

Metrics, Formulas & Examples in Software Testing

1. Introduction to Software Testing Metrics

Metrics help evaluate the effectiveness of the testing process.

- Defect Density = Number of Defects / Size of Code (KLOC)
- Test Coverage = (Number of executed test cases / Total test cases) x 100

Example: If 120 defects found in 30 KLOC, Defect Density = 4 defects/KLOC

2. Performance Metrics

- Response Time = End Time - Start Time
- Throughput = Total Requests / Time
- Error Rate = (Failed Transactions / Total Transactions) x 100

Example: 3000 requests in 60s -> Throughput = 50 req/sec

3. Bug Life Cycle Metrics

- Defect Age = Date Fixed - Date Reported
- MTTD (Mean Time To Detect)
- MTTR (Mean Time To Repair)

Example: Bug reported Jan 1, fixed Jan 4 -> Defect Age = 3 days

4. Agile Metrics

- Velocity = Story points completed per sprint
- Defect Leakage = (Defects in UAT / Total Defects) x 100

Example: 10 UAT defects, 100 total -> Leakage = 10%

5. Security Metrics

- Risk = Likelihood x Impact
- Vulnerability Count and Time to Fix

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Example: SQL injection found with High impact and Medium likelihood -> Risk = High

6. Test Case Metrics

- Test Case Effectiveness = $(\text{Defects Found} / \text{Test Cases Executed}) \times 100$

- Test Execution Rate = $(\text{Executed Test Cases} / \text{Total Test Cases}) \times 100$

Example: 80 executed out of 100 planned -> Rate = 80%

7. CI/CD & Monitoring Metrics

- Build Success Rate = $(\text{Successful Builds} / \text{Total Builds}) \times 100$

- Deployment Frequency and Mean Time to Recovery (MTTR)

Example: 9 successful builds out of 10 -> Success Rate = 90%