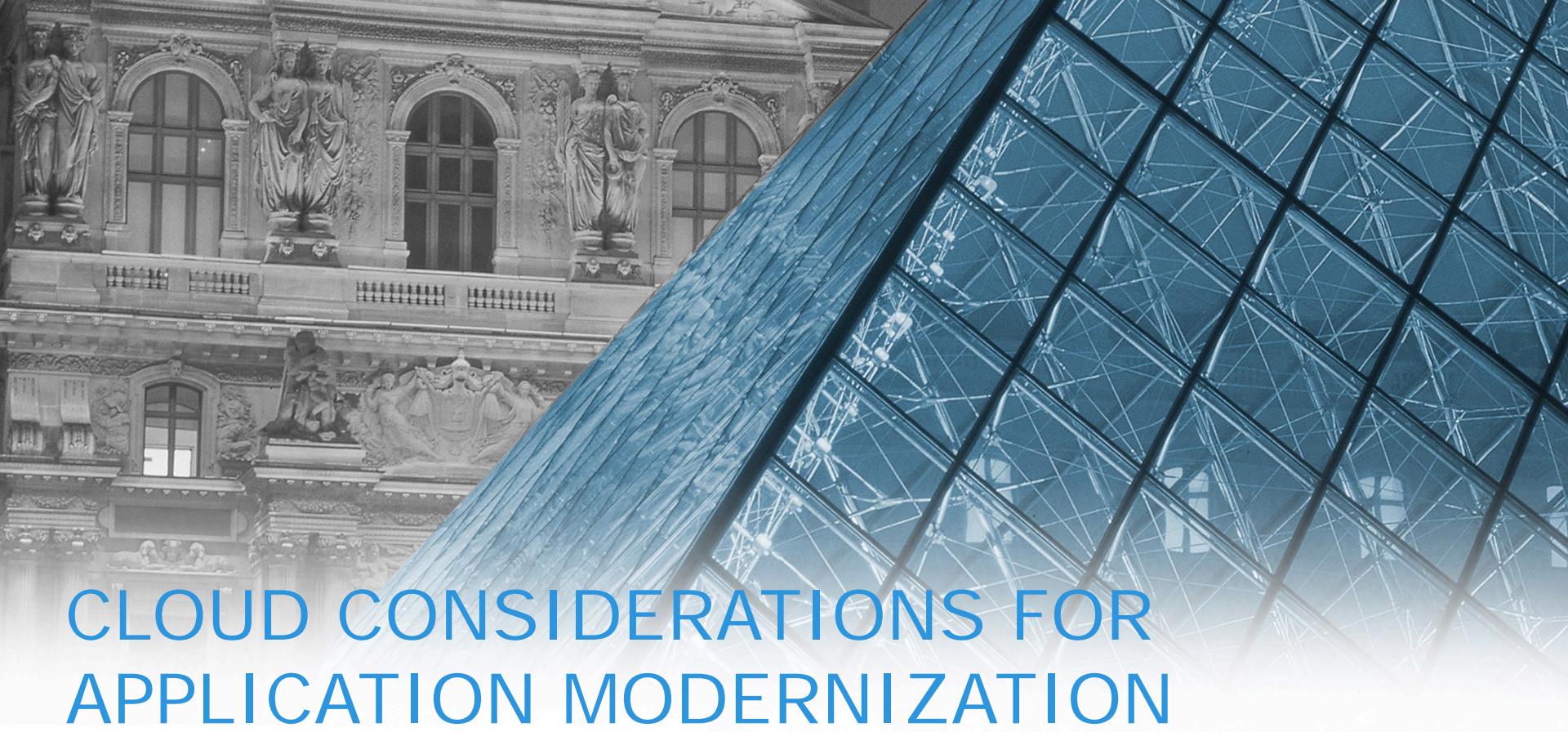
The background of the slide is a composite image. The left side shows a black and white photograph of a classical building's facade, featuring multiple arched niches containing statues of figures, likely from the Louvre in Paris. The right side shows a large, modern glass and steel dome structure, possibly the glass pyramid at the Louvre or a similar architectural feature, with a complex internal framework visible through the glass panels.

MODERNIZE

EMC WORLD 2016

EMC²



CLOUD CONSIDERATIONS FOR APPLICATION MODERNIZATION

DAMIAN KARLSON
CHRIS CICOTTE

EMC²

YOUR SPEAKERS

Damian Karlson

Principal Consultant, Cloud Portfolio, EMC Global Services



Damian Karlson is responsible for developing consulting services for emerging technologies and new EMC solutions, including EMC Native Hybrid Cloud and Pivotal Cloud Foundry.

Previously, Damian was responsible for developing consulting services for Infrastructure as a Service, DevOps, and IT service economics.



@sixfootdad



@EMCservices



Damian.Karlson@EMC.com

EMC²

YOUR SPEAKERS

Chris Cicotte

Portfolio Marketing Director - Cloud, Global Portfolio Messaging



Chris is responsible for creating the portfolio wide cloud messaging for EMC and federation of companies .

Previously, Chris was a Principal Systems Engineer and the Field CTO for EMC's Global Alliances Service Provider Program.



@chris_cicotte



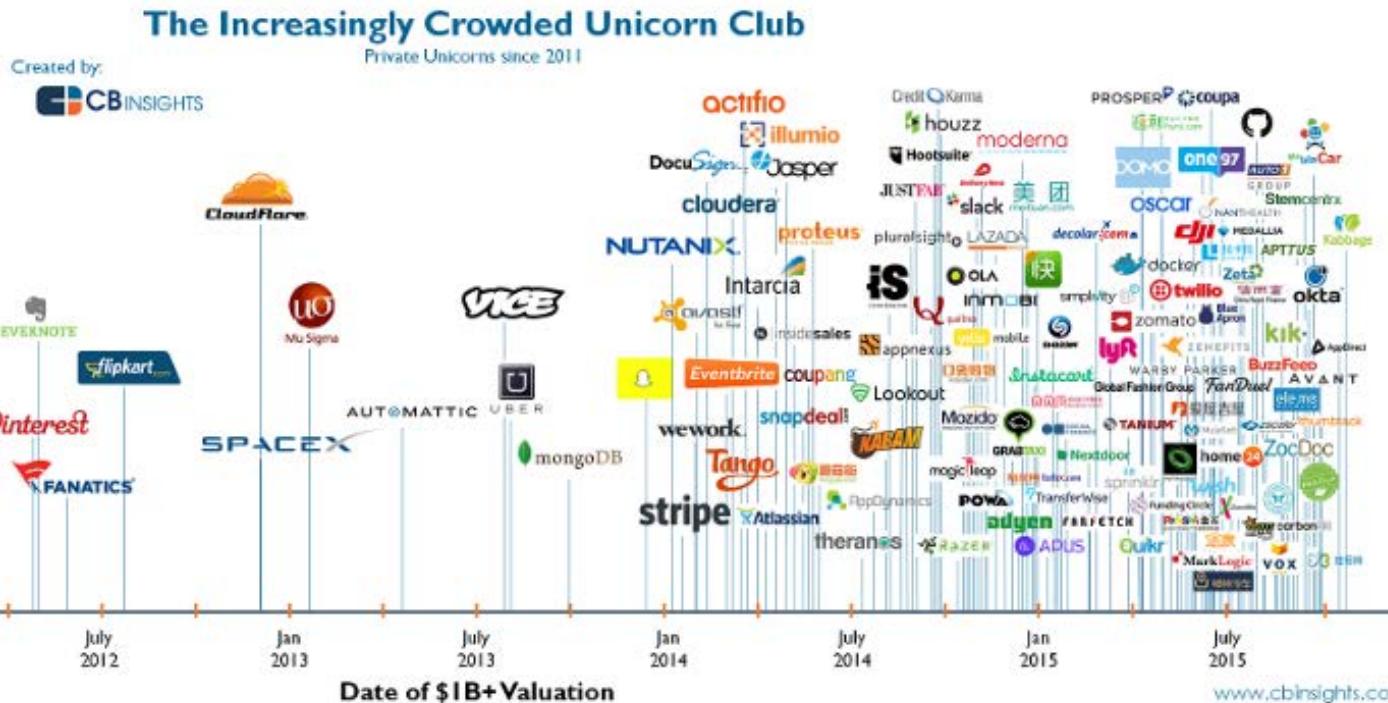
@EMCcloud



Chris.Cicotte@EMC.com

EMC²

RISE OF THE UNICORNS



<http://reports.weforum.org/digital-transformation-of-industries/wp-content/blogs.dir/94/mp/files/pages/files/digital-enterprise-narrative-final-january-2016.pdf>

ESTABLISHED COMPANIES ARE FIGHTING BACK!



