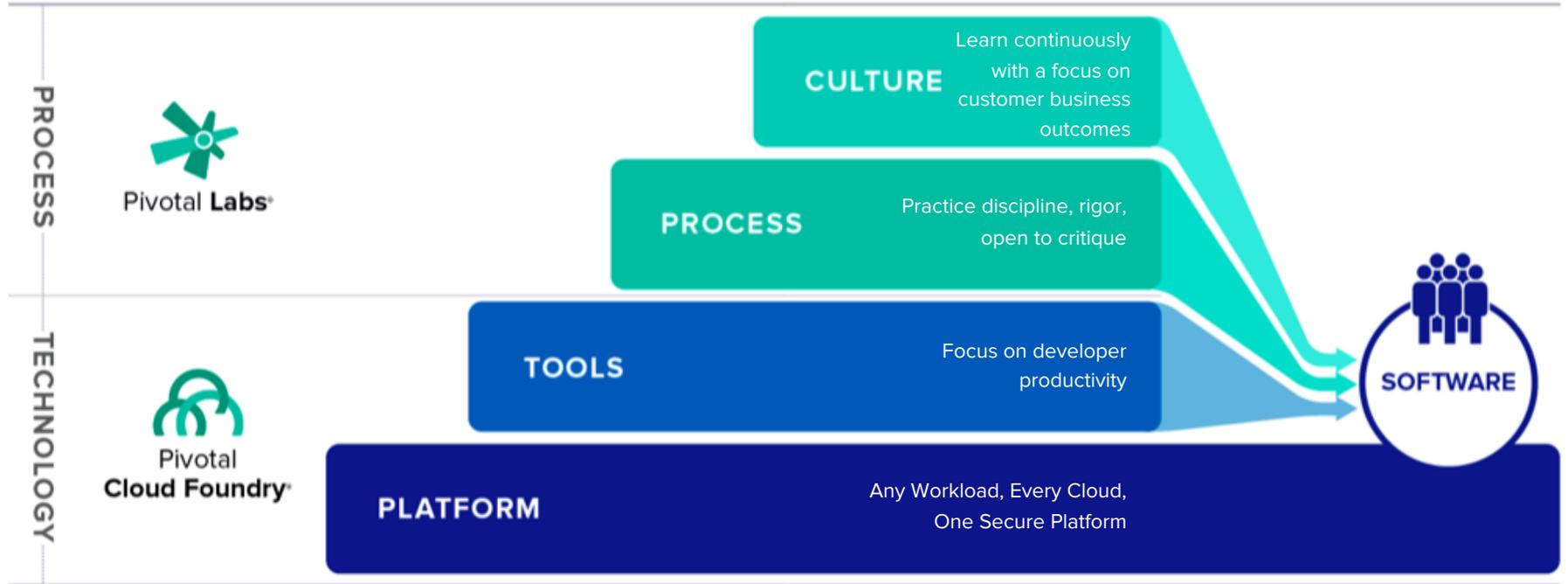# Pivotal

Who put digital transformation in my DevOps?

Nov, 2018

@cote

cote.coffee/bettersoftware

90

1

Pivotal: transforming how the world builds software

Enterprises are transforming with Pivotal

AUTO & TRANSPORTATION
American Airlines, DAIMLER, Ford, Volkswagen, BOEING, BMW, RENAULT NISSAN MITSUBISHI

INDUSTRIAL & BUSINESS SVCS.
AON, SPgroup, FedEx, BOSCH, MERRILL CORPORATION, GE, Raytheon

FINANCIAL SERVICES
Morgan Stanley, citi, synchrony BANK, fiserv., WELLS FARGO, DBS

HEALTHCARE & INSURANCE
Liberty Mutual INSURANCE, Solera, Manulife, EXPRESS SCRIPTS, Allianz, Humana

TECHNOLOGY & MEDIA
accenture, Bloomberg, dish, Cognizant, CoreLogic, HCL, DELL EMC, YAHOO! JAPAN, Ultimate SOFTWARE

CONSUMER & COMMUNICATIONS
Albertsons, T Mobile, Kroger, SONIC America's Drive-In, Telstra, west, NTT DATA

Pivotal
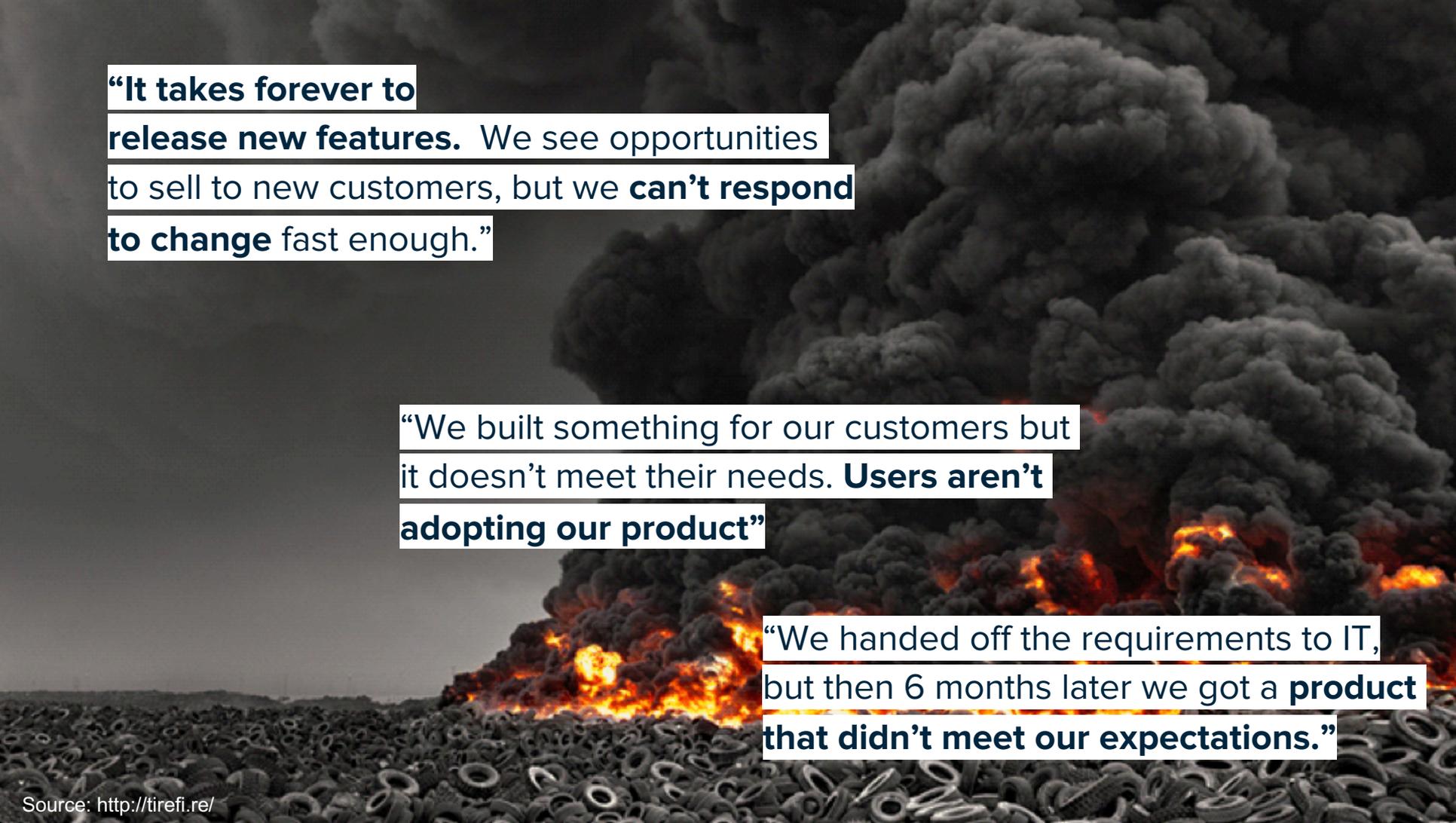
"**It takes forever to release new features.** We see opportunities to sell to new customers, but we **can't respond to change** fast enough."

