

Architecting a Post Mortem

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Hey, I'm Will!

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Intro slide - Hi, I'm Will Gallego. I'm a Staff Engineer on Etsy's Systems Engineering team. I've facilitated dozens of post mortems over the last 6+ years there ranging from major site outages due to accidental upgrades to coffee pots overflowing in the morning. All involved our shared beliefs in how we interpret our complex systems function. I'm excited to be here today sharing some of that knowledge I've picked up during this time with all of you.



Two questions for you

1. by show of hands who here has never participated in a post mortem (doc or discussion) before?
2. The second I want you to think about for a moment - Why do we put together post mortems? (This is rhetorical). We want to share our collective experiences with each other

Storytelling

A stack of several old, worn books with leather covers, resting on a wooden surface. The books are stacked in a slightly irregular manner, with some pages visible. The lighting is warm and focused on the books, creating a sense of history and knowledge. The word "Storytelling" is written in a white, serif font over the top left portion of the image.

This is how I start every post mortem I facilitate. It's my "Once upon a time". It's because post mortem meetings are not a rote listing of events to be dictated to a group of people. It is the collection of stories in which we collectively build together.

A Senior Engineer is new to his company. He takes it upon himself to tweak code he doesn't own. He deletes a file and deploys the code to production. The site then goes down. He reverts the file in git, deploys - the site stays down. He then finds other experienced engineers close by to fix the bug to restore stability in production.

Was he "wrong" to deploy his code change?

Blame as a Barrier



Now, we could easily conclude that the engineer was at fault here. They touched code they shouldn't have. As reflective of their performance, they are unfit to work here and should be summarily dismissed. What has that taught us though? What happens when the next engineer wants to change this file? This is where our discussions into the importance of Post Mortems is so critical, because we move past knee jerk reactions. Blame is preventing us from any real learning.

Blameless Post Mortems

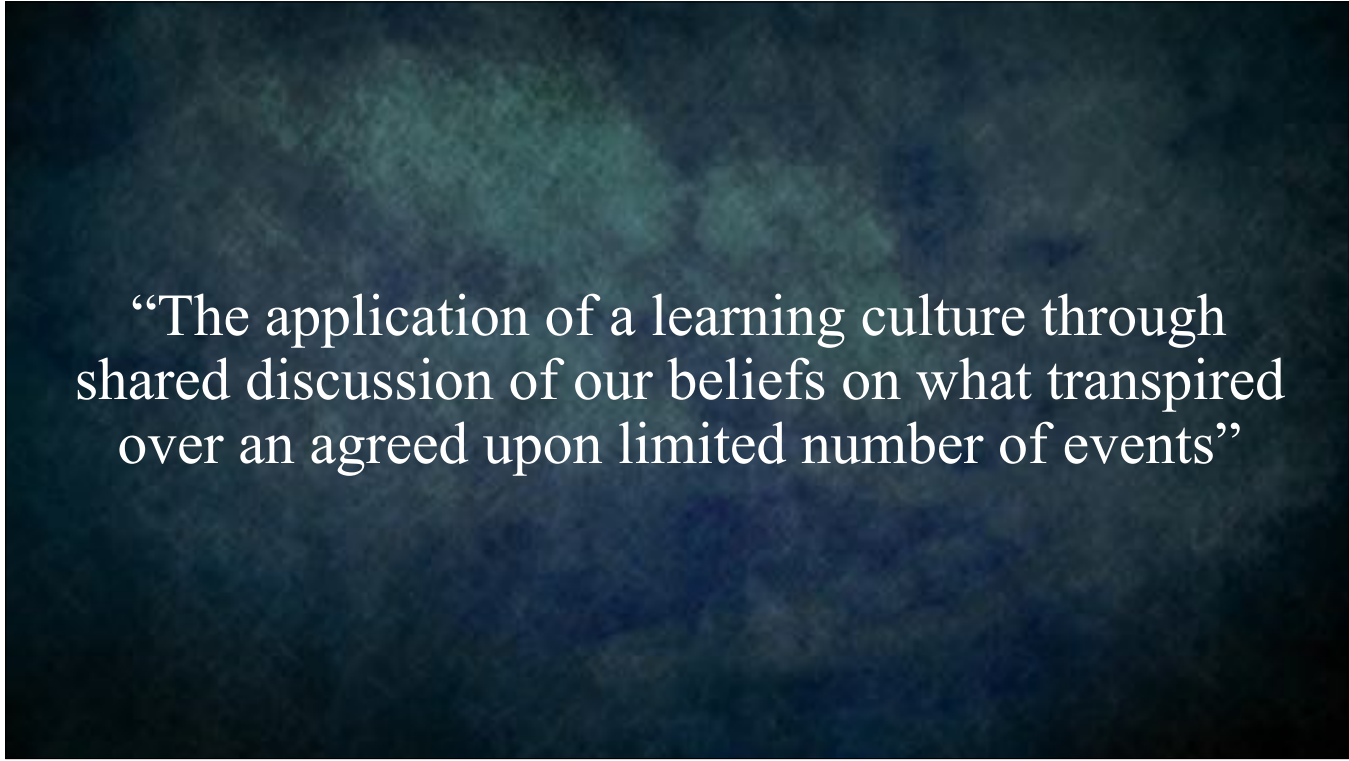
Quick tangent - Blameless vs. Blame Aware.

