# DevOps for Defense

July 2019

## Software Factory Part 1: Introduction

JD Black

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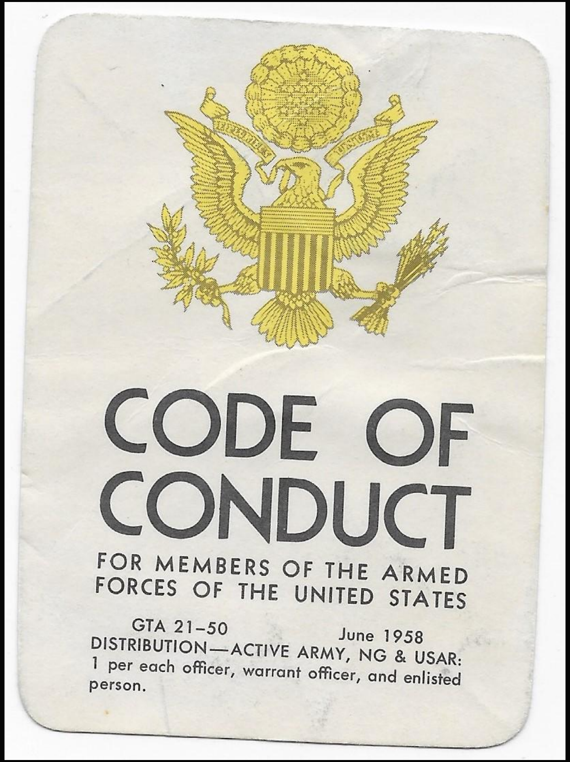
https://twitter.com/devops4defense

**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!



CODE OF CONDUCT

FOR MEMBERS OF THE ARMED FORCES OF THE UNITED STATES

GTA 21–50 June 1958

DISTRIBUTION—ACTIVE ARMY, NG & USAR: 1 per each officer, warrant officer, and enlisted person.

# Be Heard!

What would you like to do in future months?

Presentations:

- Write a topic on a card & add it to the table in the Presentation area.
- If you'd like to volunteer to present the topic, add "Volunteer: [**YOUR NAME**]".

Books:

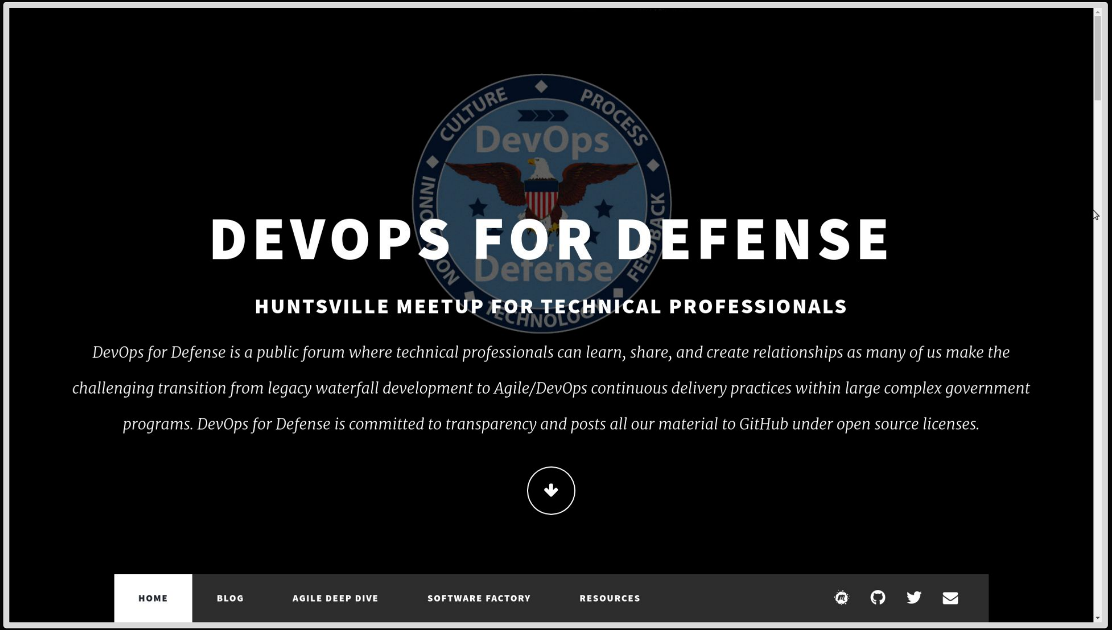
- Write the title & author on a card & add it to the table in the Book Club area.

Activities:

- Write a short name & description of the activity on a card & add it to the table in the Activity area.

**Please be an Active Part of our Meetup Success!**

# Meetup Web Site is Live!



DEVOPS FOR DEFENSE

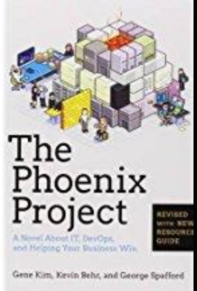
HUNTSVILLE MEETUP FOR TECHNICAL PROFESSIONALS

*DevOps for Defense is a public forum where technical professionals can learn, share, and create relationships as many of us make the challenging transition from legacy waterfall development to Agile/DevOps continuous delivery practices within large complex government programs. DevOps for Defense is committed to transparency and posts all our material to GitHub under open source licenses.*

**devopsfordefense.org**

- Hosted using GitHub Pages from our Meetup Repository, Generated using Jekyll from simple MarkDown & Images
- Follow  on Twitter @devops4defense for Notifications
- Contribute Blog Post, Meetup Summary, or DevOps Resource to our GitHub via Pull Request
- Request your Company Allow Access

# DevOps 1st Way


The Phoenix Project
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REVISED WITH NEW RESOURCE GUIDE
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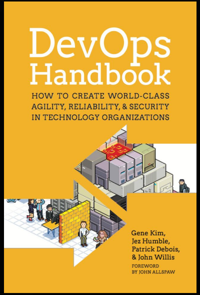
DevOps Handbook
HOW TO CREATE WORLD-CLASS AGILITY, RELIABILITY, & SECURITY IN TECHNOLOGY ORGANIZATIONS
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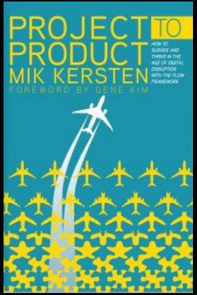