"We built something for our customers but it doesn't meet their needs. **Users aren't adopting our product**"

"We handed off the requirements to IT, but then 6 months later we got a **product that didn't meet our expectations.**"

Service Delivery ➜ Product Delivery
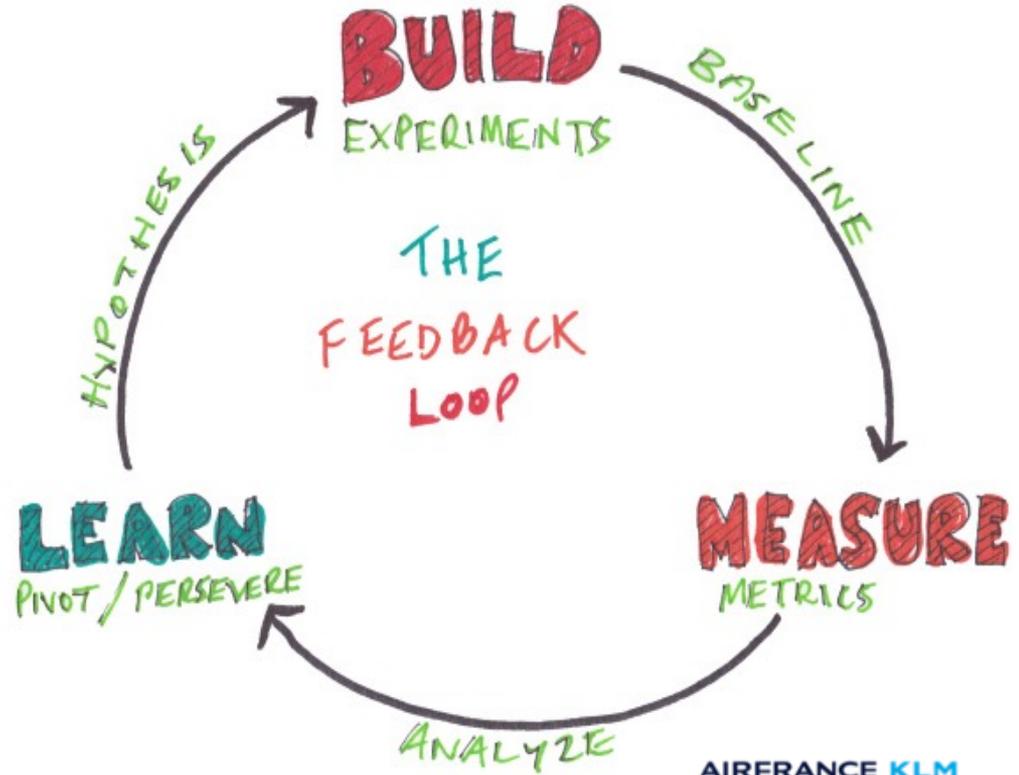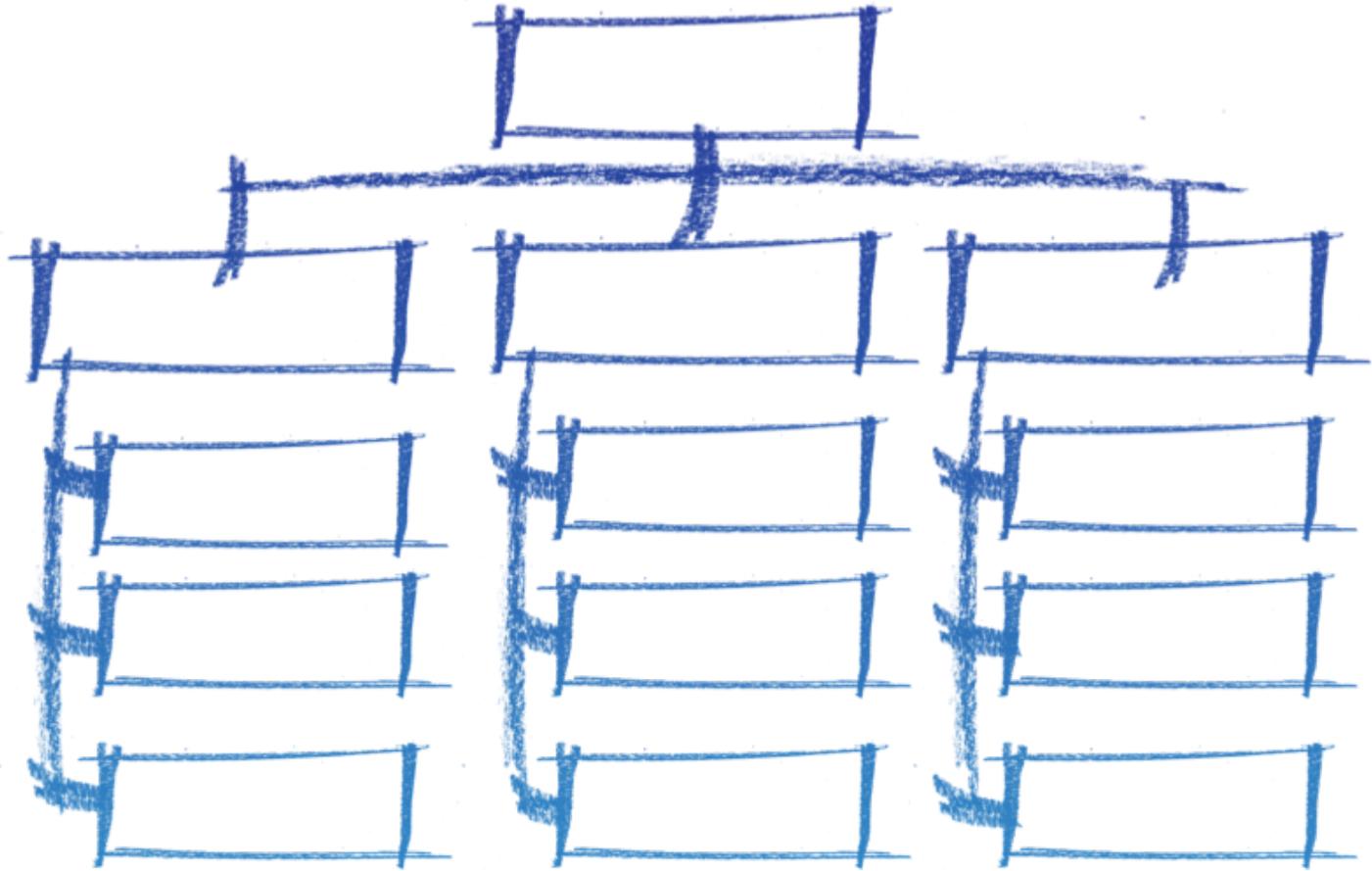
From 37% availability to $440m in back taxes

Before

YEAR	STATUS	AMOUNT	
2014	Balance Due	$644	>
2013	Taxes Paid	$685	>
2012	Refund/Applied	$100	>
2011	No Information Available	--	

