Software and Cyber Solutions Symposium 2018

Oh No, DevOps is Tough to Implement!

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Oh No, DevOps is Tough to Implement!

Misconceptions

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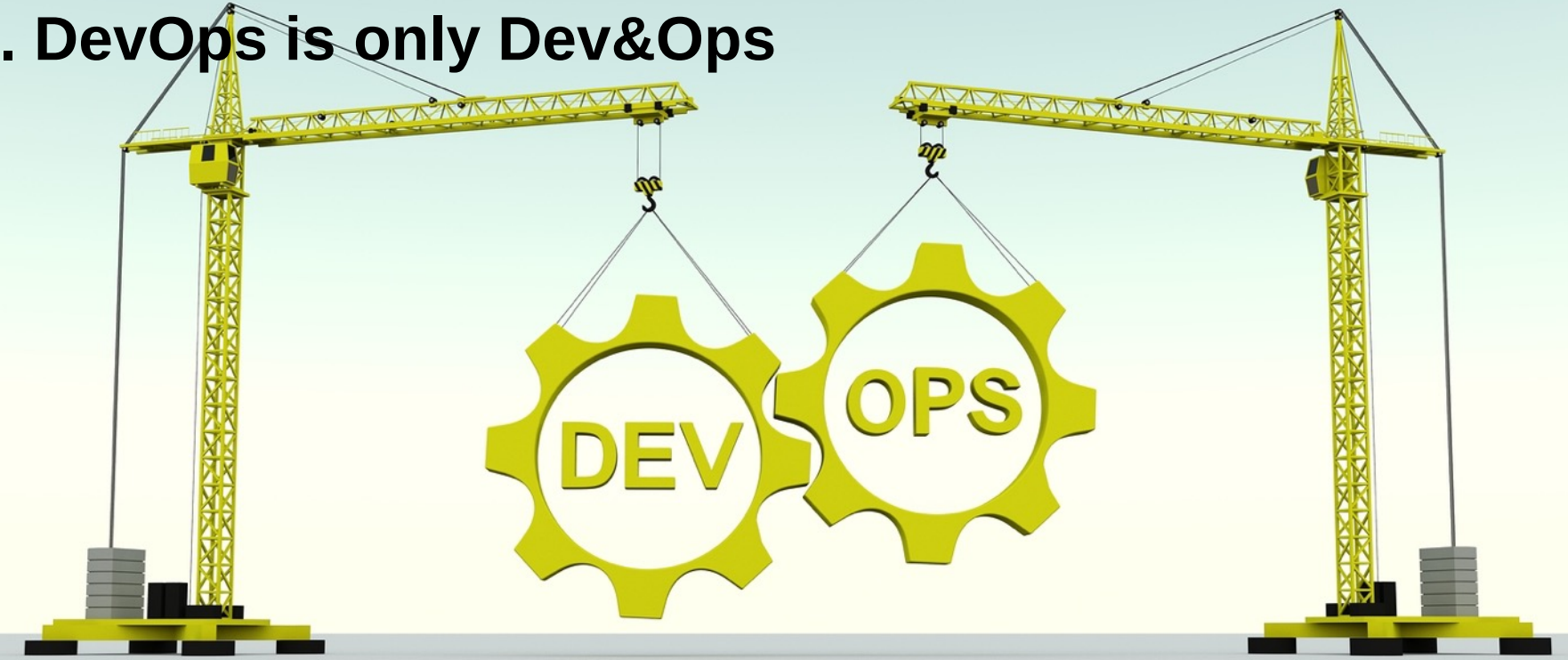
1. DevOps is only Dev&Ops



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Dev & Ops

- Follow Agile methodologies
  - Using Scrum, Kanban and modern development approaches
  - Self directing, self managed, self organized
- Using any new technology
  - Each Dev has own development strategy
  - OpenSource,

- Operations
  - Runs the application
  - Manages the infrastructure
  - Support the applications
- Operations provides
  - Service Strategy, Design, Operations
  - Secure Systems

Dev wants to deliver software faster with new requirements…

Ops wants to maintain stability, operations up-time…

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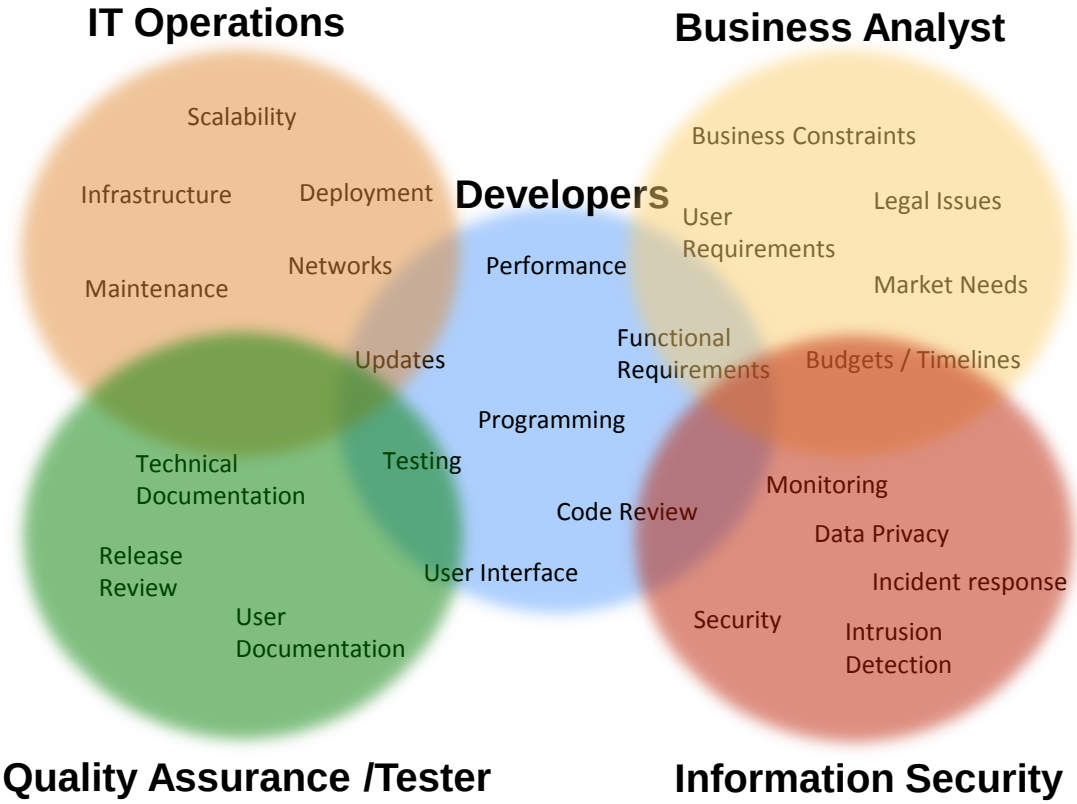
It is more than Dev and Ops



