ATARC Federal DevOps Summit

DevOps Transformation: Critical Success Factors

Pamela K. Isom
Director, Application Engineering and Development Office, Chief Information Officer
United States Patent and Trademark Office

28 June 2017
AGENDA

- Update: USPTO DevOps Journey
- DevOps Transformation: 3 Success Categories
- 10 Critical Success Factors
- Summary
- Acknowledgements
- Q&A
Update: USPTO DevOps Journey

1980-1990

Automated Information Systems
- Wouldn’t Scale Easily
- Lack of High Availability or Redundancy
- Platform/OS/Hardware Dependent
- Numerous Single Points of Failure
- Waterfall

Late 90’s/2000’s

Service Oriented Architecture
- Virtual Environments
- Dynamically Scalable
- High Availability
- Redundancy across Data Centers
- No Single Points of Failure
- User Centered Design
- Agile and Extreme Development

Top Benefits
1. Rapid Feature Delivery
2. Reduced Costs
3. Increased Quality
4. Improved Predictability

1990-2000

Technology Shifted
- Configuration Management
- Continuous Build & Release
- Automated Testing
- Shift to Commodity HW
- Spiral Development

Where are We?
- 82.3% Virtualized
- Agile Scrum
- Virtual Management
- Dynamic Scaling
- Refining 24x7x365 Ops
- Automated Builds
- Automated Testing
- Starting Blue/Green Deployments

2000-2005

Cloud Layer Model

2009 – DevOps Introduced

2017

DevOps!
DevOps Transformation
Three (3) Success Categories

- Strategy
- Technology
- Execution
Strategy

DevOps requires a well thought out and meaningful strategy

- Critical Success Factor (CSF) #1, **Strategic Playbook:**
  - Establish achievable **goals**, iterative **accomplishments**.
  - Deliver business solutions **that matter** (positive ROI).
  - Normalize **Faster Quality** Outcomes.
  - Apply **continuous** principles.
  - Exercise **One team** ownership.
  - Eliminate **Waste**.
CSF #2, **Collaboration:**
- We cannot perform in isolation
- Communicate and team across agencies, business units and offices
Examples:
  - Formation of the **DevOps Council**; cohesive DevOps activities

CSF #3, **Culture:**
- Know and Recognize talents, grow capabilities, erase fear
Examples:
  - Acknowledge achievements and grow together
  - Sharpen **systems integrator** roles/responsibilities/governance
  - Increase government (in house) development
  - Improve vendor accountability
Technology

- CSF #4, Selective Technologies:
  - Choose technologies based on use case(s)

Multi-cluster Open Source analytics platform for ingesting data from any source along with the tools and capacity to support public and private analytics and data delivery to users

Deliver more supporting capabilities

SCDAD PLATFORM
CSF #5, **Automation treated like Software Engineering:**
- Write Once – Use everywhere
  Examples: Use Common Library and Features to build scenarios to test workflows; Leverage and contribute to “Open Source”.
- Improve quality, reduce errors via Automated Tests and Rapid releases
  Examples: Quality Code Coverage, Canary Pipeline (+ measurements)

CSF #6, **Sound Architectural Decisions:**
- Apply Configuration and Infrastructure as Code
- Integrate Data Science (see next slide)
- Enterprise Architecture Alignment
Examples: Containers, Web Tracking/Instrumentation data, Configuration Management
Data Science & DevOps

- In what ways can we apply data science to improve Patent, Trademark and/or OCIO Quality?
  - Make meaningful, measurable decisions (data driven)
  - Detect anomalies (inconsistencies) in work products
  - Measure training impacts
  - Identify and prevent problems before they become systemic - sleep on through the night
  - Data driven requirements – based on software usage; are these requirements meaningful to the business?

Issue high quality patents, hard to fix after issued – let’s get it right the first time.
**Execution**

- **CSF #7, Performance measures:**
  - Balance measures of features, velocity, and technical debt to effectively track performance
  - Proactively monitor progress/impacts towards viable product

<table>
<thead>
<tr>
<th>ID</th>
<th>Points Preliminary</th>
<th>Points Current</th>
<th>Accepted Points %</th>
</tr>
</thead>
<tbody>
<tr>
<td>FE4698</td>
<td>n/a</td>
<td>8</td>
<td>100%</td>
</tr>
<tr>
<td>FE4712</td>
<td>50</td>
<td>80</td>
<td>80%</td>
</tr>
<tr>
<td>FE4636</td>
<td>220</td>
<td>69</td>
<td>100%</td>
</tr>
<tr>
<td>FE4573</td>
<td>50</td>
<td>47</td>
<td>100%</td>
</tr>
<tr>
<td>FE4731</td>
<td>50</td>
<td>30</td>
<td>100%</td>
</tr>
<tr>
<td>FE4733</td>
<td>50</td>
<td>26</td>
<td>100%</td>
</tr>
<tr>
<td>FE4732</td>
<td>50</td>
<td>82</td>
<td>85%</td>
</tr>
<tr>
<td>FE4705</td>
<td>20</td>
<td>26</td>
<td>100%</td>
</tr>
<tr>
<td>FE4723</td>
<td>150</td>
<td>150</td>
<td>100%</td>
</tr>
<tr>
<td>FE4711</td>
<td>20</td>
<td>26</td>
<td>90%</td>
</tr>
</tbody>
</table>

**Graph:**
- Blue bars: Planned
- Red bars: Committed
- Green bars: Accepted
- **CSF #8, Business Value Logging:**

  Logs show “human readable” messages to confirm verification, validation and traceability.

  a) *Verification* – Proves the existence of a button and its selection

  b) *Validation* - Proves that selecting the button produces the correct results

  c) *Traceability* = quicker root cause problem resolution

  *Instrumentation, everyone benefits!*
CSF #9, **Security Now:**
- Address Security in planning cycles and in sprints
- Don’t wait, do it now.

CSF #10, **Continuous Principles:**

<table>
<thead>
<tr>
<th>In a DevOps environment, these activities are ongoing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning</td>
<td>Process improvements</td>
</tr>
<tr>
<td>Development</td>
<td>Delivery</td>
</tr>
<tr>
<td>Integration</td>
<td>Deployment</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Growth</td>
</tr>
</tbody>
</table>
Continuous Monitoring - Example

Blue/Green Environments are essential to DevOps

Seamless Deployments

Reduced Downtimes
Summary
Three (3) Success Categories
Ten (10) Critical Success Factors

Effectively Transforming your DevOps Organization
“DevOps is more than a slogan or rallying cry at USPTO, its our passion and way of life”.

Special thanks and recognition to some contributing team members who enable our DevOps delivery each and every day:

Ordered by last name
Tom Beach, Ted Green, Kisha Harvey, David Henderson, Ramesh Pai, Gardy Rosius, Bob Simms, Kirsten O’Nell, Calvin Wallace, Scott Williams, Joe Wolf, Jayu Wu
Q&A