Enabling Product Scalability through Load Testing

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Agenda

- Introduction to our system and Bloomberg

- Planning the load test

- The testing journey

- What we learned

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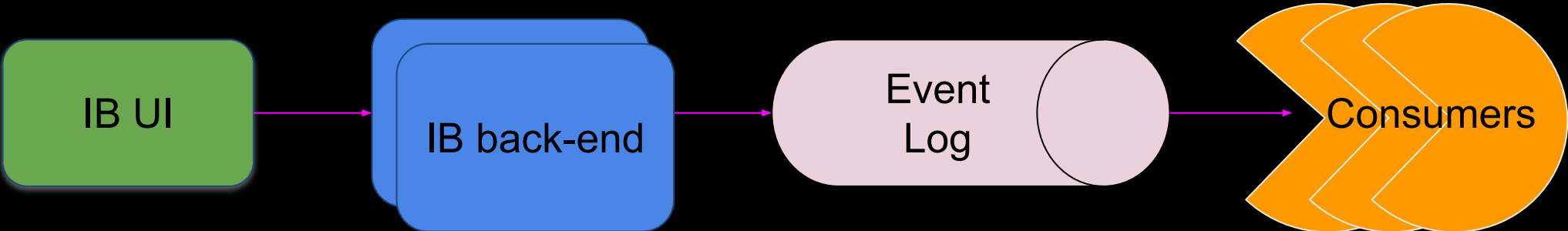
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Intro: Meet IB

- ## What is Instant Bloomberg (IB)?
  - ○ Instant messaging feature of the Bloomberg Terminal
  - ○ Used by financial professionals
  - ○ Provides multiple integrations with Bloomberg data and analytics

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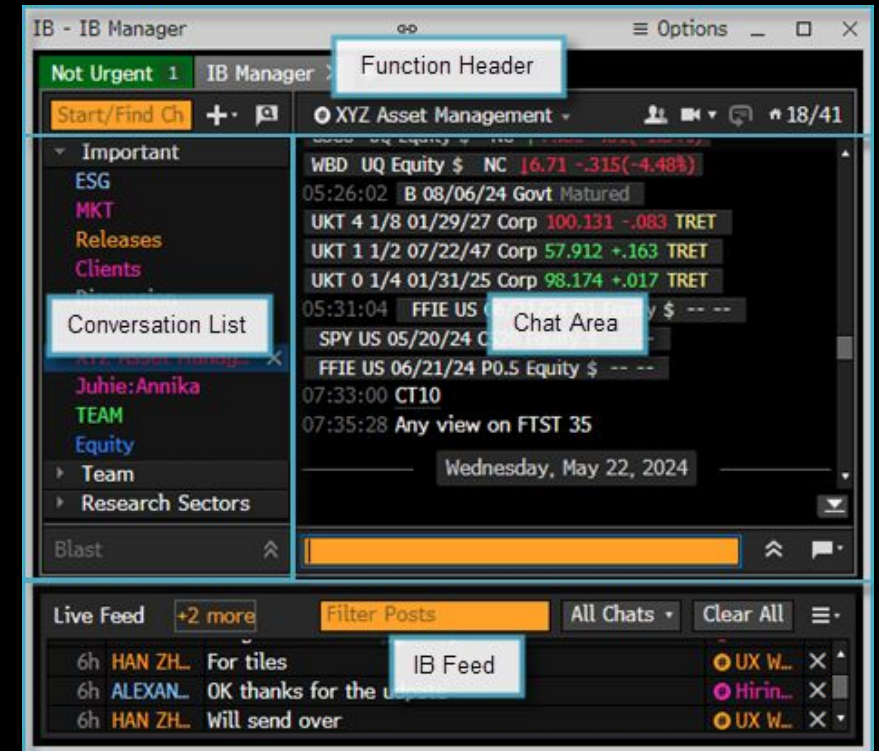
Group Chats: New features

- New group chat released internally, but with limited size of groups

- What we wanted to achieve:
  - Migrate the old chats to new chats

- How to get there:
  - Measure and test system performance

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System internals

IB UI → IB back-end → Event Log → Consumers

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The Test Plan

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We needed a plan

- What exactly do we test?
- How can we tell a test was successful?
- How do avoid impact on real users?

