An Introduction to the Supply Chain Council's SCOR Framework

The Supply Chain Council (SCC) was established as a non-profit consortium in 1996. Today, it is a worldwide organization with over 700 members. The Council conducts meetings that allow companies to gather together to discuss supply chain problems and opportunities and publishes newsletters to describe its activities. In addition, it has been working on a standard supply chain framework or reference model.

The SCOR Framework

The Supply-Chain Operations Reference (SCOR) model is, in essence, a horizontal, abstract process architecture and methodology for companies that want to develop supply chain applications. Considering the companies involved in the development of SCOR, and some of the impressive applications that have been created using the SCOR reference model, any company considering developing a supply chain system would be wise to examine SCOR carefully and would probably find it worthwhile to join the Supply Chain Council.

For information on the Supply Chain Council or SCOR, check the SCC Web site: www.supply-chain.org. For information on upcoming SCC meetings or SCOR training, check the SCC Web site or our calendar section.

SCOR uses its own vocabulary and notation to describe the steps in its methodology and the elements in its process model, but the approach is very generic and compatible with the modeling techniques used by many modeling tools. Several business process modeling tools are tailored to support the SCOR notation and we'll consider that in an upcoming newsletter.

By way of an overview, the SCC booklet, Supply-Chain Operations Reference – model: Overview of SCOR Version 5.0, describes three broad goals of the reference model as follows:

1. Capture the "as-is" state of a process and derive the desired "to-be" future state.
2. Quantify the operational performance of similar companies and establish internal targets based on "best-in-class" results, and
3. Characterize the management practices and software solutions that result in "best-in-class" performance.

The SCOR reference model provides an overall architecture for supply chain systems, high level processes and sub-processes, management goals, and measures that companies can use and tailor to create their own individual supply chain systems.
The SCOR model itself defines four levels, and then proceeds to populate the top three levels. Level four describes details that are left to specific companies to complete. At the top level of the SCOR framework, there are five processes. Companies can use these five processes to lay out very high level descriptions of their supply chains. We would say that the entire supply chain was part of a single supply chain value chain. Thus, for us, the five SCOR process types are business processes. Figure 1 illustrates the overview that SCOR normally uses.

What SCOR calls Plan, we would call the planning aspect of supply chain management, and not an ongoing business process, as such. Similarly SCOR associates measures with specific processes, and we would usually include them in a part of supply chain management, but these are the kinds of minor quibbles every company will have with a generic framework intended to define any possible supply chain. We'd say the core business processes of the SCOR supply chain are Source, Make, Deliver, and Return. The important thing to keep in mind is that the SCOR framework is not designed to force companies into a particular approach. Instead, its designed to provide divisions and companies with a very general way of talking about supply chains. Working with the generic processes of the SCOR framework several companies can quickly design a supply chain without worrying about the names that each specific company might use to describe aspects of their own processes.

SCOR defines each of the processes shown in Figure 1 in terms of optional subprocesses that could be included in them – and refers to the subprocesses as configuration level process categories. It doesn’t assume that every company will use all of the sub-processes. Instead, it assumes that companies will choose the specific sub-processes they need for their particular supply chains. It would be a rare company that would support making to stock, making to order and engineereing
### SCOR Model Overview

#### Level 1: Top Level (Process Types)

- **Description**: Level 1 defines the scope and content for the Supply Chain Operations Reference model. Here, the basis of competition performance targets are set.

#### Level 2: Configuration Level (Process Categories)

- **Description**: A company's supply chain can be "configured to order" at Level 2 from approximately 24 core "process categories." Companies implement their operations strategy through their unique supply chain configuration.

#### Level 3: Process Element Level (Decompose Processes)

- **Description**: Level 3 defines a company's ability to compete successfully in its chosen markets and consists of:
  - Process element definitions
  - Process element information inputs and outputs
  - Process performance metrics
  - Best practices, where applicable
  - System capabilities required to support best practices
  - Systems/tools

- **Comments**: Companies "fine tune" their Operations Strategy at Level 3.

#### Level 4: Implementation Level (Decompose Process Elements)

- **Description**: Companies implement specific supply chain management practices at this level. Level 4 defines practices to achieve competitive advantage and to adapt to changing business conditions.

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**Figure 2.** The SCOR model of the four levels of process detail. (After the Supply Chain Council.)

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To order, although some large companies could certainly support all three Make categories.

Figure 2 shows how SCOR conceptualizes the three levels of their reference model. Figure 2 illustrates the second level SCOR model. The SCOR notation continues to use arrows until it arrives at sub-subprocesses, which they call process elements.

Figure 3 shows the five basic SCOR process types: Source, Make Deliver, Return and Plan. (It also shows Enable, which isn’t regarded as a process.) Each of the five basic processes include sub-processes, which SCOR calls Process Categories. Enable also includes eleven processes or databases.