## Systems Thinking

*"Emphasize the performance of the entire system, as opposed to the performance of a specific silo of work or department."*

- Gene Kim (2012)

## Flow

*"Accelerate the delivery of work from Development to Operations to our customers."*

- Gene Kim (2016)

# Lessons from Lean Manufacturing

*“A system must be managed. It will not manage itself. Left to themselves, components become selfish, competitive, independent profit centers, and thus destroy the system. The secret is cooperation between components toward the aim of the organization.”*

- W. Edwards Deming

*“Everyone is already doing their best; the problems are with the system … only management can change the system.”*

- W. Edwards Deming

# What is a Factory?

**factory** **noun**

fac·to·ry | \ ˈfak-t(ə-)rē \

*plural* **factories**

**Definition of *factory***

**1**: a building or set of buildings with facilities for manufacturing

**2**: the seat of some kind of production

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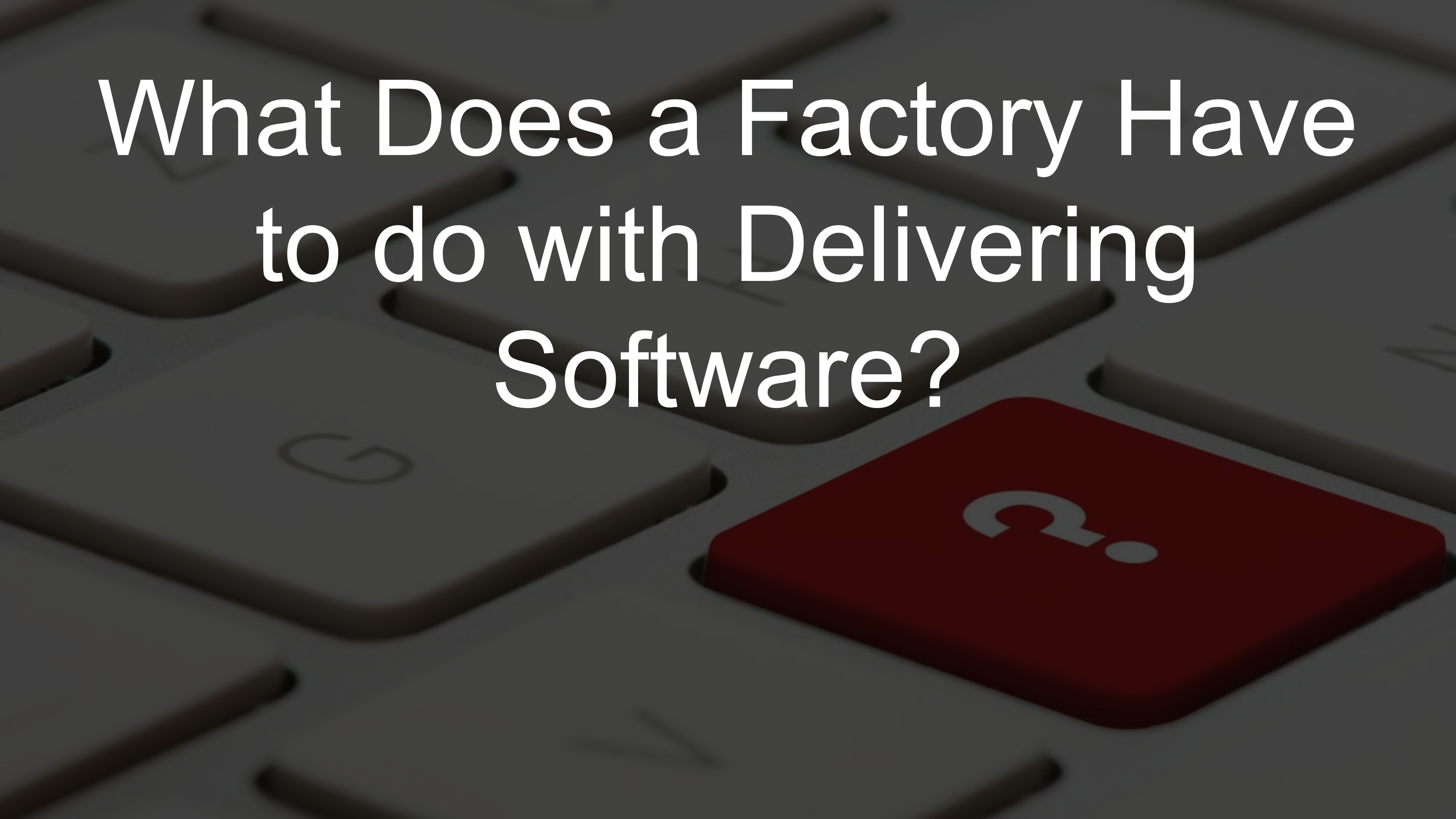
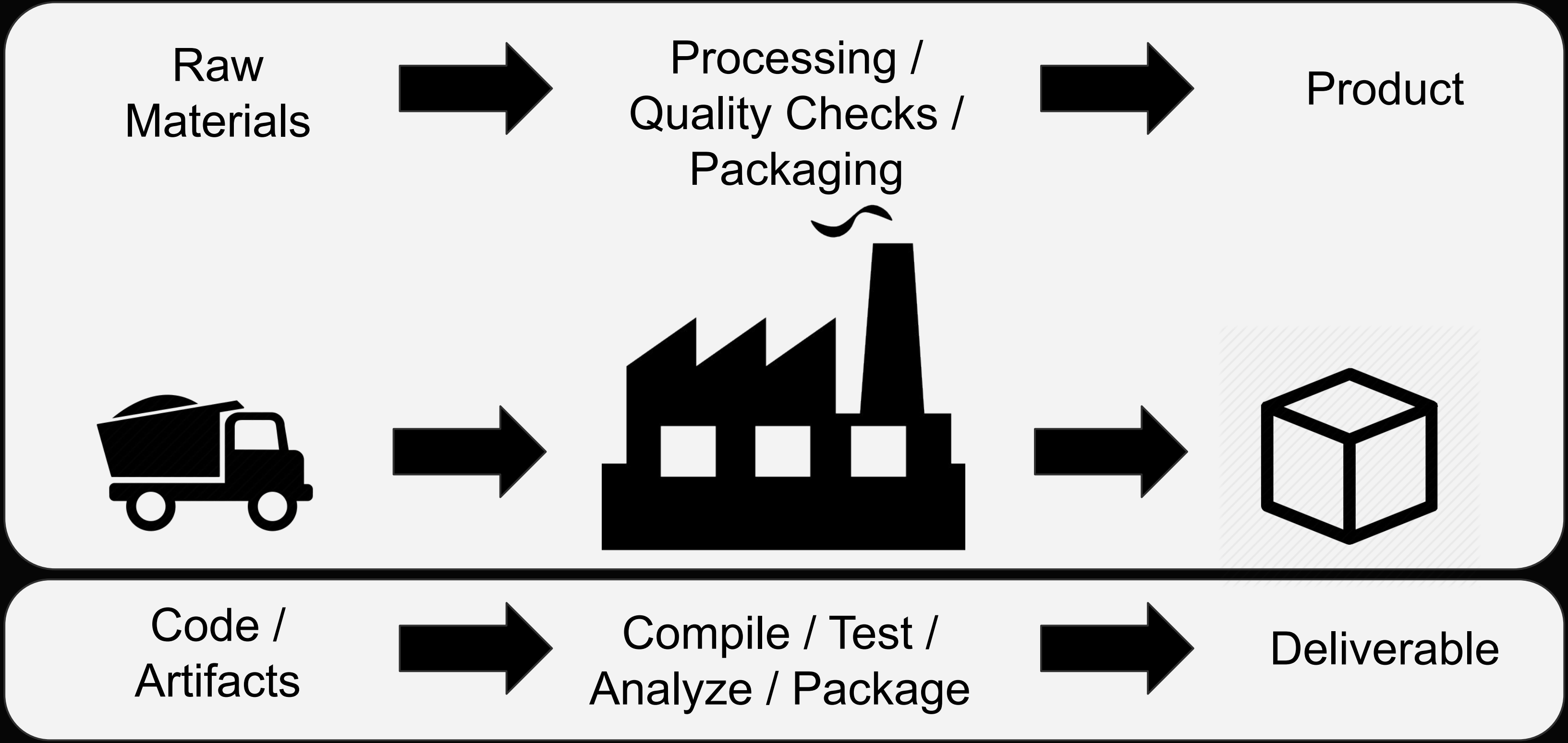
KUKA

