

Being a Test Manager

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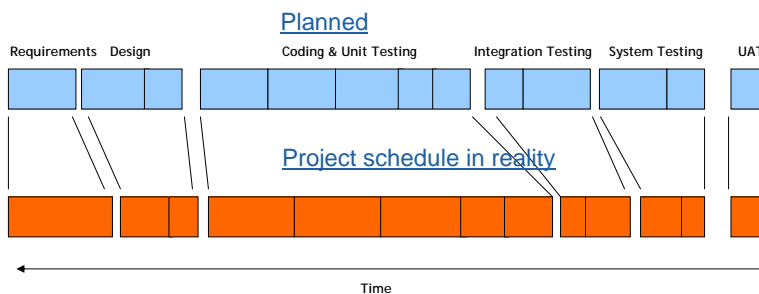
The following presentation is an output of my experience and perspective on this subject in an individual capacity as a Group Test Manager at Infosys Technologies Limited. This presentation is not an official document of Infosys on this subject

Agenda

- Definitions
- Objectives and Context Setting
- Current challenges of Test Manager
- Activities of Test Manager
- Components of a successful Test Manager
- Workshop
- Risk Management
- Stakeholder expectation
- Time Management
- Q&A

Background

- Test Manager is not a new role, then why this topic?
- Challenges of being a Test Manager
- Do we have criteria's to differentiate between **well executed testing projects** and **poorly managed testing projects**?
- 35% of the IT projects are successfully completed and implemented
 - Test estimation done by two individuals is most likely to be different



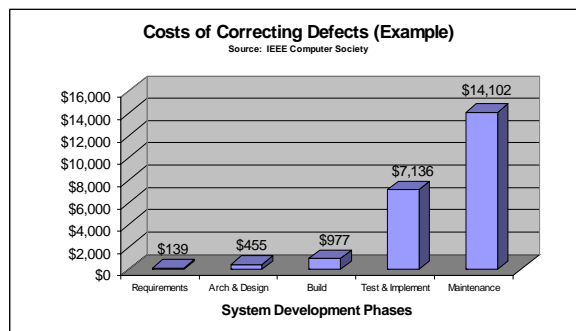
Industry References & historical data indicate a strong need for metrics

- From **Watts Humphrey** article
 - An analysis of data on more than **8,000 programs written by 810 industrial software developers**
 - The average injection rate for these developers is **120 defects per KLOC, or one defect in every eight lines of code.**
 - The **top 10%** of the developers injected **29 defects / KLOC**
 - The **top 1%** injected **11 defects / KLOC**
 - Even at the injection rate for the top 1% of software developers, a 1,000,000 LOC system would enter compiling and testing with 11,000 defects.
- As per **Caper Jones**
 - The U.S. average defect rate for released software is in the range of **5.9 to 7 defects per thousand lines of code**
 - This means a system with **1MLOC (Million Lines of Code) has about 5,900 to 7,000 defects.**
 - The article in 2002 [6], indicates the defect removal efficiencies on 1500 projects

Defect Removal Efficiency	Number of Projects	% of projects
>99	6	0.40%
95-99	104	6.93%
90-95	263	17.53%
85-90	559	37.26%
80-85	408	27.20%
<80	161	10.73%
TOTAL	1500	100.00%

Industry References & historical data indicate a strong need for metrics

- Less than **0.4% of the projects analyzed by Caper Jones** indicate a defect removal efficiency of greater than 99%
- **50% of the projects analyzed by Caper Jones data** indicate that the defect removal efficiency is lesser than 60%
- A system having **100 defects and around 40 defects missed by the testers** during the multiple testing phase and then caught in the production phase
- Cost of fixing the defect increases progressively



Objectives of the Session

The objective of this session is to address the problems and challenges faced by the Test Manager during the different phases of the testing life cycle

