goto; conference

Tiered Tragedy

Jeffery Smith

follow us @gotochgo

INSPIRED BY TRUE EVENTS.

THE NAMES AND LOCATIONS HAVE BEEN CHANGED TO PROTECT THE INNOCENT

AGENDA

WHAT ARE WE TALKING ABOUT?

Introduction

The Anatomy of a System

Walkthrough a Real Incident

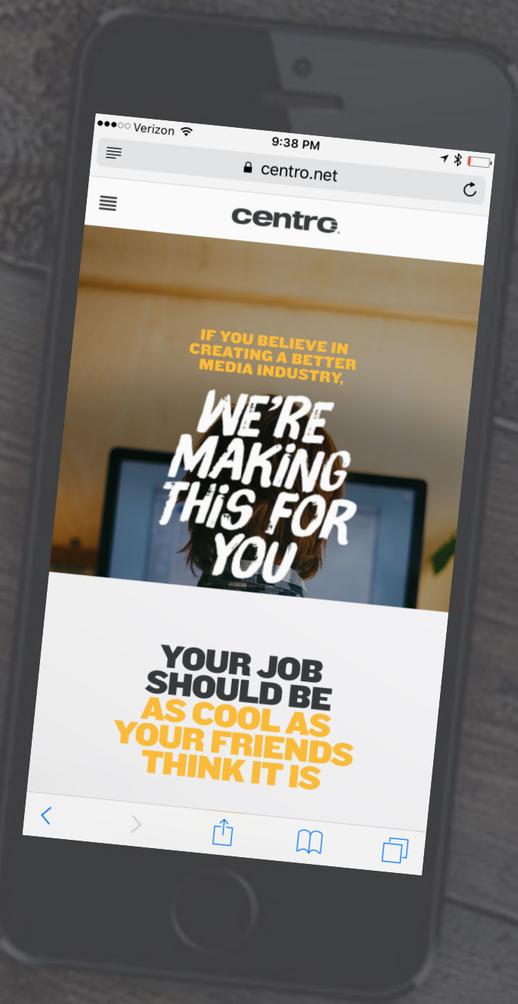
What did we learn

Jeff Smith

Centro

Manager, Production Operations

- @DarkAndNerdy
- jeff.smith@centro.net
- www.allthingsdork.com



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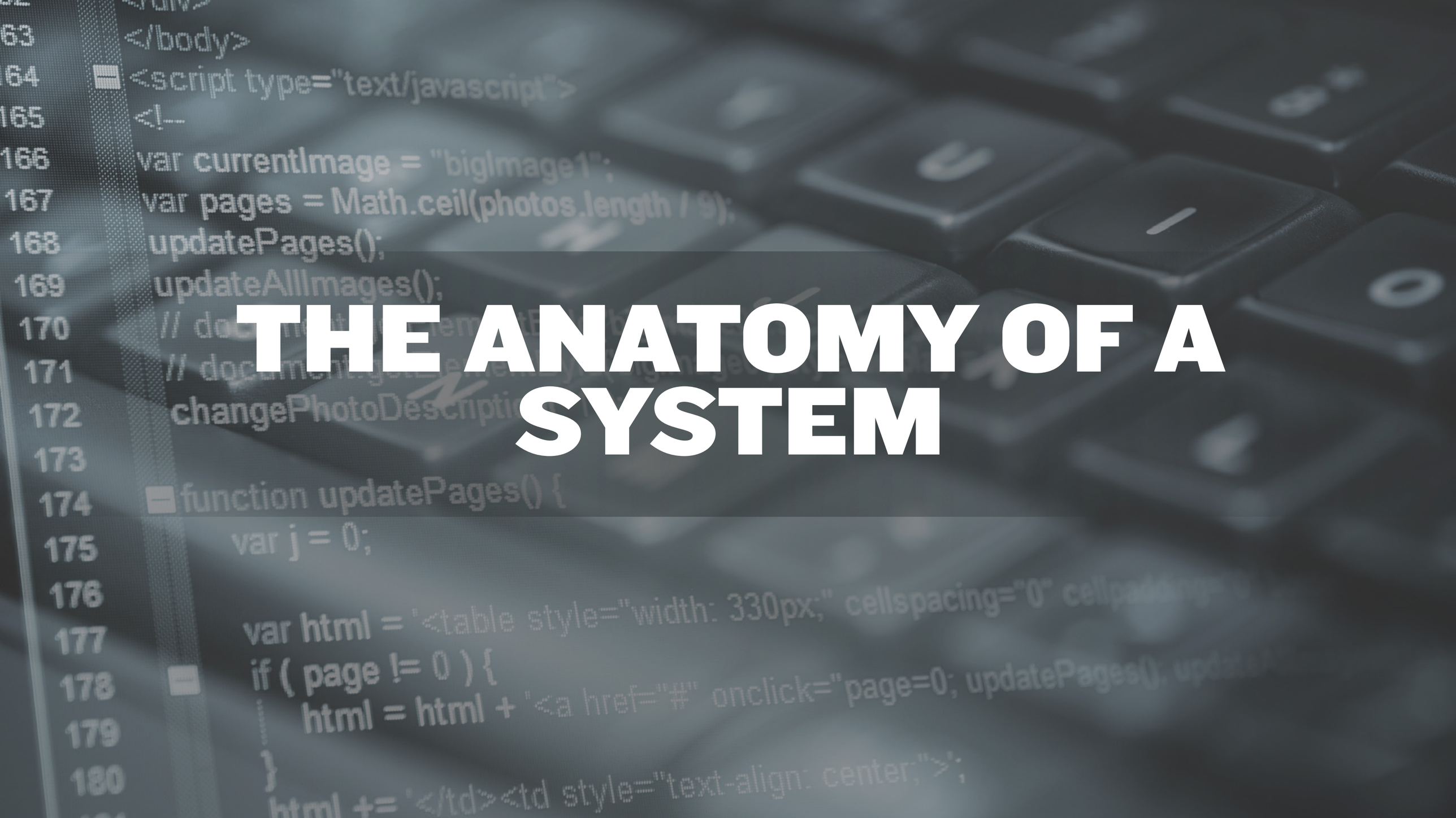
THE ANATOMY OF A SYSTEM

WHAT IS A SYSTEM?

> A set of connected things or parts forming a complex whole.
>
> A *subsystem* is a set of elements, which is a system itself, and a component of a larger system.

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https://en.wikipedia.org/wiki/System

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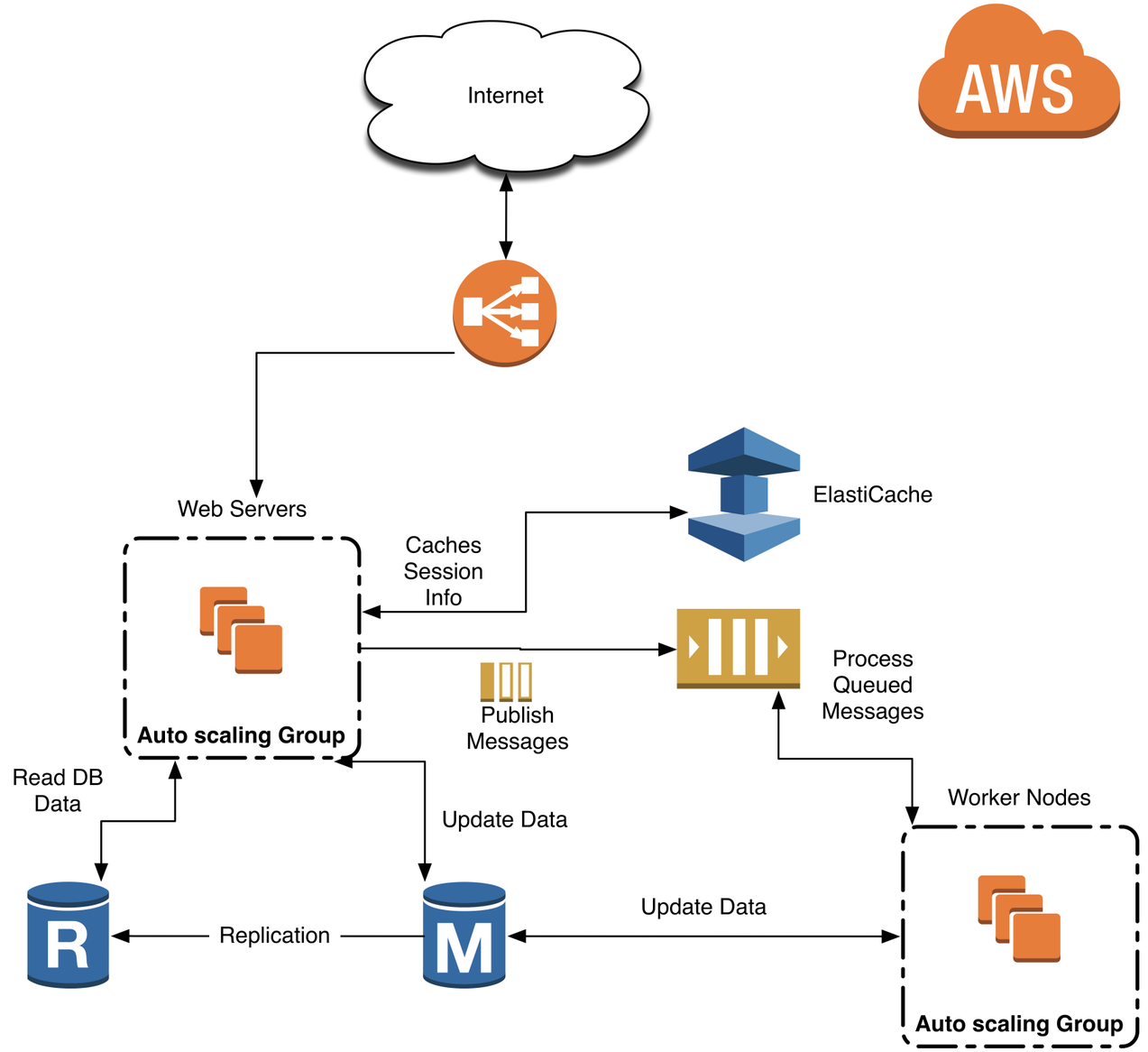

