DevOps for Defense

January 2020

DevOps Fundamentals

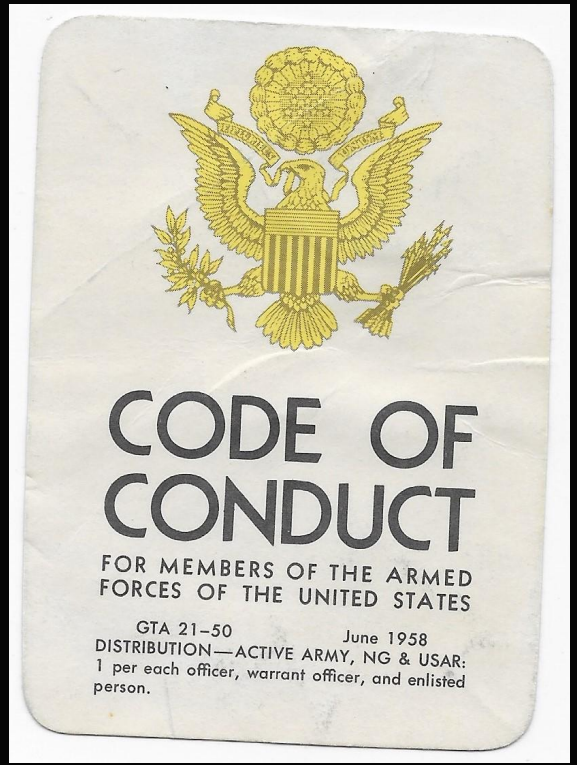
JD Black

https://devopsfordefense.org
https://www.meetup.com/DevOps-for-Defense/
https://github.com/jondavid-black/DevOpsForDefense
devopsfordefense@gmail.com
https://twitter.com/devops4defense

Sponsored by: TEKsystems Own change

DevOps for Defense Meetup: Code of Conduct

- UNCLASSIFIED ONLY!!!!
- Treat each other with respect and professionalism.
- Do not talk about private, sensitive, or proprietary work.
- Do talk about your experiences, needs, desires to improve work in our domain.
- Do share your thoughts.
- Do learn from others.
- Do respect & tip your bartenders!



What's Next for DevOps for Defense?

February

Hans Dockter
CEO Gradle Inc.
Powerful Automation & Insight

March

Open source complete CI/CD toolchain out-of-the-box.

Beyond

(Still coordinating & planning, but here's what we're thinking.)

Nicolas M. Chaillan
USAF Chief Software Officer -
Bringing DevSecOps DoD-wide

Dr. Mik Kersten
CEO Tasktop -
Author of Project to Product

Hack-a-thon?
Opportunity to put our DevOps learning into practice.

Provide us feedback so we can tailor to your needs.

DevOps for Defense Community Challenge

Donate Time 1 Day a Month

https://girlswhocode.com/

Emeka Barclay Marshall
Language Arts | Liberty Middle Scho
Apple Teacher
Google Certified Educator
Microsoft Innovative Educator
Flipgrid Certified Educator

"Knowledge is power. Information is liberating. Education is the premise of progress, in every society, in every family." -Kofi Annan

Website: caffeinatedteacher.weebly.com
Twitter: @teacheremeka

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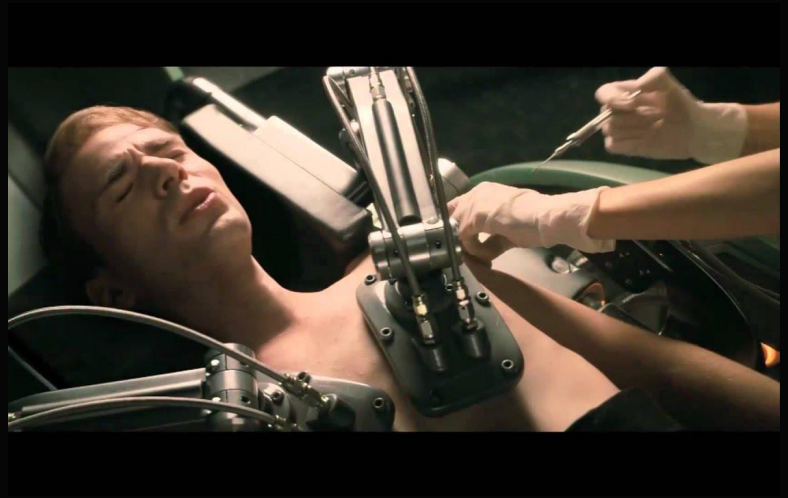
https://github.com/jondavid-black
No fees! - All donations directly support the future of DevOps for Defense meetup!

