Hype Cycle for Supply Chain Management and Procurement, 2007

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The need for improved efficiency, growth and innovation is driving the development of supply chain management and procurement technologies. Chaos-tolerant strategies are leading the evolution of the next generation of supply chain solutions.
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ANALYSIS

What You Need to Know

Gartner's reviews of global CEO surveys (see "The Gartner/Forbes Executive Survey") reveal three strategic concerns that are related to supply chain management (SCM) strategies. First, CEOs are concerned about globalization, which is supported by global trade SCM technology and new process models that support business in varied business and cultural contexts. Second, the context of competition is changing from being focused only on the product to building a business network of services and products that deliver precisely what the customer wants. This is supported by multienterprise supply chain models and technologies.

Finally, a Forbes CEO survey recently found that CEOs are aware of Web 2.0, and this technology trend is driving such SCM technology changes as Really Simple Syndication (RSS) outputs from SCM applications. In procurement, the strongest advances are through best-of-breed vendors that are enabling unstructured business processes that are common to strategic procurement.

The SCM technologies being hyped today support business strategies focused on process innovation (how new SCM models are created) and process automation (how enterprises "do it"). These supply chain technologies are complementary, rather than alternative. How an enterprise decides which technologies will receive the most investment depends on its business strategy.

Most changes in the market are across the two dimensions of process innovation and process automation — a focus for best-of-breed vendors. Larger, more-mature vendors tend to bring best practices, mostly centered on process automation, to the mass market. As CIOs take a broader view of the stack of business applications used to support their businesses in the form of their business process platforms (BPPs), users should leverage both dimensions, because they're complementary in the context of the BPP.

The Hype Cycle

Supply chain leaders recognize that much of the data they require is outside their control. The increasing virtualization of extended supply chains means that some decisions must be enacted in the absence of the kinds of process and policy guidance that exists in traditional supply chain structures. Therefore, business intelligence (BI) and decision support needs to be located closer to the source of the supply chain event or condition. This is leading to the development of chaos-tolerant techniques and approaches, and the SCM technologies we review in this year's Hype Cycle reflect this shift in focus.

The technologies Gartner researched for this year's SCM Hype Cycle address a broad range of supply chain capabilities. Many are mature, and organizations are learning to apply them more effectively, while others are new and offer significant opportunities for innovation. Some technologies focus on:

- Process automation — performing SCM processes more efficiently and at lower cost
- Process innovation — changing the SCM processes themselves
- Enterprise-centric activities — within the four walls
- Visibility — outside the four walls, including business-to-business (B2B) initiatives
- Multienterprise business processes
• The convergence of SCM business processes and SCM business analytics in the form of product performance management

Users should review each technology to determine how it applies to their SCM strategies and make or change investment allocations accordingly. SCM leaders should not look at this Hype Cycle as a source of information highlighting what is hyped most across process automation and innovation; rather, all technologies should be viewed as candidates for inclusion in a BPP. The BPP will create a broad governance organization that will ensure that IT projects (including SCM) will be closely tied to business objectives. This governance will drive integration between the supply chain strategy and the business strategy, which must also inform the allocation of investments to ensure the delivery of strong business value.

In terms of procurement, this year's Hype Cycle (see Figure 1) reflects the maturing of such technologies as e-procurement, e-sourcing and contract management. However, customers and vendors alike recognize that many procurement processes remain largely manual and uncoordinated at the enterprise level. Therefore, we see the rise of many new technology segments in the market, including supplier performance management and category-specific e-procurement.
Figure 1. Hype Cycle for Supply Chain Management and Procurement, 2007

Source: Gartner (October 2007)
The Priority Matrix

Mature SCM technologies that are yielding benefits for users during the two-year window include:

- Supply chain planning (SCP) for process automation
- E-sourcing
- Transportation routing and scheduling
- Constraint-based optimization in warehouse management systems (WMSs)
- Warehouse labor management systems (LMSs)

These technologies continue to mature with a range of large installed bases that have broad and deep experiences. Vendor are now bringing competitive offerings to market, and the business processes supported by these SCM technologies are approaching commodity status as they’re adopted by the wider market.

Several SCM technologies promise significant benefits on the two-year window and beyond:

- Sales and operations planning (S&OP)
- Product performance management
- Radio frequency identification (RFID) and sensor-based asset management
- Inventory strategy optimization
- Enterprise contract management
- Transportation management system (TMS) multimodel/international
- Service parts planning (SPP)
- E-procurement
- Business process networks
- Product information management (PIM)
- Capable-to-promise (CTP) systems
- Carbon-sensitive planning and execution
- Dock scheduling and carrier appointment management
- Global visibility for TMS
- Network-based (multienterprise) inventory and SCM
- Real-time factory scheduling
- RSS outputs from business process applications
- Supplier portals
- Supply chain analytics
• Voice-directed picking in WMS
• Standards-based voice picking

These solutions (see Figure 2) are a mix of older technologies (for example, e-procurement, SPP and S&OP) and newer technologies (such as RFID/sensor-based asset management and PIM/MDM), which leverage the new IT landscapes, including service-oriented architecture (SOA), converged BI and business applications, and, overall, a broader strategy to reuse information and align business processes, which we describe in our BPP research.
## Figure 2. Priority Matrix for Supply Chain Management and Procurement, 2007

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*As of October 2007*

*Source: Gartner (October 2007)
On the Rise

Person-Centered Warehouse Processing

Analysis By: Jeff Woods

Definition: This is the combination of wearable technology, voice, sensors and RFID to make the tracking and assignment of warehouse tasks more intuitive.

Position and Adoption Speed Justification: Most warehouse processes and technologies focus on increasing the efficiency of established warehouse operations. However, as agility becomes a business imperative across operations and the supply chain, there is a growing focus on increasing the productivity of workers through process changes and enhancements. This can be accomplished by making temporary labor more efficient or reducing the training that is required with new processes. This can also enable the implementation of more-structured warehousing processes in areas with lower literacy levels. These are the catalysts that will drive this technology forward, and it matches a larger enterprise drive to make business processes, in general, more person-centric. However, this will be a very complicated set of requirements to meet. It will require ongoing communication and development partnerships between vendors and users.

User Advice: Users should examine the labor, training, environmental, safety and agility constraints imposed by existing systems as a possible business case for exploring more intuitive person-centered warehouse processing. Users that determine they need this functionality should form relationships with a preferred software and hardware vendor because both components are required to engineer these solutions.

Business Impact: Although many people are focused on new technologies in the warehouse to improve picking efficiencies, it is likely that the primary benefit of many technologies will actually be reductions in training costs and the ability to absorb new business processes faster. By way of analogy, the retail industry bar-code-scanning systems at point of sale (POS) were envisioned to increase the productivity of front-end clerks. However, they never really delivered on that promise. The fastest clerks were about the same speed on both systems. Bar coding, however, closed the gap between mediocre performers and the top performers, and it enabled the front end to be staffed by more junior people with less training. Also, bar coding enabled the product range of the store to extend by tens of thousands of items, which enabled entirely new formats.

Benefit Rating: High

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Sample Vendor: LXE

RSS Outputs From Business Process Applications

Analysis By: Jeff Woods

Definition: This is the ability of a business process application to output an RSS feed. These RSS feeds can be representations of screens, data files, tables, analytics or reports.

This capability should not be confused with the ability to bring other RSS feeds into portal-based applications. This capability refers to the ability of a business process application to output RSS feeds.
**Position and Adoption Speed Justification:** This technology is not used much today. However, a major focus of application managers is to enable more-intuitive access to applications through the right mechanisms, and RSS is an important mechanism for achieving this. User demand coupled with vendor capabilities will bring this to market. Issues with security or control of data could slow adoption of this technology. Also, enabling legacy applications to output RSS feeds will be difficult, perhaps reviving the market for screen-scraper tools.

Most technology vendors have only looked at populating their portals with RSS feeds from things such as news sites, but some progressive vendors have started to examine how to feed their data into portals through RSS. These efforts have not yet resulted in commercial products. Also, some challenges need to be overcome, such as security, presentation layers and the ability to test "mashups" of RSS feeds.

**User Advice:** Users should begin incorporating RSS as a standard requirement in new application purchases or upgrades. Users should evaluate security, performance and process documentation implications of incorporating RSS. Users should investigate tools that consume RSS feeds that applications will output. Finally, in each new application project supporting a business process, applications managers should actively evaluate what is the right mechanism for user presentation instead of just assuming that a traditional rich interface is correct.

**Business Impact:** The primary near-term benefit of RSS feeds from applications will be to display data, reports or analytics from one application in a portal. However, the longer-term benefits of this technology will be in creating entirely new applications as mashups without affecting the underlying applications that, for some, could have substantial impacts.

RSS outputs will also facilitate the movement to support the person-to-applications interface by enabling information-driven, rather than process-driven, decision making. Many people initially conclude that this technology will only support things such as BI. However, RSS is a way to open substantial portions of the business processes and applications to innovation. For example, if the enterprise could share its open orders via RSS into a global-class community or social networking space with enterprise-level permissions and security (such as Facebook for the enterprise), innovative collaboration around solving particular order problems with suppliers could be enabled.

**Benefit Rating:** Moderate

**Market Penetration:** Less than 1% of target audience

**Maturity:** Embryonic

### Integrated Business Planning

**Analysis By:** Tim Payne

**Definition:** Integrated business planning (IBP) is a set of systems, processes and competencies that forms the strategic alignment and modeling capability that is missing from the traditional operationally focused S&OP processes. IBP links corporate performance management to S&OP, with capability for strategic and financial modeling and analytics.

**Position and Adoption Speed Justification:** IBP is developing as the “big brother” to the S&OP process. S&OP has been around for many years, and is particularly well-known in manufacturing organizations. S&OP was intended to reconcile business strategies, as well as operational plans. However, the strategic dimension is mostly missing from S&OP today. Therefore, the concept of IBP is developing to contain strategic modeling and reconciliation capabilities as a set of systems, processes and competencies that sits over the operational S&OP processes and links into the organization’s corporate performance management initiatives.
**User Advice:** IBP is a collection of capabilities and, as such, is not something that can be sourced totally from one vendor. However, different classes of vendors are progressively developing capabilities that are moving toward IBP capabilities — for example: corporate performance management (CPM), SCP, ERP and best-of-breed vendors. If you need to develop IBP capabilities, then approach this with a best-of-breed strategy for the next few years prior to more integrated solutions emerging. Work with your S&OP vendors to see which areas of IBP it is able to support as well as specialized strategic modeling vendors.

**Business Impact:** These capabilities will enable companies to model and align business strategies to operational strategies, ensuring significantly improved supply chain and business performance.

**Benefit Rating:** High

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Emerging

**Sample Vendors:** Interlace Systems; River Logic; SmartOps

**Segmented Supply Chain Response**

**Analysis By:** Tim Payne

**Definition:** Segmented supply chain response is a set of competencies, processes and systems that enables an enterprise to identify, analyze, model, deploy and execute on a portfolio of supply chain responses that dynamically align supply chain performance profiles with the key characteristics of specific product/customer segments.

**Position and Adoption Speed Justification:** Segmentation, or classification, has been around for many years in supply chain — activity-based costing classification, for example. Customer segmentation has also existed in CRM. As supply chains cope with increasing levels of external chaos (driven by such factors as globalization and virtualization), complexity and business strategy diversity, a new strategic dimension is evolving which bestows a chaos-tolerant capability to these supply chains.

Today, enterprises looking to expand the scope of their segmentation strategies have to cobble together capabilities from different technologies such as supply chain analytics, SCP and supply chain execution (SCE) applications, ERP, BI, S&OP, network design, simulation and inventory optimization strategy applications. During the next three years, some of these applications will merge to progressively form more coherent capabilities that support aspects of segmented supply chain response. For example, inventory strategy optimization (ISO) and network design are already converging, adding design capability to the existing analysis and modeling capabilities of the ISO solutions — all important aspects of segmented supply chain response. However, some pieces are still missing. The necessary convergence of planning and execution — that is, the ability to execute across a parallel set of supply chain configurations — is still missing from most vendor road maps. The initial identification and analysis of product/customer clusters, as they are relevant to supply chain performance, is still only available via data mining and offline ad hoc analysis, and is fragmented across different organizational domains, such as CRM and SCM.

**User Advice:** Segmented supply chain response is a set of competencies requiring a portfolio of solutions and, as such, cannot yet be purchased in its entirety from one vendor. However, pieces are available today with the most obvious route being through the use of network design and inventory strategy optimization applications used to leverage existing investments in SCP applications. Eventually, this point solution sourcing approach will be replaced by the integration
of planning and execution — perhaps via the ERP vendors as they develop their functional depth and breadth, and provide suitable segmentation frameworks.

**Business Impact:** A segmentation approach has demonstrated significant benefit in terms of customer service and total delivered cost to enterprises by addressing one of the primary reasons for underperforming supply chains — the mismatch between product/customer characteristics and supply chain performance profile.

**Benefit Rating:** High

**Market Penetration:** Less than 1% of target audience

**Maturity:** Emerging

**Sample Vendors:** i2 Technologies; Manugistics (acquired by JDA); Optiant; Oracle; Sterling Commerce

**Recommended Reading:** "Segment Your Supply Chain Response to Drive Enhanced Performance"

"Development of Chaos-Tolerant Processes Is Key to Supply Chain Optimization"

**SOA-Enabled Order Management**

**Analysis By:** Isher Kaila

**Definition:** Much of the value provided by integrated solutions such as ERP results from the tight linkage of orders to inventory to financials. However, when the same entity does not control execution of the order, or when the execution of the order can take a number of paths, this traditionally tight coupling may not be beneficial or appropriate. In the past, order management was tightly coupled to the underlying transactional system because of weaknesses in integration technology. Today, however, although SOAs won't solve all these problems, it is becoming practical to decouple order management from the transaction management and order execution systems.

