

Leading from Incidents

Nora Jones
LeadDev NY 2023

Don't be better alone. Bring others with you.

VentureBeat Events GamesBeat Data Pipeline Low-Code/No-Code Summit

How Jeli is improving incident response by exploring failure



12:32

Human Factors & System Safety
FACULTY OF ENGINEERING, LTH

MSc Programme | Learning Laboratories | FAQ | Lund | Staff | Videos

Learning Laboratories

For those who do not have the resources or time to participate in a full Master's Program, we organise shorter Learning Laboratories for professionals and practitioners who want to expand their knowledge and practical skills for the safety challenges of the twenty-first century.

O'REILLY

Chaos Engineer

System Resiliency in Practice

Casey Rosenthal & Nora Jones

Learning from Incidents in Software

Incidents are costly. Without spending time analyzing and determining the conditions that exist in order for an incident to take place, we won't learn how to successfully remove nor recover from these conditions in the future. Let's help each other learn.

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Who participated in the most opportunities while not on-call?

24 opportunities in the last 3 months



Lyra Halden
Software Engineer
Hired 1 year ago
80% opportunity participation

Workday vs. off-hours



Working hours are considered 9 AM - 5 PM.

On-call vs. off-call



Participation in opportunities on-call vs. off-call.

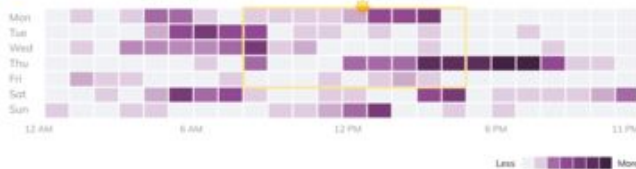
Distribution of opportunities

Filter by services

Filter by technologies

billing x kafka x submetrics x Last 6 months v

65% of opportunities started during work hours (Sun icon) | 35% of opportunities started outside of work hours (Moon icon)



We're all here because:

- The industry is changing. We've been through a lot in the last 3 years.
- There's more to learn from the incidents we have.
- You're here to share and learn and collaborate about the better ways.
- Everyone is trying to do more with less right now.

Learning from incidents...

- Learning from incidents asks not why it happened, but:
“Why did it make sense for us to do it this way?”

Learning from incidents...

- So I'm going to ask that of the industry...
“Why did it make sense for us to do it this way?”
So that we can be better, in 2023 and beyond.

Part 1. How we got here

Part 2. A tale of two incident investigations

Part 3. What's next

Part 1 - How we got here

Let's talk about why learning from incidents
is important.

The genesis of expertise amongst individuals

In the beginning of a company...



Person A



Person D



Person B



Person C



Person A

"I'd like to use
\$NEW_TECHNOLOGY to make
this project go faster. It will set us
up for success in the long run"



Person D



Person B



Person C



Person A



Person D



Person B

"Ok. If it gets us there faster and more reliably let's do it."



Person C



Person A



Person D



Person B



Person C

"Is it easy to use? I'm not familiar with it."



Person A

"I'll teach you all. It's fairly straightforward"



Person D



Person B



Person C



Pe



Person D



Person B



Person C



Person A



Person D



Person B

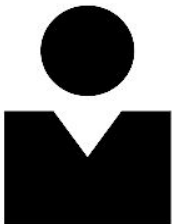


Person C



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Person D



Person B



Person C



Person A

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Person D



Person B



Person C

Months pass...

The feature that \$NEW_TECHNOLOGY was used for was a big hit (yay!) and generated a lot of demand for the product. Which means...

