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Introduction to DevOps

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Acknowledgment of Country

Christian Townsend

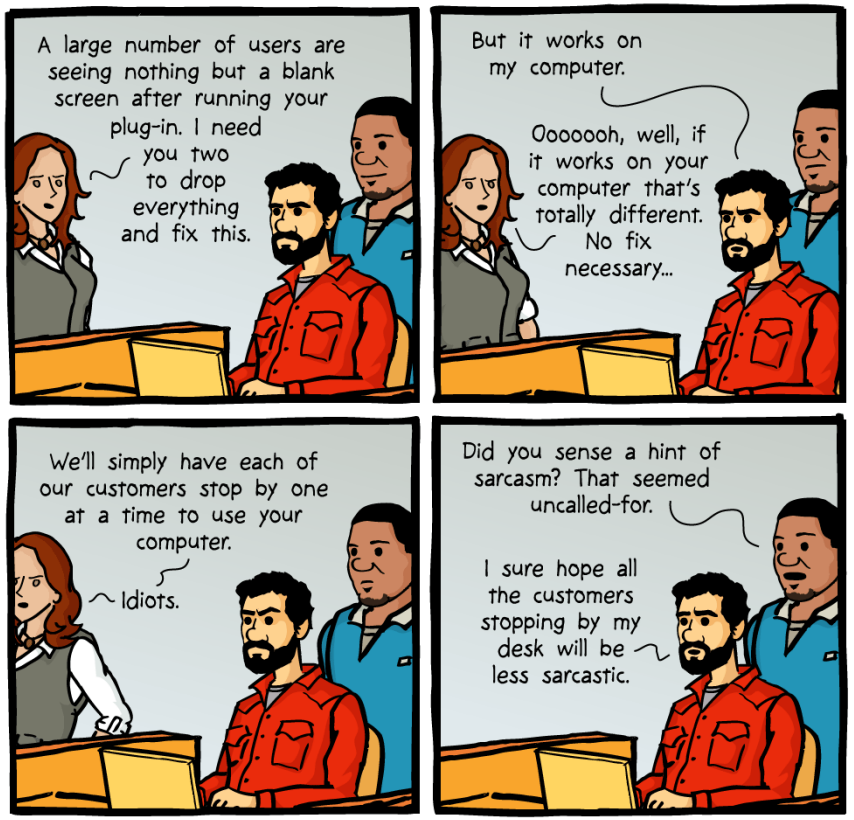
- Manager / Solutions Architect, Government Cyber at KPMG
- Former DevOps/Operations Engineer at Nuance Communications
- Passionate about:
  - Cloud Architecture
  - Infrastructure Management
  - Automation
  - Delivering high quality to customers

What is DevOps?

- **Combination of:**
  - Practices
  - Tools:
    - Planning
    - Building
    - Testing
    - Deploying
    - Monitoring
  - Culture shift – move from siloed teams to shared responsibility
  - Heavy focus on automation and feedback
  - DevOps adoption is a journey, not a step
  - Primary benefit is to frequently deploy high quality software releases

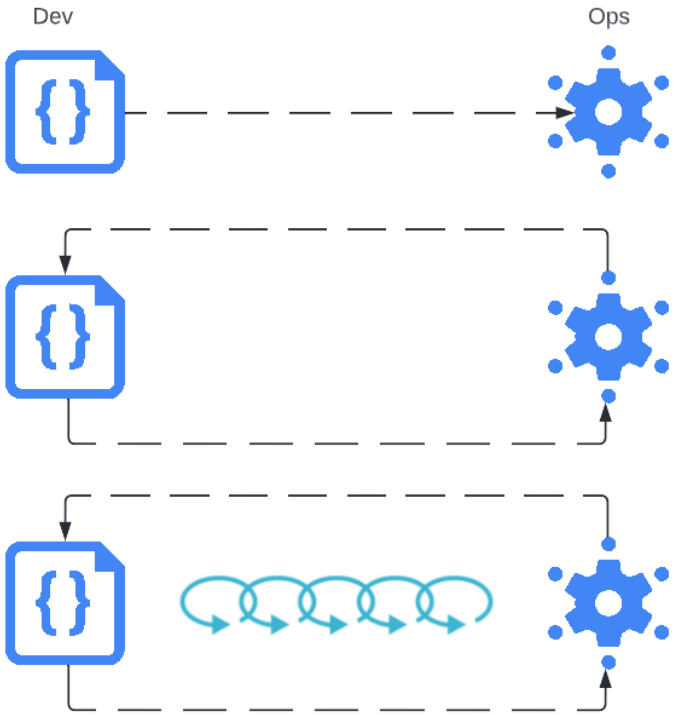
What problems is DevOps trying to solve?

