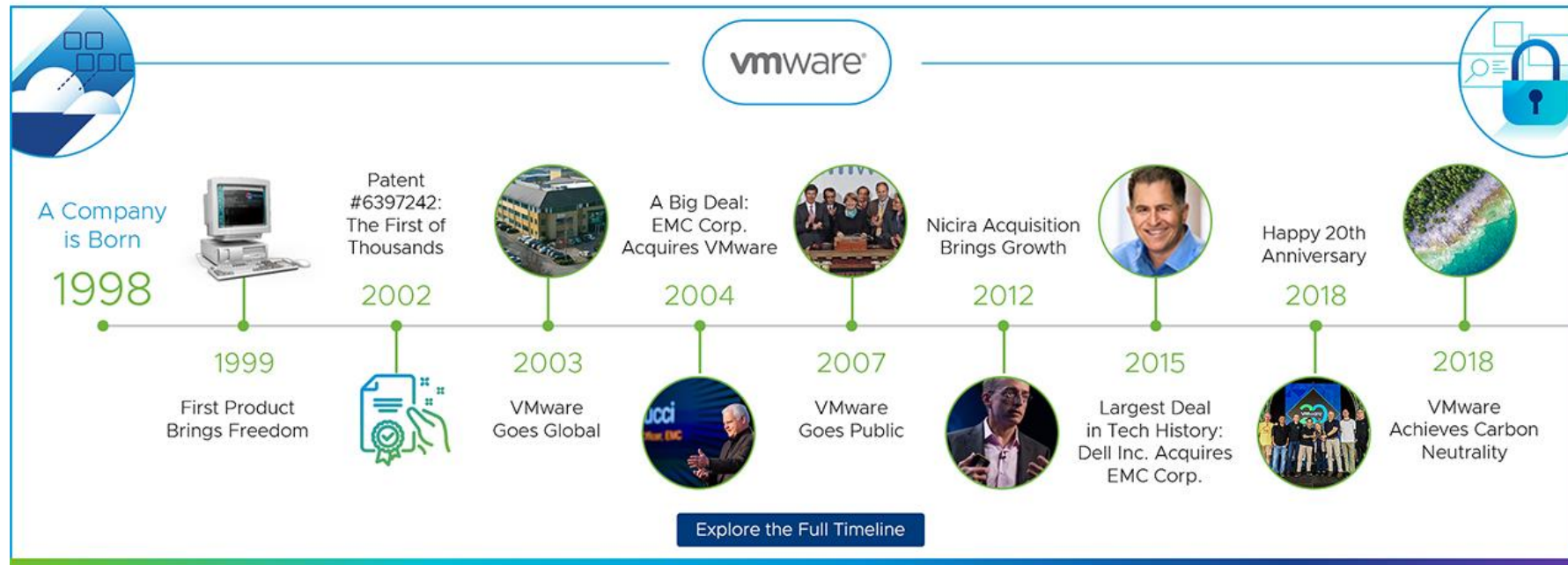


# App Modernization & Workforce Development – The ‘Software Factory’ Model

Jeremiah B. B. Sanders, MBA  
Sr. Transformation Strategist, VMware

# VMware At a Glance

- Enterprise software company and leader in multi-cloud technology. Customers include 99% of the Fortune 1000, all levels of US government and public sector organizations globally.
- VMware employs over 35,000 and supports 300,000 organizations, with 85M enterprise workloads and 5M developers building on VMware software today.
- Significant footprint and employer presence in Virginia, with major east coast facility located in Reston, VA.



# Air Force Kessel Run

Cultural & Organizational Change Driving Digital Transformation & User Outcomes

Background: Air Operations Center Weapons System

- Classified coalition air ops worldwide at 22 locations
- ~50 legacy integrated systems; sustainment nightmare!
- \$430M, 10yr modernization effort stalled; nothing delivered to users



Image is Public Domain, (U.S. Air Force photo by SSgt Alexander Riedel, 2021)

Goals when we founded Kessel Run (People, Process, Technology):

- Build organizational competencies to **Continuously Deliver war-winning software our users loved**
- Establish and run a distributed, multi-region cloud infrastructure and application platform environment on multiple classified networks capable of supporting Continuous Delivery
- Transform government acquisition & system development ecosystem – shift focus to **mission outcomes**

