

**Collaborative Planning,  
Forecasting and Replenishment  
(CPFR®)**



- An Overview
- 18 May 2004

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## Acknowledgements

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## Introduction

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Collaborative Planning, Forecasting and Replenishment (CPFR®) is a business practice that combines the intelligence of multiple trading partners in the planning and fulfillment of customer demand. CPFR links sales and marketing best practices, such as category management, to supply chain planning and execution processes to increase availability while reducing inventory, transportation and logistics costs.

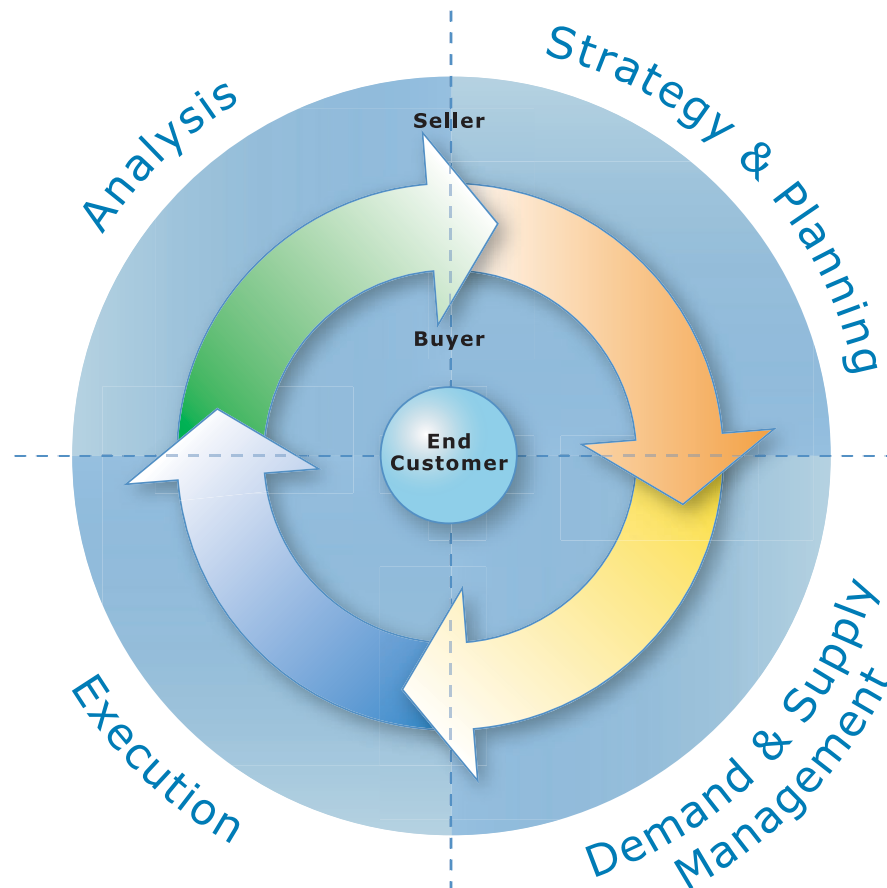
Since the publication of Voluntary Interindustry Commerce Standards (VICS) Association guidelines for CPFR in 1998, over 300 companies have implemented the process. Numerous case studies of CPFR projects document in-stock percentage improvements of from 2-8% for products in stores, accompanied by inventory reductions of 10-40% across the supply chain.

CPFR has also influenced industry sectors beyond retail, hard goods, apparel and consumer packaged goods (CPG). The RosettaNet Collaborative Forecasting standard for high-technology companies and the Chemical Industry Data Exchange (CIDX) Supply Chain Collaboration process are prominent examples.

The experience gained from pilot and production implementations of CPFR over the past six years has yielded many insights. A joint committee of VICS and the Efficient Consumer Response (ECR) organization revised the guidelines slightly in 2001 to incorporate global requirements, sanctioned by the Global Commerce Initiative (GCI). In 2004, the VICS CPFR committee developed a major revision of the CPFR model to integrate innovations and overcome shortcomings identified in the original process. This document introduces the updated model.

## The CPFR Model

The CPFR reference model provides a general framework for the collaborative aspects of planning, forecasting and replenishment processes. Figure 1 illustrates this framework, which can be applied to many industries. A *buyer* and a *seller*, as Collaboration Participants, work together to satisfy the demands of an *end customer*, who is at the center of the model.



**Figure 1** VICS CPFR Model –Top-level Diagram

In the retail industry, a *retailer* typically fills the buyer role, a *manufacturer* fills the seller role, and the *consumer* is the end customer. In other industry segments, such as high technology, the Collaboration Participants may differ. For example, an OEM, in the role of the buyer, may assemble electronics from component suppliers, in the role of the seller, and deliver the product (such as a storage subsystem) to the end customer – a financial services company. The remainder of this document presents CPFR in a retail industry context.