# What Does a Factory Have to do with Delivering Software?



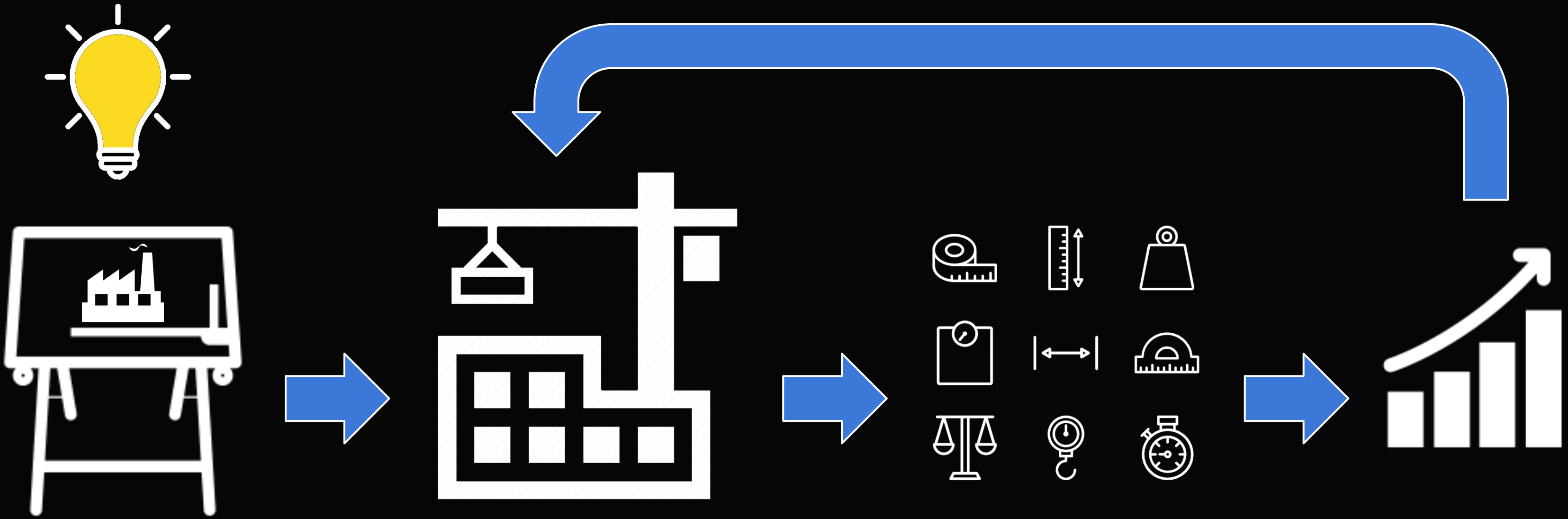
# Software Factory Core Concept



Raw Materials → Processing / Quality Checks / Packaging → Product

Code / Artifacts → Compile / Test / Analyze / Package → Deliverable

# Building Your Software Factory



Design

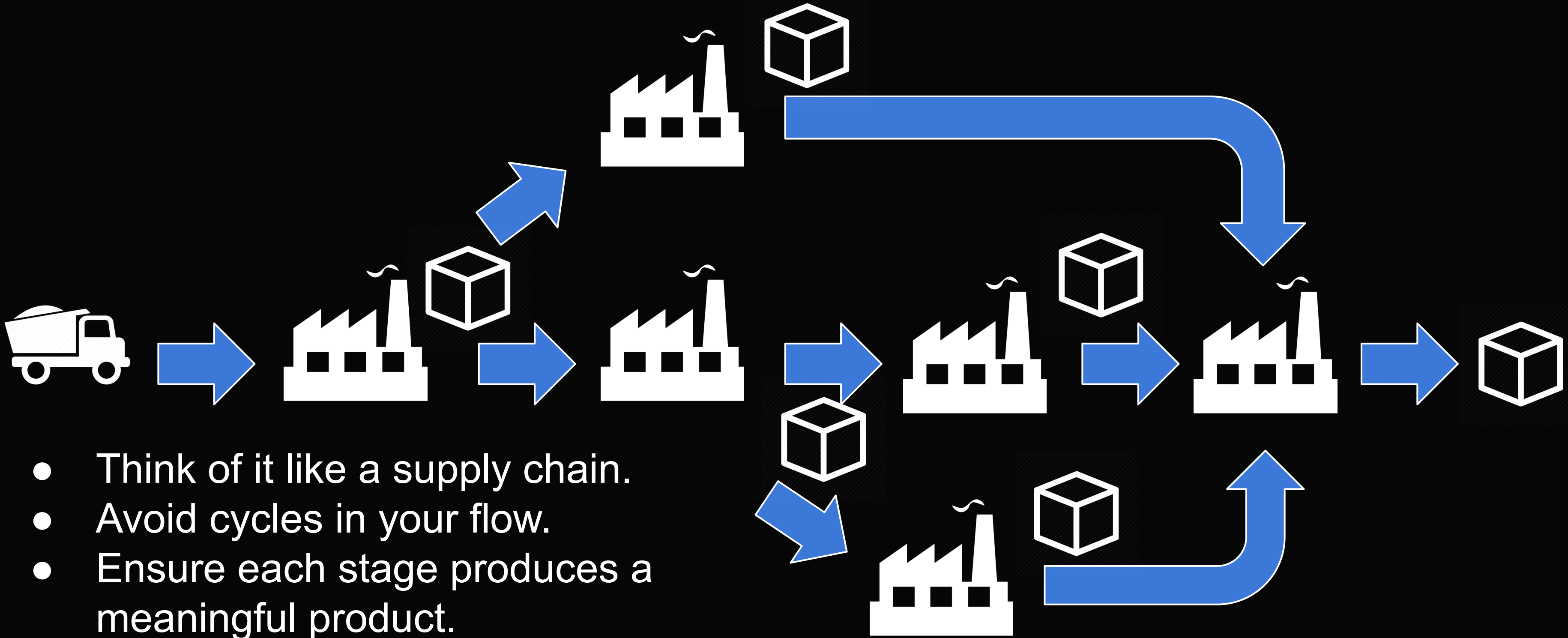
Build

Measure

Improve

Use Your Value Stream Map
(June 2018 Meetup Topic)

# Scale Your SW Factory to Meet Your Needs



- Think of it like a supply chain.
- Avoid cycles in your flow.
- Ensure each stage produces a meaningful product.
- Use good CM throughout!
- Perform QA checks throughout!

