UDACITY

ALX Nanodegree "Cloud Developer"

Week 9 Activity

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P4 Serverless Application

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I. Overview – Serverless application

In this project you will develop and deploy a simple "TODO" application using AWS Lambda and Serverless framework. This application will allow users to **create/remove/update/get** TODO items. Each TODO item contains the following fields:

- `todoId` (string) - a unique id for an item
- `createdAt` (string) - date and time when an item was created
- `name` (string) - name of a TODO item (e.g. "Change a light bulb")
- `dueDate` (string) - date and time by which an item should be completed
- `done` (boolean) - true if an item was completed, false otherwise
- `attachmentUrl` (string) (optional) - a URL pointing to an image attached to a TODO item

You might also store an `id` of a user who created a TODO item. Each TODO item can optionally have an attachment image. **Each user only has access to TODO items that he/she has created.**

A. Prerequisites

You should have the following tools installed in your local machine:

- Auth0 account
- GitHub account
- NodeJS version up to 12.xx
- Serverless

2. The following tools will help you run your project locally as a **monolithic** application.

  - PostgreSQL client, the `psql` command line utility, installed locally. Using PostgreSQL involves a server and a client. The server hosts the database while the client interfaces with it to execute queries. Because we will be creating our server on AWS, we will only need to install a client for our local setup. The easiest way to set this up is with the PostgreSQL Installer. This installer installs a PostgreSQL client in the form of the `psql` command-line utility. You can see the complete (server and client) installation instructions for Mac, Linux, and Windows. Verify using:

```
# Preferred v12.x to v13.x
psql --version
```

  - NodeJS v12.14 or greater up to v14.15 - Node.js is used to run JavaScript-based applications and NPM is a package manager used to handle dependencies. NodeJS installer will install both Node.js and npm on your system. Verify the installation using the commands:

```
# v12.14 to v14.15
node -v
# v6.14 to v7.19
npm -v
```

- Ionic command-line utility v6 framework to build and run the frontend application locally. In general, Ionic Framework is used to make cross-platform applications using JavaScript. Verify the installation as:

```
# v6.xx
ionic --version
```

3. Docker Desktop for running the project locally in a multi-container environment.
4. AWS CLI v2 for interacting with AWS services via your terminal. After installing the AWS CLI, you will also have to configure the access profile locally.
    - Create an IAM user with Admin privileges on the AWS web console. Copy its Access key.
    - Configure the access profile locally using the Access key generated above:

```
aws configure
# Run a sample command
aws iam list-users
```

5. Kubectl command-line utility to communicate with Kubernetes clusters

B. *Starter Code*

In addition to the tools above, **fork** and then clone the project starter code from the https://github.com/udacity/cloud-developer/tree/master/course-04/project/c4-final-project-starter-code

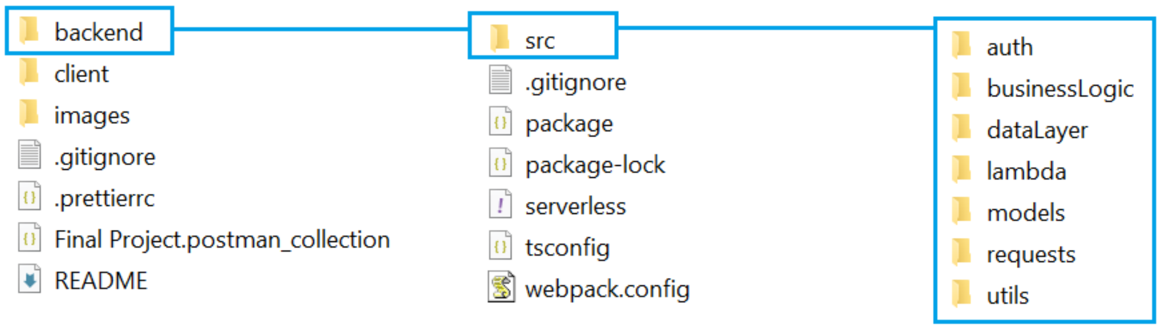
II. Getting Started

The following sections will show the screenshots the completion of the project.

A. *Modify Backend code*

The backend code is modified according to indications in the project page, updating files with “TODO”.

