

Case Study

T-Mobile's Store Application

A telecom leader gets a customer-facing e-commerce application with drastically increased search engine traffic, impressive site performance and the ability to re-arrange layouts on the fly.

A project by:

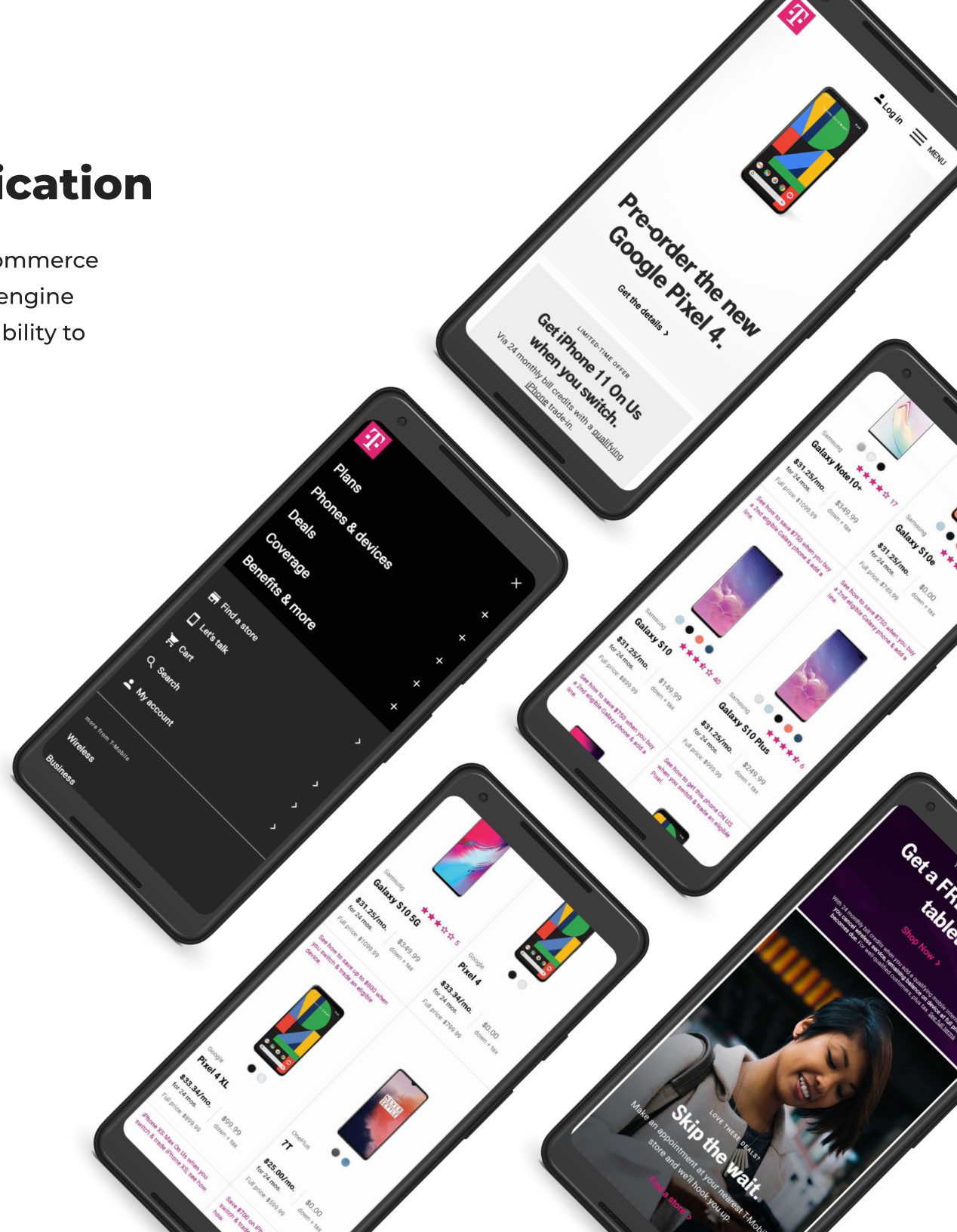


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Project Overview

**Location**

Bellevue, WA, United States

**T-Mobile's Team**

8 full-time engineers

**Services**

Consulting, Engineering

**Process**

Pair-programming, Slack,
Zoom meetings

**Nrwl's Team**

6 engineers

**Tech Stack**

Angular, Nx Dev Tools, Adobe
Experience Manager

In 2019 T-Mobile and Nrwl partnered to create a more unified shopping experience for their customers on the T-Mobile.com device store. The project's two main technical goals were to increase the application's performance and to implement new tools and processes so that contributor velocity would increase. Alongside T-Mobile's team, Nrwl provided technical recommendations and implemented a plan to develop a device store application that could handle T-Mobile.com's CMS-driven content, implement server-side rendering on the application and enable more app performance enhancements.

Nrwl engineers collaborated with T-Mobile's team to build the enterprise's online device shopping experiences in Angular using Nx, while Nrwl architects provided ongoing support and training. The rapid completion of the new application successfully achieved the following outcomes:

1. Superior site and SEO performance, which resulted in more organic search traffic to T-Mobile.com's store.
 - 28% increase in search engine traffic
 - 96 Lighthouse score for Performance
 - 153% increase in engaged visitors.
 - ~50% decrease in page load times.

2. An increase in release velocity on the T-mobile.com device store application, made possible through the implementation of Nrwl's best practices, server-side rendering, the use of Angular Elements and Nx (monorepo dev tools).

