DevOps

What is it? What is its business value?

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The IT Revolution

*Information technologies are **the dominant value creation driver** for most businesses, therefore it is imperative that IT operations deliver value quickly and efficiently*

Officials: Customs system outage causes waits at airports across U.S.

by Associated Press/ABC7 | Tuesday, January 3rd 2017

Thousands of people... patience #2017
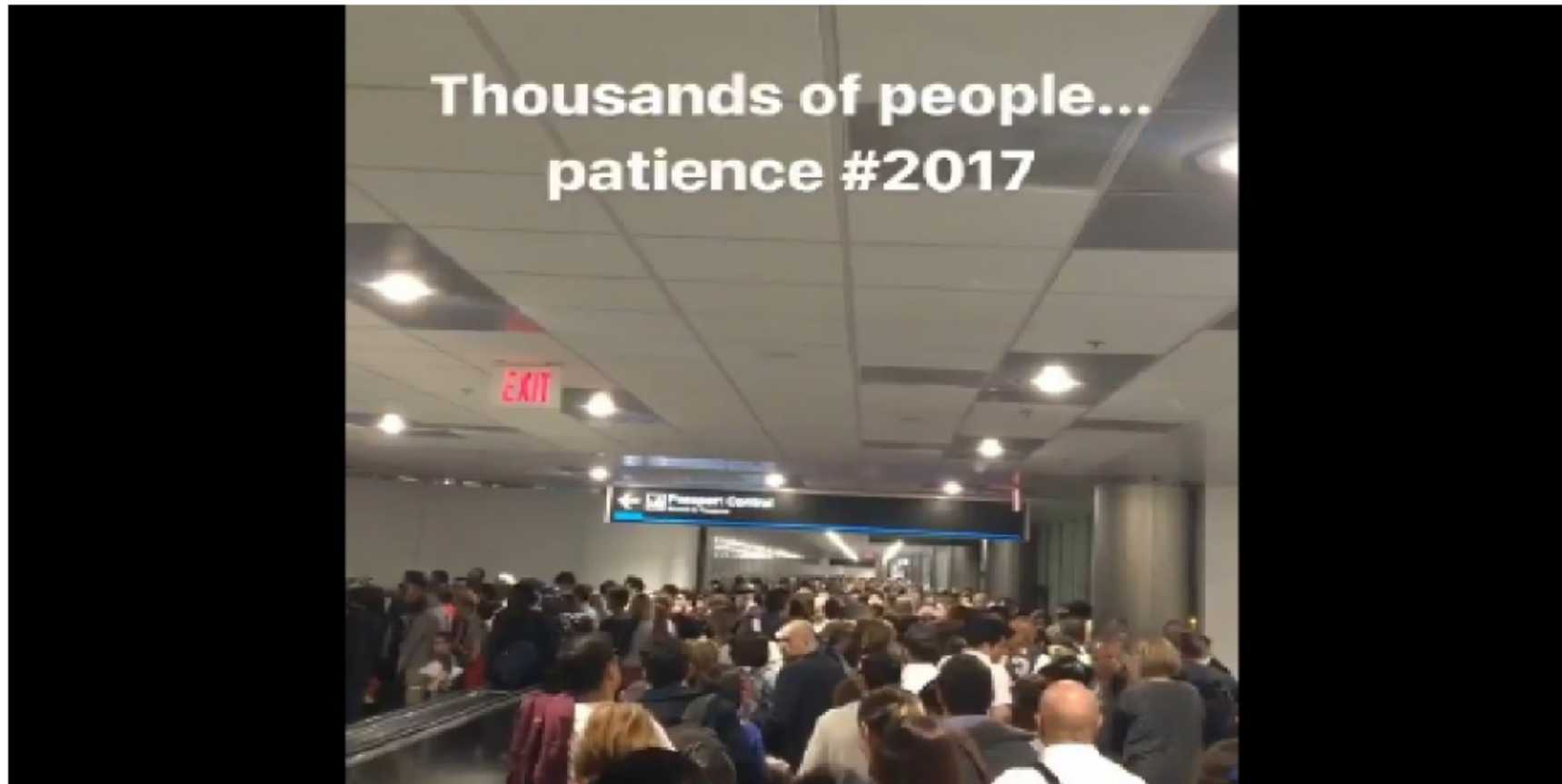
Patient died as country's busiest ambulance service suffered five-hour computer meltdown on New Year's Day

