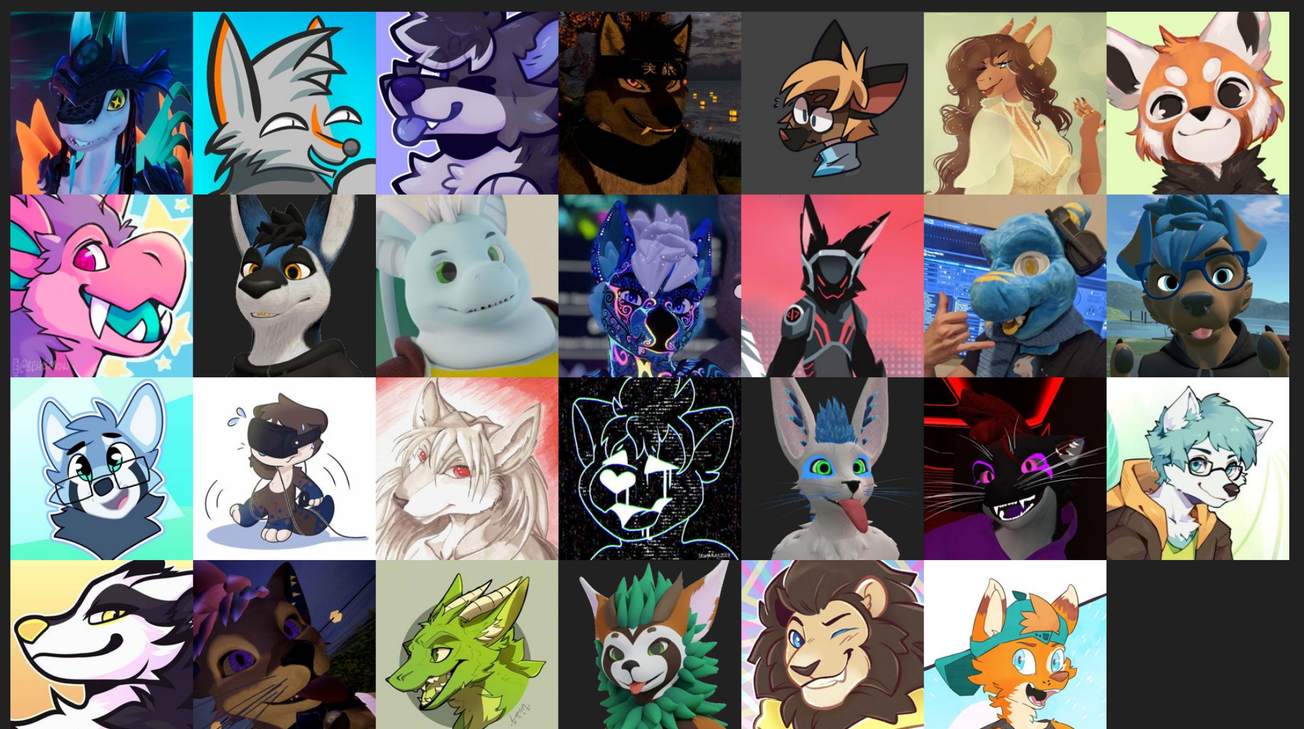
Taming the Virtual Jungle

Furality DevOps Survival Guide

Team



27 team members across the world

Ralaan, Mt Kanjon, Iso, Nova Arkane, Marty, Shallie, Christophe, Rhubarb, Patrol, Myaggic, Benacle, SUDO, Valant, Arch, Conicaw, Techie, Ghost, Junaos, Alofoxx, Kakious, Nerdy, Monty, Javahound, Sfner, Radski, Dami, Shoki

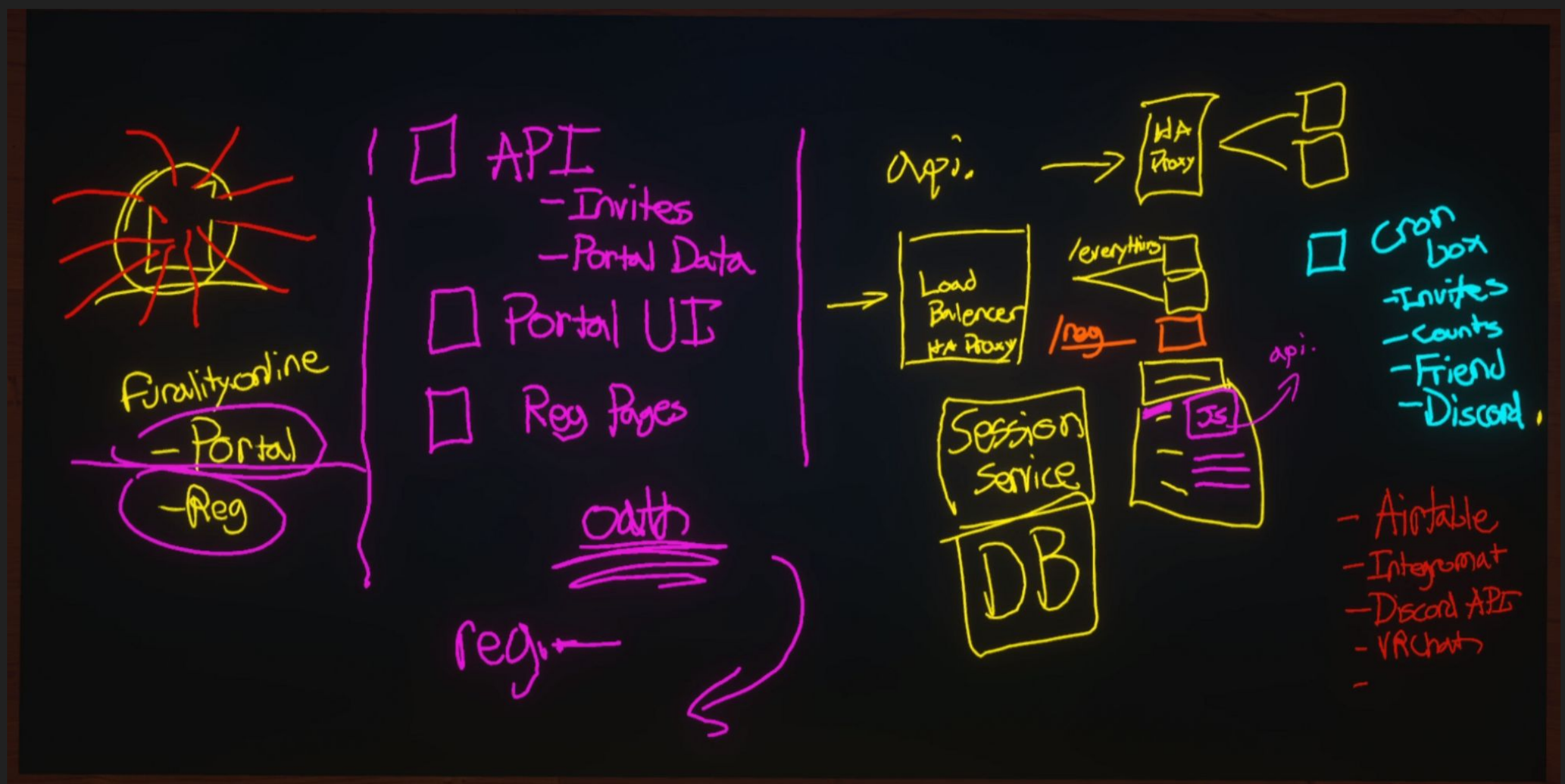
What do we do?

- Furality DevOps Department does:
  - The public websites (furality.org, apply.furality.org, team.furality.org)
  - The convention FOX Portal (furality.online)
  - Some internal tools that are the back office of the convention
  - The API powering the convention
  - Infrastructure for serving the above
  - Managing streaming infrastructure for main events, Club FYNN, & more

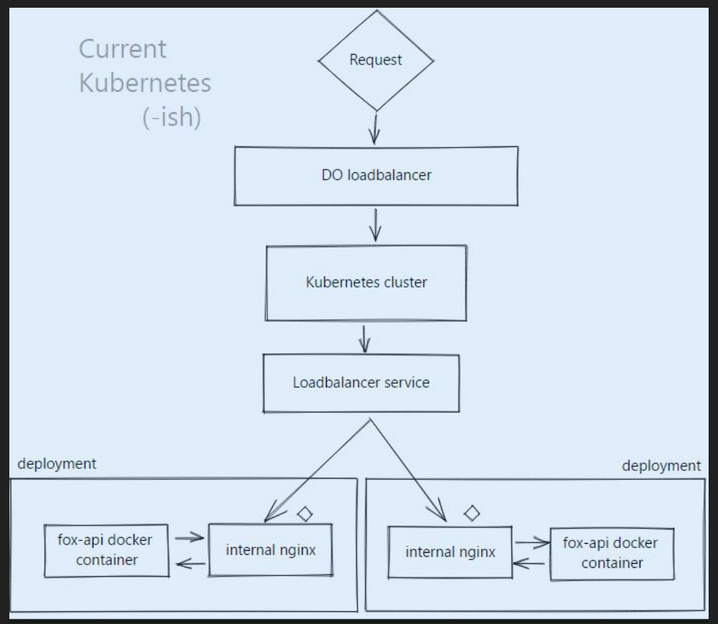
What do we NOT do?

- Furality DevOps Department doesn’t:
  - Sleep (enough)
  - Host VRChat (Instances / Worlds)
  - Develop VRChat (game client / servers)
  - Host Discord
  - KNOW WHERE YOUR FRIENDS ARE (sometimes, maybe)
  - The thousands of hours of work put in by everyone else on the Furality Team, that brings the content and experience that we help show and deliver, like:
    - Worlds, Drawings, Music, Stage lighting, etc.

In the beginning there was ze plan...



And then there were lists…



And diagrams…

And lists…

- WULF Api
  - Prod deployment
- GOOSE - Furality Admin Panel
  - DJ Apps
  - Community Team Features
  - HR Team Features?
- FOX Portal
  - Registration by Jan 15 (stretch g
  - Schedule Open by Feb 1 (stretcl

Current Priorities

Back End

- Cron Tasks moved to queue based system
- Auto Invites automation

Front End

- Add react to the Events / Lobbies
- Add react to event page (invite a

Infra

- get access to digital ocean
- set up some test infra
  - websockets to play with
  - API to play with
- set up prod infra

internal desires

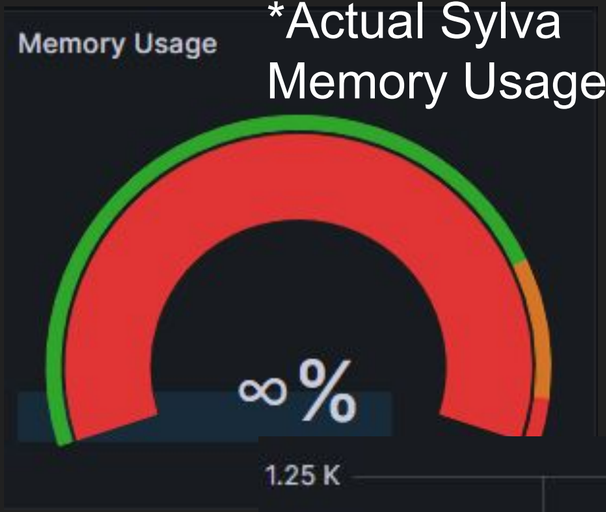
- invert selection when mass selecting
- mass upload
- mass selection
  - for tagging
  - for setting album/group
  - deletion (temporary before permanent)
  - rotation
- rotation
- setting author/photographer different than logged in u
- private/public state of photo
- photo watermarking only on public view - non-waterma
- presets
  - defaults for what to set on bulk-uploaded images
- tagging
- highlight tag (best of)