3. A more streamlined work process enabled T-Mobile engineers to integrate features and fixes within a 10-minute timespan (faster than ever before).

4. Development teams collaborated within the same workspace to more easily share code and best practices, which built greater transparency across the development organization.

"Nrwl, Angular, and Nx experts (at Nrwl), helped us create a whole new set of web development patterns customized for T-Mobile and the enterprise context which have delivered exceptional business results!"



Tim McDonald
Sr. Dev Manager / T-Mobile

About T-Mobile

As the third largest wireless carrier in the United States, T-Mobile has over 81 million customers relying on their products and services. At the core of T-Mobile's business is a strong digital offering which drives how their consumers experience and buy their wireless services. T-Mobile's engineering organization in Washington, USA, has hundreds of team members who take pride in being at the cutting-edge of innovation and technology. T-Mobile's technical leadership is especially passionate about employing the most efficient developer tools and practices. With such a strong value for engineering as a craft, the work of T-Mobile's development teams create lasting value for their customers.

About Nrwl

Comprised of former Angular team members, Googlers, and renowned software delivery experts, Nrwl partners with enterprises to address the most nuanced challenges of building applications that scale. Nrwl enables development teams to get a deeper understanding of Angular, React and other modern Javascript frameworks, and the implementation of the monorepo style of development using Nx dev tools. Nrwl is a passionate partner in building large applications that are superior within an enterprise context.

Nrwl's ambitious Fortune 500 clients in sectors such as telecommunications, finance, aviation, and consumer technology, build software better and faster through leveraging Nrwl's consulting, training, and open-source tools.

