US Marine Corps

Integrated Logistics Capability

High-Level Operational Architecture

Executive Summary

Background

This document represents the proposed ILC high-level Operational Architecture (OA). The architecture was developed by a team led by Stanley Associates and the ILC Center. It depicts the high-level business model for the "To-Be" Marine Corps logistics enterprise. The ILC team was tasked to develop a standard set of processes across the logistics enterprise, based on ILC concepts and commercial best practices. The ILC high-level OA integrates current CSS/logistics functions with common, high-level management processes based upon a universal supply-chain model. In addition, the ILC high-level OA will serve as the foundation for the follow-on efforts to develop the detailed OA for Global Combat Support System – Marine Corps (GCSS-MC).

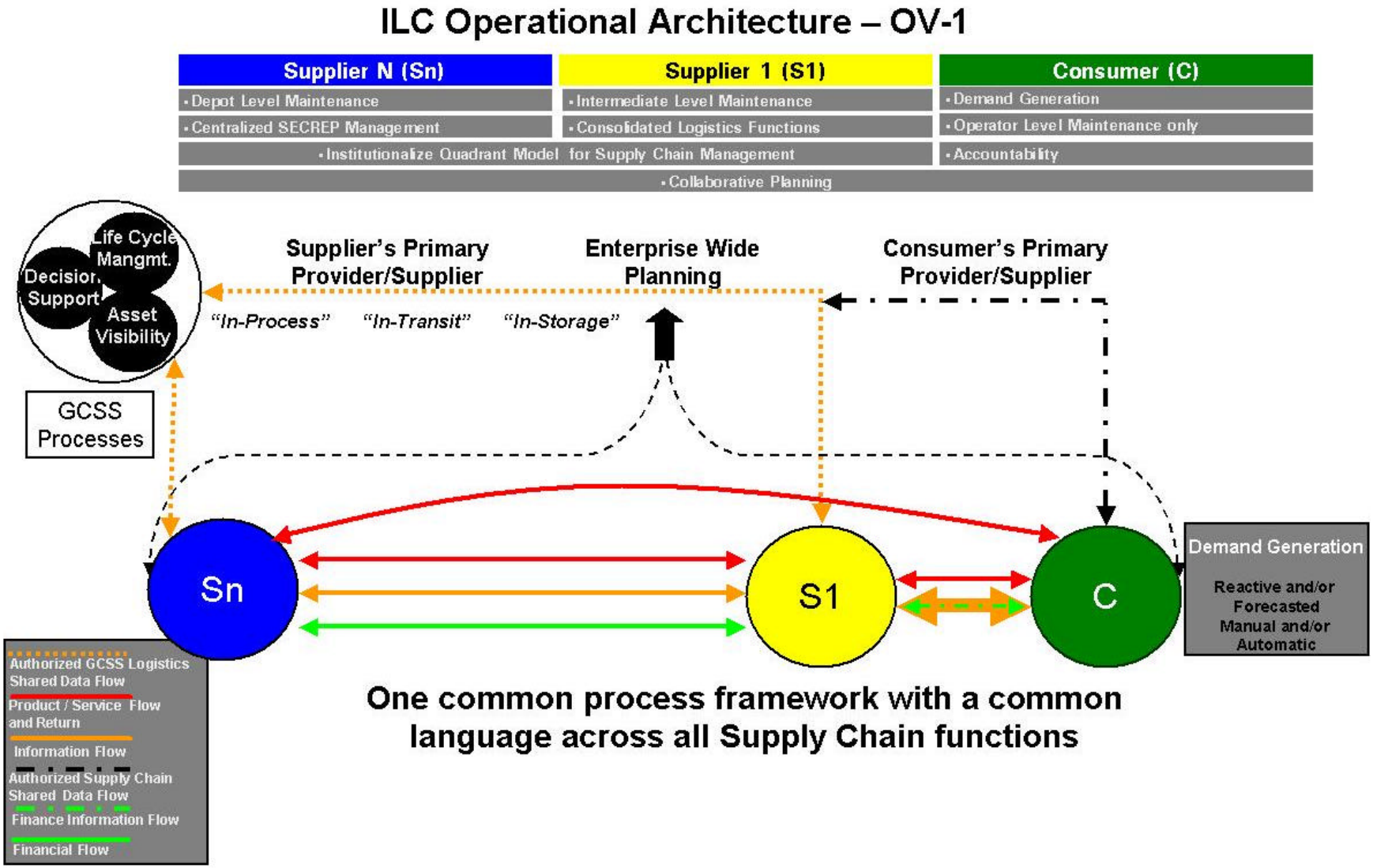
The ILC Operational Architecture

The "To-Be" ILC high-level OA provides an enterprise wide, integrated view of logistics focused on fulfillment of the demands for products and services generated by the warfighter. It relies on standard supply chain best commercial practices and performance measures, molded into a standard supply chain process to suit the expeditionary nature of Marine Corps' operations, across the Marine Corps logistics enterprise.

