



*Delivery Hero*

# **Crew Resource Management for DB Teams**

Why and How

# Introduction: Speaker and background



- Over twenty years of experience with PostgreSQL
- Worked as software developer, database administrator and engineer, IT manager, and more
- Currently Principal Database Engineer at DeliveryHero
- Past includes Director of IT Operations at Adjust GmbH

# Introduction: What is Crew Resource Mgmt

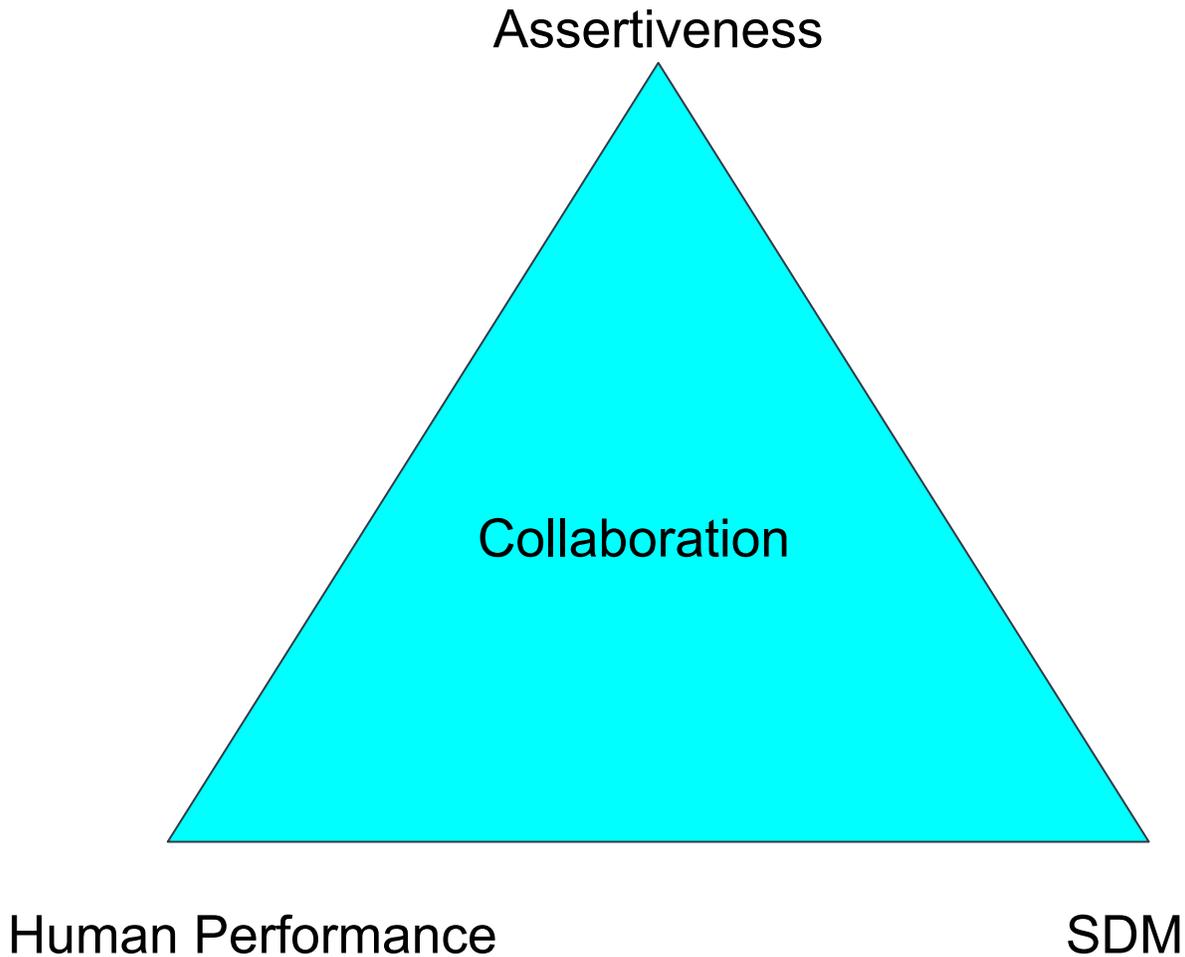


- Started in Aviation Industry in 1970's
- Skills and Technique-based Training for Incident Prevention and Handling
- Technical and evolving
- Implemented in military, transport, health care, and more fields today
- Highly collaborative
- Highly relevant to databases and other critical IT infrastructure
- More of a toolkit than a set of processes