Overview by Year

After

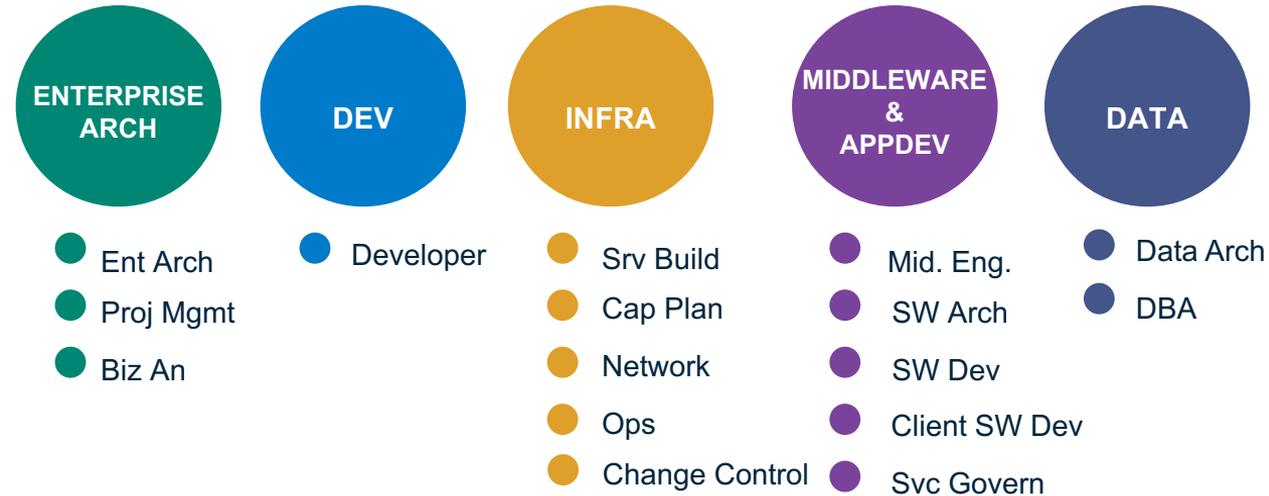| YEAR	BALANCE DUE	
2014	$644.00	>
2013	$0.00	
2012	$0.00	
2011	No Return on File	>

Overview by Year

- **User-centric, small batch**

- **Only 37% of calls answered, shrinking budgets**

- **From 2 year to 9 week releases**

- **2m+ users paid $440m in taxes**

Sources: "'Your IRS Wait Time is 3 Hours' - Is Lean Possible in Government?", Emily Price, Pivotal, April 2017; "Agile Transformation is Product Management," podcast, Oct 2017; "Minimum Viable Taxes: Lessons learned building an MVP inside the IRS," slides, Andrea Schneider & Lauren Gilchrist, 2015. See another write-up.

Pivotal

Organizing for outcomes

Functional organizations are a poor fit for product delivery

ENTERPRISE ARCH

DEV

INFRA

MIDDLEWARE & APPDEV

DATA

- Ent Arch
- Proj Mgmt
- Biz An

- Developer

- Srv Build
- Cap Plan
- Network
- Ops
- Change Control

- Mid. Eng.
- SW Arch
- SW Dev
- Client SW Dev
- Svc Govern

- Data Arch
- DBA

- **Optimized for cost & repeatability**

- **Requires coordination overhead**

- **Locally optimized**

- **Elusive responsibly for final outcome**

- **Often lacks design & product management**

Pivotal

Source: "DevOps Who Does What," Cornelia Davis, June 2017.

8

"The Business"

Corporate strategy, revenue goals, mission, etc.

Leadership, EAs, etc.

Culture, process, methodology, governance, compensation, etc.

Product teams

Mobile payments — Mortgage application — Mortgage approval — Bill pay — Transfers

Pivotal Cloud Foundry®
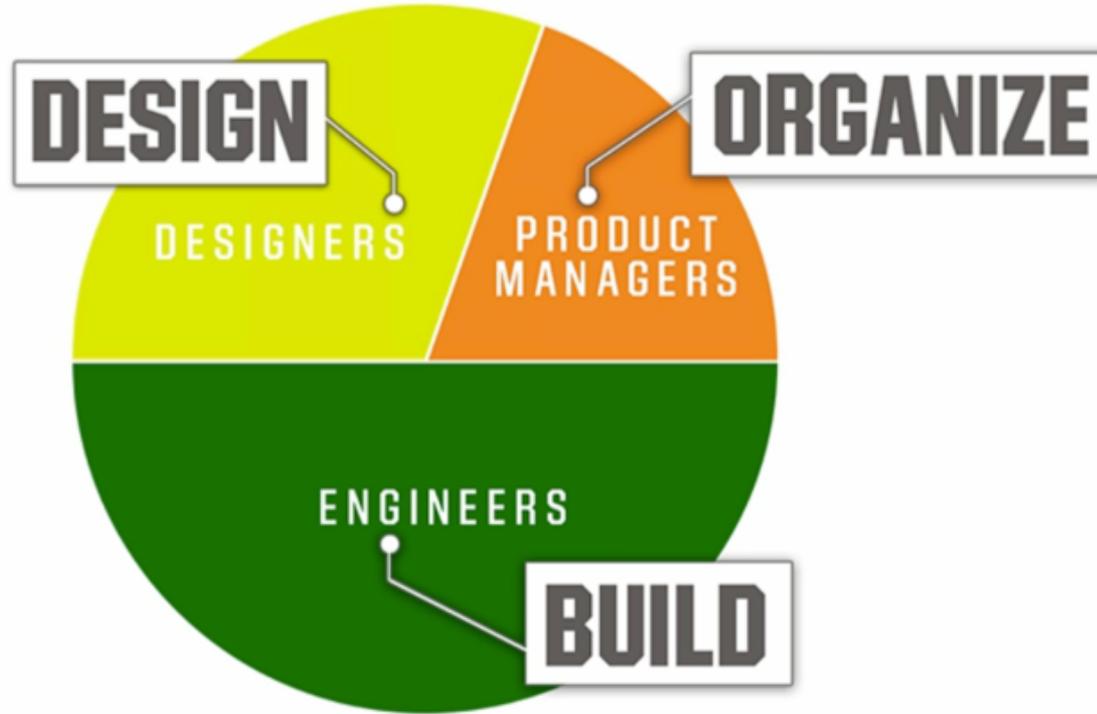
Platform Engineers
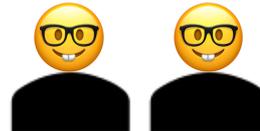
Private or public IaaS

Pivotal

We can all agree on pizza!

Product centric, balanced teams

25+ years later, agile practices are still not standard

When did or will your organization begin to use each of the following agile enterprise practices?
Base: n=176 Gartner Research Members, survey conducted Oct. 2016

■ 2016 or before   ■ By year-end 2017   ■ By year-end 2020   ■ Have plans/not sure

Practice	2016 or before	By year-end 2017	By year-end 2020	Have plans/not sure
Unit testing	69%	10%	5%	17%
Distributed Teams	38%	12%	7%	44%
Refactoring	34%	12%	3%	52%
DevOps	32%	19%	20%	29%
Continious Delivery	29%	24%	14%	32%
Test-Driven Development (TDD)	26%	15%	12%	47%
Pair Programming	20%	5%	4%	71%
Automated Acceptance Testing	19%	23%	18%	40%
Behavior-Driven Development (BDD)	9%	9%	5%	78%

Pivotal

From coding 20% of the time coding to coding 90% of the time

An agile methodology, proven over 25+ years:

- **Balanced teams w/all roles needed, dedicated to the product**

- **Paired programming, & beyond**

- **Test-driven Development**

- **Short iterations**

- **Continuous Integration & Continuous Delivery**

Pivotal

Source: "Don't Forget People and Process in Your Digital Transformation," Allstate case study, March, 2017. Sources: VW.

