APPLYING PRACTICAL MANUFACTURING SKILLS TO DEVOPS

Gordon Haff & William Henry
Cloud & DevOps Product Strategy
24 June 2015
DEVOPS:
THE WHAT & THE WHY
Why do DevOps?

- Increase customer satisfaction and engagement: 49%
- Increase employee productivity: 46%
- Increase company revenues: 45%
- Reduce total operational expenses: 44%
- Help our company be seen as more innovative: 43%

The Consumerization of IT sets new expectations

Frictionless
Hybrid
Programmable
A Definition

DevOps applies open source principles and practices with:

- Culture of collaboration valuing openness and transparency
- Automation of process from development through ongoing operations
- Adoption of tools drawing from innovative development communities
Key Principles of DevOps

“Organizations that are employing DevOps effectively are poised to blow their rivals completely out of the water.”

- Peer review
- Less management approval required
- Rigorous automated testing
- The ability to create entire environments on demand
- One-click deployment

These principles are a reflection of the culture shift required to successfully implement DevOps

Tony Bradley, Gene Kim Shares his thoughts on upcoming Jenkins User Conference, Jun 4, 2015. devops.com
WHAT MANUFACTURING CAN TEACH US
DevOps + Cloud = Industrialize
Principles for Success

- Understand the process
- Drive modularity
- Automate repeatable processes
- Create culture
- Continuous iteration and improvement
The Second Wave

Any customer can have a car painted any color that he wants so long as it is black.

Henry Ford
(probably apocryphal)

General Motors Fairfax Assembly Plant
Kansas City, Missouri
But All Was Not Well

US Vehicle Sales, Big 3 Market Share, 1961 to 2013

Source: WardsAuto

Mark J. Ferry
What Happened?

Taiichi Ohno, Inventor of the Toyota Production System (TPS)

W. Edward Demming, champion of statistical process control
You Can't Fix What You Can't See
Beyond Local Maxima: Reuse
“45–47% passenger cars will use one of top 20 platforms by 2015.”

Evaluserve, 2012

<table>
<thead>
<tr>
<th>OEM</th>
<th>Platform</th>
<th>Volume (in mn)</th>
<th>No. of Models</th>
<th>Sample models</th>
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<tbody>
<tr>
<td>1. VW</td>
<td>MQB</td>
<td>6.3</td>
<td>41</td>
<td>VW Golf, Passat; Audi A3</td>
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<tr>
<td>2. Toyota</td>
<td>MC</td>
<td>5.2</td>
<td>25</td>
<td>Auris, Corolla, Vibe: Scion xB</td>
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<td>3. Hyundai/Kia</td>
<td>HD</td>
<td>3.0</td>
<td>16</td>
<td>Hyundai i30; Kia Cee’d</td>
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<td>4. GM</td>
<td>Delta</td>
<td>2.5</td>
<td>19</td>
<td>Opel Astra; Chevrolet Cruze</td>
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<tr>
<td>5. PSA</td>
<td>EMP2</td>
<td>2.3</td>
<td>24</td>
<td>Peugeot 308; Citroen C4, DS4</td>
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<tr>
<td>6. Renault/Nissan</td>
<td>B</td>
<td>2.2</td>
<td>10</td>
<td>Renault Clio; Nissan Cube, Juke, Leaf</td>
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<tr>
<td>7. Ford</td>
<td>C1</td>
<td>2.2</td>
<td>18</td>
<td>Focus, C-Max, Kuga</td>
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<td>8. Hyundai/Kia</td>
<td>PB</td>
<td>1.9</td>
<td>18</td>
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<td>9. Renault/Nissan</td>
<td>CMF1</td>
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<td>10. Ford</td>
<td>B2E</td>
<td>1.8</td>
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<td>29.4</td>
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<td></td>
</tr>
</tbody>
</table>

Source: IHS Automotive, AlixPartners analysis
Automate (Many of) the Things

Shaded areas indicate US recessions - 2014 research.stouisfed.org
Creating Culture

Toyota Way has been driven so deeply into the psyche of employees at all levels that it has morphed from a strategy into an important element of the company’s culture.
改善
APPLYING THESE LESSONS TO SOFTWARE
The Road to DevOps: Three Converging Paths

- **DEVELOPERS**
  - Increase developer productivity and release agility for ops

- **PLATFORM SURFACE AS CODE**
  - Increase platform infrastructure automatability

- **OPERATIONS**
  - Increase ops agility and feedback for developers
Desirable Enterprise DevOps Process
CI/CD Pipeline Toolset

Tools: Red Hat CloudForms, Satellite, Gerrit, Trello, A, Puppet, JIRA, Etherpad, CI/CD Workflow UI.
Why Containers for DevOps?

