

Process and Procedure Definition: A Primer

Mike Bandor
Member of the Technical Staff
Acquisition Support Program
mbandor@sei.cmu.edu



Overview

What is a “process”?

Definitions

Varieties of Processes & Procedures

Why Do They Need to be Defined?

Components

Documentation Relationships

Documentation Methods

Documenting Processes Example

Documenting Procedures Example

Group Exercise

References



What Is a Process - 1

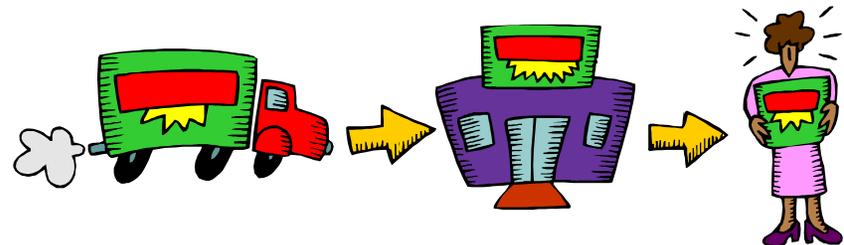
A process is not the same thing as a procedure

A process is not a:

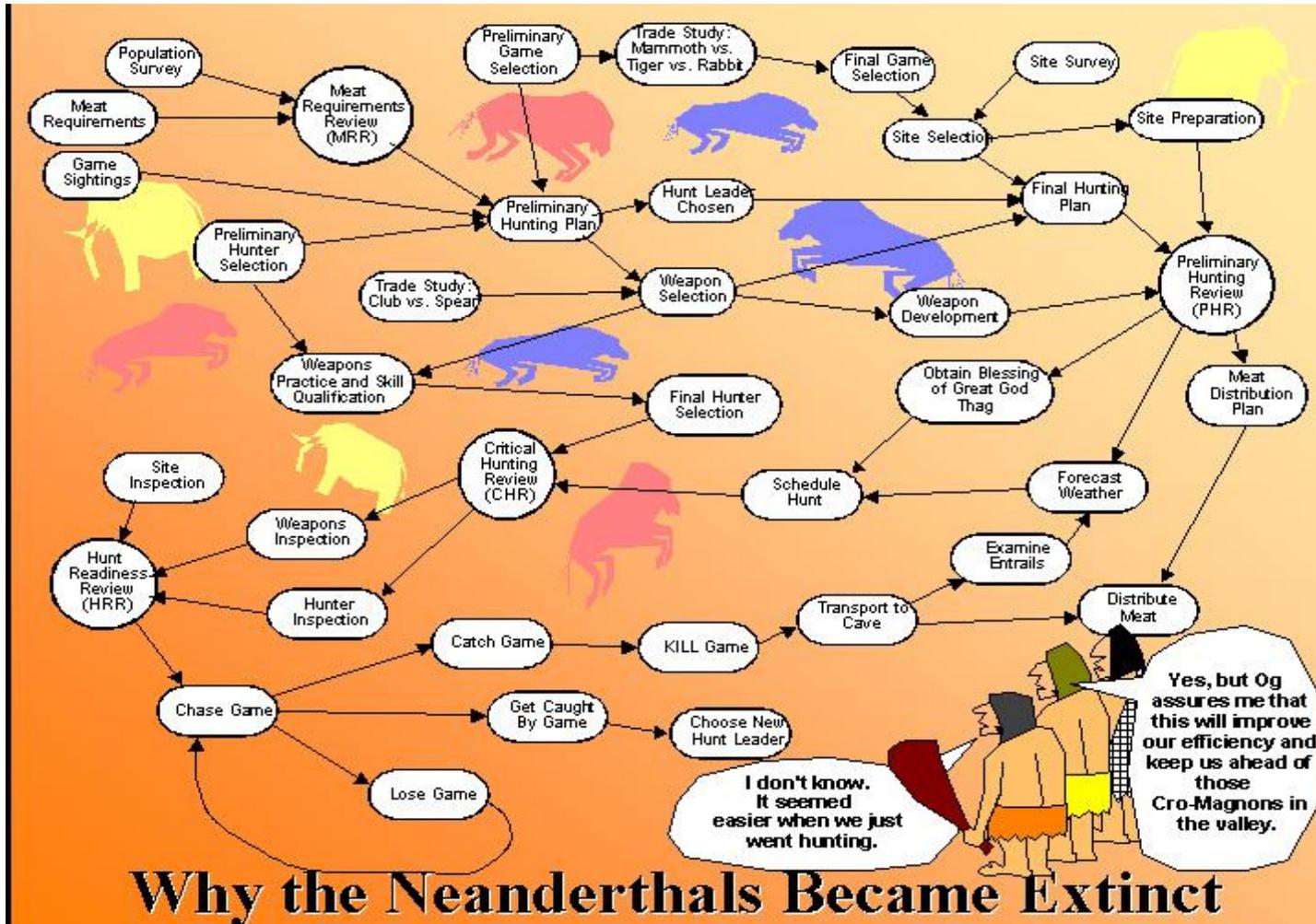
- High-level flowchart
- Lifecycle standard (e.g. Mil-Std-498)
- Tool

