







# Cloudflare Outage 2025

How One File Took Down 16% of the Internet

Geeks Club

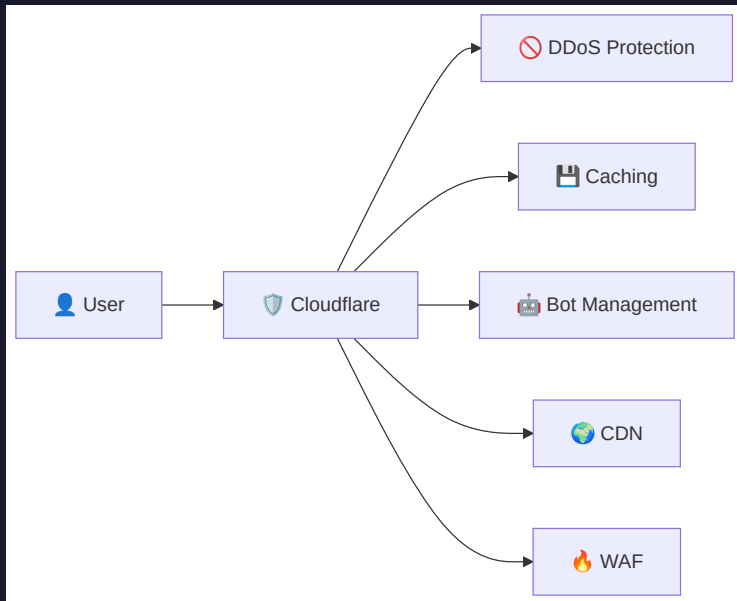
 December 10, 2025

# Agenda

1.  **Why is Cloudflare important?**
2.  **What happened? - Outage Timeline**
3.  **Technical Analysis - ClickHouse, Rust, unwrap()**
4.  **Confusing Factors - Why they thought it was a DDoS attack**
5.  **Conclusions and Remedial Actions**
6.  **Comment - What do we learn from this?**

# What is Cloudflare?

Middleware between the client and your application








# Cloudflare Scale

~16% of all internet traffic 🌐

| Every sixth request on the internet goes through Cloudflare

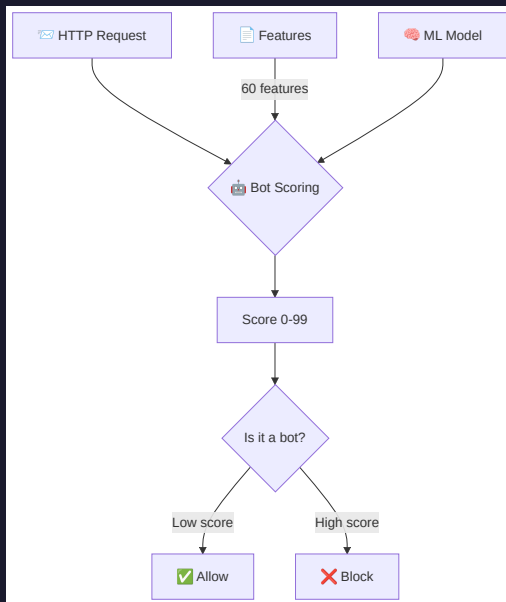
## Known users:

Category	Companies
 Technology	Mozilla, Microsoft Azure, Office 365, IBM
 E-commerce	Nike, H&M, Shopify
 Social	Reddit, Twitter



# Bot Management - Source of the Problem

How does bot scoring work?