- Value deliverance
- Reduced cycle time
- Faster deployments
- Reduced deployment failures
- Faster recovery
- Time to market



The Three Ways - the principles underpinning DevOps

- **The First Way:** Flows/Systems Thinking
- **The Second Way:** Amplify Feedback Loops
- **The Third Way:** Culture of Continual Experimentation and Learning



The First Way - Flows/System Thinking

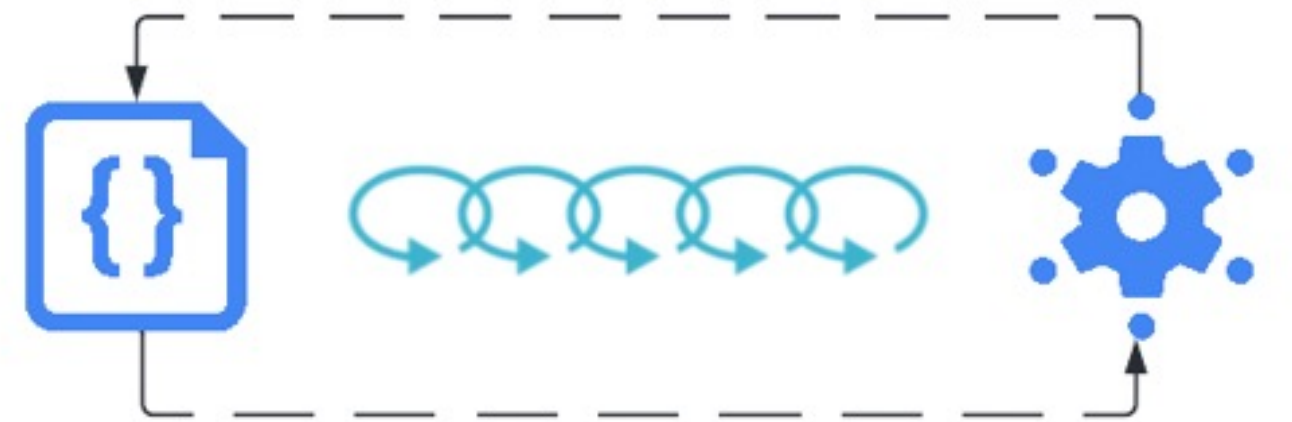
- Emphasises the performance of the entire system
- Limit work in progress
- Make work visible
- Do not pass defects downstream

The Second Way - Amplify Feedback Loops

- Create high quality information flow throughout value stream
- Feedback and Feedforward loops
- Complex systems typically have a high degree of interconnectedness
- Create feedback mechanisms where they are required

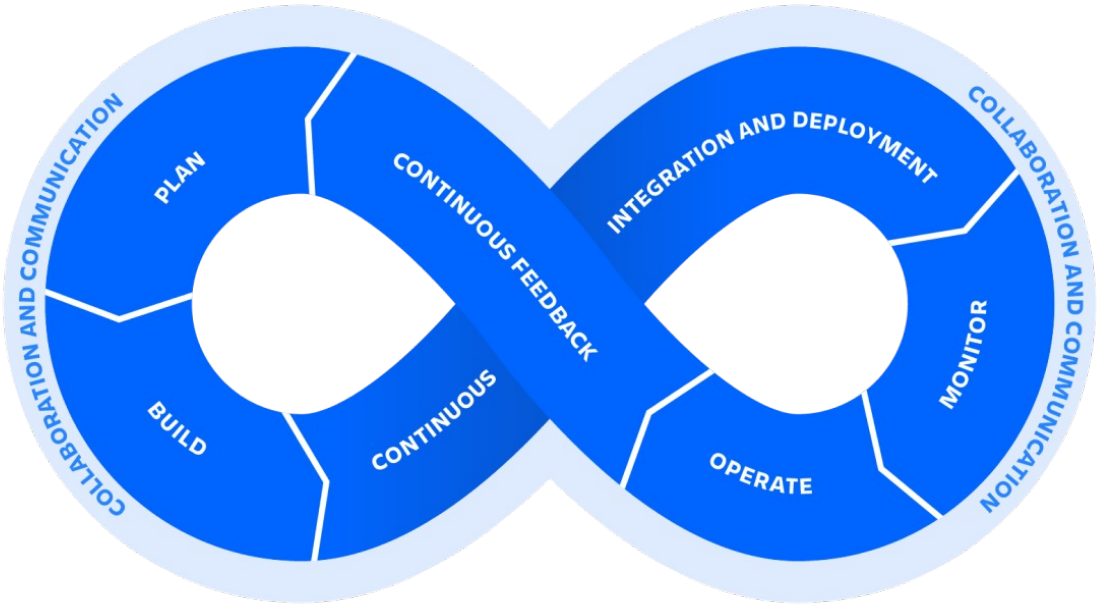
The Third Way - Continual Learning and Experimentation

- Create a culture that fosters continual experimentation, and understanding that repetition is the prerequisite to mastery
- Reserve time specifically for conducting such experiments
- Transform local discoveries into global improvements
- Promote injection of resilience into daily work



