



**PMG**  
PROCESS MANAGEMENT GROUP, LTD.  
(847) 253-3773  
The IT quality and testing experts  
www.pmg ltd.com

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**TESTING PROCESS OVERVIEW**

PROCESS MANAGEMENT GROUP, LTD.

- **Presented by:**
  - Burton J Greenberg, CSQA, CSTE
  - Colleen Maloney, CSQA, CSTE

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**PROCESS MANAGEMENT GROUP SERVICES**

PROCESS MANAGEMENT GROUP, LTD.

- **Quality Assurance**
- **Testing**
  - Internal Practices
  - Project Specific
- **Process Management**



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**TESTING PROCESS  
PRESENTATION AGENDA**

PROCESS MANAGEMENT GROUP, LTD.

- **Presentation Scope**
- **Process Overview**
- **Testing Overview**
  - Test Levels
  - Test Types
- **Independent Test Processes**
  - Test Definition
  - Test Execution
  - Defect Resolution
- **Test Overview Recap**

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**TESTING PROCESS  
PRESENTATION SCOPE**

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- **Includes:**
  - Background to Process Improvement
  - Processes for Effective "Black Box" Testing
  - Targeted for those focused on migrating from Level 1 to Level 2 (SEI CMM)
  - Focus on Functional Testing
- **Excludes:**
  - Unit / "White Box" Testing
  - Volume / Stress Testing
  - Specific Test Tools

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**Process  
Improvement  
Overview**

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## QUALITY DEFINITIONS

PROCESS MANAGEMENT GROUP, LTD.

- **QUALITY is defined as:**
  - Conformance to Requirements
- **COST OF QUALITY:**
  - Costs that ensure products and services comply with requirements
- **GOAL:**
  - Minimize the Cost of Quality

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## COST OF QUALITY

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- **Prevention Costs**
  - Cost incurred prior to development for processes that ensure requirements are satisfied
- **Appraisal Costs**
  - Cost incurred after development and prior to delivery to detect non-compliance with requirements
- **Failure Cost**
  - Cost incurred after delivery due to non-compliance to requirements

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## SOFTWARE ENGINEERING INSTITUTE (SEI)

PROCESS MANAGEMENT GROUP, LTD.

- Established in 1984, under a grant by the Department of Defense (DoD)
- Based at Carnegie Mellon University; Pittsburgh, Pa
- Developed the Capability Maturity Model (CMM)

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## CAPABILITY MATURITY MODEL (CMM)

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- Serves as an objective means of assessing IT organizational maturity
- Based upon five levels of organizational maturity
- Represents evolution through maturity levels

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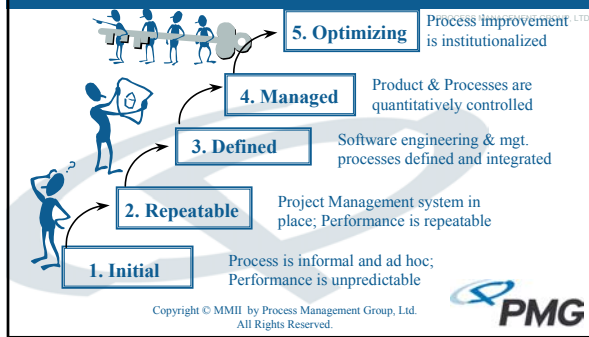
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## SEI MATURITY LEVELS



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## PROCESS MANAGEMENT

PROCESS MANAGEMENT GROUP, LTD.

