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Tutorial: Connect Your Angular App to MySQL

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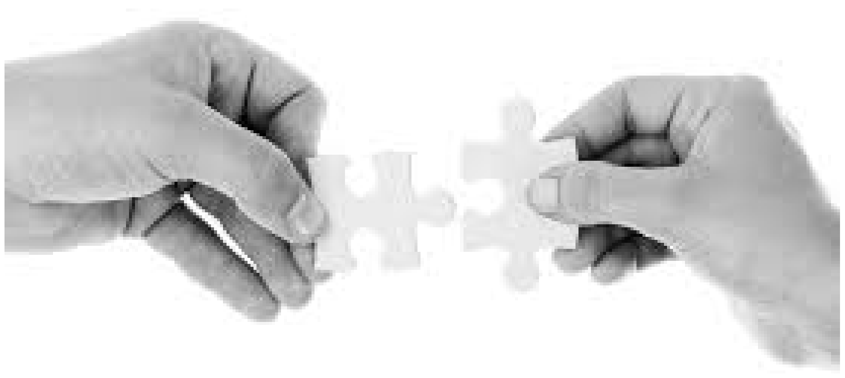

Connect Your Angular App to MySQL

MySQL is an open-source relational database that can deliver high-performance, scalable database applications. As the M in the LAMP stack, it is a powerhouse for a lot of web servers across the globe. With MySQL, data is stored in tables with strict data definitions, and rows in tables reflect data entries and through the index. There's a lot of documentation that covers best practices and the basics of SQL for developing relational databases for huge applications.

In this post, I'll walk you through creating an Angular application using MySQL that will let the user edit and add events using a CRUD API. We'll use a version of the MEAN stack, where the M will stand for the MySQL database, Express.js for the backend, and Angular.js for the client.

You might also like: How to Easily Build Angular 2 Database Apps

I will assume that you have some familiarity with Node and the `npm` package manager and that both of these are installed on your system.

Setting up MySQL

If you don't have installed MySQL on your system, follow the instructions on the MySQL website to do so. Depending on your operating system, you might be able to use the system's package manager to install the MySQL server.

Once you have installed MySQL, you can create the database that you will use in this tutorial. Log into the database using the MySQL client using the login details of the database administrator.

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```
$ mysql -u root -p
```

The `-p` option indicates that you are required to supply a password when connecting to the MySQL server. You might not need this option, depending on how the database is set up on your system. You should now see the MySQL command line prompt.

```
mysql>
```

Create a new database and switch into it by using the following command.

```
create database timeline;
use timeline;
```

Next, create a user associated with this database. It is always a good idea to have separate users for each database on the system. The following commands will create the user and grant them all permissions on the `timeline` database.

```
create user 'timeline'@'localhost' identified by 'password';
grant all on timeline.* to 'timeline'@'localhost';
```

In the first line, replace `password` with a more complex password. The rest of this tutorial assumes you used "password", so if you change it, please make sure and change it in all the code snippets below.

Now you are ready to create the `events` table in the new database by specifying the data schema.

```
create table events (
  id INT AUTO_INCREMENT,
  owner VARCHAR(255) NOT NULL,
  name VARCHAR(255) NOT NULL,
  description TEXT,
  date DATE,
  PRIMARY KEY (id),
  INDEX (owner, date)
);
```

The table contains several columns called `id`, `owner`, `name`, `description`, and `date`. The `id` column acts as the primary key for accessing individual rows. Since you will need to look up entries by `owner` and `date`, I added a secondary index using these two fields to speed up the lookup. This completes the setup of the database, and you can now exit the MySQL client by using the `quit` command.

Set up a Simple CRUD Node Express Server

To create the Express server, navigate into a directory of your choice and create a new folder called `timeline-server`. Open a terminal in this directory and initialize the Node project using `npm`.

```
npm init
```

Answer all the questions using the default answer and when asked about the entry point, set it to `src/index.js`. Next, install some libraries you will need.