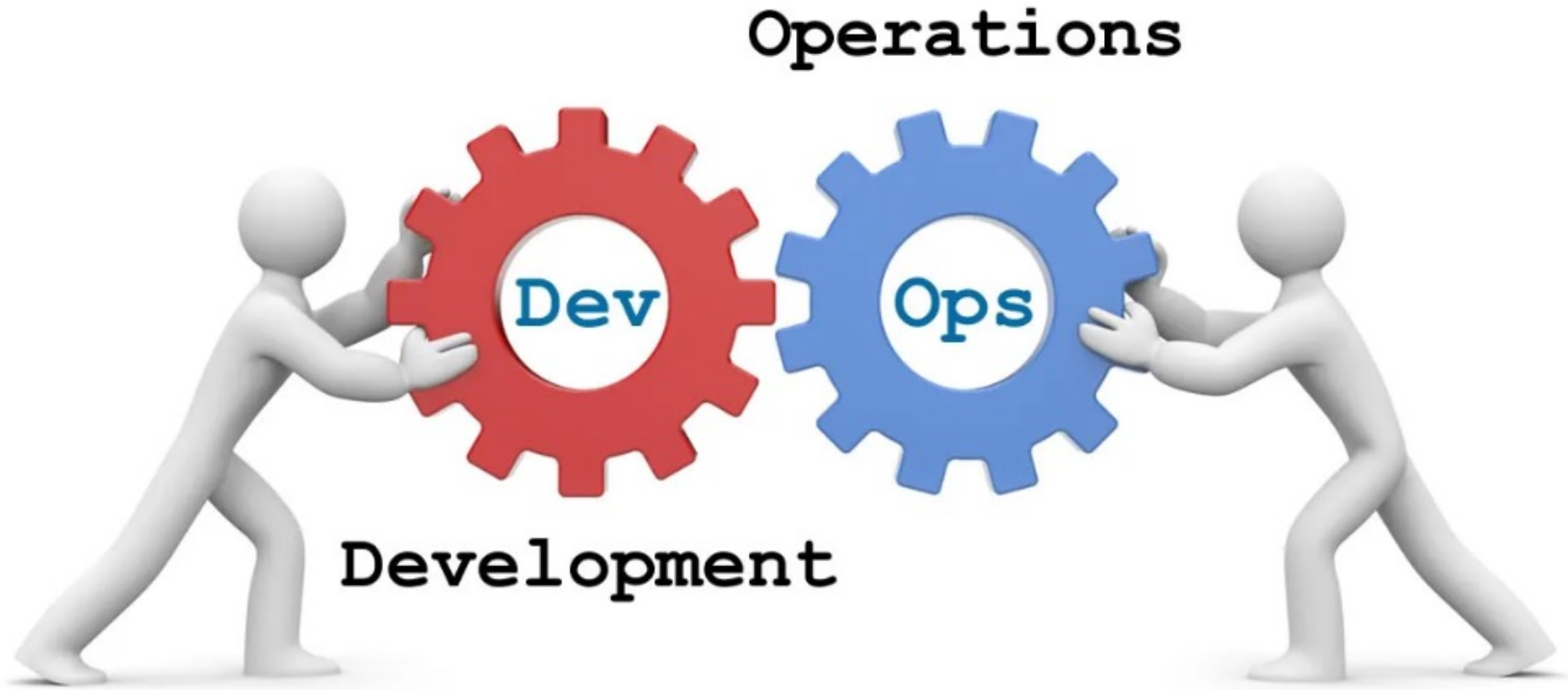
Supporting principles of DevOps

- Collaboration
- Automation
- Continuous Integration
- Continuous Delivery/Deployment
- Continuous Monitoring
- Continuous Improvement