### A Process is:

An integrated collection of procedures, tools, and training

### Sound Processes Facilitate:

- Tracking
- Management
- Enforcement
- Meaningful Metrics

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## PROCESS IMPROVEMENT OBJECTIVES

### Sound Processes:

- Increase product quality and/or
- Increase Development Productivity and/or
- Reduce Development Time and/or
- Improve Business Value

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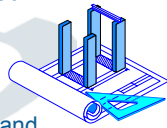
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## PROCESS IMPROVEMENT ACTIVITIES

### • Software Process Improvement (SPI) activities typically performed:

- Forming process groups
- Training
- Peer Reviews
- Forums for exchange of ideas and coordination
- Insertion of new technology



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## GUIDELINES FOR SELECTING PROCESS IMPROVEMENT METHODS

- Establish Goals
- Identify Key Process Areas (KPAs)
- Select process improvement methods
- Establish responsibility
- Communicate the process improvement plan
- Train
- Define progress tracking measures
- Implement process improvement methods
- Collect and analyze data
- Adjust the process improvement plan



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**AREAS OF FOCUS APPROPRIATE TO OBTAIN CMM LEVEL 2**

- Requirements Management
- Software project planning
- Software project tracking and oversight
- Software subcontract management
- Software Quality Assurance
- Software configuration management

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**REQUIREMENTS CHARACTERISTICS (IEEE Guide to Software Specifications)**

- Unambiguous
- Complete
- Verifiable
- Consistent
- Modifiable
- Usable during Operation
- Traceable



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## BUILD STRATEGY

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- Logically Complete Subsets
- Common Focus in Development & Testing
- Start Testing Earlier
- Incremental Progress



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## TESTABLE REQUIREMENTS

PROCESS MANAGEMENT GROUP, LTD.

- Ability to Develop Clear / Concise Test Cases
  - Can incorporate data and expected results **can be** objectively determined
- Internally Consistent
- No Interpretation of Expected Results



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PROCESS MANAGEMENT GROUP, LTD.

TEST LEVELS

TEST TYPES

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## TEST LEVELS

PROCESS MANAGEMENT GROUP, LTD.

- **Test Activities based upon "WHO" does the testing and "WHAT" baseline criteria used**
- **Unit Testing**
  - Programmer
  - Program Specs & Detailed Design Document
- **Independent/Integration Testing**
  - Independent Tester
  - Functional Design/Requirements
- **User Acceptance Testing (UAT)**
  - User (or User Liaison)
  - Requirements & Business Processes



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## TYPES OF TESTING

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- **Test Activities that Differ Based upon scope and objectives**
  - Functional Testing
  - Structural Testing
  - Performance
  - Load Testing
  - Stress Testing
  - Regression Testing
  - Parallel Testing
  - Pilot Testing



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# TEST PROCESS

PROCESS MANAGEMENT GROUP, LTD.

- TEST DEFINITION**
- TEST EXECUTION**
- DEFECT RESOLUTION**



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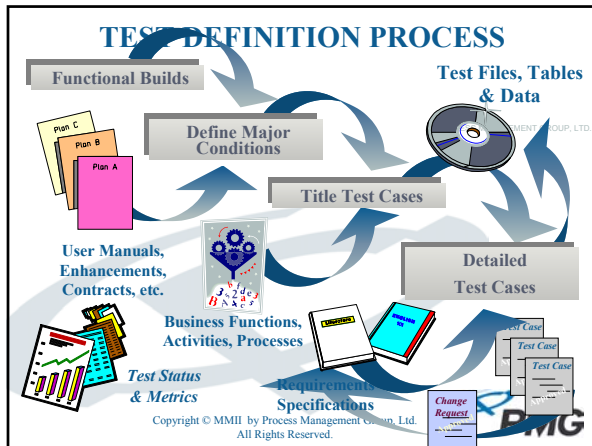
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**TEST DEFINITION**  
**Build Definition**

PROCESS MANAGEMENT GROUP, LTD.

- Define Major Business Functions for the Application
- For System Testing, often represents major system components
- For Acceptance Testing, represents business processes

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**TEST DEFINITION**  
**Major Conditions**

PROCESS MANAGEMENT GROUP, LTD.

- Define Major Business Conditions for Within Each Build
- Allows for Segregation and Focus of Critical Functions
- Facilitates Distribution of Test Case Development Activities

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### TEST DEFINITION

#### Title Test Cases

PROCESS MANAGEMENT GROUP, LTD.