Development

Extreme Programming

Building working software at a consistent speed and quality in the face of changing requirements.

PRACTICES

- Paired Programming
- Test-Driven Development
- Short iterations
- Continuous Integration / Continuous Deployment

Design

User Centered Design

Ensuring the software solves a real problem for real users in a desirable and usable product.

PRACTICES

- User Interviews
- Ethnographic studies
- Persona definition
- Prototype creation

Product Management

Lean

Reducing the risk of building the wrong thing while comfortably changing direction

PRACTICES

- Minimum Viable Product (MVP) definition
- Lean experiments
- Identify & test assumptions
- Data driven decisions

Pivotal

"The warfighter can't wait until it's perfect."

" A [waterfall] mistake could cost $100 million, likely ending the career of anyone associated with that decision. A smaller mistake is less often a career-ender and thus encourages smart and informed risk-taking."

" With a more agile approach, we pick a place to start and get to a point where you can have an intelligent conversation... a point where the requirements are 80% done and the application is good enough.

M. Wes Haga, US Air Force

Sources: "How the US Air Force Made Its ISR Network Cheaper to Run and Easier to Upgrade," M. Wes Haga, Oct, 2017; "Air Force Intelligence Unit Goes Agile," Charles Babcock, *Information Week*, June, 2017; "Limit upfront analysis by including frequent, real-world feedback from users," Coté, Nov 2017; sticky-staring team from USAF Kessel Run Group; title quote from Capt. Bryon Kroger, Kessel Run team.

Pivotal

8 hours → <2 hours

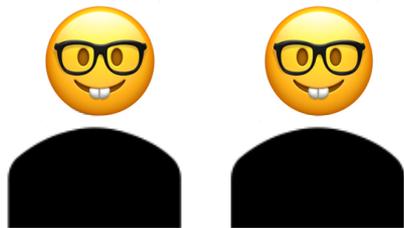6 operators → 1 operator

5 years → 120 days → weekly

$2.2m project

~$214k/day fuel savings

We've always QA'ed in production
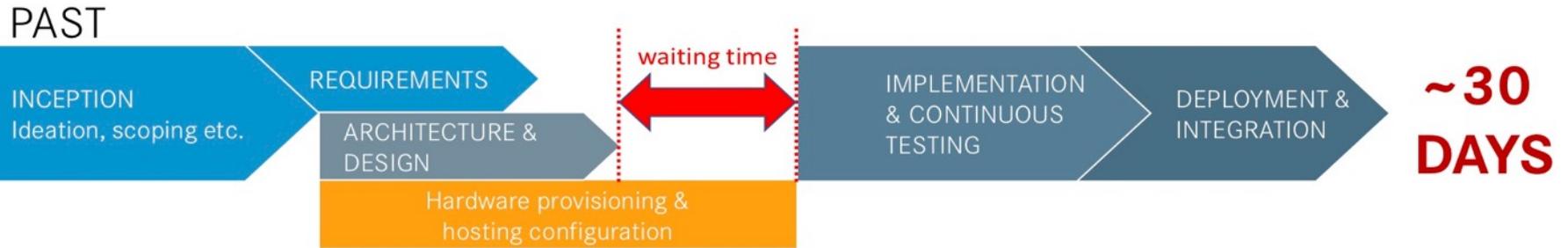
Platform as a product (aka SRE)

Platform Engineers

Functions

- Removes toil with automation & programming

- Stands up & manages the platform

- Creates shared services/middleware/etc.