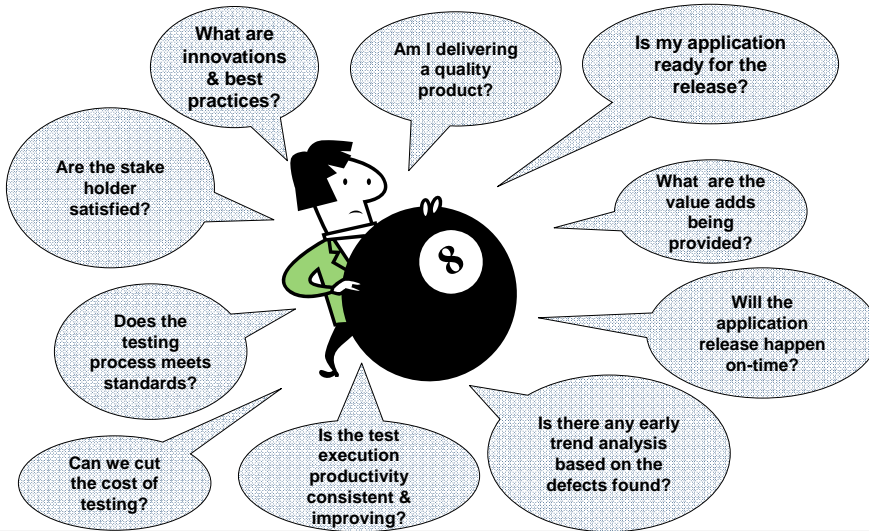
Key Topics covered

- Challenges of the Test Manager
- Various activities of the Test Manager mapped to TPI
- Attributes of Test Manager
- Types of Test Manager
- Evaluating a Test Manager
- How to become a good Test Manager
- Case studies, Workshop and Quiz

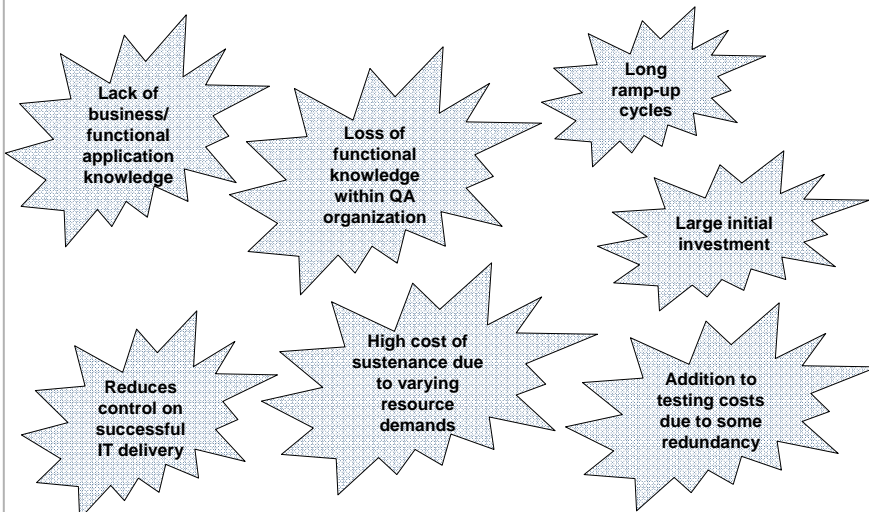
Definitions

- **Unit:** Unit can be a project or group of projects under an account in a business practice unit
- **Project:** The reference to a project in this presentation means “Testing project”
- **OMC:** Objective measurable criteria are the metrics designed and tracked in testing projects. They are derived from the QUASI framework
- **Client:** The reference to client in this presentation is the organization that requires software IT services

Some of the challenges in current testing projects from the Test Manager's view point



Common apprehensions on test outsourcing from the clients' viewpoint*



*Reference: Anand Iyer, "A structured approach for Test Outsourcing" Euro-star 2006

Case Study - 1

What is Testing efficiency and how can our Test Manager, Hari Sadhu, use this for this project?

Definition and Purpose of each Test Metric .. (cont)

Definition of Testing efficiency is the number of test cases that a tester can execute in a unit time.