A process defines “what” needs to be done and which roles are involved

A procedure defines “how” to do the task and usually only applies to a single role



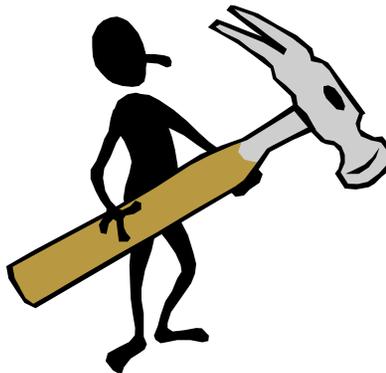
What Is A Process - 2



What Is A Process - 3

A process consists of the following:

- Roles and responsibilities of the people (roles) assigned to do the work
- Appropriate tools and equipment to support individuals in doing their jobs
- Procedures and methods defining “how” to do the tasks and relationships between the task



Definitions – 1

Dictionary.com:

- A systematic series of actions directed to some end: *to devise a process for homogenizing milk.*
- A continuous action, operation, or series of changes taking place in a definite manner: *the process of decay*

Capability Maturity Model Integration (CMMI) V1.2:

- *In the CMMI Product Suite, activities that can be recognized as implementations of practices in a CMMI model. These activities can be mapped to one or more practices in CMMI process areas to allow a model to be useful for process improvement and process appraisal. (See also “process area,” “subprocess,” and “process element.”)*



Definitions – 2

Process Description (as defined by the CMMI V1.2):

- *A documented expression of a set of activities performed to achieve a given purpose.*
- *A process description provides an operational definition of the major components of a process. The description specifies, in a complete, precise, and verifiable manner, the requirements, design, behavior, or other characteristics of a process. It also may include procedures for determining whether these provisions have been satisfied. Process descriptions can be found at the activity, project, or organizational level.*



Definitions – 3

Managed Process (as defined by the CMMI V1.2)

- *A performed process that is planned and executed in accordance with policy; employs skilled people having adequate resources to produce controlled outputs; involves relevant stakeholders; is monitored, controlled, and reviewed; and is evaluated for adherence to its process description. (See also “performed process.”)*

Defined Process (as defined by the CMMI V1.2)

- *A managed process that is tailored from the organization’s set of standard processes according to the organization’s tailoring guidelines; has a maintained process description; and contributes work products, measures, and other process improvement information to the organizational process assets. (See also “managed process.”)*



Varieties of Processes & Procedures - 1

“As-is”

- Defines how you are doing business today
- Provides a baseline for future improvement efforts



“To-be”

- Defines future (e.g. new and improved) process with a desired end-state
- “Paving over the cow path” does NOT constitute a “to-be” process (i.e., nothing of any significance is done).

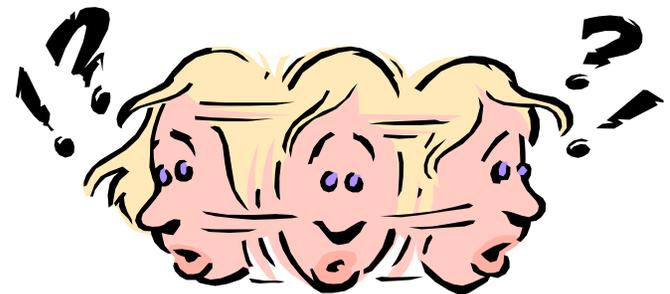


Why Define Processes & Procedures - 1

Consider the following questions:

- Is the process important for the *business goals*?
- Is there *only* one person who knows *how* to do the task?
- Do *many* people perform the task, but one way is *preferred*?