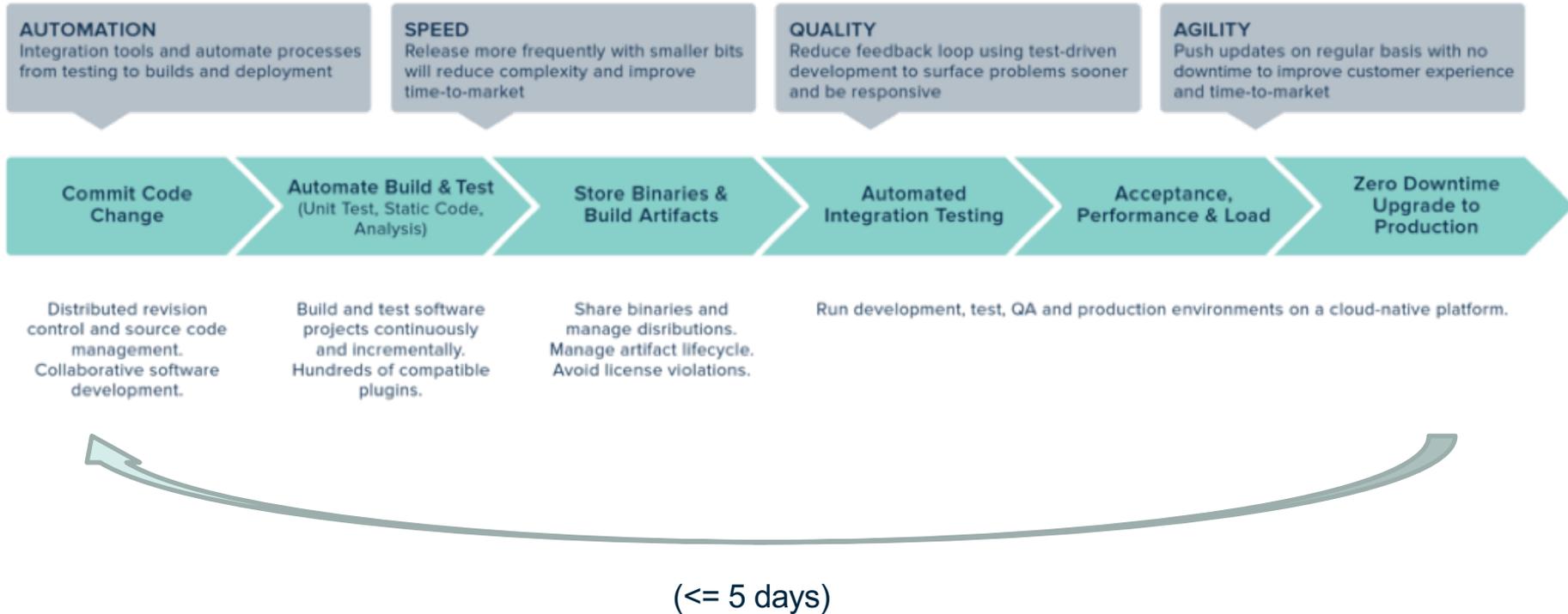- Consults with initial projects

Staffing

- T-Mobile USA: 8 ops to 300 developers, 11k containers
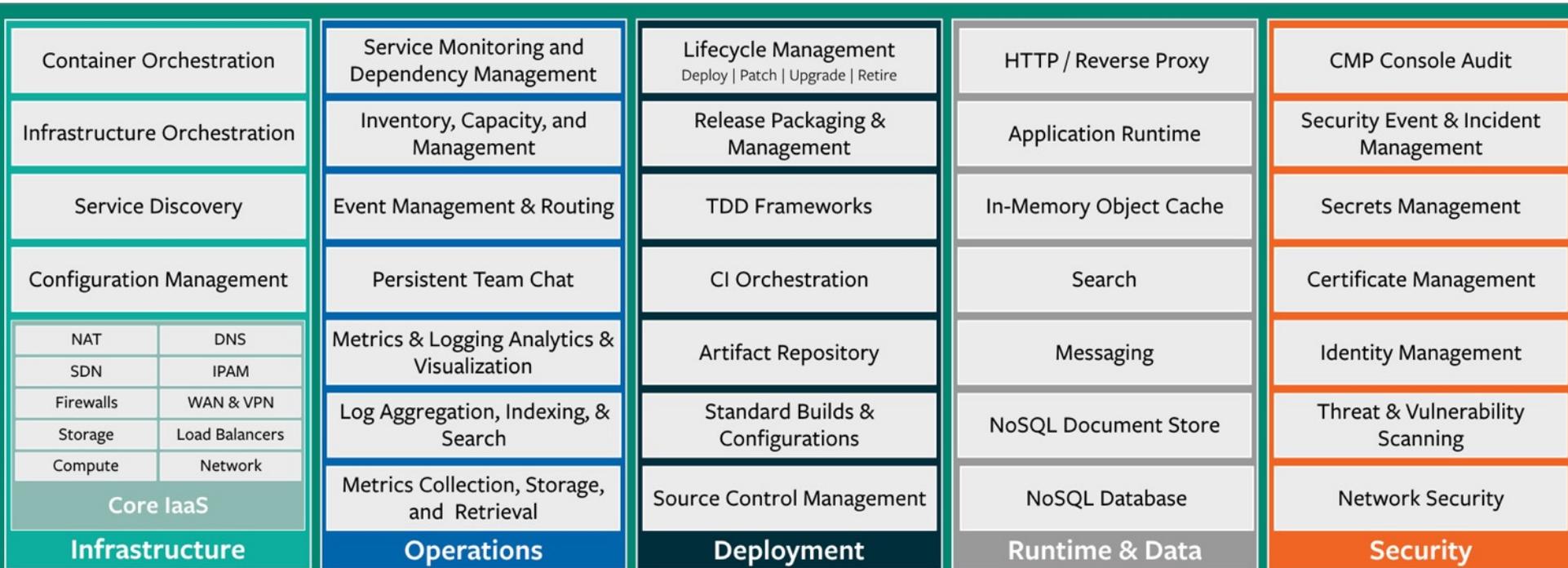
- Dick's Sporting Goods: 6 ops to 120 devs.

Pivotal

Source: "Adopting PCF At An Automobile Manufacturer," Thomas Seibert and Gregor Zurowski, s1p 2017. 20

Standardize & automate with a build pipeline

AUTOMATION
Integration tools and automate processes from testing to builds and deployment

SPEED
Release more frequently with smaller bits will reduce complexity and improve time-to-market

QUALITY
Reduce feedback loop using test-driven development to surface problems sooner and be responsive

AGILITY
Push updates on regular basis with no downtime to improve customer experience and time-to-market

Build Pipeline Operations

Commit Code Change → Automate Build & Test (Unit Test, Static Code, Analysis) → Store Binaries & Build Artifacts → Automated Integration Testing → Acceptance, Performance & Load → Zero Downtime Upgrade to Production

Tool Chain

Distributed revision control and source code management. Collaborative software development.

Build and test software projects continuously and incrementally. Hundreds of compatible plugins.

Share binaries and manage disributions. Manage artifact lifecycle. Avoid license violations.

Run development, test, QA and production environments on a cloud-native platform.

(<= 5 days)

Sources: "Speed Thrills: How to Harness the Power of CI/CD for Your Development Team," Ben Kamysz & Jared Ruckle, Pivotal, Aug 2017. CI/CD estimate based on the "The 12th Annual State of Agile Report" (2018) and "Survey Analysis: Agile Now at the Tipping Point - Here's How to Succeed," Mike West, Gartner, June 2017, see also estimates from 2015.

Pivotal

Standardize on a platform

Infrastructure	Operations	Deployment	Runtime & Data	Security
Container Orchestration	Service Monitoring and Dependency Management	**Lifecycle Management** Deploy | Patch | Upgrade | Retire	HTTP / Reverse Proxy	CMP Console Audit
Infrastructure Orchestration	Inventory, Capacity, and Management	Release Packaging & Management	Application Runtime	Security Event & Incident Management
Service Discovery	Event Management & Routing	TDD Frameworks	In-Memory Object Cache	Secrets Management
Configuration Management	Persistent Team Chat	CI Orchestration	Search	Certificate Management
NAT / DNS / SDN / IPAM / Firewalls / WAN & VPN / Storage / Load Balancers / Compute / Network — **Core IaaS**	Metrics & Logging Analytics & Visualization	Artifact Repository	Messaging	Identity Management
	Log Aggregation, Indexing, & Search	Standard Builds & Configurations	NoSQL Document Store	Threat & Vulnerability Scanning
	Metrics Collection, Storage, and Retrieval	Source Control Management	NoSQL Database	Network Security

Reference Architecture for Cloud-Native Platforms

Pivotal

Pivotal Cloud Foundry®

Application Code & Frameworks
Buildpacks | Spring Boot | Spring Cloud | Steeltoe

Pivotal Application Service (PAS)

>cf push

Java | .NET | NodeJS

Pivotal Container Service (PKS)

>kubectl run

Elastic | COTS | Spark

Pivotal Function Service

Coming Soon!

Pivotal Services Marketplace

Pivotal and Partner Products

Open Service Broker API

CLOUD **FOUNDRY**
BOSH

Embedded OS
(Windows & Linux)

NSX-T

CPI (15 methods)

vSphere OpenStack AWS Google Cloud Azure & Azure Stack

Pivotal.
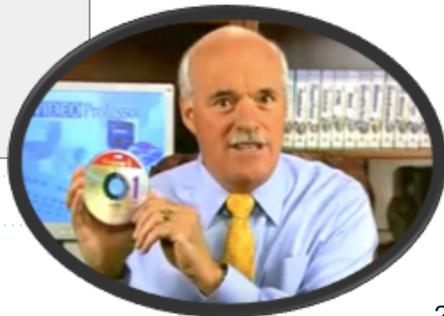
"Executive sponsorship for us was absolutely critical. Without that we could not have gotten anywhere that we needed to be."

Brendan Aye

T· ·Mobile·

(USA)

"We believe that we need to reimagine banking to make banking simple, seamless, as well as invisible to allow our customers to **live more bank less**."

