What your infrastructure can learn from accidents

How OpenVox helps prevent incidents

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OpenVox Conf
Nuremberg

Simon Hönscheid
simon@xyntion.consulting

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We build great platforms

Who am I

Simon Hönscheid

CEO and Consultant at Xyntion GmbH, Berlin, Germany

Experience with the Puppet/OpenVox ecosystem since 2012

IT infrastructure automation, CI/CD, Container technologies,

cloud computing, DevOps principles, & team building

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Content

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01

IT disasters happen

»A crisis is a terrible thing to waste.«

Paul Romer, former Chief Economist of the World Bank

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Incidents happen
and cost millions

December 2021

- AWS US East 1
- 7 hours of downtime
- Cost: $150 million

July 2022

- Rogers, Canada
- 15 hours – 12 million users offline
- 25 % of Canada without internet

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When was your last outage?

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Everything is burning

Is your infrastructure currently on fire?

Friday, 4:47 p.m.:

The website is down

No one knows what was changed

* no humans or animals were harmed in the taking of this picture

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Maybe this scenario sounds familiar?

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02

The 5 W questions

»These 5 questions save lives on the road. What if we apply them to IT?«

Key Question

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The 5 W questions

From road safety to IT infrastructure

WHO was involved?
→ Git commit author, ticket assignee, reviewer

WHAT happened?
→ Config changes, code diffs, system modifications

WHEN did it occur?
→ Precise timestamps, change windows, deploy times

WHERE was the impact?
→ Affected nodes, blast radius, geographical scope

WHY did this happen?
→ Business justification, root cause, ticket reference

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Traditional IT vs. systematic approach

Before vs. After

❌ »I don't know; it wasn't me«
❌ »Something with the configuration«
❌ »It was working yesterday«
❌ »Is this a global issue?«
❌ No history of who/what/when

✓ Commit author identified
✓ Exact changes documented
✓ Precise timing recorded
✓ Impact scope defined
✓ Business context preserved

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The Paradigm Shift

It's not about blame.
It's about understanding.

Road safety achievement:

88 % fewer deaths since 1970.

IT infrastructure:

We're still asking: »Is it working now?«

→ It's Time for systematic incident investigation!

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03

The reality check

»Complex systems fail in complex ways.«

Takeaway from Richard Cook, »How Complex Systems Fail«

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Incidents happen
Major IT outages 2021-2024

- Facebook: 6 hours, $100 million loss
- AWS: 7 hours, thousands of companies offline
- GitLab: database deleted, $10 million loss
- Rogers: 15 hours, nationwide emergency
- we haven‘t talked about critical infrastructure so far

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04

The traceability problem

»Without traceability, we're not doing engineering - we're doing archaeology.«

Michael Nygard, »Release It!«

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Let's do some archaeology

A typical response?

- ssh prod-server-17
- grep -ri 'error' /var/log/*
- »Hmm, nothing...«
- [3 hours later...]
- »Oh, it was prod-server-42«

Why traceability is lacking
The perfect recipe for disaster

✓ Technical debt
✓ Heroic administrators
✓ Tool chaos
✓ Lack of processes

❌ »I will do it«
❌ ASAP culture
❌ Legacy everywhere
❌ 5 different tools
❌ Lack of documentation

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Are you too busy to improve?
No thanks!
We are too busy
Håkan Forss @hakanforss http://hakanforss.wordpress.com
This illustration is inspired by and in part derived from the work by Scott Simmerman, "The Square Wheels Guy" http://www.performancemanagementcompany.com/

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The brutal truth

»*Without traceability, every incident is a crime scene where the evidence has already been destroyed.*«