- You may have heard blamelessness attached to PMs. I think that's good and gets us most of the way there. Risking pedantry for a moment, I prefer blame awareness.

Blameless ~~Post~~ Post Mortems

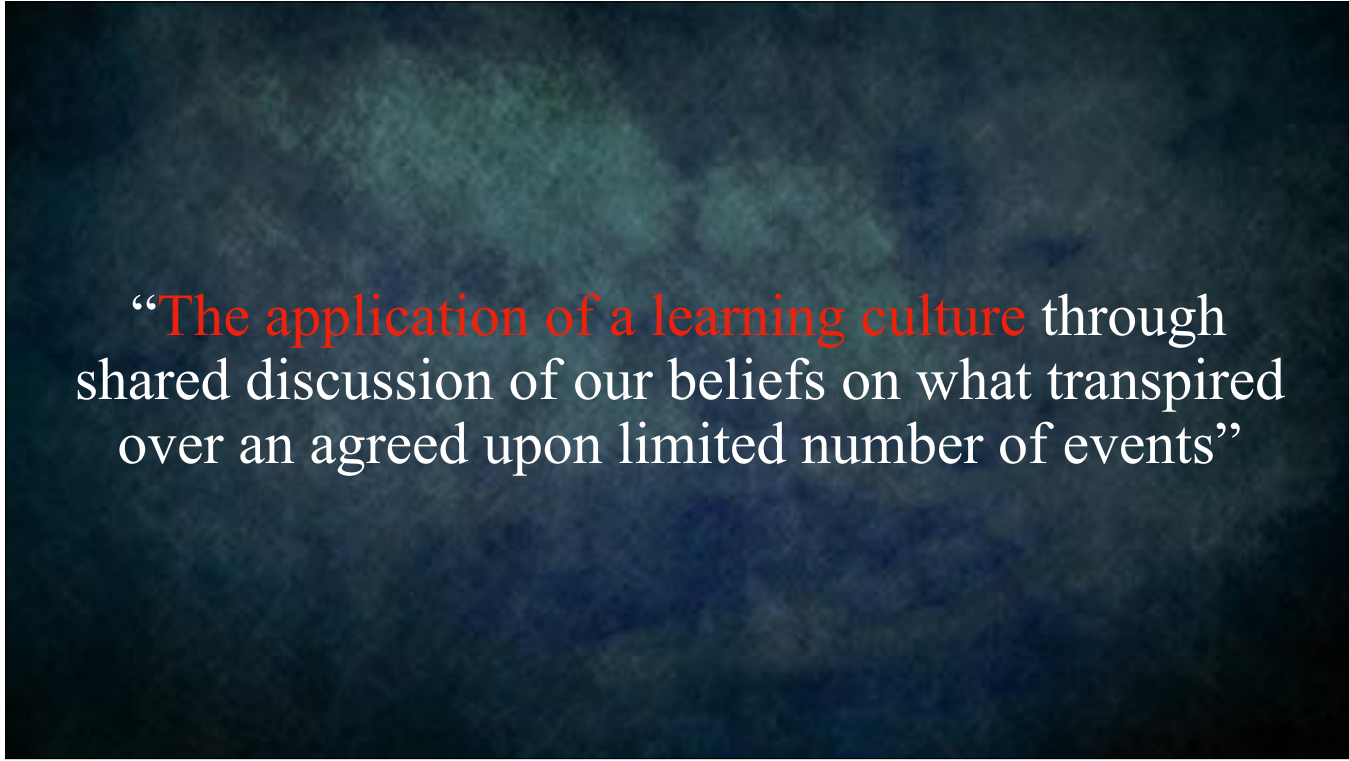
V AWARE

- This is because there's often an association of blamelessness with a lack of responsibility, which is far from the truth. Our tendency is to avoid naming names for fear we're pointing fingers. This lends itself to hiding necessary data points that shed light on the nature of the decision making.
- Don't beat yourself up if you still use "blameless". Language is **hard** and even our incident reviews are not going to be completely free of it.



“The application of a learning culture through shared discussion of our beliefs on what transpired over an agreed upon limited number of events”

Before we can talk about how to run a Post Mortem, it's important to highlight my definition. It's a tool and this is the tool I've found useful for expressing these ideas. Let's break this into a few parts



“The application of a learning culture through shared discussion of our beliefs on what transpired over an agreed upon limited number of events”

- No mention of fixes, remediation items, or guarantees to make sure this never happens again, etc.
- We are here to learn about our systems, both the technical machines we interact with and the system we are a part of, and how we previously interpreted these interactions



- sharing of experiences in open dialogue we can gain greater understanding.
- Blame aware post mortems do not guarantee you learn anything simply because you're not blaming anyone!
- A facilitator is clearing the path of blame, which are blockers for uncovering hidden truths. The path can be clear, but it's up to the participants to learn and share.

