

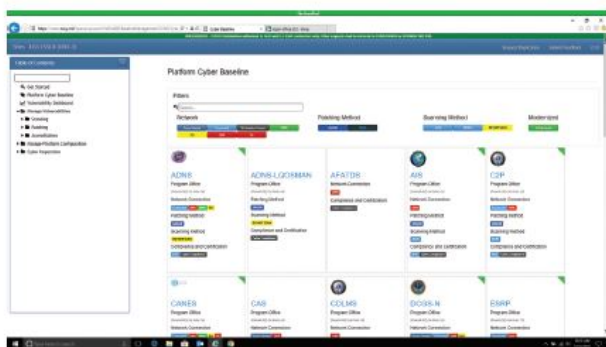
# Cyber Baseline

## TECHNICAL APPROACH



## OVERVIEW OF THE CYBER BASELINE

The Cyber Baseline provides fleet users the information necessary to verify application delivery as part of the Scan to Green Cyber initiative, detailed hardware and software configuration information, and the information necessary to maintain the cyber health of their system. It acts as a reference and overview for all systems modernized during the platform's most recent installation.



## DESIGNING THE CYBER BASELINE

Bandwidth for shipboard systems is constrained, and shipboard systems must be able to operate when communication is Denied, Intermittent, and Low Bandwidth (DIL). The SPAWAR Fleet Readiness Directorate implemented the Cyber Baseline as a Single Page Application (SPA) hosted on Collaboration at Sea (CAS) that utilizes many of the design tenets for Progressive Web Applications – a modern innovation pioneered by Google that greatly reduces the bandwidth required for web applications. PWAs were originally intended as a technique for the mobile web, but SPAWAR's FRD team recognized that the design constraints for afloat users mirrored those of users in the mobile environment and that the cyber baseline could benefit from similar techniques.

When the fleet user visits the Cyber Baseline, the code for the Cyber Baseline builds an in-browser database for persistent storage, which is used to store the Cyber Baseline content. When the user returns to the page, the code compares the resource tag and only downloads the resource if it has been updated on the server; dramatically increasing the performance and responsiveness of the site on subsequent visits. In addition, the Cyber Baseline uses numerous techniques (compression, tree-shaking, minification, ahead-of-time compilation) to ensure the code downloaded to the fleet user is as small and executes as quickly as possible. The initial Cyber Baseline was several hundred MB per platform. By utilizing these compression techniques and leveraging data reuse, FRD has reduced the file size to 20 MB of shared content with each additional platform requiring only 4 MB despite displaying over 10,000 data points regarding system and cyber configuration.

In addition to being efficient in terms of bandwidth, the Cyber Baseline makes efficient use of support personnel. Nearly all data is drawn directly from authoritative databases (SPIDER/CAPS, VRAM, CMPro, SAILOR, and eMASS) and requires minimal additional data entry. The initial Cyber Baseline product required several months of effort to prepare. By leveraging data reuse and automation, SPAWAR has reduced manpower processing time to prepare a cyber baseline from months to less than a week and in some cases a few days.

**CYBER BASELINE**  
Angular 6 / Typescript

Single Page Application (SPA)

Progressive Web App (PWA)