If you can answer “Yes” to any one of these questions, then you **NEED** to define your processes!



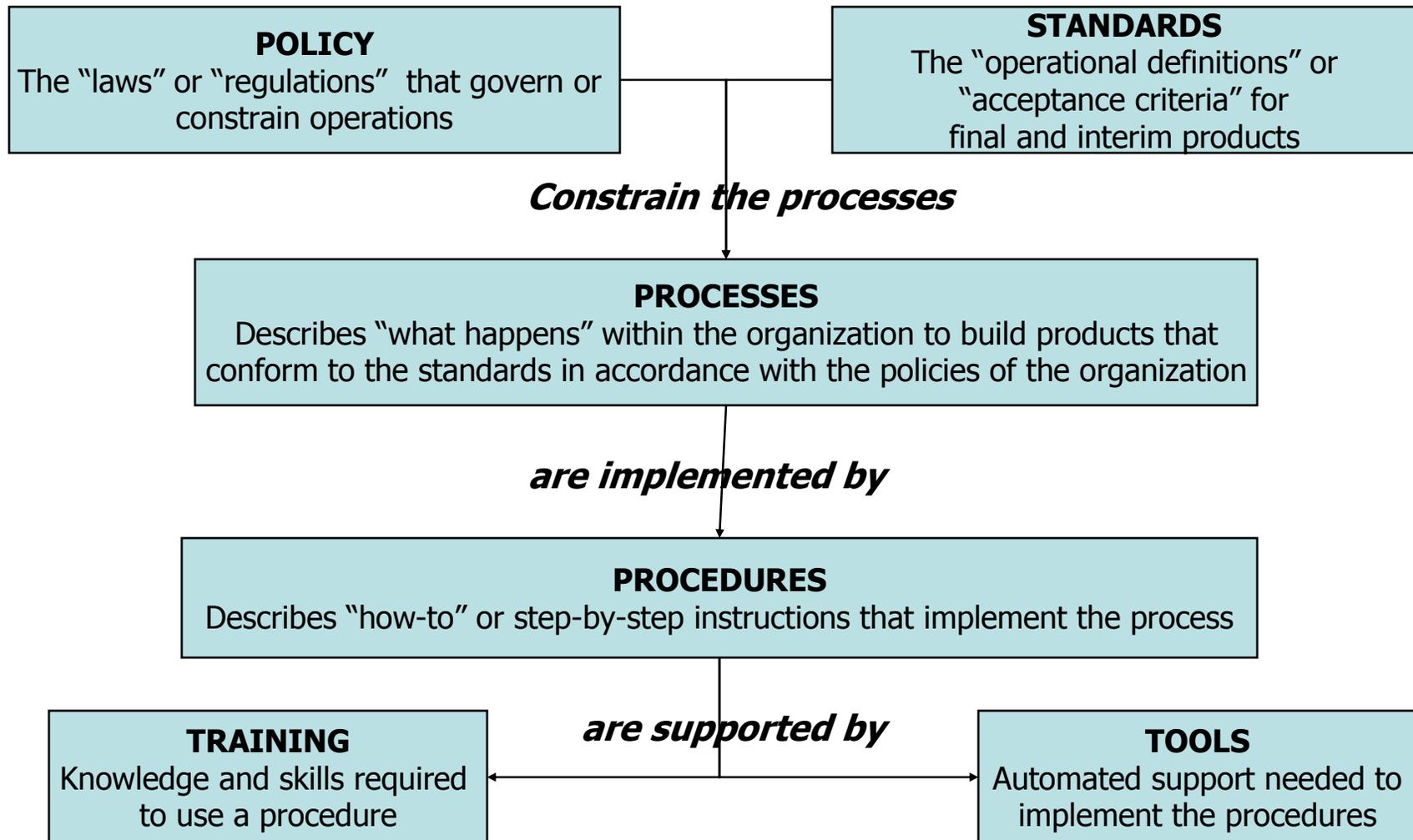
Why Define Processes & Procedures - 2

Benefits of defining your processes and procedures:

- Provides visibility into areas of quality, productivity, cost and schedule
- Improves communication and understanding
- Aids in the planning & execution of plans
- Provides the ability to capture Lessons Learned
- Helps facilitate the analysis/execution of organization-wide processes
- Provides basis for training & skills assessment



