DevOps Introduction

ITS Communication Technologies

THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Defining DevOps

DevOps is…

"DevOps, in a sense, is about setting up a value delivery factory – a streamlined, waste-free pipeline through which value can be delivered to the business with a predictably fast cycle time."

Mark Schwartz, 'The Art of Business Value'

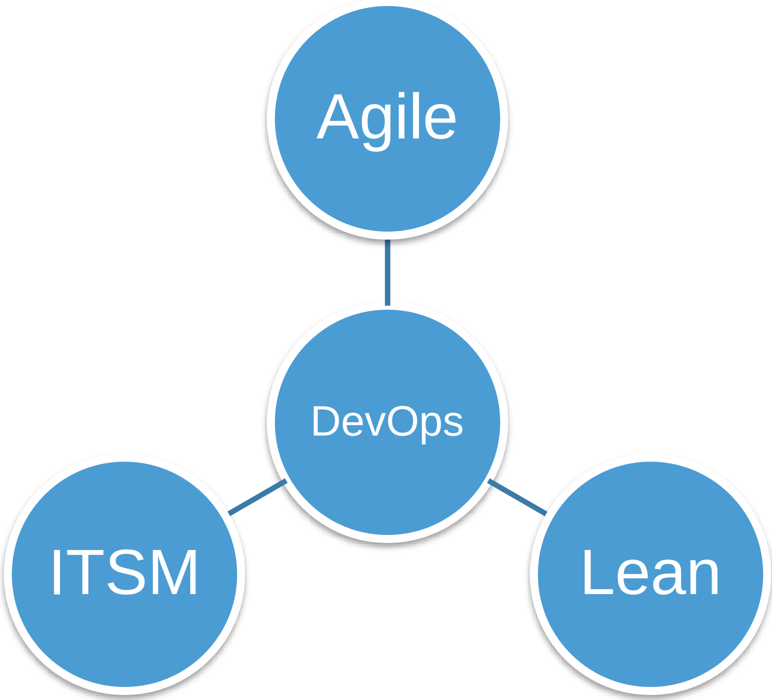
DevOps is NOT…

- A title
- A separate team
- A tool
- Only culture
- Only automation
- Anarchy
- One Size Fits All Strategy

“DevOps is not about automation, just as astronomy is not about telescopes” –

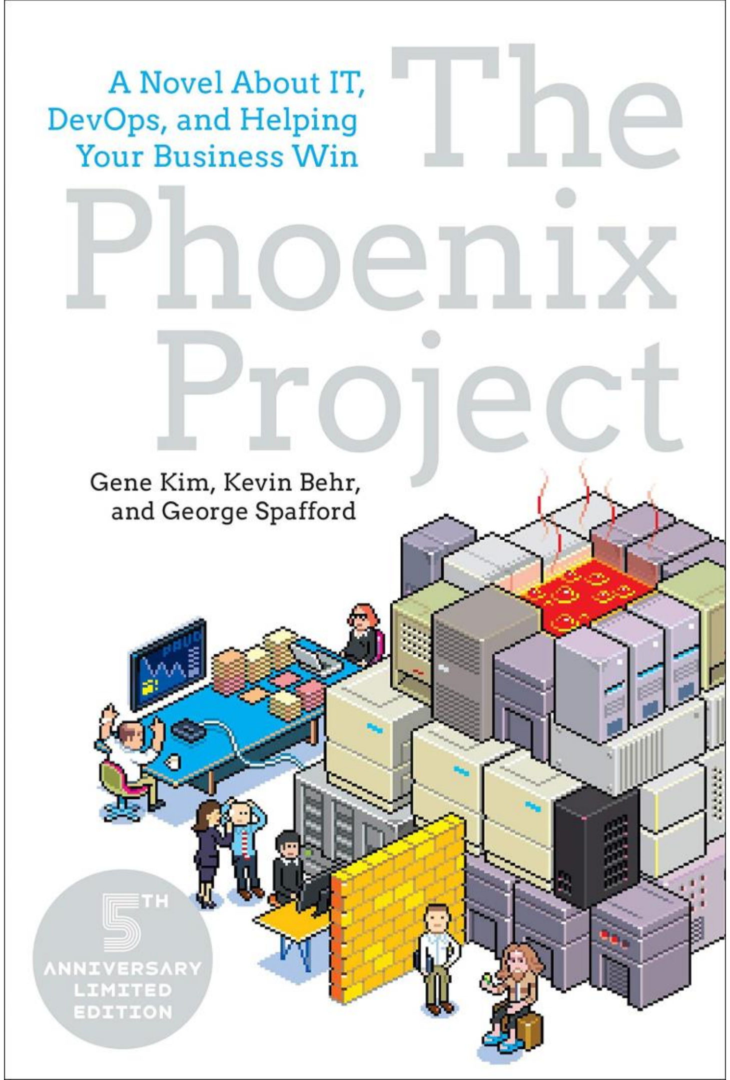
Christopher Little, quoted in The DevOps Handbook

