



# Microsoft Azure Virtual Training Day: DevOps with GitHub

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# Building in Quality

# DevOps Learning Path



Getting Started with DevOps



Managing the Flow of Work



Building in Quality



Delivering Change



Operating Software in the Cloud



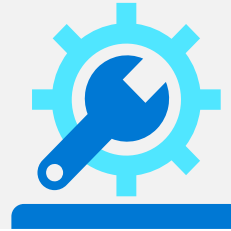
# Goals for this session



Security and Secrets

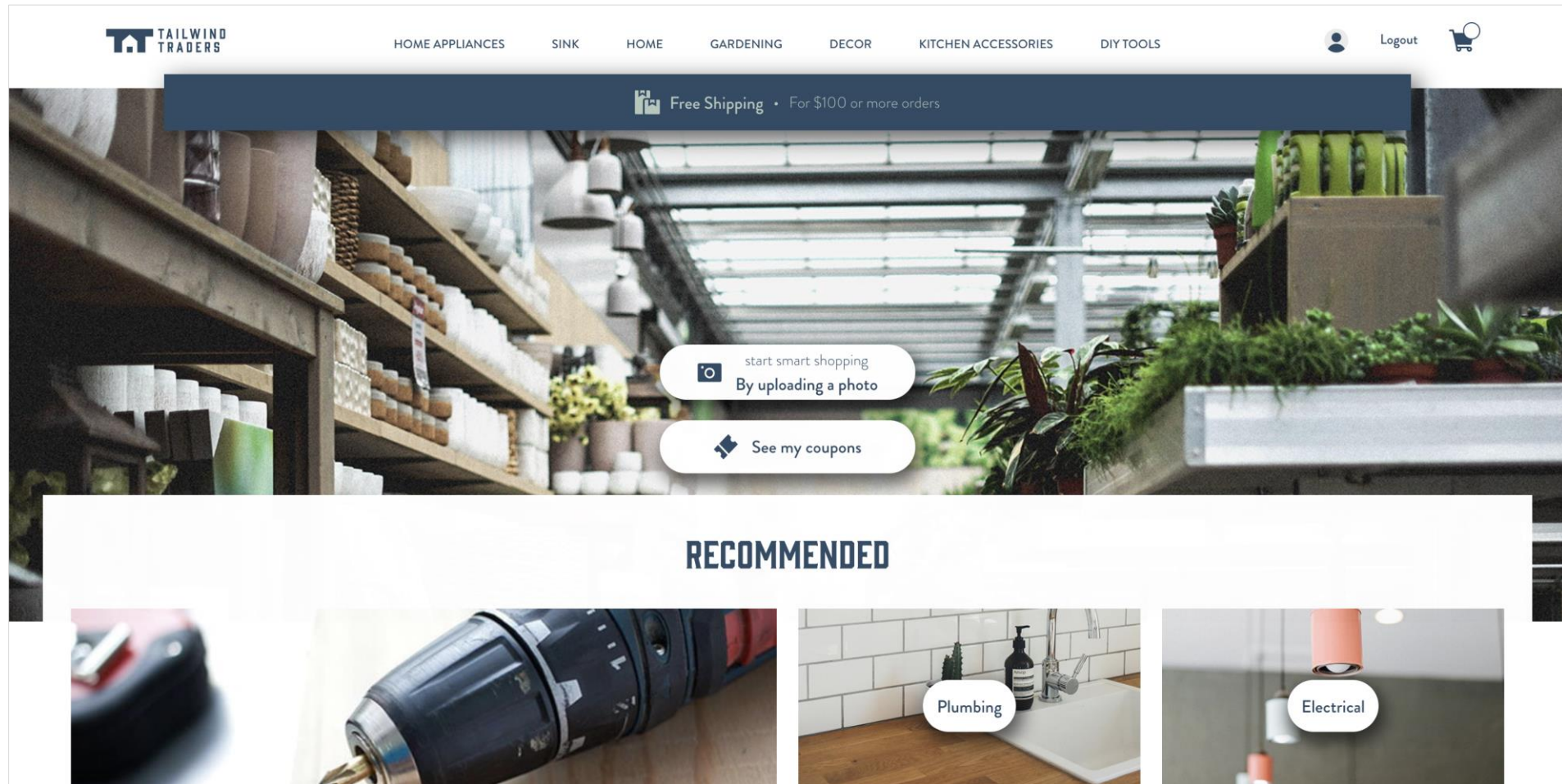


Apply Security to  
Containers

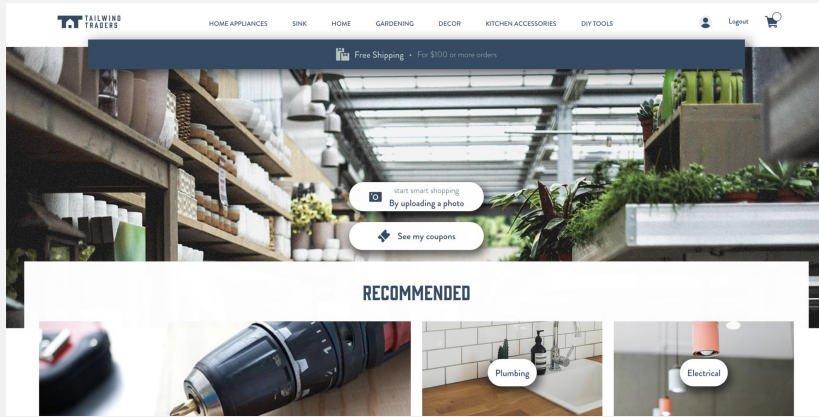


Build Quality and Gain  
Confidence

# Tailwind Traders website



# Tailwind Traders website



ASP.NET Core + React  
Docker container on  
Azure App Service



Azure SQL Database



Azure Cosmos DB

# What Tailwind Traders Needs



Quality



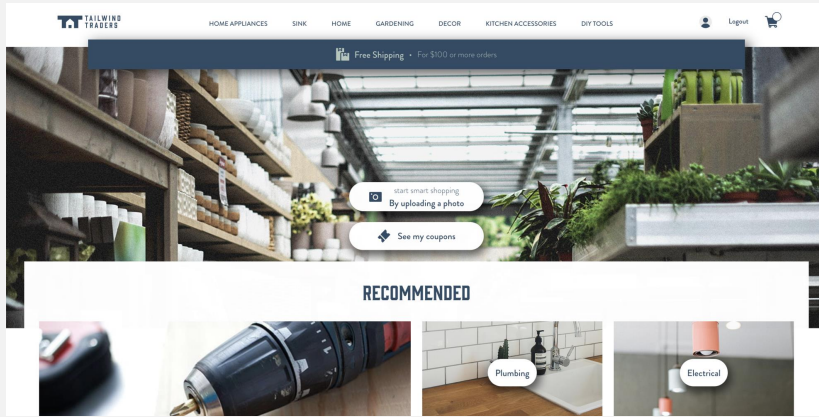
Confidence



Security

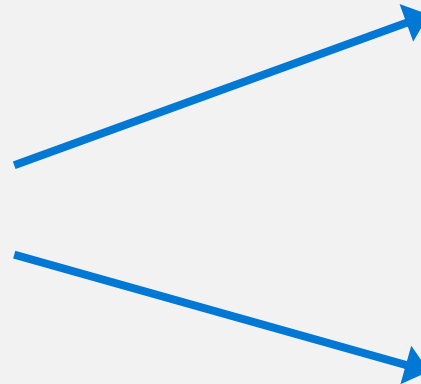


# Tailwind Traders website



ASP.NET Core + React

Microservices with backend APIs  
and Web Frontend



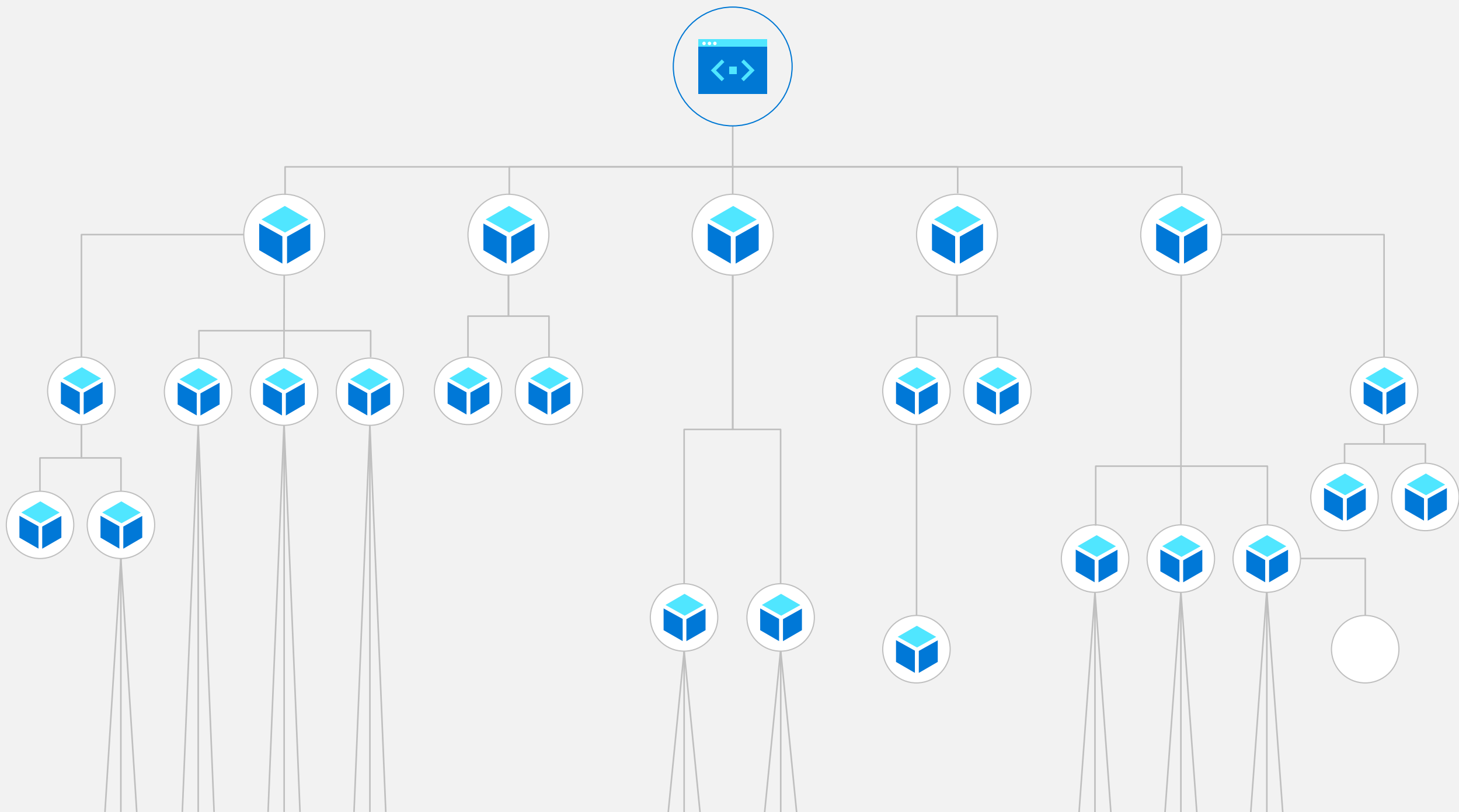
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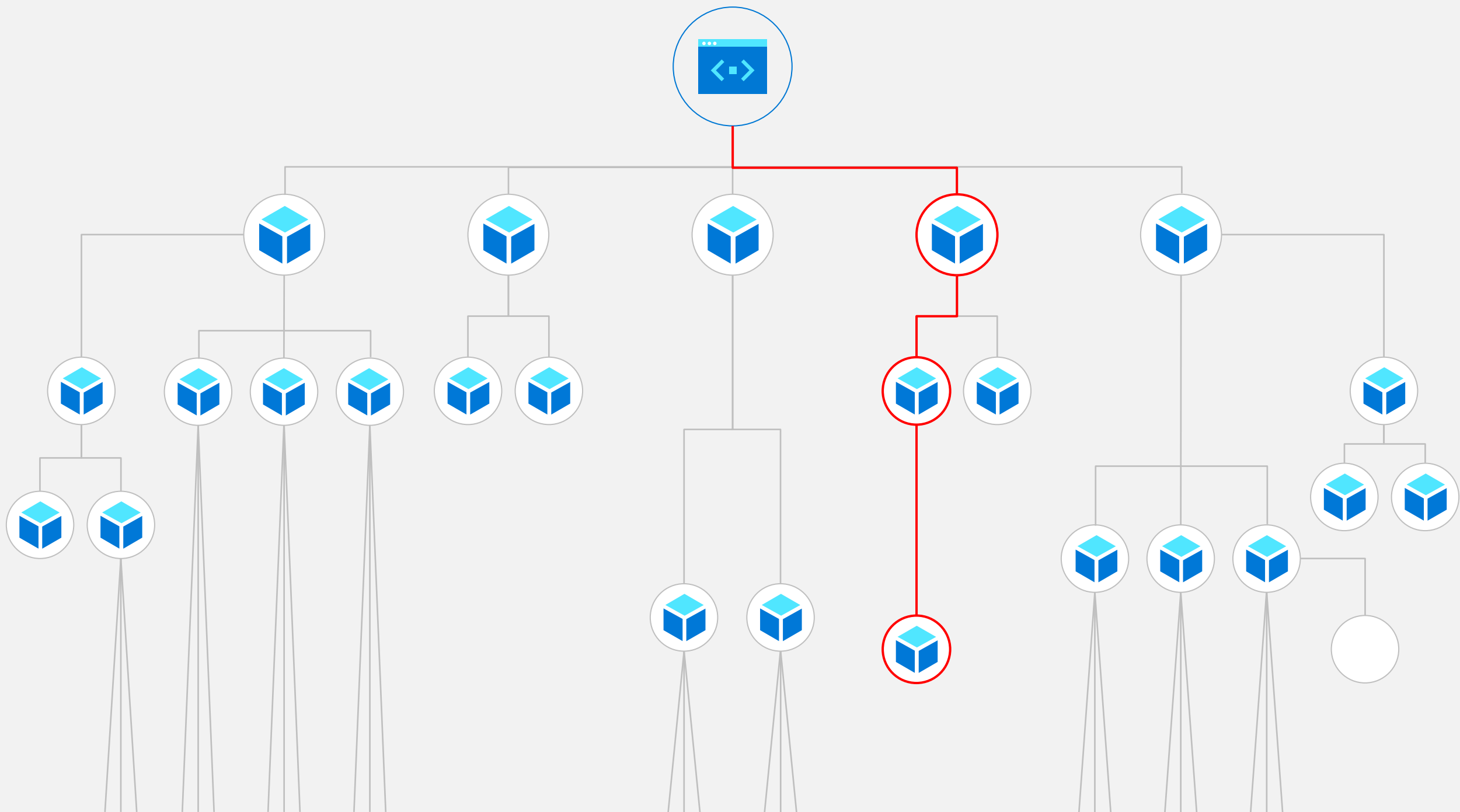


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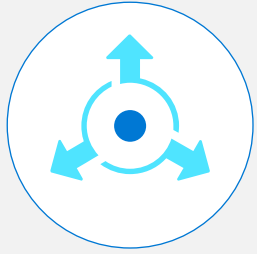