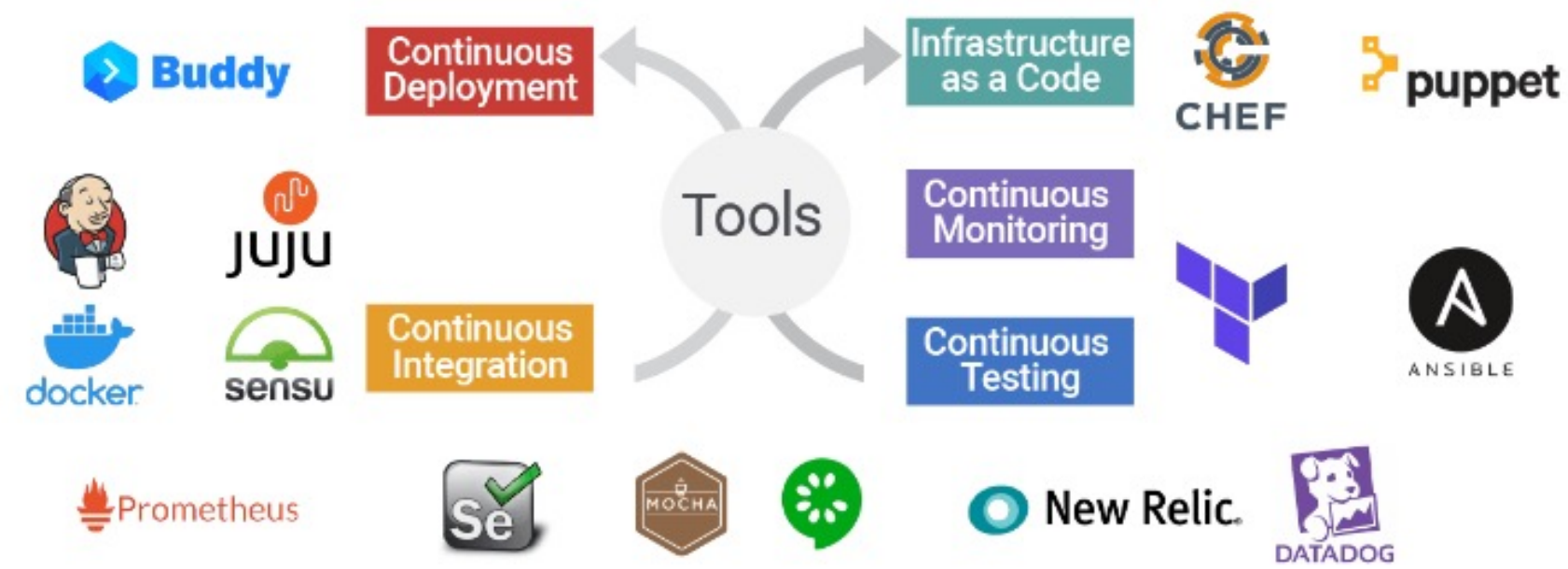
Collaboration

- Teams traditionally worked in isolation (minimal collaboration)
- Shared responsibility
- Give teams greater autonomy
- Separate failure from blame



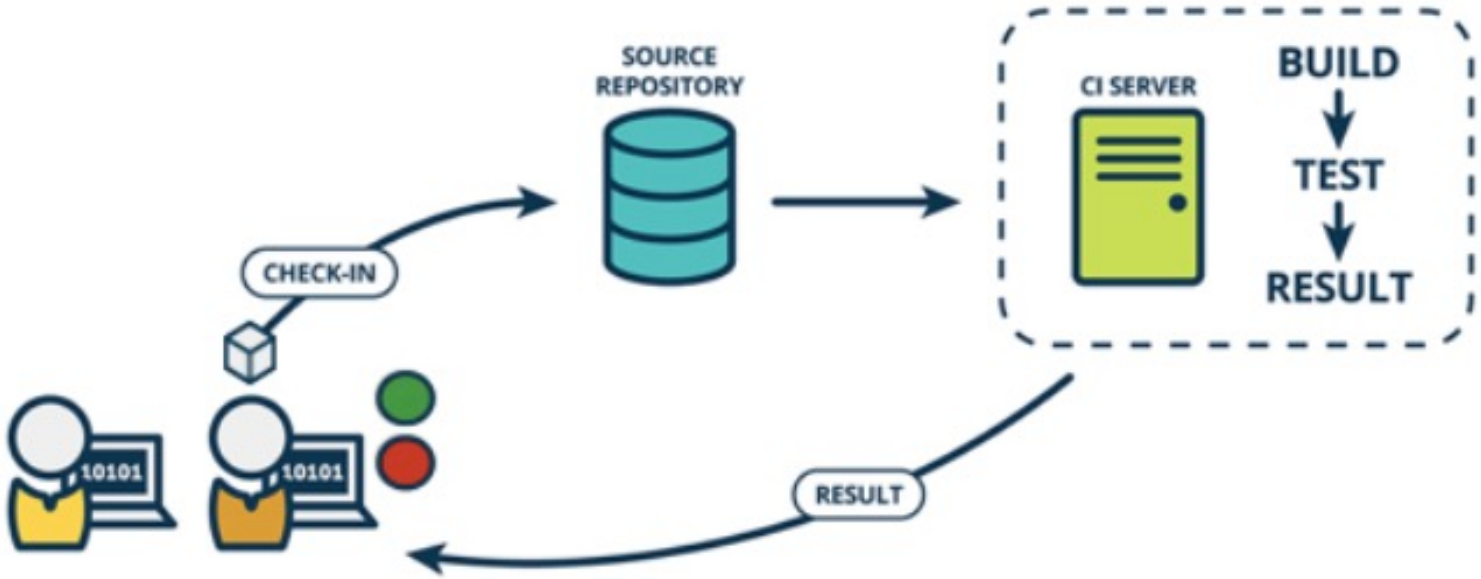
Automation

- Automate everything
- Repeatable Processes (simple and complex)
- Consistent
- Safer and more reliable
- Allows time to be spent on other activities