## CPFR Activities

In the retail industry, the manufacturer as the seller and retailer as the buyer<sup>1</sup> engage in four Collaborative Activities to improve their performance:

- **Strategy & Planning** Establish the ground rules for the collaborative relationship. Determine product mix and placement, and develop event plans for the period.
- **Demand & Supply Management** Project consumer (point-of-sale) demand, as well as order and shipment requirements over the planning horizon.
- **Execution** Place orders, prepare and deliver shipments, receive and stock products on retail shelves, record sales transactions and make payments.<sup>2</sup>
- **Analysis** Monitor planning and execution activities for exception conditions. Aggregate results, and calculate key performance metrics. Share insights and adjust plans for continuously improved results.

While these Collaboration Activities are presented in logical order, most companies are involved in all of them at any moment in time. There is no predefined sequence of steps. Execution issues can impact strategy, and analysis can lead to adjustments in forecasts.

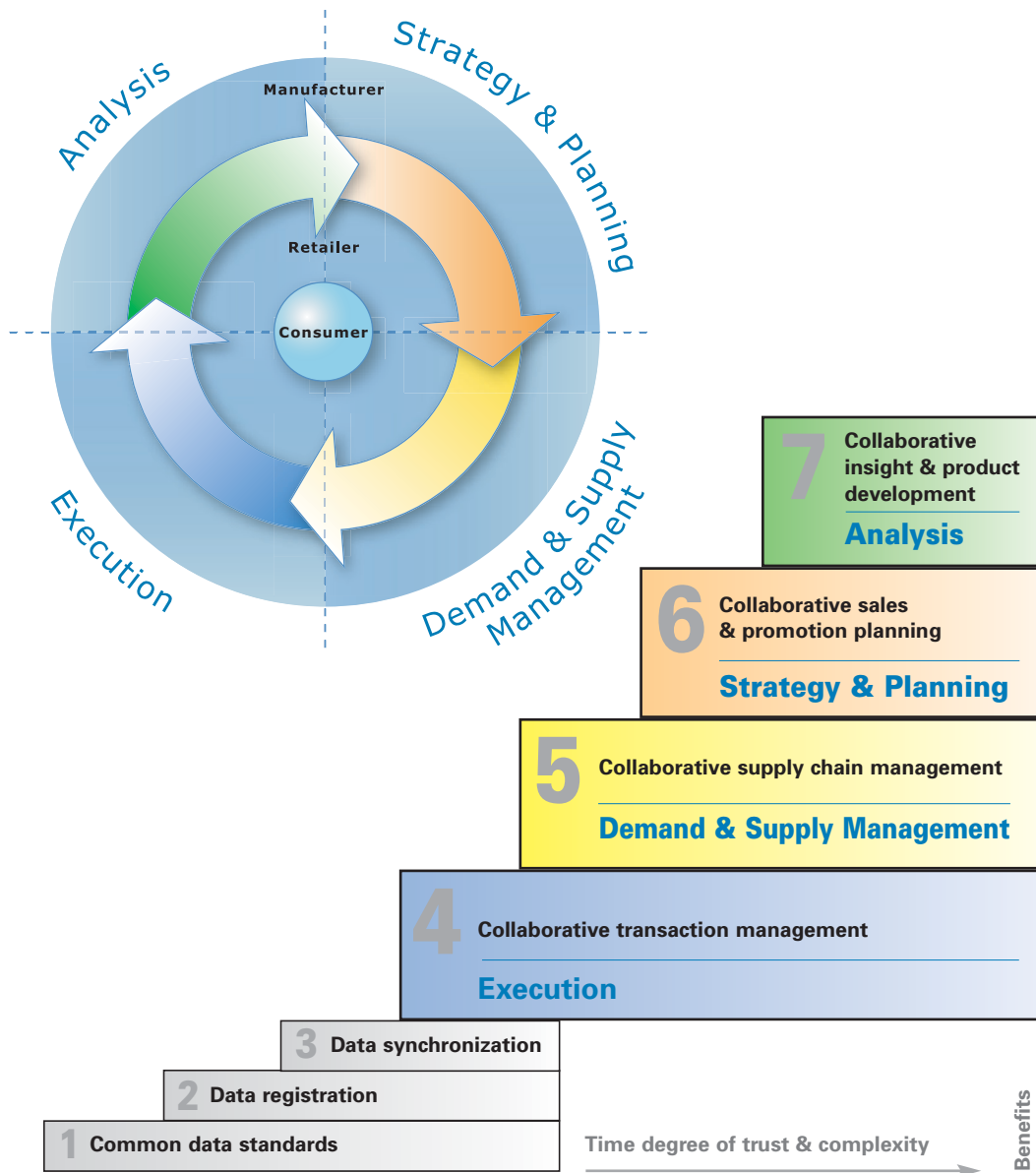
Collaboration may also focus on just a subset of the four activities (such as Strategy & Planning), while the rest of the process is performed through conventional enterprise processes. These partial implementations are sometimes called “CPFR Lite.”

<sup>1</sup> Distributors may also be participants in the process, in the buyer role, the seller role, or both. For simplicity, the remainder of the discussion only identifies retailers and manufacturers in these roles.