Approach

The Supply Chain Operational Reference (SCOR) model was used to develop the high-level OA. The objective in applying SCOR was to leverage best commercial practices while developing a unified supply chain model for products and services across the future Marine Corps logistics enterprise.

Rather than concentrate on the vertical, or functional "stove pipes" of the current logistics enterprise, the OA team employed a horizontal or process-oriented view across all of Marine Corps logistics. This OA was developed through the joint collaboration of cross-functional government subject matter experts (SMEs) and commercial supply chain experts, who vetted the OA standard processes to ensure supportability of future demand generation and fulfillment for products and services across the Marine Corps.


ILC Operational Architecture – OV-1
Supplier N (Sn)
Supplier 1 (S1)
Consumer (C)
• Depot Level Maintenance
• Intermediate Level Maintenance
• Demand Generation
• Centralized SECREP Management
• Consolidated Logistics Functions
• Operator Level Maintenance only
• Institutionalize Quadrant Model for Supply Chain Management
• Accountability
• Collaborative Planning
Life Cycle Mangmt.
Decision Support
Asset Visibility
GCSS Processes
Supplier's Primary Provider/Supplier
Enterprise Wide Planning
Consumer's Primary Provider/Supplier
"In-Process"
"In-Transit"
"In-Storage"
Sn
S1
C
Demand Generation
Reactive and/or Forecasted
Manual and/or Automatic
Authorized GCSS Logistics Shared Data Flow
Product / Service Flow and Return
Information Flow
Authorized Supply Chain Shared Data Flow
Finance Information Flow
Financial Flow
One common process framework with a common language across all Supply Chain functions

HIGH-LEVEL OPERATIONAL CONCEPT DESCRIPTION

Definition

The High-Level Operational Concept Description conveys a high-level description of the operation that the architecture supports. The graphic is generally composed of nodes in the form of icons and connectors and is the most flexible of all the OA products. The icons represent organizations, assets, missions or tasks, and the connectors show information flows or connectivity. The graphic can also depict the relative geographic position of assets and tasks. The graphic should be accompanied with a textual description of the operational concept. The template is tailored based on the scope and intent of the architecture. However, in general, the graphic will imply such things as the missions, high-level operations, organizations, and geographical distribution of assets.

Intended Use

The High-Level Operational Concept Description is useful in facilitating detailed discussions between decision-makers. It is a graphical description of the concept of the OA and is a stand-alone document. In addition, the graphic represents the goals and objectives to be achieved by the Marine Corps and will serve as the baseline for development of the detailed OA.

What the High-Level Operational Concepte Description Tells Us

The High-Level Operational Concept Description represents a high-level OA depicting processes and information flows for the “To-Be” Marine Corps logistics enterprise. The graphic displays a standard and generic view of the future supply chain. It illustrates each of the operational nodes and their roles and interactions in a collaborative environment enabled by shared data.

The Consumer in the “To-Be” supply chain is defined as the ultimate consumer of products and/or services, such as a using unit, and is depicted as "C" (figure 1). The consumer is responsible for generating demands, conducting operator level maintenance, and accounting for their resources. Demand may be reactive (e.g. unscheduled maintenance), or forecasted (e.g. scheduled re-supply), using manual (e.g. radio) and or automatic (e.g. autonomic) modes of communication.

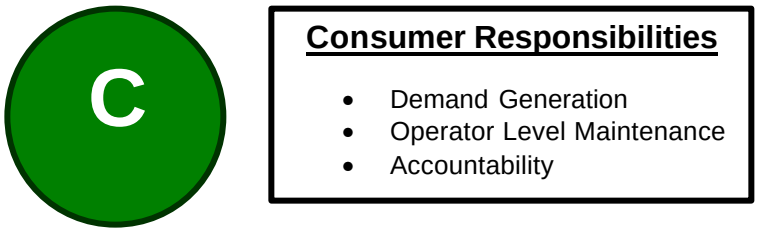


Figure 1: The Consumer

In the ILC architecture, consumer demands are passed to a single entity. This entity is depicted as Supplier 1, or the "S1" node (figure 2). Supplier 1 is responsible for all supply chain processes including order management, sourcing and the delivery of products and services for the consumer. Its primary obligation is to fulfill the demand generated at the consumer level, not necessarily to maintain a hierarchical relationship between itself and its supplier(s). Toward that end, it maintains inventory and asset visibility, has intermediate maintenance capabilities, and conducts financial management for the consumer.