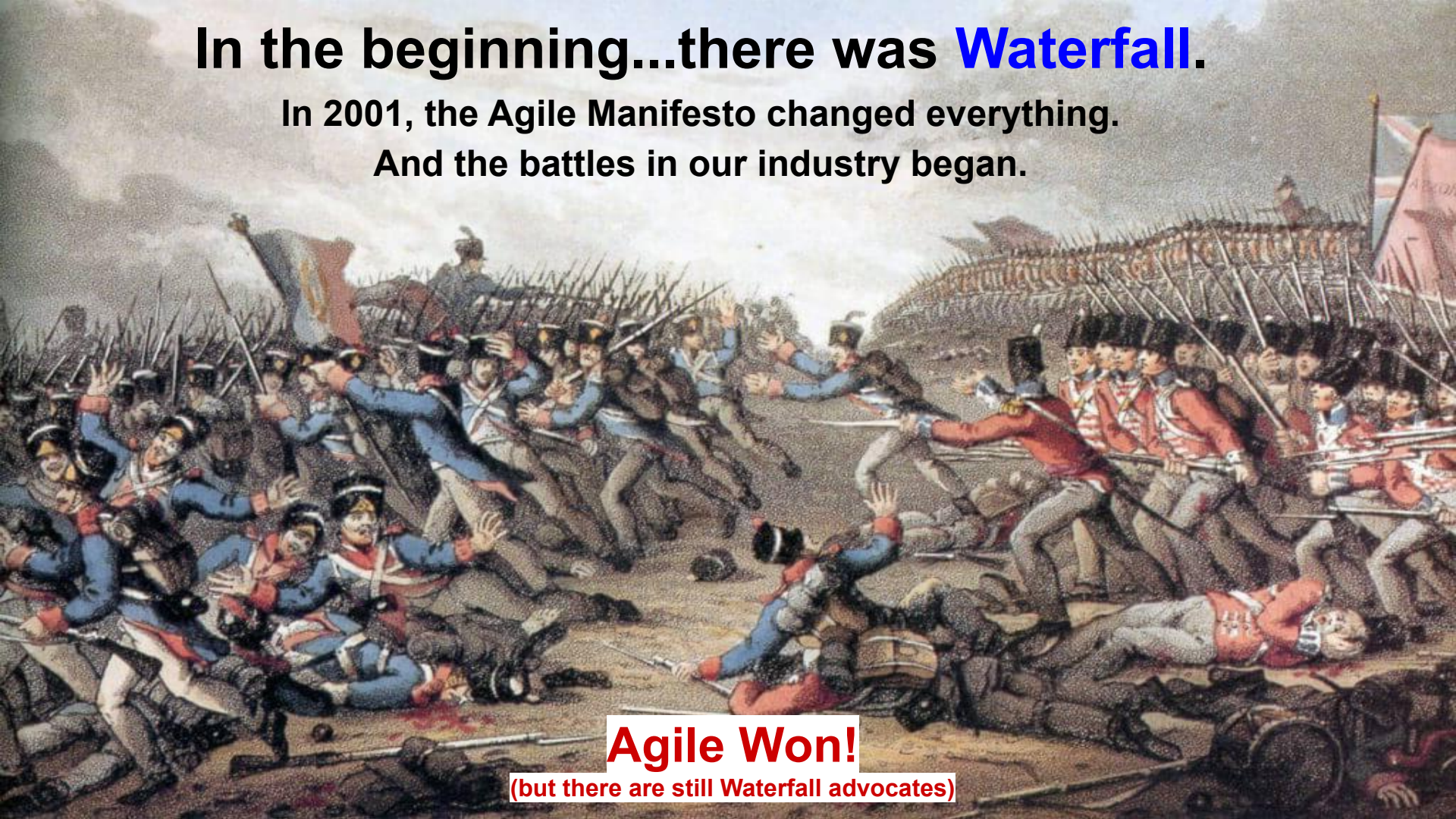
Origin Story



In the beginning...there was Waterfall.

In 2001, the Agile Manifesto changed everything.

And the battles in our industry began.



Agile Won!

(but there are still Waterfall advocates)

History of DevOps

There is definitely a historical connection between DevOps and Agile. Starting all the way back in 2008 with Patrick Dubois presenting Agile Infrastructure and Operations at the Agile 2008 conference.

See The History of DevOps by Damon Edwards for more information

10 deploys per day

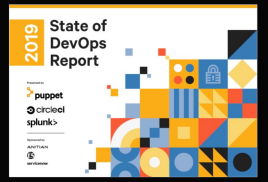
Dev & ops cooperation at Flickr

John Allspaw & Paul Hammond
Velocity 2009

Agile nor DevOps are Business Goals in and of Themselves

- Both are cultural movements that can inspire your organization with better means for achieving your goals
  - Encourage a Learning Organization
  - Experimentation, Fail Fast, Limit the Blast Radius
- Agile and DevOps work better in combination
  - Small Batch Planning & Execution
  - Regular cadence that delivers deployable products
- It is about communication and involving anyone in the development of the product
  - Attack ambiguity and uncertainty - write good stories!

Why DevOps?



High Performers Are More Agile

46x more frequent deployments

440x faster lead times than their peers

Source: Puppet/DORA 2017 State Of DevOps Report https://puppet.com/resources/whitepaper/state-of-devops-report @RealGeneKim

High Performers Are More Reliable

5x lower change failure rate

96x faster mean time to recover (MTTR)

Source: Puppet/DORA 2017 State Of DevOps Report https://puppet.com/resources/whitepaper/state-of-devops-report @RealGeneKim

High Performers Are More Secure And Controlled

2x less time spent remediating security issues

29% more time spent on new work

Source: Puppet Labs 2016 State Of DevOps Report https://puppet.com/resources/white-paper/2016-state-of-devops-report @RealGeneKim

High Performers Win In The Marketplace

2x more likely to exceed profitability, market share & productivity goals

2x more likely to achieve organizational and mission goals, customer satisfaction, quantity & quality goals

Source: Puppet/DORA 2017 State Of DevOps Report https://puppet.com/resources/whitepaper/state-of-devops-report @RealGeneKim

High Performers Win In The Marketplace

2.2x higher employee Net Promoter Score

50% higher market capitalization growth over 3 years*

Source: Puppet Labs 2016 State Of DevOps Report https://puppet.com/resources/white-paper/2016-state-of-devops-report @RealGeneKim

Key Capabilities that Drive High Performance

Technology and automation

- Version control
- Deployment automation
- Continuous integration
- Trunk-based development
- Test automation
- Test data management
- Shift left on security
- Continuous delivery
- Loosely-coupled architecture
- Architect for empowered teams

@nicolefv

DORA DEVOPS RESEARCH & ASSESSMENT

Process

- Gather and implement customer feedback
- Work in small batches
- Lightweight change approval process
- Team experimentation

