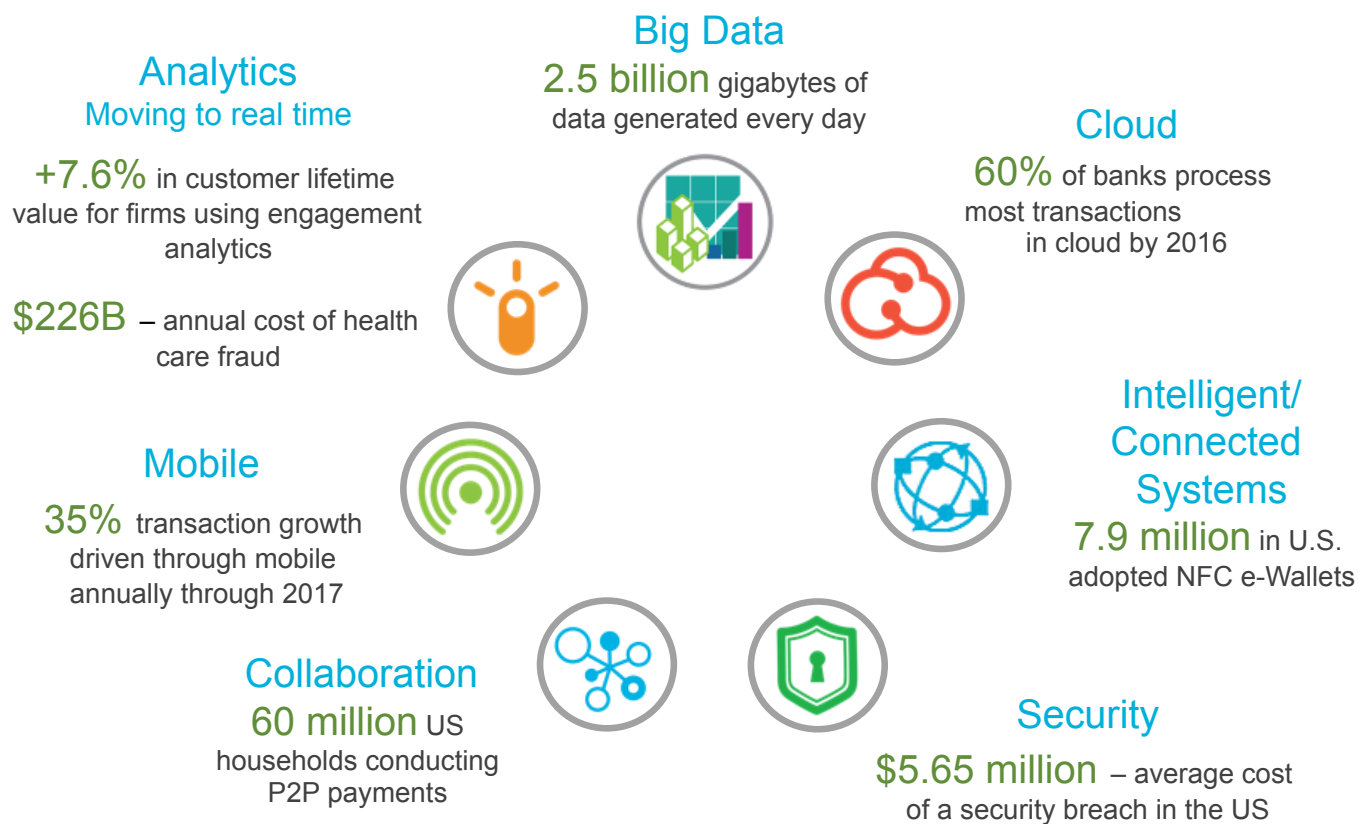# IBM DevOps

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Please Note:

- IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion.

- Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision.

- The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract.