DevOps Cannot Stand Alone



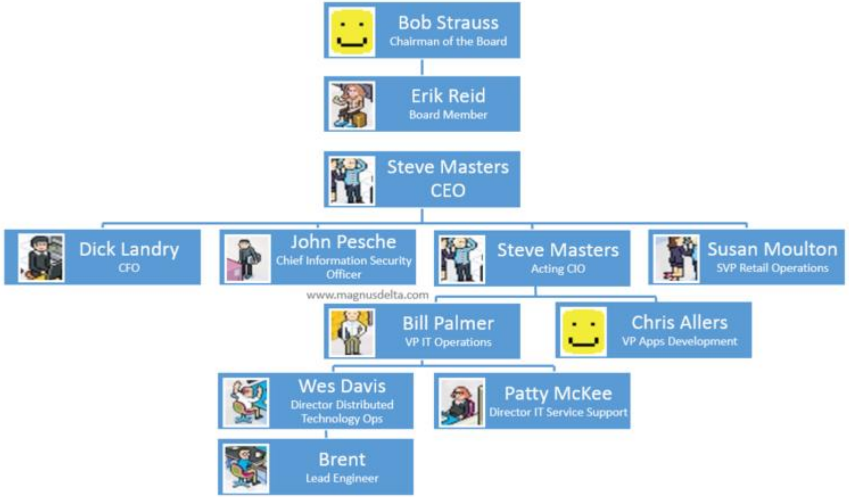
- Agile
  - Self-organizing and cross-functional teams
  - Scrum, Sprints
- Lean
  - More value
  - Less waste
- ITSM
  - ITIL framework