The backend Code Base is structured is into several sub-directories for best practices:



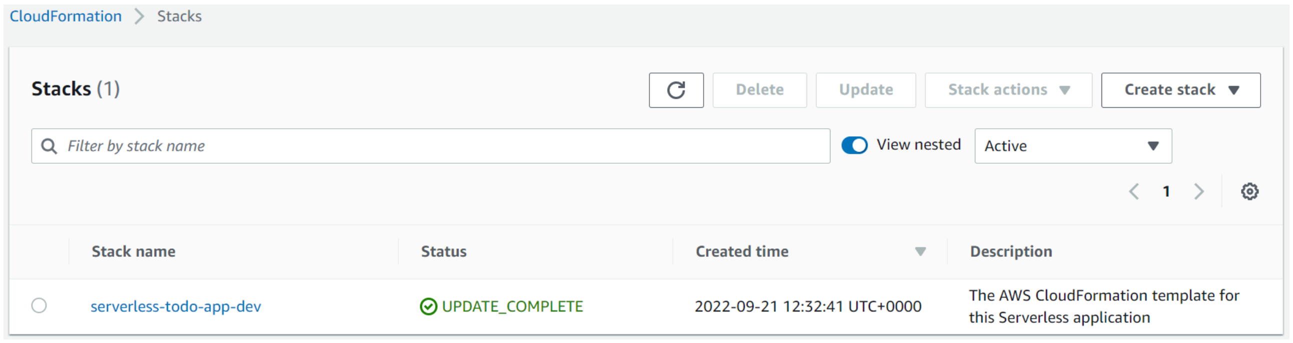
B. *Backend deployment*

After successful change in the backend, we proceed to the deployment by using following commands in project directory:

```
cd backend
npm update --save
npm audit fix
# For the first time, create an application in your org in Server-
less portal
serverless
# Next time, deploy the app and note the endpoint url in the end
serverless deploy --verbose
# If you face a permissions error, you may need to specify the us-
er profile
serverless deploy -v --aws-profile default
# sls is shorthand for serverless
# -v is shorthand for --verbose
```

We used default AWS profile.

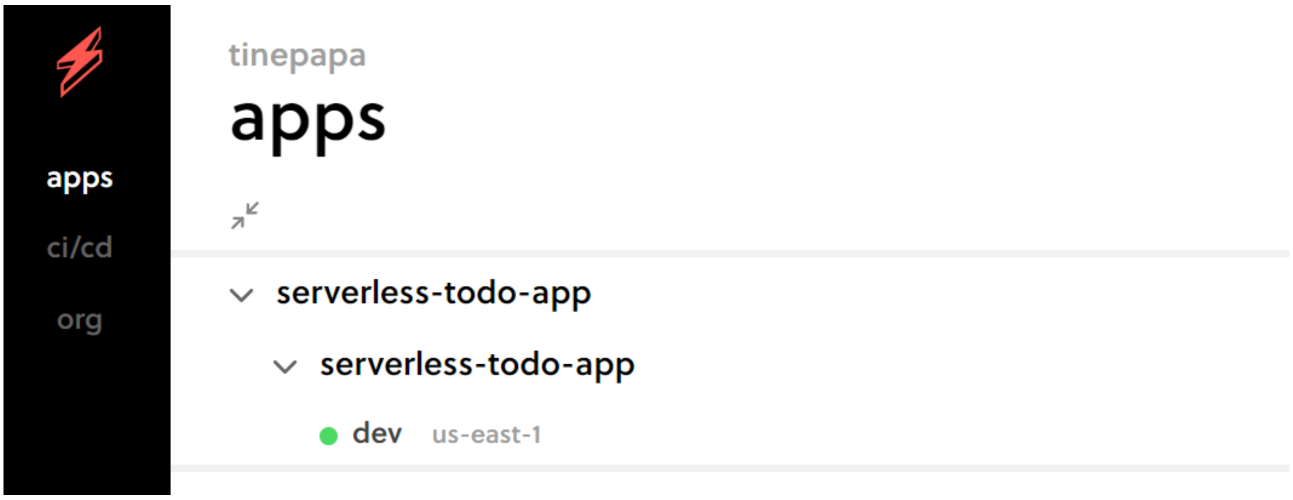
The result of the deployment:



Stack name	Status	Created time	Description
serverless-todo-app-dev	UPDATE_COMPLETE	2022-09-21 12:32:41 UTC+0000	The AWS CloudFormation template for this Serverless application

A successful deployment will create a resource stack in the CloudFormation console