Service-oriented order management leverages SOA and BPPs to reinvigorate order management as a strategic technology investment for the enterprise. Combining the flexibility of an SOA with the management discipline of a BPP will enable enterprises to have an end-to-end view of order management, providing enriched customer experiences.

**Position and Adoption Speed Justification:** This technology is emerging in the marketplace, but it's still five to 10 years from the plateau, as the SOA and BPP frameworks evolve to maturity with greater uptake in the order management space. Enterprises will need to focus on a collective view of the individual systems that make up their order management capabilities, and align them in an SOA framework for data orchestration that will, in turn, enable a BPP capability. The key barriers to adoption include incoherent data management/orchestration and SOA strategies, as well as organizational unwillingness to think beyond traditional siloed views of order management system components and toward a focus on the end-to-end processes that are enabled by one or more of the underlying technologies.

**User Advice:** Take an end-to-end view of your order management systems as they support business processing by strategically leveraging a BPP approach for ensuring efficient and enhanced orchestration (that is, consumption and integration) of order fulfillment across your organization. For business processes such as order-to-cash, procure-to-pay and quote-to-order, as well as related events, manage their effectiveness and operational efficiency from a full-
spectrum view, and avoid focusing on a single technology component or application that supports one element of the end-to-end process.

Prioritize investments involved with cleaning up and maintaining master data, implementing an SOA strategy and infrastructure for your order management capabilities, and looking at opportunities for optimization in your established order management processes.

The benefits of SOA as an architectural style will enable a standard process to be more flexible in handling a range of products, services, geographies and divisions and to make better use of external information and analytics to optimize it. Investments in SOA will provide a strong foundation for BPP capabilities. Enhanced Web order management capabilities will also be more easily adopted by adhering to a service-based architecture.

**Business Impact:** SOA-enabled order management is transformational across all facets of the supply chain and order-to-cash process frameworks, providing increased integration capabilities for Web-based order management functionality. In addition, it will enable increased customer service excellence and enrich the customers' experiences by balancing the end-to-end efficiency and effectiveness of order management and fulfillment, rather than just an individual system or subcomponent.

**Benefit Rating:** High

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Emerging

**Sample Vendors:** i2; Oracle; Sterling Commerce

**Office-Based Business Applications**

**Analysis By:** Yvonne Genovese

**Definition:** For years, management practice demonstrated the benefits of empowering the individual. Ensuring that knowledge workers have the right combination of technologies to exploit their skills and knowledge will be vital to individual empowerment and enterprise competitiveness in the future.

Knowledge workers are the primary controllers of enterprise processes and the processes that underpin any business, which can be viewed in two different ways. The first is from the enterprise view, looking down and considering the business as a whole. The individual view is from the people who contribute to the business. To date, most IT investment has supported the first perspective, which has largely ignored the individual, except as a user subservient to a role within a process. The second perspective is supported by personal productivity tools, including e-mail and other consumer-based technologies. Until recently, these two sets of technologies have, for the most part, completely ignored each other.

The next stage in the evolution of application support for business processes is to move beyond the enterprise view of processes to encompass the needs of the individual as a participant and driver of multiple processes that are better integrated. Gartner's term for integrated business processes and personal productivity tools is "process of me" (see "Person-to-Person Interaction Emerges as the 'Process of Me'"). One example of a combined process is travel and expense reporting, where a user enters a calendar entry for travel in one tool, expenses for the trip in another and approval routing happens in a third. With the process of me, this becomes a single process in which the data entered into the correct system of record is transparent to the user.
**Position and Adoption Speed Justification:** Several factors drive the integration of business applications and personal productivity tools. One obvious influencer is the productivity gain that can be realized by integrating business application processes and data into familiar workplace environments (such as portals, collaboration and content management). Web 2.0 and the consumerization of IT are also pushing technology providers to use the tools that users prefer as primary interfaces to business applications. The focus on governance and compliance is also pushing many enterprises toward a single, trusted set of process and data.

It’s becoming possible to integrate these processes primarily because SOAs are influencing the development of business applications. Stovepiped, project-centric business process automation has dominated the business application market; however, pressure for business process flexibility and agility, coupled with a desire for new cross-application, enterprise-spanning perspectives, is breaching the boundaries. Breaking processes into tasks through SOA enables the integration of personal productivity processes and business processes. An enterprise’s ability to achieve process of me capabilities will depend on vendors' adoption of SOA. Because many ERP vendors have not yet finished SOA projects, or have not yet even embraced SOA, many users will not have the option of enabling the process of me.

Business application vendors will begin by offering pre-defined packaged processes (see "It’s a Duet: SAP/Microsoft Formalize Mendocino Project Offering"). However, in many cases, the chaotic nature of business will cause these efforts to fall short of business needs, because the individual and the business need the ability to manipulate the processes and the tools that enable the process to achieve the maximum benefits. This will require a combination of packaged Web services (or business services) and tools to manipulate or build new processes that, for the most part, have not emerged.

**User Advice:** Users that redefine processes to encompass the process of the individual and adopt technologies that embrace the process of me will benefit in productivity for the individual, as well as organizational differentiation among competitors.

Major vendors in application management and collaboration markets will begin to combine application development, business process management, business applications and collaboration capabilities to take advantage of this new market opportunity.

Because they are in different places on the business process and process of me continuum, users should carefully evaluate their vision and definitive product plans before investing in a particular vendor based on its marketed process of me capabilities.

Only vendors that redefine processes beginning with the individual, combining process definition and tools that enable individuals to be flexible with the definition of their specific processes, will emerge as leaders in the process of me category.

**Business Impact:** The integration of workplace and business application processes often help users gain fresh insights from the integration of BI and analytic capabilities, enabling users to arrive at new perspectives on business issues or potential innovations. The potential business impact of new processes and innovations created by the individual can result in significant improvements in individual productivity, as well as drive new revenue.

**Benefit Rating:** Transformational

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Emerging
Carbon-Sensitive Planning and Execution

Analysis By: Dwight Klappich; Andrew White

Definition: Carbon-sensitive planning and execution refers to a range of technologies and applications that enable an enterprise to identify, model and, ultimately, optimize their environmental effect across the entire supply chain. Initial solutions will be narrowly focused on specific supply chain processes and activities, such as transportation planning, network design and carbon footprint dashboards. Near term, they will model and optimize around a limited set of resource constraints, such as minimizing carbon footprint. Later, yet-to-emerge solutions will extend across other resource constraints — and across the extended supply chain and product life cycles for all environmental conditions. Although carbon footprint is the primary focus today, in the future, users will need to consider other factors that affect their environment, such as direct operational emissions of other pollutants, energy consumption and waste generated.

Position and Adoption Speed Justification: Today, tools exist that can minimize or optimize variables that can be inferred to affect carbon footprint, such as transportation planning to minimize wasted miles, which can be inferred to reduce carbon emissions. However, tools that explicitly include carbon footprint as an optimization goal and have content databases that provide carbon footprint variables, such as a diesel truck of a certain size emits so much carbon dioxide per mile driven, are just now emerging. Other solutions, with a BI base, are being developed to help enterprises measure and monitor the carbon emissions of their operations.

User Advice: Identify the largest contributions your supply chain makes to the environment. Complement your carbon footprint analysis, and move toward resource intensity analysis. Adopt SCM technology — new attributes, data and new models — that helps to identify, track and then reduce your supply chain's ecological footprint.

Business Impact: At a minimum, these solutions will enable enterprises to comply with emerging governmental mandates and regulations, as well as leverage their adoption of green initiatives as good publicity. However, in many cases, optimizing around green considerations has complementary business justification, as reducing emissions can reduce other costs. For example, reducing wasted miles driven for a green initiative translates to significant savings on fuel and overall transportation costs.

Benefit Rating: Moderate

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Sample Vendors: Barloworld; Infor; Lawson Software; Supply Chain Consulting (Australia)

Product Performance Management

Analysis By: Andrew White; Tim Payne

Definition: Product performance management (PPM) includes the processes used to manage products across the supply chain performance (such as customer service, product profitability and total landed costs); the methodologies that drive some of the processes (such as the balanced scorecard or value-based management); and the metrics used to measure performance against strategic, operational and tactical performance goals.
However, PPM also consists of the convergence of business and analytical applications that provide the functionality to support these processes, methodologies and metrics, which are targeted at strategic users through tactical day-to-day decision making.

**Position and Adoption Speed Justification:** Most business applications are transactional in nature and BI uses a duplicate and aggregated set of this data. Although users seek to make better and smarter business decisions concerning how products perform across the supply chain, the architecture used enforces a separation in role, technology and process between business applications and BI. This leads to multiple data and process silos that make answering complex business problems hard to do and leads to supply chains that significantly underperform. Demand planning was an early example of the convergence of analytical and business applications since it was in demand planning (the business processes) where users needed to leverage analytics and data mining (BI) to improve the results of their demand-planning process. The BI and business application vendor community is aware of this experience, but is only slowly bringing this unified functionality to market. However, this vision, for the most part, is predicated on high risk and long-term SOA strategies. Smaller vendors may have a better chance in the next couple of years of bringing this functionality to market in limited areas (such as demand planning).

**User Advice:** There are no comprehensive platform solutions for enterprisewide PPM, although larger vendors are moving in this direction. If you need to make a smarter decision in the supply chain, then approach this with a best-of-breed strategy for the next couple of years as larger platform offerings emerge and mature. Align your vendor partners with specific business pain points related to improving decision making across the value chain.

**Business Impact:** The use of business applications that embed BI on a unified information-centric platform will help enterprises improve the timeliness and quality of decision making across the value chain, as well as align tactical, day-to-day decision making with strategic (corporate performance management) efforts. Product performance across the value chain will be improved.

**Benefit Rating:** Transformational

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Embryonic

**Sample Vendors:** Blue Agave Software; Coreprocess; InfoNow; QlikTech; RiverLogic; Spotfire; Vendor Managed Technologies; Vision Chain

**Recommended Reading:** "Confusion Escalates in SCM Demand Planning Market"

"SCM Requires the Alignment of Decision-Making Solutions"

**Sales and Operations Planning**

**Analysis By:** Tim Payne

**Definition:** This is a performance-based, cross-functional business process that reconciles operational plans across sales, marketing, manufacturing, distribution, product development and finance.

**Position and Adoption Speed Justification:** The concept has been around for many years and is particularly well-known in manufacturing organizations. S&OP should reconcile business strategies as well as operational plans. However, the strategic dimension is mostly missed, and S&OP is mainly focused on operational reconciliation. The strategic dimensions are starting to be incorporated into the "big brother" of S&OP — IBP. Successful adoption of S&OP has been limited by organizational issues and the inability of solutions to support a truly cross-functional
process with integrated what-if and execution capability. The resurgence in interest, supported by
the ability to source S&OP functionality from a number of technology vendors, has moved S&OP
into the Slope of Enlightenment in 2007.

**User Advice:** To support your S&OP initiatives, evaluate the various S&OP tools on the market.
Pay attention to how these tools support the business processes of S&OP and not just the data
aggregation and representation requirements. Avoid demand planning or sales pipeline planning
solutions that have been extended with S&OP screens and reports. Sources of S&OP
functionality include SCP applications, ERP suites, BI suites and best-of-breed applications.

**Business Impact:** These applications enable companies to make better use of resources by
helping to balance supply and demand. They also deliver improved collaboration throughout the
organization.

**Benefit Rating:** High

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** i2 Technologies; Interlace Systems; Logility; Oracle; SAP

**Recommended Reading:** "Sales and Operations Planning Demand IT, Organizational and
Process Alignment"

"Supply Chain Risk Management Is an Emerging Requirement for S&OP"

**Standards-Based Voice Picking**

**Analysis By:** Jeff Woods

**Definition:** Standards-based voice picking involves the use of voice XML technology to interface
with a WMS to perform voice-directed tasks in the warehouse. This enables the use of standards-
based hardware for voice technology and opens up the possibility of dual-use devices that can
run bar code operations and voice.

**Position and Adoption Speed Justification:** For the most part, voice-picking systems in the
warehouse have used proprietary technologies for hardware and software. However, the
emergence of voice XML and implementations of voice recognition systems on standards-based
hardware could open up this market and decouple the hardware from the software and integration
layers.

There do not appear to be any significant technical inhibitors to adopting standards-based
integration or runtimes. As standards-based implementations in the industry begin to build
credibility and a reference pool, this new technology will gradually become mainstream.

**User Advice:** All users should bring standards-based products into their deal. For example,
SAP's preferred interface is through voice XML, because it reduces the number of interface skills
required by users.

**Business Impact:** This technology will reduce the cost of voice-driven warehousing systems and
result in more-flexible interfaces. It will also reduce the cost of maintaining the interfaces to voice
systems.

**Benefit Rating:** Low

**Market Penetration:** One percent to 5% of target audience
Maturity: Adolescent

Sample Vendors: Intermec; Inther; LXE; SAP; Symbol; Voxware

SCM Innovation Templates

Analysis By: Andrew White; Jeff Woods

Definition: Web and SOA approaches will drive commoditization of business processes that can be standardized. Differentiated and innovative business processes will still emerge, but from compositions of custom-assembled services and from innovative business processes delivered by a range of vendors as "interoperable services." The providers of these unique business processes — in the form of business process templates, industry-specific data models and business services — will emerge from the current best-of-breed or pure-play SCM vendors that are evolving away from packaged application vendors to become SCM innovation partners.

Position and Adoption Speed Justification: As end-user enterprises build out their BPPs, leading best-of-breed SCM vendors and system integrators are beginning to make the necessary technical and strategic changes to work with them. The rate of adoption of BPP is a driver of the need for innovation templates and is also constrained by the availability of such templates.

User Advice: Regardless of how they are sourced — behind the firewall, hosted or software as a service — for differentiated business processes, SCM innovation templates help reduce your reliance on packaged applications and replace them with strategic partnerships with your preferred SCM innovation partner.