And lists…

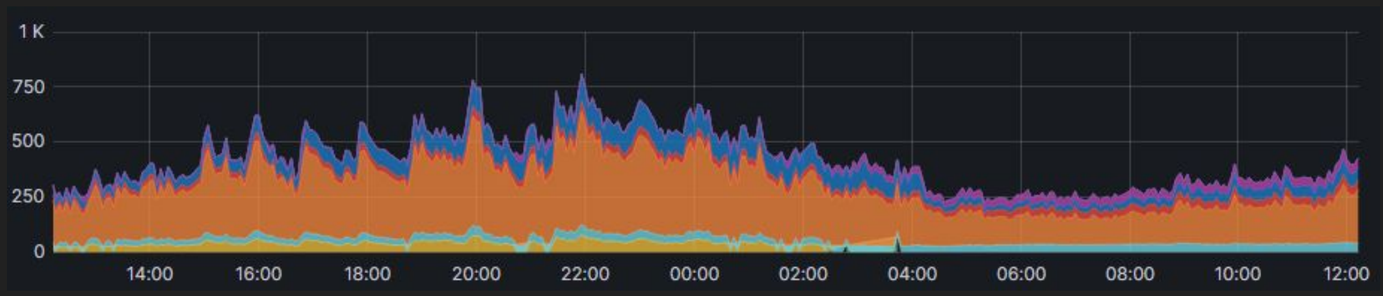
So many lists…

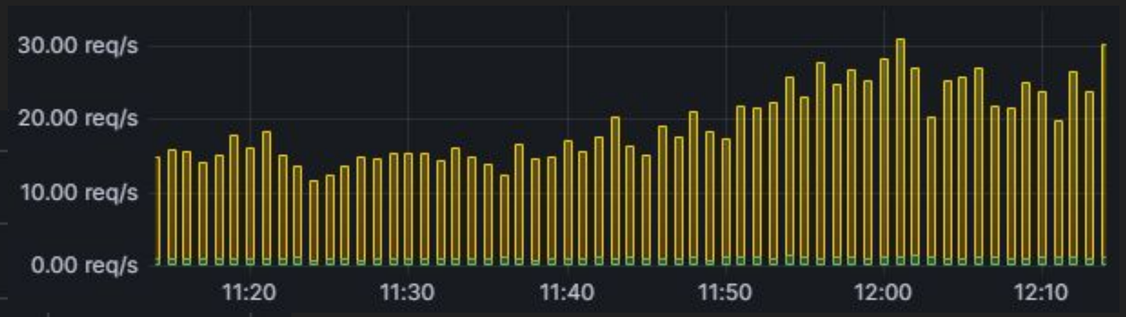
Aa Name
FOX API - Migrate api to NestJS
BOOP - Use BOOP for all auth
BOOP - Become provider for account linking
Open DJ Applicaitons for F6
GOOSE - Migration to NextJS
Open Registration for Luma Festival
Avatar Showcase Submissions
Close Applications Leading up to F5A
F6 - Dealer's Den Page
F6 FOX - Create Event
F6 FOX - Update Event
F6 FOX - Delete Event
BOOP - Use BOOP to manage Furality Team Members
Single Tasks
Open Telemetry

Then came the charts and graphs…

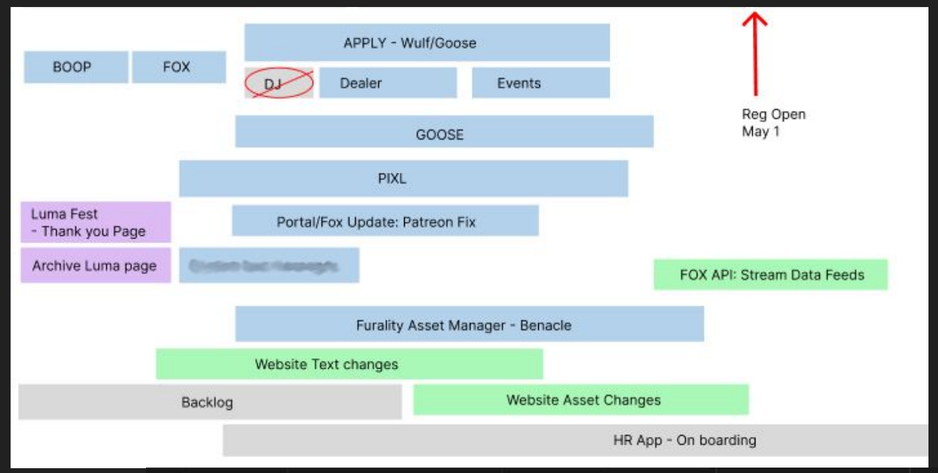


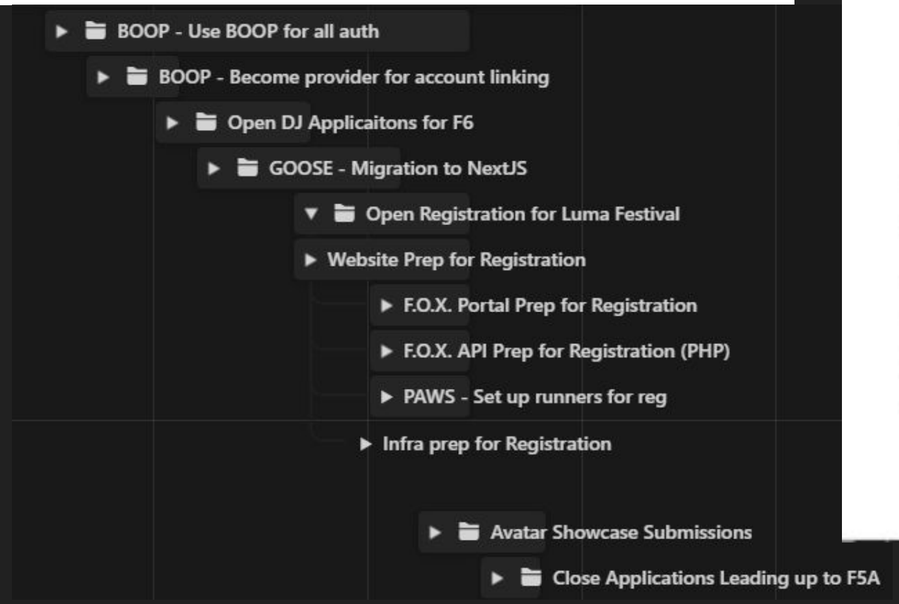
*Actual Sylva Memory Usage!

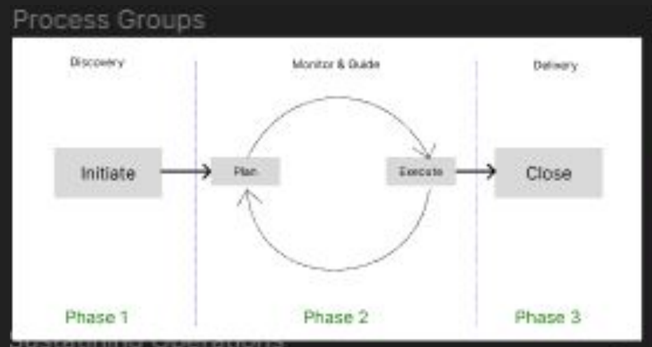


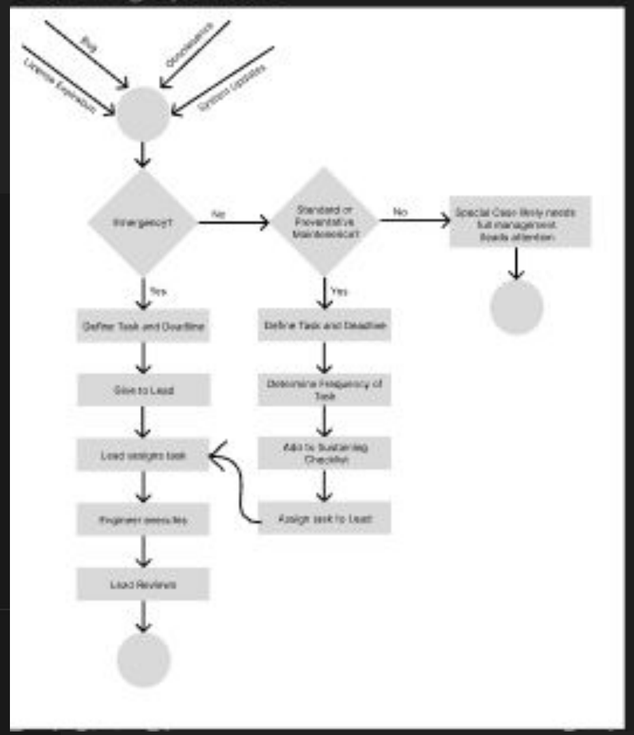


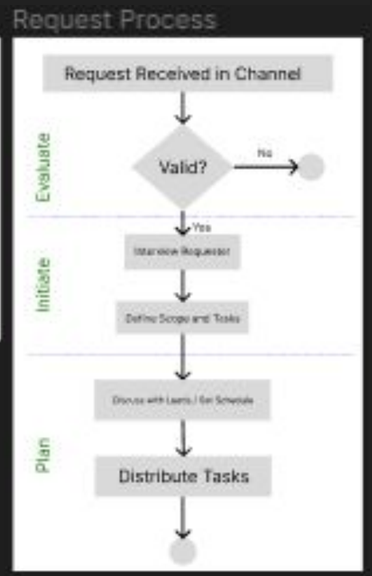
And Gantt Charts…

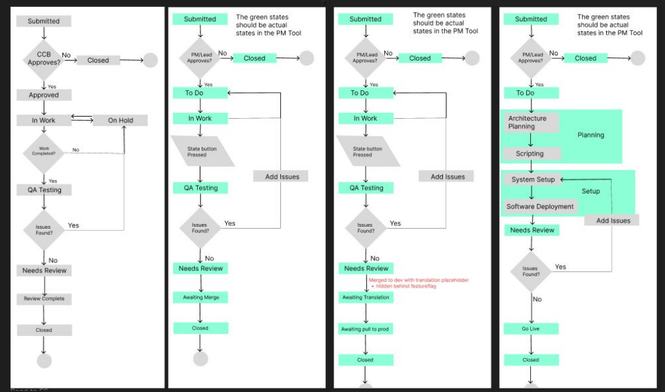








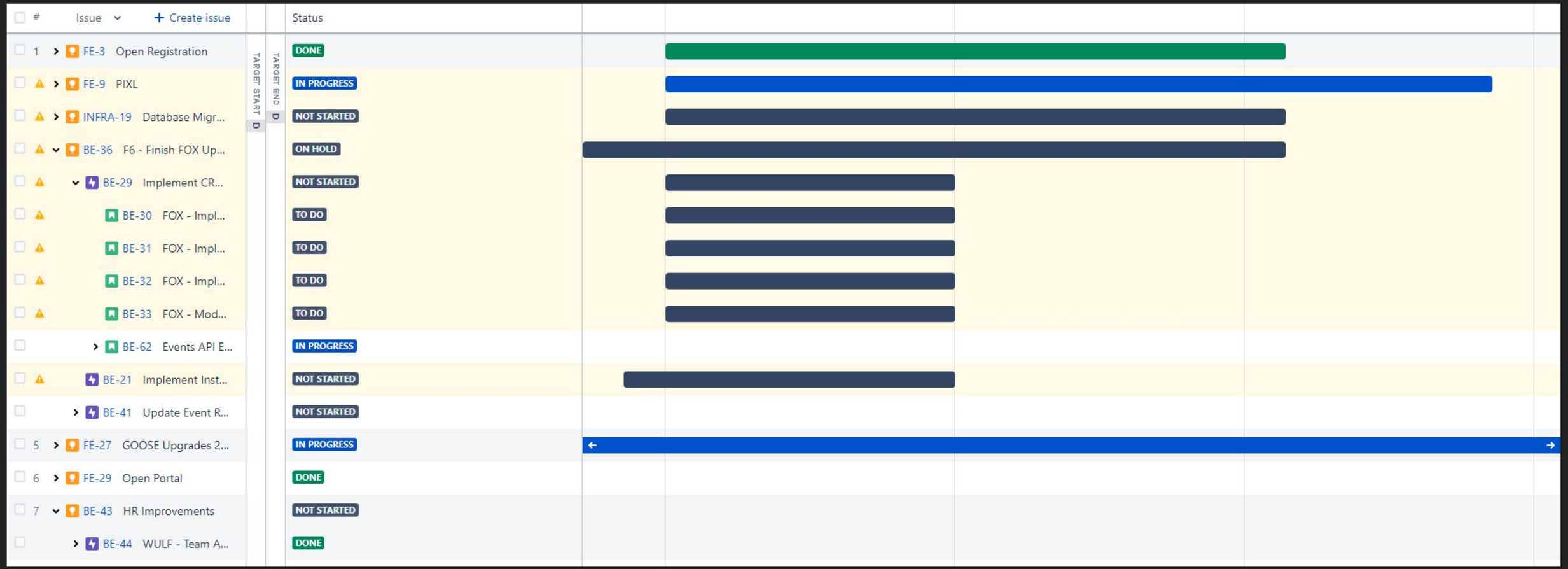




And process planning…

Lots of Process Planning…

And now, Project Management Tools!

