Software Quality Management Standards Notes

Quality Tree:

* Root Attributes: (Core Attributes)
  + Flexibility
  + Rewarding
  + Teamwork Skills
  + Expertise
  + Technology
  + Education and Training
  + Systematics
  + Flow of Information
  + Management and Leadership
  + Continuous Learning
  + Innovativeness
  + Corporate Culture
  + Multi Skills
* PROCESSES
* Dependent Attributes(fruits)
  + Satisfied Interest Groups
  + Customer Satisfaction
  + Productivity
  + Continuous Improvement
  + Quality
  + Personnel Satisfaction
  + Competence
  + Efficiency
  + Effectiveness
  + Profitability

“A Quality Management Principle is a comprehensive and fundamental rule/belief, for leading and operating an organization, aimed at continually improving performance over the long term by focusing on customers while addressing the needs of all other stake holders.”

The eight principles are…

1. Customer-Focused Organization
2. Leadership
3. Involvement of People
4. Process Approach
5. System Approach to Management
6. Continual Improvement
7. Factual Approach to Decision Making
8. Mutually Beneficial Supplier Relationships

**Customer-Focused Organization**

Try not only think from customer’s view but try to get into his demands and look for what he needs.

“Organizations depends on their customers and therefore should understand current and future customer needs, meet customer requirements and strive to exceed customer expectations”

Steps in application of this principle are:

* Understand customer Needs and Expectations for products, delivery, price, dependability, etc.
* Ensure a balanced approach among customers and other stake holders (owners, people, suppliers, local communities and society at large) needs and expectations.
* Communicate these needs and expectations throughout the organization
* Measure customer satisfaction and act on the results and (this will impact on)
* Manage customer relationships

**Leadership**

“Leaders establish unity of purpose and directions of the organization. They should create and maintain the internal environment in which people can become full involved in achieving the organization’s objectives.”

Steps in application of this principle are…

* Be proactive and lead by examples
* Understand and respond to changes in the external environment.
* Consider the needs of all stake holders including customers, owners, people, suppliers, local communities and society at large.
* Establish a clear vision of the organization’s future.
* Establish shared values and ethical role models at all levels of the organization.
* Build trust and eliminate fear
* Provide people with the required resources and freedom to act with responsibility and accountability
* Inspire, encourage and recognize people’s contributions
* Promote open and honest communication.
* Educate, train and coach people
* Set challenging goals and targets, and
* Implement a strategy to achieve these goals and targets.

**Involvement of People**

“People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization’s benefit. “

Steps in application of these principles are…

* Accept ownership and responsibility to solve problems.
* Actively seek opportunities to make improvements, and enhance competencies, knowledge and experience.
* Freely share knowledge and experience in teams.
* Focus on the creation of values for customers
* Be innovative in furthering the organization’s objectives
* Improve the way of representing the organization to customers, local communities and society at large.
* Help people derive satisfaction from their work and
* Make people enthusiastic and proud to be a part of the organization.

**Process Approach**

“A desire result is achieved more efficiently when related resources and activities are managed as a process.”

Steps in application of this principle are…

* Define the process to achieve the desire result.
* Identify and measure the inputs and outputs of the process.
* Identify the interfaces of the process with the functions of the organization.
* Evaluate possible risks, consequences and impacts of processes on customers, suppliers and other stake holders of the process.
* Establish clear responsibility, authority, and accountability for managing the process.
* Identify internal and external customers, suppliers and other stake holders of the process.
* When designing processes, consider process step, activities, flows, control measures, training needs, equipment, methods, information, materials and other resources to achieve the desired result.

**System Approach to Management**

“Identifying, understanding and managing a system of interrelated processes for a given objective improves the organization’s effectiveness and efficiency”

Steps in application of this principle are…

* Define the system by identifying or developing the processes that affect a given objective.
* Structure the system to achieve the objective in the most efficient way.
* Understand the interdependencies among the processes of the system
* Continually improve the system through measurement and evaluation, and
* Estimate the resources requirements and established resource constraints prior to action.

Assignment:

Create Matrix for all the major Principles above and Tick which-so-ever is applicable

**Continual Improvement**

“Continual improvement should be a permanent objective of the organization.”