London Ambulance Service suffered five hours of technical problems on January 1 - one of its busiest nights of the year - and investigation is set to be launched

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12:46, 7 JAN 2017 | UPDATED 12:48, 7 JAN 2017

NEWS

More Common Than You Think

- 86% of companies suffered an IT failure in the last year
- 60% of these companies listed human error as the most common cause of downtime
- 50% of human errors are related to change/configuration/release/ integration and handoff issues
- 81% of companies that suffered failures have had the exact same failure recur after the initial incident

DevOps is Not…

- Just developers taking over operation's jobs and doing it themselves
- Just implementing a set of tools
- Just culture change
- Just a job title

DevOps Definitions

- DevOps is an enterprise software development phrase used to mean a type of agile *relationship* between <u>Development</u> and <u>IT Operations</u>. The goal of DevOps is to change and improve the relationship by advocating better *communication* and *collaboration* between the two business units.
- DevOps is an operational *philosophy* that promotes better *communication* between development and operations as more elements of operations become *automatable*

DevOps Definitions

- DevOps is the practice of operations and development engineers *participating together* in the entire service lifecycle, from design through the development process to production support
- DevOps is a term used to refer to a set of practices that emphasizes the *collaboration* and *communication* of both software developers and other IT professionals while *automating* the process of software delivery and infrastructure changes. It aims at establishing a *culture* and environment where building, testing, and releasing software can happen rapidly, frequently, and more reliably.

DevOps Definitions

- DevOps represents a change in IT *culture*, focusing on rapid IT service delivery through the adoption of agile, lean practices in the context of a system-oriented approach. DevOps emphasizes people (and *culture*), and seeks to improve *collaboration* between operations and development teams. DevOps implementations utilize technology — especially *automation* tools that can leverage an increasingly programmable and dynamic infrastructure from a life cycle perspective.
- DevOps is the combination of *cultural* philosophies, practices, and tools that increases an organization's ability to deliver applications and services at high velocity: evolving and improving products at a faster pace than organizations using traditional software development and infrastructure management processes. This speed enables organizations to better serve their customers and compete more effectively in the market.
- DevOps is the end to end *automation* of software development and delivery

DevOps Definition

- DevOps is about enabling the fast flow of planned work, whether it be development, testing, deployment, or release while maximizing reliability and security.
    - DevOps is the umbrella under which a broad set of practices and tools produce this outcome
- Set of best practices for service lifecycle management

But What DevOps Really Is

- A new way of working with a very important goal -- improving IT service delivery
- A way to solve the workflow problem between Dev and Ops
- Getting more business value from IT
- Transitioning the view of IT from less of terms of TCO to increasingly being measured by ROI

DevOps Adopters Are More Agile

30x
More frequent deployments

200x
Faster deployment lead times

DevOps Adopters Are More Reliable

60x

The change success rate

168x

Faster mean time to recover

DevOps Adopters Are More Productive

22%
Less time spent on unplanned work

50%
Less time spent remediating security issues

DevOps Adopters Win in the Market Place

2x
More likely to exceed profitability, market share, and productivity goals

50%
Higher market capitalization growth over 3 years

DevOps Adopters Have Happier Employees

2.2x

More likely to recommend their organization to their friends

Benefits of DevOps

- Produces higher quality code with greater stability
- Reduces costs
- Reduces amount of unplanned work
- Reduce stress and chaos of deployments
- DevOps teams work 35% fewer after-work hours

How does DevOps Improve IT Ops?