High Level System Diagram

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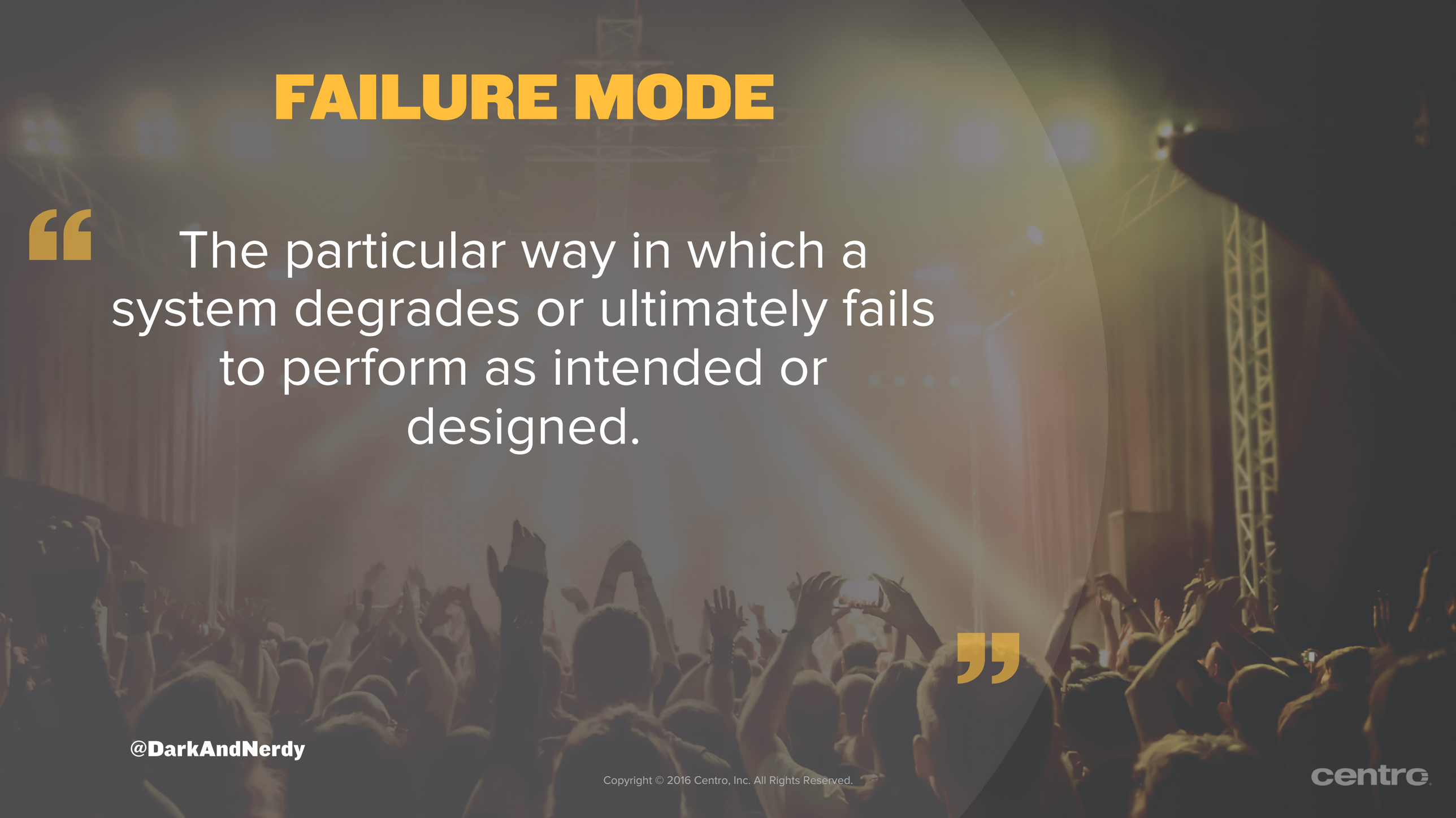
FAILURE MODE



> The particular way in which a system degrades or ultimately fails to perform as intended or designed.

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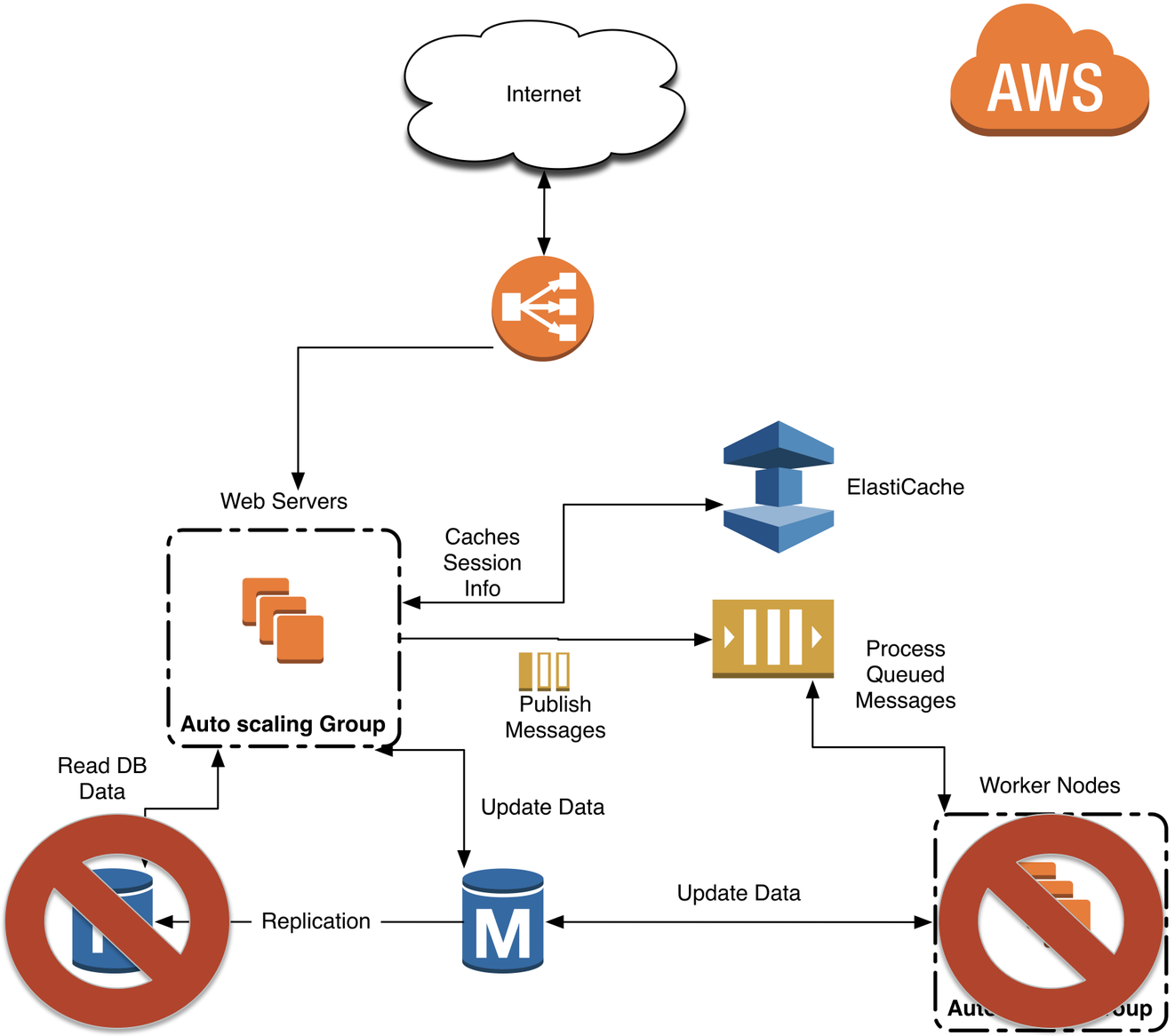

