

## **Process Description Methods for Advanced Service Assurance Processes**

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### **Abstract**

This paper identifies key process modeling limitations and introduces a methodology for improving the accuracy and usability of models through increased clarity, richness, traceability, and the creation of an electronic library. Modeling capabilities with the Pro Vision Workbench tool are discussed and suggestions offered on use of models to provide requirements artifacts through process traceability to business requirements.

### **Telecommunications Process and Workflow Integration**

We have recently been engaged in process description activities for GTE's Global Network Infrastructure (GNI), which involves business and systems requirements documentation and process map compilation. An important requirement in such network management frameworks is the integration of the work of a number of groups that are widely dispersed, geographically. Process engineering is critical to achieving this.

Every worker's responsibilities must be catalogued and detailed exhaustively and must be available to every other actor. Role-activity specification is key because mechanisms must exist to engage responsible actors in challenging new situations as they arise, such as the classic example of a network failure. It is critical that these individuals be able to join immediately and effectively in efforts to restore service by whatever means are available, and then troubleshoot and repair the network fault.

Process specifications are invaluable in providing all participants with a common understanding of the team's roles and responsibilities. However, there are some familiar obstacles to effective process description

Some conditions, which require continuing cooperation by multiple groups in testing, fault isolation, and repair or replacement of faulty network elements, can be particularly complex. Process models based on graphical applications often fail to capture this complexity. Without this critical

mass of detail and rich semantics, the models lack usefulness for the users.

### **A Framework for Improved Process Definition**

The astounding failure rate of business process reengineering efforts (approaching 70% according to some observers) serves as a grim reminder that there are serious disconnects between what businesses want and what can be delivered. A tremendous disparity is apparent between business needs and our capability to apply technology creatively to satisfy these needs.

Business process managers generally approach their work as narrow-band specification tasks, confined to business process performance goals or information system specifications. Often, these process descriptions are too technical and overflowing with large quantities of unmanageable detail.

The amount of detail required to transport responsibility for a process from one person to another is enormously large. Representing these details as notations on two-dimensional flowcharts is an onerous task, and failure to recognize the boundary between detail and generalization results in the production of many square meters of drawings. Few people even have adequate space in which to study them. This, in turn, inhibits reconsideration of process design and the dynamic reorganization of responsibilities.

New tools, like Intellicorp for the SAP R/3 environment, attempt to sidestep these problems by targeting model use to a single application. In most cases, however, there is no single application, but rather several (possibly radically different) environments. Managers and analysts must agree on terms, interpretations, syntax, and semantics before even addressing the actual dynamics of the process.

Thus, these flowcharting tools may depict a schematic sequence, without capturing the practical content of activities, work products, or their associations with actors. Too much is left to the interpretation of the reader or application software developer.

## Breaking the Chains of "Old" Process Thinking

This paper introduces a methodology for significantly improving the accuracy and usability of process models. We see three outstanding objectives: (1) Clarity and Richness: Clarity of process must combine with richness of detail. (2) Requirements Traceability: process detail must map explicitly to requirements. (3) Electronic Library: information for users must be made available in a well-designed and well-maintained knowledge base.

### 1. Clarity and Richness

The richest possible concentration of information about work is the minimal starting point for a successful process description. Only the fullest possible collection of basic information can yield useful results. The alternative is misunderstanding, oversimplification, and ruinous rework. A business process specification must deliver a concrete, practical and graphical description of how actual actors perform actual work. The process description will portray the highest levels of relevant business requirements and descend in orderly stages to the most detailed diagrams of daily work. The higher levels of process description convey a general overview to business owners and users; and are required in order to demonstrate the dependence of more detailed processes on broader structures and policies.

### 2. Requirements Traceability

Generally, even after a completed model exists, requirements must be generated in written form. After all, vendors or development organizations have to bid on the job and process and object models are seldom sufficient for contractually binding negotiations and specifications. Correlating business requirements with their functional expressions, and clearly documenting these links are complex and tedious tasks at best.

These tasks may be made easier by using detailed models as a source from which to generate requirements information. Each business requirement may be linked to a component of the process model, just as each part of the process cross-references to a business requirement. Requirements management software may be used in conjunction with an interface to establish direct linkages between requirements and process models.

### 3. The Electronic Library – A Process Knowledge Repository

As we mentioned earlier, full specification of a process requires an enormous amount of detail, more detail, in fact, than one can easily express in a standard model.

For this reason, many models do not offer the detailed and explicit decision trees which operating personnel need in order to carry out triage of a collection of network problems or conduct complex troubleshooting procedures. Network operations personnel may initially accept the

process models readily, but then fail to apply them in real life.

Consequently, a disparity quickly develops between the recorded baseline and the actual work carried out in the Network Operations Center. The AVP in charge of Operations for GTE's GNI attacked this problem by commissioning the development of an Electronic Library (Figure 1).

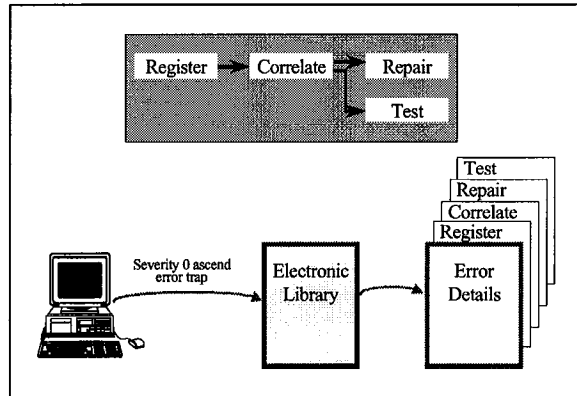


Figure 1

There are three core activities within the Monitoring process: (1) Registering Alarms: network management systems deliver alarms and performance data, eliminate duplicates and associate alarms from different protocol layers. (2) Correlating: personnel must perform special correlation procedures in order to identify customers being affected by faults, or confirm and identify, among known or unknown network events, trouble situations reported by customers. (3) Testing: of network elements to identify the root cause of trouble.

Now, when a network error occurs, the monitoring workstation automatically links to a Windows NT Web server that provides access to the Electronic Library – an alarm knowledge base. This web-based resource provides a wealth of structured details including troubleshooting and repair information. Eventually, the Library will contain detailed specifics for all aspects of the Service Assurance process.

A knowledge base such as this is a powerful mechanism for injecting key details about specific network elements and events, when and where the monitoring engineer requires them.

### Other Derivations

Other similar features can also assist business managers and operations personnel in making the most of process models. As the diagram (Figure 2) shows, it is possible to derive several useful process-engineering artifacts directly from the models and their annotations.

## Derivations From the Process Models

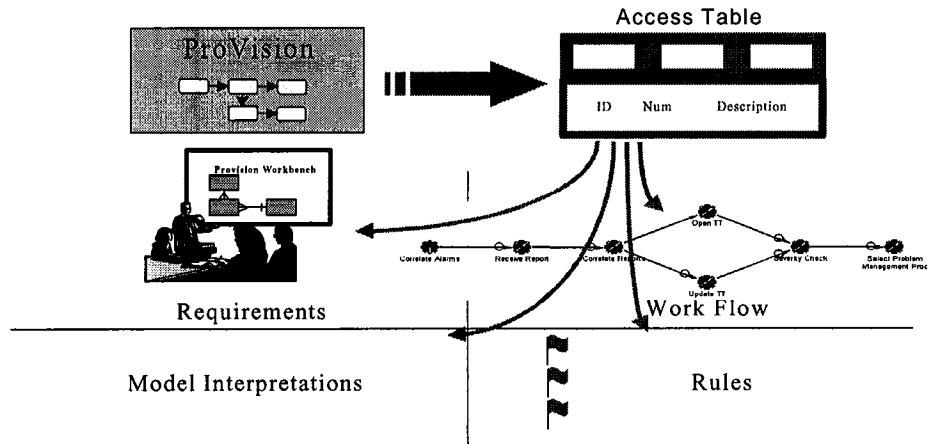


Figure 2

Such derivations include those listed in the table below (Figure 3). Fully implemented instances of each of these were developed to support GNI Service Assurance processes. Small examples can be found at the URL <http://processexamples.paper.jsac.gte.com>

|                       |   |
|-----------------------|---|
| Model Interpretations | Organized, highly structured tabulations of details about the models  |
| Workflow              | It is possible to generate workflow definitions automatically, and inject these into a commercial, off-the-shelf workflow engine like Flowmark (this is the subject of a separate paper). |
| Rules                 | Process models can be annotated with specific business rules that can then feed software development, manual procedures, or the Electronic Library.                                       |

Figure 3

### Process Description in Practice

Process description begins with identification of actors and their spheres of work. Actors are groups and individuals who perform work in *organizations* and *roles*, often in contact with external actors, e.g., customers and vendors. *Work*, in turn, is more or less specific *activity*, rising to *process*.

Information about actors and work is gathered from interviewing people and researching business documents. Snapshots of characteristic work *scenarios* are assembled, diagrammed, checked and refined, to project a catalog of roles and responsibilities, actors and tasks and of *relationships* with other actors and tasks. As we catalog these elements in finer detail, we gradually arrive at a reliable picture of what is currently being done, what needs to be done, and what is doable.

### Types of Diagrams

Tactical process description employs graphic modeling tools to catalog business objects and relationships. From this, a detailed Object Model may be elaborated, and a system workflow specified. Organizations, roles, processes and activities can be modeled in hierarchies, showing the dependence of detailed entities on general ones. Pro Vision Workbench offers modeling tools for this logical phase of process description as well, in a range of modeling systems, including UML.

**Organizational Interaction Models** display the broad relations among organizations and roles.

**Workflow Models** display the sequence of steps in work, map activities to actors, indicate systems and tools, identify outputs, diagram vectors of the process, and document rules governing the execution of steps.

**Use Case Models** depict detailed inputs and outputs to and from activities. They serve as excellent sketches or diagrammatic notes for detailed workflow models.