/introduction/flow/

The GitHub Flow



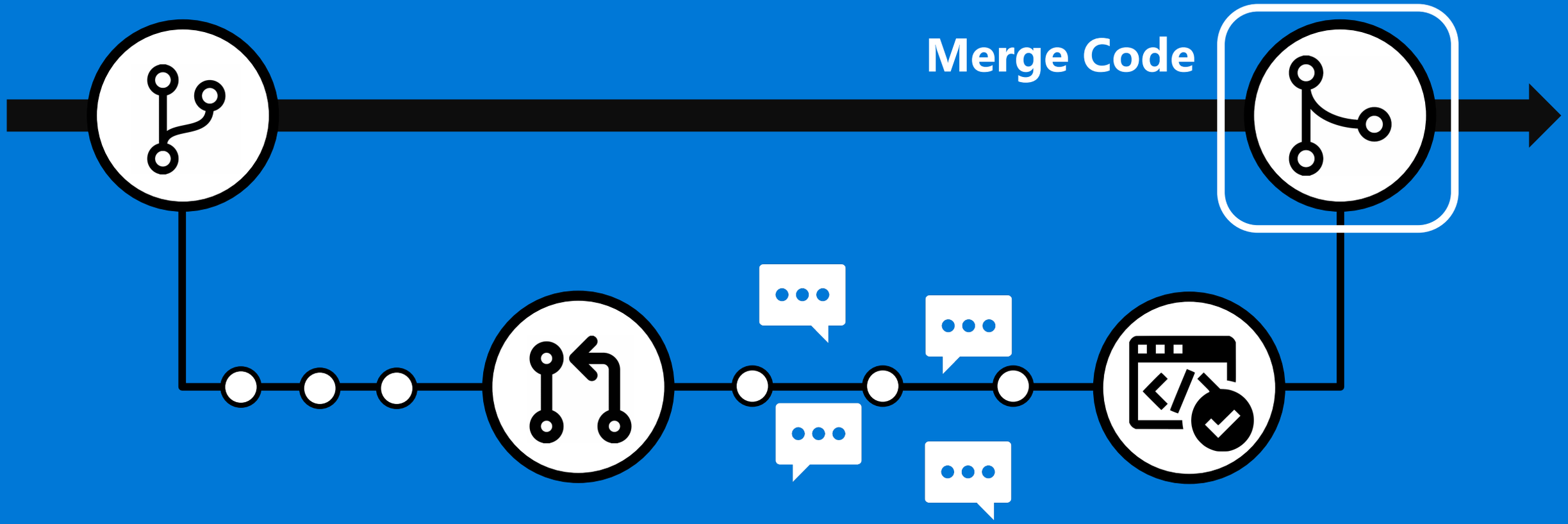
https://guides.github.com/introduction/flow/

The GitHub Flow



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

The GitHub Flow



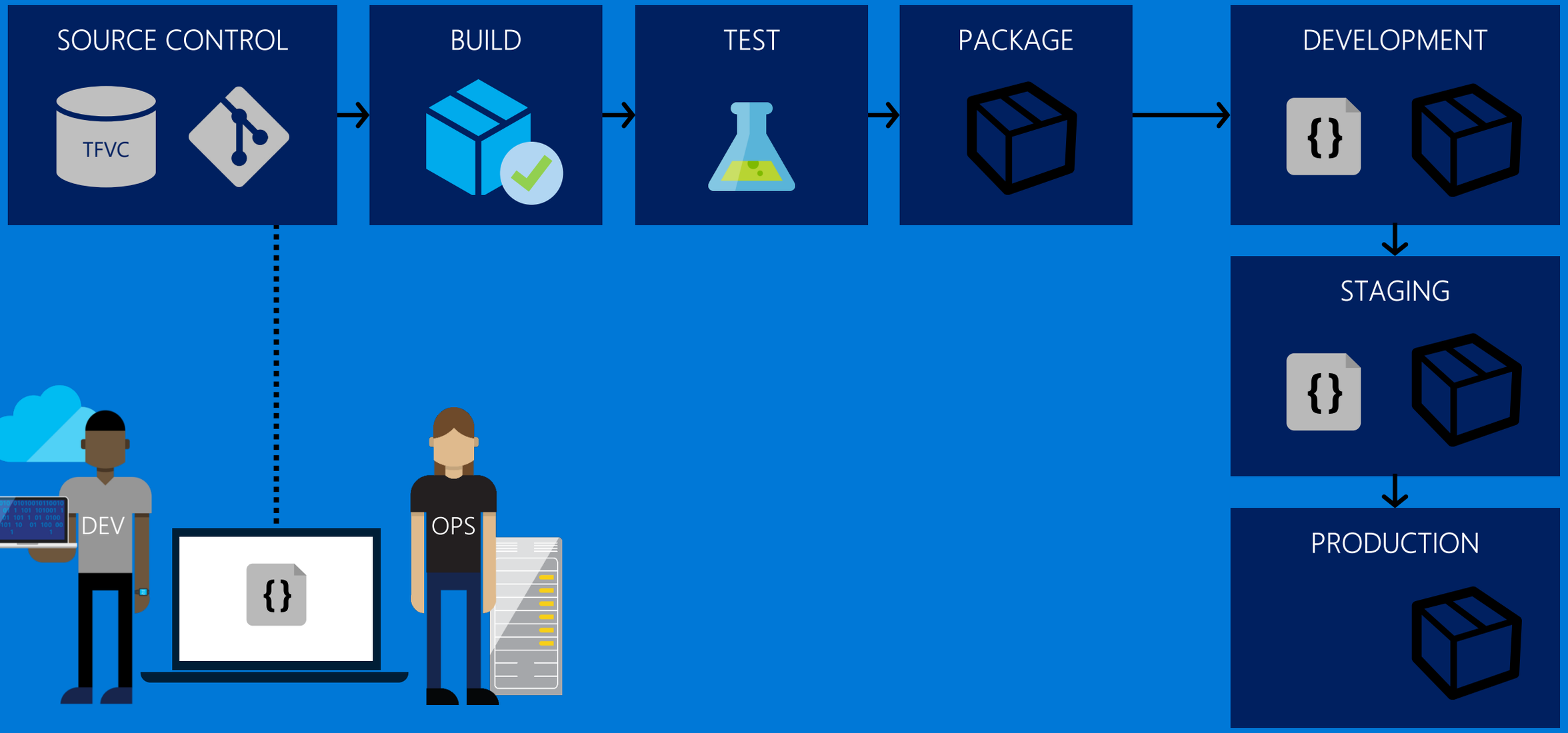
https://guides.github.com/introduction/flow/

Pull Request Best Practices

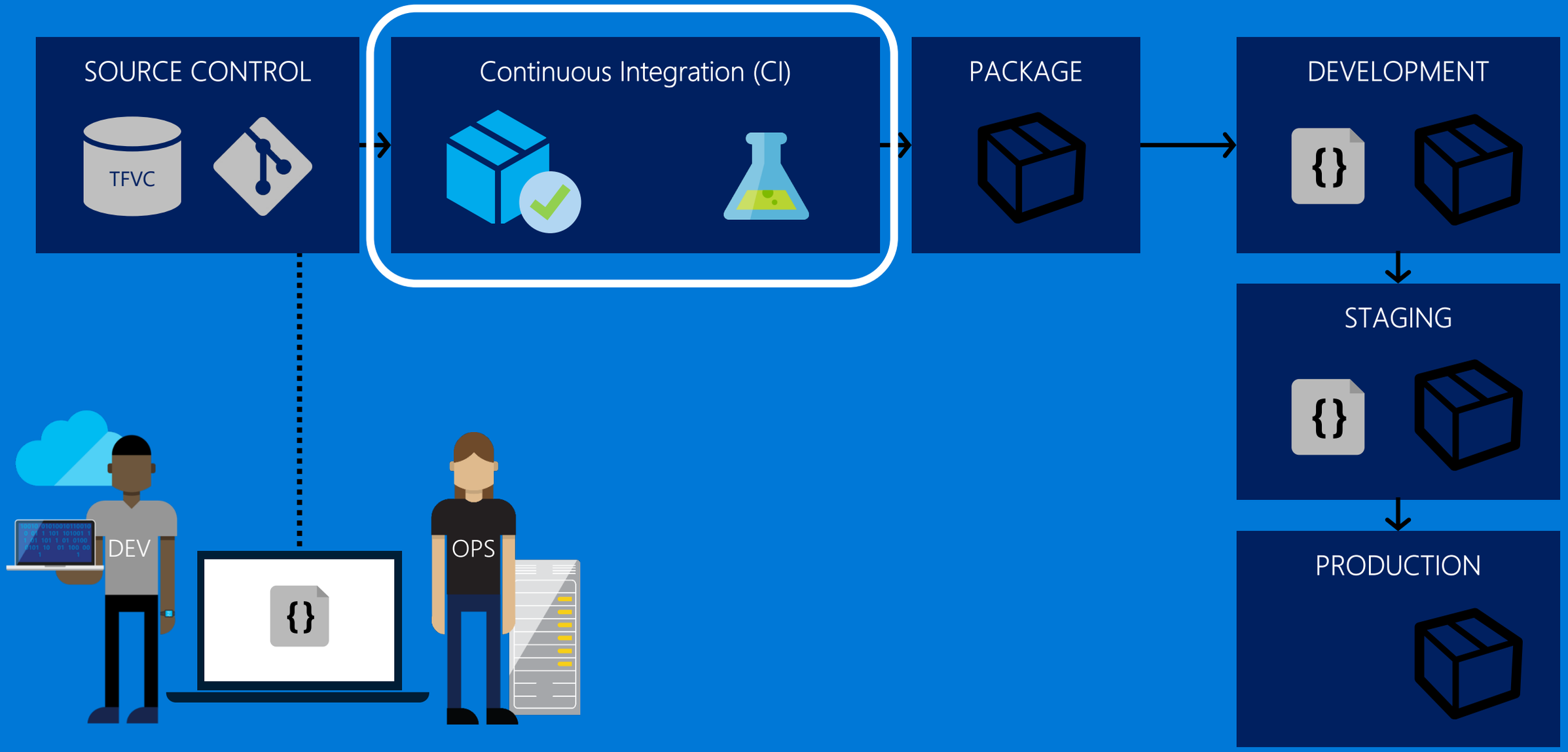
- PR early, PR often, and keep them small
- A PR doesn't HAVE to be merged
- Use PR templates
- Automate automate automate!
- Use Protected Branches

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

DevOps Pipeline



DevOps Pipeline



DevOps Pipeline

SOURCE CONTROL

TFVC

Continuous Integration (CI)

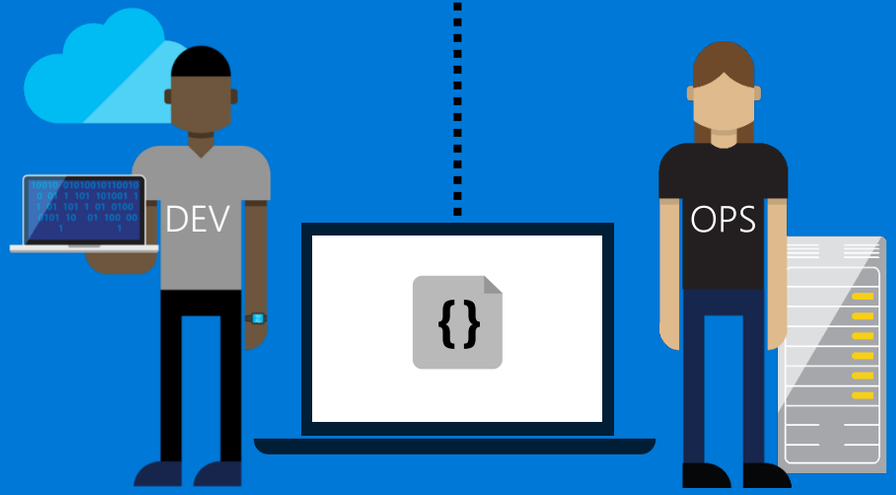
PACKAGE

Deploy

DEVELOPMENT

STAGING

PRODUCTION



Continuous Delivery

Deploy

SOURCE CONTROL

TFVC

Continuous Integration (CI)