Steps in application of this principle are…

* Make continual improvement of products *(can be called as system in terms of Software or web application etc.)*, process and Systems an objective for every individual in the organization.
* Apply the basic improvement concepts of incremental *(improvising each step at every level)* improvement and breakthrough improvement.
* Use periodic assessments against established criteria of excellence to identify areas for potential improvement.
* Continually improve the efficiency and effectiveness of all processes.
* Promote prevention based activities
* Provide ever member of the organization with appropriate training on the methods and tools of continual improvement such as the PLAN-DO-CHECK-ACT cycle, problem solving, process re-engineering and process innovation
* Establish measures and goals to guide and track improvements and
* Recognize improvements.

**Factual Approach to Decision Making**

“Effective decisions are based on the analysis of data and information.”

Steps in application of this principle are…

* Take measurements and collect data and information relevant to the objective (profit, growth etc.)
* Ensure that the data and information are sufficiently accurate, reliable and accessible.
* Analyze the data and information using valued methods
* Understand the value of appropriate statistical techniques and
* Make decisions and take actions based on the results of logical analysis balanced with experience and institution.

**Mutually Beneficial Supplier Relationships**

“An organization and its suppliers are interdependent, and a mutually beneficial relationship enhance the ability of both to create values.”

Steps in application of this principle are…

* Identify and supply key suppliers.
* Establish Supplier relationships that balance short-term *(day-to-day goals)* gains with long-term considerations for the organization and society at large.
* Create clear and open communications
* Initiate joint development and improvement of products and processes
* Jointly establish a clear understanding of customers’ needs.
* Share information and future plans, and
* Recognize supplier improvements and achievements.

**Examples:**

|  |  |
| --- | --- |
| **IT Processes** | **Process Outputs** |
| Analysis Business Needs | Needs Statements |
| Conduct JAD Session (Joint Application Development) | JAD Notes (Meeting with Key People) |
| Run Job | Execute Job |
| Develop Strategic Plan | Strategic Plan |
| Recognize Individual Performance | Appraisal or Result |
| Conduct Project Status Meeting | Updated Status Information |

**Why Processes Are Needed?**

|  |  |
| --- | --- |
| **Management Perspective** | **Worker Perspective** |
| Explain to workers how to perform work tasks | Increase the probability that the deliverables produced will be the desired deliverables |
| Transfer knowledge from more experienced to less experienced workers | Pet workers in charge of their own destiny because they know the standards by which their work products will evaluated |
| Assure predictability of work activity to that approximately the same deliverables will be product with the same resource each time the process is followed | Enable workers to devote their creativity to improving the business instead of having to develop work processes to build products |
| Establish a basic set of work tasks that can be continuously improved | Enable workers to better plan their workday because of the predictability resuting from work processes |
| Provide a means for involving workers in improving quality, productivity and customer satisfaction by having workers define and improve their own work processes |  |
| Free management from activities associated with “expediting work product” to spend more time on activities such as planning and customer and vendor interaction. |  |

**PDCA (Plan-Do-Check-Act)**

An organization needs to improve its processes over time to match the updated technologies and eradicate outdated processes. This is a long term goal therefore PDCA allows team members to change the organization one problem at a time.

The Plan-Do-Check-Act (PDCA) Cycle is an iterative four-step problem solving model to promote continuous improvement.

It contains four primary Steps which are listed below:

1. ACT: Standardize if it worked, adjust it didn’t work.
2. PLAN: Alignment, identify problem, determine goal, cause analysis.
3. CHECK: Progress, target vs. Actual
4. DO: Action Plan and Execution

**Gemba Walk:** It is an activity that takes management to the front lines to look for waste and opportunities.

**Process Mapping:** It is visual step-by-step process flow outlining how the work is done.

**Root Cause Analysis**: It is a process of identifying the source or origin of an event or defect.

**Perspective of the PDCA cycle**

Plan Phase – Process workbench is created

Act Phase – Improved

Workbench transforms the input to produce the output

The workbench is comprised of two procedures. **Do and Check**, iIf the **Check Procedure** determines that the standards for the output products are not met, the process release a nonstandard product, **People, Skills and Tools support the DO and Check Procedures.**

A process is defined by **Workbench and Deliverable definitions.**

A process is written with the assumption that the process owners and other involved parties possess certain skill and knowledge levels (subject matter expertise).