@nicolefv

DORA DEVOPS RESEARCH & ASSESSMENT

Measurement and Monitoring

- Visual management
- Monitoring for business decisions
- Check system health proactively
- WIP limits
- Visualizations

@nicolefv

DORA DEVOPS RESEARCH & ASSESSMENT

Culture

- Westrum organizational culture
- Climate for learning
- Collaboration among teams
- Make work meaningful
- Transformational leadership

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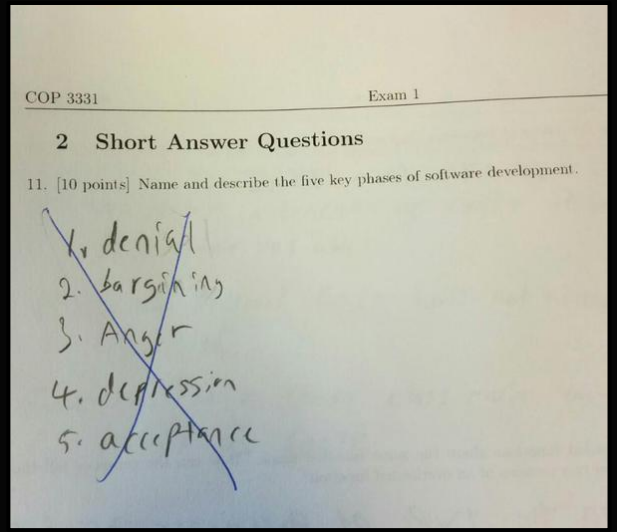
DORA DEVOPS RESEARCH & ASSESSMENT

Core of DevOps

Transform Your SW Lifecycle!

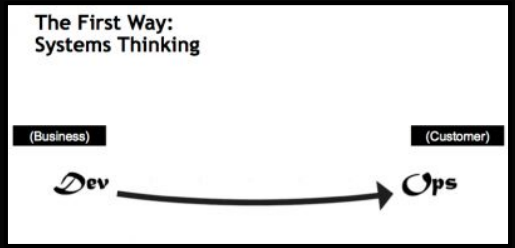

COP 3331 Exam 1

2 Short Answer Questions

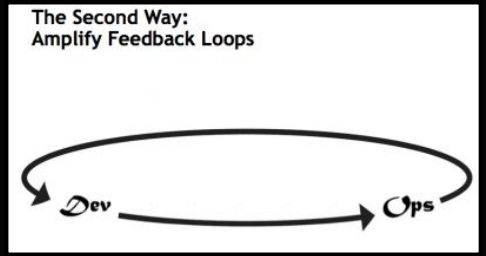
11. [10 points] Name and describe the five key phases of software development.

1. denial
2. bargaining
3. Anger
4. depression
5. acceptance

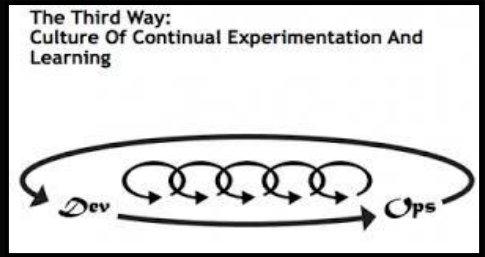
The 1st Way: Systems Thinking & Flow



The 2nd Way: Feedback

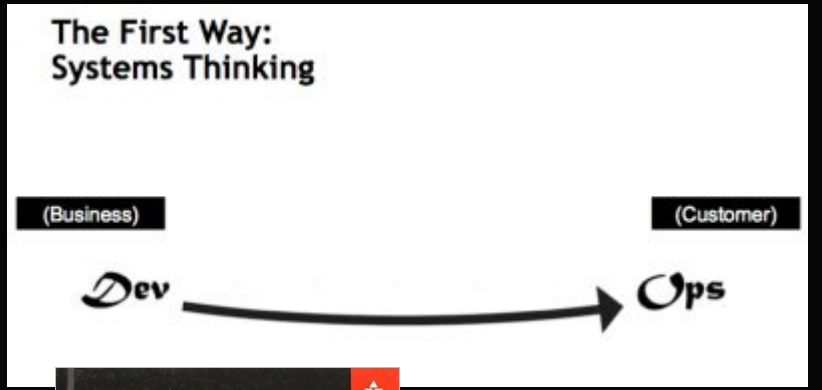


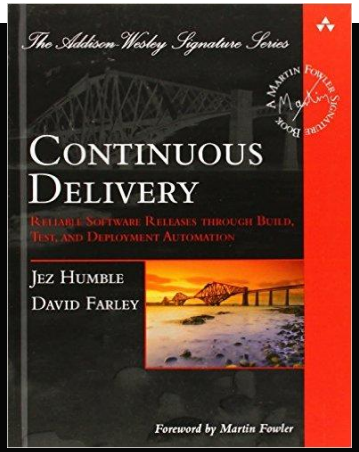
The 3rd Way: Experimentation & Learning



DevOps: The First Way - Systems Thinking & Flow

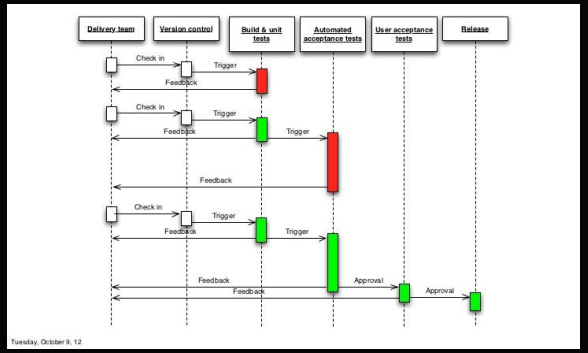
- Systems Thinking: "Emphasize the performance of the entire system, as opposed to the performance of a specific silo of work or department" - Gene Kim (2012)
  - Interpretation: Optimize the delivery of value to your customer across the organization recognizing that your delivery process is a system itself
- Flow: "Accelerate the delivery of work from Development to Operations to our customers" - Gene Kim (2016)
  - Interpretation: Build a Continuous Delivery pipeline! Feed it constantly!