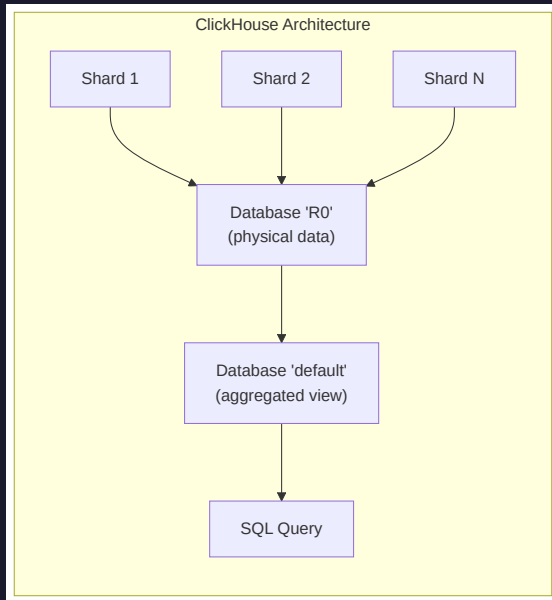


**Bot Score:** 0-99 (higher = greater bot probability)



# ClickHouse Architecture

## Databases and shards



# Query without database discriminator

```
SELECT
  name,
  type
FROM system.columns
WHERE
  table = 'http_requests_features'
ORDER BY name;
```

## Problem:

- No `WHERE database = 'default'`
- After permission change → both databases visible
- **60 features × 2 = 120+ features**



# Rust and fatal `unwrap()`

```
// Simplified code that caused panic
fn load_features(config: &Config) -> Features {
    let features = append_with_names(&config)
        .unwrap(); // 💣 BOOM!

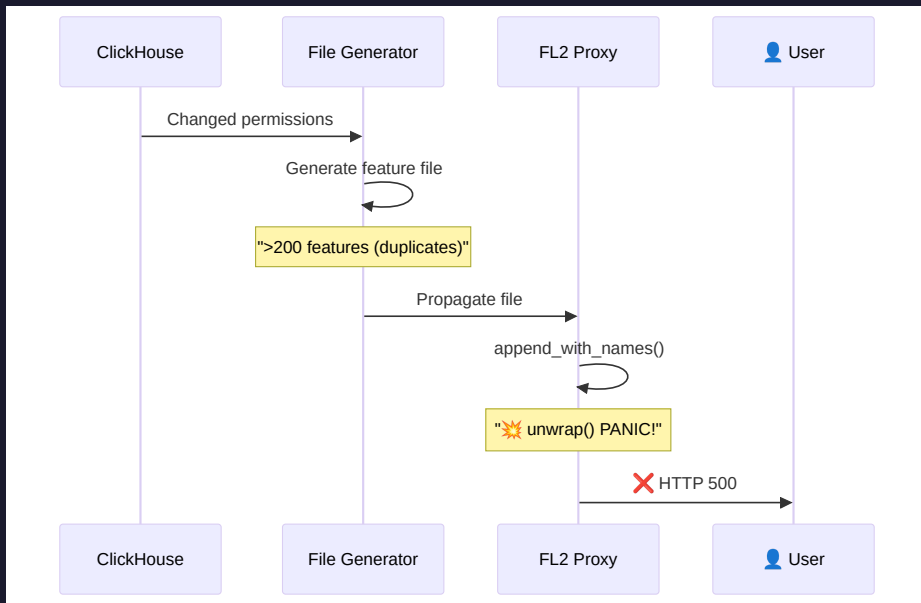
    features
}
```

## Memory preallocation problem:

- **Limit:** 200 features (safety buffer)
- **Expected:** ~60 features
- **Received:** >200 features (duplicates)
- **Result:** `Result::unwrap()` on `Err` → **PANIC** 💀