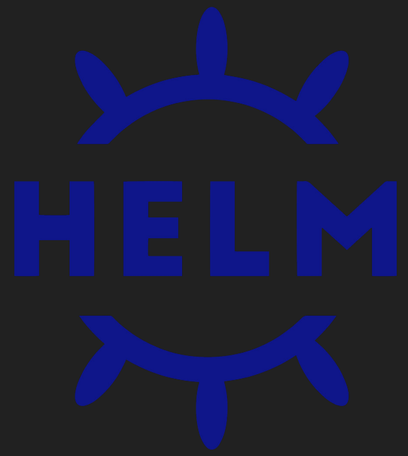


Infrastructure Team

A cluster!

From the ocean to the jungle

- A fair number of cluster changes
  - Moved to ArgoCD for managing deployments
  - Reworked configuration for Kubernetes State
    - Largely using Kustomize over Helm
- Luma Festival provided a good stress test
  - Still…

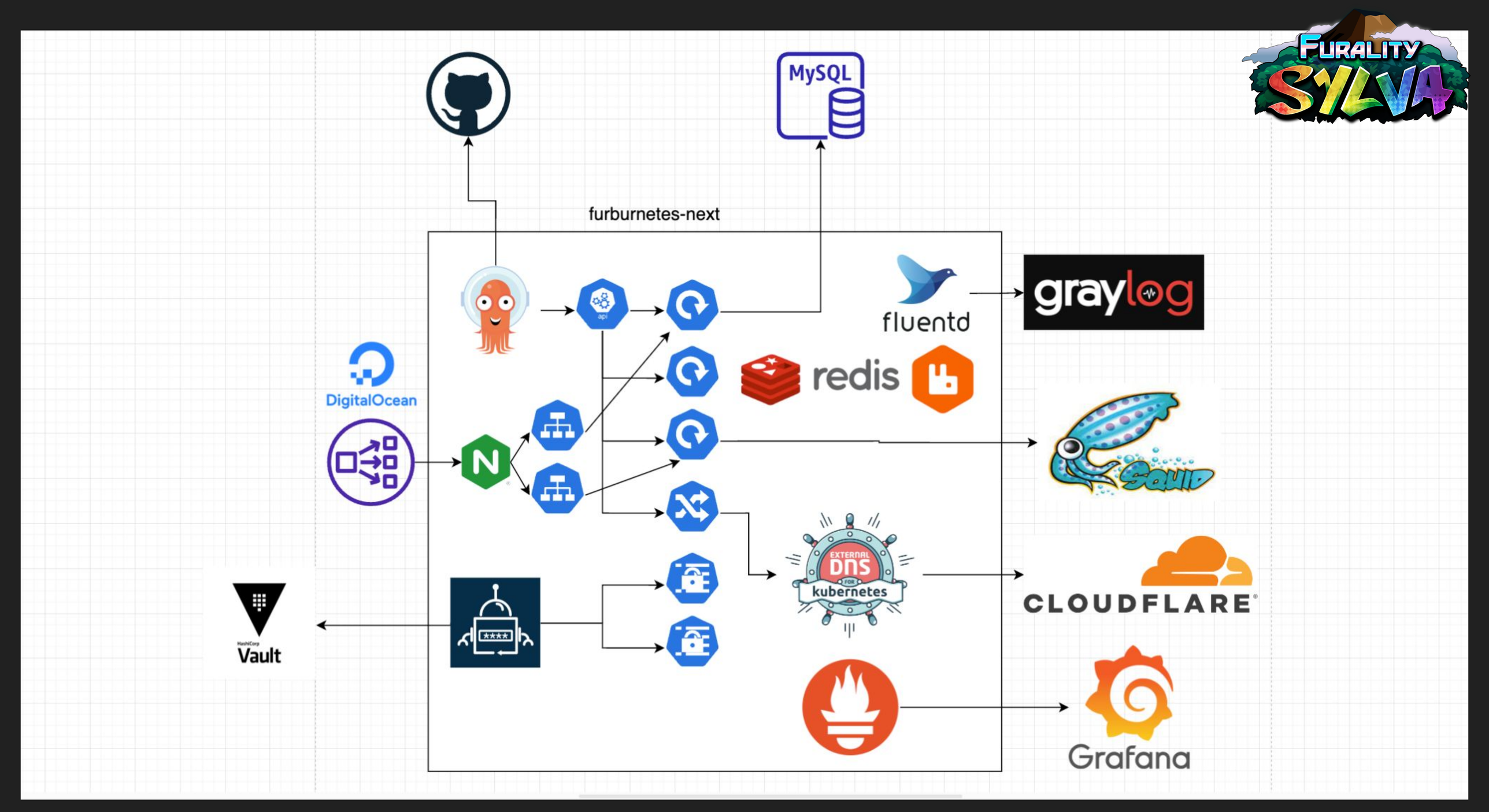


From the ocean to the jungle

- Actual cluster contents largely unchanged
- Kubernetes is very nice for us
  - Easy to scale way up during con and way down afterwards
  - Encourages DevOps practices for deployments

Why not bare metal?

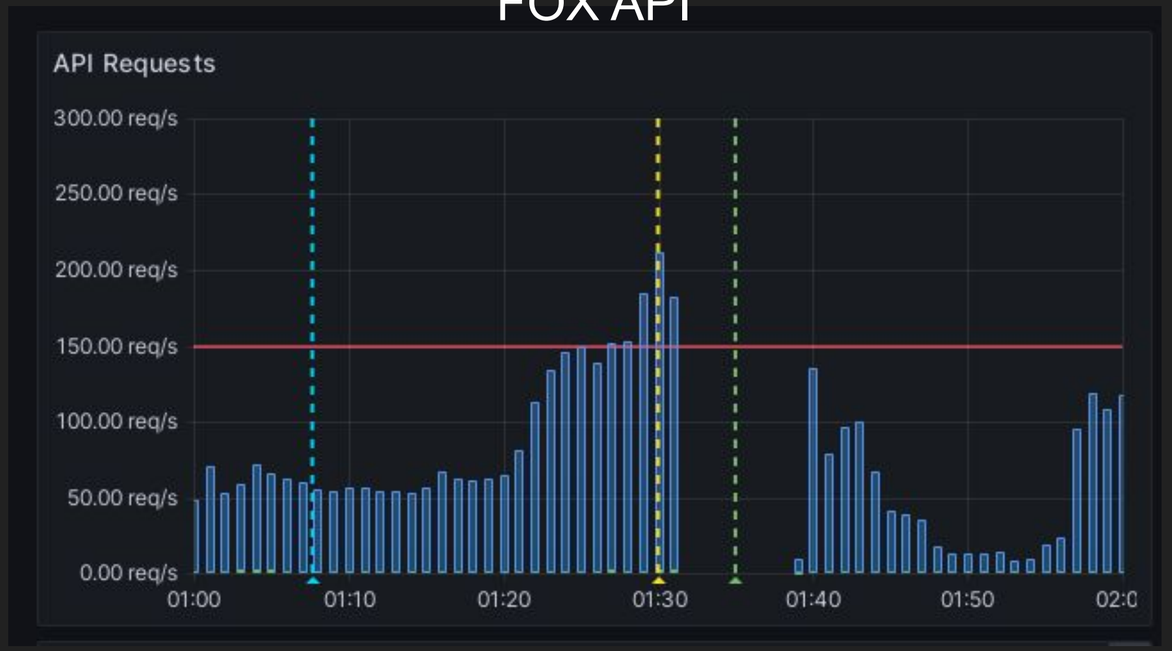
- Harder to scale, we never quite know what to expect
  - Both up and down! We don’t need as much during the off-season
- Consolidates point of failure
- Volunteers, so the less we need to worry about the better


Furality
SYLVA
MySQL
furburnetes-next
fluentd
graylog
DigitalOcean
redis
SQUID
EXTERNAL DNS FOR kubernetes
CLOUDFLARE
HashiCorp Vault
Grafana

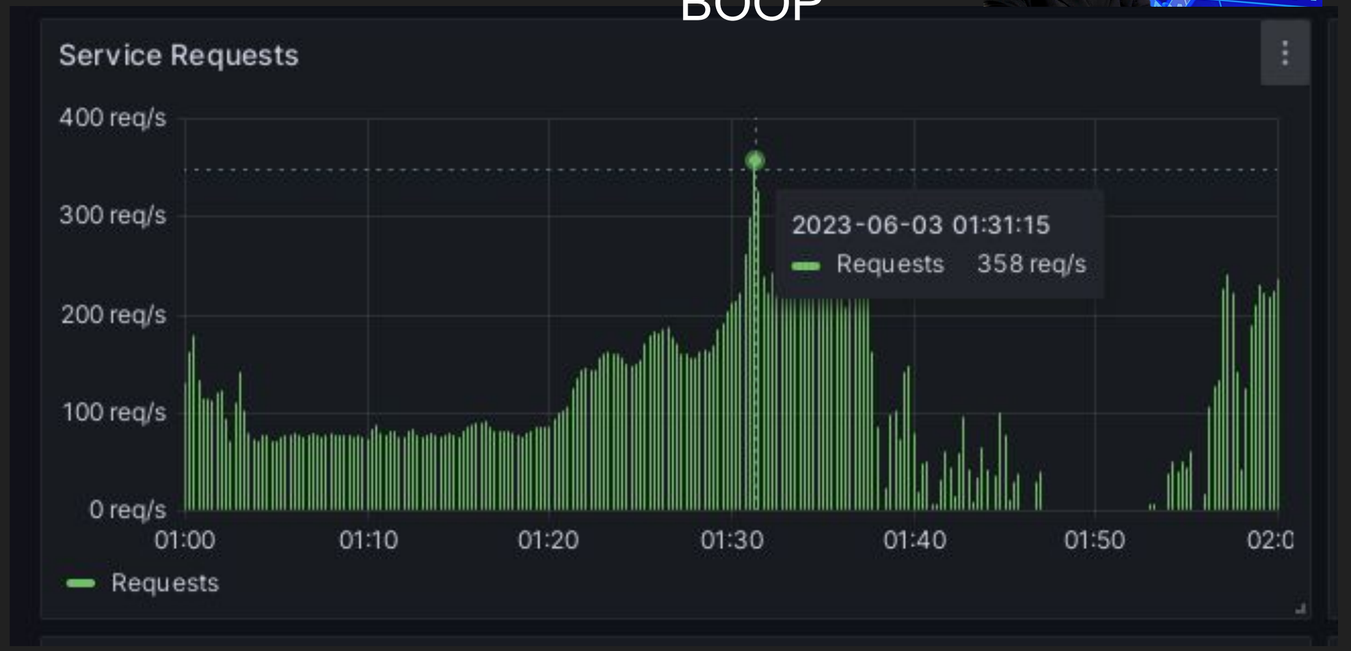
Furality Sylva Opening Ceremonies

- Furality attendee numbers continue to grow
- Testing at scale is hard.