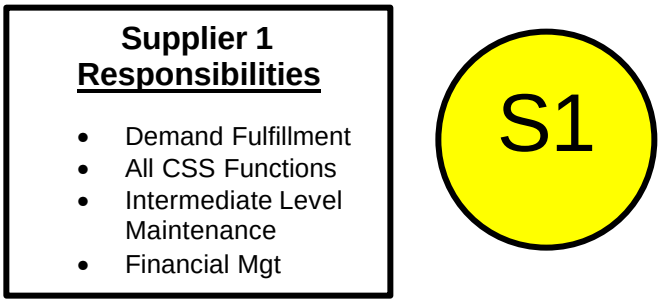


Figure 2: Supplier 1

Consumers communicate demand for products and/or services to Supplier 1 by any means available. This flow is considered an information flow and is depicted by the orange arrow (figure 3). This link is the Consumer's interface with the logistics enterprise and includes other information such as order receipt, order status, and shipping information. Demand signals from the consumer lead ultimately to the flow of products and services up and down the supply chain. Product and service flows are depicted by the red arrow. To the extent it can, Supplier 1 fulfills consumer demands from organic sources. Supplier 1 is also responsible for managing financial resources for the consumer. Financial information (e.g., available funds, account reconciliation, etc.) is passed to the consumer as information. This flow is depicted below by the dashed green line imbedded in the information exchange (orange line).

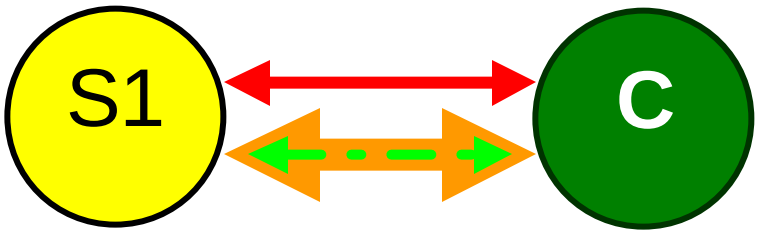


Figure 3: Customer-Supplier 1 Relationship

Supplier 1 is responsible for communications with all other suppliers, vendors and service providers (called Supplier(s) N, and depicted as "Sn"). See figure 4. Supplier(s) N is responsible for fulfilling demand generated from the Consumer at the request of Supplier 1. Within the Marine Corps, Supplier(s) N activities include (but are not limited to) wholesale supply, depot-level maintenance, and management of secondary repairables. In addition, Supplier(s) N's relationship with the supply chain enterprise is predicated on its relationship to Supplier 1 and how a particular Supplier N is incorporated into the strategic plan of the supply chain enterprise. Examples of Supplier(s) N include the Defense Logistics Agency (DLA), clinical health care provided by the Navy, transportation services provided by TRANSCOM via GTN, commercial vendors, authorized civilian agencies, or even adjacent units.

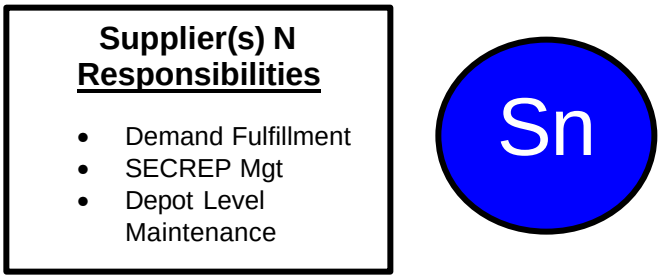


Figure 4: Supplier(s) N

The interaction between Supplier 1 and all other suppliers gives Supplier 1 the ability to pass a demand to the next node in the supply chain (e.g., commercial vendor or DLA). Figure 5 shows this relationship. S1 also has the ability to laterally source based on the situation and location of the desired product or service (e.g., an adjacent unit).

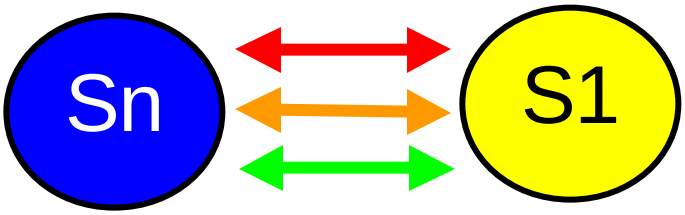


Figure 5: Supplier 1-Supplier(s) N Relationship

Figure 5, above, also shows the interfaces between Supplier 1 and Supplier(s) N. The orange line depicts Supplier 1's exchanges of information between multiple sources for logistics products and services. The green line depicts financial flows. These interfaces enable Supplier 1 to satisfy demands it is unable to fulfill organically. The red line depicts product and/or service flows between Supplier(s) N and Supplier 1.

In some cases, Supplier(s) N may deliver directly to the Consumer on behalf of Supplier 1. However, it is the responsibility of Supplier 1 to affect order

management and execution (sourcing) of these transactions to the Supplier(s) N. Supplier 1 is also responsible for conducting financial transactions with suppliers on behalf of the consumer. The consumer, then, is responsible only for passing a demand (and associated information) to Supplier 1, and maintaining accountability of assets and resources. Figure 6 illustrates this fulfillment process.