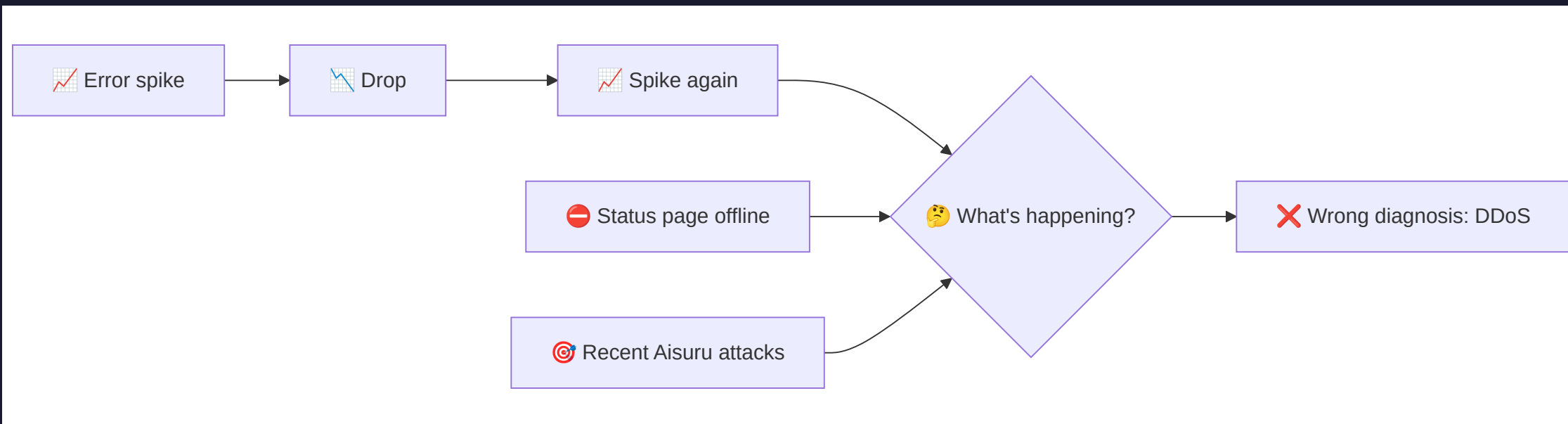


# 🌟 Outage Mechanism



# Confusing Factors

Why did they think it was a DDoS attack?



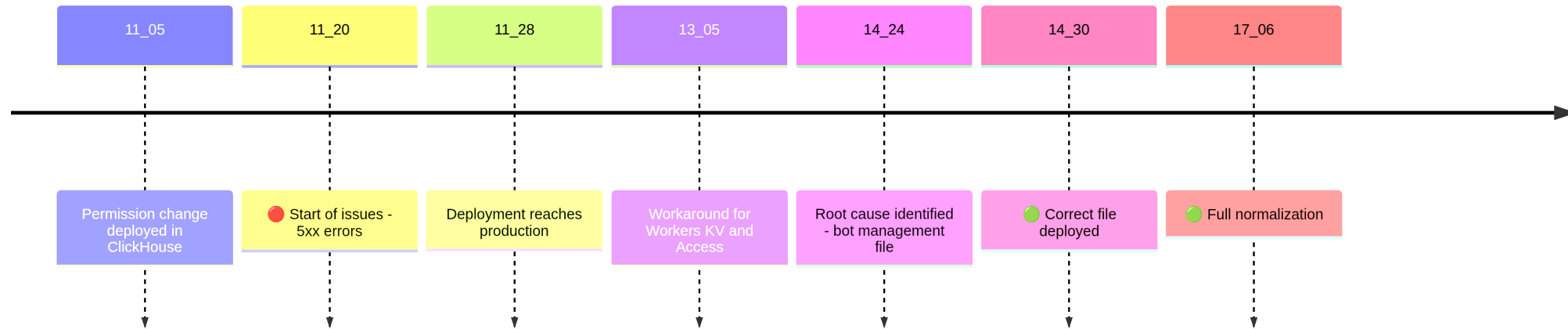
## Unusual behavior:

- Fluctuations: old nodes had correct cache
- Status page (independent infra) also offline → **coincidence!**



# Outage Timeline





## November 18, 2025 Cloudflare Outage (UTC)





# Cloudflare Remedial Actions

Official list:


1.  **Hardening** of internal configuration (like user data)
2.  **Kill-switches** - global function switches
3.  **Core dumps** - cannot overload the system
4.  **Review failure modes** of all proxy modules