FOX API



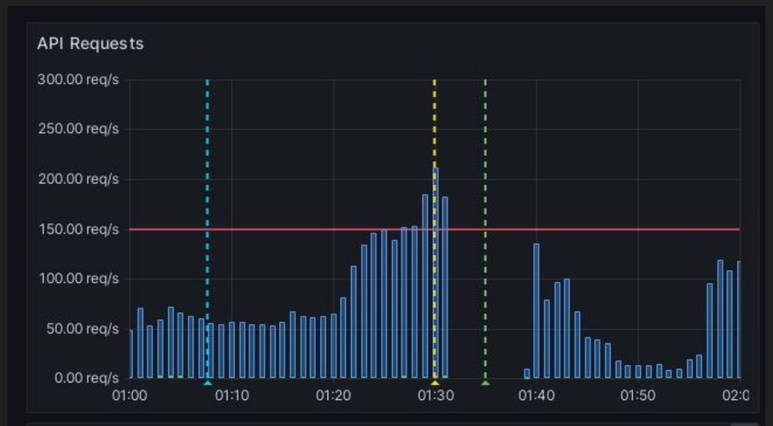
BOOP



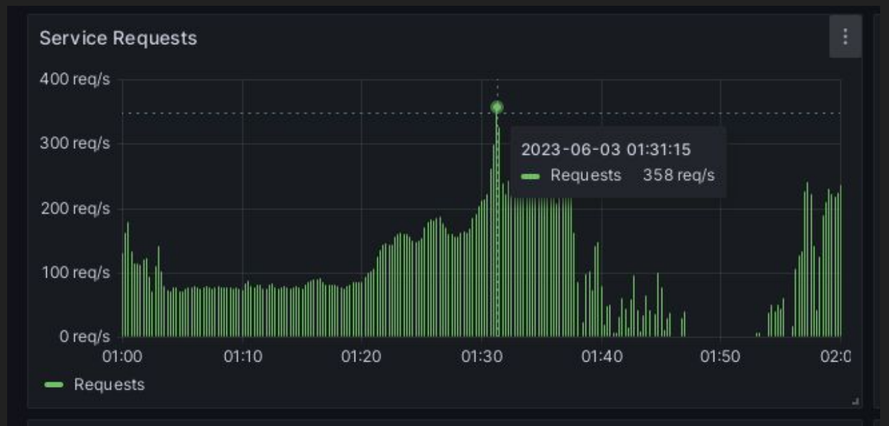
Furality Sylva Opening Ceremonies

- Over 9000(!) websocket connections
- Overwhelmed our poor identity provider
- Less than 20 minutes to recover!
- Databases were not our bottleneck this year

FOX API



BOOP



Moving Furward

- A custom database cluster tuned to our needs
- Modernising how we manage servers
- Refining out our cluster
- Improving our alerting

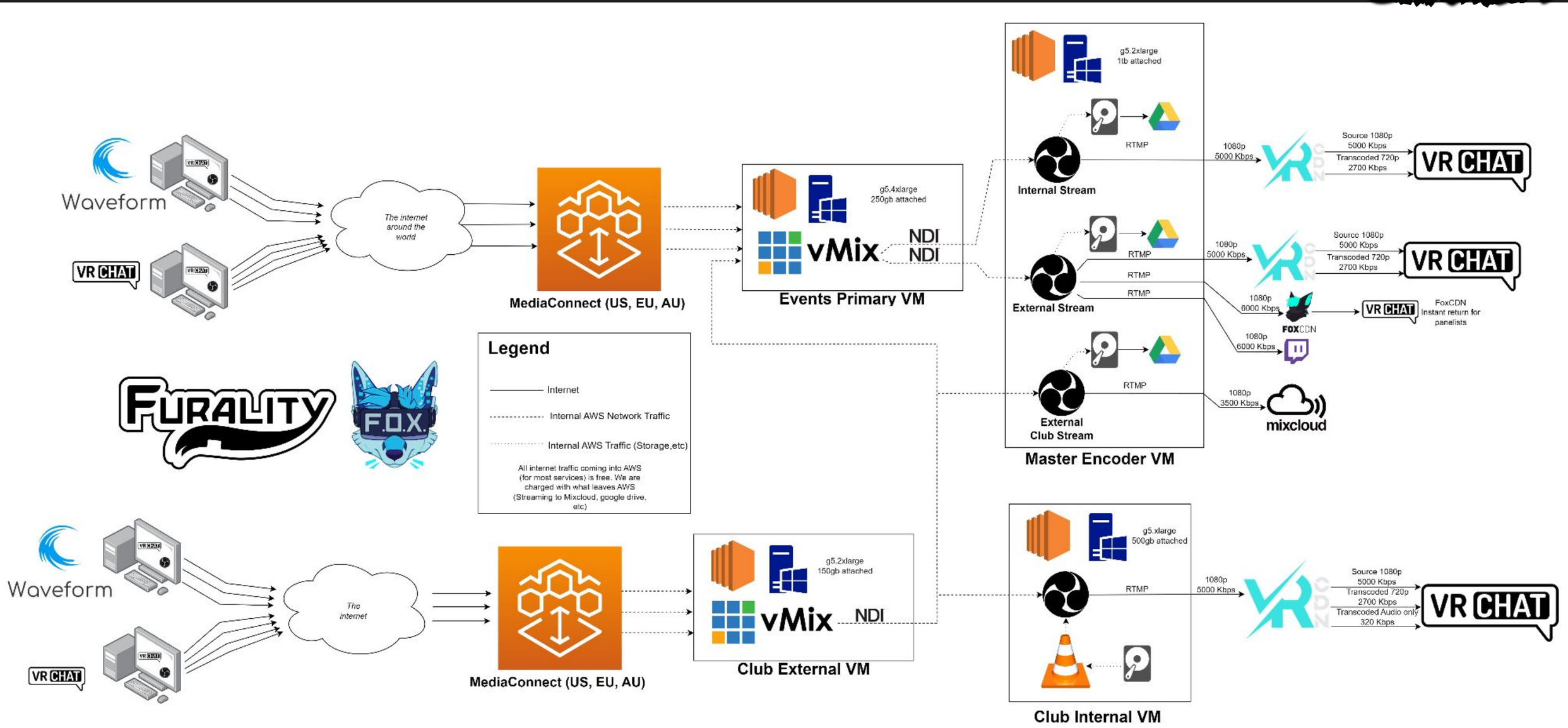
Streaming Infrastructure

The lifeblood of an online convention

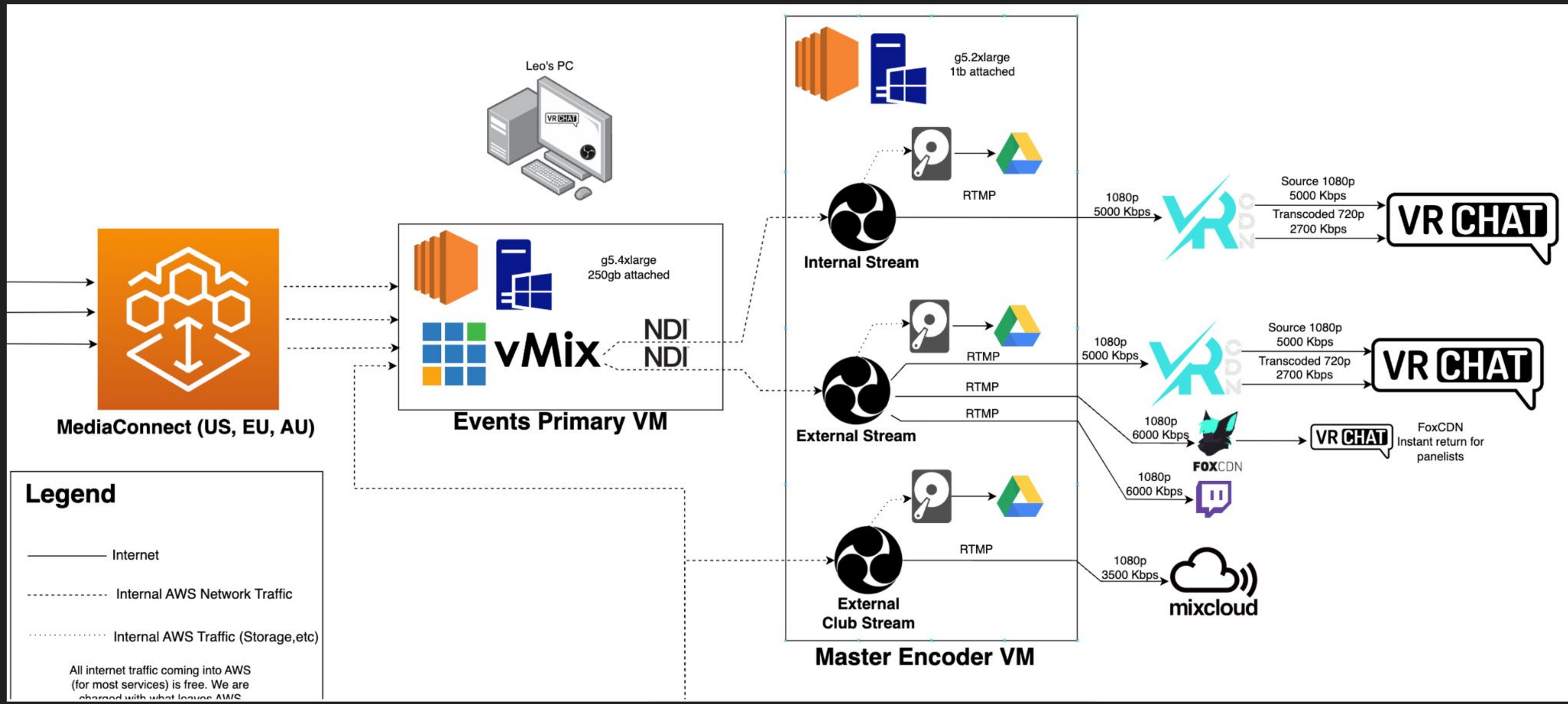
Changes!

- Previous infrastructure “just worked” but was expensive
- VRCDN is purpose built for VRChat
  - So we swapped out AWS Cloudfront for it
  - As a bonus, we get way more metrics
- Ingest and mixing is largely unchanged

Furality Sylva Stream Signal Path Diagram



Furality Sylva Stream Signal Path Diagram



Some big numbers

- Peaked at about 2.621 GB/s during opening
  - Does not include Twitch stream

Backend Team

APIs abound!

Backend APIs and Services

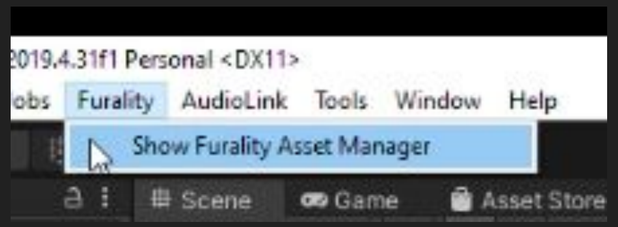
- FOX API (Team Wide)
  - Handles all in-convention tasks and requirements
  - Version 1 and 2!
  - Handles In-World metadata
    - Weather System
- FOX Paws (Kanjon, NerdyWoffy)
  - All asynchronous jobs
  - VRChat
    - Instance Checks
    - Quickjoin
    - Invites
  - Discord Linking

Backend APIs and Services

- WULF API (Conicaw)
  - Handles all out-of-convention tasks and requirements
- BOOP IdP (Kakious)
  - In-House Identity Provider (IdP)
  - External Connection Linking
  - Roles and Permissions
- FOX Socks (Kakious)
  - Socket Servers
  - Handles all real time instance updates back to portal and notifications from staff to users.

