Characteristics of Collaborative Product Commerce

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Abstract

Collaborative Product Commerce (CPC) focuses on the sharing of information over the internet. However, many manufacturers are unsure as to what CPC portal (software packages) features are required in order to aid in the collaboration process. This paper describes various types of collaborative features and characteristics of the collaborative product commerce portal.

Key Words
Collaborative Product Commerce, E-business, Extended enterprise

1.0  Background
In the past, suppliers were left out of the early stages of the product development process. Activities in product development were carried out in sequential steps, and suppliers were only involved in production. These suppliers were not involved at the design phase, and often their work only started when they received the released design documentation. Suppliers were brought in to compete with other suppliers based on price, resulting in prime contractors having to deal with several suppliers.

Stalkamp [11] discussed how Chrysler migrated from its traditional way of doing business in order to stay competitive. The objectives were to restructure the whole process planning, processing, production, and marketing processes. The most critical factor they had to consider was building a strong relationship with suppliers and making them a part of the network. Multiple suppliers worked as system integrators that provided components, detailed parts, or subassemblies to Chrysler.

Littler, Leverick, and Bruce [8] described the risks associated in developing products collaboratively. They conducted an extensive survey in which they focused on the factors involved in product development. In summary, prime contractors’ main fears were that they would lose control of the product development process, and valuable information regarding their processes and skills would be leaked to their competitors. That is; collaborators will become competitors. The notion was to produce in-house as much as possible, rather than relying on outsourcing.

2.0  Introduction
To keep pace with random fluctuations in the market place as well as with rapid change in competition, stakeholder preference, and the economic environment, enterprise operations need a high level of flexibility. The objective is to reduce cost, enhance quality, and to deliver product and services to the end user in a much faster mode. However, to accomplish this, the sharing of information is important from both upstream and downstream. There must be reliable processes to manage the product life cycle, from the conceptual phase to the production phase and beyond.

In order to facilitate these processes, enterprises use various tools for improving operations and service levels. In the course of refining the various work segments, enterprises have implemented application packages like Enterprise Resources Planning (ERP), Supply Chain Management (SCM), and Customer Relationship Management (CRM). These are used depending on the requirements, thus making it easy to build a seamless course of action, resulting in an extended e-business enterprise.

A company must maintain standards of its product in these changing scenarios in order to remain competitive in the market, while still being innovative. A homogenous application system is required to collaborate inter- and intra-enterprise more efficiently, effectively and innovatively while creating a mutually trustworthy dependency. This endeavor will not only improve one’s core competencies but also facilitate reducing operating cost. This is achieved through sharing needed capabilities and developing strategic alliances.
3.0 What is Collaborative Product Commerce?
Gartner Group defines CPC as “An e-business opportunity that leverages product intellectual capital across the many new Internet-driven inbound and outbound commerce opportunity streams” [10]. Aberdeen Group states that CPC “Allow(s) discrete manufacturers to once again distinguish themselves on their products and innovations. In other words, CPC permits discrete manufacturers to significantly improve the core processes around the management functions associated with the complete product lifecycle that are the basis of their existence. Discrete manufacturers that can successfully implement CPC will be in a position to dominate their industries in ways that their laggard competitors cannot” [1]. Figure 1[1] shows how a CPC portal fits into the enterprise.

![Figure 1: CPC position in the enterprise](image)

CPC synchronizes all the business functions and the resources that affect the product throughout its life cycle. CPC architecture has a collaborative data management structure that is used for linking all relevant data to other functions in the process. The CPC infrastructure is built upon the existing legacy applications that are being used in the companies, with some additional applications. It integrates application packages such as PDM (Product Data Management), CAD/CAM, SCM, ERP, CRM, process modeling, visualization, and component supplier management, to address the entire product development cycle [7].

CPC is an integrated system in which all the collaborating entities have a common and consistent access to a data model. This information is accessible through the Internet to all the users and there can be real-time transactions among these collaborating partners. This approach aids in optimizing the design process, thus delivering additional business benefits through an extensive, multidisciplinary, system-centric vision of continuous design improvement [1].

CPC consequently focuses on product competitiveness, such as innovation and time to market. This notion brings up the concept of design chain management, which focuses on the product development process. A list of various types of collaborative features, characteristics and process supports are shown in table 1.

Table 1. Characteristics of CPC
### CAPABILITIES

<table>
<thead>
<tr>
<th>Change management</th>
<th>Concurrent Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirement Management</td>
<td>View/Markup over the web</td>
</tr>
<tr>
<td>Program Management</td>
<td>Auction Facilities</td>
</tr>
<tr>
<td>Component Supplier Management</td>
<td>Responsibility Allocation</td>
</tr>
<tr>
<td>Collaborative Engineering</td>
<td>Secured Transactions</td>
</tr>
<tr>
<td>Configuration Handler</td>
<td>Speed</td>
</tr>
<tr>
<td>Change Management</td>
<td>System Stability</td>
</tr>
</tbody>
</table>

### FEATURES

<table>
<thead>
<tr>
<th>Process Supports</th>
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<tbody>
<tr>
<td>Plug and Play Modules</td>
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<td>Minimal Training Support</td>
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<tr>
<td>Internet</td>
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<tr>
<td>Established Rules</td>
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<tr>
<td>CAD Independent</td>
</tr>
<tr>
<td>PDM Independent</td>
</tr>
</tbody>
</table>