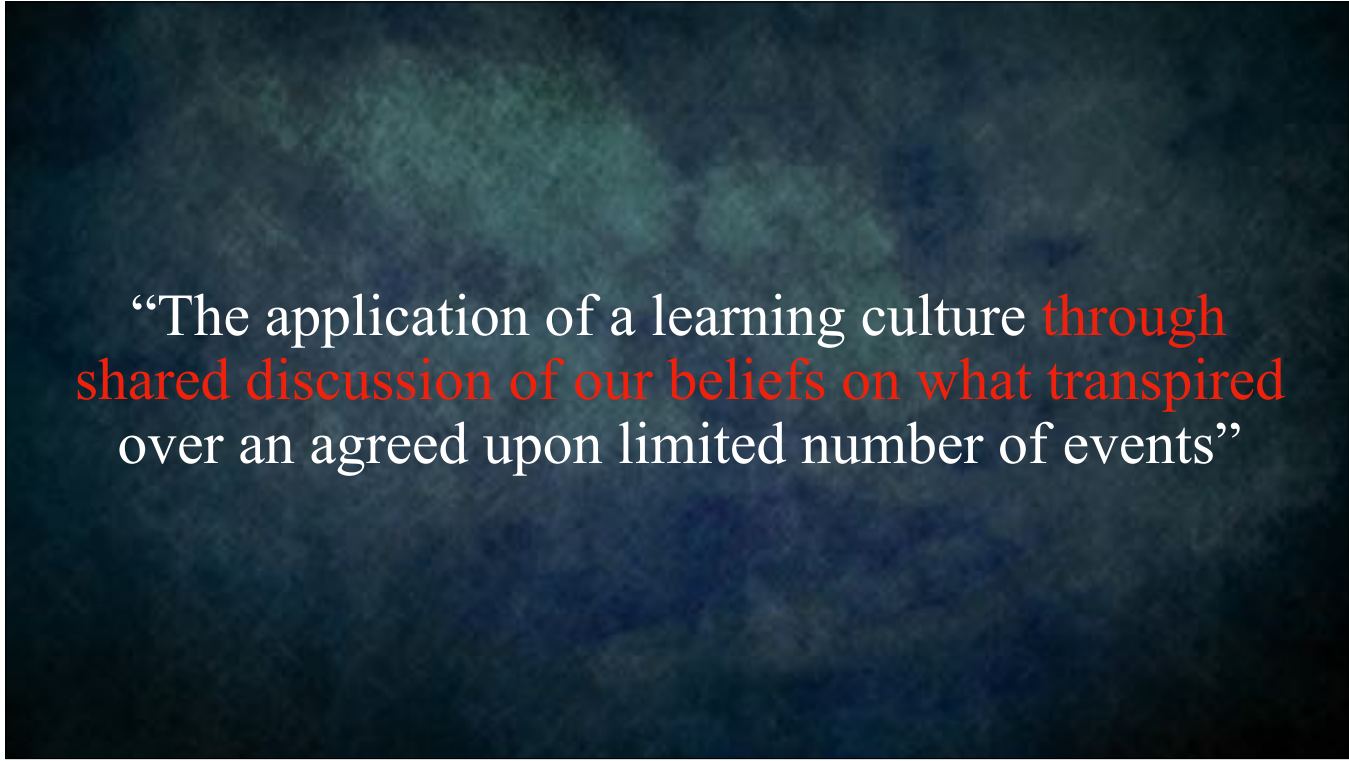


Fixed Mindset vs Growth Mindset

All of this predicated on beliefs we can get better.

Fixed Mindset - Some things we're good at and some we're not. If you're not a good fit, you don't belong. Remove all the people who made wrong choices and you've fixed the system.

Growth Mindset - Our knowledge of the working world is mutable. We can learn from our mistakes and in fact be made better by them



“The application of a learning culture **through shared discussion of our beliefs on what transpired** over an agreed upon limited number of events”

- We had one interpretation of our world before these events. Now we have a different one. We were surprised
- We will never know with complete clarity and thoroughness everything that occurs within a single. Always something else to dig into
- We can't know exactly all the parts that are involved in a person's decision making during an event. Recreating it to its exact nature is impossible
- Our memories are faulty - we smooth out “rough edges” in our interpretation of what happened to better fit our world view, limiting our scope of knowing what happened