```
npm install --save-exact express@4.17.1 cors@2.8.5 mysql@2.17.1
```

Next, use your favorite editor and create a file `src/index.js` and paste the following code into it.

```
const express = require('express');
const cors = require('cors');
const bodyParser = require('body-parser');
const mysql = require('mysql');
const events = require('./events');

const connection = mysql.createConnection({
  host     : 'localhost',
  user     : 'timeline',
  password : 'password',
  database : 'timeline'
});

connection.connect();

const port = process.env.PORT || 8080;

const app = express()
  .use(cors())
  .use(bodyParser.json())
  .use(events(connection));

app.listen(port, () => {
  console.log(`Express server listening on port ${port}`);
});
```

At the top of the file, you can see several imports. `express` contains the Express framework for creating REST APIs, `cors` is a middleware responsible for allowing cross-origin requests, and `body-parser` makes sure that the bodies of the incoming requests are read and attached to the request object.

The `mysql` object allows us to connect to your MySQL database and is seen in the code immediately below the `require` statements. In the options to `createConnection`, you will need to replace `password` with the password that you have stored in your MySQL server above. In the bottom part of `src/index.js`, the Express server is configured with the middleware and the `events` router and then started.

The last `require` statement imports the `events` router. To create the router, create a new file called `src/events.js` and paste the following code.

```
const express = require('express');

function createRouter(db) {
  const router = express.Router();
  const owner = '';

  // the routes are defined here

  return router;
}

module.exports = createRouter;
```

This piece of code defines a function that takes the database connection as an argument and creates a router. I deliberately left the main part of the function blank. Soon, you will define the individual routes of the REST API in this block. I also defined an empty string called `owner` to use as a placeholder for the `owner` column in the database. In the next section, I will show you how to obtain the user's email address and use this to identify the owner.

The first route will insert new events into the database. Paste the following into the body of the `createRouter()` function.

```
router.post('/event', (req, res, next) => {
  db.query(
    'INSERT INTO events (owner, name, description, date) VALUES (?,?,?,?)',
    [owner, req.body.name, req.body.description, new Date(req.body.date)],
    (error) => {
      if (error) {
        console.error(error);
        res.status(500).json({status: 'error'});
      } else {
        res.status(200).json({status: 'ok'});
      }
    }
  );
});
```

By using `router.post` this route will only activate when the server receives an HTTP POST request. The data posted in the request can be obtained through the `req.body` object. Using the SQL `INSERT` statement, this code adds a new row to the `events` table.

To list the events of a single owner, the following route links an HTTP GET request to a MySQL `SELECT` statement. You can paste this code into the body of the `createRouter()` function right after the previous route.

```
router.get('/event', function (req, res, next) {
  db.query(
    'SELECT id, name, description, date FROM events WHERE owner=? ORDER BY date LIMIT 10 OFFSET ?',
    [owner, 10*(req.params.page || 0)],
    (error, results) => {
      if (error) {
        console.log(error);
        res.status(500).json({status: 'error'});
      } else {
        res.status(200).json(results);
      }
    }
  );
});
```

You can also modify existing entries in the database with a PUT route, which links an HTTP PUT request to a MySQL `UPDATE` statement.

```
router.put('/event/:id', function (req, res, next) {
  db.query(
    'UPDATE events SET name=?, description=?, date=? WHERE id=? AND owner=?',
    [req.body.name, req.body.description, new Date(req.body.date), req.params.id, owner],
    (error) => {
      if (error) {
        res.status(500).json({status: 'error'});
        res.status(500).json({status: 'error'});
      } else {
        res.status(200).json({status: 'ok'});
      }
    }
  );
});
```

The code obtains the `id` as a route parameter from the `req.params` object.

Finally, you might want to delete an existing event. Do this through an HTTP DELETE request that issues a MySQL `DELETE` statement.

