Capability Analysis with the Value Delivery Modeling Language

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CAPABILITY ANALYSIS IN A VALUE CHAIN CONTEXT

Capability analysis is an established approach to determining the needs for improvement in business operations. It focuses on a functional breakdown of an enterprise's capabilities. These capabilities are the means to do the work of the enterprise. A capability analysis provides a framework for considering critical capabilities and their strengths, weaknesses, opportunities, and threats (SWOT) as a basis for improving operations as well as delivery of new products and services.

However, in a rapidly changing world, the relationships between capabilities and their importance to the success of the enterprise may not be obvious from current methods. Michael Porter[1] defined a value chain perspective where activities identify the work to be done to deliver value to a customer. In this context, capabilities are the resources for performing activities — activities define the contributions that capabilities provide for a particular product or line of business (LOB). For example, an activity in an insurance claims value chain might be to assess damage, and the supporting capabilities would include a skilled claims assessor, an application to compute the claim amount, and supporting tables of repair costs. Analysis of capabilities in a value chain context has been recognized as an important factor in the design of business systems, a point Fred highlights in his book *Building the Agile Enterprise with SOA, BPM and MBM*.[2] However, this analysis requires business leaders to think about the interaction of multiple factors — the creation of value, the dependencies between activities, performance metrics, the organization structure, relationships with suppliers, and potential support of multiple activities as well as multiple LOBs. To effectively manage this complexity, business analysts need a computer-based tool to model the current state of the business and the impact of potential changes.

In March 2009, after extensive discussion, the Business Modeling and Integration Domain Task Force of the Object Management Group (OMG) issued an RFP for a Value Delivery Meta-Model[3] specification that would define the computational elements and relationships for appropriate modeling tools. There is now a single submission team of industry experts contributing to a specification proposal for what is called the Value Delivery Modeling Language (VDML).

The specification under development will incorporate concepts from several business modeling techniques, such as Value Network Analysis (VNA),[4] e[3]-value,[5] and Resource Event Agent (REA)[6] analysis. VDML will support several different points of view. In this article we focus on capability analysis as a particular discipline and point of view that VDML will support. We will begin with a discussion of the business benefits of capability analysis in a value chain context. We will then discuss the modeling language in more detail and, finally, consider the status and availability of VDML for business users.

BUSINESS BENEFITS OF CAPABILITY ANALYSIS

In the following discussion of business benefits, you may think of an activity network as the primary structure for a VDML value chain. The activity network is similar to a PERT network diagram — the basis for typical project planning models. A hypothetical network is shown in Figure 1. The nodes in the network are activities. An arrow depicts the dependency of an activity at the head of the arrow and an activity at the tail of the arrow. You may also think of the arrows as depicting the flow of work products from one activity to the next. Of course, a VDML model — a model of a real business — would support this with additional details and related viewpoints.

Understanding How Work Gets Done

In a VDML value chain, the activities define what needs to be done to deliver a product or service to a customer. Each activity refers to a capability that is required to perform the activity. A capability is a bundle of facilities, resources, assets, process(es), intellectual capital, and so on that are managed together to perform a type

of work. A capability is the primary responsibility of an organization unit (e.g., a department, group, or team), but an organization unit may manage multiple capabilities that share resources and assets supporting multiple activities. The entire value chain is the responsibility of an associated LOB organization.

The network provides a business abstraction that hides the technical details of the business processes, but it provides a straightforward representation of what needs to be done, what is used to do it, and who is responsible.

> The network provides a structure for capturing cost, quality, and timeliness metrics for each activity and gauging their impact on the product or service delivered.

Sources of Customer Value

A "value proposition" identifies the values that a customer or market segment views as important. These values are associated with contributions of various activities in order to consider how well the value chain delivers customer value. Typical values would be competitive price, timely delivery, and zero defects. The model then helps the business assess the impact of potential changes. This is particularly important where there are multiple market segments or multiple LOBs that rely on shared capabilities. For example, in the hypothetical activity network of Figure 1, a wood

machining capability is needed to produce parts. This same capability might also be used in a millwork LOB to produce wood products. Consequently, there is a risk that an improvement to operations for millwork might not be optimal for cabinet making.

Accountability

The network provides a structure for capturing cost, quality, and timeliness metrics for each activity and gauging their impact on the product or service delivered. Management can identify and focus on the significant contributors to cost, defects, or delays. The model supports metrics and computations of overall performance and customer value so management can assess potential improvements to the business operations and capabilities. For example, delays may only be important for activities on the critical path between receipt of a customer order and product delivery.