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

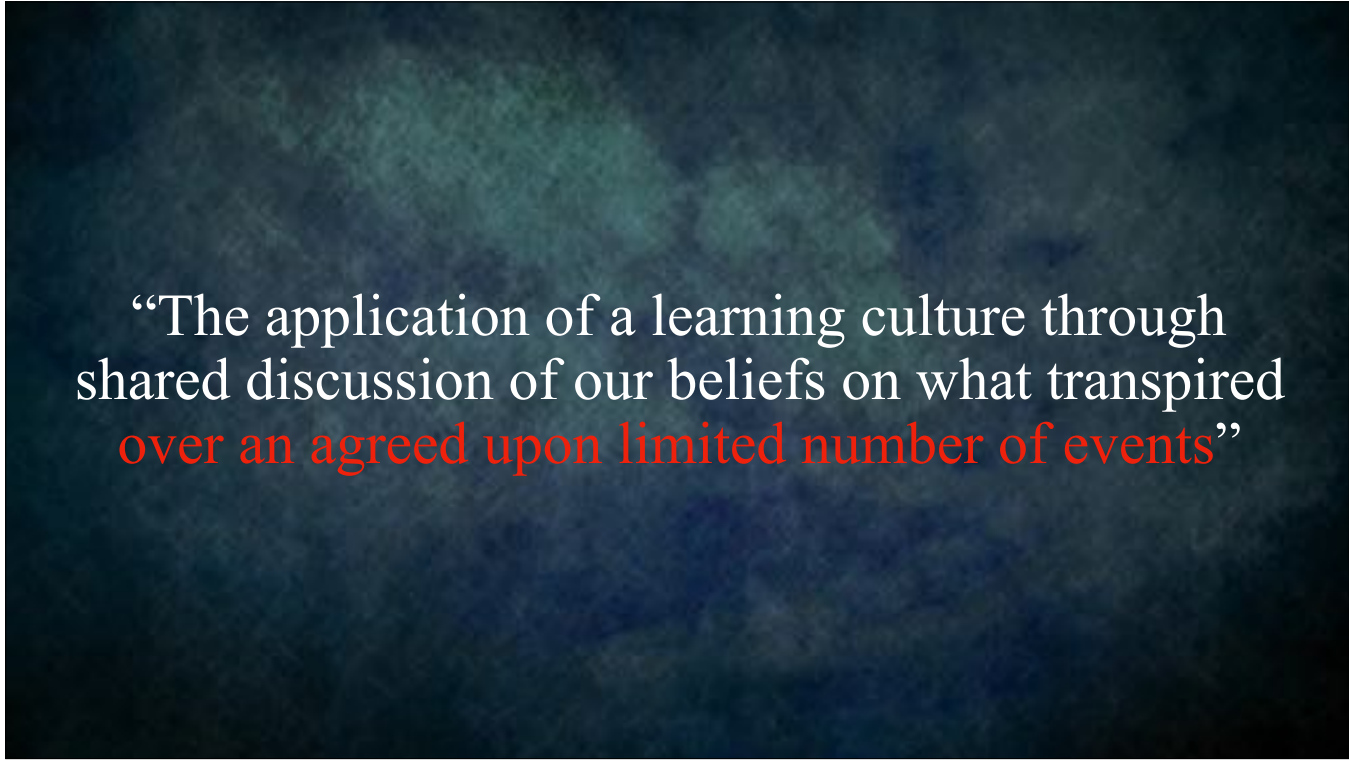
Woods' Theorem, Stella Report (<http://stella.report>)

Stella report is the findings from a collaboration between the “SNAFU Catchers’ Consortium” consisting of IBM, Etsy, IEX, and several researchers from Ohio State University regarding several outages and the investigations into them.

Show of hands, who here knows every

- line of code?
- micro service in their company?
- within their primary stack?

Now think about every time we want add a new feature.



“The application of a learning culture through shared discussion of our beliefs on what transpired over an agreed upon limited number of events”

We have finite time surrounding an event. Everything we can possibly know about a collection of events is limited - we have to agree on the constraints of what we can dig into, for how long, and to what extent.

2. We only have so much time to devote to preparation of a timeline and to review it.
3. Our ability to understand the entirety of system is intrinsically limited by how much we can know about any given topic.
4. The system underneath us is constantly changing. So our understanding of a situation is pinpointing the location of a moving target. Systems adapt and so must we.



Now that we have some understanding behind a post mortem, let's talk about about effective ways we can establish them in companies and methods to dig deep in surfacing details.



- Determine a note taker, avoid it being you the facilitator. Difficult to do both
- Co-facilitators and shadow facilitators are very useful, both to help surface questions you hadn't thought of (being in a position of power lets you feel more confident in doing such)
- Can also help with the meta surrounding getting better at being a facilitator, train others
- You're not answering questions and you're not uncovering the mysteries. The actors have already done that - they need to share it with each other
- You don't even have to be knowledgeable of the systems you're working in.

Open Invite



- Must include main actor(s), teams directly involved...but also anyone curious! Open Invite
- Avoid (some) unconscious biases - don't facilitate if you were involved
- Attendees should be given as optional. Don't hold without them either!