A **Workbench Definition** contains:

* A policy statement (why – the intent)
* Standards (what – the rules)
* Procedures (one or more tasks) in the form of procedural statements (how)

A **Deliverable definition** contains:

* A policy statement (why – the intent)
* Standards (what – the rules)
* Templates that specify documents format
* Policies, standards and procedures may refer to people, methods and tools

**Process Workbench and Components**

* Workbench is a graphical illustration of a process, documenting how a specific activity is to be performed
* Workbenches are also called phases, steps, or tasks. A process can be viewed as one or more workbenches
* Depending on the maturity of the organization, process workbenches may be defined by process management (or standards) committees, QA analysts, or work teams.

**Workbench**

**Inputs**- The entrance criteria or deliverables needed to perform testing.

**Procedures** – Describe how work must be done how methods tools, techniques, and people are applied to perform a process. There are do procedures and Check procedures

**Deliverables** – Any product or service produced by a process. They can be interim or external.

Interim deliverables are procedures within the workbench, but never passed on to another workbench. External deliverables may be used by one or more workbenches and have one or more customers.

Deliverables serve as both inputs to and outputs from a process.

DO Procedures

Check Procedures

Tool(s)

Standard(s)

Policy

Deliverable(s)

Input(s)

Rework

No

Yes

Assignment:

**Policy:** The policy is to build an application which serves as a gateway for students to get access to the resources shared by faculties for studies and also availability of study resources like Previous Years' question papers etc.

**Standard:** Material Design, (UI UX designing), Programming Standards, File Hierarchy Standards (android), Color Standards (Android)

**Tools:** Java, Android Studio, SQLite, PHP, HTML

**Do Procedures:** Creating UX and finalizing UI

Setting up the Screen

Linking with DATABASE

Linking with Web Portal

Finalizing Application

Publishing on Play Store

**Check Procedures:** Testing Authentication Screen

Checking Faculty Portal Functionality

Checking for Vulnerabilities

Checking inter connectivity between Screens

Blackbox and White box Testing

Finalizing Checklist

**Deliverable:** Portal for Faculties to upload Resources

Application for Students to get Access to those resources

Represent the vocabulary of process management

**Policy:**

* States why a process exists or its purpose.
* Indicates intentions or desirables attributes or outcomes of process performance
* Should link to the organization’s strategic goals
* Support customer needs/requirements

**Standards:**

* State what must happen to meet the intent of the policy
* May relate to a deliverable produced in the process or to the task procedures within the process
* Regarding deliverables, the standard is used to determine that the delivered product is what is needed.
* Regarding the task procedures standards may specify things such as the time frame or a sequence that must be followed
* Must be measurable, attainable and necessary.

**Inputs:**

Inputs are the entrance criteria or materials needed to perform the work.

**Procedures:**

* Describe how work must be done – how-methods, tools, techniques and people are applied to perform a process (transform the input into the output)
* Indicate the “Best way” to meet standards
* To Do and Check work. People, skills, and tools are incorporated into the Do or Check procedures, and, therefore, are not considered separate components of the workbench.
  + People or Skills are the roles (such as suppliers, owners and customers), responsibilities, and associated skill sets needed to execute a process. *For example, a programmer may require written communication skills and knowledge of Visual Basics.*
  + Manual and automated tools such as CASE tools, checklists, templates code compilers, capture/playback testing tools, and e-mail may be used to aid in the execution of the procedures.

**Components of a Process**

**Output or Deliverables**

* Are the exit criteria, products, or results produced by the process.
* Can be interim or external, Interim deliverables, such as JAD notes, are produced within the workbench, but never passed on to another workbench.
* External deliverables, such as a requirements specification, may be used by one or more workbenches and have one or more customers.
* Deliverables serves as both input to and outputs from a process.

**Process Categories**

Management Process

* Govern how the organization conducts business, including HR, planning, budgeting, directing, organizational, controls, and processes governing responsibility and authority.
* Referred to as quality Management System
* Malcom Bladrige National Quality Award model. *(Award given when a company follows model 75%+)*

Work Processes

* Includes standards and procedures that govern the performance of the specific activity or application.
* Eg: System development, conducting acquisition of software, and change management

Check Processes

* Assure that work processes are performed in accordance with the product standards and customer needs.
* Assume that the management processes are performed according to the organizational standards and needs.
* Eg: Document reviews, program reviews and testing.

**In Context to PDCA cycle**

**Immature Management and work processes** management does not know what workers are doing and worker may not know what management wants, or how management will react to work situation.