Business Impact: By providing innovative templates in the form of whole business processes, process extensions, data and process models that consume standardized services, the provider of those templates — the SCM innovation partner — will help enable mainstream adoption of innovative processes with minimal disruption, while preserving and recognizing the value of innovative business application providers in the market.

Benefit Rating: Transformational

Market Penetration: Less than 1% of target audience

Maturity: Embryonic

Sample Vendors: i2 Technologies; Manhattan Associates; Steelwedge; TCS (Tata)

Recommended Reading: "Look Outside Core Application Platform Vendors for SCM Innovation Partners"

"Innovation Shift for Business Applications: Major Suite Providers to Dominate"

Supplier Performance Management

Analysis By: Debbie Wilson

Definition: Supplier performance management is a segment of software applications that's designed to help organizations collect and publish a rounded set of quantitative and qualitative supplier performance data (spanning price, delivery, service, quality and technology) across multiple spending categories. These applications are intended to rate and monitor suppliers' ability to provide products/services in accordance with the specifications, terms and conditions established in relation to purchases; however, the applications don't measure the commercial effectiveness of the goods and services themselves.
Position and Adoption Speed Justification: For decades, companies have successfully compiled metrics to track and rate the performance of various suppliers. ERP and supply chain applications routinely provide data on delivery and purchase price to standard price that has, in many cases, proved extremely useful for buyers and suppliers. However, process complications (for example, many indirect service purchases are never "received") have largely limited these metrics to direct material procurement. Even when constrained to direct materials, many organizations are challenged to create usable supplier performance data because it requires meticulous attention to the accuracy of data (such as the delivery date), and because the definition of the metric often varies based on the spending category. For example, the delivery of a critical input into the manufacturing process may be plus/minus four hours, whereas the on-time provision of a contingent worker's resume may be plus/minus three days. Furthermore, a well-rounded assessment of supplier performance extends beyond the scope of quantitative metrics provided by transactional systems, and into qualitative data collected via survey or poll.

Recognizing the opportunity to assemble a more-comprehensive set of data on a wider variety of suppliers, and seeking to ensure that chosen suppliers perform to expectation, many sourcing vendors are offering supplier performance management solutions. CPM and BI vendors are expressing interest in the area as well, given their focus on performance analytics of any type. Regardless of the origin, the supplier relationship management application essentially is a reporting tool that's built to extract and consolidate data from heterogeneous transaction-oriented systems and survey tools.

Implementing a clever dashboard and a set of supplier-facing Web pages to post results, however, constitutes the easy part of supplier performance management. The more-difficult prerequisites include building consensus on defining measurable and appropriate indicators of success, determining how many metrics/service-level agreements to track, integrating the supplier performance management application with transactional systems, and ensuring that the data used to compile the ratings is clean and credible. Therefore, the notion that implementing a supplier performance management system could enable organizations to effectively and holistically measure and track suppliers' performance across multiple spending categories is currently hype.

Organizations are increasingly calling for this kind of system as procurement continues its transformation from a tactical function into a strategic, value-adding function that leverages suppliers. Supplier performance management is an important discipline, but it isn't yet a proper market because a scorecard isn't an application. It will take many years for the vendors and consumers of this application to determine how to effectively measure supplier performance. Eventually, standards will evolve and these tools will be very useful.

User Advice: Organizations with limited supplier performance metrics in use: Don't expect a supplier performance management tool to play a key role in measuring and tracking supplier performance at this time. Instead, build or extend a supplier performance management program through category management teams that are organized by spending category.

Organizations with developed supplier performance management reporting: This class of applications may be helpful. Balance the cost of integration to feed these applications with data against the value of having a single solution to cover supplier performance management.

Business Impact: Organizations that successfully track supplier performance, and leverage the resulting metrics to achieve a best-in-class supply base, will significantly outperform organizations that don't in terms of profitability and agility.

Benefit Rating: High

Market Penetration: Less than 1% of target audience
**Maturity:** Embryonic

**Sample Vendors:** Ariba; Emptoris; Procuri; SAP

**Recommended Reading:** "Handle With Care: Procurement Performance Metrics That Often Mislead"

**Model-Driven Business Process Applications**

**Analysis By:** Jeff Woods

**Definition:** Model-driven business process applications refer to business process applications that support explicit graphical models of the supported processes and generate output that configures commercial runtime components based on the process model. The process-modeling environment can be a subset of a corporate process-modeling/execution environment — for example, the modeling components of a business process management (BPM) system — into which commercially provided flows are maintained and services are registered. It can also be a separate process-modeling environment specific to the application. Model-driven business process applications rely on the availability of service-oriented components of the business application.

This technology trend is larger than composite applications, which generally refer to the use of services intended for other purposes that are recomposed into new applications to meet a new process need. Although model-driven business process applications can be composites of services used within other applications to create new applications, they also can be how an out-of-the-box commercial application is delivered, if that implementation fully exposes the model used to construct the processes embodied in the application.

Many traditional packaged enterprise applications have an implicit representation of process, but it is not intuitive or graphical. This representation may be embodied in rules, policies or parameters. Gartner research into BPM as a business discipline found that nongraphical process representations are inferior to graphical representations that maintain a dynamic link to the executable and configuration of the business process in an application without the need to manually configure switches, parameters, rules or policies in the application. One major issue users face with packaged applications is that they don't understand, can't easily support or can't easily change the processes embodied in their packaged applications. Gartner believes that, by providing and exposing the explicit process model, some challenges can be addressed.

**Position and Adoption Speed Justification:** Although many enterprise applications embody business processes, they do not represent these business processes in ways that are accessible and intuitive to various business and technical users. Even applications that provide an explicit business process model do not provide a dynamic link to the executable and require user intervention to maintain the model to executable link.

A new generation of packaged enterprise applications is entering the market that uses the key design principles embodied in the BPM disciplines applied to the particular process or domain supported by the application. This technology has been embraced by some early adopter SCM vendors, but we see efforts to adopt this model across the wider landscape of business process applications.

A major issue in the broader adoption of this technology will be service-enabling legacy packaged applications to the extent that they can support this model-driven approach. Many legacy applications will require substantial rewrites before this service-enabling goal can be accomplished. Because enterprises have various applications in their portfolios, enterprises likely will have one or two applications that can adopt this quickly, while other applications in the portfolio will be laggards.
**User Advice:** Users should familiarize themselves with the management principles espoused by the BPM discipline. Users also should build a business process modeling strategy that incorporates considerations for modeling processes that will be executed by custom, composed and packaged applications. Users will need a BPP management discipline to ensure that proper governance and cultural issues are addressed before the enterprise employs this application model. Users should determine if their vendors’ service-enabling strategies for existing applications will be sufficient to support the model-driven approach. Gartner believes that many applications might need to be in representational state transfer state to meet this requirement.

**Business Impact:** The model-driven business process application approach will deliver dramatic advances in business process agility and in the ability to manage business processes consistent with the BPP management discipline articulated by Gartner. Enterprises will be able to more efficiently upgrade applications and respond to changing business requirements.

**Benefit Rating:** Transformational

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Emerging

**Sample Vendors:** i2; Sterling Commerce

**Recommended Reading:**
- "A Business Service Repository Provides the Foundation for a Business Process Platform"
- "Achieving Agility: BPM Delivers Business Agility Through New Management Practices"
- "Achieving Agility: Implement a BPP Model to Support Static and Dynamic Processes"
- "Flexibility Drives the Emergence of the Business Process Platform"
- "How BPM Can Enhance the Eight Building Blocks of CRM"

**Integrated Demand and Replenishment Planning**

**Analysis By:** Andrew White; John Davison

**Definition:** Represents the new generation of forecasting and replenishment planning engines that integrates store, distribution center and warehouse planning across an extended planning horizon through to the supplier. This eliminates the need for external store clustering and retail allocation mechanisms, as well as independent planning, at retail and manufacturer. It enables a more end-to-end integration of space planning, point-of-sale technologies, RFID consumption-based replenishment, next-generation merchandising, event and promotional planning at the store level and then back to the supplier for automated planning and response, with specifically targeted analytical tools to identify root-cause analysis and prevent out-of-stock situations.

**Position and Adoption Speed Justification:** Incumbent systems are based on reorder point technology as well as independent and separate merchandise planning systems. Technology has been a gating factor in this movement because of the inability to automatically process significant amounts of data, or to model real business-centric rules to emulate the desired behavior.

**User Advice:** Adopting integrated demand and replenishment is a major change to how the retail operation plans and responds to consumer and market conditions. It requires a significant amount of organizational, cultural and system changes. This strategy should only be undertaken when it's recognized and sufficiently planned.
Business Impact: Lead time and latency removed from the supply chain; synchronization of demand, driven with supply-optimized chains; inventory and order visibility across the network; high degrees of automation in the supply chain response; improved analytics; increased customer service; and reduced inventory.

Benefit Rating: High

Market Penetration: Less than 1% of target audience

Maturity: Adolescent

Sample Vendors: i2; JDA Software Group (Manugistics); Teradata

Recommended Reading: "Integrated Supply Chain Planning and Execution: Connecting the Retail Store to the Factory Door"

RFID and Sensor-Based Asset Tracking

Analysis By: Jeff Woods

Definition: This is the tracking of assets using sensor technology (such as RFID), Wi-Fi-based asset tracking, mesh networks, the Global Positioning System (GPS), satellite tracking and emerging technologies (such as ultra-wideband). This represents an evolution of Gartner RFID research, where RFID coverage is split into the user-oriented domains of sensor-based inventory management and sensor-based asset management.

RFID and sensor-based asset tracking focuses primarily on the hardware and its ability to track assets, because the hardware to track assets can be made into infrastructure. However, the use of this data in a business process or information flow is an obvious complement to the hardware. This software and the associated business processes are covered as part of operational asset management.

Position and Adoption Speed Justification: Tremendous interest exists in using sensor technologies to track assets, and this is a much simpler use of sensor technology than sensor-based inventory management projects. The main issue is finding the right mix of sensor technologies to meet the different asset-tracking requirements of the enterprise. The other challenge is linking the sensor data to business processes. However, this is also much easier than in inventory projects because the technology is not usually competing with bar coding because this is not as developed as bar-code-based inventory management.

User Advice: Users should develop a sensor architecture at the corporate level that establishes use cases and general infrastructure components for sensor-based asset management projects. Gartner often finds that organizations need to establish infrastructure patterns for indoor/campus asset tracking, outdoor asset tracking, shop floor asset tracking and wide-area asset tracking.

Business Impact: Traditional asset management systems have focused on cataloging and documenting the maintenance of assets. Sensor technologies can enable enterprises to determine where the assets are and how they are being used in a process in real time. This can be used to infer the status of a business process or assign responsibility for assets to the individuals or entities that were in control of the asset. This, ultimately, improves the efficiency or accuracy of the business process. It can also result in reduced shrinkage of assets.

Benefit Rating: High

Market Penetration: One percent to 5% of target audience

Maturity: Early mainstream
Sample Vendors: AeroScout; Cisco; InSync Software; PanGo; WhereNet

Recommended Reading: "Key Issues for Building an RFID and Sensory Network Strategy, 1H06"

Category-Specific E-Procurement

Analysis By: Debbie Wilson

Definition: Category-specific e-procurement applications provide users with self-service mechanisms for drafting purchase requisitions, accessing catalog content, obtaining management approval and communicating the resulting purchase orders to suppliers. These solutions differ from general e-procurement solutions, because they provide specialized functionality to support the unique processes associated with certain complex spending categories. For example, print e-procurement tools support the complex specification development and request for proposal process associated with buying printed materials, and services e-procurement solutions offer time card capabilities to support services that are paid for on an hourly basis.

Position and Adoption Speed Justification: The limitations of the general e-procurement solution have opened the door for a wide variety of niche solutions that can successfully enable the requisition and purchase of complex categories of spending. These narrowly scoped but deeply featured solutions have increasingly been hyped as early customers share their initial success, which, in turn, is attracting new market entrants. Because many of these solutions leverage real-time connectivity to communities of related suppliers, they often are delivered as software as a service, or as a secure supplier Web site. To date, the most popular categories for these specialized e-procurement tools include contingent labor, printing, travel, facilities and telecom. Although the position for each specific category varies, all are relatively close together at the pre-peak phase.

User Advice: Look to category-specific e-procurement tools to drive efficiency and on-contract spending for complex purchases.

A general rule for considering a category-specific solution is a minimum of $1 million in spending for that category.

Employ extra due diligence when choosing a category-specific e-procurement vendor because the market is frothy, and many players will not survive in the long term.

Solution selection teams should ensure a fair trade-off between the simplicity of a one-stop shop e-procurement solution and the additional functionality delivered by category-specific solutions.

Business Impact: The business impact of category-specific e-procurement solutions is very high, because the categories of spending they address tend to be the larger categories in an organization’s budget. As a result, these solutions will enable significant levels of savings through the introduction of systematic competition and/or through improved adherence to contract.

Benefit Rating: High

Market Penetration: One percent to 5% of target audience

Maturity: Emerging

Sample Vendors: Bitstream; Claritum; Click Commerce; eWork; Fieldglass; Invoice Insight; IQNavigator; James Tower; Mtivity; NewlineNoosh; NowDocs; P3Software; Printellect; ProcureStaff; ProfitLine; ServiceChannel; Standard Register; Tangoe; Traq; VFA; WorkforceLogic
**Recommended Reading:** "The Flavors of E-Procurement Extend Beyond Software as a Service and On-Premise"

**Network-Based Inventory and Supply Chain Management**

**Analysis By:** Jeff Woods

**Definition:** Network-based inventory and SCM is the management of inventory balances, sourcing decisions and actions at the network level outside the scope of an ERP system. The most-common place to manage inventory is at the enterprise level in an ERP or at the facility level within a WMS. In addition, SCP systems have held views of inventory balances at different locations for planning purposes, but not usually for transactional purposes. The new technology is the transactional management of inventory and supply chain functions. Specialist vendors typically provide this; however, in the future, it might be provided by ERP vendors through new modules, rather than extensions of inventory modules.