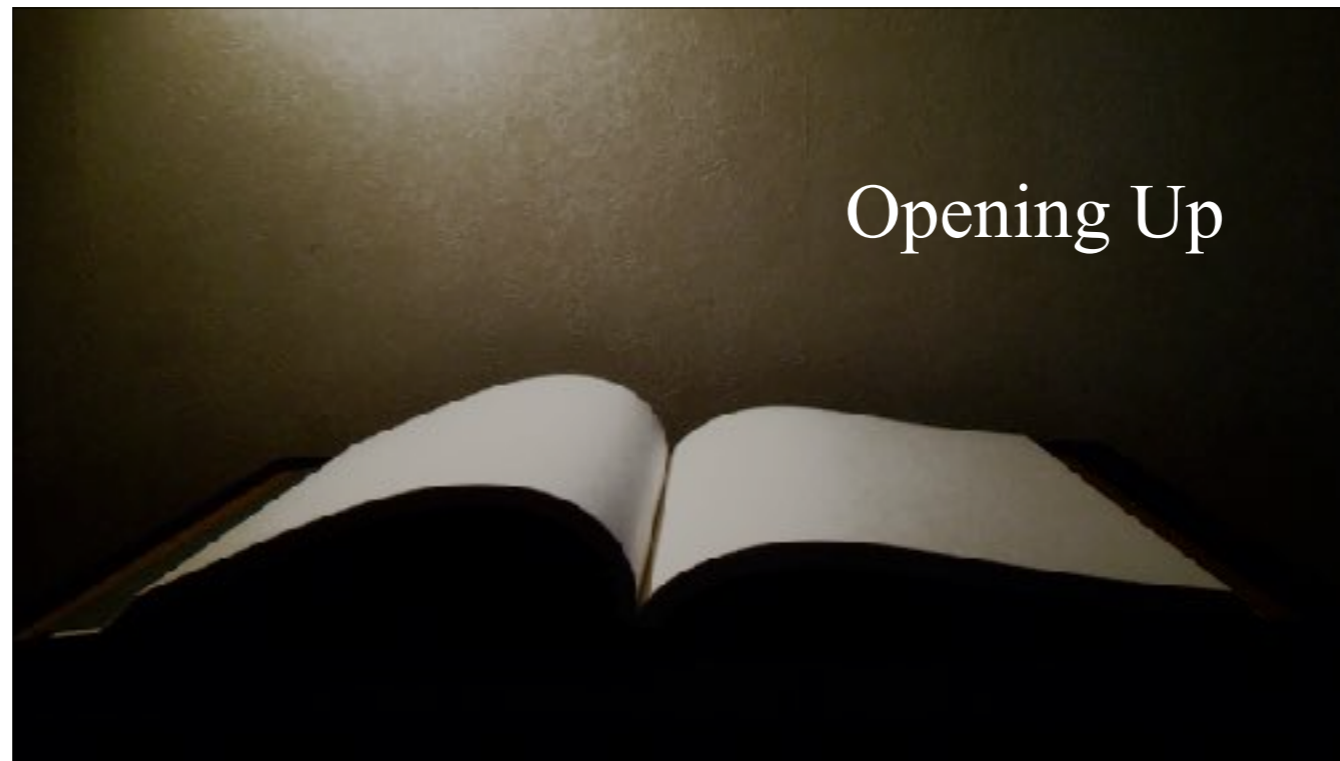
- Actors involved should relate the story, using chat logs, graphs etc. as support
- Walk through their version of the timeline with them as they can best relate it. Resist asking questions if you can. This is because you want to ask those when everyone is gathered together.
- Try to schedule this within a day or two after the incident. Memory loss is real
- Schedule the PM within 2 weeks. Within a week is much better, but scheduling is hard. Any more than that and people both lose interest (“oh that? That happened weeks ago, it’s fixed”) and smooth out details (Nodding your heads, agreeing with facts laid out as opposed to asking questions to clarify them)

Timeboxing

One hour for a PM

- 5 min intro - First PMs, why we're here
- 35-40 min for timeline. Know inflection points
- 10 minutes for follow up Q&A
- Remaining time for Remediation, if needed

- Keep an eye on the clock
- Know inflection points and expectations on how much left to cover.
- tangents? Ask to put a pin in them "That's really interesting and deserves more attention. Can we go into more detail at the end?"



