"Today, in most supply chains, the efficiencies usually end at the edges of a company. Eliminating inefficiencies at enterprise boundaries and streamlining cross-company processes is the next frontier for reducing costs, increasing quality, and speeding operations."

—Michael Hammer

i2 Collaborative Supply Execution

Global outsourcing has left companies facing several challenges related to procurement, lead times, and material supply reliability. On the other hand, margin pressures require companies to react much quicker to demand. It is this unique dichotomy that has led companies to take a closer look at their sourcing strategies, procurement processes, supplier relationships, as well as their material management processes. Supply-related issues have once again become a key factor in companies' profitability in most major industry sectors.

Among the first challenges companies face include dealing with efficient procurement across multiple geographically distributed divisions with different IT systems—as well as a multi-tier global supply network with a host of different kinds of relationships. Outsourcing has also led to companies procuring more and more critical parts resulting in closer relationships with certain suppliers.

As companies look to expand their productivity by collaborating with suppliers at different levels, they are faced with the challenges of dealing with very diverse groups with significantly varied degrees of technology sophistication and disparate business processes.

Companies are also looking at lean replenishment processes such as vendor-managed inventory and just-in-time. A need has emerged for companies to use a single system to manage their supplier relationships—everything from sophisticated lean replenishment workflows to collaboration on forecasts, delivery schedules, orders, and inventory, to discrete purchase order workflows.

In addition to being able to collaboratively resolve supply-demand mismatches, companies need the ability to seamlessly manage the entire execution process. Key execution questions need to be answered during replenishment, including:

–What to buy?

–When and how much to order?

–What alternates are available as substitutes?

–Can the parts be sourced internally from other divisions?

–What shipment methods should be used?

Companies faced with such decisions must incorporate automated contract and price terms, have visibility into inventory across the end-to-end supply chain, and have access to up-to-date order and shipment statuses. Coordinating the procurement process across the enterprise reduces maverick spend and can enable the creation of accurate supplier scorecards.

In addition, supply planning, procurement, and collaboration can no longer work in system and functional silos if they are to achieve long-term value. It will become imperative to tie these systems together to enable true collaboration of demand, supply, and design data that together drive direct material procurement decisions.
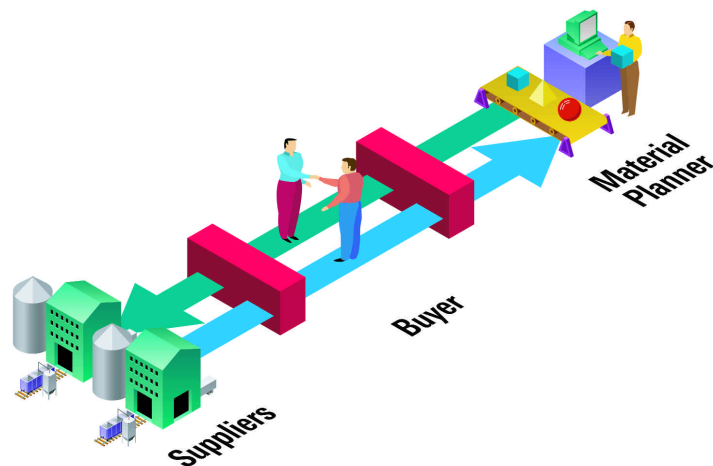
Solution Evolution

Each tier in a supply chain faces demand and supply uncertainty. First-generation supply chain solutions were primarily geared toward automating and optimizing business processes within the four walls of an enterprise. Soon, many industries realized that optimizing inventory within an enterprise does not necessarily lead to reduced costs. Often times, the burden of reduced inventory in a company is borne by other tiers within the supply chain. The goal should therefore be optimization of the entire supply chain. Collaboration among trading partners on various aspects of planning and execution processes becomes key to attain the optimum supply chain.