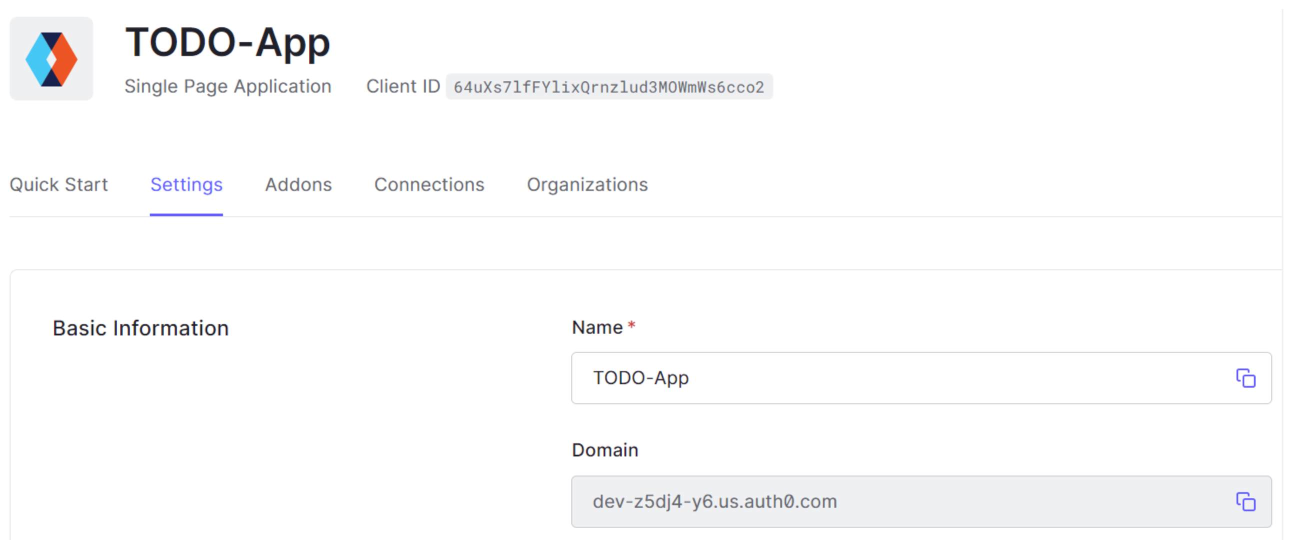
We have the app deployment status in serverless dashboard:



C. *Frontend configuration*

The **/client/** folder contains the frontend web application which consumes the backend API developed in this project. You don't need to make any changes to the frontend code in the **/client/** folder, except for the Authentication related changes, as explained below.

- **Authentication** - Login to the Auth0 portal, and navigate to your Dashboard.
    - Create a "Single Page Web Applications" type Auth0 application
    - Go to the App settings, and setup the Allowed Callback URLs
    - Setup the Allowed Web Origins for CORS options.
    - Setup the application properties. We recommend using asymmetrically encrypted (RS256) JWT tokens.
    - Copy "domain" and "client id" to save in the `/client/src/config.ts` file.
    - In your backend auth handler function, fetch the Auth0 certificate programmatically.


TODO-App

Single Page Application   Client ID `64uXs7lfFYlixQrnzlud3MOWmWs6cco2`

Basic Information

Name *

TODO-App

Domain

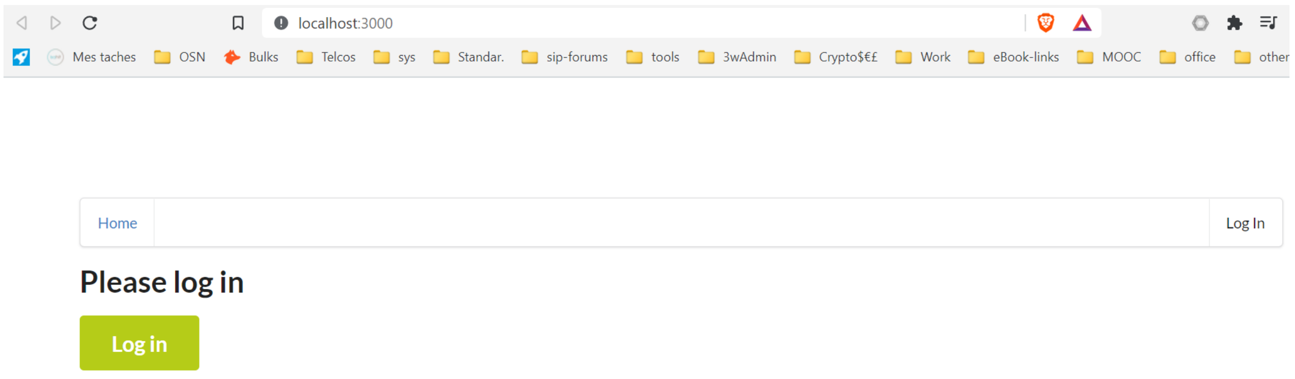
dev-z5dj4-y6.us.auth0.com

The client config file modified according to the Auth0 application.