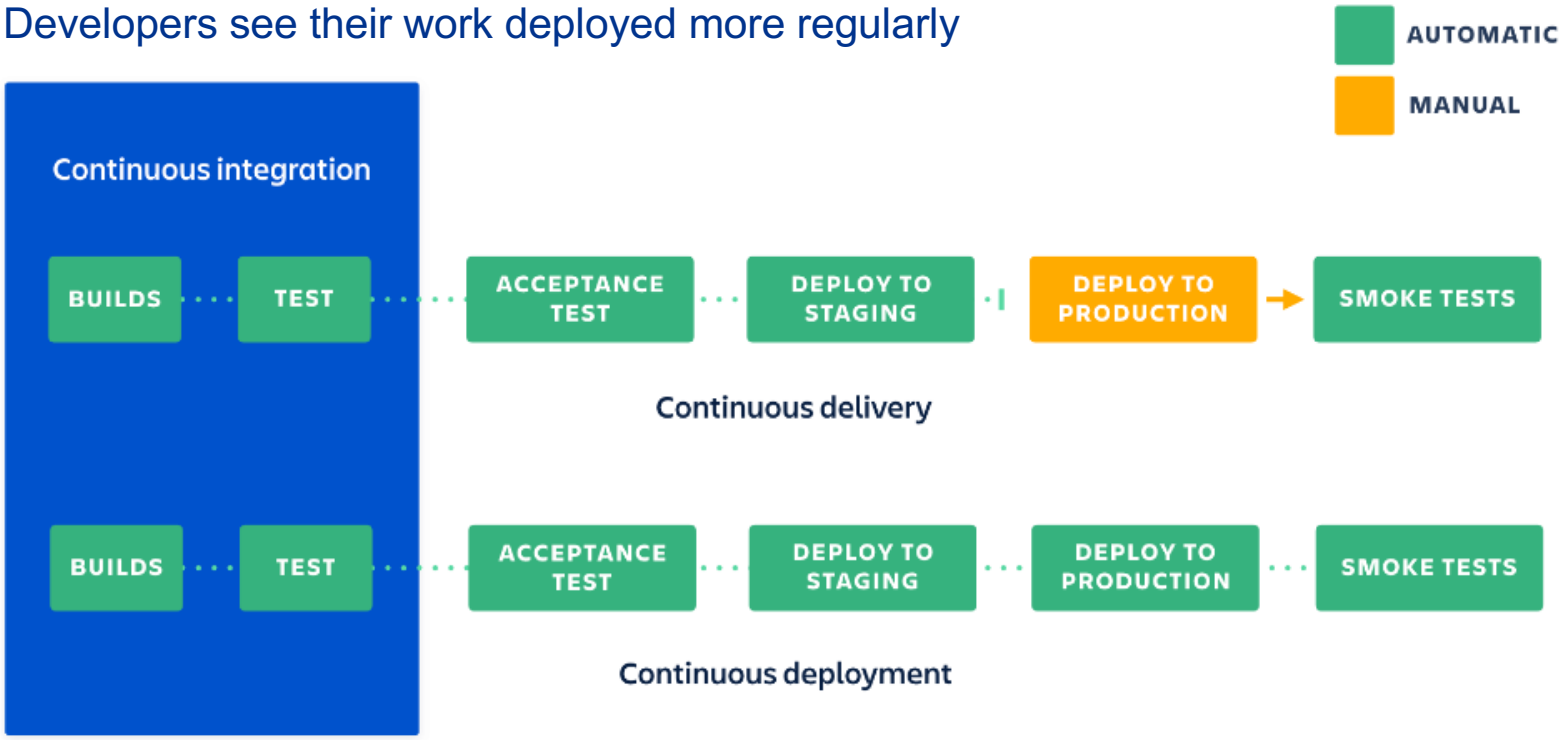
Continuous Integration

- Commit to main branch
- Robust testing regimes
- Trunk based development
- Reduce Developer coordination and associated overheads