This inventory model can form the basis of SCM solutions that are more execution-centric, but will augment innovative planning models on top of them. The unique element of this model is that, although network-based views of inventory have formed the foundations of SCM applications, these new technologies provide the ability to manage the transactions, view the inventory and layer planning applications on top of them. Gartner has defined the architectural principles that underlie such multienterprise SCM applications, and we expect network-based inventory and SCM products to adhere to these architectural principles. However, network-based inventory and SCM tools can be used to solve enterprise, as well as multienterprise supply chain problems.

Where there is an ERP in place, inventory positions relevant to the ERP (plants that the ERP knows about) are updated through an integration interface with the ERP, but the ERP plays only a limited role in the transactional management of the inventory in the network. In addition, sales orders and purchase orders are replicated from the ERP into this environment, if the ERP is the origination of those documents. However, there is usually a clear line of demarcation between the points in the process that are controlled by the ERP and the point at which responsibility is passed to the network inventory model, when the ERP simply maintains visibility to the status of the inventory and updates the general ledger with the appropriate transactions that reflect the inventory status.

**Position and Adoption Speed Justification:** Supply chain inventory visibility (SCIV) or supply chain event management provided the initial view of this application. However, although these applications formed the basis for a networkwide view of inventory, they generally lacked the ability to do anything with the information — they were "view only" tools. The emerging set of applications ties this network view of the inventory to business processes and transactional support to enable SCM applications, rather than just SCIV applications.

Several early-adopter implementations of this technology are employed to augment planning tools used where no manageable ERP is in place. However, this technology is just beginning to garner early mainstream users because of an urgent need to track inventory in these locations.

**User Advice:** Users that need to track inventory above a facility level, but do not need the full range of capabilities of ERP-based inventory management, should evaluate this technology and the accompanying service-oriented order management capabilities, because the two go together in many situations. Users should evaluate commercial solutions for network-based inventory management and SCM against the architectural principles outlined in Gartner's architecture for multienterprise SCM solutions.

**Business Impact:** Network-based inventory and SCM technology will enable more-flexible management of inventory at the network level in areas in which an ERP represents too much...
transactional overhead for the target application. For example, managing inventory through a temporary supply chain might be better suited to this type of technology than an ERP. This will reduce inventory costs, improve supply chain responsiveness and improve customer service levels.

**Benefit Rating:** Moderate

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Adolescent

**Sample Vendors:** i2 Technologies; Manhattan Associates; Sterling Commerce

**Recommended Reading:** "Defining a Multienterprise Application Architecture for Supply Chain Management"

**At the Peak**

**Business Process Networks**

**Analysis By:** Benoit Lheureux

**Definition:** A BPN is a process-specific instance of multienterprise integration between two or more companies. A BPN is not a category of IT vendor — it is something that a wide range of IT vendors and private communities implement.

From the business process point of view, a BPN links the execution of a specific business process, such as order to cash or claims adjudication, between the applications and IT infrastructure of two or more companies. Note that a BPN doesn't execute the business process logic per se — such process execution occurs within the participating applications and business process management logic. The multienterprise integration can leverage B2B standards or proprietary specifications. For example, to implement the order-to-cash process, a community might use industry-standard B2B specifications (such as EDI X12, RosettaNet or UBL) or, alternatively, a proprietary specification defined solely, for example, by a large manufacturer or retailer.

From the multienterprise community point of view, the scope of a BPN can be one-to-many or many-to-many. BPNs that are implemented only between a company and its own private external business partners are one-to-many. BPNs — such as Global Data Synchronization or SWIFT — that are implemented to support the interactions of a large number of companies on a peer-to-peer fashion are many-to-many.

From the IT implementation point of view, a BPN can be implemented using B2B gateway software, integration as a service (IaaS) or any form of B2B infrastructure — see “Taxonomy and Definitions for the Multienterprise/B2B Infrastructure Market.” BPNs can be operated directly by companies or by a wide range of IT service providers, including providers of application hosting, IT outsourcing, software as a service (SaaS) and IaaS. Many offer extensive complementary services for participant onboarding, participant training and participant help desk.

**BPN Examples**

BPNs are often run out of the data center of a prominent host for a community of interest. Examples are Dell, USPS and Wal-Mart, which run their own BPNs to support their supply chains.
BPNs are operated by business process hubs (formerly called marketplaces), which combine multienterprise integration and multienterprise applications for specific industries. Examples include Elemica in petrochemicals, Liaison in paper and pulp, and Quadrem in mining.

Supplier networks, another form of BPN, are operated to exchange procure-to-pay documents and data using a diverse set of B2B specifications, such as cXML, AS2 and flat-file upload. They are run by vendors such as Ariba, Ketera, cc-hubwoo, SciQuest and Perfect Commerce.

Enterprises such as SWIFT, GS1 and E4X have implemented BPNs to support the exchange of financial transactions, product information and foreign currency exchange data, respectively.

Providers of IaaS, such as GXS, Inovis and Sterling Commerce, also operate private BPNs — for example, to support the supply chains for specific retailers or manufacturers — and public BPNs, such as GDS, so that their customers can publish product information to regional data pools.

IT service providers, such as Accenture, Atos Origin, EDS and IBM, typically implement private BPNs to support multienterprise projects for their outsourcing customers, such as the multienterprise integration component of a much larger overall procurement business process outsourcing.

**Position and Adoption Speed Justification:** BPNs are emerging, and many are still in the early adoption stage. As IT vendors evolve and make more hosted services, such as SaaS, available, awareness and adoption of BPNs will rapidly proliferate, driving a peak of expectations in the next year or so. Following the peak of expectations, we expect there will be a mild trough of disillusionment as communities of interest discover that despite their utility, BPNs: 1) are not flexible enough and cannot evolve rapidly enough to meet more rapidly changing business requirements, and 2) do not easily solve diverse requirements to link processes across industries. For example, most BPNs will only support processes in one community of interest or in one industry.

**User Advice:** Enterprises of all sizes should look for opportunities to run or participate in BPNs when they offer a preconfigured method of implementing multienterprise integration for a specific business process as an alternative to a custom multienterprise integration project. Industry standards, such as RosettaNet, SWIFT and UBL, are often — though not always — the basis for BPNs, but are preferable to proprietary B2B specifications when they can be leveraged.

**Business Impact:** Enterprises can more quickly and less expensively implement multienterprise integration projects with external business partners when a BPN is available, versus having to design and implement a multienterprise infrastructure from scratch. BPNs are available for automating supply chains, making electronic payments, exchanging product information, sharing foreign exchange calculation and linking a wide range of other business processes between enterprises.

**Benefit Rating:** High

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Ariba; cc-Hubwoo; E2open; E4X Inc.; Elemica; Financial Information Exchange; GXS; IBX; Inovis; Ketera Technologies; Liaison Technologies; Open Business Exchange; Perfect Commerce; Quadrem; Quick Connect Computer Services; SciQuest; Society for Worldwide Interbank Financial Telecommunication; Sterling Commerce; Strikelron; SupplyOn

**Recommended Reading:** "Magic Quadrant for Integration Service Providers, 1Q06"

"A Tectonic Shift in the Business Process Center of Gravity"
Constraint-Based Optimization in Warehouse Planning

**Analysis By:** Jeff Woods

**Definition:** Most WMSs contain some way of evaluating the allocation of orders or tasks to waves. However, these allocations have been somewhat primitive and focused on the number of picks or orders per zone or per wave.

Technology has been developed to integrate more-complicated constraints into wave-planning functions to enable the dynamic assignment of tasks to waves based on an overall view of the constraints and goals of the warehouse. Sometimes, this goes so far as to use optimizer technology. In its ideal implementation, this would use the goal times from engineered labor standards calculations to precisely calculate the amount of work required per wave, per zone and per person to balance activity and ensure that customer service levels are met. Also, this technology can be used to schedule labor for upcoming shifts or to better plan for overtime expenditures and possibly avoid them.

**Position and Adoption Speed Justification:** This technology has been developed during the past three to four years for many pioneering accounts. However, it has been placed into the base package of several WMS applications, so it should see wider use. One of the major inhibitors to this type of technology will be the operations engineering expertise of users, as well as the data management requirements.

**User Advice:** Users should include this type of optimization capability in the justification for an upgrade to a WMS where operations are resource-constrained. Users that are already on the latest version of a WMS that contains these capabilities should evaluate the potential of implementing these options, keeping in mind the cost involved in managing the data more diligently so that constraints can be fairly evaluated.

**Business Impact:** This technology can improve warehouse operations and service levels, particularly in situations where warehouses are resource-constrained or operate under tight order turnaround constraints. Through tight integration with labor management and scheduling, this technology can be used to avoid or better plan for overtime requirements.

**Benefit Rating:** Moderate

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Adolescent

**Sample Vendors:** i2; Infor; Manhattan Associates; Oracle; RedPrairie; SAP

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Price Optimization

**Analysis By:** Dwight Klapich; Robert DeSisto

**Definition:** Price and revenue optimization solutions help enterprises develop pricing strategies by calculating list, promotion, seasonal and catalog prices by market/customer segment, as well as by evaluating special price incentives and programs, such as volume discounts, deals and special offers. Price optimization tools leverage mathematical algorithms, such as price elasticity and customer preferences, to project future sales revenue based on proposed variations in price targets. Because of uniqueness in the underlying mathematical algorithms, price optimization tools focus by industry and type of pricing environment, such as retail by shelf and markdown; consumer by list, promotion and volume discounts; commodity products by sales and contract price; and travel/hospitality by yield management. Price and revenue optimization solutions can:
• Evaluate multiple scenarios, aiming to maximize profitability
• Evaluate specific pricing proposals before offering them to customers
• Set quantity break discounts by simulating various price points and the impact on volumes and margins
• Offer specialized promotion planning where multiple deals/promotions can be evaluated, looking for those with the best overall price/margin characteristics

**Position and Adoption Speed Justification:** This software is maturing in the retail and yield management sectors, but other industries are just beginning to investigate its use. New markets for pricing optimization are emerging and growing outside the traditionally more-mature pricing markets of yield management (such as airline and hotel markets) and retail (such as shelf pricing and mark-down optimization). Solutions remain fairly industry-specific and will continue to grow in these areas during the next several years. Emerging price management combines sophisticated optimization with more-basic analytics or heuristics and price execution.

**User Advice:** Enterprises that want to improve revenue management and profitability through improved pricing are good candidates for pricing optimization. Pricing remains complex, and improvements will come only if enterprises address the organizational and process side of pricing while implementing more-sophisticated tools. Price management software should be considered by Fortune 2000 enterprises in industries with complex pricing requirements, including one or more of the following: a large number of product stock-keeping units (SKUs) with varying price points; multiple customer segments with different price points; inconsistent deal margins; flexible discounting bands; multiple, volume-based pricing agreements; complex price-bundling kits; pricing that fluctuates with market conditions, including competition and market indexes; special price approval processes; or nonprice terms (such as services, freight and packaging) that are part of the quotation process. Enterprises must not view pricing optimization as something that can be up and running right out of the box. They must invest in implementation, change management and industry-specific solutions.

**Business Impact:** Pricing optimization is a moderate growth application category driven by enterprises focusing more attention on increasing profitability and revenue improvements created through better price setting, control and management. This software enables enterprises to leverage mathematics, such as price elasticity algorithms, to:
  • Quickly calculate and modify prices, based on internal and external factors
  • Raise profitability
  • Increase competitive advantage
  • Reduce risk

**Benefit Rating:** High

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** DemandTec; i2; Manugistics; Metreo; Oracle/Retek; ProfitLogic; PROS Revenue Management; Rapt; SAP Khimetrics; SignalDemand; Zilliant

**Recommended Reading:** "Important Considerations When Implementing Price Modeling and Optimization Technology"
Dock Scheduling and Carrier Appointment Management

Analysis By: Jeff Woods

Definition: Dock scheduling and carrier appointment management is the use of optimization and scheduling tools to automate carrier appointment scheduling and improve the overall use of shipping and receiving docks in distribution. In this system, a dock calendar is maintained showing all operating constraints, such as open/close time, commodities accepted through the dock door (for example, refrigerated or ambient) and trailer types accepted.

Carriers, customers and suppliers with a pending shipment or receipt request can query the system to determine available dock times. In the most sophisticated optimization systems, these external queries are held together with load tenders and optimally assigned at a specified point based on maximum resource use. For example, if there is congestion during a particular period, then the system would not operate on a first-come, first-served appointment basis. Instead, the materials being delivered or shipped would be evaluated based on criticality or capacity to determine which appointments must be scheduled during the congested period and which can be scheduled during alternate periods.

Position and Adoption Speed Justification: Scheduling functionality is a long-standing concern among many of the world’s largest shippers. However, recent challenges in carrier capacity, as well as increasing customer requirements around on-time shipment performance, are driving more enterprises to evaluate this technology. Additionally, a scheduling and appointment management system can be used in conjunction with constraint-based warehouse optimization to begin creating an SCE model that moves more toward flow-through and cross-docking models.

User Advice: Users with capacity constraints in their yard or dock areas should evaluate this system. Additionally, users that are capacity-constrained within the warehouse should evaluate dock scheduling and optimization as part of an overall flow-through system.

Business Impact: Dock scheduling and carrier appointment management reduces the amount of administrative time required to set carrier appointments and manage the dock schedule. If managed properly, then this approach also can improve relations with an enterprise’s carriers, customers and suppliers because the system can be more responsive than manual processes. Finally, scheduling and appointment management can improve the overall throughput and capacity of a warehouse by optimizing appointments and activities, reduce operating labor costs by reducing idle time and can reduce transportation costs by increasing the number of cross-docking opportunities.

