EduNFT Implementation

Remix interface
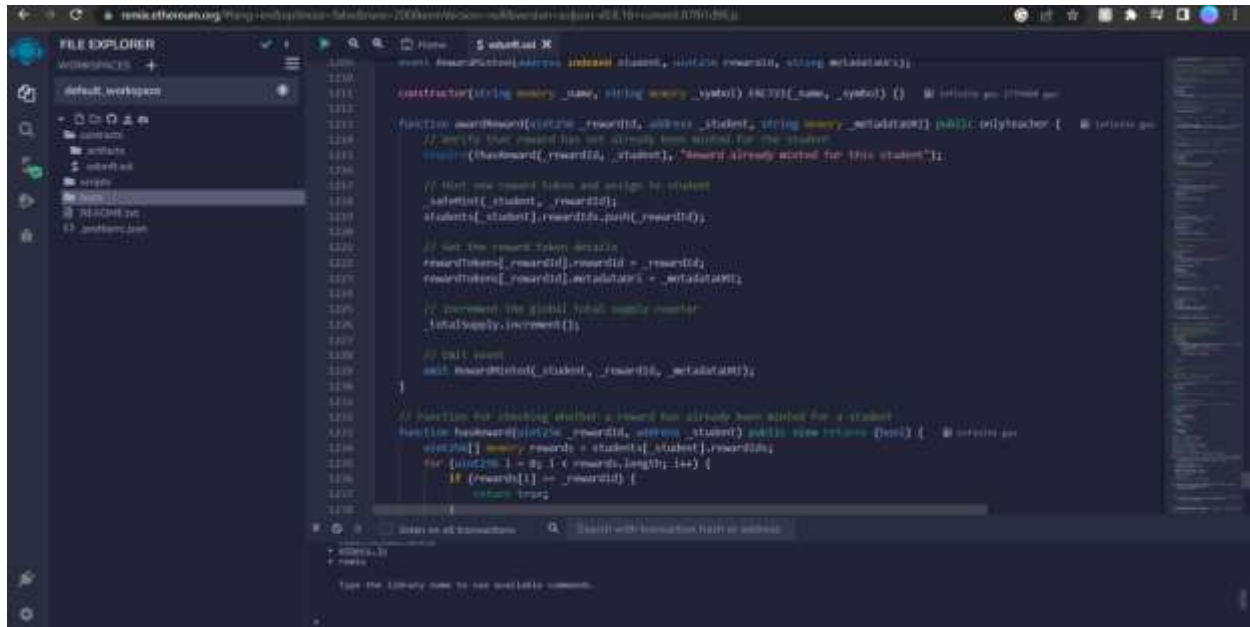
Code compilation in Remix
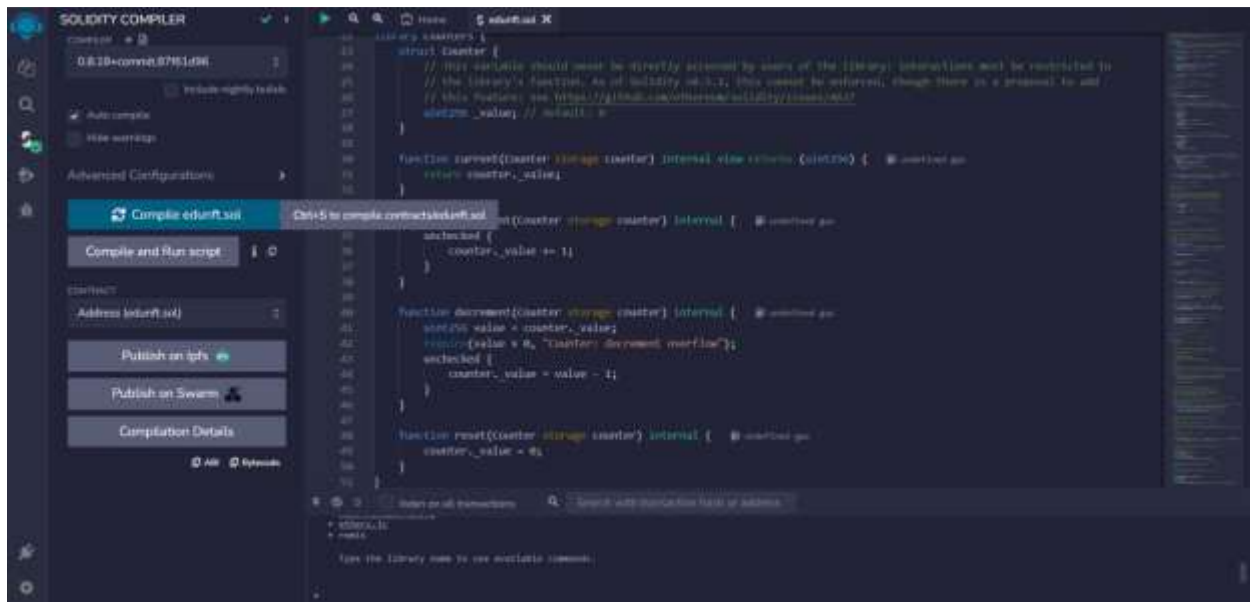
Deployment of smart contract via Remix