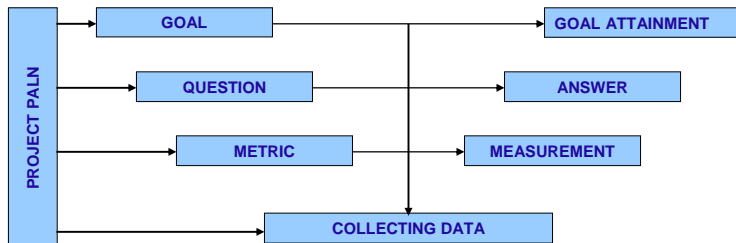
How can one use the test metric - Testing efficiency:

- Measure productivity
- Testing phase reduction
- Improving the time to market
- Identification of the critical features
- Cost of the testing phase
- Revalidate the estimation model
- Input for future estimation mechanism for similar type of project
- Revalidate the test execution plan
- Test environment set-up
- Sturdiness of the test data and build

Best Practice: “Goal-Question-Metric” method for Identifying Metrics based on goals...*

Goal-Question-Metric (GQM) is an excellent technique for selecting appropriate metrics to meet ones need.. With GQM, one has to begin by selecting a few project or organizational goals. State the goals to be as quantitative and measurable & brainstorm with questions and queries to the “differentiators” to bring in to reach the goal, then finally define what is it that one has to measure to quantify the progress towards achieving the goal.

➤ GQM is a systematic approach for integrating goals to the process.



➤ Best metrics relevant to the process improvement can be effectively identified and the resulting metrics are tailored to the organization and its goal.

➤ Measurement provides the most appropriate information for answering the questions thus ensuring consistency with completeness playing a constructive and instructive role in the organization for goal attainment.

*Reference: Ramesh Pusala, Eurostar Conference 2005

Available Reference Models

Focuses of Software Process

- CMMi
- IEEE
- ISO-9000
- SPICE
- TQM

Focuses of Testing

- TMM
- TPI
- TSM
- TIM

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Test strategy

Is Test Strategy for the project in place.

Are all risks involved in the projects identified?

Is the project's software effort and costs tracked and reviewed ?

Have the acceptance criteria been defined?

Have you prioritized the test cases / sets?

Is the approach for testing clearly defined?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Life-cycle model

Have the different phases applicable to the project been identified?

Has the project planning / Estimation approach and project life cycle model been reviewed and documented with the project team, quality assurance, configuration management, technical writers?

Has the project scope been defined and are the user requirements clear?

Is the project shared vision generated and shared with the team? (mandatory if project duration is above 6 months and team size is above 10)