## **A Collaboration Triangle**

# Collaboration Triangle



We can increase collaboration by improving:

1. Assertive communication and intervention
2. Human Performance Management (including workload management)
3. Structured Decision Making, by using Structured Decision Models

# Assertiveness as Non-Conflict-oriented



## Aggressive

- Dismissive
- In your face
- Domineering
- “My way or the highway”

## Assertive

- Matter of fact
- Can include intervention
- Clear, direct
- Respectful
- Confident

## Submissive

- Avoiding conflict
- Never intervenes
- Uncomfortable
- Lack of confidence

# Case Study: PostgreSQL Upgrade Problems



- At a previous employer
- Time pressure existed due to running out of space
- Upgrade would require downtime
- Downtime was underestimated by senior management
- Nobody challenged calculations
- Multiple delays followed by a downtime much longer than expected
- Assertive intervention could have set customer expectations and reduced customer dissatisfaction.

# Case Study: Network problems



- At a previous employer
- Network disruption upstream between datacenters.
- Upper management was actively involved in actual resolution
- Many engineers saw issues with current steps but declined to step up
- Power distance matters!

# Case Study: Impending XID Wraparound



- At a previous employer
- 36 hrs of degraded services (minor issues) due to intentional degradation to avoid xid wraparound.
- At several points various people intervened effectively even against their line managers, in ways that contributed to a positive outcome.

# Quick Tips



- Incident response and upper level management status updates should be kept separate, to minimize power distance
- Use a structured intervention strategy like Bishop's:  
“Hey Bob, I am worried that the database is overloaded. We are seeing an increase in waiting queries. I would like to throttle inbound connections. What do you think?””
- Use open questions as much as possible.

# Quick Tips



- Communicating emergencies should follow NITS:
  - Nature of emergency
  - Intentions
  - Time estimates/required/available
  - Special instructions

For example: “X is overloaded. We are scaling it up. This is expected to take half an hour. Customer should note x, y, and z may be impacted.”

# Human Performance Management



- Stress management -- impact of stress on decision making
- Workload management -- too many things to pay attention to at the same moment hurts accuracy
- Situation Awareness -- Ensuring people are alert when they need to be
- Emotional control -- startle response, etc.
- Awareness of circadian rhythm/circadian disruption
- etc..... This is a broad field

# Observations



- Stress can make people perceive maliciousness where none exists
- Too high workload can result in missing problems
- Stress makes high workloads harder to address.
- Stress can cause health issues.
- High workloads are harder to manage during circadian low windows.
- Lowering workload improves outcomes

# Best Practices



- Watch for signs of stress in others, and brief on call or operational folks on physiological signs of stress.
- In major responses, divide workload intentionally to ensure people have fewer things to focus on.
- Reduce workload further by using checklists
- Ensure that operations folks have to frequently carry out routine tasks to keep them plugged in, so to speak.

# Structured Decision Models



## T-DODAR

- Time/Triage
- Diagnose
- Options
- Decide
- Act/Assign
- Review

## FORDEC

- Facts
- Options
- Risk Assessment
- Decide
- Execute
- Check

## PIOSEE

- Problem
- Information
- Options
- Select
- Execute
- Evaluate

# In a nutshell



- Take in information
- Determine the nature of the problem
- Brainstorm options
- Decide which option to execute
- Do it
- Re-evaluate, and maybe start at the top

The frameworks are all variations on this theme, and it is collaborative.