- Use of automation to speed execution and reduce errors
- Faster provisioning of compute resources
- Expands responsibility for quality
- Deploying smaller more frequent code releases reducing risks
- Automating deployments and recovery processes reduces service outages

DevOps Gives Businesses Competitive Advantage

- A study conducted by Deloitte concluded that "*the ability to innovate, at an accelerated pace, will be the most important capability differentiating the success of companies*"
- Companies that trail behind on the technology curve will lose their competitive edge
- Customer expectations challenge business more than ever and they have little patience for underperforming or outdated apps
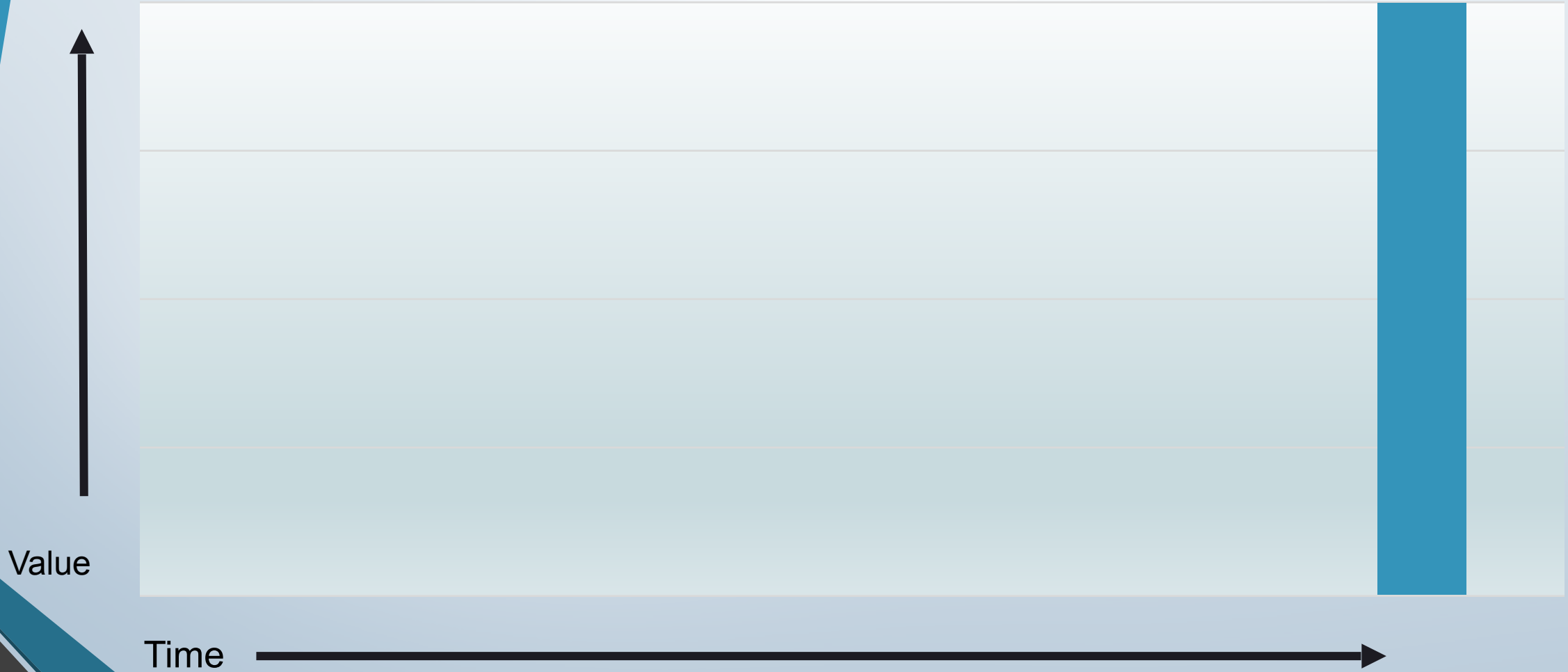
Things Are Changing Faster – Can You Keep Up?
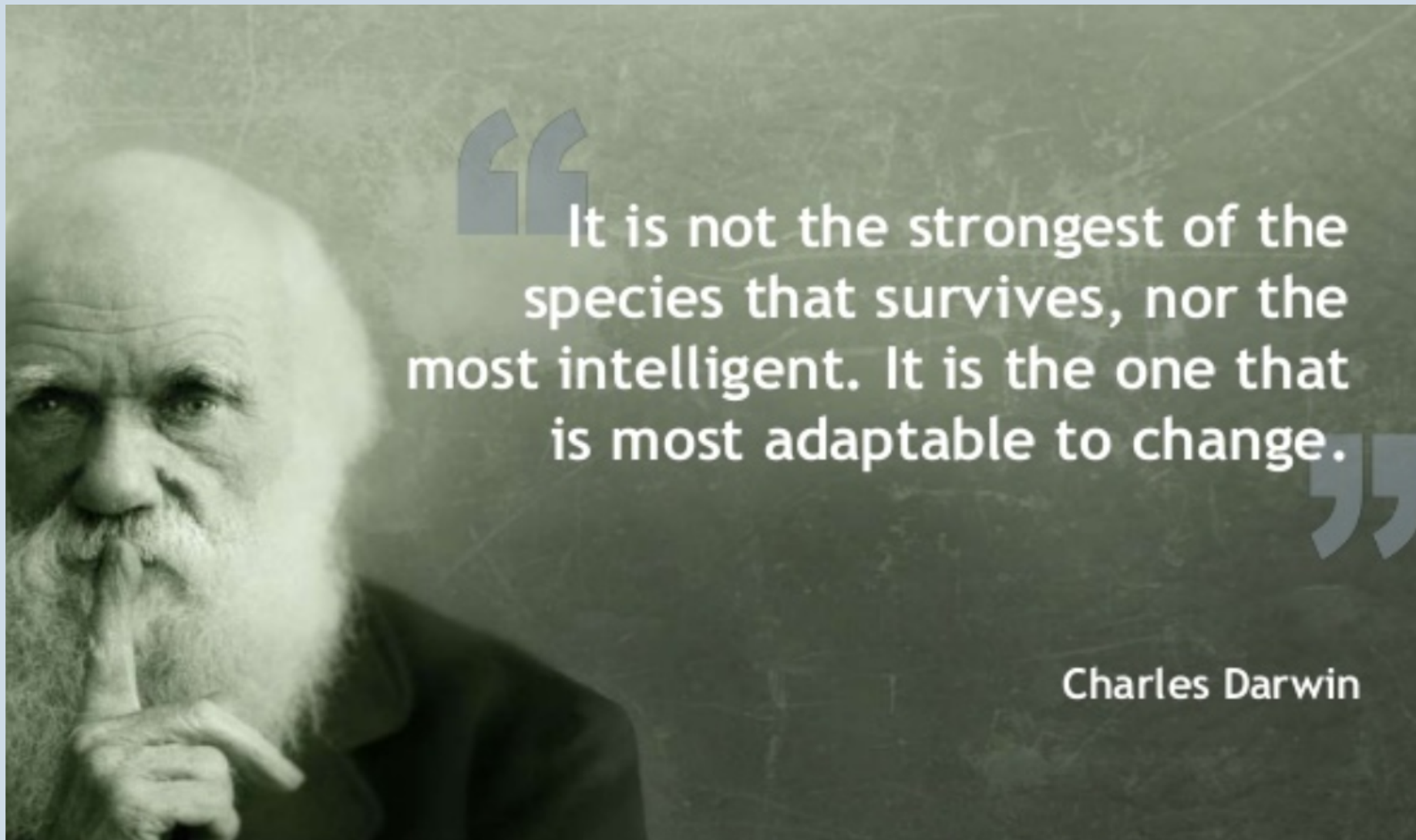
"It is not the strongest of the species that survives, nor the most intelligent. It is the one that is most adaptable to change."

