BEYOND DEVOPS
Finding Value through Requirements

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REALISM
The message

DevOps enables fast delivery of features.

RE community can enable fast delivery of value.
VALUE

“the importance, worth, or usefulness of something”

“a person’s principle or standards of behaviour”
VALUE

“the importance, worth, or usefulness of something”

“a person’s principle or standards of behaviour”
PART 1

DevOps Today
"A rosetta stone for DevOps"

- G. Hutch, Amazon customer review

**THE THREE WAYS**

Flow
Feedback
Continual learning and experimentation
BETTER QUALITY THROUGH TEST AUTOMATION

FASTER RESPONSE FOR BUG FIXES

HIGHER VELOCITY OF DELIVERY

What companies say about DevOps...

https://dzone.com/articles/real-world-problems-solved-by-devops
Icon credit: https://www.flaticon.com/authors/gregor-cresnar
https://www.flaticon.com/authors/smashicons
https://www.flaticon.com/authors/freepik
Benefits “of DevOps go beyond financial results”

KEY FINDINGS

Faster throughput and better stability

DevOps applies to all organizations

Automation is a huge boon

https://puppet.com/resources/whitepaper/state-of-devops-report
### Table 2: 2017 IT performance by cluster

<table>
<thead>
<tr>
<th>Survey questions</th>
<th>High IT performers</th>
<th>Medium IT performers</th>
<th>Low IT performers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deployment frequency</strong></td>
<td>On demand (multiple deploys per day)</td>
<td>Between once per week and once per month</td>
<td>Between once per week and once per month*</td>
</tr>
<tr>
<td>For the primary application or service you work on, how often does your organization deploy code?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lead time for changes</strong></td>
<td>Less than one hour</td>
<td>Between one week and one month</td>
<td>Between one week and one month*</td>
</tr>
<tr>
<td>For the primary application or service you work on, what is your lead time for changes (i.e., how long does it take to go from code commit to code successfully running in production)?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Mean time to recover (MTTR)</strong></td>
<td>Less than one hour</td>
<td>Less than one day</td>
<td>Between one day and one week</td>
</tr>
<tr>
<td>For the primary application or service you work on, how long does it generally take to restore service when a service incident occurs (e.g., unplanned outage, service impairment)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Change failure rate</strong></td>
<td>0-15%</td>
<td>0-15%</td>
<td>31-45%</td>
</tr>
<tr>
<td>For the primary application or service you work on, what percentage of changes results either in degraded service or subsequently requires remediation (e.g., leads to service impairment, service outage, requires a hotfix, rollback, fix forward, patch)?</td>
<td></td>
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</table>
How we deploy 300 times a day
Zack Bloom, HubSpot

Small teams and projects
Libraries
Automated Builds
Versioning

Black box deploys
Gates
Notifications
Testing
Pull Requests

Integrations
Configuration
Metrics
Processes

https://product.hubspot.com/blog/how-we-deploy-300-times-a-day
Nov 18, 2013
EMPHASIS IS ON BACK END

| SPEC | CODE | BUILD | TEST | DEPLOY |

| Continuous Integration | Continuous Delivery |

| Time from check-in to deployment |
“Lean product management practices help teams ship features that customers actually want, more frequently. This faster delivery cycle lets teams experiment, creating a feedback loop with customers.”

— State of DevOps Report 2017
“Lean product management practices help teams ship features that customers actually want, more frequently. This faster delivery cycle lets teams experiment, creating a feedback loop with customers.”

— State of DevOps Report
PART 2

Value Streams
Value Stream Maps

Lean management method to optimize taking a product or service from beginning through to the customer

Value Stream Maps in SE

Lean Software Development
An Agile Toolkit

Poppendieck & Poppendieck
Value Stream Maps in SE

- Need to capture information flow
- Need to connect real data
- Need to analyze and visualize

FLOW-assisted value stream mapping in the early phases of software development
Nauman Bin Ali, Kai Petersen, Kurt Schneider

FLOW-assisted value stream mapping in the early phases of software development, JSS, 2016
surviving the “Turning Point of the Age of Software”

FLOW FRAMEWORK

Focus on end-to-end software value stream flows to enable correlation to business outcomes

Available Nov 2018
Flow Framework

End-to-end metrics & business outcomes

Product Model

Activity Model

Integration Model
A flow item is “a unit of business value pulled by a stakeholder in the software delivery process.”
Products may be customer-facing, APIs, etc.