Benefit Rating: Moderate

Market Penetration: One percent to 5% of target audience

Maturity: Adolescent

Sample Vendors: i2; Manhattan Associates; Oracle; RedPrairie

Inventory Strategy Optimization

Analysis By: Andrew White

Definition: ISO systems provide the capability to develop multiple and separate supply chain response strategies (for example, plan inventory levels, sourcing points, postponement, routing rules and push/pull points) across the entire supply chain to support segmented customer and channel strategies. These systems are emerging and beginning to encompass supply chain network design tools as well as operational SCP tools. Most ISO solutions use optimization
technologies, and now even more are using event simulation and stochastic algorithms that enable companies to represent uncertainty factors.

**Position and Adoption Speed Justification:** Although new vendors are appearing, many of their products’ capabilities can also be found in traditional SCP tools. These capabilities will eventually evolve into innovation/best-practice templates.

**User Advice:** For complex, distribution-intensive industries (for example, consumer goods, retail, aerospace and defense, and utilities/telephone companies), use these tools instead of classic SCP tools to extract the greatest value from inventory and supply chain assets.

**Business Impact:** These systems enable consumer goods companies to more-accurately determine where and how much inventory should be held.

**Benefit Rating:** High

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Adolescent

**Sample Vendors:** i2; JDA Software Group (Manugistics); LogicTools; Optiant; Oracle; SmartOps; Tools Group

**Recommended Reading:** "Chaos-Tolerant Networks Will Drive Adoption of Inventory Strategy Optimization"

"Who's Who in Inventory Strategy Optimization"

**Price and Promotion Management**

**Analysis By:** Dwight Klappich

**Definition:** Price and promotion management are most commonly used by consumer goods and some retail enterprises to improve the timing, product assortment, frequency, pricing and venue of trade promotions. These are capabilities within trade promotions that are developing separately and have not typically been embedded in trade promotions management applications. However, this is changing as some vendors, such as Oracle and CAS, are now bringing them together.

**Position and Adoption Speed Justification:** Price and promotion management are still pursued only by very forward-thinking enterprises.

**User Advice:** Work with a trade promotions management or category management vendor to embed these capabilities. Otherwise, deploy them as stand-alone functionality. The former will provide a more enterprise-wide solution, but both have the ability to provide significant competitive advantage. This is because they predict the future rather than report the past.

**Business Impact:** Price and promotion management solutions can help improve sales and margins by targeting events better and by designing promotions at a more-granular level using analytical tools.

**Benefit Rating:** High

**Market Penetration:** Less than 1% of target audience

**Maturity:** Emerging

**Sample Vendors:** DemandTec; i2 Technologies; JDA Software Group (Manugistics); M-Factor; Oracle; Oracle/Demantra; SAS Institute
**Recommended Reading:** "Use the CRM Competitive Advantage Model to Strengthen Your Position in the Consumer Goods Industry"

**Product Information Management**

**Analysis By:** Andrew White

**Definition:** Product content and data management (PCDM) composes the set of disciplines, processes and technologies used to create and maintain a consistent interpretation of product and material data (its semantics, syntax and structure) companywide. PIM applications are used to implement and support PCDM. PIM systems use workflow to orchestrate governance across the enterprise for the business to achieve and maintain a “single view” of the product for analytical and operational applications. PIM support data modeling, hierarchy management to support dynamic business services related to new product introduction, price changes, order management, multichannel integration, and event and forecast collaboration based on product and rich-attribute data synchronization.

**Position and Adoption Speed Justification:** The PIM market is starting to mature and continues to grow. The hype level is high; however, there are potential benefits for early adopters. Application platform vendors (such as IBM, Oracle and SAP) have realized the strategic importance of managing master data and, specifically, product master data. Some parts of the PIM market (such as sell-side PIM) are more mature than others (such as buy-side PIM), and there are differences in awareness and adoption by industry. Through 2010, the PIM market will continue to see major changes, acquisitions and new entrants, causing problems for user organizations that want to make a strategic commitment to the market before it settles down.

**User Advice:** Make PIM part of your overall enterprise master data management (MDM) strategy and determine when, not if, you will adopt MDM. Look for business benefits across all IT programs, as well as BI and applications programs that can be addressed with one information management approach, rather than the traditional piecemeal approach. Review the organization’s capabilities and challenges in product information management, as well as its ability and political willingness to use a single product view. Educate the organization on these challenges and their effects on the business. Create a vision (that is, business outcome, technology, processes and organizational commitment) for what could be achieved. Think in terms of creating a central PIM repository that integrates with established source systems and becomes the system of record for master product data in a synchronized, heterogeneous environment. Focus on key business problems and build a business case that is based on benefits. Analyze the likely scenarios in which the enterprise wants to use a PIM system in the short and long term. This will guide your choice of a PIM vendor, because their products have different “sweet spots.” Such sweet spots differ by industry and by implementation style. PIM systems need to have a rich, tightly knit combination of facilities, including a comprehensive data model, information quality tools, workflow engine and integration infrastructure. Evaluate PIM products based on a set of objective, balanced criteria, including industry experience. Start small, but "think big," and deliver early and often.

**Business Impact:** Organizations spread product data across many systems. It is fragmented and often inconsistent. This makes it difficult for organizations to streamline business processes and operations efficiently or develop new, agile business processes. Without a single view of a product, organizations cannot effectively up-sell, cross-sell, leverage operational benefits from merger and acquisition activity, identify efficiencies on the buy side with deep insight on spend data analysis, or achieve a competitive new product introduction process. Some form of a single product view is, therefore, fundamental to managing the value chain. There is a new focus on the problem (typically referred to as PCDM), and a new set of packaged technologies, called PIM, have emerged to provide a foundation for a central, shared, single view of the product. It is
suitable for early adopters and fast followers, and requires architectural vision and business commitment.

**Benefit Rating:** High

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Adolescent

**Sample Vendors:** FullTilt Solutions; GXS; IBM; Oracle; Riversand; SAP; Tibco; Zynapse

**Recommended Reading:** "Magic Quadrant for Product Information Management, 2005 Update"

"Vendors Have Different Approaches to Implementing Master Data Management"

**Vendor-Managed Inventory (Analytics-Based)**

**Analysis By:** Andrew White

**Definition:** Vendor-managed inventory (VMI) systems are tools and processes that enable a supplier to automate, manage and ensure inventory-based service levels at customer locations. Analytical-based VMI solutions, which are less than three years old, differ from order- and forecast-based solutions, which are older and more mature, because they use execution/POS data and analytics engines to determine supplier replenishment activities. Some approaches are scan-based (determining out-of-stock evaluation based on zero scans) and others are more on POS; both lead to analysis of customer inventory levels that are incorrect (for example, phantom or ghost inventory) when compared to reality.

**Position and Adoption Speed Justification:** VMI systems are undergoing a resurgence in interest, and newer technology approaches are being married to users with a more mature understanding of the process. VMI as a process is well-known, so visibility of these new tools is rapidly increasing — hence, the substantial movement along the Hype Cycle in 2006 and 2007.

**User Advice:** Pick the right VMI approach: forecast-, order- or analytics-based. Compare and contrast approaches, and align the approach to your desired business goal and IT environment. Determine the level of inventory analysis needed to achieve desired customer service levels.

**Business Impact:** VMI tools enable enterprises to share supply and demand data, as well as business plans including sales, forecasts, promotions, events and replenishment plans, internally and externally. This should lead to improved rates of in-stock inventory, inventory distribution and sales, even in intensive periods with excessive seasonality or promotions.

**Benefit Rating:** High

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Blue Agave Software; T3Ci; TrueDemand Software; Vendor Managed Technologies; VeriSign (Retail Solutions); Vision Chain

**Recommended Reading:** "Maturing Models for Vendor Managed Inventory Offer More Choices"

"Confusion Escalates in SCM Demand Planning Market"
Sliding Into the Trough

Enterprise Contract Management

Analysis By: Debbie Wilson

Definition: Organizations of all sizes and types enter into contractual legal agreements that are complex enough to require a formal contract to document the terms, conditions and obligations of the participating parties. These contracts span purchase agreements, outsource arrangements, sales agreements, lease agreements, licensing agreements and employee agreements. Problems arise from the ad hoc processes surrounding the contract, including inconsistent language across the organization and lost documents when archiving is paper-based or in a simple document management system. In addition, enterprises can incur significant liabilities if contract obligations are not adequately tracked or when contracts automatically renew, without negotiation, because nobody realized the expiration date had come and gone. Enterprise contract management systems help organizations address these issues by enabling standardized clause language, by providing fully searchable, centralized contract repositories and by establishing an alert system so that the resulting agreements can be proactively managed.

Position and Adoption Speed Justification: In 2000 through 2003, the enterprise contract management market was very hyped as a result of the lure of a process that virtually every organization employs in some manner. Early tools touted the ability to enable the "full life cycle" of the contract, including agreement authoring and subsequent compliance management. Early customers, however, used these tools primarily as a searchable, alertable database of agreements. The few that attempted to leverage authoring capabilities such as track changes and supplier collaboration were disappointed because these features proved more difficult to build out than first imagined. One that was especially difficult was integration of Microsoft Word, a necessary feature for most customers attempting authoring because Word is a de facto standard for document creation in many companies.

In addition, many industry players envisioned the contract management solution as an application that is best consumed as a specialized tool for particular types of contracts, such as buy-side, sell-side, or intellectual property agreements. The architectural components required for contract management solutions of any type of agreement are similar. Therefore, we see the organically spreading use of contract management tools from the initial department to other departments and, following this trend, a gradual reorientation of contract management vendors toward general-purpose tools.

User Advice: Use available solutions for what they can do and avoid customization. Look to achieve rapid return on investment from those features that have proved to be useful, including metadata tagging, full-text search and e-mail alerting. For other functionality, consider only those advanced vendors that have worked out the bugs and filled the functional gaps. The difficulty of introducing an application to new user communities, such as lawyers and commercial contract managers, should not be underestimated. Contract management implementations are change management programs first and technology implementations second.

Since most available solutions feature greater functionality for their initial target group, such as sales, choose solutions that favor the department that has the most complex requirements in your organization.

Business Impact: This software enables organizations to centralize all legal agreements in a single repository, comply with regulations and provide early alerts to users for milestones. The effect of this functionality is significant because contracts typically document an organization's
most significant obligations. A lack of awareness of pending milestones and renewals can be costly.

**Benefit Rating:** High

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Ariba; Contiki; Emptoris; Nextance; Oracle; Procuri; SAP; Selectica (Determine Software); Symfact; Upside Software

### Global Visibility for TMS

**Analysis By:** Dwight Klappich

**Definition:** Global visibility for a TMS improves connectivity and visibility across facilities, multiple transportation modes, transportation providers, trading partners, suppliers, customers and, eventually, governments. Global visibility enables companies to track and trace orders and shipments, as well as detect event-driven problems early and notify recipients of problems.

**Position and Adoption Speed Justification:** Event management applications are maturing, but connectivity to carriers and other constituencies — such as suppliers, forwarders, brokers and governments — remains difficult, although improving during the past year. Capturing movement information beyond large constituencies that are typically electronic data interchange (EDI)-enabled remains nascent. EDI remains the dominant way to connect with trading partners, but has limited worldwide adoption beyond large, sophisticated trading partners, such as ocean carriers and third-party logistics companies. However, many solutions now have simplified trading-partner portals that allow for easier capture of data from less-sophisticated or automated trading partners. Global visibility has been a stand-alone application, but is increasingly part of more-comprehensive global logistics and TMS applications, which is increasing adoption.

**User Advice:** Midsize to large international shippers (5,000 or more containers per year) in dynamic logistics environments will benefit from improved visibility. Early adopters should consider on-demand global visibility solutions, where upfront costs are minimized.

**Business Impact:** Given the increased risk of managing a global supply chain, visibility to potential problems is critical to managing global logistics operations effectively. However, visibility alone provides only incremental value because it can identify problems but not resolve these. The value of visibility increases when it is integrated with other applications, such as a TMS, where problems can be identified, diagnosed and resolved in a single environment.

**Benefit Rating:** Moderate

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Descartes Systems Group; GT Nexus; i2 Technologies; Log-Net; Management Dynamics/BridgePoint; Oracle OTM; SAP; TradeBeam

### Supplier Portals

**Analysis By:** Debbie Wilson; Andrew White

**Definition:** Many, if not most, procurement-related applications offer some sort of extension that enable suppliers to view records, update files and/or submit bids via a secure login on an Internet
Web site. For example, a single buy-side enterprise may provide suppliers access to a sourcing tool, an e-procurement tool, a contract management tool, a collaborative product life cycle management (PLM) solution and a payment data portal all on separate, distinct Web pages, with separate logins and distinct "looks and feels." When the application (or application suite) that is extended to the vendor is implemented on-premise, this extension of functionality to the Web is defined as a vertical supplier portal.

A horizontal supplier portal is an on-premise application that aggregates multiple vertical portals between the buyer and its supply base, providing suppliers access to multiple applications and typically a network, all from a single Web site and usually through a single logon. Horizontal portals are not limited to the content or applications provided by the vendor, but are extensible so that the buyer can use them to post data from applications not licensed from the vendor.

At the low end, supplier portals function as a simple and inexpensive Web form or bulletin board, enabling buyers and suppliers to post information, such as supplier registration updates, basic contact and trading information, purchase orders and contracts. At the high end, supplier portals can be sophisticated components of an extended SCM strategy supporting externally facing business processes, including distributed planning and performance monitoring. Supplier portals can be hosted by the buyer, using a custom solution or by using a portal application, such as SAP ICH. They can also be hosted by a vendor. For example, Eqos offers portal functionality because it aggregates the multiple Web extensions from the various applications its customers install behind their firewall to a single Web site for suppliers.

Supplier portals are generally well-received by suppliers because they greatly reduce the need for phone calls and the exchange of paper. In addition, they speed up communication by an order of magnitude and simplify the customer support process.

**Position and Adoption Speed Justification:** Supplier portals vary greatly in capability and functionality. However, few enterprises have fully implemented portals because the market for the solution is still emerging, and the buy-side constituent users for each application tend to be different. The formation of a single interaction point for all supplier communications has a strong potential as a collaborative supply chain process medium, but many enterprises are unclear about how to enable this and they have not made a consolidated supplier portal a priority — hence, the two- to five-year outlook.