Charles Darwin

Improves Performance By Delivering Value Sooner

Value

Time

What are DevOps Practices?

- Infrastructure as code
- Code/artifact repository
- Version control
- Continuous integration
- Continuous testing
- Continuous delivery
- Containerization
- Automated release

Infrastructure as Code

- Fast
- Readable
- Auditable
- Repeatable
- Versioned

Continuous Integration

- Isolated changes are immediately tested and reported on when they are added to a larger code
- Immediate feedback on code developer is working on
- All check ins are validated by automated build, and automated unit, integration, and acceptance testing

Continuous Delivery

- Provides feedback on the production readiness of a system
- Provides push-button deployments on demand
- Reduces deployment risks

Containerization

- Portable – write once, run anywhere
- Creates an atomic unit
- Faster and easier to deploy
- Allows for rapid scaling up/down

A new release was just pushed to production?

Didn't notice

Questions?

Dev vs Ops

- Opposing forces
  - Dev wants to create change
  - Ops wants stability, therefore opposes change
  - Development process is agile, Ops process is Static
  - But change is required for business
  - DevOps enables the change needed while reducing the firefighting

How does DevOps Improve Performance?

- Reduced batch size
- Reduce pain of releases
- (Goes with automated testing and burning down pic) Improve Quality - Fast feedback loops - people are self motivated to improve quality if they can see quickly that what they are doing has problems. But if there is a long delay their motivation drops significantly.

Dev vs. Ops
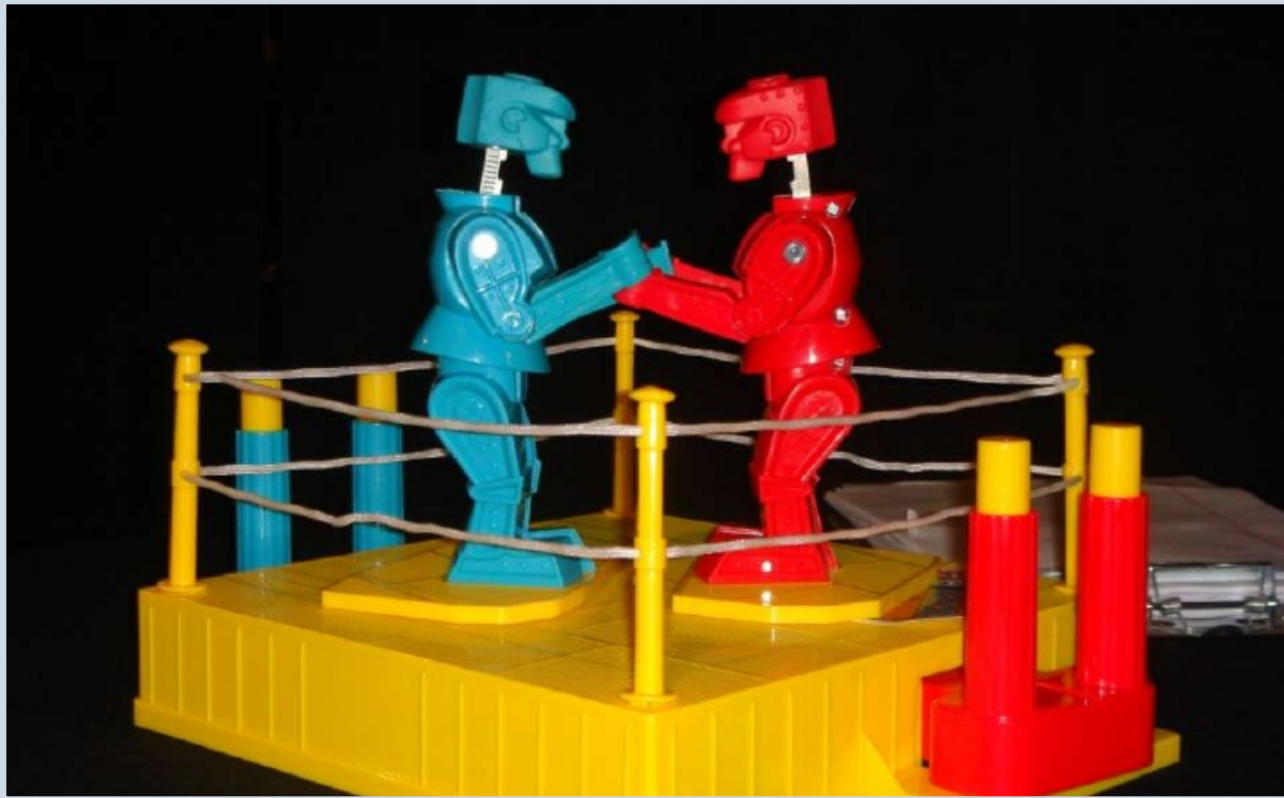
"It works on my machine…"