High Level System Diagram

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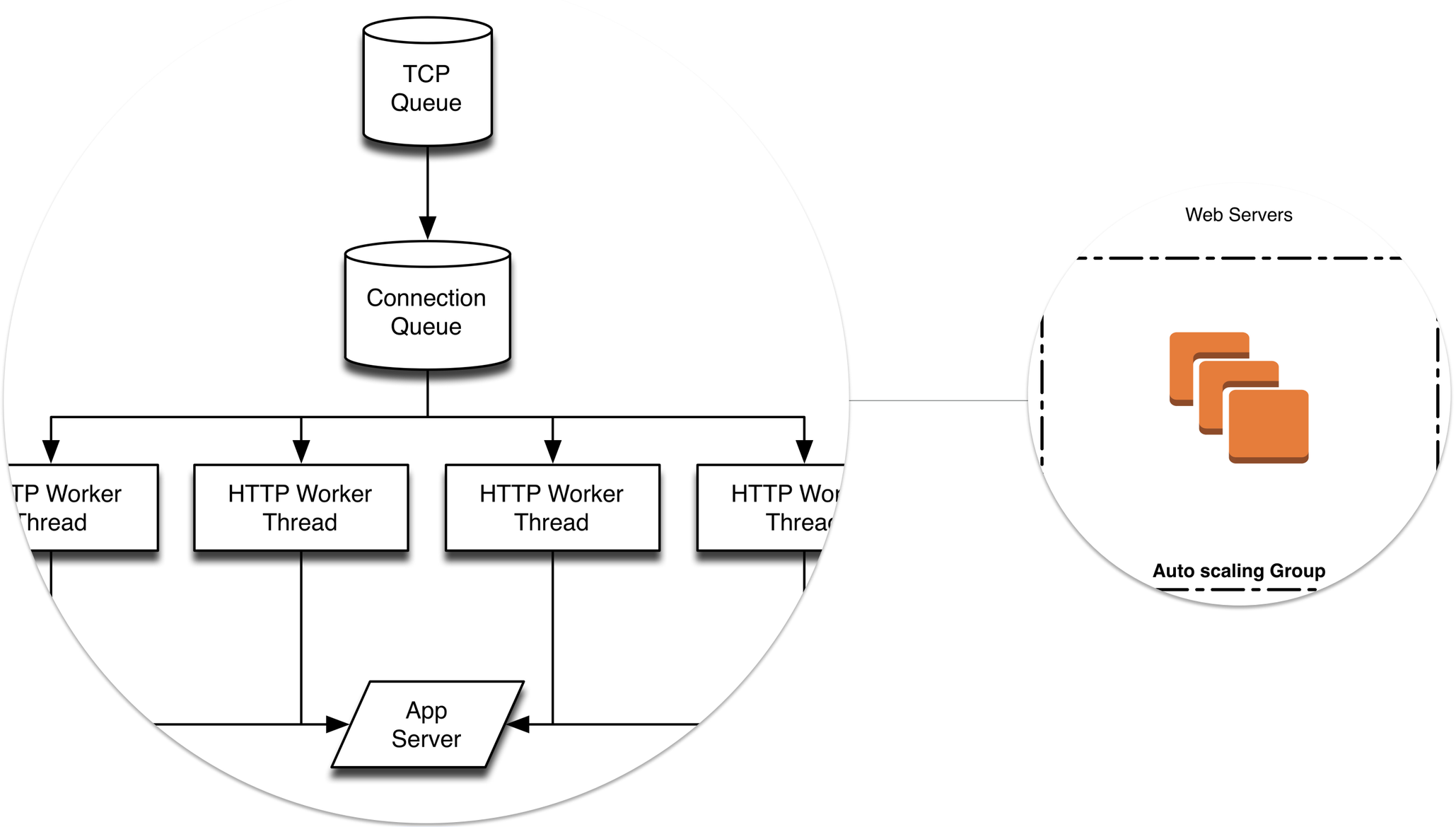

High Level System Diagram

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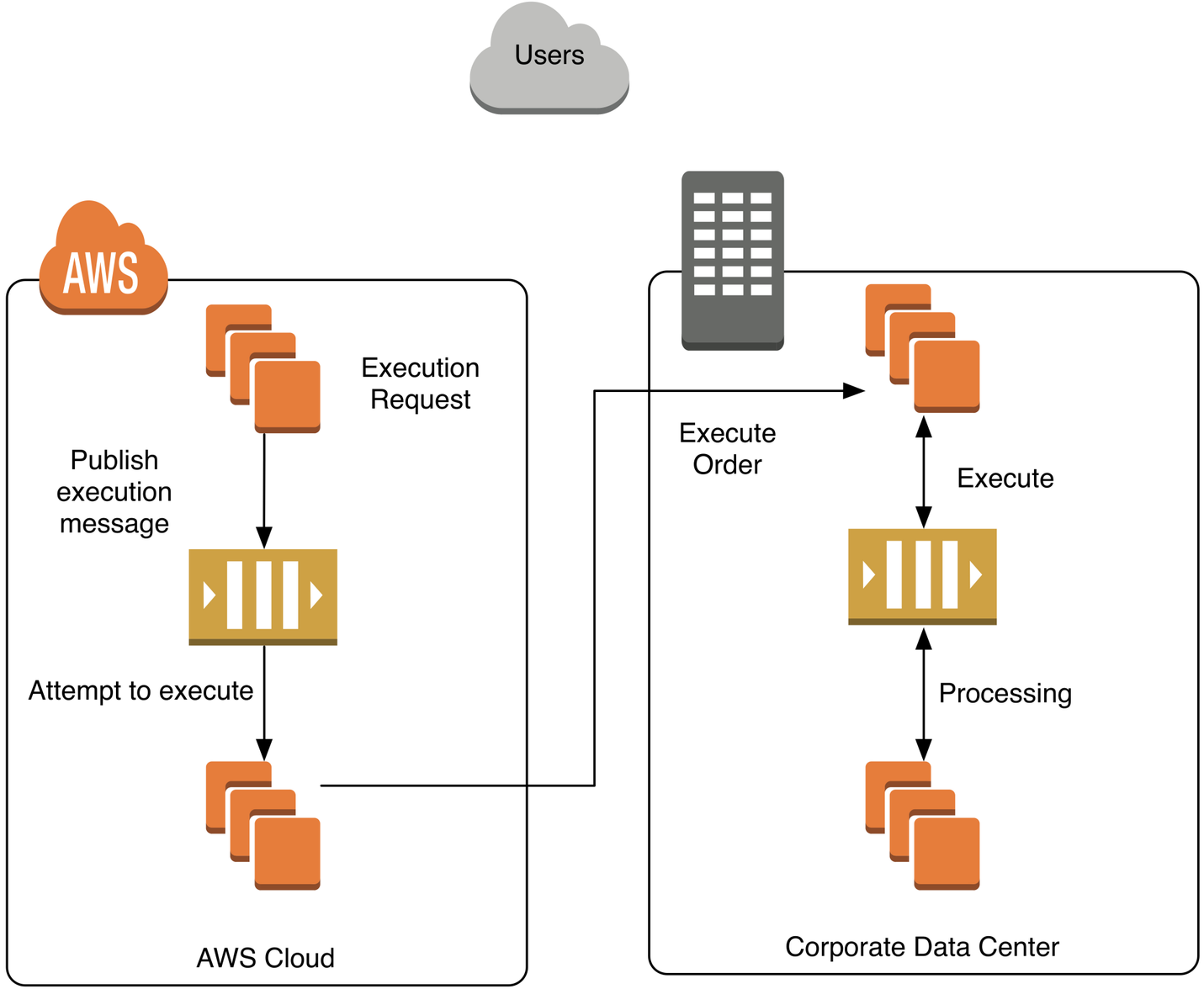
A FAILURE WALK THROUGH