<sup>2</sup> These execution activities are often called the “order to cash” cycle.

## Positioning CPFR Activities in Collaborative Commerce

An effective CPFR program builds upon a firm foundation of synchronized product data and electronic commerce messaging standards. Figure 2 positions CPFR relative to the Collaborative Commerce Model, a roadmap developed by A.T. Kearney for the Grocery Manufacturers' Association (GMA) and the Food Marketing Institute (FMI). The four CPFR Collaboration Activities map to steps 4 through 7 in the model.



Source AT Kearney for GMA/FMI

**Figure 2** Positioning CPFR Relative to the FMI/GMA Collaborative Commerce Model

## CPFR Tasks

Figure 3 breaks down the CPFR model to the next level of detail – specific Collaboration Tasks. There are eight tasks – two for each of the four Collaboration Activities.



**Figure 3** CPFR Model – Collaboration Tasks

Within Strategy & Planning, *Collaboration Arrangement* is the process of setting the business goals for the relationship, defining the scope of collaboration and assigning roles, responsibilities, checkpoints and escalation procedures. The *Joint Business Plan* then identifies the significant events that affect supply and demand in the planning period, such as promotions, inventory policy changes, store openings/closings, and product introductions.

Demand & Supply Management is broken into *Sales Forecasting*, which projects consumer demand at the point of sale, and *Order Planning/Forecasting*, which determines future product ordering and delivery requirements based upon the sales forecast, inventory positions, transit lead times, and other factors.

Execution consists of *Order Generation*, which transitions forecasts to firm demand, and *Order Fulfillment*, the process of producing, shipping, delivering, and stocking products for consumer purchase.

Analysis tasks include *Exception Management*, the active monitoring of planning and operations for out-of-bounds conditions, and *Performance Assessment*, the calculation of key metrics to evaluate the achievement of business goals, uncover trends or develop alternative strategies.

## **Retailer and Manufacturer Tasks**

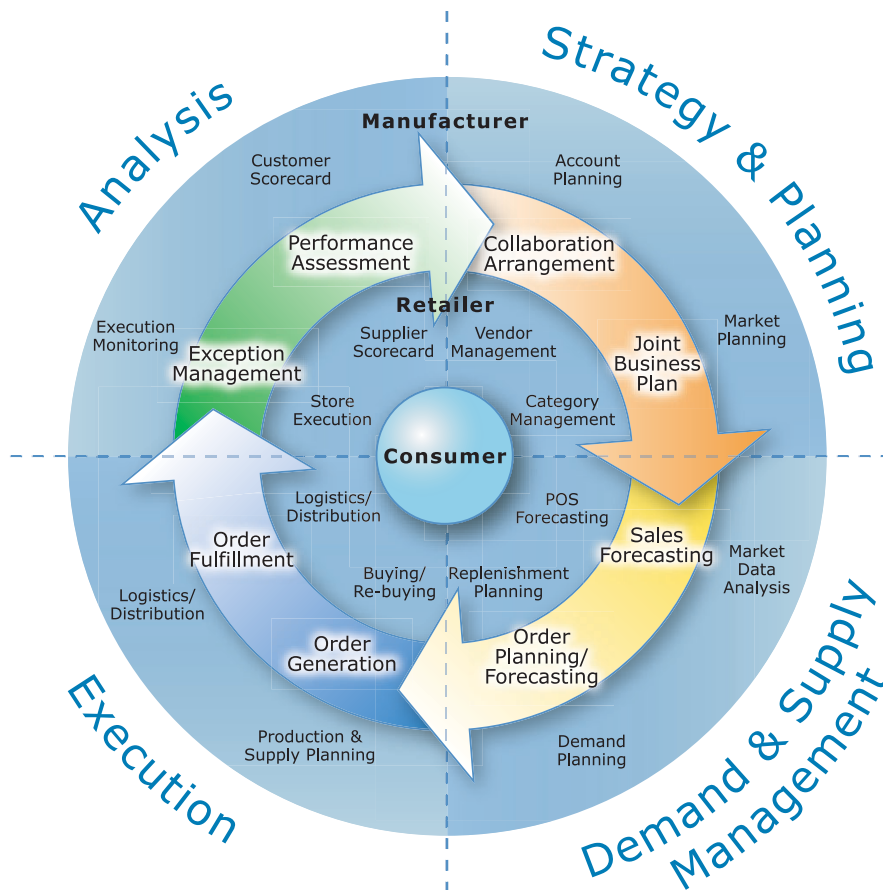
For each Collaboration Task in the model, there are corresponding Enterprise Tasks that personnel in the retailer and manufacturer perform. These Enterprise Tasks, as listed in Table 1, link business-to-business Collaboration Tasks to the overall operation of the enterprise.