Humana.



FORD SMART MOBILITY



CURRENT PLATFORMS IMPEDE BUSINESS AGILITY

What IT offers



TECHNOLOGY PLATFORMS DESIGNED
FOR TRADITIONAL WORKLOADS

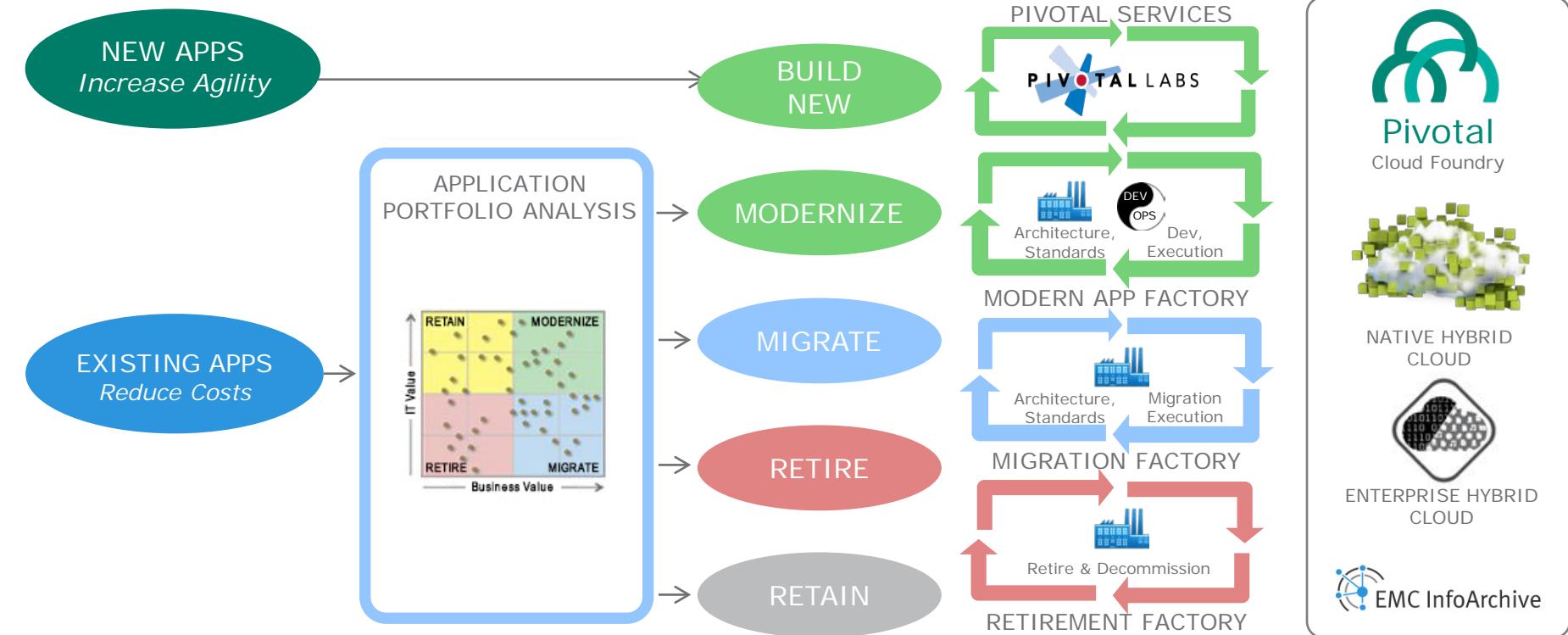
What business needs to build



ENGAGING CUSTOMER EXPERIENCES
BROUGHT TO MARKET QUICKLY

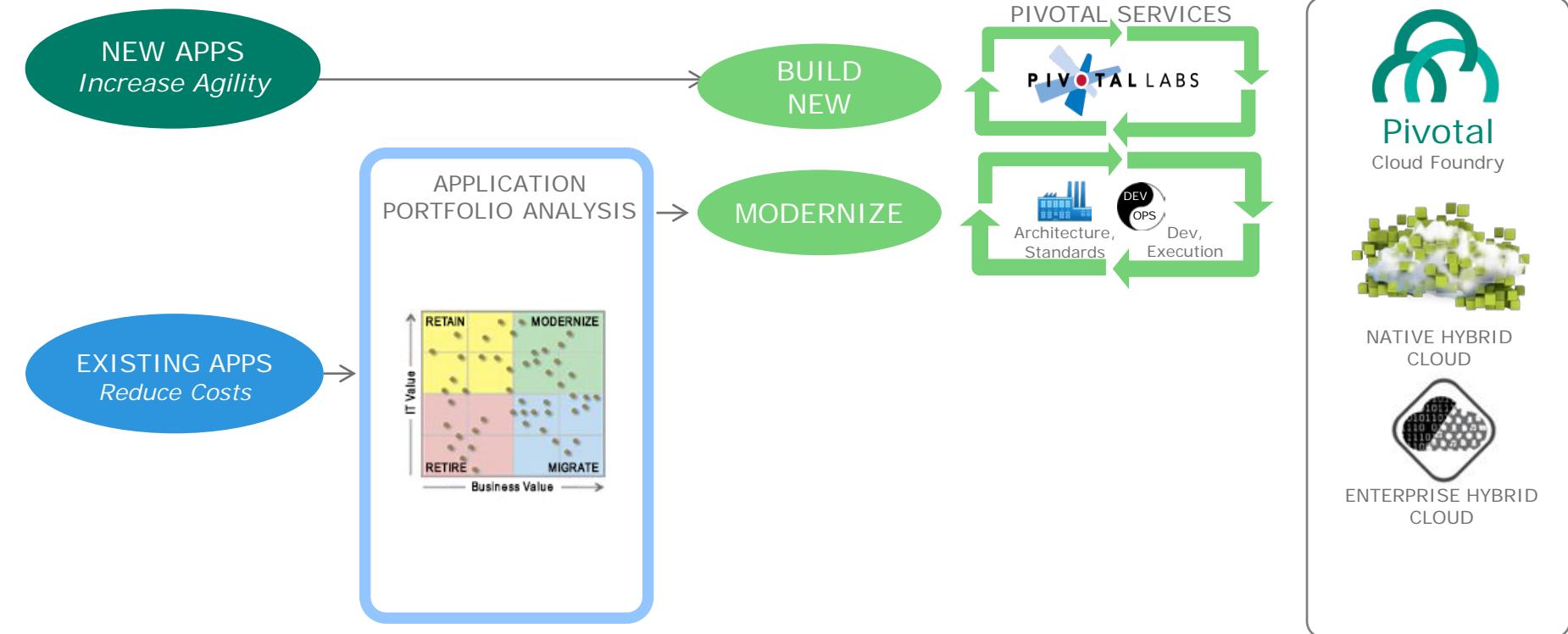
EMC APPLICATION TRANSFORMATION FRAMEWORK

INCREASE AGILITY AND REDUCE COST



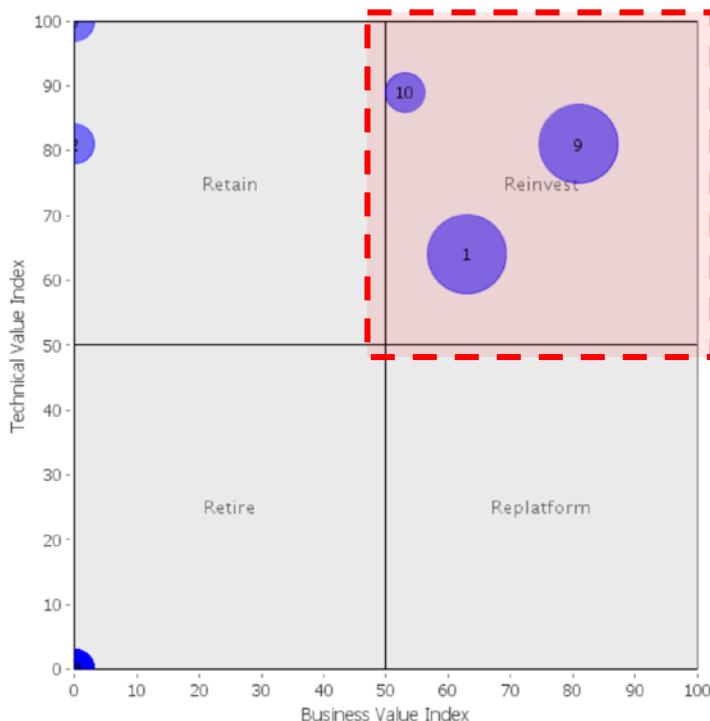
EMC APPLICATION TRANSFORMATION FRAMEWORK

INCREASE AGILITY AND REDUCE COST



WHERE TO START?

PILOT SELECTION: INVEST IN VALUABLE ASPECTS OF PORTFOLIO



Typical Application Profile:

- High Business Value and/or provide market differentiation
- Frequently changes or major effort planned
- At beginning or middle of lifecycle
- High TCO and/or high risk of outage due to resiliency and platform stability concerns
- x86 Platform that currently virtualized or planned to be virtualized

TRADITIONAL APP ARCHITECTURE IS COSTLY AND CUMBERSOME

Layered, Monolithic Architecture



- Software is built modularly but deployed as a monolith
- Updates are time consuming
- Inefficient scaling
- Over-provisioning and hoarding of resources
- Long-term platform commitment

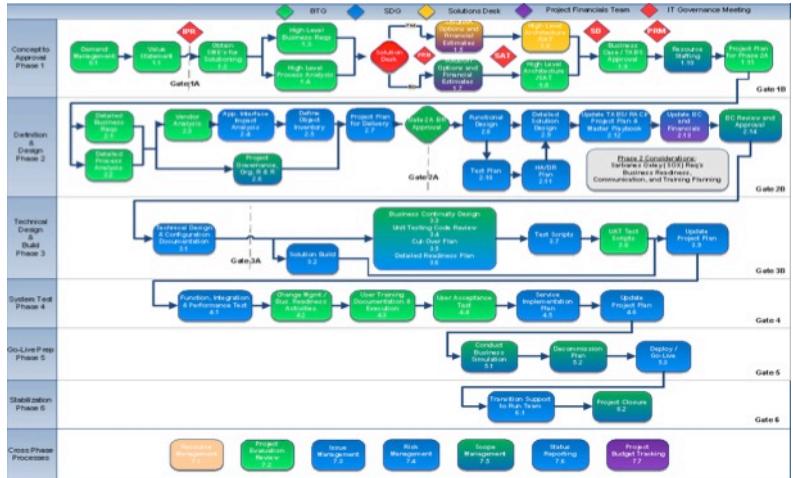
Cloud Native App Architecture



- Software powered by an API of many single-purpose services (aka 'microservices')
- Deployment is modular, updates are easy
- Designed for horizontal scale and fault tolerance
- Elastic provisioning and efficient resource usage
- Reduces long-term technology commitment