Has sufficient effort and time been planned for all milestones, work product reviews ?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Moment of involvement
Is Testing team part of the Requirement gathering, understanding and elicitation phase ?
Is the scope of the testing activities defined? Are they signed off by the stakeholders
Are the responsibilities of the Customer, Development team and Testing team clearly defined?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Estimating and planning
Is there a basis of estimation document for project? What is the % of testing effort to the overall project effort?
Can you verify for some of the requirements (randomly picked) in different categories and check on the basis of estimation?
Is the estimated number of test cases/scenarios sufficient to cover the all the requirements? What is the risk? (No risk, medium, Unknown)
What is the estimated # of defects in the application that the team is anticipating? Is this reasonable?
Is the test strategy mapped to the test estimation and approach? Can the test strategy help in finding the estimated # of defects?
How many cycles of testing planned? Is this sufficient to detect all the defects?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Test specification tech
Is the traceability matrix to map requirements to test cases complete and correct?
Is the requirements and functional specifications baseline under formal SCM baseline control?
Are the test cases based on SRS / Use cases / Functional specifically?
Are there any deviations from SRS?
Are the following adequately defined ? <ul style="list-style-type: none"> • Test method • Test type (functionality , regression , system testing) • Test environment • Test software (in case of automated testing)
Are all input parameters validated for each requirement and stated in test cases?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Static techniques
Are formal reviews conducted at selected milestones?
Have critical dependencies between project stakeholders identified, negotiated, and tracked?
Are Minutes of Meeting maintained for all kinds of meetings / calls? E.g Team meetings, client meetings, status calls etc
Are different control charts created / updated and shared ? E.g Schedule adherence, defect efficiency, review effectiveness, defect slippage, cost of quality, productivity, defect trends etc.
Are checklists such as - sanity checklist, release checklist, review checklist, process checklist available and used at requisite stages in project?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Metrics
Have the metrics to be collected identified ? (projects artifacts related e.g. test cases planned , test cases executed, # of releases tested etc)
Have the metrics to be collected identified ? (effort tracking, project cost tracking, schedule tracking etc)
Have the metrics to be collected identified ? (defects management, expected vrs actuals etc)
Have the metrics to be collected identified ? (productivity, DIR, defects density, DRE etc)
Have the metrics to be collected identified ? (training, KM , acquired-skills related)
Is there a tracking mechanism/ process in place to collect the metrics ?
Are the metrics being collected are regular intervals ?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Test Tools
Is there scope of automation in the testing phase?
Is there plan to use Test Management Tools, Defect Management tools?
What % of benefits the team would see in using the Test Management tools?
Will the selected tool for automation give more benefits in terms of cost and coverage against other tools?
What is the cost involved in moving from one version of tool to other version of tool and does the tool have backward compatibility?
How much % of effort is reduced by using the tool?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Test Environment
Are all the required hardware/software identified for test environment setup and if remotely used have the necessary procedures defined for accessing the environment?
Is the Test bed, Test environment planned , created and readily available
Have enough rounds of testing been done in QE and Stage environments as per schedule?
Is everyone having access to the test environment setup? Access privileges?
In case of issues have you defined necessary contact details to resolve the issues?
Is there any backup created for data/hardware failures?
Is disaster recovery plan in place?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Office Environment
Is all the hardware requirement defined in the plan and available for the testing team?
Is the requirements for the software (Testing Phase) defined in the project plan? Are they available?
Are spaces and desktops allocated for all the project people
Is there a tracker for keeping track of space/PC/ software/Licenses (with expiration details) being utilized for the project
Is there infrastructure for easy and clear communication with project stakeholders (telephone, conferencing, email)

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Commitment and Motivation
What is the team composition? Is this mapped to the estimated people in the project?
Does the project have people with the right skill sets ?
Is the team composition index (Commitment versus Competency) is the high?
Is there a proper training/ induction plan for transitions
Does the team have the right mix of domain specialists, and testing experts
Does the team have intra-team people issues (personality clashes)

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Testing functions and training
Is there a training plan defined covering the testing, domain, project and process perspective?
Is the team certified as per the training plan?
What is the risk of the competency from the team composition?
Is there proof of training and continuous monitoring of skills sets available throughout the project?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Scope of methodology
Has the each methodology activity scope been defined?
Have the acceptance criteria been defined?
Are all risks involved in the projects identified?
Have all deliverables been identified?
Have effort estimates and responsibilities clearly assigned for all milestones and to even to all work items?
Have the selection criteria for methods and tools to support the technology approach been identified and documented?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Communication
Is there escalation matrix in place?
Is there a communication plan? Is there a proof that it is followed in the project: Check and verify with 1 instance in the cycle
Is the back up key contacts in loop in case of absence of the key contact for all communication?
Are there SPOC at onsite and offshore?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Reporting

Is there any active participation from the testing team on the project/ Client interaction (Check with the proof)

Is there any active participation from the testing team on the project with the development team (Check with the proof)

Is there any suggestions or recommendations proactively done by the testing team with respect to the development process from the testing perspective (DIR, Defect analysis, Schedule etc)

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Defect management

How are defects tracked for each life cycle phase - unit testing, integration, system and acceptance phases?

How is defect slippage tracked per phase?

Is root cause analysis done for each slippage at each phase of lifecycle?

What are the defect prevention activities?

what % of defects are in process defects?

Is the process for tracking defects defined?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Testware management

Is the sequence in which relevant Testing wares are developed based on a plan that accounts for factors such as criticality, difficulty, integration and test issues, and needs of the customer and end users as appropriate?