**Table 1** Retailer and Manufacturer Enterprise Tasks that Support Collaboration

<b>Retailer Tasks</b>	<b>Collaboration Tasks</b>	<b>Manufacturer Tasks</b>
<b>Strategy &amp; Planning</b>		
Vendor Management	Collaboration Arrangement	Account Planning
Category Management	Joint Business Plan	Market Planning
<b>Demand &amp; Supply Management</b>		
POS Forecasting	Sales Forecasting	Market Data Analysis
Replenishment Planning	Order Planning/Forecasting	Demand Planning
<b>Execution</b>		
Buying/Re-buying	Order Generation	Production & Supply Planning
Logistics/Distribution	Order Fulfillment	Logistics/Distribution
<b>Analysis</b>		
Store Execution	Exception Management	Execution Monitoring
Supplier Scorecard	Performance Assessment	Customer Scorecard

For example, manufacturer sales teams perform periodic strategic account planning. Retailers conduct vendor management reviews. When the trading relationship involves CPFR, the teams that are responsible for these enterprise processes come together to produce the Collaboration Arrangement.

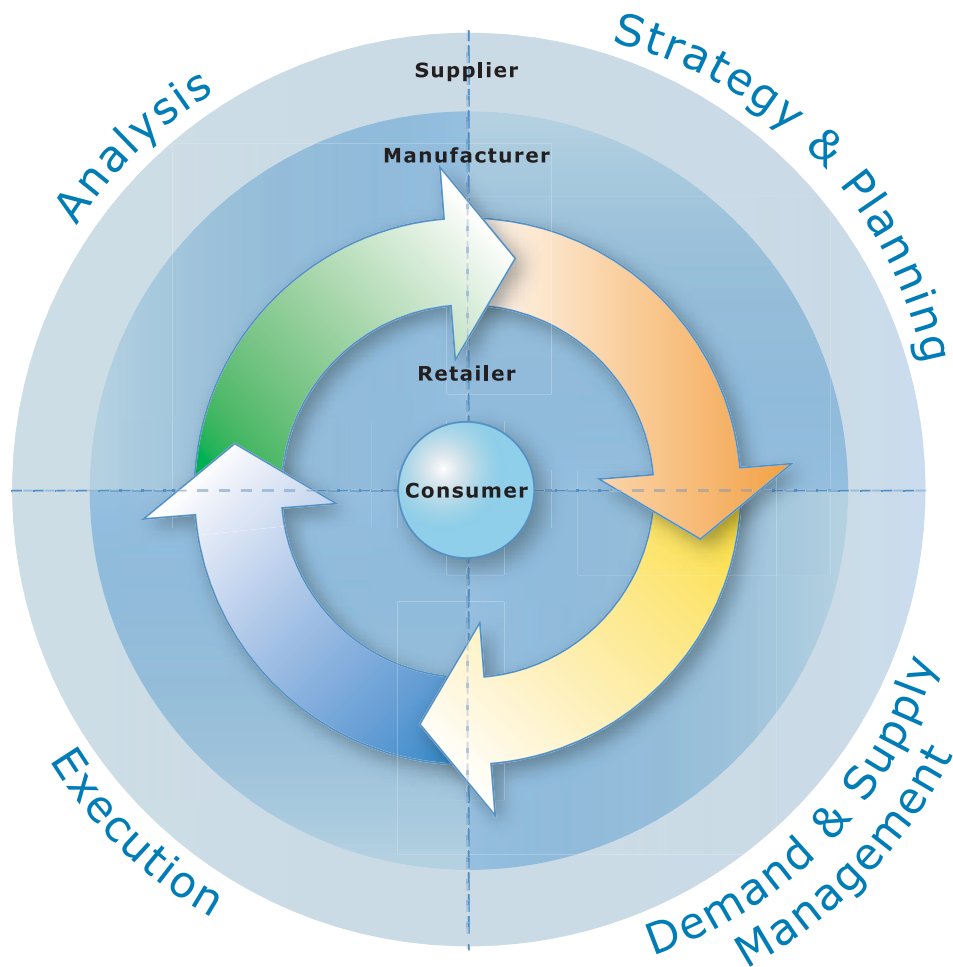
Figure 4 depicts the CPFR model with retailer and manufacturer tasks aligned with their corresponding Collaboration Tasks.



**Figure 4** Manufacturer and Retailer Tasks

## ***n-Tier Collaboration***

The CPFR model can be extended to encompass more than two tiers of trading partners. N-tier collaboration is the term used to describe relationships that progress from retailers through manufacturers or distributors to suppliers. Figure 5 dramatizes n-tier collaboration by placing the supplier in an enclosing ring.



**Figure 5** n-tier Collaboration

## CPFR Scenarios

The CPFR reference model is designed to fit many scenarios. Any individual CPFR program must adapt the model to the particular needs of the trading relationship. Of the alternative approaches that have been documented, four specific scenarios have dominated large-scale CPFR deployments. To better assist companies who are contemplating CPFR initiatives, or are engaging trading partners in their programs, the CPFR guidelines now provide detailed descriptions of these specific scenarios.

Table 2 summarizes the four standard CPFR scenarios by their applicability to product categories and distribution methods, as well as the industry segments where they are most used.