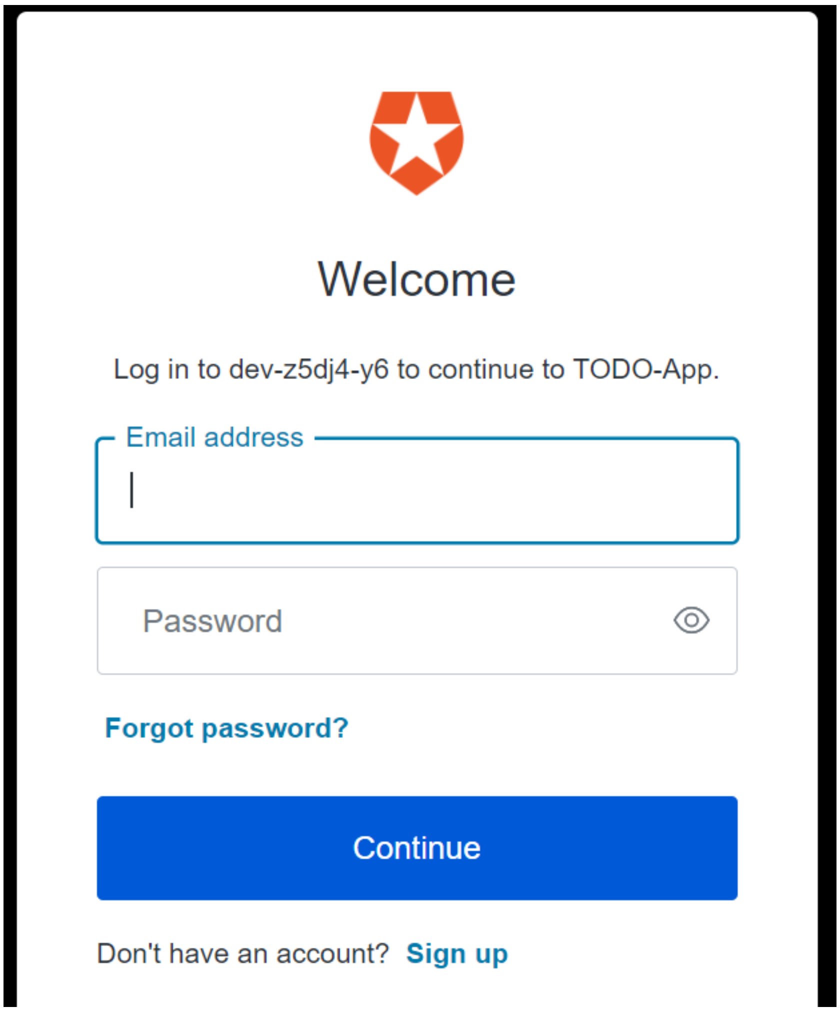
Running the client after successful configuration in Auth0 portal and config.ts file:

```
cd client
npm update --save
npm audit fix --legacy-peer-deps
npm install --save-dev
npm run start
```

After start of the application, we have the login screen as home page of :


localhost:3000

Please log in


Welcome

Log in to dev-z5dj4-y6 to continue to TODO-App.

