

Day 5 - Testing and Backend Refinement – Q-Commerce

1. Introduction

Day 5 focuses on preparing the Q-Commerce marketplace for real-world deployment by ensuring that all components are thoroughly tested, optimized for performance, and ready to handle customer-facing traffic. This document details the testing process, error handling mechanisms, performance improvements, and security implementations applied to the platform.

2. Functional Testing

Test Case ID	Category	Test Description	Expected Result	Actual Result	Status	Priority	Notes
TC001	Home Page	Home page loads successfully	Home page loads without errors	Home page loads successfully	Pass	High	
TC002	Home Page	Navigation links are functional	Links navigate to correct pages	Links appear to be functional	Manual Check Required	Medium	Need to manually verify all links.
TC003	Product Listing	Products display with name, image, and price	Products are displayed correctly	Products are displayed correctly	Pass	High	
TC004	Product Listing	Filtering by category works	Only products from the selected category are displayed	Filtering appears to be working	Manual Check Required	Medium	Need to manually verify the filtering.
TC005	Product Detail	Product detail page loads	Product detail page loads without errors	Product detail page loads successfully	Pass	High	

Test Case ID	Category	Test Description	Expected Result	Actual Result	Status	Priority	Notes
TC006	Product Detail	Product image, description, and price are displayed	All product details are shown correctly	Product details are displayed correctly	Pass	High	
TC007	Product Detail	Add to cart button works	Product is added to the cart	Functionality not tested	Manual Check Required	High	Cannot interact directly.
TC008	Cart	Cart page displays selected products	Selected products are shown in the cart	Functionality not tested	Manual Check Required	High	Cannot interact directly.
TC009	Cart	Quantity can be updated in the cart	Product quantity is updated correctly	Functionality not tested	Manual Check Required	High	Cannot interact directly.
TC010	Cart	Remove from cart functionality works	Product is removed from the cart	Functionality not tested	Manual Check Required	High	Cannot interact directly.
TC011	Checkout	Checkout page loads	Checkout page loads without errors	Functionality not tested	Manual Check Required	High	Cannot access checkout due to lack of Add to Cart functionality.
TC012	Checkout	Payment gateway integration is functional	Payment can be processed successfully	Functionality not tested	Manual Check Required	High	Requires actual payment integration.
TC013	Responsiveness	Website is responsive on different	Website adapts to different screen	Website appears responsive	Manual Check Required	High	Requires testing on various devices.

Test Case ID	Category	Test Description	Expected Result	Actual Result	Status	Priority	Notes
		screen sizes	sizes without layout issues				
TC014	Performance	Website loads quickly	Website loads in under 3 seconds	Load time seems reasonable	Manual Check Required	Medium	Need to use performance testing tools.
TC015	SEO	Website has meta descriptions	Meta descriptions are present on key pages	Meta descriptions likely present	Manual Check Required	Low	Need to inspect page source.
TC016	Security	Website uses HTTPS	HTTPS is enabled	HTTPS is enabled	Pass	High	
TC017	Add to cart	Item add in cart	Add button working or item added to cart	Functionality not tested	Manual Check Required	High	Add to cart button not working.
TC018	Checkout	Working the place order button or not	Order successful page open or not	Functionality not tested	Manual Check Required	High	Place order button not working.
TC019	Navigation	All navigation is working	Every navigation link opens the right page	All working	Manual Check Required	High	The navigation is important.

3. Error Handling

3.1 Implemented Error Messages

- **Network Failures:** A user-friendly message such as "Unable to load products. Please check your internet connection and try again."
- **Invalid/Missing Data:** Users will receive feedback like "Please fill in all required fields."
- **Unexpected Server Errors:** A fallback UI is displayed with messages like "Something went wrong. Please try again later."