**Table 2** Specific CPFR Program Scenarios

Scenario Segments	Applicability	Typical Industry
Retail Event Collaboration	Highly-promoted channels or categories	All (except EDLP)
DC Replenishment Collaboration	Retail DC distribution	Drug chain Hardware Grocery
Store Replenishment Collaboration	Direct store delivery or retail DC-to-store distribution	Mass merchant Club store European and DSD grocery
Collaborative Assortment Planning	Apparel and seasonal goods	Department store Specialty retail

The following sections describe these scenarios in more detail. Note that scenarios are not designed to be exclusive; trading partners are free to combine scenarios if appropriate.

## ***Retail Event Collaboration***

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In many retail environments, promotions and other retail events generate the largest swings in demand, and as a result, the majority of out-of-stocks, excess inventory and unplanned logistics costs. Consequently, retailers in these highly promoted channels have focused their collaboration efforts on retail events, where their financial opportunity is greatest.

The *Retail Event Collaboration* scenario of CPFR provides an industry-standard approach to this process. Trading partners develop a collaboration strategy and a joint business plan for promotions, typically on an annual or quarterly basis. They then work together to determine the impact of planned events on consumer demand and retail distribution. As events occur, promotional orders are placed, and delivery takes place. Then the event is executed in stores. Along the way, exceptions related to event planning or execution may be identified and resolved. The process concludes with an evaluation of event performance.

The *VICS Retail Event Collaboration Business Process Guide* describes this scenario in more detail.

## ***DC Replenishment Collaboration***

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DC replenishment collaboration is a CPFR scenario that enhances continuous replenishment programs such as co-managed inventory or vendor-managed inventory (VMI). Conventional replenishment programs typically calculate order requirements in a short lead-time horizon. A single trading partner entity manages the entire process. By contrast, DC Replenishment Collaboration offers a joint order commitment process at multiple horizons beyond a single lead-time. DC Replenishment Collaboration enables manufacturers to adopt a make-to-demand policy, while allowing retailers to minimize their inventory liability and stock-out risk. Trading partners typically collaborate on DC withdrawal forecasts, manufacturer-to-retailer DC forecasts, or both. The output of collaboration is an order or series of orders that are committed over a time horizon. The buyer and seller support order generation with their buying/re-buying and production and supply planning organizations respectively.

DC Replenishment Collaboration extends the replenishment process beyond the buyer's DC and seller's finished goods warehouse to encompass all the nodes in the supply chain – from the store shelf to raw materials. The benefits attributed to DC replenishment collaboration include:

- Greater visibility to improve replenishment accuracy
- Out-of-stock reduction
- Overstock reduction
- Production capacity aligned to meet customer demand

DC replenishment collaboration also seeks to increase the efficiency of the flow of product between trading partners, especially in supply chains that have long supply cycles, heavy, bulky or regulated goods, or complex transportation requirements. Product flow benefits include optimized order quantities that minimize the operations costs of picking, loading and unloading and product put-away.

### ***Store Replenishment Collaboration***

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As with DC Replenishment, conventional store replenishment programs are executed by a single trading partner over a single lead-time horizon. Many retailers are now sharing more responsibility for the store-level availability of products via store-level collaboration initiatives. Store Replenishment Collaboration leverages the insights of both the retailer and manufacturer to drive an optimal replenishment plan. Trading partners typically collaborate on store POS forecasts. Other collaboration points that influence replenishment include:

- Store clustering
- Replenishment parameters
- Presentation stock
- Assortment optimization

The output of Store Replenishment Collaboration is an order or series of orders that are committed over a time horizon. The buyer and seller support order generation with their replenishment planning/buying re-buying and production and supply planning organizations respectively.

Store collaboration is focused on the closest link to the consumer and consequently directly influences shelf availability. The benefits attributed to Store Replenishment Collaboration include greater visibility to consumer take-away, improved replenishment accuracy, improved in-stocks, overstock reduction, and improved promotional execution. Trading partners have a direct view of how consumers are responding to new products, existing shelf distribution and promotional take-away. Manufacturers and upstream suppliers leverage this information throughout the supply chain for improved operational execution.

### ***Collaborative Assortment Planning***

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Some industries, such as fashion apparel and accessories, follow a seasonal rhythm of demand. As a result, collaborative planning in this market segment typically has a horizon of a single season and is performed at seasonal intervals.

The nature of fashion and other short lifecycle products implies that there is minimal discrete historical data to utilize in the planning cycle. Hence, there is a heavy dependence on collaborative interpretation of industry trends, consumer tastes and macroeconomic conditions.

Collaborative Assortment Planning is a process that allows retailers and suppliers to better coordinate their merchandising decisions to drive maximum profitability for both constituencies. Trading partners jointly develop an assortment plan, which contains both visual representations of the product and financial models. The output of this collaboration process is a planned purchase order containing item commitments at the UPC (style/color/size) level for each delivery point in the retailer's enterprise. The planned order is electronically shared in advance of a market or show, where sample products are viewed by the buyer and seller and final merchandising decisions are made.