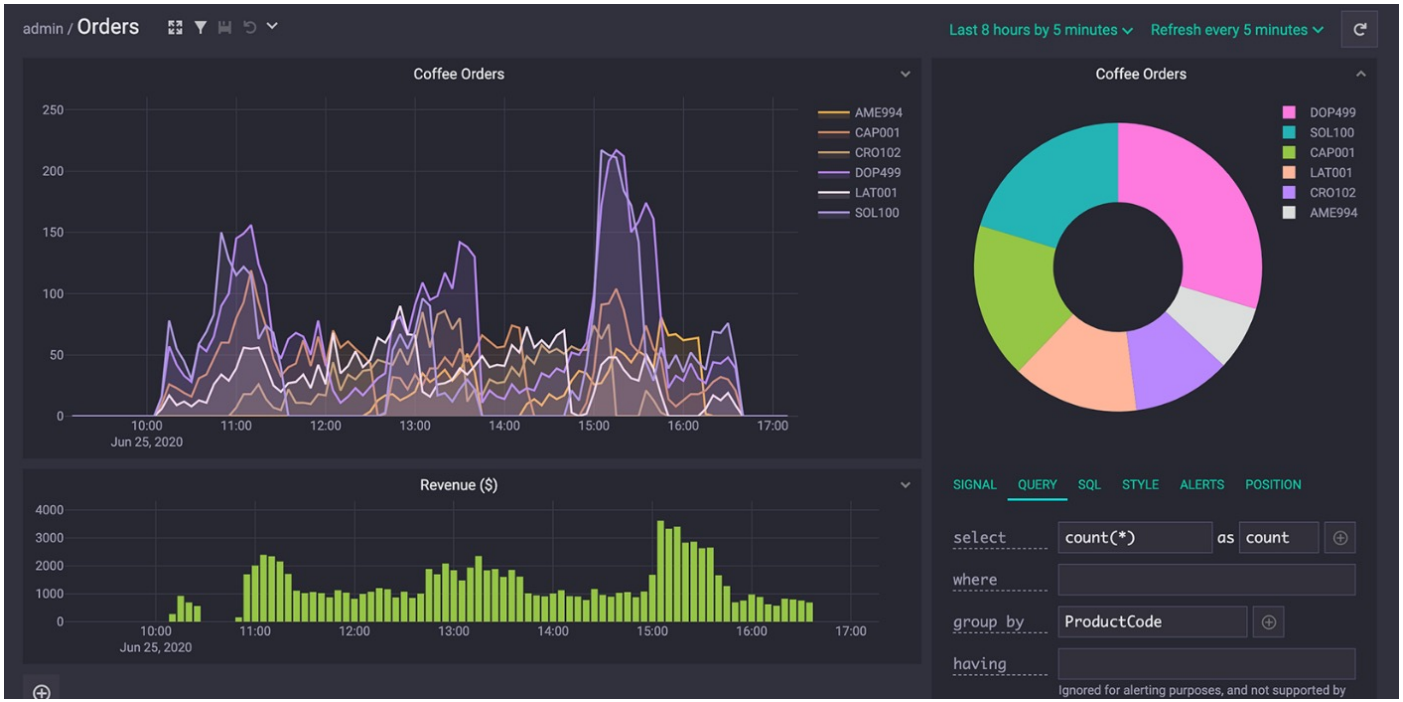
Continuous Delivery and Deployment

- Deploy to production frequently (daily)
- Develop and Deploy in small batches
- Rollbacks are less impactful
- Easier to troubleshoot issues with deployment/code
- Customer receives improvements more regularly
- Developers see their work deployed more regularly

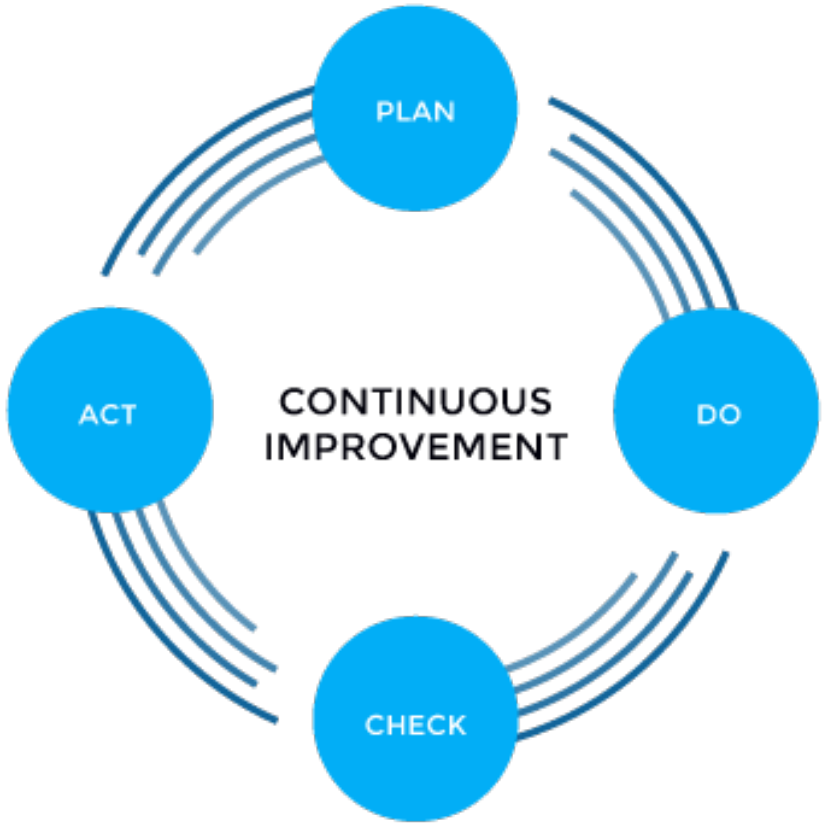


Continuous Monitoring

- Analyse performance of software:
  - What is normal behaviour? What is abnormal behaviour?
- It is critical to configure key metrics:
  - Hardware usage, User usage, Log telemetry
- Proactively respond to potential issues
- Enables customer to operate with minimal downtime



Continuous Improvement



- Better quality
- Improved productivity
- Boost employee morale
- Customer satisfaction

- Bottlenecks
- Suppressed innovation

The challenges

- Initial effort
- Dealing with legacy systems
- Unique skill set required
- Culture shift as well as technical shift