Supply collaboration in its earliest form was introduced in the 1980s by virtue of EDI (Electronic Data Interchanges) and VANs (Value-Added Networks). It wasn't until the 1990s that the first generation of supply collaboration was introduced. It leveraged the internet and provided point-to-point communication between trading partners. Supplier portals became popular in the late 90s and early 2000 with the ability to have downloads and supplier postings. Second-generation supply collab-oration solutions were introduced in 2000. These were web-based collaboration hubs with a vision for "n-tier" collaboration. Concepts of alert management were also introduced. As leading-edge companies started seeing

the benefits of collaboration, a more wide-spread adoption of supply collaboration practices pushed the capabilities of these solutions to its limit.

i2 was a pioneer in this space with its launch of its first-generation solutions. With more than 50 deployments in many major industries, i2 clearly established itself as a market leader. Today, i2 is once again at the frontier of the next-generation procurement, supply collaboration, and material management solutions that attempt to remove the limitations of previous solutions. The char-acteristics of these solutions include:

– Increased performance and scalability to handle much larger volumes
– Ability to support multiple replenishment modes so this system can provide a single interface for supplier interactions
– Synchronized material planning with procurement
– Rapid "what-if" capabilities and incremental planning for faster response to changes in demand and supply
– Exception- and resolution-driven workflows
– Configurable/extensible technology to keep up with evolving and changing business processes
– Service-oriented architecture for non-intrusive deployments
– Visual design environment for rapid and easy customization of workflows, business rules, user interface, data model, and integration interfaces, as well as events and exceptions
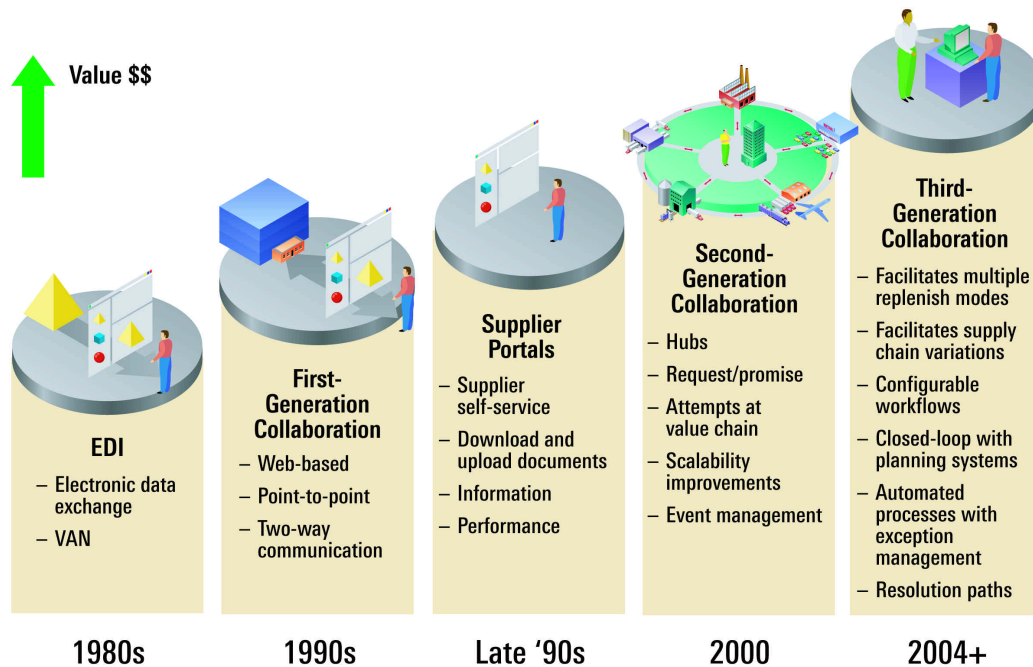
Value $$

EDI
– Electronic data exchange
– VAN

First-Generation Collaboration
– Web-based
– Point-to-point
– Two-way communication

Supplier Portals
– Supplier self-service
– Download and upload documents
– Information
– Performance

Second-Generation Collaboration
– Hubs
– Request/promise
– Attempts at value chain
– Scalability improvements
– Event management

Third-Generation Collaboration
– Facilitates multiple replenish modes
– Facilitates supply chain variations
– Configurable workflows
– Closed-loop with planning systems
– Automated processes with exception management
– Resolution paths

| 1980s | 1990s | Late '90s | 2000 | 2004+ |

A closer look at the i2 solution

Enabling companies to manage their supplier interactions in the same system, i2 Collaborative Supply Execution™ is a comprehensive footprint that allows companies to address three major business objectives:

–**i2 Consolidated Procurement**™ across multiple divisions, outsourced business, suppliers, and different material types (direct and MRO). It provides a single system of reference and can link to multiple back-end systems allowing local processing. The solution allows easier rescheduling, substitution, and transfer of inventory from other locations to meet exception conditions. It also can provide companies global visibility and tracking of all purchasing, as well as project-based purchasing.