# Don’t Forget to Secure Your Factory!

- Build in Security!
- Easiest way to compromise your delivered system is to compromise the supply chain or your factory.
- There are good open source resources to help.
    - STIG Source (GitHub)
        - OpenSCAP
        - Compliance as Code
    - STIG In Your OS Repo
        - yum install scap-security-guide
        - apt install ssg-debderived

# Designing & Building Your Factory is Not Easy!

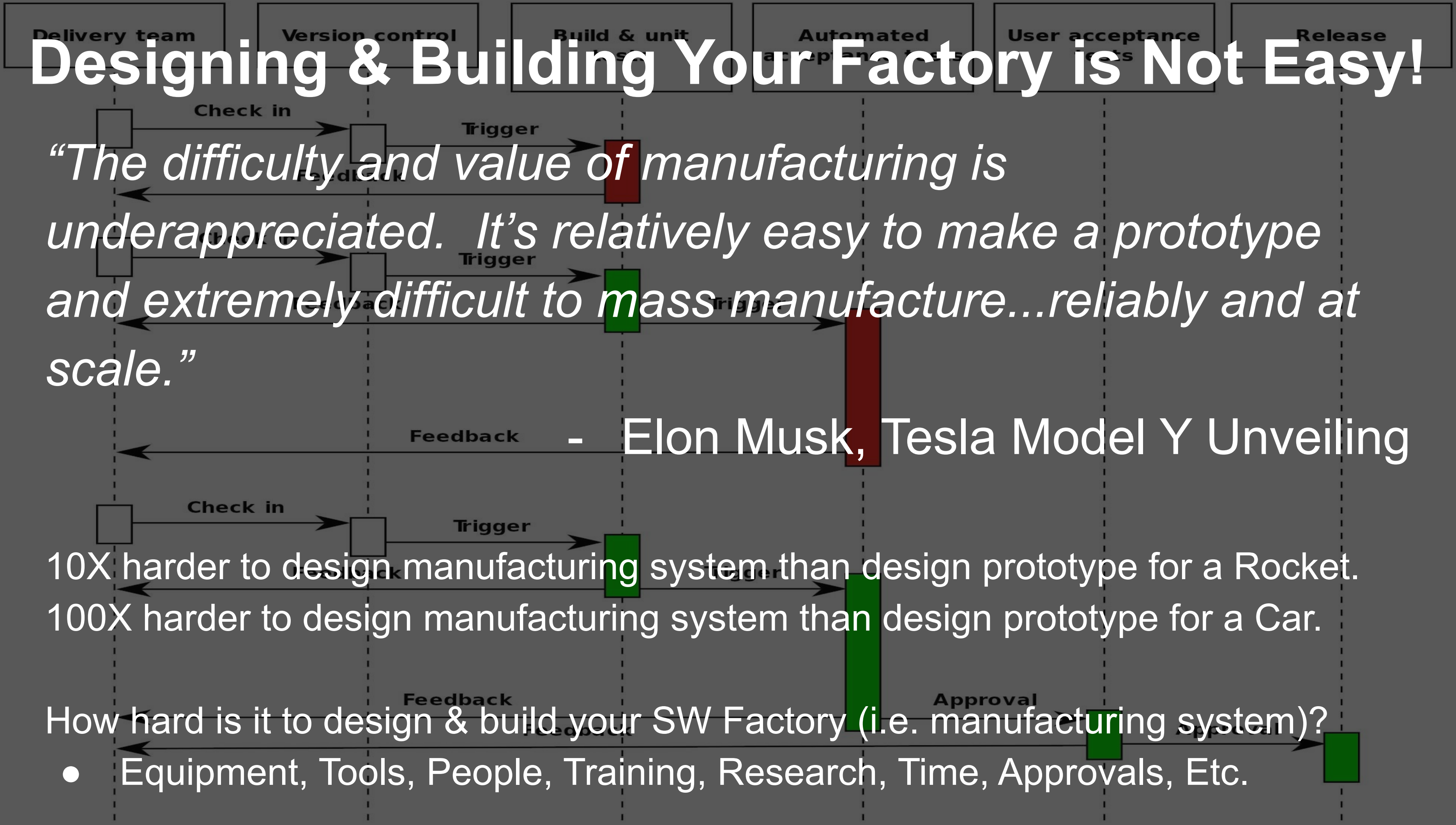
*“The difficulty and value of manufacturing is underappreciated.  It’s relatively easy to make a prototype and extremely difficult to mass manufacture...reliably and at scale.”*

