



#ASLI ENGINEERING

Google maps outage: Handling Cascaded Failures



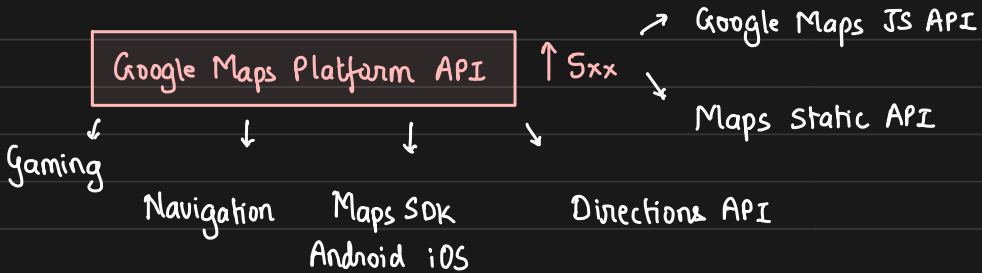
BY

ARPIT BHAYANI

Google Maps: Outage Dissection

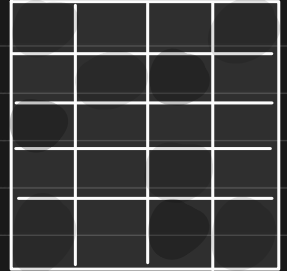
18th March 2022: Bad Rollout & Cascading Failure

2 hours 31 minutes !!



Impact of the outage

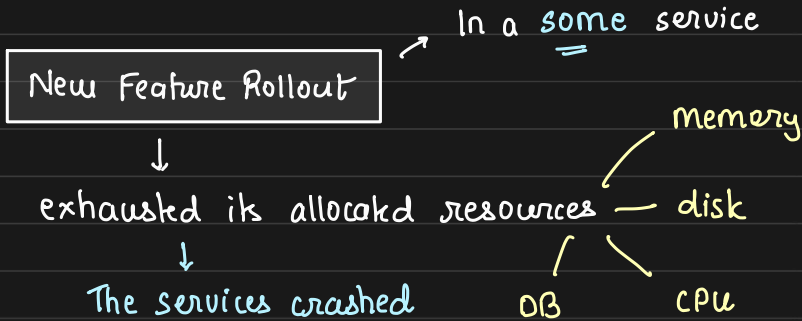
- 65% average error rate on Maps JS API
- Directions API p99 hit 8500ms
- 37% error rate in Navigation
- Gray tiles, failed map initialization, failed routing, crashes



Map not loading. Users seeing Gray tiles

The outage was global !!

Root Cause



The crash of this service resulted in



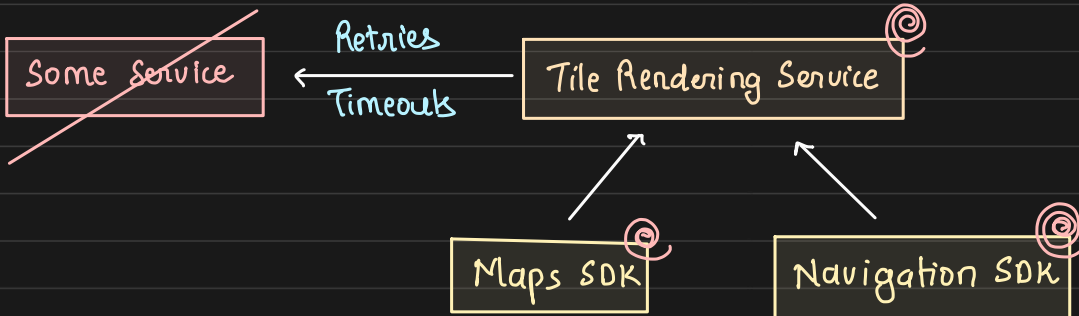
Started throwing errors because of retries

Because of retries, internal memory queues reached capacity

Server ran out of Memory! **CRASHED!!**

increased latency, new req rejected with 503

Failures Cascade



Because external clients
were retrying ↓
10x the normal traffic ↓

Denial of Service

← Side effect of retries

Remediation:

Rollback → Minimizing the downtime is important

↓

But cascaded failure continued for some time

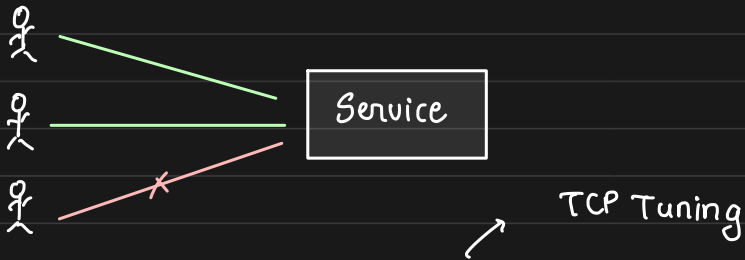
↓

Slowly Tile API recovered

Prevention :

- Reject request when server is at full capacity

[graceful degradation]



- Optimize bounds of Server Queues → Web Server Tuning
↓
In-mem proc buffer tuning

- Exhaustive monitoring: Notify when significant jump

- Circuit Breaking

Block internal traffic, serve customers