Troubled System

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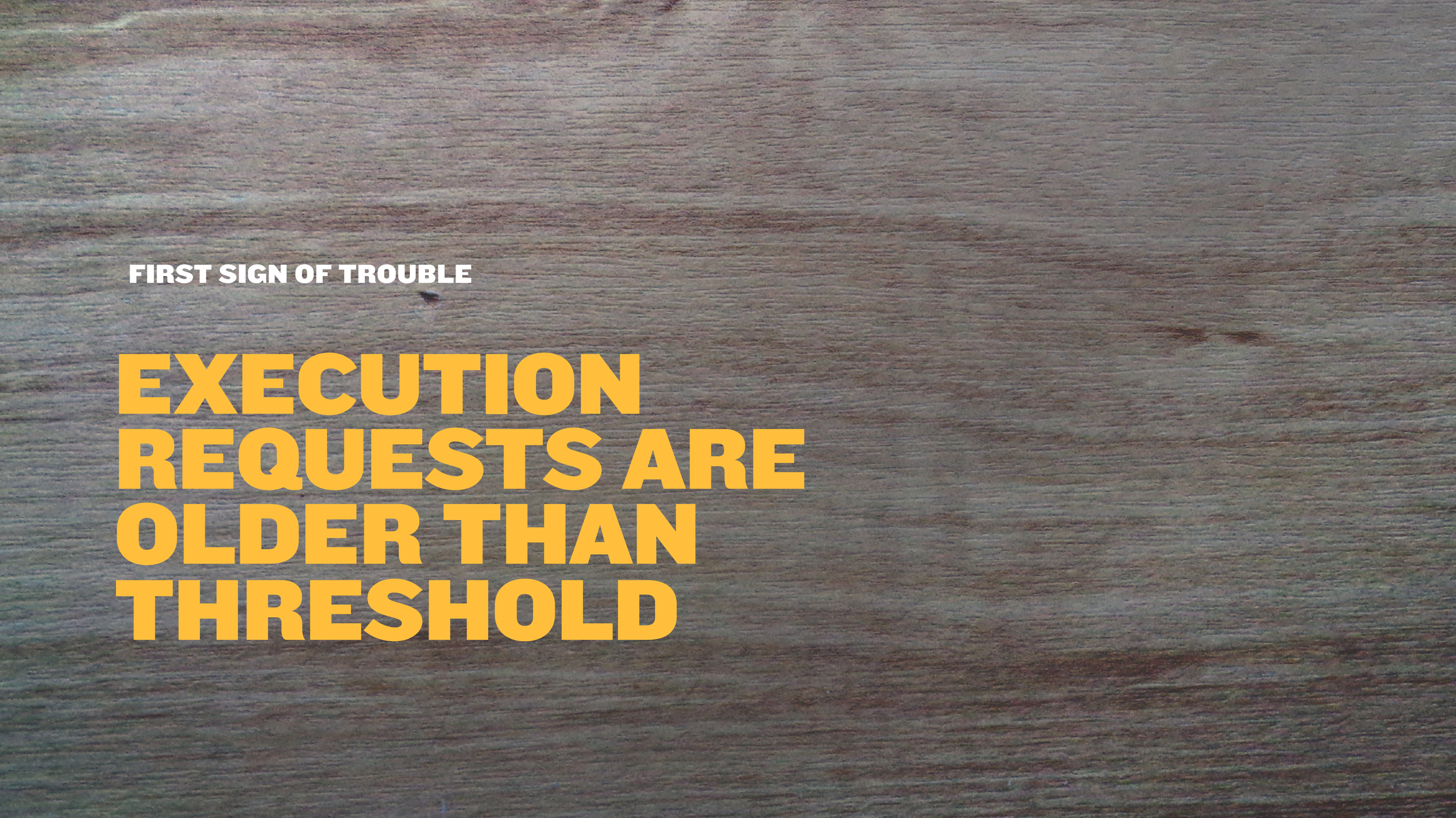
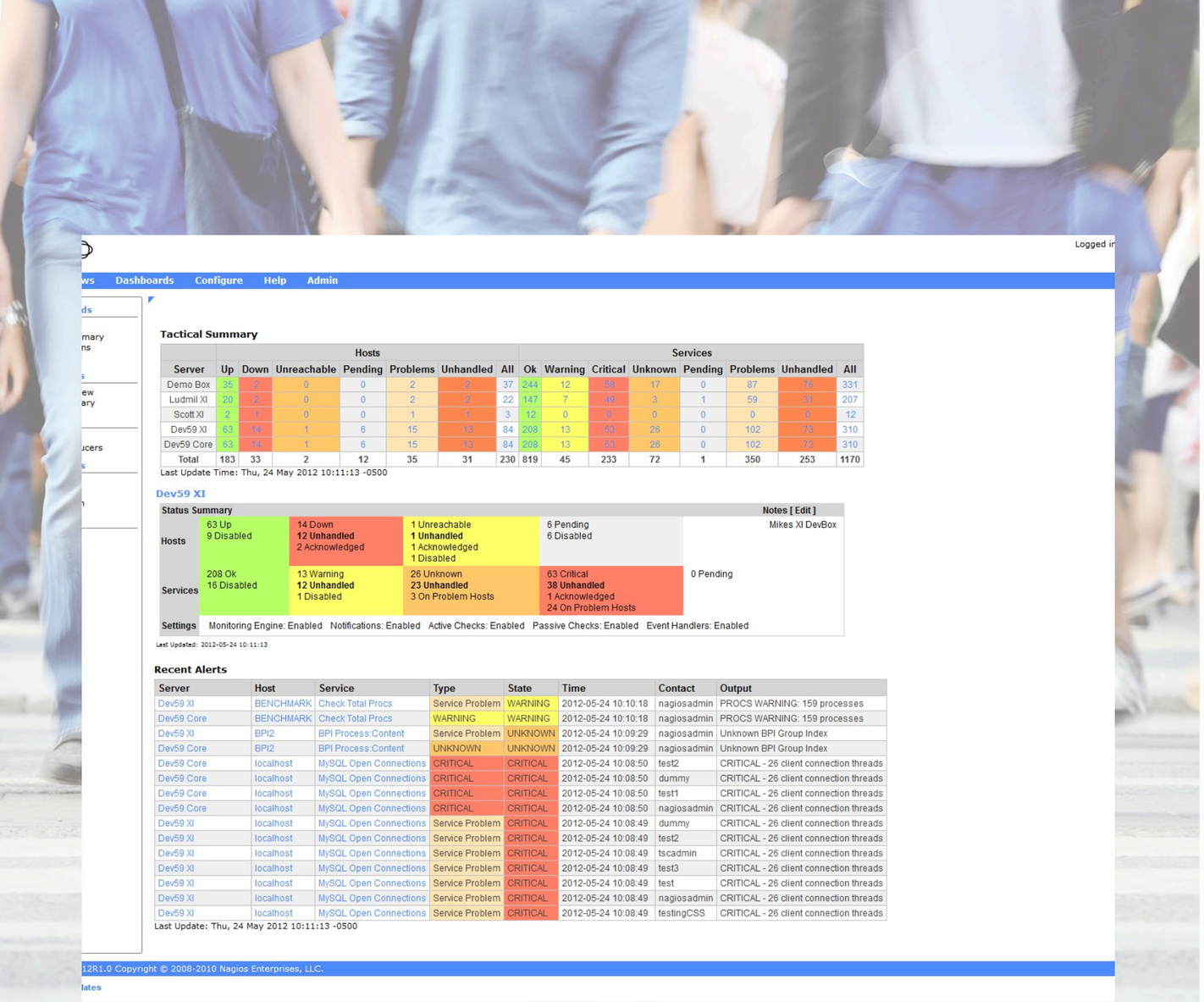

FIRST SIGN OF TROUBLE
EXECUTION REQUESTS ARE OLDER THAN THRESHOLD



PROS AND CONS

You quickly understand the business impact

You don’t know what part of the pipeline is problematic

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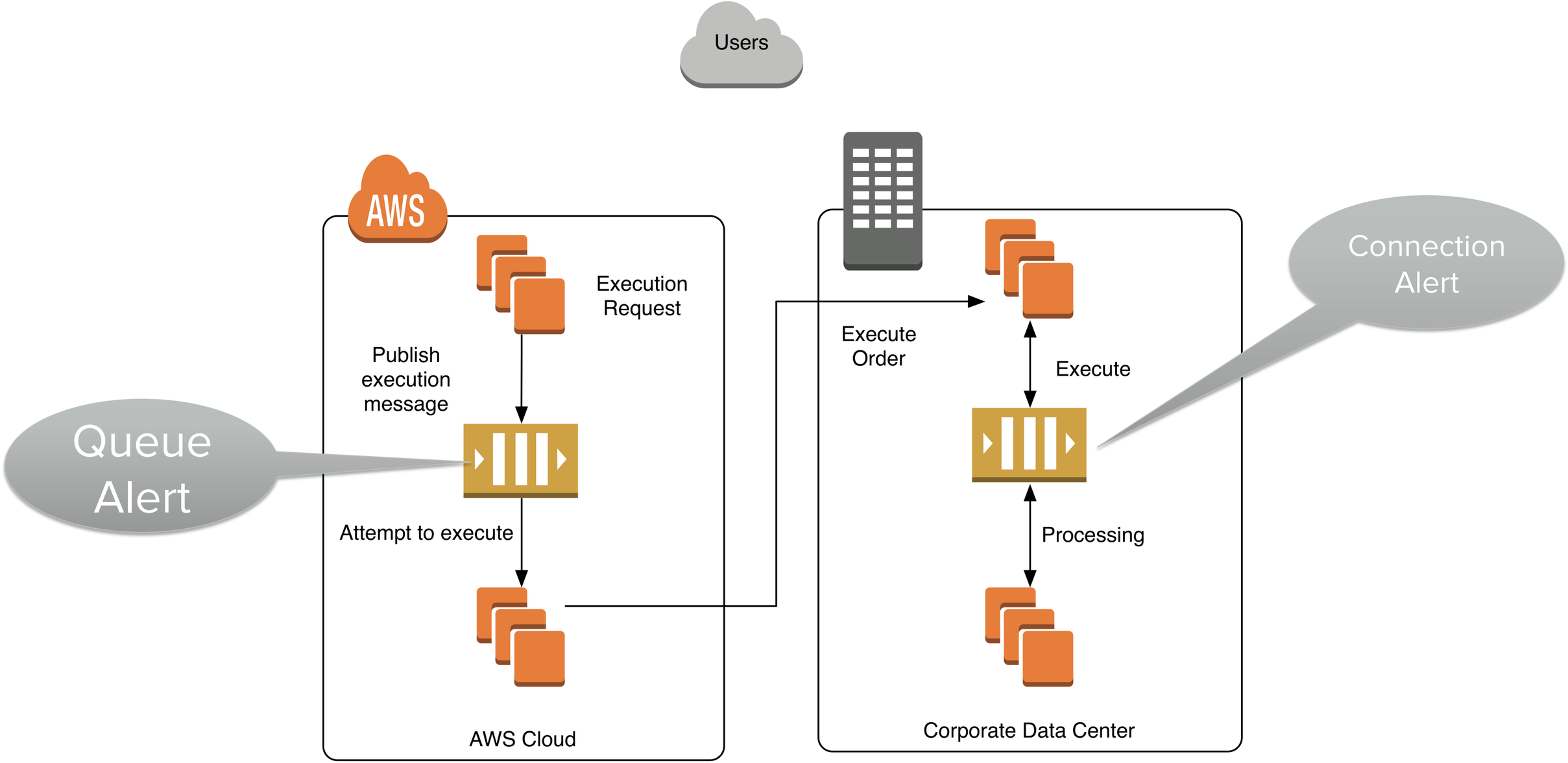