# Security and Vulnerability Management





# Community-powered security & compliance



## Dependency Insights

- Real-time inventory
- License compliance
- Vulnerability alerting



## Vulnerability Management

- Code scanning
- Secret scanning
- Largest vulnerability database
- Automated security updates

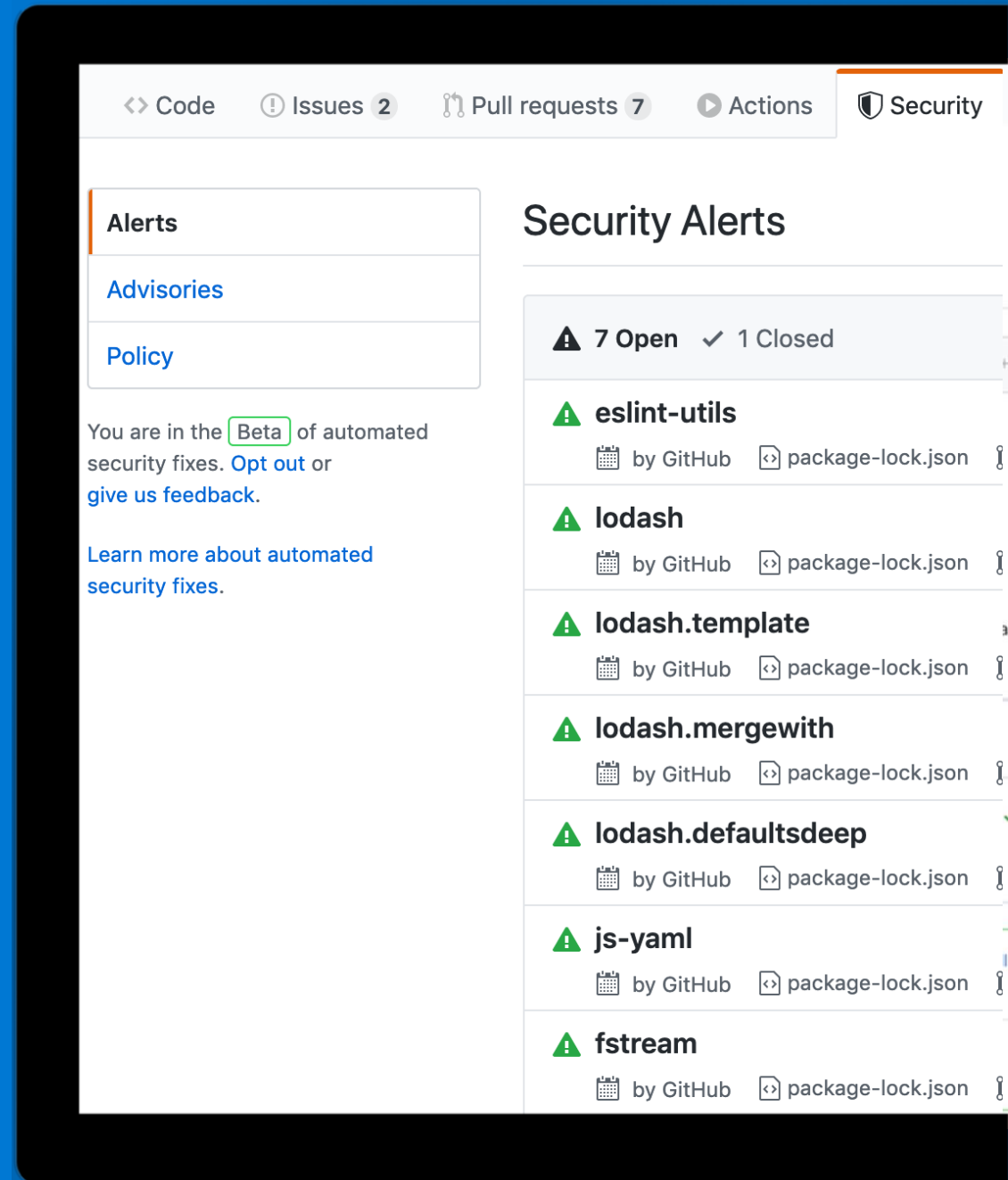


## CodeQL

- World's most advanced code analysis
- Vulnerability hunting tool
- Community of top security experts

# Vulnerability Management

Over 62 million security alerts sent across GitHub.



# Code Scanning

## Find and fix vulnerabilities fast

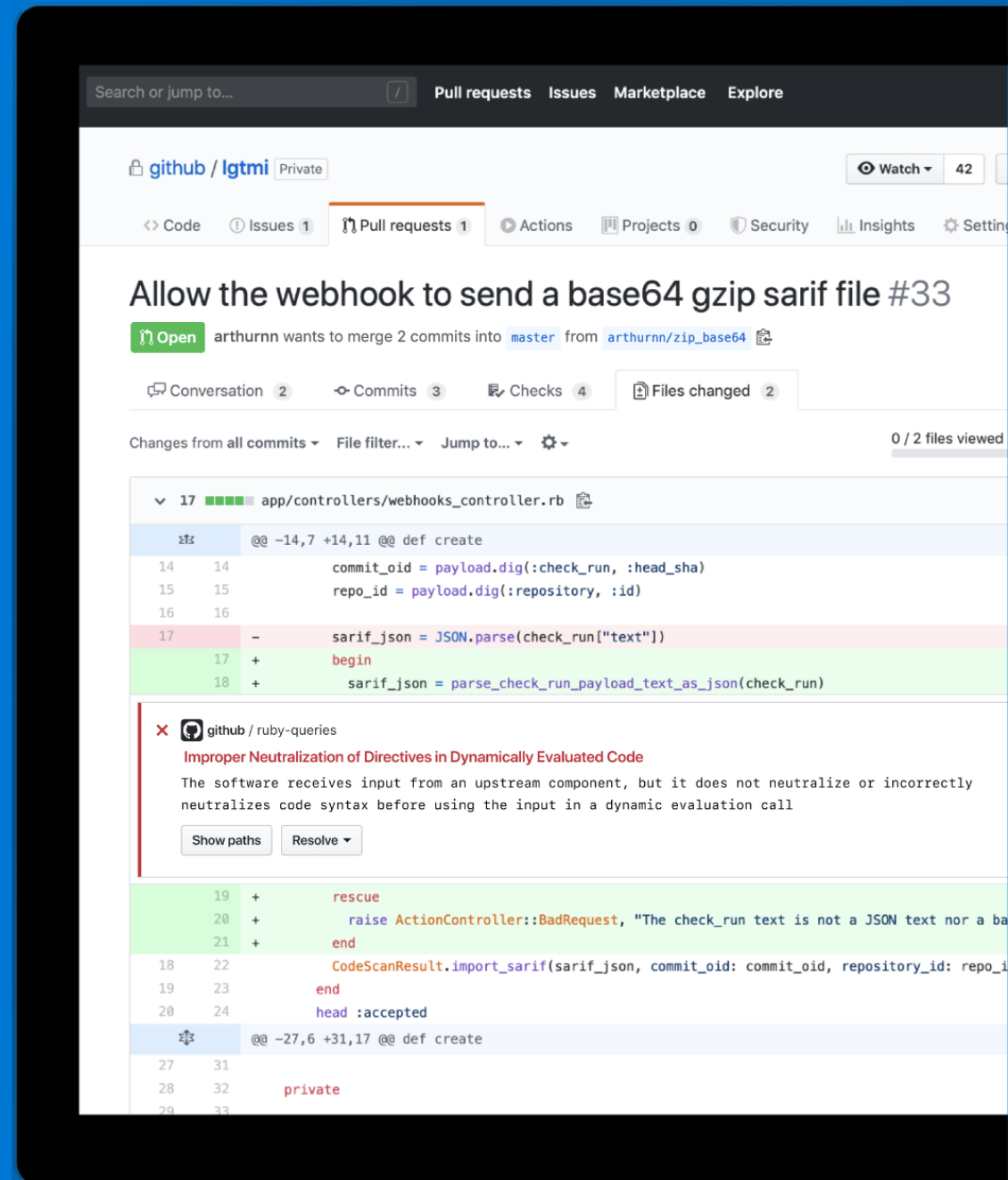
Find and fix vulnerabilities before they are merged into the code base with automated CodeQL scans

## Community of top security experts

Community-driven query set powers every project with a world-class security team.

## Integrated with developer workflow

Integrate security results directly into the developer workflow for a frictionless experience and faster development