## Implementing CPFR

### *Collaboration Roles*

Collaborative Planning, Forecasting and Replenishment is always superimposed on an existing demand planning and replenishment process. CPFR enhances and is compatible with both vendor-managed (VMI) and conventional ordering processes. The distinguishing factor in these alternatives is who takes the lead in three Collaboration Tasks: sales forecasting, order planning/forecasting, and order generation. Table 3 compares these alternatives.

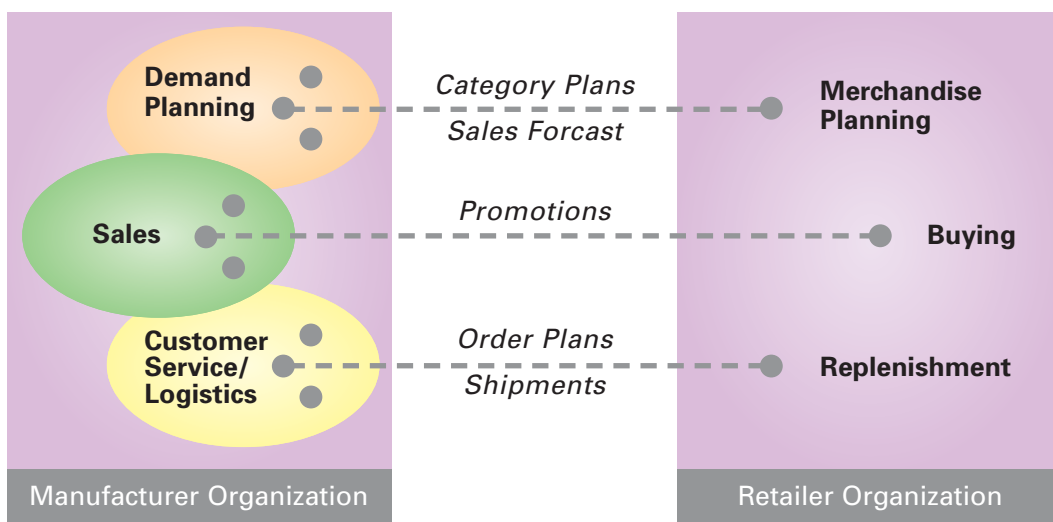
**Table 3** Collaboration Role Alternatives

Alternatives	Sales Forecasting	Order Planning /Forecasting	Order Generation
Option A (Conventional Order Mgmt)	Retailer	Retailer	Retailer
Option B (Supplier-Managed Inventory)	Retailer	Manufacturer	Manufacturer
Option C (Co-Managed Inventory)	Retailer	Retailer	Manufacturer
Option D (Retail VMI)	Manufacturer	Manufacturer	Manufacturer

## Organizational Implications

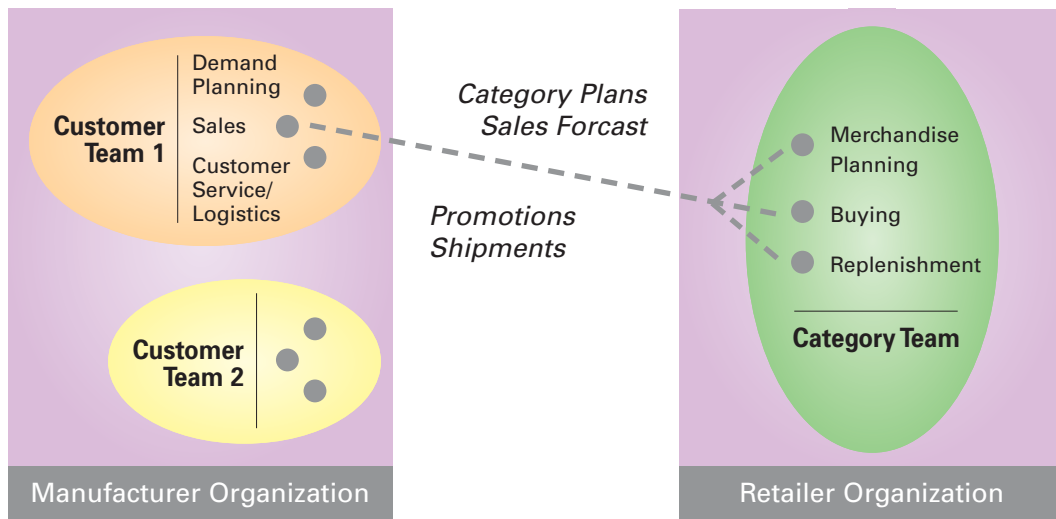
CPFR establishes guidelines for enterprises to integrate their planning processes across corporate boundaries. However, business-to-business programs must be based upon more fundamental collaborative processes *within* each enterprise. For some companies, achieving internal collaboration can pose a bigger challenge than working with customers or suppliers.