**Enablement Partner:** Pivotal, now VMware Tanzu



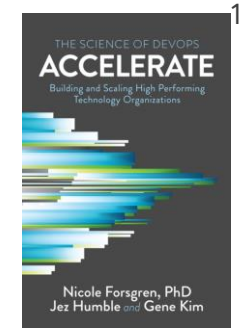
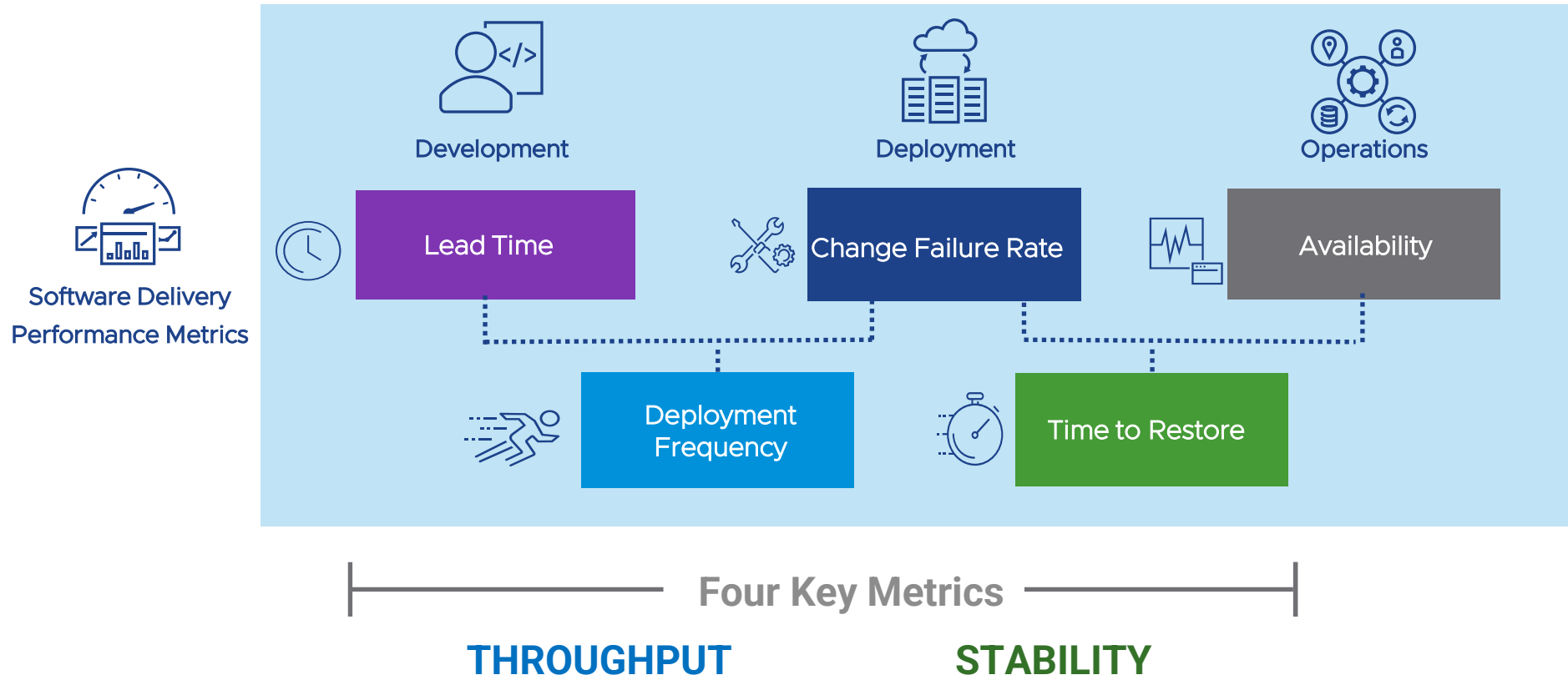
# Drive Digital Transformation Using DORA Insights