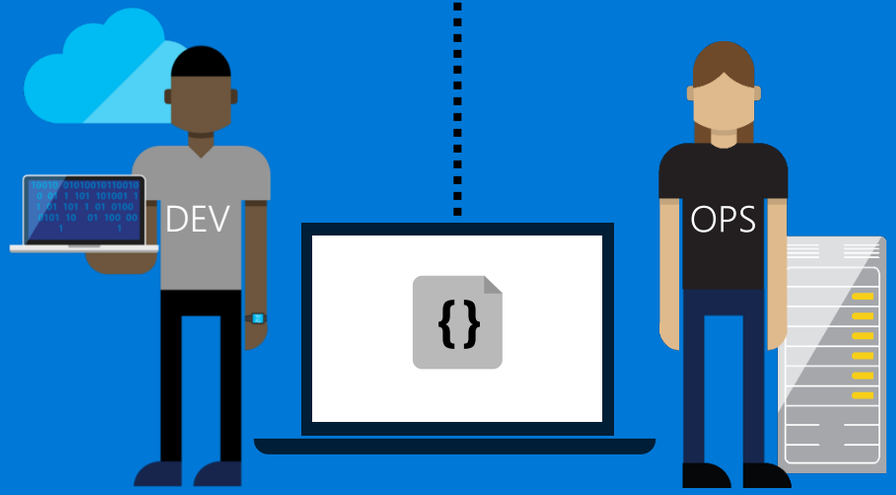
PACKAGE

DEVELOPMENT

STAGING

PRODUCTION

Build



The Enterprise Collaboration Solution

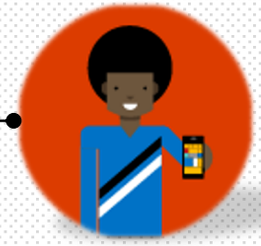
Project Manager

Business Analyst / Product Owner

Quality Analyst

Project Lead

Developer



IT/Operations

Plan & Track

Portfolio

Storyboards

User Stories

Tasks

Develop

SonarQube

Code Analysis

Architecture

Quality Gates

Commit / Check-in

Source Code

Manual Testing

Test Cases

Bugs

Execute Test

Build/Deploy

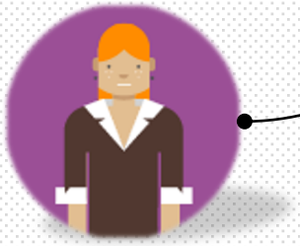
Deployment

Approval Pipeline

Build

The Enterprise Collaboration Solution

Project Manager



Business Analyst / Product Owner

Quality Analyst

Plan & Track

Develop

Manual Testing

Build/Deploy

Project Lead

Developer

IT/Operations

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.

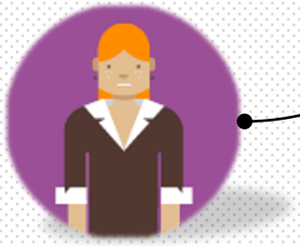
Azure Artifacts

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

https://aka.ms/micd/AzureDevOps

The Enterprise Collaboration Solution

Project Manager



Business Analyst / Product Owner

Quality Analyst

Plan & Track

Develop

Manual Testing

Build/Deploy

Project Lead

Developer

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

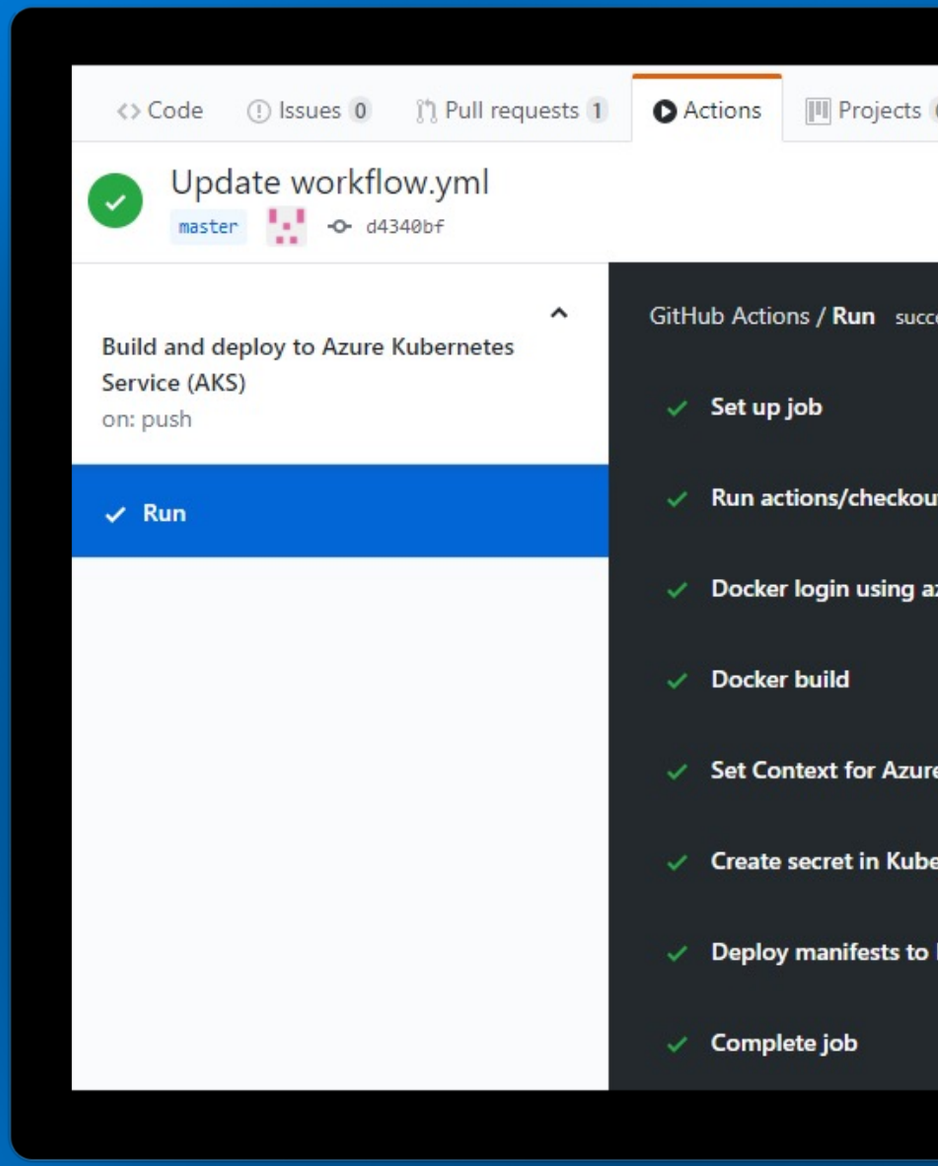
Sign into Azure with your GitHub credentials and authenticate to GitHub Enterprise with Azure AD

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



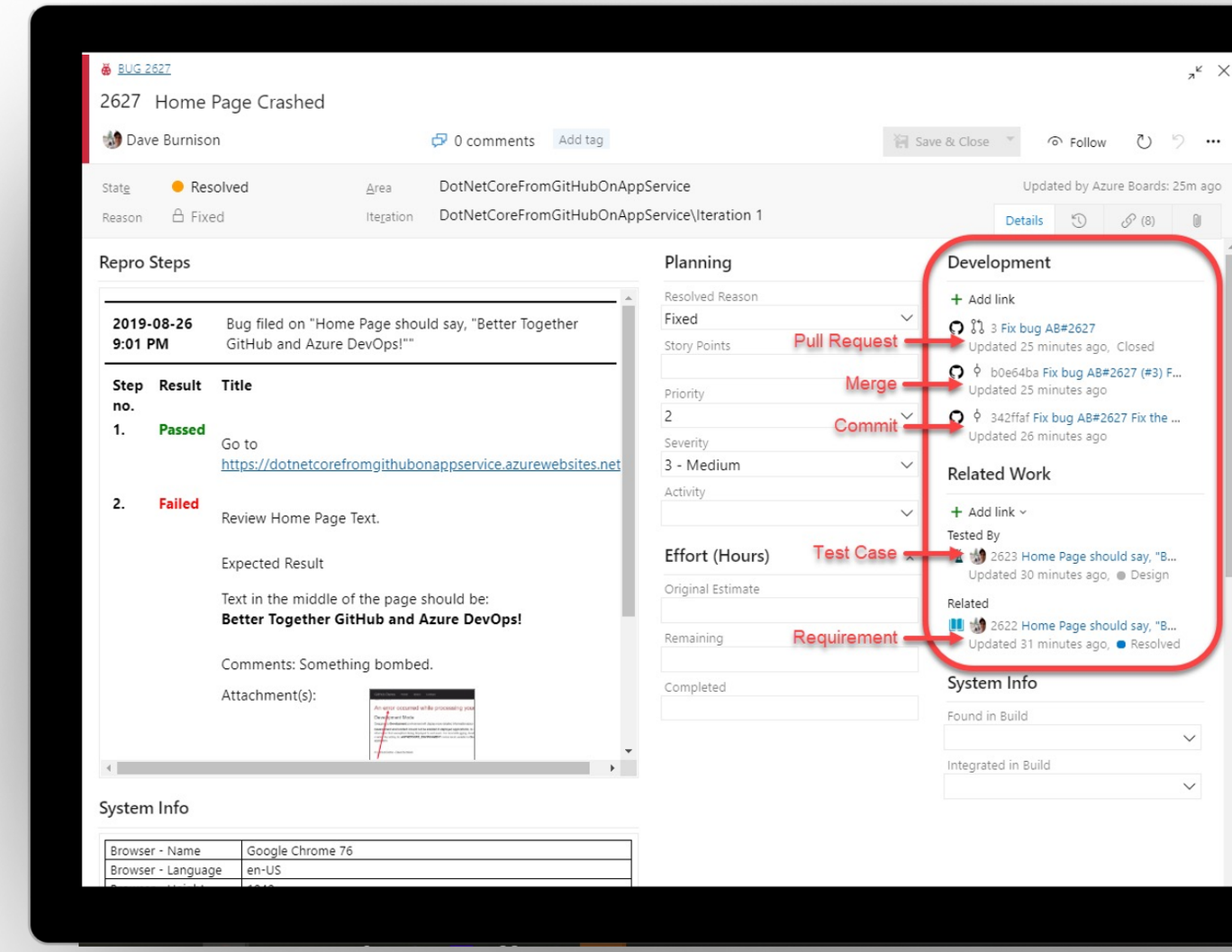
https://aka.ms/micd/GitHubAndAzure

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!