*"Today's outage was the most serious incident since 2019"*

— Matthew Prince, CEO

# Our Technical Conclusions

What could have been done better?

```
let features = append_with_names(&config).unwrap_or_default();
if features.len() > 200 {
    log::warn!("Retrieved {} features, exceeded limit 200. Taking first 200.", features.len());
    features.truncate(200);
}
//  Continue with features
```

Instead of:

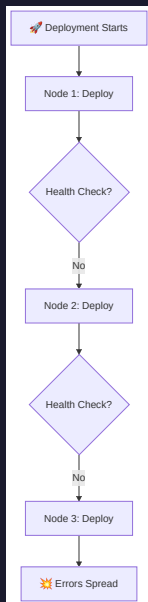
```
.unwrap() // ❌ PANIC!
```

Should be:

```
.unwrap_or_else(|e| { log::error!("{}", e); defaults() })
```

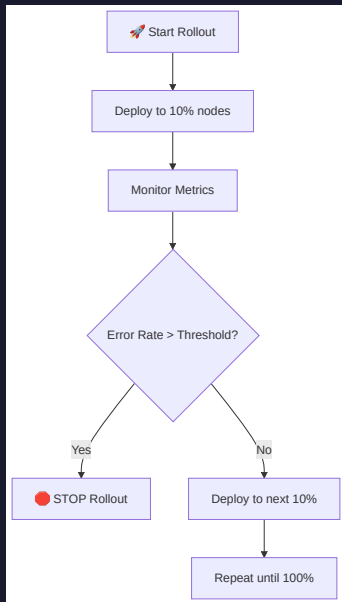
## Preventing Deployment Spread: Circuit Breakers and Rollout Strategies

### Why did the update keep spreading?



**Automated rollouts without real-time monitoring** → Errors propagate unchecked





# Circuit Breaker Pattern for Deployments



Stop propagation if errors exceed safe limits



## Different Strategies for Different Changes

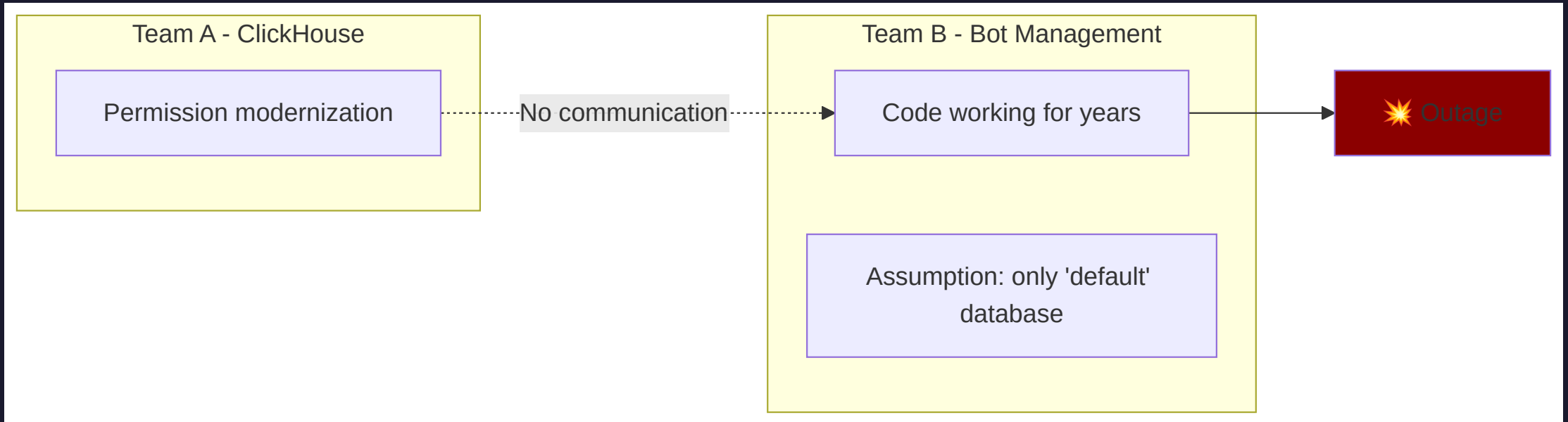
Change Type	Strategy	Speed vs Safety
 <b>Security Patches</b>	Fast rollout	 Speed (counter attacks)
 <b>Infrastructure Changes</b>	Canary / Blue-Green	 Safety (rollback ready)