## Elite Performing IT organizations (per State of DevOps Report):<sup>1</sup>

- **Meet mission faster** – 106x faster Lead Time from commit to deploy; 208x more frequent code deployments
- **Better software** – 7x lower change failure rate, 22% less time on unplanned work/rework; 50% less time remediating security issues
- **More reliable** – 2,604x faster recovery (MTTR)
- **More cost effective** – dev costs reduced ~40%, costs per program down 78%
- **More innovation** – 44% more time spent on new work vs. sustaining legacy
- **Improved morale** – Employees 2.2x more likely to recommend their org
- **More competitive** – 2x more profitability, market share, productivity, customer satisfaction, quality of products or services

# Accelerate Your Software Delivery and Operations Performance

## Measuring Industry Results



- 30k+ Survey Respondents
- 1.5k IT/Software Organizations

# How to Enable Digital Transformation – The DORA Playbook

## Bringing the Future Faster – 24 Key Capabilities of High Performing IT Organizations<sup>1</sup>

### Continuous Delivery Capabilities

1. Version control all prod artifacts
2. Automate deployment process
3. Continuous Integration
4. Trunk-based development
5. Test automation
6. Manage test data
7. Shift left on security
8. Continuous Delivery

### Architecture Capabilities

9. Loosely coupled architecture
10. Architect for empowered teams

### Product and Process Capabilities

11. Customer (end-user) feedback
12. Workflow visible through value stream
13. Small batch sizes
14. Enable team experimentation

### Lean Management and Monitoring Capabilities

15. Lightweight change approval process
16. App & infrastructure monitoring inform business decisions
17. Proactive system health checks
18. Work-in-process limits
19. Visualize work to monitor quality and communicate throughout the team

### Cultural Capabilities

20. Westrum-style generative culture
21. Encourage and support learning
22. Support and facilitate collaboration across teams
23. Provide resources and tools that make work meaningful
24. Support or embody transformational leadership

# Air Force Kessel Run Vision:

## Continuously Deliver War-Winning Software our Users Love

## KESSEL RUN 2020 IN REVIEW

- ✓ ENABLED THE USE OF CLOUD IN MULTI-REGION, DISTRIBUTED AOC OPS FOR 1ST TIME
- ✓ CONDUCTED AOC'S 1ST MULTI-REGION, OPERATIONAL FAILOVER - NO USER IMPACT
- ✓ SHIFTED 1200+ PERSON ORG REMOTE IN 48 HRS WITH NO DIP IN PRODUCTION

"They are the new standard of military acquisition excellence"  
Defense Innovation Board

**2K+** Production Deployments

**75+** Total Apps Hosted On KR Platform

**7K+** Active Users

**1K+** Developers Using KR Platform Daily

**82%** Faster Adoption Over Legacy

**150%** Increase in KR Platform Customers

### AGILE ACQUISITIONS

Piloting new SW Pathways Construct

**82** Contracts Managed

**54** Industry Partners

### ON TO 2021...

- Deliver full modernized KRADOS app suite to enable deprecation of TBMCS
- Deliver Torque MVP capabilities to F35 and F22; paving way for Single MIS
- Migrate all KR workloads to container-based platform on all classifications
- Deploy fully interoperable KR Suite in-a-box to support ABMS On Ramp-5

"One of the more remarkable models of software development success is Kessel Run."  
**Congressman Jim Himes**

### Mission Impact

**57K+** Mission Reports Created in Operations

**400%** User Base Increase for Wing C2/COVID Cape

**85%** Decrease in Daily Tanker Planning Time Needed

**15K+** Missions Planned in KR Planning Applications

**66%** Decrease in maintenance personnel scheduling time

**77%** More Apps Contributing to KR Event Stream

**\$512M** Fuel Savings Since 2017

**81%** Decrease in MAAP Planning Workflow Time

"Kessel Run is revolutionizing the way we command and control airpower."  
**Col Trey Coleman, AOC Commander**

43

organic, government-led product teams; equivalent of 12 'Software Factories' based on AF avg (153% growth in 2020)

### DEPLOYMENT FREQUENCY

DEPLOY EVERY

4.5 HOURS

Deploying small batches of functionality continuously into prod decreases risk

### MEAN TIME TO RESTORE

118 MINUTES

Modern, complex systems are going to fail; the focus must be on the ability to respond rapidly