Troubled System

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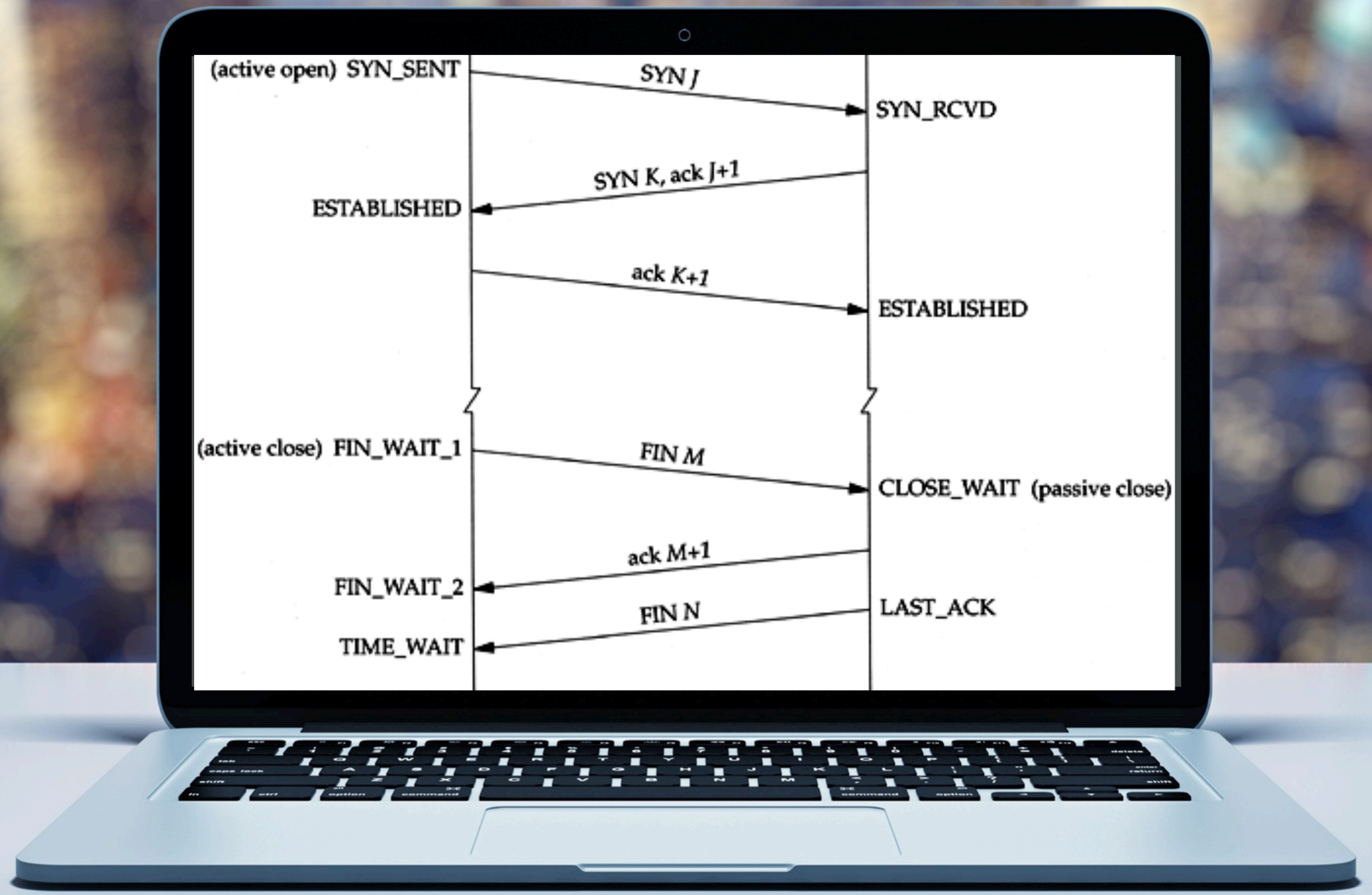
FAILED CONNECTIONS

Lots of CLOSE_WAIT statuses

WHAT IS CLOSE WAIT?

- The client end has finalized the connection
- Waiting for the server to call close() on the socket.



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https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjWxamR_8rTAhVC64MKHfzfA7UQjxwIAw&url=http%3A%2F%2Ffllyli b.com%2Fbooks%2Fen%2F3.223.1.188%2F1%2F&psig=AFQjCNF7QFRODIHuDsu6XnqSGgsW5NUicg&ust=1493600816471929

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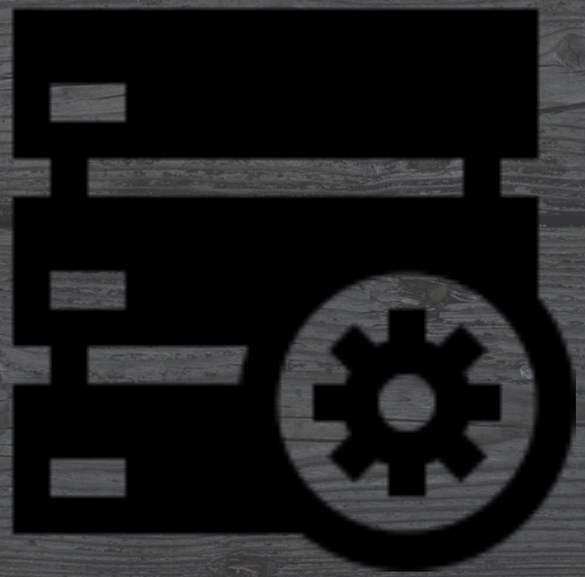
SERVER