- The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

- Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

IBM

Emerging technologies drive business transformation

Analytics
Moving to real time

+7.6% in customer lifetime value for firms using engagement analytics

$226B – annual cost of health care fraud

Big Data
2.5 billion gigabytes of data generated every day

Cloud
60% of banks process most transactions in cloud by 2016

Mobile
35% transaction growth driven through mobile annually through 2017

Intelligent/ Connected Systems
7.9 million in U.S. adopted NFC e-Wallets

Collaboration
60 million US households conducting P2P payments

Security
$5.65 million – average cost of a security breach in the US

What is DevOps

Enterprise capability for continuous software delivery and management that enables organizations to innovate rapidly to capitalize on new market opportunities, and reduce the cycle time to collect and react to customer feedback

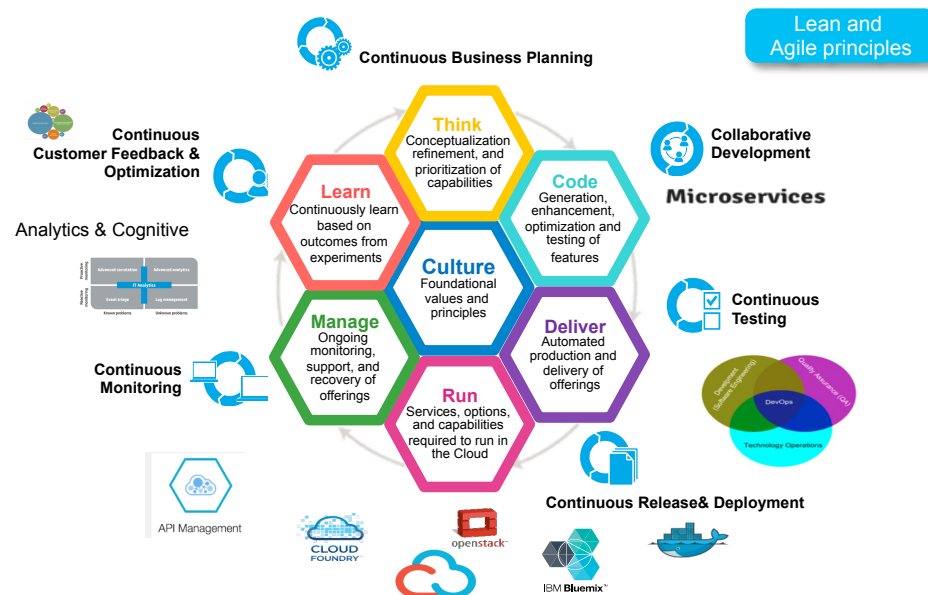**Accelerate software delivery –** *for faster time to value*