Potential Consolidation

The representation of a capability includes its key aspects, such as the required resources and facilities, personnel skills, and supporting technologies. A business analyst can identify capabilities with similar aspects so as to examine the potential benefits and implications of consolidation. Consolidated capabilities will provide shared services that support multiple activities or LOBs. This can yield economies of scale, improve consistency and policy implementation, and improve the ability of the business to respond to fluctuations in demand for individual product lines.
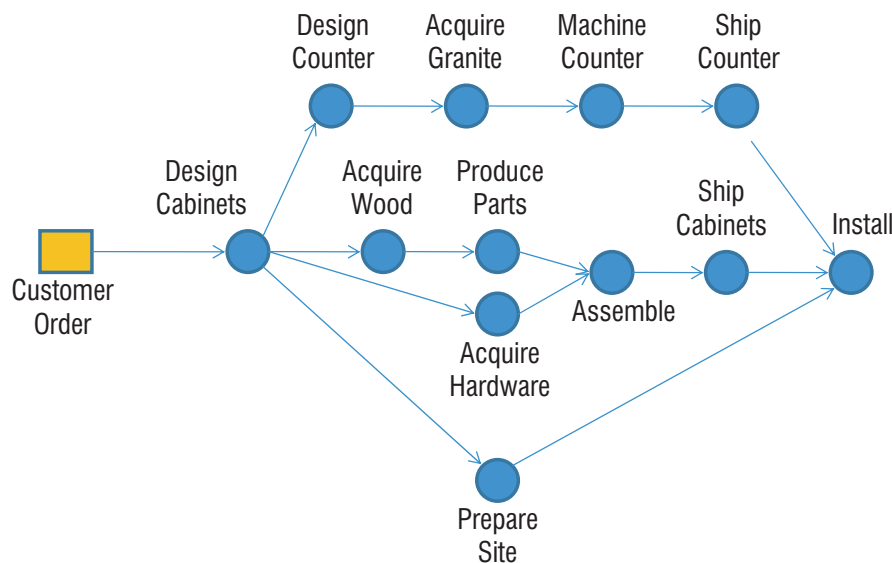

Figure 1 — A hypothetical value chain activity network.

Potential Outsourcing

The model identifies the sources of customer value that provide competitive advantage. This helps the business analyst distinguish those capabilities that are critical to the enterprise's competitive position from those that are essentially commodity capabilities. Commodity capabilities are candidates for outsourcing. Outsourcing relieves management of the burden of maintaining the capability, particularly where evolving technology or regulations are involved. In addition, providers can achieve economies of scale beyond those available to their clients. Outsourcing of a capability, rather than "a process," clarifies the scope and potential dependencies between capabilities such as shared resources and expertise.

Business Transformation

The abstraction of a VDML model enables the business analyst to consider alternative modes of operation and organization structure in the context of value delivery objectives. For example, the production process may be designed to respond to individual customer orders (manufacture to order). The business analyst can change the value chain model to produce certain components to inventory so orders only require final assembly (assemble to order). Transformation of the hypothetical model discussed earlier is depicted in Figure 2. The basket icons represent the addition of inventories. The transformation reduces order response delay and changeover costs. However, this needs to be balanced against the drawback of carrying inventory costs, as well as the risk of having to scrap unused inventory when an engineering change order (ECO) needs to be applied immediately.

Planning New Offerings

Management can use a VDML model to support feasibility analysis for a new product or service offering. A value proposition provides focus on customer values and associated demands on business operations. A business analyst can create an activity network to define what needs to be done (activities) to deliver the product or service. The analyst can then evaluate current capabilities to determine those that meet requirements, those that need to be adapted, and those that are missing. Finally, the analyst can use the resulting model to assess costs and response time based on existing performance along with estimates of performance for new and revised capabilities.