### LEAD TIME

7 HOURS

Reducing lead time ensures valuable capability isn't sitting on the shelf and gets to users as fast as possible

### CHANGE/FAIL RATE

8% OF PROD DEPLOYS

Agile doesn't discount quality; creating quality code is imperative; especially in our environment

### 1257 Employees

220 Civilians | 92 Military | 945 Contractors

**20%** REMOTE

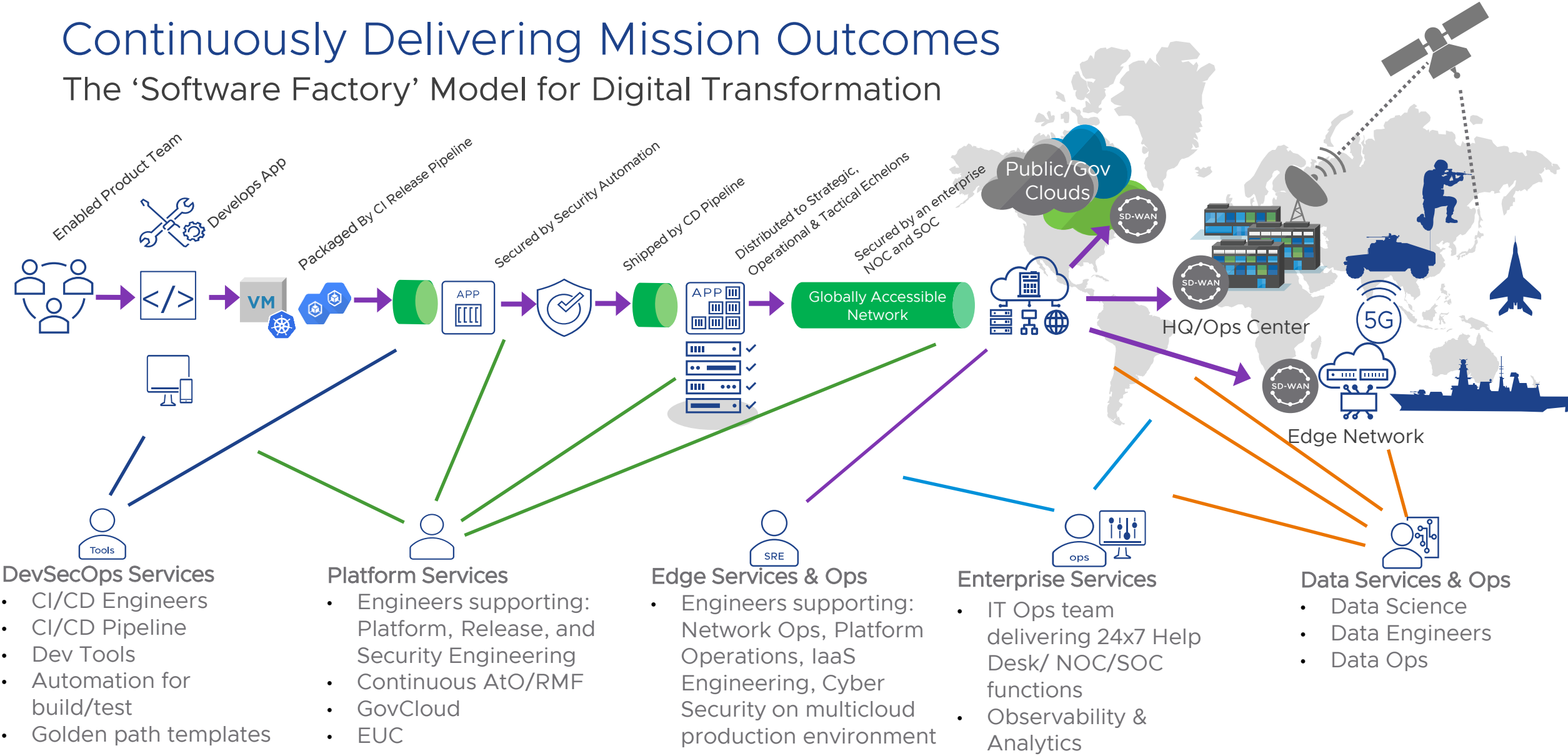
**31%** WOMEN

**25%** MINORITY

**25%** VETERANS

# Continuously Delivering Mission Outcomes

## The 'Software Factory' Model for Digital Transformation



Automation + Ubiquitous Layered Abstractions + Culture of Service = Outcomes that Scale