plan

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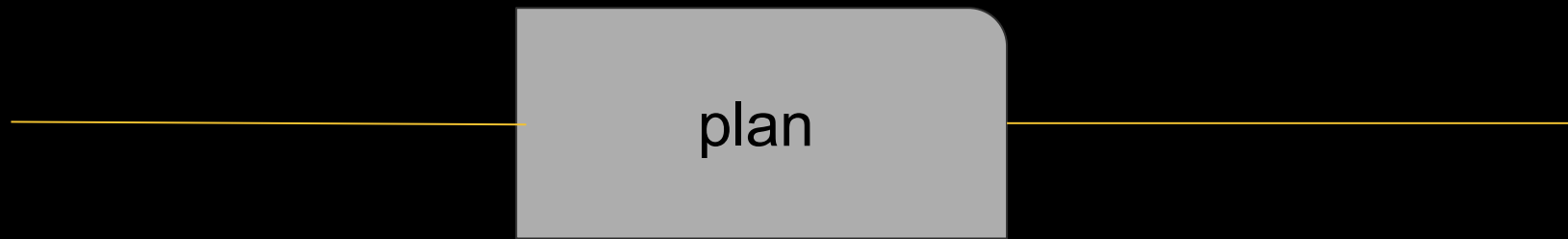
Test plan: What workflows to test

- Test migrating Old Chat to New Chat
  - One-button push
  - Create new room
  - Migrate users and configurations

- A lot of the workflows use common APIs between the Old and New chats
  - Rely on existing monitoring to catch issues in the shared workflows

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Test plan: Defining success metrics

- Defining success metrics
  - Add SLOs specific to the workflow we're testing: (e.g., 99% createNewChatRoom < 3s)
  - All the other SLIs need to stay within bounds

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Test plan: Isolating the traffic

	Docker/Dev	Beta
Isolation	High	Medium
Accuracy	Low	High

- Depends on what part of the system is under test
  - One component (e.g., one service, one UI client)
  - Multiple back-end components interacting
  - The whole system end-to-end
- In our case, the staging environment
  - Include off-switch / recovery in your plan

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Test plan: Review

- Reviewing the plan with stakeholders
    - Identify the business and engineering stakeholders and review the plan with them early
    - Have clear instructions for running the actual test
    - Include links to the dashboards to follow during the test
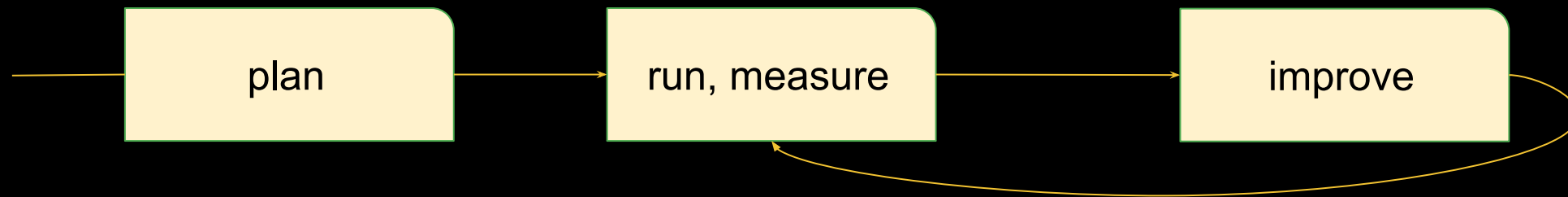   - Announce any scheduled tests