\$NEW_TECHNOLOGY



Person A



Person D



Person B



Person C



\$NEW_TECHNOLOGY



Person A



Person D



Person B



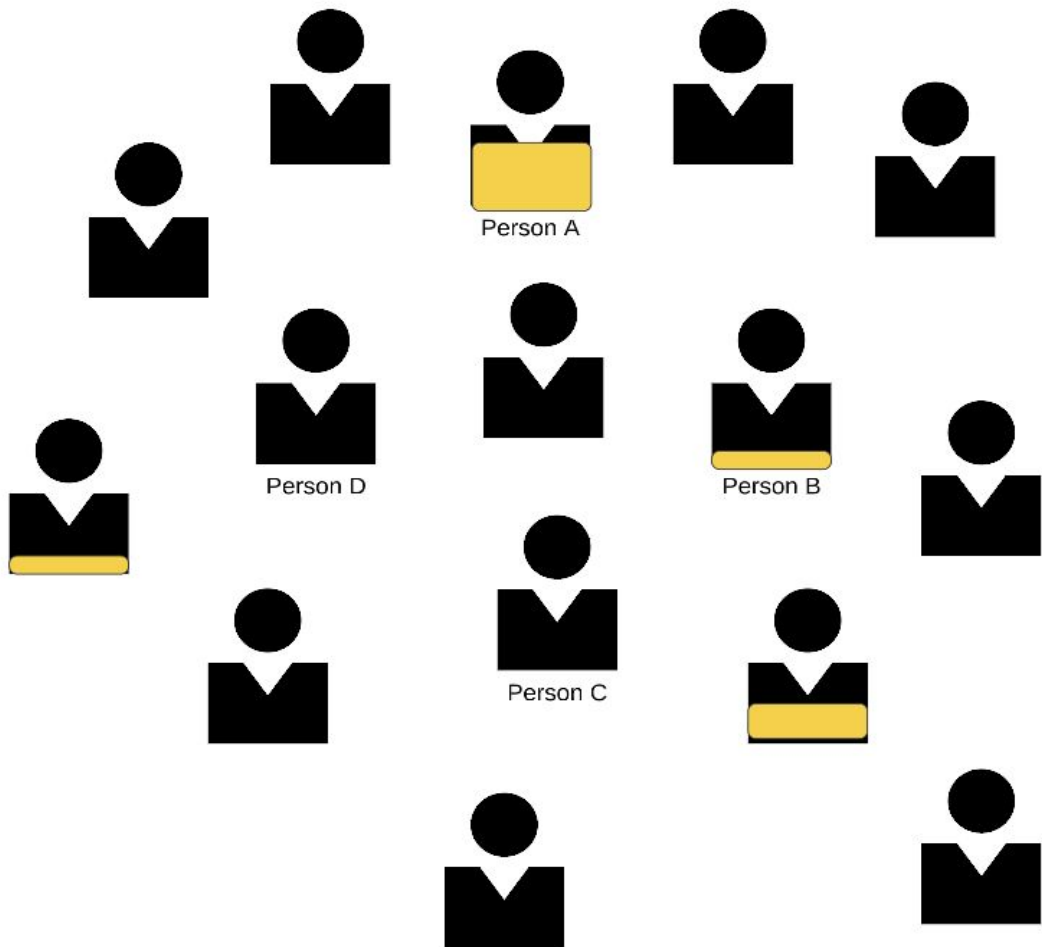
Person C



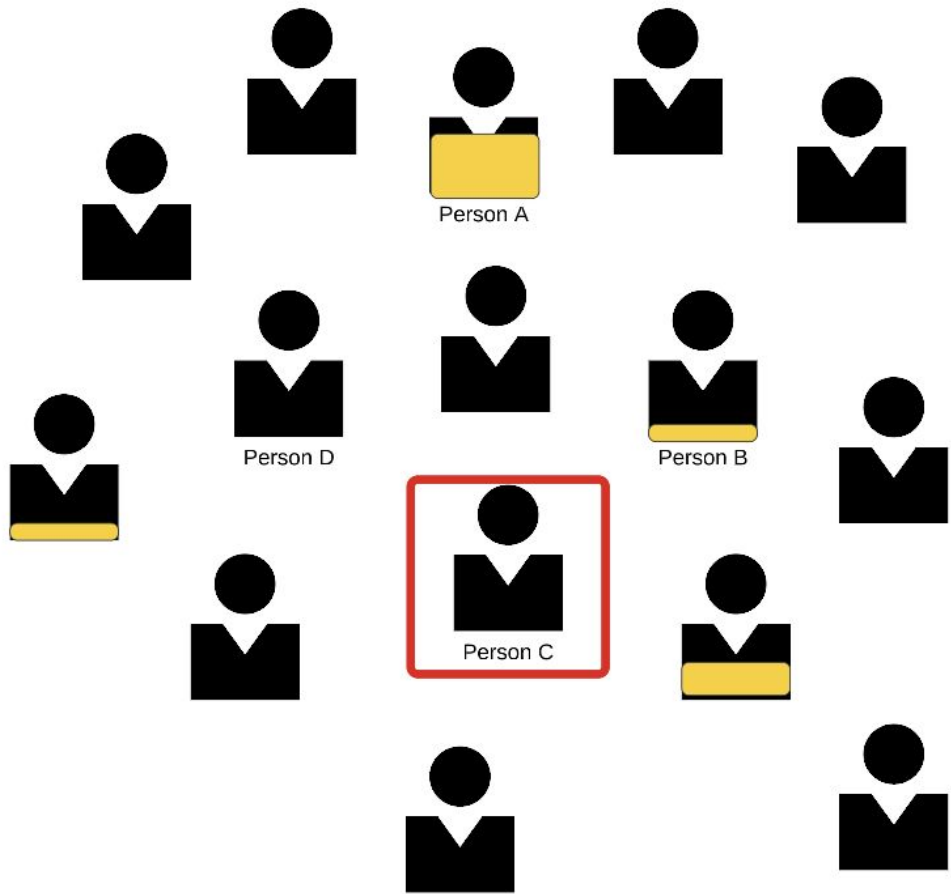
Woods' Theorem:

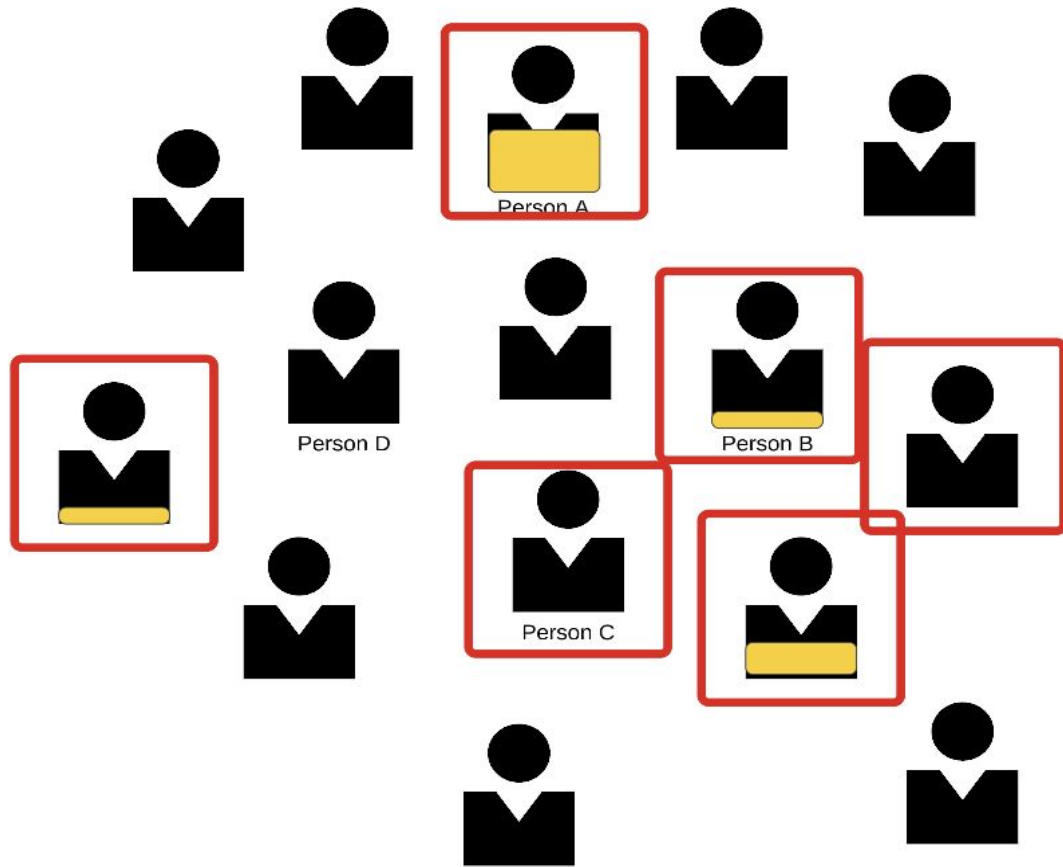
“As the complexity of a system increases, the accuracy of any single agent's own model of that system decreases rapidly.”

*-SNAFU Catchers Cycle 1 report
(stella.report)*



INCIDENT OCCURS



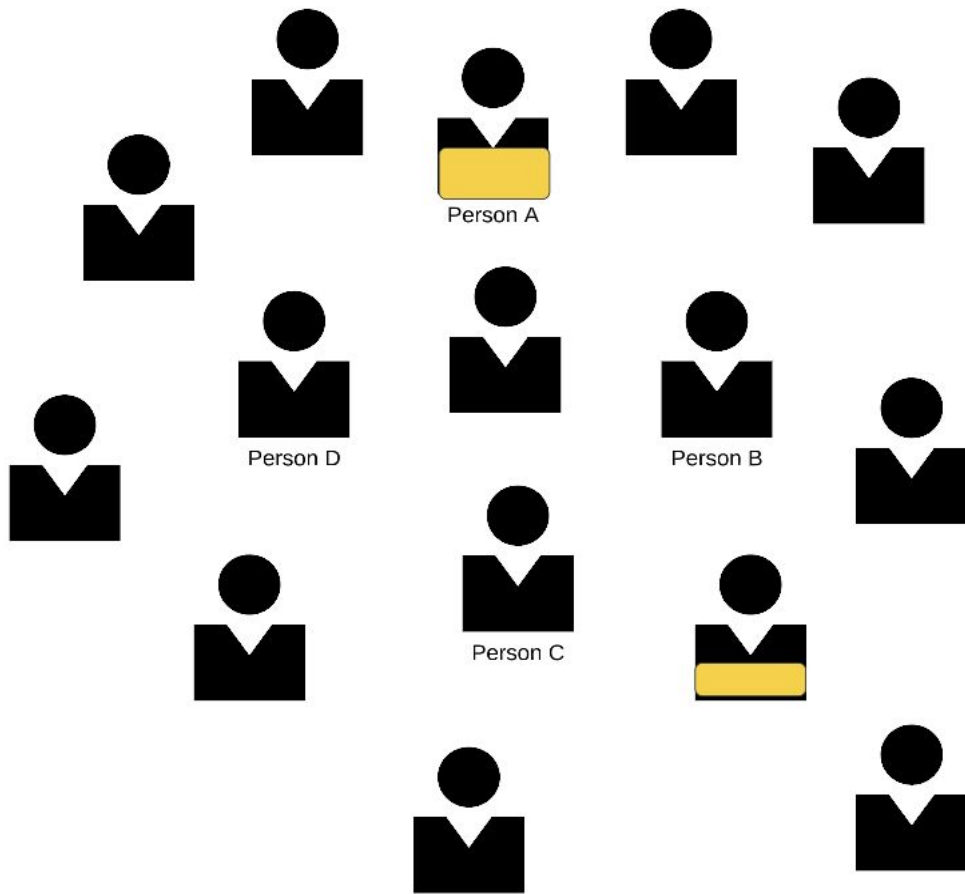


Incident Review happens, but only includes a small group of people and is done hastily. And some experts cannot make the incident review

Management gets high level report with high-level metrics and indicators on the incident.