Signing request to connect wallet via MetaMask
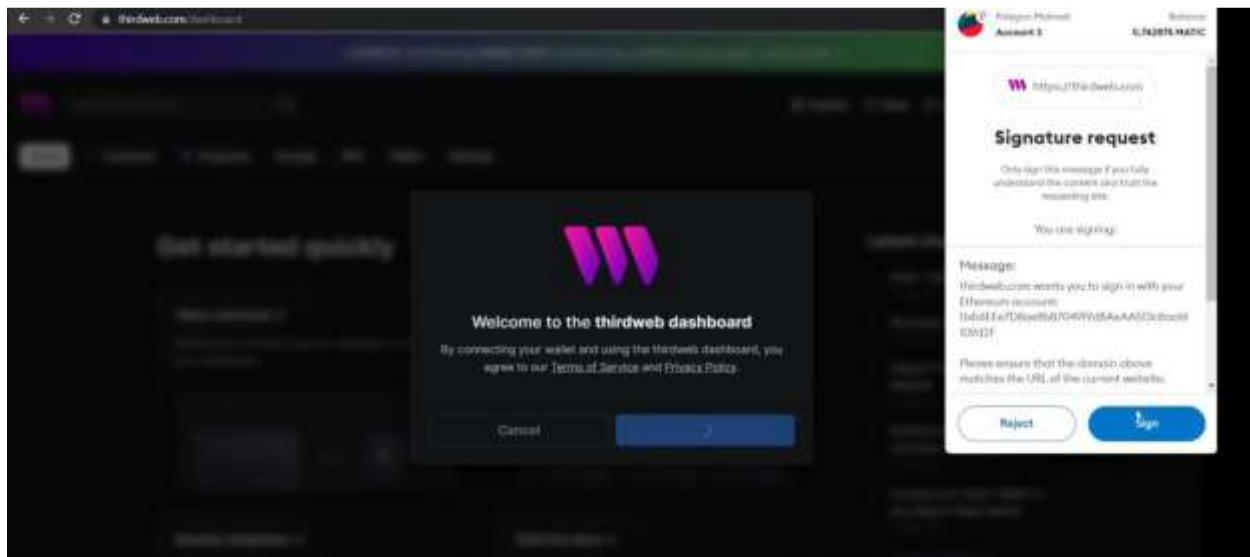
Importing the smart contract
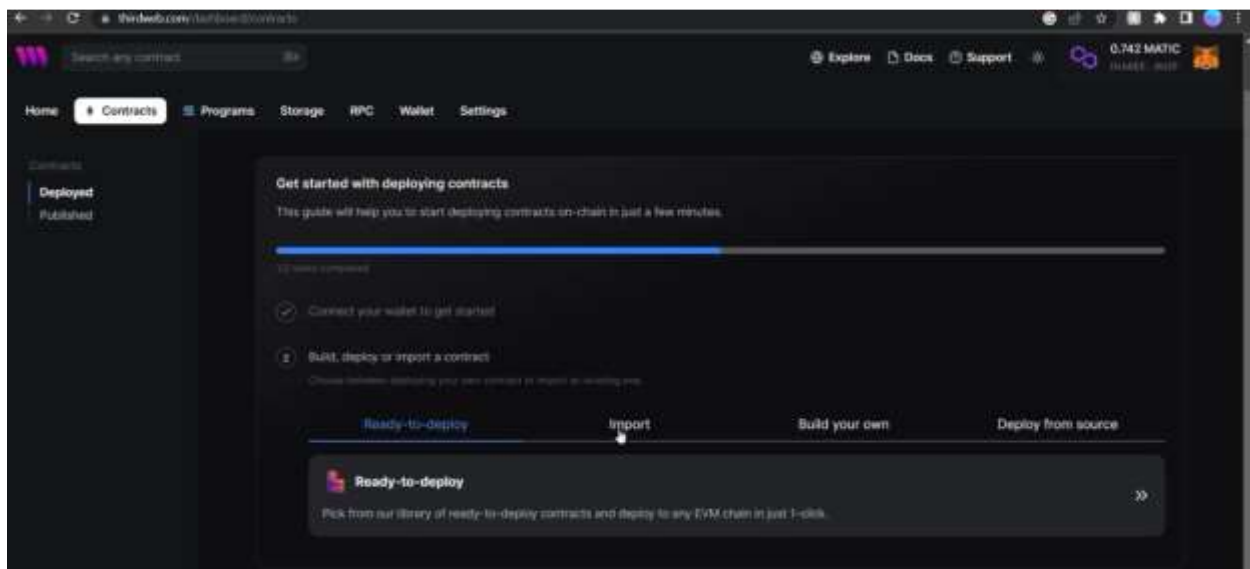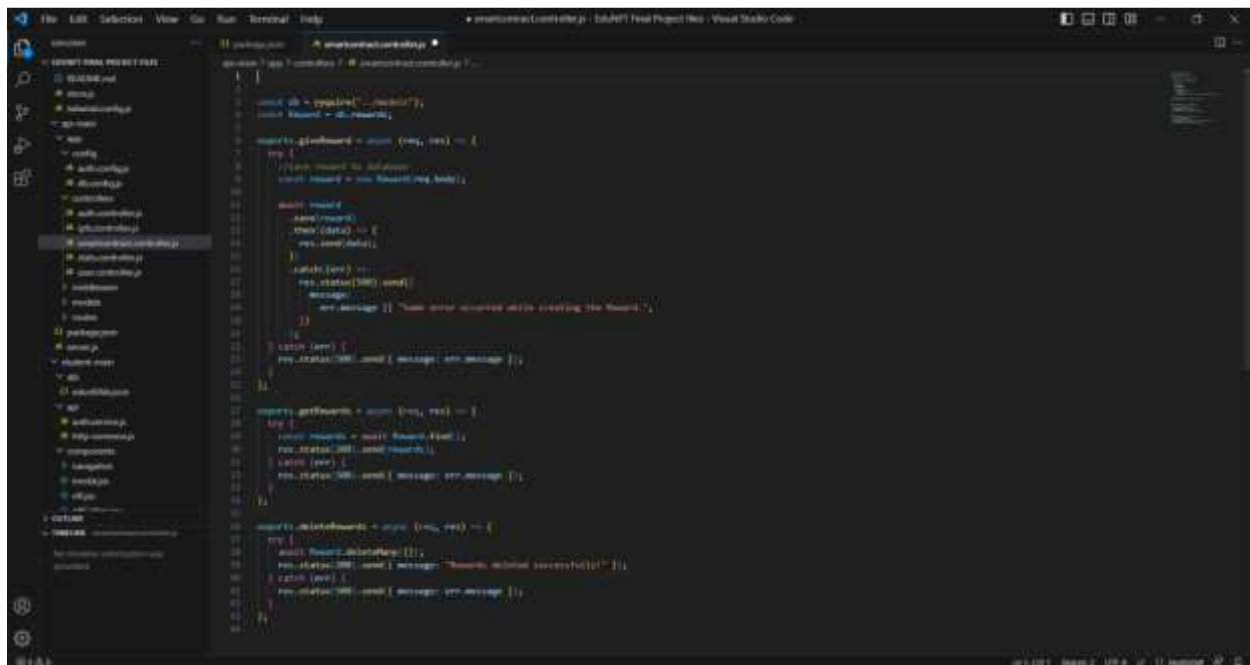
Importing the deployed smart contract
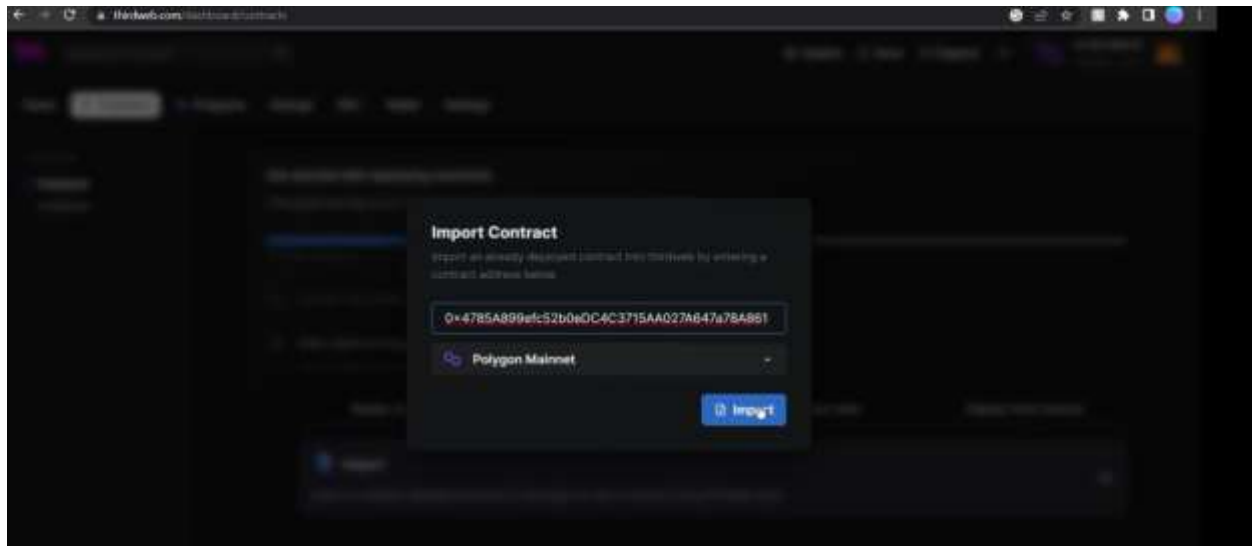
Verification of contract
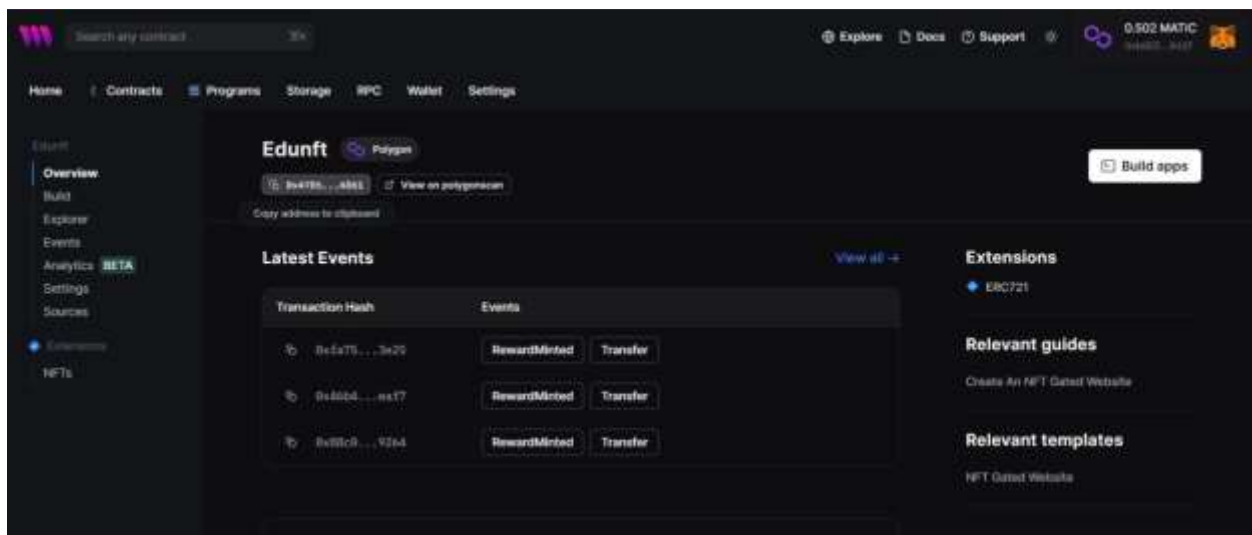
Smart contract controller code