This is the core of what a facilitator does

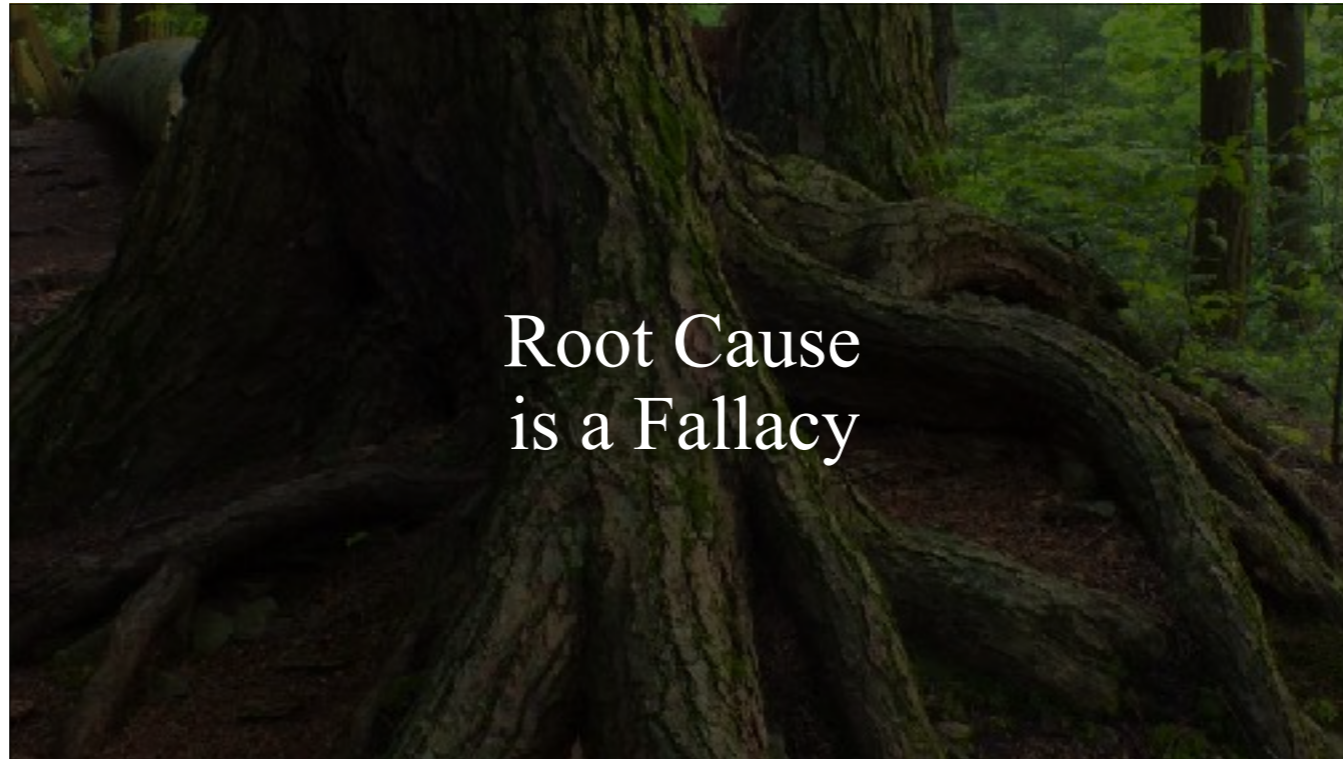
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Looking Deeper

- Assumptions before an action and how they changed
- Acting (or not acting!) believed to be the right decision
- Sources of truth - people
- Documentation, alerts, graph - when are they useful and when they are discarded
- Get knowledgeable people to say out loud what think is common knowledge

This is the single most important job for a facilitator.

- What are people afraid to talk about?
- What do people think isn't important because it's "every day" to them but a black box to others?
- Where are people going down tangents that aren't critical



As tempting as it is, don't use root cause, primary cause, or similar language in a PM

Events are almost never a single case. There's tools, new input, and changing goals that are all interconnected and influence the decisions we make. To use root cause is to say "we want a shallow answer and we're not going to dig deeper".

Success has no "root cause". There are countless small decisions to make something work. There is no difference with failure.

Avoiding Counterfactuals

- “If only they had...”
- “They failed to...”
- “They should have...”
- “They could have...”

Counterfactuals go hand in hand with hindsight bias. As the name implies, they go against what the facts of the situation are. You describe a world where alternative decisions were made and then make judgments based on these imaginary worlds. These do nothing for explaining what actually happened or why.

If you're using any of this language, you're falling prey to hindsight bias.



With outages comes stress. That doesn't go away when the incident is resolved. A lot of that emotion is carried over to the PM as well. This is where you prep work comes in handy

- Review the timeline and interview folks who may be carrying this into the PM
- Find out who might feel like they're up against the wall for "doing the wrong thing". Relating your own mistakes can be helpful here
- You want people to feel confident and self assured. That's when they speak up and consequently people learn!
- Offer to revisit topics later. Taking a breather on tough points can give folks time to reset

Local Rationality



You might say “That’s fine before the meeting, but what happens when it turns into a shouting match? Remind folks of this, Local Rationality.

People act in accordance with what they believe was the best course of actions given the information at the time. No one goes to work wanting to break something (Tie this up with defusing high emotions)