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05

Infrastructure as Code — from chaos to clarity

»You can't debug what you can't trace.«

Distributed Systems Engineering Principle

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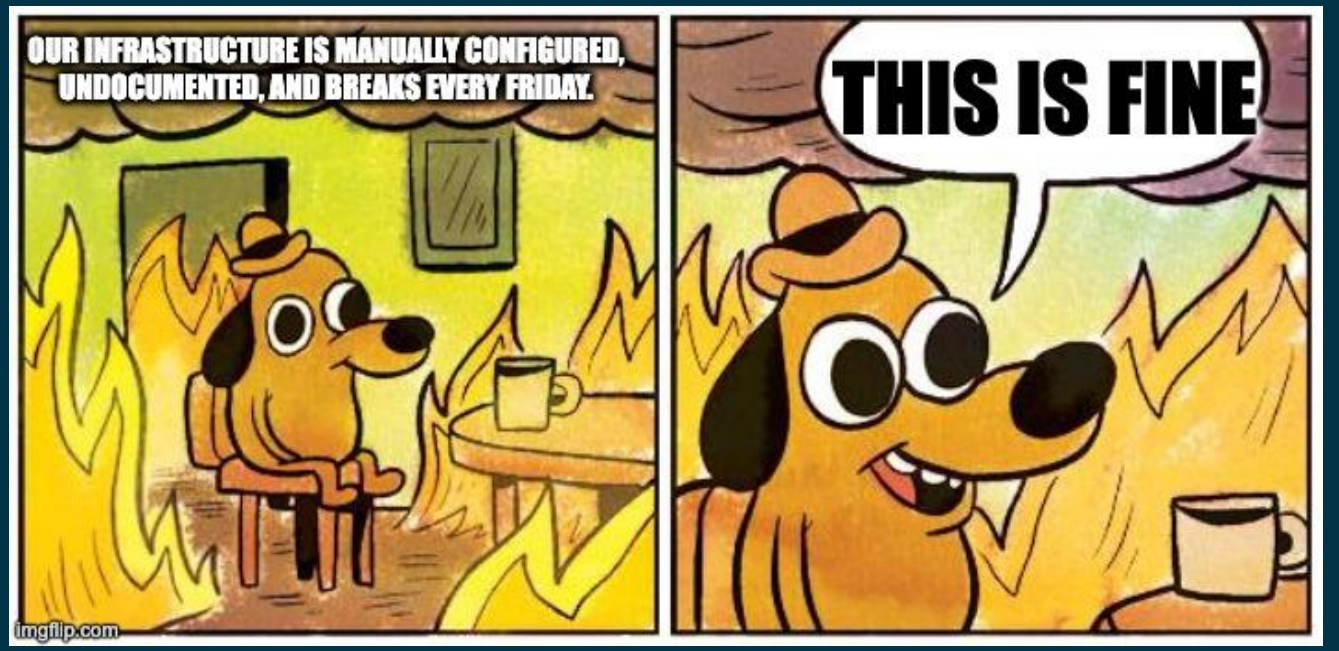
Breaking the Cycle

Why traditional infrastructure management fails

- ❌ Manual changes
- ❌ Undocumented modifications
- ❌ »It worked on my machine«
- ❌ Archaeological debugging

- ✓ Every change tracked
- ✓ Full audit trail
- ✓ Instant root cause analysis



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Infrastructure as Code
to the rescue

- There are different tools for the same job
- Use what you and your team know best

OR

- What survived your evaluation process

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OpenVox
checks all the boxes

- ✓ Enterprise-ready Puppet Fork
- ✓ Git-native Workflow
- ✓ Tracability built-in
- ✓ Agent-Server model
- ✓ Agent pulls config every 30 min.
- ✓ Complete change history

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Real-World Scenario
Black Friday preparation gone wrong

✓ **The Ticket:**
Increase worker_connections for user spike
✓ **The Change:**
1024 to 4096 worker_connections
✓ **The Problem:**
Service becomes unresponsive
✓ **The Question:**
How do we trace this back?