Balance speed, cost, quality and risk – *for increased capacity to innovate*

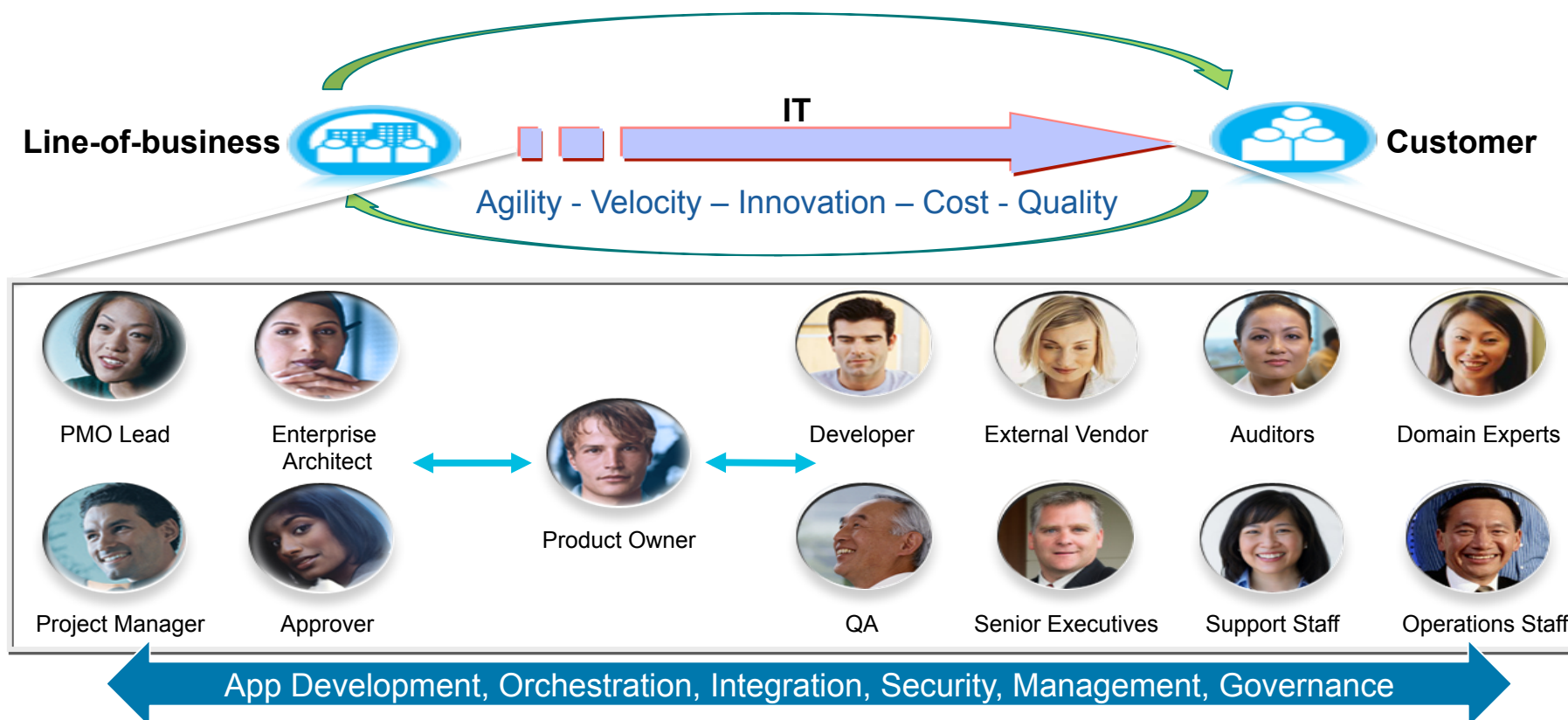**Reduce time to customer feedback –** *for improved customer experience*
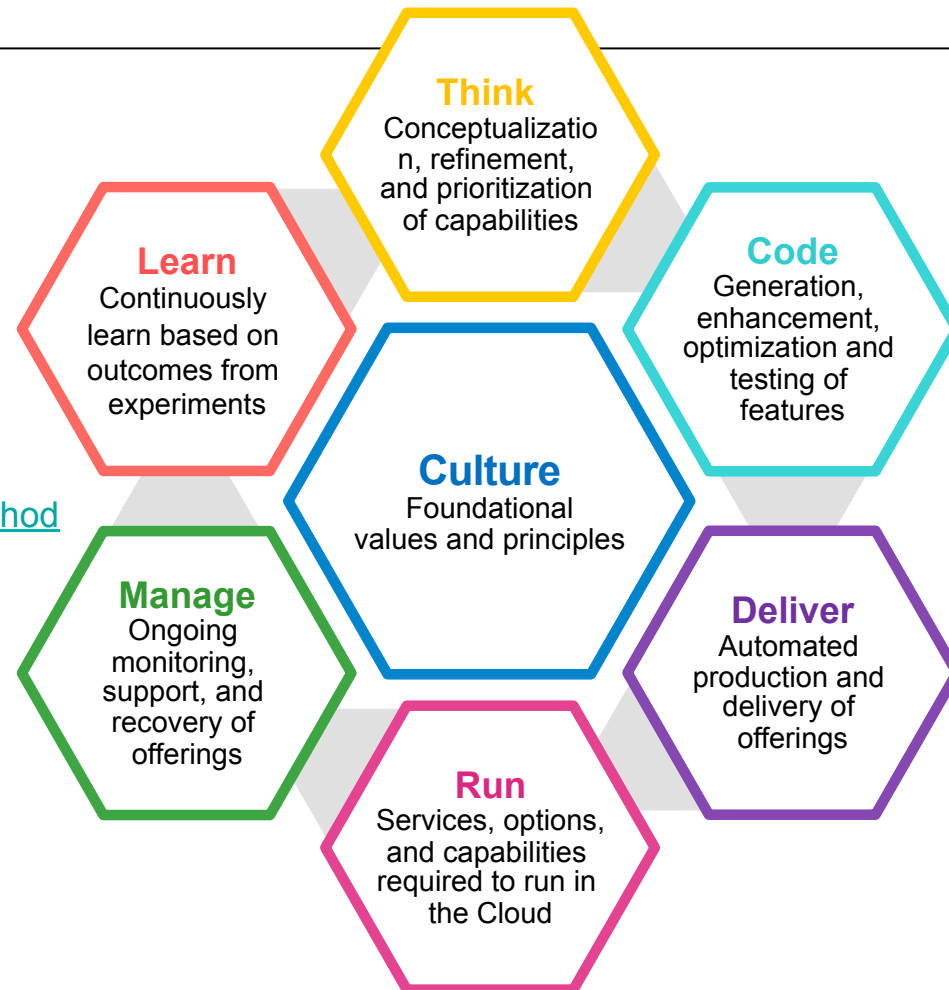
Process