Parties engaged in
incident response
have different
goals and
priorities.





Over time, Person A is involved in almost every incident that involves \$NEW_TECHNOLOGY.

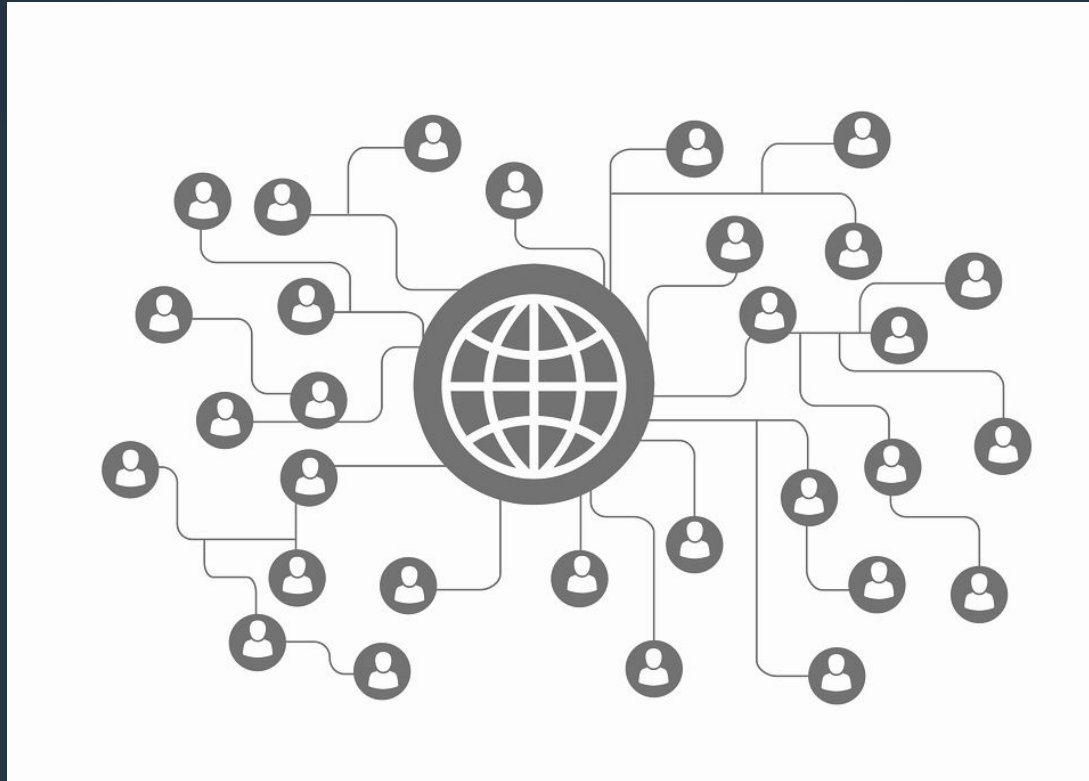
They're very valuable to the organization, they have a rich skillset,

As they manage this piece of technology, the organization grows and grows, more people are hired around them with limited knowledge.

They also have a lot going on, they don't have time to teach new people all the ins and outs of \$NEW_TECHNOLOGY. So they keep responding to incidents about it and then moving on to do other things.

- Events that happen since adding piece of technology:
- Company adds more customers
- Company has higher demands
- The scope of Person A's role grows
- Company hires a lot
- They have less time to “teach” people about the technology they implemented
- They just “do the work” on it instead

Multiple, diverse perspectives



You can't meaningfully
improve expertise of people
without looking at the
cognitive work.

You can't meaningfully
improve expertise of people
without looking at the
cognitive work.

Which is, itself, work.

There can be
So.
Much.
Awkward.



Part 2 - A tale of two incident reviews.

Investigation #1

A seemingly innocuous incident, that didn't have much customer impact, and didn't "deserve" or have time for a thorough postmortem.

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- Templated approach
- Completed by members of the team most involved in the incident
- Purpose was to file and report

Post Mortem Template

Summary

Impact

Detection

Resolution

Detailed Summary

Contributing Factors

Timeline

What went well

What went wrong

How we got lucky

Action Items

Post Mortem Template

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What went well

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Action Items

What don't we know:

- How much time was spent on this document
- Who read it
- Who attended the meeting
- What the purpose of it was
- What was difficult or easy about handling the incident?

Investigation #1: Summary

A change was made to some of the search infrastructure tooling that updates which search index to look at each day.

We were able to recreate the issue and soon after it had been reported, engineering was able to track down the problem and fix the bad configuration.

Due to the nature of the bug, no pre-processing work had to be done for search to be functional again.

