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Advanced Next.js Training

2 days (14 hours)

Overview

Next.js is a React framework for building modern, high-performance, production-ready web applications. With the App Router, Server Components, Server Actions, streaming, and advanced caching mechanisms, Next.js enables the creation of robust and scalable web architectures.

Our Advanced Next.js training will take you beyond the basics to master the critical topics encountered when deploying Next.js applications.

You will learn how to structure an advanced App Router architecture, make the right choice between Server Components and Client Components, and manage data fetching, caching, revalidation, and mutations with Server Actions.

By the end of the course, you will be able to optimize the performance of a Next.js application, reduce client-side JavaScript, improve rendering, secure sensitive actions, and prepare a production-ready architecture.

This training also covers testing, observability, instrumentation, traces, metrics, and deployment best practices to ensure the reliability of your applications in a real-world environment.

Like all our courses, this one will introduce you to **the latest stable version** of the technology and its new features.

Objectives

- Master advanced uses of the App Router and Server Components
- Implement a strategy for data fetching, caching, and revalidation

- Use Server Actions to manage data mutations and forms
- Optimize performance, streaming, bundles, and Core Web Vitals
- Secure access, server actions, cookies, and sensitive data
- Implement testing, observability, instrumentation, and best deployment practices

Target Audience

- React and Next.js developers
- Advanced front-end developers
- Full-stack JavaScript or TypeScript developers
- Front-end tech leads
- Web architects and application architects

Requirements

- Proficiency in React and functional components
- Knowledge of TypeScript is recommended
- Initial experience with Next.js, App Router, or full-stack JavaScript development
- Basic understanding of APIs, authentication, and web deployment is a plus

Technical requirements

- Have a computer with Node.js installed
- Install a code editor such as Visual Studio Code
- Have Git installed
- Ensure a stable internet connection

Curriculum for our Advanced Next.js Training

[Day 1 - Morning]

Advanced architecture with the App Router

- Understanding advanced uses of the App Router in a modern Next.js application
- Structuring an architecture with layouts, nested layouts, route groups, and loading states
- Distinguish precisely between Server Components and Client Components
- Minimize client-side JavaScript through server-first composition
- Identify common mistakes: overuse of the client, misplaced boundaries, overly large bundles
- Hands-on workshop: refactoring a Next.js application to reduce Client Components and improve the App Router structure

[Day 1 - Afternoon]

Data fetching, caching, and revalidation

- Understanding server-side data fetching strategies with Next.js
- Master caching mechanisms, cache keys, tags, and invalidation
- Implementing time-based and event-driven revalidation according to business needs
- Choose between static, dynamic, and streaming rendering, and fresh data on demand
- Identify issues with stale data, inconsistent caching, and overly aggressive revalidation
- Hands-on workshop: Implement a caching and revalidation strategy across multiple pages and data sources

Server Actions, data mutations, and form management

- Understand the role of Server Actions in managing server-side mutations
- Create robust forms with validation, error handling, and user feedback
- Securing data mutations: input validation, authentication, authorization, and data validation
- Handling optimistic transactions, server errors, redirects, and cache invalidation after data updates
- Compare Server Actions, Route Handlers, and traditional API calls depending on the context
- Hands-on workshop: Implementing a complete workflow for data creation, validation, updates, and revalidation

[Day 2 - Morning]

Performance, streaming, and rendering optimization

- Optimize performance with streaming, Suspense, loading.tsx, and progressive rendering
- Analyzing performance with Core Web Vitals, Lighthouse, bundle analyzer, and server traces
- Reducing bundle size: targeted imports, splitting, lazy loading, and removing unnecessary dependencies
- Optimize images, fonts, third-party scripts, and critical resources
- Minimize waterfall charts, redundant calls, unnecessary re-renders, and server bottlenecks
- Hands-on workshop: audit a Next.js application, identify performance bottlenecks, and apply measurable optimizations

[Day 2 - Afternoon]

Security, authentication, and production architecture

- Implement an authentication strategy tailored to Next.js applications
- Manage sessions, cookies, headers, middleware, and secure redirects
- Secure Server Actions, Route Handlers, and access to server data
- Apply best practices: CSRF, server-side validation, secrets, environment variables, and permissions
- Structure a production-ready application: separation of concerns, services, repositories, and domain layer
- Hands-on workshop: Securing a Next.js application with auth, middleware, server-side validation, and protection of sensitive actions

Testing, observability, and deployment

- Set up unit tests, integration tests, and end-to-end tests tailored to Next.js
- Testing Server Components, client components, Server Actions, and critical workflows
- Configure observability with instrumentation, structured logs, traces, and metrics
- Understand the value of OpenTelemetry for tracking application performance and behavior
- Prepare for deployment: variables, environments, CI/CD, monitoring, rollback, and release strategy
- Hands-on workshop: adding tests, instrumentation, and a production deployment checklist to an advanced Next.js application

Target Audience

This training is intended for both individuals and companies, large or small, seeking to train their teams in a new advanced IT technology or to acquire specific domain knowledge or modern methodologies.

Assessment upon enrollment

The pre-training assessment complies with Qualiopi quality standards. Upon final registration, the learner receives a self-assessment questionnaire that allows us to evaluate their estimated proficiency in various types of technologies, as well as their expectations and personal goals regarding the upcoming training, within the limits imposed by the selected format. This questionnaire also allows us to anticipate certain connection or internal security issues within the company (intra-company or virtual classroom) that could pose challenges for monitoring and ensuring the smooth running of the training session.

Teaching Methods

Practical Course: 60% Practical, 40% Theory. Training materials distributed in digital format to all participants.

Organization

The course alternates between theoretical input from the trainer, supported by examples and reflection sessions, and group work.

Assessment

At the end of the session, a multiple-choice questionnaire is used to verify that the skills have been properly acquired.

Certification

A certificate will be issued to each trainee who has completed the entire training program.