An Evolving Partnership

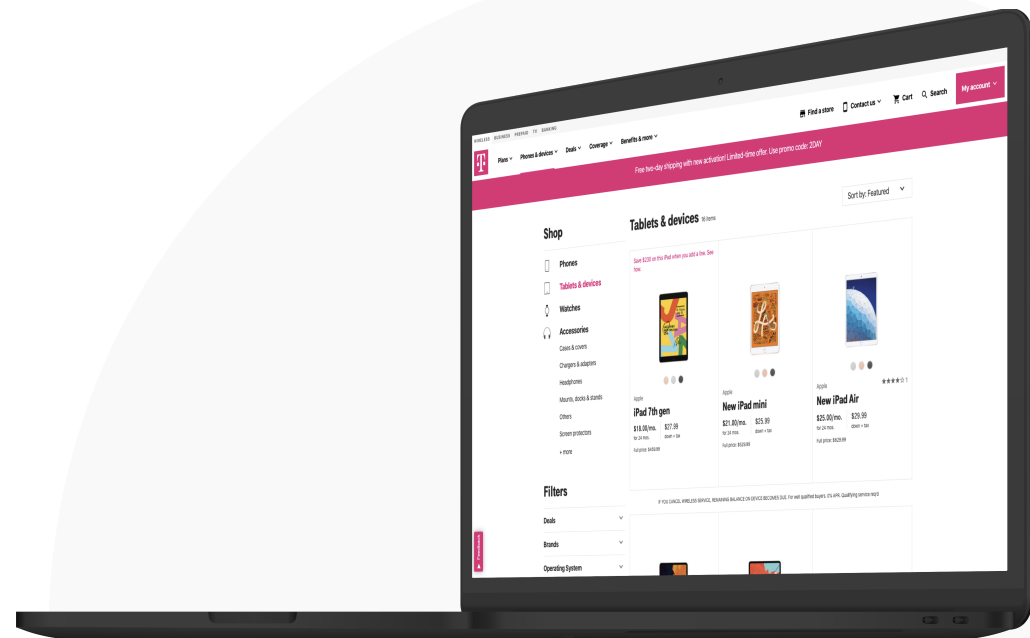


An Evolving Partnership

T-Mobile's goal was to build a unified shopping experience for their T-Mobile.com device store, and they knew it would be important to start off on the right foot with a strong technical partner. Early on, T-Mobile emphasized their key goals of increasing their development team's contributor velocity and the application's performance. As a consultant, Nrwl was able to identify the key constraints and challenges in achieving T-Mobile's goals and provided tactical technical recommendations, which enabled their success.

As the project progressed, T-Mobile took advantage of an evolving opportunity and moved ahead with an additional six Nrwl engineers and architects over the course of eight months. Nrwl engineers worked alongside T-Mobile's team and participated in T-Mobile's established Agile delivery processes to provide ongoing support and training. In partnership with Nrwl, T-Mobile efficiently completed an ambitious and successful project.

The Challenge



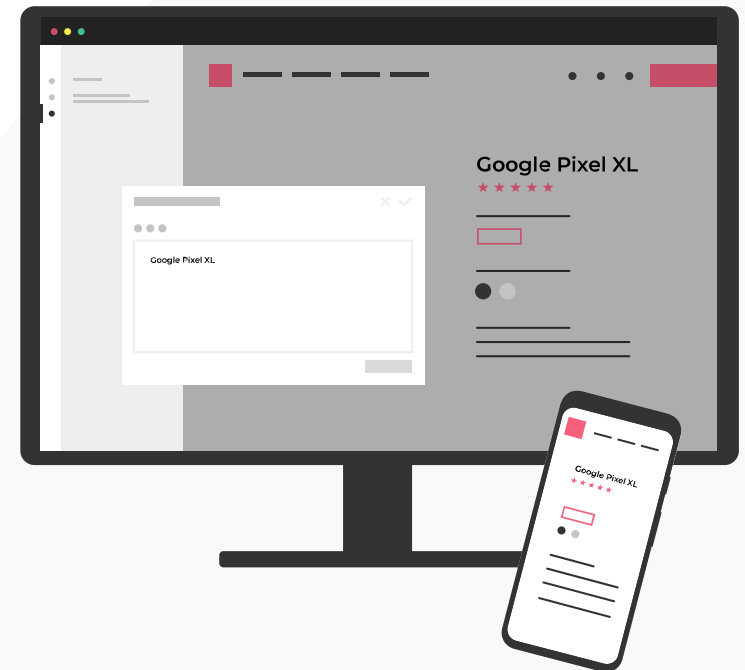
The Challenge

T-Mobile's team identified some critical opportunities to improve their customer-experience interface for their device selection platform. In addition, they found some issues to resolve - For example their existing customer-facing desktop app needed to be faster, as it originally took over 10 seconds to load.