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2. DevOps is FAD

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IT performance metrics	2016	2017
Deployment frequency	200x more frequent	46x more frequent
Lead time for changes	2,555x faster	440x faster
Mean time to recover (MTTR)	24x faster	96x faster
Change failure rate	3x lower (1/3 as likely)	5x lower (1/5 as likely)

* 2017 state of DevOps report by puppet and DORA

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3. DevOps is all about tools

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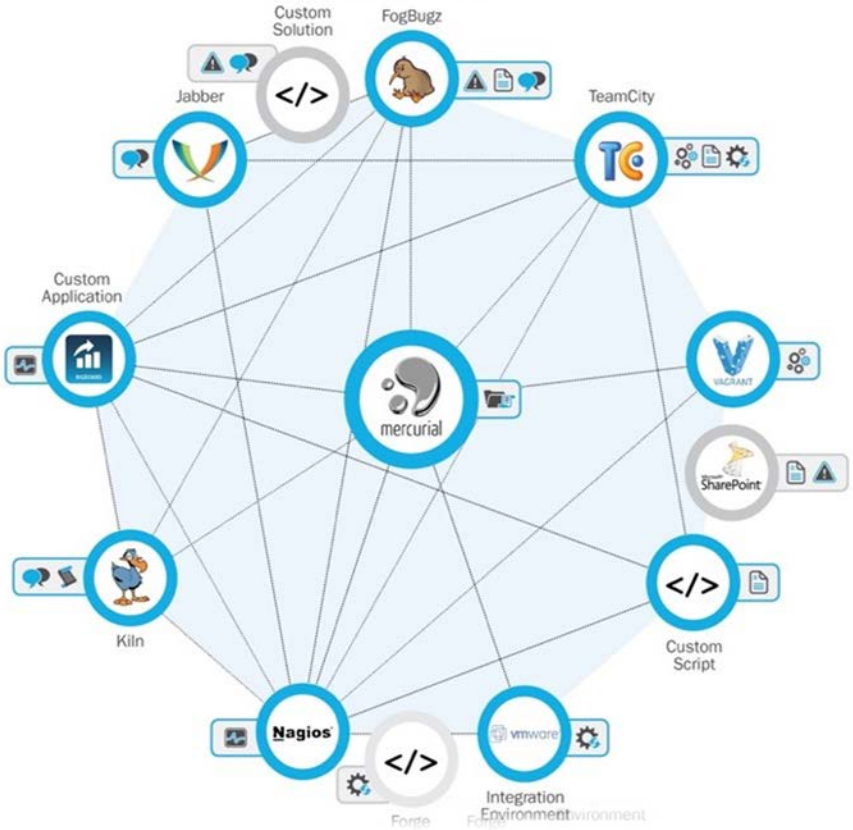

- Many tools can help you achieve your DevOps goals…
- But **don't get distracted!**
- **Integration and communication**, even among tools, is key.
- Redundant tooling is worse than no tooling at all.

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4. DevOps is Product!

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DevOps is About Culture and Quality

- Early involvement of experts
  - Ops = experts in maintainability and deployability

- Complete engagement
  - Don’t bring Ops Engineers in as consultants – make them first-class team members with same success criteria as devs

- Break down organizational silos
  - Enable and require constant communication

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Without a Collaborative Culture, You Don't Have DevOps

Ask yourself:

- Do your Devs know **exactly** what **actual** production looks like?
- Does Ops know how Devs package a build?
- Is it **consistent**?
- Can both Dev and Ops collaborate on server configuration and apply it automatically to both **development and production environments**?
- Do business analysts **know the cost** of feature addition or modification?
- Can project managers measure project status **at any point in time**?
- Can the customer measure project status **at any point in time**?

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5. DevOps is same for all : One Size Fits all

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DevOps Requires Customization to Meet Your Unique Needs

Example: How should I configure my CI server?

- What is your project technical requirments ?
- Want 90% test coverage?
  - **Fail the build if code base is < 90% covered**

- Want all DB queries < 2sec?
  - **Test them, and fail the build otherwise**

- What does **quality** mean to your organization?

