When the Database Hits the Fan: Our Transformation into DevOps During Disaster Recovery
“The world was filled with danger . . .

all of these **forces** working very, very hard to kill us. Nothing personal.

Whether it was the weather, lack of resources, maybe a **saber-toothed tiger** . . .

so we **evolved** into social animals, where we lived together and worked together in what I call a **circle of safety**, inside the **tribe** . . . when we felt safe amongst our own,

the natural reaction was trust and cooperation. ”

*Sinek, “Why Good Leaders Make You Feel Safe,” TED2014*
“The world was filled with danger . . .

all of these **technologies** working very, very hard to kill us. Nothing personal. Whether it was the weather, lack of resources, maybe a **corrupted snapshot** . . .

so we **transformed** into social animals, where we lived together and worked together in what I call a **circle of safety**, inside the **tribe** . . . when we felt safe amongst our own,

**the natural reaction was DevOps.**”

*Adapted from Sinek, “Why Good Leaders Make You Feel Safe,” TED2014*
Agenda

• Who we are
• What we do
• What happened
• How we responded
• What we learned
• What do you think

Takeaways

1. Model of behavioral patterns in DevOps
2. Techniques for influencing these patterns
“A cultural movement... that changes how individuals think about their work, values the diversity of work done, supports intentional processes that accelerate the rate by which businesses realize value . . .

a way of thinking and a way of doing”

(Davis & Daniels, Effective DevOps: Building a Culture of Collaboration, Affinity, and Tooling at Scale, 2016)
Distinctive collections
Psalterium Sancti Ruperti: Salzburg, Stiftsbibliothek St. Peter, Codex a I 0 (ca. 850-875)

Robert Barker, the King’s Printer, in 1611, the King James Version The Holy Bible, Conteyning the Old Testament, and the New: Newly Translated out of the Originall Tongues

a 14th century tax roll dated 4 January 1352
Distinctive collections
Digital vault

Granite Mountain Records Vault
Little Cottonwood Canyon, Utah

### Digital collections

#### Opening of the Hogan's Alley Athletic Club
- **Title:** Opening of the Hogan's Alley Athletic Club
- **Creator:** Orcutt, Richard F., 1853-1920
- **Identifier:** <_1613>
- **Date Created:** 1936-05-27

#### Opening Of The Boating Season As McDougall Sees It
- **Title:** Opening Of The Boating Season As McDougall Sees It
- **Creator:** McDougall, Weller, 1839-1938
- **Identifier:** <_5297>
- **Date Created:** 1904-05-22
### Poverty

**Handle:** 1811/e523dd7e-5486-4b9f-986e-eaf8638f0f38  
**Type:** Image  
**Creator:** Walker, Alanson Burton, 1878-1947  
**Notes:** Date in pencil on verso. Gift of Keith and Mary Louise Walker.  
**Published in:** Harper's Weekly  
**Rights:** The Ohio State University Libraries believes this object is in the Public Domain, users are responsible for making a final determination of copyright status before reproducing.  
**Date:** 1909-07-21  
**Subject:** Love, Marriage, Marital conflict  

**Identifier:** d_10314  
**Genre:** magazine cartoon  
**Time period:** 1900s (1900-1909)  
**Format:** original art  
**Call number:** IMCA 77 33  
**Sub-Collection:** International Museum of Cartoon Art Collection  
**Preservation level ratio:** Provisional Master  
**Preservation level:** Full  
**Measurements:** 34 cm height, 49 cm width, 34 cm height, 49 cm width  
**Materials:** Paper, Ink, paper, ink
## Opening Of The Boating Season As McDougall Sees It

### Descriptions

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Credit line: San Francisco Academy of Comic Art Collection, The Ohio State University Billy Ireland Cartoon Library & Museum

### File Details

### User Activity
Regardless of what we discover, we must understand and truly believe that 

**everyone did the best job he or she could**

given what was known at the time, his or her skills and abilities, the resources available, and the situation at hand.