Book Recommendations and References



The Phoenix Project

- Format modeled after Goldratt's "The Goal"
- Gene Kim, fan of IT Operations



Bob Strauss
Chairman of the Board

Erik Reid
Board Member

Steve Masters
CEO

Dick Landry
CFO

John Pesche
Chief Information Security Officer

Steve Masters
Acting CIO

Susan Moulton
SVP Retail Operations

Bill Palmer
VP IT Operations

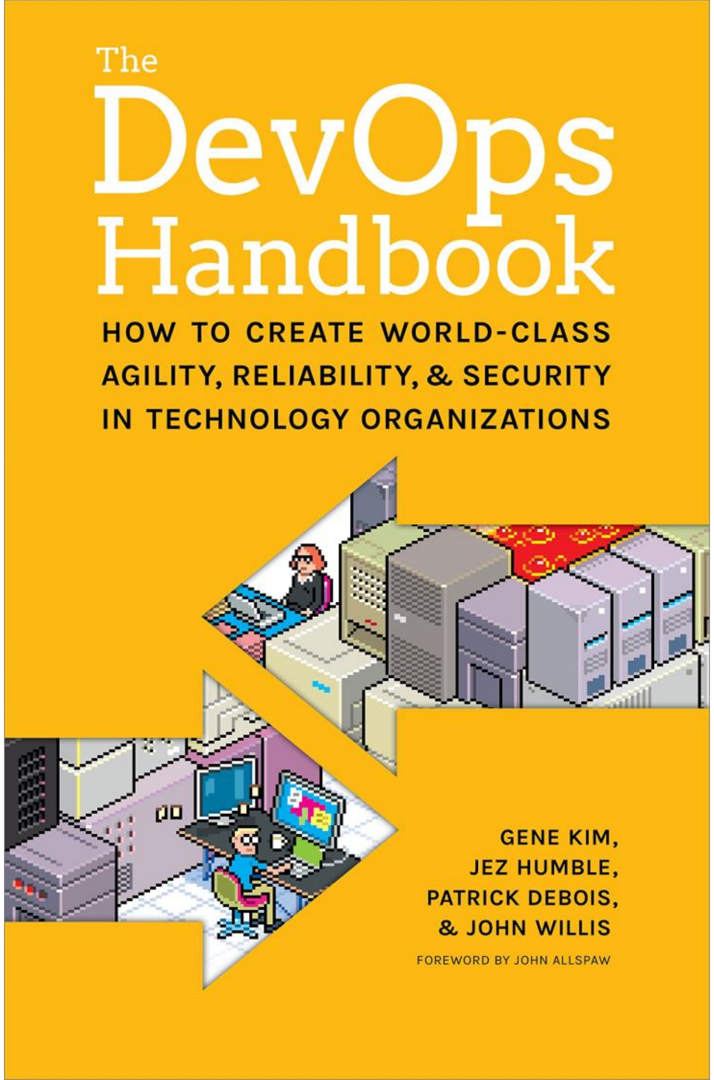
Chris Allers
VP Apps Development

Wes Davis
Director Distributed Technology Ops

Patty McKee
Director IT Service Support

Brent
Lead Engineer

www.magnusdelta.com



The DevOps Handbook

- Sequel to
  “The Phoenix Project”
- Focus is on the how
- Guide to how modern IT runs and operates

Core DevOps Principles

Core DevOps Principles

The Three Ways

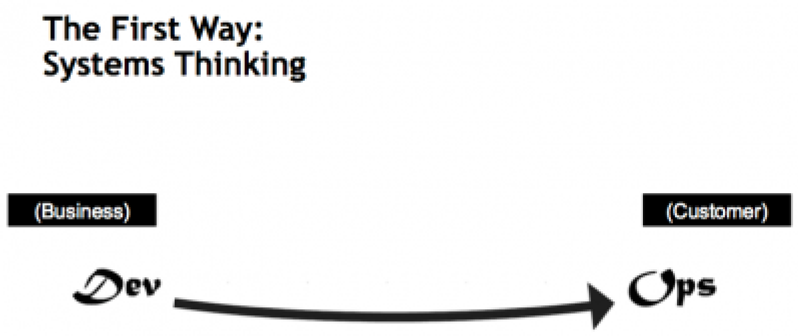
- The principles from which all the observed DevOps behaviors can be derived.
- “We assert that the Three Ways describe the values and philosophies that frame the processes, procedures, practices of DevOps, as well as the prescriptive steps.” Gene Kim

The First Way

The First Way

The Principles of Flow

- Maximize the flow of work
- Left to right flow



The First Way (continued)

Make Work Visible

- How do you see technology value?
- Common Options
  - Kanban Board
  - Sprint Board
- i.e. Patty's change board

The First Way (continued)

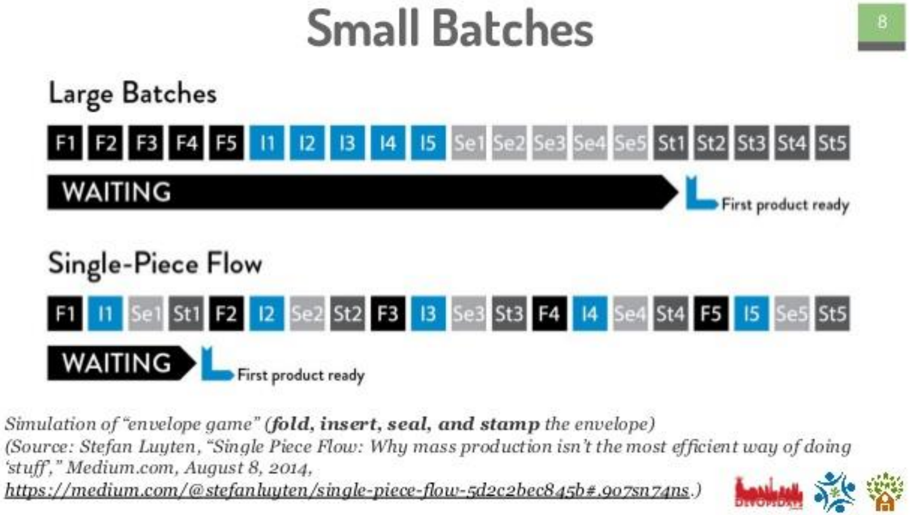
Limit Work in Process (WIP)

- WIP is not generating value
- Easy to interrupt tech staff
- Limit multitasking
- WIP limits via Kanban
- i.e. Brent’s project work