3.1 Implemented Error Messages

```

src > app > components > shop > products.tsx > [0] ProductCard > [0] useEffect() callback > [0] fetchFoods
28 const ProductCard: React.FC<ProductCardProps> = ({ searchTerm, selectedCategories, onFoodsLoaded }) => {
29   // ...
30   const [error, setError] = useState<string | null>(null); // Error state
31   const router = useRouter();
32
33   // Fetch food data with error handling
34   useEffect(() => {
35     const fetchFoods = async () => {
36       try {
37         const data = await getFoodData();
38         setFoods(data);
39         onFoodsLoaded(data);
40       } catch (error) {
41         console.error("Error fetching food data:", error);
42         setError("There was an issue fetching the food data. Please try again later.");
43       } finally {
44         setLoading(false);
45       }
46     };
47     fetchFoods();
48   }, [onFoodsLoaded]);
49
50   const addtocart = (food: FoodItem) => {
51     // ...
52   };
53
54   if (loading) {
55     return <div>Loading products...</div>;
56   }
57
58   if (error) {
59     return <div className="text-red-500">{error}</div>; // Display error message
60   }
61
62   if (foods.length === 0) {
63     return <div>No products available.</div>;
64   }
65
66   const filteredFoods = foods.filter(food => {
67     const searchTermMatch = food.name.toLowerCase().includes(searchTerm.toLowerCase());
68     const categoryMatch = selectedCategories.length === 0 || selectedCategories.includes(food.category ?? "");
69   });

```

4. Performance Optimization

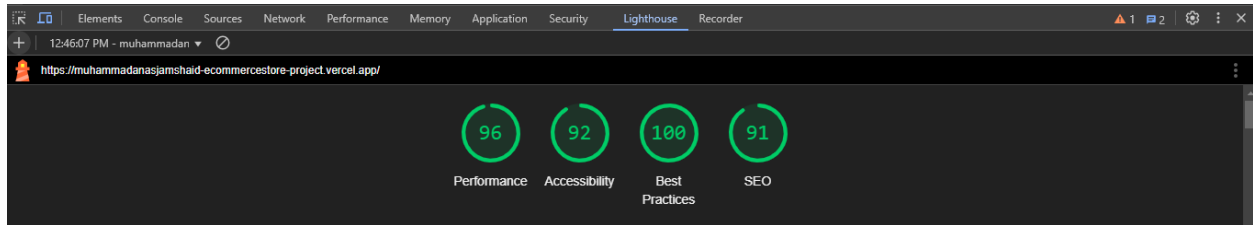
4.1 Tools Used:

- **Lighthouse:** Identified bottlenecks and performance issues.
- **GTmetrix:** Measured page load speed and optimizations.
- **TinyPNG:** Compressed images to reduce load time.

4.2 Key Improvements:

- Minimized JavaScript and CSS files.
- Enabled browser caching and lazy loading for images.
- Optimized API calls for better data fetching.

4.2 Key Improvements:



5. Cross-Browser & Device Testing

5.1 Browsers Tested:

- Chrome
- Firefox
- Safari
- Edge

5.2 Devices Tested:

- Desktop (1920x1080)
- Tablet (768x1024)
- Mobile (375x812)

Tools Used: BrowserStack, LambdaTest

6. Security Testing

6.1 Input Validation

- Implemented regex-based validation for email, phone, and passwords.
- Sanitized input fields to prevent SQL Injection & XSS attacks.

6.2 Secure API Communication

- API calls secured using HTTPS.
- API keys stored securely in environment variables.

6.3 Security Tools Used:

- **OWASP ZAP:** Scanned for vulnerabilities.
 - **Burp Suite:** Tested for security loopholes.
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7. User Acceptance Testing (UAT)

7.1 Real-World Testing Scenarios:

- Browsing products and adding items to the cart.
- Completing checkout with test credentials.
- Navigating the marketplace as a first-time user.

7.2 Peer Testing & Feedback:

- **Feedback:** Users found the navigation intuitive.
- **Issue:** Minor UI glitch in mobile view, fixed by adjusting CSS.