Kerth's Prime Directive, 2001
What happened
## What happened

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>Jan 19</td>
<td>IMS not responding</td>
</tr>
<tr>
<td>Jan 20</td>
<td>Inconsistent data, restart so db repairs itself, it doesn’t</td>
</tr>
<tr>
<td>Jan 22</td>
<td>Last good snapshot Dec 23, restore system to read only</td>
</tr>
<tr>
<td>Jan 22-26</td>
<td>Attempt to repair db</td>
</tr>
<tr>
<td>Jan 26</td>
<td>Decide to shift to recovery</td>
</tr>
<tr>
<td>Jan 27-Feb 9</td>
<td>“Replay” transactions from logs</td>
</tr>
<tr>
<td>Feb 10</td>
<td>Failed reindex, can’t “see” objects</td>
</tr>
<tr>
<td>Feb 10-19</td>
<td>Manually traverse objects to update index</td>
</tr>
<tr>
<td>Feb 19</td>
<td>System ready for data entry</td>
</tr>
</tbody>
</table>
tl;dr

• Customer reported errors
• Discovered errors in the logs
• Database wouldn’t repair itself
• Snapshots were bad
• Replayed transactions from logs
Why it happened

**Trigger**: network maintenance Dec 24

**Root cause**: system not robust enough to recover from disconnect to storage
Blameless retrospective

Project
- Developer turnover, inexperience with repository stack
- Biggest Agile project so far, organization not so agile
- Some disconnect from end users

Process
- Deployments not always coordinated
- Incomplete monitoring
- Standups without sysadmins
- Ticket triage
But we get along great...

Can you do well at **collaborating** across teams
and **not** be DevOps?

Can you adopt the DevOps **toolset**
and **not** be DevOps?
<p>| | |</p>
<table>
<thead>
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| @ | I want to put ~15Gb on 1php, is that a concern?  
|   | more like ~17Gb |
| Sure | Lemme add the disk space |
| Thanks T | |
| @ | done |
| thanks 😊 |
Request fulfillment

New ImageServer VM

Details
- Type: Service Request
- Priority: Critical
- Component/s: None
- Labels: None

Description
New VM for Loris image server on the 3 stack.
They have instructions for Ubuntu and Centos/Redhat
https://github.com/loris-imageserver/loris
Behavioral patterns

**Request Fulfillment**
Service as transaction

**Knowledge Exchange**
Service with cross-training

**Promiscuous Pairing**
Collaboration as needed

**Shared Ownership**
We’re all in this together
This looks to be why /var/log is filling

Any idea why logs stopped rotating?

the nginx process is holding old logs open, from more than a month ago, so logrotate can't get a lock to move 'em around
don't know why nginx is holding on to them, sentimentality?
I'll check the configuration flags 😊

cool
Knowledge exchange

DEVOPS-61: increase apache timeout for loris server

Type: 🌐  Service Request  Priority: ☠  Blocker  Status: AWAITING INFORMATION  Assignee: 

@user can this change wait until Thursday or is the lack of the setting change causing a production system outage?
Description

We are going to put Resque workers on separate vms.

So, I'll need some VMs spun up.

Thanks.

Are these production VMs?
How many?
Ruby on Rails?
What kind of resources are needed:
  - memory
  - cpu
  - disk space

NFS access?
Firewall access to and from other VMs?
Promiscuous pairing

Image: flickr.com/photos/damienpollet/5048830734
Shared ownership

- Daily DevOps standups
- Commitment to continuous improvement plan
- Alerting and monitoring
Shared ownership
What to why

Request Fulfillment
Service as transaction

Knowledge Exchange
Service with cross-training

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Shared Ownership
We’re all in this together
What to why

Really good at **WHAT**

Pretty good at **HOW**

Then something bad happened

Didn’t know **WHY** we were doing what we were doing?

*Image: Sinek, Start With Why: How Great Leaders Inspire Everyone to Take Action, 2011*
What to why

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WHAT

[ Informal . . . Formal ]

WHY
Building DevOps culture

Provide clarity of purpose

“When a **WHY** is clear those who share that belief will be drawn to it and maybe want to take part in bringing it to life.”

*Sinek, Start With Why: How Great Leaders Inspire Everyone to Take Action, 2011*
WHAT

Request Fulfillment
Service as transaction

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We’re all in this together

WHY
Sustaining DevOps culture

- Fire drills: disaster simulations
- Encourage face to face communication
- Include sysadmins in daily standups
- Pair more often
- Include sysadmins in sprint planning and review meetings
- Maintain positive relationships with peers in IT
- Share responsibility for monitoring systems
- Solve problems together
- Connect team performance to customer satisfaction
- Reinforce long term program and project objectives

- Your ideas?
Acknowledgments

Digital Collections Project Team @ OSU Libraries

- [library.osu.edu/ims](http://library.osu.edu/ims)
- Information Technology Division
- Special Collections Description & Access
- Billy Ireland Cartoon Library & Museum
- Byrd Polar and Climate Research Center Archival Program

Contact Information

- snapp.6@osu.edu

Special Thanks

- Ousmane Kebe
References & Resources

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Walls, Building a DevOps Culture, O'Reilly Media, 2013