The First Way (continued)

Reduce Batch Sizes

- Large vs small batches
- Shrink lead times
- Increase quality
- i.e. Agile sprint cycle

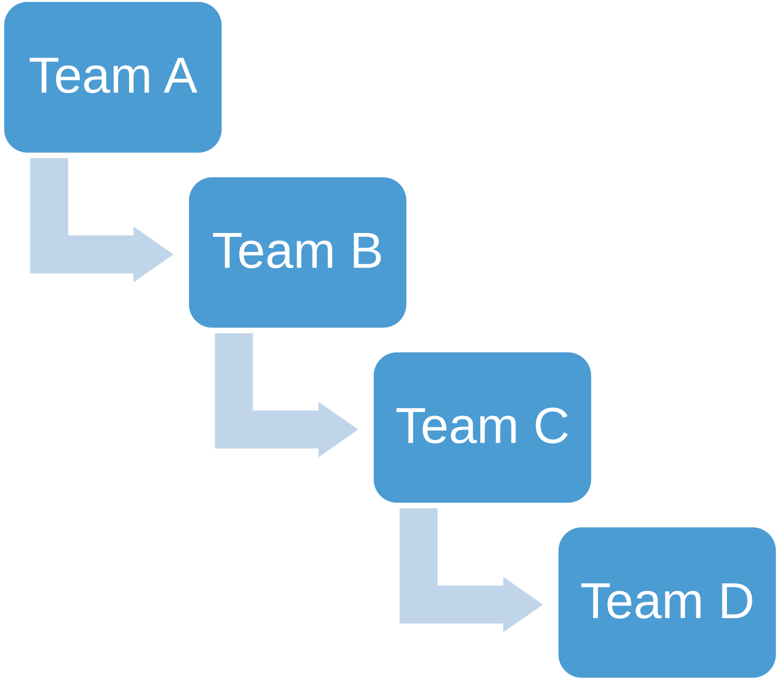

Small Batches
8
Large Batches
F1 F2 F3 F4 F5 I1 I2 I3 I4 I5 Se1 Se2 Se3 Se4 Se5 St1 St2 St3 St4 St5
WAITING
First product ready
Single-Piece Flow
F1 I1 Se1 St1 F2 I2 Se2 St2 F3 I3 Se3 St3 F4 I4 Se4 St4 F5 I5 Se5 St5
WAITING
First product ready

*Simulation of "envelope game" (**fold, insert, seal, and stamp** the envelope)*
(Source: Stefan Luyten, "Single Piece Flow: Why mass production isn't the most efficient way of doing 'stuff'," Medium.com, August 8, 2014, https://medium.com/@stefanluyten/single-piece-flow-5d2c2bec845b#.907sn74ns.)

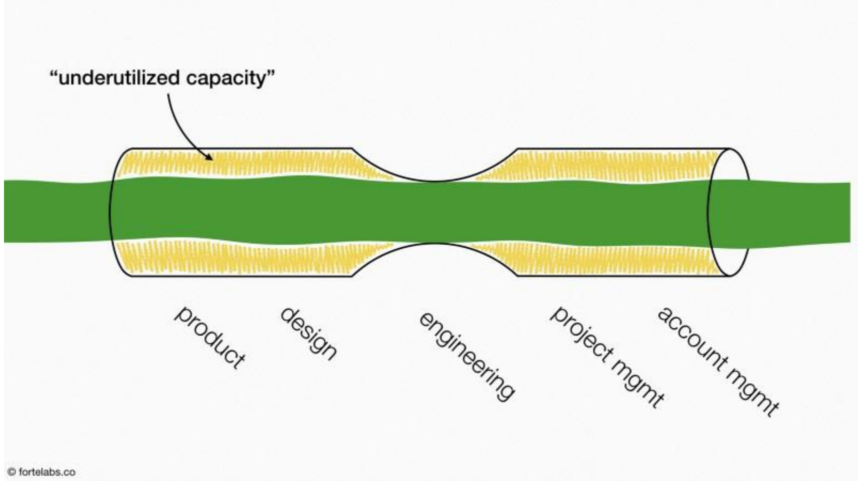
The First Way (continued)

Reduce Total Handoffs

- Each step:
  - Has a queue
  - Requires communication
  - Looses knowledge
- Automate where possible
- Empower teams
- i.e. IT’s laptop refresh



The First Way (continued)