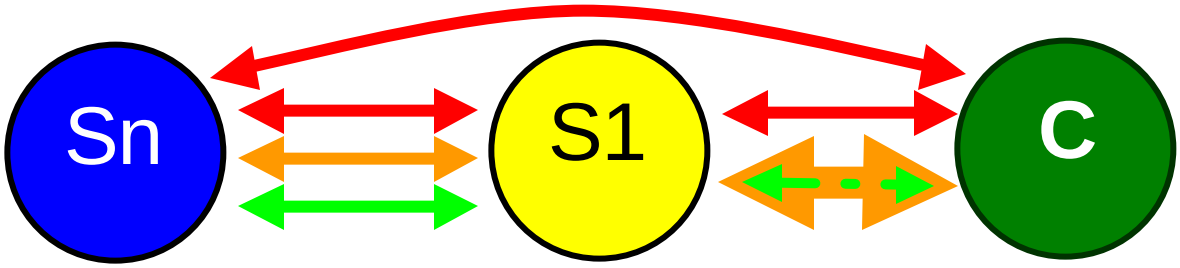


Figure 6: The Fulfillment Process

A critical piece of the supply chain depicted in figure 6 is the availability of quality data across the enterprise. This "sharing" of data is enabled by a Shared Data Environment (SDE), which is used to facilitate the flow of data throughout the enterprise. This capability is depicted in figure 7 by the orange dotted lines above the supply chain nodes.

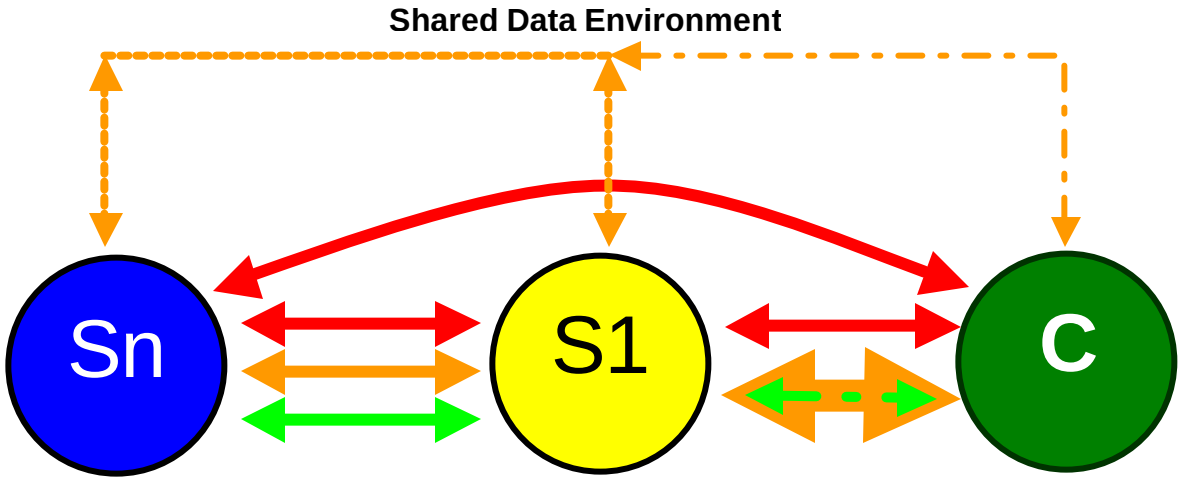


Figure 7: Availability of data throughout the enterprise

The SDE enables members of the logistics enterprise to maintain visibility of assets that are in transit, in storage and or in processing, and provides a means of accessing information by each node in the supply chain. Note the line that connects the consumer (C) to the SDE is slightly different. This depicts the ability of the consumer to disconnect from the network, conduct operations remotely, and re-connect when in a position to do so. This allows the architecture to accommodate any means of communications between the

consumer and Supplier 1. Thus, connectivity to the SDE is not required for the consumer. Additionally, some Supplier(s) N may also reside outside the SDE (e.g., vendors) which is not depicted here.

Another key aspect of this architecture is the ability to plan the supply chain based on current and accurate information. Real time (or near real time) information maintained in the SDE enables collaborative planning that spans the entire logistics enterprise. To facilitate the planning process, data from the execution activities can be fed back, via the SDE, to the planning elements throughout the supply chain. This creates a continuous, cyclical flow of information between plan and execution activities. This capability is depicted in figure 8. Access to planning data throughout the supply chain enables each organization within the supply chain to collaborate and optimize their planning activities. Planning activities reside at each node and include activities such as materiel lifecycle management.