Documentation Relationships



Common Components - 1

Process and Procedure components

- Identifier
- Name
- Purpose
- Owner
- Entry & Exit Conditions
- Input & Output required
- Roles & Activities (steps)
- Methods & Tools
- Measurement(s)
- Review(s)
- Training & References



Common Components - 2

Identifier

- Unique identifier; shows where the process fits within a hierarchy of processes (e.g. SQA 1.2.1)
- Procedures may not necessarily have an identifier
- Not the same as the Configuration Identifier

Name

- The name of the process or procedure being performed
- Starts with a verb (e.g. Perform Document Peer Review)

Purpose

- Describes what is accomplished & when it is to be accomplished



Common Components - 3

Owner

- Describes what organization or work center “owns” and is responsible for the process and its description

Entry & Exit Conditions

- Not the same as Input & Output – conditions are a “state”
- Conditions that must be met before starting or exiting
- Entry conditions can also be thought of as “trigger events”



Input & Output

- Items needed to perform the process/procedure (input)
- Items that are created (artifacts) as part of the process/procedure (output)
- Input can be modified and become an output



Common Components - 4

Roles & Activities (steps)

- Activities define what steps are being performed
- Roles define who is performing the step
- Procedures are usually defined for a single role
- Process activities are defined at a high-level and decomposed into lower levels (e.g. each step may be a sub-process)



Methods & Tools

- Lists what tools (e.g. MS Word, Test Director, etc.) is used



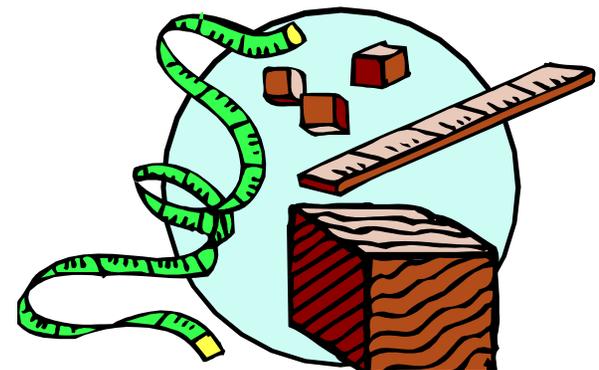
Common Components - 5

Measurement(s)

- What measurement(s) are performed as part of this process or procedure (e.g. number of defects found, review time, etc.)

Review(s)

- Lists what reviews are accomplished as part of the process or procedure (e.g. Branch Chief Review, QA Rep Review, etc.)



Common Components - 6

Training

- What training is needed in order to perform the process or procedure

References

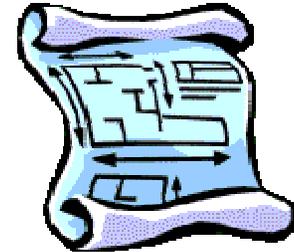
- Lists reference material (e.g. checklists, AFIs, user manuals, etc.) necessary



Documentation Methods - 1

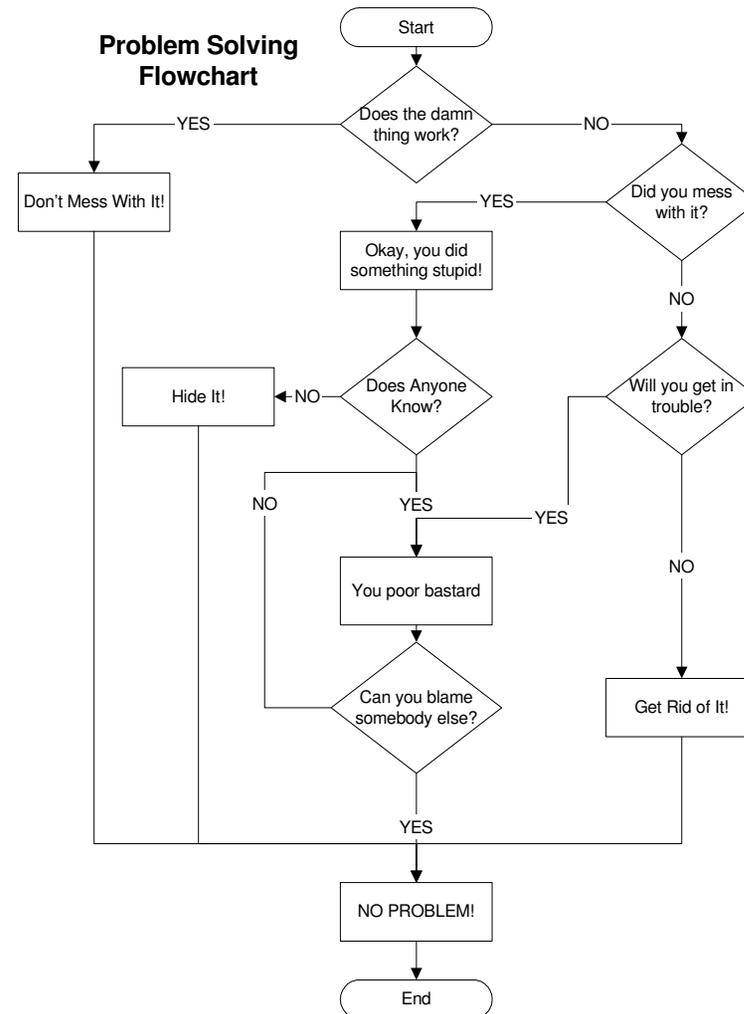
Different methods can be used

- Graphical
 - Flowcharts
 - Cross-functional diagrams
 - Integrated Definition for Functional Modeling (IDEF) diagrams
- Narrative description
 - Entry-Task-Verification/Validation-eXit (ETVX)

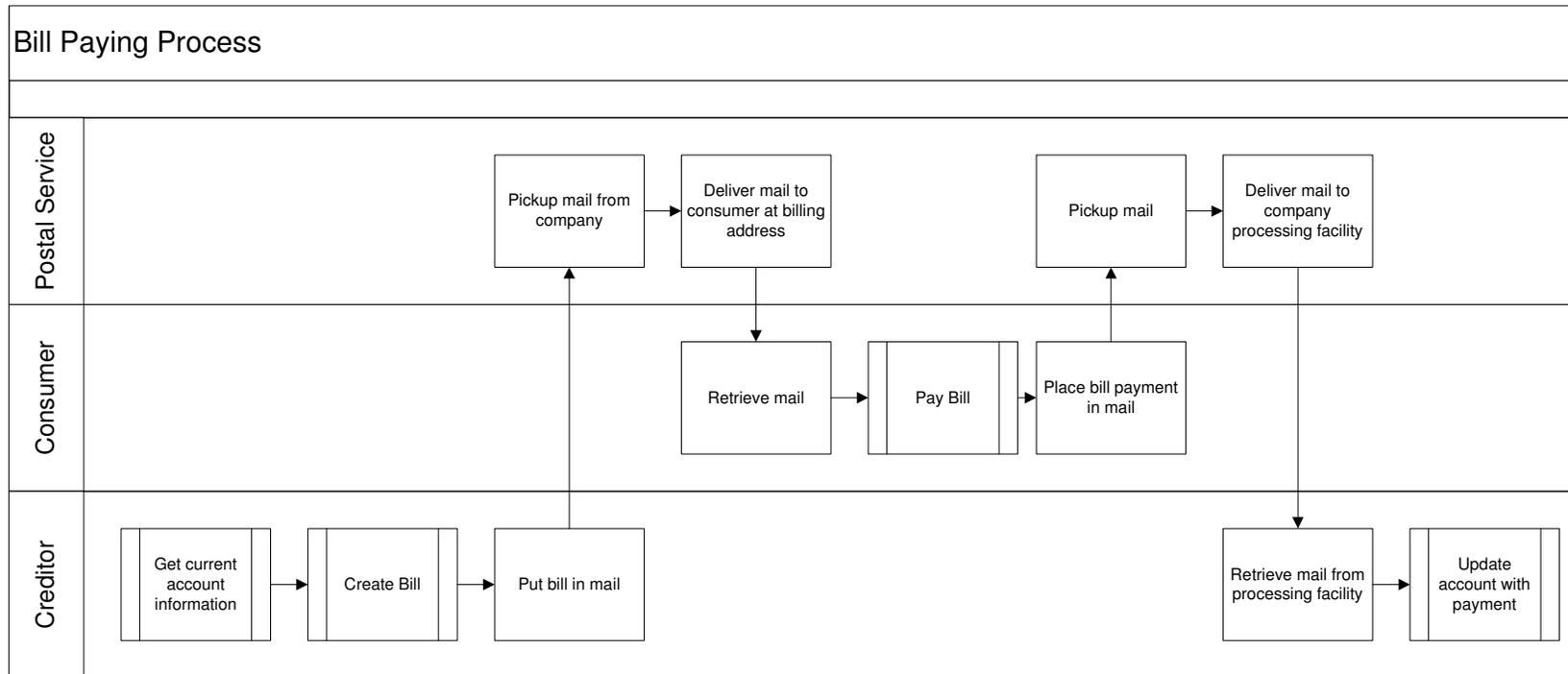


Documentation Methods - 2

- Flowcharts show activities, decisions, etc
- Standard symbols used



Documentation Methods - 3

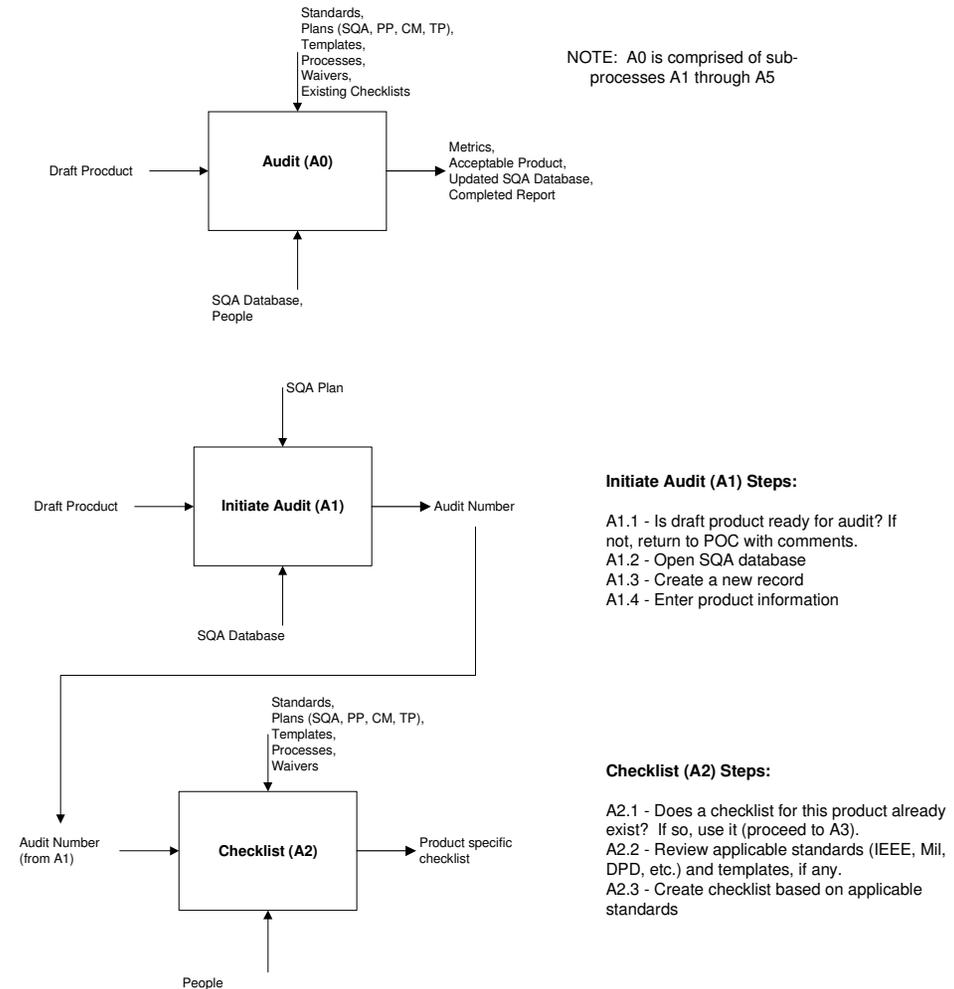


- Cross-Functional Diagram (a.k.a "swim lane" diagram)
- Shows roles and functions performed
- Uses standard symbols

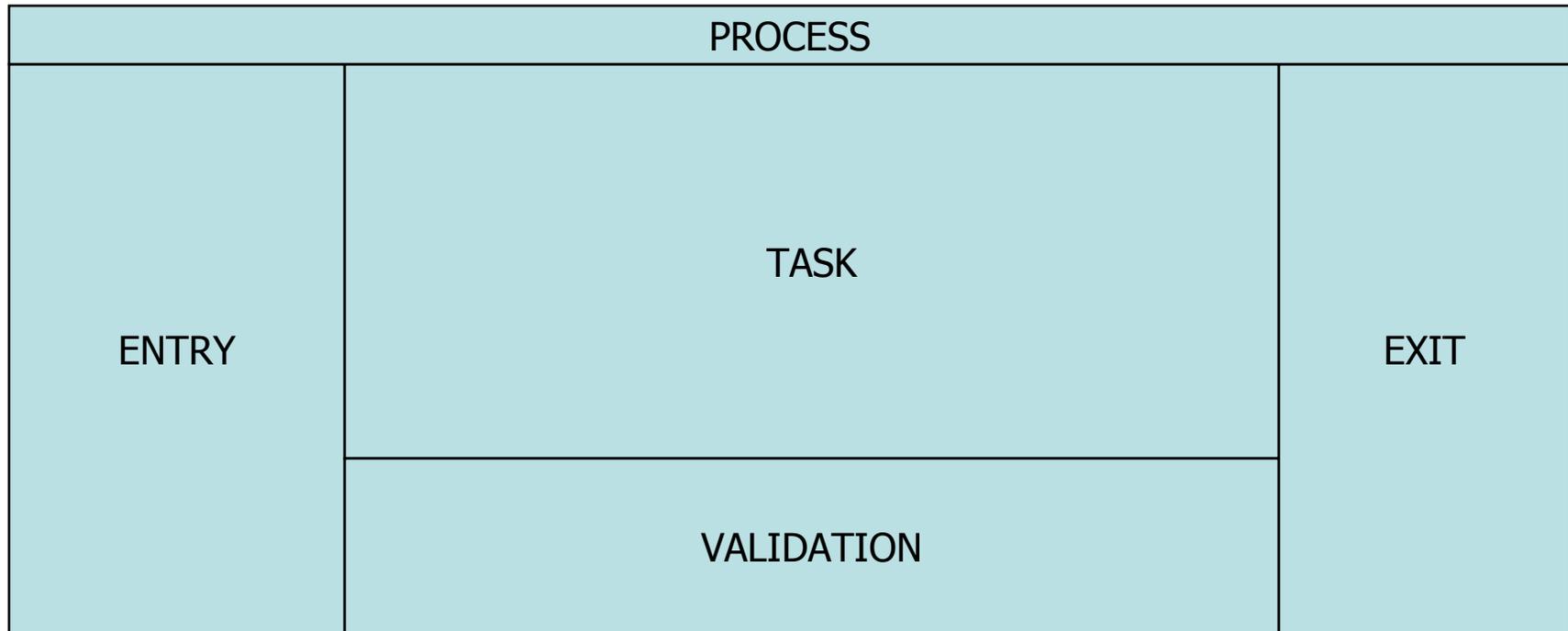


Documentation Methods - 4

- IDEF Diagrams
- International standard
- Standard symbols used
- Shows input (material, requirements, equipment, etc.), Control mechanisms, Agents (humans, machines, & software), and output (products, services, etc.)
- Decomposed into lower-level activities



Documentation Methods - 5



- ETVX originated by IBM in 1980's
- Indicates the entry criteria (state), the tasks to be performed, the validation/verification criteria, and exit conditions (state)



Documentation Samples

Implementation Samples:

- Process Specification Template Sample
 - Tailored versions of ETVX format
- Can be supplemented with additional documentation (flowcharts, cross-functional diagrams, etc.)
- Procedure Specification Template Sample
 - Similar to Process Specification Template
 - Intended for greater level of detail
- Procedural Checklist Template Sample
 - Used in cases where a checklist is a better implementation (e.g. discrete tasks that have to be performed and verified)



Documenting Processes Example - 1



Specific Guidance

- Process Title: includes the unique identifier (e.g. SQA 1.2.1) as well as the name of the process
- Version: use form of “x.x” for version control
- Revised: Date of last revision
- Owner: owner of the process (office symbol)
- CID: Configuration ID (used by Configuration Management)
 - Not the same as the Identifier
 - Left blank while in draft form
 - Needs CID assigned once approved



Documenting Processes Example - 2



Specific Guidance (cont)

- Purpose: self explanatory
- Entry & Exit Conditions: self explanatory
- Input: self explanatory
- Output: artifacts produced
 - High-level definition uses bullet format
 - Lower-level definition uses legal-style format; matches process step numbering
 - At the high-level definition, only show the final products from the lower-level processes (not intermediate products)



Documenting Processes Example - 3



Specific Guidance (cont)

- Process Steps:
 - Numbering should match identifier sequence (e.g. if process ID is 2.0, then first process step is 2.1, etc.)
 - Starts with a verb phrase (e.g. perform, conduct, create, etc.)
 - Do not exceed 3 levels of decompositions (e.g. x.x.x.x is maximum depth)
 - If process steps exceed 8-10, then decomposition needs to be reexamined
 - Include procedure names when referencing procedures
 - Processes may call other pre-defined processes (include process identifier in the step)



Documenting Processes Example - 4



Specific Guidance (cont)

- Roles: list roles (not people) performing the activities
 - Role list in template is tailorable (provided as a sample)
- Activities: (listed across the top; includes the numbering)
 - Use the pre-defined list of activities
 - Key activity being performed should be annotated with a bold-face font



TIP: The table information can be used as the basis for a cross-functional diagram



Documenting Processes Example - 5



Specific Guidance (cont)

- Methods & Tools: self explanatory (don't forget about the MS Office software)
- Measurements:
 - List of measurements that should be taken
 - Don't list all possible measurements
 - Not a set of standard process metrics (varies from process-to-process)
- Reviews: list any reviews from the process steps (defined as part of the process)



Documenting Processes Example - 6



Specific Guidance (cont)

- Training: list any specific training needed to perform the process
- References
 - List any references used (standards, checklists, guides, etc.)
 - Check against Input section!



TIP: Whiteboard sessions work very well for initial definition sessions!



Documenting Procedures Example - 1

Procedure Specifications

- Uses the Procedure Specification Template as standard format
- Provides specific information for each entry in the specification
- Format is slightly different than process definition
 - Assumed to be a single role but can include multiple roles if the situation calls for it
 - Greater level of detail in a single definition
- Checklist variant of the template can also be used where a checklist makes more sense (e.g. Database Administration steps, etc.)



Documenting Procedures Example - 2



Specific Guidance

The same guidance used for processes is used for procedures with the following exceptions:

- Roles
 - List of Role or Roles involved in performing the tasks
- Summary of Tasks
 - List of Task (summary) to be performed
 - Uses legal-style numbering
 - Start with 1.1 (1.0 is assumed with the title of the procedure)



Documenting Procedures Example - 3



Specific Guidance (cont)

- Procedure Steps
 - For each task (from Summary of Tasks) provide the detailed steps (in order) to accomplish the specified task
 - Provide as much as the “click on...” and “enter xxx” detail as necessary
 - Task steps will be prefaced with “Step” and sequentially numbered
 - Numbering for each task step will restart with each task
 - Only 1 action will be performed per step
 - If additional info is needed to clarify the step (e.g. if a message appears, etc.) make sure it is included
 - If more than 1 role is involved in the task, be sure you identify which role performs the specific steps



Group Exercise

As a group, define the “going to work” process

- Use the whiteboard to capture the information
- Give some thought to “trigger events”, input needed, activities being performed (keep in mind gender differences in the process steps), etc.
- Have fun!



References

- Hanavan, P., (2003). Systems Engineering Process Group Concepts. Training material provided to ESC/HR at Randolph AFB, TX, by Martin Process Solutions, Inc. (MPSI)
- Kulpa, M., & Johnson, K. (2003). Interpreting the CMMI(R): A Process Improvement Approach. Boca Raton, Florida: CRC Press LLC
- Patterson, B. (2002, November). Business Process Mapping: Navigating in Troubled Waters. Proceedings of the First International Conference of Software Process Improvement., College Park, Maryland.



Contact Information

Mike Bandor
Member of the Technical Staff
Acquisition Support Program
Software Engineering Institute (SEI)
Carnegie Mellon University
mbandor@sei.cmu.edu
210-380-5563

<http://www.sei.cmu.edu/programs/acquisition-support/>