- Elon Musk, Tesla Model Y Unveiling

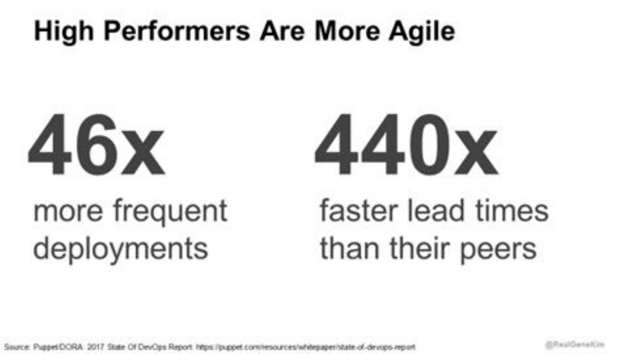
10X harder to design manufacturing system than design prototype for a Rocket.
100X harder to design manufacturing system than design prototype for a Car.

How hard is it to design & build your SW Factory (i.e. manufacturing system)?

- Equipment, Tools, People, Training, Research, Time, Approvals, Etc.



# If This is So Hard...Why Do It?



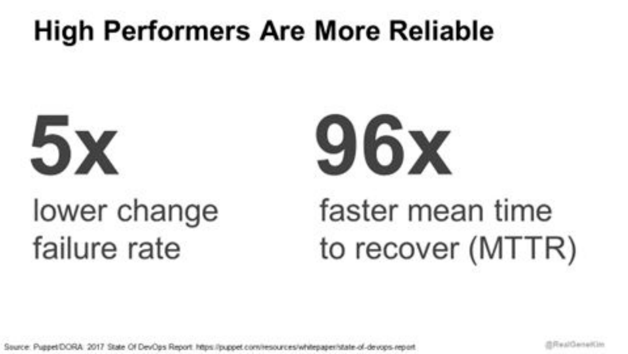
## High Performers Are More Agile

**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

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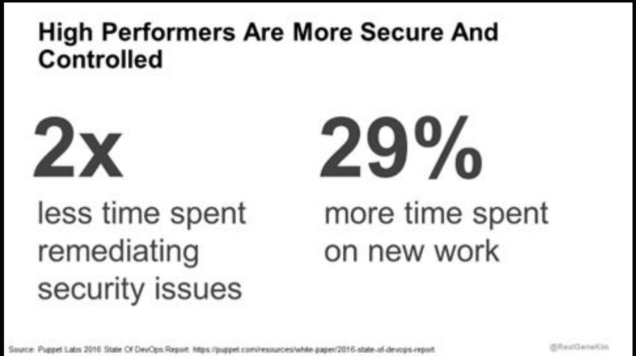

## High Performers Are More Secure And Controlled

**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

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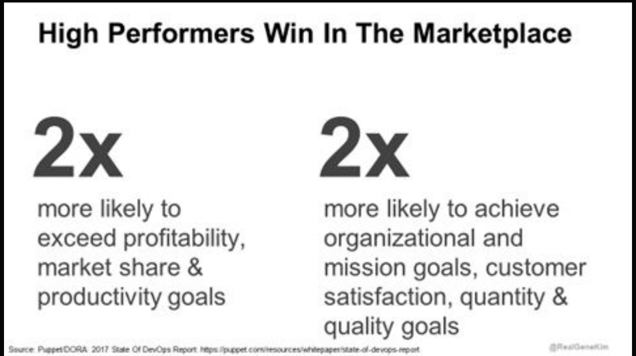

## High Performers Win In The Marketplace

**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

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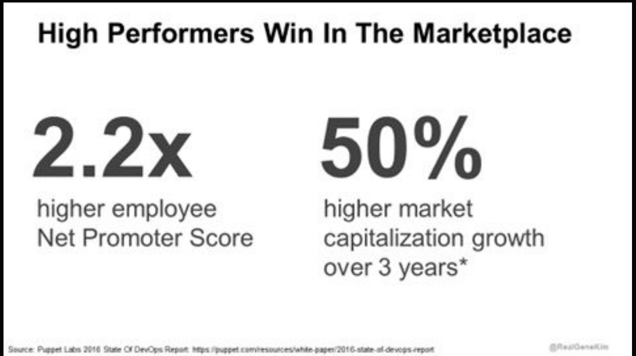

