



Unit Testing with Jasmine and Karma

Jasmine is a testing framework for writing unit tests, and **Karma** is a test runner that executes them in real browsers.

Used For:

- Testing individual components, services, pipes, etc.
- Fast feedback on logic correctness.

Example (Component):

```
describe('MyComponent', () => {  
  let component: MyComponent;  
  let fixture: ComponentFixture<MyComponent>;  
  
  beforeEach(() => {  
    TestBed.configureTestingModule({  
      declarations: [MyComponent]  
    });  
    fixture = TestBed.createComponent(MyComponent);  
    component = fixture.componentInstance;  
  });  
  
  it('should create the component', () => {
```

```
    expect(component).toBeTruthy();  
  });  
});
```

Example (Service):

```
describe('MyService', () => {  
  let service: MyService;  
  
  beforeEach(() => {  
    TestBed.configureTestingModule({});  
    service = TestBed.inject(MyService);  
  });  
  
  it('should return expected value', () => {  
    expect(service.getValue()).toBe('expected');  
  });  
});
```

Component and Service Testing

This falls under **unit** or **integration testing** depending on whether dependencies are mocked.

- **Component Testing:** Validates UI logic, bindings, event handling.
- **Service Testing:** Tests business logic, API calls, or data manipulation.

Tools:

- **Jasmine for specs**
 - **Karma to run in browser**
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End-to-End (E2E) Testing

E2E testing simulates real user behavior across the entire application. In Angular, this is commonly done using **Protractor (older)** or **Cypress (modern alternative)**.

Used For:

- Testing UI navigation, user flows, form submission, etc.
- Verifying app behavior in a real browser.

Cypress Example:

```
describe('Login Flow', () => {  
  it('should log in the user', () => {  
    cy.visit('/login');  
    cy.get('input[name=username]').type('user');  
    cy.get('input[name=password]').type('pass');  
    cy.get('button[type=submit]').click();  
    cy.url().should('include', '/dashboard');  
  });  
});
```

Summary Table

Type	Tools	Scope	Purpose
Unit Testing	Jasmine + Karma	Isolated Units	Test individual logic units
Component Test	Jasmine + Karma	UI Components	Test DOM updates, bindings
Service Test	Jasmine + Karma	Logic/Services	Test business logic, APIs
E2E Testing	Cypress / Protractor	Full App	Test user journeys & behavior