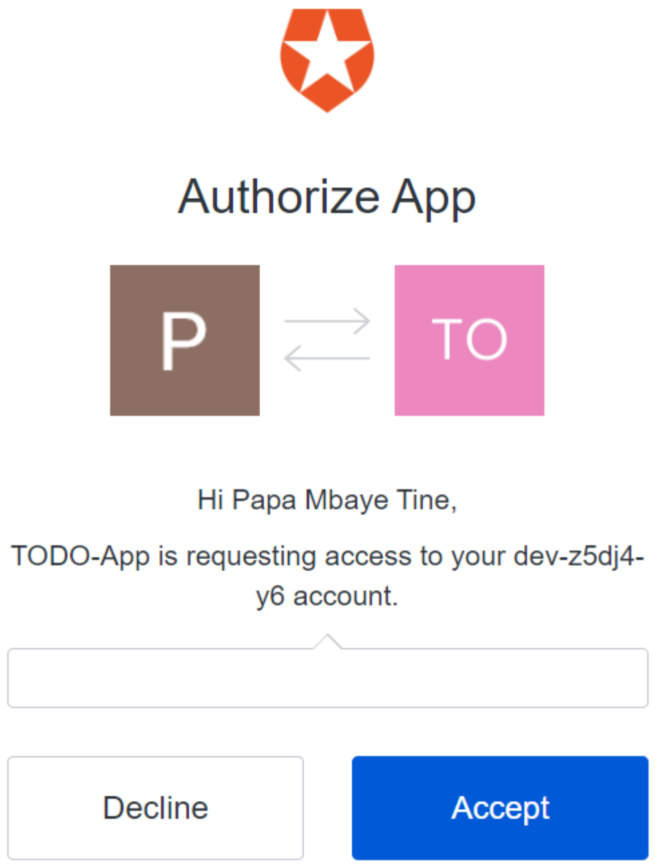
Email address

Password

Forgot password?

Continue

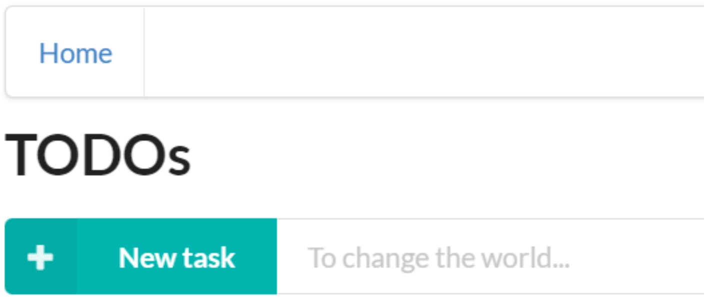
Don't have an account? Sign up


Authorize App

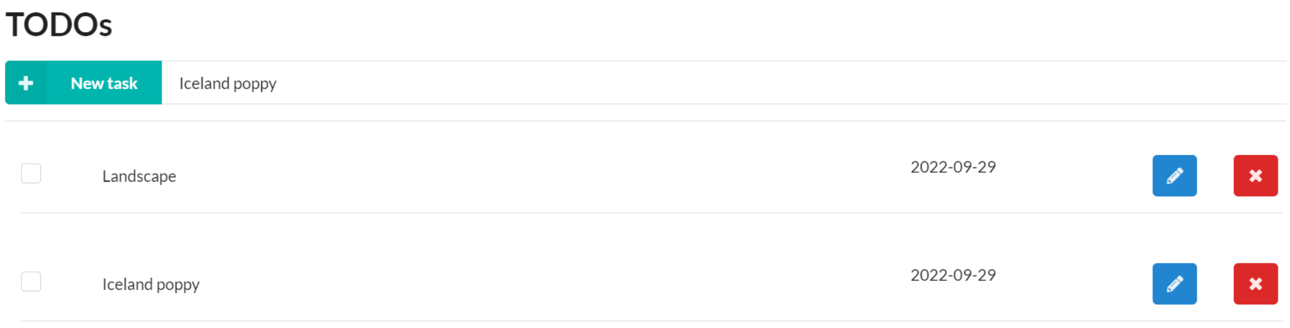
Hi Papa Mbaye Tine,

TODO-App is requesting access to your dev-z5dj4-y6 account.

After successful login and authorization, we can create Todo by using button "New Item"