Backend APIs and Services

- Furality Asset Manager (BenicleJames)
  - Unity tool to download assets
  - Integrates with BOOP and FOX API to allow easy import and updates



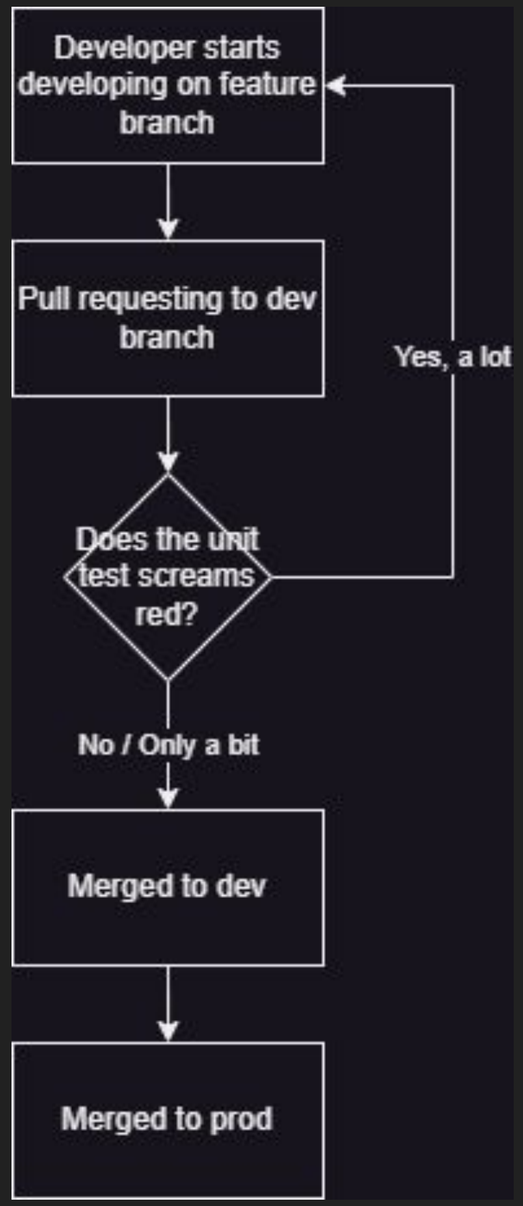
Backend APIs and Services

External Services

- Grafana
  - Not built but mostly managed by Backend team.
  - All Furality Services dashboards are created by them.
  - Used by teams for monitoring status of systems and VRCDN streaming network.
- Graylog
  - Centralized Log Server
  - Receives all logs and alerts from every deployed pod and server.
  - Handles roughly 50-60 Gigs of log data every day of the convention

Developer Workflow

1. Slam face on keyboard, `git push -f --no-verify`
2. Hope working code is produced
3. Cry to Arch to deploy to prod
4. Cry when it does not work
5. Get laughed at by Arch and the rest of infra
6. Infra gets blamed for outage when it’s a Backend issue



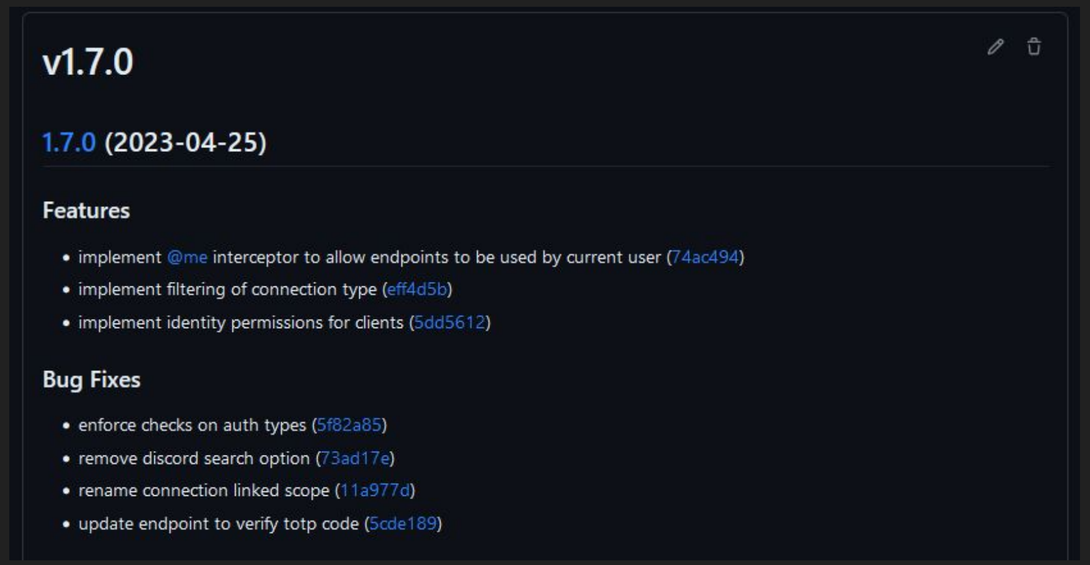
Deployment/Developer Process (Final Final V2)

We cry to Infra and they do it.

1. Developer creates Pull Request to dev branch
2. Merging gated by automated unit and end to end tests
3. Another dev reviews and approves it to dev
4. It’s get built and pushed to cluster for QA and bug testing
5. Once bugs are resolved, Team Lead approves the Pull Request to merge into Production
6. Cluster deploys it to production

Cool things we do.

- Automated semantic versioning
  - Changes version from 1.7.3 -> 1.8.0 when large changes happen
- Changelogs based on developer commits



v1.7.0

1.7.0 (2023-04-25)

Features

- implement @me interceptor to allow endpoints to be used by current user (74ac494)
- implement filtering of connection type (eff4d5b)
- implement identity permissions for clients (5dd5612)

Bug Fixes

- enforce checks on auth types (5f82a85)
- remove discord search option (73ad17e)
- rename connection linked scope (11a977d)
- update endpoint to verify totp code (5cde189)

Example from BOOP

Furality Asset Manager (FAM)

Why tho?

- Download private attendee/patreon-only assets without ever leaving the editor
- Resolve dependencies automatically, regardless of the VRChat Creator Companion
- We can push updates automatically
- Working on allowing downloads for past convention avatar assets!

Without FAM, you'd need to find, download, and import multiple dependencies manually

Trust me, this method is easier for all of us

Just a *couple* of issues on release

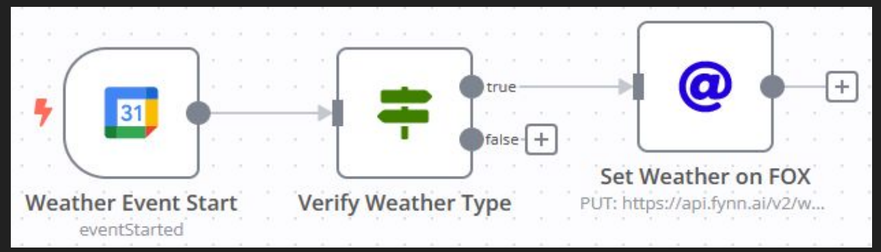
- FOX API returning weird data sometimes
- Conflicting scripts creating errors and preventing FAM from running
- Unity weirdness when importing multiple packages at once

One of the bigger issues was our update method conflicting with VRCFury

(Shoutout to Senky for pushing a hotfix so quick)

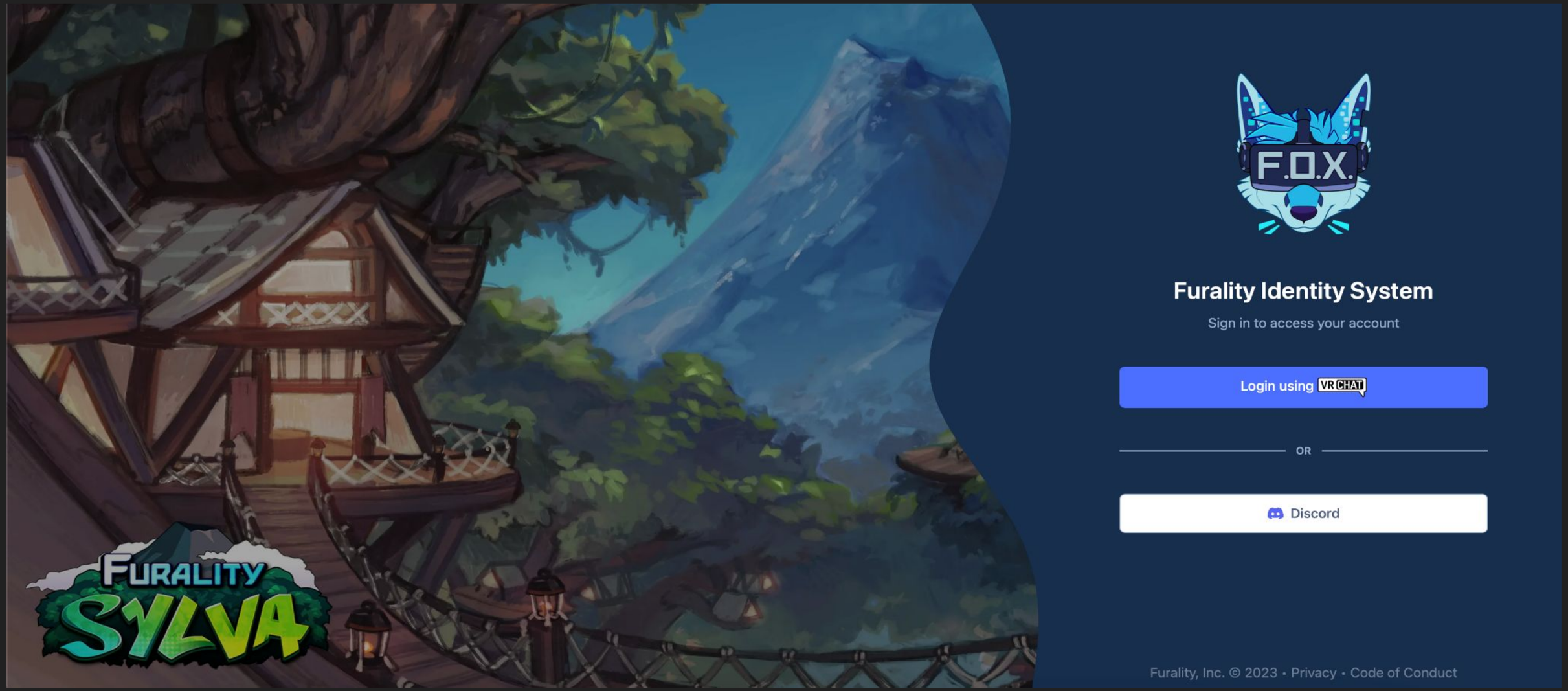
FOX API

- Improved Stability!
  - No outages at Furality Sylva
- Building version 2 of the API
  - Using NestJS
  - Doubles max connection throughput
  - Technically 3rd iteration of the portal system logic
- Moved to BOOP for permissions, Patreon linking, and logins!
- New world metadata system
  - Synced weather updates across instances
  - Planned to expand to allow worlds to be synced to external events in the future



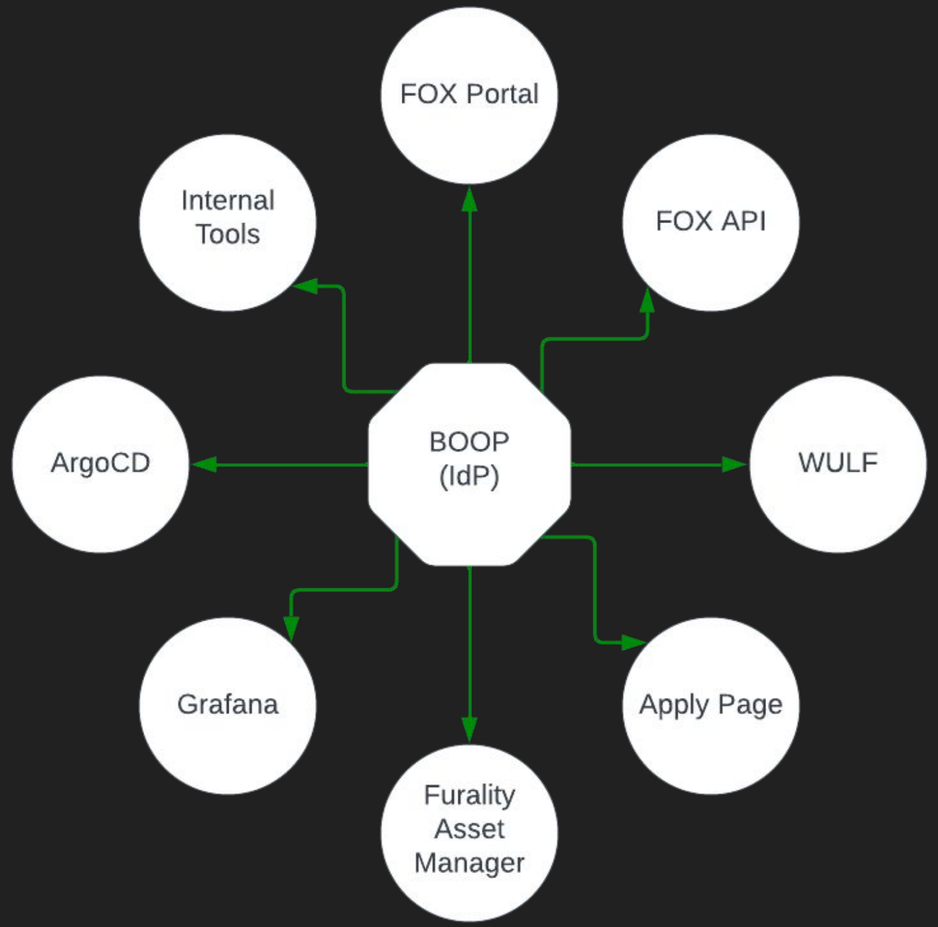
Weather System Automation Script

BOOP login splash page



BOOP (Backend Online OIDC Platform)

- Growing needs and tools required a central identity management solution
- In-House build Identity Provider (IdP)
- OIDC Compliant. SAML planned.
- Knows everything about you and who you are.
  - Linked accounts (Discord, Patreon)
  - VRChat Information
  - Persistent Sessions
  - Audit Logs (Login, Logout, Consents)
  - 2FA Support (FIDO, TOTP) (publicly coming soon™)
  - Roles (Support Team, Event Team, etc.)