# VMware's Holistic Approach to Enabling Software Organizations

## Practices & Culture

Learn new ways to build and run resilient software at scale



VMware  
Tanzu Labs

## Tools

Leverage your preferred, cloud native tools and OSS



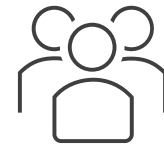
OSS Powered

## Platform

Develop, operate and optimize any app, on every cloud, on a unified platform



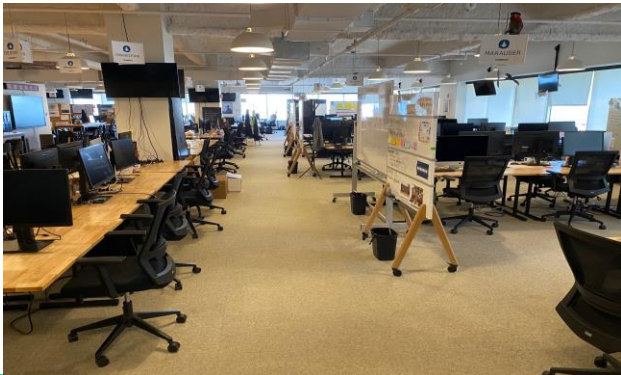
Your Teams



Accelerate  
Mission Outcomes



vmware®



# VMware Tanzu Labs – Three Decades of Enabling Transformation

## 2000's - Silicon Valley Startups



“We need to build new apps our users will love.”

## 2010's - Fortune 500



“We need a well-run platform that supports our devs.”