## High Performers Win In The Marketplace

**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

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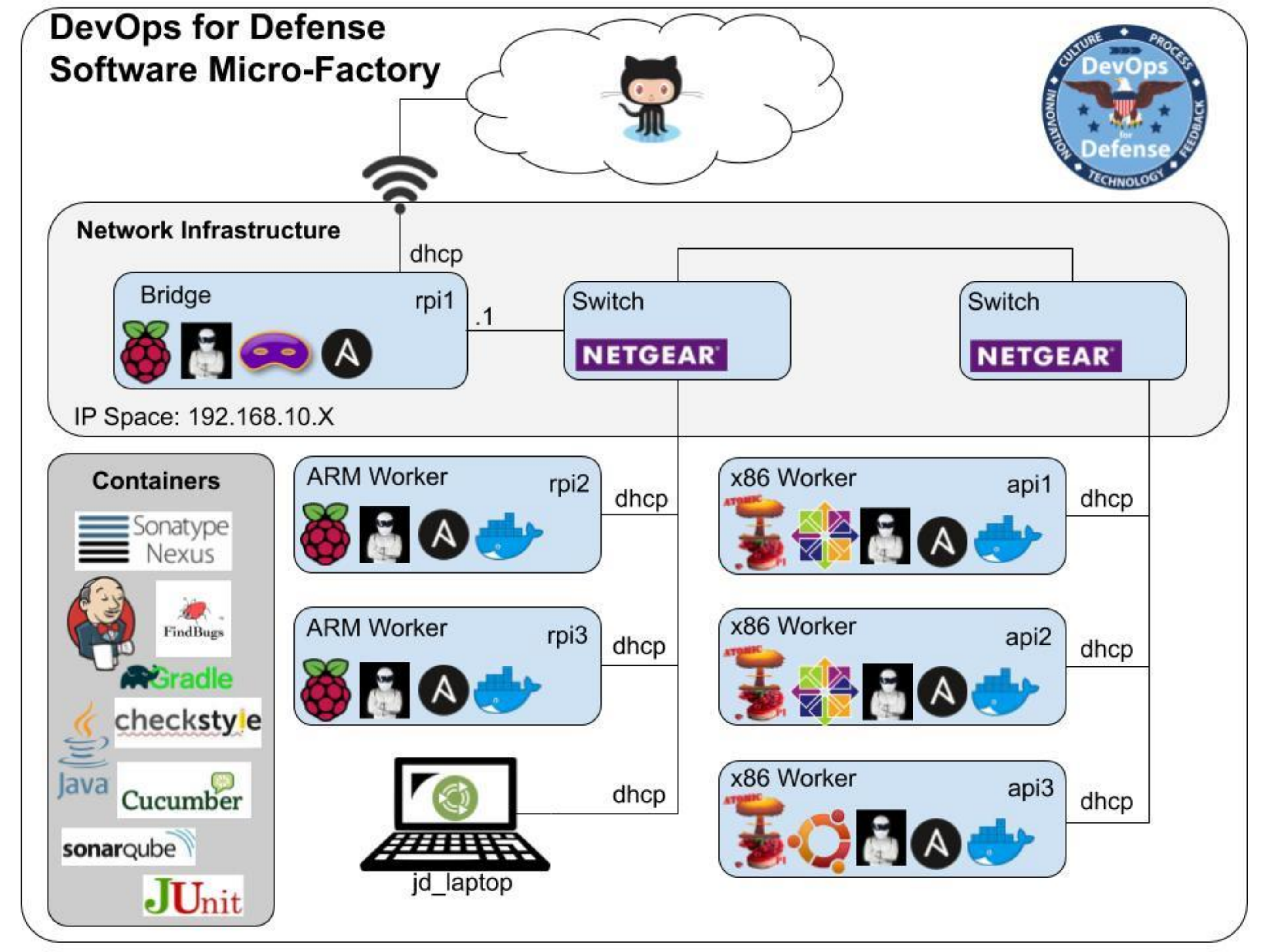


SW Micro-Factory Specs:

- 100% FOSS

3 x Raspberry Pi 3B

- Broadcom BMC2837 ARM Cortex A53
- Quad core @ 1.2 Ghz
- 1 GB DDR2
- 10/100 Ethernet
- 802.11n
- USB 3.0

3 x Atomic Pi

- Intel Atom x5 - Z8350
- Quad core @ 1.92 Ghz
- 2 GB DDR3
- 16 GB eMMC
- Gb Ethernet
- USB 2.0