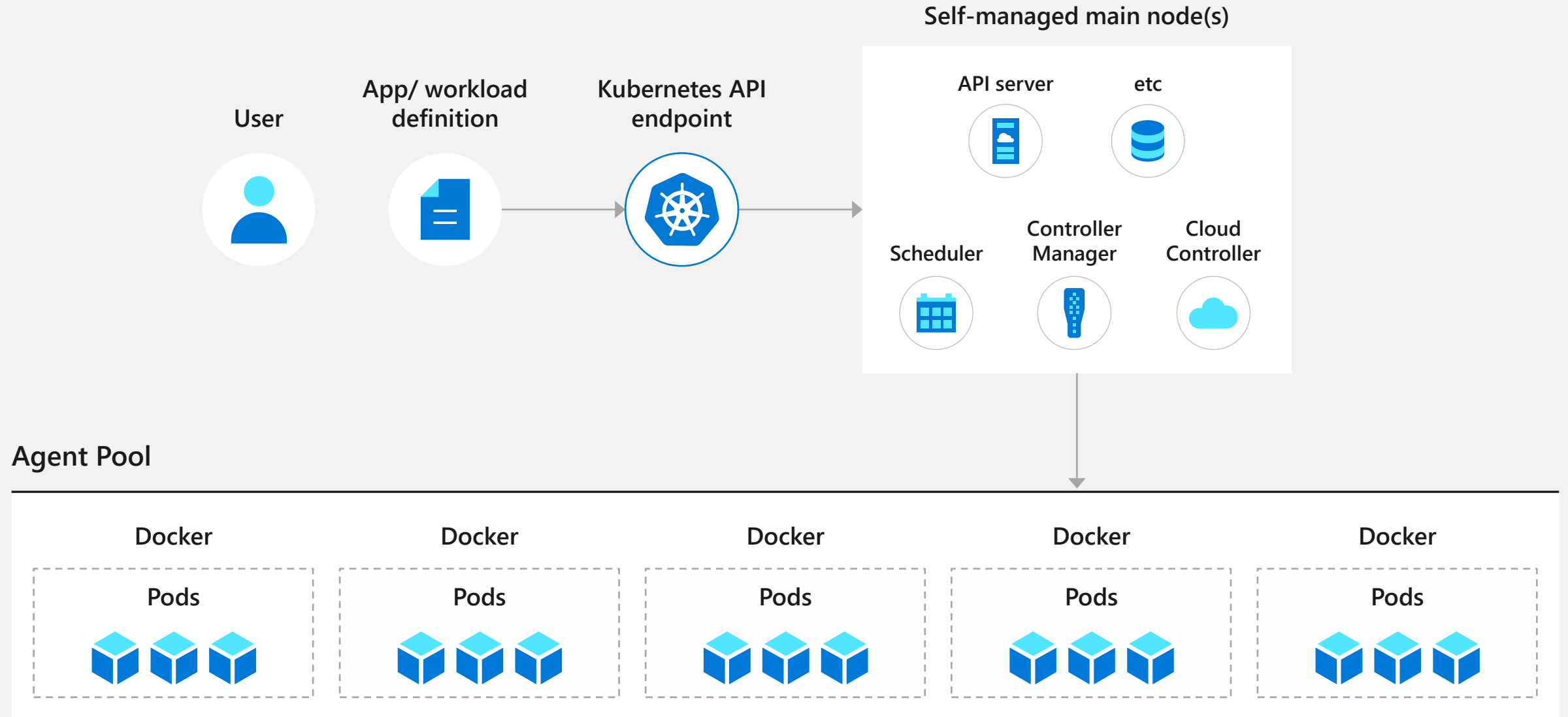


# Demo – Azure Security and GitHub Secret Scanning

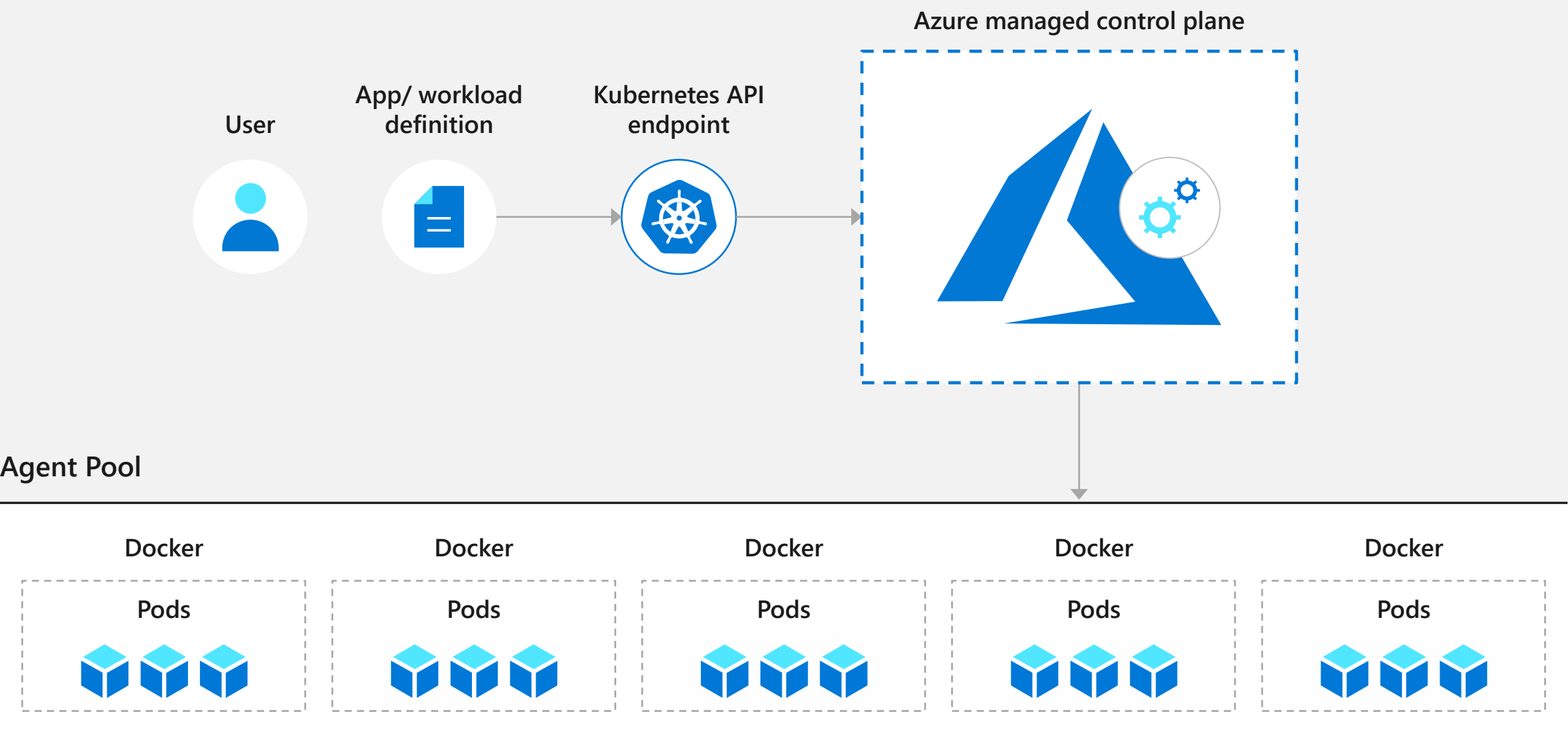


# Container Security

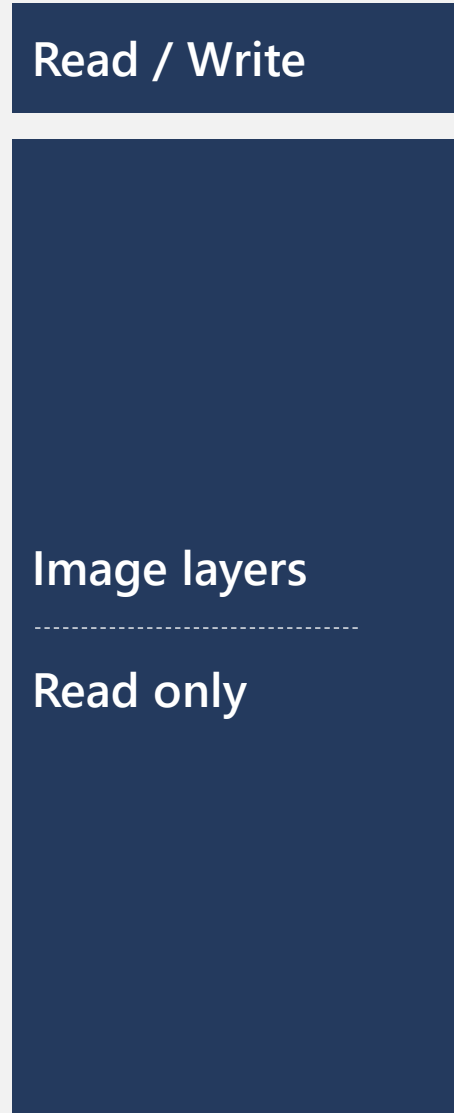
# Kubernetes Architecture



# Kubernetes Architecture



# Refresher on container layers





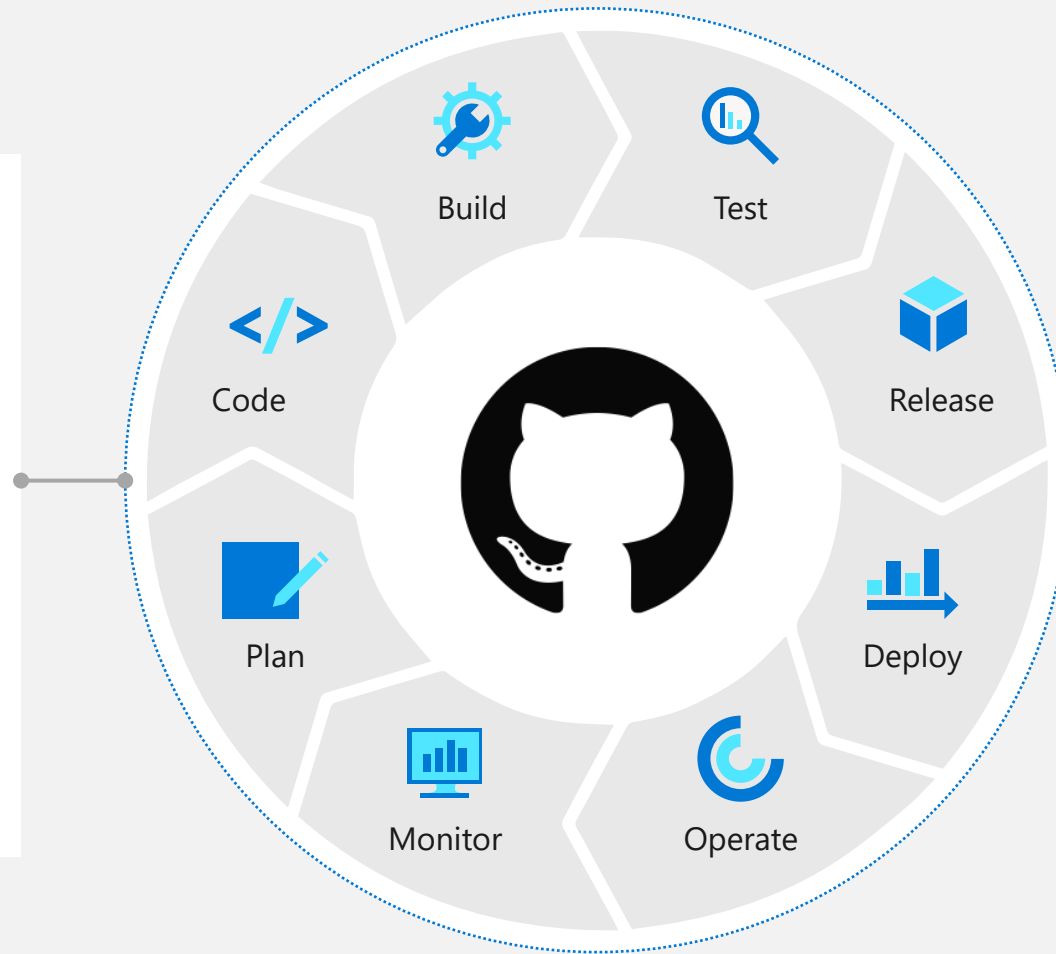
# Demo – Building Secure Containers

# End-to-end, code-to-cloud DevOps

Home for all developers  
Home for the world's code



- Elastic, to any scale
- Fully managed
- Packages always the latest
- Supports all OS for CI/CD
- Largest ecosystem
- Community-led automation



Deploy anywhere, including  
your own data centers



- On-prem
- Azure
- AWS
- Google Cloud Platform

# GitHub Actions



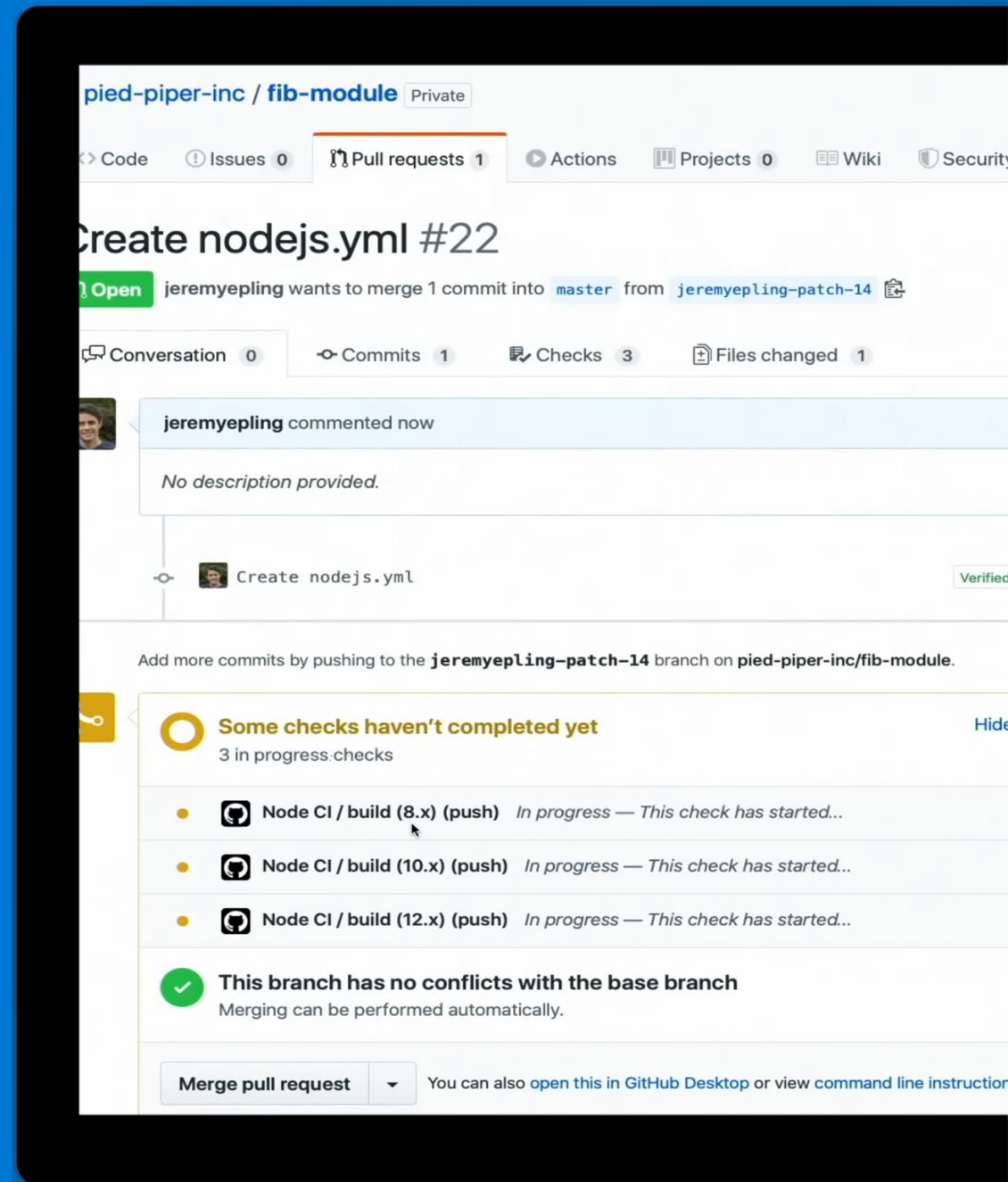
Automate



Build, test and deploy with confidence



Customizable



# Demo – Gaining DevOps Confidence with Containers, IaC, and Azure Policy





# What did we learn?



Code Scanning and Dependency Alerts

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Build More Secure Containers

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Gain DevOps Confidence





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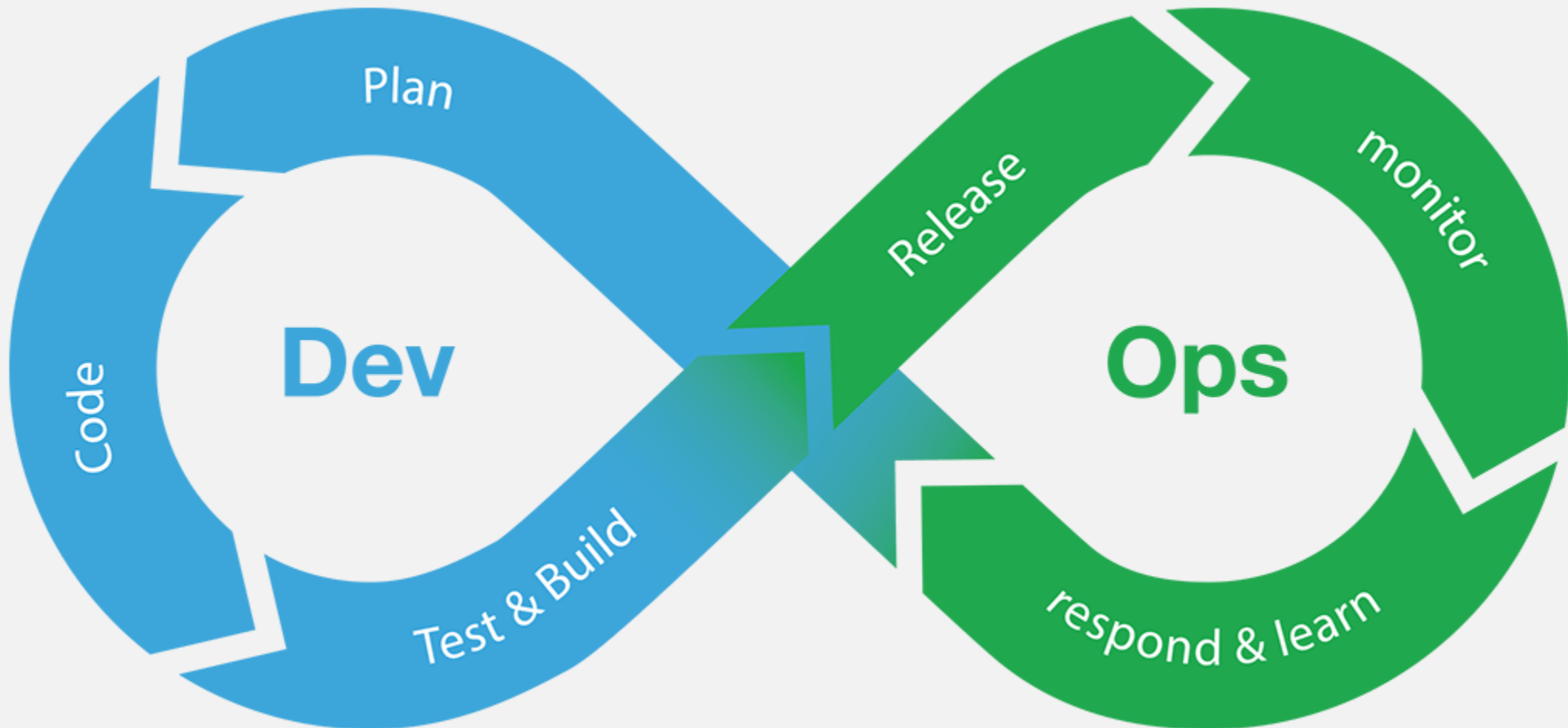
Invent with purpose.