NFT contract specified in the code


```
student-main > pages > api > JS getNftsForOwner.js > ⦿ handler > 🔧 nfts > ⦿ formattedNfts.filter() callback
63       } catch (e) {
64         console.error("Error getting NFTs for owner: ", e);
65         res.status(500).json({ message: "Failed to retrieve NFTs" });
66         return;
67       }
68
69       let formattedNfts;
70       try {
71         formattedNfts = formatNFTs(nfts);
72       } catch (e) {
73         console.error("Error formatting NFTs: ", e);
74         res.status(500).json({ message: "Failed to format NFTs" });
75         return;
76       }
77
78       res.status(200).json({
79         nfts: formattedNfts.length
80           ? formattedNfts.filter(
81             (nft) => nft.contract == 0x4785a899efc52b0edc4c3715aa027a647a78a861
82           )
83           : null,
84         pageKey: nfts.pageKey,
85       });
86     }
87
```

ContractAddress is kept as the smart contract address

```javascript
import { Web3Button, useContract, useContractWrite } from "@thirdweb-dev/react";
import { useToast } from "@chakra-ui/react";
import { useState, useEffect } from "react";

const TeacherManager = () => {
  const toast = useToast();
  const [address, setAddress] = useState("");
  const contractAddress = "0x4785A899efc52b0eDC4C3715AA027A647a78A861";
  const { contract, error } = useContract(contractAddress);

  const submitToast = () => {
    toast({
      title: "Success!",
      description: "Your transaction has been submitted.",
      status: "info",
      duration: 9000,
      isClosable: true,
    });
  };
```