Balance speed for security with caution for infra





# Organizational Problem

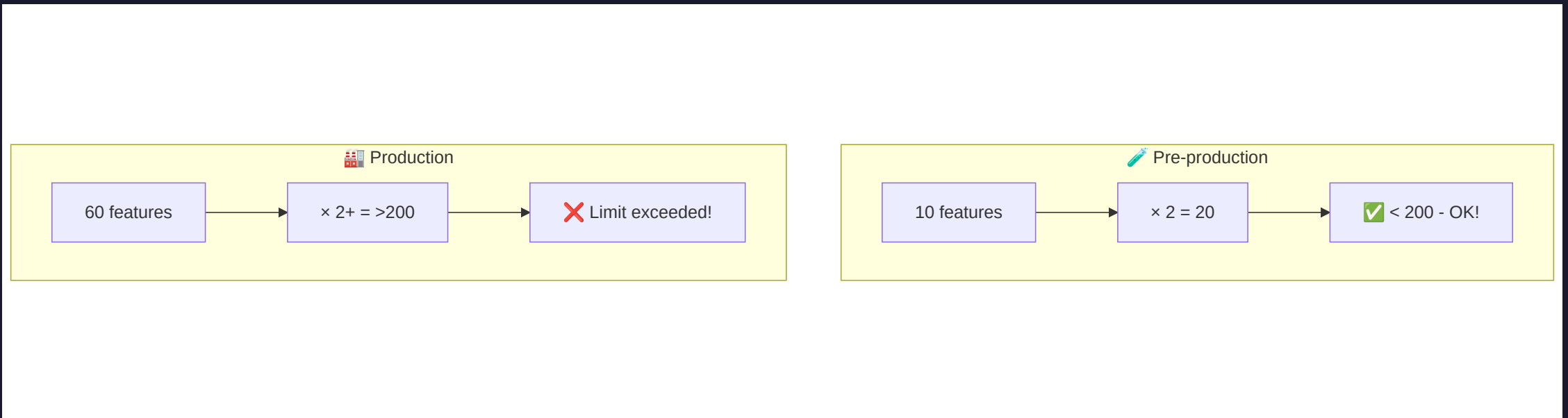


🎯 Key problem:

Change in one place → explosion in another

# What about the test environment?

Possible explanation:



**Production scale  $\neq$  Test scale**

# Key Lessons

## 1 Defensive Programming

| Never trust that inputs will be correct

## 2 Graceful Degradation

| System should work limited, not crash

## 3 Inter-team Communication

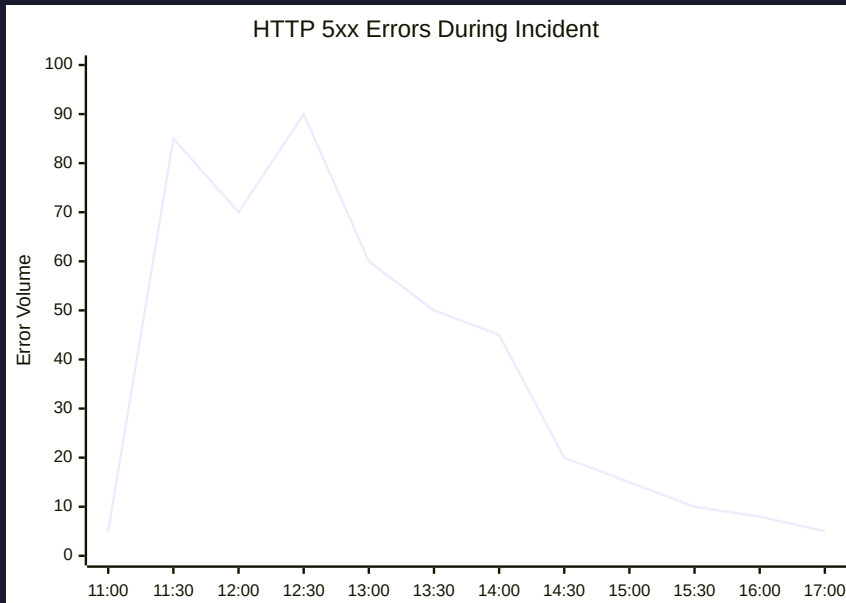
| Changes in one system can affect others

