

***REQUIREMENT ALLOCATION  
DOORS Positive Influence  
InDOORS USA '99***

By

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***Authors biography***

Patricia L. Ferdinandi is the president of ***Strategic Business Decisions, Inc.***, a company specializing in requirements engineering and process improvement activities. She has participated as the *requirements engineer, lead facilitator, trainer, and project leader* on several mission critical projects crossing several business domains. She participated on both the Information Technology sides of the house as well as for the individual business units. Pat has assisted many business managers in communicating business requirements and understanding the inner workings of Information Technology. She has assisted Information Technology organizations transform from being a cost center to a profit center. With over 20 years of experience, Pat continues to assist through her lectures, consulting, training and writing projects. Her most recent book, *Data Warehousing: Advice for Managers (AMACOM)*, has been received extremely well by both the business and technology communities. One of her new projects includes a book titled *Requirements: Diamonds in the Rough (SciTech)* that will include the use of DOORS.

### ***Presentation abstract***

Whether the requirements were misunderstood, mishandled, or mismanaged the results of the failures are costly. One of the ways to improve the requirement process is through the Requirement Allocation Activity.

***Requirement Allocation*** is the pivotal requirement engineering activity in the requirement process and the least documented. This session will provide an explanation of what it is, the process that is involved and how to implement the process with DOORS. The process, if not defined correctly, could create possible political conflicts or missing requirements. Therefore, this session will include a discussion on approaches to minimize any political motives that may occur during the allocation activity. The lecture contains excerpts from the speaker's forthcoming book: *Requirements--Diamonds in the Rough (SciTech)*.

*Audience:* Requirements Engineers, Business Users, Facilitators, Project Managers, Software Engineers, DOORS specialists.  
*Prerequisites:* None.  
*Format:* 25 minutes.  
*Slides:* 8 slides.  
*Speaker:* Patricia L. Ferdinandi, *Strategic Business Decisions, Inc.*

### ***Presentation summary***

Research firms, such as the Standish Group, have documented that defects in requirements have caused 50% of software project failures. A quality requirement process and a quality facility to manage the requirements will reduce the risk and ensure a positive return on the products' investment.

A key activity, ***Requirement Allocation***, is the pivotal requirement engineering activity of the requirement process. The multi-dimensional ***Requirement Cube Model*** (RCM) is the resulting work product that depicts the requirements and their relationships that are closely aligned to the corporate structure. Applying these tools will enhance the quality of the requirements. These tools can be easily enhanced with the implementation of DOORS.

DOORS is most commonly used to manage requirements through organization and change control. DOORS can also be used to assist with the requirement allocation process by creating a DOORS template to depict the RMC. The DOORS template is the result of object and module relationships (links), hierarchy of objects, associated triggers and change proposal functionality.

By understanding the **Requirement Allocation Activity** (RAA), the DOORS specialists will be able to assist Requirements Engineers with identifying the different type of requirements, the different category of requirements, and the partitioning of requirements by focus, perspective and concentration. Missing information and links will be reported early in the development cycle, with the assistance of DOORS, to minimize costly misunderstandings, assumptions, delays and incomplete functional compliance. The result will be a consistent and complete view of requirements that will reduce software risk and improve the products' Return on Investment.

## ***Presentation discussion***

### *Introduction*

We have all heard that the sooner we identify bugs in the software project, the cheaper they are to repair. As a result, many organizations have instituted a verification process to review work products, if and when they are produced. Across the board, requirements, in one form or another, is one of the top causes of software project failure.

The affect is approximately 50% of Information Technology dollars. That amount of money directly affects the return on the product's investment and the corporation's bottom line.

With the advent of project failures, quality initiatives like the CMM and SPICE and the realization of the financial impact, executives are recognizing that the verification processes are not enough. They recognize the importance of implementing a process to obtain quality requirements.

To begin to reduce the software risk through requirements, we must first understand the Requirement **Process**. We will review the overall requirement process from the initial idea or concept down to the Information Technology requirement. The process discussed does not imply a waterfall approach. The processes invoke an interactive, incremental approach. The key to the success is proper allocation, organization, and linkage of the requirements. DOORS provide facilities that will assist in this endeavor.

### *The Requirement Initiation Process*

Requirements are initiated by a need from within the corporation or external to the corporation. When they are initiated from an external source, it takes the form of “wants” or “must have.” “Wants” are desire or recommendation type of requests (I wish I could purchase a weekly train ticket two weeks ahead of the time when it is needed). “Must have” are compliance or market survival type of requests (new tax laws are in effect in 01/2001).

Both requirements follow the same requirement process. However, “must have” types usually are automatically given a top or higher priority than “wants.” Defect repair requirements could fall into either category. It depends on the severity of the defect or financial impact. In any case, someone receives external requirements internally who will be the internal sponsor of the external requirement. The internal sponsor stimulates a process to turn the requirement into a software project.

Requirements are also initiated internally. Capacity requirements or new marketing ideas are examples. The source usually comes from one of many corporate divisions. Each corporate division will either sponsor an externally initiated requirement or identify one of their own. Whatever division is selected, it is important to note that a single requirement will affect one or more of the other divisions. In DOORS, you will define each corporate division as an object, level 2 heading. A trigger will be established to notify the impacted sponsors. The key is to identify the impact sooner rather than later.

### *Requirement Evolution*

Requirements pass through multiple levels (external to internal) and suggested that many requirements affect multiple areas internally. In reality, requirements evolve through multiple levels before being implemented. The evolution is an “**allocation**” activity. **Allocation** is the activity to make sure the right individuals are assigned responsibility to identify and define quality requirements.

