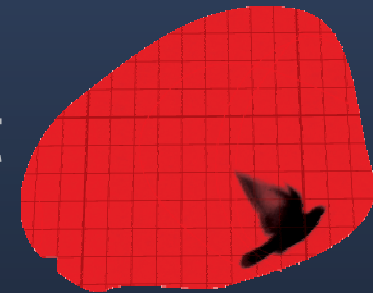O'REILLY®

Applied Software Project Management

Process Improvement

Life Without a Formal Process

■ Many process improvement experts see the world as black and white.

▷ They often feel that there are bad software teams without a formal process, and good teams that have one in place.

▷ But the world is not that simple!

Life Without a Formal Process

- Teams can be effective without a formal software process
  - ▷ Teams can consist of "jack-of-all-trades" programmers who understand the business of the organization.
  - ▷ "Skunk works" programmers may often take initiative and build useful software without input.
  - ▷ A highly capable development manager may be willing to put in an enormous effort.

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Life Without a Formal Process

- An organization that produces software always has a software process
  - ▷ It's just not *formal*, or documented and repeatable
  - ▷ And teams without a formal process can be happy and productive when they can point to their successes!
  - ▷ Except when their projects fail.

Life Without a Formal Process

■ A team without a formal process does not scale up easily.

  ▷ Programmers who used to produce lots of software find that their projects have started to feel "bogged down."

  ▷ This often happens when a small programming group with a good track record is faced with having to build a project on a larger scale.

  ▷ It also happens when teams expand.

 Andrew Stellman & Jennifer Greene

Life Without a Formal Process

- If there are no complaints about the way the team is building software, then there's no reason to change!
  - ▷ However, few teams are really in this situation for long.
- Expanding the team is not the only place a formal process is useful.
  - ▷ It can also help in an organization where experts, users, or stakeholders are no longer readily available to the programmers.

Software Process Improvement

- *Software process improvement* is the art and science of changing an organization's software process in order to build better software.
- Software process improvement always involves looking at the big picture.
    - ▷ This means writing down the entire software process as a whole and making sure that it is followed on each project.
    - ▷ It involves looking at entire projects and identifying areas that can be improved.

Frameworks and Methodologies

- Models and certifications that help assess the state of the organization's process and serve as a *framework* for improving that process.
  - ▷ CMM, ISO 9000 and Six Sigma are frameworks
- There are also *methodologies* that an organization can adopt that describe the complete set of activities, roles, and work products needed to build software.
  - ▷ Rational Unified Process and Extreme Programming are methodologies.

Capability Maturity Model

- The CMM defines the characteristics of a mature, capable process in a way that can be measured and compared to processes at other organizations.
  - ▷ The CMM consists of areas of improvement, goals that must be met for each area, and specific practices to be implemented.
  - ▷ A *software engineering process group* within the organization identifies problems and inefficiencies and defines practices to address them.
  - ▷ Independent assessors verify that an organization is in compliance with CMM practices.

ISO 9000

■ ISO 9000 is a family of *quality management* standards defined by the International Standards Organization. It is based on core principles:

 ▷ Organizations must focus on their customers by understanding current and future customer needs.

 ▷ Leaders within the organization must create and maintain an environment in which people can become involved and fulfill the organization's objectives.

 ▷ People at all levels are important to the organization.

 ▷ Activities and resources are best managed as a process.

 ▷ Organizations have many interrelated processes, which must be understood and managed as a system.

 ▷ The organization should continually improve its performance.

 ▷ Decisions should be well informed and based on real data and information.

 ▷ An organization and its suppliers are in a mutually beneficial relationship.

Six Sigma

- *Six Sigma* is an approach to improving quality in manufacturing and business processes.
  - ▷ The Greek letter sigma refers to standard deviation—Six Sigma means "six standard deviations from the mean."
- DMAIC is a five-phase approach to Six Sigma improvement
  - ▷ **D**efine opportunities, **M**easure performance, **A**nalyze opportunity, **I**mprove performance, **C**ontrol performance

Extreme Programming

■ XP consists of a set of rules and practices that govern all areas of software development: planning, designing, coding, and testing.

▷ The goal of XP is to lower the cost of change. To meet this goal, many XP practices are highly iterative.

▷ XP is a disciplined and well-defined process.

▷ By making the stakeholders part of the project team, XP addresses the problem of the hands-off customer.

Rational Unified Process

- RUP is a popular off-the-shelf process based on the idea of highly iterative development
  - ▷ One thing that makes RUP unique is that it is a product in addition to a process.
- RUP includes a disciplined approach to requirements management that is based on the idea of managing changes.
  - ▷ RUP incorporates software design using the Unified Modeling Language (UML), a visual modeling system for graphically representing the use cases, class model, object interactions, and components of the software.
- One core element of RUP is the continuous assessment of the quality of the system.