- Aligned with lightweight services
- Defined as composable layers
- Resource-efficient
Use DevOps To Create Cloud-Native Apps

- Monolithic app container
- Scale up by adding hardware resources
- Limited scale out through clustering

- Distributed, networked, containerized services
- Scale out by orchestrating services
  - Faster iteration and release
  - More robust
DevOps Workflow

- **OPS**
  - Create containerized IaaS or PaaS development environment

- **DEV**
  - Provision environment locally or at OpenShift by Red Hat
  - Write app as containerized microservices cluster and commit changes
  - Push changes through CICD and automated testing system to containerized staging

- **DEVOPS**
  - Scheduler orchestrates and deploys app
  - Monitor and operate app
A Cloud Platform for Microservice Cloud Apps

- Provision apps from service catalog
- Orchestrate and place apps
- Run composed microservices in containers
- Provide dynamic, programmable infrastructure

- OPS MANAGEMENT AND SERVICE CATALOG (RED HAT CLOUDFORMS)
- CONTENT, ENTITLEMENT, AND LIFECYCLE (RED HAT SATELLITE)

- SERVICE SCHEDULER/ORCHESTRATOR (KUBERNETES)

- RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM
  COMPUTE STORAGE NETWORK
  (RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM, RED HAT STORAGE, OPEN DAYLIGHT)
DevOps Spans Infrastructure Types

- **OPS MANAGEMENT AND SERVICE CATALOG** (RED HAT CLOUDFORMS)
- **CONTENT, ENTITLEMENT, AND LIFECYCLE** (RED HAT SATELLITE)

**SERVICE SCHEDULER/ORCHESTRATOR** (KUBERNETES,)

- Red Hat CloudForms Orchestration Docker Image
- Red Hat Satellite Content Docker Image
- Red Hat JBoss AMQ Docker Image
- App DB Docker Image
- Red Hat JBoss BRMS Docker Image
- Apache HTTPD Docker Image

**AMAZON SCHEDULER**

- Apache HTTPD Docker Image
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**RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM** (RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM, RED HAT STORAGE, OPEN DAYLIGHT)

- Compute Storage Network
- Private Cloud

**RED HAT ENTERPRISE LINUX ATOMIC HOST**

- Physical

**RED HAT ENTERPRISE VIRTUALIZATION/VSphere**

- Virtual

**AMAZON WEB SERVICES**

- Public Cloud

#redhat #rhsummit
DevOps Spans Modes of IT

MODERNIZE
- Waterfall development
- Strong governance
- Slow change
- Technology teams
- Emphasize safety and efficiency

CLASSIC I.T.

OPEN HYBRID CLOUD

BUILD
- DevOps
- Managed risk
- Rapid iterative change
- Multi disciplinary teams
- Emphasize agility and speed

CLOUD-NATIVE I.T.
Some Other DevOps Sessions

- Bootstrapping a DevOps movement in Red Hat IT (Wednesday @ 4:50)
- Accelerate DevOps with OpenShift Platform-as-a-Service (Thursday @ 10:40)
- Continuous delivery, with a side order of DevOps (Thursday @ 1:20)
- So you want to be a DevOps Engineer? (Thursday @ 4:50)
SUMMIT BY DAY
PARTY BY NIGHT

JOIN OUR JBOSS, OPENSHEIF, AND MOBILE TEAMS FOR A NIGHT OF GAMES, DANCING, AND OPEN CONTAINERS

Visit the Red Hat booth in Hall D for location and invitation.
LEARN. NETWORK. EXPERIENCE OPEN SOURCE.