How Many Is Too Much? Exploring Costs of Coordination During Outages

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Learning From...
Laura Maguire

@ Laura Maguire

Monday, February 10th

eric  3:15 PM
learning is not at all automated.

nora  3:19 PM
Perhaps unfortunately, part of the task as the chaos facilitator is to present the "design" phase as fun and challenging. Which involves some creativity on the facilitators part - otherwise, yes you will have trouble getting people to participate.

matt  4:54 PM
learning can be a difficult thing to get support for. I was in a $50/hr group where the CTO refused to cover an embarrassingly expensive local conference (no zero anything else, just the < $50 pass, for maybe 30-20 people), that the company had previously covered until this person became CTO. He vociferously proclaimed "people are in charge of doing their own learning on their own time, not on the company dollar".

I imagine this attitude is more common than not.

Fred Hébert  2:47 PM
When our local users group for developers started a few years ago, some local business owners were apparently afraid of letting their employees go in their own time for fear they'd get poached.

nora  4:00 PM
Yup, this is why the LFI hold needs some active focus on change management to take hold in orgs...

It's difficult for us to unseen things, but ultimately others in our orgs aren't there yet - how do we get them there?
Software is increasingly managing critical societal functions
Overview

<table>
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<th>Changing nature of ‘control rooms’ &amp; implications</th>
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*Hint: You are probably going to want to rethink the need for an Incident Commander. @LauraMDMaguire*
Cognitive work

- Perceiving
- Reasoning
- Attending
- Forming an Action
Cognitive work

- Anticipating
- Observing
- Inferring
- Reasoning
- Recognizing change
- Prioritizing
- Planning
- Troubleshooting
- Diagnosing
- Correcting
- Modifying
- Reacting

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Reasoning
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Forming an Action

Perceiving

Coordinative work

Recruiting
Synchronizing
Grounding
Updating
Signaling
Taking Initiative
Delegating
Taking Direction
Reciprocity
Relaxing goals or constraints

@LauraMDMaguire
Cognitive costs of coordination – additional mental effort, load and delay required to participate in joint activity.
Wait... but then why coordinate?

• 24/7 ops
• Geographically distributed
• Dependencies
• Specialized functions
  • Characterized by continuous change
  • Complex, interactive systems
  • Operating at speed & scale
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“Woods' Theorem: As the complexity of a system increases, the accuracy of any single agent's own model of that system decreases rapidly.”

-Stella report (stella.io)
Which people are important...
Which people are important...

...in what collaborative interplay...
Which people are important...

...in what collaborative interplay...

...in what sequence?
The progression of an incident

Cognitive demands

Coordinative demands
The coordination paradox

• In complex adaptive systems, everyone’s model is going to be partial and incomplete (Woods, 2017).
The coordination paradox

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• Therefore we need multiple, diverse perspectives to handle non-routine or exceptional events (Grayson, 2018, Watts-Perotti & Woods, 2001).
The coordination paradox

• In complex adaptive systems, everyone’s model is going to be partial and incomplete (Woods 2017).

• Therefore we need multiple, diverse perspectives to handle non-routine or exceptional events (Grayson, 2018, Watts-Perotti & Woods, 2001).

• But there is additional cognitive load working with others (Klein et al, 2005; Maguire, 2019).
The coordination paradox

How to reap the benefits of joint activity without the costs of coordination becoming too high?

What strategies do software engineers use to control the costs of coordination?
What did I find?

1) Incident response
2) Incident command
3) Adaptation was key
4) Tooling can increase CoC
SNAFU Catchers Consortium Cycle 2

@LauraMDMaguire
Incident Response – a model

- Preparation
- Detection and Analysis
- Containment
- Eradication and Recovery
- Post-Incident Activity
Incident Response – the hidden stuff

Is this an incident? Anuj would know.

How is the tech debt from last incident going to impact us now?

I don’t know what it is yet but we need to take action NOW.

You have new mail
From: CEO
To: Responder
Subject: WTF is going on??!

I’m not sure its actually over. We should make sure we don’t burn out.

How is the tech debt from this incident going to impact us later?

I think I need help but I don’t want to wake anyone up until I’m sure

I need to get Sarah, she can do this better than I can

Not sure why that worked or how long it will hold... I better tell the other devs

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LauraDMuigre

Preparation  Detection and Analysis  Containment  Eradication and Recovery  Post-Incident Activity

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LauraDMuigre
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@LauraMDMaguire
“The incident commander holds the high-level state about the incident. They structure the incident response task force, assigning responsibilities according to need and priority.

**De facto**, the commander holds all positions that they have not delegated.”

Beyer et al (2016)
Adaptive Choreography.

Dynamically reconfiguring how coordination happens.
Taking Initiative
Updating
Sharing Info
Deciding
Anticipating
Adjusting

Taking Direction
Recruiting others
Being recruitable
Backfilling IC tasks
Model Updating
Investing
Adaptive Choreography.

Taking Initiative
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Model Updating
Investing
Which people/machines are important...

...in what collaborative interplay...

...in what sequence?
Costs of coordination with tooling

- Lag/delay
- Reduced functionality
- Glitches
- Updating
- Calibration
- Difficulty with access
- Limited observability

- Investments in:
  - Selecting
  - Testing
  - Piloting
  - Launching
  - Switching
  - Calibration
  - Re-calibrating
  - Working around limitations
What did I find?

1) Incident response has technical and coordinative demands

2) Incident command should be A role, not THE role

3) Adaptation was key

4) Tooling can increase costs of coordination.
References


• Maguire, L. (2019). Managing the hidden costs of coordination. ACM Queue


Interested in chatting further? workshops@jeli.io
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