```
router.delete('/event/:id', function (req, res, next) {
  db.query(
    'DELETE FROM events WHERE id=? AND owner=?',
    [req.params.id, owner],
    (error) => {
      if (error) {
        res.status(500).json({status: 'error'});
      } else {
        res.status(200).json({status: 'ok'});
      }
    }
  );
});
```

Run Your Express App and Connect to MySQL

The code above implements a fully functioning server. You can run this server by opening the terminal in the project directory and running the following command.

```
node src/index.js
```

You might see the following error when you run this command:

```
Error: ER_NOT_SUPPORTED_AUTH_MODE: Client does not support authentication protocol requested by server; consider upgrading MyS
```

To fix this, log into MySQL and execute the following SQL (where `password` is the value you used for your password):

```
ALTER USER 'timeline'@'localhost' IDENTIFIED WITH mysql_native_password BY 'password';
```

Authentication With JWT

In this section, I will show you how to use JWT and Okta to authenticate users to your application. User authentication is an important part of any web app, but developers often underestimate the effort required to safely implement and maintain secure authentication. With Okta, you can offload all the complexity and security considerations to an external provider.

To start, sign up for a free developer account with Okta. After completing your registration, you will see your Okta dashboard.

To create a new application, select the **Applications** link in the top menu, and click on the green **Add Application** button. Next, you will see a screen with several options. Select **Single-Page App** and click **Next**.

The next screen lets you edit the application settings. For the client you will use Angular, so make sure that the base URI points to `http://localhost:4200/`. You will also need to set the Login Redirect URI to `http://localhost:4200/implicit/callback`, where the user will be redirected after a successful login. After you click the **Done** button, you will see a screen with a client ID you will need below.

To use Okta authentication in your server app, you need to install some additional libraries. In the terminal, run the following command:

```
npm install --save-exact express-bearer-token@2.4.0 @okta/jwt-verifier@1.0.0
```

Next, create a new file `src/auth.js` and paste the following code.

```
const OktaJwtVerifier = require('@okta/jwt-verifier');

const oktaJwtVerifier = new OktaJwtVerifier({
  clientId: '{yourClientId}',
  issuer: 'https://{yourOktaDomain}/oauth2/default'
});

async function oktaAuth(req, res, next) {
  try {
    const token = req.token;
    if (!token) {
      return res.status(401).send('Not Authorized');
    }
    const jwt = await oktaJwtVerifier.verifyAccessToken(token, ['api://default']);
    req.user = {
      uid: jwt.claims.uid,
      email: jwt.claims.sub
    };
    next();
  }
  catch (err) {
    console.log('AUTH ERROR: ', err);
    return res.status(401).send(err.message);
  }
}

module.exports = oktaAuth;
```

This module defines an Express middleware that reads a token from the request and verifies it using the Okta JWT Verifier. In the code above, `{yourClientId}` is the client ID you obtained from the Okta application settings and `{yourOktaDomain}` is your Okta domain. When the user authenticates successfully, a `user` object containing the user ID and email will be added to the request.

Open `src/index.js` again and add the following `require` statements to the top of the file.

```
const bearerToken = require('express-bearer-token');
const oktaAuth = require('./auth');
```

Now modify the Express application configuration to include the `bearerToken` and `oktaAuth` middlewares.

```
const app = express()
  .use(cors())
  .use(bodyParser.json())
  .use(bearerToken())
  .use(oktaAuth)
  .use(events(connection));
```

Finally, modify the `event` route to make use of the user email. In `src/events.js`, remove the line `const owner = '';` and add `const owner = req.user.email;` to the first line in each router block:

```
router.post('/event', (req, res, next) => {
  const owner = req.user.email;
  // db.query() code
});

router.get('/event', function (req, res, next) {
  const owner = req.user.email;
  // db.query() code
});

router.put('/event/:id', function (req, res, next) {
  const owner = req.user.email;
  // db.query() code
});

router.delete('/event/:id', function (req, res, next) {
  const owner = req.user.email;
  // db.query() code
});
```

These changes secure your server application. It also stores events for users separately, and each user will only see their own events.

The Timeline Angular Client

Now it's time to implement the client application based on Angular 8 with the `ngx-bootstrap` library for responsive layout and standard components. You will also use a free icon set called Line Awesome, a variant of the well known Font Awesome that replaces the standard icon designs with some stylish line icons. You will also use the `ngx-timeline` library to make it easy to create beautiful vertical timelines.

To start, you will need to install the latest version of the Angular CLI tool. In a terminal, type the following command.