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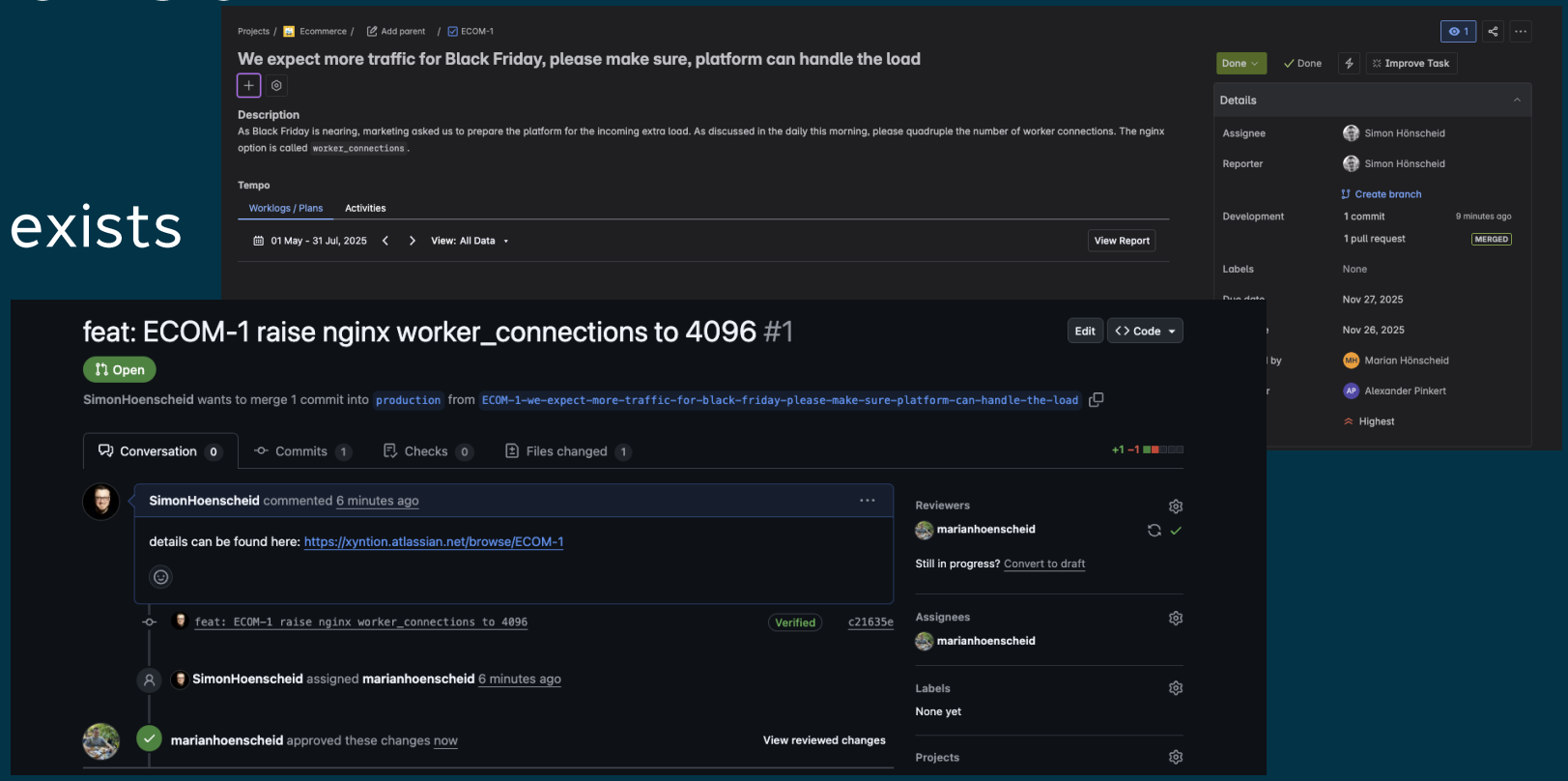
Who?
Who was involved?