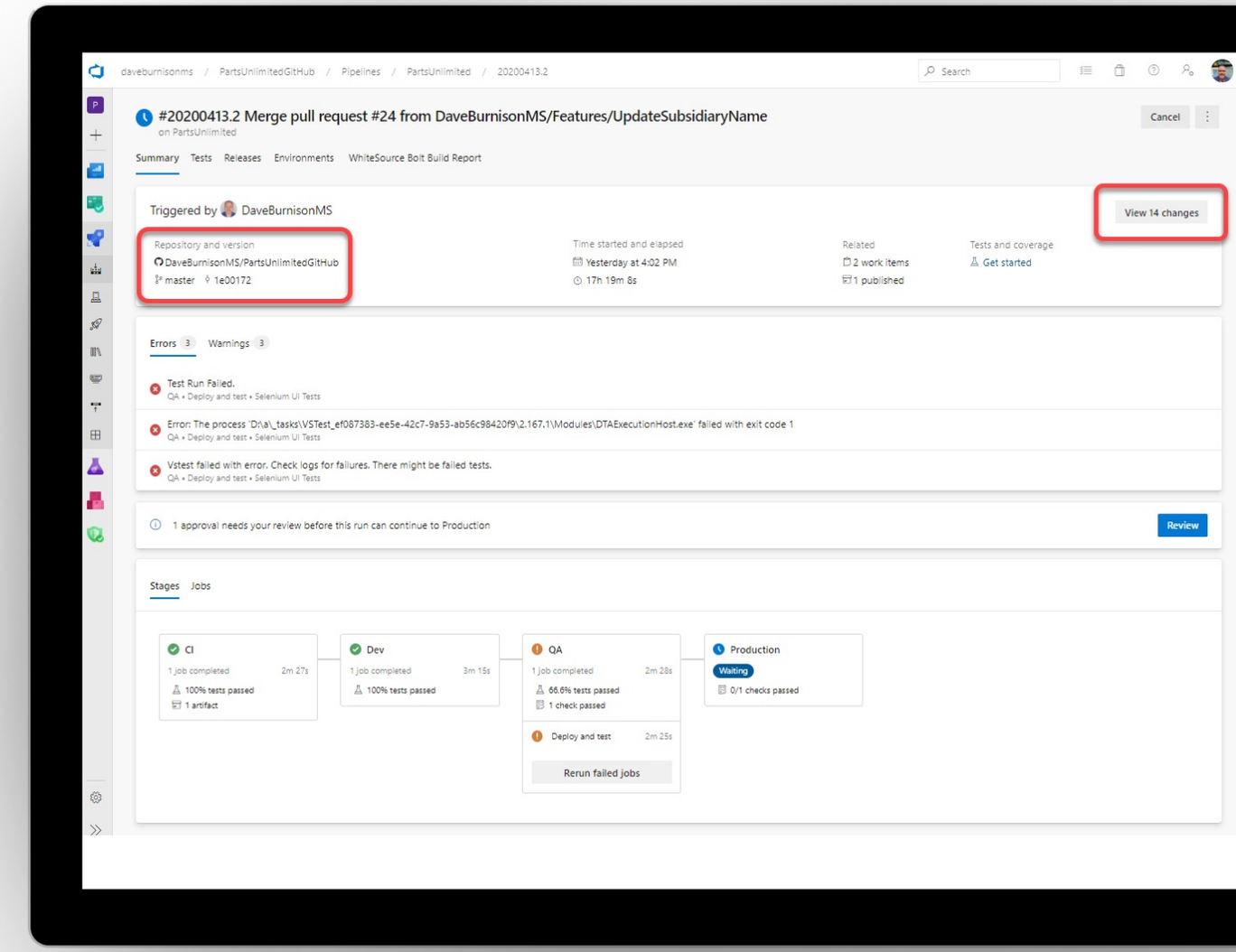
Better Together: GitHub and Azure Pipelines

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!



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.

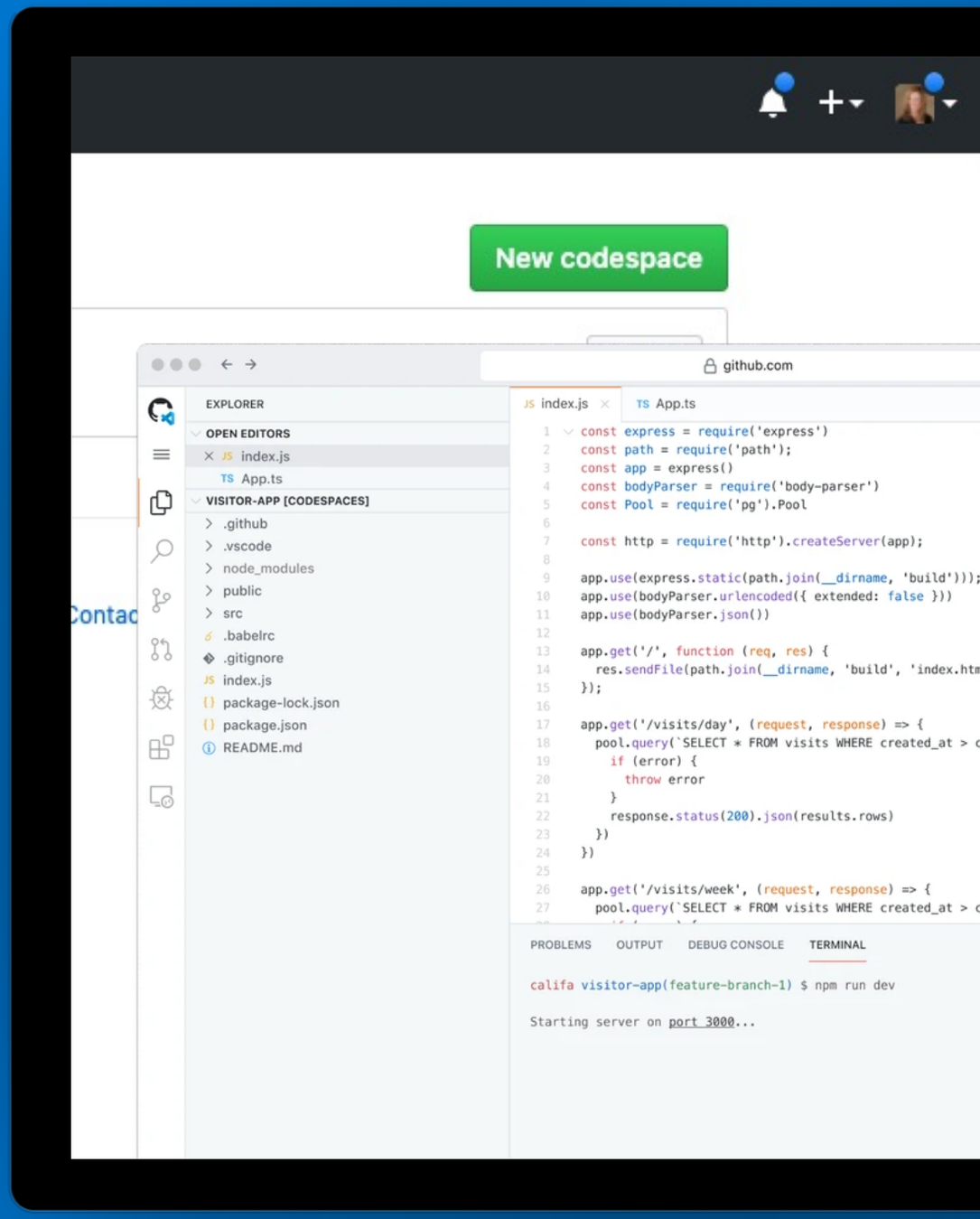
Simplify your workflow

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

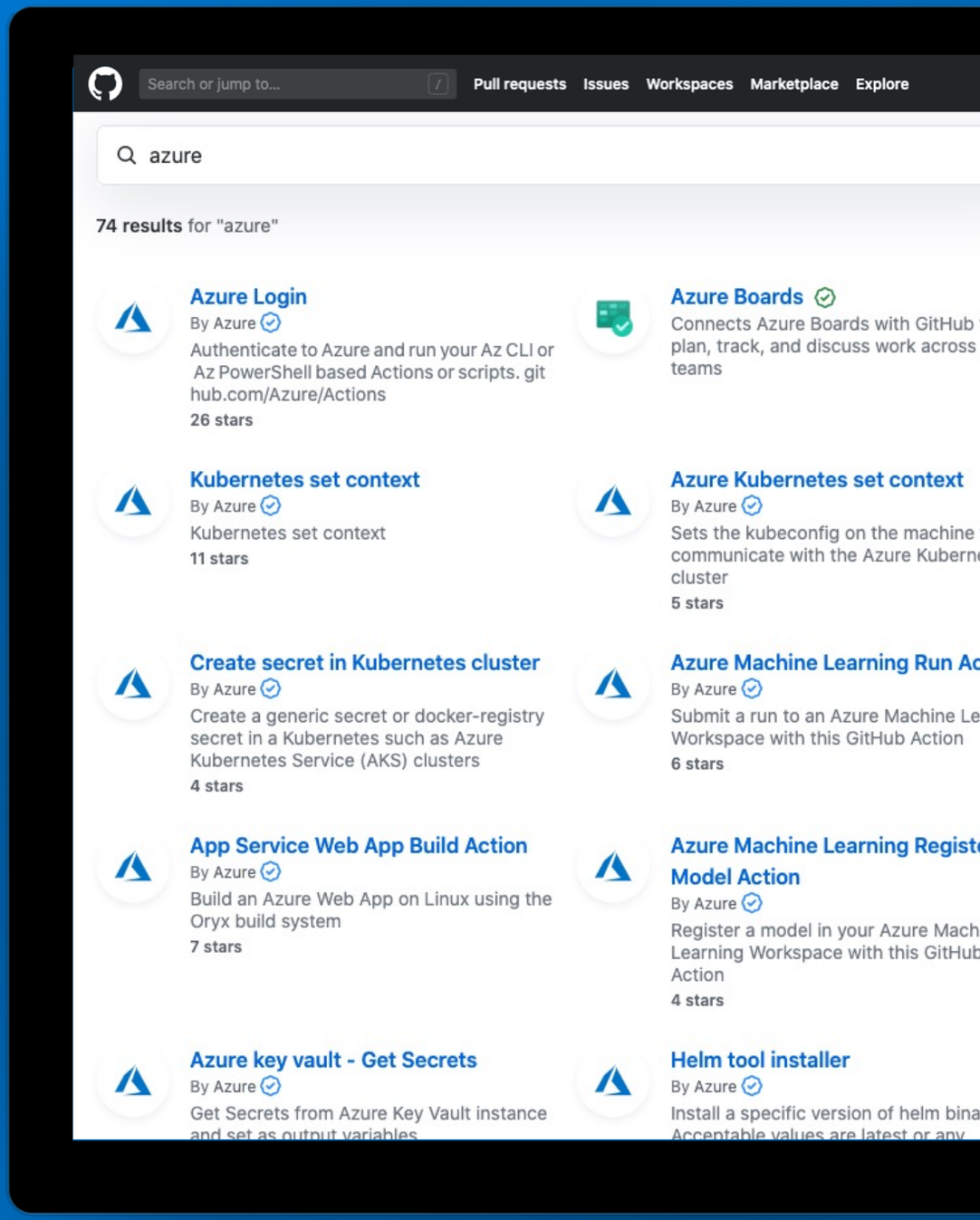
Over 70 ready-to-use actions for Azure

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

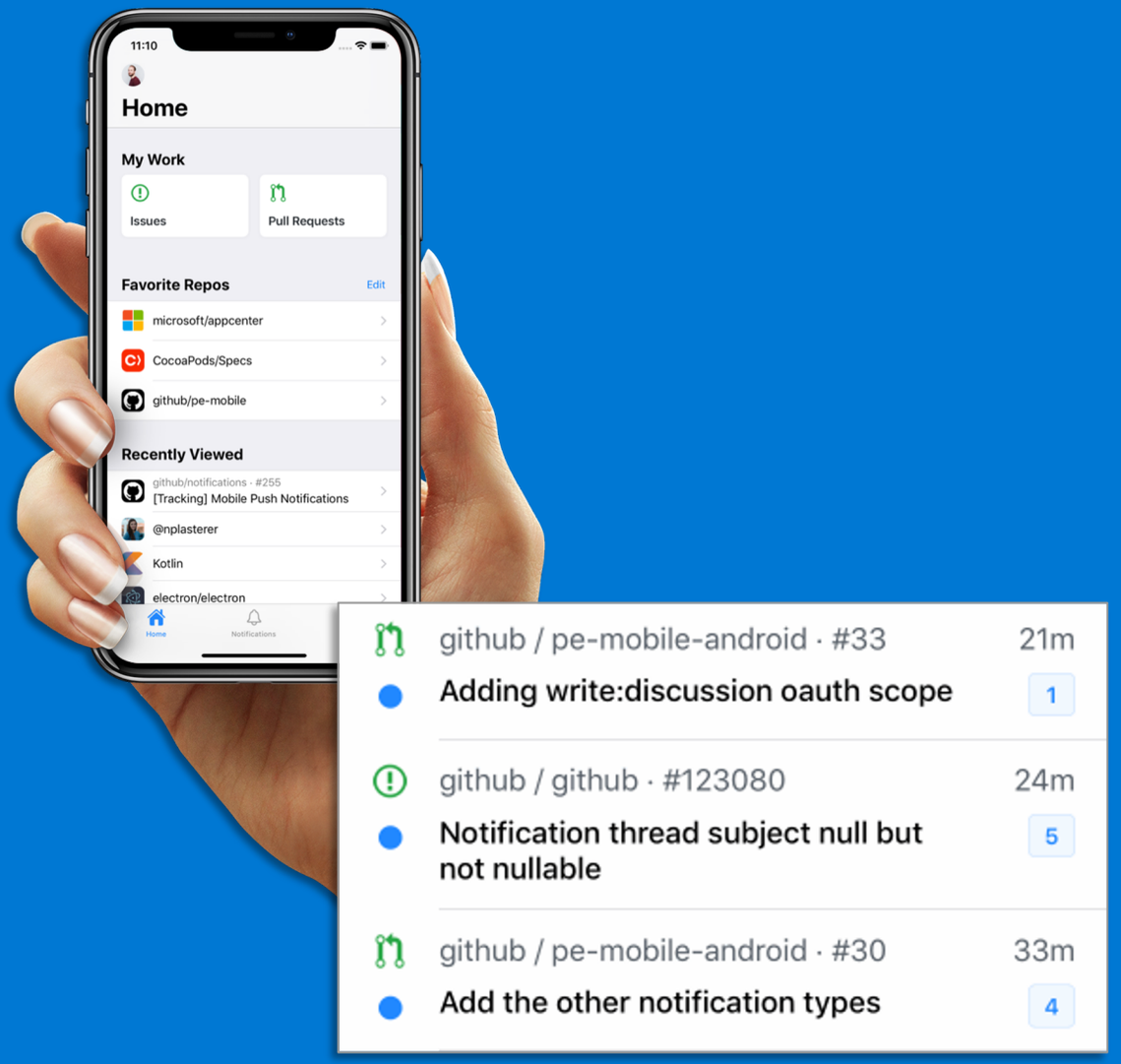
Collaborate from anywhere

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.