CONNECTION STATES

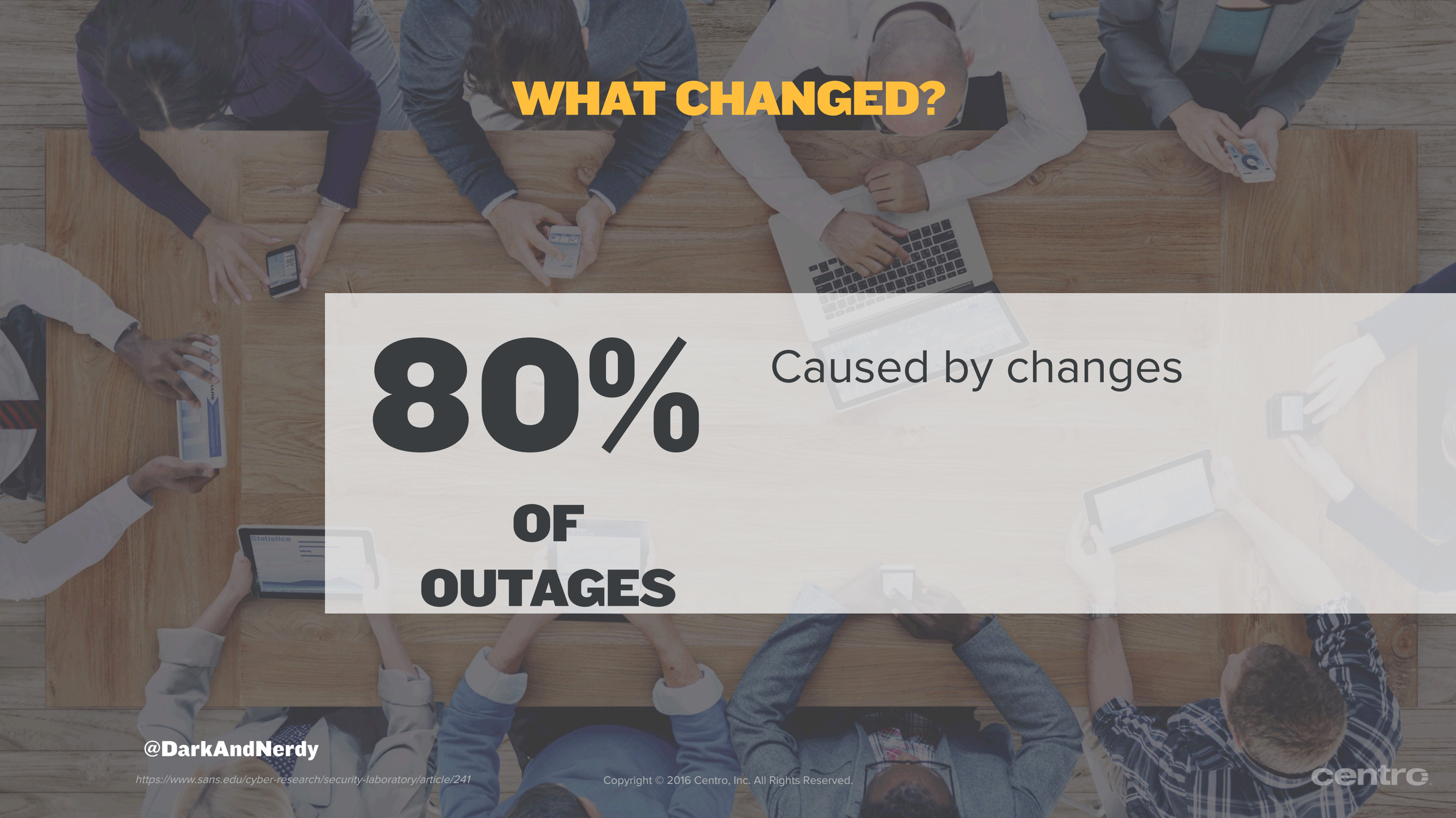
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT
- CLOSE_WAIT



MEMORY USAGE

- 80%
- 80%
- 82%
- 82%
- 83%
- 85%
- 85%
- 87%
- 87%
- 88%
- 88%
- 89%

WHAT CHANGED?



80%

OF OUTAGES

Caused by changes

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https://www.sans.edu/cyber-research/security-laboratory/article/241

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CHANGE CONTROL LOG

LOGGING AGGREGATION

FIREWALL RULES CHANGE

LOGO REDESIGN

CHANGE TO MESSAGE QUEUE PROCESS

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CHANGE TO MESSAGE QUEUE PROCESS

INCREASE NUMBER OF WORKER THREADS (10 -> 20)

REGRESSION WHICH CAUSED NEW TCP CONNECTIONS FOR EACH MESSAGE PROCESSED

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OPERATIONS RULE #172

ROLLING BACK WHAT CHANGED IS ALWAYS A GOOD IDEA

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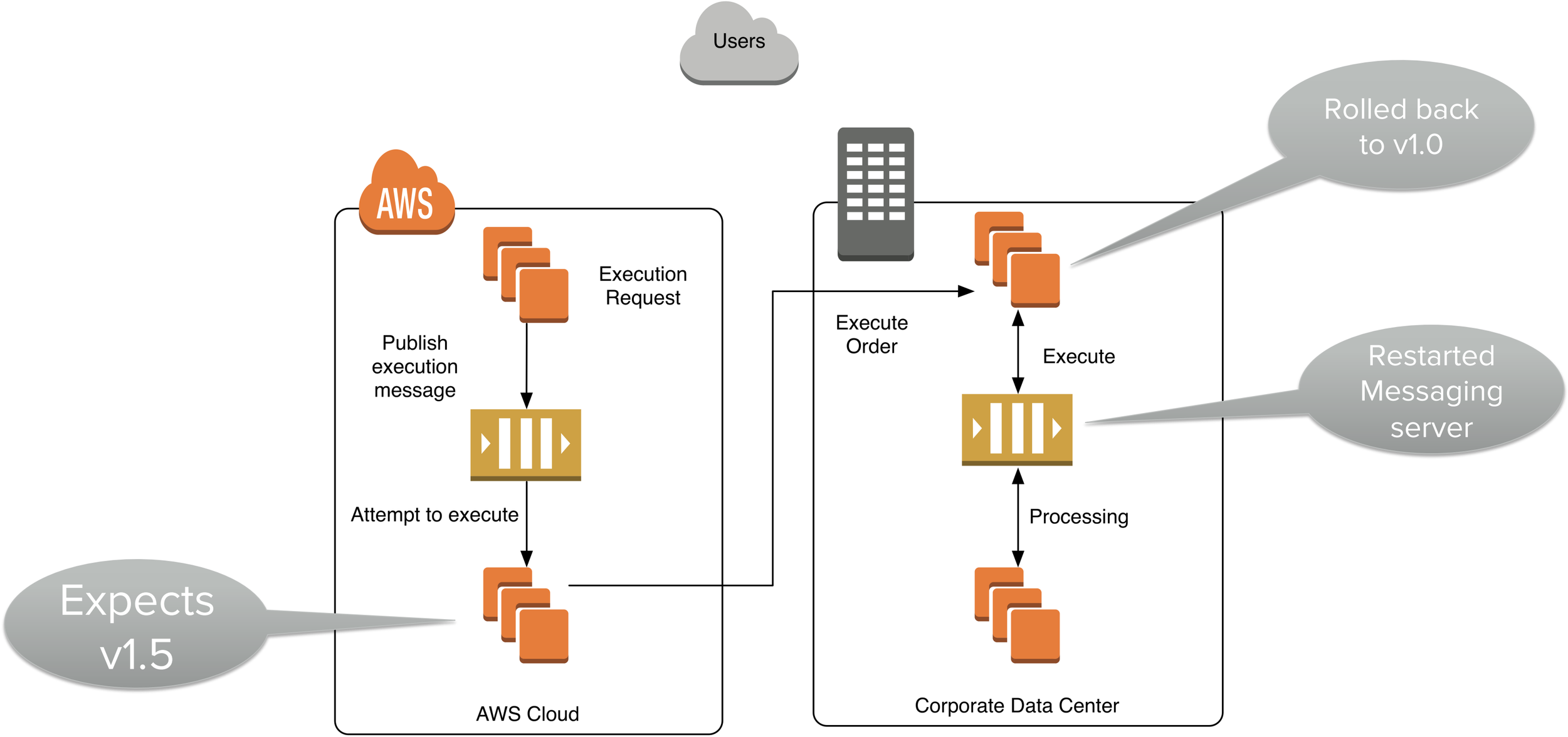

It's Complicated

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IT'S
FIXED!
Or is it?
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WHAT DID WE MISS?

In hindsight, things that were important

1

Message server ran out of memory

Alerts fired, but missed during outage

2

Bad connections continued after rollback

Ignored due to pending restart

3

Message thread errors

Missed in the mound of logs

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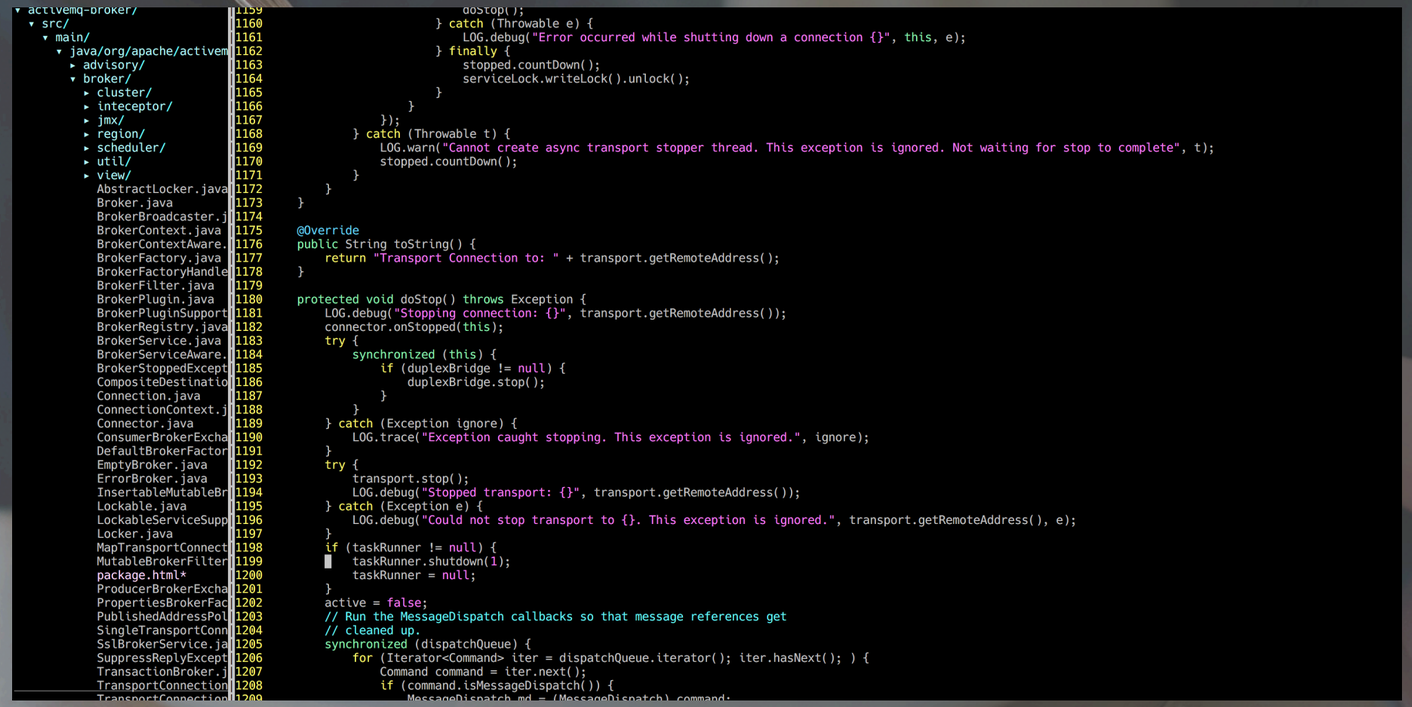
MESSAGE THREAD ERRORS