Culture

Technology

Lean and Agile principles

Continuous Business Planning

Continuous Customer Feedback & Optimization

Analytics & Cognitive

Think Conceptualization refinement, and prioritization of capabilities

Learn Continuously learn based on outcomes from experiments

Code Generation, enhancement, optimization and testing of features

Culture Foundational values and principles

Manage Ongoing monitoring, support, and recovery of offerings

Deliver Automated production and delivery of offerings

Run Services, options, and capabilities required to run in the Cloud

Collaborative Development

Microservices

Continuous Testing

DevOps

Continuous Monitoring

API Management

CLOUD FOUNDRY

openstack

IBM Bluemix

Continuous Release & Deployment

What does the Line of Business want from IT?

Line-of-business ⟷ **IT** ⟷ **Customer**

Agility - Velocity – Innovation – Cost - Quality

PMO Lead

Enterprise Architect

Product Owner

Developer

External Vendor

Auditors

Domain Experts

Project Manager

Approver

QA

Senior Executives

Support Staff

Operations Staff

App Development, Orchestration, Integration, Security, Management, Governance

DevOps

To learn more visit:
https://www.ibm.com/devops/method

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Delivering Business Capability: Hybrid Applications, Hybrid Platforms, Hybrid Teams

Standardization of Tools and Practices drives Scalability across the Enterprise. #NoSilos #NoIslands

"Where there is no Standard there can be no Kaizen."
- Taiichi Ohno

Multi-Speed IT: Five Touch Points

"Everyone is responsible for delivery to Production"

"By the way, while you were off sick we located the bottle neck."

Significant Architecture Decisions

Application Type	Delivery pipeline	End-to-End Tool chains	Delivery platform

- Cloud Native app
- Cloud Ready app
- Monolithic app
- Hybrid app
- Mobile application
- Micro-services
- API / Integration
- Internet of Things
- Big Data & Analytics

- On-premises
- Off-premises
- Hybrid Cloud
- Traditional IT
- # test environments
- # staging environments

- Requirements and lifecycle management
- Integrated development environment
- Source control management
- Build / Artifact repository
- Continuous integration tool
- Service virtualization
- Deployment automation
- Orchestration
- Service management
- Defects management

- On-premises
- Off-premises
- Hybrid Cloud
- Traditional IT
- Deployment automation
- Orchestration
- Security

Eight Key DevOps Practices

IBM

Pulled from Agile & Lean Experiences

34% of companies have "crossed the chasm" to 3-week delivery increments

Positive correlation between speed and business satisfaction

1. Minimum Viable Product	2. Dedicated Teams	3. Loosely Coupled Architecture	4. Minimizing Hand-offs, Maximizing Flow
5. Deliver in Small Batches	6. Transparency	7. Eliminate Overhead	8. Automate Testing using APIs

FORRESTER®

Base: 600 IT professionals with application development responsibilities from US, Canada, UK, France, and Germany Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, May 2014

APIs power the modern, digital supply chain

Enhances

API

Shares

API

Reuses

Shares

API

Combines

API

Enterprise IT team

Composes

API

Consumes

API

API

API

API

External APIs

CRM

ERP

Systems of Record
(Processes,
services and data)