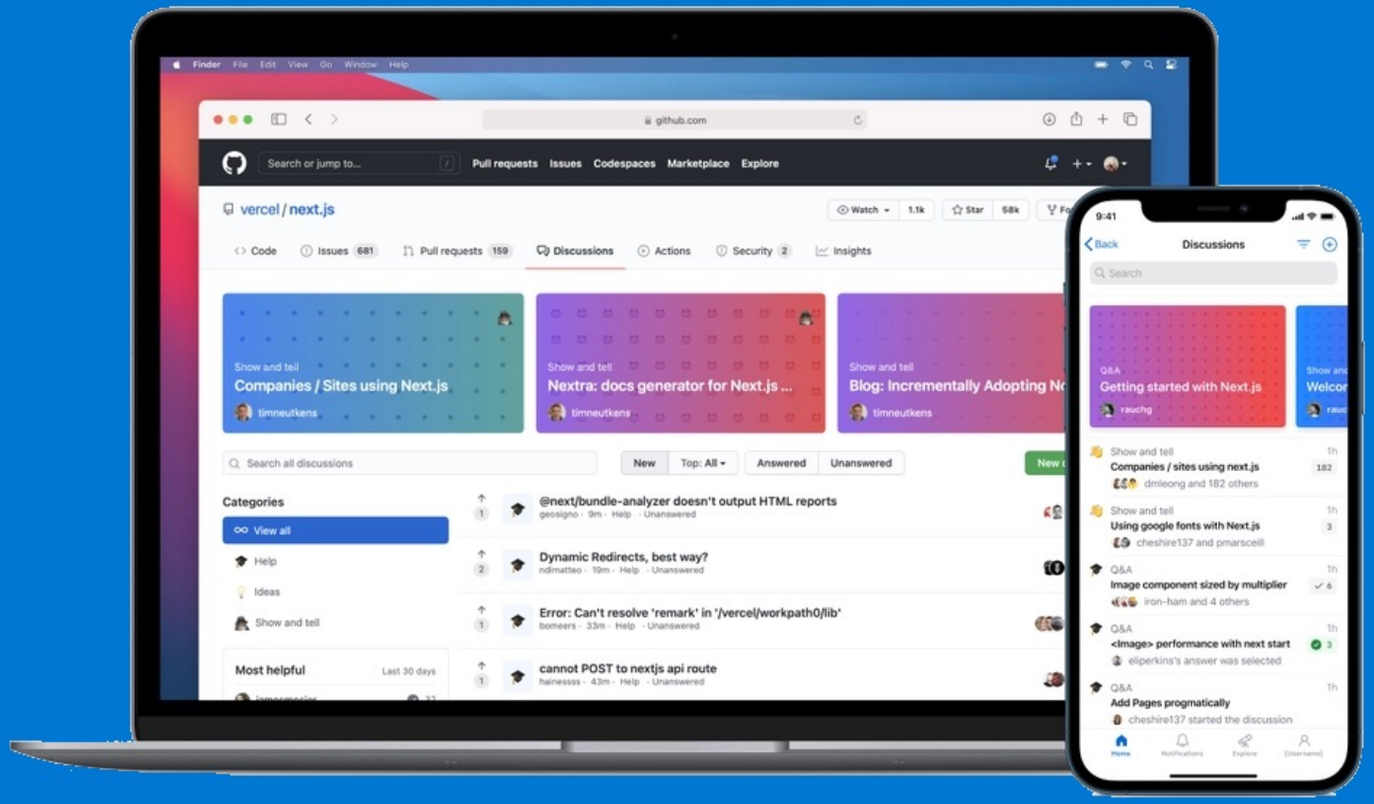
Perfect for Q&A

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

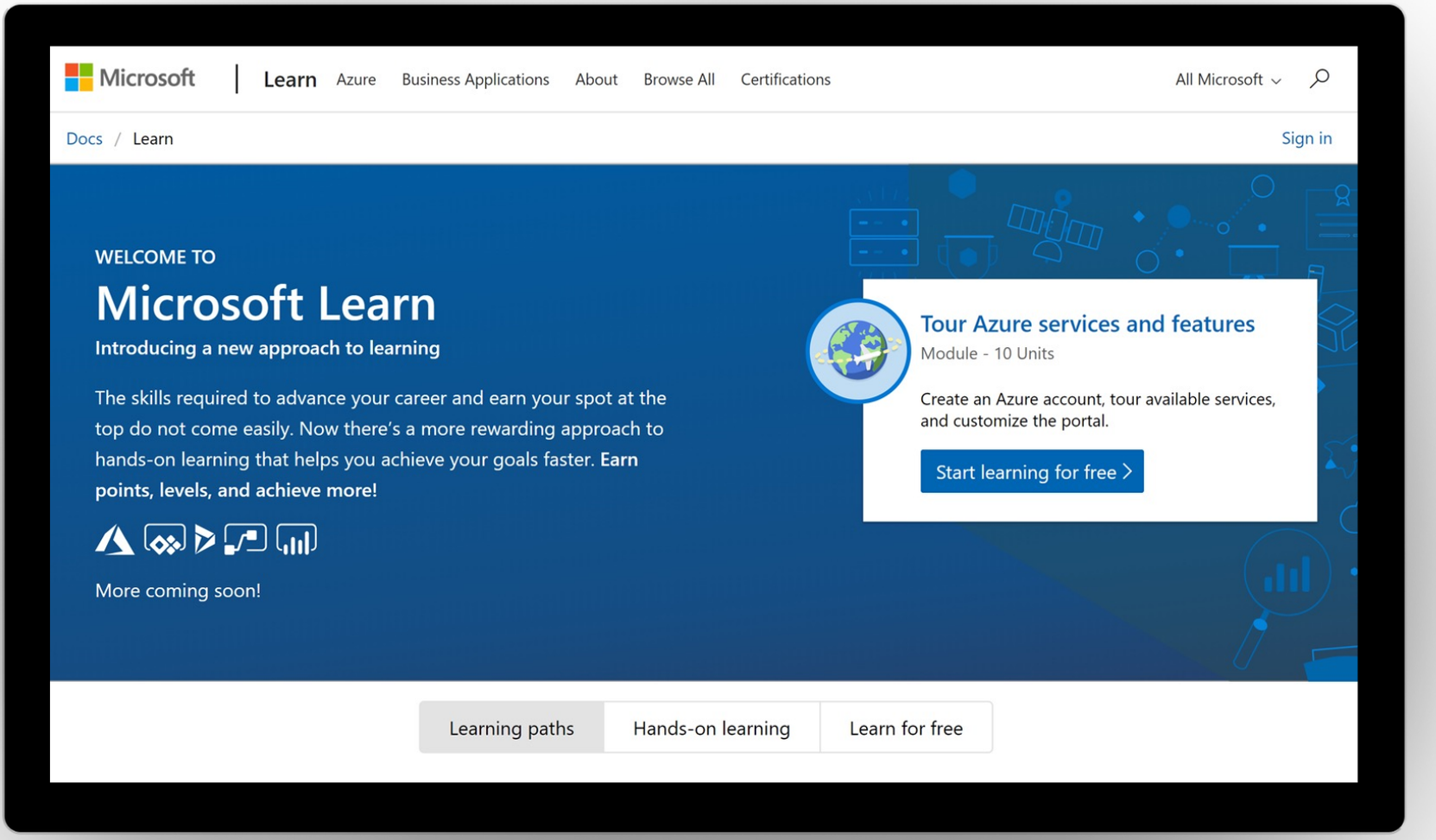
Continuous Integration with GitHub and Azure DevOps

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

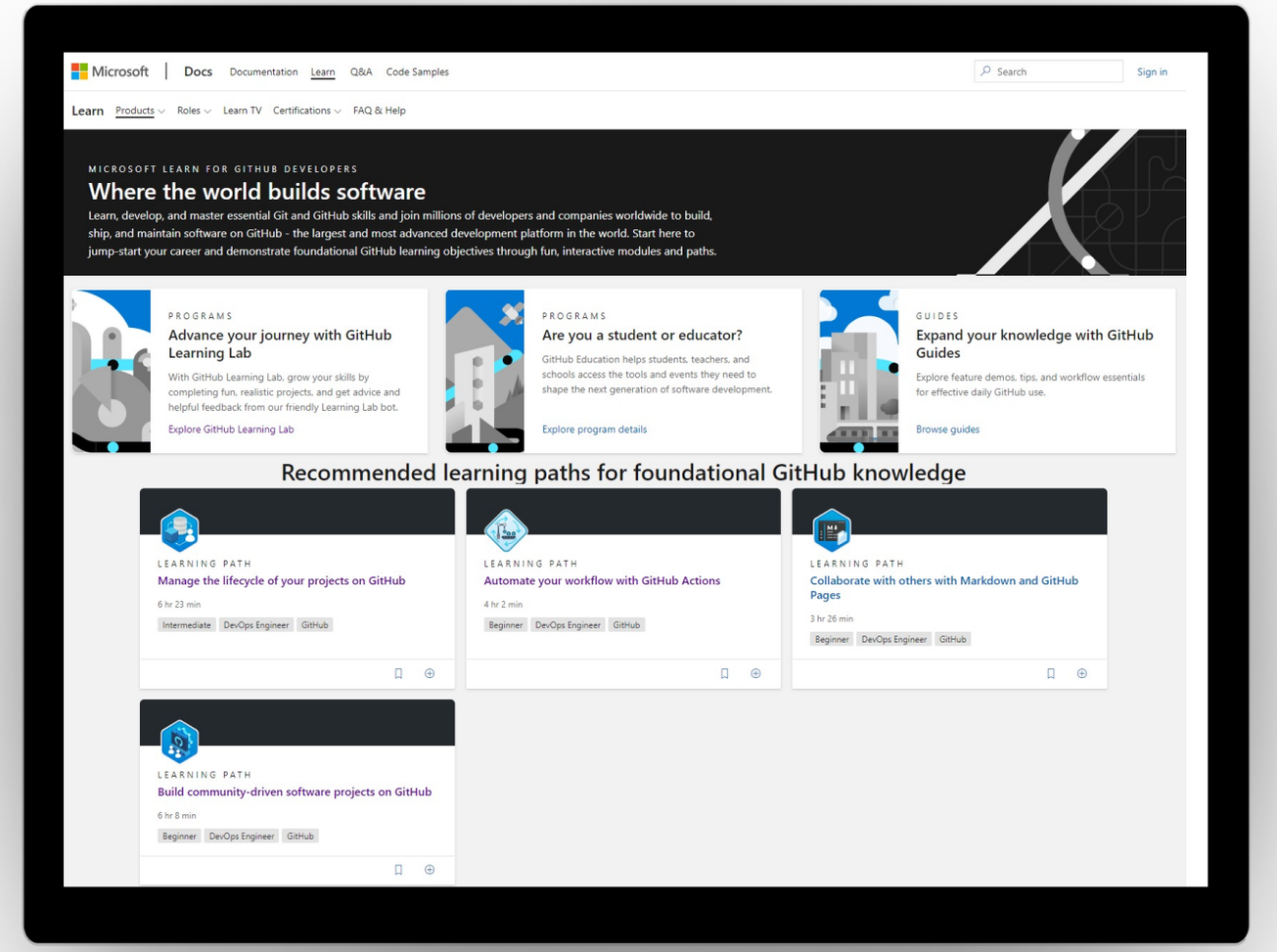


https://aka.ms/micd/Learn

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.

