



RESOURCE LIFE CYCLE ANALYSIS: A CRITICAL COMPONENT OF ENTERPRISE DATABASE

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Background

Ron Ross, a well known "data" consultant formalized his ideas about corporate resources and their life cycles in a 1992 monograph, *Resource Life Cycle Analysis A Business Modeling Technique for IS Planning*. Resource Life Cycle Analysis (RLCA) uses a form of business modeling to perform information strategic planning. Ross identifies the need for this type of planning because:

"...It is therefore unreasonable to attempt to satisfy both dimensions of scope---i.e. "process vs. data"---in a single type of project. I believe strategic planning should produce two types of projects --- one for "data" and one for "process". . . Scoping for each type of project is orthogonal---no attempt is made to satisfy both dimensions at once---so that the result is like weaving a fabric. . . .Creating such a data-based infrastructure clearly requires early attention to data architecture for at least some of the "data" projects before any "process" project kicks off. That means pursuing high-level or "framework" entity modeling for at least some of the individual data projects. . . during or in parallel with the strategic planning phase."

In Ross's parlance, "data" projects refer to those that exist under the Whitemarsh Knowledge Worker Framework column, Database Object, while "process" projects are those that fit under the Business Information System column.

Resource Life Cycle Analysis Objectives

The goal of RLC analysis is to build a bridge between the operational level needs of information management organizations and the strategic level organization business process needs required by upper management. The main goal of the strategic level is to identify and describe the major resources that are essential to the enterprise's survival, and the main goal of the Information systems organization is to plan, develop, deliver, and maintain the various information systems projects that are required to implement the enterprise resources in the most effective manner possible. RLC analysis achieves this bridge goal by determining:

1. The resource life cycle networks
2. The database object projects and business information system projects and establishing their proper sequence for analysis, design, and implementation.
3. A strategic view of the ongoing information systems development and major maintenance work

RLC analysis determines three components of the resource life cycle networks, that is, the resource, life cycle chain and the precedence vectors between resource life cycles.. A **resource** is an enduring asset with value to the enterprise. The **life cycle** is a linear identification of the major states that must exist within life of the resource. The life cycle of a resource represents the resources's "cradle to grave" set of most-critical state changes. The **precedence** is a vector that may occur between nodes on different resource life cycles, and thus indicates which resource life cycle node enables another resource life cycle node.

Resource Identification

Subsequent to mission analysis and subsequent to database object identification, the resources of the enterprise quickly emerge. For a state-wide judicial court system environment, their resources included, Cases, Documents, Court Personnel, Calendars, Court Facilities, and the Law. Resources are typically a superset of the concepts represented by the database objects.

Resource Life Cycles

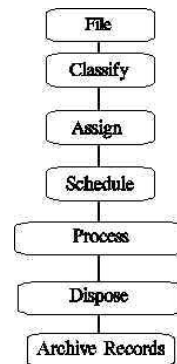
Each resource has a life cycle of state changes in the resource. The resource (at a minimum) is created, maintained, and terminated. Each resource changed state name represents a value-added accomplishment of a significant set of business activities. Further, each accomplishment is significant with respect to the previous resource life cycle node. in some way. The total sum of the functions for a resource is a "value chain" that comprises the life cycle of the resource. Figures 1, 2, and 3 illustrate the life cycles for Document, Case, and Court Personnel.

Resource Life Cycle Network

After the resources and life cycles are complete, the precedencies are established. There are actually two types of precedencies: Within the value chain and between resources. Precedencies *within* the value chain are established during the life cycle analysis. These are the lines that connect one node to the next.

A precedence between resources is created when a resource life cycle state, that is, a specific life cycle node, cannot be effective or correctly done unless the preceding resource life cycle state has been established or completed. A precedence arrow, renamed precedence vector, is drawn from the enabling resource life cycle state to the enabled resource life cycle state.



Figure 1. Document*Click on the diagram to see it enlarged.***Figure 2. Case Resource Life***Click on the diagram to see it enlarged.***Figure 3. Court Personnel Resource Life***Click on the diagram to see it enlarged.*

The most difficult problem in establishing the precedence is the mind set of the analyst. The life cycle is **not** viewed in **operational** order, but in **enablement** order: that is, what resource life cycle state must exist before the next resource life cycle state is able to occur. This is a difficult mind set to overcome, as there is a natural tendency to view the life cycle in operational order. The test of precedence becomes: what enables and what is it enabled by?

For example, project establishment precedes the award of a contract. This does not seem natural, since a project would not operationally begin until after a contract is awarded. However, there must be an established infrastructure to create the project and to perform the work prior to the contract award. A workforce must be in place to perform work along with the ability to assign work to the employee on the contract, and the ability to bill the customer. Therefore, the project enables the contract.

There are three possible meanings for enablement. That is, a resource life cycle state precedes another resource life cycle state because:

1. The accomplishment of the preceding resource life cycle state saves money.
2. The resource life cycle state leads to rapid development of another resource life cycle state
3. The resource life cycle state permits faster, more convenient accomplishment of another resource life cycle state.

If one or more indicators exists, then a precedence vector should be created.

Two alternatives exist relative to the existence of the enterprise: newly established or existing. Experience shows the preferred perspective is that of an already-existing enterprise.

RLC states may or may not occur during a life cycle, or events may occur in parallel. For example, an employee may receive an award, but then again, may never receive an award. An employee may work before and after a security clearance is granted. The strategy to deal with parallel or optional RLC states is to create a single stream of RLC states in which none are parallel or optional by "pushing down" the parallel or optional RLC states to a lower level.

Figure 4 presents the resource life cycle network for documents, cases, and court personnel.

