https://www.udemy.com/course/microservices-with-node-js-and-react/

Microservices with Node JS and React

Build, deploy, and scale an E-Commerce app using Microservices built with Node, React, Docker and Kubernetes

26 sections 652 lectures 54h 27m total length

### **Fundamental Ideas Around Microservices9 lectures • 46min**

* ~~How to Get HelpPreview~~
* ~~00:56~~
* ~~Course Resources~~

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* ~~What Is a Microservice? Preview~~
* 03:19
* ~~Data in MicroservicesPreview~~
* 07:34
* ~~Quiz - Data in Microservices~~

3 questions

* ~~Big Problems with Data~~

05:08

* ~~Sync Communication Between Services~~

06:53

* ~~Event-Based Communication~~

05:19

* ~~A Crazy Way of Storing Data~~

09:48

* ~~Pros and Cons of Async Communication~~

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* ~~App Overview~~

05:44

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* ~~Posts Service Creation~~

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* ~~Testing the Posts Service~~

04:04

* ~~Implementing a Comments Service~~

08:22

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* ~~Note on the React App~~

00:20

* ~~Addressing Default Export and ReactDom.render Warnings~~

00:39

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05:00

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* ~~Handling CORS Errors~~

04:08

* ~~Fetching and Rendering Posts~~

10:04

* ~~Creating Comments~~

08:09

* ~~Displaying Comments~~

07:23

* ~~Completed React App~~

00:13

* ~~Request Minimization Strategies~~

04:54

* ~~An Async Solution~~

07:16

* ~~Common Questions Around Async Events~~

04:14

* ~~Event Bus Overview~~

05:14

* ~~Important Note about Node v15 and Unhandled Promise Rejections~~

00:23

* ~~A Basic Event Bus Implementation~~

05:22

* ~~Emitting Events~~

05:18

* ~~Emitting Comment Creation Events~~

03:45

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04:33

* ~~Creating the Data Query Service~~

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* ~~Parsing Incoming Events~~

07:02

* ~~Using the Query Service~~

07:09

* ~~Adding a Simple Feature~~

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* ~~Issues with Comment Filtering~~

07:43

* ~~A Second Approach~~

05:37

* ~~How to Handle Resource Updates~~

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* ~~Creating the Moderation Service~~

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* ~~Adding Comment Moderation~~

04:26

* ~~Reminder about Node v15 and Error Catching~~

00:11

* ~~Handling Moderation~~

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* ~~Updating Comment Content~~

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* ~~A Quick Test~~

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* ~~Rendering Comments by Status~~

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* ~~Dealing with Missing Events~~

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* ~~Implementing Event Sync~~

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* ~~Event Syncing in Action~~

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### **Running Services with Docker8 lectures • 30min**

* ~~Deployment Issues~~

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* ~~Why Docker?~~

02:55

* ~~Why Kubernetes?~~

05:47

* ~~Don't Know Docker? Watch This.~~

01:17

* ~~Note About Docker Build Output and Buildkit~~

00:44

* ~~Dockerizing the Posts Service~~

04:02

* ~~Review Some Basic Commands~~

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* ~~Warning on Docker Desktop for Linux~~

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* ~~Installing Kubernetes~~

03:19

* ~~IMPORTANT Note for Minikube and MicroK8s Users~~

00:47

* ~~A Kubernetes Tour~~

09:45

* ~~Important Kubernetes Terminology~~

02:51

* ~~Notes on Config Files~~

03:11

* ~~Creating a Pod~~

06:41

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00:35

* ~~Understanding a Pod Spec~~

05:15

* ~~Common Kubectl Commands~~

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* ~~A Time-Saving Alias~~

02:26

* ~~Introducing Deployments~~

03:27

* ~~Creating a Deployment~~

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* ~~Common Commands Around Deployments~~

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* ~~Updating Deployments~~

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* ~~Preferred Method for Updating Deployments~~

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* ~~Networking With Services~~