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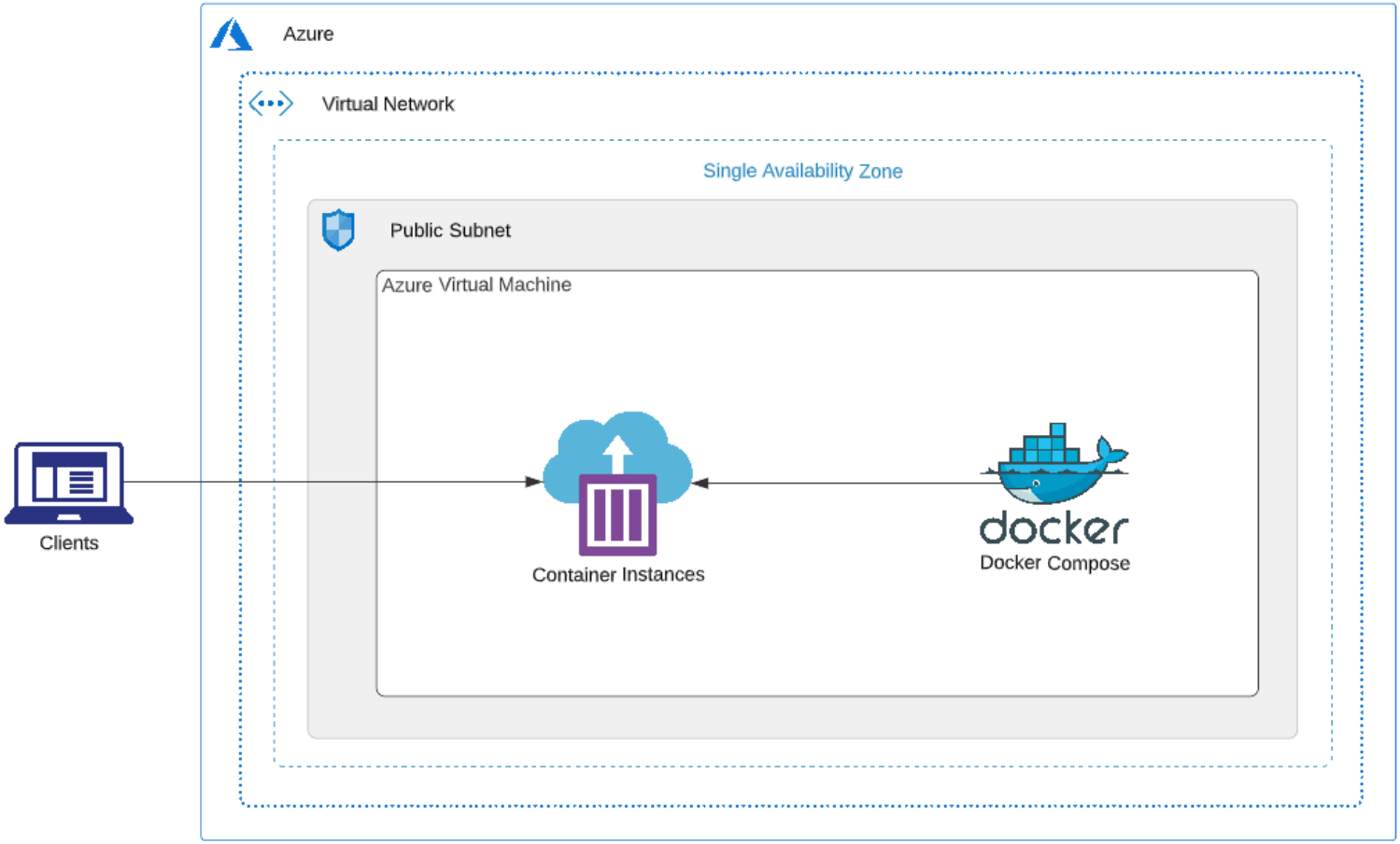
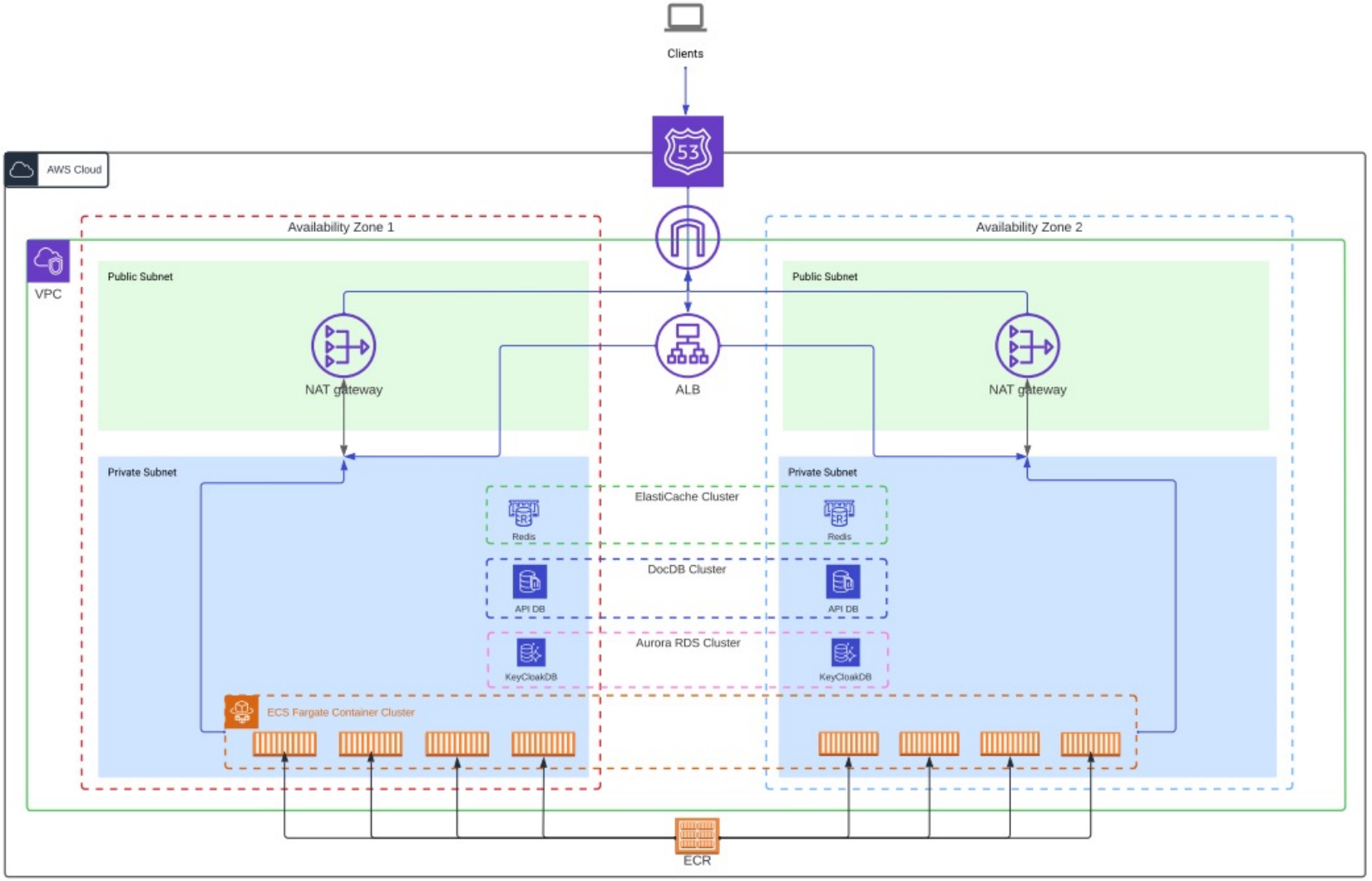
Story Time