Are the test deliverables like test plan, test cases etc are easily maintainable?

Are the test deliverables stored in appropriate place and version controlled?

Is the workflow for review and updation for test ware defined properly and maintained? And is everyone aware of who has to submit the deliverables, who is the reviewer, etc?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Testing process management

Is the Test Plan / Test Approach / Test Strategy and Test Management Plan in place? Are they modified / updated at regular intervals?

Are defect reports, status reports (daily / weekly) maintain at the scheduled frequency?

Is any Test Management Tool being used in project?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

Evaluation
Is the design adhering to any design standards
Are requirements reviewed to sort out issues affecting design before developing automation architecture?
Is the architecture developed and reviewed early, within the constraints of the testing life cycle and any pending issues resolved?
Has each of functional requirements been taken into account?
Are there any analyses to demonstrate that performance requirements can be met?

Control points, responsibilities and check points of Test Manager in various phases, activities of project life cycle:

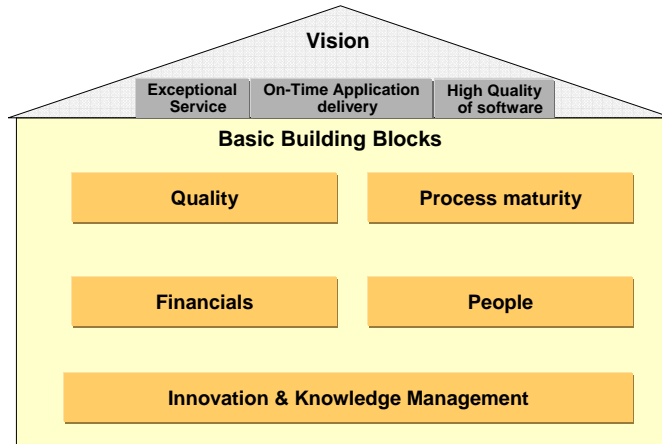
Low-level testing
Is the total # of estimated Unit testing defects computed in the project?
Is there a strong co-relation between the actuals defects in current phase to the estimated defects?
Is the # of Complex, Severe defects in Unit Testing matches the predicted ratio of the overall defects
Is the total # of estimated Integration defects computed in the project?

Attributes of a good Test Manager

- << To be discussed in the tutorial>>

How to be a successful Test manager

Illustrative QUASI Framework – Can be used by any Test Manager to drive success within the project



Focus area of Test Manager to ensure success

Quality of Work	
Technical Deliverables	Includes the quality of any deliverable (tested software) that goes from the team to the client. The measure of integration testing phase is determined by the # of defects found in the system testing phase; Likewise the measure of test effectiveness is determined by the number of defects missed by the system testing team in the user acceptance phase
Documentation	Includes the quality of test plan, test strategy, test automation feasibility studies, test cases that are part of the deliverables of the testing project
Review Effectiveness	Measures review of the project documents that are delivered at various stages and final delivery. Recommended to have internal SLA's for the reviews incase the client does not define for the project
Transition / KT Effectiveness	This includes the knowledge gained by the project team from the client or vendor during the transition phase. It is typically applicable when the service provider takes ownership from a client.

Focus area of Test Manager to ensure success

Unit Maturity Level	
Process Adherence	This includes the process compliances as agreed with the client and/or organization benchmark. The typical evaluation can be the CMMi. The projects at higher maturity level (CMMi Level 5) can bring in benefits to the client. Any process that is agreed between the project team and the client will be under the scope of evaluation (Security, Disaster Recovery, Testing Process etc)
Project Tracking	Includes the schedule, timelines, work complete % of the deliverables of the testing project
Schedule & Effort Tracking	The effort for each task in a project needs to be captured. If the testing project has automation testing and functional manual testing as part of the regression testing, then it is expected to log both the effort as a separate task rather than grouping as one activity. Likewise the QA team needs to break the task within the project and track the effort. This would serve as a key input for many metrics in a QA project
Productivity Improvement	This includes focus areas in testing such as test case productivity, test case execution productivity, test automation improvements etc.