**Mature Management Processes** should be stabilized and in conjunction with work processes.

**Check Processes** are a major source of quantitative data needed for the continuous process improvement.

**Mature check and Do processes**, workers need less supervision leaving management free to perform their planning responsibilities rather than inspecting work product or service.

Eg:

1. Management took a decision to change the sales policy for one of its product but still sales were exactly the same as previous.

2. Company crossed check that the new sales strategies and plans were into action are being followed.

3. Company compared the new sales performance with the previous performance to check if the plans and strategies were implemented and followed properly or not.

**Process Maturity**

“Process maturity is the extent to which a specific process is explicitly defined, managed (standardized), measured, controlled, and effective.”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Process | Process | Process | Process | Process |
| Governance | Standardization | Measurement | Control | Improvement |

Authorizing governing bodies to be responsible for process improvement goals and plans.

**Process Governance**

**Process Standardization**

* Assemble, develop, purchase, or otherwise acquire a common process.
* Monitor compliance with process.
* Standardize the common Process.

**Process Measurement**

* Internal standards regarding process performance
* Identify critical process characteristics
* Measure critical characteristics
* Identify upstream measures.
* Measure process critical inputs.

**Process Control**

* Develop a process control plan System for maintaining process control
* Audit process stability
* Identify root problems during process execution

**Process Improvement**

* Identify process improvements
* Continuous process improvement.
* Integrate process improvements with process standardization

**Process Management Process…**

Plan Cycle: (used by the Process Management Committee)

* **Process Inventory:** defines a list of processes that support an organization in accomplishing its goals.
* **Process Mapping** identifies relationships between processes and the organization’s mission/goals, its functions(people), and its deliverables (products and services).
* **Process Planning** sets priorities for process management projects (defining or improving processes)

**Do Cycle** (used by the Process Development Team)

* **Process Definition** defines a process’s policies, standards task procedures, deliverables, people and skill requirements, and tools.
* **Process Controls** identifies the level and type of quality controls needed within a process, and incorporates QC procedures into the process.

**Process Quality Control Activities**

Check that assumptions and criteria for the selection of data and the different factors related to data are documented.

Check for transcription errors in data input and reference.  
Check for consistency in data.  
Check that the movement of inventory data among processing steps is correct.  
Check for uncertainties in data, database files etc.  
Undertake review of internal documentation.  
Check methodological and data changes resulting in recalculations.  
Undertake completeness checks.  
Compare Results to previous Results.

**Process Management Process**

\* go through them deeply using internet!

**Check Cycle** (Process Management Committee)

Process Measurement determines what measures and metrics are needed to strategically and tactically manage by fact, and incorporates tactical measurement into the appropriate processes.

**Act Cycle** (Process Development Team)

Process Improvement uses facts (measurement results) to identify root cause of problems and t change the processes in order to improve results, prevent problems, and reduce variation.

**Process Inventory**

* Master list of processes that support an organization to accomplish the goals
* Scope of the efforts must be defined, focusing on the processes owned and used by the organizational.
* Updated and improved on an ongoing basis

Inventories can be developed by:

* Referencing existing policies, standards, procedures, and system development life cycle manuals
* Conducting brainstorming and affinity grouping session
* Surveying and interviewing employees
* Starting with existing process inventories (such as other companies’ inventories, or
* Information Systems Process Architecture) and updating to reflect organizational
* Structure and terminology

**Process Mapping**

* Identifies or “maps” relationships between processes and the organization’s mission and goals, its functional units or roles (people), and its deliverables (products and services).
* Objectives of process mapping are to understand how a process contributes to meeting the organization’s mission and goals, who is responsible for the process, and how the process interface to product the organization’s outcomes.
* To map processes, executive management (Quality Council) must have identified the organization’s mission, long and short-term goals, organizational structure, and deliverables.

If formal strategic planning is not regularly performed, identifying an organization’s mission and goals is difficult.

Processes should be mapped to mission and goals, to functional units (people), and to deliverables in separate matrices.

Generic process can be used for each mapping:

* Create a Matrix
* List processes across the top of the matrix
* On the left side of the matrix, list the goals, functional units or roles or deliverables. Right hand side – A process may support multiple goals.  
  Processes have primary owners, suppliers and customers. Identify a linkage in this matrix by using “o”, “s” or “c” in the intersection to distinguish between the roles.
* In the matrix, indicate the usage of the deliverable by placing a “c”,”r”.”u” and /or “d” in the intersection.  
  “c” is used when the deliverable is created, or the service is provided through the process.  
  “r” indicates the deliverable is referenced or used as input to the process.  
  “u” indicates the deliverable is updated or revised in the process.