Available offline

Loads quickly

**COLLABORATION  
AT SEA**

Lotus Domino

NoSQL client / server  
database environment

Replicates files to the  
shipboard domino servers  
every 10 minutes

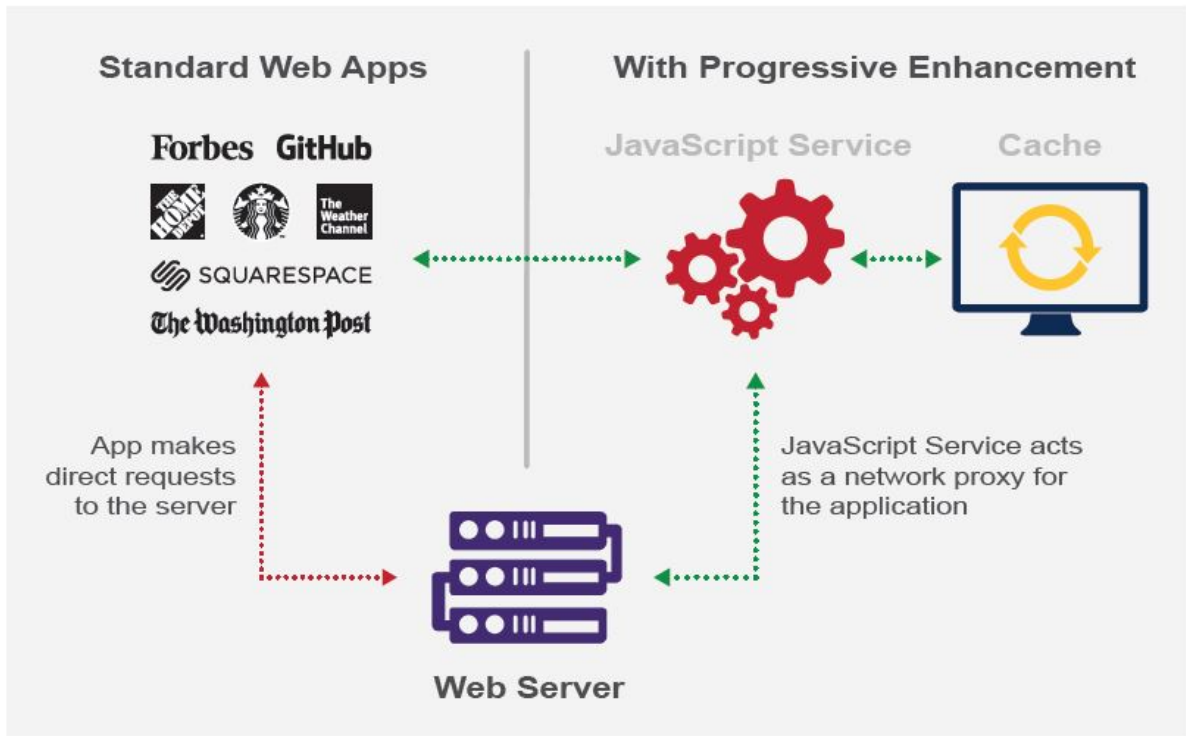
# WHAT ARE PROGRESSIVE WEB APPS?

**Progressive Web Apps (PWA)** combine features of a browser with the benefits of a mobile app experience. A PWA is able to load instantly, even in areas of low connectivity. This gives users the reach of the web and improves mission readiness capabilities by providing an interface that is:

**RELIABLE** – Loads instantly even in uncertain network conditions

**FAST** – Responds quickly with seamless navigation, smooth animations, and responsive scrolling

**ENGAGING** – Provides an immersive user experience



## PROVEN SUCCESS WITH PROGRESSIVE WEB APPS

The term PWA was first coined by Google engineers in 2015. Since that time, PWAs have been deployed by many companies and organizations including GitHub Explorer, Code.NASA.gov, Offline Wikipedia, Twitter, Forbes, Alibaba, Konga, Flipkart, The Weather Channel, The Washington Post, The Home Depot, Virgin America, Pinterest, Starbucks, and AliExpress. These organizations, and many others, have realized the benefits to using PWAs, including:

- ▶ Dramatically decreased load time and increased user engagement. Forbes reduced load time from 3-12 seconds to .8 seconds, with a 100% increase in engagement.
- ▶ Increased efficiency with little data storage on user devices, no lengthy download period, and no installation. Twitter reduced customer data usage by up to 70% compared to its native predecessor.
- ▶ Faster to build and update, resulting in greater economy based on reduced software developer effort required.
- ▶ Improved website management with updates displaying seamlessly and identically on all devices.
- ▶ Wider website access through a unified ability to work on browsers that are common to all devices.