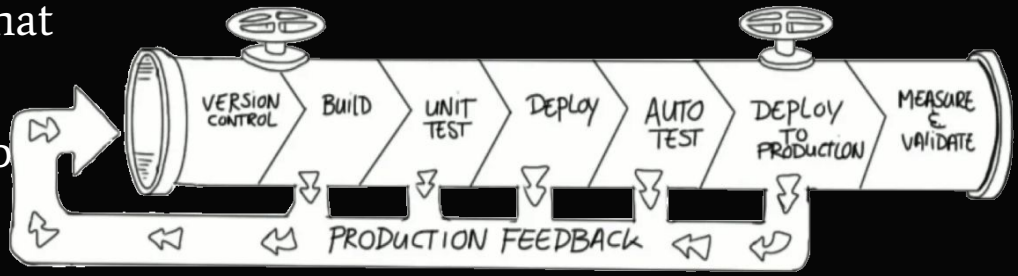


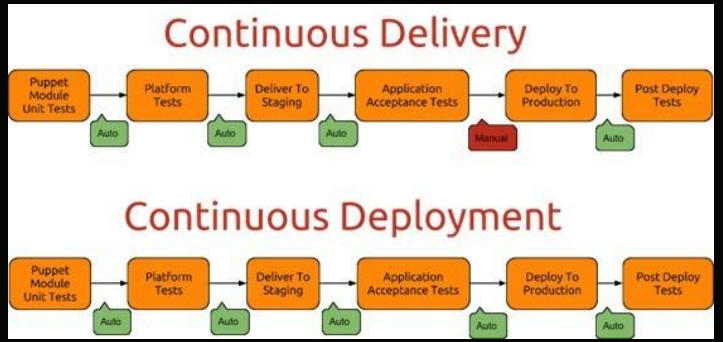


What is a Continuous Delivery Pipeline?

1. Automated suite of tools, triggered by an update to your product's configuration managed baseline, that performs all the build, test, QA, packaging, (and deployment) of yo system.
2. Rapid feedback to engineers of issues introduced by a change
3. Continuous Integration...on steroids!
4. Your product's immune system
5. Your source of confidence



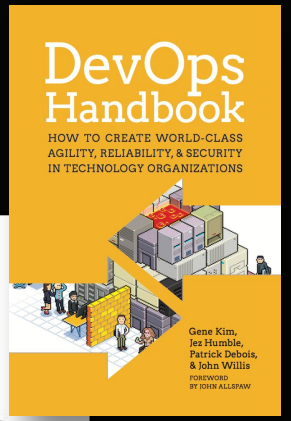




“Here at _____, we build _____ into our products!”

- Use your pipeline to build in quality, security, and the “ilities”.
- Quality:
  - Automated Unit Test - xUnit
  - Automated Acceptance Tests - Cucumber
  - Static / Dynamic Analysis - (sooo many)
  - Metrics (Sonar Qube, Jenkins, etc.)
- Security:
  - Klocwork, Fortify, Coverity, Arachni, etc.
- Deployability:
  - Puppet, Chef, Ansible
- Reliability:
  - Simian Army (Chaos Monkey, etc.)
- _____ility
  - Find/Build the right tool, Read Jez’s Book

DevOps: The Second Way - Feedback

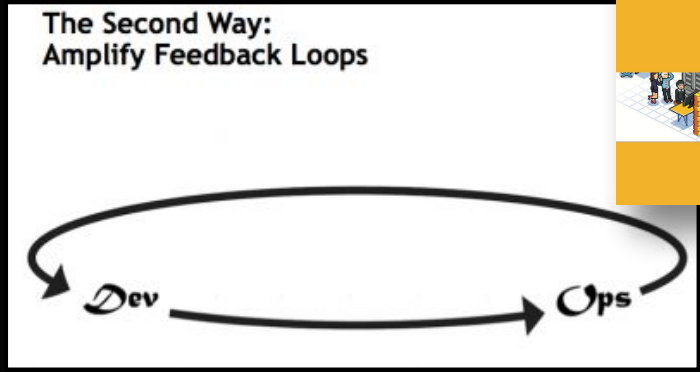


"Create a system of work where knowledge acquired downstream in Operations is integrated into the upstream work of Development and Product Management."

- The DevOps Handbook, 2016

"If Engineering at Etsy has a religion, it's the Church of Graphs. If it moves, we track it. Sometimes we'll draw a graph of something that isn't moving yet, just in case it decides to make a run for it."

- Ian Malpass, Etcy 2011



"By amplifying signals as part of our daily work, we make it possible to see and solve problems as they occur, and we grow safe systems of work that allow us to confidently make changes and run product experiments, knowing we can quickly detect and remediate failures."