Service Overview

Current QPS

204

Current Redis CPS

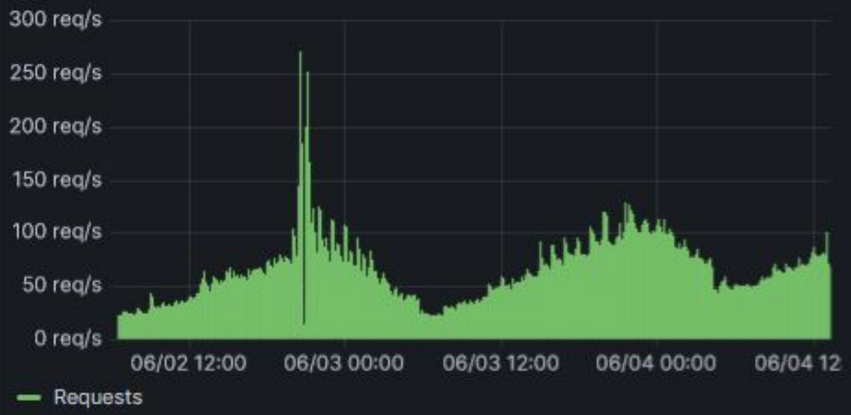
475

Current Keys in DB

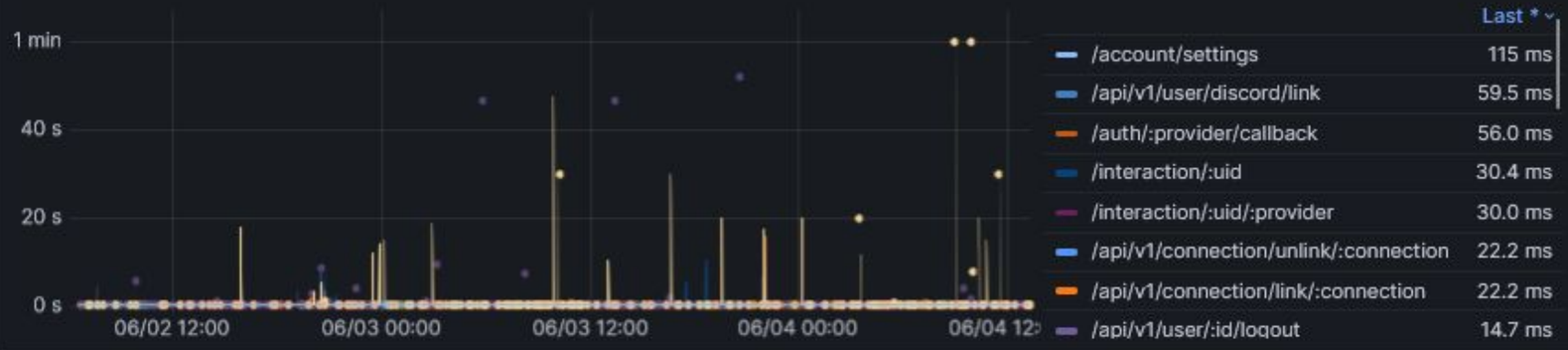
Pod API Spread

Endpoint Data

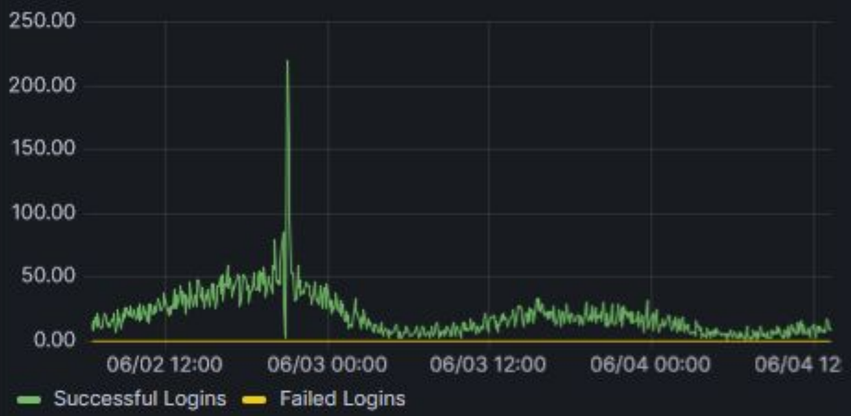
Service Requests



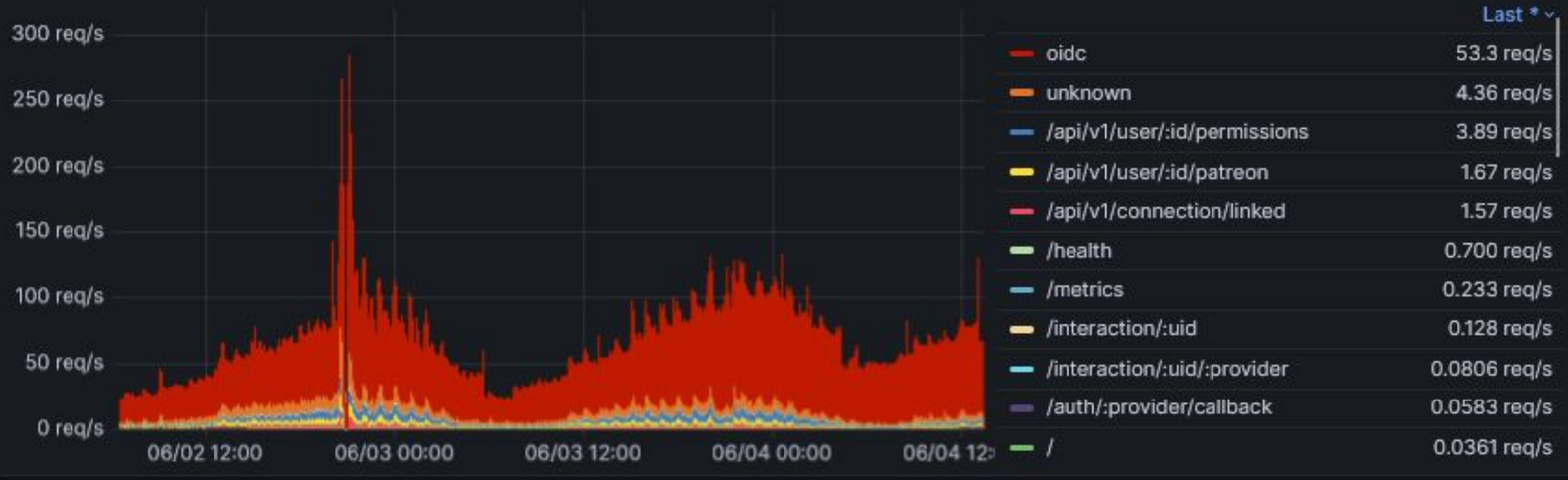
Endpoint Processing Time



Logins



API Requests per Endpoint



WULF (What U Looking For)

- Built from the ground up using NestJS as the foundation.
- Supports all out of convention tasks that do not touch the Portal.
- Talks to the FOX API for dealer’s den updates.

Supports

- Furality Applications
- Team Page
- Dealer’s Den/Avatar Showcase uploads
- DJ Submission and Rating System