“d” means the deliverable is delete, or retired, etc.

* + - 1. Login/SignUp Process
      2. File Upload
      3. Accessing Files
      4. Modification of User Details
      5. Feedback

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**Process Improvements**

(It talks about Prioritizing processes.)

GAP ANALYSIS – GAP – BPR – (Process Improvement is the part of Process Improvement)

Process improvement is a continuous, interactive process. It involves finding the defects, accumulating the defects in a manner that identifies the significant from the insignificant, selecting a single defect, and identifying the root cause of that defect.

Process Improvement has two components:

* Establishing process improvement teams, (PIT), which may or may not include members of the process development team
* Providing the teams with a process to use for process improvement.

**Process Improvement Process**

1. Select process and team
2. Describe current process
3. Assess process for control and capability
4. Brainstorm for improvements
5. Plan how to test proposed improvement
6. Analyze results
7. Compare results
8. Change process or redo steps 4-8

**Example:**

*Process*: Uploading a file on the server.

*Process* Included: Login, navigating to the exact Folder, Uploading File

*Description*: This process is used to make a faculty upload files on the server according to the course and subject.

*Improvements:* File Upload Size should be limited upto 5 mb.

File should be in one of the selected formats.

Logs should be maintained to track the changes on the server.

*Test:* Uploading file larger than 5 mb.

Uploading file in other formats than specified ones.

Doing unnatural things to check if all the activities on the server are getting logged up.

*Compare:* Checking if file upload greater than 5 MB, file upload in other formats are creating an error or not. Checking if all the activities are getting recorded in LOG file or not. If everything is working fine, then implement the changes or repeat the steps.

*Changes:* Changes will be implemented to the selected Process.

**Process Output Indicators**

This is the next stage of process improvement. Shows how Process has improved on the certain factors.

Examples of process output indicators are listed below:

1. **Amount** **of** **Rework**: factors which were involved while working (Team members, process phases)
2. **Yield** **or** **Productivity**: what came out after putting up so much of things.
3. **Errors (Defects) in products, reports, or services**: What reports are getting generated after process improvement.
4. **Cycle Time**: Time taken for detection and recovery for the error.
5. **Timeliness**: How fast the specific task is done
6. **Number of schedules missed:** This indicates how many times schedule was missed because of some or the other factor
7. **Engineering changes per document:** It tells to maintain all the records for each and every change taking place in the process for further references.
8. **Downtime because of maintenance, parts shortage or other factors:** This indicates for how much time the process stopped because of maintenance, part shortage or any other factor.
9. **Overtime:** How many people worked overtime to meet the requirements.
10. **Absenteeism or sick leaves:** How many people got sick and because of which process got delayed

**What is ISO 9001?**

ISO 9001: 2008 is the International Standard for Quality Management Systems (QMS) Requirements.

* Process Approach
* Identify the processes necessary for effective implementation
* Understand interactions between these processes
* Document the processes to assure effective operation and control

Aim of the standard

* To enhance customer satisfaction through the effective application of the system,
* Including processes for continual improvements of the system and the assurance of conformality to customer and
* Applicability statutory and regulatory requirements

<<ISO Slides will be forwarded>>

**Quality Standards Relational**

* Customers want and need assessments of supplier quality
* Means
  + Individually audit (i.e. qualify) vendor:
    - Specific Products
    - Processes (e.g. manufacturing, design and development)
* Alternative:
  + Common Quality Assurance standards and audits

**Software Quality Assurance Tasks**

* Generation of QA Documentation
* Review of project materials
* Auditing
* Monitoring of project status
* Inspection of delivered items
* Monitoring corrective actions
* Participation in project activities
* Guidance of project
* Testing oversight

**Audit**

*Formal Definition:* Audits provide an independent evaluation of software products or processes to ascertain compliance to standards, specifications and procedures based on objective criteria that included documents that specify:

* The form or content of the product to be produced
* The process by which the product shall be produced
* How compliance to standard or guidelines shall be measured+

Objectives:

* Program Development and Administration
* Audit Preparation and Execution
* Audit Reporting and Follow-up