04:15

* ~~Creating a NodePort Service~~

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05:09

* ~~Setting Up Cluster IP Services~~

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* ~~Building a Deployment for the Event Bus~~

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04:09

* ~~Updating Service Addresses~~

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* ~~Verifying Communication~~

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09:57

* ~~Testing Communication~~

05:29

* ~~Load Balancer Services~~

05:13

* ~~Load Balancers and Ingress~~

06:38

* ~~Important - DO NOT SKIP - Ingress Nginx Installation Info~~

00:30

* ~~Installing Ingress-Nginx~~

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* ~~Ingress v1 API Required Update + pathType Warning~~

00:56

* ~~Writing Ingress Config Files~~

04:47

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01:12

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* ~~Skaffold Setup~~

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00:20

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* ~~Ingress-Nginx Setup~~

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* ~~Remote Dev with Skaffold~~

06:35

* ~~Free Google Cloud Credits~~

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* ~~Google Cloud Initial Setup~~

02:43

* ~~Kubernetes Cluster Creation~~

03:59

* ~~Kubectl Contexts~~

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* ~~Initializing the GCloud SDK~~

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* ~~Installing the GCloud Context~~

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* ~~Updating the Skaffold Config~~

04:34

* ~~More Skaffold Updates~~

01:06

* ~~Creating a Load Balancer~~

05:12

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* ~~Creating Route Handlers~~

05:40

* ~~Scaffolding Routes~~

04:05

* ~~Adding Validation~~

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* ~~Handling Validation Errors~~

06:18

* ~~Postman HTTPS Issues~~

00:11

* ~~Surprising Complexity Around Errors~~

06:06

* ~~Other Sources of Errors~~

04:17

* ~~Solution for Error Handling~~

04:50

* ~~Building an Error Handling Middleware~~

07:38

* ~~Communicating More Info to the Error Handler~~

05:23

* ~~Encoding More Information In an Error~~

04:35

* ~~Subclassing for Custom Errors~~

08:17

* ~~Determining Error Type~~

03:10

* ~~Property 'param' does not exist on type 'AlternativeValidationError'~~

00:23

* ~~Converting Errors to Responses~~

10:12

* ~~Moving Logic Into Errors~~

08:36

* ~~serializeErrors' not assignable to the same property in base type 'CustomError'~~

00:21

* ~~Verifying Our Custom Errors~~

08:34

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10:19

* ~~How to Define New Custom Errors~~

05:01

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05:49

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* ~~Creating Databases in Kubernetes~~

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* ~~Connecting to MongoDB~~

07:53

* ~~Understanding the Signup Flow~~

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* ~~Getting TypeScript and Mongoose to Cooperate~~

05:21

* ~~Creating the User Model~~

04:54

* ~~Type Checking User Properties~~

06:01

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06:00

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04:53

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04:58

* ~~Adding Password Hashing~~

06:57

* ~~Comparing Hashed Password~~

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* Huge Issues with Authentication Strategies

07:32

* ~~So Which Option?~~

02:58

* ~~Solving Issues with Option #2~~

08:26

* ~~Reminder on Cookies vs JWT's~~

06:21

* ~~Microservices Auth Requirements~~

11:00

* ~~Issues with JWT's and Server Side Rendering~~

09:58

* Cookies and Encryption

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* Adding Session Support

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* Generating a JWT

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* JWT Signing Keys

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* Securely Storing Secrets with Kubernetes

02:13

* Creating and Accessing Secrets

09:18

* Accessing Env Variables in a Pod

05:18

* Common Response Properties

04:41

* Formatting JSON Properties

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* The Signin Flow

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* Common Request Validation Middleware

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* Sign In Logic

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* Returning the Current User

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* Requiring Auth for Route Access

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* Testing Goals

04:32

* Testing Architecture

07:51

* Index to App Refactor

02:54

* Replacing --only=prod Install Flag

00:12

* A Few Dependencies

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* Required MongoMemoryServer Updates

