Building an Issue Tracking System Using Reactive Forms

Web applications use HTML forms to collect data from users and validate them, such as when logging in to an application, performing a search, or completing an online payment. The Angular framework provides two types of forms, reactive and template-driven, that we can use in an Angular application.

In this chapter, we will build a system for managing and tracking issues. We will use Angular reactive forms for reporting new issues. We will also use **Clarity Design System** from VMware for designing our forms and displaying our issues.

We will cover the following topics:

- Installing Clarity Design System in an Angular application
- Displaying an overview of issues
- Reporting new issues
- Marking an issue as resolved
- Turning on suggestions for new issues

Essential background theory and context

The Angular framework provides two types of forms that we can use:

- **Template-driven**: They are easy to set up in an Angular application. Template-driven forms do not scale well and are difficult to test because they are defined in the component template.
- **Reactive**: They are based on the reactive programming approach. Reactive forms operate in the TypeScript class of the component, and they are easier to test and scale better than template-driven forms.

In this chapter, we will get hands-on with the reactive forms approach, which is the most popular in the Angular community.

Angular components can get data from external sources such as HTTP or other Angular components. In the latter case, they interact with components that have data using a public API:

- `@Input()`: This is used to pass data into a component.
- `@Output()`: This is used to get notified about changes or get data back from a component.

Clarity is a design system that contains a set of UX and UI guidelines for building web applications. It also comprises a proprietary HTML and CSS framework packed with these guidelines. Luckily, we do not have to use this framework since Clarity already provides various Angular-based UI components that we can use in our Angular applications.

Project overview

In this project, we will build an Angular application for managing and tracking issues using reactive forms and Clarity. Initially, we will display a list of issues in a table that we can sort and filter. We will then create a form for allowing users to report new issues. Finally, we will create a modal dialog for resolving an issue. We will also go the extra mile and turn on suggestions when reporting an issue to help users avoid duplicate entries. The following diagram depicts an architectural overview of the project:

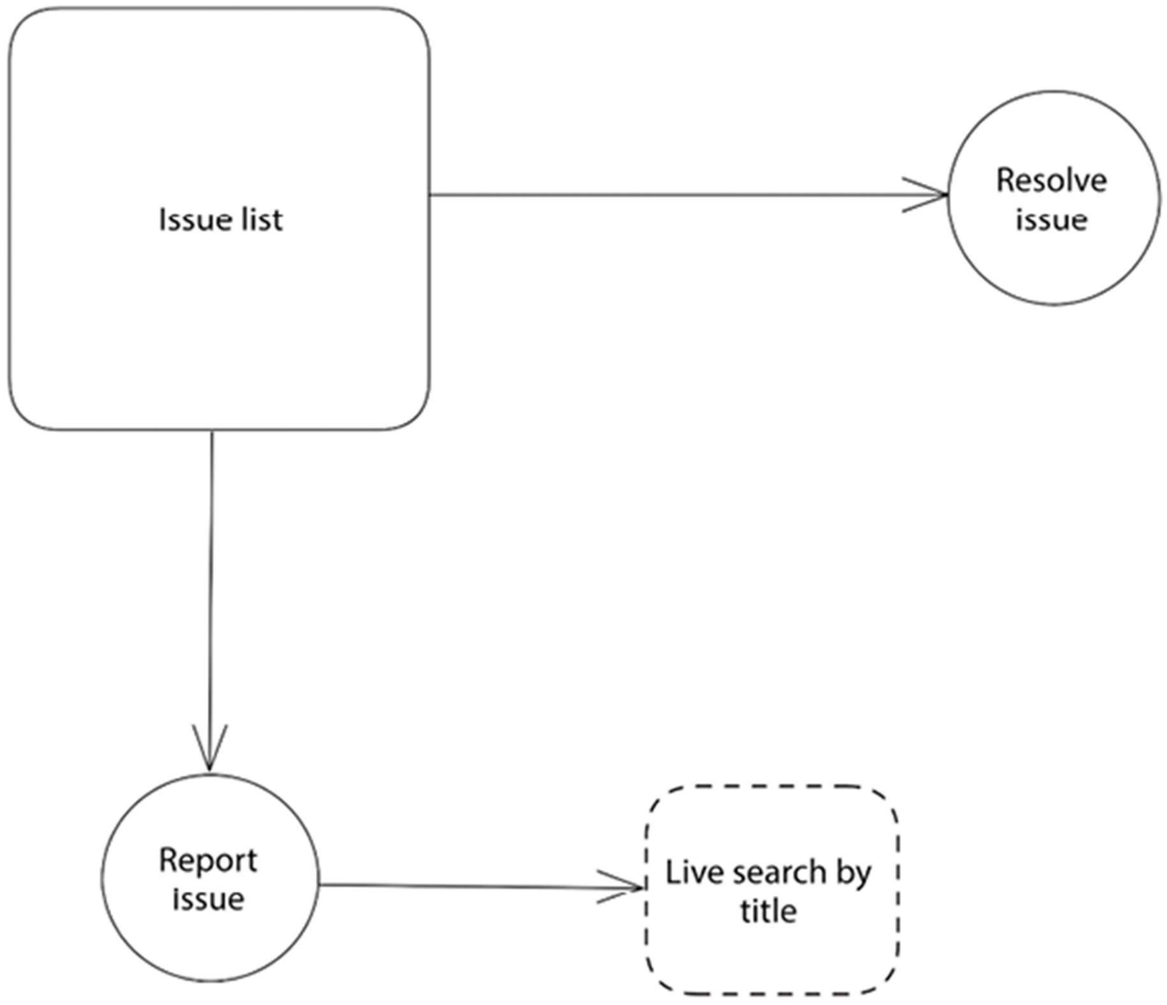


Figure 3.1 – Project architecture

Build time: 1 hour

Getting started

The following software tools are required to complete this project:

- **Angular CLI**: A command-line interface for Angular that you can find at `https://angular.io/cli`
- **GitHub material**: The related code for this chapter, which you can find in the `Chapter03` folder at `https://github.com/PacktPublishing/Angular-Projects-Third-Edition`

Installing Clarity in an Angular application

Let's start creating our issue-tracking system by scaffolding a new Angular application:

```
ng new issue-tracker --defaults
```

We use the `ng new` command of the Angular CLI to create a new Angular application with the following characteristics:

- `issue-tracker`: The name of the Angular application.
- `--defaults`: This disables Angular routing for the application and sets the stylesheet format to CSS.