Figure 6 illustrates the organizational roles that manage CPFR activities on each side of the trading relationship. Resources responsible for merchandise planning develop category plans, which the manufacturer's demand planning personnel incorporate in their forecasts. Sales representatives and buyers negotiate deals and other promotional events. Replenishment personnel determine store and/or DC order quantities, and manufacturer customer service and logistics personnel mobilize the resources to fulfill them. In many cases, these discussions and business transactions take place independently, without coordination among enterprise organizations.



**Figure 6** Conventional Organizational Roles

Effective business-to-business collaboration demands a reorientation of resources – from functional silos to an interdisciplinary focus. For major accounts, many manufacturers establish cross-functional, customer-specific teams. Logistics, planning and financial resources are co-located with sales personnel to provide a single face to the customer. For smaller accounts, cross-functional teams are assigned to a geography or channel. Figure 7 dramatizes the desired collaborative organizational structure.



**Figure 7** Collaborative Organizational Structure

Retailers face an even bigger organizational challenge. It is not usually practical for planning, buying and replenishment personnel to reorganize around suppliers, but they sometimes can create cross-functional category teams. The biggest change may come within the replenishment organization itself: the store and DC replenishment functions must carefully orchestrate distribution to reduce out-of-stocks and chain-wide inventory balances, so some retailers have combined their store and DC replenishment teams to reduce disconnects.

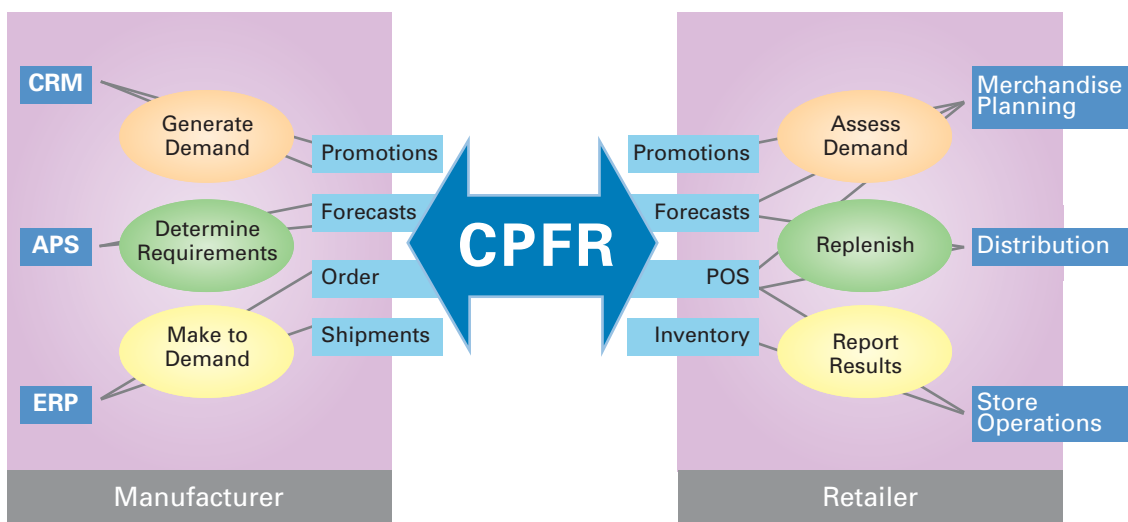
Appendix A is a self-assessment tool that companies can use to evaluate their readiness for rolling out CPFR programs.

## CPFR Technology

The CPFR process does not fundamentally depend upon technology. However, specialized technology can make the process more scalable. Many CPFR solutions have been developed to facilitate the process, including:

- Sharing forecasts and historical data
- Automating the collaboration arrangement and joint business plan
- Evaluating exception conditions
- Enabling revisions and commentary

A CPFR solution must be integrated with the enterprise systems of record that produce and consume demand and supply chain data, as illustrated in Figure 8.



**Figure 8** The Role of CPFR Technology in Integrating Retailer and Manufacturer Processes

CPFR technology can be deployed as a shared solution, or as a peer-to-peer network of interoperating CPFR applications. The shared solution can be operated as part of a retailer's or manufacturer's extranet, or hosted by an exchange or other third party. Peer-to-peer communications may flow directly between manufacturers and suppliers, or via proxies (trading-partner-to-exchange or exchange-to-exchange).

## CPFR-Related Standards

A core CPFR objective is to establish a common process that can be used not only between two trading partners, but across an entire marketplace. To achieve this objective, CPFR builds upon EAN.UCC standards for item identification, location identification, and electronic commerce message interchange.

Trading partners can use EDI messages, XML messages, or both to facilitate CPFR communications, as shown in Table 4. The EAN.UCC Global Business Message Standard provides the most comprehensive coverage of the process, with a suite of eleven CPFR-specific XML message types. While there are no EDI mappings for some CPFR messages, some projects use XML to "fill in" where EDI messages have gaps.