00:26

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* Our First Test

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* Testing Invalid Input

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* Requiring Unique Emails

01:45

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* Tests Around Sign In Functionality

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05:18

* Easy Auth Solution

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* globalThis has no index signature TS Error

00:16

* Auth Helper Function

07:12

* Testing Non-Authed Requests

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### Integrating a Server-Side-Rendered React App40 lectures • 3hr 1min

* Starting the React App

02:11

* Reminder on Server Side Rendering

03:38

* Suggestion Regarding a Default Export Warning

00:30

* Basics of Next JS

05:24

* Building a Next Image

04:28

* Running Next in Kubernetes

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* Small Update for Custom Webpack Config

00:19

* Note on File Change Detection

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* Adding Global CSS

05:09

* Adding a Sign Up Form

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* Handling Email and Password Inputs

03:42

* Successful Account Signup

05:12

* Handling Validation Errors

06:53

* The useRequest Hook

06:59

* Using the useRequest Hook

03:40

* An onSuccess Callback

05:37

* Overview on Server Side Rendering

06:47

* A note about ECONNREFUSED errors

00:24

* Fetching Data During SSR

05:07

* Why the Error?

09:00

* Two Possible Solutions

07:04

* Cross Namespace Service Communication

07:45

* When is GetInitialProps Called?

06:46

* On the Server or the Browser

02:01

* Ingress-Nginx Namespace and Service - Important Update

00:19

* Specifying the Host

08:23

* Passing Through the Cookies

04:01

* A Reusable API Client

07:05

* Content on the Landing Page

02:01

* The Sign In Form

03:12

* A Reusable Header

05:00

* Moving GetInitialProps

02:11

* Issues with Custom App GetInitialProps

06:42

* Handling Multiple GetInitialProps

06:07

* Passing Props Through

03:03

* Error: Invalid <Link> with <a> child

00:16

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* Options for Code Sharing

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* NPM Organizations

04:27

* Publishing NPM Modules

04:06

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00:12

* An Easy Publish Command

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* Relocating Shared Code

07:29

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* Updating the Common Module

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### Create-Read-Update-Destroy Server Setup26 lectures • 2hr 28min

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* Project Setup

05:24

* Running the Ticket Service

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* Quick Auth Update

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* Test-First Approach

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* Creating the Router

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* Faking Authentication During Tests

07:09

* A Required Session Fix and a Global Signin Reminder

00:15

* Building a Session

05:39

* Testing Request Validation

04:12

* Validating Title and Price

04:09

* Reminder on Mongoose with TypeScript

07:12

* Defining the Ticket Model

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* Creation via Route Handler

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* Testing Show Routes

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* Unexpected Failure!

05:29

* What's that Error?!

08:57

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* Complete Index Route Implementation

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06:15

* Handling Updates

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* Permission Checking

06:49

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* NATS Server Status - IMPORTANT NOTE

00:37

* Three Important Items

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* Creating a NATS Streaming Deployment

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* Big Notes on NATS Streaming

09:53

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* Port-Forwarding with Kubectl

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* Publishing Events

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* Small Required Command Change

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* Accessing Event Data

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* Manual Ack Mode

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09:45

* Graceful Client Shutdown

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* Core Concurrency Issues

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* Common Questions

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* [Optional] More Possible Concurrency Solutions

16:42

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09:40

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### Connecting to NATS in a Node JS World17 lectures • 1hr 22min

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* The Listener Abstract Class

09:27

* Extending the Listener

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* Leveraging TypeScript for Listener Validation

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00:25

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* Where Does this Get Used?

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* Using the Custom Publisher

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* More on Publishing

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* NATS Client Singleton

05:24

* Node Nats Streaming Installation

00:09

* Remember Mongoose?

04:57

* TS Error - Did you forget to include 'void' in your type argument

00:17

* Singleton Implementation

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* Accessing the NATS Client

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* Successful Listen!