Investigation #1: Detailed Summary

The search index is split into collections, one large collection for older [SKUs] and 2-3 collections for recent [SKUs], one per day, for newly created [SKUs].

Each collection can be individually submitted for reading or writing. Since search queries typically read from all collections from a given vendor.

We employ a feature called collection read alias which lets us query from many collections using one name. As new daily collections are created (typically done 2 days in advance), they are added to the read alias.

Due to a bug in our tooling introduced a week before, newly created daily collections were not being added to the read alias. **Since collections are created and added to the alias 2 days in advance, the first collection to be affected by the bug was 3 days ago.**

Incident #1 Timeline

December 4, 2022	Bug is introduced in python tooling
December 4, 2022	The 6 December collection is created and not added to the alias
December 5, 2022	Newly created SKUs start going into the 6 December alias
December 6, 2022, 2:30 PM	Incident channel starts based on customer reports Search team is paged and begins work
2:31 PM	Issue with elevated error rates is red herring
2:31 PM	Borked broker potential cause
2:33 PM	Borked broker ruled out
2:34 PM	Misconfiguration in read alias identified as the cause
2:36 PM	Configuration is fixed
2:36 PM	Fix is confirmed
2:37 PM	Fix is applied to index file

Incident #1: Impact

All [e-commerce] users had a degraded search experience for the 20 minutes over which the incident took place.

Incident #1: Contributing Factors

- Lack of type system or static analysis in code
- Alert that would have detected this is also broken

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Incident #1: What went well

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Incident #1: What went wrong

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Incident #1: How we got lucky

- Happened during a low traffic time, and not many users were impacted

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- Fix the bug preventing the read alias from being updated
- Fix the alert that should have fired
- Check all our alerts to make sure that they fire

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What questions do you have about incident
#1?

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**It's always a little more
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- Conducted by an engineer outside of the main team, fresh perspective

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- Included teams impacted, but not previously involved in the timeline
- Informed new team members about system dynamics
- Purpose was to engage the audience and to be read

How We Got Here “HOWIE” Guide

Background of the document

Who responded

Who investigated

Executive Summary

Customer+Employee Impact

Key Takeaways

Triggering Event

Contributors/Enablers

Mitigators

Difficulties during handling

Follow-up items


Incident #2: Timeline

Search

Data from #key-updates X


Filtered By Select Tag(s) / Participant(s) / Type(s)

Display Notes: Build a timeline ⁷

 Justin Bacon Nov 23 at 1:28 AM

We're receiving requests right now related to the key change beta release

Trigger - Actual




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Natalie Demo [Dec 3 at 3:51 AM](#)

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posting here for posterity

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Detection - Early Warning Detection - Weak Signals

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k, deploying now. will run through tests once it gets to staging


 **Conor Jacobs** Dec 6 at 2:16 PM 🗑️ ⋮
status of tests:


- add to cart looking good (5/5 passed)
- moving on to search next


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I'm assuming that's normal behavior? my deployment wasn't related to search

Detection - Early Warning Detection - Weak Signals

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alright. Moving on to the second deploy

 **Conor Jacobs** Dec 6 at 2:17 PM 🗑️ ⋮
will run through tests on this one too





Incident #2: Timeline


Search Data from #spam-detection x


Filtered By Select Tag(s) / Participant(s) / Type(s)

Display Notes: Build a timeline ¹¹


 **Conor Jacobs** Dec 6 at 2:14 PM 🗑️ ⋮
I'm working on automation that should stop these bots...once and for all.

 **Conor Jacobs** Dec 6 at 2:14 PM 🗑️ ⋮
posting here for posterity

 **Conor Jacobs** Dec 6 at 2:14 PM 🗑️ ⋮
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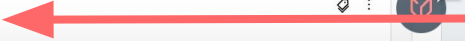
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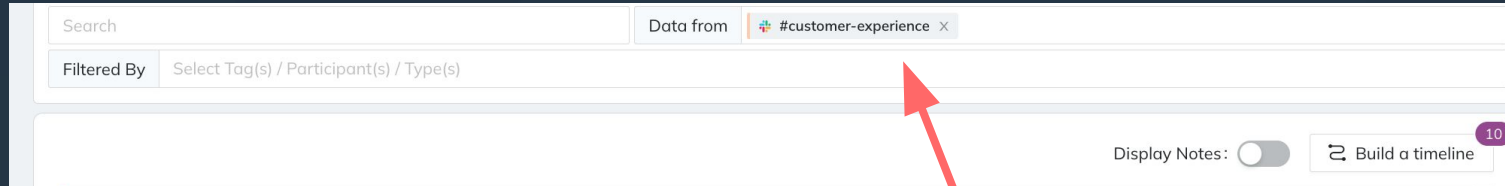
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Incident #2: Timeline...meanwhile in #customer-experience



The screenshot shows a software interface for creating a timeline. At the top, there is a search bar and a 'Data from' dropdown menu currently set to '#customer-experience'. Below this is a 'Filtered By' section with a placeholder text 'Select Tag(s) / Participant(s) / Type(s)'. On the right side, there is a 'Display Notes' toggle switch which is currently turned off, and a 'Build a timeline' button with a circular arrow icon and a purple notification badge containing the number '10'. A red arrow points from the bottom right towards the 'Filtered By' section.