–**i2 Supply Collaboration/Lean Replenishment**™ that allows companies to manage multiple replenishment modes, including lean supply strategies across their supplier base—regardless of size, relationship, or technological sophistication. The solution is designed to allow companies to enable mid-term (1–6 months) to long-term (6–24 months) collaboration of supply chain plans, primarily around forecast and capacity coordination to short-term (0-30 days) order execution, shipment, and inventory tracking. It allows companies to implement and automate lean supply processes such as vendor-managed inventory (VMI), pull-based (Kanban) replenishment, and other just-in-time (JIT) programs. The solution can enforce process discipline through business rules and allows visibility into complete purchase order life-cycle management.

–**i2 Collaborative Material Management**™ to help companies gain greater efficiency by synchronizing and automating the material planning and procurement processes and help them react much faster to changes in demand and supply through rapid "what-ifs" and "incremental planning." The solution is tied with supply planning solutions to automatically execute on recommended schedules, as well as EDC (expedite, de-expedite, cancel) recommendations, thereby removing latency, errors, and grief in synchronizing planning recommendations with actual execution.

Collaborative Supply Execution can help companies meet these three major objectives through a set of differentiated functional and technical capabilities.
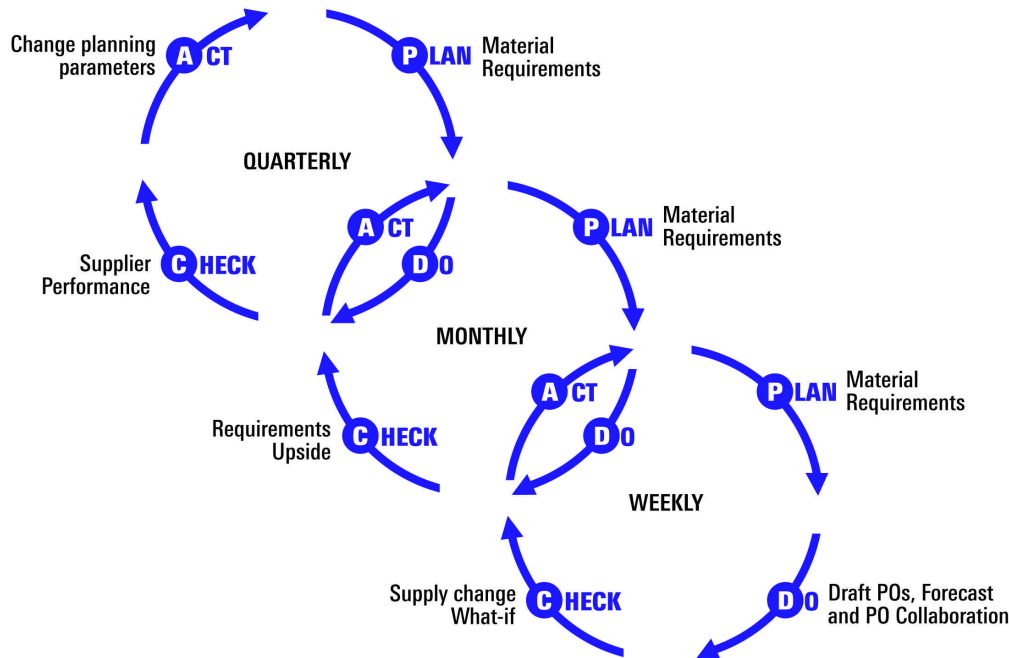
Figure 3: Procurement synchronized with supply planning

Leverage planning, distributed execution, collaboration, and event management
This solution closes the loop between planning and execution by leveraging rapid re-planning capabilities in advanced planning systems, enabling real-time collaboration with suppliers, providing tools to execute over the web, and monitoring events for proactive problem notification.

Packaged and customizable workflows
The solution comes packaged with a number of workflows (such as VMI, Kanban, Customer Scheduled Shipment), which can be easily customized, as well as new workflows can be deployed through a visual design studio.

Flexibility and extensibility
The solution is designed to evolve as business processes evolve. The solution is built on a very flexible and configurable technology platform that allows companies to re-configure their business processes as they go along using a visual design studio.

Multiple processes and replenishment modes
The solution is designed so that the underlying data model, business workflows, rules, user interface, and events can support multiple replenishment or supply strategies in the same system.