- ✓ A ticket for the change exists
- ✓ Personal Git identity
- ✓ Signed commits
- ✓ Review process



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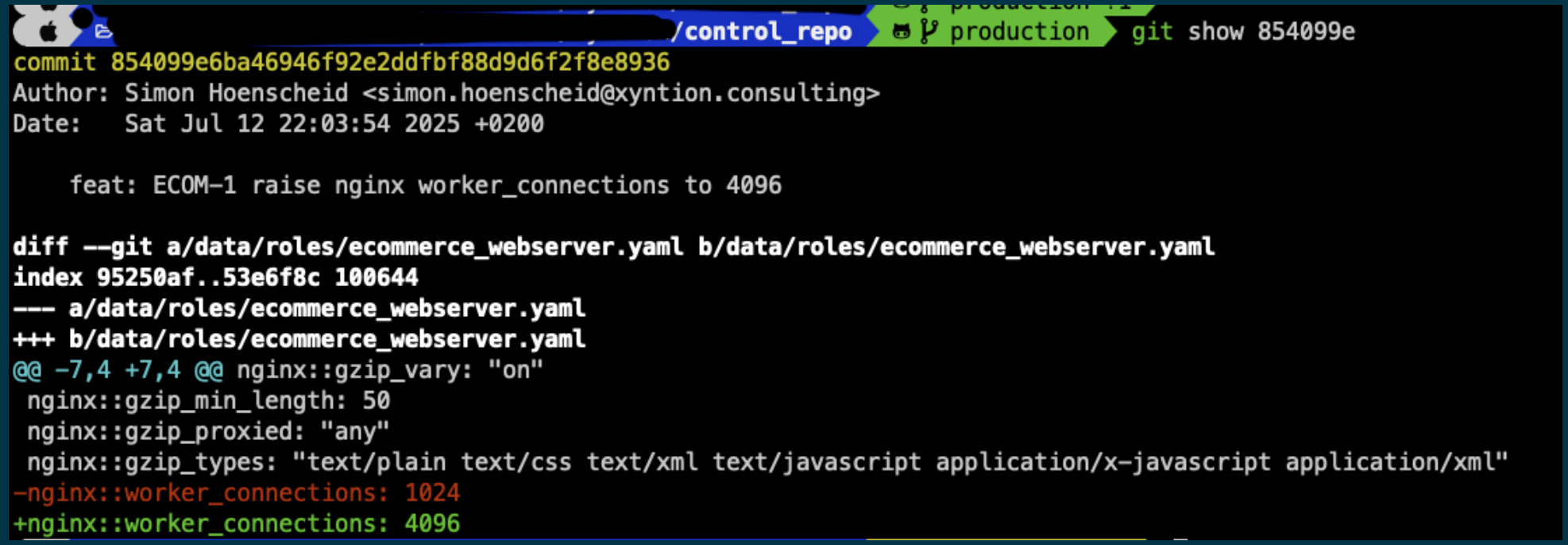
What?
The course of the accident

✓ git show commit-id



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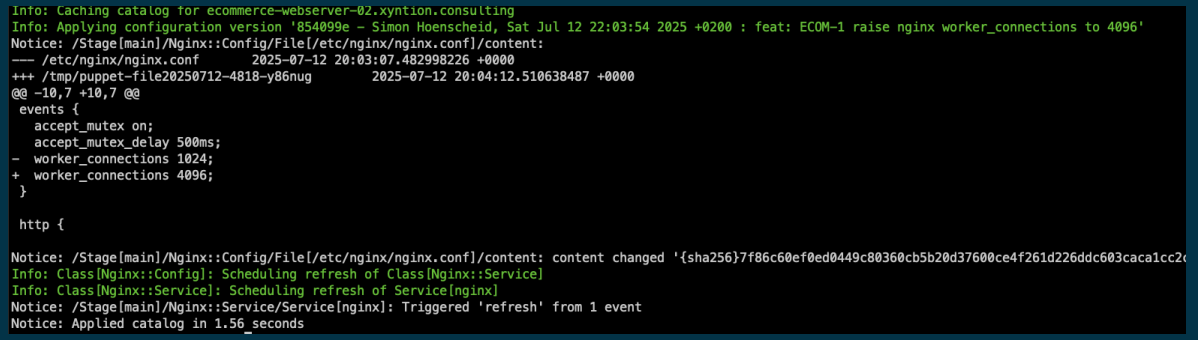
When?
Seconds can change everything