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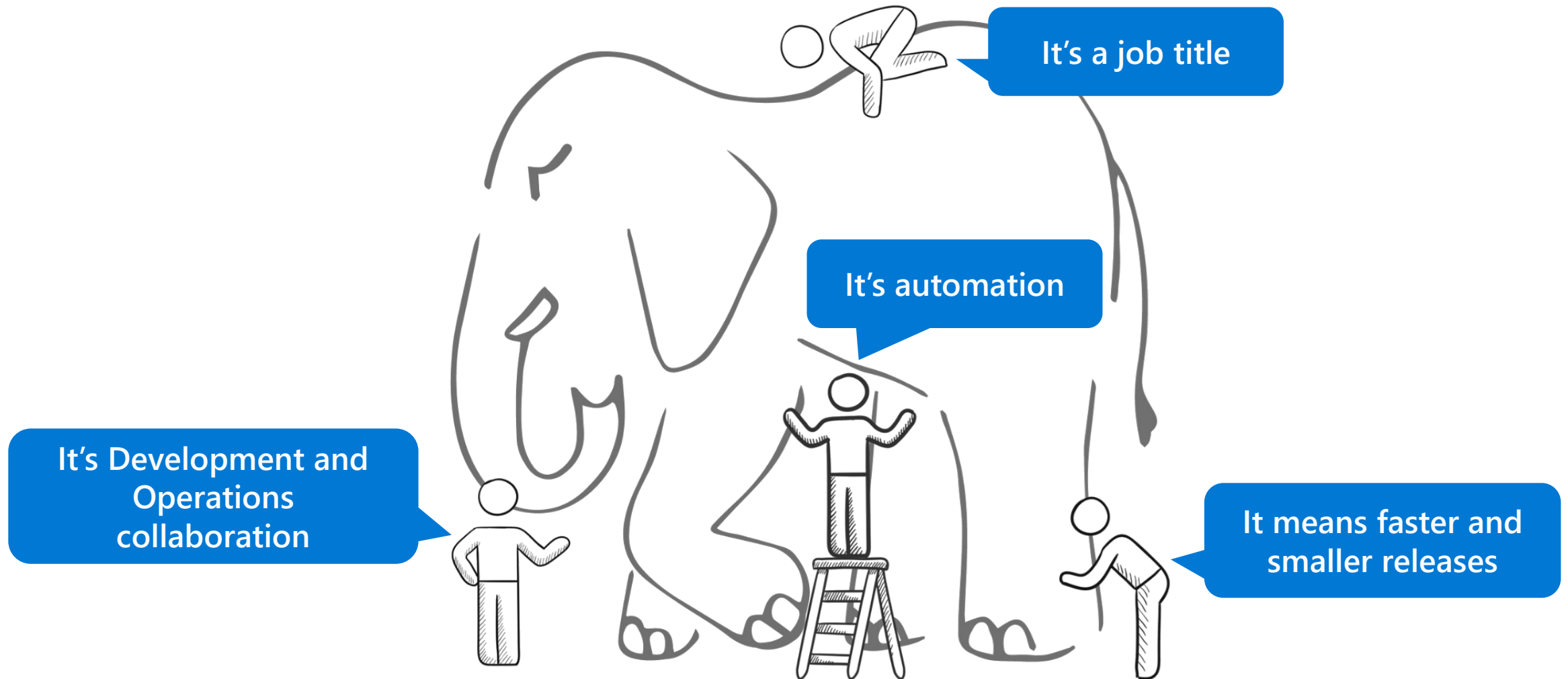
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# DevOps In Azure: Managing the Flow of Work

# Tailwind Traders all in on DevOps



# What is DevOps?



“

DevOps is the union of People, Process,  
and Products to enable continuous  
delivery of value to our end users

– *Donovan Brown*

”

# Why is DevOps so Important?



- Your competition is already doing this



- Increase velocity



- Reduced downtime

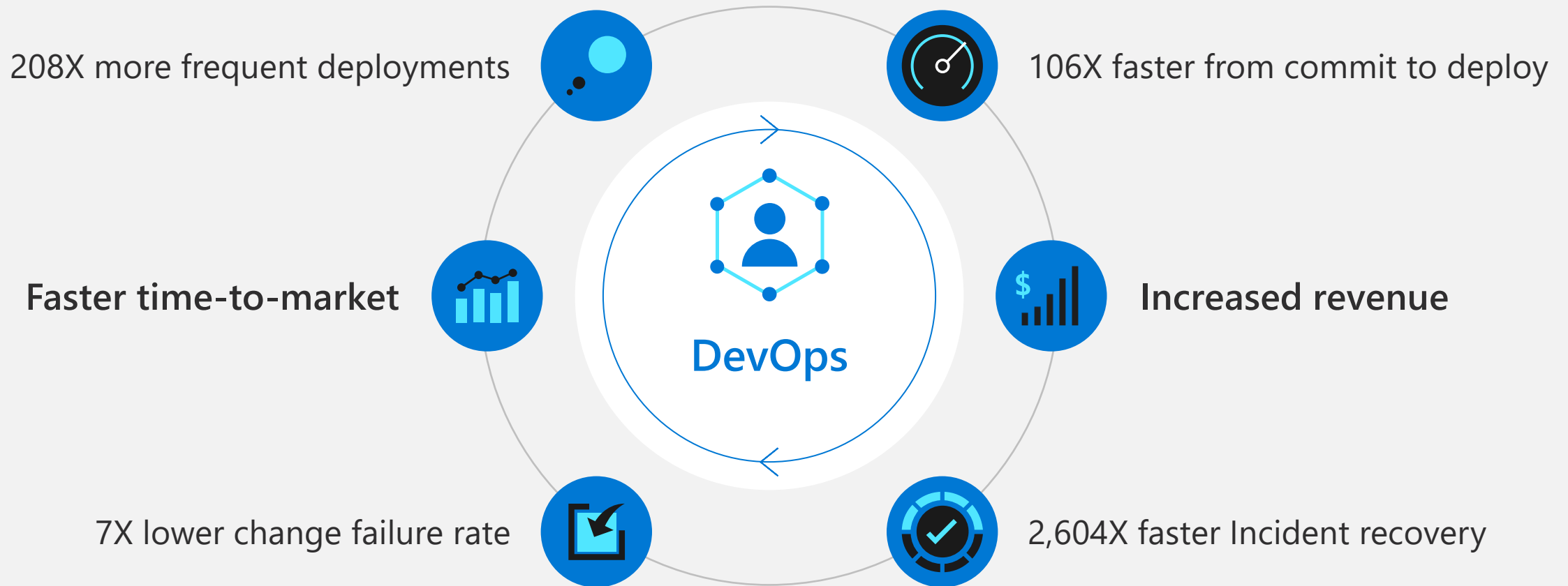


- Reduced human error





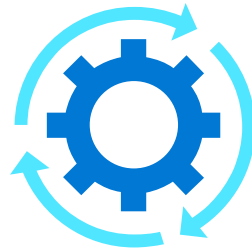
# High performance DevOps Companies Achieve Developer Velocity by ...



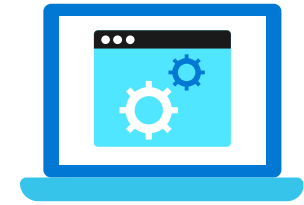
# DevOps: The Three Stage Conversation



1 | People

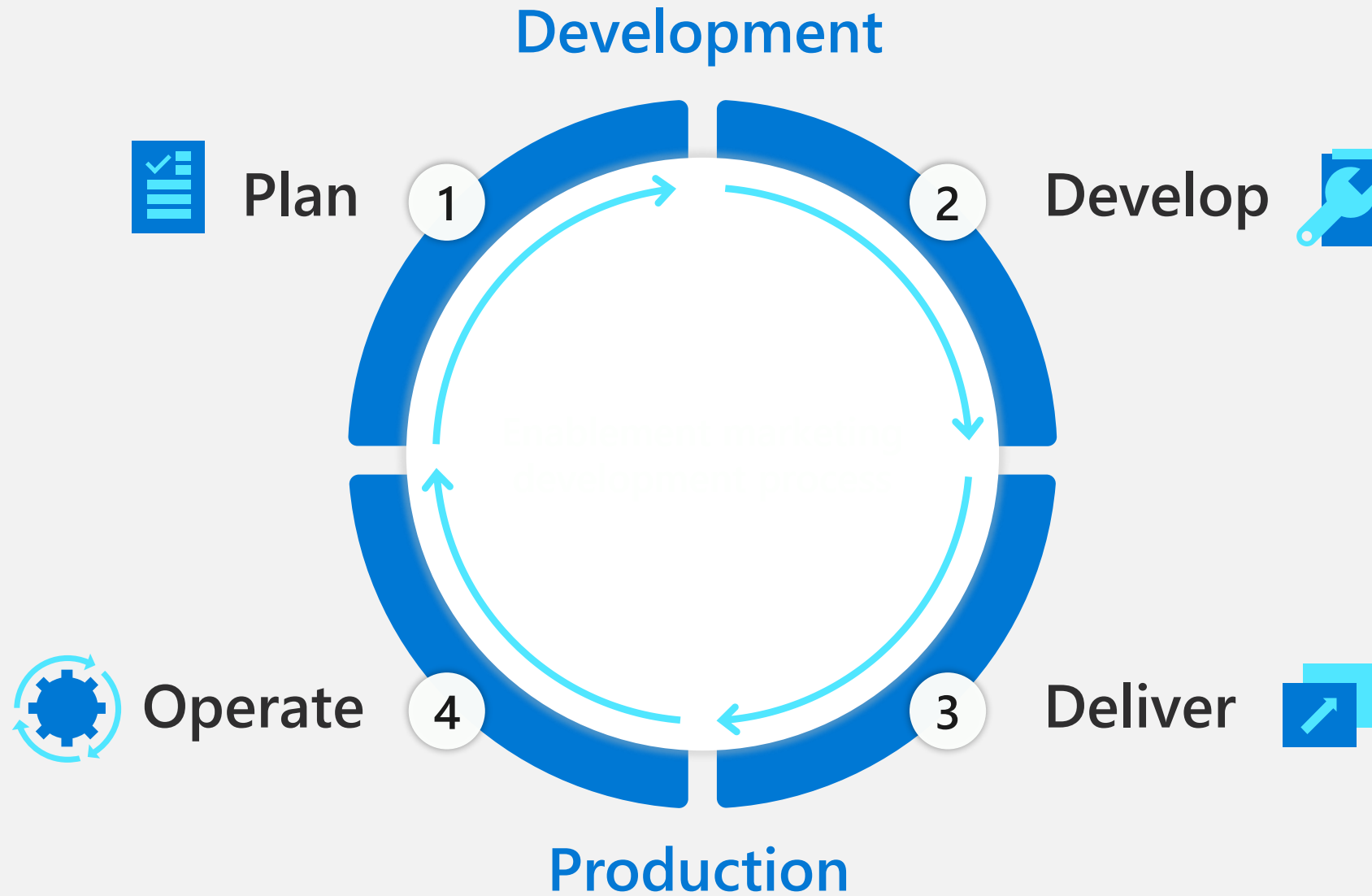


2 | Process



3 | Products

# Process



# Scrum

## The Agile: Scrum Framework at a glance

Inputs from Executives  
Team, Stakeholders,  
Customers, Users



Product Owner



Product  
Backlog

Ranked list of  
what is required:  
features stories,...

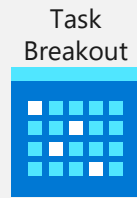


Sprint Planning  
Meeting

Team selects starting  
at top as much as it  
can commit to deliver  
by end of Sprint

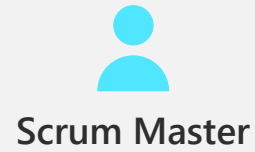


The Team

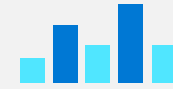


Sprint  
Backlog

Task  
Breakout



Scrum Master

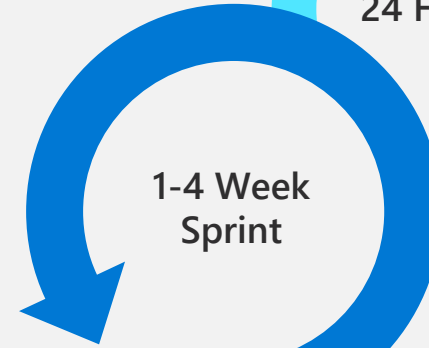


Burndown/up  
Charts



Daily Scrum  
Meeting

Every  
24 Hours



1-4 Week  
Sprint

Sprint end date and team  
deliverable do not change



Sprint Review



Finished Work



Sprint Retrospective

# General Principles



- Product is built incrementally



- Frequent inspection and adaption (course correction)



- Transparency (Product and Sprint backlogs are public)



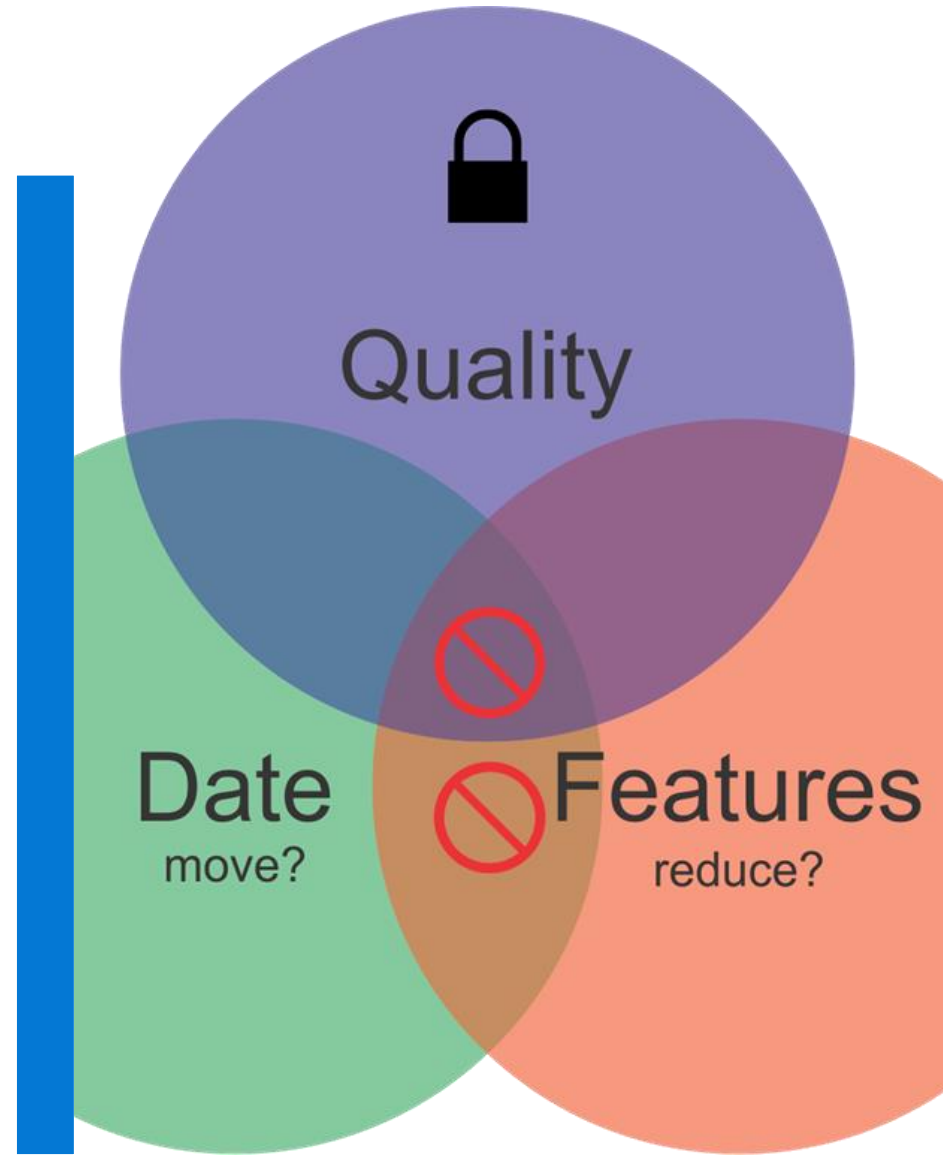
- Product Owner, Development Team, Scrum Master



- Scrum Teams are self-organizing and cross-functional



Quality is  
non-  
negotiable



# Estimates



Never accept an estimate over 4 hours

- More accurate
  - Enables parallel development
  - Confirms alignment with DoD
- 