Figure 4 shows the third level of analysis provided by SCOR -- what SCOR terms process elements -- for a single process category: S1 Source Stocked Processes. In this case we’ve used rectangles with rounded corners to represent the 5 sub-subprocesses and swimlanes to show here one company relates to a supplier. The notes on the diagram are a little obscure but they show how the sub-subprocesses are linked to specific best practices and measures.
Measures and Best Practices

In addition to defining high-level processes, SCOR does a nice job of defining process goals and measures, and benchmark information for the processes it defines. Table 1 provides an overview of the process goals and measures that SCOR uses for each process.
For each process element that SCOR has defined, it has also defined a set of measures. Thus, for the process element Schedule Product Deliveries, SCOR provides the information shown in Table 2.
### SCOR Level One Process Measures

<table>
<thead>
<tr>
<th>Process Measures</th>
<th>Customer-Facing</th>
<th>Internal-Facing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reliability</td>
<td>Responsiveness</td>
</tr>
<tr>
<td>Delivery Performance</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Fill rate</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Perfect order fulfillment</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Order fulfillment lead time</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Supply-chain response time</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Production flexibility</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Supply chain management cost</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Value added productivity</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Warranty cost or returns processing cost</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Cash-to-cash cycle time</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Inventory days of supply</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Asset turns</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

#### Figure 5. SCOR level one process measures

SCOR also provides a list of best practices associated with each process element, and metrics that show what the average company in a given industry managed to achieve against these metrics.

Among the best practices defines for S1.1 Schedule Product Deliveries are:
- Utilize EDI transactions to reduce cycle time and costs
- VMI agreements allow suppliers to manage (replenish) inventory automatically
- Mechanical (Kanban) pull signals are used to notify suppliers of the need to deliver product
- Consignment agreements are used to reduce assets and cycle time while increasing the availability of critical items
- Advanced ship notices allow for tight synchronization between Source and Make processes

#### Benchmarking SCOR Projects

In business process circles, a *benchmark* refers to a data point that one company can use to determine how well it is doing, in comparison with others in the same industry, or others who undertake similar tasks. Some consulting companies that work with lots of companies within the same area gather data, do statistical averages and publish benchmarks. Thus, for example, a company developing a customer service process might want to know how long their competitors typically take to answer their support line phones. In most cases, good benchmarks are hard to come by. The Supply Chain Council, on the other hand, with over 700 members, is
S1.1 Schedule Product Deliveries

**Definition:** Scheduling and managing the execution of the individual deliveries of product against an existing contract or purchase order. The requirements for product releases are determined based on the detailed sourcing plan or other types of product pull signals.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>% Schedules Generated within Supplier’s Lead Time</td>
</tr>
<tr>
<td></td>
<td>% Schedules Changed within the Supplier’s Lead Time</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Release Cycle of Changes</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Average Days per Schedule Change</td>
</tr>
<tr>
<td></td>
<td>Average Days per Engineering Change</td>
</tr>
<tr>
<td>Cost</td>
<td>Product Management and Planning Cost as a % of Product Acquisitions Costs</td>
</tr>
<tr>
<td>Assets</td>
<td>None identified</td>
</tr>
</tbody>
</table>

Table 2. SCOR Process S1.1 Schedule of product deliveries.

in an ideal place to gather data and generate good benchmarks for supply chain processes. The council keeps benchmarks for all of its processes and sorts them by industry. This provides companies with hard data on what kinds of savings they might be likely to obtain if they implement one or another supply chain systems.

SCOR leaves the final level of analysis, which it refers to as Level 4, Implementation Level, out of its the reference model. It assumes that companies will use the SCOR model to identify process categories and elements they need and then implement them in a manner best suited to the specific company.

Several SCOR models deal with the movement of parts from suppliers to manufacturing sites to warehouses in various locations around the world. The SCOR notation provides various ways of indicating this, including picture-diagrams. We prefer to use standard process diagrams and to label the swimlanes with the locations of various sites. If this was inconvenient, one could always put the information in the process or activity box.

**What Next**

SCC provides courses in which certified instructors teach the entire SCOR methodology and prove detailed documentation for SCOR. In addition, several of the leading modeling tools provide implementations of the SCOR system. (We plan to describe these tools in an upcoming issue of the BP Trends Newsletter.) Starting with such a tool certainly makes it easier to quickly modify SCOR models for your company. On the other hand, most of the problems you face with involve determining how your supply chain system should be organized and what rules will be needed. The diagrams may be less important than the ideas that simply reading about the SCOR approach will bring to mind.

Your company may or may not decide that the SCOR system is appropriate for you e-business development effort. It’s hard to imagine, however, that a careful review of the SCOR approach, metrics and performance data wouldn’t give your company some good ideas about the design or improvement of a supply chain process.