## 4 Production-scale Testing

| Pre-prod must reflect reality








# Outage Visualization



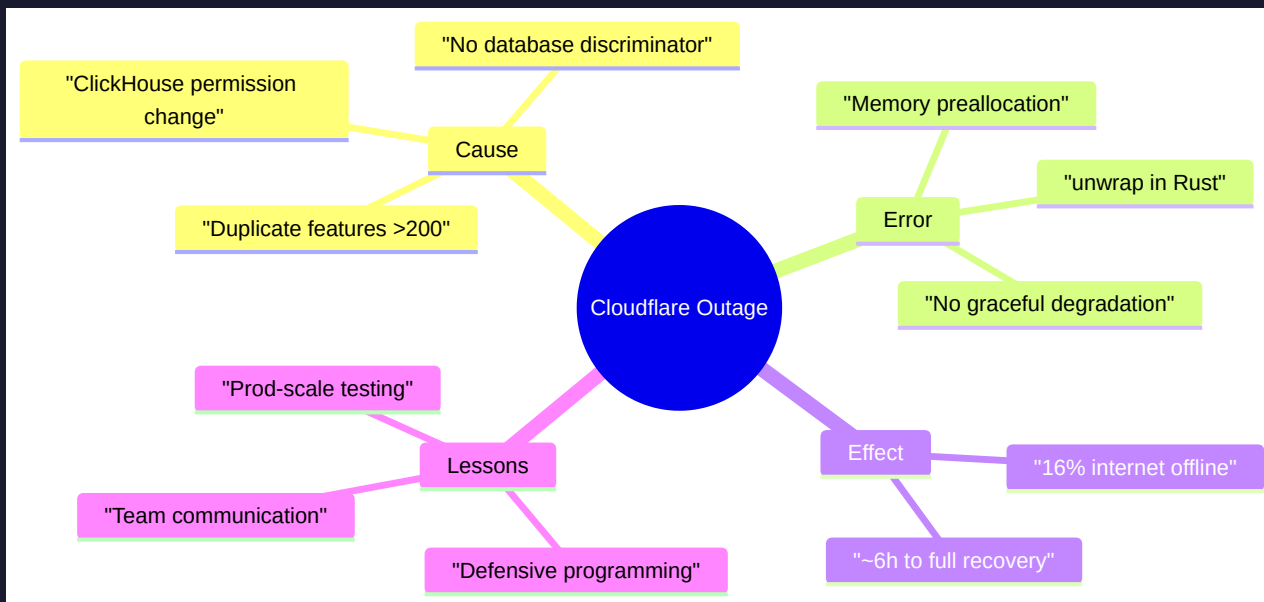
**Fluctuations** = different nodes with different feature file versions

# For Discussion

Questions for the team:

1.  Do we have similar "hidden dependencies" in our systems?
2.  How do we handle errors in critical code paths?
3.  Do our test environments reflect production scale?
4.  How quickly will we detect an outage before users?
5.  Do we do post-mortems and are they public?

# Summary





## Sources

### Official Post-Mortem:

 [blog.cloudflare.com/18-november-2025-outage](https://blog.cloudflare.com/18-november-2025-outage)

### Video:

 [IT News #25 - DevMentors](#)



# Thank You!

Questions?



🛡️ Post-Mortem 18.11.2025 🛡️

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