Strategic Software Testing Levels

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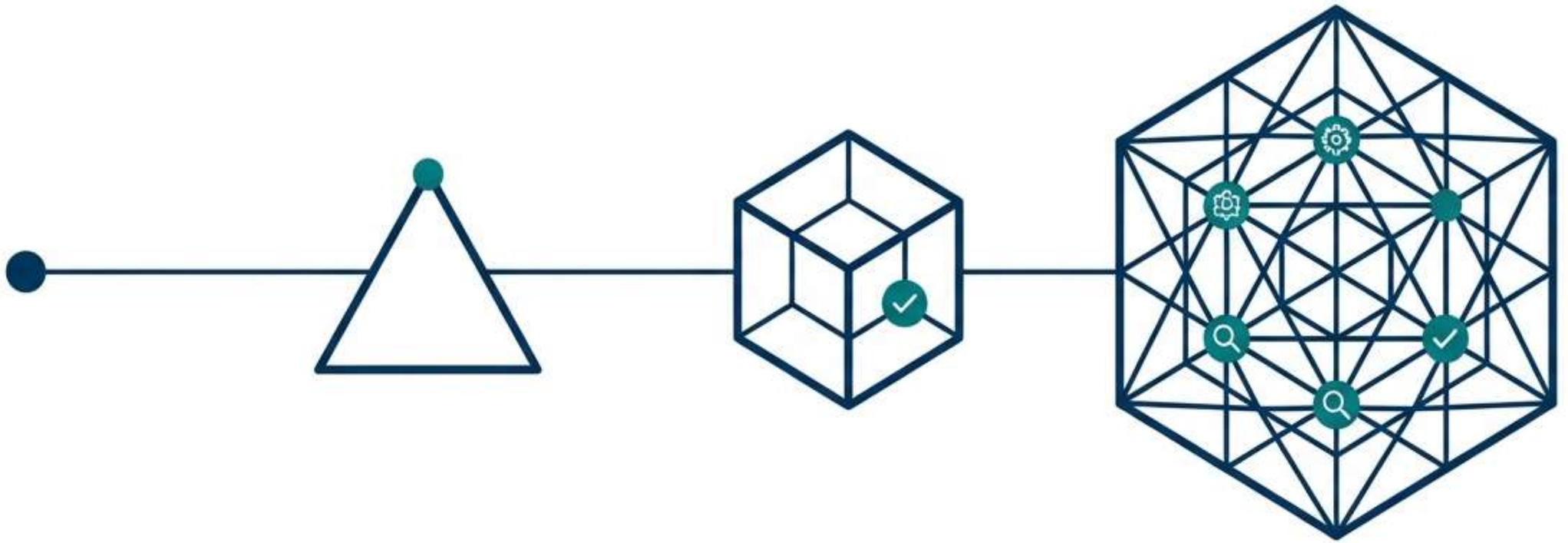
From Unit Verification to User Acceptance



UNIT TESTING → **INTEGRATION TESTING** → **SYSTEM TESTING** → **USER ACCEPTANCE TESTING**

Component Isolation | Interface & Interaction | End-to-End Functionality | Validation against Requirements

