

The Sherpas of Testing Success

Studies of Successful Independent Test Groups



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Advantages of Independence

- ❖ An independent test group offers many advantages to an organization, but also raises questions...
 - ❖ What is an independent test group?
 - ❖ What are the objectives of such a group?
 - ❖ What services does it provide?
 - ❖ How can we organize it?
 - ❖ What strategies does it follow?
 - ❖ What are the key process indicators (KPIs)?
 - ❖ What are the risks?
 - ❖ What is the business case?
- ❖ Let's look for some answers, and examine some case studies...



Independent Test Groups

- ❖ An independent test group...
 - ❖ Is composed of professional testers and test leads
 - ❖ Is managed by a test director or test manager
 - ❖ Reports to a level of management above the project team
 - ❖ Has their own environments and (often) tools
 - ❖ Provides an independent assessment of quality

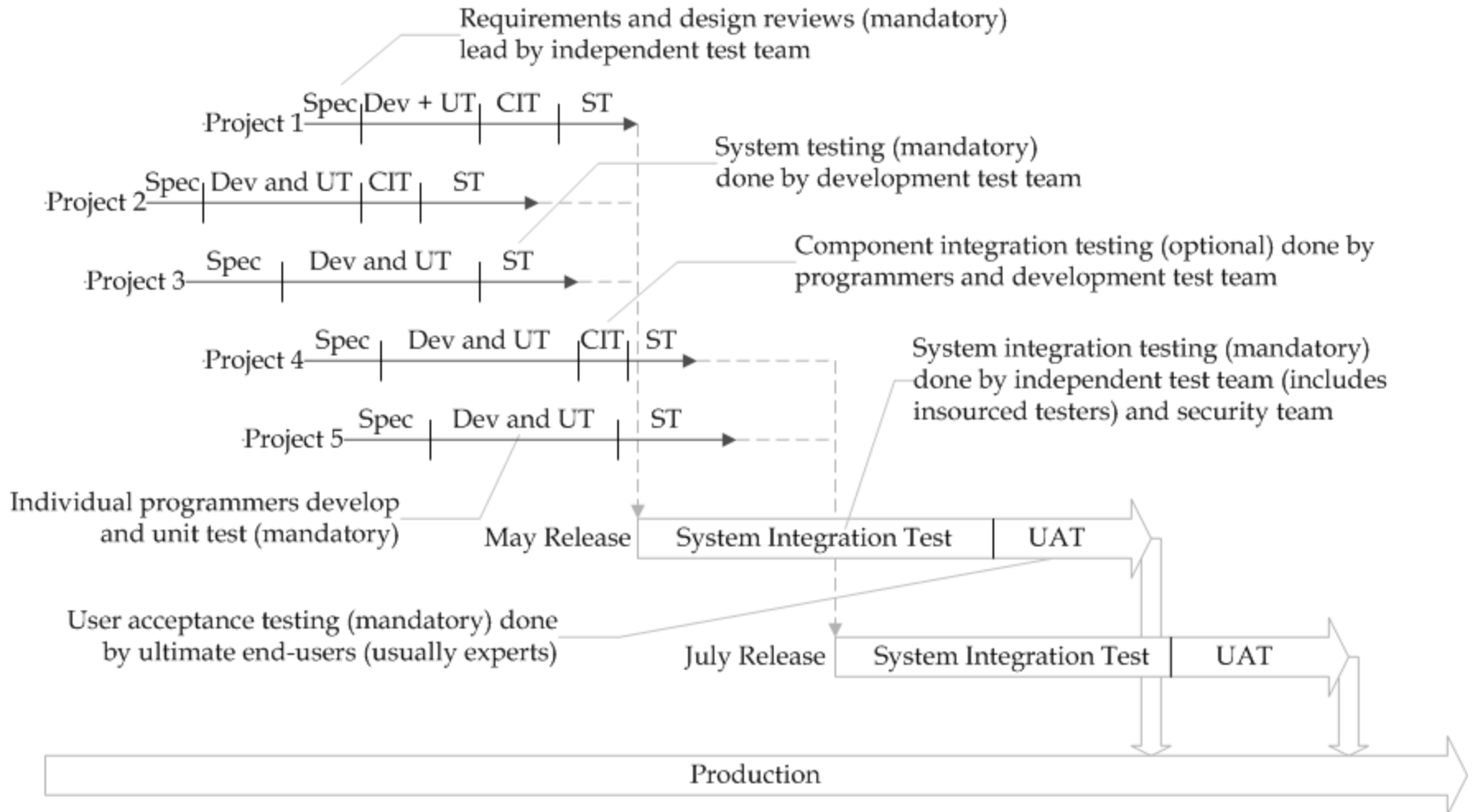


Case Study: Independent Test Group

- ❖ A large banking organization in Australasia has an independent test group
- ❖ This team is very effective and efficient based on specific KPIs (more later)
- ❖ It is responsible for system integration testing
- ❖ It supports other testing and quality assurance functions, as shown on the next slide