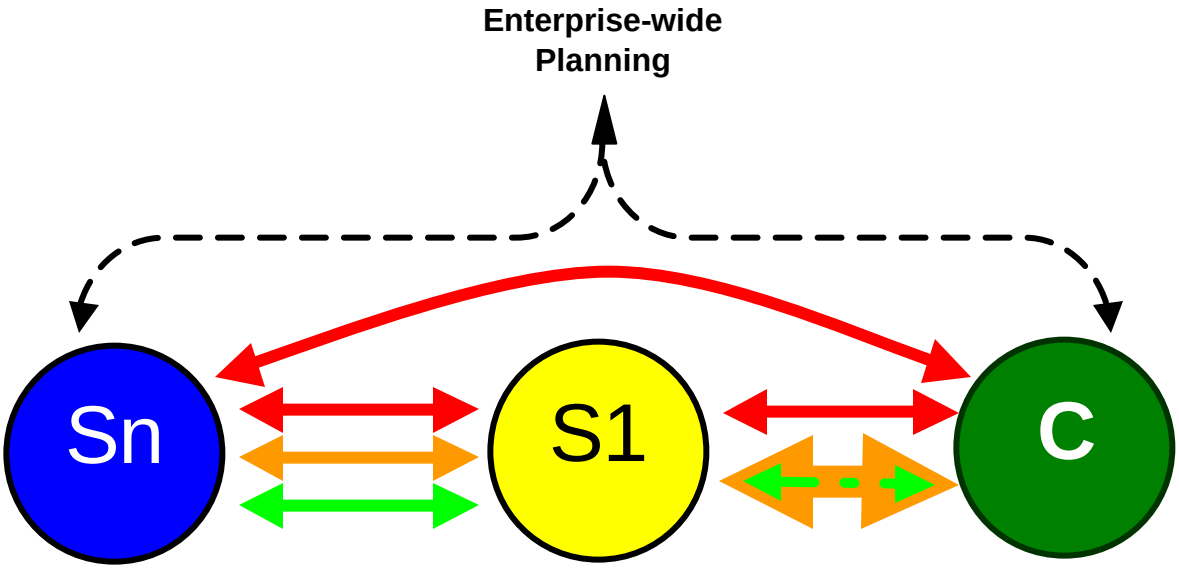


Figure 8: Supply Chain Planning

The SDE, which is the cornerstone of GCSS-MC, provides data that is of uniform and consistent structure. The SDE will provide an easily accessible repository for common data necessary to provide rapid, flexible decision support, total asset visibility, an effective planning capability (across the enterprise), and an enhanced ability to execute lifecycle management.

In summary, the high-level operational concept graphic depicts a logistics enterprise that is optimized for a deployed environment, provides a clear customer focus enabled by standard processes, well-defined activities and integrated information technology in an SDE.

Analysis

Background

In January 2001, the ILC office and a team led by Stanley Associates began work on the Marine Corps logistics Operational Architecture (OA) to support the Integrated Logistics Capability (ILC) Center in its continuing efforts to develop the Marine Corps logistics enterprise. The OA will be used as the foundation for reengineering the Marine Corps' logistics processes and business rules and modernizing the supporting information technology based on the ILC Business Case, the Marine Corps Campaign Plan, and other visionary documents.

The focus of the high-level OA effort is to develop a high-level business model for the "To-Be" Marine Corps logistics enterprise in the 2004-2006 timeframe. This business model will provide standard, yet flexible, logistics processes that support Marines in any situation worldwide. To this end, the objective of the high-level OA is to develop a high-level OA that defines the principal processes, activities and interfaces involved in the "To-Be" Marine Corps logistics enterprise. As such, the OA defines the high-level business model for the "To-Be" Marine Corps logistics enterprise.

In general, the high-level OA provides a standard business model from which a more exhaustive OA for the Marine Corps "To-Be" logistics enterprise can be developed. The detailed OA will provide the operational context and functional requirements necessary to develop and implement the Global Combat Support System - Marine Corps (GCSS-MC). The end result will be a standard yet flexible supply chain supported by integrated, interoperable information systems that serve as the backbone of the Marine Corps logistics enterprise.

What is the OA?

The "To-Be" high-level OA removes the burden of logistics from the warfighter and consolidates logistics, products and services, with a logistics provider. It defines a standard set of processes, across all six functional areas of CSS, for providing products and services to the customer. This architecture allows both the warfighter and the logistics provider to focus on their core competencies.

"To-Be" vs. "As-Is"

The "To-Be" OA provides a common model for all CSS/logistics functions. In the "To-Be" OA, CSS/logistics functions are integrated with common, high-level management processes based upon a universal supply-chain model and commercial best business practices. Therefore, the "To-Be" OA eliminates

duplicative processes from the logistics enterprise. In the "As-Is", unique processes and the data they generate exist within each "stove pipe" CSS/logistics function.

The information that the "To-Be" processes generate is defined by common data that can be shared with the Asset Visibility and Decision Support processes of GCSS. In contrast, the "As-Is" is not based upon a common model for all CSS/logistics functions. Because the "As-Is" generated data are unique, it is infeasible to attempt to use the data to support the processes found within GCSS.

The integrated processes and common data within the "To-Be" OA will support a collaborative planning capability. This will enable the current decision support structure of the Marine Corps' disparate organizations and geographical elements to participate in global planning, execution and monitoring of the logistics enterprise.

Additionally, in the "To-Be" OA, the USMC consumer can be treated similarly to a commercial consumer (i.e., all commercial supply-chain processes are handled by the Supplier/Provider, not the consumer). The "To-Be" OA will utilize an integrated channel to communicate the consumer's demands. Thus, demands can be fulfilled through a fully integrated, optimized process and support structure.

Finally, the "To-Be" OA is not constrained by a physical environment or by traditional organizational relationships, (e.g. geographical, peacetime garrison or wartime field environments). In fact, it is optimized for a deployed environment. Conversely, the "As-Is" is optimized around a peacetime environment and is tied to existing organizational structures and relationships.