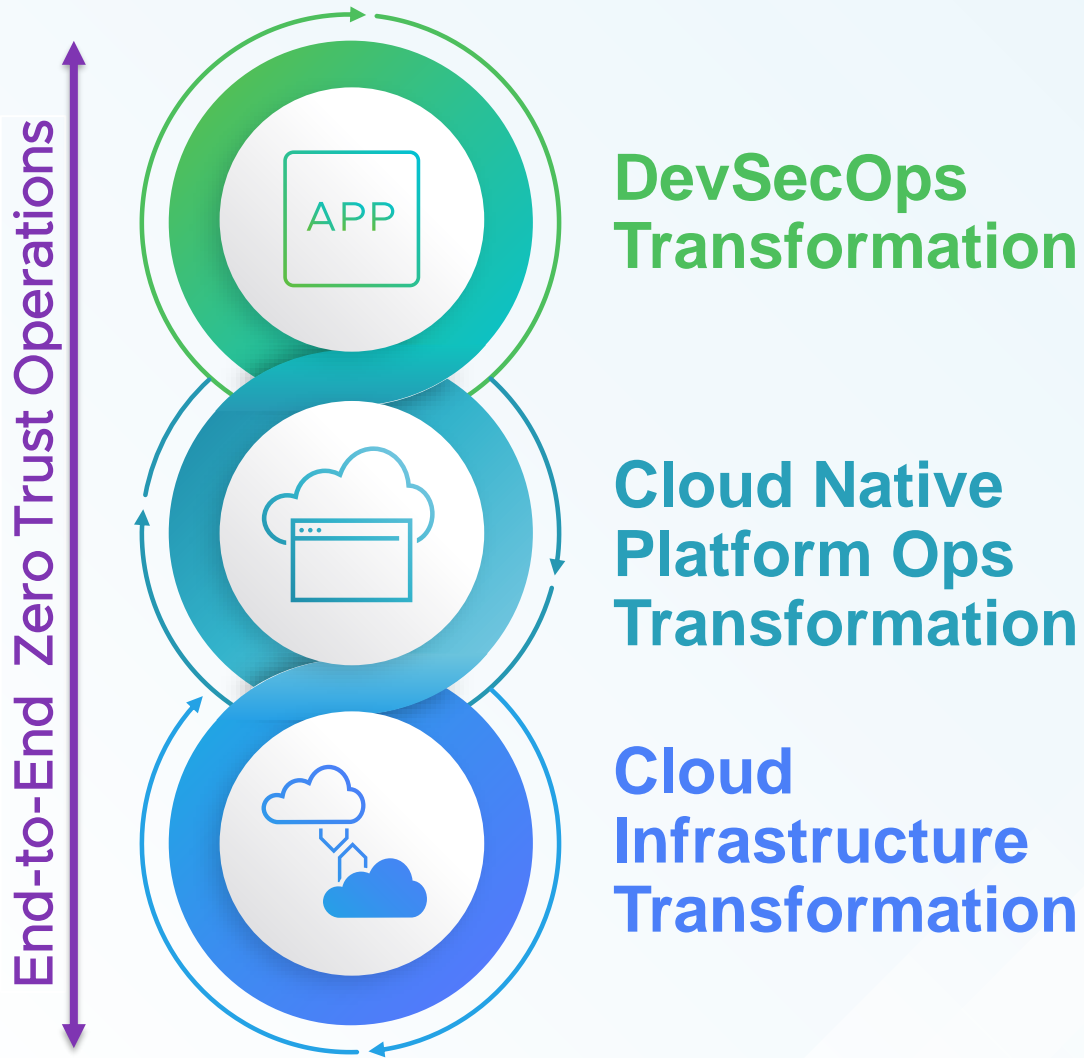
## 2016> - The US Federal Government



“We need to modernize our apps for the cloud.”

- 200+ Gov modernization engagements since 2016: Delivered **80%+ mission efficiency gains** (on average), 32% developer productivity increases, **82% more software to production**, 300% faster Kubernetes adoption, 91% Day 2 Kubernetes ops efficiency gains, 92% less OS patching time
- Enabled “**Speed is the new security**” paradigm: **Automated and repeatable path to production via Continuous ATO/RMF**; ATO to production in 90 days on average; remediate vulnerabilities enterprise-wide in less than 24 hours