Incident #2: Timeline...meanwhile in #customer-experience

Search [] Data from #customer-experience x

Filtered By Select Tag(s) / Participant(s) / Type(s)

Display Notes: Build a timeline ¹⁰

- N** Natalie Demo Dec 6 at 2:26 PM
Receiving some reports that customers can't access search results for the items in the promo emails that were sent out yesterday
Impact
- N** Natalie Demo Dec 6 at 2:27 PM
Looking into it and managing them
- N** Natalie Demo Dec 6 at 2:27 PM
They appear to be receiving search results for all other SKUs added before last week. So it seems like it's not an obvious "down" for search.
- Conor Jacobs** Dec 6 at 2:30 PM
you know what...
- Conor Jacobs** Dec 6 at 2:30 PM
I think this was the same issue I was seeing earlier
Hypothesis - Proved
- Conor Jacobs** Dec 6 at 2:30 PM
I'm going to page the search team
Communication - Benefit
- Conor Jacobs** Dec 6 at 2:31 PM
gah, I can't figure out the auto-paging. I'm going to manually page them which I think pages... all of them, but oh well
Communication - Issue




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Incident #2: Timeline







Select or create a filter set

Search

Data from #search-incident x

Filtered By Select Tag(s) / Participant(s) / Type(s)

Display Notes: Build a timeline

-  Justin Bacon Dec 6 at 2:31 PM
@Justin Bacon has joined #search-incident
Responder - Joins
-  Justin Bacon Dec 6 at 2:32 PM
I'm here
-  Natalie Demo Dec 6 at 2:32 PM
@Natalie Demo has joined #search-incident
Responder - Joins
-  Natalie Demo Dec 6 at 2:32 PM
So am I
-  Jen Harvey Dec 6 at 2:33 PM
@Jen Harvey has joined #search-incident
Responder - Joins
-  Jen Harvey Dec 6 at 2:33 PM
me too!



Conor Jacobs
Customer Support |


Tenure	over 6 years Jul 11, 2016
Location	new york, ny Eastern Standard Time (UTC-05:00)
On call?	Permanently
Schedules	● Default

Incident #2: Timeline

Search

Data from #search-incident ×

Filtered By






Incident #2: Timeline


Search Data from #search-incident x


Filtered By Select Tag(s) / Participant(s) / Type(s)


Display Notes: Build a timeline ¹⁷


 **Justin Bacon** Dec 6 at 2:34 PM
I don't see any messages past UTC midnight in the search results 


 **Natalie Demo** Dec 6 at 2:34 PM
Yeah 1205 and later are not in the read alias 🙄

 **Natalie Demo** Dec 6 at 2:34 PM
Gonna update it

 **Melissa Day** Dec 6 at 2:35 PM
@Melissa Day has joined #search-incident
Responder - Joins

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Ok aliases are fixed. I wonder why that happened


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Incident #2: Timeline



Justin Bacon Dec 6 at 2:37 PM

it's related to PR 23



Justin Bacon Dec 6 at 2:37 PM

a variable named `update_aliases` override the method named `update_aliases`



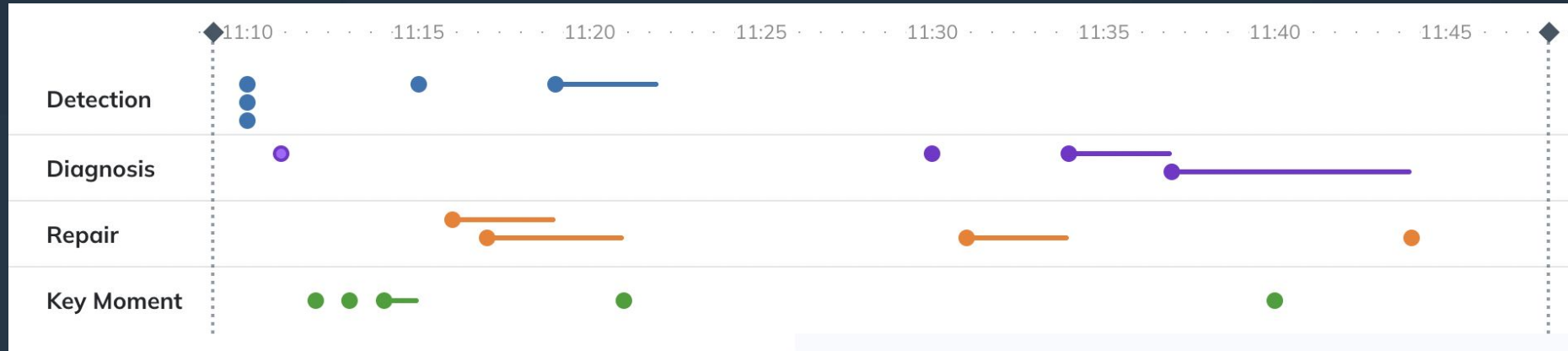
Justin Bacon Dec 6 at 2:37 PM

ughhhh python !!