Local Innovation

A well-defined capability will be "loosely coupled" with the activities it serves. This means that the capability operates relatively independently of the various contexts in which it us used. For example, a reimbursement request typically has the same form and processing operations regardless of the department from which it is issued. The users of a capability do not need to know how it is performed, and the capability providers do not need to know the details of why it is being used
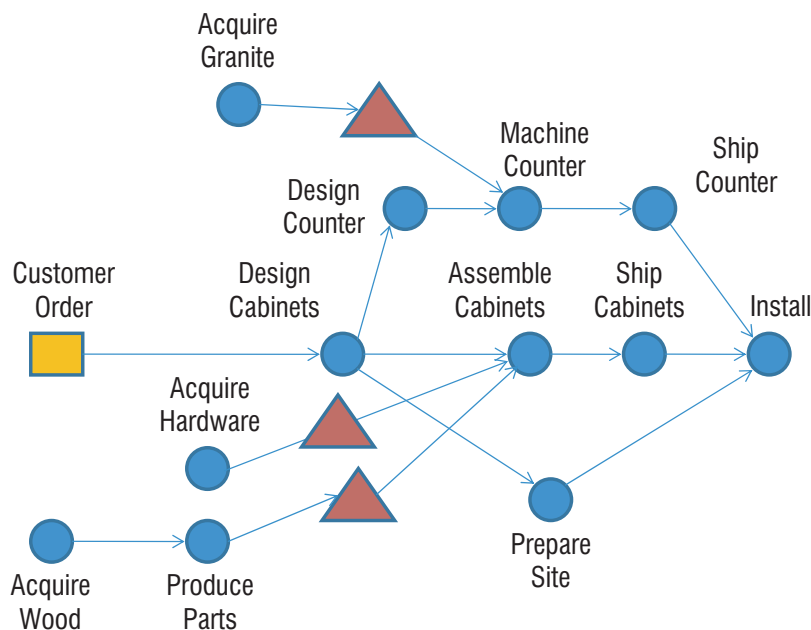

Figure 2 — Addition of inventories for improved order response.

beyond the specifications in a request. While this creates a risk that shared services will not be responsive to the needs of users, a change control process should use the VDML model to focus on who the users are and the potential impact of changes to a shared capability. This degree of autonomy enables the operation of the capability to be improved through local innovation with few if any adverse impacts on the users of the capability.

Allocation of Investment

A VDML model shows how capabilities are being used or could be used and the impact of changes on overall performance and stakeholder value. This enables management to make a more objective assessment of the relative merits of different investments in improved operations or structural transformations. Management can also use the model to define appropriate performance metrics for evaluation of results.

Analysis of Supporting Services

In most cases, operating activities of the enterprise LOBs will be the primary focus of capability analysis. Supporting services deliver value to internal customers and can have a significant impact on cost and performance. Consequently, VDML value chain models may be defined for supporting services. These include facilities management, financial services, purchasing, and information services.

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Product development is an important value chain that should also be viewed as a supporting service — delivering product and process specifications to the operational activities of the business. This value chain can have a significant impact on the customer value proposition. For example, a new product design may improve product ease of use or performance, thus increasing customer value. Alternatively, a new manufacturing technology may reduce costs, resulting in potential profit improvement or more competitive pricing.

Framework for Automation

A VDML model with well-defined capabilities provides management with a basis for design of business processes and supporting computer applications. A capability should be supported as a sharable service and its business processes should be bounded by the scope of the capability. The responsible business organization should own a capability's supporting applications, so they can be designed and evolved to optimize delivery of the capability in all contexts. This enterprise-specific, business design framework then helps improve alignment of IT with the needs of the business.

For example, traditional enterprise systems merge the support of multiple organizations based on the consolidation of data in shared databases, and business processes are streamlined and embedded in applications without regard for the organizational boundaries. As a result, changes to business processes or supporting data require coordination and validation with multiple organizations. Alignment of applications with capabilities improves management control of application functionality and the enterprise ability to leverage existing capabilities to address changing business needs.

VDML VIEWPOINTS

VDML will provide four key viewpoints for capability analysis:

1. Activity network

2. Performance metrics

3. Value exchange

4. Organization structure

Activity Network

Activities define what needs to be done to deliver a product or service. These are connected by flows that depict the dependency of an activity on the result of a preceding activity. The activity network depicts the flow of deliverables as opposed to the flow of control depicted by conventional business process models. Each activity identifies a supporting capability that performs the work.

The network abstraction represents operations for a representative product or service without necessarily examining the detailed operations for individual products or services. For example, while every automobile on the production line may be different in detail, the activity network will represent the characteristic activities for a typical product mix. The activity network does not have alternative paths or contingencies. While some issues and concerns may be obscured, the network provides a framework for discussion and for more detailed analysis of particular circumstances.

While many of the business operations are represented by activities, the flows between activities may also have relevant characteristics. For example, if a deliverable from one activity is shipped to the next activity via truck, then the flow has time and cost associated with it. If an activity produces output in batches, then the flow is through an inventory that anticipates production. This may involve cost, but it may also reduce the time for customer delivery.