- The DevOps Handbook, 2016

Remember: State of DevOps Report 2017

Technology and automation

Measurement and Monitoring

- Visual management
- Monitoring for business decisions
- Check system health proactively
- WIP limits
- Visualizations

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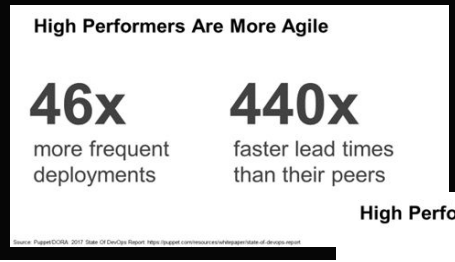
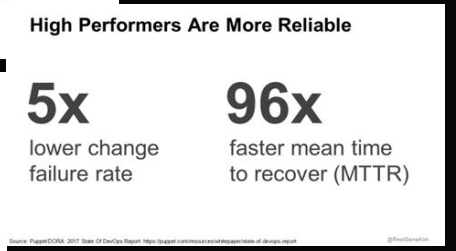
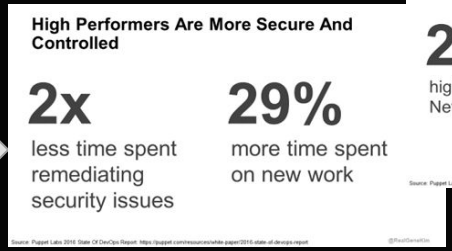
DEVOPS RESEARCH & ASSESSMENT

Process

Culture





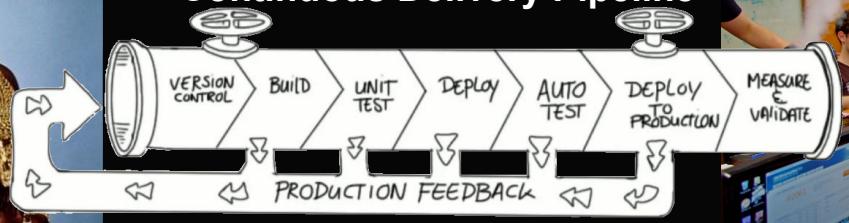


Tap All Your Sources of Feedback

Management

Cross-Functional Team

Continuous Delivery Pipeline



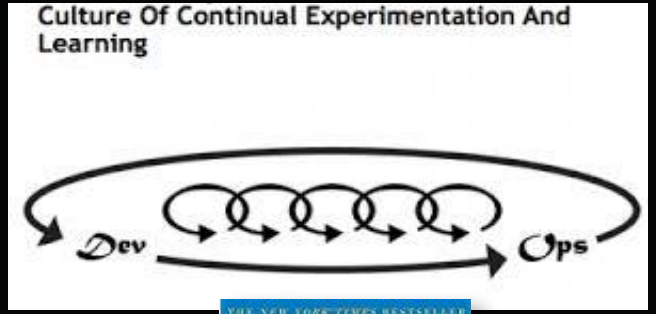
System Test

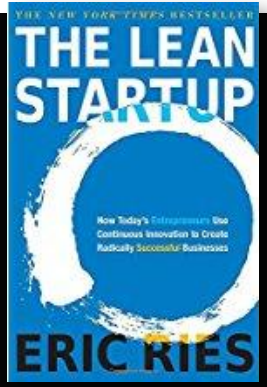
End User

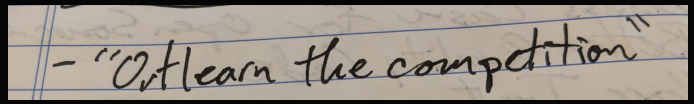
DevOps: The Third Way - Experimentation & Learning

- Knowing how to get smarter, faster matters a lot.
- Smarter faster means finding fault early and often.
- Easier said than done.

- Create opportunities for learning as quickly, frequently, cheaply, and as soon as possible.
- Learn from accidents and failures, which are inevitable when working within complex systems.
- Institutionalize rituals that increase safety, continuous improvement, and learning
  - Establish a just culture to make safety possible
  - Inject ~~production~~ failures to create resilience
  - Convert local discoveries into global improvements
  - Reserve time to create organizational improvements and learning







Taken from The DevOps Handbook - Gene Kim, Jez Humble, Patrick Debois, & John Willis

Define Your Experiment

Hypothesis Template

We believe that

[building this capability]

[for these people]

Will achieve **[this outcome]**.

We know we are successful when we see

[this measure / metric / observation].