# Best Practices



- Select a decision framework for incident response for your organization.
- Train all stakeholders in that incident response model
- Follow it during major incidents
- Review and revise your understanding of the decision model periodically via retrospectives, and be open to changing (or evolving) if a model is not working for you.



## **Safety “Attitudes” around CRM**

# Safety “Attitude” aspects



## Safety Culture and Mgmt

- Near Miss Handling
- Incident Post Mortems
- Follow-up and Tracking
- Concern Tracking

## Inclusion and Intervention

- Everyone feeling empowered to intervene
- Intervention welcome but respectful
- Interventions of subordinates welcomed by leaders

## Threat and Error Mgmt

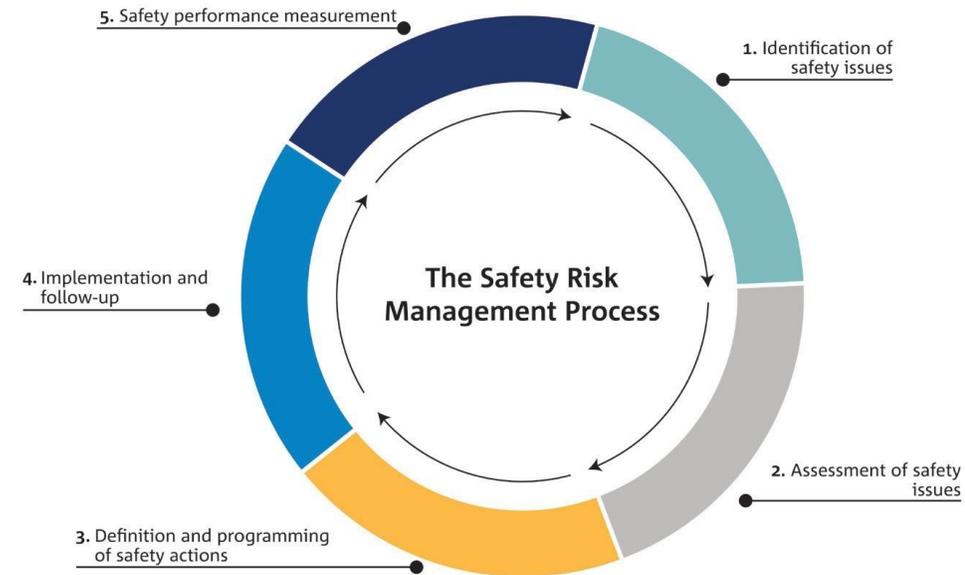
- Risk assessment as a primary engineering duty.
- “If I do this, what could go wrong?”
- “If things are bad, how can I mitigate risks and make them good again?”

# Safety Management



Safety Management is a term taken from other industries (manufacturing, aviation, etc)

- Ensure a place of no-fault reporting
- Encourage reporting of near misses
- Encourage reporting of structural concerns
- Encourage reporting of minor incidents
- Presumption against fault.



# Inclusion and Intervention



A successful culture of intervention depends on inclusion, and a culture of both leadership and followership

- Intervention should never presume personal fault.
- Structured interventions work best if there is time
- Leaders need to be accepting and embracing of interventions
- Followers need to be empowered to intervene when leaders may be about to make mistakes.
- Honest mistakes are not generally personal faults

# Threat and Error Management



- Identify and prepare for threats
- Identify and recover from errors
- Give yourself an out
- Structured decision making is important.
- Comes back to situation awareness





**Conclusions/Benefits of CRM**

# CRM Awareness Benefits



- Improved processes for late night responses
  - Lower workload at night means faster, more accurate responses
  - Troubleshooting checklists provide better escalations
  - Clearer, up front risk assessment in repeated incident classifications
- Improved hiring processes
  - Filters for situation awareness and resilience
  - Better focus on those who can grow into a role

# CRM Culture Benefits



- Faster, better outcomes in incident response
- Less exhaustion, stress, etc during incident response
- More confidence during incident response
- Better customer/stakeholder management during incident responses



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**Thanks!**

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