Audit Preparation/Reporting Objectives

* Compliance with standards
* Effectiveness of controls
* Opportunities for improvements
* Regulatory requirements
* Permit registration

Auditing Stages

* Planning and preparation
* Performance
* Reporting
* Corrective action and follow-up

**Reasons for Audits**

* Contractually required
* Verify QMS meets a standard
* Confirm QMS implementation
* Verify QMS effectiveness
* Evaluate compliance with standards

**Audit Responsibilities**

|  |  |
| --- | --- |
| **ROLE** | **RESPONSIBILITIES** |
| Auditor | * Communicate, clarify, comply with audit requirements * Effective audit as assignment * Document observation, report results * Very electiveness of corrective actions * Retain/safeguard Documents * Maintain confidentially of audit |
| Lead Auditor | * In-overall charge for all phases of audit * Selecting team members * Prepare audit plans * Represent team to auditee’s management * Submit audit work * Maintain ethics of team |
| Client | * Determine need, scope, purpose of audit * Initiates audit * Selecting auditing organizations * Gets audit reports * Determines follow up actions |
| Auditee | * Inform employees * Appoint staff to accompany the co-operate audit team * Cooperate * Provide access to facilities and materials * Provides resources * Determine and perform corrective actions |

**Auditing Standards**

* ANSI/ISO/ASQC Q10011-1994 Guidelines for auditing QMS
* ISO 9001:2000
  + [ISO 9000-3 Guideline]
* IEEE 1028
* TickIT
* SEI (CMMI)

**Software Audit**

*Audit Teams*

* Audit
* Checklists
* Compliance
* Conformance
* Customers
* Interviews
* Objective Evidence

*Audit Types*

* First Party
* Second Party
* Third Party
* Internal
* External
* System
* Process
* Product
* Compliance
* Regulatory
* Management
* Quality
* Functional configuration
* Physical configuration
* Administrative Audit
* Etc

*Audit Methodology*

* Purpose
* Prespectives
* Frequency
* Criteria
* Procedures

*Audit Percept*

* Function of management
* Qualified auditors
* Measures against standards
* Objective Evidence
* Focus on control system

*Audit Steps*

* Planning
* Preparation
* Execution
* Reporting
* Corrective action
* Verification
* Follow-up

**Software Audits**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Management Audits** | **Audit Perspectives** | **Audit Process** | **Audit Tools** | **Audit Frequency** |
| Adequate controls exist  Controls are being implemented  Control really works | Customers  \* Auditee  \* Client  **\*** Organizational  Auditor | Objective  Scope  Entry Criteria  Assessment Criteria  Exit Criteria | Checklist  Authoritative Documents  Flowcharts  Interviewing  Data Collection | Project Mile Stone  Quality Milestone  External requirements  Internal request  Major organizational change |

**Audit** **Phases**

* **Preparation:** Starts from decision to conduct audit. Includes team selection through on-site gathering and review of information. (Which members will be there and what will they be doing)
* **Performance:** On-site opening meeting through gathering and analysis of information; what people think of as “the audit”.
* **Reporting:** Exit meeting through publication of formal audit report Is the translation of audit team’s conclusions into tangible product. (Auditing head will have to suggest the ways to implement and what changes will take place after implementing the changes)
* **Closure:** Tracking and evaluating of corrective actions taken based on reported weaknesses.

**Data Collection**

* Interviews
  + Data gathering
  + Not objective evidence
  + Conducting an interview
* Sampling
* Trace Forward
* Trace Back

**Audit Data Sources**

* Physical properties (Infrastructure/Resources)
* Observation
* Documents and records
* Interviews
* Patterns of information

**Audit Steps**

**Planning:** Purpose, scope, team resources and selection, authority, standards understanding or processes, contact auditees, evaluate documented system, create checklists of data needed.  
 Produce: audit plan, audit checklists, logical arrangements, initial evaluation fo methods, plan for fact collection.

**Performance:**  
{Field work} Meeting with Auditees -Opening meeting: understanding of process and control communicating with audit team members communicating with auditee

**Reporting:**Accuracy, conciseness, clarity, timeliness, and tone; Introduction, overall summary, statement of findings; to Auditee, client and official files (as quality record)

**Findings:**clear, concise statements of generic problems;

**Closure:**(After report) evaluation of responses (CAPlan for root causes); verification of corrective actions; closure of audit (common at next audit); assembly of the records (good rule is five years, but audit plan specifies);