**User Advice:** In general, supplier portals have been well-received as efficiency-enhancing tools by the supplier community, and it is generally advisable to use them. Consider supplier portal functionality as a means to significantly enhance collaboration.

**Business Impact:** A supplier portal can be a tactical (focused on automation and self-service) or strategic (focused on unifying all supplier interaction and driving growth) asset. In its simplest form, it is a low-cost means of distributing data (such as requests for quotes/proposals and purchase orders) and improving the timeliness and accuracy of receiving supplier data (such as trading information, product availability and shipping notices). In more-strategic scenarios, supplier portals are a single, unified gateway for most or all supplier interactions, spanning multiple applications and processes. They are a part of an integrated procurement strategy that facilitates a single, companywide supplier registry, collaborative planning, scheduling, vendor-managed inventory and PLM.

**Benefit Rating:** Moderate

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Adolescent

**Sample Vendors:** Ariba; E2open; Equos; GXS; IBM; Oracle; Quadrem; SAP
**Recommended Reading:** "A Tectonic Shift in the Business Process Center of Gravity"

"Business Strategy Drives B2B Connectivity Choices"

**Capable-to-Promise Systems**

**Analysis By:** Dwight Klappich; Tim Payne; Andrew White

**Definition:** CTP systems enable enterprises to commit to customer orders based on production/resource capacity (available or planned) and inventory. CTP solutions consider resource (equipment, people, materials) availability/capacities, constraints, work-in or planned-in progress, and various rules to calculate accurate promises.

**Position and Adoption Speed Justification:** CTP products are available, but many users are struggling with issues of data availability, accuracy, information latency and cultural change. Many customers have resorted to less-sophisticated available-to-promise (ATP) systems, even though visionaries are already talking about concepts beyond CTP, such as profitable-to-promise systems. Historically, best-of-breed solutions were the most robust alternatives, which created integration challenges. However, some ERP vendors are enhancing their CTP capabilities.

**User Advice:** CTP is a more sophisticated technology than ATP because it must look at more resources and constraints. Select the appropriate approach that yields the desired level of customer service. Recognize that CTP requires greater integration and more data from SCP solutions than ATP engines.

**Business Impact:** CTP systems enable enterprises looking at postponement, make-to-order and assemble-to-order strategies to better use their assets and improve customer satisfaction by providing better and more-informed promise dates.

**Benefit Rating:** Moderate

**Market Penetration:** Twenty percent to 50% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Adexa; i2 Technologies; Inc.; Infor; Logility; Manugistics (acquired by JDA); Oracle; SAP

**Global Data Synchronization**

**Analysis By:** Andrew White

**Definition:** Global data synchronization (GDS) consists of technology and applications used to receive, approve and manage product, price, forecast, promotion and contract data from suppliers via the Global Data Synchronization Network (GDSN), in support of standards from the Global Commerce Initiative.

**Position and Adoption Speed Justification:** The GDSN is mature in some parts (basic item synchronization by region) and immature in others (global — not really existing; price and promotion standards are again the focus in 2007), so GDS is operational, but still far from delivering the benefits that the wider community is expecting. There are benefits to be had and, in some cases, early adopters have seen this; however, the overall industry benefits remain elusive, waiting for critical parts of the GDSN to mature.

**User Advice:** Connect to regional data pools based on supplier aggregation and location. Evaluate your internal capability to consume high-quality data; and appropriately implement a
master data management program as a prerequisite to achieving a "single view" of products, customers, prices, hierarchies and locations.

Business Impact: GDS will reduce "out of stocks," settlement queries, lead times, new product introduction and cycle times, and transaction costs by eliminating data re-entry across the value chain. GDS will also synchronize multichannel integration, enable business-to-business synchronization and enhance revenue.

Benefit Rating: High

Market Penetration: One percent to 5% of target audience

Maturity: Adolescent

Sample Vendors: 1SYNC; Agentrics; GS1; GS1 UK; GXS; Sterling Commerce

Recommended Reading: "Gain Value Sooner With a Clear Understanding of the Global Data Synchronization Road Map"

TMS Multimodel/International

Analysis By: Dwight Klappich

Definition: Global logistics applications help automate the movement of goods globally by helping to ensure that processes are synchronized with all the parties involved in the international shipment. International shipments are typically complex, multileg movements in which goods and information flow between many constituencies, such as suppliers, port operations, governments, ocean or air carriers, and domestic truck or rail carriers. Global logistics must support different modes of transportation, such as by water, truck, rail and air, with unique planning and execution requirements not traditionally addressed by TMS applications designed for domestic, truck and rail transport.

Position and Adoption Speed Justification: Solutions are evolving rapidly because of pent-up buyer demand and consideration of global shipping requirements by many enterprises. Although solutions are incomplete, they are maturing rapidly, and support for international shipping requirements is improving.

User Advice: Enterprises with significant international logistics operations should consider these solutions, paying particular attention to the breadth and depth of the TMS solutions being considered, with equal or greater attention focused on the global logistics domain expertise of the vendors.

Business Impact: Complexity and the rising cost of global logistics, particularly rising fuel costs, combined with the need to manage international operations cost-effectively and with sufficient management controls for the safe and secure transit of goods, drive the need for software to help manage global logistics operations.

Benefit Rating: High

Market Penetration: Five percent to 20% of target audience

Maturity: Adolescent

Sample Vendors: GT Nexus; i2 Technologies; Log-Net; Manhattan Associates; Oracle OTM; SAP
EPCglobal Network

Analysis By: Jeff Woods

Definition: The EPCglobal Network was originally conceptualized as a way to manage information about the “Internet of Things.” This is a relatively tall order that was recently scaled back into more-practical uses. The initial conceptualization placed the EPCglobal Network as an alternative to emerging MDM. The primary benefit of the networked MDM style of the EPCglobal Network was that it could be used to create a pull-style way to access information about any object anywhere in the world. However, the most recent incarnation of the EPCglobal Network focuses the uses on sensor-based end-to-end track and trace in the supply chain and in pedigree management for pharmaceuticals or other goods to respond to counterfeiting efforts.

The current incarnation is realized as a network service that stores observations about objects from sensor networks. This collection of observations can be used to create a history of observations about an object as it has traveled through the supply chain. Although many components, such as security and authentication, have been contemplated for this architecture, the initial implementation is fairly limited. This is primarily being contemplated by the pharmaceutical industry and in international shipping situations for track and trace, as well as cargo security.

Position and Adoption Speed Justification: After an initial run up the Hype Cycle curve and into the Trough of Disillusionment, the EPCglobal Network has adopted a more pragmatic view of its uses and a more-limited scope. This makes its use more realistic and the scope achievable. Nonetheless, it still faces major challenges.

The use of the EPCglobal Network for global track and trace is probably the most complicated use envisioned. The challenge is that years of work have been spent on developing nesting logic or shipment split logic in document-based visibility systems that have yet to be incorporated into the EPCglobal Network. Until that happens, the EPCglobal Network is not likely to be a replacement for document-based inventory visibility systems. Instead, it will likely be a repository for sensory observations that feed into a document-centric visibility system for processing and presentation to the user.

Pedigree tracking may emerge as one of the primary uses of the EPCglobal Network, and it is reasonably well-suited for this application because it is a multienterprise architecture. However, the benefits of its use are dubious in this situation; without regulatory pressure, it is not likely to see widespread use.

Pull-based MDM capabilities remain an outside possibility for use of the EPCglobal Network, but commercial tools for catalog syndication and synchronization are deeper and more robust specifications of this functionality. This use of the EPCglobal Network will likely devolve into a series of document specifications for transmitting serialized product or asset information in a pull or push mode and, probably, through a variety of systems. Therefore, although the actual network might not survive for this use, its payload specifications may.

User Advice: Users that are looking for global inventory visibility should primarily pursue document-based inventory visibility solutions and supplement this with sensory data that can be collected and monitored through the EPCglobal Network. Users looking to reduce counterfeiting and diverting of products should evaluate pedigree systems based on the EPCglobal Network, where the integrity of multienterprise supply chains is in question. However, pedigrees alone do little to prevent or detect counterfeiting and diverting, especially with uncooperative parties; therefore, e-pedigree uses of the EPCglobal Network should only be pursued in the context of a comprehensive anti-counterfeiting program.
**Business Impact:** This will enable some enterprises without a document-based visibility system to trace inventory and assets across their supply chains. It can be used to create electronic pedigrees. Simply constructing electronic pedigrees will do little, by itself, to reduce counterfeiting and diverting of pharmaceuticals.

This network layer is unrelated to whether the data collection system underneath is RFID, bar coding or manual data collection. Therefore, the benefits of different data collection systems should not be imputed to the EPCglobal Network, which is a common mistake.

**Benefit Rating:** Moderate

**Market Penetration:** Less than 1% of target audience

**Maturity:** Emerging

**Sample Vendors:** BEA; IBM; Microsoft; Oracle; SAP; SupplyScape; Sybase (iAnywhere); VeriSign

**Recommended Reading:** "Findings: Counterfeit Drug Task Force Recommendations Will Push, Not Propel RFID"

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**RFID and Sensor-Based Inventory Management**

**Analysis By:** Jeff Woods

**Definition:** This is the management of inventory with sensor technologies, such as RFID. Most of these applications use passive RFID along with a range of software to support business processes. This is primarily concerned with the direct sensing and observation of inventory because the tracking of containers or types of assets that contain inventory would likely fall under sensor-based asset management.

**Position and Adoption Speed Justification:** Wal-Mart is the "poster child" for this application, and many people see Wal-Mart's delays and difficulties with RFID as an indication of a broader malaise with RFID. However, Gartner has always maintained that the industry's hyper-focus on Wal-Mart's RFID projects and its use as a broad indicator for the overall health of RFID is somewhat misleading. Wal-Mart is pursuing a particular type of RFID project that may work for that business. However, Wal-Mart's success or failure really doesn't speak to how well other enterprises can use RFID. This is because Wal-Mart's success or failure doesn't depend on technological success or failure. Rather, the success or failure of most inventory-based RFID projects is tied to the business case and the ability of the enterprise to construct business processes that can leverage the additional information about the inventory given by RFID.

Therefore, the maturation of RFID will largely depend on the specific business process conditions that the enterprise faces, rather than industrywide maturation of the technology. Some spillover effects from one project to another will help to drive the industry forward, but firm-specific process conditions will overwhelm those spillover effects for the near future.

**User Advice:** Gartner maintains its view that the worst thing that ever happened to RFID was that it was conceptualized as the "next bar code." This caused untold numbers of enterprises to focus on established uses of bar codes and replace them with RFID. This turns out to embody the worst elements of business case construction because the established process, for the most part, works, and RFID technology is actually inferior to bar coding in many ways. In situations where the business process is under authoritative control of the enterprise, bar coding is usually the best option, unless bar codes are physically infeasible technologies.
Instead, Gartner recommends that sensor-based inventory applications focus on supporting inventory visibility and management in chaotic business processes that are beyond the authoritative control of the enterprise. For example, retail-selling floors and hospitals are relatively chaotic process environments in comparison to a factory floor or a disciplined warehouse. This is the primary determinant as to whether the inventory-based RFID project will be successful. Users must also be patient and willing to experiment if they want to pursue sensor-based inventory management, because these projects can last several years before showing definitive business value.

**Business Impact:** This technology offers the possibility to extend enterprise control over business processes that were invisible to the enterprise. By 2017, at least one global 2000 enterprise will be able to exploit sensory-based inventory management to reshape its business operations and dominate its industry. For many others, this technology will give enterprises early warning into supply chain or operations issues and allow proactive responses. However, this type of business case is extremely difficult to access.

**Benefit Rating:** Transformational

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** IBM; Intermec; LXE; Motorola; OATSystems; Oracle; R4; SAP; TrueDemand Software

**Recommended Reading:** "Key Issues for Building an RFID and Sensory Network Strategy, 1H06"

**Service Parts Planning**

**Analysis By:** Dwight Klappich; Andrew White

**Definition:** SPP applications optimize the forecasting, stock locating and replenishment planning of service parts, and balance customer service with inventory and supply chain costs. These applications are specialized versions of SCP applications that focus on the unique characteristics of service parts management, such as failure/demand uncertainty, asset and part population planning, reverse logistics and large-part inventories. SCP solutions have additional features to support SPP, including modeling of returns, support for erratic and irregular demand planning, and supplier scheduling.

**Position and Adoption Speed Justification:** The SPP market may emerge as one of several new post-SCP and innovation partner solutions targeted at specific industry requirements. However, there is a widening gap between the most sophisticated users of SPP who are looking for very advanced applications and less-demanding enterprises that are not aware of its availability or the value of more-advanced capabilities. Therefore, they "make do" with traditional SCP technology.

**User Advice:** Users can achieve better inventory asset use through more-specific functionality from SPP technology vendors. When aftermarket inventory management is a critical business issue, look to SPP solutions over best-of-breed SCP or ERP/suite offerings.

**Business Impact:** These tools can help improve part availability while reducing inventory carrying costs for holding large populations of parts. In addition, they can enable enterprises to share supply and demand data, as well as intellectual property, internally and externally.

**Benefit Rating:** High
Market Penetration: Five percent to 20% of target audience

Maturity: Early mainstream

Sample Vendors: Baxter Planning; Click Commerce (Xelus); MCA Solutions; Oracle; SAP; Servigistics; Syncron

Recommended Reading: "MarketScope for Service Parts Planning, 4Q06"

"Supply Chain Planning Market Is Bifurcating Into Process Automation and Process Innovation Markets"

Multienterprise Supply Chain Collaboration

Analysis By: Andrew White

Definition: Multienterprise supply chain collaboration supports dynamic collaboration among employees, business partners, customers and suppliers throughout a multienterprise business application, often offered or hosted by a trading community or business process hub (BPH). Multienterprise collaboration solutions are formulated business processes defined by a business process management engine or represented by a business application. The applications are sourced on business process networks and BPHs, and can be offered via software as a service. Such forms of collaboration are structured and can use industry standards, such as collaborative planning, forecasting and replenishment (CPFR). Other forms of collaboration exploit technology standards for data interchange, although the business processes that are collaborated are uniquely supported by custom applications.