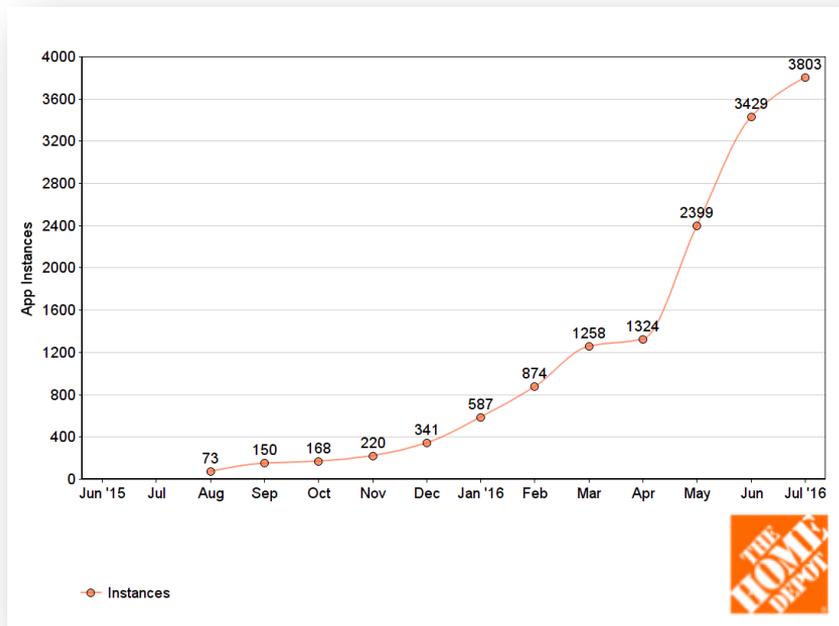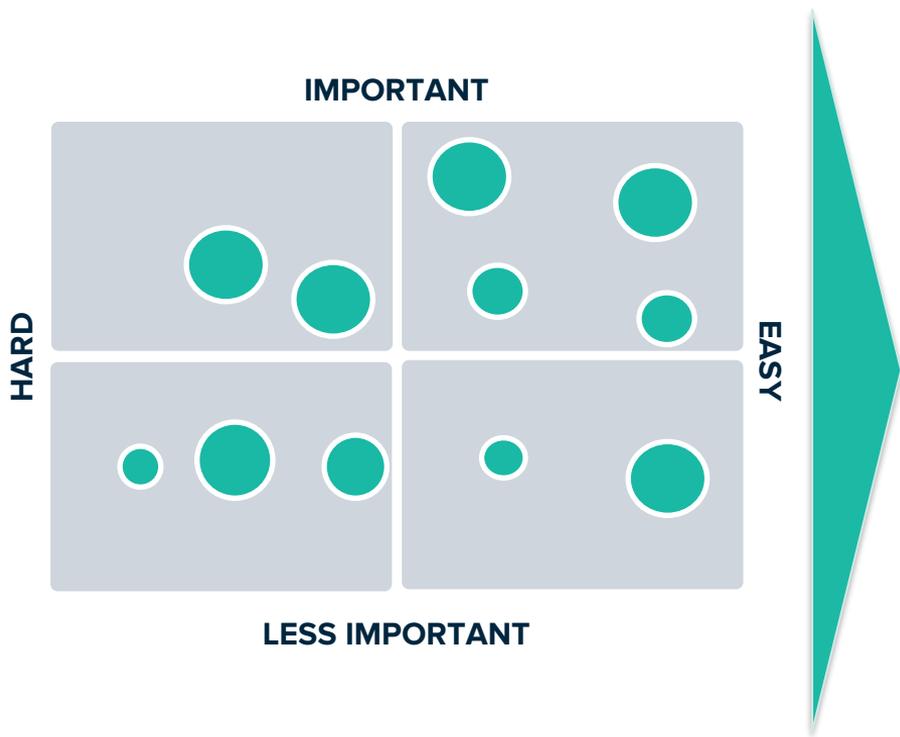*Siew Choo Soh, DBS Bank*

Leadership (the missing piece)

Without persistent, present leadership, nothing will change

Winning (and keeping) hearts and minds.

1. CREATE A SENSE OF URGENCY
2. BUILD A GUIDING COALITION
3. FORM A STRATEGIC VISION & INITIATIVES
4. ENLIST A VOLUNTEER ARMY
5. ENABLE ACTION BY REMOVING BARRIERS
6. GENERATE SHORT-TERM WINS
7. SUSTAIN ACCELERATION
8. INSTITUTE CHANGE

- Sponsorship and stakeholder engagement
- Exemplars; assessment and maturity modeling
- Mapping the journey [Individual, Team, Initiative, Enterprise]

- Storytelling [AS-IS — TO-BE]
- Reporting inside & outside the teams

- Precise vision & strategy

- A sense of urgency

- Building coalitions

- Building on small, successes

- Holding back corporate sappers & nonsense policy

- Persistent, ongoing mandating, management

west   T··Mobile·
(USA)

Pivotal

Source: *Leading Change,* John P. Kotter, 2012; "Disruption from Within," Thomas Squeo, West Corporation, May, 2018; "Zero to 12 Million," Brendan Aye, T-Mobile USA, SpringOne Platform, Dec 2017.

28

Starting: "pilot low-risk apps, and ramp-up."

USAF Follow-on: ~16 apps in production by 2019

Oct. 2016 - Whiteboard

April 2017 - JIGSAW

Dec. 2017 - CHAINSAW
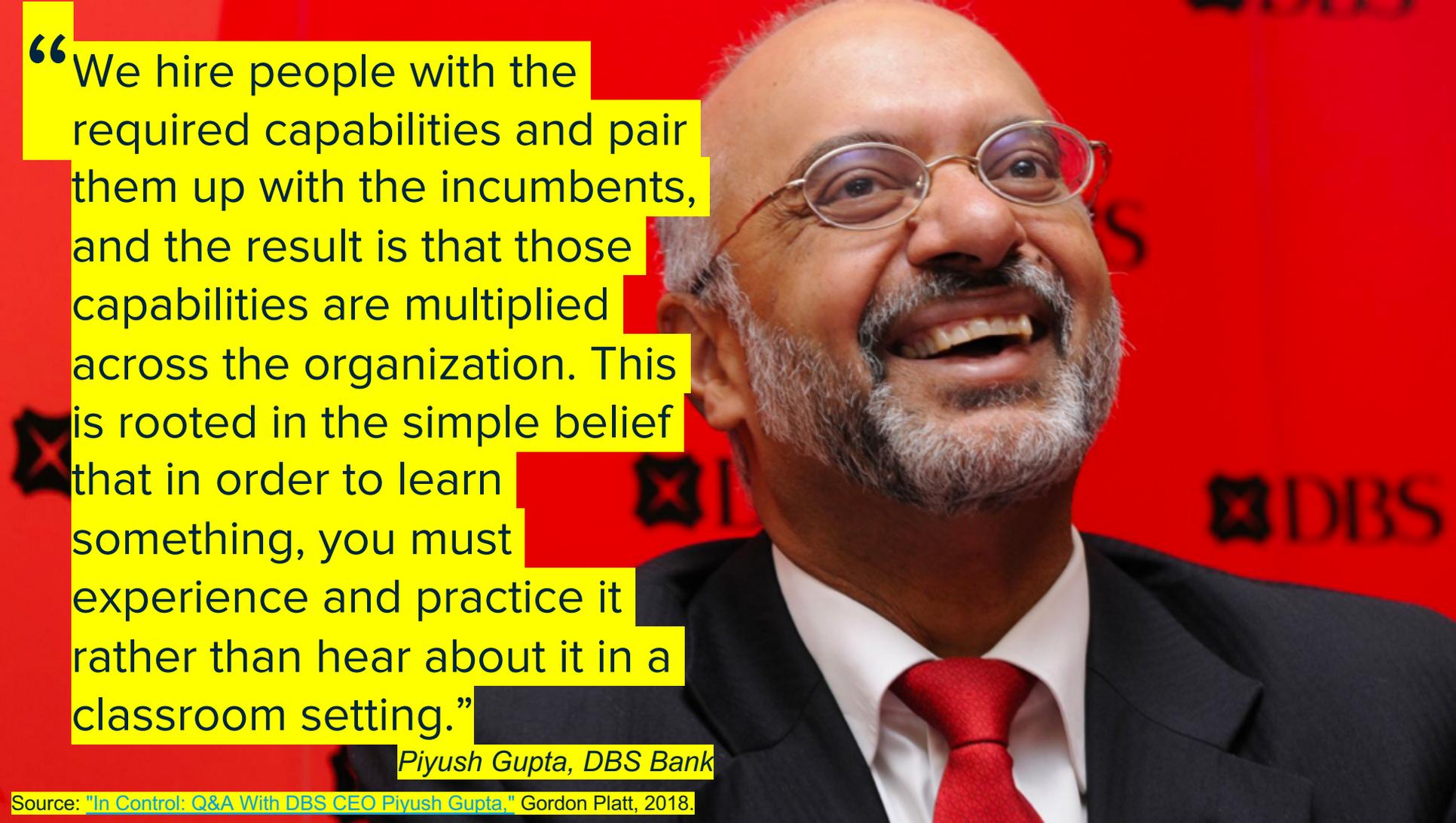
March 2018 - RAVEN

May 2018 – 5 prod. apps, 8 in dev

Jan 2019 – plan for 15-18 prod. apps

- **JIGSAW: $2.2m**
- **Avoided $391m cost of delay**
- **1 new feature a week, at least**
- **124 days to production, avg.**
- **Contacts awarded in 60 days**
- **Proven method spreading to other groups**
- **Canceled existing $745m contract**

Pivotal

"We hire people with the required capabilities and pair them up with the incumbents, and the result is that those capabilities are multiplied across the organization. This is rooted in the simple belief that in order to learn something, you must experience and practice it rather than hear about it in a classroom setting."