Applying the Supply Chain Operations Reference Model to the Marine Corps Logistics Enterprise

Supply Chain

At a high level, the Marine Corps' supply chain reflects characteristics that are similar to the typical supply chain for most commercial enterprises. For example, a typical commercial supply chain is comprised of two basic sets of activities – recognition of demand for products and services, and the fulfillment of that demand. The Marine Corps' supply chain can be described in these terms. The consumer creates demand for products or services, and a supplier fulfills that demand.

Despite the similarities between the two, the Marine Corps' supply chain differs from the commercial world. These differences are directly related to the

organization, roles, and mission of the Marine Corps. Nevertheless, like any enterprise responsible for logistics execution, the Marine Corps' supply chain still encompasses demand generation and demand fulfillment.

The SCOR Model

To fully understand the "to-be" logistics architecture, a working knowledge of the SCOR model is needed. The Supply Chain Council[1] (SCC) developed the SCOR Model to serve as a framework for standardizing supply chain operations based on commercial best business practices. Many commercial enterprises, such as Boeing and Coca-Cola, use the SCOR Model as a tool to improve supply chain performance. These cases, coupled with the similarity of the Marine Corps' supply chain to most commercial supply chains, supports the use of the SCOR Model to develop and reengineer the Corps' supply chain.

The SCOR Model describes business activities that are associated with satisfying consumer demand. The model outlines the steps of a supply chain transaction, starting with the consumer inquiry through the paid invoice.

SCOR is a hierarchical model depicted in 3 levels and organized around five different management processes (Plan, Source, Make, Deliver and Return).

- Level 1 defines these high-level management processes;
- Level 2 further decomposes these processes to a configuration level comprised of 26 core process categories; and
- Level 3 further decomposes these categories into process elements consisting of definitions, information inputs and outputs, process performance metrics, best practices (where applicable) and the system capabilities required to support best business practices.

The SCOR Model offers specific standard processes for a supply chain down to Level 3. Common information flows that are part of the Level 3 process elements will lead to improved access to information throughout the supply chain. These information exchanges are critical to making supply chains more efficient and effective. Applying the SCOR Model facilitates precise, information-based logistics.

Below Level 3, applying the SCOR model to configure the supply chain requires an in-depth understanding of "To-Be" business rules and activities of the enterprise. SCOR does provide standard best commercial practices, performance attributes and associated metrics to measure and manage the performance of a supply chain down to Level 3. However, below Level 3 each

[1] The SCC is an independent, not-for-profit organization with membership open to all companies and organizations (over 700 members at the time of the release of SCOR model version 4.0). The goal of SCC is to advance and share state-of-the-art supply chain practices and systems to all the members of the Council.

enterprise must develop and implement specific supply chain practices with suitable performance attributes and associated metrics for its own operations.

Performance attributes are standard characteristics used to describe a supply chain. Using these characteristics (such as reliability, responsiveness, flexibility) is similar to using standard characteristics to describe a physical object (e.g. height, width, depth). They provide a common language for evaluating, analyzing and comparing the performance of two competing supply chains. Although SCOR defines the key performance attributes of a supply chain, the Marine Corps must define its vision through the prioritization of these attributes.

Performance attributes are divided into two major categories - Customer-Facing and Internal-Facing. The qualities for Customer-Facing are reliability, responsiveness and flexibility. Internal-Facing qualities are cost and assets. At a high-level, these performance attributes, through metrics, measure two conflicting qualities of a supply chain – efficiency and responsiveness (efficient supply chains and responsive supply chains). Internal-Facing performance attributes are principally focused on efficiency. Customer-facing performance attributes are principally focused on responsiveness.

The challenge of configuring the supply chain below Level 3 is developing a model where performance attributes can be used to measure, assess and adjust the supply chain. In commercial industry, neither the efficient nor the responsive supply chain is necessarily appropriate for all circumstances. Various trade-offs occur to optimize one quality or another at the expense of the other.

Besides the five supply chain management processes (Plan, Source, Make, Deliver, and Return), the SCOR Model differentiates three process types: Planning, Execution, and Enable.

The planning processes align resources with expected demand requirements. These processes balance aggregated demand across a consistent planning horizon and contribute to supply chain response time. Planning processes include Plan the Supply Chain (P1), Plan Source (P2), Plan Make (P3), Plan Deliver (P4) and Plan Return (P5). SCOR illustrates a hierarchical and cyclical planning process. P1 (Plan the Supply Chain) is the hierarchical lead of all the SCOR planning processes and represents the high-level or enterprise wide planning activity. The P1 SCOR activity balances all the supply chain requirements and resources in order to determine an overarching “supply chain plan”. This high-level “supply chain plan” then drives the development of the lower level planning activities.

Lower level planning activities produce sourcing, production, delivery and return plans and drive the execution of the Source, Make, Deliver, and Return SCOR elements. These elements, in turn, feed information back to the planning elements, thus creating a continuous cyclical information flow between plan and

execution activities. Execution activity outputs have a direct impact on the planning elements, which in turn coordinate the execution of those activities.