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6. DevOps is a Team & Title

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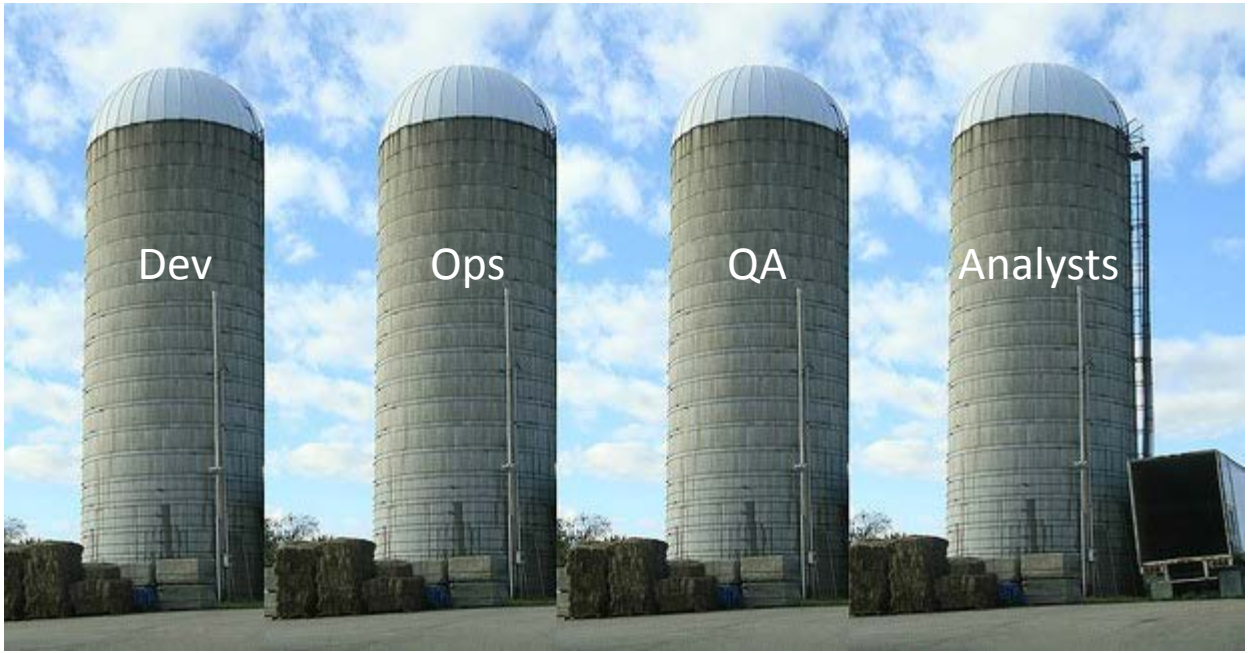

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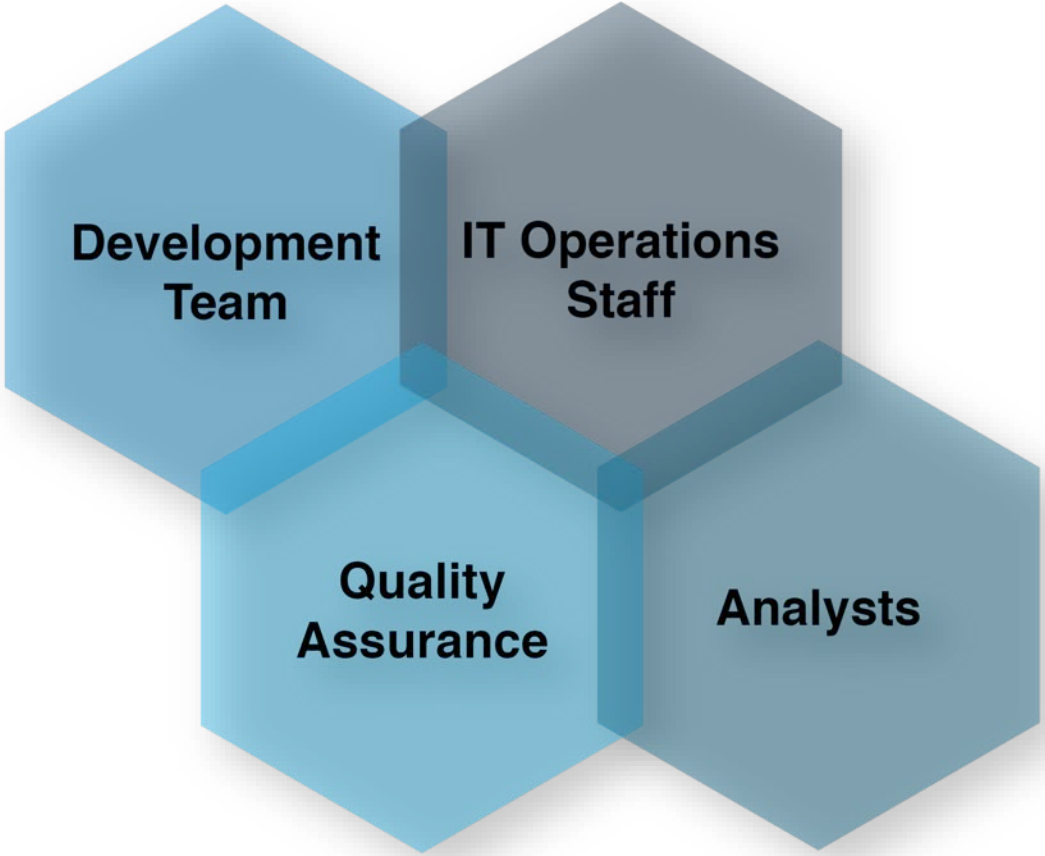
DevOps Breaks Down Silos



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7. DevOps replaces Ops (No Ops!)

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Effective Teams Need Dedicated Experts

- Primary attributes of your system require
  - **dedicated expert team members**
    - Security, Usability, Deployability

- DevOps does **not** mean telling developers to learn / automate operations tasks

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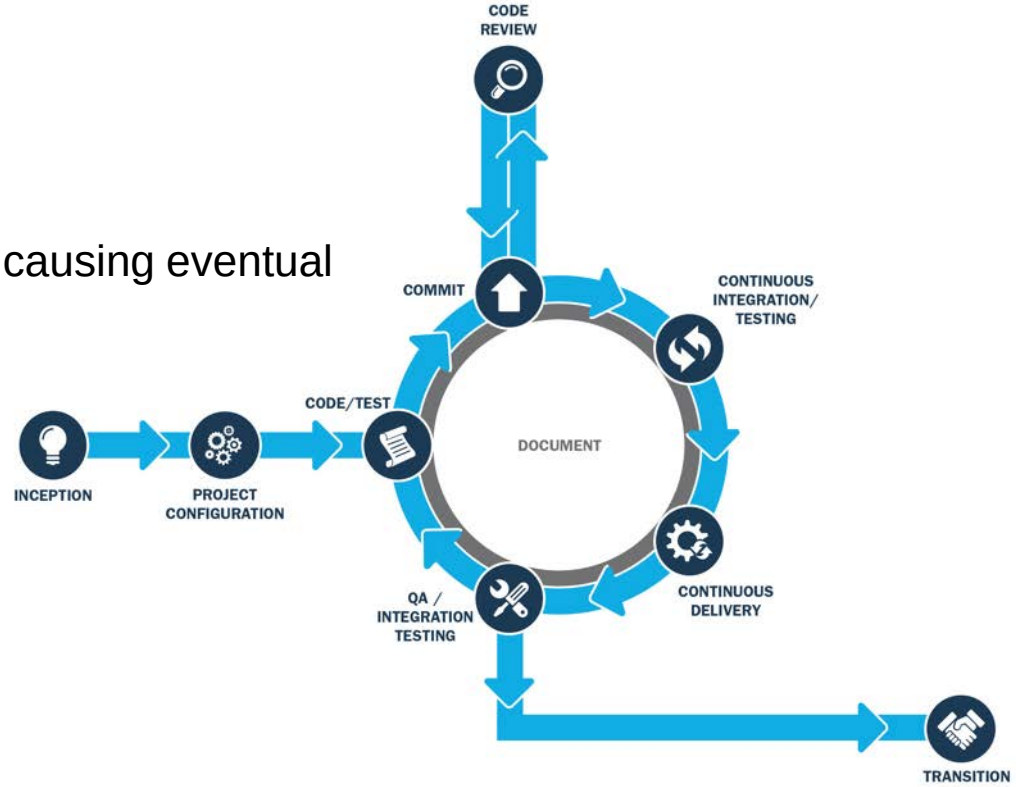
The SDLC is Full of Decision Points