- adapted from Jeff Gothelf

The DevOps for Defense Meetup Hypothesis

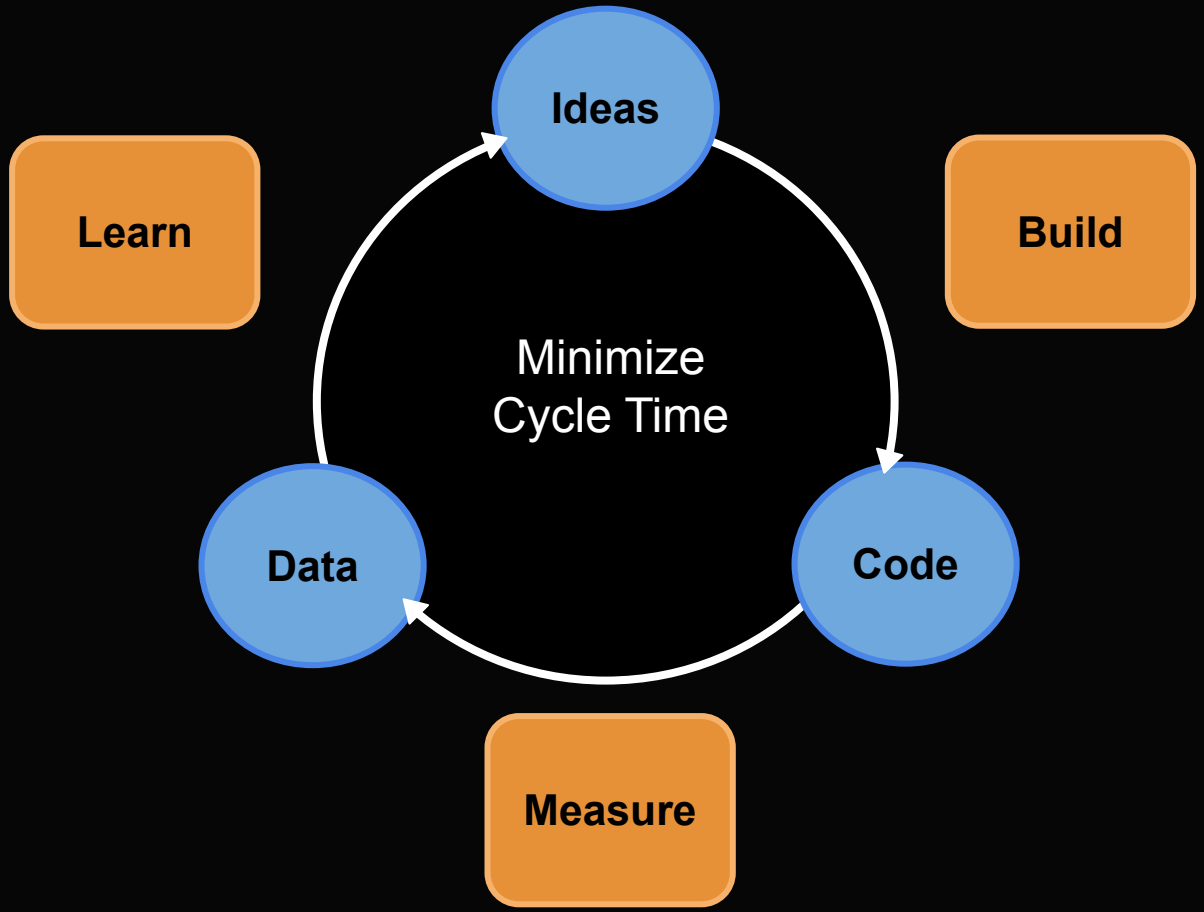
creating a DevOps meetup

for defense industry professionals

a broad cultural transformation that improves DoD system development and mission value delivery by adapting commercial best practices to our domain

modern DevOps concepts and practices embraced by DoD and Industry to safely deliver greater value to our Warfighters

Lean Start-Up (by Eric Ries)



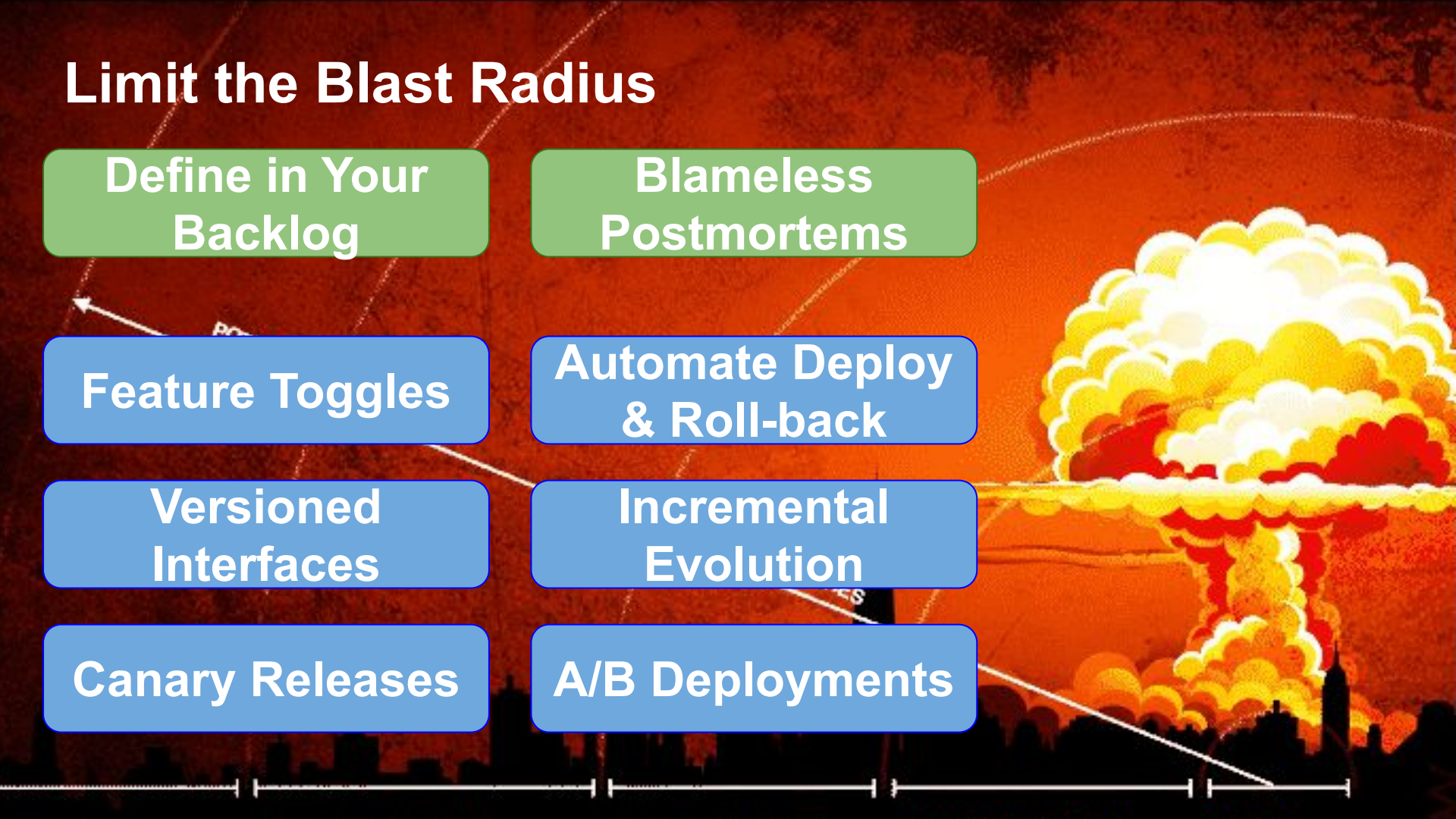
Lean Startup In Practice:

1. Define Hypothesis
2. Build the absolute smallest thing you can to test that hypothesis. This is your **Minimum Viable Product (MVP)**.
3. Collect and analyse the data to prove / refute your hypothesis.
4. If things go well, continue. If not, pivot.