Test Levels and Independence





Test Group Objectives

- ❖ Find defects, especially important defects
- ❖ Build confidence in the system
- ❖ Reduce quality risk to an acceptable level, including regression risk
- ❖ Provide unbiased information about quality and completeness of testing



Case Study: Objectives

Test Level	Owner	Objectives
Unit	Development	<ul style="list-style-type: none">•Early detection of bugs in code units•Reduce risk of unit failures in production•Unit testing run before CIT•Unit tests results documented in the feature turnover
CIT (Comp Int Test)	Development	<ul style="list-style-type: none">•Early detection of bugs in unit interfaces•Reduce risk of dataflow and workflow failures in production•Ensure development ownership for delivering quality features
CIT System/SIT	QA	<ul style="list-style-type: none">•Early QA validation of completed features
	QA	<ul style="list-style-type: none">•Detect bugs, reduce risk, build confidence in use cases and end-to-end scenarios•Detect bugs, reduce risk, build confidence in user workflows
Beta	Customer	<ul style="list-style-type: none">•Detect bugs related to customer deployment•Reduce risk of failing customer business requirements•Demonstrate readiness for deployment

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Services from Test Groups

- ❖ Test groups provide services to stakeholders
 - ❖ Technical stakeholders: programmers, development managers, database administrators, network architects, system architects, technical support
 - ❖ Business stakeholders: marketing personnel, business analysts, project and product managers, users and customers
- ❖ The specific services depend on the needs of the stakeholders



Case Study: Services

- ❖ Australasian test group services:
 - ❖ Lead requirements reviews
 - ❖ Support system testing
 - ❖ Perform system integration testing
 - ❖ Support test lab
 - ❖ Support user acceptance testing
 - ❖ Develop and support automated tests
- ❖ They regularly survey stakeholders on the quality of their services



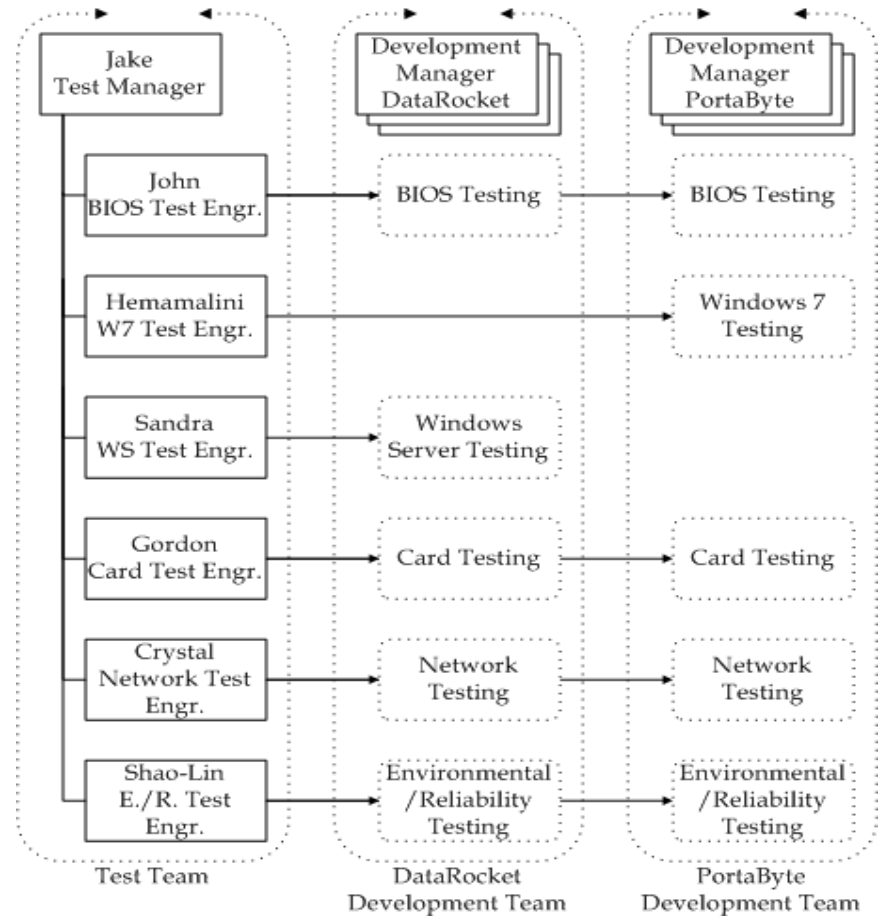
Organizational Options

- ❖ The test group assigns testers and possibly test leads to work on projects
- ❖ Assignment can be based on skills or availability (next slides)
- ❖ Assignment can be long term or as needed
- ❖ For Agile projects, the assignment is a form of matrix management