Contract address set in the Admin-main

```javascript
 2    import { useDispatch, useSelector } from "react-redux";
 3    import Layout from "@/components/layout";
 4    import { upload } from "@/slices/cloudinary";
 5    import { uploadMetadata } from "@/slices/storage";
 6    import { giveReward } from "@/slices/reward";
 7    import { getStudents } from "@/slices/auth";
 8    import { Spinner, Badge, useToast } from "@chakra-ui/react";
 9    import { Web3Button, useAddress, useContract } from "@thirdweb-dev/react";
10    import withAuth from "@/hoc/withAuth";
11
12    const AddReward = () => {
13      const dispatch = useDispatch();
14      const toast = useToast();
15      const { students } = useSelector((state) => state.auth);
16      const { isLoading, url } = useSelector((state) => state.cloudinary);
17
18      const { storage, isLoadingStorage } = useSelector((state) => state.storage);
19
20      const [search, setSearch] = useState("");
21      const [supply, setSupply] = useState(0);
22      const [selectedStudent, setSelectedStudent] = useState({});
23      const address = useAddress();
24      const contractAddress = "0x4785A899efc52b0eDC4C3715AA027A647a78A861";
25      const { contract } = useContract(contractAddress);
26
27      const [reward, setReward] = useState({
28        name: "",
29        description: "",
30        image: url,
31        student: selectedStudent,
32        teacher: { name: "Mr. John Doe", walletAddress: address },
33        rewardId: 0,
34        metadataURI: storage?.hash,
35        transactionHash: "",
```

React Version 18.2.0 utilized in code

The 'react' and 'react-dom' package utilization

```
{} package-lock.json ×

admin-main > {} package-lock.json > {} dependencies > {} react-redux
21728          "resolved": "https://registry.npmjs.org/react/-/react-18.2.0.tgz",
21729          "integrity": "sha512-/3IjMdb2L9QbBdWiW5e3P2/npwMBaU9mHCSCUzNln0ZCYbcfTsGbTJrU/kGemd12IWmB2ioZ+zkxtmq6g09fGQ==",
21730          "requires": {
21731            "loose-envify": "^1.1.0"
21732          }
21733        },
21734        "react-clientside-effect": {
21735          "version": "1.2.6",
21736          "resolved": "https://registry.npmjs.org/react-clientside-effect/-/react-clientside-effect-1.2.6.tgz",
21737          "integrity": "sha512-XGGGRQAKY+q2SLz9a/4EPqom7WRjz3z9R2k4jhVKA/puQFH/5Nt27vFZYq14m4NVNdUvX8PS3O7r/Zzm7cjUlg==",
21738          "requires": {
21739            "@babel/runtime": "^7.12.13"
21740          }
21741        },
21742        "react-cropper": {
21743          "version": "2.3.2",
21744          "resolved": "https://registry.npmjs.org/react-cropper/-/react-cropper-2.3.2.tgz",
21745          "integrity": "sha512-1ug25ZC8d8/49KkEnv4HZiyZl1yJ90JEIVvjRpt1FoIn5/SAatOd8QMaPRN6f/fPFwWL3hwTdZV5GsC6Wz6QSg==",
21746          "requires": {
21747            "cropperjs": "^1.5.13"
21748          }
21749        },
21750        "react-dom": {
21751          "version": "18.2.0",
21752          "resolved": "https://registry.npmjs.org/react-dom/-/react-dom-18.2.0.tgz",
21753          "integrity": "sha512-6IMTriUmvsjHUjNtEDudZfuDQUoWXvxKHhlEGSkB1n4YFS+r/K199wXiwlVXtPBtJenozv2P+hxDsw9eA7Xo6g==",
21754          "requires": {
21755            "loose-envify": "^1.1.0",
21756            "scheduler": "^0.23.0"
21757          }
21758        },
21759        "react-drag-drop-files": {
21760          "version": "2.3.9",
21761          "resolved": "https://registry.npmjs.org/react-drag-drop-files/-/react-drag-drop-files-2.3.9.tgz",
21762          "integrity": "sha512-4061sC2sDJC+kALBtQqHlOlinYBhovyZEzCPUVq9C0JTz98I4KgCSGnIpqOZsV2B5kznGByMK6u2AWjWrZH6iw==",
21763          "requires": {
21764            "prop-types": "^15.7.2",
21765            "styled-components": "^5.3.0"
21766          }
21767        },
21768        "react-fast-compare": {
21769          "version": "3.2.1",
21770          "resolved": "https://registry.npmjs.org/react-fast-compare/-/react-fast-compare-3.2.1.tgz",
21771          "integrity": "sha512-sTYF9zFim2pEif/Fw16dBiXpe0hoySPxcD8+Ow8nTtNLfIm3gfW0xhKNurY+6OmdH1u6Ta/W/V16vjbYP1MFnDg=="
21772        },
```