Performance Metrics

The performance metrics viewpoint aggregates metrics from multiple activities for an overall value chain assessment. The contributions of multiple activities to a particular operating variable are aggregated for a network total. Each of these variables is then summarized for a net result. This may be used, for example, for a balanced scorecard, assessing key performance indicators, or assessing the impact of potential changes in the network or supporting capabilities.

Of particular interest is the aggregation of values that supports a value proposition. Creation of a value proposition starts with consideration of the values that are important to the customer, such as competitive price, reliability, and timely delivery. Each variable that contributes to the value of the end product or service is aggregated for the network and incorporated into the value proposition. Additional value contributions may come from other enterprise activities, such as usability from product engineering or brand recognition from marketing, to reflect a more complete representation of the customer's perspective. Each variable is then transformed to a recipient satisfaction measure that reflects the customer's view of that variable. These satisfaction measures are then combined as weighted values to compute an overall recipient satisfaction measure.

Value Exchange

The value exchange viewpoint typically represents the exchange of value between independent business entities (including individual consumers). For example, the simple sale of a product to a customer is an exchange between producer and consumer. Beyond the specific product or service, additional values may involve reputation, credit worthiness, product warranty, and service agreement. More complex exchanges may involve multiple participants such as subcontractors, resellers, and so forth.

The interactions between participants may be represented by the exchange of value as expressed by value propositions and depicted in Figure 3. In the figure, an Internet publisher provides content and includes advertising for a merchant. A subscriber reads the content, sees the advertising, and purchases products from the merchant. A viable exchange relationship requires that each participant view the value received as greater than the value provided.

In another example, an exchange may represent an outsourcing relationship. A supplier delivers value to one or more internal activities in the recipient's value chain. In this context, only the supplier's contribution is relevant — not the supplier's assessment of the recipient's
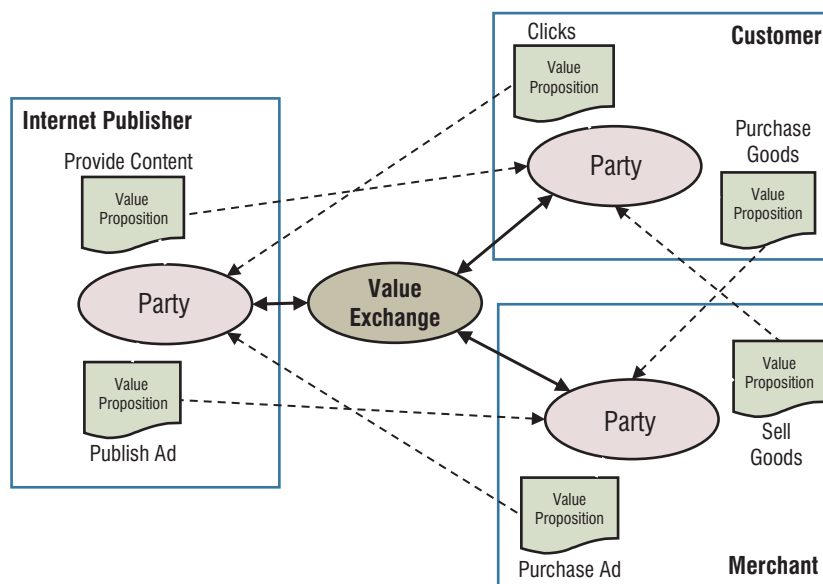

Figure 3 — A multiparty value exchange.

values. The supplier's value proposition contains the business variables that are of value to the recipient such as actual delivery times or frequency of defects. These variables (not the satisfaction measures) contribute to the aggregations of values in the recipient's overall value chain as discussed above. In this way the end values are assessed independently of the fact that part of the value chain is outsourced.

Organization Structure

In VDML, organizations are represented as various forms of collaborations. A company is a collaboration of people and subordinate organizations that exists to achieve some corporate purpose. The people and subordinate organizations participate in particular roles. Similarly, each department, task force, or committee can be represented as a type of collaboration, an organization unit, with participants in defined roles. In a corporate hierarchy, a specialized role type — a subordinate role — identifies the relationship between each organization unit and the higher-level organization unit it reports to.

This generalized form of representation allows a variety of relationships to be represented that go well beyond the traditional organizational hierarchy. The model can represent people in many different roles, as depicted in Figure 4.

In the figure, Fred is an employee of the XYZ Company. As an employee, he is a Claims Agent in the Claims Processing Department. As a Claims Agent, he participates in a Work Team as a Quality Reviewer, and as a Quality Reviewer, he participates on a corporate Quality Committee.