Position and Adoption Speed Justification: True supply chain collaboration has been around for nine years, but has rarely been deployed outside of channel master or brand owner efforts in a scalable, repeatable or sustainable manner. However, this is far simpler than large-scale multienterprise collaboration. We expect multienterprise collaboration to evolve rapidly, but die before it plateaux, and then re-emerge with newer related technologies — such as master data management (to ensure data consistency in processes) and global data synchronization (to synchronize data and ensure data semantics in the business-to-business sphere) — to remove technical barriers to large-scale integration, which is a precursor to multienterprise collaboration.

User Advice: Look for business applications that embed collaboration technology in the business process. Only apply collaboration technology outside the business process and application as a last resort. Focus collaboration programs on developing shared risk and reward measures for all stakeholders.

Business Impact: This technology affects complex multienterprise business processes. It is a source of competitive differentiation when enterprise-centric business processes can no longer be squeezed for cost savings. It is common in initiatives such as distributed order fulfillment, CPFR and VMI.

Benefit Rating: High

Market Penetration: Five percent to 20% of target audience

Maturity: Early mainstream

Sample Vendors: Agentrics; E2open; EQOS; i2; JDA Software Group (Manugistics); Logility; Oracle (Syncra)

Recommended Reading: "Defining a Multienterprise Application Architecture for Supply Chain Management"
Climbing the Slope

Business Process Hubs

**Analysis By:** Andrew White; Debbie Wilson

**Definition:** A BPH is a process-specific instance of multienterprise applications between two or more companies. A BPH is not a category of IT vendor — it is something that a wide range of IT vendors and private communities implement. From the business process point of view, a BPH arranges the design, orchestration and execution of a specific business process, such as order to cash, claims adjudication, procure to pay, demand forecasting collaboration, product planning/design and sourcing between trading partners. Many BPHs leverage an integrated business process network to provide detailed, transaction-level integration. The multienterprise applications can leverage either business-to-business (such as RosettaNet) or business process (such as VICS CPFR) standards or proprietary specifications. From the multienterprise community point of view, the scope of a BPH can be "one to many" or "many to many." BPHs that are implemented only between an enterprise and its own private external business partners are effectively hosted (or even managed) partner-facing portals.

**Position and Adoption Speed Justification:** BPHs, historically known as "e-marketplaces," never created their expected value, because many focused on business processes that were not founded on how enterprises behaved or were willing to behave. Those that have survived have, for the most part, shifted their focus to catalog and item part data content synchronization, hosting of traditional applications, and Web-based collaboration to support transaction cost reduction, supply chain visibility and performance analytics, as well as multienterprise collaboration. Some BPHs are now reinvesting in e-marketplace functionality, particularly in support of excess inventory liquidation and the leveraging of membership to enable participants to find new suppliers. A few offer group contracts. Some are transitioning their focus to hosted application services, looking more like business process networks as they strengthen and, in some cases (such as Elemica), even emphasize the value of their hosted integration services relative to their hosted application services.

**User Advice:** Source business applications, analytics and services according to criteria that measure process complexity and value to the business. Consider BPHs that function in your industry as a strong candidate for procurement applications and supplier collaboration. Enterprises that are already engaged with a BPH should insist that charges be broken out among the various solutions they consume from the BPH and exercise due diligence periodically to ensure that the cost for use of those tools is in line with the market and is price competitive (via economy of scale) vs. what it would cost to implement the same functionality themselves.

**Business Impact:** The business process hub can offer much value to its customers by providing industry-specific hosted applications, or multienterprise applications that are often procurement-related, and supply-chain-related functionality and services for "one-stop shopping." These vendors exist, however, in a limited number of industries. Their value often depends on the level of standardized communication between members of the same industry and the maturity of SCM business processes operating within them.

**Benefit Rating:** Moderate

**Market Penetration:** Five percent to 20% of target audience
Maturity: Adolescent

Sample Vendors: Agentrics; Click Commerce; E2open; Elemica; Enporion; Exostar; Liaison Technologies; Mitrix; Quadrem

Recommended Reading: "A Tectonic Shift in the Business Process Center of Gravity"
"The Public vs. Private Debate Continues in E-Marketplaces"

E-Procurement

Analysis By: Debbie Wilson

Definition: E-procurement applications provide users with self-service mechanisms for drafting purchase requisitions, accessing catalog content, obtaining management approval and communicating the resulting purchase orders to suppliers. These solutions are carving out a role in the enterprise as the application that drives compliance to strategic sourcing plans by guiding individual requisitioners to contract suppliers and corporate standard indirect goods and services.

Position and Adoption Speed Justification: E-procurement failed to deliver on its 1998-through-2000 promise to be a driver of significant savings for indirect purchases. A variety of issues caused this disillusionment, including the unsuitability of the tool for many categories of spending and the unanticipated difficulty of enabling suppliers in the system.

Catalog-based e-procurement systems effectively automate only 20% to 25% of a typical enterprise's overall indirect spending. In particular, utilities, complex category and noninvoiced spending, even though they can comprise a significant percentage of the overall budget, are best left outside of e-procurement, as explained below:

Utilities spending. This type of spending presents a challenge because it is not practical to document every event that triggers a liability, and enabling payment for line items as expenses occur is the purpose of the purchase order. For example, the cost incurred for a single event such as a telephone call would, in most cases, be lower than the cost to raise a purchase order, and the use of a resource, such as the cost of turning on an electric light, may not be traceable to a single act. Furthermore, recurring expenses, such as rent and loan payments, should not be put through an e-procurement system because their payment is not discretionary. The nature of the e-procurement system is to enable spending that is at least partially variable.

Complex category spending. For many categories of spending, the issuance of a purchase order constitutes a small percentage of the overall set of tasks required to place the order. For example, the hiring of contingent labor involves resume solicitation, candidate interviews and verification of documentation that attests to the individual's right to work. Software applications that address the larger process tend to add much more value to the enterprise than attempting to force-fit a complex purchase into a tool designed for simple orders. A wide variety of vendors are plying tools that enable complex spending categories, such as printing, services and labor, with transaction-oriented solutions that include functionality that addresses the wider procurement process steps present. The use of these tools, however, requires the enterprise to invest in, manage and implement additional applications, which in turn leads to a more complex IT environment. Therefore, it is not clear whether the use of stand-alone category-specific applications will stand the test of time.

Noninvoiced spending. The invoice is not the standard for settlement in some spending categories. For example, the travel industry has traditionally secured payments via credit cards. Payments against complex service agreements are typically triggered by the completion of a milestone or by the passing of a key date, rather than by an invoice. When there is no expectation
of an invoice, a purchase order system does not make sense, because the accounts payable system is set up to settle purchase orders by matching them to invoices.

The second obstacle for e-procurement is the cost and time required to bring suppliers on board. Many e-procurement vendors have attempted to set up all participating suppliers with the latest and greatest XML-based technologies, whether or not this level of connection was truly cost-effective, further exacerbating the obstacle. The industry is now realizing that suppliers should be selectively set up for machine-to-machine electronic transactions.

Finally, for larger, geographically diverse enterprises, e-procurement applications face the barrier of operation in heterogeneous environments. Countries have different taxation policies, practices and rates — and the supply base in different regions can vary radically. As a result, most e-procurement implementations to date are confined to a single geographic region.

E-procurement is now climbing out of the Trough of Disillusionment and onto the Slope of Enlightenment because of the spreading acceptance of the tool's limitations and the consequent setting of realistic expectations. There is growing acceptance that bringing suppliers on board requires significant services to set up and maintain a healthy engagement from the suppliers' side. There is also realization that e-procurement does not, by itself, trigger any cost reduction. However, e-procurement does provide a useful means to guide individual requisitioners to the suppliers and contracts, and when used in conjunction with strategic sourcing, it will drive significant savings. Therefore, a rationalized supply base and strategic purchase agreements are prerequisites to successful e-procurement.

**User Advice:** Users should evaluate category-specific solutions for complex spending categories.

Organizations should expect e-procurement solutions to effectively address approximately 20% to 25% of overall indirect spending.

Enable catalogs only for those suppliers that are established strategic partners. Require a significant discount (at least 10%) from list price in exchange for their inclusion in your e-procurement system.

Choose an e-procurement vendor that offers significant ongoing vendor community management services, or engage a third-party vendor for content management and supplier onboarding.

**Business Impact:** E-procurement applications are an effective tool for guiding requisitioners to contractual, strategic suppliers and standardized goods and services. Since only a minority of spending can be addressed through an e-procurement solution, the overall effect on organizational productivity is moderate.

**Benefit Rating:** Moderate

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Ariba; Basware; Coupa; Ketera Technologies; Microsoft; Oracle; Perfect Commerce; Proactis; PurchasingNet; SAP; Verian Technologies

**Recommended Reading:** "One-Size Procurement Transaction Tools Don't Fit All"

"Turbo-Charge Procurement Value-Add With Consumption Management"
Voice-Directed Picking in Warehouse Management

**Analysis By:** Jeff Woods

**Definition:** Voice-directed picking in warehouse management is the use of voice recognition and speech synthesis technology to drive activity in warehouse operations. This enables hands-free and eyes-free operations. This technology profile refers broadly to the use of voice-directed activity in the warehouse, regardless of implementation style. Today, most implementations take place via a proprietary interface and proprietary hardware. However, another technology profile details the move to the open-standards-technology implementation of voice-directed picking.

The major considerations for this technology have been where to do voice processing and synthesis. However, this largely has been resolved, and the portable unit receives machine instructions that are translated into speech synthesis or recorded voice instructions to the warehouse operator. Speech feedback and confirmations from the user are interpreted on the machine (rather than by passing the sound file over the network), and a confirmation is passed to the host system. Typically, this is a third-party subsystem rather than an integral part of the WMS.

Most applications focus on voice-picking activities. However, some enterprises are considering the technology to direct other activities, such as put-away or replenishment.

**Position and Adoption Speed Justification:** After several years of competing designs and styles, the industry has settled on the design and use of the system outlined in the definition section of this technology profile. For several years, this resulted in Vocollect establishing itself as the dominant vendor in the space. However, other vendors have begun to replicate the technology approach of Vocollect (and potentially to improve on it).

Initial uses were grocery-oriented, because the systems were so complicated and training requirements were high. This meant that only large warehouses like those of grocery facilities could afford the upfront costs and investments. However, the technology has matured to the point that most facilities with meaningful picking volumes can afford to use voice technology.

**User Advice:** All users with intensive picking requirements, such as case-picking operations, should evaluate voice picking as an addition to a warehouse management environment. It is possible to go directly from paper-based picking to voice picking, so there is no need to step through radio frequency picking before implementing voice picking. Users will need to ensure that the warehouse has good wireless network coverage. Users also need to consider whether they should upgrade their WMSs as part of the project to ensure that voice picking is implemented on top of modern business practices, even though business benefits can be had without upgrading the underlying WMS.

**Business Impact:** Voice-directed picking can improve the productivity of order selectors, especially in situations where both hands are required to perform picking operations, such as case picking for pallet building. The use of voice direction can improve safety in the warehouse, because employees are not distracted by reading a screen for instructions.

**Benefit Rating:** Moderate

**Market Penetration:** One percent to 5% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Adata Solution; Inther; Vocollect; Voxware

Supply Chain Analytics

**Analysis By:** Dwight Klappich; Tim Payne; Andrew White
**Definition:** Supply chain analytics refers to the methodologies, metrics, processes and systems used to monitor and manage the performance of a supply chain, including portals, dashboards, key performance indicators, industry templates and business activity monitoring (BAM) solutions.

**Position and Adoption Speed Justification:** Supply chain analytics are the tools needed to support supply chain performance management and are key to monitoring and measuring a supply chain's activities and performance. Most enterprises have some, although often rudimentary, measurement systems, but it will be several years for use to reach expectations and solutions to mature because it takes time to develop the measurement strategies and to then deploy the necessary processes and integrated systems. Basic supply chain analytics will devolve into tactical departmental analytics, while a more strategic use of supply-chain-oriented performance management will likely replace it with a more end-to-end view of SCM performance.

**User Advice:** Enterprises should look first at analytic solutions that are seamlessly integrated with their core SCM applications. Consider stand-alone systems only if:

- They have extreme SCM application heterogeneity.
- They're looking for a consolidated view of SCM metrics where underlying data may reside in multiple applications.
- Choosing a single solution from a single application vendor is impossible.

**Business Impact:** It brings about proactive and intelligent management of an enterprise's supply chain by using ongoing monitoring and feedback to adjust and fine-tune processes and activities.

**Benefit Rating:** Moderate

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Business Objects; Cognos; i2 Technologies; Informatica; JDA Software Group (Manugistics); Manhattan Associates; Oracle EPM; SAP; SAS Institute; Teradata

**Recommended Reading:** "Confusion Escalates in SCM Demand Planning Market"

"SCM Requires the Alignment of Decision-Making Solutions"

**Warehouse Labor Management Systems**

**Analysis By:** Jeff Woods

**Definition:** In this system, the best work patterns are employed to construct goal times for the performance of each discrete task in the warehouse. These are called engineered labor standards. This is done at a very detailed level and can be based on a library of best work standards that some specialist implementers and vendors have developed. For example, the difference in time that it takes to reach the top shelf of a warehouse rack is incorporated vs. what is required at eye level. One of the most important components of this system is the incorporation of travel times into the goal time. Thus, it is important to pay attention to how the travel paths are constructed in the system.