Actions by people and tools change artifacts
Integration between tools enables the tracking of activities and links to flow items.
toolchains are often heterogeneous

BUT...
Multiple different ways to record and manage requirements

How do the requirements relate to units of value?
PART 3

The Gap
Three Examples

- Moodle
- Kubernetes
- Firefox
KUBERNETES

Open source system for automating deployment, scaling and management of containerized applications

68,000 commits
33 branches
415 releases

1,760 contributors
2,200 open issues
188 labels in use

kind of item (e.g., feature, bug, api)

priority

area of system

...
188 labels in use

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KUBERNETES

v1.12
No due date  49% complete

35 Open  34 Closed

#67223 Synchronous & unbatched audit log writes ×
release-note-none  sig/auth  size/L
#67223 opened 3 days ago by talclair

#61932 Fix batching log audit backend
area/audit  kind/bug  priority/important-soon  sig/auth
#61932 opened on Mar 30 by crazirostris

#65266 Advanced Auditing 1.12 umbrella bug
area/audit  kind/feature  priority/important-long
status/approved-for-milestone
#65266 opened on Jun 20 by x13n

#62692 authn: extend authenticator.Token to support audience validation ×
kind/api-change  kind/feature  priority/important-soon  release-note-none  sig/auth
status/approved-for-milestone
#62692 opened on Apr 16 by mikedanese

#61656 svcacct: pass pod information in user.Info.Extra() when available ×
kind/api-change  release-note  sig/auth  size/L
status/approved-for-milestone
#61656 opened on Mar 28 by mikedanese

#67049 [hold] Runtimeclass API ×
donot-merge/hold  kind/api-change  kind/node
priority/important-soon  release-note  sig/node  size/XXL
#67049 opened 6 days ago by talclair

#50102 Task 1: Move apimachinery/pkg/watch.Until into client-go/tools/watch.UntilWithoutRetry ×
do-not-merge/hold  kind/bug  milestone/needs-appro
priority/important-soon  release-note-none  sig/api-machinery  sig/cli  size/L
#50102 opened 10 days ago by trozicka
188 labels in use

kind of item (e.g., feature, bug, api)

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area of system

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188 labels in use

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**KUBERNETES**

v1.12

No due date 49% complete

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188 labels in use
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<tr>
<td>Version (Closed issues)</td>
<td>v1.8 (1,059)</td>
<td>v1.9 (616)</td>
<td>v1.10 (606)</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------</td>
<td>------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>bug</td>
<td>118</td>
<td>41</td>
<td>104</td>
<td></td>
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<tr>
<td>feature</td>
<td>24</td>
<td>6</td>
<td>17</td>
<td></td>
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<tr>
<td>technical debt</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>area/security</td>
<td>6</td>
<td>6</td>
<td>3</td>
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</tr>
<tr>
<td>Feature Designation</td>
<td>Challenges</td>
<td></td>
<td></td>
<td></td>
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<td>---------------------</td>
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MOODLE

Open source learning platform

90,002 commits
24 branches
303 releases

447 contributors
8,990 open issues
MOODLE

134 open epics
1095 open features

no clear links between epics and features

multiple mechanisms to choose work, including user association makes proposals and votes on priority
<table>
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**THE GAP**

- **KUBERNETES**
- **MOODLE**
THIRD EXAMPLE

FIREFOX

Open source web browser that needs no introduction

It’s big
choose experiments you want to help test

e.g., Snooze Tabs

58,000 users; 400K sessions
<table>
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<td><strong>FIREFOX</strong></td>
<td>(Testpilot) Unclear how relates to feature tracking</td>
<td>Multiple approaches; Value implicit and inconsistent</td>
</tr>
</tbody>
</table>
THE GAP