The Previous Architecture

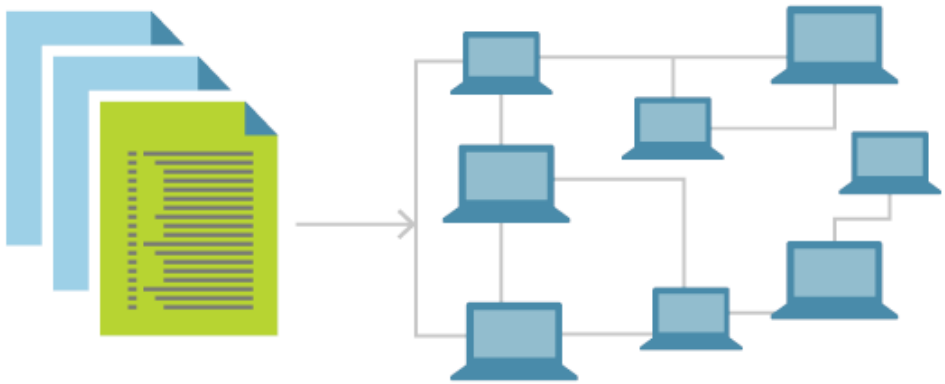


The New Architecture



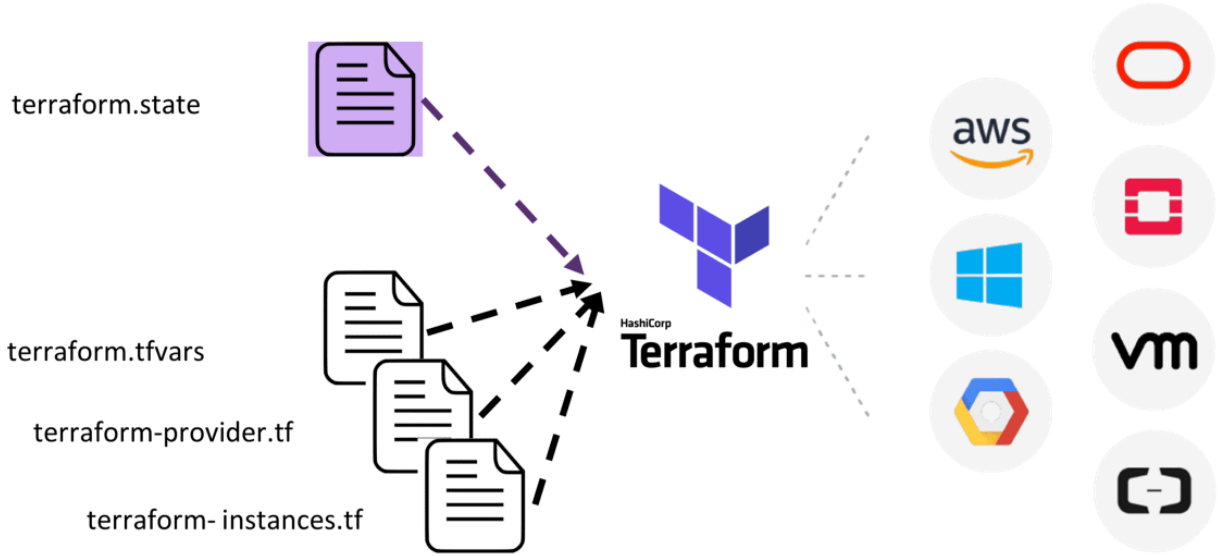
Infrastructure as Code (IaC)

- Describe and implement our cloud infrastructure using code
- Creates a layer of abstraction between declaration and implementation (human readable)
- Consistent
- Repeatable
- Can be automated
- Version controlled



Terraform

- IaC tool
- Created by HashiCorp
- Open source
- Declarative
- “Cloud agnostic”



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IaC Demonstration

Recommendations

- **Reading:**
  - The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organisations
- **Learning Pathway:**
  - DevOps Roadmap: https://roadmap.sh/devops

Good luck!

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Thank you

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