```
npm install -g @angular/cli@8.1.2
```

Depending on your system, you might have to run this command using `sudo` to allow modification of system resources. Next, navigate into a directory of your choice and create a new Angular application.

```
ng new timeline-client
```

You will be asked a number of questions about your applications. Make sure that you add the Angular routing module.

```
? Would you like to add Angular routing? (y/N) Y
```

When asked which stylesheet format to use, choose the default `CSS` option. Now change into the new folder `timeline-client` and install some additional packages. Add Bootstrap with the `ng add` command.

```
ng add ngx-bootstrap@5.1.0
```

To add the timeline library and Okta's Angular SDK, run the following command:

```
npm install --save-exact ngx-timeline@5.0.0 @okta/okta-angular@1.2.1
```

Now start your IDE and open up the file `src/index.html`. Here, add some external CSS files inside the `<head>` tags to add styles for Bootstrap and Line Awesome:

```
<link href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/bootstrap.min.css" rel="stylesheet">
<link rel="stylesheet" href="https://maxcdn.icons8.com/fonts/line-awesome/1.1/css/line-awesome-font-awesome.min.css">
```

Open `src/app/app.component.ts` and replace the contents with the following code.

```
import { Component } from '@angular/core';
import { OktaAuthService } from '@okta/okta-angular';

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
  title = 'timeline-client';
  isAuthenticated: boolean;

  constructor(public oktaAuth: OktaAuthService) {
    this.oktaAuth.$authenticationState.subscribe(
      (isAuthenticated: boolean)  => this.isAuthenticated = isAuthenticated
    );
  }

  ngOnInit() {
    this.oktaAuth.isAuthenticated().then((auth) => {this.isAuthenticated = auth});
  }

  login() {
    this.oktaAuth.loginRedirect();
  }

  logout() {
    this.oktaAuth.logout('/');
  }
}
```

The `AppComponent` handles the authentication through Okta. `OktaAuthService.isAuthenticated()` initializes the `isAuthenticated` field of the component. The field is kept up to date by subscribing to the `OktaAuthService.$authenticationState` observable. `OktaAuthService.loginRedirect()` will trigger a browser redirect to the Okta login page and `OktaAuthService.logout('/')` will log out the user and navigate to the `'/'` route.

Now open the template of the application component `src/app/app.component.html` and paste in the following HTML.

```
<nav class="navbar navbar-expand navbar-light bg-light">
  <a class="navbar-brand" [routerLink]="['']">
    <i class="fa fa-clock-o"></i>
  </a>
  <ul class="navbar-nav mr-auto">
    <li class="nav-item">
      <a class="nav-link" [routerLink]="['']">
        Home
      </a>
    </li>
    <li class="nav-item">
      <a class="nav-link" [routerLink]="['timeline']">
        Timeline
      </a>
    </li>
  </ul>
  <span>
    <button class="btn btn-primary" *ngIf="!isAuthenticated" (click)="login()"> Login </button>
    <button class="btn btn-primary" *ngIf="isAuthenticated" (click)="logout()"> Logout </button>
  </span>
</nav>
<router-outlet></router-outlet>
```

The bootstrap navigation bar contains a menu with links to the home page and a `timeline` route. It also contains a login button and a logout button that appear depending on the authentication state.

In the next step, you need to import the component modules into `src/app/app.module.ts`. It looks like this:

```
import { BrowserModule } from '@angular/platform-browser';
import { HttpClientModule } from '@angular/common/http';
import { NgModule } from '@angular/core';
import { BsDatepickerModule } from 'ngx-bootstrap/datepicker';
import { NgxTimelineModule } from 'ngx-timeline';
import { FormsModule, ReactiveFormsModule } from '@angular/forms';

import { AppRoutingModule } from './app-routing.module';
import { AppComponent } from './app.component';
import { BrowserAnimationsModule } from '@angular/platform-browser/animations';
import { ModalModule } from 'ngx-bootstrap/modal';
import { HomeComponent } from './home/home.component';
import { TimelineComponent } from './timeline/timeline.component';

import { OktaAuthModule } from '@okta/okta-angular';

@NgModule({
  declarations: [
    AppComponent,
    HomeComponent,
    TimelineComponent
  ],
  imports: [
    BrowserModule,
    HttpClientModule,
    AppRoutingModule,
    BrowserAnimationsModule,
    FormsModule,
    ReactiveFormsModule,
    BsDatepickerModule.forRoot(),
    NgxTimelineModule,
    ModalModule.forRoot(),
    OktaAuthModule.initAuth({
      issuer: 'https://{yourOktaDomain}/oauth2/default',
      redirectUri: 'http://localhost:4200/implicit/callback',
      clientId: '{yourClientId}'
    })
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

Replace `{yourClientId}` with the client ID from your Okta dashboard and `{yourOktaDomain}` with your Okta domain. Next, create two components for the home page and the timeline page, as well as a service to connect to the server.

```
ng generate component home
ng generate component timeline
ng generate service server
```

The home page will simply contain a heading and no other functionality. Open `src/app/home/home.component.html` and replace the contents with the following.

```
<div class="container">
  <div class="row">
    <div class="col-sm">
      <h1>Angular MySQL Timeline</h1>
    </div>
  </div>
</div>
```

Now open `src/app/home/home.component.css` and add the following styles.

```
h1 {
  margin-top: 50px;
  text-align: center;
}
```

Before you implement the timeline component, let's take a look at the `ServerService` first. Open `src/app/server.service.ts` and replace the contents with the following code.

```
import { Injectable } from '@angular/core';
import { HttpClient } from '@angular/common/http';
import { OktaAuthService } from '@okta/okta-angular';
import { environment } from '../environments/environment';

@Injectable({
  providedIn: 'root'
})
export class ServerService {

    constructor(private http: HttpClient, public oktaAuth: OktaAuthService) {
    }

    private async request(method: string, url: string, data?: any) {
      const token = await this.oktaAuth.getAccessToken();

      const result = this.http.request(method, url, {
        body: data,
        responseType: 'json',
        observe: 'body',
        headers: {
          Authorization: `Bearer ${token}`
        }
      });
      return new Promise((resolve, reject) => {
        result.subscribe(resolve, reject);
      });
    }

    getEvents() {
      return this.request('GET', `${environment.serverUrl}/event`);
    }

    createEvent(event) {
      return this.request('POST', `${environment.serverUrl}/event`, event);
    }

    updateEvent(event) {
      return this.request('PUT', `${environment.serverUrl}/event/${event.id}`, event);
    }

    deleteEvent(event) {
      return this.request('DELETE', `${environment.serverUrl}/event/${event.id}`);
    }
}
```

The main logic of this component resides in the `request` method, which sends a request to the server. To identify the user to the server, the request header contains a bearer token obtained from `OktaAuthService`. The method returns a `Promise` that resolves once a response from the server has been obtained.

The remainder of the `ServerService` uses the `request` method to call the server routes. The server URL is provided through the environment object, which is defined in `src/environments/environment.ts`.

```
export const environment = {
  production: false,
  serverUrl: 'http://localhost:8080'
};
```

The comments in `src/environments/environment.ts` provide useful hints about how to use environments in Angular.

