

## **MERN Stack Training**

**Company:** Sensation Software Solutions

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**Training Duration:** 6 Months

**Days:** 92

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### **Objective of the Day**

The objective of **Day 92** was to improve **backend performance** and optimize API responses to handle real-world user traffic efficiently.

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### **API Performance Analysis**

The trainer explained how unnecessary data transfer and heavy database queries slow down applications. Existing APIs were analyzed for:

- Over-fetching of data
  - Unoptimized MongoDB queries
  - Repeated database calls
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### **Optimizing Product APIs**

Product listing APIs were optimized by:

- Selecting only required fields using `.select()`

- Implementing pagination logic
- Reducing payload size for frontend rendering

This improved page load speed significantly.

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## Order & Cart API Improvements

Order APIs were improved to:

- Prevent duplicate orders
- Validate cart items before checkout
- Handle stock availability at backend level

Backend logic was added to ensure **business rule enforcement**, not just frontend validation.

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## Error Handling & Logging

Global error handling middleware was enhanced to:

- Log errors internally
- Return clean, user-friendly error messages
- Avoid exposing sensitive server information

This reflects real production practices.

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## Hands-on Practice

- Load tested APIs with multiple requests
  - Simulated invalid API calls
  - Verified error responses
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## Conclusion

Day 92 strengthened the **backend performance and robustness** of the GadgetShop project, making it suitable for real users and higher traffic loads.