# What's happening? We are in the Midst of Multiple Transformations...

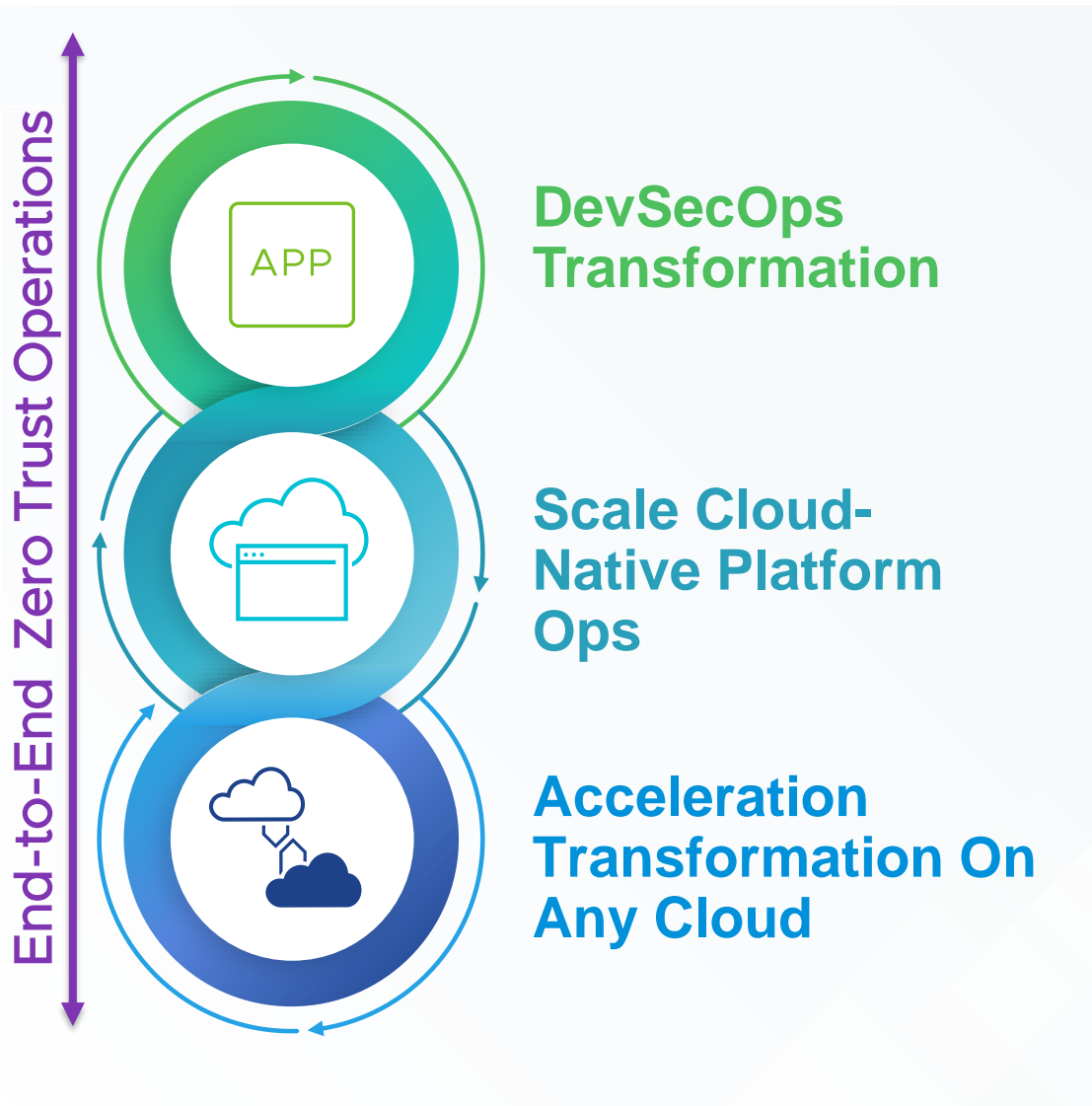


**'A New Way of Work'** – Best practices to Continuously Deliver with Developer and Operator Efficiency (Faster, More Secure); Microservices/APIs/Cloud Native App/Data Architecture Patterns

**Automated** Path to Production; Platform to Manage, Monitor and Secure Containers **Consistently** Across Data Center/Edge/Public Clouds

**Multicloud Operating Model:**  
Data Center/Edge/Public Clouds/Sovereign Clouds; Legacy Virtualized App Migration

# Executing Simultaneous Government Transformations



## Lessons Learned

- **People/Process/Tech** lenses across these transformations
- Infrastructure and platform exist to **serve** the application
- **Tech** should be seen as an **enabler** of a **'new way of work'** focused on **mission outcomes**
- Tech **decisions** should be made **based on** how they impact **mission outcomes** (can finally measure outcomes)
- The keys to tech enabling outcomes are **automation** of integrations, **abstractions** and services through the tech stack; need **repeatability and maintainability that scale**
- **Don't build what you can buy; don't buy what you can rent**
- **Culture, culture, culture...**

# Implications for Government Digital Transformation

Make Government Software 'Fun' Again...Enable Continuous Outcomes

'Software Factory' Model and [Procurement Transformation](#) - *Expect Better!*

- Build **organizational competencies** to **Continuously Deliver software**: embrace **gov't-led** integration; DevSecOps is a 'contact sport' - fundamentally alters relationship between gov and industry
- **Value constituent values/outcomes** over procurement process outputs; Gov manages org capacity to create value for constituents vs. cost, schedule, tech conformance
- Reject all-in-one massive contracts: optimize for change and uncertainty, diversify and spread procurement risk; **more & modular, services-based contracts** with LOE/T&M terms
- Leverage **innovation accounting and growth board models** as procurement decision points vs. traditional C/S/P milestones

**Gov Workforce Transformation**: Public/Private partnerships with academia creates Gov tech talent pipelines – [Article](#): Public university/community college interns become gov tech employees

Change is happening...**lead from the front**: DoD Software Acquisition Pathway, Congressional support for 'Software Factories' & Implications on Fed Agencies, State Governments (TX, CA Dept of Corrections, etc.)

# Thank You

- [VMware State & Local Government Solutions](#)
- [What's a Software Factory?](#)
- [Agile Acquisitions - Enabling Government Digital Transformation](#)
- [Video: Software Factory and Agile Acquisitions Enablement - Jeremiah Sanders](#)