Focus area of Test Manager to ensure success

Adherence to Plan	
Schedule & Effort Adherence	This measures the adherence to schedule and timelines for intermediate stages and milestones of the project. This should also account on the slippages due to development team. These slippages can have impact on the QA activities during release cycles.
Financials	This includes the revenue, cost, overhead, onsite to offshore ratio and margins of the project
Scope Management	The scope of the testing is measured and verifies that only the scope that is committed to the client is executed by the team. The change to the scope is managed by the QA Manager. The measurement of scope management is part of this assessment
Forecasting Accuracy	This include measuring the resource forecasting, risk forecasting, revenue forecasting, business changes etc.

Focus area of Test Manager to ensure success

Stakeholder feedback	
Team satisfaction	This measures if team is motivated through timely reward & recognition and reviews team and individual's contributions to project/unit and issues that can demoralize the team like overtime, lack of challenging work etc. This is to have a high performing and highly motivated team.
Client satisfaction	This a very important factor to be reviewed on a regular basis which helps the testing team to re-orient its actions towards improving client's or client's customer satisfaction level
Client Focus Group/ Sr. Management Feedback	Decision makers at client side are important for stakeholders for the organization's repeat business and growth. It is important to review their feedback separately apart from overall satisfaction.

Focus area of Test Manager to ensure success

Innovation and Knowledge Management	
Value added deliverables	Team needs to constantly work providing additional information and reports apart from delivering the work committed. This might be giving metrics that showcase ROI in QA efforts or improving "time to market" or "decreasing maintenance and production support efforts to IT team" or "reduction in # of test cycles" etc
Reusable utilized & Contributed	Unit/team needs to be aware of best practices and knowledge that are acquired by other teams in the organization and use them optimally within their work to benefit clients and organization through enhanced quality and productivity and also contribute their specially acquired knowledge and skills back to the organization. Knowledge could be re-usable test scenarios, case studies, best practices, optimized processes or even lesson learnt
Knowledge Dissemination	Knowledge sharing within and outside the unit/project is to be reviewed to lessen person dependency, enhance skills. It will also for enhance team's presentation skills and visibility of the project in the organization and at client side
Thought leadership	Team's innovative ideas, initiatives need to be known so that management can provide right support in publishing and implementing thought leadership in Testing Industry

Strategic benefits

- **Cost savings** in providing QA services through better operations
- **Productivity improvements** in projects can be determined including methods of tracking and guaranteeing these productivity improvements
- Derive **estimation guidelines** for the unit
- Career planning programme for people
- **Better relationship** with stakeholders through objective mechanism of tracking and defining goals
- Consolidation of process, best practices at Unit level
- **Stakeholder's view** of the unit by business, domain and people
- **Continuous improvements** in internal QA process, metrics
- **Knowledge Management** at Unit level
- **Improved Service Level Agreement (SLA)** governance processes and SLA metrics in the project
- Provides **dashboard view** at Unit level

Tactical benefits

- Track the **health** of the project
- Provides a view of **financials status** of the project
- **Project maturity** level and its compliance level to the testing process
- **Effectiveness** (Review effectiveness, Defect removal etc) and **efficiencies** of the QA service provided at project level can be measured
- Indicator for **cost of quality**, **cost of project** and **revenue** of the project
- Provides the **stakeholder** feedback of the project
- Helps to meet and exceed **service level agreement (SLA)**
- Pointer to **innovation** at project level and its impact to the business
- Parameter for measuring the **knowledge management**, **re-usable artifacts**

Risk management

What is a Risk?

