Fermilab Web-based Controls Application Framework R&D

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2023 EPICS Collaboration Meeting
26th April 2023
What are we replacing?

• C/C++ using Xlib

Typical ACNET Console
(Index Page, Console Application, Utilities)
What are we replacing?

• Java using Swing

Typical ACNET Java/Swing-based Console Application
What is ACORN?

- DOE 413.3B Project
- Accelerator Controls Operation Research Network
- $100-142 MM to upgrade controls and power supplies
- Console applications will be a big chunk
Where do we want to go?

- Moving from desktop applications to Progressive Web Applications
- Expected benefits:
  - Aligning with industry trends
  - Improve UX
  - Mobile devices
  - Simplified development
Are web applications scary?

- Web applications are a big departure from desktop applications
- GraphQL connects UI to services for persistence, data acquisition and business logic
- Extensible – services don’t care who their clients are!
Are web applications scary?

- This is an application of clean architecture – the UI is a detail that we expect to change.
Which web application framework will you choose?

A barrel of Web Application Frameworks!

- Lots of options:
  - Vue
  - Angular
  - React
  - Flutter
  - Fresh
  - Svelte

- Which is best for Fermilab?
- Which is best for YOU?
So how do you choose?

- Look at requirements and industry trends
- Three candidates:
  - React (Meta)
  - Flutter (Google)
  - Fresh (Deno -- next-gen Node.js)
- React and Flutter support Mobile devices
So how do you choose?

- Test drive them!
- Five developers chose one and implement the MCR Telephone Index in the framework of their choice
  - React (2), Flutter (1), Fresh (2)
- Dedicated an afternoon to workshop the results
Who won?!!?

- Flutter!
- Each framework has pros/cons... not enough time to review!
- Fresh was determined to be... too... fresh (haha)
- React and Flutter were strong contenders!
Who won?!!?

- Flutter has a vast widget library and Material design

Flutter Telephone Index & Demo Plot
You chose Flutter – yay! Now what?

- Validate our decision
- Re-write our Parameter Page application in Flutter as a PWA
- Hope to share more at next meeting.
- Move on to harder problems, like plotting
- Thank you!!!