- Document Permutations for each Condition
- Can be Performed Without Detailed Requirements Baseline Available
- Identifies "What" needs to be Tested
- Serves as Foundation of Test Metrics

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### TEST DEFINITION

#### Detailed Test Cases

PROCESS MANAGEMENT GROUP, LTD.

- Explicit "Actions" and "Expected Results" using Baseline Requirements
- Specific Data Incorporation
- Reference to Requirements Documentation
- Can Serve as Cross Reference and Support to Problem Reports



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### TEST DEFINITION

#### Techniques

PROCESS MANAGEMENT GROUP, LTD.

- Equivalence Partitioning
- Boundary Value Testing
- Special Value Testing
- Positive and Negative Testing
- Coverage



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### Production File Test Limitations

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- **Production Files may contain only 30% of all required conditions, often missing:**
  - New Requirements
  - Empty Conditions
  - Error Conditions
  - Date Sensitive data
- **Production Files may exercise <50% of the logic**
- **Expected Results are difficult to determine**
- **Volume is often too large**
- **Security Issues**

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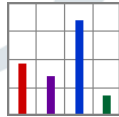
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### TEST DEFINITION Tracking & Metrics

PROCESS MANAGEMENT GROUP, LTD.

- **Ability to Track and Report Status:**
  - Test Cases Titled
  - Test Cases Under Development
  - Test Cases Completed
  - Test Cases Approved



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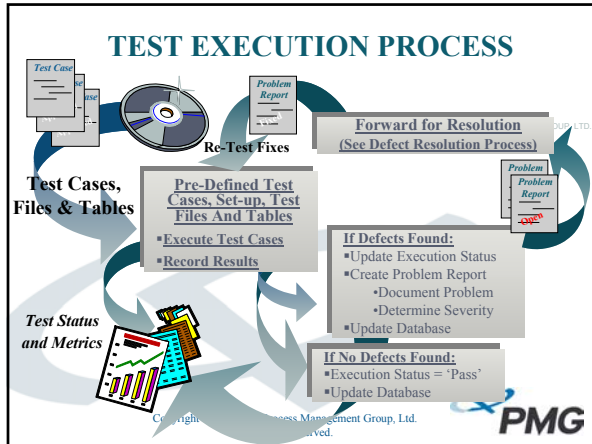
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### TEST EXECUTION PROCESS

#### Set up & Execution

PROCESS MANAGEMENT GROUP, LTD.

- **Test Set up**
  - Execution of setup tests to establish foundation
  - Test Files restored to proper configuration
  - Ensure tables / parameters coded for the test (clearly document content of these entries)
- **Test Execution**
  - Initiate test per steps documented in Test Case
  - Carefully analyze test results vs. pre-defined expected results

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### TEST EXECUTION PROCESS

#### Tracking

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- **Log Results**
  - If results per expectations
    - Test Case "PASS"
  - If results differ from expectations
    - Determine "SEVERITY" Code
    - Initiate a Problem Report with documentation of deviations from expectations (include samples)
  - Always evaluate if Test Case and/or Requirements require updates

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## Test Execution Assessment of Defects

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- **Severity Codes**
  - Determination of a defects impact to the application system
    - Ranges from 'halts performance' to 'cosmetic'
  - Objective Definition assigned by the Test Analysts
- **Priority Codes**
  - Determination of urgency of resolution of a defect
    - Ranges from 'immediate resolution' to 'defer for future consideration'
  - Provided by Business Owners

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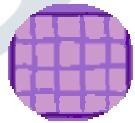
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## TEST EXECUTION PROCESS Test Management

PROCESS MANAGEMENT GROUP, LTD.

- **Forward to Development for Resolution**
  - Reviews and Assigns
    - (See following section on Defect Resolution Process)
- **Produce regular Test Execution Status**
  - Requirements Coverage
  - Problem Report Metrics
    - Defects by Severity
    - Defects by Component
    - Defects by Assignment
    - Defect Aging
    - Project Specific & ad hoc

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## GATING CRITERIA

PROCESS MANAGEMENT GROUP, LTD.