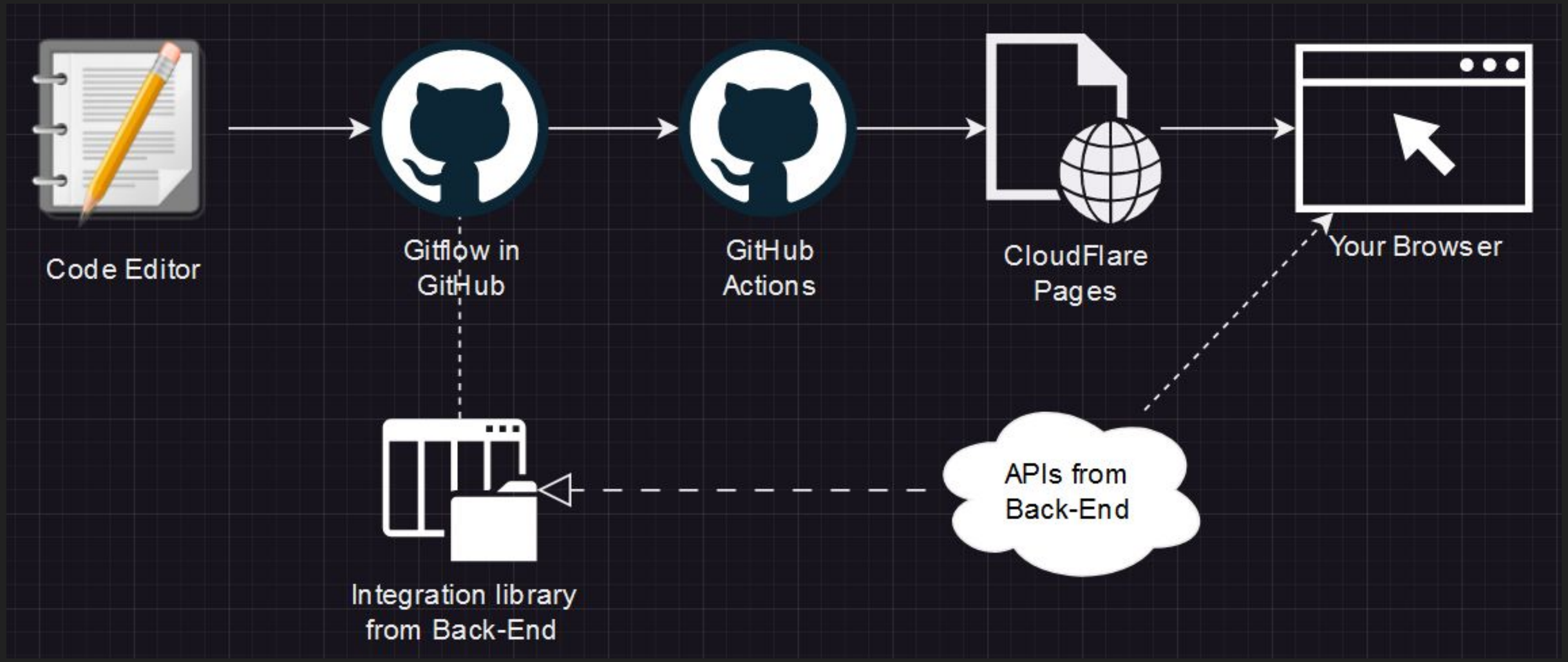
Frontend Team

Making us look good

Frontend

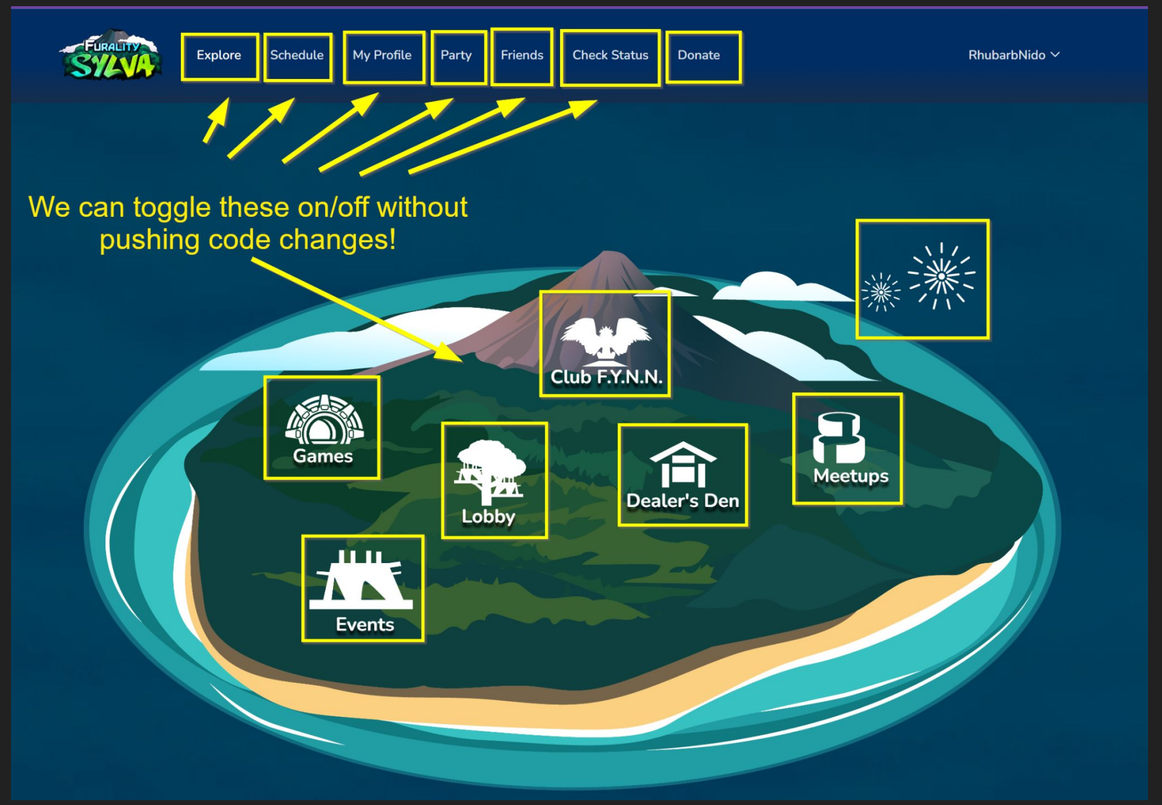
- What is the Frontend?
  - Everything you see and interact with on the FOX Portal is part of the Frontend (Buttons, Text, Pages, Maps, ect.)
  - We utilize React and NextJS to display data that changes on your web browser
- What is React?
  - A popular JavaScript library for writing applications for the browser, with features and tools to display dynamic data for users like you!
  - It helps us reducing complexity, which can explode quickly and easily.

Our Usual Workflow



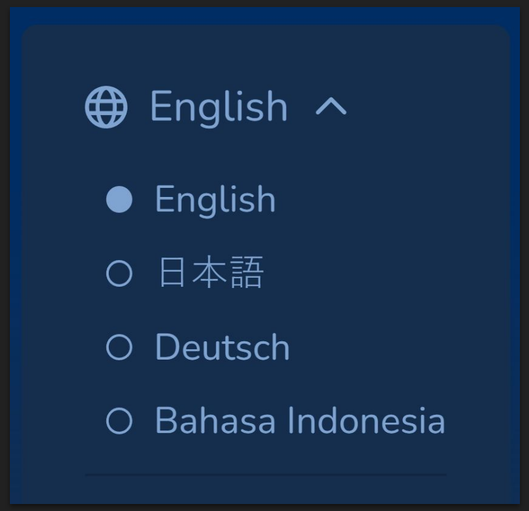
Rolling Out Changes Quickly

- **10+ minutes** to apply changes
- We already used feature flags
- We couldn’t try out anything in production before it was live for everyone
- Unleash has *unleashed* our potential to **instantly** release stuff as they get ready



Internationalization

- We’re continuing to add more languages to the website.



Language switchers on the Portal and the VRChat worlds

Shoutout to the Translation Team!

- The translation team added German and Indonesian for Furality Sylva!
- We are working on adding Spanish next

Consider checking team.furality.org for translator positions and/or emailing volunteer@furality.org

Browser Compatibility Hiccups

- Browsers pretend to be all the same
- We can easily test two of them: Firefox and Chromium-derivatives
- And W3C standards?
  - Browser Vendors: "*Freestyle standard interpretation is our passion*" (not actual quote)
  - Write first in a browser of personal preference
  - Test on other browsers later, just to double-check
  - What if a browser updates and breaks the layout?

- Shoutouts for all Mac users in the Furality Team who helped us testing our stuff in Safari!

Other Challenges

- Usability is hard ⚒️
  - There are so many ways to put buttons in the screen, but only in a few ways they look right
  - We relied on User Experience Team to tell us what is good and what needs to change
- Testing is hard 🧪
  - DTAP environments are way too bureaucratic - dev and prod are enough for us
  - What would we be testing if the VRChat API can change without notice?
  - We’ve been YOLOing for way too long
- Debugging is hard 🔥
  - GlitchTip collects short excerpts and reports errors you see
  - Our ways of testing is still insufficient, but we got a fire extinguisher
- Deadlines are hard 🕛
  - Converting from a lot of web pages from “Luma Festival” into “Sylva” in 102 days
  - Keeping stuff sanely organized was the key

Moving Forward

- Better development processes
  - Mocking for development
  - QA process
- Better error tracing
  - OpenTelemetry with backend
  - Potentially replacing Sentry/GlitchTip entirely
- More helpful error messages
  - Previous API errors were hardcoded error messages
- An upcoming photo upload platform for our Photography team
  - Stay tuned for updates – soon™
- More of everything

User Experience Team

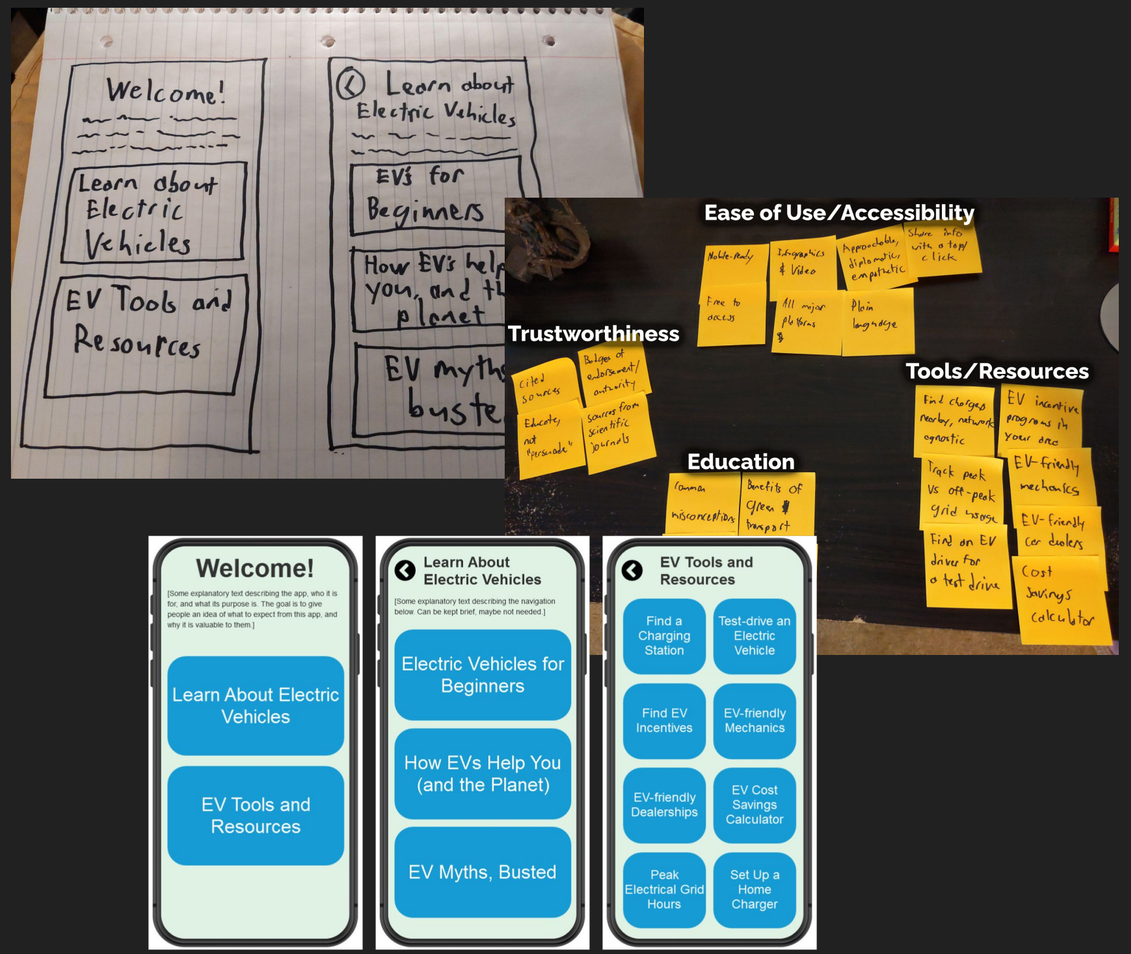
They say no to Comic Sans!

Page Disabled

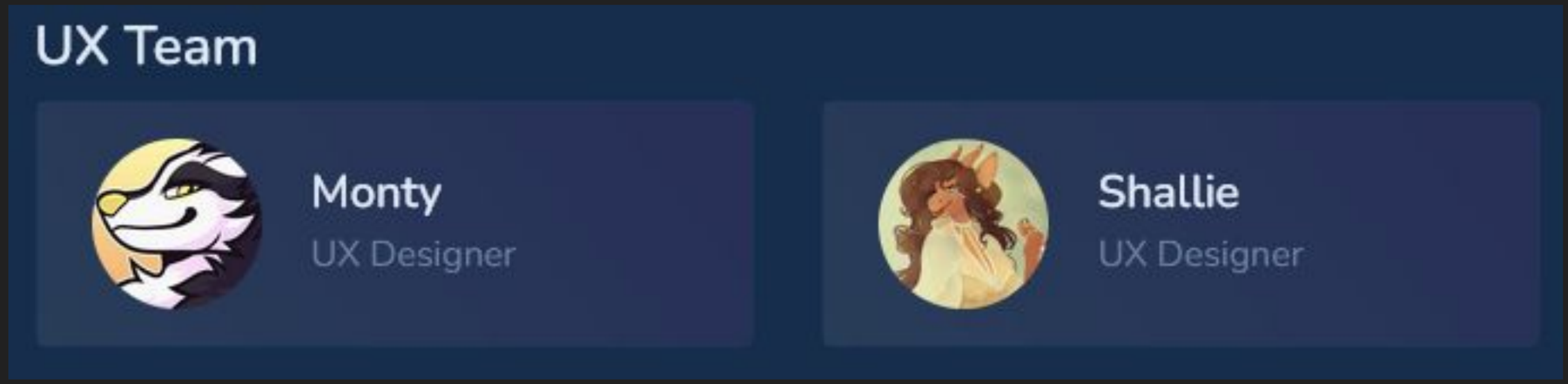
Return to home

User Experience (UX)

- What is UX?
  - Designing solutions to people's problems
  - Making things easier to use
- What does a UX designer do?
  - Defining the problem
  - Coming up with ideas
  - Designing and testing solutions
  - General design suggestions (e.g. color, word choice, etc.)