CURRENT PROCESSES ARE SLOW AND ERROR PRONE

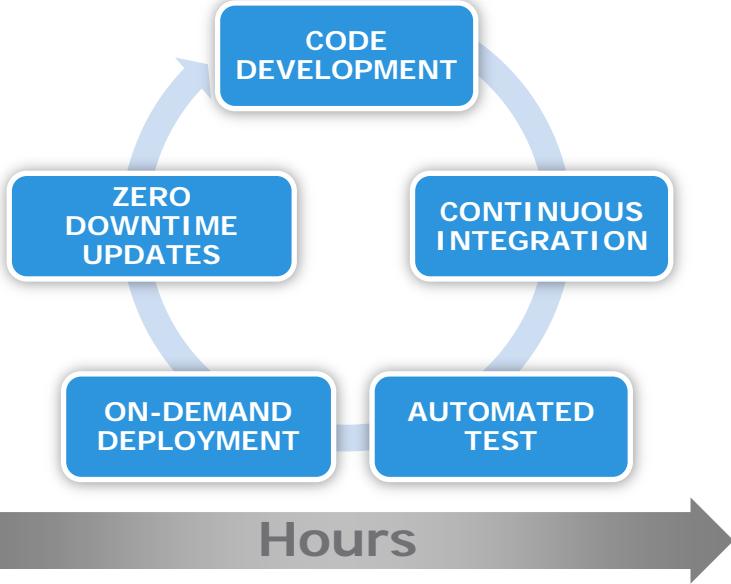
Traditional Software Delivery



Weeks

TICKET-DRIVEN PROCESSES, MANUAL EFFORTS AND COMPLEXITY

Continuous Delivery

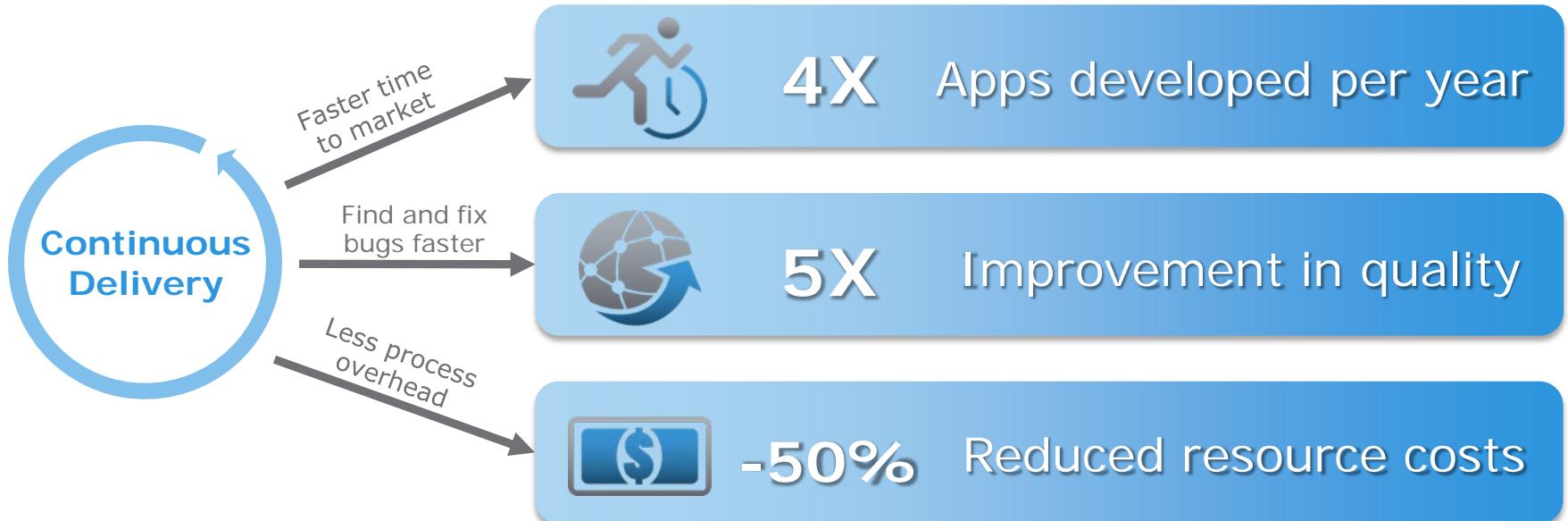


Hours

AUTOMATED DELIVERY PIPELINE ACCELERATES TIME-TO-MARKET AND REDUCES BUGS

DEVELOP SOFTWARE LIKE A STARTUP

CONTINUOUS DELIVERY, ENABLED BY NEW PLATFORMS AND PROCESSES,
DRIVES COSTS DOWN AND QUALITY UP

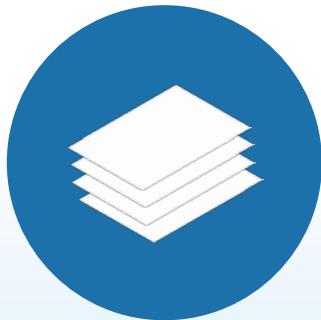


Sources: Pivotal, Cutter IT Journal, EMC analysis

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EMC PERSPECTIVE

DELIVER SOFTWARE LIKE A HIGH-VELOCITY STARTUP



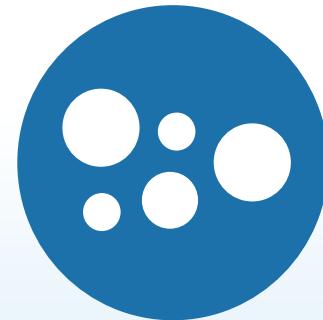
PLATFORM

- Great Developer Experience
- Automated Operations
- Broad Choice of Services



PROCESS

- Agile, Lean and DevOps
- Faster Feedback Loops
- Automated Delivery Pipeline



ARCHITECTURE

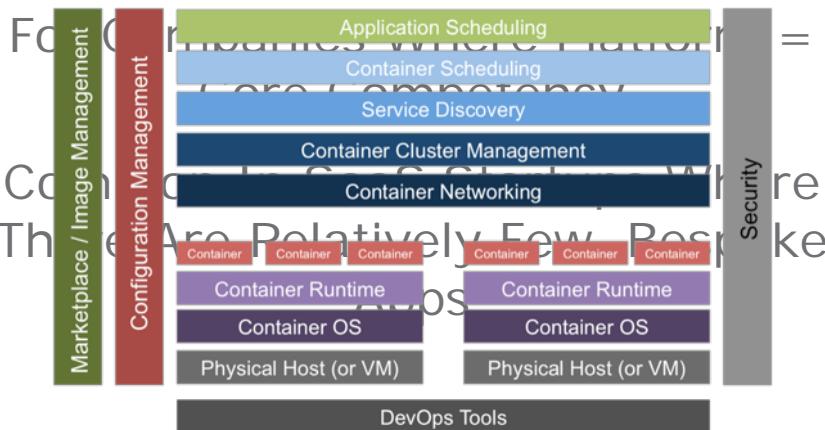
- Cloud-Native Microservices
- Responsive, User-Centric Design
- No-Long Term Platform Lock

TWO TYPES OF CLOUD NATIVE PLATFORMS

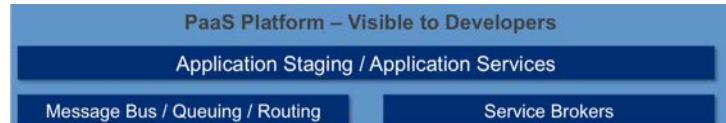
Unstructured

Ultra-flexible

Max Opportunity For Optimization



Structured



Pivotal **Cloud Foundry**®



EMC²

PCF CLOUD NATIVE PLATFORM