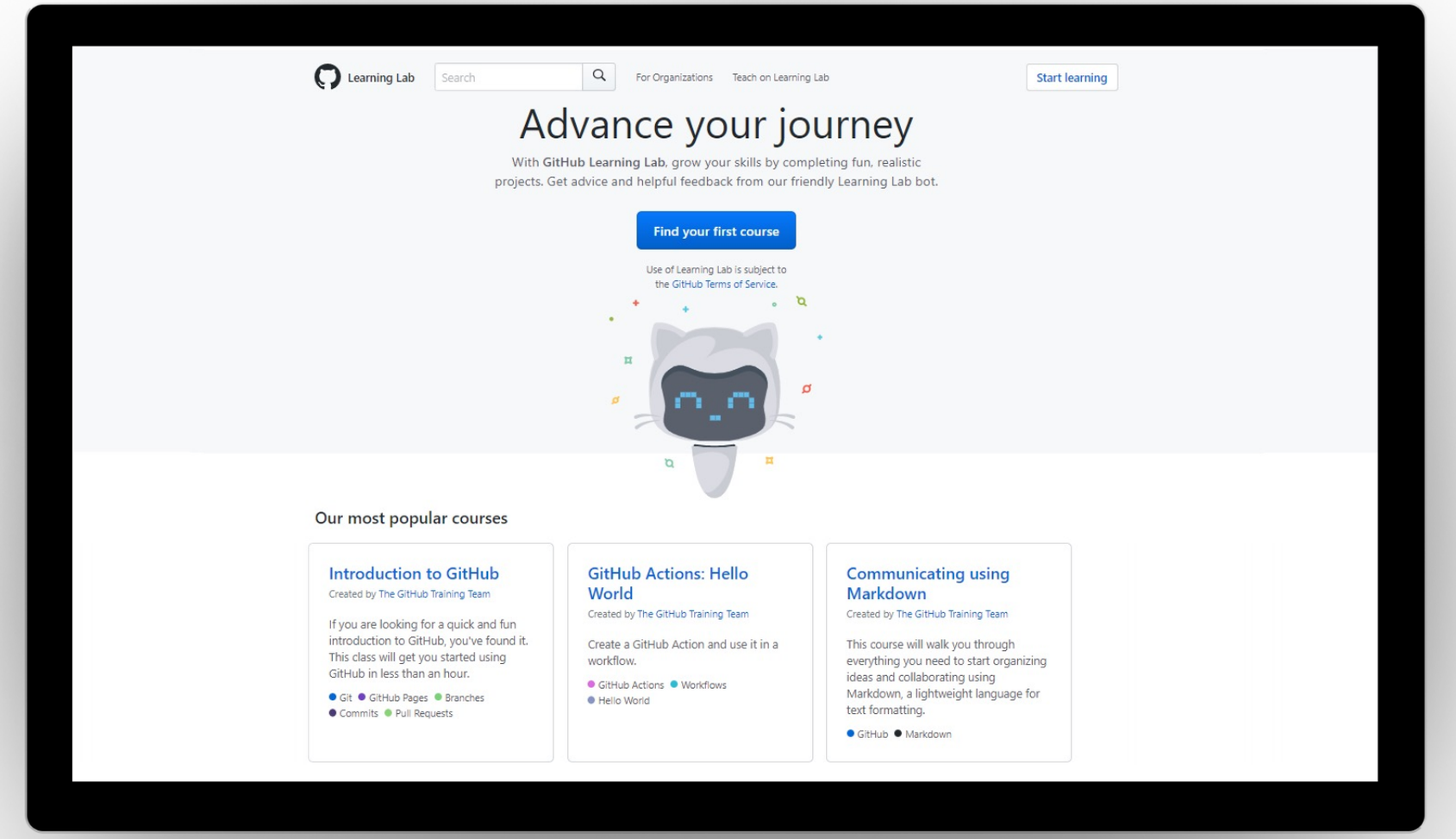


https://aka.ms/micd/LearnGitHub

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.

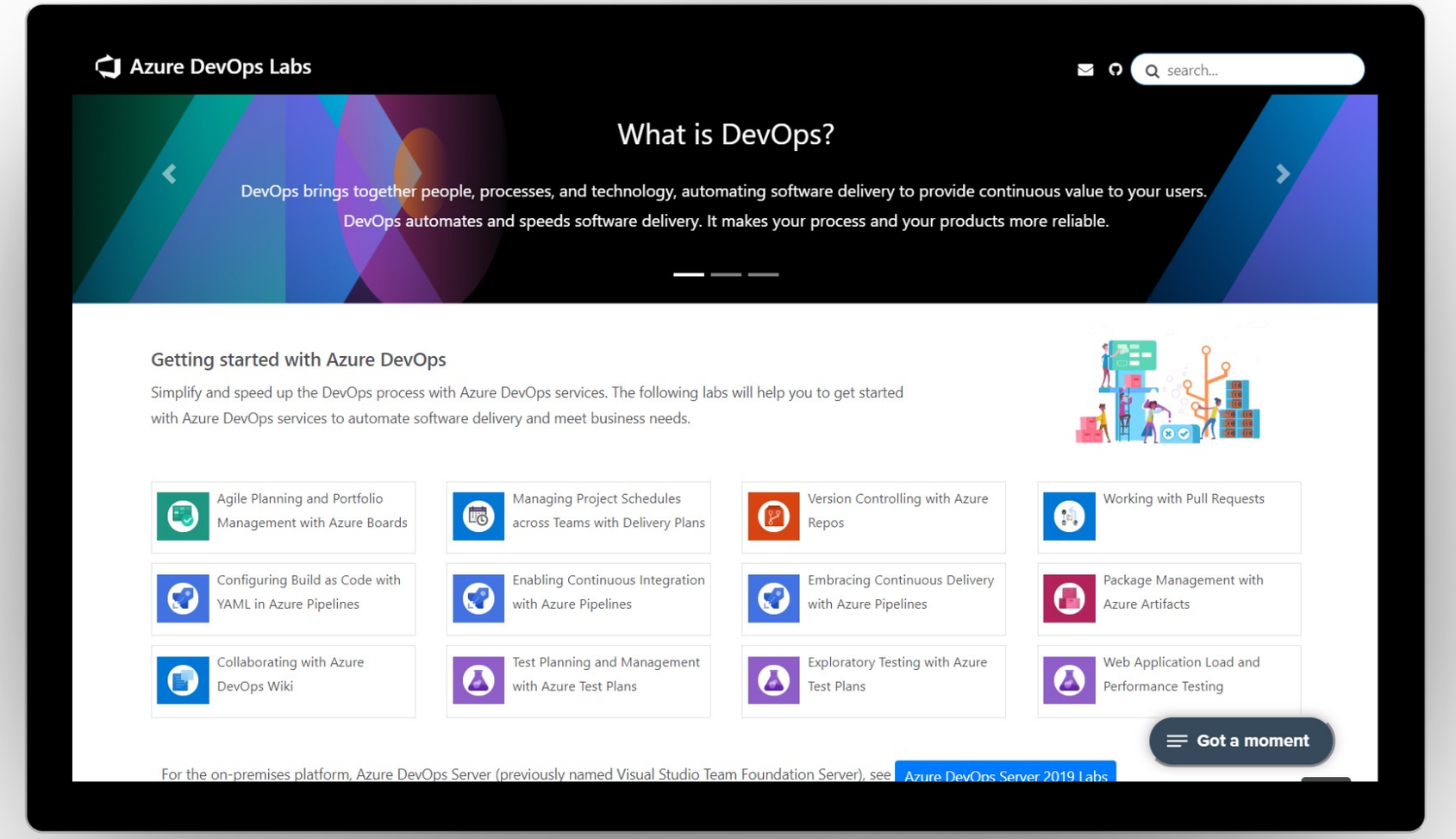


https://lab.github.com/

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.

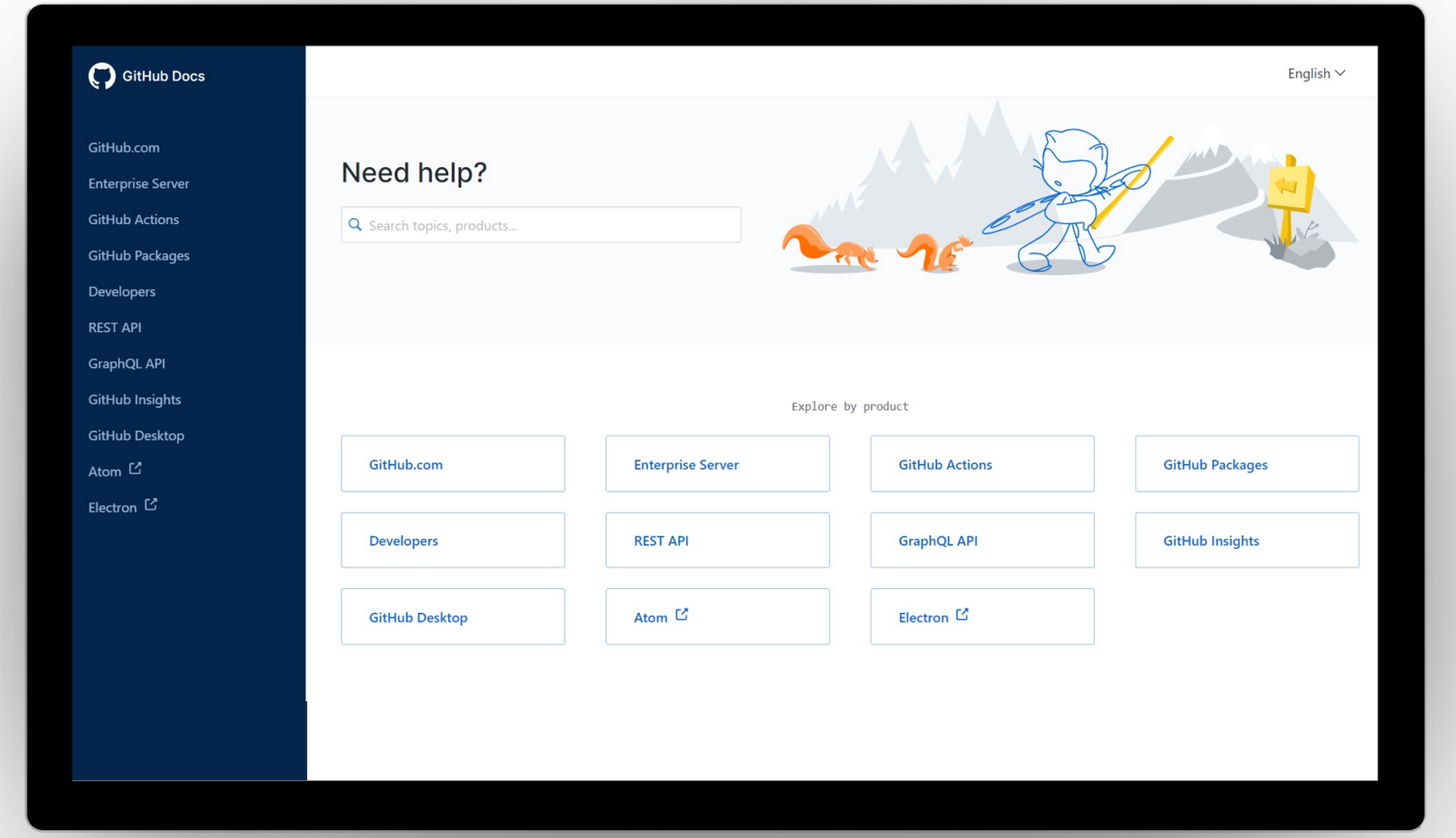


https://www.AzureDevOpsLabs.com

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!