Specialized Teams

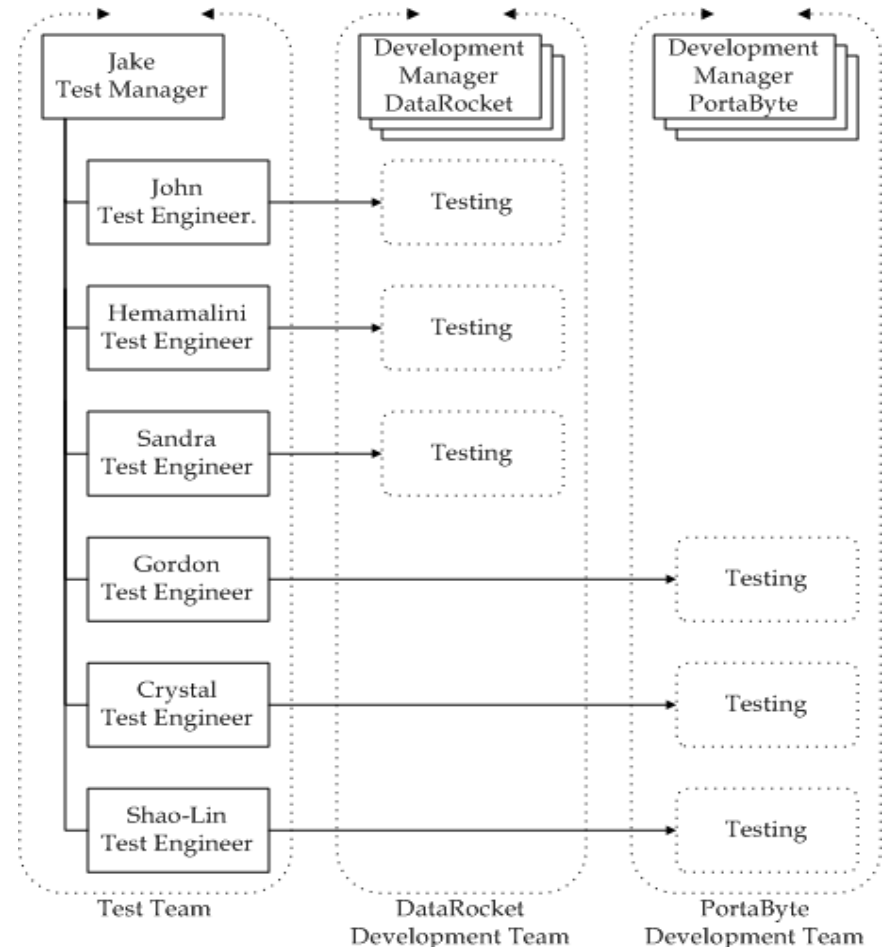
- Each tester has his own specialty
- Assigned to projects based on need
- May be on more than one project
- Provides maximum flexibility, deep expertise to test team
- Not always popular with other managers