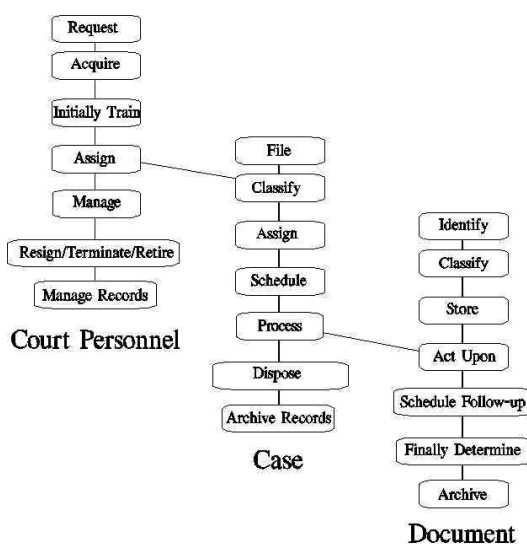


Figure 4. Precedence Vectors Among Resource Life Cycles

Click on the diagram to see it enlarged.

Employing Resource Life Cycle Networks

The resource life cycle network represents the enterprises' need for information in an enablement order. Because there is a network, similar to a project management systems's PERT network, information

technology projects can be staged to be accomplished in the RLC network order. The RLC network thus represents a natural network for accomplishing projects.

The RLC networks serves as a very useful framework for allocating existing databases and information systems. The RLC network gives IT organizations the ability to answer questions such as:

1. What IT projects address a particular segment of the enterprise?
2. What business resource is served/enabled when one project be started and completed before another?
3. What IT projects are largely redundant one with another?
4. Which segments of the RLC networks are either under or over served by IT?

Figure 5 shows that there are multiple systems allocated to several of the RLC nodes. Analysis should be performed to ensure that the semantics of these systems are either not at cross purposes or completely redundant. If redundant, then elimination should be considered.

As IT projects are proposed, their required resources (i.e., staff, time, hardware and software) can be quantified in terms of the difference between the existing and proposed state of IT assets allocated to the RLC node. Project estimating for technology improvement projects can be greatly improved when standardized project methodology templates are associated with these proposed projects. Finally, if metrics have been kept on past efforts, realistic estimates of efforts can be quickly determined.

When all the IT improvement projects have been identified and estimated, the very fact that they are allocated against the RLC network enables them to be scheduled through a project management system, en mass.

Real Benefit from RLC Analysis

Under the presumption that the result of the en mass scheduling is normal, that is, a requirement for an infinite amount of time coupled with infinite resources, the real value of RLC analysis comes into play.

Because the RLC network is a reflection of the essential business resources, their life cycles, and the interactions among the life cycles, business analysts and managers quickly grasp its significance. It represents the business. Playing secondary and supporting roles are all the databases and information systems, as they should. So, when infinite corporate resources are not available, the RLC networks enable the "problem" to be put back where it belongs: squarely on corporate management, who cannot then avoid answering the three critical questions:

1. What needs to be done? (That's expressed as the allocated databases and information systems against the resource life cycle nodes.)
2. When is it appropriate to do it? (That's expressed through the

enablement vectors.)

- Why does it benefit the enterprise? (That's expressed as the resources and their life cycle nodes.)

The only question left for the IT staff is, "How will it be done?" This question is commonly answered through packages, custom development, and code generators, or not at all. As each "how" is answered and/or refined, the effects of the answer should be expressed as changes in resource requirements for the IT projects allocated to the nodes. Once changed, the entire enterprise-wide RLC-based IT project set can be re-estimated. This process is iterated and re-iterated until a least-unobjectionable solution is found.

Once the information systems plan has been agreed-to and signed-off by management, the plan can be quickly and easily revisited whenever technology changes, packages are discovered, or code generators, repositories and CASE tools are obtained.

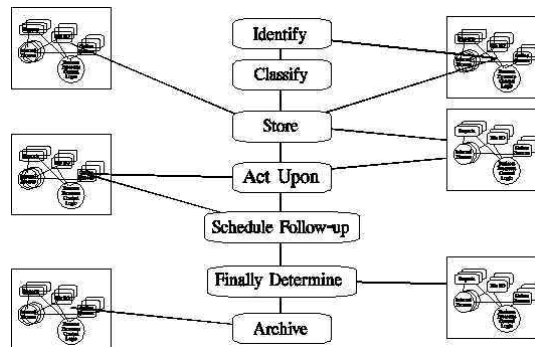


Figure 5.

Click on the diagram to see it enlarged.

Summary

RLC analysis enables business managers to participate in the identification of the resources, their life cycles, and then enablement vectors among the life cycles. The IT staff then has a business management defined network against which it can allocate the existing information systems and databases. Once allocated, IT can root out the conflicting and redundant systems and databases. IT projects representing advances in the sophistication of its support to the business can be identified and resource-estimated through standardized methodologies and metrics. Once the set of IT projects are estimated, the entire enterprise-network of IT projects can be scheduled through project management software. At that point, management re-enters the picture and makes the hard choices, what, when, and why. IT is left with the How. That's as it should be.

Note: The Knowledge Worker Framework book can be obtained from the Whitmarsh website.

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Languages Committee, X3H2 for 19 years. X3H2 standardizes SQL. A full list of Whitemarsh's clients and products can be found on the web site, www.wiscorp.com. The goal of the web site, WisWeb, is to make data management books, courses, methodologies, software, and metrics available to the database community through electronic publishing and downloading. WisWeb memberships are very reasonable and are designed for the individual, the ISD organization, universities/colleges, and professional training organizations.

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