Piyush Gupta, DBS Bank

Start small with Pivotal, scale with your new capabilities
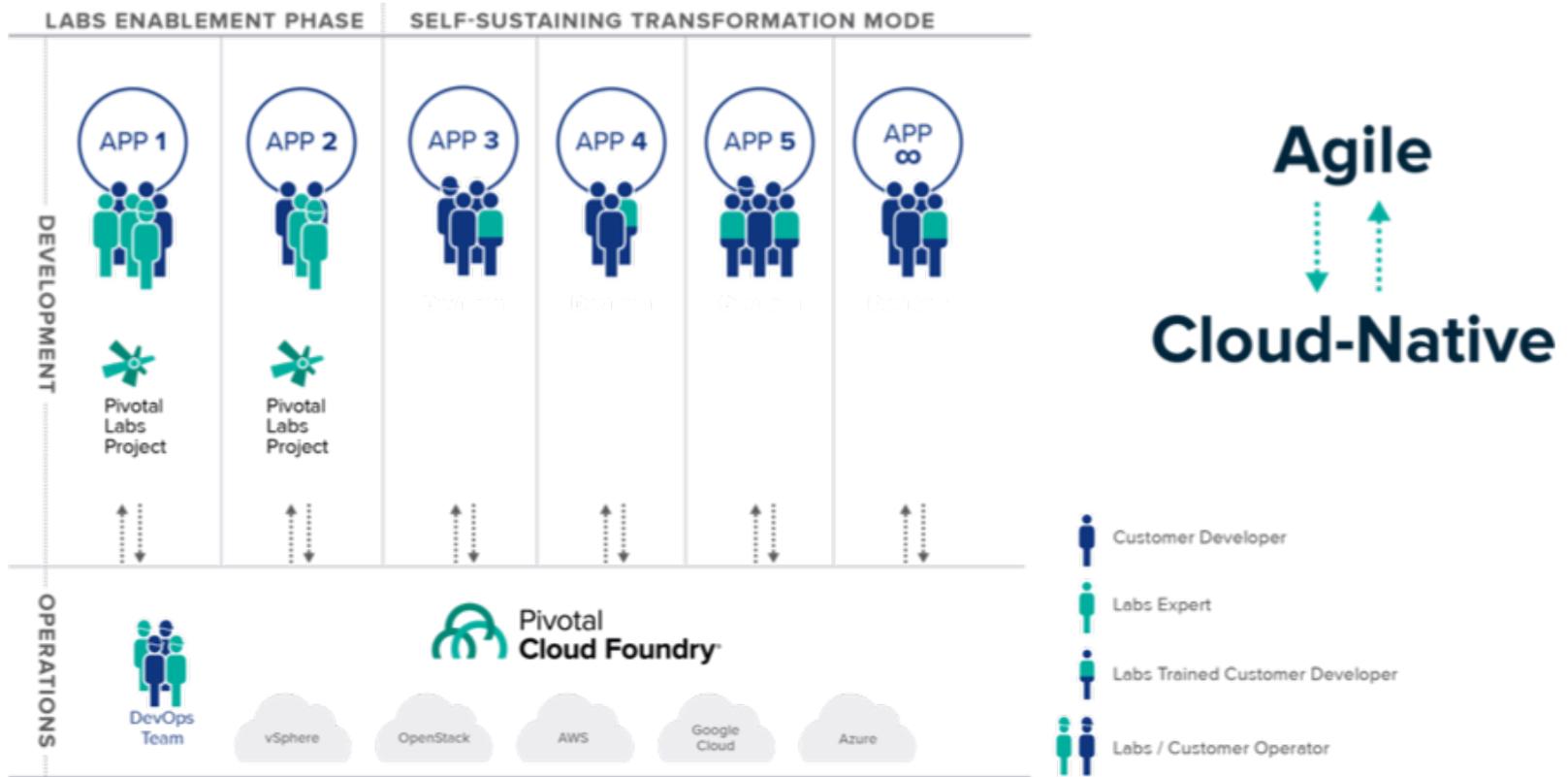
Beyond 10 ways to make coffee: leadership's role

- Create a culture of innovation, risk taking, and focusing on people ("users")

- Give product teams autonomy, trust, and voice

- Establish trust by doing what you say, delegating, and celebrating ~~failure~~ learning.

- Feedback loop: surveys (ENPS), silence, churn, results.

- Giving feedback: OKRs, praising process & stories, not just schedule

Pivotal   More in work-in-progress book on Leading Digital Transformation, see the culture section.   33

Focus on cost reductions with un-motivated executives

82% average reduction in 'path to production' time (from 84 days to 15 days)

Software Development Lifecycle			On-going Ops

**Provisioning
90% faster**

**Developing
37% more time coding
E.g.: $4.80m/year**

**Releasing
61% faster
Time-to-market**

**Operating (Day 2)
69% more efficient
E.g.: $7.35m/year**

90% time reduction

87% process time reduction

Total time: from 65 to 6 days

Process time: from 81 to 11 hours

37% relative improvement in time spent coding (from 56% to 77%)

21% absolute improvement in time spent coding (from 56% to 77%)

61% time reduction

82% process time reduction

Total time: from 14 to 5 days

Process time: from 115 to 21 hours

69% time reduction

74% process time reduction

Total time: from 79 to 24 hours

Process time: from 34 to 9 hours

Notes 1: 2017 & 2018 Pivotal customer case studies. n=15. "Process Time" = hands-on work (vs. "total time" being the time to deliver).
Note 2: Averages are exclusive of highest and lowest measures.
Not 3: savings based on insurance co.'s strategy to move 17 app portfolio to Pivotal Cloud Foundry. Dev:ops ratios: 30:1 (insurance co.), 375:1 (Comcast), 62:1 (Northen Trust).

Pivotal

Changing is often too hard, so create a new organization

- **CompoZed Labs now handles 40% of Allstate's software development**

- **Road-side assistance app delivered in 6 months**

  o **25k rescues/month**

  o **30 minute wait to 15**

  o **+$10m, +$100m planned**

Sources: Andy Zitney; "Don't Forget People and Process in Your Digital Transformation," Allstate case study, March, 2017; "How Insurance Giant Allstate Is Using Cloud Tech to Build New Businesses," Barb Darrow, June, 2017; "Allstate Technology Chief Develops The Uber Of Roadside Assistance," Perer High, Oct, 2017.