Ease of integration
The solution is architected for ease of integration with external and internal systems; the solution is through-and-through XML, supports web services, and leverages EAI and ETL capabilities.

Lower total cost of ownership
The solution is built on open standards (XML, WSDL) and has reduced risk of proprietary legacy support. It also has much less memory requirement compared to standard application servers. It has a unique way of separating customization code from the core code base, thereby easing software upgrades.

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Key features

Program setup
–Creation of multiple programs for different items, locations, and suppliers
–Setup of forecast policies, flex, and inventory policies
–Visibility of data, forecasts, and inventory at aggregate levels (suppliers, locations)
–Supplier allocation of forecasts based on fixed splits and auto-order creation

Forecast analysis and collaboration
–Mid- to long-term forecast collaboration and visibility
–Aggregate views across suppliers, items
–Flex liability and waterfall analysis
–Forecast/commit exception resolution

Order collaboration and execution
–Multiple order types
–Approval workflows
–Order aggregation
–Order change collaboration
–Delivery schedule collaboration
–Item/supplier substitution
–ASN, goods receipt, invoice processing (including bar code labeling of ASN and UOM conversion)
–Three-way matching
–Auto PO closures based on rules

Inventory visibility
–VMI enablement
–Dynamic min/max inventory alerts
–Part shortage/stockouts
–Time-phased inventory visibility
–Support for on-hand, pulls, in-transits, receipts

Event management
–Personalized dashboard
–Work list, watch list, notifications
–Event context and resolution workflows

Collaborative material management
–Gross forecast for VMI suppliers (VMI Program)
–Netted forecast for MRP suppliers (CSS Program)
–Procurement requisitions (PRs) grouped and converted to POs based on rules
–POs sent to supplier or available as drafts for the buyer to review
–Buyer can review planning reschedule suggestions and make modifications
–Drill-down to pegged demand to review reason for reschedule
–"What-if" analysis on supply events with plan-to-plan comparison

Key workflows enabled
–Program setup
–Forecast analysis and collaboration
–VMI enablement
–Kanban enablement
–Material requirement consolidation
–Purchase order management/brokering/aggregation
–Order/schedule/ASN collaboration
–Receipts, shipments, billing, matching
–Requisition and approval
–What-if analysis
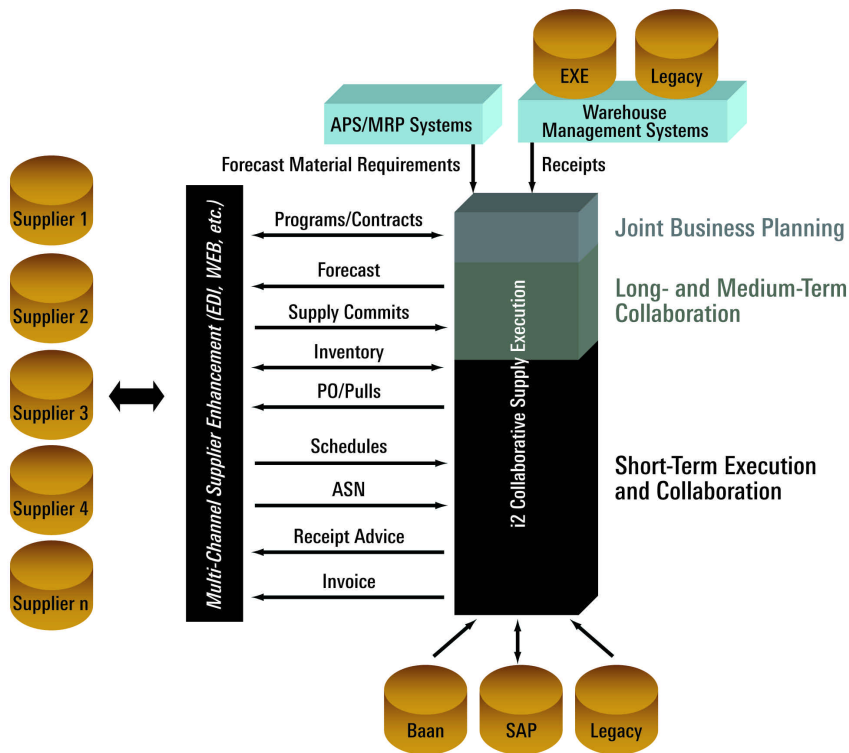–Automated expedite, de-dexpedite, cancel
–Supplier score-carding