In the defense domain we call this performing a **Decision Analysis Report** (DAR from CMMI) or a **Trade Study**.

Our problem is we define huge studies that take many months to complete.

Limit the Blast Radius



Define in Your Backlog

Blameless Postmortems

Feature Toggles

Automate Deploy & Roll-back

Versioned Interfaces

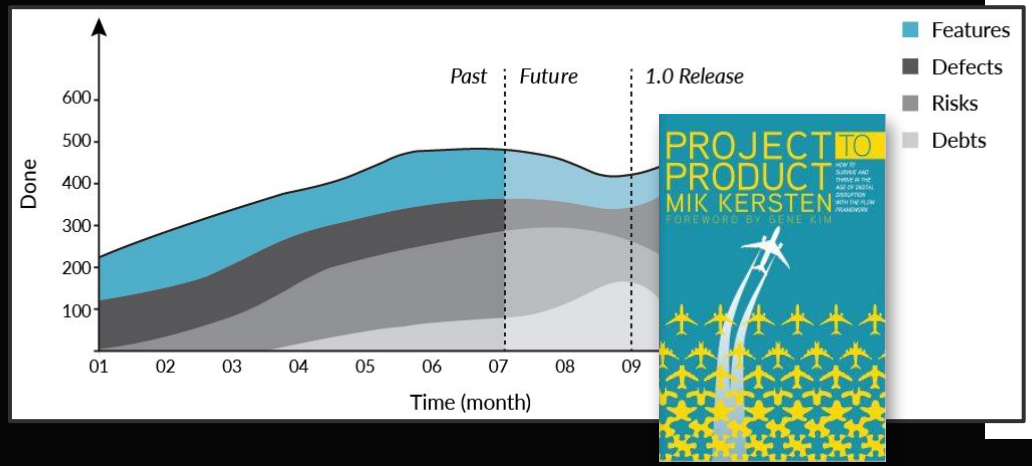
Incremental Evolution

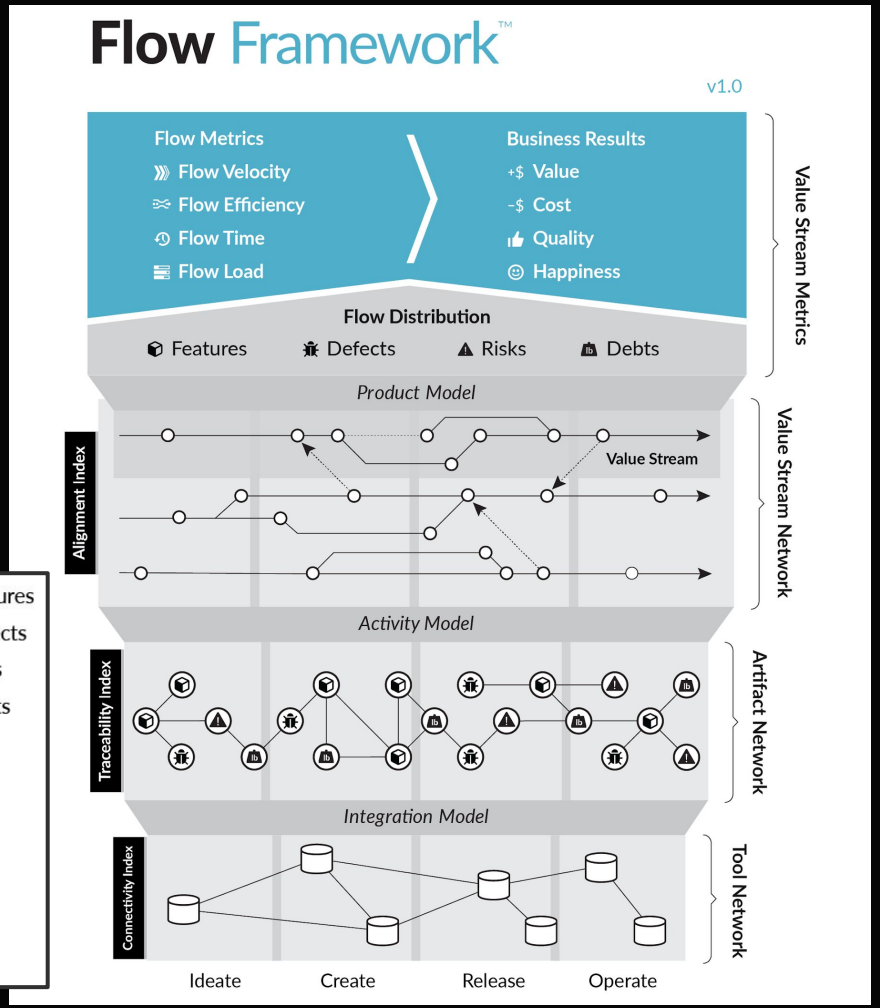
Canary Releases

A/B Deployments

4 Types of Work

Features - Value Generation
Defects - Unplanned Mandatory Investment
Risks - Security, Reliability, Etc.
Debts - Impediments to Progress