© fortelabs.co

Continually Identify and Elevate Constraints

- Theory of Constraints
  - Identify
  - Exploit (quick actions)
  - Subordinate (review others)
  - Elevate (further actions)
  - Repeat

i.e. Brent's incident workload

The First Way (continued)

Eliminate Hardships and Waste in the Value Stream

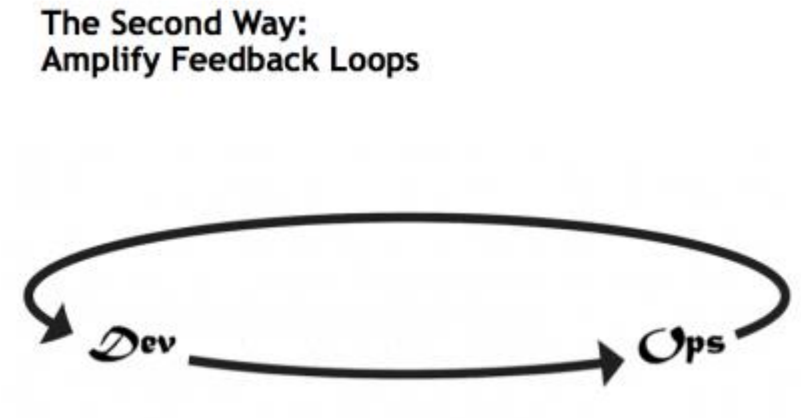
- Unplanned work
- Situations requiring heroics, unreasonable acts
- Work not adding value to the customer
- i.e. John’s security focus

The Second Way

The Second Way

The Principles of Feedback

- Right to left loop
- Fast and constant
- Continuous improvement
  - Detect and correct early



The Second Way (continued)

Working Safely Within Complex Systems

- No single person view of the whole system
- Failure is inherent and inevitable
- Work needs to be performed:
  - without fear
  - with errors detected before negative results
- i.e. Payroll database field change

The Second Way (continued)

See Problems as They Occur

- Fast feedback at all stages
- Automate build, test, etc.
- Production monitoring
- i.e. Phoenix deployment late defect detection

The Second Way (continued)

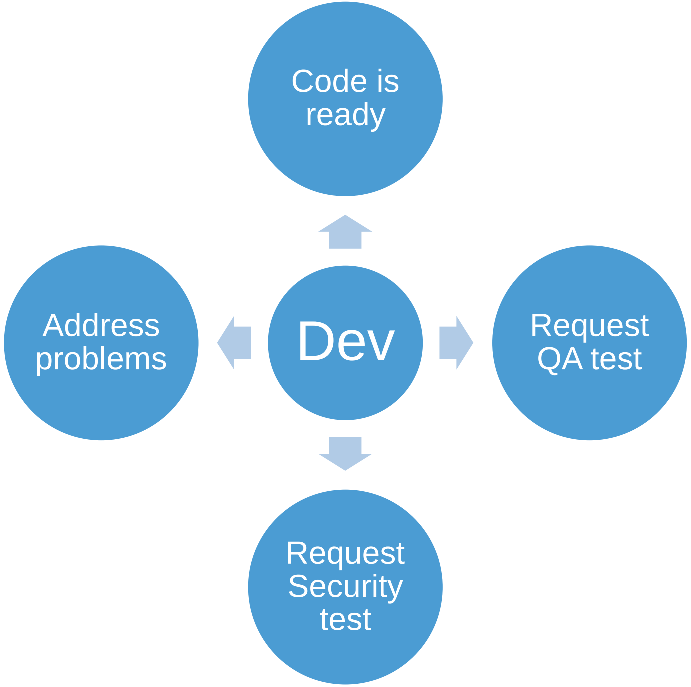
Swarm and Solve Problems to Build New Knowledge

- Stop the system to fix a problem
- Seems contrary but…
  - enables learning
  - prevents information lost by fading memories.
- i.e. Toyota Andon cord

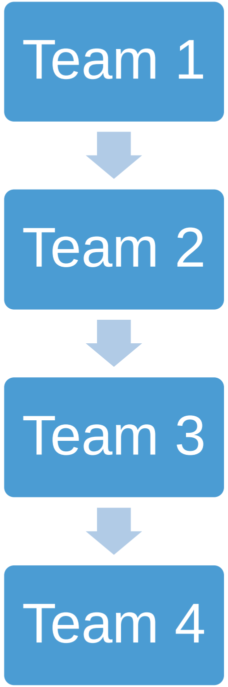
The Second Way (continued)