A CRITICAL FOUNDATION FOR HIGH QUALITY, CLOUD-NATIVE SOFTWARE

PIVOTAL CF™

GREAT DEVELOPER EXPERIENCE



Seamlessly integrate build, CI and deployment tooling



Broad language and framework support



Robust CLI and scripting APIs

AUTOMATED OPERATIONS



Health Management, Load Balancing & High Availability



Identity and User Roles/Rights Management

BROAD CHOICE OF SERVICES



Mobile Services – Push, Data Sync, API Gateway



Data Services – Relational, NoSQL, Graph, IMDG



Integration Services – enterprise systems, APIs, and Data sources

DEPLOY, OPERATE, UPDATE, SCALE ON ANY INFRASTRUCTURE



....and more



INTRODUCING NATIVE HYBRID CLOUD

CLOUD NATIVE APPS AT THE SPEED OF BUSINESS

Supported &
Sustained as One

Deployed in Days

Developer & IT Ops
Services

Platform as a Service

Infrastructure as a
Service



An
**ENGINEERED
SOLUTION**

Powered by



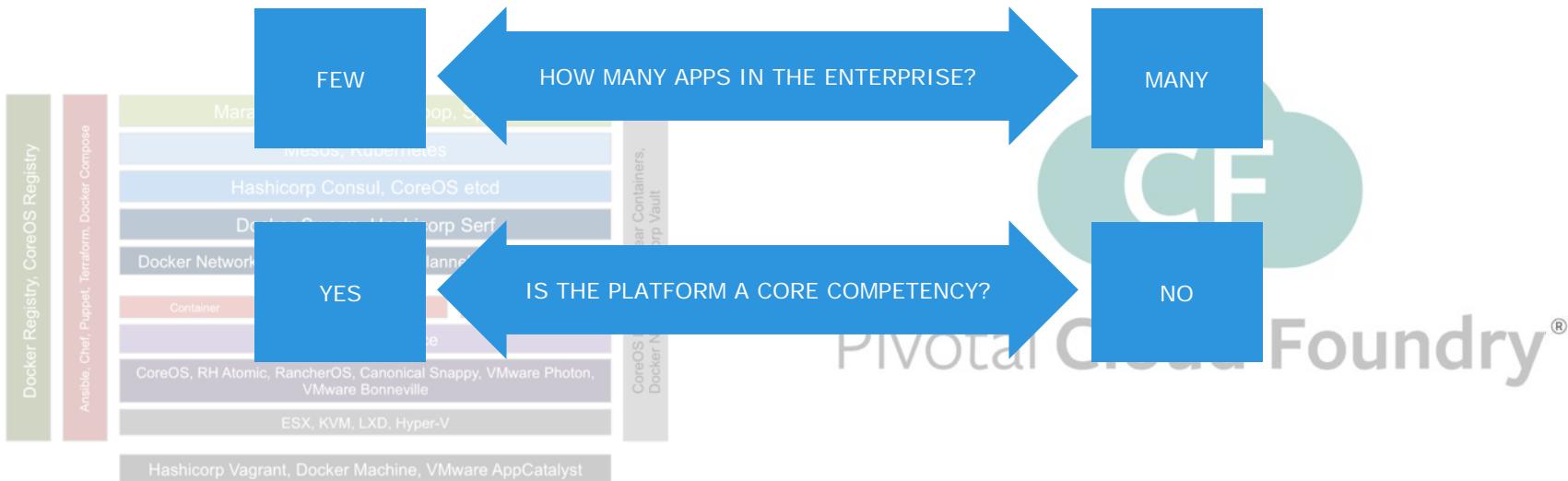
Pivotal Cloud Foundry®

Innovate. Empower. Accelerate

WHICH PLATFORM IS RIGHT?

Unstructured

Structured



WHICH CLOUD NATIVE PLATFORM IS RIGHT?

Unstructured



Structured



WHERE DO YOU RUN IT?

OFF PREMISES



ON PREMISES



EMC²

WHERE DO YOU RUN IT?

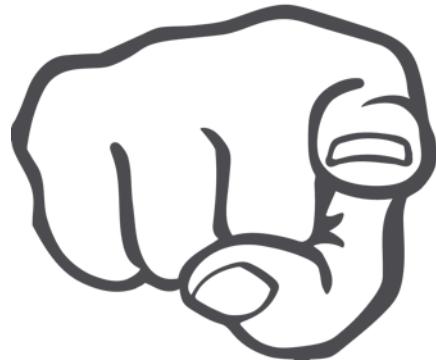
OFF PREMISES

ON PREMISES



WHO MANAGES IT?