- ✓ 2:30 p.m. – Change deployed, OpenBolt Plan triggered
- ✓ 2:35: p.m. – Alarm triggered
- ✓ 2:40 p.m. – OpenVox View or Foreman show last changes
- ✓ 2:45 p.m. – Rollback and Open Bolt Plan initiated
- ✓ 2:50 p.m. – Service restored
- ✓ 2:55 p.m. – ITSM ticket created for incident
- ✓ 2:56 p.m. – Invitation to post-mortem sent

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Where?
The scene of an incident

```
5   class role::ecommerce_webserver () {
6     include profile::apt
7     include profile::packages
8     include profile::openssl
9     include profile::nginx_webserver
10  }
```

- ✓ Explicit node definitions
- ✓ Predictable blast radius
- ✓ No more surprises

[redacted] data > roles > ! ecommerce_webserver.yaml > ...

You, vor 1 Stunde | 1 author (You)

```
1   ---
2   nginx::ssl_protocols: "TLSv1.2 TLSv1.3"
3   nginx::ssl_ciphers: "ECDHE-ECDSA-CHACHA20-POLY1305:ECDHE-ECDSA-AES128-GCM-SHA256:ECDHE-ECDS
4   nginx::ssl_ecdh_curve: "secp521r1:secp384r1:prime256v1"
5   nginx::gzip: "on"
6   nginx::gzip_vary: "on"
7   nginx::gzip_min_length: 50
8   nginx::gzip_proxied: "any"
9   nginx::gzip_types: "text/plain text/css text/xml text/javascript application/x-javascript a
10  nginx::worker_connections: 4096
```

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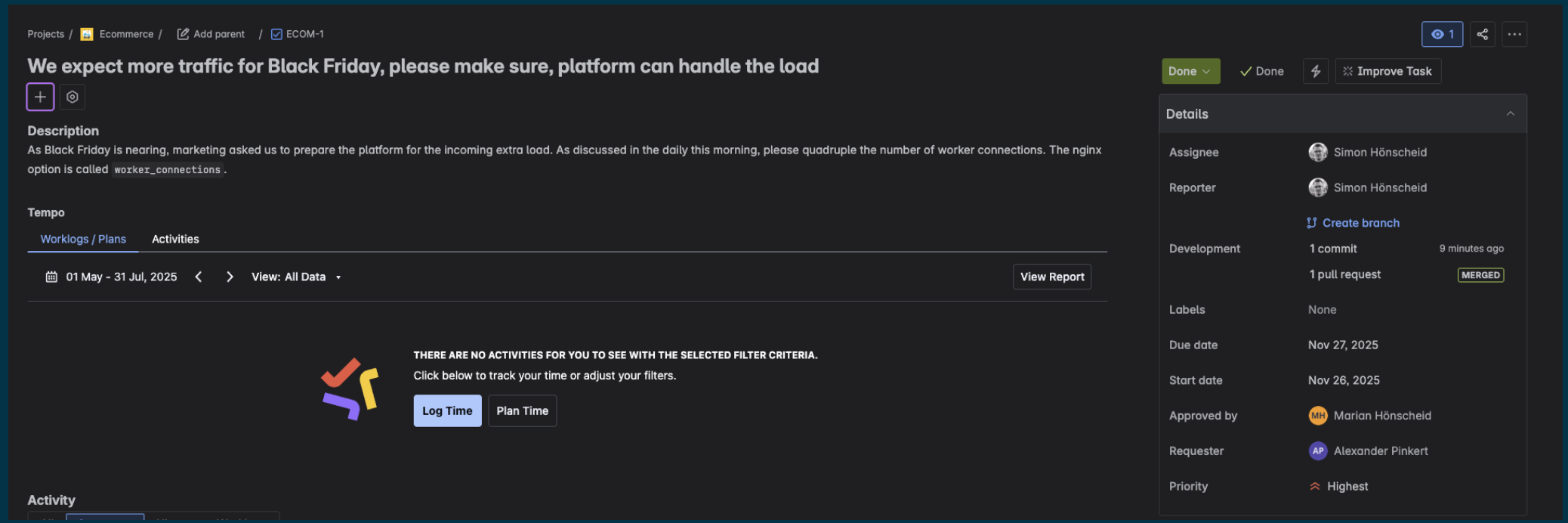
Why?
It started with a ticket