Keep Pushing Quality Closer to the Source

- Adding inspection and approval processes increase likelihood of failures.
- Quality is everyone’s responsibility
- Automate tests from QA and Security as much as possible
- i.e. Approvals from busy and far removed people



The Second Way (continued)



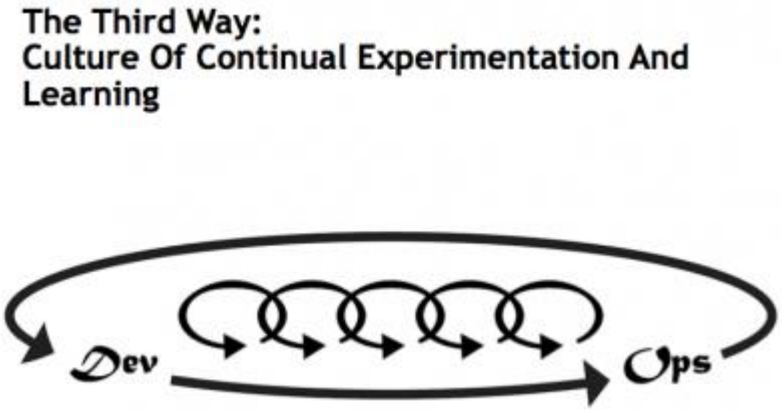
Enable Optimizing for Downstream Work Centers

- Have empathy in order to identify problems that prevent smooth flow
- The most important customer is the next downstream (Lean)
- i.e. Designing parts that only assemble in one way

The Third Way

The Third Way

- Create a culture that fosters:
  - Experimentation, taking risks and learning from failure
  - Understanding that repetition and practice is the prerequisites to mastery



The Third Way:
Culture Of Continual Experimentation And Learning

The Third Way (continued)

Enabling Organizational Learning and a Safety Culture

- “Name, blame, shame” the human cause
- Leads to hidden problems
- Blameless post-mortem
- i.e. Phoenix deployment review

The Third Way (continued)

Institutionalize the Improvement of Daily Work

- Processes don’t stay the same in the absence of improvement. They degrade instead.
- Workarounds in lieu of fixes create technical debt.
- Reserve time to pay down technical debt
- i.e. kaizen blitzes

The Third Way (continued)

Transform Local Discoveries into Global Improvements

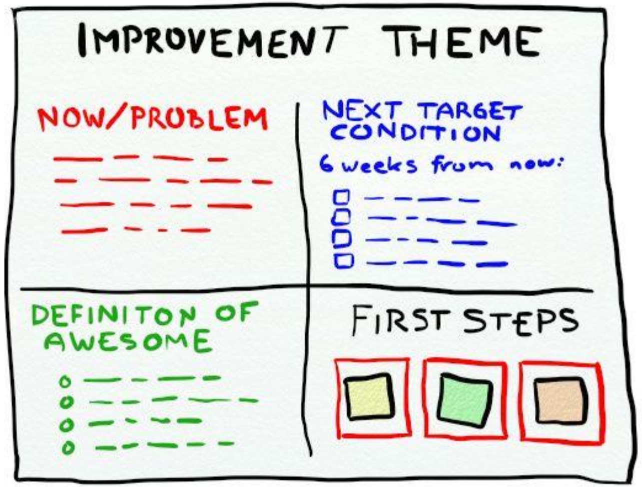
- Leverage cumulative and collective experience
- Publish post-mortems
- Utilize standardized work
  - Create incident reports of deviations
- i.e. Phoenix team adopting Unicorn techniques

The Third Way (continued)

Inject Resilience Patterns into Daily Work

- Avoid increasing capacity to reduce risk of failure
  - Increases cost and bulk
- Continually introduce tension
- i.e. Simian Army, Chaos Monkey

The Third Way (continued)



Leaders Reinforce a Learning Culture

- Creating greatness requires leaders and workers
  - Leaders are not close enough to the work
  - Workers lack a broader context outside their area
- Improvement Kata
  - Long term goals drive short term goals
- i.e. Periodic mock incident response

Wrap Up

Remember…

- DevOps does not fix anything
- People…
  - from all levels of the organization,
  - working together towards a common goal,
  - with committed leadership,
  - will achieve amazing results.

THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL