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COLLEGE OF ENGINEERING  
AND COMPUTER SCIENCE

# Advanced Software Process

Part I: Software Process Maturity

## *3. Software Process Assessment*

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# Course Roadmap

## Part I: Software Process Maturity

- 1. A Software Maturity Framework
- 2. The Principles of Software Process Change
- 3. Software Process Assessment
- 4. The Initial Process

## Part II: The Repeatable Process

- 5. Managing Software Organizations
- 6. The Project Plan
- 7. Software Configuration Management (Part I)
- 8. Software Quality Assurance

## Part III: Defined Process

- 9. Software Standards
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- 13. Defining the Software Process
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## Part IV: The Managed Process

- 15. Data Gathering and Analysis
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- 17. Defect Prevention
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# Software Process Assessment

- Assessment Overview
- Assessment Phases
- Five Assessment Principles
- The Assessment Process
- Assessment Conduct
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# Assessment Overview

Process assessment helps software organizations improve themselves by identifying their critical problems and establishing improvement priorities.

The basic assessment objectives are:

- To learn how the organization works
- To identify its major problems
- To enroll its opinion leaders in the change process

# Assessment Overview

A software **process assessment** is not an **audit but a review** of a software organization to advise its management and professionals on **how they can improve their operation**.

It is conducted by a team of SW professionals who typically have **assessment experience or training**.

# Assessment Phases

Assessment typically conducted in three phases:

- Preparation
- Assessment
- Recommendations

# Assessment Phases

## Preparation

- **Senior management** becomes committed to the process, agree to participate personally, and commits to take action on the resulting recommendations or explain its reasons for not doing so.
- Phase one concludes with a **brief one-or two-day training** program for the **assessment team**.

# Assessment Phases

## Assessment

- Phase two is the **on-site assessment** period.
- Assessment activity typically takes several days, although it can take two or more weeks, depending on the size of the organization and the assessment technique used.
- Phase two **concludes with a preliminary report of the findings** to local management.



# Assessment Phases

## Recommendations

- In phase three **the findings and action recommendations are presented** to the local managers.
- A **local action team** is then assembled to plan and implement the recommendations.
- The **assessing organization** may provide assistance during this period and may participate in a subsequent **follow-up assessment**.

# Five Assessment Principles

As in many activities, the basic requirements for a good assessment are a competent team, sound leadership, and a cooperative organization.

Because the software process is human-intensive, however, some special considerations should be kept in mind.

# Five Assessment Principles

- The need for a **process model** as a basis for the assessment
- The requirement for **confidentiality**
- **Senior management** involvement
- An **attitude of respect** for the views of the people in the organization being assessed
- An **action** orientation

# Start with a Process Model

- An **assessment** implies a **standard**.
- The organization's process is **reviewed in comparison with some vision** of how such processes should be performed.

# Observe Strict Confidentiality

- The assessment's purpose must be to support the organization's improvement program and not to report its problems to higher management.
- Even when initiated with this intent, it is extraordinarily difficult to maintain confidentiality, particularly when a chief executive demands to see the results.

# Observe Strict Confidentiality

- If assessment team provides such data, however, people will learn that they **can not** speak in confidence.
- As this becomes widely known, the assessment group will find it **increasingly difficult to conduct assessments that uncover the real issues.**
- **Confidentiality** is required at all organizational levels.

# Involve Senior Management

- The senior manager sets the **organization's priorities**.
- Site manager
  - Senior manager of total organization
  - The site manager **must be personally involved in the assessment** and its follow-up action plans.
  - If not, the work will not be given sufficiently priority.

# Keep an Open Mind and a Level Head

- Even when the assessment team is appropriately supportive, some local people will be **resentful** and **not cooperate**.
- If the team members' actions clearly **demonstrate their desire for active collaboration** with the on-site professionals, however, this will be recognized and people generally will respond positively.



# Focus on Action

- The **assessment** must be directly toward improvement.
- An **action orientation** keeps the questions focused on current problems and the need to solve them.
- If the assessment turns into a **general exploration**, it will **not focus on the priority issues or produce recommendations** that will be implemented.
- Management must **either focus on taking action or not do an assessment**.

# The Assessment Process

- The first step in any assessment is to identify **the organization** to be assessed and **the team** to do it.
- This typically requires the **site manager's commitment** to doing the assessment and willingness to assign sufficient skilled resources to get it done.

# Forming an Assessment Team

- The **assessment team leader** is selected first.
- The assessment team **members** should all be experienced SW developers, and one or more should have experience in each phase of the SW process.
- **Four to six professionals** typically form an adequate team, although more can be used if desired.

# Guidelines for Selecting Assessment Team Members

Each assessment team member should:

- Have at least **eight to ten years** professional software experience
- Be **well respected** in the organization
- Be **able to deal with people** in an informal and non-threatening manner
- Be a **team player**
- Have attended **assessment training** with this team

No assessment team member should:

- Be currently **serving in an audit or review capacity** for any of the projects being assessed
- Be a **line manager** over any of the projects being assessed or people being interviewed
- Be **working directly on any of the projects being assessed** or working on their direct support

# Self-Assessment Considerations

While it is possible for organizations to **assess themselves**, they should be aware of several **potential problems**.