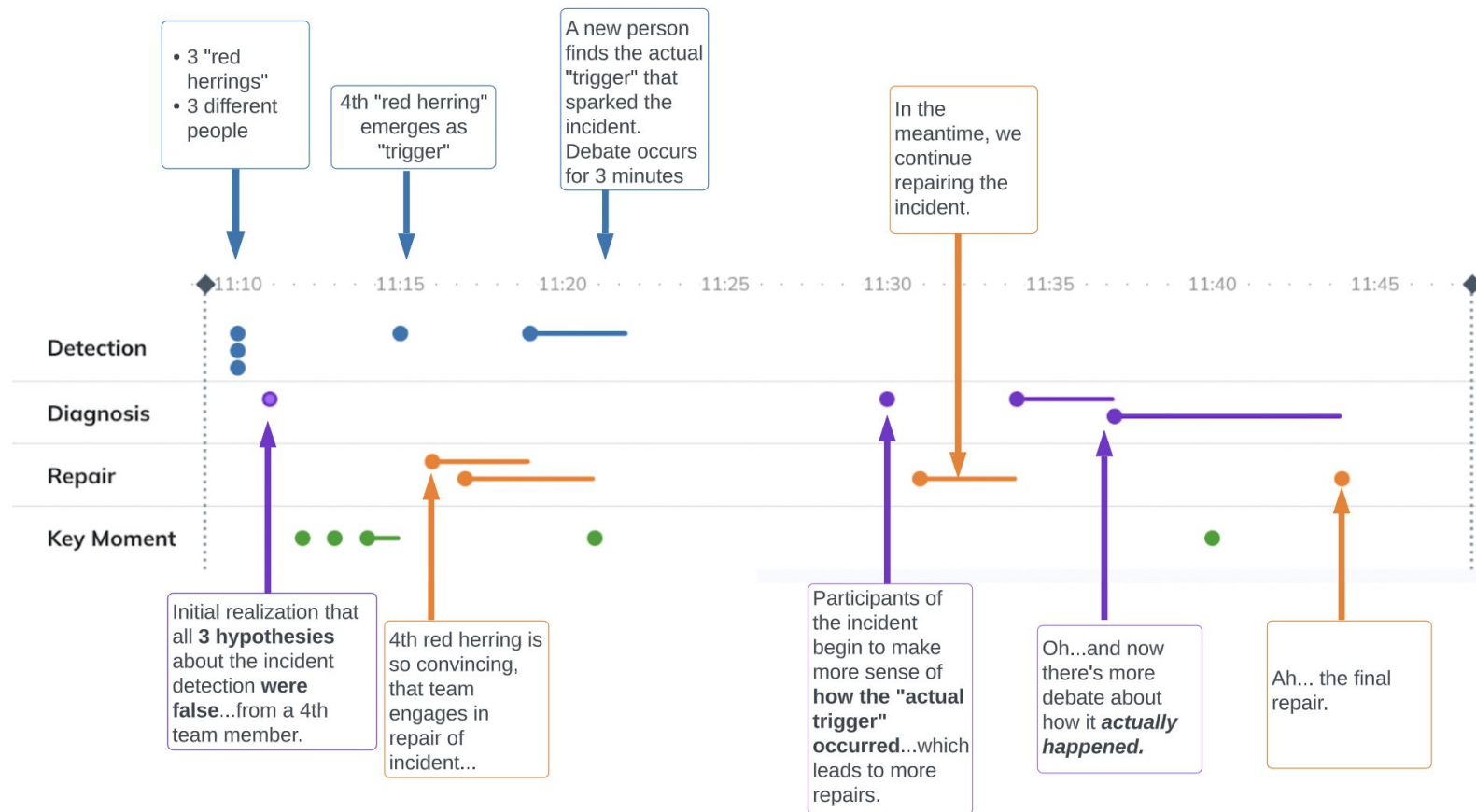


👍 1

Incident #2: Timeline



Incident #2: Timeline



Incident #2: Key Takeaways

- There are multiple notions of what it means for search to be “working”
- Incident handling excellence is influenced by team cohesiveness and collaboration
- Changing code with alerts has risk
- Ease of coordination due to familiarity of team
- Quick awareness of issue at hand

Incident #2: Key Takeaways

- There are always multiple sharp-ends to study, and multiple people to invite to the meeting.
- An incident review can be used to gain insight into other's sharp ends.

	Incident 1	Incident 2
Time to investigate	45 minutes	1 week
Time of incident	20 minutes	Dates back to 3 weeks before the event
Contributing Factors	2	8
Action Items that got completed	2	6
People involved	2	8
Difficulties During Handling	No section	Dedicated section
Impact	Customer	Customer + Employee
Readers of the document	10	140

Part 3 - What's next

Working to understand how experts think, creates more experts.

Working to understand how experts think, creates more experts and helps them understand each other.

This is how you scale these people.