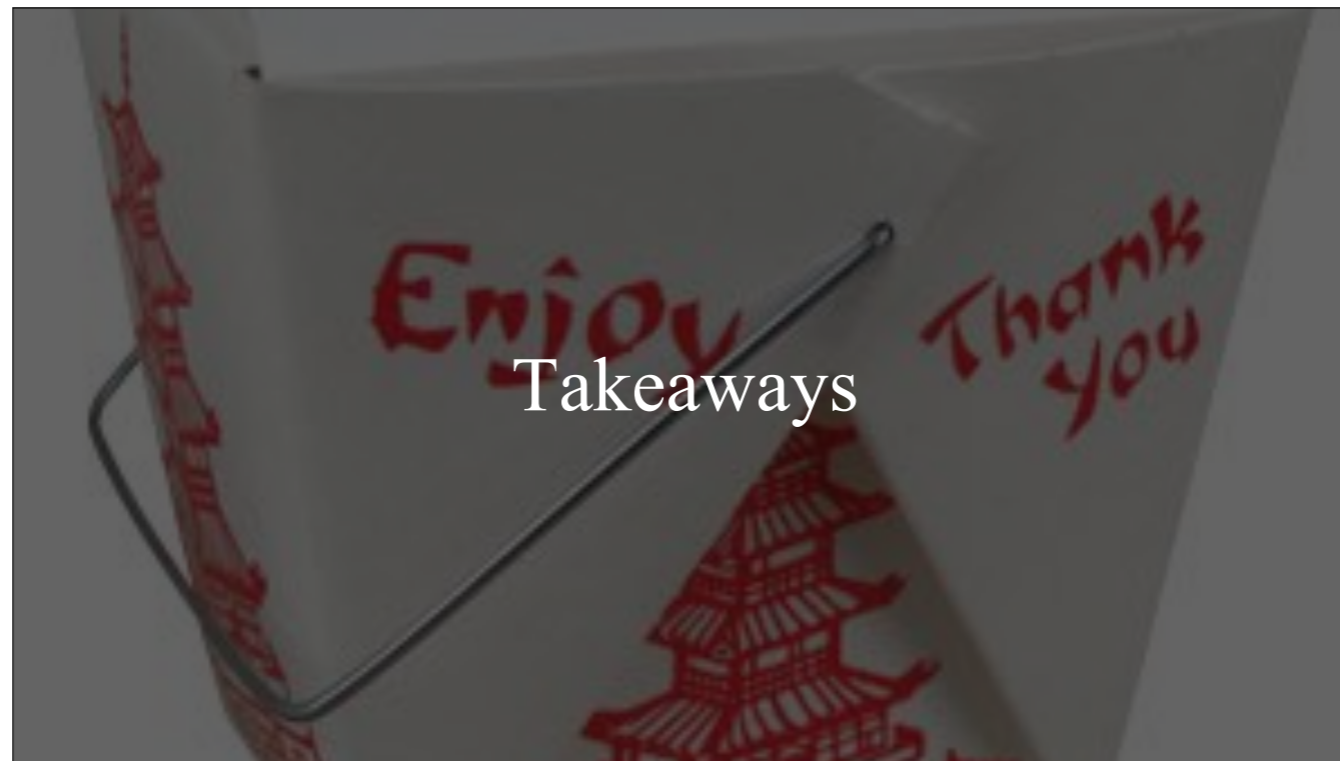
When your instinct is to dismiss someone’s decision, remember this. Empathy can be a powerful tool in learning.



Retributive justice is about rules, violations and sanctions. It believes that wrongdoing creates guilt and that it demands something from the offender to compensate it.

A restorative just culture meets hurt with healing, welcomes multiple stories about the event, and focuses on restoring relationships and trust.

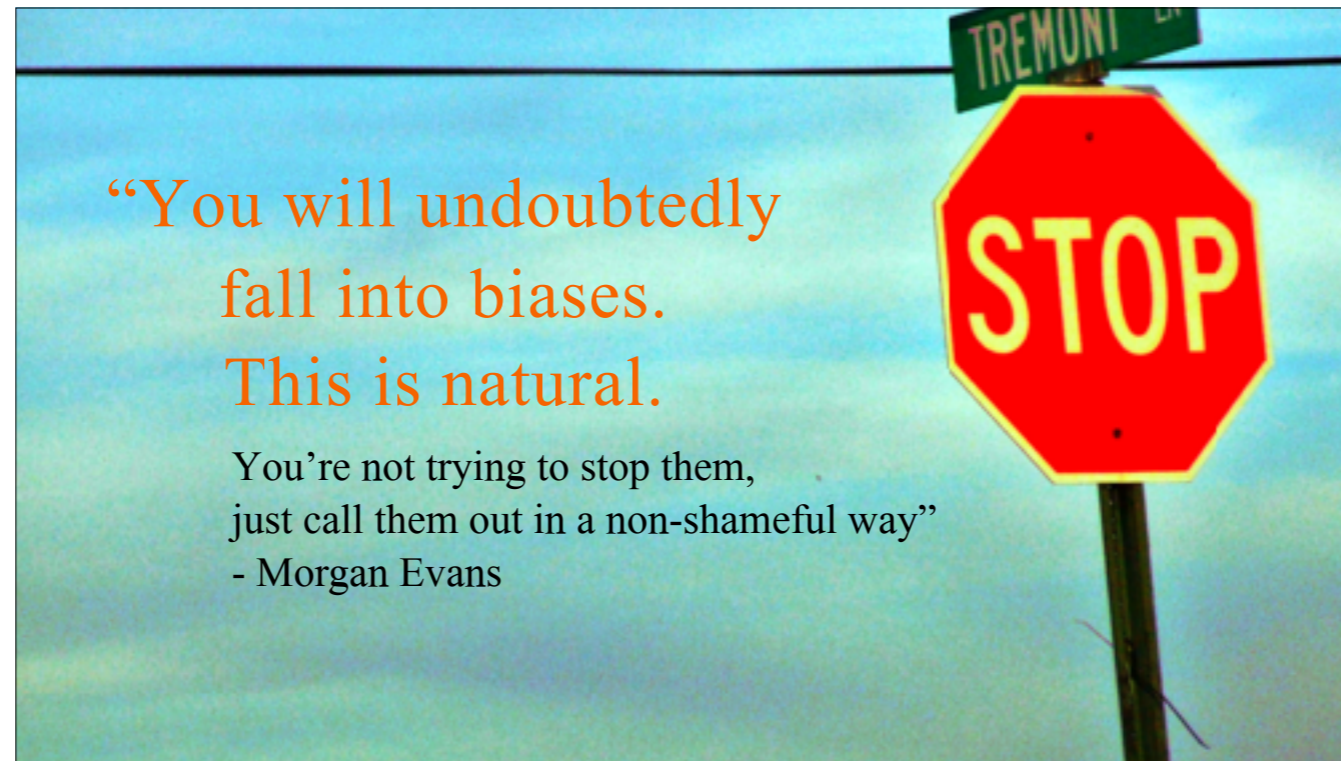
(Jump back to story about engineer deploying code to de