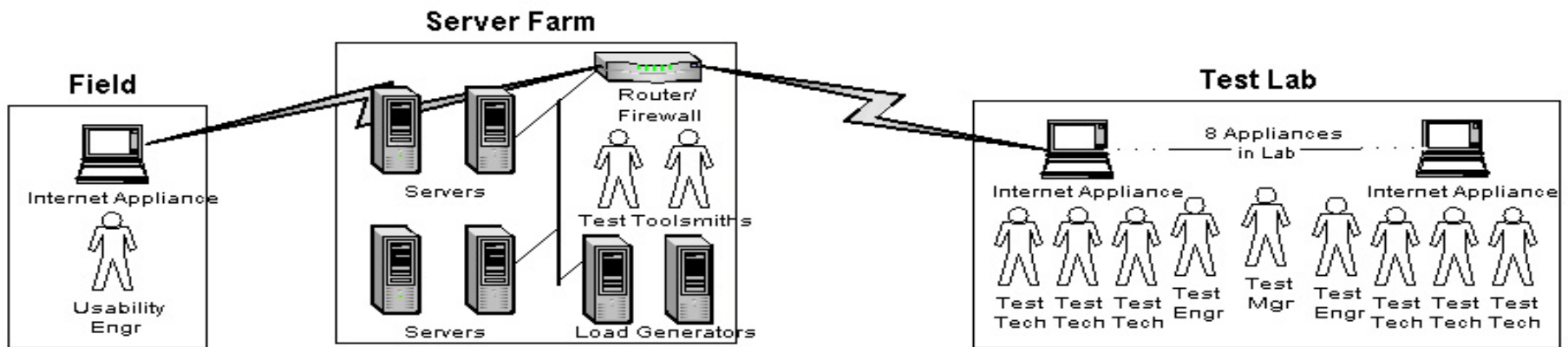
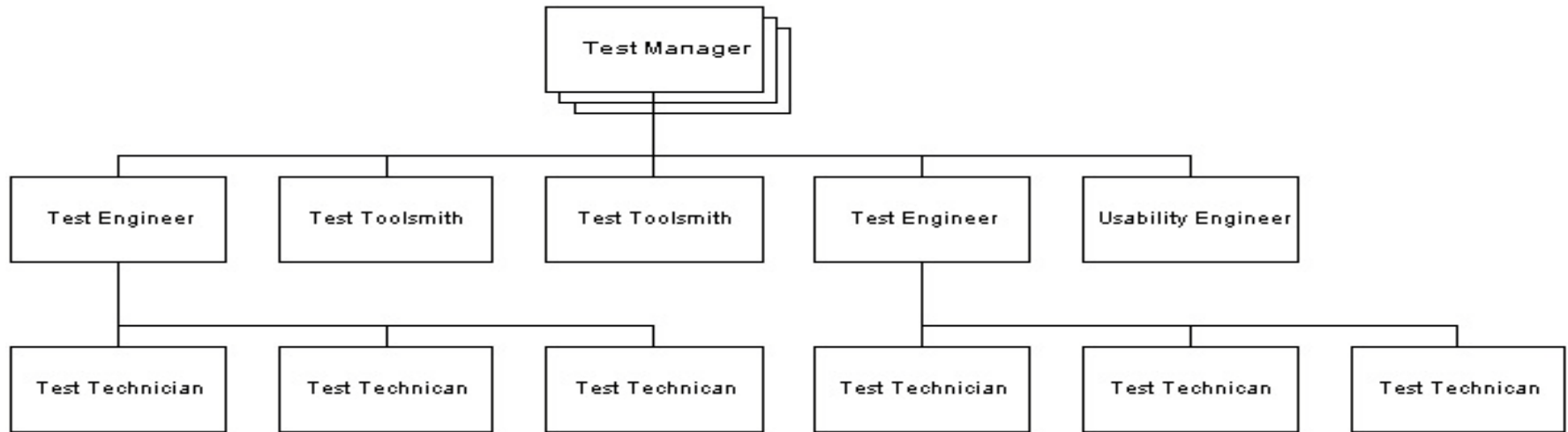
Generalized Teams

- Each engineer assigned to a specific project
- Testers stay on the project until their role is complete
- Helps testers focus on one task at a time
- Testers can sometimes “go native” and identify more with development team than test team





Case Study: Organizational Options





Test Strategies

- ✦ Analytical: early involvement; e.g., risk-based and requirement-based
- ✦ Model-based: testing from a model; e.g., stochastic or statistical testing
- ✦ Methodical: testing from a standard pattern; e.g., failure-based and checklist-based
- ✦ Process- or standard-compliant: e.g., IEEE 829 standard or Agile methodology
- ✦ Reactive: respond to system as delivered
- ✦ Directed: coverage determined by outside (non-tester) advice
- ✦ Regression-averse: reuse of existing tests, especially automation of such tests



Case Study: Test Strategies

- ❖ Internet appliance project
 - ❖ Analytical risk-based and requirements-based testing
 - ❖ Model-based performance and reliability testing
 - ❖ Reactive (exploratory testing)
 - ❖ Regression-averse: standard set of tests, some automated
- ❖ Blended approaches are most effective and efficient



Key Process Indicators

- ❖ To develop KPIs
 - ❖ Identify objectives
 - ❖ Create questions about effectiveness, efficiency, and elegance of achievement of objectives
 - ❖ Devise a measurable metric (or surrogate metric) for each question
 - ❖ Set a goal for each metric
- ❖ Using KPIs
 - ❖ Measure success against KPI
 - ❖ Implement improvements if needed