12

Never start from a date

# The Rules Apply to Everyone



No one is above  
the law



Even the CEO must  
obey the rules



# Demo

Tracking Work using Azure Boards

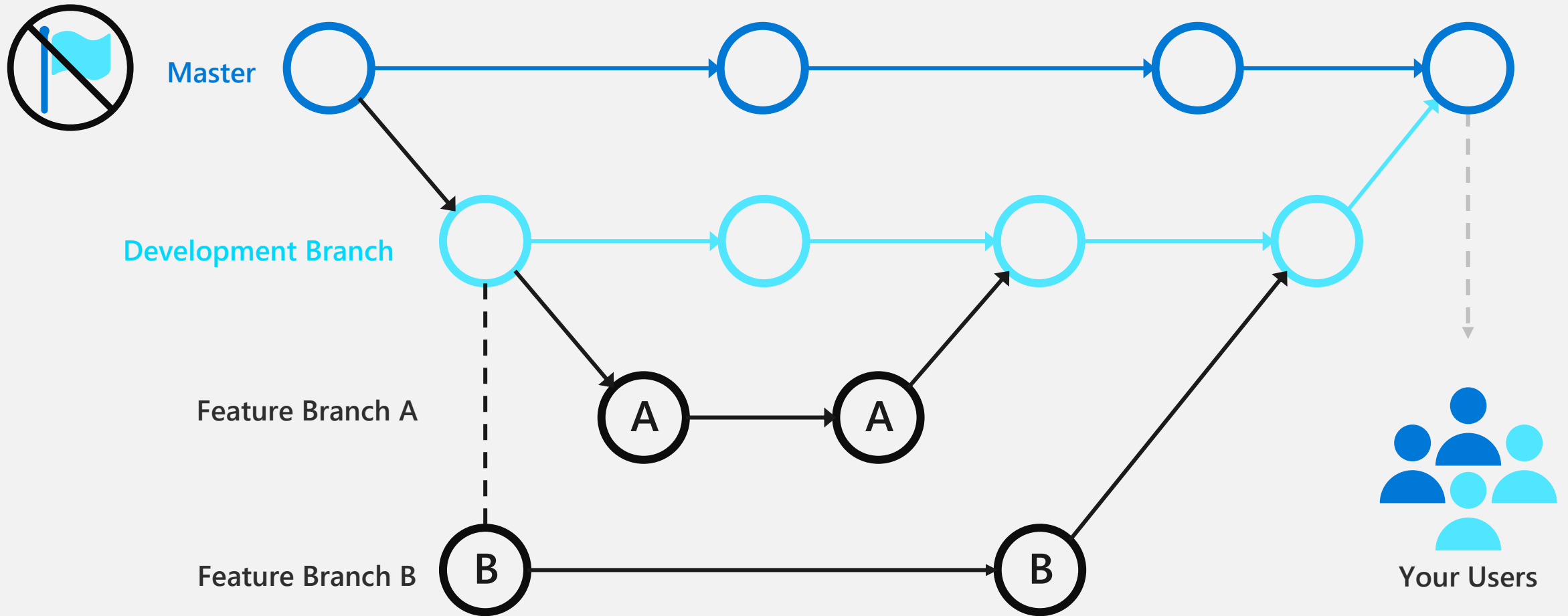
# Branching Strategy

**Choosing the right branching scheme is critical to success**



# Traditional Branching Strategy

Feature Branching without flags

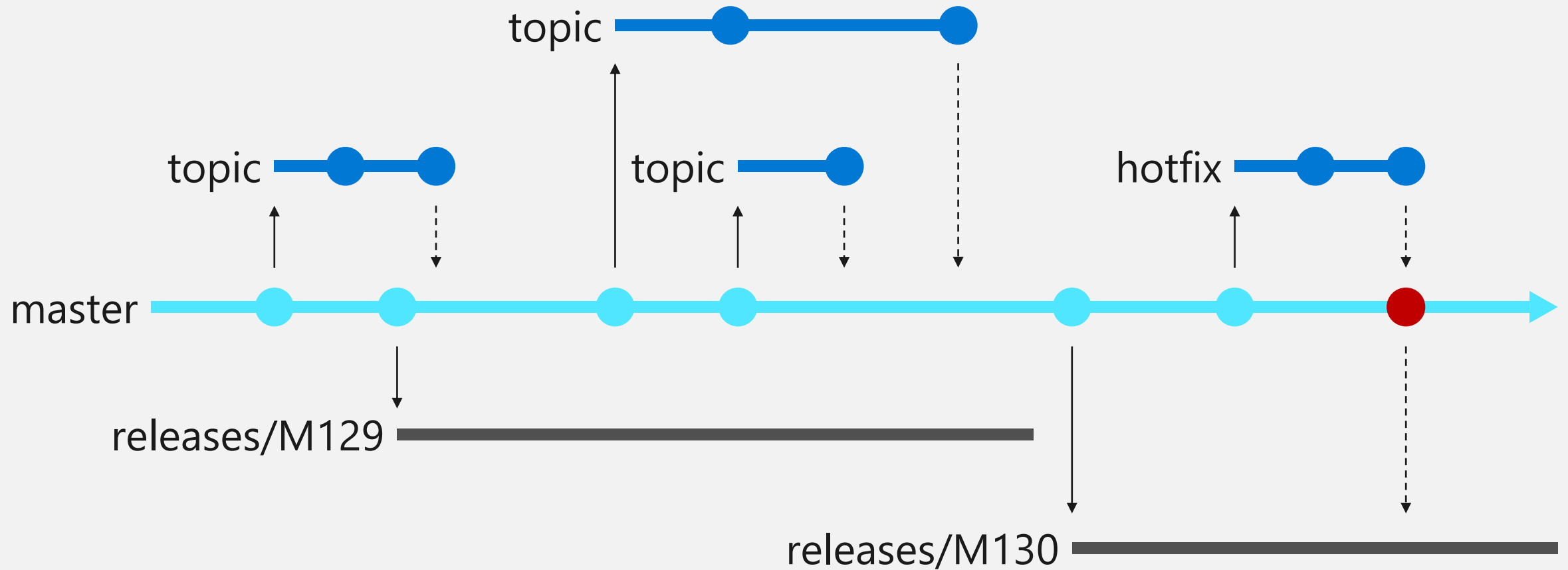




**MERGE BOMB!!!!!!!!!!!!!!!!!!!!**

# Trunk Based Development

Using trunk based development to avoid merge debt



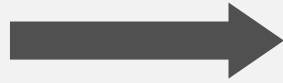
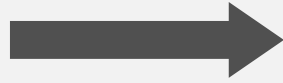
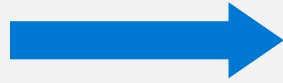
How can that  
work???



# Feature Flags



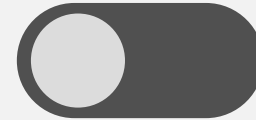
New Feature



On



Off



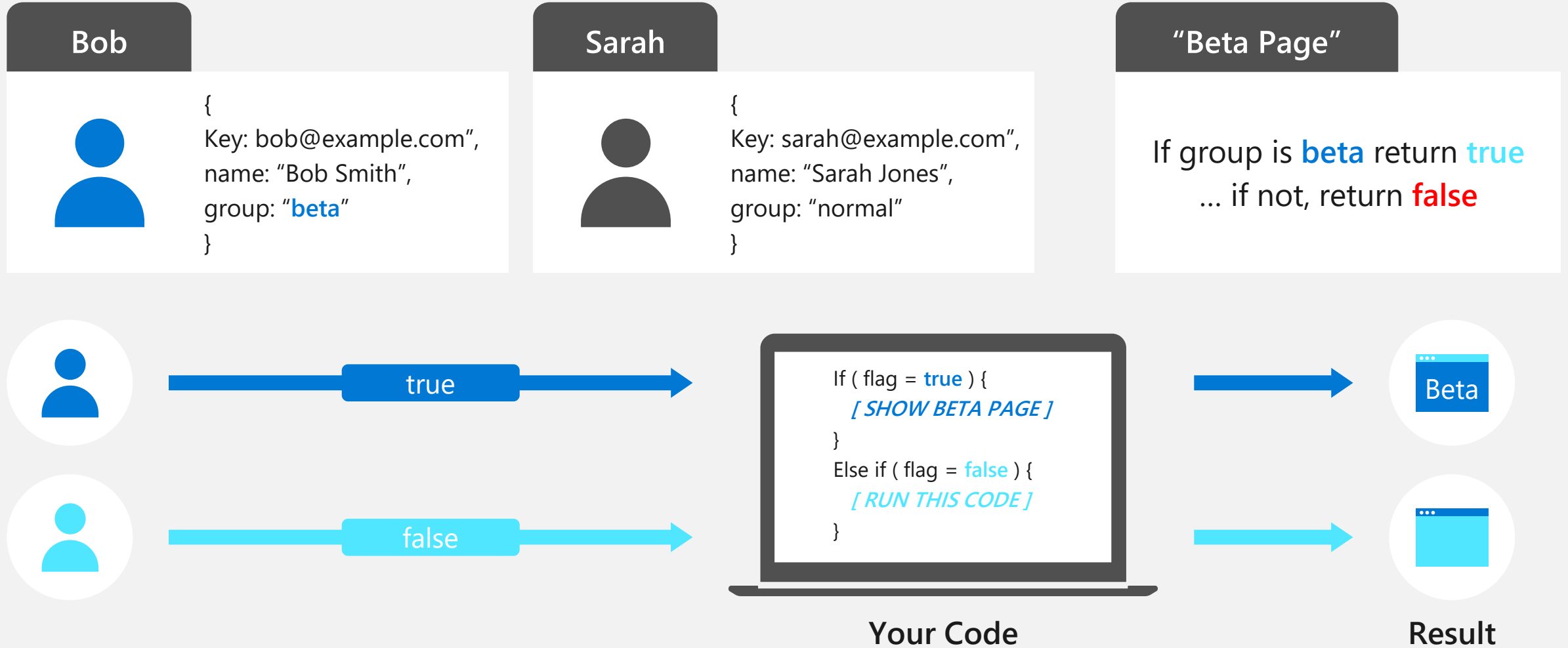
Off



Feature Flag or Toggle

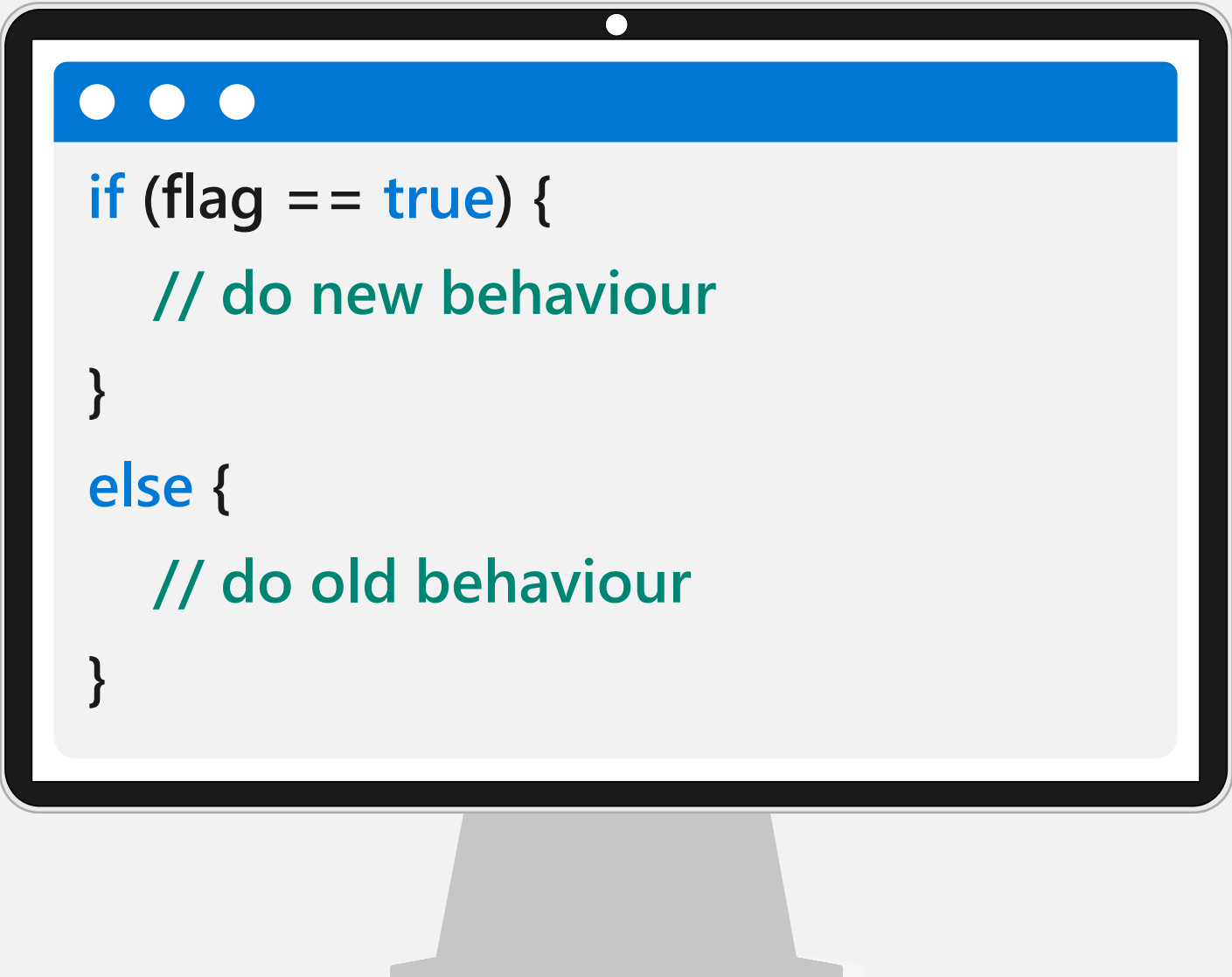
Consumers

# Glorified If statement





# No really... it's a freaking if statement



```
if (flag == true) {  
    // do new behaviour  
}  
else {  
    // do old behaviour  
}
```