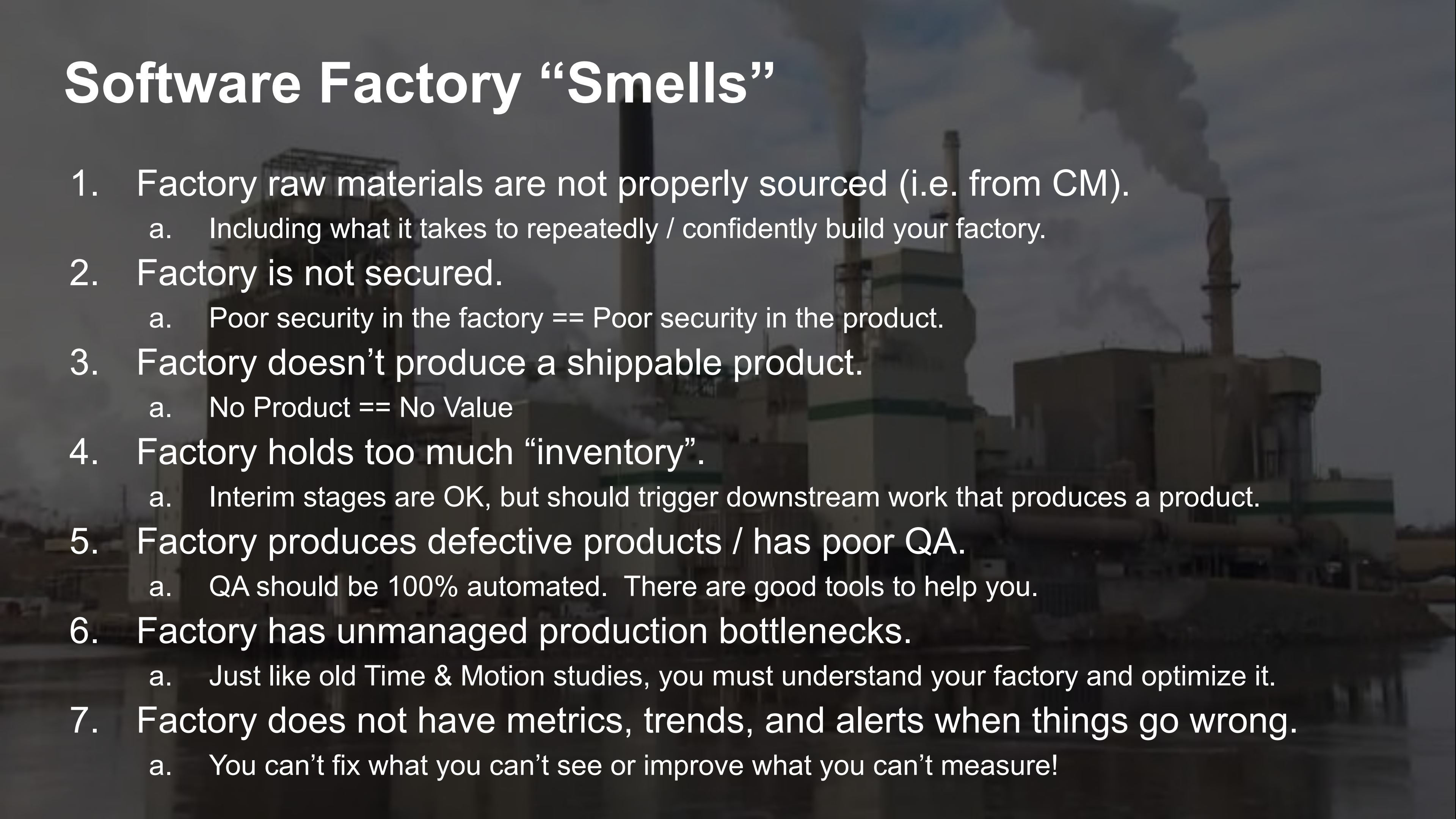
2 x Netgear Switch

- 5 x Gb Ports
- Unmanaged
- Flat Network

# Hardware Looks Good...But SW Isn’t There Yet

In the SW Factory series we’ll develop, demo, and publish SW solutions to build out a working SW factory with diverse processor architectures and OSs.

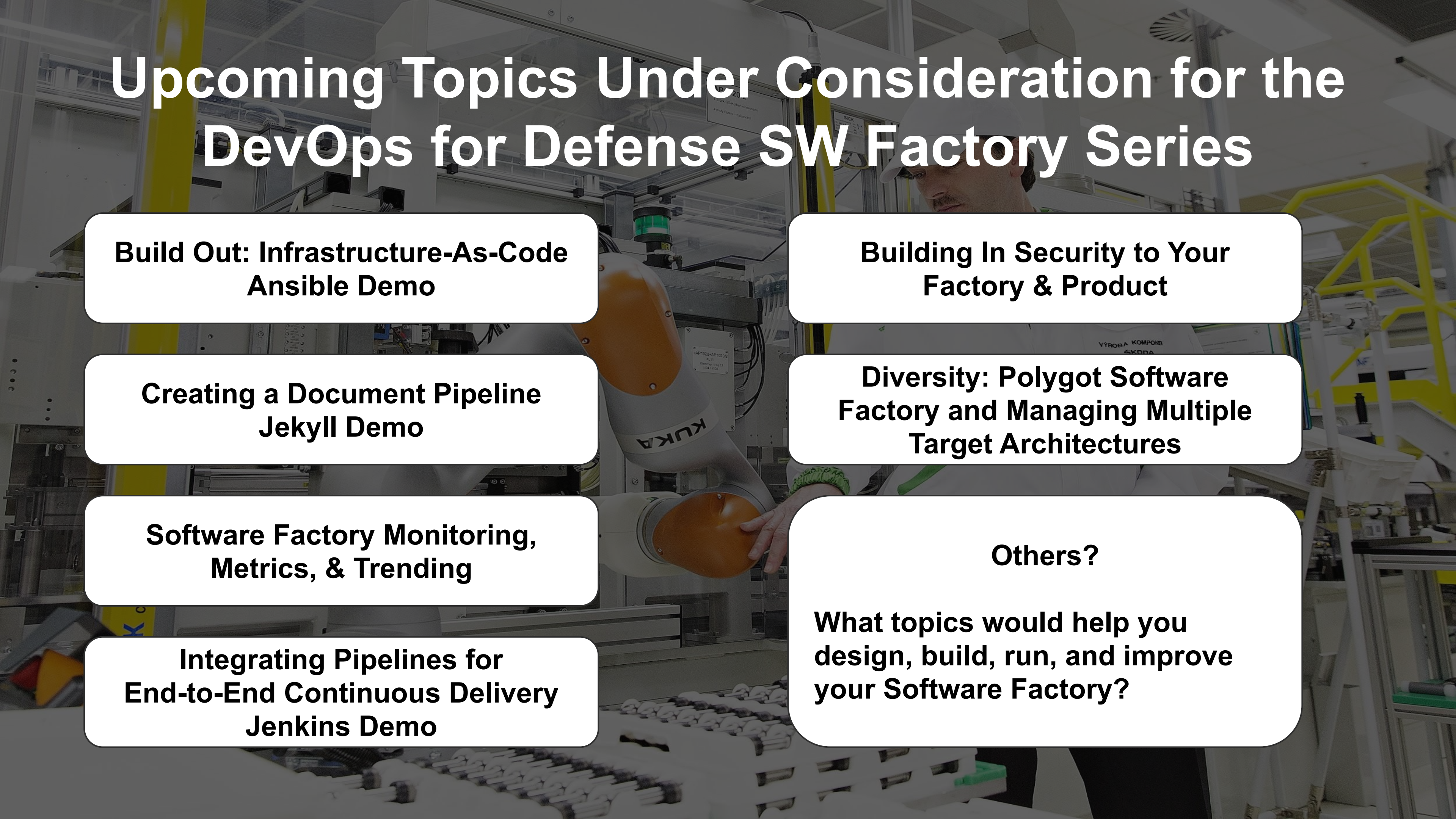
Let me know if there’s a particular topic or demo you’d like to see!