Without Ops knowledge,

developers continually
make uninformed decisions, causing eventual
risk or **inefficiency**



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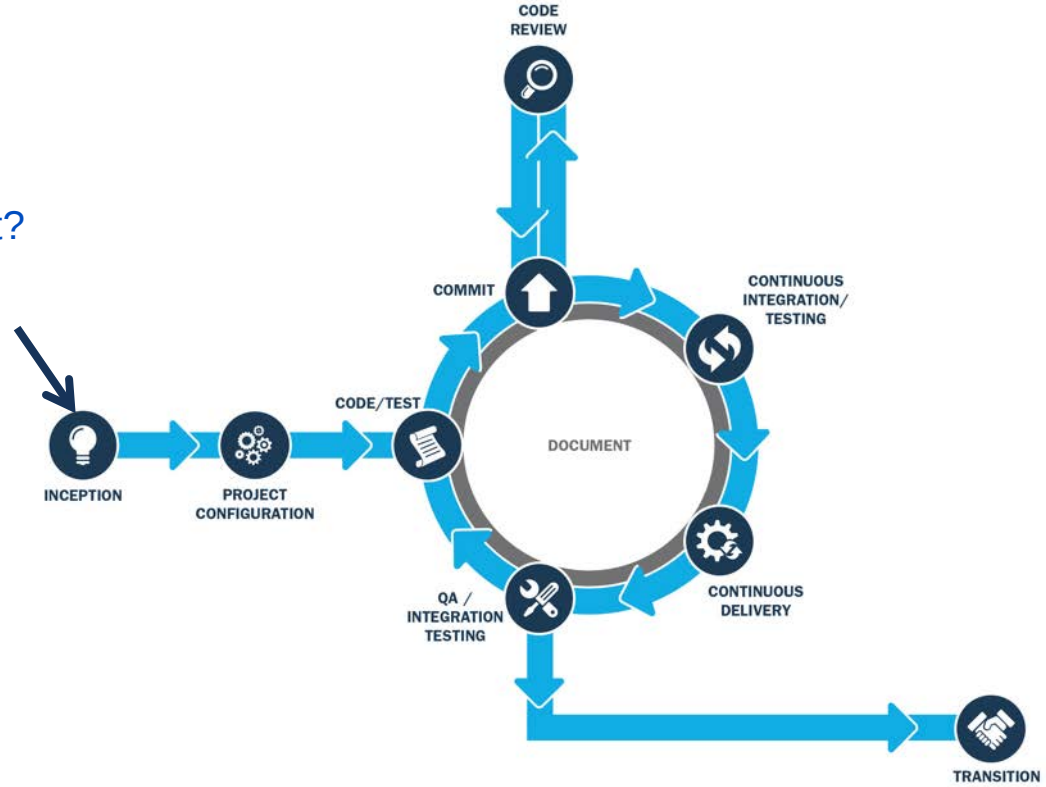
The SDLC is Full of Decision Points

How many users?

Payment model?

Who is the Target Market?

Which regions?



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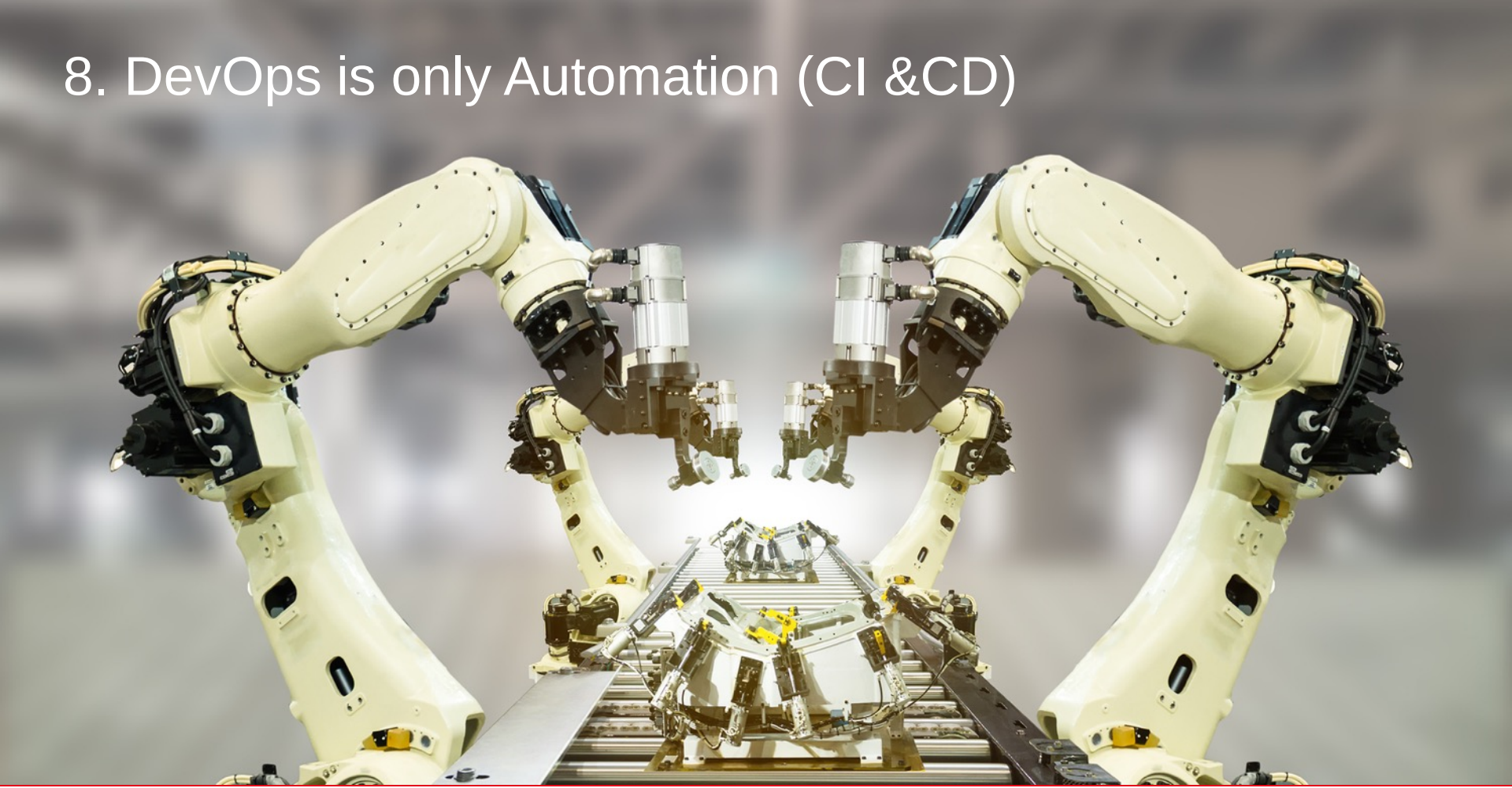
8. DevOps is only Automation (CI &CD)



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Not Everyone Needs to Achieve Continuous Deployment

- Your DevOps goals should be designed around business needs
  - Deployment frequency?
  - Production environment.
- Do frequent deployments give you a competitive edge?
- Establish traceability, visibility and collaborative environment

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Oh No, DevOps is Tough to Implement!

So DevOps is…

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DevOps and How it started

DevOps is a set of principles and practices emphasizing collaboration and communication between software development teams and IT operations staff along with acquirers, suppliers and other stakeholders in the life cycle of a software system [1]

- Patrick Debois “Agile infrastructure and operations: how infra-gile are you?”, Agile 2008 Conference
- John Allspaw “ 10+Deploys per Day: Dev and Ops Cooperation”, Velocity 2009
- DevOpsDays, October 30th 2009, #DevOps term born

[1] IEEE P2675 DevOps Standard for Building Reliable and Secure Systems Including Application Build, Package and Deployment

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DevOps has four Fundamental Principles

Collaboration: between project team roles

Infrastructure as Code: all assets are versioned, scripted, and shared where possible

Automation: deployment, testing, provisioning, any manual or human-error-prone process

Monitoring: any metric in the development or operational spaces that can inform priorities, direction, and policy

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Challenges

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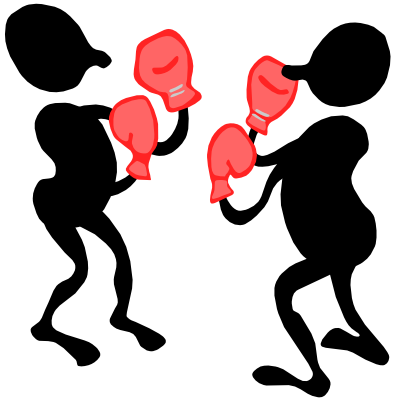
Incentivizing Behaviors



- Blame-Free Culture
  - No Hiding of Problems
  - Culture of shared responsibility
  - Collective decision and continuous learning
- Cross-Silo Goals
  - Incentivize Collaboration
  - Reduce “Not My Job”
  - Increase Sense of Purpose
- Optimize Ease-of-Use
  - Tools: Chat, ChatOps, Wiki
  - Integrated Pipelines

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2. Organizational Structure

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Conway's Law:

" How to organize our teams affects how we perform our work"

- Share common goals from top to bottom
- Enable business value oriented team
- Functional Team
- Share responsibilities (like Security is everyone's job)
- Keep team size small

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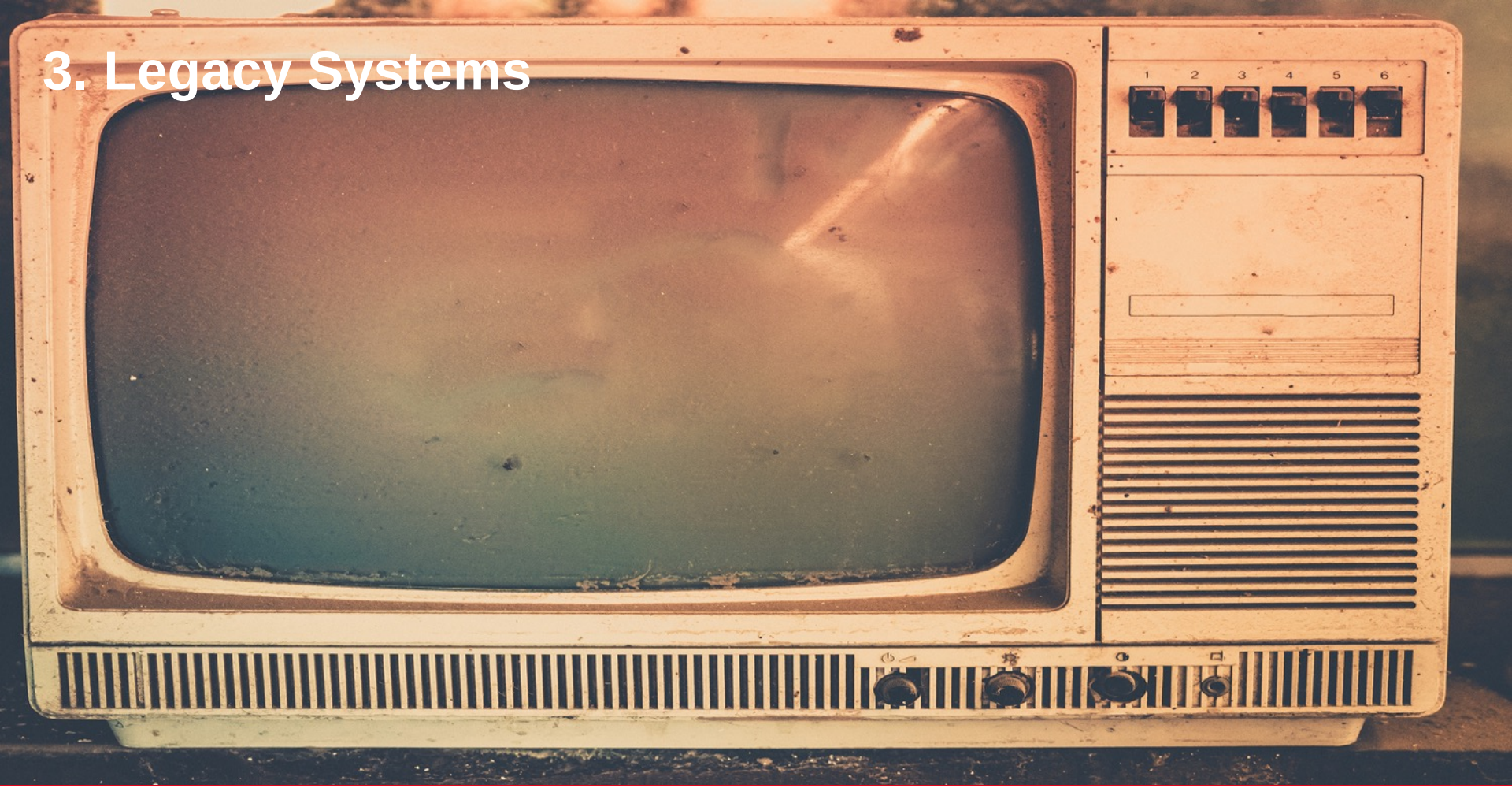
3. Legacy Systems



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Apply DevOps to migrate Legacy Systems

- Ancient systems should be replaced.
- Installing new systems to fit in
- Build a new version instead of maintaining
- Re-architect to support incremental and iterative development
- Enable dynamic integration of systems

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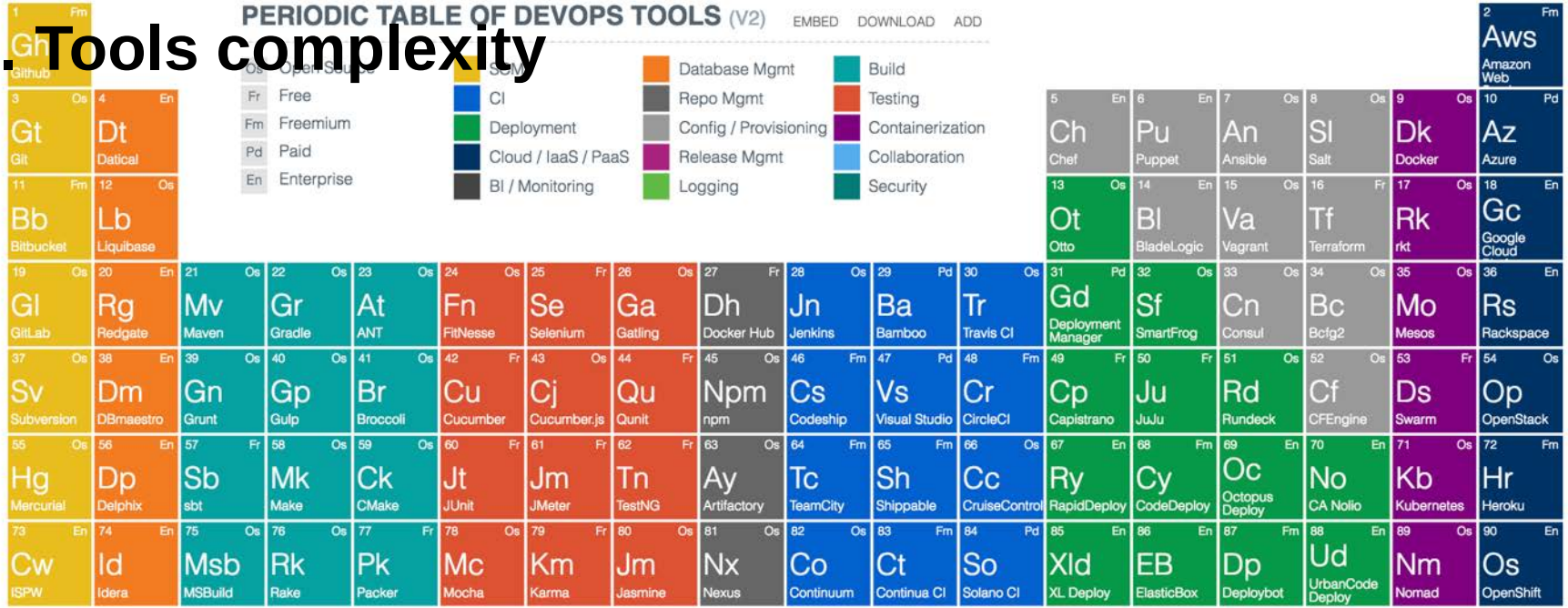
4. Tools complexity



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Tools Quality Attributes

- Integrate-ability
- Interoperability
- Usability
- Portability
- Resilience
- Security/Permissions
- Availability (Error handling)
- Scalability

- Performance
- Modifiability
- Configurability
- “Automate-ability” (of manual tasks)
- “Approvability” (allows for manual approval)
- Measurability?
- Other?

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4. Lack of Metrics and Measurements

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Decide what to measure

- Deployment frequency
- Lead time
- # of work items (tickets)
- Defect escape rate
- Mean time to detection (MTTD)
- Mean time to recovery (MTTR)
- Application performance

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5. Process Challenges

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DevOps Enabler..

Establish a process to enable people to succeed using the platform to develop Secure application

Such that;

- Constant communication and visible to all
- Ensures that tasks are testable and repeatable
- Frees up human experts to do challenging, creative work
- Allows tasks to be performed with minimal effort or cost
- Creates confidence in task success, after past repetitions
- Faster deployment , frequent quality release

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6. DevOps and Acquisition

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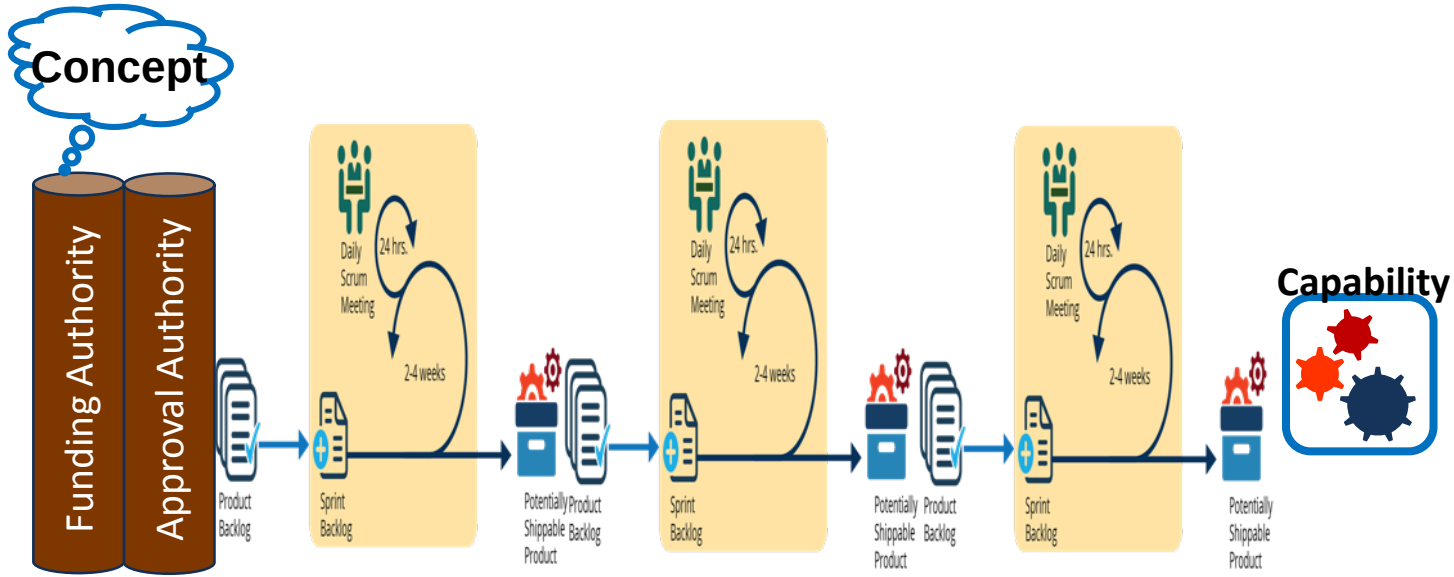
Apply DevOps Mindset

Understand many portfolios of work as a continuous flow of smaller efforts



Expand the collaboration, iteration, distributed (automated) governance constructs of Agile and DevOps to acquisition, needs analysis, certification, etc…

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7. DevOps and Governance

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Compliance as Code

- Plan from beginning and carry-out throughout the lifecycle
- Enable audit log
- Design DevOps pipeline to comply with governance
- Make policy available to all stakeholders
- Implement configuration management and keep track every changes.

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7. Inconsistent environments

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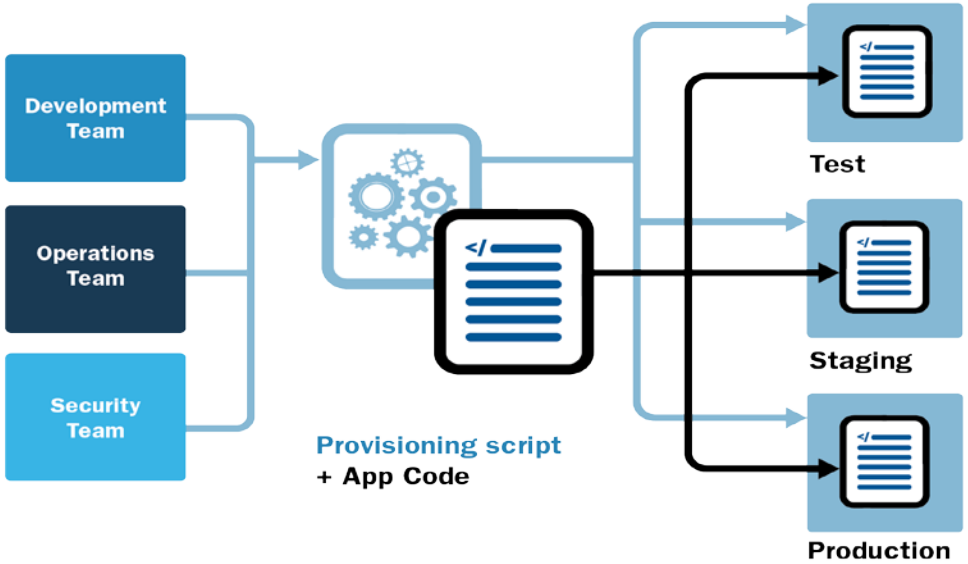
Use Infrastructure as Code (IaC)



- Environment parity throughout the development pipeline
- Develop and treat provisioning scripts as part of code repository
- Share IaC amongst the developer and IT operational teams

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8. Security (RMF, ATO)