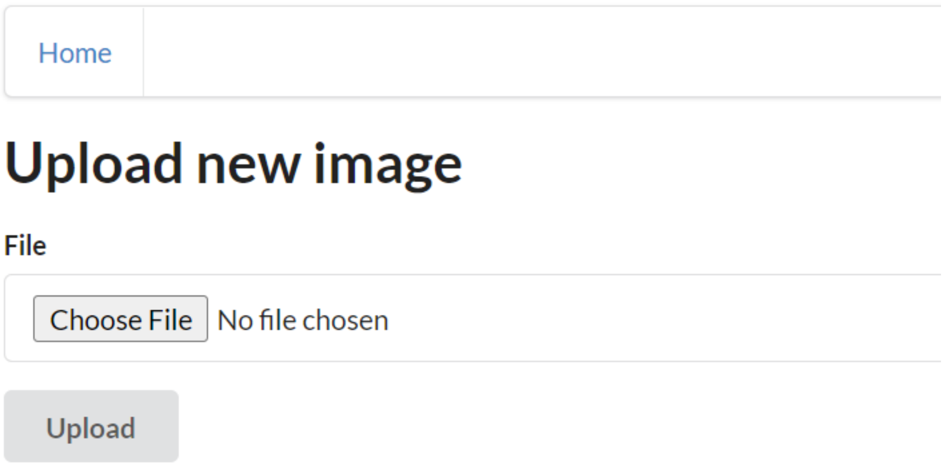


And performs other tasks like upload an image or delete Todo entries:



☐	Landscape	2022-09-29	✎	✖
☐	Iceland poppy	2022-09-29	✎	✖

Uploading a new image


Home

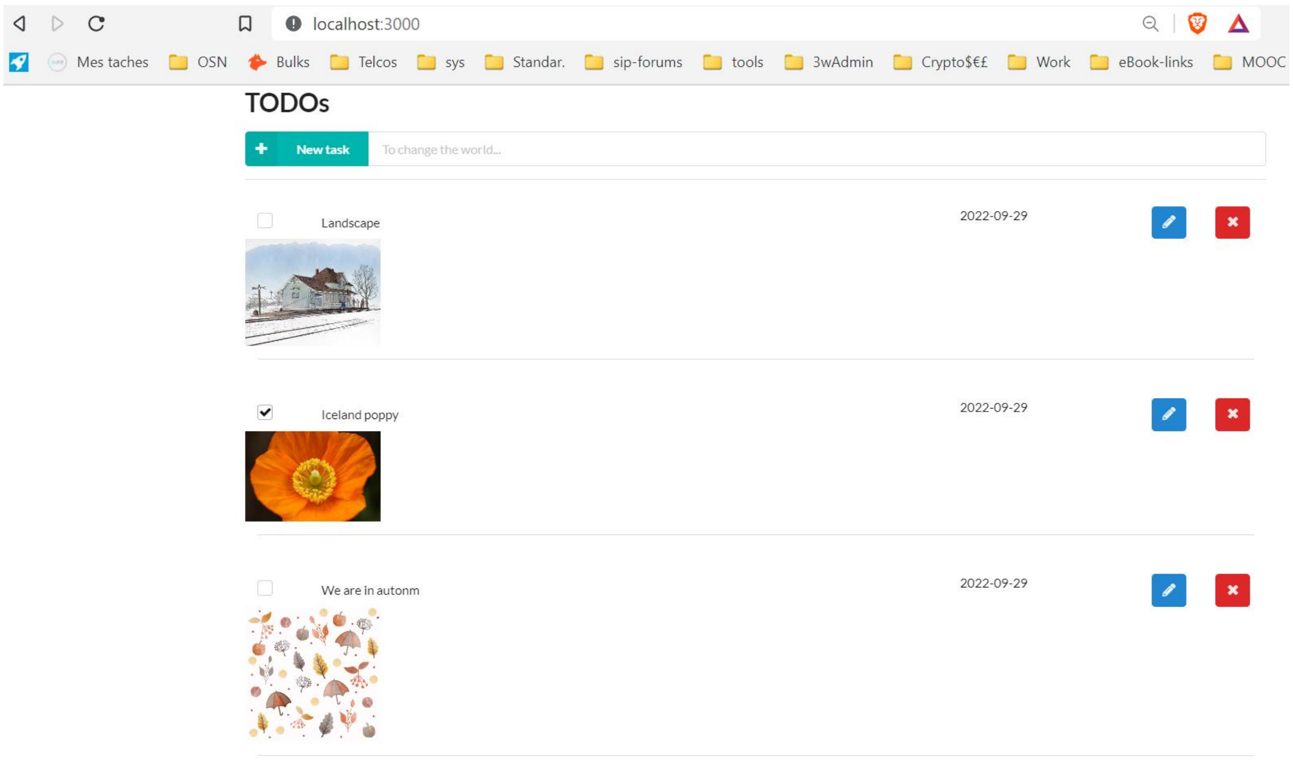
Upload new image

File

Choose File No file chosen

Upload

Successful creation and upload of image:



TODOs

New task | To change the world...

☐	Landscape	2022-09-29
✓	Iceland poppy	2022-09-29
☐	We are in autonm	2022-09-29