The Philosophy of Layered Testing

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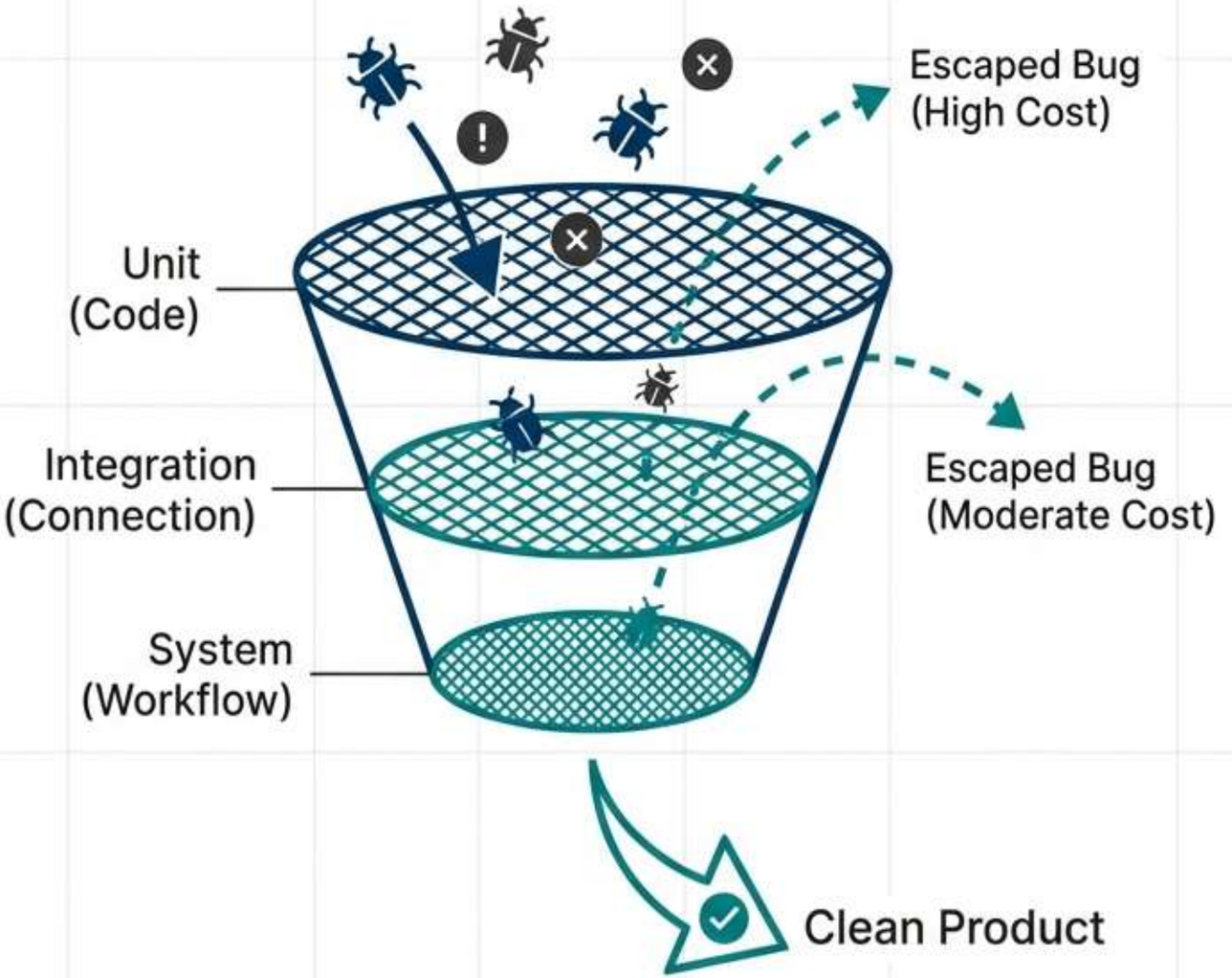
The Cost of Quality: Testing is a progressive filtration process. Identifying bugs during early development saves significant time and budget compared to post-release fixes.



The Four Pillars of Software Testing

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Unit Testing (White Box)

Test individual component

Integration Testing (Grey Box)

Test components work together

System Testing (Black Box)

Test the entire system

Acceptance Testing (User-Centric)

Test the final system

Micro-Level Verification: Unit & Integration

Unit Testing (White Box)

Focus: Smallest testable part of the system.
Owner: Developers.
Benefit: Enables rapid changes and documentation.

Integration Testing (Grey Box)

Focus: Data connectivity between modules.
Owner: Joint effort (Dev + Test).
Goal: Verifying communication.

Macro-Level Validation: System & Acceptance

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System Testing (Black Box)

Scope: Validating fully integrated application against specifications.
Owner: Independent QA Testers.
Goal: End-to-end compliance.

Acceptance Testing (User-Centric)

Scope: Final validation for business needs.
Alpha Phase: Developer environment.
Beta Phase: End-user environment.