### 3.1 Characteristics

“The ability to learn faster than your competitors may be the only sustainable competitive advantage”[7]. To learn faster one needs access to consistent and homogenous knowledge, and knowledge is only gained through the sharing of information. CPC aids in the sharing of information between different trading partners in the enterprise. Some of the characteristics of CPC are as follows:

- Independent design activities are synchronized.
- Engineering and functional specifications are captured.
- Design specification changes can be updated in less time.
- Design robustness is addressed.
- Simulation techniques are used to account for the variability and uncertainty in the product development process thus improving the buoyancy in building and optimizing the design course.
- Relationships are developed between multifunctional teams that are composed of internal and external trading partners.
- Continuous innovations are supported, thus launching new products in a cost reduction environment.
- Knowledge is shared between the trading partners (Transparent knowledge).
- Accessibility to correct data facilitates better-planned resources to meet design requirements.
- Migration from serial processes to parallel processes.
- Responding to abrupt changes in requirements is efficient and effective.
- Return on investment is high.
- Even distribution of benefits between all the trading partners involved in the enterprise is promoted.
- Better communications yields reduction in duplicate efforts.

### 3.2 Features of CPC

Collaboration requires frequent communication among all involved trading partners. A major factor of collaboration is that all partners contribute equally as expected, thus creating a perception of equal benefits [8]. Collaborative Product Commerce will realize the following:

- Customization of products: Collaboration allows inter- and intra-enterprise entities to participate on a real-time basis during the design of the product. CPC enables the review of product specification change in a real-time basis. This makes it possible to keep alternate and updated product specifications without losing any valuable information.
- Customer perception: CPC facilitates greater interaction between the provider and stakeholders leading to a better understanding of the originating requirements. These requirements are then translated into system-wide requirements, which the stakeholders can review and comment on.
- Utilization of available computing systems: The Internet technologies enabling CPC link together the whole range of heterogeneous and dispersed computing systems. They utilize all the data and expertise developed in these disparate systems for making the whole product life cycle efficient.
- Product development lead-time: CPC enables greater customer requirements understanding and collaboration within the enterprise and its trading partners during development of a product. This enables the company in introducing enhanced and customized products at a much faster rate and with less cost.
- Configuration handler: CPC enables mitigating the risk of developing a new product with the utilization of configuration handler. The purpose of a configuration handler is to conduct a *what-if* analysis of product design.
• Commitment: CPC allows real-time participation of all the inter- and intra enterprise partners during the entire product life cycle.

4.0 Technology Requirement
Requirement is defined as “if it mandates that something must be accomplished, transformed, produced, or provided, it is a requirement-period” [6]. The core objective of these technologies is to provide multiple accesses to various collaborating partners and provide the appropriate context for interoperation. The basic characteristics of technologies that are required for the effective implementation of CPC are high speed, reliable and secure communication links to every relevant product expert’s terminal, safe and sound portals for conducting business, search enabling for new set of components and service suppliers on a universal basis, and server and storage high-end scalability at price performance levels that are equivalent to less costly low-end hardware. Figure 2 shows how some of the application packages converge to develop CPC architecture.

5.0 Challenges
Much of CPC is implemented through the Internet. To utilize it efficiently management should first be comfortable and receptive to the idea of conducting business and exchanging information over the Internet. In the first place, they should be ready to share information with partners, suppliers, customers, and other departments and sometimes even with competitors. CPC involves a big technological transformation initiative in the enterprise, which can only be successful if it has the full support and co-operation of senior management.

A collaborative environment has to be created in the enterprise, which requires creation of new processes and authorities. In addition, it requires restructuring of business processes to encompass the CPC standards and requirements. Navi Radjou of Forrester Research states, “To win, firms must adopt a continuous product development strategy by building and tapping new product development portals. These portals will offer a single point of access and control for all product development parties and processes” [10]. Nevertheless, all trading partners have unique business processes and want to protect their intellectual capital. They need ways to build stronger relationships and work as a team.

6.0 CPC Providers
Many providers have graduated towards providing collaborative planning software to cash in on this rapidly growing and lucrative market. Each of these companies has different designs and approaches for satisfying user
requirements. The major portal providers for CPC are PTC-Windchill, Dassault/IBM-ENOVIA, SDRC-Metaphase, and Unigraphics-iMan. These vendors have the various capabilities that are shown in table 1. They can integrate with other miscellaneous packages if they do not have those capabilities. In addition, these portals support both 2-D and 3-D visualization and markup.

Most of these providers have open architectures. This makes it compatible with other software modules and provides standardized and synchronized information for the entire network. These solutions are designed for eliminating the uncertainty in supply.

7.0 Conclusion
CPC is based on the concept of the Best-of-breed solutions. That is, multiple application packages are co-opted together to form an integrated architecture. This integration enables building a stronger and seamless interconnection between the trading partners. This notion promotes flexibility in sharing information over the web. The goal is to develop innovative new products in record time and tailor them according to stakeholder preference.

It can be summarized that the purpose of CPC is to manage product development information effectively and ensure that there is an error-free data exchange between the collaborating partners. CPC promotes the notion of system integrators who engineer and provide parts to assemblers (Primes or OEM), that is; give responsibility to the trading partners for developing major components of a product [4]. Nevertheless, CPC ensures that users have a single access to information from their desktop and that they can easily visualize and manipulate the product data.

8.0 Future Research Work
A common matrix is being developed for various types of CPC portals. The objective is to highlight characteristics and features that are provided by different vendors.

9.0 Acknowledgement
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