EXCEPTIONS GIVE CLUES

- Open source products give you the chance to search source code
- Helped us to identify what the thread was responsible for

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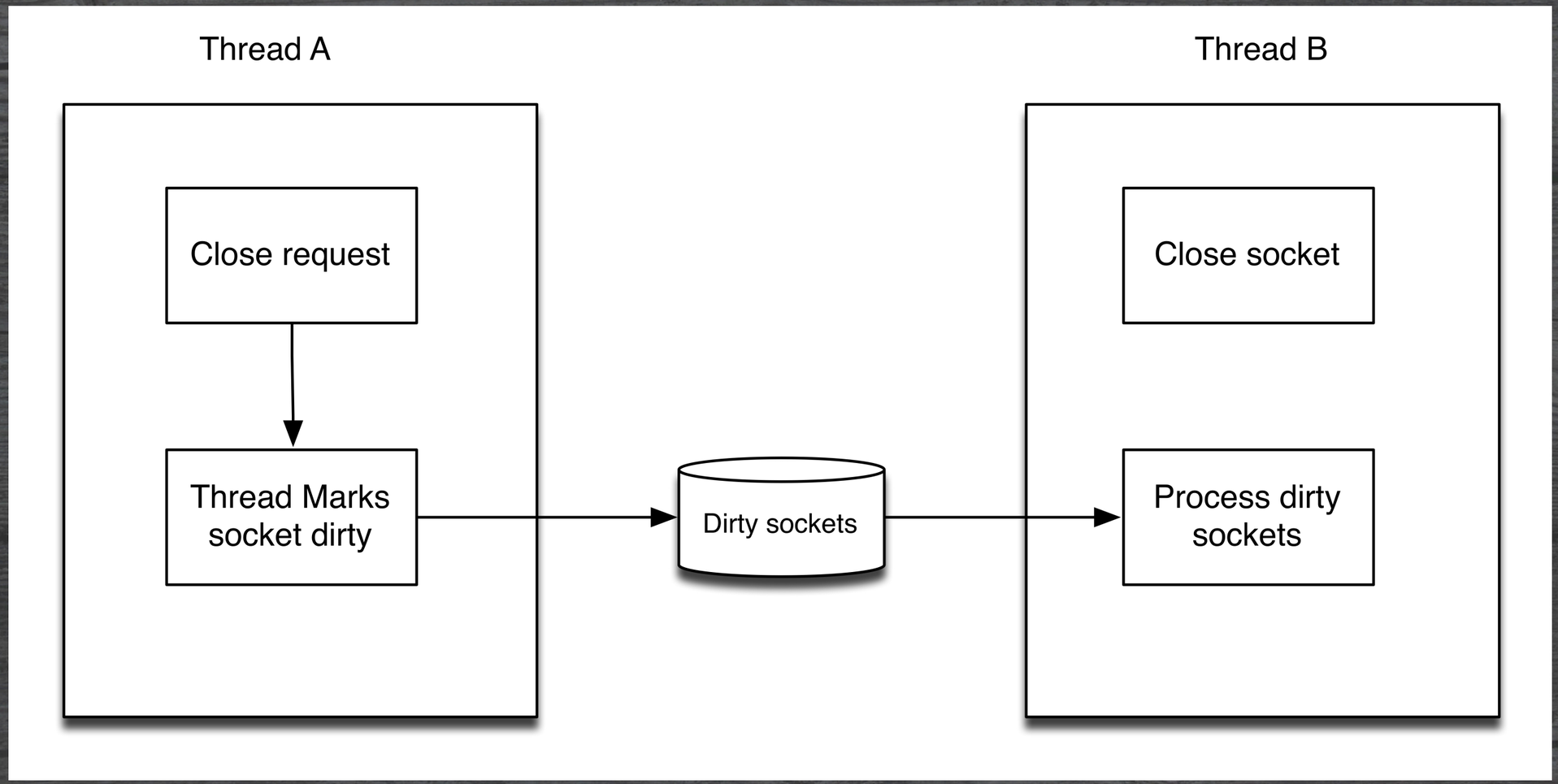
ASYNC SOCKET CLOSES



CAPACITY PLANNING 101

HOW MANY CONNECTIONS CAN WE SUPPORT?

@DarkAndNerdy

MAXIMUM CONNECTIONS

```
/**
 * The maximum number of sockets allowed for this server
 */
protected int maximumConnections = Integer.MAX_VALUE;
```

WHAT DID WE LEARN?

ROOT CAUSES?

A collection of individual failure states that created a unique system state

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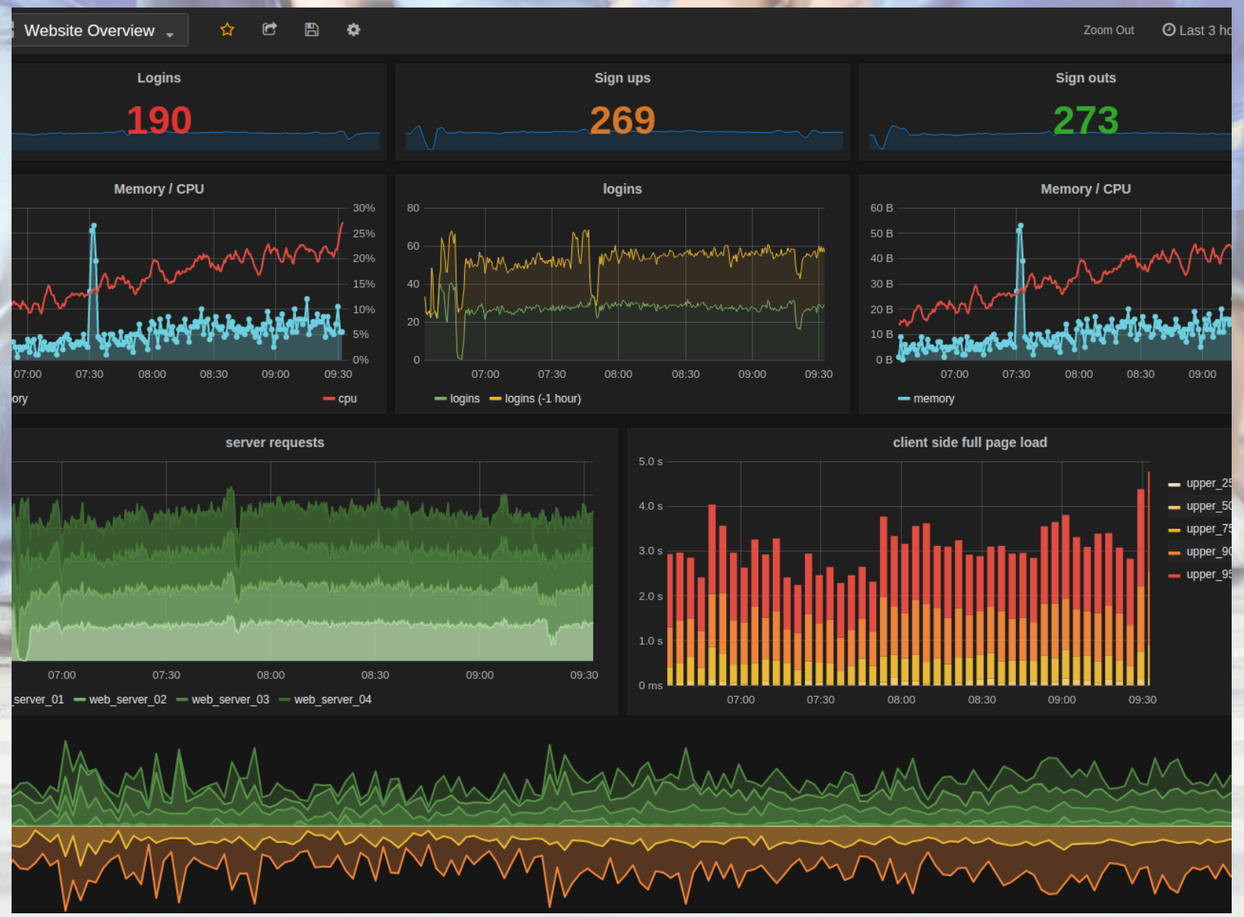