Pivotal

"If that crusty, old .Net developer can do it, anyone can," transforming people

1. Most people are skeptical for good reasons

2. They enjoy doing IT if it's rewarding

3. Volunteer based at first, building up peer-to-peer marketing

4. Also, there's plenty of more comforting IT for grumpy people to work on

Pivotal®   Source: "Navigating the Sea of 'No's,'" John Osborn, GAIC, Dec 2017; Dealing with Grumps, Coté, May 2018.

automategrc

- 80-90% of Risk Management Framework controls inherited via IaaS/PaaS

- Cut Authority-to-Operate process from ~10 months to <1 week for ~40 remaining controls at application layer

AOC Today (10.1)

| APPLICATIONS |
| DATA |
| RUNTIME |
| MIDDLEWARE |
| O/S |
| VIRTUALIZATION |
| SERVERS |
| STORAGE |
| NETWORKING |

You manage

VS

AOC Vision (Pathfinder)

| APPLICATIONS |
| DATA |
| RUNTIME |
| MIDDLEWARE |
| O/S |
| VIRTUALIZATION |
| SERVERS |
| STORAGE |
| NETWORKING |

You manage

PCF PaaS

Cloud Infrastructure

Pivotal

Internal marketing:
Everything, frequently

Sources: Pivotal customers; "The Need For Speed: Drive Velocity And Quality With DevOps," Robert Stroud & Eveline Oehrlich, Forrester, Feb 2017

"Digital transformation" == creating better software

orange — 50% B2B customer engagement, shipped in 6 months vs. 18.

DAIMLER — Modernized app, rolled out 20 countries in 5 months

THALES — Idea to production In 2 days; fix production incidents in 2 hours.

HCSC Health Care Service Corporation — 40%+ productivity/cost, rebooted member facing app.

Allianz — Small teams deploying to production in minutes, not days.

Liberty Mutual INSURANCE — 40% policy strike rate, vs. 20% industry average.

Sources: *Crafting your cloud-native strategy*, Coté, 2017; Air Force story; Mojgan Lefebvre, Liberty Mutual, June, 2017; Interview with Orange's Xavier Perret, 2017; "A Unifying Foundation for the Customer Journey at Mercedes-Benz," BuiltToAdapt, Apr 2018; Allianz interview, Sep 2016.

Pivotal

A new business in 6 months, doubling avg. sales rate

40% strike rate
Compared to 20% industry average

3 minutes
Versus 10 minutes to do a referral

199 quotes
With 60 bound policies to date

#TechAtLiberty   20

Liberty Mutual Insurance

CLOUDFOUNDRY SUMMIT 2017
JUNE 13-15 | SILICON VALLEY
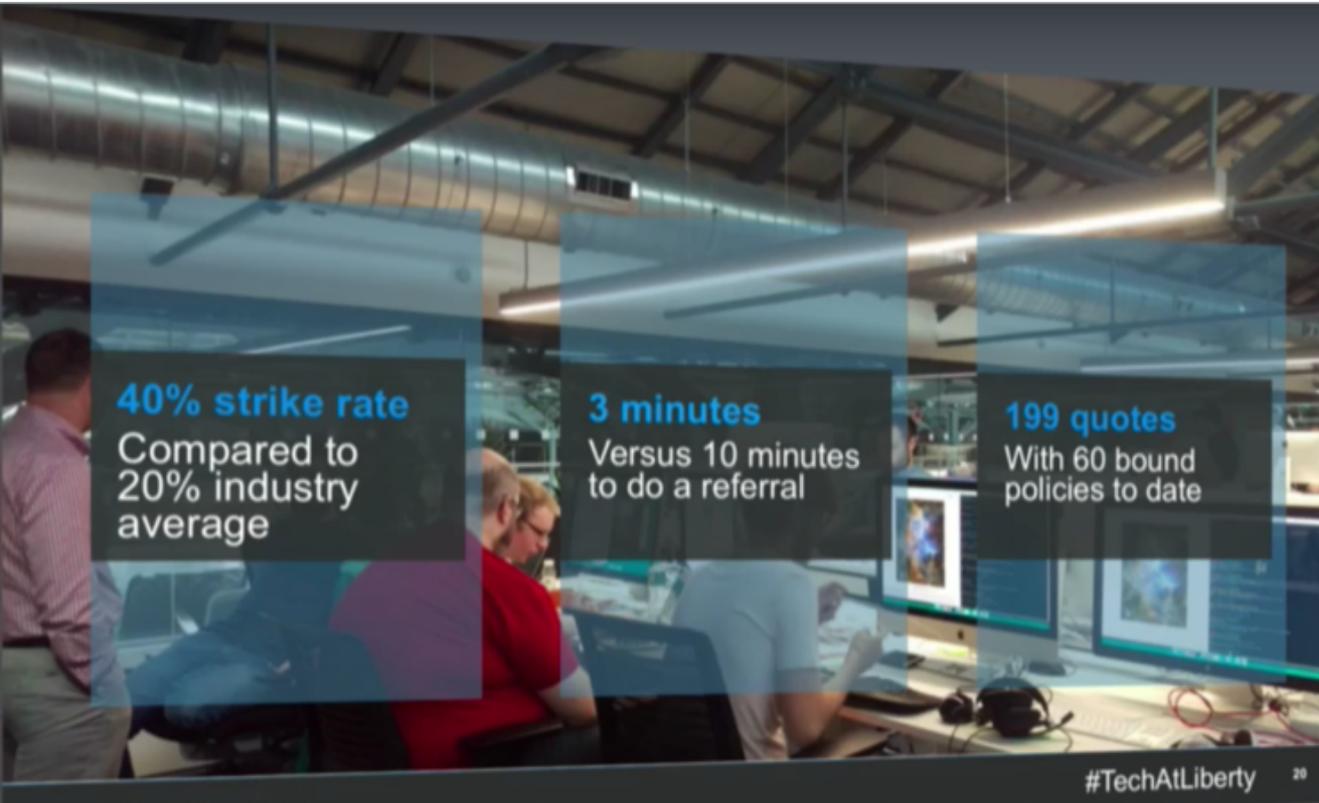
"We are uncovering better ways of developing software by doing it and helping others do it."

- *The Agile Manifesto*, 2001

http://cote.coffee/bettersoftware/

@cote | cote@pivotal.io
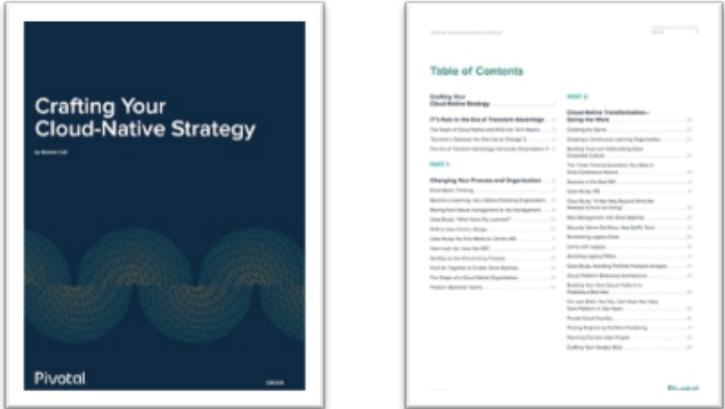
"DevOps is not about what you do, [it's about] outcomes"

Gene Kim

Transformational Leadership
- Personal Recognition
- Supportive Leadership
- Intellectual Stimulation
- Inspirational Communication
- Vision

- Test and Deployment Automation
- Continuous Integration
- Trunk-based Development
- Shifting Left on Security
- Loosely Coupled Architecture
- Empowered Teams

Lean Product Management
- Team Experimentation
- Working in small batches
- Gathering and Implementing Customer Feedback

Continuous Delivery

IT Performance

Organizational Performance

Non-commercial Performance

Source: "2017 DevOps Report," Puppet, DORA, et.al., July, 2017. See 2018 DORA report for more detail and additional attributes.

45

Pivotal.