Person A



Person D

Person B



Person C



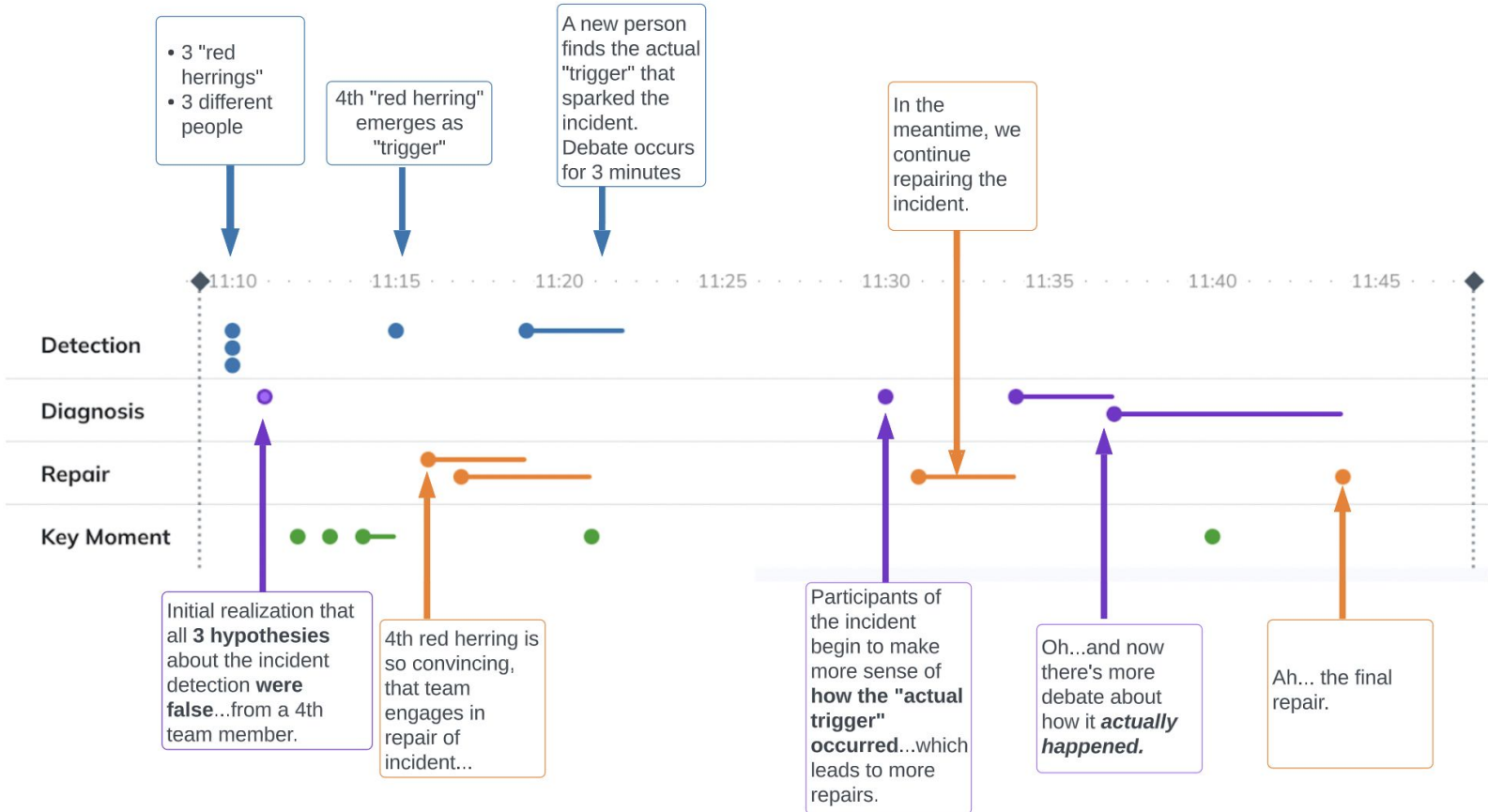
Tips for learning more from incidents:

- **Use more than “customer impact” to warrant a review.**
- **Make it engaging – create a record.**
- **Schedule and make time for learning. Don't break your promises to learn.**
- **Put the responsibility of running an incident review outside of the expert. Leadership needs to support this.**

Tips for learning more from incidents:

- Use more than “customer impact” to warrant a review.
- Make it engaging – create a record.
- Schedule and make time for learning. Don't break your promises to learn.
- Put the responsibility of running an incident review outside of the expert. Leadership needs to support this.

Make it engaging



Doing this can...

- Give the writer of the document more expertise
- Become **training** documents,
- Inform **chaos experiments**,
- Serve as **professional development** and **refresher** training,
- Help enable meta-analysis across incidents,
- Highlight how **goal conflicts** and **changing organizational priorities**,
- Identify where additional headcount is or is not needed,
- Inform build vs buy decisions,
- Create more experts.

Your metrics are wrong and they are lying to you. Stop making decisions based on them.

When you become an expert on learning from incidents, don't do it alone. Bring others with you.

Challenge for you: Attend or run a post-incident review in the next 2 weeks. I guarantee you can find something to analyze.

**Keep the conversation going.
Come find me!**

Thank you

To learn more on how to unearth expertise:

<https://www.jeli.io/howie>

nora@jeli.io