Now you are ready to implement the timeline component. Open `src/app/timeline/timeline.component.html` and edit the contents to match the code below.

```
<div class="container page-content">
  <div class="row">
    <div class="col-sm-12 col-md">
      <ngx-timeline [events]="events">
        <ng-template let-event let-index="rowIndex" timelineBody>
          <div>{{event.body}}</div>
          <div class="button-row">
            <button type="button" class="btn btn-primary" (click)="editEvent(index, eventmodal)"><i class="fa fa-edit"></i></b
            <button type="button" class="btn btn-danger" (click)="deleteEvent(index)"><i class="fa fa-trash"></i></button>
          </div>
        </ng-template>
      </ngx-timeline>
    </div>
    <div class="col-md-2">
      <button type="button" class="btn btn-primary" (click)="addEvent(eventmodal)"><i class="fa fa-plus"></i> Add</button>
    </div>
  </div>
</div>
```

This template uses the `ngx-timeline` component to display an array of events in a vertical timeline, with buttons for adding and editing events. Some of these actions will open up a modal window. `ngx-bootstrap` allows you to simply create a modal window from an `ng-template` component. Paste the following code into the bottom of the file.

```
<ng-template #eventmodal>
  <div class="modal-header">
    <h4 class="modal-title pull-left">Event</h4>
    <button type="button" class="close pull-right" aria-label="Close" (click)="modalRef.hide()">
      <span aria-hidden="true">×</span>
    </button>
  </div>
  <div class="modal-body">
    <form [formGroup]="form" (ngSubmit)="onSubmit()">
      <div class="form-group full-width-input">
        <label>Name</label>
        <input class="form-control" placeholder="Event Name" formControlName="name" required>
      </div>
      <div class="form-group full-width-input">
        <label>Description</label>
        <input class="form-control" formControlName="description">
      </div>
      <div class="form-group full-width-input">
        <label>Date</label>
        <input class="form-control" formControlName="date" bsDatepicker>
      </div>
      <div class="button-row">
        <button type="button" class="btn btn-primary" (click)="modalCallback()">Submit</button>
        <button type="button" class="btn btn-light" (click)="onCancel()">Cancel</button>
      </div>
    </form>
  </div>
</ng-template>
```

Only a small amount of styling in `src/app/timeline/timeline.component.css` rounds off the design.

```
.page-content {
  margin-top: 2rem;
}

.button-row {
  display: flex;
  justify-content: space-between;
  margin-top: 1rem;
}
```

The `src/app/timeline/timeline.component.ts` file contains the bulk of the application logic.

```
import { Component, OnInit, TemplateRef } from '@angular/core';
import { BsModalService, BsModalRef } from 'ngx-bootstrap/modal';
import { FormGroup, FormBuilder, Validators, AbstractControl, ValidatorFn } from '@angular/forms';
import { ServerService } from '../server.service';