YOU RUN IT

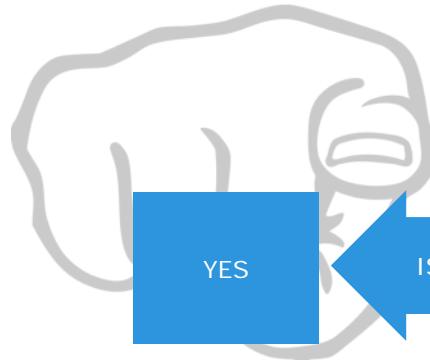


WE RUN IT

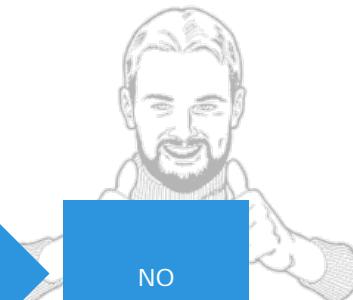


WHO MANAGES IT?

YOU RUN IT



WE RUN IT



IS IT ONE OF YOUR CORE COMPETENCIES?

CAPEX OR OPEX?

PAY UP FRONT



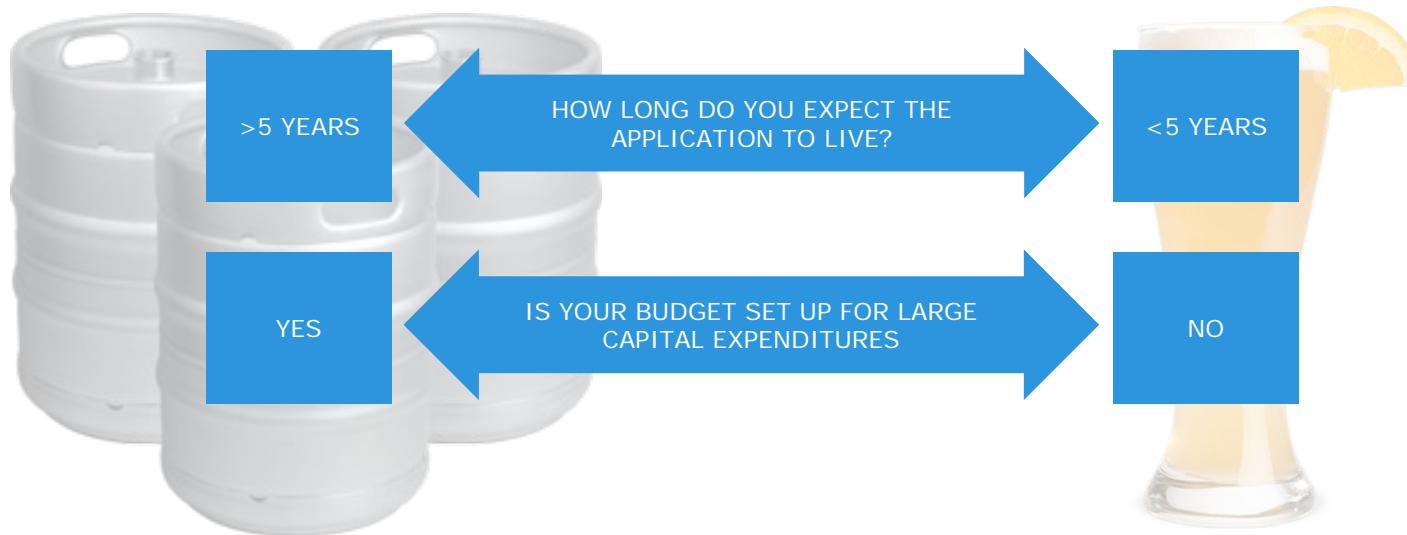
PAY BY THE DRINK



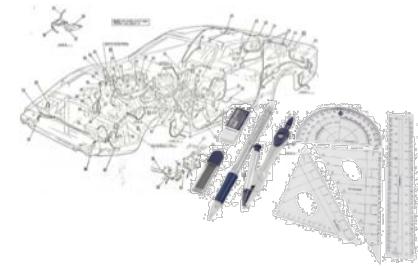
CAPEX OR OPEX?

PAY UP FRONT

PAY BY THE DRINK



NET = KNOW THYSELF. KNOW THY PATH.



Who	Enterprises	SaaS Startups	People Without Revenue Pressures & Unicorns
What	Focus on differentiating your business by gaining speed in apps and data	Build an stack that optimizes for YOUR singular app	Build an unstructured stack, build your own IaaS, assemble the infrastructure
How	Structured Platform + Curated Cloud Native IaaS + Turnkey Infrastructure (on or off-premises)	Assembly Platform + Cloud Native IaaS + Turnkey infrastructure (on or off-premises)	DIY Platform + DIY IaaS + DIY Infrastructure (on or off-premises)

A UNIQUE FEDERATION OF COMPANIES

STRATEGICALLY ALIGNED, BUT OFFERING CUSTOMER CHOICE!

On-Premises

Pivotal

OPEN CLOUD DEVELOPMENT PLATFORM
BIG DATA SUITE
AGILE APPLICATION DEVELOPMENT



Off-Premises

vmware®

HYBRID CLOUD
SOFTWARE-DEFINED DATA CENTER
MOBILE COMPUTING

EMC II

HYBRID CLOUD
INFORMATION STORAGE & PROTECTION

VCE

CONVERGED
INFRASTRUCTURE

RSA®

IDENTITY,
SECURITY
ANALYTICS,
GRC

vmware®
vCloud Air® Network

virtustream®

CLOUD
SERVICES

EMC²

WHAT CAN A FEDERATION DO?

DELIVER "GO FASTEST" TO "MOST OPTIONALITY"

On-Premises

Off-Premises

Structured Or Unstructured PaaS

OPEN CLOUD DEVELOPMENT PLATFORM
BIG DATA SUITE

Cloud Native Or Unified IaaS

vmware®

BYO Or Converged/Hyperconverged

EMC II
HYBRID CLOUD
INFORMATION STORAGE & PROTECTION

VCE
CONVERGED
INFRASTRUCTURE

RSA
IDENTITY,
SECURITY
ANALYTICS,
GRC

virtustream
CLOUD
SERVICES

WHAT CAN A FEDERATION DO?