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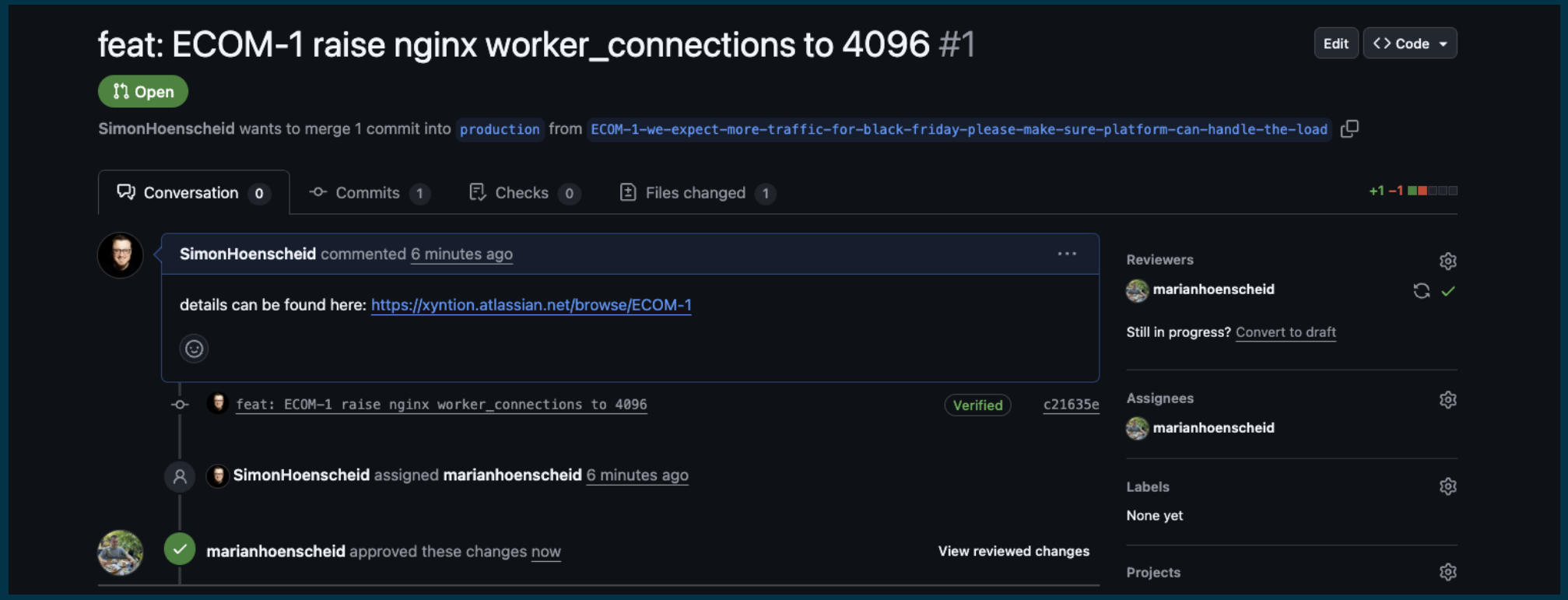
Why?
A Pull Request was created...