```

```
@Component({
  selector: 'app-timeline',
  templateUrl: './timeline.component.html',
  styleUrls: ['./timeline.component.css']
})
export class TimelineComponent implements OnInit {
  form: FormGroup;
  modalRef: BsModalRef;

  events: any[] = [];
  currentEvent: any = {id: null, name: '', description: '', date: new Date()};
  modalCallback: () => void;

  constructor(private fb: FormBuilder,
              private modalService: BsModalService,
              private server: ServerService) { }

  ngOnInit() {
    this.form = this.fb.group({
      name: [this.currentEvent.name, Validators.required],
      description: this.currentEvent.description,
      date: [this.currentEvent.date, Validators.required],
    });
    this.getEvents();
  }

  private updateForm() {
    this.form.setValue({
      name: this.currentEvent.name,
      description: this.currentEvent.description,
      date: new Date(this.currentEvent.date)
    });
  }

  private getEvents() {
    this.server.getEvents().then((response: any) => {
      console.log('Response', response);
      this.events = response.map((ev) => {
        ev.body = ev.description;
        ev.header = ev.name;
        ev.icon = 'fa-clock-o';
        return ev;
      });
    });
  }

  addEvent(template) {
    this.currentEvent = {id: null, name: '', description: '', date: new Date()};
    this.updateForm();
    this.modalCallback = this.createEvent.bind(this);
    this.modalRef = this.modalService.show(template);
  }

  createEvent() {
    const newEvent = {
      name: this.form.get('name').value,
      description: this.form.get('description').value,
      date: this.form.get('date').value,
    };
    this.modalRef.hide();
    this.server.createEvent(newEvent).then(() => {
      this.getEvents();
    });
  }

  editEvent(index, template) {
    this.currentEvent = this.events[index];
    this.updateForm();
    this.modalCallback = this.updateEvent.bind(this);
    this.modalRef = this.modalService.show(template);
  }

  updateEvent() {
    const eventData = {
      id: this.currentEvent.id
      id: this.currentEvent.id,
      name: this.form.get('name').value,
      description: this.form.get('description').value,
      date: this.form.get('date').value,
    };
    this.modalRef.hide();
    this.server.updateEvent(eventData).then(() => {
      this.getEvents();
    });
  }

  deleteEvent(index) {
    this.server.deleteEvent(this.events[index]).then(() => {
      this.getEvents();
    });
  }

  onCancel() {
    this.modalRef.hide();
  }
}
```

I will not go into every detail of this code. The methods `addEvent()`, `editEvent()`, and `deleteEvent()` are the event handlers for the respective HTML buttons. `addEvent()` and `editEvent()` open the modal window and set either `createEvent()` or `updateEvent()` as a callback function when the user submits data. These use the `ServerService` to complete the request.

Finally, link the components to the routes. Open `src/app/app-routing.module.ts` and add the following import statements to the top of the file.

```
import { HomeComponent } from './home/home.component';
import { TimelineComponent } from './timeline/timeline.component';
import { OktaCallbackComponent, OktaAuthGuard } from '@okta/okta-angular';
```

Next, replace the `routes` array with the following.

```
const routes: Routes = [
  {
    path: '',
    component: HomeComponent
  },
  {
    path: 'timeline',
    component: TimelineComponent,
    canActivate: [OktaAuthGuard]
  },
  { path: 'implicit/callback', component: OktaCallbackComponent }
];
```

The first entry sets the base route and links it to the `HomeComponent`. The second entry links the `timeline` route to the `TimelineComponent` and prevents unauthorized access to the route with `OktaAuthGuard`. When a user authenticates via the Okta service, they will be redirected to the `implicit/callback` route.