AND RUN THOSE STACKS IN DIFFERENT WAYS FOR DIFFERENT WORKLOADS

On-Premises

Off-Premises

Structured Or Unstructured PaaS

OPEN CLOUD DEVELOPMENT PLATFORM
BIG DATA SUITE

Cloud Native Or Unified IaaS

vmware®

BYO Or Converged/Hyperconverged

MOBILE COMPUTING

Managed By You Or Us

HYBRID CLOUD
INFORMATION STORAGE & PROTECTION

CONVERGED

IDENTITY,
SECURITY
ANALYTICS,
CLOUD
MANAGEMENT

Consumed Via CapEx Or OpEx

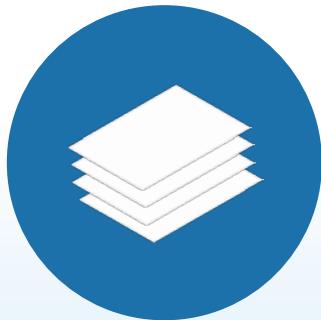
virtustream

CLOUD
SERVICES

EMC²

EMC PERSPECTIVE

DELIVER SOFTWARE LIKE A HIGH-VELOCITY STARTUP



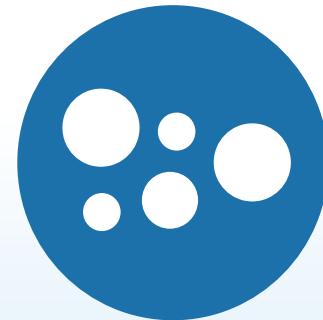
PLATFORM

- Great Developer Experience
- Automated Operations
- Broad Choice of Services



PROCESS

- Agile, Lean and DevOps
- Faster Feedback Loops
- Automated Delivery Pipeline

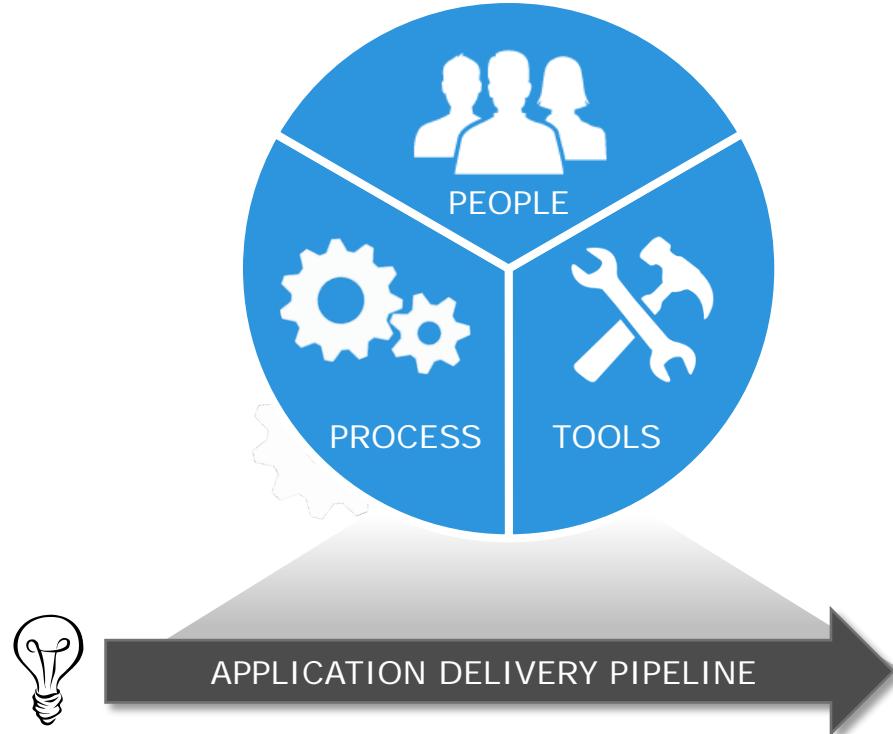


ARCHITECTURE

- Cloud-Native Microservices
- Responsive, User-Centric Design
- No-Long Term Platform Lock

WHAT IS DEVOPS?

- Framework for Rapid Application Delivery
- Automated, Integrated Tool Chain
- Cross-Functional Teams, Executive Leadership, Unified Culture



USE DEVOPS TO OPERATIONALIZE AGILE PLATFORMS

INTEGRATING & ALIGNING PEOPLE, PROCESS, AND TOOLS



ITERATIVE

Deploy smaller changes more often, frequently seek feedback and fold learning into next releases.



AUTOMATED

Replace manual, ticket-driven process wherever possible with automated testing, build and release processes.

APPLICATION DELIVERY PIPELINE



COLLABORATIVE

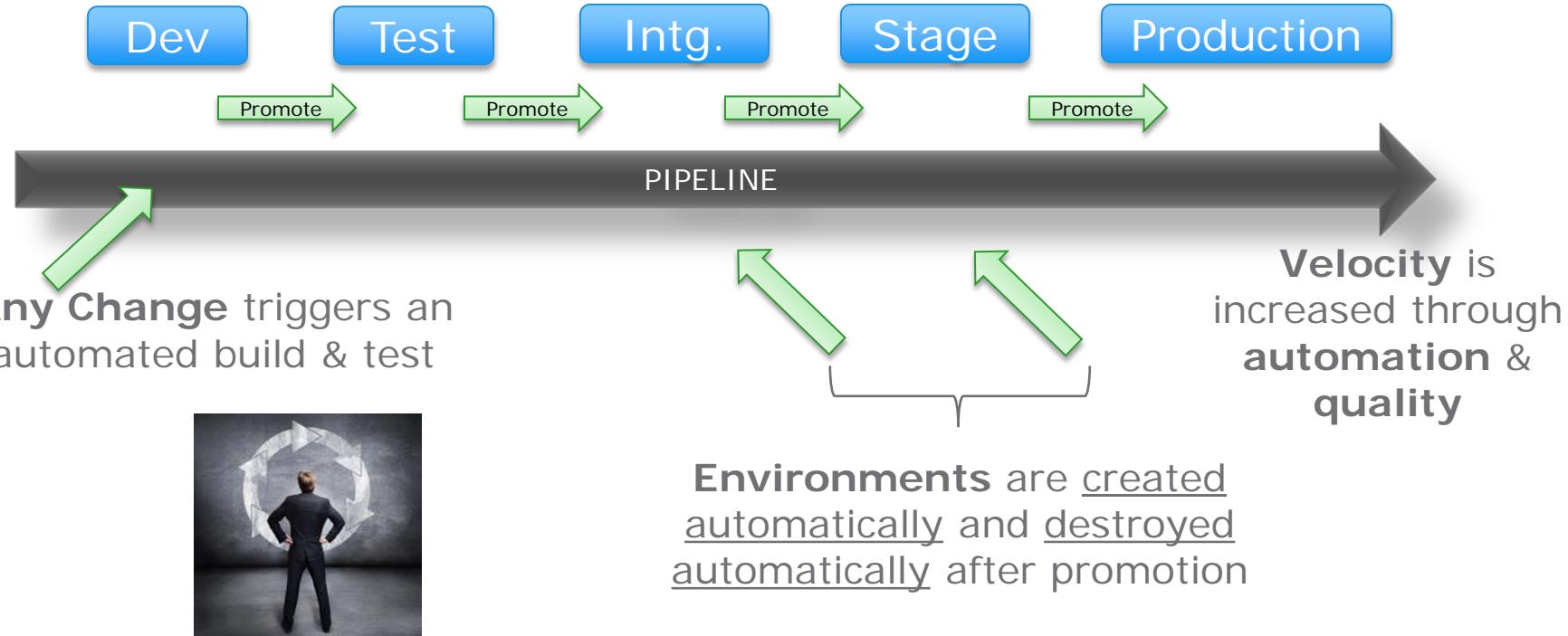
Remove people silos and create cross-functional teams incented to work with and help one another be successful.



TRANSPARENT

Measure, track and ensure transparency to deliver clear ROI while constantly learning, adapting and improving.

CONTINUOUS DELIVERY PIPELINES



OVERCOMING DEVOPS CHALLENGES

	CHALLENGE	SOLUTION
 1. People	<ul style="list-style-type: none">• Executive Understanding, Sponsorship & Air Cover• Middle Management• Cultural Shift• Skills, Roles & Responsibilities	<ul style="list-style-type: none">• Executive Coaching• KPIs, Benchmark, Measure• Showcase Success• Navigator/Driver• Pilots• Workshops & Immersion
 2. Technology	<ul style="list-style-type: none">• Tool Chain Integration• Cloud Infrastructure• Orchestration	<ul style="list-style-type: none">• Reference Architecture• Design for Change• CD Pipelines
 3. Process	<ul style="list-style-type: none">• Disparate Processes• Configuration Nightmares• Heritage Knowledge	<ul style="list-style-type: none">• Continuous Delivery• Configuration Management• Everything is Code

DEVOPS CULTURE

Typology of Organizational Culture (Westrum, 1994)

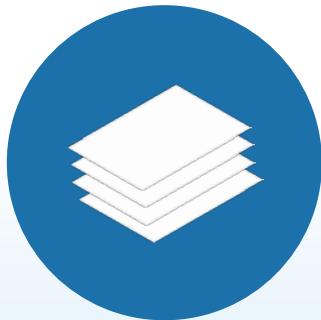
Pathological <i>Power-oriented</i>	Bureaucratic <i>Rule-oriented</i>	Generative <i>Performance-oriented</i>
Low cooperation	Modest cooperation	High cooperation
Messengers shot	Messengers neglected	Messengers trained
Responsibility shirked	Narrow responsibilities	Risks are shared
Bridging discouraged	Bridging tolerated	Bridging encouraged
Failure leads to scapegoating	Failure leads to justice	Failure leads to inquiry
Novelty crushed	Novelty leads to problems	Novelty implemented

Execs can shape the culture by creating aligned incentive structures that reward certain behaviors.