React-related packages

```
admin-main > {} package-lock.json > {} react-cropper > {} requires
21767          "version": "2.9.4" ,
21768          "resolved": "https://registry.npmjs.org/react-focus-lock/-/react-focus-lock-2.9.4.tgz",
21769          "integrity": "sha512-7pEdXyMseqm3kVjhdVH18sovparAzLg5h6WvIx7/Ck3ekjhrrDMEeghfSa3swwC8wgfdd7DIdUVRGeiHT9/7Sgg==",
21770          "requires": {
21771            "@babel/runtime": "^7.0.0",
21772            "focus-lock": "^0.11.6",
21773            "prop-types": "^15.6.2",
21774            "react-clientside-effect": "^1.2.6",
21775            "use-callback-ref": "^1.3.0",
21776            "use-sidecar": "^1.1.2"
21777          }
21778        },
21779        "react-icons": {
21780          "version": "4.8.0",
21781          "resolved": "https://registry.npmjs.org/react-icons/-/react-icons-4.8.0.tgz",
21782          "integrity": "sha512-N6+k0LciHD1Anj5Czu637waJq5mwlMNROzVZMhfX68V/9bu9qHaMIJC4UdozWoOk57gahFCNHwVvWzmRMTzRjg==",
21783          "requires": ()
21784        },
21785        "react-is": {
21786          "version": "18.2.0",
21787          "resolved": "https://registry.npmjs.org/react-is/-/react-is-18.2.0.tgz",
21788          "integrity": "sha512-xWGDIW6x9Z1xtzPkh1ULtth7Ho3vBbF3q26fz1oPCK0HsvxtPVelvftw3zjbH4SkR2kw9Z+4uxbODK/6Zw9B8w=="
21789        },
21790        "react-cropper": {
21791          "version": "2.3.2",
21792          "resolved": "https://registry.npmjs.org/react-cropper/-/react-cropper-2.3.2.tgz",
21793          "integrity": "sha512-1ug25ZC8d8/49KkEnv4HZ1yZL1yJ90JEIVvjRpt1FoIn5/SAatOd8QMaPRN6f/fPFwWL3hwTdZVSGsC6Wz6Q5g==",
21794          "requires": {
21795            "cropperjs": "^1.5.13"
21796
21797          }
21798        },
21799        "react-redux": {
21800          "version": "8.0.5",
21801          "resolved": "https://registry.npmjs.org/react-redux/-/react-redux-8.0.5.tgz",
21802          "integrity": "sha512-Q2F6fCKxPFpkXt1qNRZdEDL15csDWyrg5j0m1iK59qD6W5gvBiKkdMFG2IJzhd1rCctf0hb6EtePPLZ2e0m1uw==",
21803          "requires": {
21804            "@babel/runtime": "^7.12.1",
21805            "@types/hoist-non-react-statics": "^3.3.1",
21806            "@types/use-sync-external-store": "^0.0.3",
21807            "hoist-non-react-statics": "^3.3.2",
21808            "react-is": "^18.0.0",
21809            "use-sync-external-store": "^1.0.0"
21810          }
21811        },
21812        "react-remove-scroll": {
```

Radix-UI and React implementation


```json
    },
    "@radix-ui/react-menu": {
      "version": "2.0.4",
      "resolved": "https://registry.npmjs.org/@radix-ui/react-menu/-/react-menu-2.0.4.tgz",
      "integrity": "sha512-mzKR4TtZ1t19JtrEqlQoJvzY4u9vYfVHl6ryBrVrCAGZzkgyWnMQYEZdUkM7y8ak9mrkKtJiqB4T1IEnubeOFQ==",
      "requires": {
        "@babel/runtime": "^7.13.10",
        "@radix-ui/primitive": "1.0.0",
        "@radix-ui/react-collection": "1.0.2",
        "@radix-ui/react-compose-refs": "1.0.0",
        "@radix-ui/react-context": "1.0.0",
        "@radix-ui/react-direction": "1.0.0",
        "@radix-ui/react-dismissable-layer": "1.0.3",
        "@radix-ui/react-focus-guards": "1.0.0",
        "@radix-ui/react-focus-scope": "1.0.2",
        "@radix-ui/react-id": "1.0.0",
        "@radix-ui/react-popper": "1.1.1",
        "@radix-ui/react-portal": "1.0.2",
        "@radix-ui/react-presence": "1.0.0",
        "@radix-ui/react-primitive": "1.0.2",
        "@radix-ui/react-roving-focus": "1.0.3",
        "@radix-ui/react-slot": "1.0.1",
        "@radix-ui/react-use-callback-ref": "1.0.0",
        "aria-hidden": "^1.1.1",
        "react-remove-scroll": "2.5.5"
      }
    },
    "@radix-ui/react-popover": {
      "version": "1.0.5",
      "resolved": "https://registry.npmjs.org/@radix-ui/react-popover/-/react-popover-1.0.5.tgz",
      "integrity": "sha512-GRHZ8yD12MrN2NLubHPE8Rb5uHTxd9x372DE9PPNnBjpczAQKcZ5ne0KXG4xpf+RDdX5zdLv9ym6mY7CDTaUZg==",
      "requires": {
        "@babel/runtime": "^7.13.10",
        "@radix-ui/primitive": "1.0.0",
        "@radix-ui/react-compose-refs": "1.0.0",
        "@radix-ui/react-context": "1.0.0",
        "@radix-ui/react-dismissable-layer": "1.0.3",
        "@radix-ui/react-focus-guards": "1.0.0",
        "@radix-ui/react-focus-scope": "1.0.2",
        "@radix-ui/react-id": "1.0.0",
        "@radix-ui/react-popper": "1.1.1",
        "@radix-ui/react-portal": "1.0.2",
        "@radix-ui/react-presence": "1.0.0",
        "@radix-ui/react-primitive": "1.0.2",
        "@radix-ui/react-slot": "1.0.1",
        "@radix-ui/react-use-controllable-state": "1.0.0"
```