"It's not the server, it's your code."

Questions/Observations

- Shouldn't Quality be (built in) addressed before QA?
  - Shift left!
- How long would it take your organization to deploy a single new line of code?
- Do you know how any of your servers are precisely configured?
- When I say automated testing, I don't mean "When I push my code to production, the users automatically start testing it"
- Deployment is different than release/break them apart!
- Software is changing industries
- The best people to support a complex app are the ones who built it
- Shadow IT problem
- All companies are in the software business
- Would you rather have your employees spending time fixing things or building things of value?
- What's the result of an error in prod?
   What would be the effect if you received a bill for the cost of downtime every time there was an outage?

Pain Points

- Long and painful testing cycles
- Releases that are infrequent
- The quality of your products is poor
- Solutions that don't satisfy customers
- More time spent testing, deploying, releasing, and fixing rather than designing and building
- Production incidents result from errors in manual configurations and releases

Problems

- Finance having to approve new environments adding delays of months to a project
- System administrators spend as much as 50% of their time on routine, repetitive tasks
- Developers spending time waiting on environments
    - Think about the number of ways IT slows progress
- Ops doesn't have spare capacity
- Support team constantly fighting fires
- Time spent on unplanned work steals time away from planned work
- Releases are usually painful events that are dreaded by ops
    - That and ensuing issues leading to fire fighting impact IT quality of life

The problem in a Nutshell

- Everything needs software
- Software runs on a server to become a service
- Delivering a service from inception to its uses is too slow and error prone
- This loses you money (delay = loss)
- Therefore IT is frequently the bottleneck in the transition of "concept to cash"
- Inconsistent or unknown state of servers

Symptoms

- Defects released into production causing outages
- Problems appear only in some environments
- Long delays while dev, QA, or another team waits on resource or response from other teams
- "Manual error" is commonly cited as the root cause of an outage
- Releases slip/fail
- Quality of life issues in IT

