Verizon’s Journey to enterprise grade DevOps
We are Verizon.

Verizon delivers the promise of the digital world.

- Fortune 500 rank: #13
- $30.5 billion in second-quarter revenue (2016)
- 162,700 employees

LTE covers 98% of U.S. population
113.2 M total retail connections
XLTE covers 466 markets

100% fiber optic Fios network
5.5 M Fios Internet & 4.6 M Fios TV connections
500Mbps upload and download speeds

Global IP network
One of the largest, most reliable IP networks in the world

Products and Solutions
Innovating in entertainment, digital media, the Internet of Things and broadband service

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An innovative incubator for entrepreneurs and inventors.
Change Drivers

• Competitive environment is increasing pressure on our business to optimize for agility

• Although progress has been made, significant opportunities exist to evolve our current technology delivery model, culture, and skillset

• Operating model changes will improve customer/value alignment, accountability, speed, quality, and security

• Technology capabilities must enable, not hinder, ability of business to pivot

Accelerate our tech innovation capability to enable Verizon’s business agility
Bold Goals

• Public Cloud first and all new application development is Cloud Native

• All engineers develop proficiency in secure coding practices

• All Dev teams fully accountable for building and running their product tech stacks

• All Infrastructure teams make services automated, compose-able, and self-service; work intake is no longer through ticket processing

• Quality & Security is engineered in to the delivery process and is valued more than features

• Through continuous improvement, all processes and activities that don’t add value to the product or service delivery are eliminated
Accelerating Innovation

Results

- Happier Customers
- Increased Quality
- Talent Magnet
- Accelerate Time to Value
- Better Experiences

Technology

- CLOUD
- AUTOMATION
- SECURITY

- DevOps Optimized
- Customer Centric
- Product Focused

Operating Model

- Empowered
- New Roles & Skills
- “T” Shaped Talent

Talent

- Internal Community
- External Brand
- Always Learning

Culture

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# Focus on Outcomes to Increase Business Agility

<table>
<thead>
<tr>
<th>Culture</th>
<th>Talent</th>
<th>Operating Model</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcomes</strong></td>
<td><strong>Culture</strong></td>
<td><strong>Talent</strong></td>
<td><strong>Operating Model</strong></td>
</tr>
<tr>
<td><strong>Highly collaborative engineering community, responsibility and ownership for technology delivery</strong></td>
<td><strong>Extremely adaptive workforce, with deep coding competency, and multidisciplinary skills.</strong></td>
<td><strong>Optimized products, services, and practices with simplified accountability</strong></td>
<td><strong>Technology viewed as a “first option” business agility enabler</strong></td>
</tr>
<tr>
<td><strong>Measuring Success</strong></td>
<td><strong>Team engagement / feedback</strong></td>
<td><strong>DevOps Survey – Capability Improvement</strong></td>
<td><strong>Velocity (Time To Value)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>DevOps Survey - Culture Improvement</strong></td>
<td><strong>At least once per day, 85% of talent check into git</strong></td>
<td><strong>Quality (Defects)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Community / Dojo participation</strong></td>
<td></td>
<td><strong>Service Availability</strong></td>
</tr>
</tbody>
</table>

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Continuous Improvement & Iterative Implementation

INITIAL STEPS
- Create our story...
- Incubate
- Assess
- Simplify

GAIN MOMENTUM
- Tell our story...
- Immerse

ACCELERATE
- Others tell our story...
- Transformed Skills

OPERATING MODEL
- Optimized

TECHNOLOGY
- Agile Technology Delivery (Unicorns)
The three phases to maturity

**Initial Steps**
- Get the tool chain up and running
- Git-Jenkins-Jira-Ansible connectors
- Invest in large scale automation and automation best practices

**Gain Momentum**
- Orchestration of application releases
- Service Virtualization
- Test Data Management
- Mature Engineering practices

**Accelerate**
- Rewrite/Refactor Applications as Microservices
- Cloud Enable the applications.
- Run the containerized applications on cloud
DevOps Tools

SDLC
- Code Management: git, Confluence
- Issue Tracking: JIRA
- Agile Planning: JIRA Agile
- Code Analysis: SonarQube
- Code Scans: Fortify
- Document Repository

DevOps
- Test Automation: Selenium
- Deploy Orchestration: Jenkins
- Testcase Management: Zephyr
- Monitoring: Zenoss

Cloud
- Logging: Logstash
- Containers: Docker
- Deployment: Ansible
- Networking: Palo Alto, VMware
- Cloud Foundry
- OpenShift
- Public Cloud: AWS
- IaaS
- PaaS

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DevOps Integration
No app left behind

DevOps integration of COTS products (Oracle Siebel example)

- Custom script created to bridge the gap from Siebel to git
- Jenkins builds from git to the Siebel repository for deployment
- During Siebel deployment ongoing git commits are ignored
SDLC Digitization

Full SDLC visibility

SDLC digitization/automation to enable full visibility

- Commits from git are automatically posted back to Jira
- Comparison (diff) is available in Jira via Stash (integrated with git)
Complete CI CD and Mature Engineering

Continuous Integration Tools
- Buildbot
- Jenkins

Other CI Tools

Test Reports
- HTML
- Email

Defect Reporting

Data Source

Other Sources

Configurations
- XML

Read Configurations

Selenium Hybrid Automation Framework

Generate Reports

Report Defect

Test Case Management System
- Zephyr
- JIRA

Retrieve Test Cases

Execute Tests

Test Application

Multithreading with Selenium Grid

Nodes

Test Execution With Selenium Grid

Test Data Management

Read Test Steps

Execute Tests

Generate Reports

Defect Reporting

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Accelerate DevOps: Microservices route

- Refactor Existing apps as Microservices
- Organize services based on business units
- Accelerate DevOps and gain 10x agility
- Major applications involving orchestration, validation and provisioning refactored as Microservices
- Achieve true independence of teams focused on business results

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## Success with DevOps, in numbers..

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td># test cases created</td>
<td>338875</td>
</tr>
<tr>
<td># automated test cases</td>
<td>25100</td>
</tr>
<tr>
<td># support Tickets created</td>
<td>1533</td>
</tr>
<tr>
<td># confluence spaces</td>
<td>696</td>
</tr>
<tr>
<td># jira Projects</td>
<td>315</td>
</tr>
<tr>
<td># stash Projects</td>
<td>260</td>
</tr>
<tr>
<td># confluence users</td>
<td>5130</td>
</tr>
<tr>
<td># jenkins jobs</td>
<td>1900</td>
</tr>
<tr>
<td># jira users</td>
<td>6450</td>
</tr>
<tr>
<td># stash users</td>
<td>3150</td>
</tr>
<tr>
<td># Cloud onboarding queue</td>
<td>42</td>
</tr>
<tr>
<td># apps in cloud</td>
<td>5</td>
</tr>
</tbody>
</table>

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