Strategic Integration Approaches

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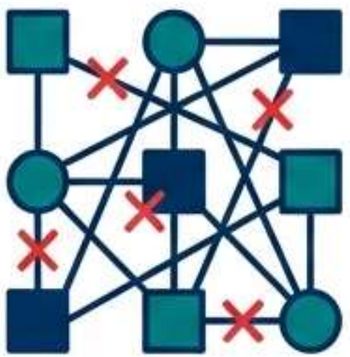
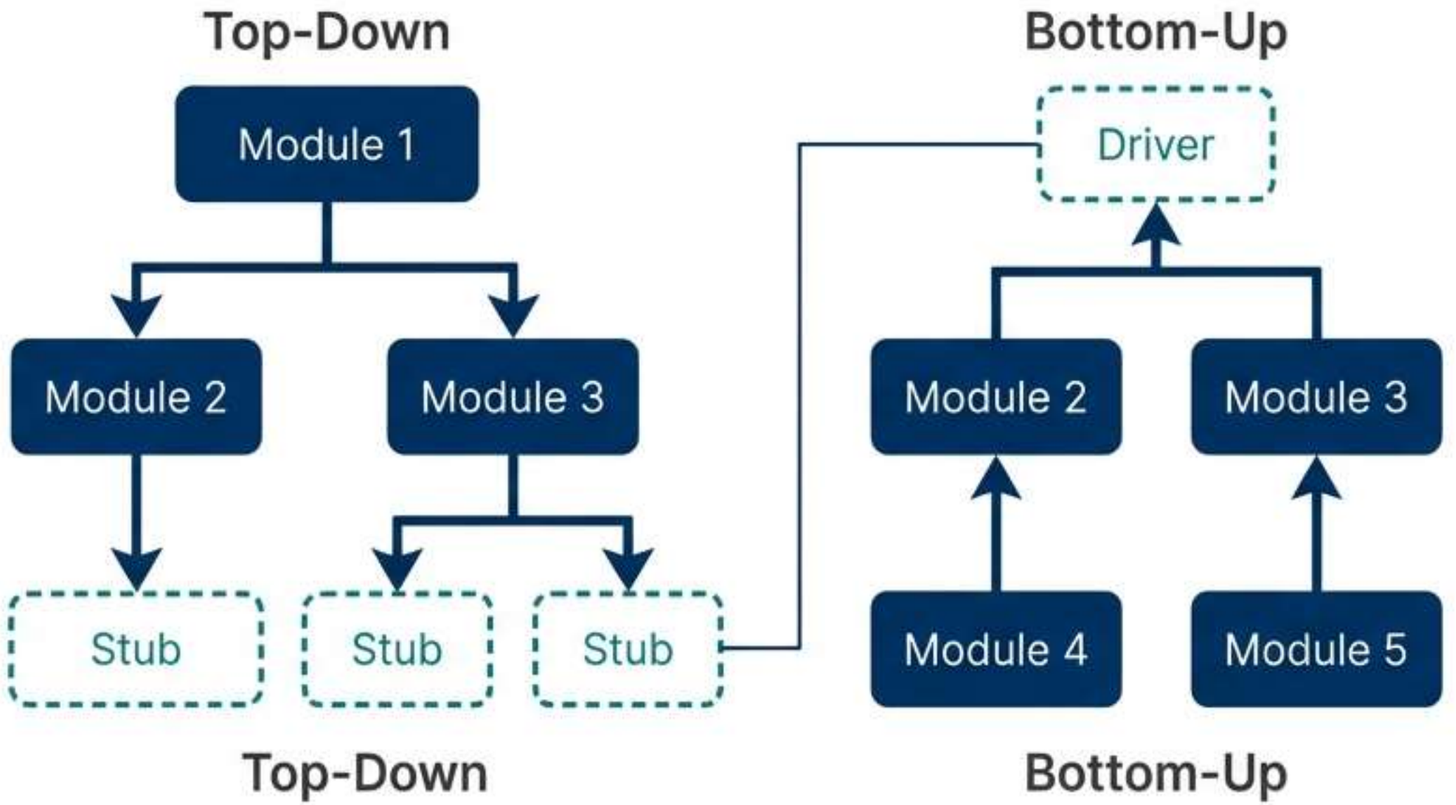
Big Bang Approach

Integrating all modules simultaneousy. High risk, difficult fault localisation.



Incremental Approach

Integrating logically related modules gradually.



Real-World Application: E-Commerce Platform

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Unit

Verify Tax Calculation Function

Integration

Cart sends total to Payment Gateway

System

Full Checkout: Search > Cart > Pay > Email

Acceptance

Beta testers use app during holiday sale

Guidelines for Effective Implementation

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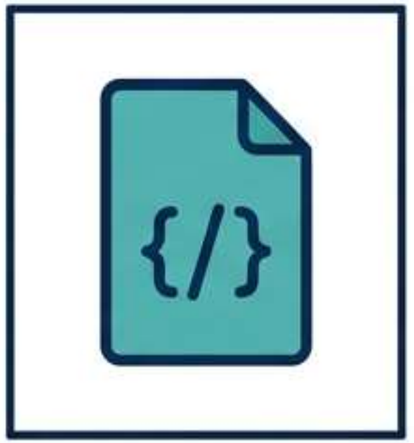
Shift Left Strategy

Prioritise Unit Testing to catch errors when they are cheapest to fix.