DevOps Benefits

- DevOps enables companies to seize market opportunities
- For businesses to survive, IT must transform from a back-office concern that needed to "keep the lights on" to key part in how the business competes every day
- **devops is not about a technology, devops is about a business problem**
  - **Changes IT from being a business bottleneck to a business enabler**
  - **Devops is about improving business performance by delivering value earlier**
- **(Want to) Speeds delivery while improving system stability**
- **DevOps helps you to adopt new technology faster**
- Reduce time wasted fixing things i.e. – firefighting
- Enables dev to provision without ops putting up roadblocks
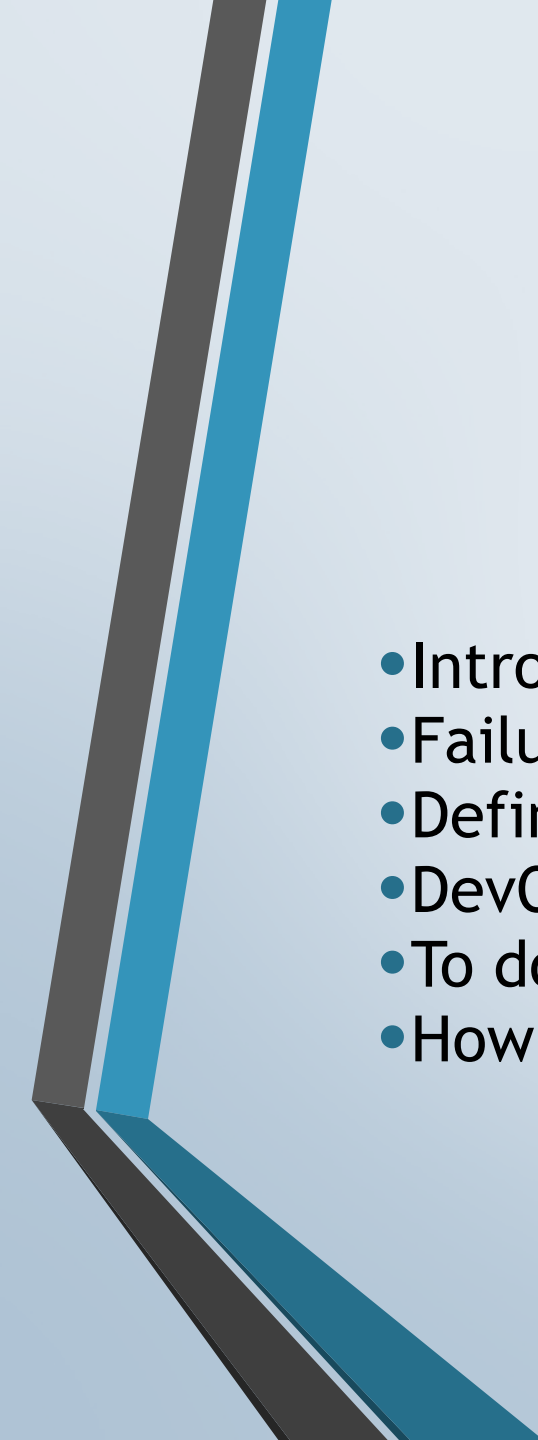- Frees up ops to concentrate on value-added functions

Why do DevOps?

- The benefits of a DevOps approach are many, including:
- Everything needs software
- Improved deploy frequency which can lead to faster time to market
- Lower failure rate
- Shortened lead time
- Faster mean time to recovery (recover automatically)
- Zero touch build and deploy
- Customer expectations around convenience, cost, and experience are ever increasing and challenge business more than ever (with a click of a mouse I can find someone else to fulfill what I'm looking for) Customers have little patience for underperforming or outdate apps
- Customers have little patience for underperforming or outdated apps. With the speed of a click of a mouse they can find someone else to fulfill what they are looking for.
- DevOps is no longer a fringe movement, it is a competitive necessity
- #1 Reason to adopt Devop? Because your competitors are
- The fast overtaking the slow
- Deliver better software faster
- Eliminates IT as a bottle neck for the business
- Reduce development costs
- Increase capacity to innovate

- development team tested new code in an isolated development environment

- Immutable hardware – eliminate the one off changes that over time

Outline

- Why I'm giving this lecture
- Why was DevOps developed?
  - Over the years we've gotten better at developing software, but operations has been lagging behind
- Impact of unplanned outages – Most can be prevented!
- Quality issues lead to…
  - Service outages
  - Waste
  - Ops spending a significant amount of time fixing issues

- Lost opportunity – traditional method of provisioning environments
  - Things started to improve with new technology – virtual machines

- Intro
- Failures
- Definitions
- DevOps benefits
- To do all these thing we have to fix existing IT problems
- How doe DevOps work?

What's wrong with traditional methods?

- Requirements
- Design
- Development
- Test
- Deploy