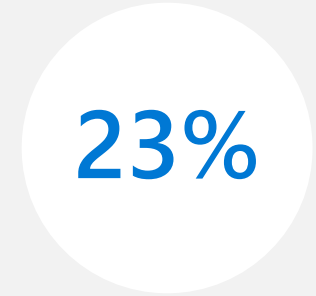
# A/B Experiments



50% visitors see  
variation A



Variation A



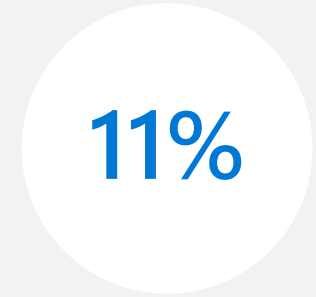
conversion



50% visitors see  
variation B



Variation B

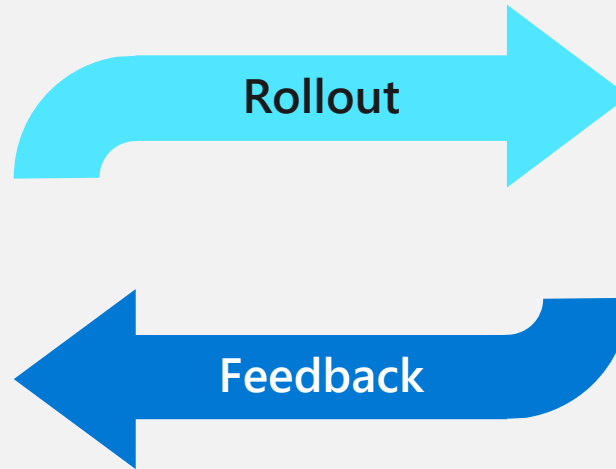


conversion

# Safe Deployment



New Feature



Soft Launch



Incremental Rollout

# Rollback

Set switch to off. Done



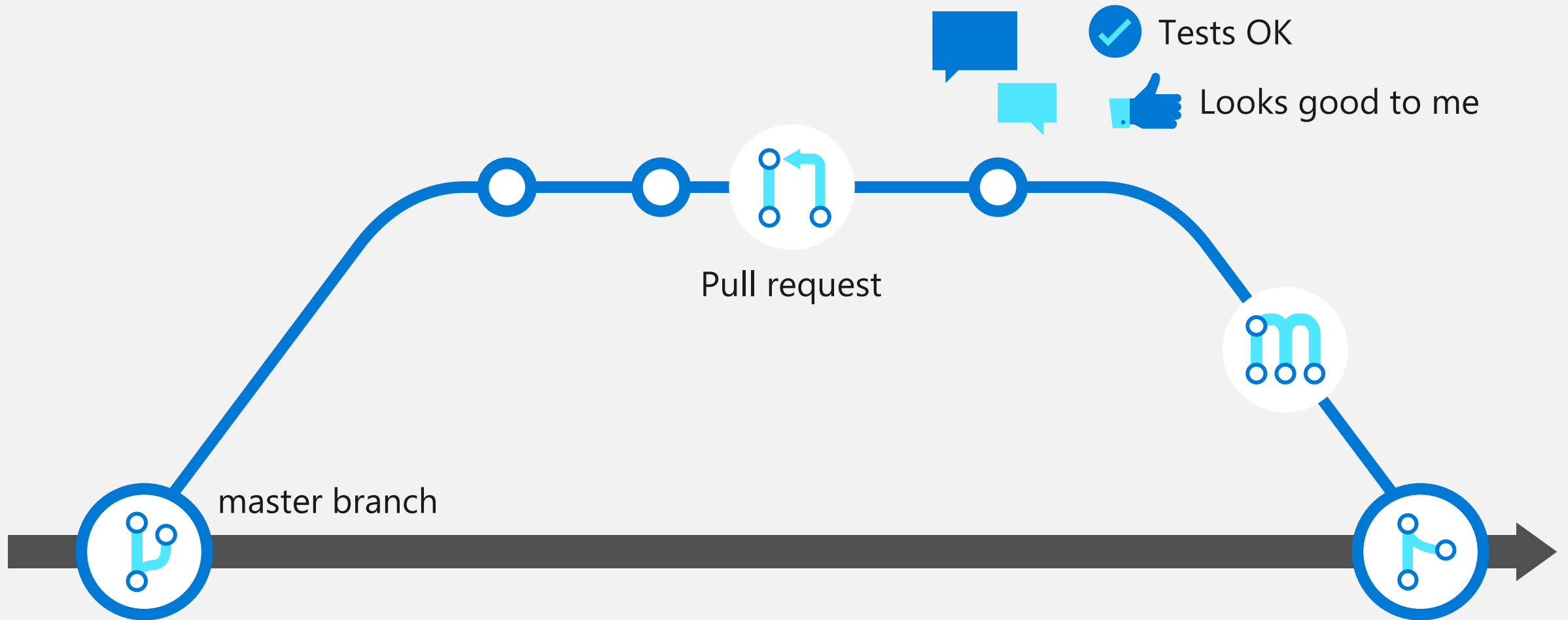
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Done

# Demo

Feature Flags

# Maintaining Quality w/Pull Requests



# Problems with PR workflow

1 People didn't know when PR's were ready to review



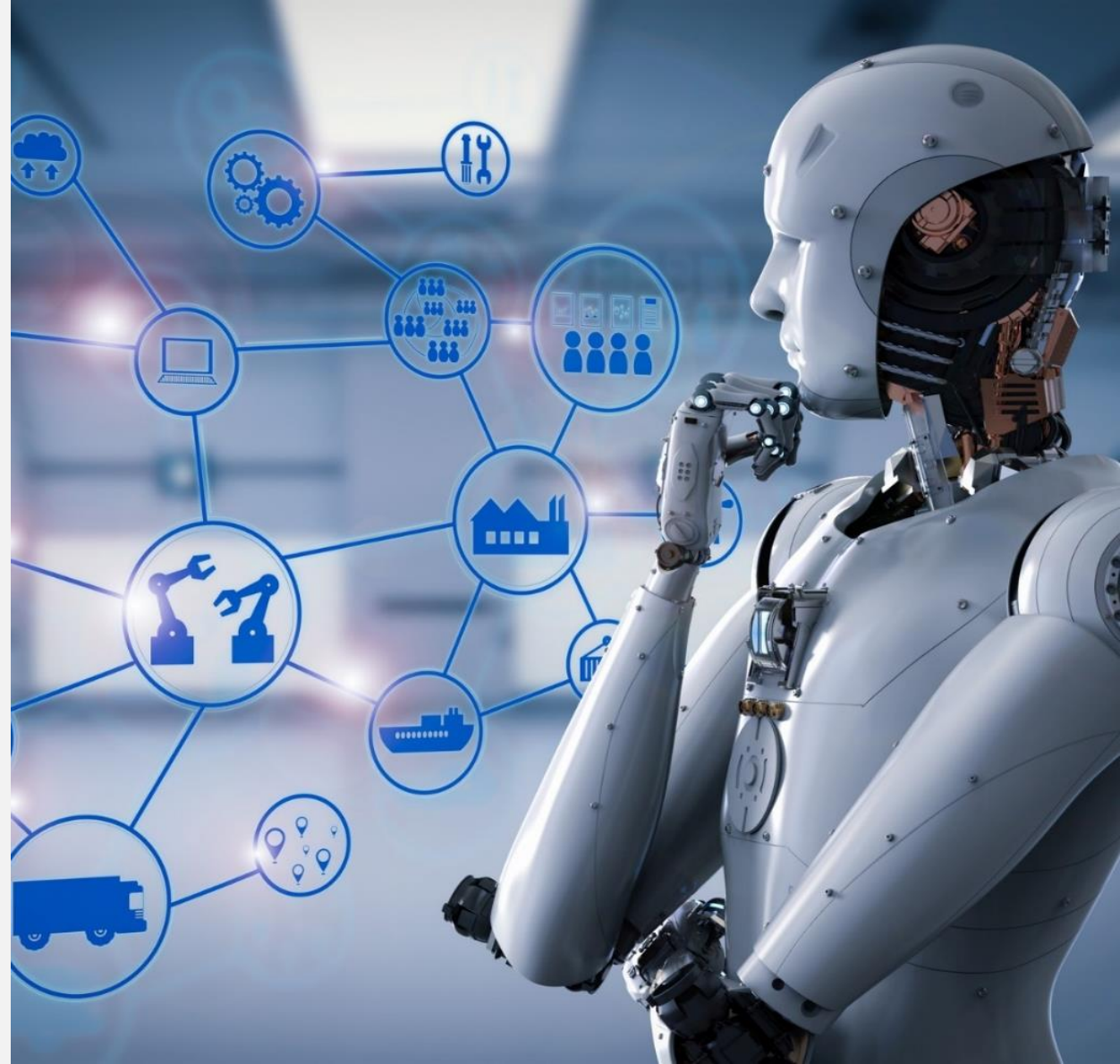
2 People needed to see the PR changes on a live system



3 Multiple staging environments needed to see PR changes



**Automation to  
the rescue!**





# Demo

Automation with GitHub Actions

**Tailwind Traders**  
is now in a  
good state





# Let's Recap

# Tailwind Traders



## Needed Solving

- Managing Work
- Managing Source Control Changes
- Automation to help with processes

## The Solution

- Scrum and Azure Boards
- Trunk Based Development
- Feature Flags
- GitHub Actions



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# DevOps Learning Path



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Managing the Flow of Work



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Operating Software in the Cloud



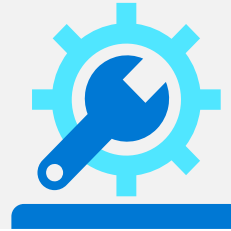
# Goals for this session



Security and Secrets



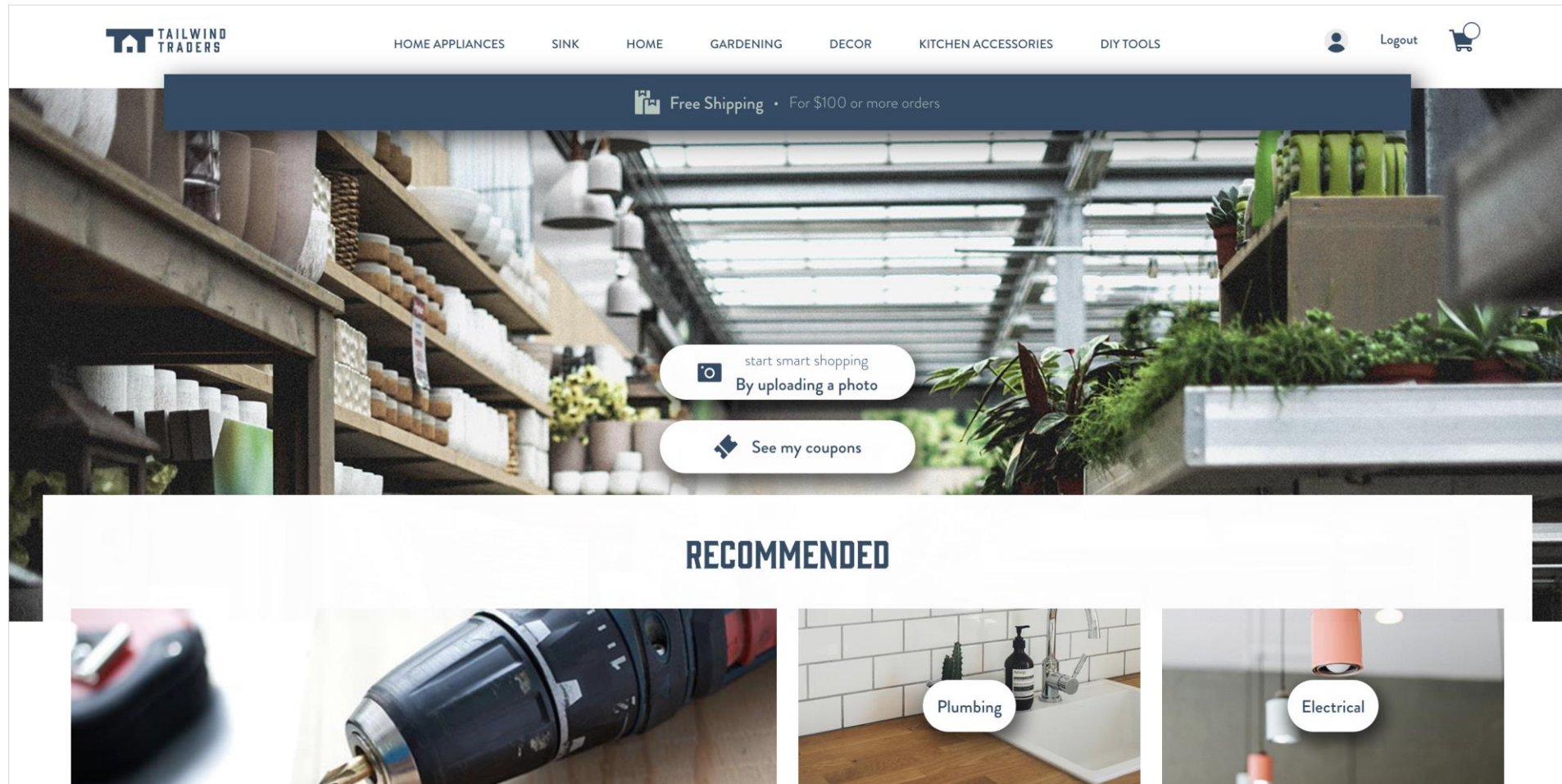
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Build Quality and Gain  
Confidence

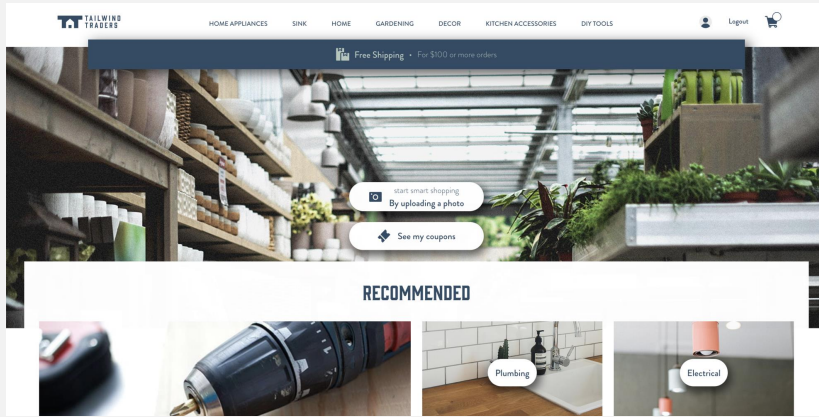


# Tailwind Traders website





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ASP.NET Core + React  
Docker container on  
Azure App Service