We lack:

consistency in “feature”
ability to track features

or risk or defect or debt...
PART 4

RE Connection
“Much of current software engineering practice and research is done in a value-neutral setting, in which every requirement, use case, object, and defect is treated as equally important”
these are not new ideas

2009 17th IEEE International Requirements Engineering Conference

From Feature Development to Customer Value Creation

Marjo Kauppinen¹, Juha Savolainen², Laura Lehtola¹, Marko Komssi¹, Harri Töhönen¹, Al Davis³
Helsinki University of Technology¹, Nokia¹, University of Colorado at Colorado Springs³
{marjo.kauppinen; laura.lehtola; marko.komssi; harri.tohonen}@tkk.fi,
juha.e.savolainen@nokia.com, adavis@uccs.edu

“Key Finding 1: Product features are seen as the core of value creation.”

“Focusing on features and launching them as fast as possible can cause problems from the perspective of customer value.”
these are not new ideas

REFSQ 2016

Customer Involvement in Continuous Deployment: A Systematic Literature Review

Sezin Gizem Yaman¹, Tanja Sauvola², Leah Riungu-Kalliosaari¹, Laura Hokkanen³, Pasi Kuvaja², Markku Oivo², and Tomi Männistö¹

“the life cycle of customer data—collection, analysis and return to the customer if needed—poses a number of difficulties”
RE needs to play a crucial role
EMPHASIS IS ON BACK END

<table>
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<th>SPEC</th>
<th>CODE</th>
<th>BUILD</th>
<th>TEST</th>
<th>DEPLOY</th>
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| Continuous Integration | | Continuous Delivery | | Time from check-in to deployment |
EMPHASIS NEEDS TO BE ON VALUE FLOW

SPEC  CODE  BUILD  TEST  DEPLOY
EMPHASIS NEEDS TO BE ON VALUE FLOW

SPEC → CODE → BUILD → TEST → DEPLOY

customer & organization value
EMPHASIS NEEDS TO BE ON VALUE FLOW

features tech debt risks defects

SPEC CODE BUILD TEST DEPLOY
customer & organization value
EMPHASIS NEEDS TO BE ON VALUE FLOW

- features
- tech debt
- risks
- defects

SPEC → CODE → BUILD → TEST → DEPLOY

→ customer & organization value
EMPHASIS NEEDS TO BE ON VALUE FLOW

features    tech debt    risks    defects
SPEC        CODE        BUILD      TEST      DEPLOY

customer & organization value
EMPHASIS NEEDS TO BE ON VALUE FLOW

Needed...
EMPHASIS NEEDS TO BE ON VALUE FLOW

Needed...

- Automatically identify work categories
- Ability to track work through development
- Connect work to value (telemetry, focus groups, etc)
- Predict/negotiate value
- Predict/connect value to effort
What if we could...

validate that these are all features
(semi-)automatically assign them a representation of value
assess whether value is delivered by tracking usage
periodically re-assess if value continues or delete feature

Add statistical functionality to datasets for calculated and calculated simple question types

New element type smart select
EMPHASIS NEEDS TO BE ON VALUE FLOW

- features
- tech debt
- risks
- defects

SPEC → CODE → BUILD → TEST → DEPLOY

RE is key to identifying, linking and tracking features to customer value

or risk or defect or debt

customer & organization value
THANKS TO...

Mik Kersten and the great minds at Tasktop

awesome grad students

organizers of RE 2018
DevOps enables fast delivery of FEATURES

RE community can enable fast delivery of VALUE
DevOps enables fast delivery of FEATURES

There is work to do....

Connecting features to value
Predicting and negotiating value
Tracking value delivery
Reassessing delivered value

RE community can enable fast delivery of VALUE

BEYOND DEVOPS:
Finding Value in Requirements

@gail_murphy