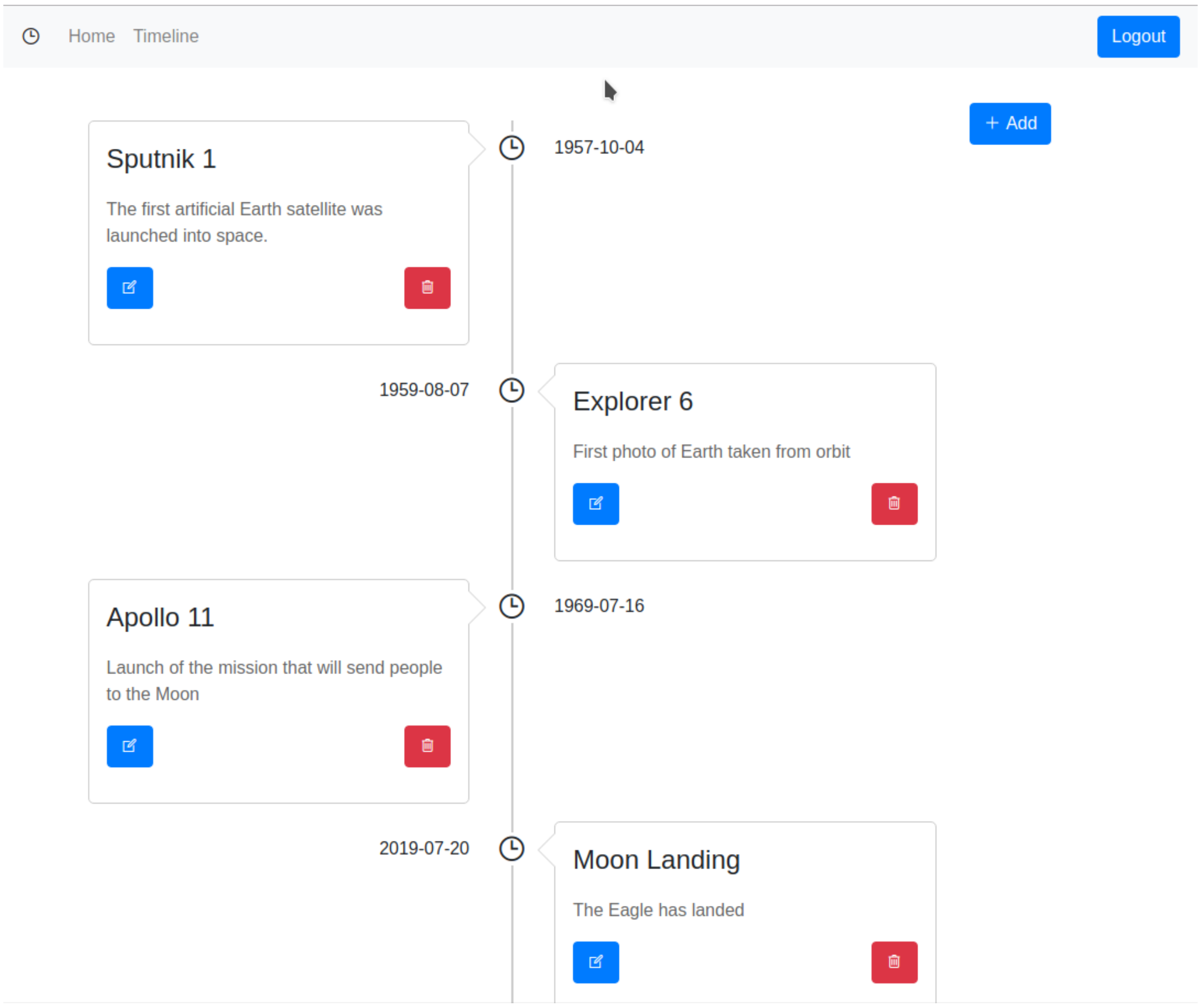
Run Your Angular Client Application

This completes the implementation of the client. You can start the client from the terminal by running this command.

```
ng serve
```

Make sure that you have also started the server, as described in the previous section. Open a browser to `http://localhost:4200`. Log in, click on **Timeline** in the top menu, and add events to your heart's content.

I added some of my favorite historical events. You can see how this looks in the screenshot below.


Home
Timeline
Logout
+ Add
1957-10-04
Sputnik 1
The first artificial Earth satellite was launched into space.
1959-08-07
Explorer 6
First photo of Earth taken from orbit
1969-07-16
Apollo 11
Launch of the mission that will send people to the Moon
2019-07-20
Moon Landing
The Eagle has landed

Learn More About MySQL, Angular, and Node

In this tutorial, I have shown you how to implement a web application with Angular and MySQL using a server-based on Express. Using the ngx-timeline library you created beautiful timelines. When written from scratch, authentication requires solid up-to-date knowledge about security issues. Using Okta authentication and helper libraries lets you implement authentication in just a few lines.

You can find the code created in this tutorial on GitHub at okta-angular-mysql-timeline-example.

If you'd like to be notified when we publish new posts like this one, please follow @oktadev on Twitter. We also publish videos on our YouTube channel.

How to Work with Angular and MySQL was originally published on the Okta Developer Blog on August 16, 2019.

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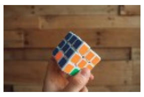
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