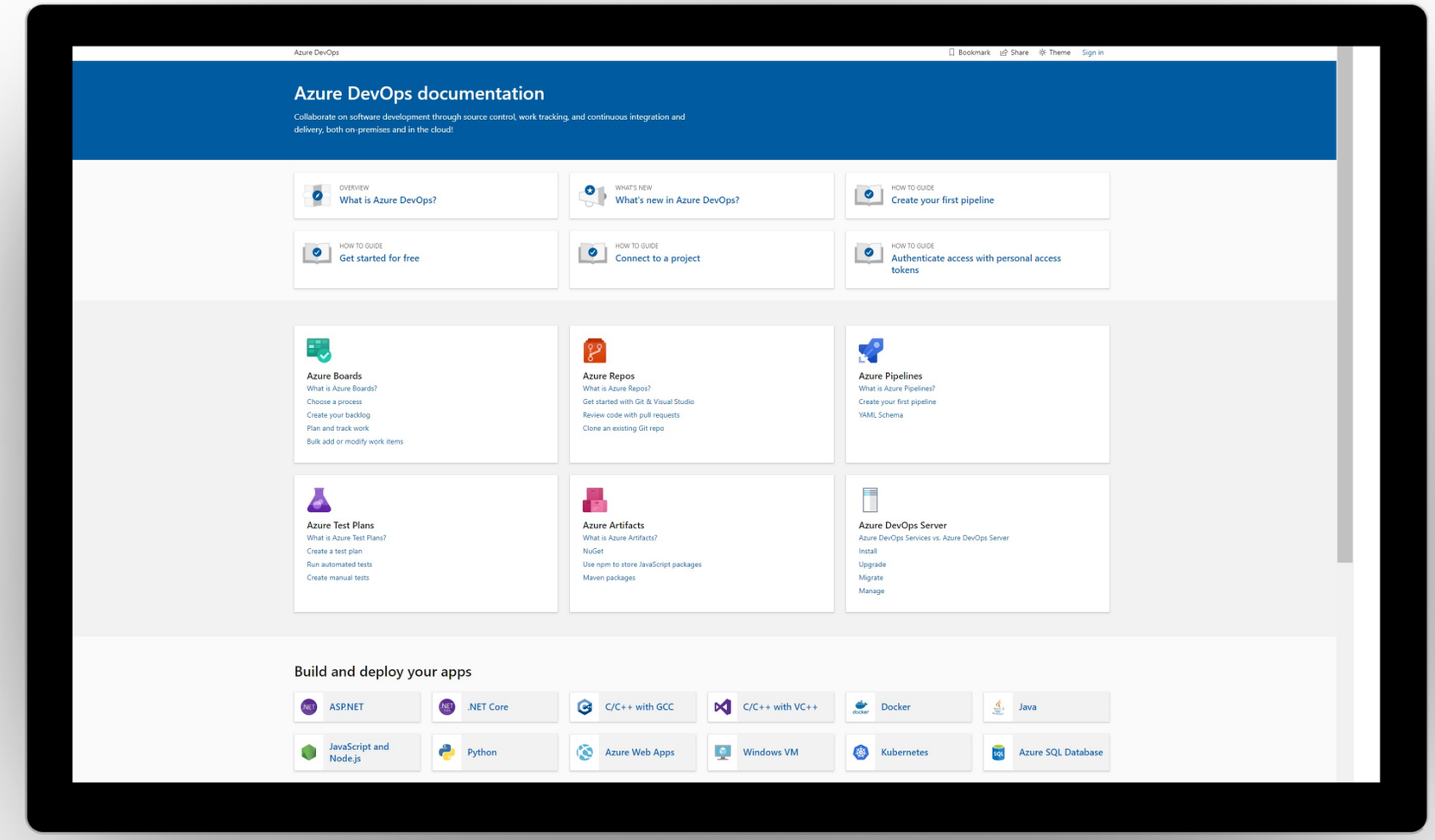


https://docs.github.com

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!

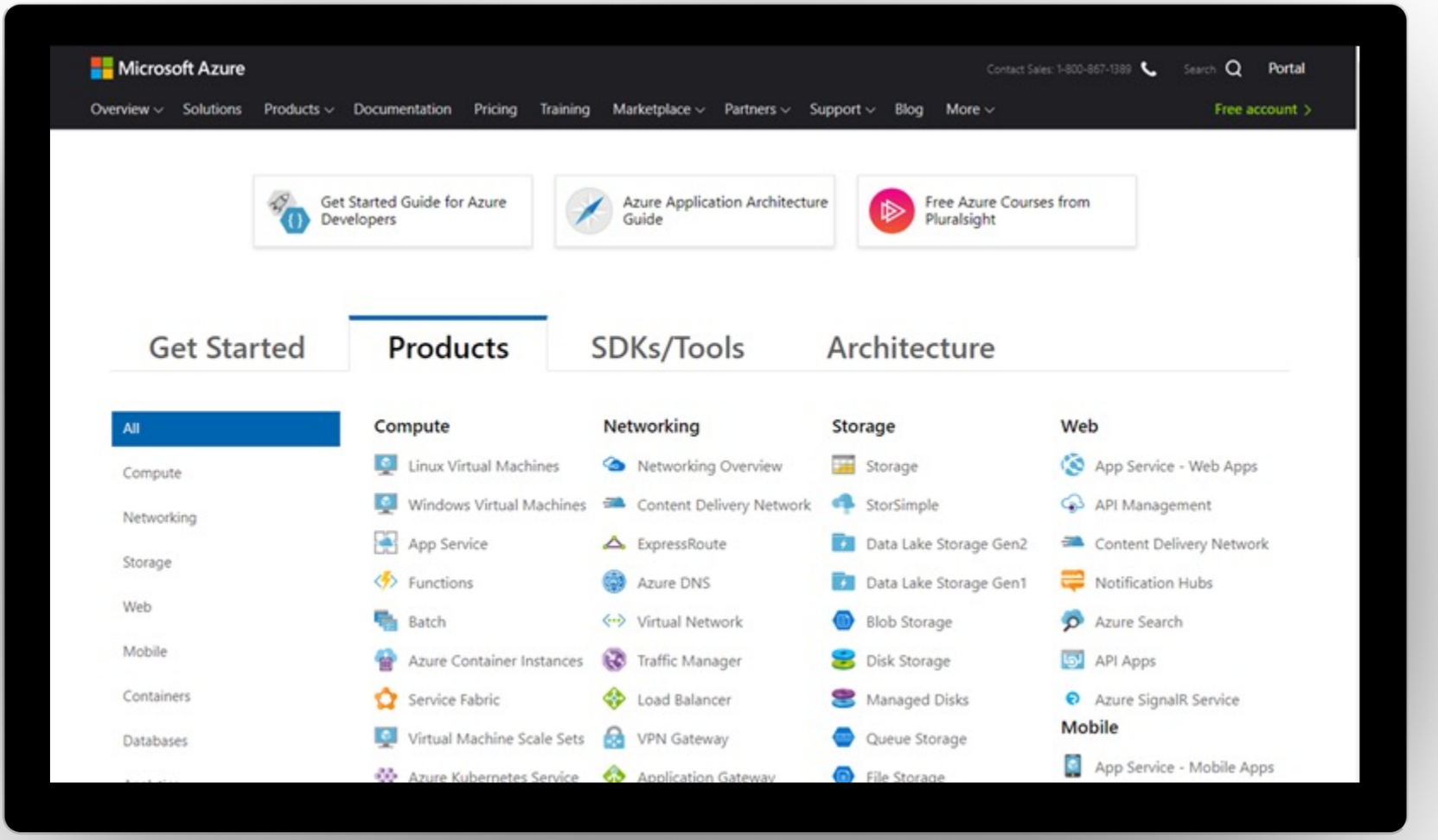


https://aka.ms/micd/AzureDevOpsDocs

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**!

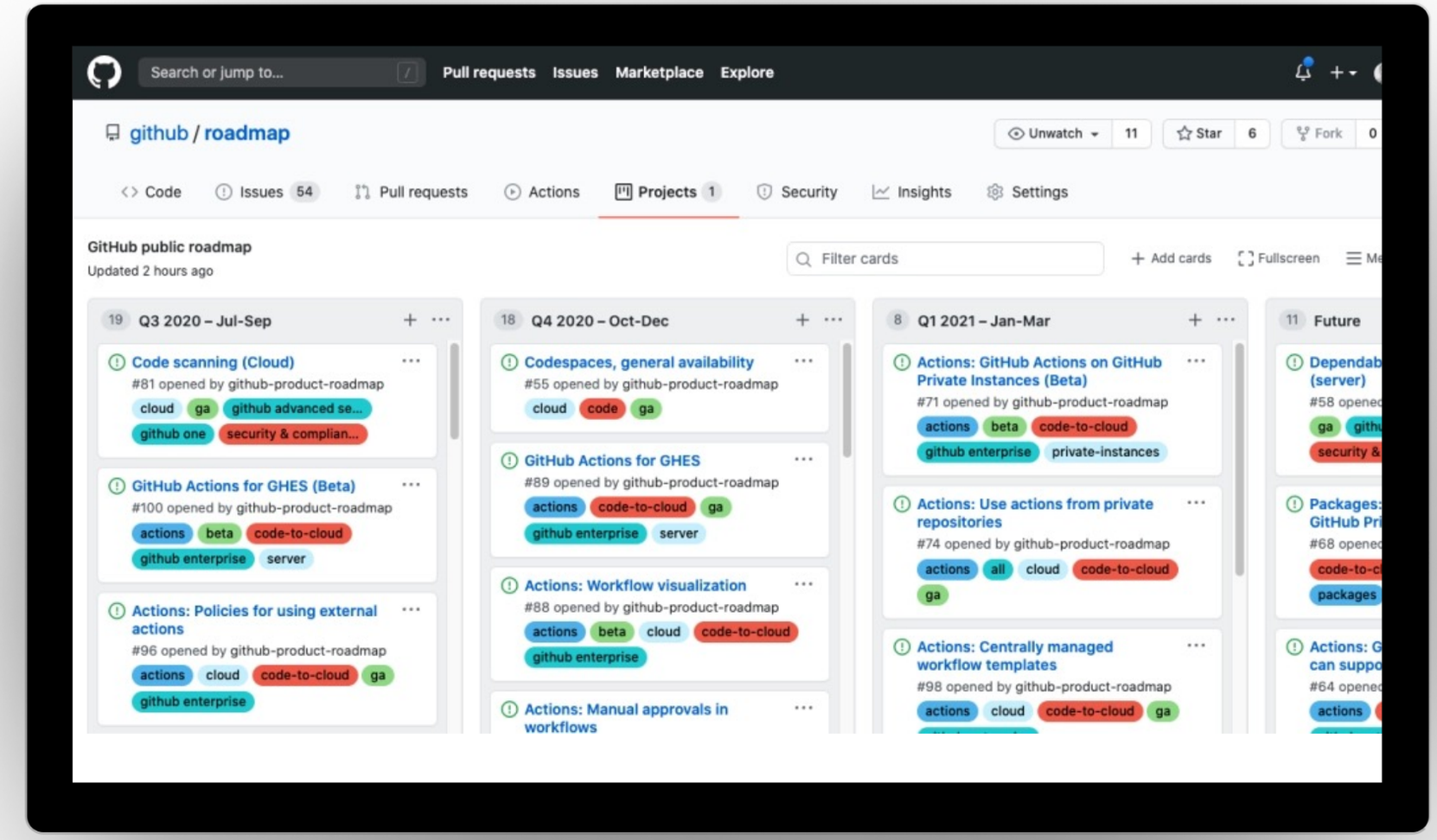


https://aka.ms/micd/AzureDocs

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.