Execution processes (Source, Make, Deliver, and Return) are triggered by planned or actual demand that changes the state of products. They include scheduling and sequencing, transforming materials and services, and moving product. Within the execution processes, the SCOR Model focuses on three major environments for all products and services: Make-To-Stock (MTS), Make-To-Order (MTO), and Engineer-To-Order (ETO). All the products and services of a supply chain can be classified under these three environments.

Enable processes prepare, maintain, and manage information or relationships upon which planning and execution processes rely. The five supply chain management processes (Plan, Source, Make, Deliver, and Return) have enabling elements that facilitate their execution. At a high-level, some of these elements perform similar functions. Examples of some of the common enable processes include the management of decision support criteria (manage business rules), performance tracking (actual vs. established standards), collection and maintenance of critical information/data, inventory management, management of capital assets and compliance with regulatory documentation and standards. In addition to these common elements, each SCOR management process has enable elements that are unique to their specific process and execution.

Planning

Goal of Enterprise Wide Planning

The goal of enterprise wide planning (EWP) is to provide strategic planning that supports global procurement, life cycle management, resource allocation and fulfillment throughout the supply chain. As identified in P1 (Plan Supply Chain) of the SCOR model, planning identifies, prioritizes, assesses and aggregates supply chain requirements and resources. Planning then balances resources with requirements and communicates the information through the shared data environment to the supply chain.

Purpose

Enterprise wide planning will enable the Marine Corps' supply chain to operate under one set of rules that satisfy requirements as directed by higher agencies (e.g. DoD, OSD, Marine Corps' I&L). It is from these types of organizations that high-level policies, standards and business rules are established across the entire enterprise. The use of high-level rules and policies, however, does not preclude the use of local or regional product and service providers. Rather, centralized planning and controls ensure that all suppliers meet the established standards set by those higher agencies.

Strategic vs. Operational Planning
Strategic planning is conducted by an agency responsible for establishing and/or enforcing the business rules for the Marine Corps' supply chain. This is conducted in the shared data environment and establishes the business rules by which collaborative operational planning is conducted. Operational planning is collaborative and conducted in the shared data environment, but is particular to the location, geography and consumer requirements. It is the planning by which details of fulfillment and configuration of the product and service are determined.

Inputs and Outputs
Each of the execution processes (Source, Make, Deliver and Return) depicted in the SCOR model have planning inputs and outputs that are depicted in the product delivery or services execution diagrams (Appendix 1). An example of one of the SCOR elements that provides inputs to the execution processes is P1 or Plan the Supply Chain. P1 represents the enterprise wide planning element in SCOR and drives the preceding Plan elements (P2-P5). Each of these Plan elements in turn provides inputs (sourcing, production, delivery and return plans) that drive the execution of the Make, Source, Deliver and Return elements. The enabling and planning processes will be developed in Task 4, the detailed OA.

Configuring the Marine Corps' Supply Chain

Commercial enterprises are shifting their focus from optimizing performance within functional silos to optimizing performance across the supply chain. They are streamlining the flow of products/services, information and finances within their enterprises as well as between partners across the supply chain.

The Marine Corps' supply chain is segregated into discrete or "stove piped" functional areas: supply, maintenance, transportation, engineering, health services and other services. The Marine Corps will derive significant improvement in supply chain operations with a more holistic (i.e. cross-functional) view of its supply chain.

Beyond Level 3 of SCOR, an organization can model its own business processes at further levels of resolution (Levels 4, 5, etc.). This process will help develop new business rules, practices, organizations, etc. that are unique to the enterprise. By using SCOR as the basis for model development, sufficient standardization is maintained to ensure cross-functional commonality and communication.

The Future Marine Corps Logistics Enterprise

Background

The Integrated Logistics Capability (ILC) transformation initiative focuses on improving logistics support to the warfighter. This transformation is derived from a larger effort that focused on integrating capabilities in an effective and efficient manner. The goal was to ensure that fielded capabilities, coupled with the appropriate level of sustainment, address the life cycle needs across the spectrum of doctrine, organization, training and education, equipment, facilities and support. Furthermore, the establishment of Materiel Command, the ILC Center, and the completion of the ILC Business Case Study helped to focus the Marine Corps logistics transformation around the nine approved recommendations of the ILC Business Case. The common driver throughout has been the need to create a dynamic, integrated, process based supply chain. Industry best business practices promise improvements in both efficiency and responsiveness to the warfighter. This section documents the desired future state, provides a road map for reaching the future state, and identifies likely challenges to successful implementation.

Transformation: The Desired Future State

As the Marine Corps logistics processes are developed and transformed, every participant in the supply chain will notice a leaner, more responsive and flexible replenishment environment. Fluid, proactive operations will become the standard by which the CSS is measured. The new supply chain practices adopted by USMC CSS personnel will require a more enterprise wide perspective to be effective.