- **Objective Conditions and Standards for Product Quality for Promotion to Subsequent stages of Development, Testing or Production Use**
- **Often a function of Severity Codes and Priority Codes**
- **May incorporate Builds**

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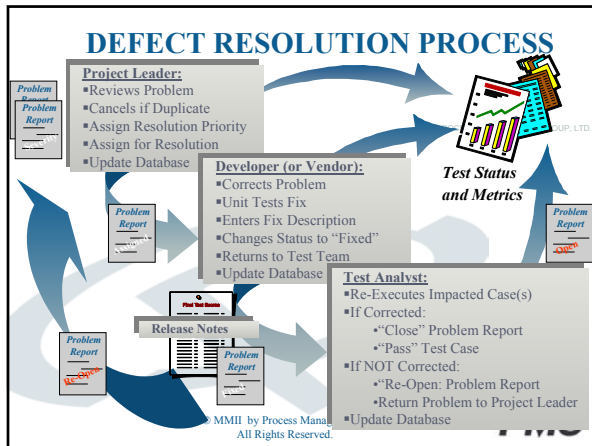
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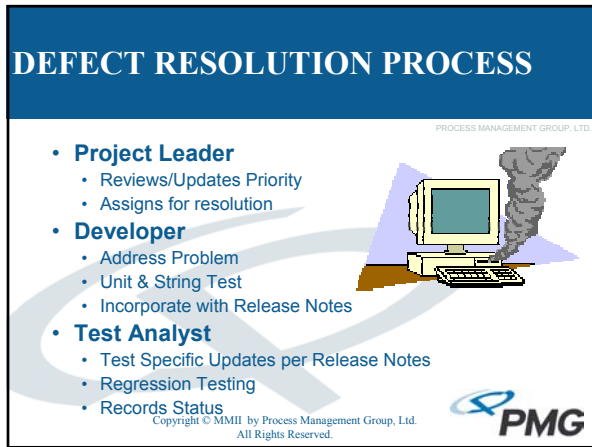
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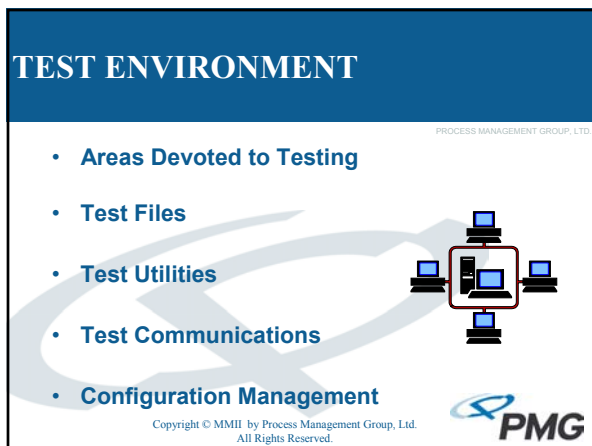
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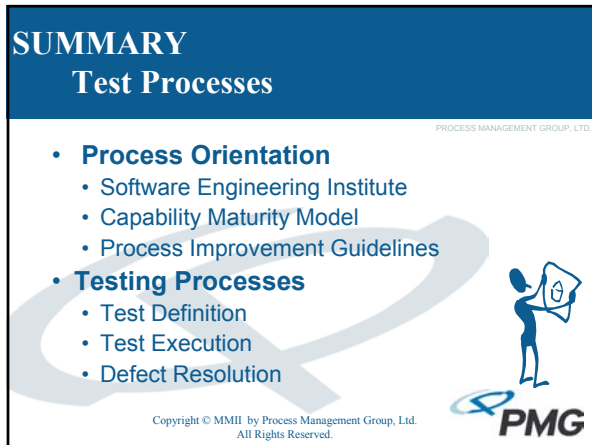
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