**Table 4** Mapping Electronic Commerce Message Standards to CPFR

Message	EAN.UCC XML	UN/EDIFACT	ANSI ASC X12 EDI
Retail Event	Retail Event	N/A	Promotional Announcement (889)
Sales Forecast / Order Plan	Forecast / Forecast Response	DELFOR	Planning Schedule with Release Capability (830)
Exception	Exception Notification	N/A	N/A
Purchase Order	Purchase Order	ORDERS	Purchase Order (850) or Grocery Order (875)
Despatch Advice	Despatch Advice	DESADV	Advance Ship Notice (856)
Product Activity	Product Activity	SLSRPT	Product Activity (852)
Performance History	Performance History	N/A	N/A

## Conclusion

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In the six years since its publication, the CPFR model has demonstrated benefits for hundreds of manufacturer and retailer companies. It has also influenced trading relationships in the high technology, chemical and automotive industries. The model has now been revised to incorporate the lessons of experience. The original "nine steps" of CPFR have been refined to a set of eight Collaboration Tasks that are easier to understand, and yet more comprehensive than the original model. Companies have greater flexibility in selecting the focus for their efforts, as well as the sequence of collaboration tasks. Specific CPFR scenarios (such as Retail Event Collaboration) give retailers and manufacturers detailed business process guidance based on successful projects.

### *For More Information*

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Readers who seek more information about CPFR have a number of resources at their disposal:

- The *VICS CPFR Committee* meets four times a year. Committee members share the results of their standards development activities, present case studies, and gather in small teams to outline future work. Meetings also offer a valuable opportunity for retailers, manufacturers, solution providers and consultants to network with experienced CPFR practitioners.
- The *VICS CPFR website* ([www.cpfr.org](http://www.cpfr.org)) includes case studies, meeting minutes, presentations and white papers, as well as the CPFR guidelines themselves.
- The Uniform Code Council (UCC) Solutions Center at [solutionscenter.uc-council.org](http://solutionscenter.uc-council.org) provides UCC members with access to the EDI and XML technical standards for CPFR messaging.
- The *Collaborative Commerce Standards Institute (CCSI)* is an organization that provides executive education and research on collaborative commerce standards, including CPFR. Courses are held on an annual schedule. See the CCSI website ([www.ccsi1.org](http://www.ccsi1.org)) for additional details.
- Major trade shows, such as the Retail Systems-VICS Collaborative Commerce Conference, UConnect and ECR Europe offer collaborative commerce tracks with CPFR presentations."

## Appendix A CPFR® Rollout Readiness Self-Assessment

Place a check mark next to each statement that is true for your business, then sum up the marks to determine your total score.

### A Organizational Readiness

- 1. The value proposition for collaboration is well understood in the company.
- 2. There is an agreed company strategy and an adequate budget for collaboration initiatives.
- 3. Collaboration process owners have been assigned and empowered.
- 4. Affected organizations have performance goals and incentives aligned with collaboration objectives.

### B Retailer Process Readiness

*(Retailers rate themselves and suppliers rate their customers' readiness in this section.)*

- 1. Details of promotions and other retail events are captured and kept up to date so that consumer demand impact can be correlated with them.
- 2. Consumer demand is forecasted based on historical sales and planned promotional activities.
- 3. Ordering processes are driven from forecasted consumer demand.
- 4. Feedback from collaboration can be incorporated in future plans and forecasts.

### C Supplier Readiness

*(Suppliers rate themselves and retailers rate their suppliers' readiness in this section.)*

- 1. Supplier sales and service/logistics personnel coordinate their response to customer issues and opportunities.
- 2. Collaboration (consumer POS) data can be effectively used in the supplier's sales and operations planning (S&OP) process.
- 3. A unified approach to collaboration allows the supplier's insights to reflect the demands of multiple customers.

### D Technology Readiness

- 1. Internet data transport (EDI/INT AS2) capabilities are production-ready.
- 2. XML translation capabilities for B2B initiatives are production-ready.
- 3. Enterprise planning applications have supported interfaces for collaboration data (import and export).
- 4. A scalable CPFR solution is available.

\_\_\_\_\_ Total Score

## Evaluating Your Score

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### ■ If you scored 11-15

- Your strategic trading partners should all be live in collaboration.
- You should be driving CPFR best practices in the industry.

### ■ If you scored 6-10

- You are ready to begin rollouts, starting with demand/supply visibility.
- Address key gaps to enhance ROI of collaboration.

### ■ If you scored 0-5

- You should act quickly to close gaps, starting with organizational ones.
- Work to sustain momentum in existing collaboration relationships, to gain experience that can be applied to future efforts.

## Suggestions for Improving Your Score

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### ■ Enhancing Organizational Readiness

- Conduct a collaboration ROI assessment
- Engage in strategy and program development

### ■ Enhancing Retailer Process Readiness

- Invest in event visibility and demand forecasting technology/processes
- Enable continuous replenishment processes

### ■ Enhancing Supplier Readiness

- Enhance S&OP practices to leverage customer-specific POS forecast data
- Implement supplier scorecards

### ■ Enhancing Technology Readiness

- Implement Internet data transport, translation and mapping technologies
- Establish interoperability among installed enterprise solutions and CPFR programs