In capability analysis, from an organizational perspective, a capability is a collaboration of persons who contribute to the application of the capability to activities. Similarly, a value chain is a collaboration of capabilities, and the value chain is the responsibility of an LOB organization. An exchange, as discussed above, is a collaboration of business entities exchanging values. As a result, the various elements of a VDML model can be viewed from an organizational perspective.

When capabilities are consolidated for economies of scale, as in a shared service center, management of those capabilities should be independent of any particular LOB organization so that the capabilities can be optimized from an enterprise perspective. This results in a matrix-oriented relationship between functional organizations that manage capabilities and LOB organizations that manage products or services. At the same time, from an organizational perspective, capabilities have roles in LOB value chains.

Organizational relationships will also be important for providing appropriate incentives, performance management, and technical leadership. Consequently, capabilities with similar disciplines may be brought under common management to achieve synergy.
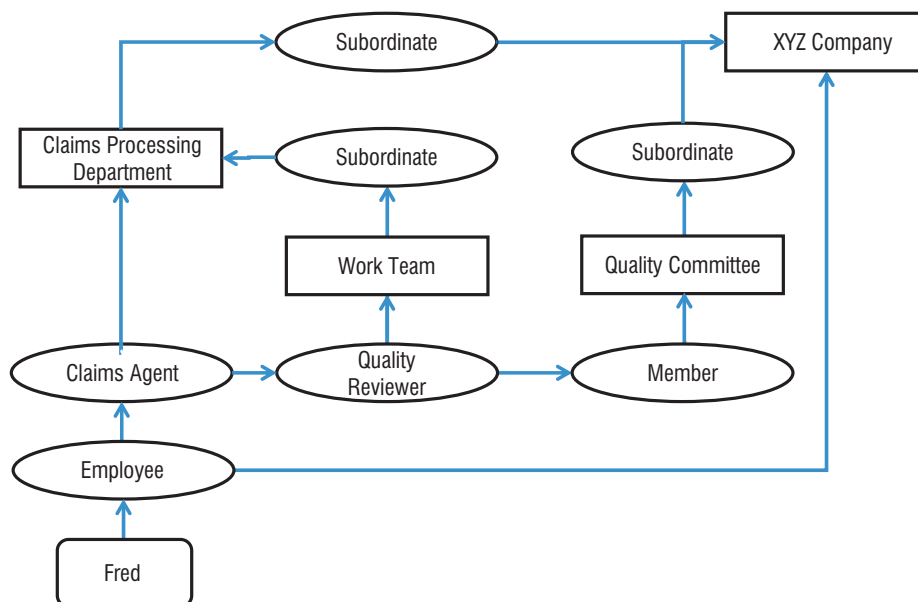

Figure 4 — An example of collaborations (boxes) and roles (ellipses).

STATUS OF VDML

The VDML specification is a work in progress. There are industry leaders engaged in this effort who represent VNA, e³-value, REA analysis, and other practices. These modeling techniques have elements in common with the value chain–oriented approach discussed here. Evaluations and revisions of the specification will be conducted through the rest of 2011, and the adoption process could be completed in early 2012. Furthermore, at least one of the participants is implementing the specification as it is being developed, so product availability could closely follow adoption of the specification.

In the meantime, some level of capability analysis can be accomplished with less robust tools. The activity network can be represented using a project planning tool with capabilities as resources. Activities, and thus capabilities, that contribute to key customer values can be identified for potential improvements. Management can consider similar capabilities for consolidation based on the activity network, providing contexts for their use to support design of shared interfaces. When the more robust VDML becomes available, it will enable more rigorous analysis of value creation, performance metrics, exchanges with suppliers and customers, and their organizational implications.

ENDNOTES

[1]Porter, Michael. *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press, 1985.

[2]Cummins, Fred A. *Building the Agile Enterprise with SOA, BPM and MBM*. Elsevier, 2009.

[3]Object Management Group. "Value Delivery Meta-model RFP" (http://doc.omg.org/bmi/2009-03-09).

[4]Allee, Verna, with Oliver Schwabe. *Value Networks and the True Nature of Collaboration*, Value Networks, 2011 (www.valuenetworksandcollaboration.com).

[5]Gordijn, Jaap, and Hans Akkermans. "Design and Evaluation of e-Business Models," *IEEE Intelligent Systems*, Vol. 16, No. 4, July/August 2001, pp. 11-17.

[6]McCarthy, William E. "The REA Accounting Model: A Generalized Framework for Accounting Systems in a Shared Data Environment." *The Accounting Review*, Vol. LVII, No. 3, July 1982 (www.msu.edu/user/mccarth4/McCarthy.pdf).

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