Live Documentation

Treat Unit Tests as documentation to aid future developers.

Incremental Integration

Avoid Big Bang testing to ensure easier fault localisation.

Environment Parity

Ensure Acceptance testing mirrors the production environment.

Critical Learning Points

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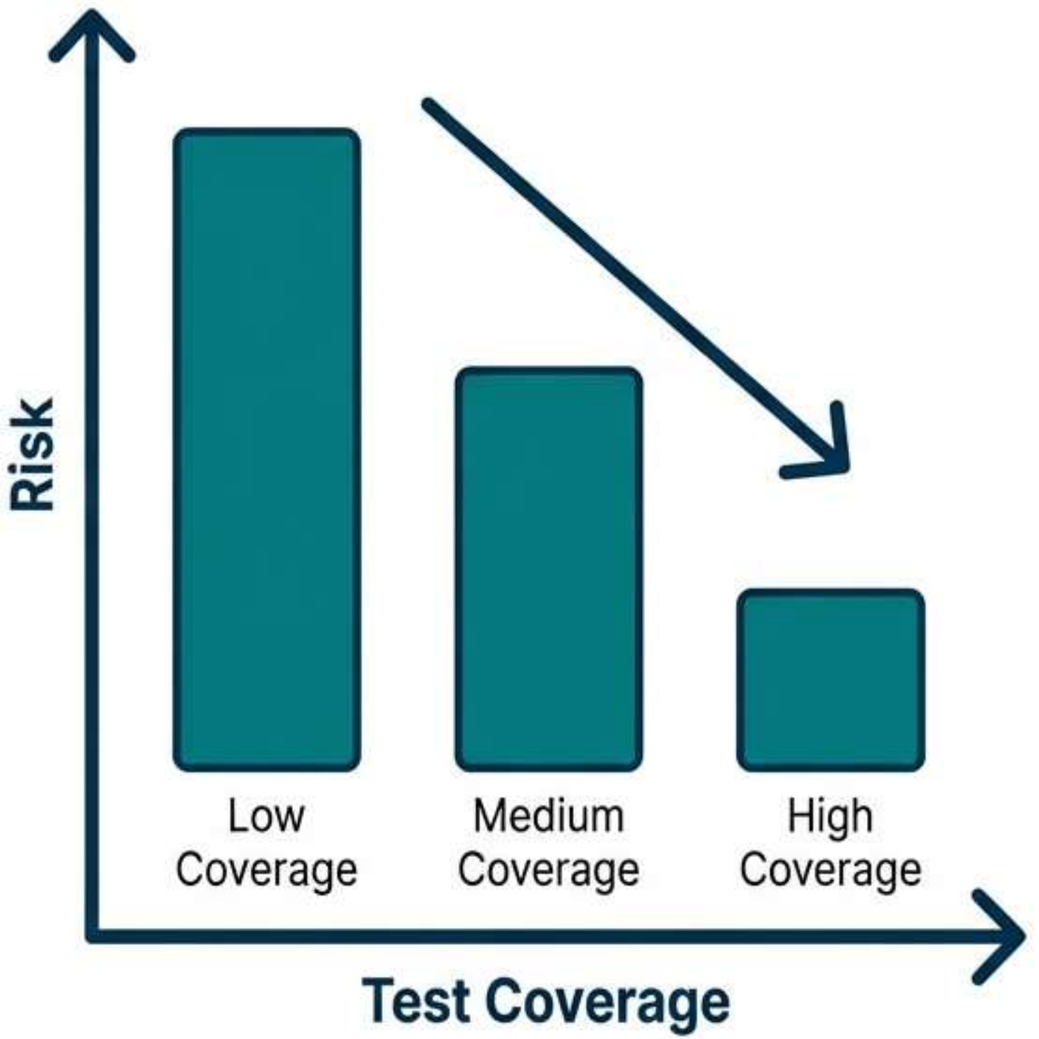
- **Progression**: Testing moves from granular (Unit) to holistic (System).
- **Responsibility**: Ownership transitions from Developers to QA to Users.
- **Strategy**: Incremental integration offers superior control over Big Bang.
- **Value**: Rigorous lower-level testing reduces production risks and costs.



Session Summary

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- We defined Unit, Integration, System, and Acceptance testing.
- We analysed why Incremental Integration is preferred over Big Bang.
- We distinguished between Alpha (Dev) and Beta (User) environments.