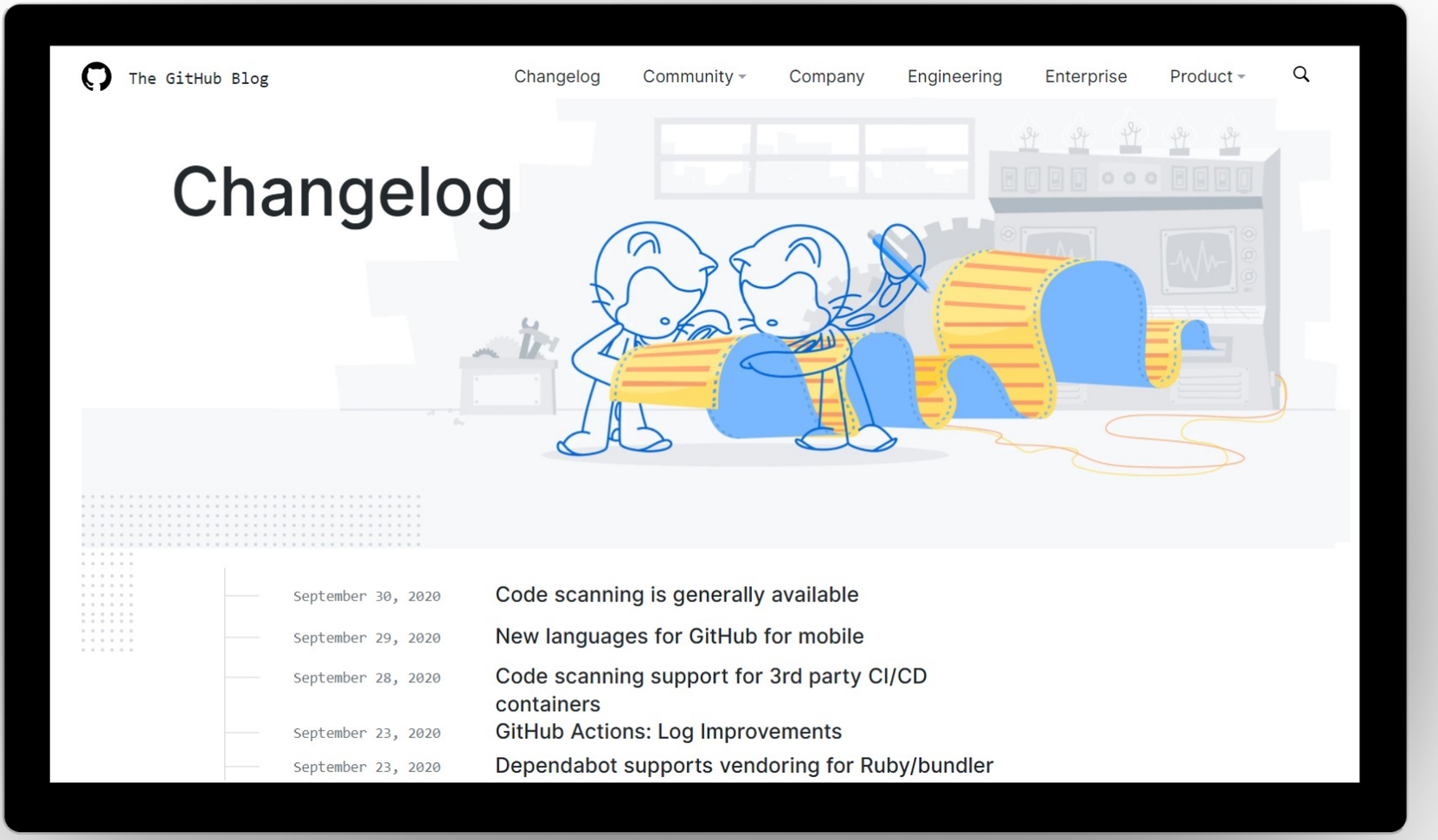


https://github.com/github/roadmap/projects

GitHub Changelog

https://github.blog/changelog/

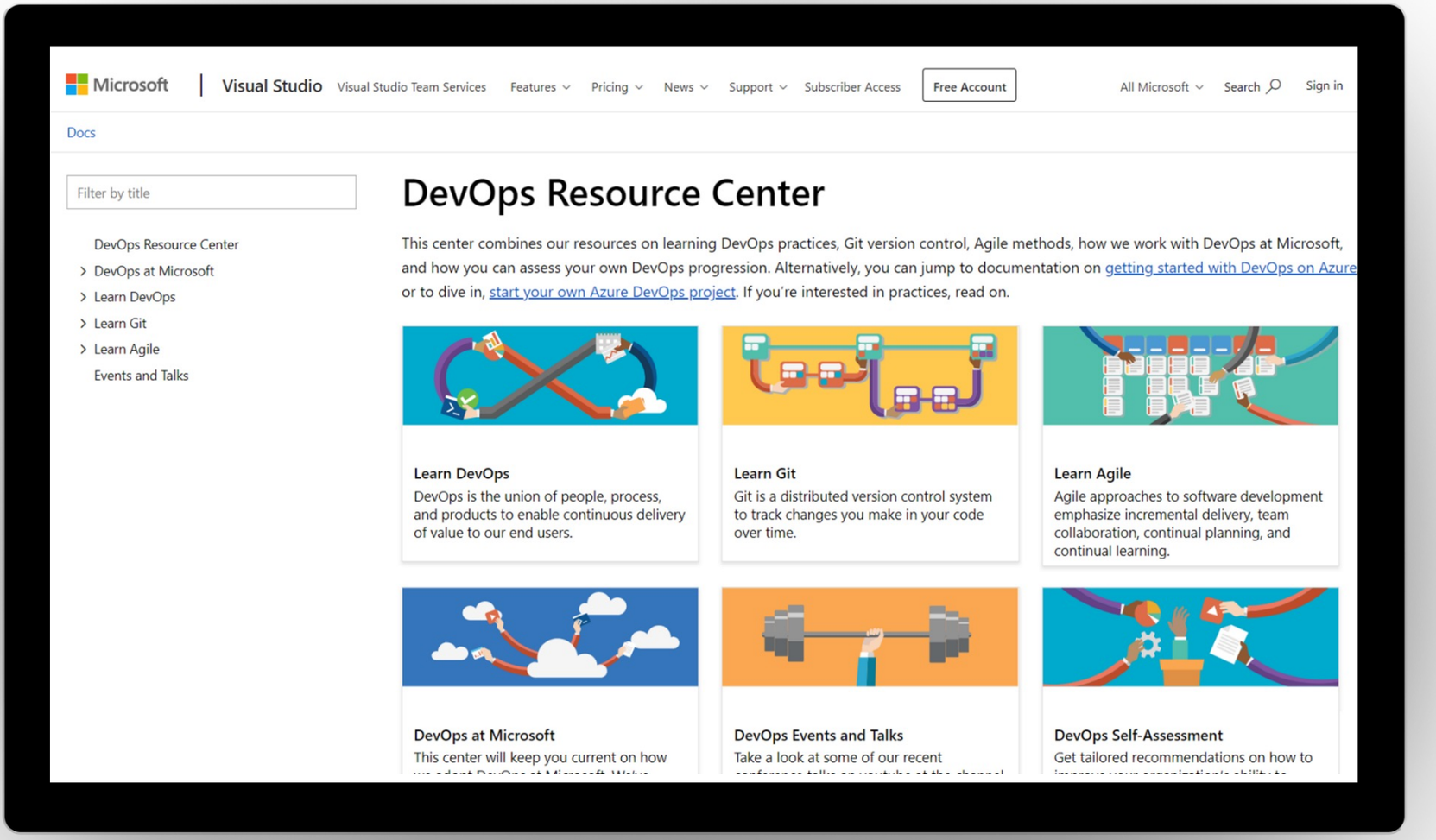
- Track the release of new features. These are the GitHub “Release Notes”.
- Go to https://github.blog/ and click on “Changelog”.



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

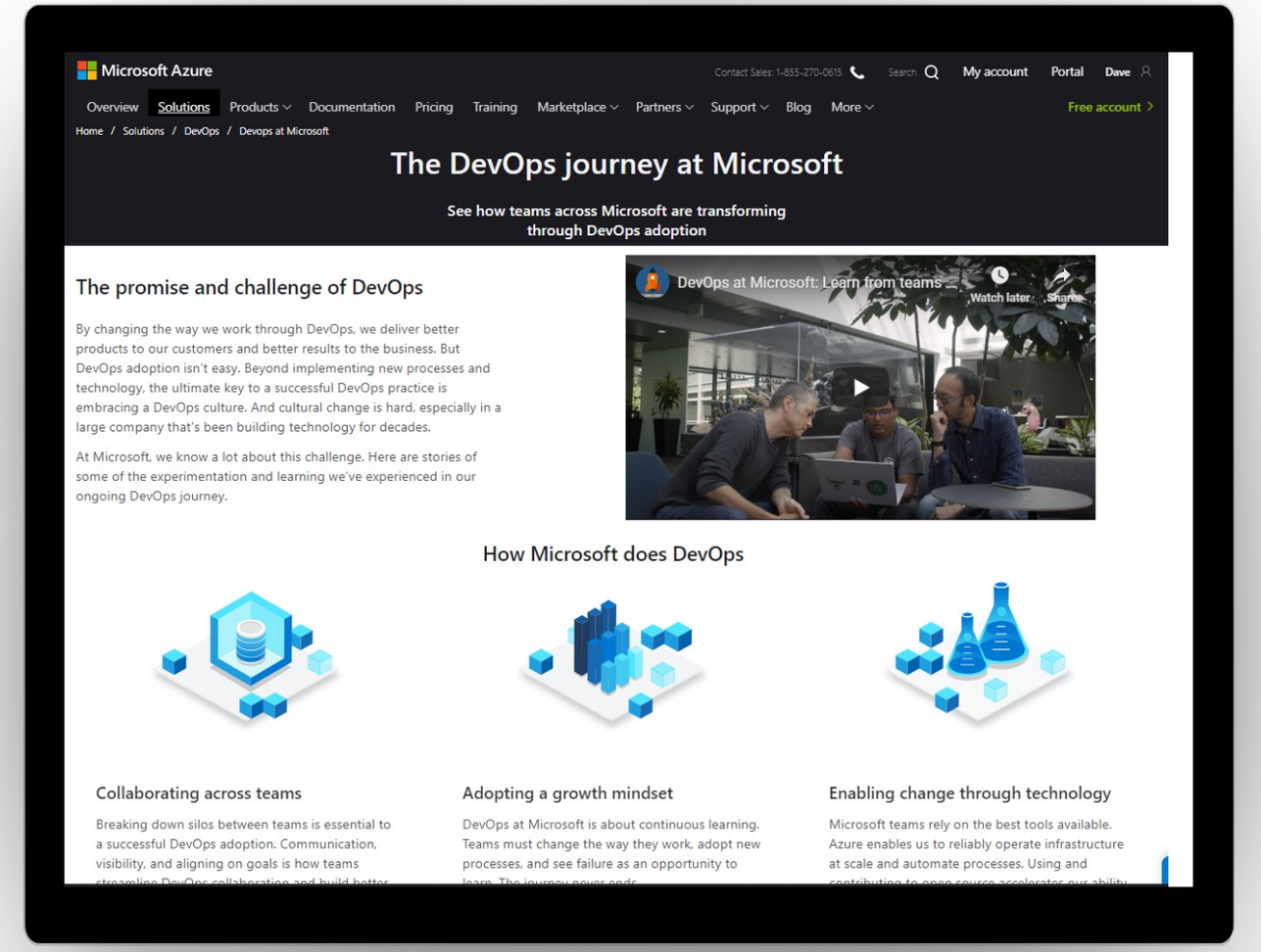


http://aka.ms/micd/DevOps

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!)