Chakra UI library modules in the react application part of the code


```
{} package-lock.json ×

admin-main > {} package-lock.json > {} packages
1153            "react-dom": ">=18"
1154          }
1155        },
1156        "node_modules/@chakra-ui/react-children-utils": {
1157          "version": "2.0.6",
1158          "resolved": "https://registry.npmjs.org/@chakra-ui/react-children-utils/-/react-children-utils-2.0.6.tgz",
1159          "integrity": "sha512-QVR2RC7QsOsbWwEnq9YduhpqSFnZGvjjGREVBygKi8ADhXh93C8azlECCUVgRJF2Wc+So1fgxmjLcbZfYZVmBA==",
1160          "peerDependencies": {
1161            "react": ">=18"
1162          }
1163        },
1164        "node_modules/@chakra-ui/react-context": {
1165          "version": "2.0.8",
1166          "resolved": "https://registry.npmjs.org/@chakra-ui/react-context/-/react-context-2.0.8.tgz",
1167          "integrity": "sha512-tRTKdn61CTXMXWPjSokAAKCw21oih7Eg8cNgaYRSwKBck8nkz9YqxgIIEj3d3D7MGtp1245/SNI981R8dRwR/A==",
1168          "peerDependencies": {
1169            "react": ">=18"
1170          }
1171        },
1172        "node_modules/@chakra-ui/react-env": {
1173          "version": "3.0.0",
1174          "resolved": "https://registry.npmjs.org/@chakra-ui/react-env/-/react-env-3.0.0.tgz",
1175          "integrity": "sha512-tfMRO2v508HQWAqSADFrwZgR9oU10qC97oV6zGbjHh9ALP0/IcFR+Bi71KRTveDTm85fMeAzZYGj57P3Dsipkw==",
1176          "dependencies": {
1177            "@chakra-ui/react-use-safe-layout-effect": "2.0.5"
1178          },
1179          "peerDependencies": {
1180            "react": ">=18"
1181          }
1182        },
1183        "node_modules/@chakra-ui/react-types": {
1184          "version": "2.0.7",
1185          "resolved": "https://registry.npmjs.org/@chakra-ui/react-types/-/react-types-2.0.7.tgz",
1186          "integrity": "sha512-12zv2qIZ8EHw1ytggtGvo4iiT8APr1s7T0qaWWqzpUG58cdUtRRW+V1B35Ocq+7cA6dzQ/7+wShoKih6iTuWWQ==",
1187          "peerDependencies": {
1188            "react": ">=18"
1189          }
1190        },
1191        "node_modules/@chakra-ui/react-use-animation-state": {
1192          "version": "2.0.8",
1193          "resolved": "https://registry.npmjs.org/@chakra-ui/react-use-animation-state/-/react-use-animation-state-2.0.8.tgz",
1194          "integrity": "sha512-xv9zSF2Rd1mHWQveSDL8WeH4atF8qrNvsOs3MWrvxKYBS3f79N3pqcQGrWAEvirXWXfiCeje2VAkEggqFRIo+Q==",
1195          "dependencies": {
1196            "@chakra-ui/dom-utils": "2.0.6",
1197            "@chakra-ui/react-use-event-listener": "2.0.7"
1198          }
```

'node_modules' usage within the code

```
{} package-lock.json ×

admin-main > {} package-lock.json > {} packages > {} node_modules/@json-rpc-tools/provider

2761        },
2762        "node_modules/@ledgerhq/connect-kit-loader": {
2763          "version": "1.0.2",
2764          "resolved": "https://registry.npmjs.org/@ledgerhq/connect-kit-loader/-/connect-kit-loader-1.0.2.tgz",
2765          "integrity": "sha512-TQ21IjcZOw/scqypaVFY3jHVqI7X7Hta3qN/us6FvToI3AY86UmrhhXGuw0E9xHmAbdX241ddwXEiHBSQZFr9g=="
2766        },
2767        "node_modules/@lit-labs/ssr-dom-shim": {
2768          "version": "1.1.0",
2769          "resolved": "https://registry.npmjs.org/@lit-labs/ssr-dom-shim/-/ssr-dom-shim-1.1.0.tgz",
2770          "integrity": "sha512-92uQ5ARf7UXYrzaFcAX3T2rTvaS9Z1//ukV+DqjACM4c8s0ZBQd7ayJUSDh2AFLD/Ayuyz4uMmxQecBq3U4Ong=="
2771        },
2772        "node_modules/@lit/reactive-element": {
2773          "version": "1.6.1",
2774          "resolved": "https://registry.npmjs.org/@lit/reactive-element/-/reactive-element-1.6.1.tgz",
2775          "integrity": "sha512-va15kYZr7KZNMPZdxONGQzpUr+4sxVu7V/VG7a8mRfPPXUyhEYj5RzXCQmGrlP3tAh0L3HHm5AjBMFYRq1M9SA==",
2776          "dependencies": {
2777            "@lit-labs/ssr-dom-shim": "^1.0.0"
2778          }
2779        },
2780        "node_modules/@metamask/safe-event-emitter": {
2781          "version": "2.0.0",
2782          "resolved": "https://registry.npmjs.org/@metamask/safe-event-emitter/-/safe-event-emitter-2.0.0.tgz",
2783          "integrity": "sha512-/k5XhY692q1VJMXu6EeOZvg5nEClc1xNXcXCxJ3cXQgYuRymRHpdx/t7JXfsK+JLjwA1e1c1/50r1QYpusC29Q=="
2784        },
2785        "node_modules/@motionone/animation": {
2786          "version": "10.15.1",
2787          "resolved": "https://registry.npmjs.org/@motionone/animation/-/animation-10.15.1.tgz",
2788          "integrity": "sha512-mZcJxLjHor+bhcPuIFErMDNyrdb2vJur815fMCsuCB4UyV0ILZLvK+t+pg56erv0ud9xQGK/10GPt10agPrCyQ==",
2789          "dependencies": {
2790            "@motionone/easing": "^10.15.1",
2791            "@motionone/types": "^10.15.1",
2792            "@motionone/utils": "^10.15.1",
2793            "tslib": "^2.3.1"
2794          }
2795        },
2796        "node_modules/@motionone/animation/node_modules/tslib": {
2797          "version": "2.5.0",
2798          "resolved": "https://registry.npmjs.org/tslib/-/tslib-2.5.0.tgz",
2799          "integrity": "sha512-3361Vw3rtn2BUK7URdIAHTyxHGRIHVReokCR3XjbckJMK7msBFysBfhLR8IXnAgy7T0PTPNBWKiHS14FOW/WSg=="
2800        },
2801        "node_modules/@motionone/dom": {
2802          "version": "10.15.5",
2803          "resolved": "https://registry.npmjs.org/@motionone/dom/-/dom-10.15.5.tgz",
2804          "integrity": "sha512-Xc5av1gyh3xukU9tydh9+8m5B+2zAq+WlLsC3eEIp7Ax7DnXgY7Bj/iv8a4X2R9z9ZFZiaXK3B00xMYHKbAAdA==",
2805          "dependencies": {
```