Few organizations can afford a staff of assessment experts.

# Assessment Ground Rules

It is desirable to have a **written set of assessment ground rules** for the organization being assessed and for the assessment team members.

For an external assessment, the site manager and the assessment team leader should sign **a written agreement covering these ground rules.**

A copy of the standard agreement used by the SEI is shown in **Appendix B.**

# Assessment Team Training

As the **assessment team** is formed, the **members must agree to participate fully** during the training period, on-site review, and wrap-up meetings.

# The On-Site Period

The **assessment** starts with a **presentation** to the site manager and staff.

The **assessment ground rules** are discussed, as well as the **assessment principles** and the **overall schedule**.

An **overview meeting** is then held with all the site participants, including the project managers and the professionals to be interviewed.



# Assessment Conduct

The **assessment** should focus on **what the projects actually do, how they do it, the problems encountered, and the results obtained.**

A **selected set of questions** should be prepared in advance of the actual assessment period.

**Meetings** are next held with small group of selected professionals who have **expertise in various facets of the software process.**

# Probing Questions

In conducting assessments, it is hard to obtain really accurate information.

- Questions are often misunderstood.
- The respondents may have a different understandings of some common terms.
- The respondents may not be broadly aware of the work in their own organization.
- Occasionally people are unwilling to risk the truth.

# Assessment Conclusions

- At the **assessment conclusion**, the team prepares **a report on its initial findings**.
- The report should be **a composite summary of site status**, together with more detailed findings in key areas.
- Prior to **reviewing** this material with the **site manager**, the team should review it with **the project managers**.

This should identify any overlooked problems or any misstated or overemphasized topics.

# Assessment Conclusions

- The last site actions is to **review the composite findings with the site manager and staff.**
- Any questions are addressed, and the schedule for follow-up work is reviewed.
- If possible, all the site personnel who participated in the assessment should attend this meeting.

# Assessment Report

The final assessment team action is the presentation of a written final report and recommendations to the site manager and staff.

- The recommendations should highlight the three or four items of highest priority.
- Since no organization can handle more than a few priority tasks at a time, the total number of items requiring attention should be limited to around ten.
- These should be clearly explained with the assessment team's views on implementation priority.

# Action Plans

- The **action plans** are next **prepared by the local site organization**, generally under the guidance of the **team member** named for this purpose.
- If properly chosen, this **member** is now fully knowledgeable on the issues and is able to start quickly.

# Assessment References

- Typical SEI-Assisted Assessment Schedule [Table 3.2]
- Guidelines for Selecting Functional Area Representatives [Table 3.3]
- Guidelines for Finding Formulation [Table 3.4]
- A Typical Outline of the Findings Presentation [Table 3.5]
- A Typical Final Report Outline [Table 3.6]

# Reassessments

Organizations should generally conduct follow-up assessment one to two years after the initial action plans have been developed and approved.

This is important for several reasons:

- To assess the progress that has been made
- To provide a visible future milestone for completion of the actions from the prior assessment
- To establish new priorities for continued improvement



# Implementation Considerations

- The greatest **assessment risk** is that **no significant improvement actions** will be taken.
- Without proper management focus a few superficial efforts may be made, but soon everything will revert to business as usual.

# Implementation Considerations

A catalyst is needed to maintain the improvement priority, such as **goals** and **management reviews**.

- **Long-term goals** are first established, and then **sub-goals** are defined for intervening **two-or three-month periods**.
- A **senior management quarterly review** then maintains high-level checkpoint visibility, crystallizes the plans, and creates the periodic crises required to get things accomplished.

# Risks

Some of the other key risks and potential actions to alleviate them are schedule conflicts, inadequate support, and lack of follow-through.

# Risks: Schedule Conflicts

- Despite the best intentions, **crises that conflict with assessment plans often arise.**
- The most damaging of these require the site manager to miss either the opening or the closing meeting or both.
  - Such unfortunate schedule conflicts have **happened in about one-third of the assessments.**
  - A solution -substitute executive who can speak for the site manager and then arrange for a later private meeting to cover the issues

# Risks: Inadequate Support

- The reason of **inadequate support** is that the assessment commitment is **made at too low a management level**.
- Often only a very senior executive can **take a sufficiently long-term view** to avoid becoming defensive.
- Also, even fairly high-level managers are often **only responsible for portions**, so they cannot provide adequate **organization-wide** priority.

# Risks: Lack of Follow-through

- Frequently management change or other high-priority issues reduce the focus on action plan implementation.
- The most important determinants of success is the presence of an aggressive manager to lead the change efforts, a capable process improvement staff, and a clearly stated improvement goal.

# Staffing

- **Staffing** is generally the most serious implementation problem.
- In addition to staffing the assessment itself, the **other staffing needs** will generally include:
- A **small, full-time staff** to focus and to guide the improvement efforts
- **Part-time project participation** in the action plan working group
- Project **review and implementation** of the resulting actions

# References

Humphrey, Watts S., *Managing the Software Process*, The SEI Series in Software Engineering, Addison-Wesley, 1989. (29th Printing, May 2003) (ISBN 0-201-18095-2)