Developers can share,
re-use, (re)combine and
deliver new capabilities
quicker

Composing new
capabilities using
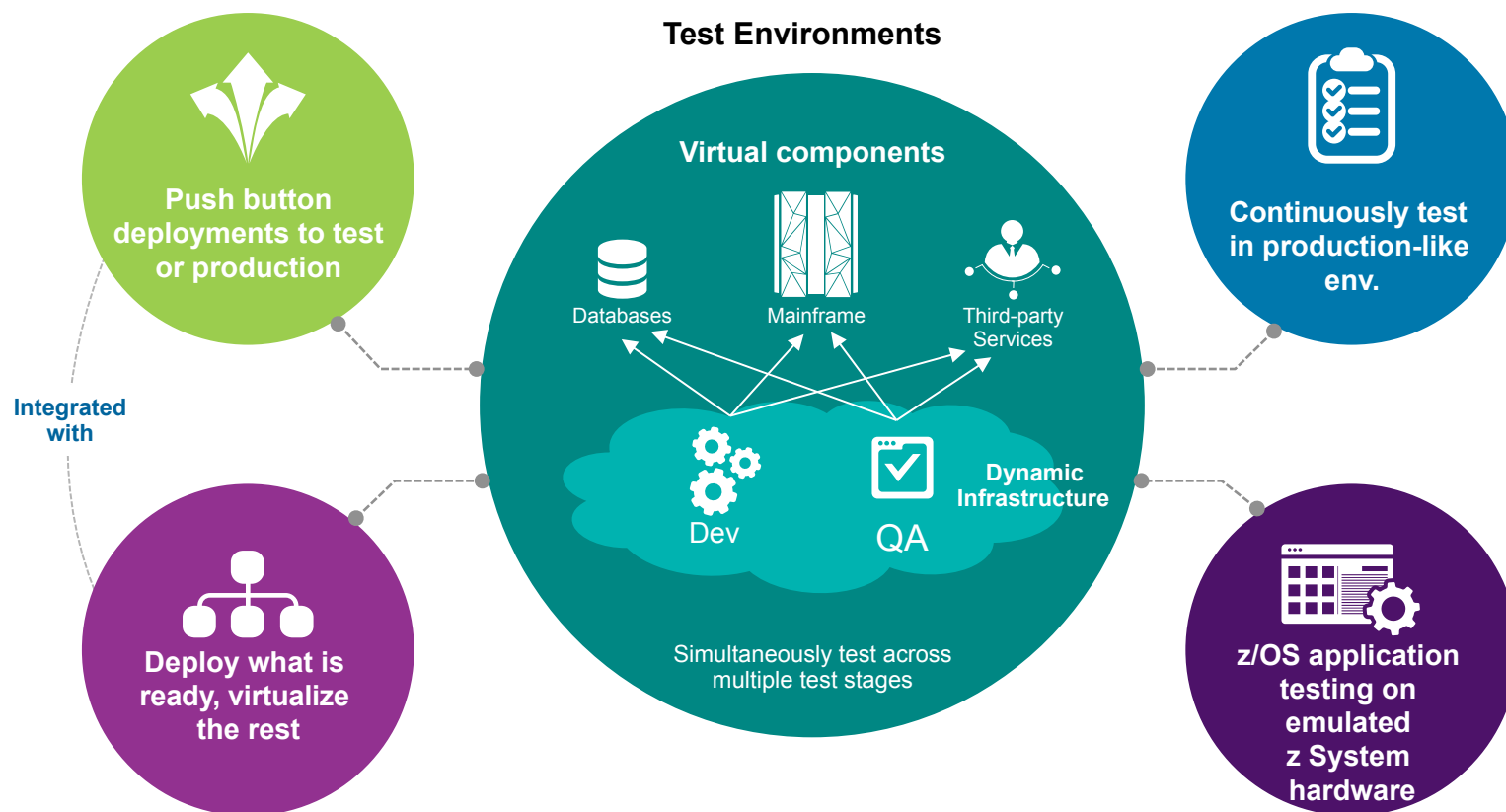internally shared APIs and
external APIs

Modern Tools for Multi platform development and operation

Full Development Environment

Problem Determination Tools and Debug

HLASM

JAVA

C/C++

PL/I

IMS

WAS

CICS

COBOL

Collaborative Development & Application Understanding

Operations Interface – Access to Files & Jobs

Break down silos by moving to an agile team environment

Analyst

Document requirements using textual and visual techniques

Project Manager

Leverage real-time planning techniques to make plans instantly executable and resilient to change

Operations

Operations provides feedback before, during, and after deployment

- Requirements
- Collections
- Storyboards
- Use cases

- Agile release plans
- Iterations
- Work Items
- Source code

- Test plans
- Test cases
- Test scripts
- Test executions

Developer

Collaborate across diverse disciplines and teams to meet business requirements

Tester

Achieve quality by design with an integrated, automated testing process

Release Engineer

Automate software delivery tasks and accelerate handoff to Operations

Deploy what is ready, virtualize the rest

Test Environments

Push button deployments to test or production

Integrated with

Deploy what is ready, virtualize the rest

Virtual components

Databases

Mainframe

Third-party Services

Dev

QA

Dynamic Infrastructure

Simultaneously test across multiple test stages

Continuously test in production-like env.