Team Members



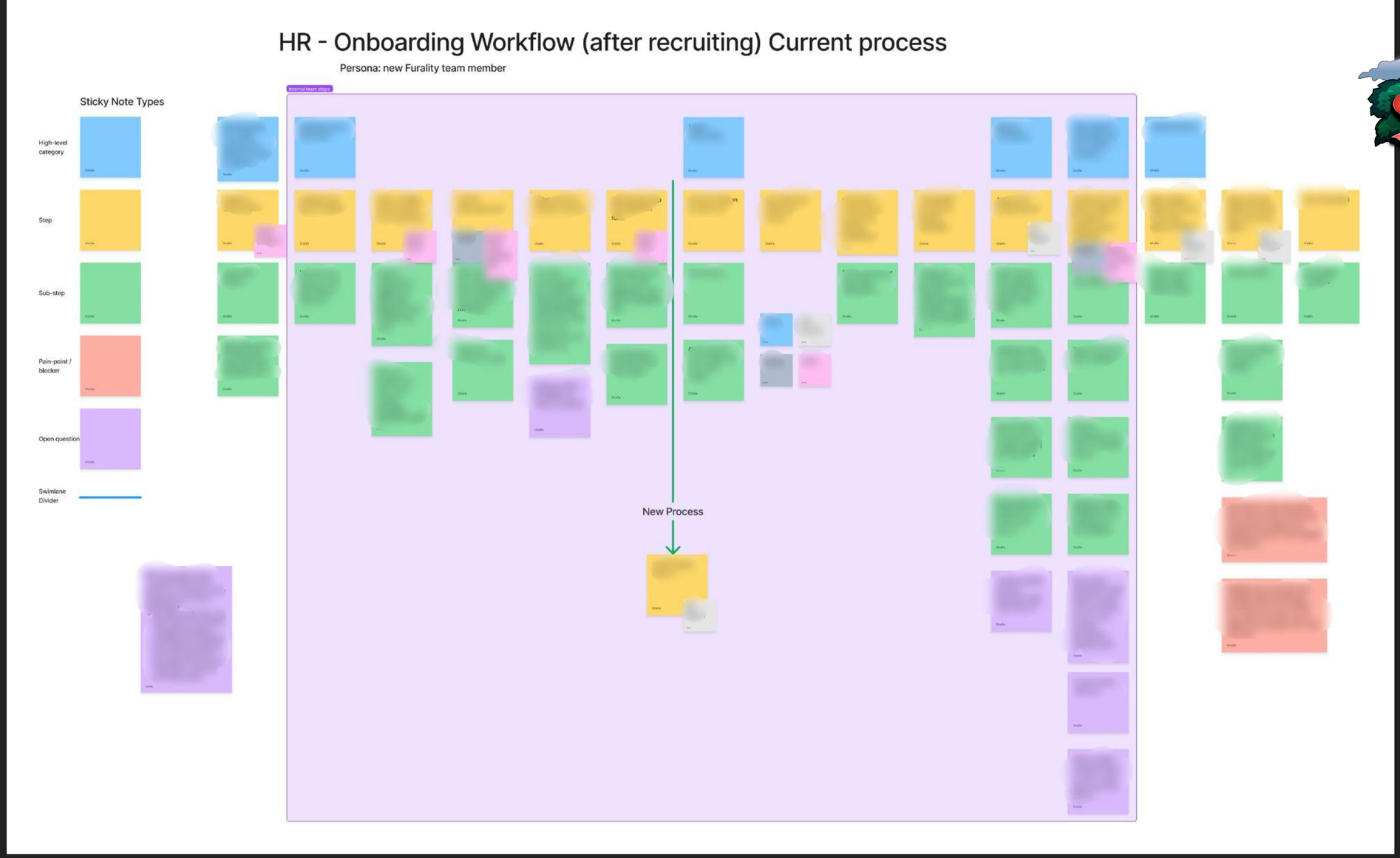
UI/Visuals

Research

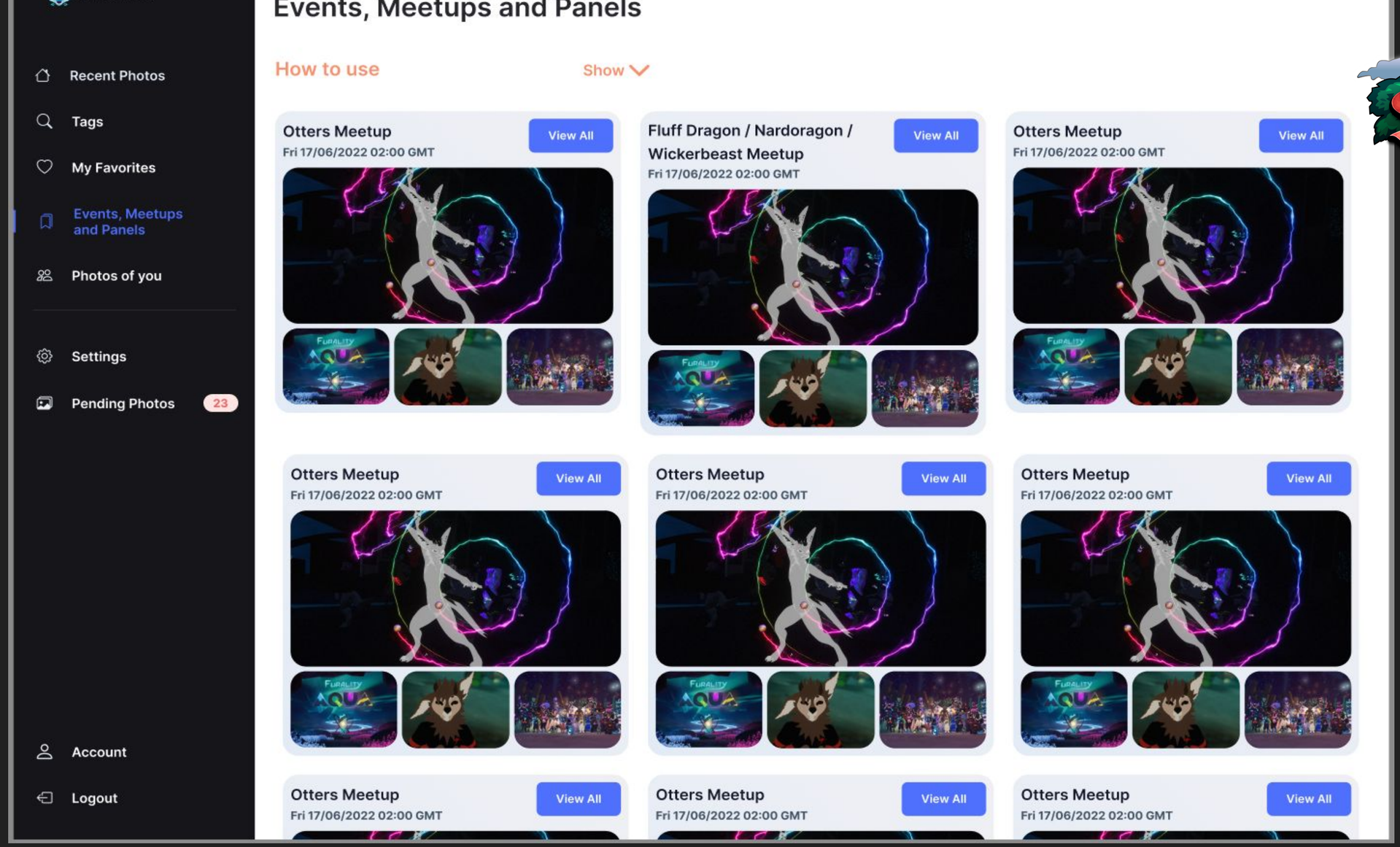
But we both do design!

Projects

- Since Aqua
  - Update FOX Portal for Furality Sylva
  - Admin Portal
  - BOOP (Backend Online OIDC Platform)
  - Accessibility Improvements (thanks, Aurora!)
- Future Plans
  - SUPER SECRET IMAGE PLATFORM
  - Onboarding experience of the FOX Portal
  - Using a Design System (WebPixels)
  - Creating UI style and content guidelines



HR Portal Story Map (planning the work)



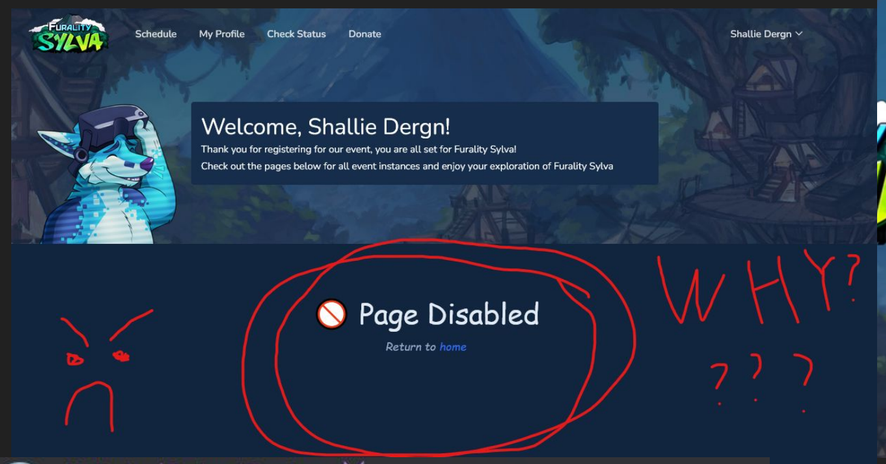
Prototype ideas for SUPER SECRET UPCOMING PHOTO PLATFORM

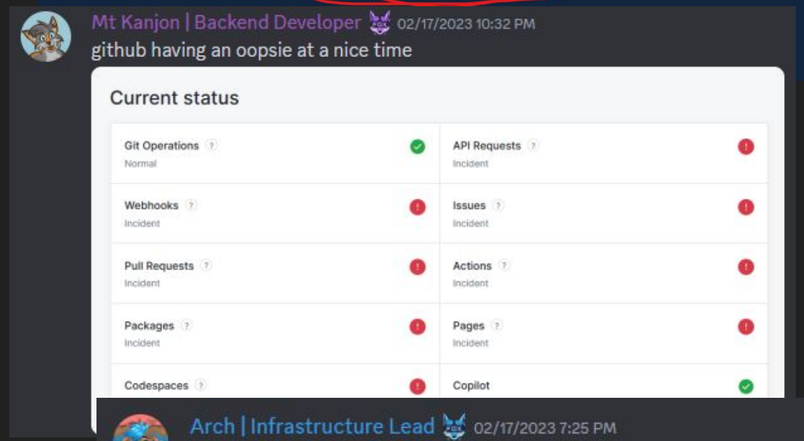
UX Learnings After 6 Conventions and a Festival

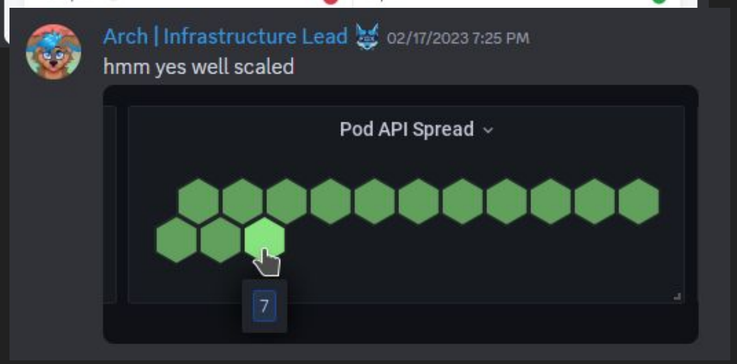
- VR usability
  - Large buttons, minimal typing, fewer clicks
- Diverse users with diverse needs
  - age, experience, countries, accessibility needs
- Sometimes things don’t go as planned
  - Handling errors gracefully, helping people correct
- We can only do so much before each con
  - too many projects and goals, not enough people or time

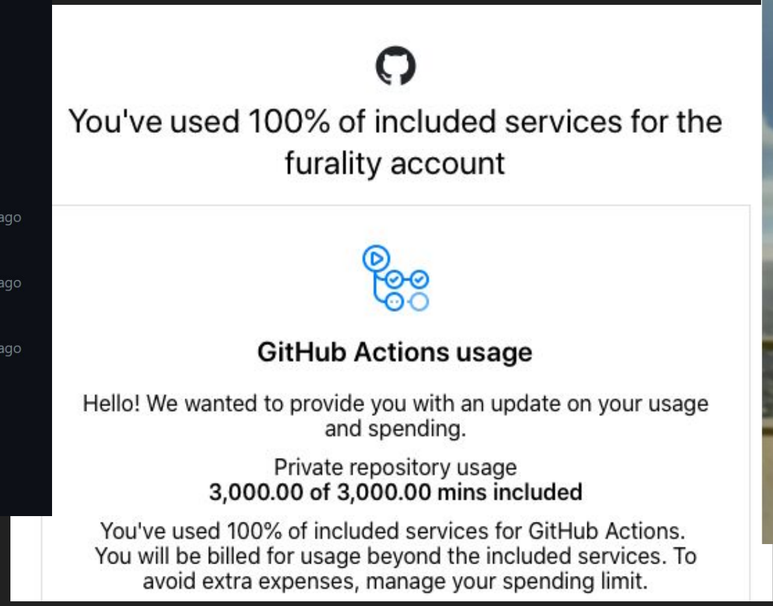
Retrospective

we r profesionals









DevOps Q&A

AMA!