- Example 1 – Your company is the only Testing service provider for your client. For a new testing service, the client requests for a proposal from your organization and two of your competitors.
- Example 2 – Your company is involved with the testing and your competition is involved in with the development activities. There are many defects identified during the testing phase.
- Example 3 - Your company is involved with the testing and your competition is involved in with the development activities. There are many defects identified during the production phase.
- Example 4 – The design schedule and effort of the project increases by 20% for the development team. Your company has been awarded to execute the testing for this project.
- Example 5 - You get a new service request from your client. You plan to include fresh test engineers in to the project and prepare their training plan. Few weeks into the project, due to lack of expertise among the testers you start seeing problems related to test case development, understanding of test process etc. which could potentially lead to Crisis

So what are the risk in each case?

What is a Risk?

- A possible event or situation, potentially having either positive or negative impact on the project.

Risk → Opportunity → **Benefit**

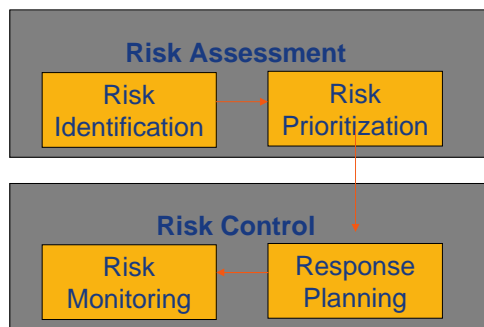
Risk → Problem → **Crisis**

Risk management

- Risk management is an iterative process of identifying, assessing and responding to risk

Identify risks

- Proactively at the beginning of the project
- Throughout the testing life cycle



Assess risks

- Classify them
- Identify the impact on testing
- Review the assessment in the light of changing circumstances and risk management actions

Contingency planning

- The idea behind contingency planning is to reduce the impact of a risk by creating alternatives
- Assumes that the worst will occur and tries to figure out methods so the project can continue
- Allows the testing team to address the unforeseen challenges during life cycle
- Will focus on areas such as:
 - Sanity testing prior to full blown testing
 - Risk based testing
 - Bringing in an external domain expert to focus testing on highly critical areas of the application
 - Increased testing effort, at the cost of redundancy in order to increase test coverage

Sample risks in testing

- Risk to the deliverables - Defects found in production
- High test management overhead due to dependency on other phases, projects, interfaces, development team
- Connectivity failure to test environment
- Issue resolution from client not happening on time
- Requirements change affecting testing
- Increased turn around time in defect fix
- Lack of data to test some specific cases
- Incomplete Test Planning
- Incomplete / Absence of traceability
- Improper Testing, Test data usage
- Insufficient knowledge of the application, tools and processes
- Testing time shrinks but deadline does not change

Stake holder management



Role Play – Stakeholder Expectation

Hari Sadhu is a Test Manager and handling the project in the Bangalore office

Mr. Brown is the client and QA Manager. Mr. Brown is very particular on the quality of work and kind of people in the project.

Kumar is one of the Test Engineer working in Bangalore office. He has been in the project for almost 12 months. He is bit de-motivated and looking forward for a change. He has completed 18 months in the IT industry and in this organization.

Naveen is the onsite coordinator of this project. He has seen that the quality of the release and the test deliverables is not what it used to be during the intermediate releases. He is upset with Kumar's work and Hari Sadhu's reviews. He has to spend extra hours of work to re-validate some of the fixes at onsite.

Mr. Brown is seeing that Naveen is spending lot of time at the office and concerned. He has called for a meeting with Naveen and Hari.

End objective: Hari needs to fix all the issues with the different stakeholders

Quick snapshot on the Traditional metrics approach vs. Professional approach

Traditional approach	Professional Approach
<ul style="list-style-type: none">• Use standard metrics for all projects	<ul style="list-style-type: none">• Design the metrics
<ul style="list-style-type: none">• Compare performance of the project at milestones	<ul style="list-style-type: none">• Measure metrics of the project at regular intervals
<ul style="list-style-type: none">• Metrics are aligned to fewer stakeholder	<ul style="list-style-type: none">• Metrics are aligned to all stakeholders
<ul style="list-style-type: none">• Focused on what trends that happened	<ul style="list-style-type: none">• Focused on trends for the future
<ul style="list-style-type: none">• Metrics are project level	<ul style="list-style-type: none">• Multi-level dash board view

Q & A

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