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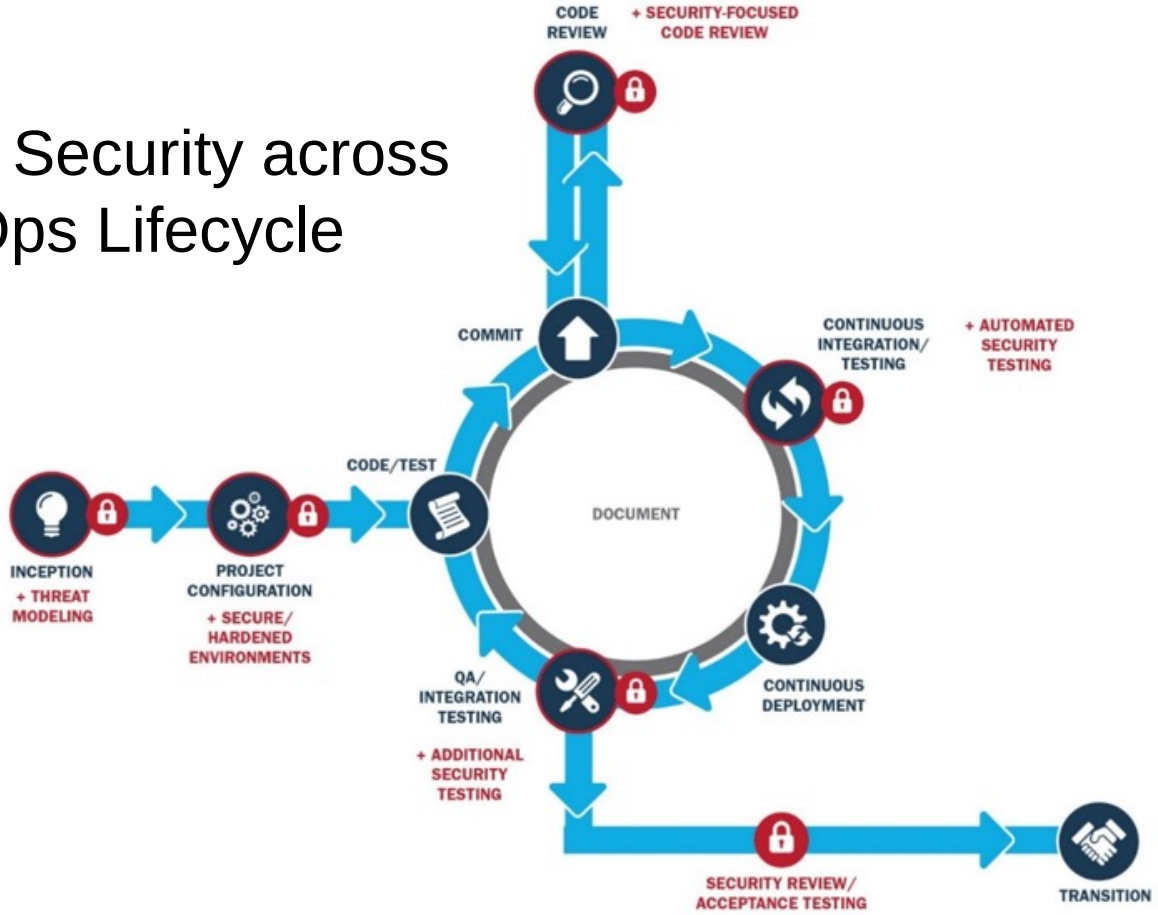
Integrate Security across DevOps Lifecycle



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SLS team GitHub Projects

- Once Click DevOps deployment
  https://github.com/SLS-ALL/devops-microcosm
- Sample app with DevOps Process
  https://github.com/SLS-ALL/flask_api_sample
  - Tagged checkpoints
    - v0.1.0: base Flask project
    - v0.2.0: Vagrant development configuration
    - v0.3.0: Test environment and Fabric deployment
    - v0.4.0: Upstart services, external configuration files
    - v0.5.0: Production environment
- On YouTube:
  https://www.youtube.com/watch?v=5nQlJ-FWA5A

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For more information…

DevOps Blog: https://insights.sei.cmu.edu/devops

Webinar : https://www.sei.cmu.edu/publications/webinars/index.cfm

Podcast : https://www.sei.cmu.edu/publications/podcasts/index.cfm

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Any Questions?

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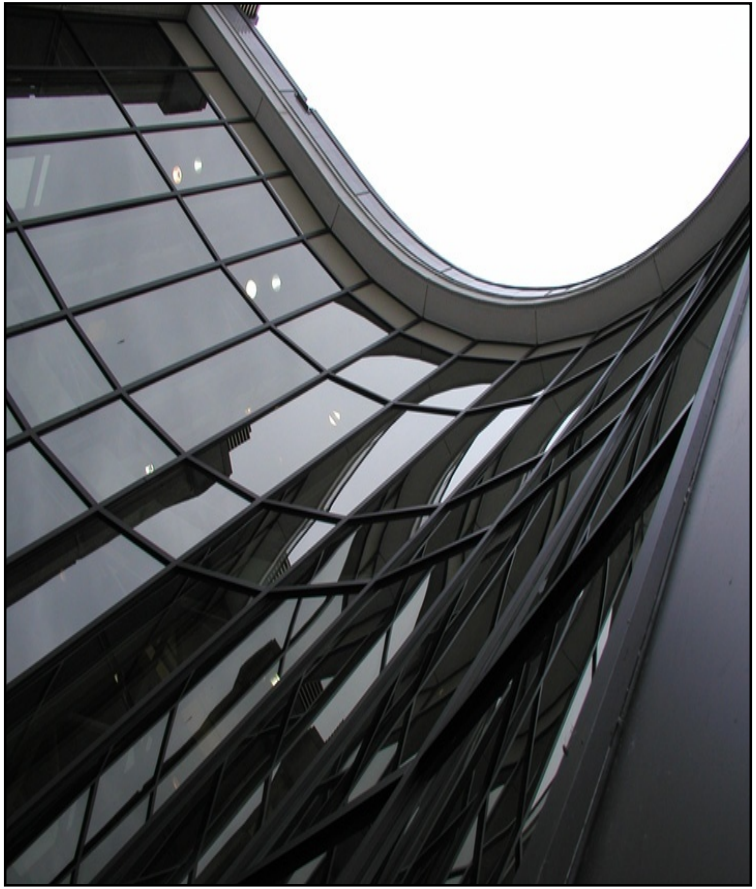

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