Azure SQL Database



Azure Cosmos DB

# What Tailwind Traders Needs



Quality

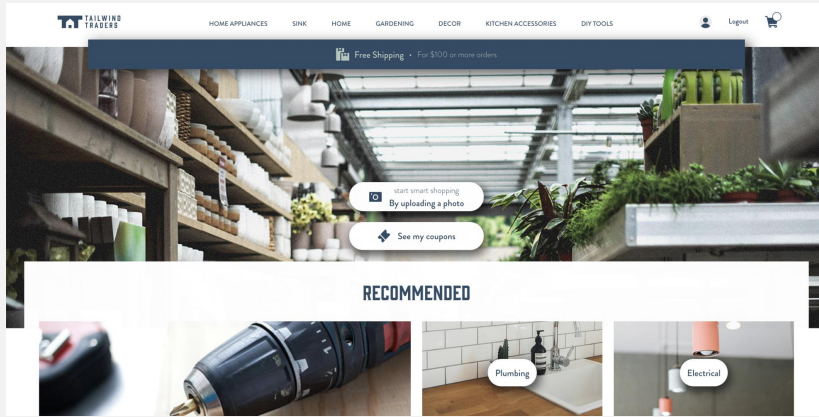


Confidence



Security

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ASP.NET Core + React

Microservices with backend APIs  
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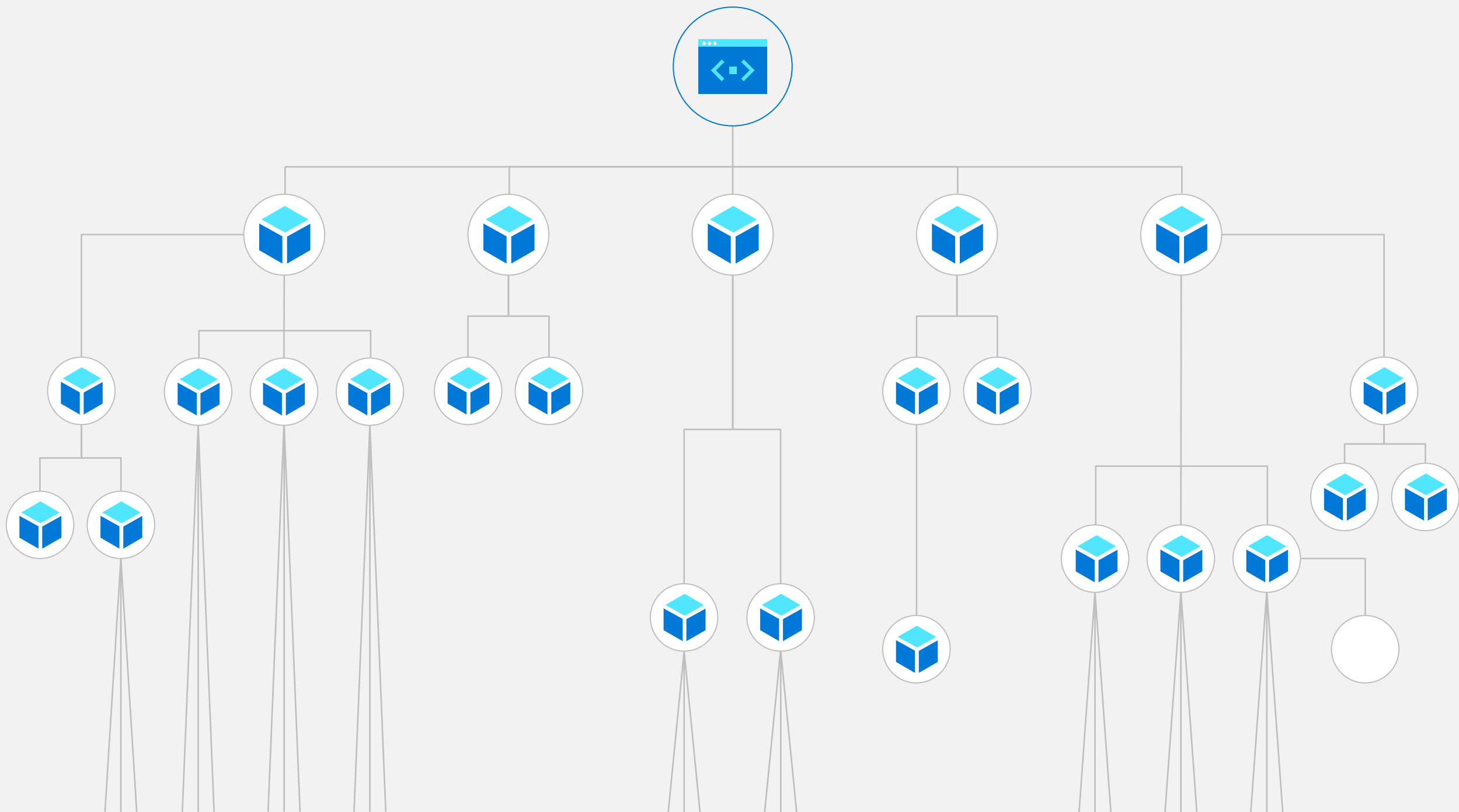
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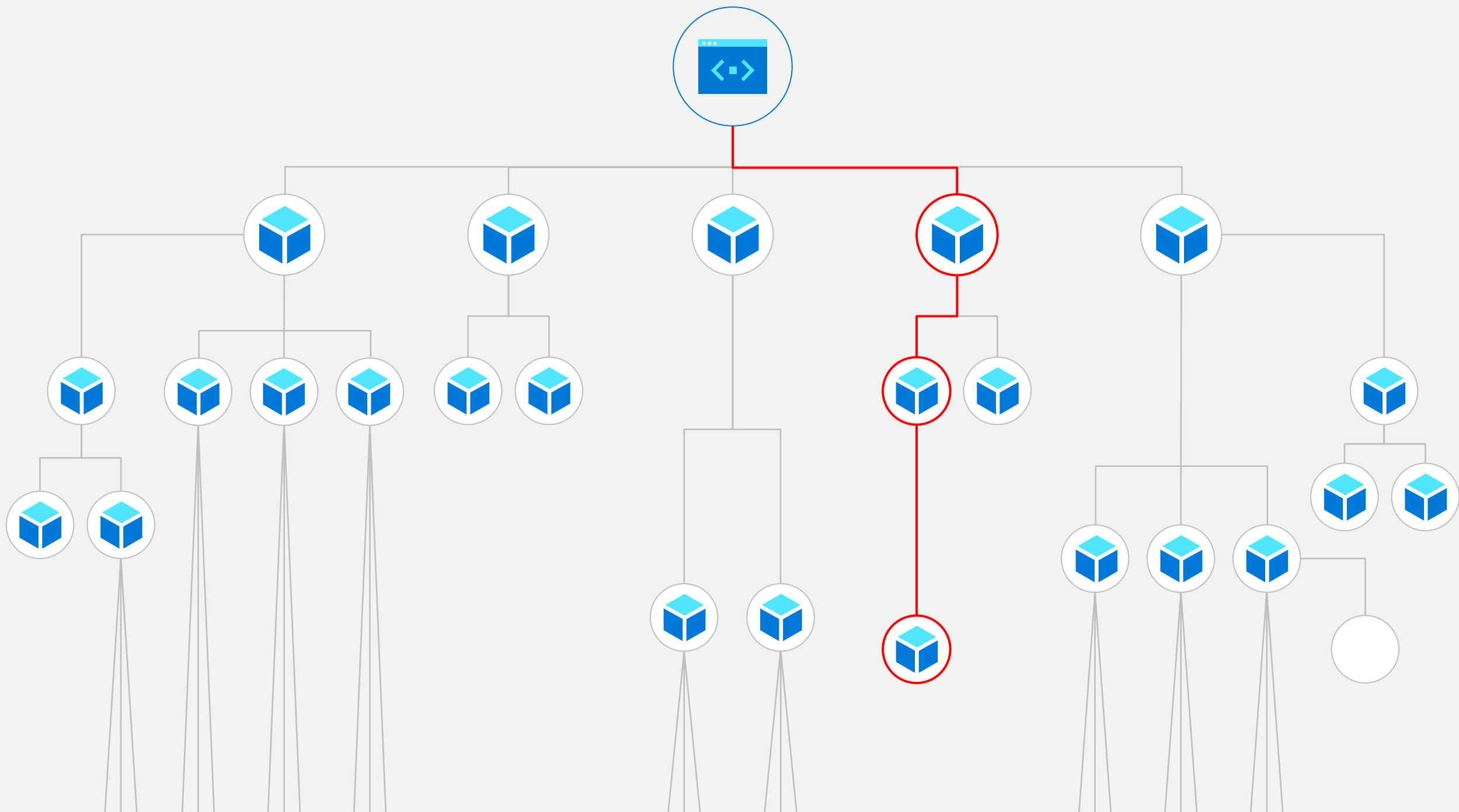


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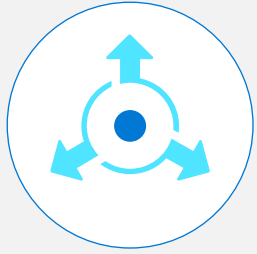


# Security and Vulnerability Management





# Community-powered security & compliance



## Dependency Insights

- Real-time inventory
- License compliance
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## Vulnerability Management

- Code scanning
- Secret scanning
- Largest vulnerability database
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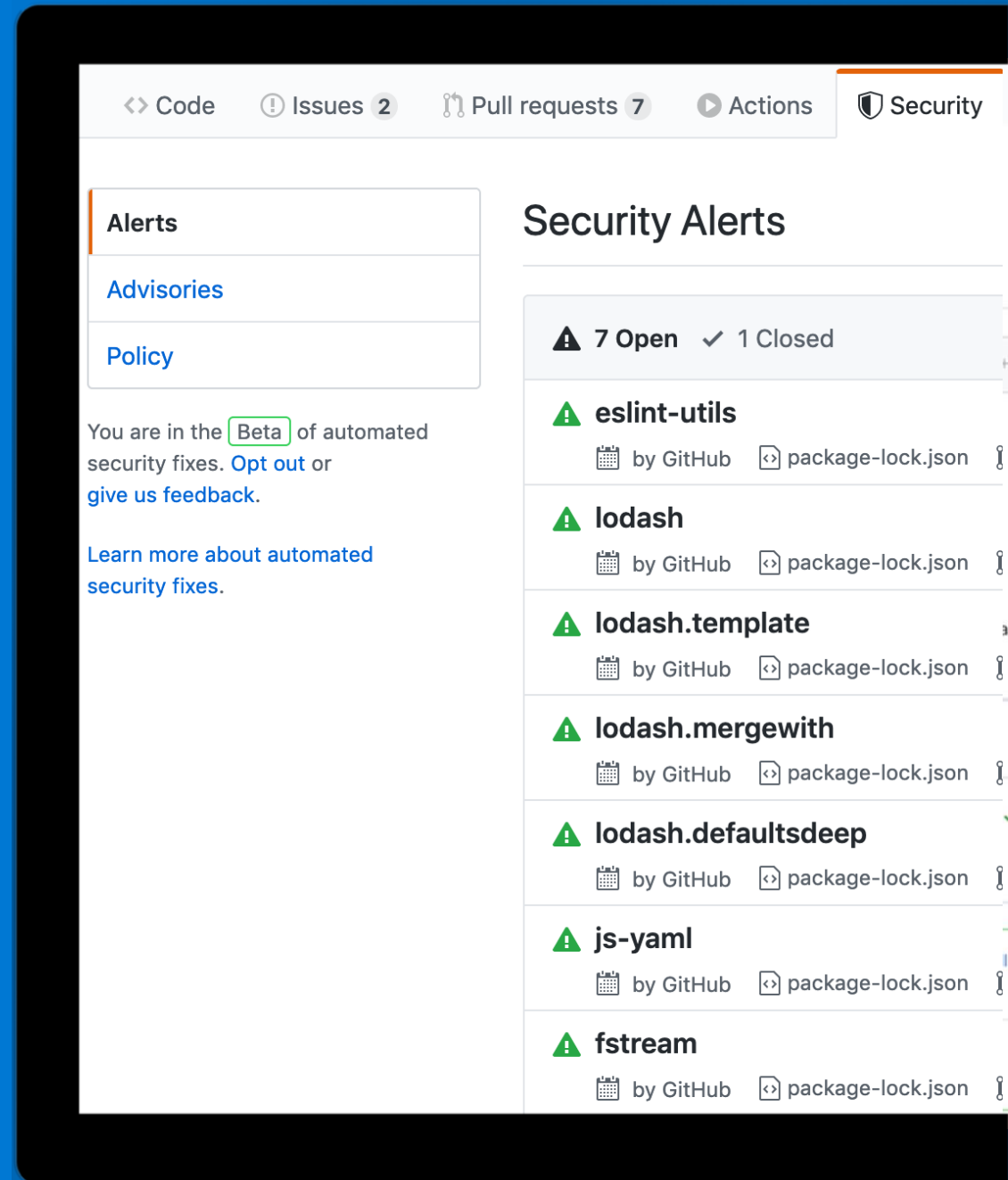


## CodeQL

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- Vulnerability hunting tool
- Community of top security experts

