

Software Test Process, Techniques and Tools

Test process model: V model

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Following is a sample of techniques and tools for use in software testing. The information given is by no means exhaustive. Each organization needs to carefully evaluate the tools and techniques for use within their software development process. The final decision depends on many factors including level of risk to the customer, tool availability, cost of tools, cost of training needed to use the tools, and the nature of the software (e.g, real time or non-real time). Tools for security testing are not included here.

Verification phases

Process Phase	Testing related tasks	Suggested test generation techniques	Suggested tools
Requirements analysis	Acceptance test design		
System design	System test design	<ul style="list-style-type: none">FSM modeling and test generationCombinatorial test designReal-time system modeling	ModelJunit NModel SmartTestDesigner ACTS AETG UPPAAL
Architecture design	Interface identification		
Module design	Unit test design and execution	<ul style="list-style-type: none">Equivalence partitioningBoundary value analysisCause-effect graphing	ParTeG

Validation phases

Process Phase	Testing related tasks	Suggested test generation techniques	Suggested tools
Coding*			
Unit testing*	Unit test execution and additional test design	<ul style="list-style-type: none"> • Equivalence partitioning • Boundary value analysis • Cause-effect graphing • Code coverage based enhancement • Real-time test design 	JUnit CPPUnit ParTeG
Integration testing	Integration test execution	Interface mutation	Proteum/IM
System testing	System test execution Load testing Stress testing Performance testing Random testing GUI testing Real-time testing	<ul style="list-style-type: none"> • Load identification • Stress point identification • FSM/GUI modeling 	SilkTest2009 Winrunner PerformanceTester LoadTester4 JMeter GUITAR UPPAAL
Acceptance testing	Acceptance test execution		SilkTest2009 Winrunner
Maintenance	Regression testing	Test set minimization	SilkTest2009 Winrunner
Test management	Scheduling, process control, defect tracking, etc		BugZero FogBugz

* These often are combined.