# Software Factory “Smells”

1. Factory raw materials are not properly sourced (i.e. from CM).
   a. Including what it takes to repeatedly / confidently build your factory.
2. Factory is not secured.
   a. Poor security in the factory == Poor security in the product.
3. Factory doesn’t produce a shippable product.
   a. No Product == No Value
4. Factory holds too much “inventory”.
   a. Interim stages are OK, but should trigger downstream work that produces a product.
5. Factory produces defective products / has poor QA.
   a. QA should be 100% automated.  There are good tools to help you.
6. Factory has unmanaged production bottlenecks.
   a. Just like old Time & Motion studies, you must understand your factory and optimize it.
7. Factory does not have metrics, trends, and alerts when things go wrong.
   a. You can’t fix what you can’t see or improve what you can’t measure!

# Upcoming Topics Under Consideration for the DevOps for Defense SW Factory Series



**Build Out: Infrastructure-As-Code**
**Ansible Demo**

**Creating a Document Pipeline**
**Jekyll Demo**

**Software Factory Monitoring, Metrics, & Trending**

**Integrating Pipelines for End-to-End Continuous Delivery**
**Jenkins Demo**

**Building In Security to Your Factory & Product**

**Diversity: Polygot Software Factory and Managing Multiple Target Architectures**

**Others?**

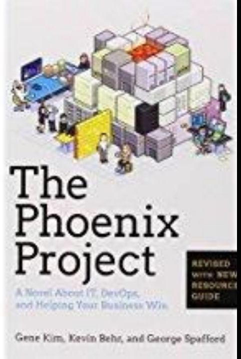
**What topics would help you design, build, run, and improve your Software Factory?**

# DevOps Resources

**https://devopsfordefense.org**

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

Books / Publications:


The Phoenix Project
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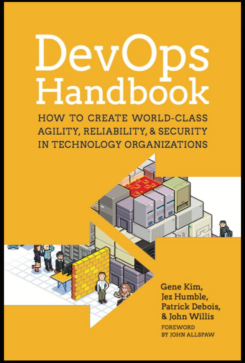
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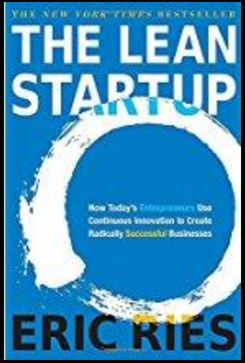
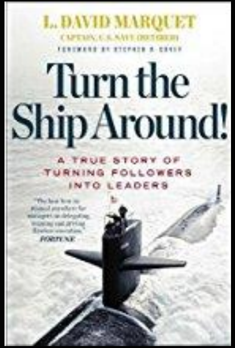
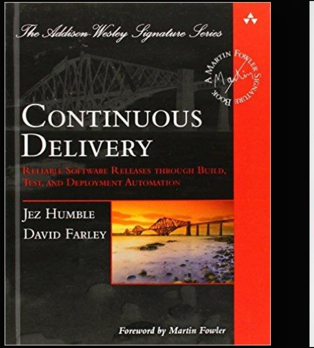

THE NEW YORK TIMES BESTSELLER
THE LEAN STARTUP
How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses
ERIC RIES

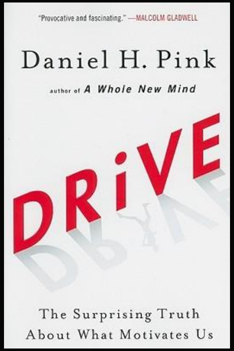
Conference Presentations (YouTube):

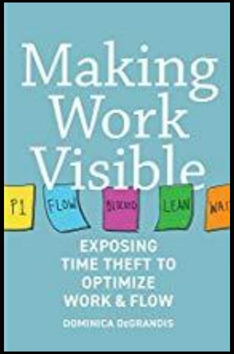
- DevOps Enterprise Summit (DOES)
- IT Revolution
- Velocity
- GoTo

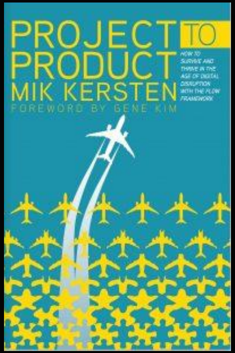
YouTube

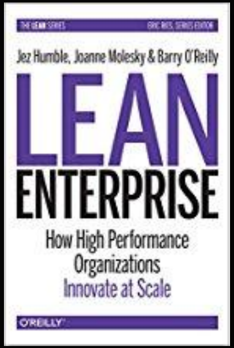


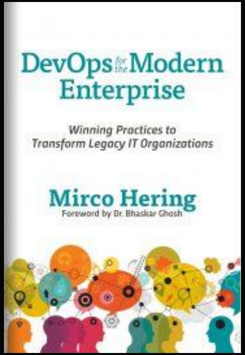

The Addison-Wesley Signature Series
A MARTIN FOWLER SIGNATURE BOOK
CONTINUOUS DELIVERY
RELIABLE SOFTWARE RELEASES THROUGH BUILD, TEST, AND DEPLOYMENT AUTOMATION
JEZ HUMBLE
DAVID FARLEY
Foreword by Martin Fowler


"Provocative and fascinating." —MALCOLM GLADWELL
Daniel H. Pink
author of A Whole New Mind
DRiVE
The Surprising Truth About What Motivates Us






THE LEAN SERIES
ERIC RIES, SERIES EDITOR
Jez Humble, Joanne Molesky & Barry O'Reilly
LEAN ENTERPRISE
How High Performance Organizations Innovate at Scale
O'REILLY


DevOps for the Modern Enterprise
Winning Practices to Transform Legacy IT Organizations
Mirco Hering
Foreword by Dr. Bhaskar Ghosh

# Group Exercise:  Lean Coffee & Book Club

**Book Club:**

- **"Turn the Ship Around" - Capt David Marquet**

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.

**Topics:  "Factory Design Challenges", "Factory Build-Out Obstacles"**