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The Testing Journey

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It's time to run 🏃

```
plan → run, measure → improve
         ↑_____|
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Testing the back-end: Run 🏃

- Script sends requests and monitors response times
  - Create an Old Chat room
  - Add n users to the room
  - Send request to migrate Old Chat room to New Chat room
  - Record processing time in our telemetry platform

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Testing the back-end: Monitoring 📈

- Create dashboards that track all of the SLIs
  - Grafana, aggregated logs
  - Monitor dashboards from our SRE team for the existing workflows
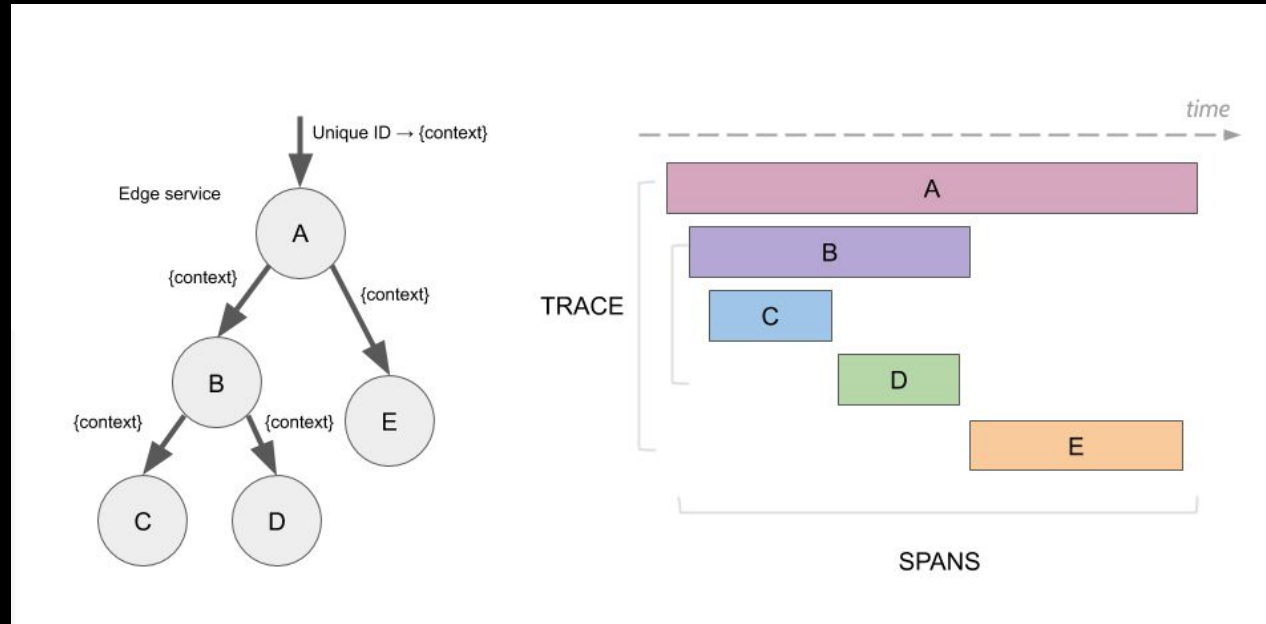 - Add our own dashboards for the new workflows

Source: https://grafana.com/grafana/

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"Any improvements made anywhere besides the bottleneck are an illusion."

- Gene Kim, Author
"The Phoenix Project: A Novel About IT, DevOps, and Helping Your Business Win"

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Testing the back-end: Monitoring++ 📈📈

- Use distributed trace for more complex systems
  - Track an event / request through all its hops in the system (requests, DB accesses, Apache Kafka consumers, etc.)

Source: https://github.com/rbaumgar/otracing-demo-app/blob/master/OpenTracing.md

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Testing the back-end: Improve 🔥

- Identified back-end bottlenecks
  - Requests that needed to be batched together
  - Requests that needed to be split in smaller chunks
  - Sync vs. async processing

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We hit our success metrics!

🎉

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Thank you for coming to our SREcon talk!

Just joking…

We're not done.

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Let's put our tests to test

- Try it out with internal users
  - Migrated a few Old Chat rooms to new chat rooms
  - Surprise! When users are added to the room, they immediately start interacting with it:
    - Open and read the room content
    - Post in the room, react to posts
  - The added traffic from these interactions was not covered by the tests!
  - Some services were negatively affected by the extra load
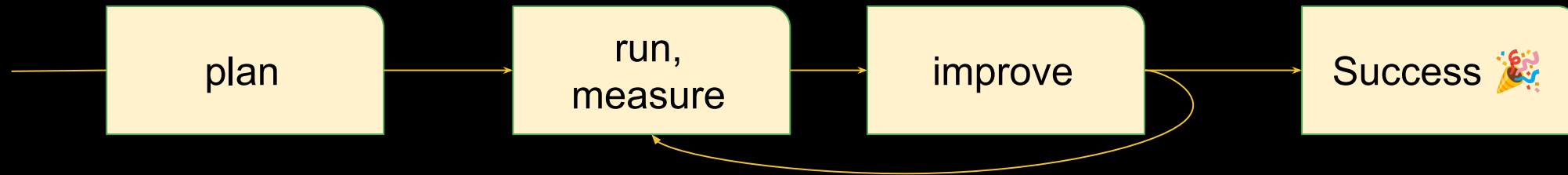
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Testing the system end-to-end

- Updated plan:
  - Test the whole system end-to-end from the UI
  - Simulate more complicated user workflows (sequences of actions)

- Harder to set up – You need a fleet of UI clients running in parallel
  - We had this infrastructure available in Bloomberg, running on VMs

- Ran UI clients in different VMs
  - Reproduced scenarios from experiments with internal users
  - Found the final bottlenecks 🎉

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Our positive outcomes

Fast forward:
- Achieved test success metrics ✔️
- Reached our business goal: **migrate all the Old Chats to New Chats** ✔️✔️

plan → run, measure → improve → Success 🎉

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Key Takeaways

What we learned

- In a world of event-driven and microservice architectures…
  - It can be hard to find the bottlenecks
  - Trivial changes can result in massive consequences (both good and bad)
- Plan the test and review it with stakeholders
- Have clear success metrics
- Isolate the test traffic and have safeties in place
- Make running the tests as easy as possible
  - Make monitoring the results just as easy
  - Consider running the tests periodically

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Thank you! (for real this time)

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