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### Cross-Service Data Replication In Action28 lectures • 2hr 44min

* The Orders Service

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* A Touch More Setup

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* Associating Orders and Tickets

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* Finding Reserved Tickets

06:10

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* Order Expiration Times

06:05

* globalThis has no index signature TS Error

00:15

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02:36

* Small Update for "Value of type 'typeof ObjectId' is not callable"

00:21

* Asserting Tickets Exist

06:08

* Asserting Reserved Tickets

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* Testing the Success Case

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* Fetching a User's Orders

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* A Slightly Complicated Test

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07:17

* Cancelling an Order

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* Can We Cancel?

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* Creating the Events

09:23

* Implementing the Publishers

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* Publishing Order Cancellation

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* Time for Listeners!

02:12

* Reminder on Listeners

01:53

* Blueprint for Listeners

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* A Few More Reminders

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* Simple onMessage Implementation

02:17

* ID Adjustment

05:44

* Ticket Updated Listener Implementation

04:32

* Initializing the Listeners

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* A Quick Manual Test

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* Clear Concurrency Issues

12:59

* Reminder on Versioning Records

06:41

* Optimistic Concurrency Control

05:37

* Mongoose Update-If-Current

03:46

* Implementing OCC with Mongoose

04:02

* Test functions cannot both take a 'done' callback and return something Error

00:20

* Testing OCC

09:07

* One More Test

03:45

* Who Updates Versions?

06:29

* Including Versions in Events

02:59

* Updating Tickets Event Definitions

03:55

* Property 'version' is missing TS Errors After Running Skaffold

00:49

* Applying a Version Query

07:14

* Did it Work?

04:31

* Abstracted Query Method

05:42

* [Optional] Versioning Without Update-If-Current

18:34

* Testing Listeners

04:55

* A Complete Listener Test

09:25

* Testing the Ack Call

02:09

* Testing the Ticket Updated Listener

08:20

* Success Case Testing

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* Out-Of-Order Events

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* Fixing a Few Tests

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* Listeners in the Tickets Service

01:47

* Building the Listener

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* Strategies for Locking a Ticket

05:28

* Reserving a Ticket

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07:00

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* Missing Update Event

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* Private vs Protected Properties

06:54

* Publishing While Listening

06:42

* Mock Function Arguments

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06:51

* A Lightning-Quick Test

07:28

* Don't Forget to Listen!

02:21

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* The Expiration Service

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* Expiration Options

07:55

* Initial Setup

06:14

* Skaffold errors - Expiration Image Can't be Pulled

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* A Touch of Kubernetes Setup

07:44

* File Sync Setup

02:32

* Listener Creation

03:42

* What's Bull All About?

03:56

* Creating a Queue

09:07

* Queueing a Job on Event Arrival

05:10

* Testing Job Processing

03:17

* Delaying Job Processing

05:23

* Defining the Expiration Complete Event

03:50

* Publishing an Event on Job Processing

06:27

* Handling an Expiration Event

06:00

* Emitting the Order Cancelled Event

05:37

* Testing the Expiration Complete Listener

05:51

* A Touch More Testing

07:20

* Listening for Expiration

02:20

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02:11

* globalThis has no index signature TS Error

00:21

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08:45

* Replicated Fields

05:57

* Another Order Model!

07:30

* Update-If-Current

01:17

* Replicating Orders

04:07

* Testing Order Creation

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* Marking an Order as Cancelled

05:39

* Cancelled Testing

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* Starting the Listeners

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* Payments Flow with Stripe

05:10

* Implementing the Create Charge Handler

08:32

* Validating Order Payment

04:03

* Testing Order Validation Before Payment

06:59

* Testing Same-User Validation

05:10

* Stripe Setup

03:58

* Creating a Stripe Secret

03:20

* Creating a Charge with Stripe

06:08

* Manual Testing of Payments

06:35

* Automated Payment Testing

06:27

* Mocked Stripe Client

04:23

* A More Realistic Test Setup

09:16

* Realistic Test Implementation

06:15

* Tying an Order and Charge Together

07:18

* Testing Payment Creation

06:13

* Publishing a Payment Created Event

06:31

* More on Publishing

03:18

* Marking an Order as Complete

06:18

* Important Info About the Next Lecture - Don't Skip

00:51

* Don't Cancel Completed Orders!