### *The Requirement Allocation Levels*

The first level describes the external or internal requirement as the “problem/need” level. The problem/need becomes the idea that will be sponsored internally. The idea becomes the kickoff of the initial business requirements still within the whelm of the internal sponsor. The requirement must then be evaluated, reviewed at the corporate level to identify the impact on other areas. For example, a new marketing initiative will probably spawn requirements for manufacturing, customer service, legal, and human resources. The new marketing initiative is the initial triggering requirement. The additional spawned requirements are all required to support the marketing initiative.

These other corporate areas will need to identify requirements they need to initiate to support the initial triggering requirement. If the other corporate divisions will require some action to support the triggering requirement, they are “*allocated*” the responsibility to satisfy the triggering requirement. They define the requirement as it pertains to their area of responsibility (concentration). They become the sponsors in their area of the tailored requirement. They are then responsible to identify any additional requirements that will be required to support the *allocated* requirement.

These “corporate” level requirements are then evaluated at a division level within their organization for possible impact. If impacted, the requirement is “*allocated*” to them. The *allocation* process continues through the architectural and product level requirements. Hence the term “*requirements that have been allocated to software.*” This term is used throughout software engineering documents and mentioned in the Capability Maturity Model.

Each new requirement identified on the way to product level must be reviewed from the top. This enable other groups to identify additional impacts and action required as early as possible. The reason for reviewing at the higher level is that a division may need to create an additional requirement that will impact another corporate level. The change could also impact design or priority decisions in other areas. Early notification allows everyone to react in a planned manner versus acting in catch-up mode. Allowing all levels to early knowledge of requirements allows them to work it into their own development process. This creates a spiral model that includes elicitation and verification at multiple levels. Note that an outcome of this process is that the new requirement may not be approved due to the cost of the impact on other areas or the delay causing loss in market share. The change proposal system provided by DOORS facilitates the notification, acceptance and rejection process of the triggering and allocated requirements. DOORS will also keep track of the reason for rejection for future analysis.

The number of allocation levels may differ from organization to organization. The point is that everyone has an opportunity to react to a triggering requirement earlier rather than later. All levels impacted review and approve changes to requirements. The *Requirement Hierarchy* that is the result of the *Requirement Allocation Activity* ensures that the IT is brought in to the picture earlier rather than latter and that support organizations such as Legal or Network Planning are not brought in too late.

### *Avoiding Politics*

The allocation process should not be a political process. Each requirement should be evaluated to satisfy the initial business problem statement. In order to be able to determine if the requirement should be allocated to you requires that the previous requirement is well defined and complete. Each requirement is not rewritten but tailored to represent the proper focus, perspective, and concentration. New additional requirements that are derived from the initial requirement are documented. As a side note, this is where a good Requirements management tool like DOORS saves time, provides traceability, and facilitates the identification and need for interfaced requirements.

The delegation is a joint effort between the originator of the requirement and the representatives of the categories at the next allocation level. For example, the Technical System Requirement once it was allocated to him/her, will be reviewed and discussed between the Hardware/Software representative. When conflicts occur, it is the responsibility of the Technical System Representative to make the final decision. However, sometimes it may require a review up the allocation ladder with the Business Representatives. The original Business or Executive Sponsor always has the final word.

Most of the politics come into play at the Corporate Level. This may require the intervention of a higher executive. However, the better the requirement is documented, the less the chance of organizational politics. The decision-maker will see if someone is avoiding responsibility of a requirement or attempting to expand the scope beyond its value.

A requirements engineer or requirements architect will also assist in facilitating any conflicts. There are rather new roles that are developing, as software engineering becomes a well-defined discipline.





### *The Requirement Cube Model (RCM)*

The details of all these requirements are assembled in requirement documents creating a requirement set. A requirements document should exist at every level with sections for each category at each allocation level. The requirements document should answer the who, what where, when how and why from the concentrations perspective. Other requirement categories such as project requirements and performance requirements will be captured and may be part of or contained in separate requirement documents. No matter how many documents, all requirements should be traceable to the initial triggering requirement. This can be implemented in DOORS by linking different modules and/or objects at appropriate headings.

After the initial set of requirements are baselined. All changes and additions that occur after the initial set of requirements are fed through the process as each area is working on solutions to their allocated requirements. A new baseline is taken after each requirement or requirement change has been approved. This can be implemented in DOORS through the proposed change facility.

### *DOORS Positive Influence*

Throughout the presentation we discussed where DOORS could positively influence the **Requirement Allocation Activity**. This is accomplished through:

-  *Model & Object Definition:* documentation templates including appropriate headings. Linking requirement headings to create the Requirement Cube Model.
-  *Change Proposal Setup:* Who needs to be notified, who has authority to approve new and derived requirements.
-  *Interface Requirements Reports:* Identifying sources (existing or missing) for interface requirements. Defining the interface requirements.
-  *Triggers and Links:* Notifying the appropriate sponsors for their area of focus, perspective, and concentration.

### *Conclusion*

One of the activities involved in RE/RM that are misunderstood is the **Requirement Allocation Activity**. This process enables those areas that need to be involved in the project to be aware and work in parallel with the solution. The general process works for all type of projects: Information Technology Software, Maintenance, and non-Information Technology products and services alike. The specifics would be tailored to the focus, perspective, concentration and the type of project.

DOORS facilitates the **Requirement Allocation Activity** by providing the proper placeholder (objects & modules). Each Requirement and trigger provides the proper interface information throughout the development creating the **Requirements Cube Model**.