# Vulnerability Management

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# Code Scanning

## Find and fix vulnerabilities fast

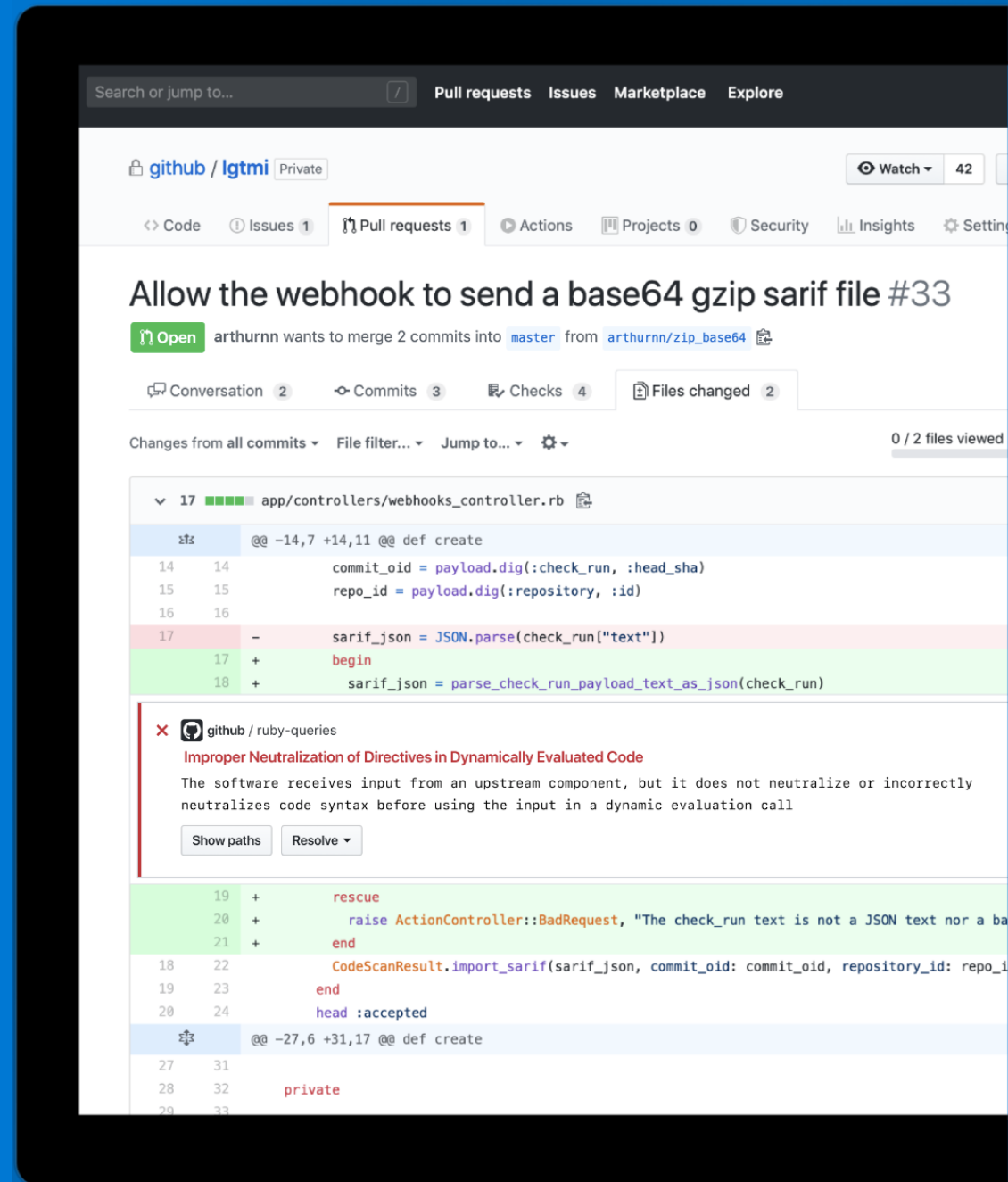
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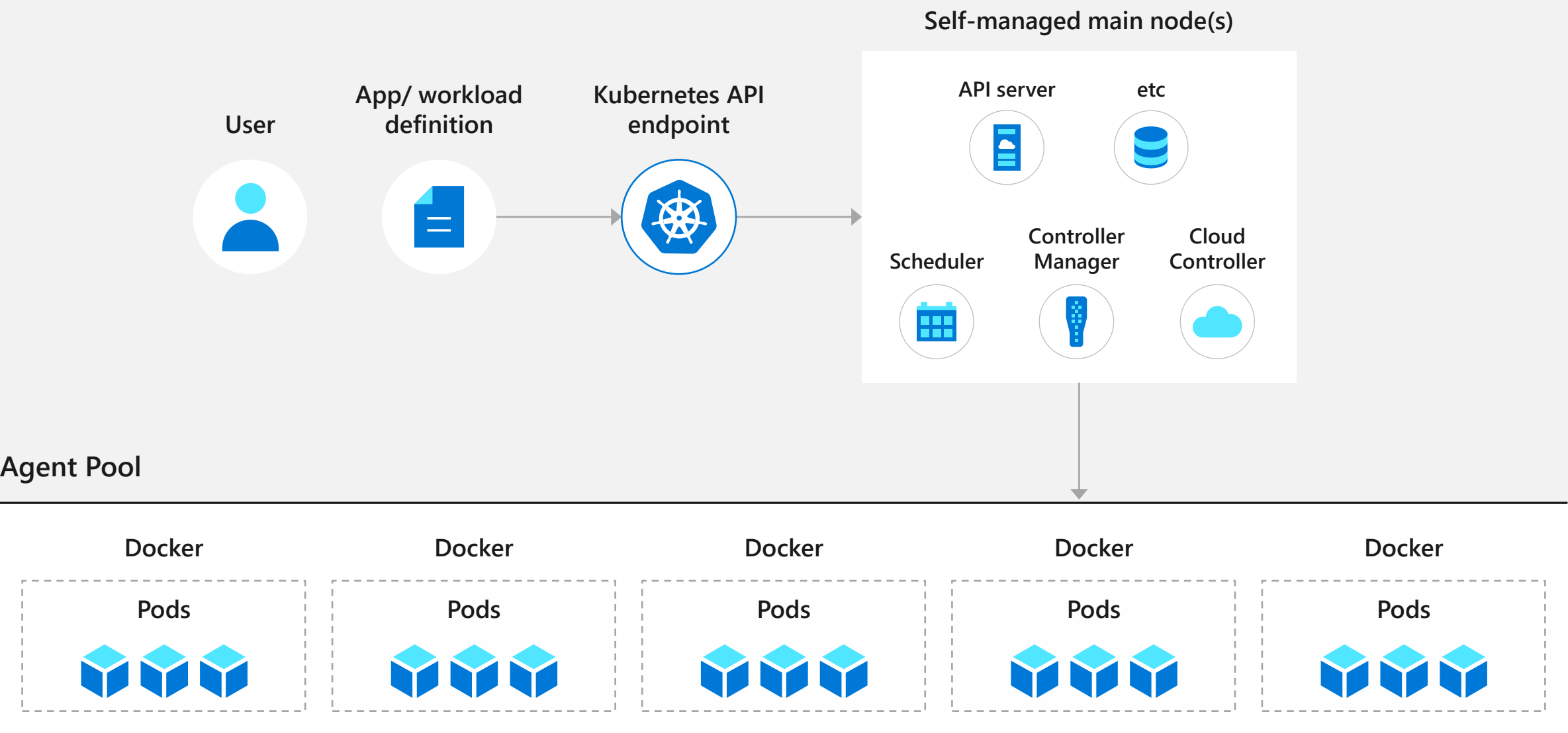
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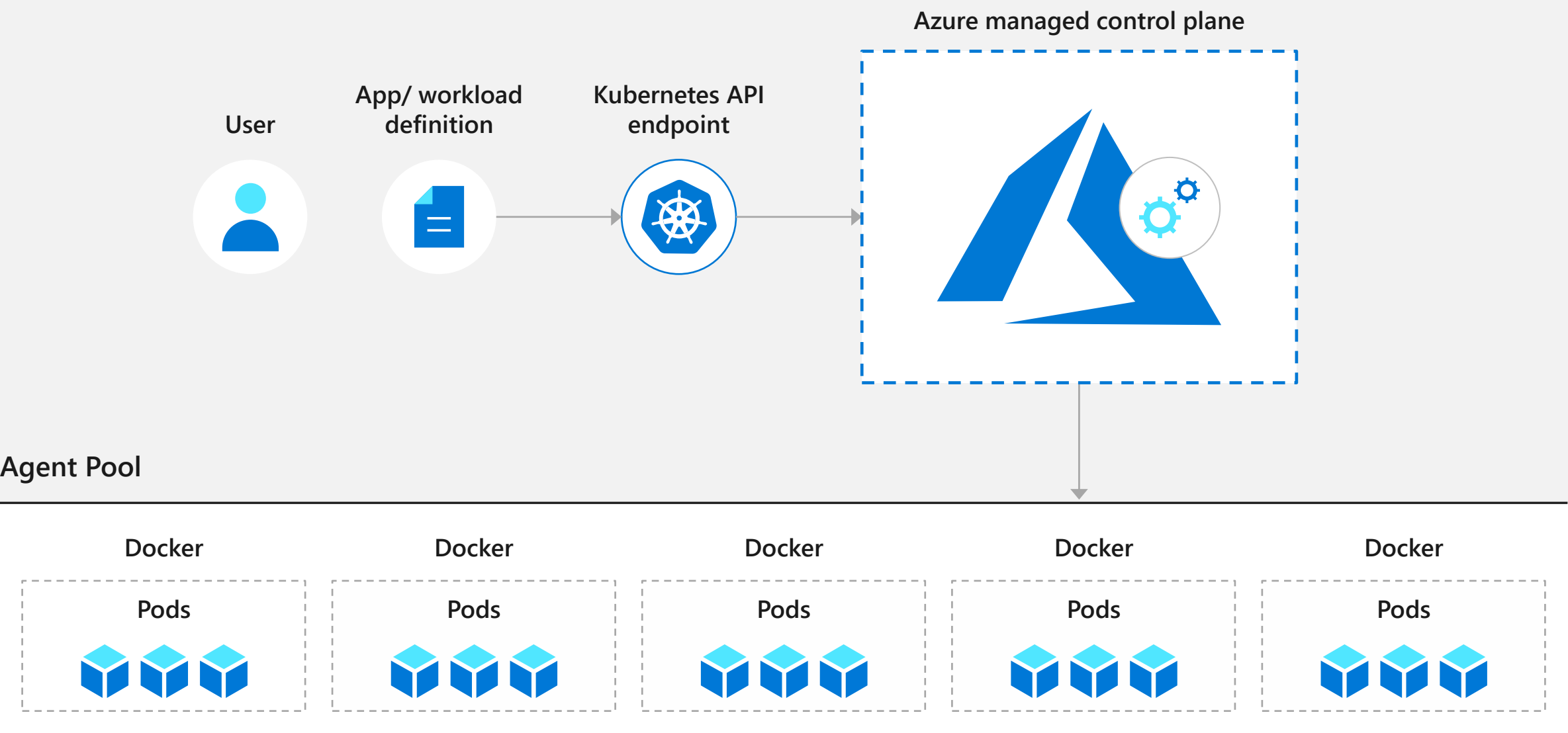
# Demo – Azure Security and GitHub Secret Scanning

# Container Security

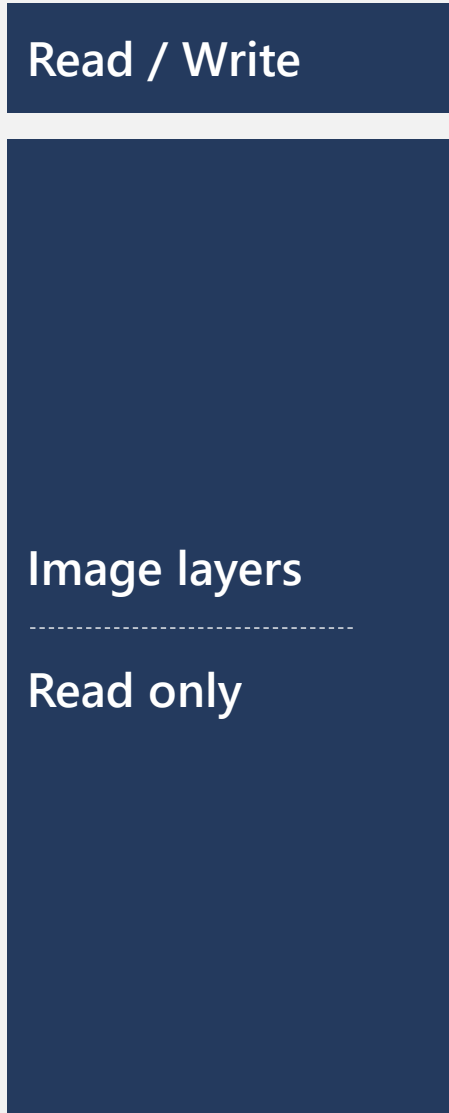
# Kubernetes Architecture



# Kubernetes Architecture



# Refresher on container layers





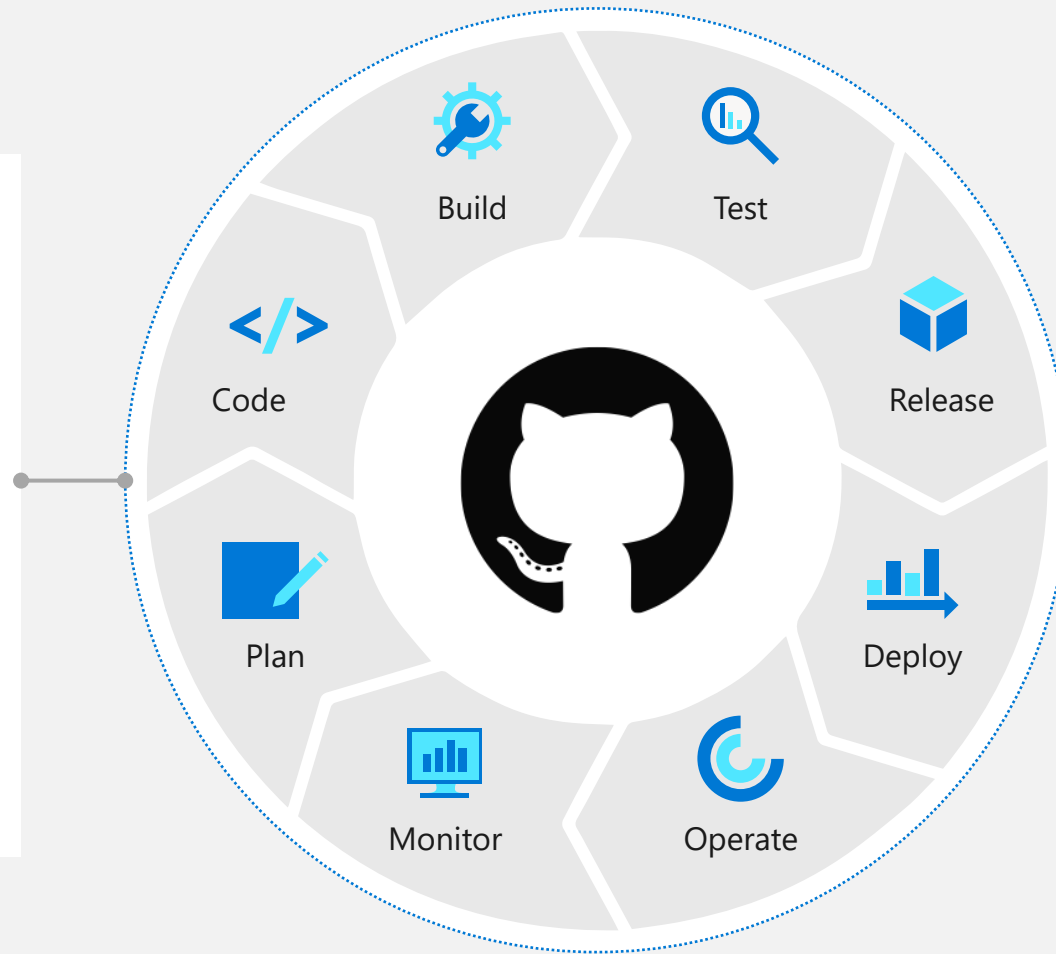
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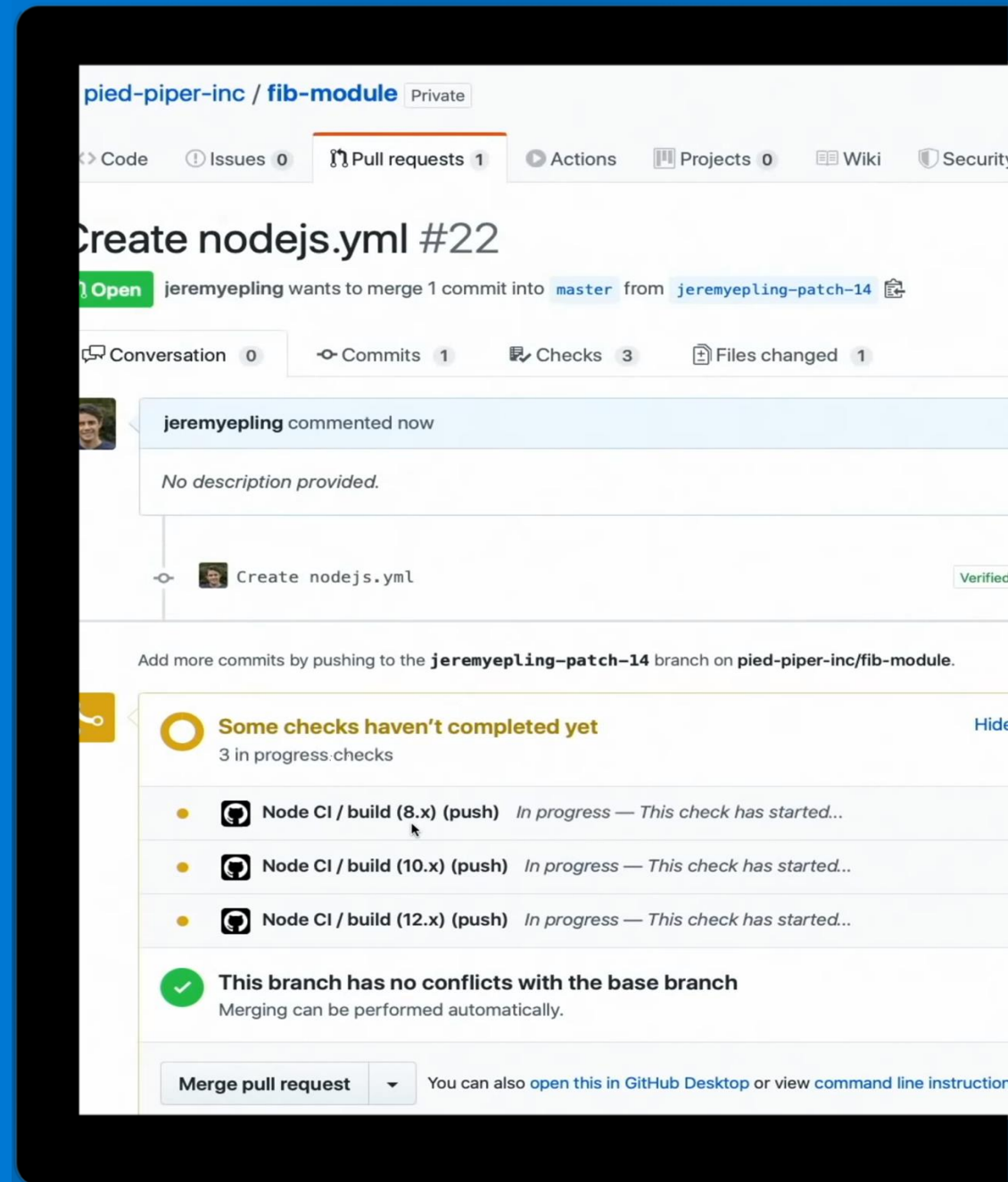
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Customizable



# Demo – Gaining DevOps Confidence with Containers, IaC, and Azure Policy



# What did we learn?



Code Scanning and Dependency Alerts

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Build More Secure Containers

---



Gain DevOps Confidence





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Invent with purpose.