z/OS application testing on emulated z System hardware

Modern Tools allow the transition to DevOps

Using RTC and UrbanCode …

- **Facilitates the use of ID&T for additional dev environments**

- **Supports deploying to dynamically provisioned test environments using ID&T**

- **Facilitates the use of ID&T to test new middleware and compiler updates**

- **Enables a modern DevOps pipeline for z/OS development**

Application Release Management

IBM Development and Test Environments for z Systems (ID&T)

Rational Doors Next Generation (RDNG)
Rational Team Concert (RTC)
Application Discovery– understanding

UrbanCode Deploy (UCD)

Cloud Provisioning

Application Deployment Automation

RTC – Dependency build

Development   Build   Package Repo   TEST ENV.   STAGE ENV.   PROD ENV.

Rational Team Concert (RTC)
Application Delivery Foundation for z Systems (RDz)

Rational Quality Manager (RQM)
Rational Test Workbench (RTW)
Rational Test Virtualization Server (RTVS)
Application Delivery Intelligence

Pipeline Automation - Rational Team Concert (RTC) - Jenkins

Bluemix Garage Method

Think
Conceptualization, refinement, and prioritization of capabilities

Learn
Continuously learn based on outcomes from experiments

Code
Generation, enhancement, optimization and testing of features

Culture
Foundational values and principles

Manage
Ongoing monitoring, support, and recovery of offerings

Deliver
Automated production and delivery of offerings

Run
Services, options, and capabilities required to run offerings

Combining industry best practices for **Design Thinking, Lean Startup, Agile Development, DevOps** and **Cloud** to build and deliver innovative solutions and culture change.

To learn more visit:
https://www.ibm.com/devops/method

DevOps accelerates digital transformation
with standardization and automation

PRIMERICA®

Innovate faster by accelerating software delivery across hybrid environments

Transformed from 18-month cycle times to delivering a **complete mobile solution in just five months**—with **3-week update cycles**

Tangerine
Forward Banking

Improve customer engagement by shortening feedback loops

Generated 1,000 items of feedback on new mobile app in 2 weeks. **Reduced implementation time by 90-95%**

Nationwide®

Create a **culture of continuous improvement and trust**

Reduced critical defects by 80% over the last three years. **90% on-time delivery** versus 60% previously

Fidelity™
WORLDWIDE INVESTMENT

Eliminate error-prone manual steps and **speed up** the release process

Reduced time required for software releases by 99%. Cost avoidance of more than US$2.3M per year for one app.

Summary: ADDI helps clients quickly and safely unlock the value of existing assets for digital transformation

HYBRID CLOUD

API Management

ADDI

DEVOPS & AGILITY

- ADDI accelerates clients' transformation to a digital enterprise by unlocking core business logic & apps

- ADDI's application discovery enables understanding business-critical assets to hybrid cloud-enable them

- ADDI complements IBM's API Solutions connecting mainframe assets to systems of engagement leveraging hybrid cloud architecture

- ADDI further extends IBM's leadership in Enterprise DevOps helping modernize and innovate core business process at the speed of business

An end-to-end solution to speed digital transformation

Unlock: Rapidly analyze and visualize the secrets of complex applications

Analyze and visualize relationships between application components, data and jobs

- Understand the structure of your business-critical applications **across languages and environments**

- Reduce risk and time and increase quality of changes through **visual impact analysis** integrated with your IDE

- Prioritize changes by understanding **operational performance** of most frequently used applications

- Synchronize ADDI with latest changes in your source code management systems for a **single source of truth**

Reduce development change effort by up to 30%*
Reduce project management by up to 50%*

** Based on **EZSource** client surveys 2013-15, guidance from industry analysts and industry reference frameworks*

Application Health – ADDI: Delivery Intelligence

Correlate code analysis with operational and test data to provide comprehensive, real-time view of application health and to optimize development and test

- **Easy-to-use** web-based graphic interface providing accurate, unified view of entire application landscape