IT Managers play a critical role in connecting the strategic objectives of the business to the work their teams do.

EMC PERSPECTIVE

DELIVER SOFTWARE LIKE A HIGH-VELOCITY STARTUP



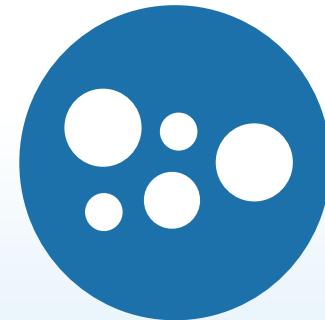
PLATFORM

- Great Developer Experience
- Automated Operations
- Broad Choice of Services



PROCESS

- Agile, Lean and DevOps
- Faster Feedback Loops
- Automated Delivery Pipeline



ARCHITECTURE

- Cloud-Native Microservices
- Responsive, User-Centric Design
- No-Long Term Platform Lock

MICRO-SERVICES VS. MONOLITHIC ARCHITECTURES

- Monolithic
 - App built as a single unit
 - Run as a single process
 - Change cycles involve building and deploying the entire app
 - Increased change impact and risk
 - Scales by replicating the monolith
- Micro-service
 - App built as a suite of small services
 - Run in its own process, communicate with lightweight mechanisms
 - Changes are done within each service and independently deployed
 - Decreased impact and risk
 - Scales through service distribution and replication

MICRO-SERVICE ARCHITECTURE CHARACTERISTICS

- Componentization via services
- Messaging over a lightweight bus
 - REST API, for example, vs. more complex messaging protocols
- Organized around business capabilities
- Products not projects
- Decentralized governance & data management
- Design for failure
- Infrastructure automation

12 FACTOR APPS

HIGH LEVEL OVERVIEW

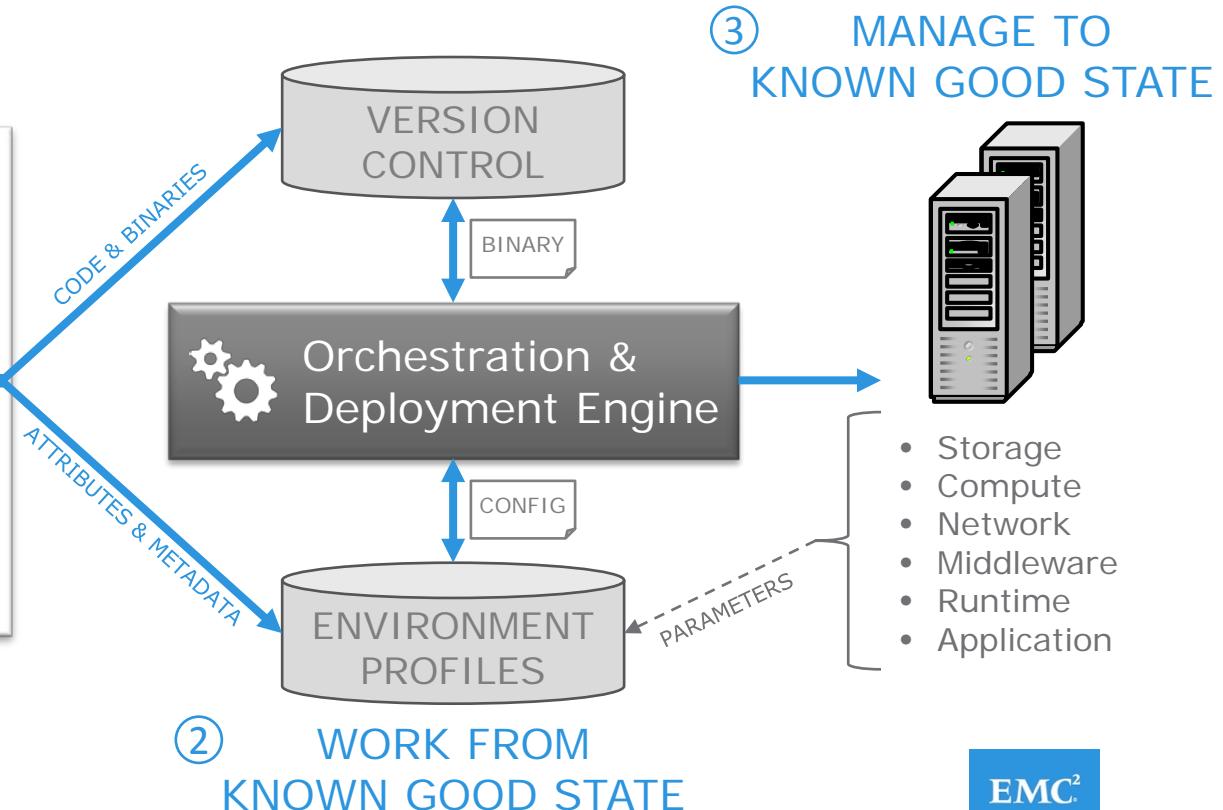
- One codebase with many deploys (development, staging, production)
- Always detached from any sort of locally stored data
 - Logs, monitoring, etc.
- Explicitly declare and isolate dependencies
- Strict separation of configuration from code
- Enable continuous deployment with dev/prod parity
- Micro-services

INFRASTRUCTURE-AS-CODE

REPEATABLE, CONSISTENT AUTOMATED CONFIGURATION

DECLARE DESIRED STATE ① IN READABLE CODE

```
class 'elasticsearch' {  
  
    package { 'elasticsearch':  
        ensure => installed,  
    }  
  
    file { 'elasticsearch.conf':  
        path    => "${ES_HOME}/config/elasticsearch.conf",  
        source  => 'puppet:///modules/elasticsearch/config/elasticsearch.conf',  
        require => Package['elasticsearch'],  
        notify   => Service['elasticsearch'],  
    }  
  
    service { 'elasticsearch':  
        ensure => running,  
        enable  => true,  
    }  
}
```



GLOBAL BANKING CLIENT

- Enterprise Objective
 - Improve Earnings per Share
- Aligned IT Goals
 - Drive efficiency
 - Improve Net Income by lowering net operating cost
 - Accelerate Time-to-Market
 - Capture new (or reclaim) market share by providing new/update service to customers faster than competitors
 - Improve Quality
 - Advance customer satisfaction by delivering technically sound, fit for purpose solutions
- Software Delivery Management Program



Enterprise At-A-Glance

- 6,000+ active dev projects
- 30,000+ IT Professionals
- 7 Major Divisions
- Globally distributed IT
- Countless Partners
- Heterogeneous platforms

EMC & GWB COLLABORATION

GLOBAL WHOLESALE BANKING DIVISION

- Focus
 - Pilot Continuous Integration and Delivery
 - Advise Infrastructure Provisioning and Management
- Influence
 - Integrating Lean SDLC (SAFe/Agile) initiative
 - Developing business case and roadmaps
 - Support development of Standardized Architectures
- Approach
 - Provide multi-level services
 - Develop internal champions and sponsors

QUESTIONS/NEXT STEPS

For more info, please visit us at –

- Booth #226 for EMC Global Services
- Booth #739 for our Native Hybrid Cloud solution