Set up of an Express.js server

```
api-main > JS server.js > ...
 1    const express = require("express");
 2    const cors = require("cors");
 3    // Import dotenv at the beginning of the file
 4    require("dotenv").config();
 5
 6    const app = express();
 7
 8    let corsOptions = {
 9      origin: "*",
10    };
11
12    app.use(cors(corsOptions));
13
14    // parse requests of content-type - application/json
15    app.use(express.json());
16
17    💡 parse requests of content-type - application/x-www-form-urlencoded
18    app.use(express.urlencoded({ extended: true }));
19
20    const db = require("./app/models");
21    db.mongoose
22      .connect(db.url, {
23        useNewUrlParser: true,
24        useUnifiedTopology: true,
25        dbName: "edunft",
26      })
27      .then(() => {
28        console.log("Connected to the database!");
29      })
30      .catch((err) => {
31        console.log("Cannot connect to the database!", err);
32        process.exit();
33      });
34
35    // simple route
36    app.get("/", (req, res) => {
37      res.json({ message: "Welcome to Edunft application." });
38    });
39
40    require("./app/routes/user.routes")(app);
41    require("./app/routes/auth.routes")(app);
42    require("./app/routes/smartcontract.routes")(app);
43    require("./app/routes/ipfs.routes")(app);
44    require("./app/routes/stats.routes")(app);
45
46    // set port, listen for requests
```

Database configuration

```
JS db.config.js  ✕
api-main > app > config > JS db.config.js > ...
   1    const isProduction = process.env.NODE_ENV === "production";
   2
   3    module.exports = {
   4      url: isProduction
   5        ? "mongodb+srv://edunft7:22uMCmTcsJUwnNk0@cluster0.pnqzuyw.mongodb.net/?retryWrites=true&w=majority"
   6        : "mongodb://localhost:27017/thirdweb",
   7    };
   8
```