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Why?
Check the diff

```
/control_repo  production  git show 854099e
commit 854099e6ba46946f92e2ddfbf88d9d6f2f8e8936
Author: Simon Hoenscheid <simon.hoenscheid@xyntion.consulting>
Date:   Sat Jul 12 22:03:54 2025 +0200

    feat: ECOM-1 raise nginx worker_connections to 4096

diff --git a/data/roles/ecommerce_webserver.yaml b/data/roles/ecommerce_webserver.yaml
index 95250af..53e6f8c 100644
--- a/data/roles/ecommerce_webserver.yaml
+++ b/data/roles/ecommerce_webserver.yaml
@@ -7,4 +7,4 @@ nginx::gzip_vary: "on"
 nginx::gzip_min_length: 50
 nginx::gzip_proxied: "any"
 nginx::gzip_types: "text/plain text/css text/xml text/javascript application/x-javascript application/xml"
-nginx::worker_connections: 1024
+nginx::worker_connections: 4096
```

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Why?
Let's apply the change

```
Info: Caching catalog for ecommerce-webserver-02.xyntion.consulting
Info: Applying configuration version '854099e - Simon Hoenscheid, Sat Jul 12 22:03:54 2025 +0200 : feat: ECOM-1 raise nginx worker_connections to 4096'
Notice: /Stage[main]/Nginx::Config/File[/etc/nginx/nginx.conf]/content:
--- /etc/nginx/nginx.conf       2025-07-12 20:03:07.482998226 +0000
+++ /tmp/puppet-file20250712-4818-y86nug        2025-07-12 20:04:12.510638487 +0000
@@ -10,7 +10,7 @@
 events {
   accept_mutex on;
   accept_mutex_delay 500ms;
-  worker_connections 1024;
+  worker_connections 4096;
 }

 http {

Notice: /Stage[main]/Nginx::Config/File[/etc/nginx/nginx.conf]/content: content changed '{sha256}7f86c60ef0ed0449c80360cb5b20d37600ce4f261d226ddc603caca1cc2c
Info: Class[Nginx::Config]: Scheduling refresh of Class[Nginx::Service]
Info: Class[Nginx::Service]: Scheduling refresh of Service[nginx]
Notice: /Stage[main]/Nginx::Service/Service[nginx]: Triggered 'refresh' from 1 event
Notice: Applied catalog in 1.56 seconds
```

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Why?
We need to revert this

```
Info: Caching catalog for ecommerce-webserver-02.xyntion.consulting
Info: Applying configuration version 'b109f06 - Simon Hoenscheid, Sat Jul 12 22:05:18 2025 +0200 : Revert "feat: ECOM-1 raise nginx worker_connections to 4096"'
Notice: /Stage[main]/Nginx::Config/File[/etc/nginx/nginx.conf]/content:
--- /etc/nginx/nginx.conf       2025-07-12 20:04:12.518638445 +0000
+++ /tmp/puppet-file20250712-6075-9er73s        2025-07-12 20:07:11.689768831 +0000
@@ -10,7 +10,7 @@
 events {
   accept_mutex on;
   accept_mutex_delay 500ms;
-  worker_connections 4096;
+  worker_connections 1024;
 }

 http {

Notice: /Stage[main]/Nginx::Config/File[/etc/nginx/nginx.conf]/content: content changed '{sha256}8f7657ebd283b5b57e57ee97476e40c0e8d1aced8db1ff35b7deefca197f259f
Info: Class[Nginx::Config]: Scheduling refresh of Class[Nginx::Service]
Info: Class[Nginx::Service]: Scheduling refresh of Service[nginx]
Notice: /Stage[main]/Nginx::Service/Service[nginx]: Triggered 'refresh' from 1 event
Notice: Applied catalog in 1.45 seconds
```

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The 5 W questions in IT infrastructure

In every crisis, ask five questions

- ✓ **WHO** made the change? → Git commit author
- ✓ **WHAT** was changed? → Diff in the hiera repository
- ✓ **WHEN** did the change take place? → Update in Control Repository
- ✓ **WHERE** was the change made? → Node classification and monitoring dashboard
- ✓ **WHY** did this change happen? → Ticket in commit message

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06

Questions

»The important thing is not to stop questioning.«

Albert Einstein

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