Case Study: KPIs

	A	B	C	D	E	F	G	H
1	Objective(s)	Question	Dashboard(s)	Data Source	Available Now?	Goal	Notes	Metric
2	SO-SS-Risk	How effective at covering risks?	Exec	Risk Rating by Requirement Linked to Test Results	No	100%		Risk reduction effectiveness
3								
4	SO-SS-Risk	How much risk remains (during testing)?	Mgmt Project	Risk Rating by Requirement Linked to Test Results	No		Management and project team should evaluate acceptability.	Residual risk table or graph
5								
6								
7	SO-SS-Risk	What is the risk of failure in production?	Exec Mgmt	Incidents (Arising from Software or Infrastructure Defects) Reported by Users	Yes		The specific goals probably depend on the criticality of the system (or a class of systems).	Production incident trend
8								
9								
10	SO-SS-Risk	What is the risk of system unavailability during operation?	Exec Mgmt	Uptime and Downtime for Each System	Yes		The specific goals probably depend on the criticality of the system (or a class of systems).	System availability trend
11								
12								
13	SO-SS-Defect	How effective at finding defects?	Exec Mgmt	Integrated Defect Tracking System for Dev & Prod	No	85%	Starting goal of typical industry average.	Defect detection effectiveness
14								



Risks of Independence

- ❖ There are many advantages, but some risk
 - ❖ Developer testing reduced (“testers will catch the bugs”)
 - ❖ Isolation and alienation (“testers are an obstacle”)
 - ❖ No clear business benefit (“where’s the value”)
- ❖ These risks can be managed



Case Study 1: Risks Unmanaged

- ❖ One US company had a “quality cop” oriented test team
- ❖ All stakeholders said, “Testing has no value”
- ❖ Testers said, “Stakeholders are clueless about quality”
- ❖ Adversarial system set up by former CIO
- ❖ No clear mission or objectives for testing
- ❖ Test group was dissolved/outsourced



Case Study 2: Risks Managed

- ❖ Australasian test group manages risks by...
 - ❖ Supporting developer testing and measuring defect phase containment
 - ❖ Regularly surveying stakeholder satisfaction and addressing any issues (as mentioned before)
 - ❖ Quantifying success with KPIs and measuring business benefit
- ❖ This test group is supported by the organization



Business Case

❖ Quantifiable values

- ❖ Finding must-fix defects
- ❖ Finding deferrable defects
- ❖ Reducing risk by running tests
- ❖ Delivering information

❖ Qualitative values

- ❖ Improving reputation for quality
- ❖ Smoothing releases
- ❖ Increasing confidence
- ❖ Protecting from legal liability
- ❖ Reducing loss of missions or lives



Cost of Quality

- ⊕ Cost of quality is useful to measure quantitative value and efficiency
- ⊕ Cost of quality classifies quality costs in four categories
 - ⊞ Costs of prevention
 - ⊞ Costs of detection
 - ⊞ Costs of internal failure
 - ⊞ Costs of external failure
- ⊕ Testing budget is part cost of detection, part cost of internal failure
- ⊕ Detection and internal failure are typically cheaper than external failure, making testing an excellent value



Case Study: Business Case

<i>Detection Costs</i>		<i>External Failure Costs</i>	
Test Budget	\$1,000,000	Sustaining Costs	\$3,000,000
Future Value of Assets	100,000	Percentage Bug-Related	50%
Re-test Costs	500,000		
Net Detection Costs	\$400,000	Net Ext. Failure Costs	\$1,500,000
Must-Fix Test Bugs	1,500	Must-Fix Released Bugs	500
Detection Cost per Bug	267	Ext. Failure Cost per Bug	3,000
<i>Internal Failure Costs</i>		<i>Return on Investment</i>	
Test Bug Fix Costs	750,000	Must-Fix Test Bugs	1,500
Re-test Costs	500,000	Money Saved Per Bug	\$1,900
Net Int. Failure Costs	\$1,250,000	Net Benefit of Testing	\$2,850,000
Must-Fix Test Bugs	1,500	Net Detection Costs	400,000
Int. Failure Cost per Bug	833	Test ROI	713%



Conclusions

- ✦ Independent test groups offer an objective perspective and can achieve a variety of objectives
- ✦ Many different business and technical stakeholders receive services from such groups
- ✦ Organizational options include deep specialization and demand-driven generalization
- ✦ Independent test groups have a number of strategies they can use to achieve objectives
- ✦ Success in achieving these objectives can be measured quantitatively via KPIs
- ✦ There are risks, but these can be managed
- ✦ There is a strong business case, with the typical ROI for testing assessed at 800%



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