Aside from the new application that needed to be built, a new shared workspace that could support all of the applications moving into their digital web platform was recommended. With this new shared workspace, greater collaboration and transparency across development teams within the organization could also be enabled.

In order to address their customers' and business needs, T-mobile's technical leadership needed to come up with the best solutions and rapidly get a drastically improved device store to market.

Project Requirements



Project Requirements

- An update from the AngularJS to Angular tech-stack
- An application that supports WYSIWYG authorable content from T-Mobile's CMS (Adobe Experience Manager), so content producers can easily update the store.
- The optimization of continuous integration processes.
- The implementation of Nx tooling to enable developers in different teams working on different applications to collaborate within a single workspace.

Technical Solution

Together, Nrwl and T-Mobile built several successful technical solutions to meet T-Mobile's goals.

Here's how →



01

We implemented server-side rendering and service workers to decrease the time to first paint and first interactive in order to speed up the time in which customers can view the store app.

- Since the HTML is fully rendered on the server, the user can see content before the client-side application bootstraps (first paint).
- We offloaded computationally expensive operations (such as generating cryptographic keys) to a service worker so the main UI thread would not be not blocked.

02 We configured server-side rendering so that HTML parsing by a search engine was possible, thereby improving page performance and search engine optimization for the site.

- With improved page performance we were able to increase the pagerank on Google for T-Mobile's customers and ultimately boost phone sales through organic search.

03

We leveraged Angular Elements to allow dynamic page composition via T-Mobile's CMS, making it possible for T-Mobile's e-commerce team to autonomously update the site, as they did before, without requiring all of the CMS infrastructure and associated overhead that was previously needed.

- We used Angular Elements in order to expose certain components as custom elements within the app.
- We built custom elements so that the browser could render our Angular elements as normal DOM elements.
- We used custom elements in the CMS in a way that did not require the CMS to load the entire Angular framework.
- We enabled the content from CMS to be loaded dynamically by the Angular application, along with any custom elements inside.
- We provided a way for the custom elements to communicate and coordinate with the main Angular application.

4

We used a monorepo approach and leveraged Nx to provide smart tooling.

- The Monorepo development approach allowed developers to share libraries that are used by different applications.
- Nx's dependency graph highlights the complexity of the enterprise workspace and allows the team to see shared code.
- Being able to see affected features helps speed up the continuous integration process by running tests against only what's affected by change set.

Great Collaboration Leads to Big Success



By implementing the Nx dev tools solution and a monorepo development approach, T-Mobile's many engineering teams are now able to work in the same workspace. By enabling a higher degree of collaboration, Nx positively impacted T-Mobile's enterprise software practices for the foreseeable future.

The new development processes and Nx tooling that Nrwl trained T-Mobile's engineers on has significantly increased T-Mobile's software release velocity, and teams are now working in a more streamlined fashion.

Today, T-Mobile's engineering teams can integrate features and fixes within a 10-minute timespan,

which is considerably faster than ever before. Meanwhile, T-Mobile's automated deployment to an integration environment occurs within an hour. Their pipeline gets built out to deploy multiple applications all at the same time. However, the deployment only occurs if needed (if the application has been affected by a change).

Reports from the Google Lighthouse performance metrics tool clearly show that work done in this project has significantly increased T-Mobile's site's performance across load-times, SEO, and accessibility. These metrics are all key performance indicators and are vital to the success of T-Mobile.com's business and T-Mobile customers' continued happiness.

If you enjoyed this case study about Nrwl's partnership with T-Mobile, please let us know.

Don't hesitate to consult with our experts about your next project!

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