@sixfootdad



@EMCservices



Damian.Karlson@EMC.com



@chris_cicotte



@EMCcloud



Chris.Cicotte@EMC.com

EMC²



THANK YOU

EMC²
®

EMC PAAS ROADMAP SERVICE

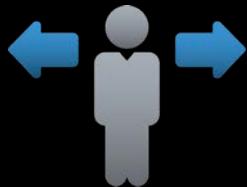
PLANNING YOUR ROAD TO PAAS

PROOF AND
PLANNING



PaaS ROADMAP
SERVICE

PLATFORM



Discover

Working in small teams we'll work with your business, applications and IT infrastructure experts during a set of workshops

Plan

We will review collected information, populate modeling tools, prioritize opportunities, and elaborate future state architecture

Enable

We'll spend our last days polishing deliverables, training and conducting knowledge transfer

Typically delivered in 4-6 weeks

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EMC PAAS ROADMAP SERVICE

DELIVERABLES AND OUTCOMES

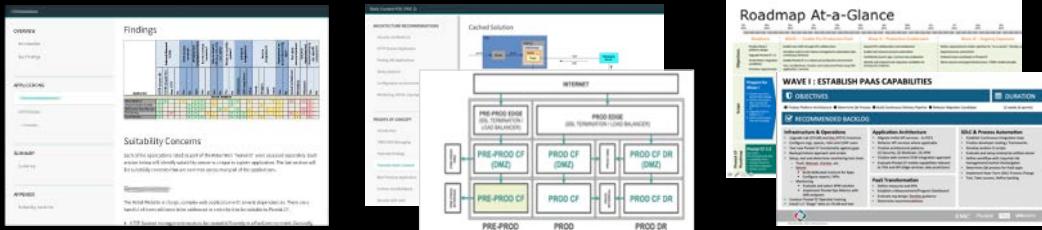
PROOF AND
PLANNING



PaaS ROADMAP
SERVICE

PLATFORM

- Determine what apps can move to PaaS
- Define candidate architecture
- Plan transformation from a people and process perspective
- Determine a path forward with platform and process experts



Application Assessment

Structured review of top priority applications for technical suitability and plans for remediation to run on PaaS

Operational Assessment

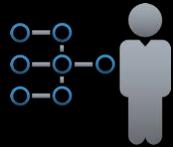
Broad assessment of infrastructure design and operational process in context of PaaS transformation

Roadmap

Key findings and a recommended sequence of projects and scope to achieve objectives and opportunities

EMC CLOUD FOUNDRY ONBOARDING SERVICE

ONBOARD PaaS AND ENABLE YOUR PEOPLE



Define

We'll work with your stakeholders and technical SMEs to define an architecture best suited for your short and long term objectives



Build

Our experts will install and fully configure Pivotal CF, build or migrate an app and setup a continuous delivery pipeline



Enable

And finally we'll spend our last days polishing deliverables, training your people and conducting knowledge transfer

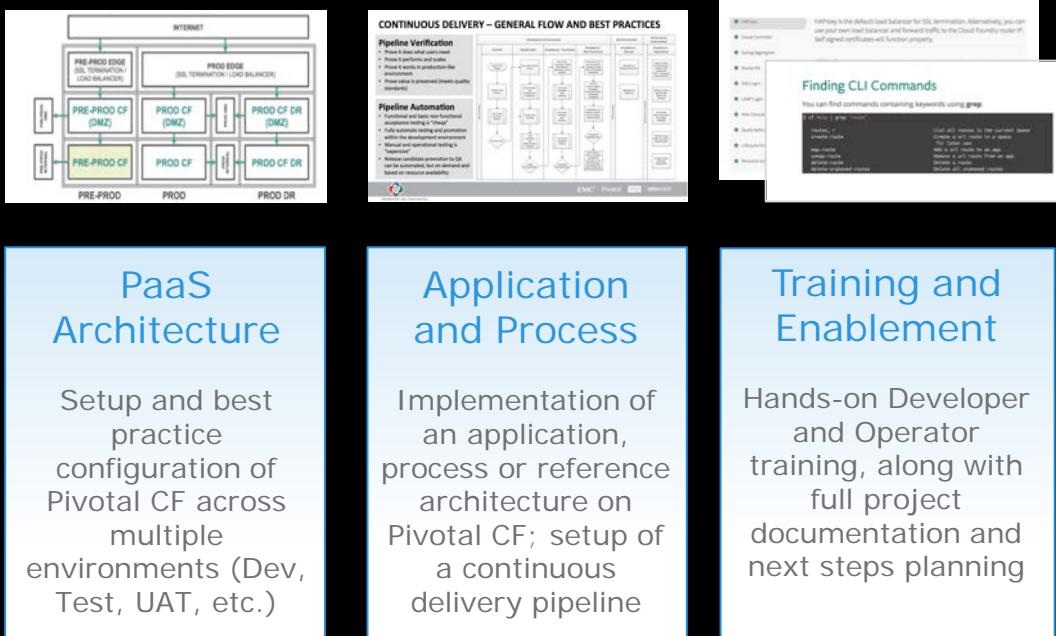
Typically delivered in 4-6 weeks

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EMC CLOUD FOUNDRY ONBOARDING SERVICE

DELIVERABLES AND OUTCOMES

- Fully configured PaaS
- Migrated app or service
- Continuous delivery pipeline setup
- Hands-on training
- Next steps planning



EMC DEVOPS ADVISORY SERVICE

AUTOMATE SDLC PROCESSES

PROOF AND
PLANNING



DEVOPS
ADVISORY
SERVICE



Analyze

We'll engage your SMEs to quickly evaluate SDLC process and tool chain, and look for opportunities to improve speed and agility



Prioritize

Opportunities and gaps will be reviewed and prioritize to define a phased roadmap outlining overall DevOps strategy



Plan

Develop a detail Phase 1 project plan to deliver the "MVP" needed to recognize tangible improvements in delivery pipeline

Typically delivered in 6 weeks

EMC²

EMC DEVOPS ADVISORY SERVICE

DELIVERABLES AND OUTCOMES

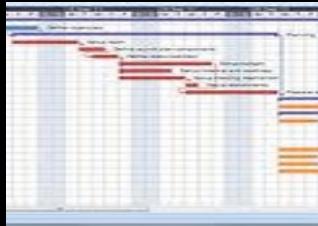
PROOF AND
PLANNING



DEVOPS
ADVISORY
SERVICE

- Identify SDLC process bottlenecks
- Identify automation “quick wins”
- Understand tool chain
- Business case and roadmap of next steps

Area	NONE	BASIC	ADVANCED	LEADING
Traceability				●
Continuous Integration		●		●
Quality Assurance	●		●	●
Continuous Deployment	●		●	
Platform-as-a-Service	●		●	●
Infrastructure-as-a-Service		●	●	●
Adaptive Execution	●		●	●



Maturity Assessment

Define DevOps readiness and establish a set of baseline metrics to measure improvements across key process and tooling indicators

Tactical Plan

Design solutions and a phase 1 implementation plan that targets key impediments along the application delivery pipeline

Business Case

Project expected impact to process efficiency and cost based on successful implementation of DevOps solutions

CLOUD NATIVE APP DEVELOPMENT

ENABLING YOUR LONG-TERM SUCCESS WITH CUTTING
EDGE INNOVATION

FOUNDATIONAL
PaaS



CLOUD NATIVE
APP
DEVELOPMENT

ARCHITECTURE



Agriculture
Technology
Company

Established rapid
PaaS with Pivotal
CF, reducing
development effort
and speeding time
to market



Developed strategic
plan for customer
experience, created
collaborative
customer
environment



Global
Financial
Services

Developed a multi-year
PaaS transformation
strategy through a
collaborative, coaching-
style engagement
framework



LEAD

- Digital and Mobile Strategy
- Data and App Architecture
- Agile Transformation



PAIR

- Co-Development
- Knowledge Enablement



COACH

- Transformation Strategy
- Process Improvements

ARCHITECTURE WORKSHOP

A 1 day engagement that engages client SMEs around topics like continuous delivery,
architecting cloud apps and application modernization.

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Pivotal

RSA

vmware

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