A common, process-wide understanding of the requirements, and how all the different functional organizations work together to satisfy the needs will be critical. Currently, each CSS element has unique systems developed to satisfy functional requirements. In the future, cross-functional systems will satisfy common processes across all the CSS elements, with the added benefit of common data available to all participants and supply chain process managers. Transparent to the warfighter will be the deliberate, disciplined, enterprise-oriented logistician supported by integrated technologies, focused on the delivery of products and services.

Employing integrated enterprise applications facilitates the development of the Marine Corps logistics enterprise. This effort will be supported by an enterprise-wide solution that integrates commercial-off-the-shelf (COTS), government-of-the-shelf (GOTS) and selected legacy systems. Homegrown solutions and other

legacy systems identified for elimination will be replaced by more modern applications that are robust, distributed, scaleable and reliable, thereby providing seamless logistic process information integration. Data and information sharing will be the norm, supported by a standard integrated framework of supply chain applications. Automated management reporting applications and metrics will support Executive Information Systems (EIS). These knowledge management tools will support all those engaged in process management and integrated planning across the enterprise.

The end result will be a robust, lean, highly efficient and fluid enterprise supported by a logistics community of enterprise professionals…Marine, civilian, and contractor. The consumer will request necessary products and services through a **"**portal". The request for products and services may be autonomic or communicated by LAN, wireless LAN, phone, radio, messenger, or any other means available. The administration and support of these requests will then be in the hands of the logistics enterprise.

Road Map: Developing the "To-Be" Marine Corps Logistics Enterprise

Key to the success of the future logistics enterprise is the adoption of fundamental supply chain management practices. As described by SCOR, these practices place heavy emphasis on the key areas of planning, execution and performance measurement.

Planning

The key activity that drives an effective supply chain is planning. Strategic Planning and Demand Planning occur (predominantly) at higher echelons of the supply chain management team. At the other end of the spectrum, Production Planning, Material Requirements Planning, and Distribution Planning occur (predominantly) as close to the consumer as possible. Infrastructure and Information Systems planning can occur throughout the supply chain. It is important to ensure all activities in the supply chain provide input into the planning process

Execution

Sound execution of the supply chain requires a continuous exchange of near real-time information. Working backward from the warfighter, demand will flow through a single logistics/CSS "portal". The receiver of the demand has multiple points of contact throughout the supply chain to satisfy the requirement. The supply source will then service the warfighter directly or register the demand back through specific links of the supply chain (e.g., production, distribution, etc.) to fulfill the demand.

Throughout the process of satisfying the consumer's demand, information will be captured and shared within the supply chain. Product and service usage will be monitored to:

- Adjust purchases of new materials;
- Reset inventory safety stock levels;
- Validate distribution channels; and
- Update planning and forecasting models.

A Shared Data Environment (SDE) and an integrated information system will make these considerations possible.

Performance Measurement

Selected metrics will be employed to determine how effectively the supply chain satisfies the needs and demands of the consumer. Metrics will be developed to ensure the accurate measurement of an activity and the continuous improvement of support to the consumer. Decision Support Systems (DSS) will provide the tools necessary to identify critical metrics used to continually weed out non-value added activities.

In the current state, finance personnel typically focus on reducing inventory-carrying costs without considering the impact on material availability. Maintenance tends to focus more on utilization of maintenance personnel rather than on delivery schedules. Transportation may be more concerned with ensuring full loads than rapid delivery. All of these goals or concerns must be properly re-aligned with the overall supply chain strategy to meet the consumer's needs. Each activity must be measured in a way that provides quality input into the decision support tools utilized by the logistics enterprise. The current state reflects localized optimization of a single activity or function, which may, in fact, degrade the performance of other activities within the supply chain. In the future, use of common performance metrics, focused on customer support, will facilitate the optimization of the supply chain as a whole.

Use of the Quadrant Model

For some critical products and services, supply chains are lengthy and require significant effort. For example, during World War II, the supply chain for tires extended backward all the way to raw materials (rubber), which were deemed strategic resources. Such extensive supply chains are difficult and expensive to manage effectively. Exploration of alternatives (additional sources of supply, different raw materials, different end item design) may provide relief to this problem, and result in shorter supply chains. Management techniques, such as the Quadrant Model, enable this activity.

Within the quadrant model, products and services will be categorized within one of the four sectors of the quadrant. Routine products and services are considered low value and low risk. At the opposite corner of the quadrant are critical products and services that are of high value and high risk.

Routine products and services will be relatively simple to manage. Routine products are easily available from a wide variety of sources and are inexpensive. As demand is registered, the supply chain will satisfy those requirements by sourcing from the best provider, in most cases, directly to the consumer.

Conversely, critical products and services have limited availability and are of high value to the consumer. For these products and services, the supply chain offers limited sources of supply; consequently, the supply sources extract high prices and require dedicated management to prevent warfighter mission degradation.

Within the context of the Quadrant Model, effective supply chain management will involve tailoring management practices and supply chain relationships to fit the attributes of each quadrant. The net result of employing the Quadrant Model will be:

- Overall simplification of the supply chain;
- Reduction in supply chain costs; and
- Improved responsiveness to the consumer.