We now need to install the Clarity library in our Angular application:

1. Navigate to the `issue-tracker` folder that was created and run the following command to install it:

```
npm install @cds/core @clr/angular @clr/ui --save
```

3. Open the `angular.json` file and add the Clarity CSS styles in the `styles` array:

```
"styles": [
  "node_modules/@clr/ui/clr-ui.min.css",
  "src/styles.css"
]
```

8. Finally, import `ClarityModule` and `BrowserAnimationsModule` in the main application module, `app.module.ts`:

```
import { NgModule } from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';
import { AppComponent } from './app.component';
import { ClarityModule } from '@clr/angular';
import { BrowserAnimationsModule } from
  '@angular/platform-browser/animations';
@NgModule({
  declarations: [
    AppComponent
  ],
  imports: [
    BrowserModule,
    ClarityModule,
    BrowserAnimationsModule
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

Now that we have completed installing Clarity in our application, we can start building beautiful designs with it. In the following section, we will begin by creating a list for displaying our issues.

Displaying an overview of issues

Our Angular application will be responsible for managing and tracking issues. When the application starts, we should display a list of all pending issues in the system. Pending issues are defined as those issues that have not been resolved. The process that we will follow can be further analyzed as the following:

- Fetching pending issues
- Visualizing issues using a data grid

Fetching pending issues

First, we need to create a mechanism for fetching all pending issues:

1. Use the `generate` command of the Angular CLI to create an Angular service named `issues`:

```
ng generate service issues
```

   The preceding command will create an `issues.service.ts` file in the `src\app` folder of our Angular CLI project.

2. Every issue will have specific properties of a defined type. We need to create a TypeScript interface for that with the following Angular CLI command:

```
ng generate interface issue
```

   The previous command will create an `issue.ts` file in the `src\app` folder of the project.

3. Open the `issue.ts` file and add the following properties in the `Issue` interface:

```
export interface Issue {
  issueNo: number;
  title: string;
  description: string;
  priority: 'low' | 'high';
  type: 'Feature' | 'Bug' | 'Documentation';
  completed?: Date;
}
```

The `completed` property is the date that an issue is resolved. We define it as optional because new issues will not have this property set.

4. Open the Angular service we created in step 1 and add an `issues` property to hold our data. Also, create a `getPendingIssues` method that will return all issues that have not been completed:

```
import { Injectable } from '@angular/core';
import { Issue } from './issue';
@Injectable({
  providedIn: 'root'
})
export class IssuesService {
  private issues: Issue[] = [];

  constructor() { }

  getPendingIssues(): Issue[] {
    return this.issues.filter(issue => !issue.completed);
  }
}
```

In the preceding code, we initialize the `issues` property to an empty array. If you want to get started with sample data, you can use the `mock-issues.ts` file from the `src\assets` folder that exists in the GitHub material of this chapter and import it as follows:

```
import { issues } from '../assets/mock-issues';
```

In the following section, we will create a component for displaying those issues.

Visualizing issues in a data grid

We will use the data grid UI component of the Clarity library to display data in a tabular format. A data grid also provides mechanisms for filtering and sorting out of the box. Let's create the Angular component that will host the data grid first:

1. Use the `generate` command of the Angular CLI to create the component:

```
ng generate component issue-list
```

3. Open the template of the main component of our application, `app.component.html`, and replace its content with the following HTML code:

```
<div class="main-container">
  <div class="content-container">
    <div class="content-area">
      <app-issue-list></app-issue-list>
    </div>
  </div>
</div>
```

The list of issues will be displayed in the main component of the Angular application as soon as it starts up.

3. Currently, the `<app-issue-list>` component displays no issue data. We must connect it with the Angular service we created in the *Fetching pending issues* section. Open the `issue-list.component.ts` file and inject `IssuesService` in the `constructor` of the `IssueListComponent` class:

```
import { Component } from '@angular/core';
import { IssuesService } from '../issues.service';
@Component({
  selector: 'app-issue-list',
  templateUrl: './issue-list.component.html',
  styleUrls: ['./issue-list.component.css']
})
export class IssueListComponent {
  constructor(private issueService: IssuesService) { }
}
```

14. Create a method named `getIssues` that will call the `getPendingIssues` method of the injected service and keep its returned value in the `issues` component property:

```
import { Component } from '@angular/core';
import { Issue } from '../issue';
import { IssuesService } from '../issues.service';
@Component({
  selector: 'app-issue-list',
  templateUrl: './issue-list.component.html',
  styleUrls: ['./issue-list.component.css']
})
export class IssueListComponent {
  issues: Issue[] = [];
  constructor(private issueService: IssuesService) { }
  private getIssues() {
    this.issues = this.issueService.getPendingIssues();
  }
}
```

30. Finally, call the `getIssues` method in the `ngOnInit` component method to get all pending issues upon component initialization:

```
import { Component, OnInit } from '@angular/core';
import { Issue } from '../issue';
import { IssuesService } from '../issues.service';
@Component({
  selector: 'app-issue-list',
  templateUrl: './issue-list.component.html',
  styleUrls: ['./issue-list.component.css']
})
export class IssueListComponent implements OnInit {
  issues: Issue[] = [];
  constructor(private issueService: IssuesService) { }
  ngOnInit(): void {
    this.getIssues();
  }
  private getIssues() {
    this.issues = this.issueService.getPendingIssues();
  }
}
```

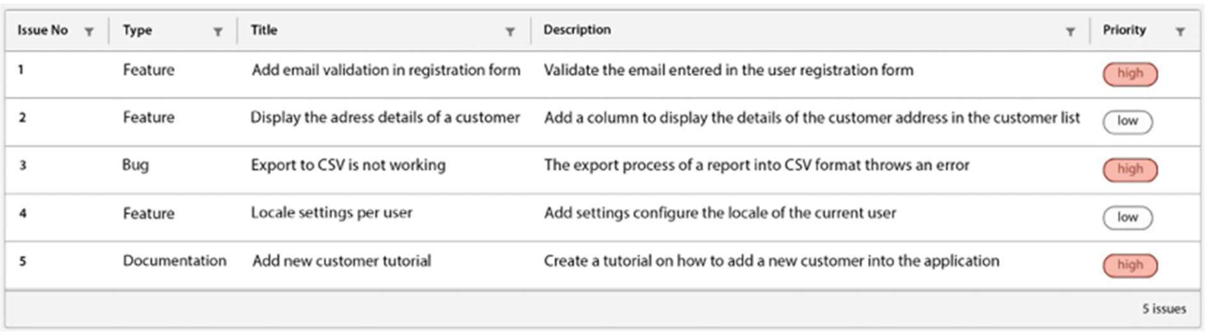
We have already implemented the process for getting issue data in our component. All we have to do now is display it in the template. Open the `issue-list.component.html` file and replace its content with the following HTML code:

```
<clr-datagrid>
    <clr-dg-column [clrDgField]="'issueNo'" [clrDgColType]="'number'">Issue
No</clr-dg-column>
    <clr-dg-column [clrDgField]="'type'">Type</clr-dg-column>
    <clr-dg-column [clrDgField]="'title'">Title</clr-dg-column>
    <clr-dg-column [clrDgField]="'description'">Description</clr-dg-column>
    <clr-dg-column [clrDgField]="'priority'">Priority</clr-dg-column>
    <clr-dg-row *clrDgItems="let issue of issues">
      <clr-dg-cell>{{issue.issueNo}}</clr-dg-cell>
      <clr-dg-cell>{{issue.type}}</clr-dg-cell>
      <clr-dg-cell>{{issue.title}}</clr-dg-cell>
      <clr-dg-cell>{{issue.description}}</clr-dg-cell>
      <clr-dg-cell>
       <span class="label" [class.label-danger]="issue.priority ===
'high'">{{issue.priority}}</span>
      </clr-dg-cell>
    </clr-dg-row>
    <clr-dg-footer>{{issues.length}} issues</clr-dg-footer>
</clr-datagrid>
```

In the preceding snippet, we use several Angular components of the Clarity library:

- `<clr-datagrid>`: Defines a table.
- `<clr-dg-column>`: Defines a column of a table. Each column uses the `clrDgField` directive to bind to the property name of the issue represented by that column. The `clrDgField` directive provides sorting and filtering capabilities without writing a single line of code in the TypeScript class file. Sorting works automatically only with string-based content. If we want to sort by a different primitive type, we must use the `clrDgColType` directive and specify the particular type.
- `<clr-dg-row>`: Defines a row of a table. It uses the `*clrDgItems` directive to iterate over the issues and create one row for each issue.
- `<clr-dg-cell>`: Each row contains a collection of `<clr-dg-cell>` components to display the value of each column using interpolation. In the last cell, we add the `label-danger` class when an issue has a high priority to indicate its importance.
- `<clr-dg-footer>`: Defines the footer of a table. In this case, it displays the total number of issues.

If we run our Angular application using `ng serve`, the output will look like the following:



Issue No	Type	Title	Description	Priority
1	Feature	Add email validation in registration form	Validate the email entered in the user registration form	high
2	Feature	Display the adress details of a customer	Add a column to display the details of the customer address in the customer list	low
3	Bug	Export to CSV is not working	The export process of a report into CSV format throws an error	high
4	Feature	Locale settings per user	Add settings configure the locale of the current user	low
5	Documentation	Add new customer tutorial	Create a tutorial on how to add a new customer into the application	high

5 issues

Figure 3.2 – Overview of pending issues

In the previous screenshot, the application uses sample data from the `mock-issues.ts` file.
The data grid component of the Clarity library has a rich set of capabilities that we can use in our Angular applications. In the following section, we will learn how to use reactive forms to report a new issue.

Reporting new issues

One of the main features of our issue-tracking system is the ability to report new issues. We will use Angular reactive forms to create a form for adding new issues. The feature can be further subdivided into the following tasks:

- Setting up reactive forms in an Angular application
- Creating the report issue form
- Displaying a new issue in the list
- Validating the details of an issue

Let's begin by introducing reactive forms in our Angular application.

Setting up reactive forms in an Angular application

Reactive forms are defined in the `@angular/forms` npm package of the Angular framework. To add them to our Angular application:

1. Open the `app.module.ts` file and import `ReactiveFormsModule`:

```
import { ReactiveFormsModule } from '@angular/forms';
```

3. Add `ReactiveFormsModule` into the `imports` array of the `@NgModule` decorator:

```
@NgModule({
  declarations: [
    AppComponent,
    IssueListComponent
  ],
  imports: [
    BrowserModule,
    ClarityModule,
    BrowserAnimationsModule,
    ReactiveFormsModule
  ],
  providers: [],
  bootstrap: [AppComponent]
})
```

`ReactiveFormsModule` contains all necessary Angular directives and services that we will need to work with forms, as we will see in the following section.

Creating the report issue form

Now that we have introduced reactive forms in our Angular application, we can start building our form:

1. Create a new Angular component named `issue-report`:

```
ng generate component issue-report
```

3. Open the `issue-report.component.ts` file and add the following `import` statement:

```
import { FormControl, FormGroup } from '@angular/forms';
```

   In this statement, `FormControl` represents a single control of a form and `FormGroup` is used to group individual controls into a logical form representation.

3. Create the following interface, which will represent the structure of our form:

```
interface IssueForm {
  title: FormControl<string>;
  description: FormControl<string>;
  priority: FormControl<string>;
  type: FormControl<string>;
}
```

10. Declare an `issueForm` property of the `FormGroup<IssueForm>` type in the TypeScript class:

```
issueForm = new FormGroup<IssueForm>({
  title: new FormControl('', { nonNullable: true }),
  description: new FormControl('', { nonNullable: true }),
  priority: new FormControl('', { nonNullable: true }),
  type: new FormControl('', { nonNullable: true })
});
```

   We initialize all controls to empty strings because the form will be used to create a new issue from scratch. We also explicitly state that all controls will not accept null values by default using the `nonNullable` property.

5. We must now associate the `FormGroup` object we created with the respective HTML elements. Open the `issue-report.component.html` file and replace its content with the following HTML code:

```
<h3>Report an issue</h3>
<form clrForm *ngIf="issueForm" [formGroup]="issueForm">
  <clr-input-container>
    <label>Title</label>
    <input clrInput formControlName="title" />
  </clr-input-container>
  <clr-textarea-container>
    <label>Description</label>
    <textarea clrTextarea
      formControlName="description"></textarea>
  </clr-textarea-container>
  <clr-radio-container clrInline>
    <label>Priority</label>
    <clr-radio-wrapper>
      <input type="radio" value="low" clrRadio
         formControlName="priority" />
      <label>Low</label>
    </clr-radio-wrapper>
    <clr-radio-wrapper>
      <input type="radio" value="high" clrRadio
        formControlName="priority" />
      <label>High</label>
    </clr-radio-wrapper>
  </clr-radio-container>
  <clr-select-container>
    <label>Type</label>
    <select clrSelect formControlName="type">
      <option value="Feature">Feature</option>
      <option value="Bug">Bug</option>
      <option value="Documentation">Documentation
        </option>
    </select>
  </clr-select-container>
</form>
```

The `formGroup` and `clrForm` directives associate the HTML `<form>` element with the `issueForm` property and identify it as a Clarity form.
The `formControlName` directive is used to associate HTML elements with form controls using their name. Each control is also defined using a Clarity container element.
For example, the `title` input control is a `<clr-input-container>` component that contains an `<input>` HTML element.
Each native HTML element has a Clarity directive attached to it according to its type. For example, the `<input>` HTML element contains a `clrInput` directive.

6. Finally, add some styles to our `issue-report.component.css` file:

```
.clr-input, .clr-textarea {
    width: 30%;
}
button {
    margin-top: 25px;
}
```

Now that we have created the basics of our form, we will learn how to submit its details:

1. Add an HTML `<button>` element *before* the closing tag of the HTML `<form>` element:

```
<button class="btn btn-primary" type="submit">Create</button>
```

We set its type to `submit` to trigger form submission upon clicking the button.

2. Open the `issues.service.ts` file and add a `createIssue` method that inserts a new issue into the `issues` array:

```
createIssue(issue: Issue) {
  issue.issueNo = this.issues.length + 1;
  this.issues.push(issue);
}
```

We automatically assign a new `issueNo` property to the issue before adding it to the `issues` array.
The `issueNo` property is currently calculated according to the length of the `issues` array. A better approach would be implementing a generator mechanism for creating unique and random `issueNo` values.

3. Return to the `issue-report.component.ts` file and add the following `import` statements:

```
import { Issue } from '../issue';
import { IssuesService } from '../issues.service';
```

6. Inject the `IssuesService` class into the `constructor` of the TypeScript class:

```
constructor(private issueService: IssuesService) { }
```

8. Add a new component method that will call the `createIssue` method of the injected service:

```
addIssue() {
  this.issueService.createIssue(this.issueForm.getRawValue() as Issue);
}
```

We pass the value of each form control using the `getRawValue` property of the `issueForm` object that will provide us access to the underlying form model. We are also typecasting it to the `Issue` interface since we already know that its values will represent the properties of an issue object.

6. Open the `issue-report.component.html` file and bind the `ngSubmit` event of the form to the `addIssue` component method:

```
<form clrForm *ngIf="issueForm" [formGroup]="issueForm"
(ngSubmit)="addIssue()">
```

The `ngSubmit` event will be triggered when we click on the `Create` button of the form.
We have completed all the processes to add a new issue to the system. In the following section, we will learn how to display a newly created issue in the pending issue table.

Displaying a new issue in the list

Displaying and creating new issues are two tasks delegated to different Angular components. When we create a new issue with `IssueReportComponent`, we need to notify `IssueListComponent` to reflect that change in the table. First, let's see how we can configure `IssueReportComponent` to communicate that change:

1. Open the `issue-report.component.ts` file and use the `@Output()` decorator to add an `EventEmitter` property:

```
@Output() formClose = new EventEmitter();
```

   `Output` and `EventEmitter` symbols can be imported from the `@angular/core` npm package.

2. Call the `emit` method of the `formClose` output property inside the `addIssue` component method right after creating the issue:

```
addIssue() {
  this.issueService.createIssue(this.issueForm.getRawValue() as Issue);
  this.formClose.emit();
}
```

7. Add a second HTML `<button>` element in the component template and call the `formClose.emit` method on its `click` event:

```
<button class="btn" type="button"
(click)="formClose.emit()">Cancel</button>
```

`IssueListComponent` can now bind to the `formClose` event of `IssueReportComponent` and be notified when any buttons are clicked. Let's find out how:

1. Open the `issue-list.component.ts` file and add the following property in the `IssueListComponent` class:

```
showReportIssue = false;
```

   The `showReportIssue` property will toggle the appearance of the report issue form.

2. Add the following component method, which will be called when the report issue form emits the `formClose` event:

```
onCloseReport() {
  this.showReportIssue = false;
  this.getIssues();
}
```

   The preceding method will set the `showReportIssue` property to `false` so that the report issue form is no longer visible and the table of pending issues is displayed instead. It will also fetch issues again to refresh the data in the table.

3. Open the `issue-list.component.html` file and add an HTML `<button>` element at the top of the template. The button will display the report issue form when clicked:

```
<button class="btn btn-primary" (click)="showReportIssue = true">Add new
issue</button>
```

5. Group the button and the data grid inside an `<ng-container>` element. As indicated by the `*ngIf` Angular directive, the contents of the `<ng-container>` element will be displayed when the report issue form is not visible:

```
<ng-container *ngIf="showReportIssue === false">
```

```
    <button class="btn btn-primary" (click)="showReportIssue = true">Add new issue</button>
    <clr-datagrid>
        <clr-dg-column [clrDgField]="'issueNo'" [clrDgColType]="'number'">Issue No</clr-dg-column>
        <clr-dg-column [clrDgField]="'type'">Type</clr-dg-column>
        <clr-dg-column [clrDgField]="'title'">Title</clr-dg-column>
        <clr-dg-column [clrDgField]="'description'">Description</clr-dg-column>
        <clr-dg-column [clrDgField]="'priority'">Priority</clr-dg-column>
        <clr-dg-row *clrDgItems="let issue of issues">
            <clr-dg-cell>{{issue.issueNo}}</clr-dg-cell>
            <clr-dg-cell>{{issue.type}}</clr-dg-cell>
            <clr-dg-cell>{{issue.title}}</clr-dg-cell>
            <clr-dg-cell>{{issue.description}}</clr-dg-cell>
            <clr-dg-cell>
                <span class="label" [class.label-danger]="issue.priority === 'high'">{{issue.priority}}</span>
            </clr-dg-cell>
        </clr-dg-row>
        <clr-dg-footer>{{issues.length}} issues</clr-dg-footer>
    </clr-datagrid>
</ng-container>
```

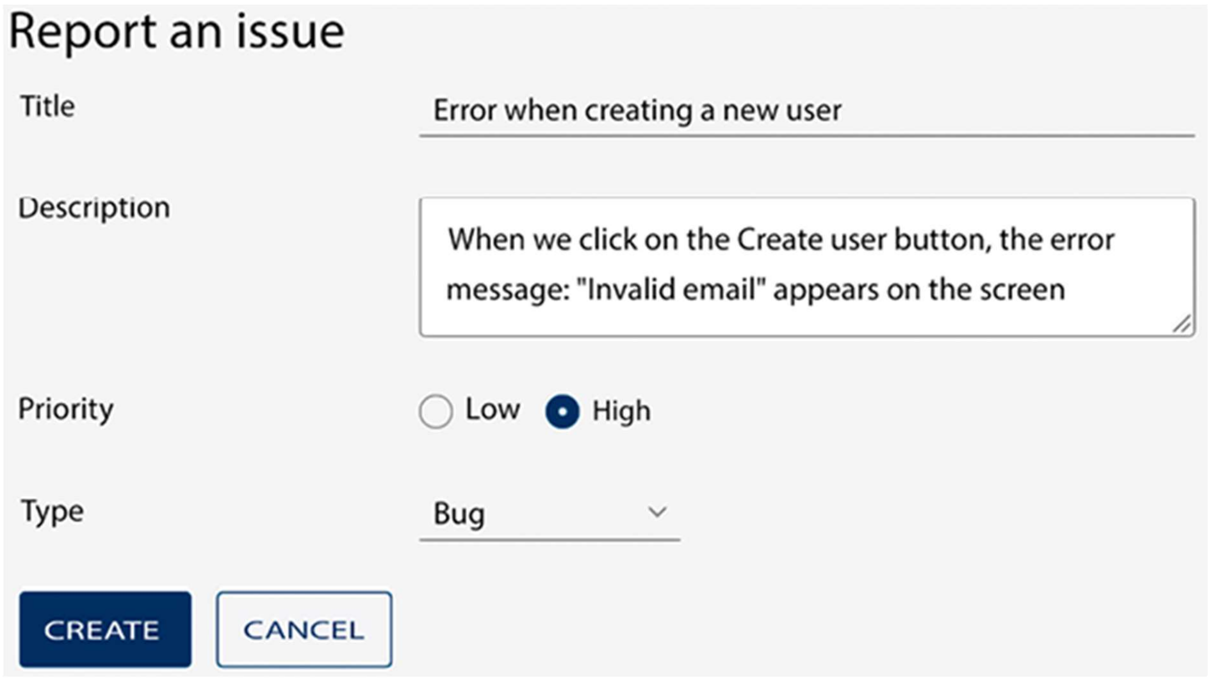
The `<ng-container>` element is an Angular component not rendered on the screen and used to group HTML elements.

5. Add the `<app-issue-report>` component at the end of the template and use the `*ngIf` directive to display it when the `showReportIssue` property is true. Also bind its `formClose` event to the `onCloseReport` component method:

```
<app-issue-report *ngIf="showReportIssue === true" (formClose)="onCloseReport()"></app-issue-report>
```

We have successfully connected all the dots and completed the interaction between the report issue form and the table that displays issues. Now it is time to put them into action:

1. Run the Angular application using `ng serve`.
2. Click on the **ADD NEW ISSUE** button and enter the details of a new issue:

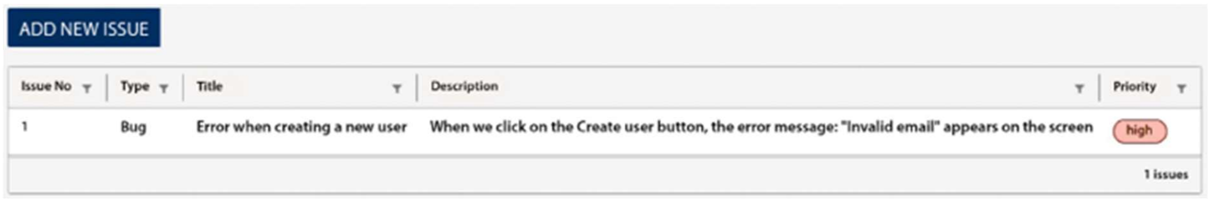


Report an issue

Title	Error when creating a new user
Description	When we click on the Create user button, the error message: "Invalid email" appears on the screen
Priority	Low [✓ High]
Type	Bug

Figure 3.3 – Report issue form

3. Click on the **CREATE** button, and the new issue should appear in the table:



Issue No	Type	Title	Description	Priority
1	Bug	Error when creating a new user	When we click on the Create user button, the error message: "Invalid email" appears on the screen	high

1 issues

Figure 3.4 – Pending issues

4. Repeat steps 2 and 3 without filling in any details, and you will notice an empty issue added to the table.

An empty issue can be created because we have not defined any required fields on our report issue form. In the following section, we will learn how to accomplish this task and add validations to our form to avoid unexpected behaviors.

Validating the details of an issue

When we create an issue with the report issue form, we can leave the form control value empty since we have not added any validation rules yet. To add validations in a form control, we use the `Validators` class from the `@angular/forms` npm package. A validator is added in each form control instance when we build the form. In this case, we will use the **required** validator to indicate that a form control is required to have a value:

1. Open the `issue-report.component.ts` file and import `Validators` from the `@angular/forms` npm package:

```
import { FormControl, FormGroup, Validators } from '@angular/forms';
```

3. Set the `Validators.required` static property in all controls except the `description` of the issue:

```
issueForm = new FormGroup<IssueForm>({
  title: new FormControl('', { nonNullable: true, validators: Validators.required }),
  description: new FormControl('', { nonNullable: true }),
  priority: new FormControl('', { nonNullable: true, validators: Validators.required }),
  type: new FormControl('', { nonNullable: true, validators: Validators.required })
});
```

   We can use various validators for a form control, such as **min**, **max**, and **email**. If we want to set multiple validators in a form control, we add them inside an array.

3. When we use validators in a form, we need to provide a visual indication to the user of the form. Open the `issue-report.component.html` file and add a `<clr-control-error>` component for each required form control:

```
<clr-input-container>
    <label>Title</label>
    <input clrInput formControlName="title" />
    <clr-control-error>Title is required</clr-control-error>
</clr-input-container>
<clr-textarea-container>
    <label>Description</label>
    <textarea clrTextarea formControlName="description"></textarea>
</clr-textarea-container>
<clr-radio-container clrInline>
    <label>Priority</label>
    <clr-radio-wrapper>
      <input type="radio" value="low" clrRadio formControlName="priority" />
      <label>Low</label>
    </clr-radio-wrapper>
    <clr-radio-wrapper>
      <input type="radio" value="high" clrRadio formControlName="priority" />
      <label>High</label>
    </clr-radio-wrapper>
    <clr-control-error>Priority is required</clr-control-error>
</clr-radio-container>
<clr-select-container>
    <label>Type</label>
    <select clrSelect formControlName="type">
      <option value="Feature">Feature</option>
      <option value="Bug">Bug</option>
      <option value="Documentation">Documentation</option>
    </select>
    <clr-control-error>Type is required</clr-control-error>
</clr-select-container>
```

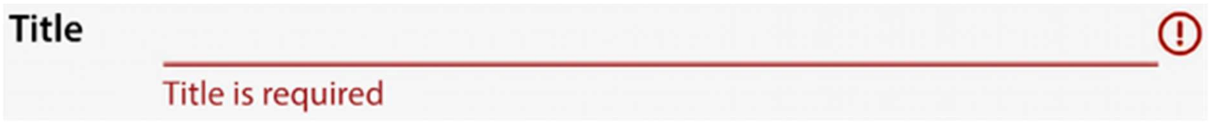
The `<clr-control-error>` Clarity component provides validation messages in forms. It is displayed when we touch an invalid control. A control is invalid when at least one of its validation rules is violated.

4. The user may only sometimes touch form controls to see the validation message. So, we need to consider that upon form submission and act accordingly. To overcome this case, we will mark all form controls as touched when the form is submitted:

```
addIssue() {
  if (this.issueForm && this.issueForm.invalid) {
    this.issueForm.markAllAsTouched();
    return;
  }
  this.issueService.createIssue(this.issueForm.getRawValue() as Issue);
  this.formClose.emit();
}
```

In the preceding snippet, we use the `markAllAsTouched` method of the `issueForm` property to mark all controls as touched when the form is invalid. Marking controls as touched makes validation messages appear automatically. Additionally, we use a `return` statement to prevent the creation of the issue when the form is invalid.

5. Run `ng serve` to start the application. Click inside the **Title** input, and then move the focus out of the form control:

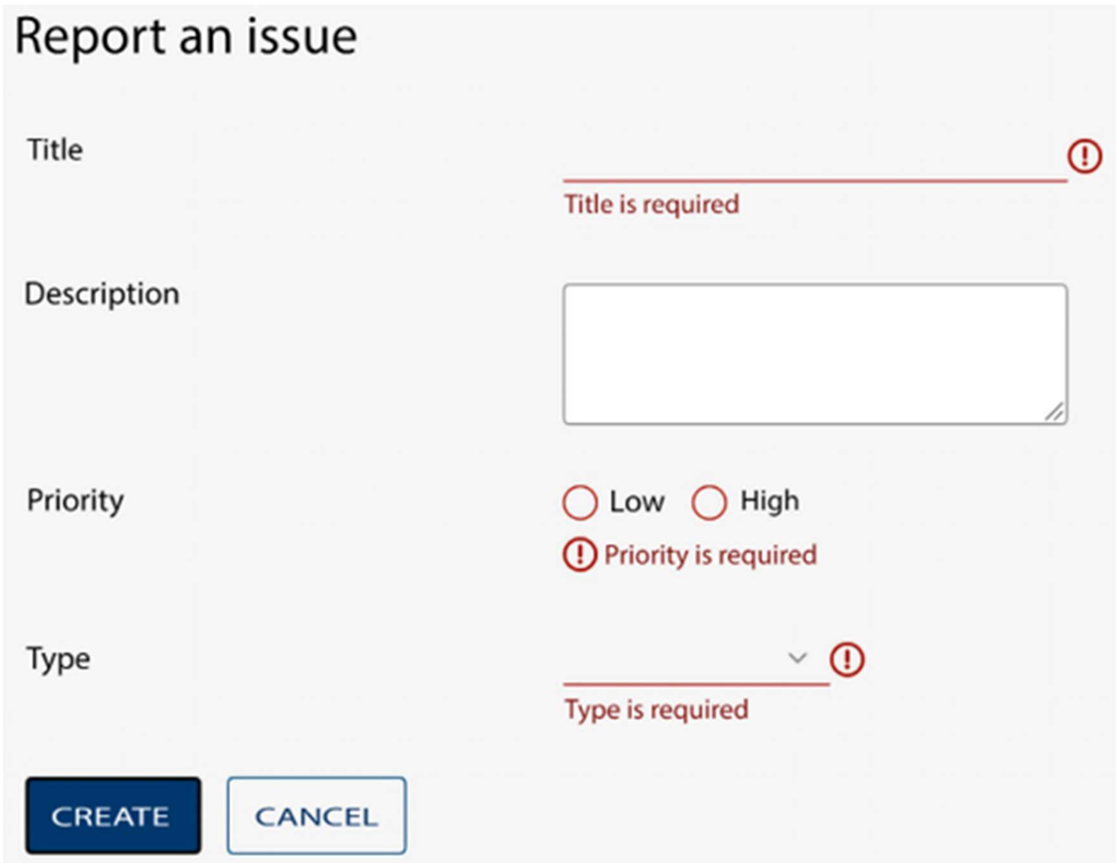


Title is required

Figure 3.5 – Title validation message

A message should appear underneath the **Title** input stating that we have not entered any value yet. Validation messages in the Clarity library are indicated by text and an exclamation icon in red in the form control that is validated.

6. Now, click on the **CREATE** button:



Report an issue

Title

Title is required

Description

Priority

Low High

Priority is required

Type

Type is required

CREATE CANCEL

Figure 3.6 – Form validation messages

All validation messages will appear on the screen at once, and the form will not be submitted. Validations in reactive forms ensure a smooth UX for our Angular applications. In the following section, we will learn how to create a modal dialog with Clarity and use it to resolve issues from our list.

Resolving an issue

The main idea behind having an issue tracking system is that an issue should be resolved at some point. We will create a user workflow in our application to accomplish such a task. We will be able to resolve an issue directly from the list of pending issues. The application will ask for confirmation from the user before resolving with the use of a modal dialog:

1. Create an Angular component to host the dialog:

```
ng generate component confirm-dialog
```

3. Open the `confirm-dialog.component.ts` file and modify it as follows:

```
import { Component, EventEmitter, Input, Output } from '@angular/core';
@Component({
  selector: 'app-confirm-dialog',
  templateUrl: './confirm-dialog.component.html',
  styleUrls: ['./confirm-dialog.component.css']
})
export class ConfirmDialogComponent {
  @Input() issueNo: number | null = null;
  @Output() confirm = new EventEmitter<boolean>();
}
```

We use the `@Input()` decorator to get the issue number and display it on the component template. The `confirm` event will emit a `boolean` value to indicate whether the user confirmed resolving the issue or not.

3. Create two methods that will call the `emit` method of the `confirm` output property, either with `true` or `false`:

```
agree() {
  this.confirm.emit(true);
  this.issueNo = null;
}
disagree() {
  this.confirm.emit(false);
  this.issueNo = null;
}
```

Both methods will set the `issueNo` property to `null` because that property will also control whether the modal dialog is opened. So, we want to close the dialog in both cases.

We have set up the TypeScript class of our dialog component. Let's wire it up now with its template. Open the `confirm-dialog.component.html` file and replace its content with the following:

```
<clr-modal [clrModalOpen]="issueNo !== null" [clrModalClosable]="false">
    <h3 class="modal-title">
      Resolve Issue #
      {{issueNo}}
    </h3>
    <div class="modal-body">
      <p>Are you sure you want to close the issue?</p>
    </div>
    <div class="modal-footer">
      <button type="button" class="btn btn-outline"
(click)="disagree()">Cancel</button>
      <button type="button" class="btn btn-danger" (click)="agree()">Yes,
continue</button>
    </div>
</clr-modal>
```

A Clarity modal dialog consists of a `<clr-modal>` component and a collection of HTML elements with specific classes:

- `modal-title`: The dialog title that displays the current issue number.
- `modal-body`: The main content of the dialog.
- `modal-footer`: The footer of the dialog that is commonly used to add actions for that dialog. We currently add two HTML `<button>` elements and bind their `click` event to the `agree` and `disagree` component methods, respectively.

Whether it is opened or closed, the current status of the dialog is indicated by the `clrModalOpen` directive bound to the `issueNo` input property. When that property is null, the dialog is closed. The `clrModalClosable` directive indicates

that the dialog cannot be closed by any means other than programmatically through the `issueNo` property.
According to our specs, we want the user to resolve an issue directly from the list. Let's find out how we can integrate the dialog that we created with the list of pending issues:

1. Open the `issues.service.ts` file and add a new method to set the `completed` property of an issue:

   ```
   completeIssue(issue: Issue) {
     const selectedIssue: Issue = {
       ...issue,
       completed: new Date()
     };
     const index = this.issues.findIndex(i => i === issue);
     this.issues[index] = selectedIssue;
   }
   ```

   The previous method first creates a clone of the issue we want to resolve and sets its `completed` property to the current date. It then finds the initial issue in the `issues` array and replaces it with the cloned instance.
2. Open the `issue-list.component.ts` file and add a `selectedIssue` property and an `onConfirm` method in the TypeScript class:

   ```
   selectedIssue: Issue | null = null;
   onConfirm(confirmed: boolean) {
     if (confirmed && this.selectedIssue) {
       this.issueService.completeIssue(this.selectedIssue);
       this.getIssues();
     }
     this.selectedIssue = null;
   }
   ```

   The `onConfirm` method calls the `completeIssue` method of the `issueService` property only when the `confirmed` parameter is true. In this case, it also calls the `getIssues` method to refresh the table data. The `selectedIssue` property holds the `Issue` object that we want to resolve, and it is reset whenever the `onConfirm` method is called.
3. Open the `issue-list.component.html` file and add an action overflow component inside the `<clr-dg-row>` component:

   ```
   <clr-dg-row *clrDgItems="let issue of issues">
       <clr-dg-action-overflow>
           <button class="action-item" (click)="selectedIssue = issue">Resolve</button>
       </clr-dg-action-overflow>
       <clr-dg-cell>{{issue.issueNo}}</clr-dg-cell>
       <clr-dg-cell>{{issue.type}}</clr-dg-cell>
       <clr-dg-cell>{{issue.title}}</clr-dg-cell>
       <clr-dg-cell>{{issue.description}}</clr-dg-cell>
       <clr-dg-cell>
           <span class="label" [class.label-danger]="issue.priority === 'high'">{{issue.priority}}</span>
       </clr-dg-cell>
   </clr-dg-row>
   ```

The `<clr-dg-action-overflow>` Clarity component adds a drop-down menu in each table row. The menu contains a single button to set the `selectedIssue` property to the current issue when clicked.

4. Finally, add the `<app-confirm-dialog>` component at the end of the template:

```
5. <app-confirm-dialog *ngIf="selectedIssue"
   [issueNo]="selectedIssue.issueNo" (confirm)="onConfirm($event)"></app-
   confirm-dialog>
```

We pass the `issueNo` property of `selectedIssue` to the input binding of the dialog component.
We also bind the `onConfirm` component method to the `confirm` event so that we can be notified when the user either agrees or not.
The `$event` parameter is a reserved keyword in Angular and contains the event binding result, which depends on the HTML element type. In this case, it includes the `boolean` result of the confirmation.

We have put all the pieces into place to resolve an issue. Let's give it a try:

1. Run `ng serve` and open the application at `http://localhost:4200`.
2. If you don't have any issues, use the **ADD NEW ISSUE** button to create one.
3. Click on the action menu of one row and select **Resolve**. The menu is the three vertical dots icon next to the **Issue No** column:

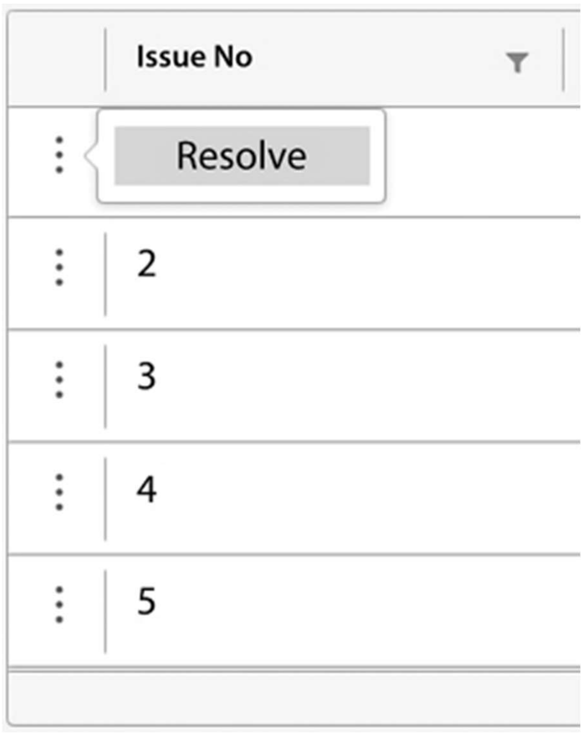
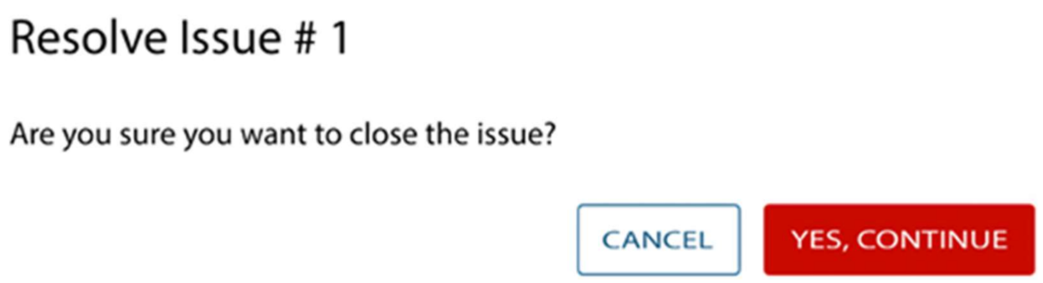


Figure 3.7 – Action menu

4. In the dialog that appears, click on the **YES, CONTINUE** button:


Resolve Issue # 1

Are you sure you want to close the issue?

Figure 3.8 – Resolve Issue dialog

After clicking the button, the dialog will close, and the issue should no longer be visible on the list.

We have provided a way for users of our application to resolve issues. Our issue-tracking system is now complete and ready to put into action! Sometimes, users are in a hurry and may report an issue already reported. In the following section, we will learn how to leverage advanced reactive form techniques to help them in this case.

Turning on suggestions for new issues

The reactive forms API contains a mechanism for getting notified when the value of a particular form control changes. We will use it in our application to find related issues when reporting a new one. More specifically, we will display a list of suggested issues when the user starts typing in the title form control:

1. Open the `issues.service.ts` file and add the following method:

```
getSuggestions(title: string): Issue[] {
  if (title.length > 3) {
    return this.issues.filter(issue =>
      issue.title.indexOf(title) !== -1);
  }
  return [];
}
```

   The preceding method takes the title of an issue as a parameter and searches for any issues that contain the same title. The search mechanism is triggered when the `title` parameter is more than three characters long to limit results to a reasonable amount.

2. Open the `issue-report.component.ts` file and import the `OnInit` artifact from the `@angular/core` npm package:

```
import { Component, EventEmitter, OnInit, Output } from '@angular/core';
```

4. Create a new component property to hold the suggested issues:

```
suggestions: Issue[]= [];
```

6. Add the `OnInit` interface to the list of implemented interfaces of the `IssueReportComponent` class:

```
export class IssueReportComponent implements OnInit {
```

8. The `controls` property of a `FormGroup` object contains all form controls as a key-value pair. The key is the name of the control, and the value is the actual form control object. We can get notified about changes in the value of a form control by accessing its name, in this case, `title`, in the following way:

```
ngOnInit(): void {
  this.issueForm.controls.title.valueChanges.subscribe(title => {
    this.suggestions = this.issueService.getSuggestions(title);
  });
}
```

   Each control exposes a `valueChanges` observable that we can subscribe to and get a continuous stream of values. The `valueChanges` observable emits new values as soon as the user starts typing in the `title` control of the form. When that happens, we set the result of the `getSuggestions` method in the `suggestions` component property.

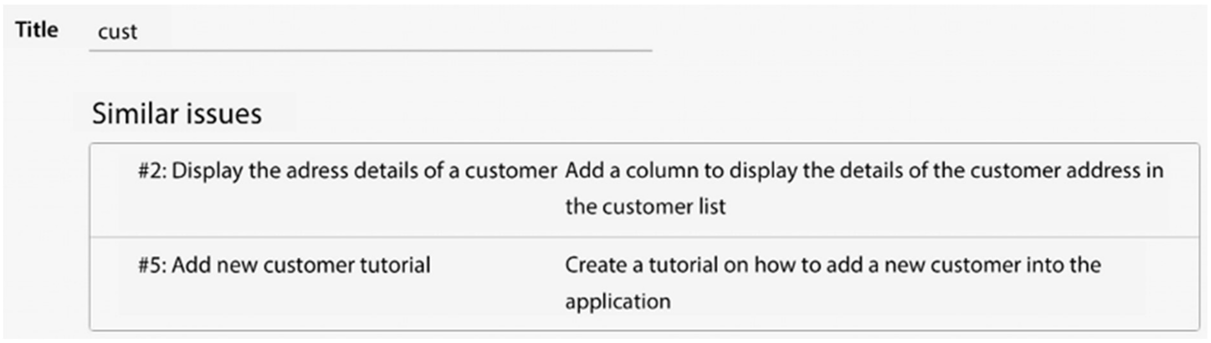
6. To display the suggested issues on the template of the component, open the `issue-report.component.html` file and add the following HTML code right after the `<clr-input-container>` element:

```
<div class="clr-row" *ngIf="suggestions.length">
    <div class="clr-col-lg-2"></div>
    <div class="clr-col-lg-6">
      <clr-stack-view>
        <clr-stack-header>Similar issues</clr-stack-header>
        <clr-stack-block *ngFor="let issue of suggestions">
            <clr-stack-label>#{{issue.issueNo}}:{{issue.title}}</clr-stack-label>
            <clr-stack-content>{{issue.description}}</clr-stack-content>
        </clr-stack-block>
      </clr-stack-view>
    </div>
</div>
```

   We use the `<clr-stack-view>` component from the Clarity library to display suggested issues in a key-value pair representation. The key is indicated by the `<clr-stack-header>` component and displays the title and the number of the issue. The `<clr-stack-content>` component indicates the value and displays the issue description.

We display similar issues only when there are any available suggested ones.

Run `ng serve` and open the report issue form to create a new issue. When you start typing in the **Title** input, the application will suggest any issues related to the one that you are trying to create:


Title cust

Similar issues

#2: Display the adress details of a customer	Add a column to display the details of the customer address in the customer list
#5: Add new customer tutorial	Create a tutorial on how to add a new customer into the application

Figure 3.9 – Similar issues

The user will now see if there are any similar issues and avoid reporting a duplicate issue.

Summary

In this chapter, we built an Angular application for managing and tracking issues using reactive forms and Clarity Design System.

First, we installed Clarity in an Angular application and used a data grid component to display a list of pending issues. Then, we introduced reactive forms and used them to build a form for reporting a new issue. We added validations in the form to give our users a visual indication of the required fields and guard against unwanted behavior.

An issue-tracking system is only efficient if our users can resolve them. We built a modal dialog using Clarity to resolve a selected issue. Finally, we improved the UX of our application by suggesting related issues when reporting a new one.

In the next chapter, we will build a progressive web application for the weather using the Angular service worker.

Exercise

Create an Angular component to edit the details of an existing issue. The component should display the issue number and allow the user to change the title, description, and priority. The title and the description should be required fields.

The user should be able to access the previous component using the action menu in the list of pending issues. Add a new action menu button to open the edit issue form.

After the user has completed updating an issue, the form should be closed, and the list of pending issues should be refreshed.

You can find the solution to the exercise in the `Chapter03` folder of the `exercise` branch at `https://github.com/PacktPublishing/Angular-Projects-Third-Edition/tree/exercise`.

Further reading

- Angular forms: `https://angular.io/guide/forms-overview`
- Reactive forms: `https://angular.io/guide/reactive-forms`
- Validating reactive forms: `https://angular.io/guide/form-validation#validating-input-in-reactive-forms`
- Passing data to a component: `https://angular.io/guide/component-interaction#pass-data-from-parent-to-child-with-input-binding`
- Getting data from a component: `https://angular.io/guide/component-interaction#parent-listens-for-child-event`
- Getting started with Clarity: `https://clarity.design/documentation/get-started`