Mongoose configuration

```
JS index.js    ✕
api-main > app > models > JS index.js > ...
   1    const dbConfig = require("../config/db.config.js");
   2
   3    const mongoose = require("mongoose");
   4    mongoose.Promise = global.Promise;
   5
   6    const db = {};
   7    db.mongoose = mongoose;
   8    db.url = dbConfig.url;
   9    db.users = require("./user.model.js")(mongoose);
  10    db.rewards = require("./reward.model.js")(mongoose);
  11
  12    module.exports = db;
  13
```
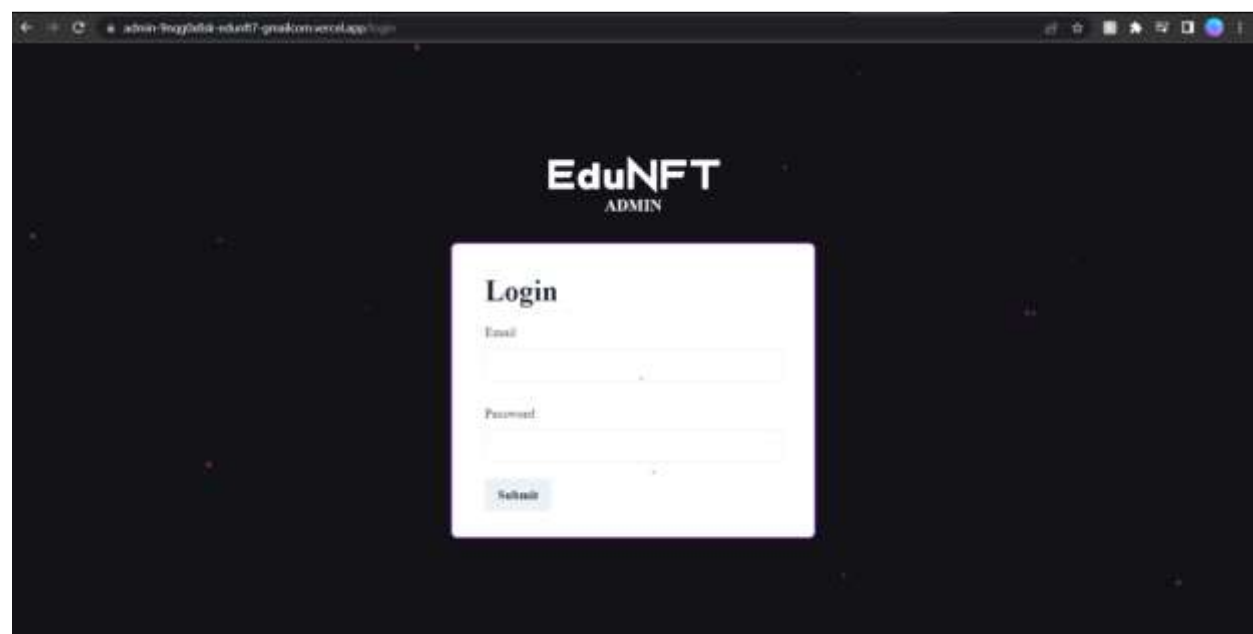
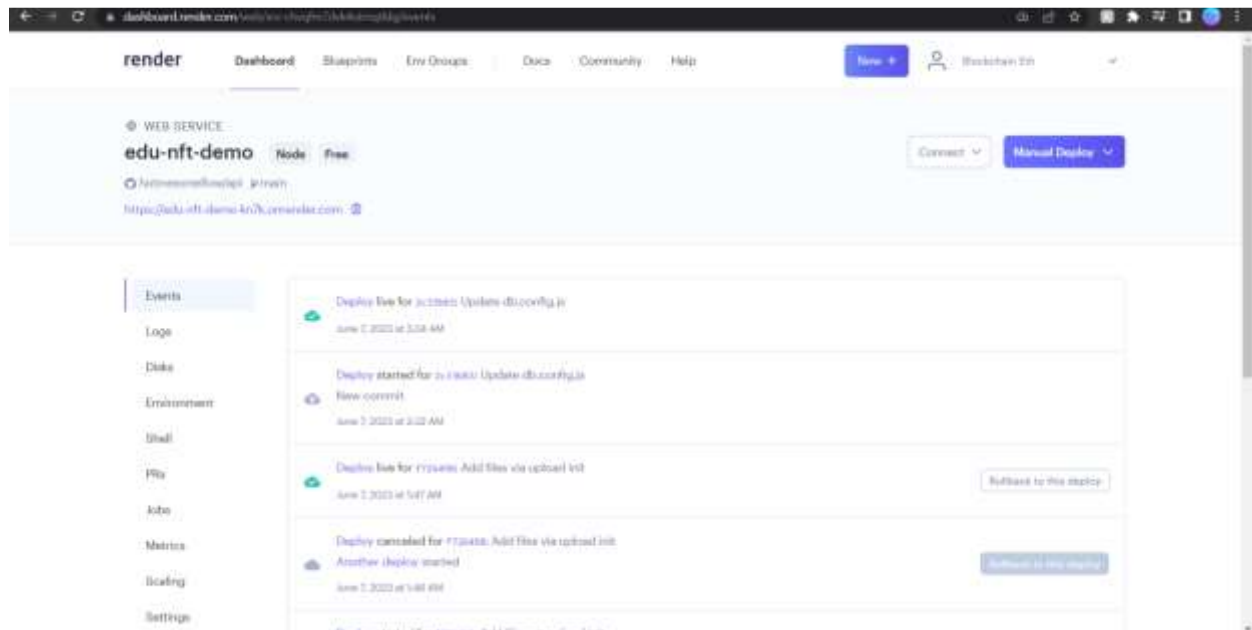Deployed Student and Admin portals on Vercel
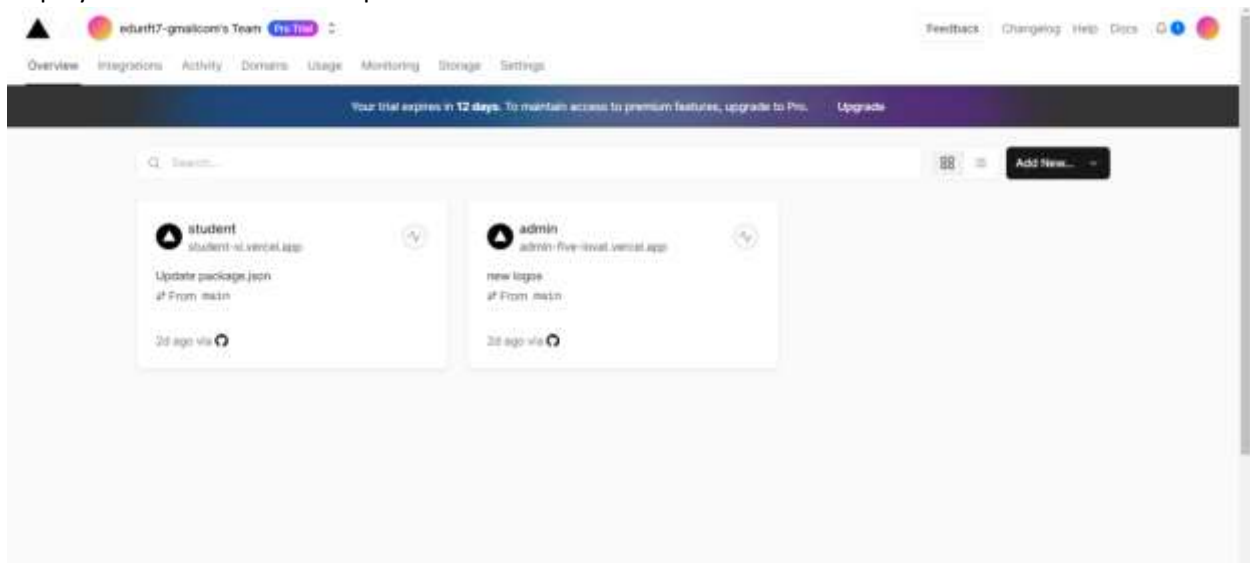
Generated URL of the platform
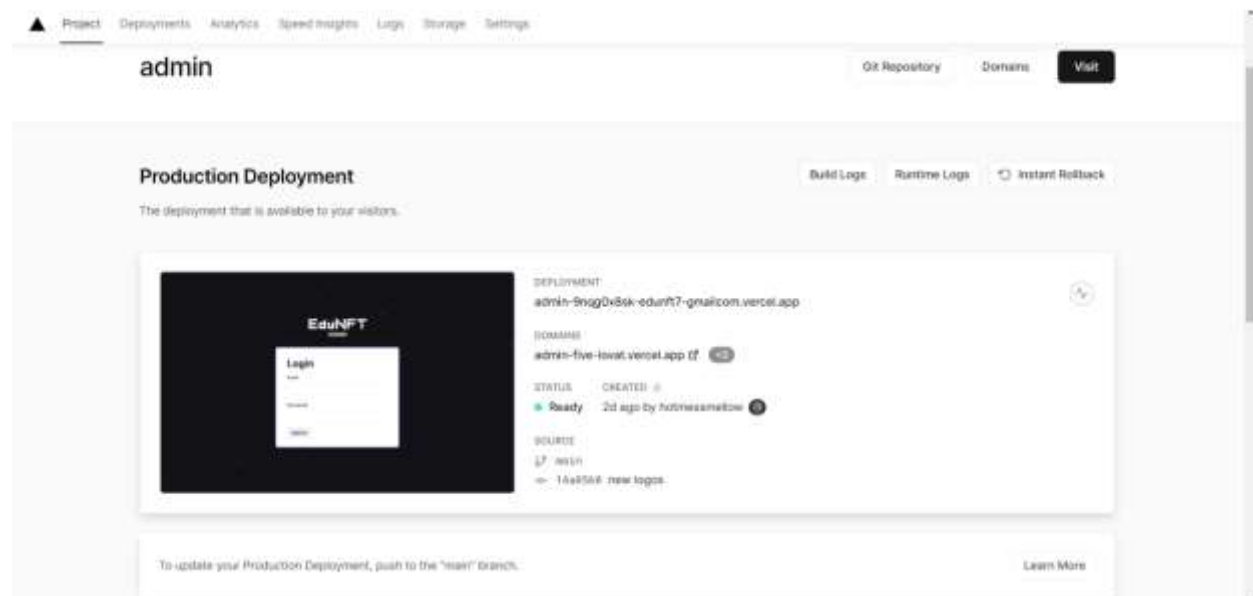
Access to the Admin Portal via Vercel

Render.com's Dashboard

Student portal hosted on render