METRICS NEED CONTEXT

- Sometimes data points need further clarifying data
- It's helpful if Dashboards operate at different system level views

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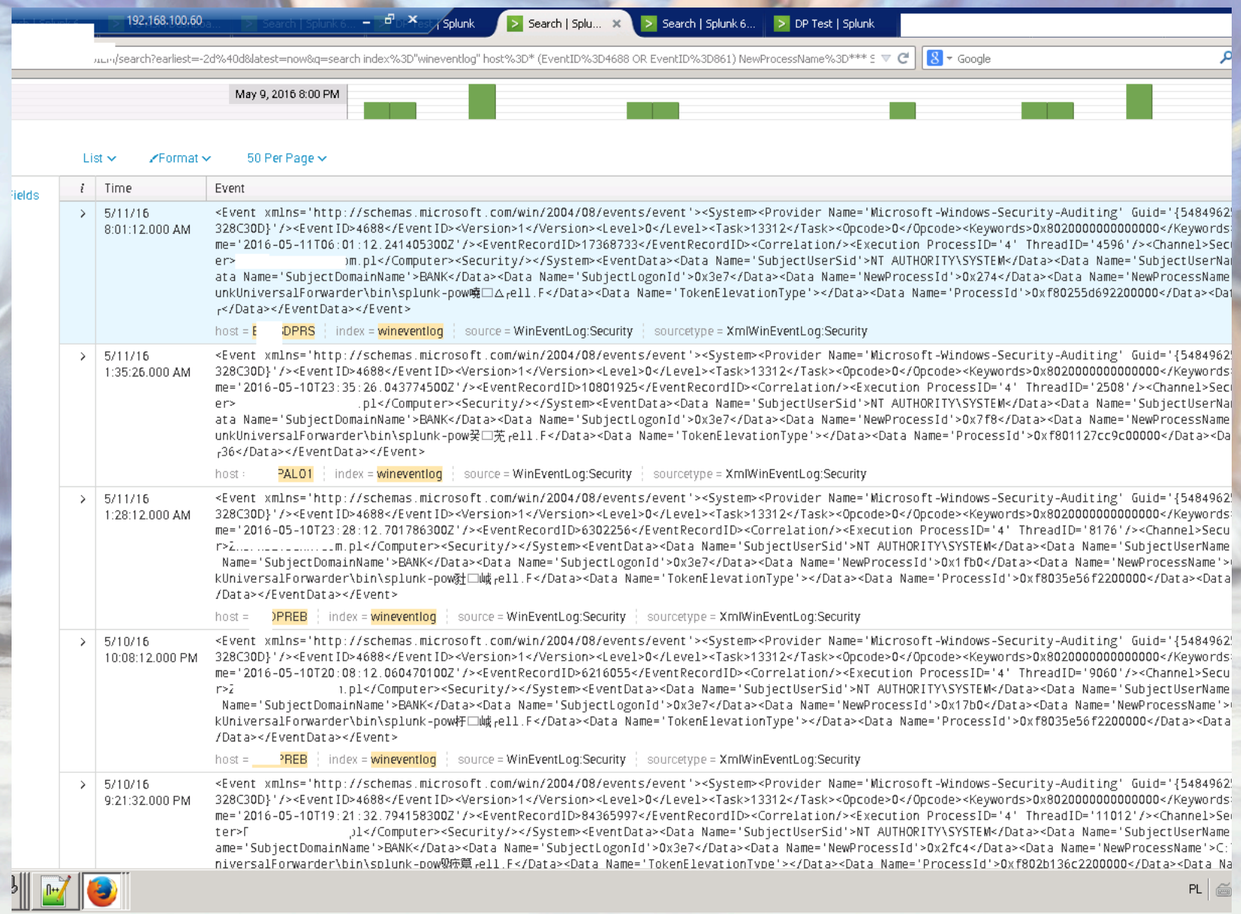

LOGS, LOGS, LOGS, LOGS LOGS

- Dead in the water without centralized logging
- Signal from the noise. Easy way to generate a list of classes of errors

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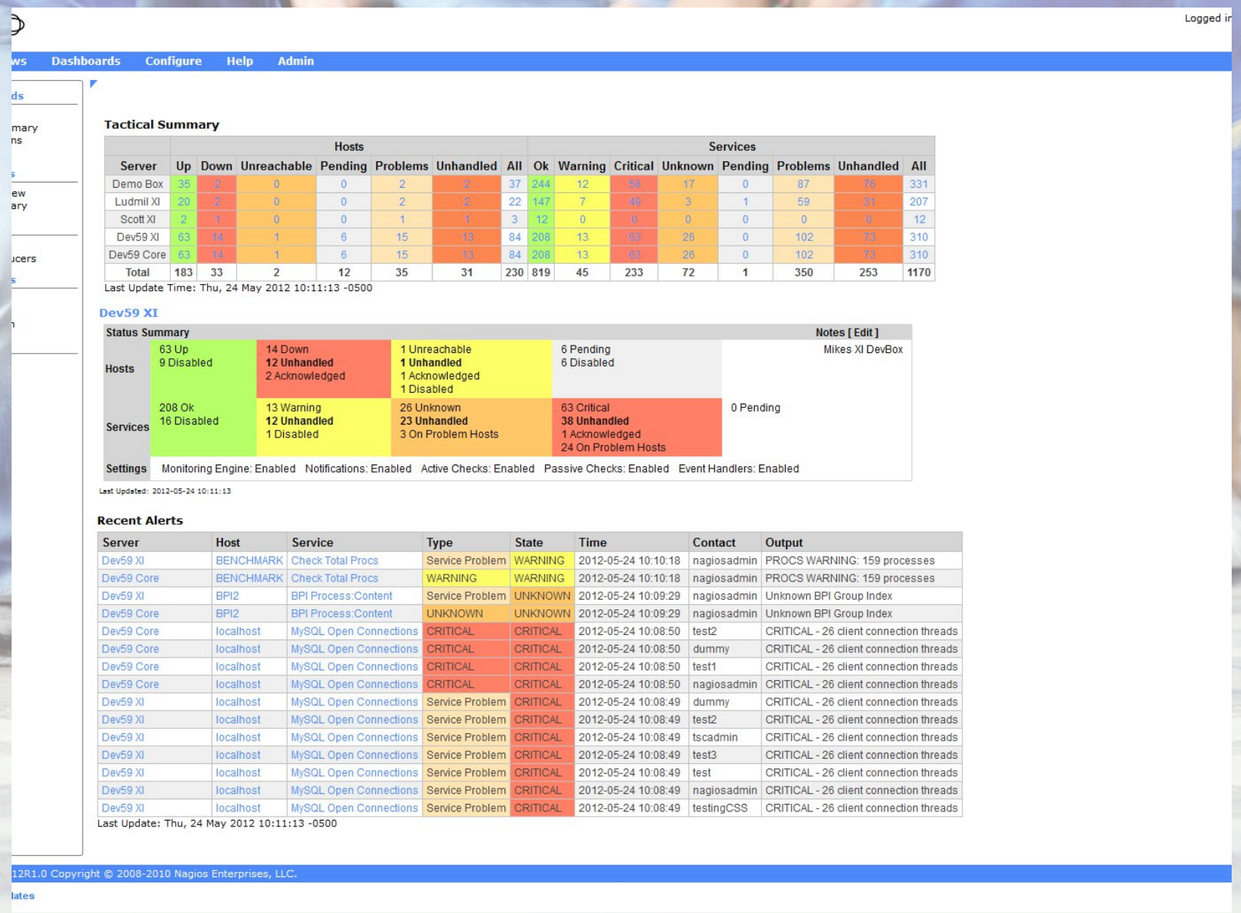

ALERTS

- Easy to lose new alerts that come in during a major outage.
- Constant paging
- Services like Big Panda hope to solve this

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Recap

WHAT WE TALKED ABOUT

The Anatomy of a System

- Systems within systems
- Complexity increases with number of systems

Walkthrough a System Failure

- Most failures are caused by a change, rollback!
- Root cause analysis is difficult

Things we Learned

- Give you alerts context
- Aggregated logging is table stakes
- Manage your alerts so you don’t miss out on state changes

THANK YOU.

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