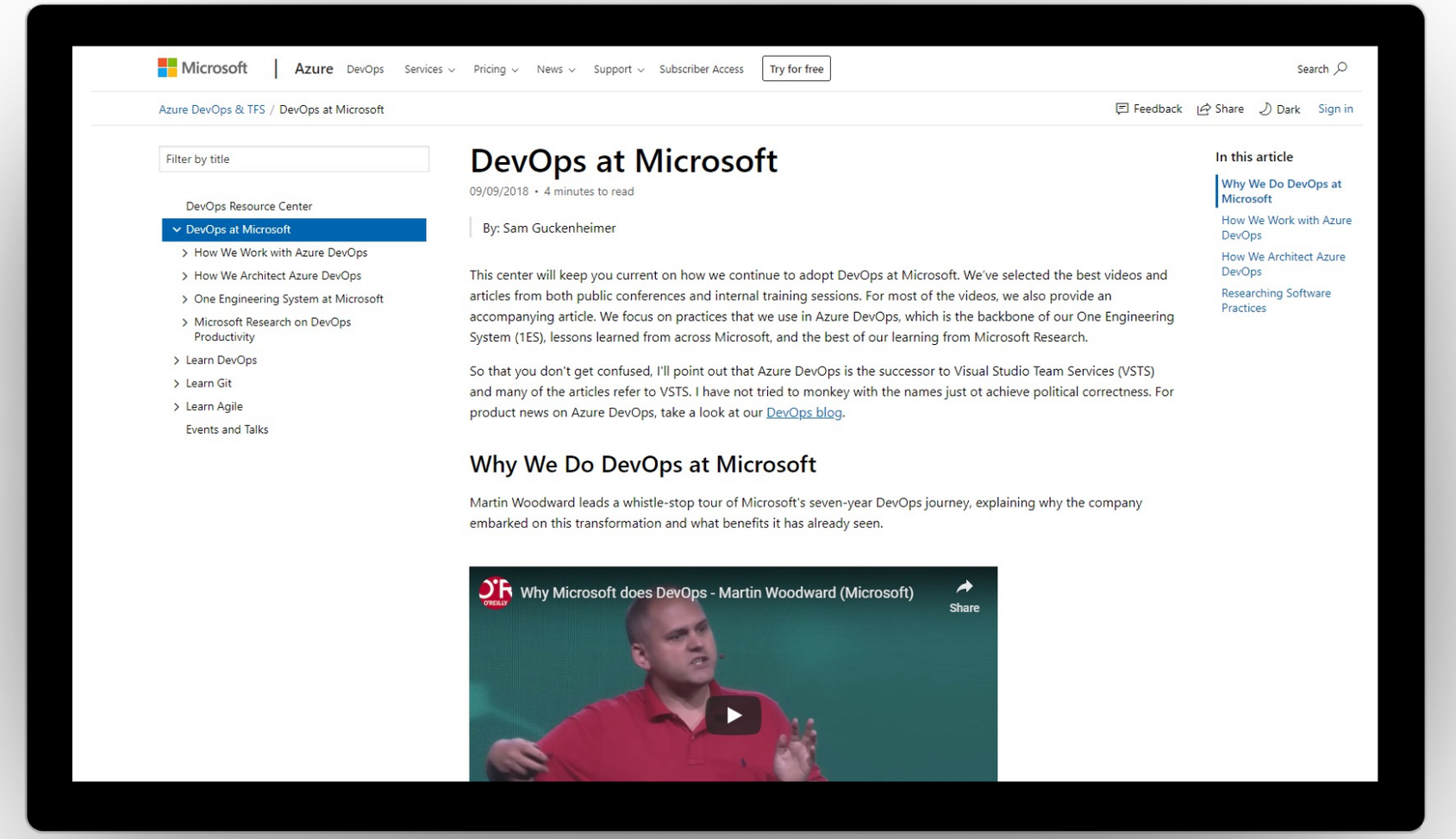


https://aka.ms/micd/DevOpsStories

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!)

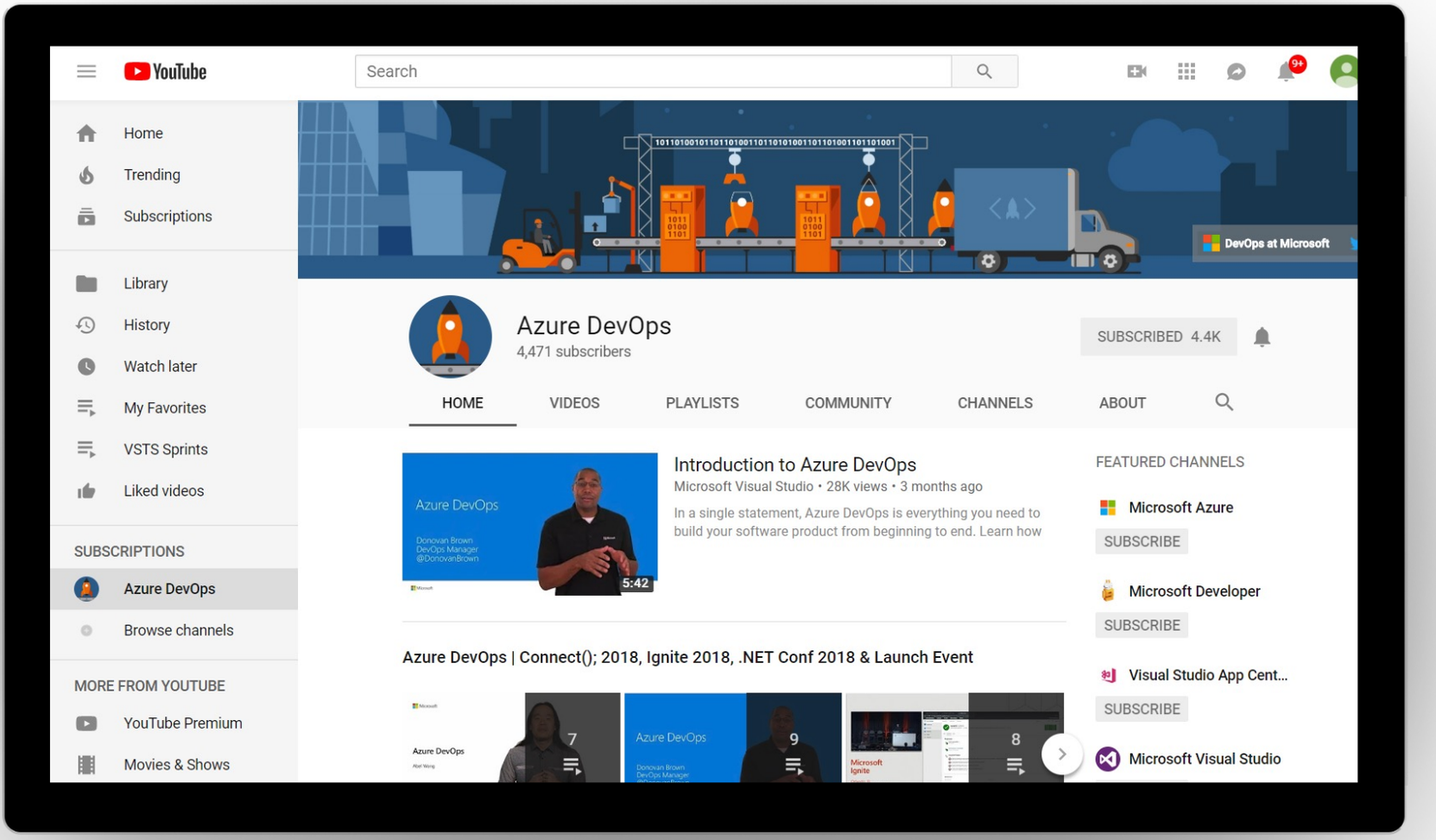


https://aka.ms/micd/DevOpsAtMicrosoft

"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

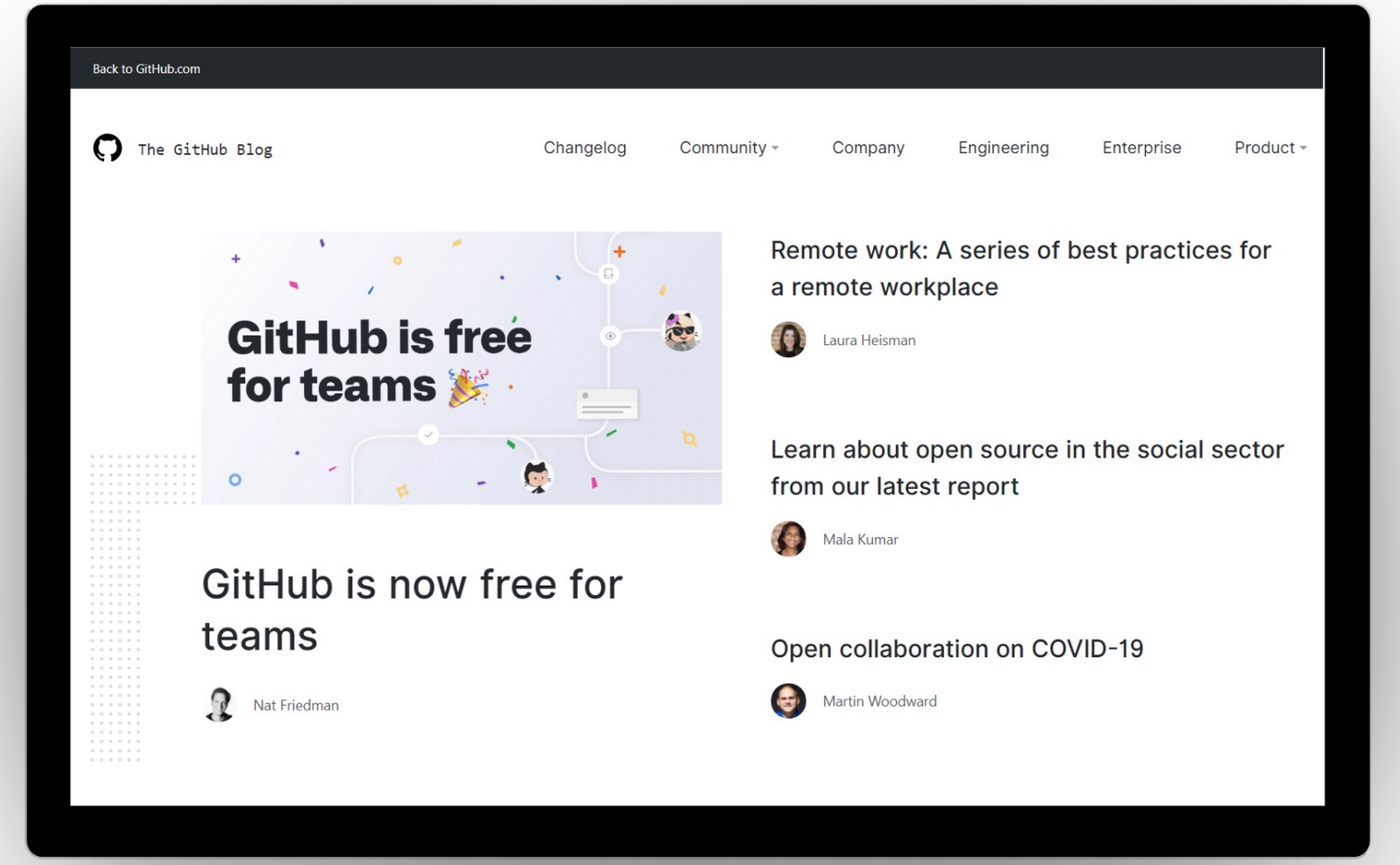


https://aka.ms/micd/AzureDevOpsYouTube

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.

https://aka.ms/micd/DevOpsBlog

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

Questions?

Dave Burnison
DaveBurnisonMS@GitHub.com
@DaveBurnison
http://aka.ms/DaveOpsResources

Zachary Deptawa
zdeptawa@Microsoft.com
@zdeptawa

Milliman

Thank you

Dave Burnison
Technical Advocate – GitHub & Azure DevOps
DaveBurnisonMS@GitHub.com
@DaveBurnison

Zachary Deptawa
Cloud Advocate – Microsoft
zdeptawa@microsoft.com
@zdeptawa