01:01

### Back to the Client21 lectures • 1hr 43min

* A Few More Pages

06:15

* Reminder on Data Fetching with Next

06:09

* Two Quick Fixes

05:43

* Scaffolding a Form

03:43

* Sanitizing Price Input

06:29

* Ticket Creation

06:44

* Listing All Tickets

07:41

* Reminder on Invalid <Link> with <a> child Errors

00:11

* Linking to Wildcard Routes

07:07

* Creating an Order

07:25

* Programmatic Navigation to Wildcard Routes

04:16

* The Expiration Timer

10:54

* Displaying the Expiration

01:01

* Showing a Stripe Payment Form

03:06

* Module not found: Can't resolve 'prop-types'

00:14

* Configuring Stripe

04:23

* Test Credit Card Numbers

01:58

* Paying for an Order

09:24

* Filtering Reserved Tickets

02:27

* Header Links

01:47

* Rendering a List of Orders

06:20

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* Development Workflow

03:39

* Git Repository Approaches

06:05

* Creating a GitHub Action

07:11

* Adding a CI Test Script

02:42

* Tests in GitHub Actions Hang - Jest did not exit

00:17

* Running Tests on PR Creation

04:48

* Output of Failing Tests

05:48

* Running Tests in Parallel

07:28

* Verifying a Test Run

03:01

* Selective Test Execution

05:44

* Deployment Options

07:40

* Creating a Hosted Cluster

02:39

* Reminder on Kubernetes Context

03:32

* Reminder on Swapping Contexts

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* The Deployment Plan

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* Building an Image in an Action

08:40

* Testing the Image Build

02:30

* Restarting the Deployment

07:17

* Applying Kubernetes Manifests

03:27

* Prod vs Dev Manifest Files

04:23

* Manual Secret Creation

03:39

* Don't Forget Ingress-Nginx!

05:31

* Testing Automated Deployment

02:51

* Additional Deploy Files

07:12

* A Successful Deploy!

06:07

* Buying a Domain Name

03:10

* Three Important Changes Needed to Deploy - Do Not Skip!

01:23

* Configuring the Domain Name

05:27

* I Really Hope This Works

01:58

* Next Steps

04:36

### [Appendix A] - Basics of Docker46 lectures • 3hr 3min

* Finished Code and Diagrams

00:38

* Why Use Docker?

03:43

* What is Docker?

02:53

* Docker for Mac / Windows

01:57

* Installing Docker on macOS

01:10

* Installing Docker with WSL2 on Windows 10/11

01:50

* Installing Docker on Linux

01:55

* Using the Docker Client

05:03

* But Really... What's a Container?

08:30

* How's Docker Running on Your Computer?

02:44

* Docker Run in Detail

01:54

* Overriding Default Commands

05:12

* Listing Running Containers

04:09

* Container Lifecycle

05:16

* Restarting Stopped Containers

03:43

* Removing Stopped Containers

01:39

* Retrieving Output Logs

02:33

* Stopping Containers

05:21

* Multi-Command Containers

04:16

* Executing Commands in Running Containers

02:53

* The Purpose of the 'it' Flag

04:35

* Getting a Command Prompt in a Container

04:06

* Starting with a Shell

02:13

* Container Isolation

03:09

* Creating Docker Images

02:36

* Buildkit for Docker Desktop

00:45

* Building a Dockerfile

04:51

* Dockerfile Teardown

02:41

* What's a Base Image?