DevOps for Defense Book Club

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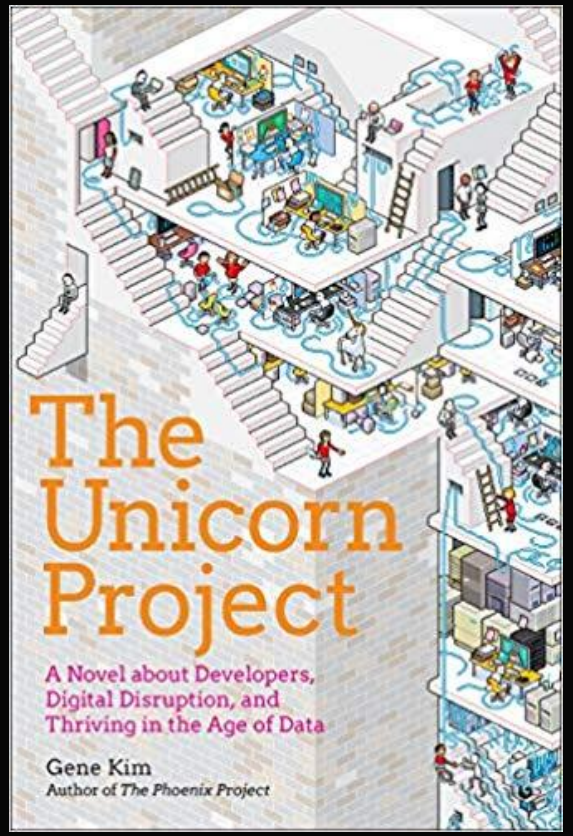


The Unicorn Project
By Gene Kim
Released Nov 26th, 2019

The 5 Ideals:

1. Locality & Simplicity
2. Focus, Flow, & Joy
3. Improvement of Daily Work
4. Psychological Safety
5. Customer Focus

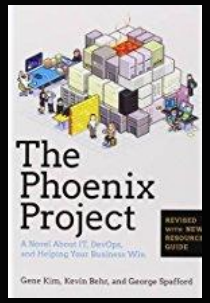
Get your copy, put your name on the library card, read, and share!

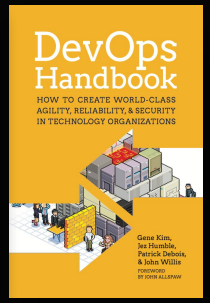
DevOps Resources

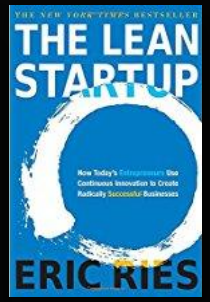
https://devopsfordefense.org/resources/

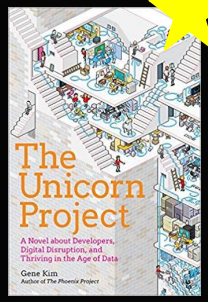
https://www.meetup.com/DevOps-for-Defense/
https://github.com/jondavid-black/DevOpsForDefense
devopsfordefense@gmail.com

Books / Publications:



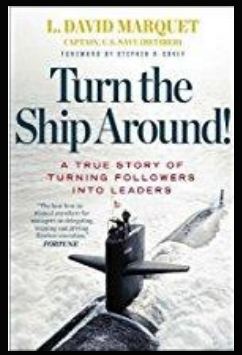


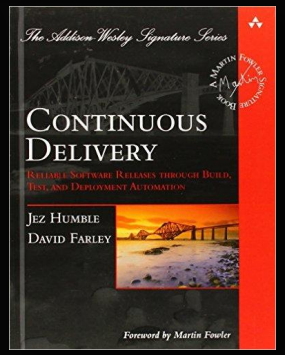


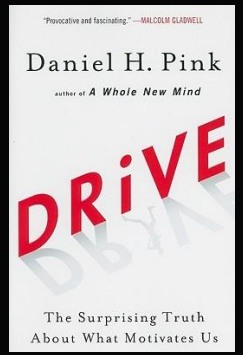


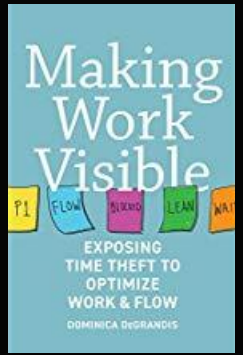
- DevOps Enterprise Summit (DOES)
- IT Revolution
- Velocity
- GoTo

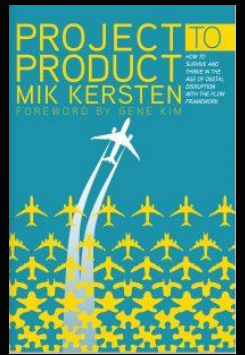
YouTube

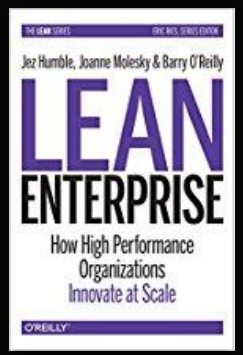


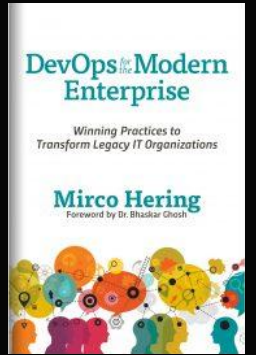












Group Exercise: Lean Coffee

1. Each table has a facilitator.
2. The facilitator has a short introduction.
3. Everyone write down questions or topics for discussion on the subject. Place them in the middle of the table.
4. The group votes on each question or topic by placing a dot on the card. 3 votes per person.
5. Cards with most dots goes first. Set a timer for 5 minutes and discuss.
6. After 5 minutes, either vote (thumbs up/down) to keep going or move on to the next card.

Suggested Topics: “DevOps 3 Ways”, “DevSecOps”, “4 Types of Work”