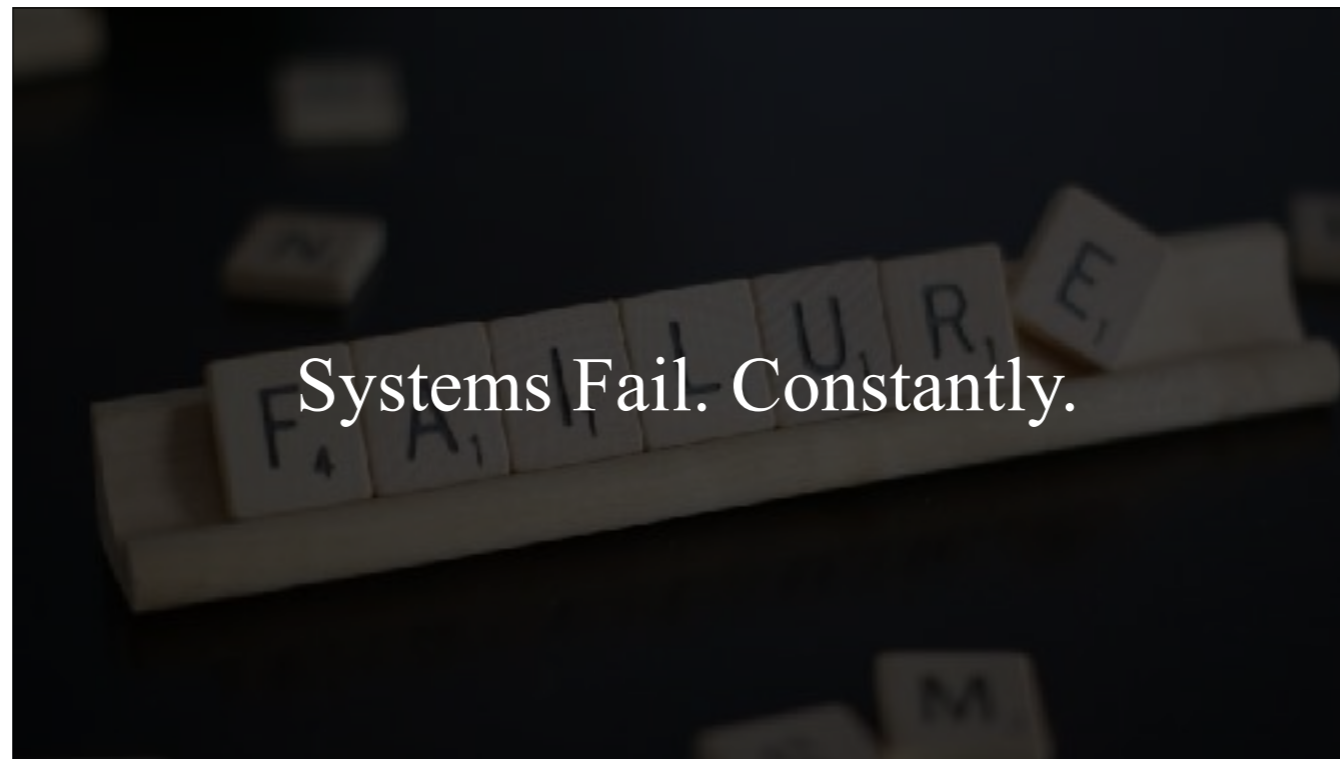
Takeaways



The mantle of blame awareness is not taken on and off if we're currently in a post mortem. Your colleagues won't be open and honest with you in a PM if they can't do it outside. PM's are a great place to be mindful of this, to then practice elsewhere in our daily lives.



When you or your colleagues notice biased language, take note of it but don't point fingers here either. It's another place to learn



Everything is always going wrong. Our systems are built to handle little and great failures. The ones we notice for Post Mortems stand out because they're unexpected.

Failure is absolutely an option in tech. It's our ability to adapt to these failures that makes them tolerable and manageable.



Lastly, for every incident in which we dissect the nuances of our decisions, how we get down on ourselves or others for their actions - they could be much worse. Consider all the decisions you make (and those you **avoid**) that prevent the situation from deteriorating further.

Thanks!

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- [1] <https://pixabay.com/en/blueprint-ruler-architecture-964629/>
- [2] <http://www.businessinsider.com/inside-etsys-new-perk-filled-office-2016-6>
- [3] <https://www.flickr.com/photos/ukgardenphotos/10208196373>
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