- **Correlates** project metrics from the ADDI repository with availability and performance information and code coverage data for targeted insights into application health

- **Optimize** development and test by combining static and operational analysis to accelerate delivery and improve quality

Superior user experience:
ADFz and Explorer for z/OS

Strategic integration platform and trouble free install and maintenance

- Benefit from Explorer for z/OS V3.0 Aqua, our new common integration platform, as products install and work together nicely

Integration across dev and ops

- Select and install those you need for development and operations

Comprehensive and convenient packaging

- Build high quality z/OS applications with ADFz, leveraging robust integration across development and problem determination tools

Drinking our own champagne

- Exploit our advances as soon as they are ready with our new monthly deliveries…you benefit from our internal DevOps adoption

Application Delivery Foundation for z Systems

| APA | FA |
| DT | FM |
| IDz |

CICS Explorer

RTC

CICS Tools

z/OS Connect EE

Explorer for z/OS Aqua

Eclipse 4.4 Luna

Plan

Develop / Test

Deploy

Operate

Cross-Platform DevOps

Rational Team Concert V6

Life Cycle Management at scale

RTC synchronizes enterprise teams by…

- **Automating** full traceability
- **Managing** with dashboards and reports
- **Demonstrating** compliance
- **Orchestrating** multi-speed IT
- **Supporting** multiple platform / processes / languages
- **Scaling** actions to the enterprise (multi-threaded builds, integrated deployment, multi-project queries)

Modern Development Environment

RTC provides modern development …

- **SCM** full modern development capability
  - Supports parallel development
  - Supports all platforms and artifact types in one SCM
- **Promotion** for z/OS artifacts
- **Dependency Build** for z/OS artifacts
  - Supports integration with testing, security scanning, and other modern build activities
- **UCD** integration for end to end integrated deployment
- **Jenkins Integration** for full CI/CD integration

Facilitate deployment to hybrid cloud environments:
UrbanCode Deploy (UCD)

- Ability to **design and reuse** deployment processes for z/OS applications that capture corporate security standards

- Support for z/OS packages in UCD code station, allowing a secure and consistent way to download to any deploy nodes

- Ability to design and execute a deploy process by using impersonation with authorization managed by the native z/OS security framework

- New RTC integration, allowing to seamlessly push builds and packages to UCD

- New z/OS Management Facility plug-in feature allowing the execution of workflows in z/OSMF

- New topology viewer to track down potential problems whether with the Deploy infrastructure, or with a specific deployment

- Cloud: "Affordable off host development and test environment"
- Green box: "COBOL, PL/I, C++, Java, EGL, Batch, Assembler,"
- "Z Systems Development and Test Environment for z Systems (zD&T)"
- Boxes: RTC, RDz, RIT, IMS, DB2, CICS, WAS, MQ
- z/OS
- RD&T

Add mainframe dev & test capacity,
without increasing your MIPS

Affordable off host development and test environment

COBOL, PL/I, C++, Java, EGL, Batch, Assembler,

Z Systems Development and Test Environment for z Systems (zD&T)

RTC	RDz	RIT
IMS		DB2
	CICS	
WAS		MQ

z/OS

RD&T

X86 PC or HX5 Blade running Linux

IBM SoftLayer Infrastructure

- Develop and test z/OS applications anywhere, anytime
- Free up mainframe development MIPS for production workload
- Eliminate costly delays by reducing burden on existing IT operations staff
- Reduce time to value and minimize ongoing administration and capital expense with RD&T Cloud Managed DevOps
- Expanded DevOps scenario coverage with UCD z/OS Agent 6.1.1.6
- Exploit the z13 hardware capability, including z13 Crypto Express 5S
- Improve development coverage with newer z/OS 2.1 software stack, including MQ 8, COBOL 5.2, and RTC

"RD&T improved our development and testing timeline and provided stability and quality" Developer, Large Enterprise Computer Services Company

https://www.techvalidate.com/tvid/C99-3F2-1ED

Note: This Program is licensed only for development and test of applications that run on IBM z/OS. The Program may not be used to run production workloads of any kind, nor more robust development workloads including without limitation production module builds, pre-production testing, stress testing, or performance testing.

z Systems Development and Test Environment V10

More flexible licensing with an updated z/OS software distribution:

- **Cloud friendly** software-based licensing for enterprise customers

- Hardware-based software licensing for **personal and portable** use cases

- **Adopt newer levels of z/OS software-** with z/OS 2.2, z/OS Connect, CICS 5.3, IMS 14.1, RDz 9.5.1, z/OS Explorer 3, RTC 6.0.1, and UCD 6.2

Cognitive Devops – get rid of the guesswork:
Application Delivery Intelligence (ADI)

Drive DevOps improvement with analysis, insight, and optimization

- **Analysis**: Rapidly identify areas of concern in your application portfolio, then assess the impact, scope, risk and actions required

- **Insight**: Improve the accuracy of your planning and estimating with insights gained from data collected from DevOps activities

- **Optimization**: Cut waste and work smarter by executing the optimum actions required to build, test and deploy your applications

Version 1.0 Intelligent Testing helps you…

- Run the right tests
- Run fewer tests
- Track trends and flag issues

28

Serve your mobile apps even faster:
COBOL for z/OS V6.1

Expanded capacity to compile and optimize very large COBOL programs

- Fully supports z13 and z13s hardware

Deliver release-to-release performance improvements

- Well-structured, compute intensive batch applications running on z13 compiled with COBOL 6.1 have shown CPU time reduction of up to 5% over the same applications compiled with the GA release of COBOL V5.2; up to 40% over the same applications compiled with COBOL V4.2 [1]

New capability to generate JSON documents directly from COBOL

- Extend business critical COBOL applications to support mobile application where preference is JSON/REST

New COBOL 2002 language features

Improved migration from COBOL compilers prior to Enterprise COBOL V5

Trial version available for 90 days at zero cost

[1] Performance results are based on an internal IBM compute-intensive test suite. Performance results from other applications may vary.

DevOps Innovation Workshop

Review the current state

1. Business goals, IT goals, current initiatives

2. DevOps

3. Requirements

4. Environments

5. Repositories

6. Roles / Organization

7. Metrics

8. Security

9. Other

Prioritize challenges to be resolved

Create a first pass at an improvement roadmap

The whiteboard
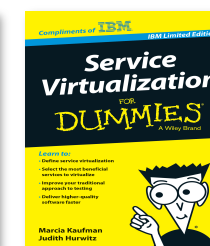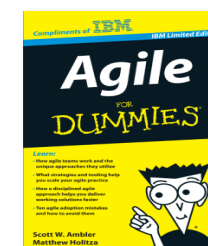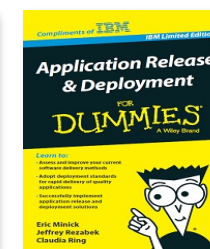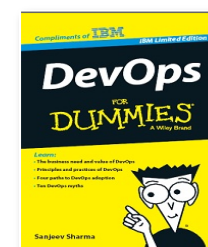
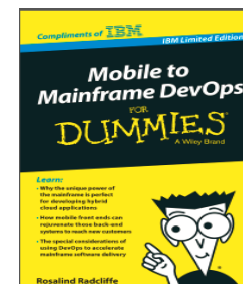Mapping your Delivery Pipeline

Questions

IBM

DevOps for Enterprise Systems – Key Takeaways

1. **DevOps is about transforming application development and delivery in order to accelerate digital innovation.** *So DevOps is a topic for both business and IT roles in the organization.*

2. **You don't <u>buy</u> DevOps, you <u>do</u> DevOps.** *DevOps is an approach, a mindset – a combination of culture, process and technology (including infrastructure, tools and services).*

3. **DevOps is not only about the hand-off between Development and Operations.** *DevOps is about applying <u>lean and agile</u> principles across the application delivery lifecycle (biz-dev-test-deploy-operate) to achieve <u>continuous delivery</u> of digital innovation. Key concepts: automation, feedback loops.*

Resources

Continuing your 'Understanding DevOps' journey

- For Dummies books:

- https://ibm.biz/mmdevops

- http://ibm.co/devopsfordummies

- http://ibm.co/agilefordummies

- http://ibm.co/ServiceVirtualizationForDummies http://ibm.co/ARDfordummies

- IBM DevOps Page:
  http://ibm.com/DevOps

- IBM DevOps for Enterprise Systems:
  http://bit.ly/1PB02KS

- DevOps Lean Assessment (Beta):
  http://bit.ly/IBMLeanAssess

THANK YOU