Once these parameters are determined, each pick task is analyzed by the WMS or LMS to determine its goal time based on the individual elements of that task, such as beginning and ending zone, person assigned the task and time on shift (to account for things such as fatigue). Then, the actual time is compared to the goal time for the specific task, and achievement is evaluated. This is superior to productivity management systems that just evaluate the completion
of an aggregate number of tasks over a work period (such as picks per hour). This is because the more-precise specifications of goals and performance enable the manager to properly evaluate work, counsel for improvement and fairly compensate the good performance. It is important to note, though, that most vendors have not yet completed the technology projects to enable the systems to fully comply with restrictive labor laws outside the U.S. Additionally, there are still few reference customers on these systems outside the U.S.

These systems are being extended to labor-scheduling systems, such that the activities of the warehouse can be projected over a period, and labor requirements can be more accurately forecast and scheduled for. Some of these systems advertise the ability to calculate gross pay and, potentially, to obviate the need for a third-party time-and-attendance system.

**Position and Adoption Speed Justification:** This technology has historically been used primarily in large grocery facilities because the range of tasks in use has been fewer than in other types of warehouses. However, the technology and engineering standards have been expanding during the past three to five years. This has made the technology and labor management processes applicable to most warehouse facilities these days. It is important to point out that the LMS commercial offerings from some vendors are somewhat antiquated systems that are undergoing technical modernization as the focus on the system expands to more users. It used to be a specialized system, but, with general use, there is more emphasis on the technical fit and finish of the systems.

Most implementations of LMSs have been in the U.S. European companies have generally resisted implementing this technology due to local labor laws or perceived cultural constraints. However, some vendors have begun focusing on deployments outside the U.S. and are amending systems to meet local conditions. Gartner expects these changes, as well as real-world experience in other countries to accelerate adoption by users outside the U.S.

**User Advice:** All users in the U.S. should be evaluating or implementing an LMS based off of engineered standards. However, it isn’t enough to just install the systems. Users have to be willing to incorporate best work practices as well as build a program of worker training and rewards based on this new system. Users that work with labor unions should employ a consultant with specialized expertise in working with labor unions around the deployment of labor management systems to ensure that a win-win business case and business process is developed. Users outside of the U.S. should begin evaluating LMSs to evaluate whether there are real or perceived issues with cultural fit and legal regulations surrounding this technology.

**Business Impact:** A typical warehouse might be performing at 50% to 70% of optimal performance through the use of productivity management tools and a good WMS. The implementation of an LMS can bring a warehouse to 90% to 100% of optimal performance. The deployment of pay-for-performance schemes based on engineered labor standard goal times can move a warehouse to 110% to 120% of “optimal” levels for true best-in-class performance. Sometimes, these systems can be used to evaluate temporary labor to determine whether a full-time offer should be extended based on performance.

The scheduling components can be used to better forecast labor requirements and reduce overtime expenditures. The time-and-attendance systems can avoid costly third-party systems.

**Benefit Rating:** Moderate

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Catalyst International; CyberShift; HighJump Software; Infor (Workbrain); Kronos; Manhattan Associates; RedPrairie; SAP
Real-Time Factory Scheduling

Analysis By: Dwight Klappich

Definition: Production scheduling applications have traditionally been batch-centric — that is, planning data is input daily, schedules are created in batch-planning cycles overnight and changes between planning cycles are handled manually. Next-generation production-scheduling applications will be more closely integrated with "shop-floor" applications that pull real-time data off production devices and will become real-time solutions where the scheduling process is driven by the real-time capture of production data. Schedules will change dynamically as real-time information and scheduling rules permit.

Position and Adoption Speed Justification: Batch production scheduling is a mature market and now off the Hype Cycle. Real-time production scheduling is a natural evolution and less-mature market that links real-time production status information from shop-floor control and data historians with the real-time production scheduling application. Although batch-scheduling applications were traditionally independent of shop-floor control, real-time production scheduling must be more tightly integrated.

User Advice: Enterprises in dynamic manufacturing environments, where conditions change rapidly and unpredictably, should consider real-time production scheduling.

Business Impact: Real-time factory scheduling technology helps plant performance by increasing throughput, reducing costs and improving schedule performance. Additionally, by leveraging real-time factory-scheduling technologies, enterprises can support better capable-to-promise strategies and improve customer service with improved promise date compliance.

Benefit Rating: Moderate

Market Penetration: Five percent to 20% of target audience

Maturity: Emerging

Sample Vendors: Aspen Technology; i2

Strategic Network Design

Analysis By: Dwight Klappich

Definition: Strategic network design tools are typically stand-alone applications deployed on premise or via external consulting services to help organizations analyze and design their distribution, transportation and manufacturing networks. These solutions use sophisticated mathematical solvers to optimize designs around network costs, given specified constraints. Historically, consultants primarily used these tools to help companies realign their networks. In addition, the tools were periodically used (every three to five years) to help make strategic supply chain design decisions. Today, however, many companies run these tools more frequently using strategic network design to facilitate making tactical decisions, such as how best to address seasonal builds, how or if to realign your network based on seasonal supply/demand fluctuations, and to evaluate the network impact of a new large customer/market.

Position and Adoption Speed Justification: Strategic network design tools have been in the market for many years. They’re extensively used by a limited number of sophisticated enterprises with more-complex, multigeographical supply chains. With the increase in globalization and supply chain complexity, more organizations want to use these tools to help optimize their supply chain costs. Additionally, as strategic network design becomes more tactical, the need for solver capabilities that can drive a higher level of granularity across global networks will become more
important, as will the need to link strategic network design applications with inventory strategy optimization tools so the supply chain design and the operationalization of specific inventory targets can be modeled explicitly.

**User Advice:** As the complexity of a company's supply chain increases, or as supply chain costs become a greater "pain point," the company should investigate strategic network design tools to help identify more cost-effective supply chain models to deploy. These tools are available from specialized vendors, as well as some best-of-breed, broad-line SCP vendors.

**Business Impact:** These applications enable companies to identify significant cost reductions in their networks through redesign, consolidation and optimization.

**Benefit Rating:** High

**Market Penetration:** Five percent to 20% of target audience

**Maturity:** Mature mainstream

**Sample Vendors:** i2 Technologies; Insight; LogicTools; OM Partners; Oracle

### E-Sourcing

**Analysis By:** Debbie Wilson

**Definition:** E-sourcing applications provide a management environment for the construction, publication and life cycle management of requests for information, requests for proposals and requests for quotations (RFx documents). These tools enable buyers to systematically and expeditiously solicit tenders by electronically publishing an RFx to prospective suppliers, capturing the corresponding proposals in a structured manner, providing a means for the buyer to compare the resulting proposals and documenting the final award decision. Some e-sourcing applications feature optimization engines so that buyers can effectively process and leverage large numbers of bids. Additionally, many support reverse auctions and/or electronic sealed bids. E-sourcing vendors often provide services alongside their tools to help their customers train their suppliers, construct effective bid packages and assess market opportunities.

**Position and Adoption Speed Justification:** E-sourcing emerged in 1998, at the beginning of the business-to-business e-business bubble, and it has since earned the role as a leading survivor from that era because the tool reliably delivers significant returns on investment and generates value for the enterprise. E-sourcing is the preferred means for managing the RFx process — procurement teams that have deployed this type of application will not return to paper-based processes.

**User Advice:** Companies interested in transforming their procurement performance should first analyze their overall spending to identify opportunities and, second, invest in e-sourcing so that they can create the strategic supplier agreements needed to realize those savings opportunities.

The key success factor for implementing e-sourcing is changing existing processes to make the best use of the software capabilities. E-sourcing is most effective within enterprises that develop and leverage a standardized sourcing process across spending categories.

Procurement teams should adopt e-sourcing as the standard mechanism for managing the RFx process across all procurement spending that is capable of being tendered.

**Business Impact:** The business benefits of engaging with e-sourcing are high. Significant benefits accrue through the increased visibility, transparency and manageability of the tender process, combined with the ability to rapidly replicate best practices across the enterprise. The net result is that tenders take less time and deliver better-quality results.
**Supply Chain Planning**

*Analysis By:* Dwight Klappich; Tim Payne; Andrew White

**Definition:** SCP refers to applications that optimize the delivery of goods and services, balancing supply and demand. An SCP suite sits on top of a transaction system to provide planning and real-time analysis of "what if" scenarios. The core features of SCP — basic forecasting and demand planning, replenishment/inventory/supply planning, and manufacturing planning and scheduling, without support for industry specialization or innovation — are widely available.

**Position and Adoption Speed Justification:** SCP is emerging from several years of depression. Products are now more scalable and can do more. In addition, vendors' promises have become more realistic. Improved implementation frameworks ensure a higher likelihood of success and a greater return on investment than previously.

**User Advice:** When supply chains are an asset to be exploited, or a source of cost savings or differentiation, use SCP technology to help manage decision making. It's widely available from ERP suite vendors, as well as from stand-alone providers.

**Business Impact:** These applications enable enterprises to make better use of resources by coordinating supply and demand, and by using BAM to identify anomalies in demand/supply conditions.

**Benefit Rating:** High

**Market Penetration:** More than 50% of target audience

**Maturity:** Early mainstream

**Sample Vendors:** i2 Technologies; Infor; Intentia; JDA Software; Logility; Oracle; SAP

**Entering the Plateau**

**Transportation Routing and Scheduling**

*Analysis By:* Dwight Klappich

**Definition:** Transportation routing and scheduling software helps companies create truck/vehicle routes and schedules that meet delivery objectives at minimal cost and mileage. These can create a repeatable schedule, or routes can be determined dynamically based on the input (orders), rules and constraints for meeting an objective, such as minimizing miles or cost. Shippers directly (private fleet) or indirectly (contract fleet) control the assets to be scheduled.

**Position and Adoption Speed Justification:** Transportation routing and scheduling is a mature market, and solutions have been evolving for almost 20 years. Vendors offer proven and mature applications. The market has consolidated considerably during the past year, and only a few
vendors of traditional routing and scheduling remain. There are some changes under way as new entrants bring to market contemporary tools, and TMS vendors add more routing and scheduling functionality to their TMS solutions.

**User Advice:** Shippers that control the day-to-day operations directly or indirectly, and need planning tools to improve route and schedule creation, are prospects for these types of solutions.

**Business Impact:** These solutions create routes and schedules that minimize miles and costs. They meet delivery objectives by considering multiple constraints of the truck fleet, which, combined, help improve delivery performance and reduce delivery costs.

**Benefit Rating:** Moderate

**Market Penetration:** More than 50% of target audience

**Maturity:** Mature mainstream

**Sample Vendors:** Mobitrac; Ortec; Paragon Software Group; Quintiq; The Descartes Systems Group; UPS (Roadnet)
Appendices

Figure 3. Hype Cycle for Business-Centric Supply Chain Management, 2006
As of July 2006

Years to mainstream adoption:
- ○ less than 2 years
- ● 2 to 5 years
- ■ 5 to 10 years
- ▲ more than 10 years
- ○ before plateau

Source: Gartner (July 2005)
Hype Cycle Phases, Benefit Ratings and Maturity Levels

<table>
<thead>
<tr>
<th>Phase</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technology Trigger</strong></td>
<td>A breakthrough, public demonstration, product launch or other event generates significant press and industry interest.</td>
</tr>
<tr>
<td><strong>Peak of Inflated Expectations</strong></td>
<td>During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the technology is pushed to its limits. The only enterprises making money are conference organizers and magazine publishers.</td>
</tr>
<tr>
<td><strong>Trough of Disillusionment</strong></td>
<td>Because the technology does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.</td>
</tr>
<tr>
<td><strong>Slope of Enlightenment</strong></td>
<td>Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the technology's applicability, risks and benefits. Commercial, off-the-shelf methodologies and tools ease the development process.</td>
</tr>
<tr>
<td><strong>Plateau of Productivity</strong></td>
<td>The real-world benefits of the technology are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. Growing numbers of organizations feel comfortable with the reduced level of risk; the rapid growth phase of adoption begins. Approximately 20% of the technology's target audience has adopted or is adopting the technology as it enters the Plateau.</td>
</tr>
<tr>
<td><strong>Years to Mainstream Adoption</strong></td>
<td>The time required for the technology to reach the Plateau of Productivity.</td>
</tr>
</tbody>
</table>

Source: Gartner (October 2007)

<table>
<thead>
<tr>
<th>Benefit Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformational</td>
<td>Enables new ways of doing business across industries that will result in major shifts in industry dynamics</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td>Benefit Rating</td>
<td>Definition</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>Low</td>
<td>Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings</td>
</tr>
</tbody>
</table>

Source: Gartner (October 2007)

### Table 3. Maturity Levels

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Status</th>
<th>Products/Vendors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Embryonic</strong></td>
<td>In labs</td>
<td>None</td>
</tr>
<tr>
<td><strong>Emerging</strong></td>
<td>Commercialization by vendors Pilots and deployments by industry leaders</td>
<td>First generation High price Much customization</td>
</tr>
<tr>
<td><strong>Adolescent</strong></td>
<td>Maturing technology capabilities and process understanding Uptake beyond early adopters</td>
<td>Second generation Less customization</td>
</tr>
<tr>
<td><strong>Early mainstream</strong></td>
<td>Proven technology Vendors, technology and adoption rapidly evolving</td>
<td>Third generation More out of box Methodologies</td>
</tr>
<tr>
<td><strong>Mature mainstream</strong></td>
<td>Robust technology Not much evolution in vendors or technology</td>
<td>Several dominant vendors</td>
</tr>
<tr>
<td><strong>Legacy</strong></td>
<td>Not appropriate for new developments Cost of migration constrains replacement</td>
<td>Maintenance revenue focus</td>
</tr>
<tr>
<td><strong>Obsolete</strong></td>
<td>Rarely used</td>
<td>Used/resale market only</td>
</tr>
</tbody>
</table>

Source: Gartner (October 2007)

**RECOMMENDED READING**

"Understanding Gartner's Hype Cycles, 2007"

"The Gartner/Forbes Executive Survey"
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