05:40

* The Build Process in Detail

11:09

* A Brief Recap

03:24

* Rebuilds with Cache

07:02

* Tagging an Image

04:26

* Quick Note for Windows Users

00:14

* Manual Image Generation with Docker Commit

05:00

* Project Outline

02:35

* Node Server Setup

05:03

* A Few Planned Errors

05:12

* Required Node Base Image Version

00:23

* Base Image Issues

07:50

* A Few Missing Files

03:18

* Copying Build Files

04:50

* Container Port Forwarding

07:26

* Specifying a Working Directory

07:52

* Unnecessary Rebuilds

04:16

* Minimizing Cache Busting and Rebuilds

04:58

### **[Appendix B] - Basics of Typescript75 lectures • 5hr 42min**

* ~~How to Get Help~~

01:04

* ~~TypeScript Overview~~

06:19

* ~~Environment Setup~~

07:59

* ~~Important Axios Version Information~~

00:12

* ~~A First App~~

04:43

* ~~Executing Typescript Code~~

05:03

* ~~One Quick Change~~

03:35

* ~~Catching Errors with TypeScript~~

07:22

* ~~Catching More Errors!~~

05:15

* ~~Do Not Skip - Course Overview~~

03:36

* ~~Types~~

05:12

* ~~More on Types~~

05:53

* ~~Examples of Types~~

04:48

* ~~Where Do We Use Types?~~

00:49

* ~~Type Annotations and Inference~~

02:03

* ~~Annotations With Variables~~

04:53

* ~~Object Literal Annotations~~

06:53

* ~~Annotations Around Functions~~

05:55

* ~~Understanding Inference~~

03:51

* ~~The Any Type~~

07:47

* ~~Fixing the "Any" Type~~

01:49

* ~~Delayed Initialization~~

03:05

* ~~When Inference Doesn't Work~~

04:37

* ~~More on Annotations Around Functions~~

04:56

* ~~Inference Around Functions~~

06:08

* ~~Annotations for Anonymous Functions~~

01:42

* ~~Void and Never~~

02:49

* ~~Destructuring with Annotations~~

03:35

* ~~Annotations Around Objects~~

07:05

* ~~Arrays in TypeScript~~

05:05

* ~~Why Typed Arrays?~~

04:30

* ~~Multiple Typees in Arrays~~

02:57

* ~~When to Use Typed Arrays~~

00:54

* ~~Tuples in TypeScript~~

04:04

* ~~Tuples in Action~~

05:28

* ~~Why Tuples?~~

03:20

* ~~Interfaces~~

01:26

* ~~Long Type Annotations~~

04:42

* ~~Fixing Annotations With Interfaces~~

04:36

* Syntax Around Interfaces

03:31

* Functions in Interfaces

04:46

* Code Reuse with Interfaces

04:15

* General Plan with Interfaces

03:12

* Classes

03:47

* Basic Inheritance

03:03

* Class Method Modifiers

06:41

* Fields in Classes

06:18

* Fields with Inheritance

04:18

* Where to Use Classes

01:09

* Updated Parcel Instructions

00:13

* App Overview

02:45

* Bundling with Parcel

04:54

* Project Structure

03:19

* IMPORTANT Info About Faker Installation

00:23

* Generating Random Data

05:29

* Type Definition Files

05:17

* Using Type Definition Files

06:20

* Export Statements in TypeScript

05:06

* Defining a Company

04:43

* Important Note About Google Maps Key

00:27

* Adding Google Maps Support

07:38

* Required Update for New @types Library

00:18

* Google Maps Integration with TypeScript

04:06

* Exploring Type Definition Files

12:46

* Hiding Functionality

06:28

* Why Use Private Modifiers? Here's Why

08:25

* Adding Markers

09:18

* Duplicate Code

02:45

* One Possible Solution

06:38

* Restricting Access with Interfaces

05:35

* Implicit Type Checks

03:26

* Showing Popup Windows

06:47

* Updating Interface Definitions

07:11

* Optional Implements Clauses

06:06

* App Wrapup

08:08

### Bonus!1 lecture • 1min

* Bonus!

00:33