Benefits

Key overall benefits that customers can achieve
with the deployment of Collaborative Supply Execution
can include:

–Potentially reduce response time to demand changes
  by more than 50%
–Potential 50%–75% reduction in time spent by
  procurement personnel
–Potentially reduce inventory (raw, WIP, FG) by 10–15%
–Potentially reduce logistics expense by 3–4%
–Increase visibility of supply, demand, and inventory,
  as well as status of orders and shipments
–Coordinate with multiple tiers of trading partners
–Rapidly resolve problems before they become
  customer issues
–Reduce supplier stockouts and excess supplier inventory

Depending on the business objective for which the
solution is deployed, the benefits and value will vary.
Following are some examples.

Consolidated procurement
–Reduced purchasing costs due to:
  –Rationalized supplier base and consolidated number
    of unique parts
  –Better price leverage through volumes and
    spend analysis
  –Reduced expedited freight
  –Compliance — use preferred parts and suppliers
–Reduced inventory
  –Reduced material shortages
  –Lower safety stocks
  –Increased re-use of existing inventory
    in other locations

i2 Supply Collaboration/Lean Replenishment
–Reduced purchasing costs due to:
  –Reduced grief resolution costs and expedited freight
  –Reduced stock-outs
  –Reduced order processing errors
  –Better supplier negotiation through supplier
    performance score-carding

Figure 5
The value proposition
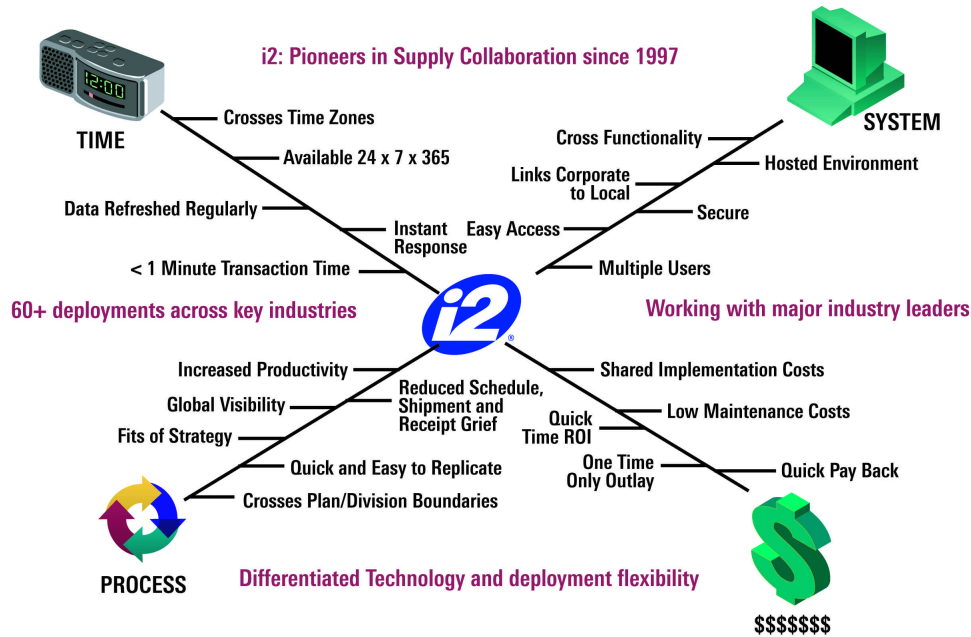
—Improved productivity

—Single view of all procurements

—Automated processing of large portions of the
workflow through business rules

—Exception-driven workflows

i2 Collaborative Material Management

—Reduced purchasing costs due to:

—Proactive visibility into supply changes on demand
and vice versa

—Reduced inventory due to lower safety stocks
and capacity

—Improved productivity

—Automated processing of material requirement plans
to purchase orders and requisitions depending on
business rules

—Exception handling of expedites, de-expedite,
and cancels

Summary

Based on learnings from more than 50 deployments
across major industry segments, i2 Collaborative
Supply Execution is designed to be a comprehensive
material flow management, procurement, and supplier
collaboration suite that can allow companies to interact
with their suppliers and manage different kinds of
relationships and replenishment strategies.

It also can allow companies to break down the barriers
between material planning and procurement with
proactive visibility into exceptions and "what-if"
analysis and resolution workflows to react to changes
in supply.

For more information on i2 Collaborative Supply
Execution and other i2 solutions, visit www.i2.com.

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