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Case Study

***Fairchild Semiconductor
Centralizes Supply Chain
Management Planning***

Designing and Deploying
the Network-Centric Capabilities for
Operational Excellence

*By Geoffrey E. Bock
February 2003*

Prepared for IBM Corporation

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EXECUTIVE SUMMARY

Fairchild Semiconductor, a leading global player in the multi-market semiconductor industry, is focusing on streamlining its supply chain planning and production processes. Its competitive success in a fast-changing market depends on accurately forecasting customer demand as well as on achieving economies of scale in product innovation, cost-effective manufacturing, and superior customer service. In 1999, senior executives determined that the company could no longer operate successfully using its then manual, product-centric, supply chain planning processes. Rather, the company needed to take an enterprise-wide view of its strategic manufacturing and sales activities and build an integrated supply chain management system.

Fairchild has worked with IBM and with i2, an IBM strategic alliance partner, to develop and deploy a comprehensive solution for supply chain management. Fairchild has designed, integrated, and implemented three application modules for demand planning, master planning, and demand fulfillment.

Fairchild turned to IBM Global Services' Business Consulting Services for systems integration services and consulting expertise in advanced supply chain management. IBM Global Services' Business Consulting Services provided the business consulting services and operational expertise to ensure the successful design and implementation of the i2-based solutions. IBM Global Services' Business Consulting Services facilitated key business requirement definitions and systems design activities and worked in tandem with i2 to ensure the successful design and deployment of the enterprise-wide initiative. IBM Global Services' Business Consulting Services, Fairchild and a process reengineering firm formed a project team to document the "as is" conditions for supply chain planning and to design the "to be" processes. IBM Global Services' Business Consulting Services provided business analysis expertise when evaluating alternative technical design implementations to ensure optimum design-related decision making.

Following a 22-month development project and a phased implementation cycle, Fairchild went live with all three applications in July, 2002, in one of its three primary product groups. Fairchild is now in the midst of rolling out the implementation and the business process transformation of operational activities within its remaining product groups. When it began the project, Fairchild estimated that it would save more than \$64 million over five years, based on an investment of roughly \$30 million. The company is on track to achieve its return on investment according to plan. Equally important, it is able to substantially improve its ability to respond to customer demand and compete effectively in its global marketplace.

BUSINESS CONTEXT: COMPETING IN A DYNAMIC INDUSTRY

A Global Company

Fairchild Semiconductor is a leading global player in the multi-market semiconductor industry. It designs, manufactures, and markets high-performance semiconductors that are used in consumer, communications, computer, industrial, and automotive applications. Fairchild manufactures analog and mixed signal, discrete, interface and logic, optoelectronics and non-volatile memory products. In 2001, it reported sales of \$1.4 billion and had 10,000 employees worldwide.

Headquartered in South Portland, Maine, Fairchild maintains design centers, semiconductor fabrication facilities (or fabs), and assembly and test plants in nine locations throughout the United States and the Asia-Pacific region. Fairchild also maintains five customer service centers to support these manufacturing activities, as well as 36 direct sales offices in 17 countries to sell its products.

These world-wide operations require a global supply chain. It is not unusual for a semiconductor device to be designed in San Jose, California, fabricated in Salt Lake City, Utah, assembled and tested in Penang, Malaysia, and then shipped to warehouses in Japan, only to be embedded in goods destined for the European market.

An Industry Pioneer Reborn

Originally founded in October, 1957, Fairchild was one of the pioneering firms of the semiconductor revolution. It produced the first generation of integrated circuits and many of the then nascent industry's original manufacturing processes. Despite its considerable successes as an innovative firm, the company faced a business downturn

in the late 1970s and, in 1979, was acquired by Schlumberger Limited, a diversified global oilfield services and electronics company, who then sold it to National Semiconductor in 1987.

Ten years later, in 1997, Fairchild was reborn as an independent company to a management-led investor group in a deal valued at about \$473 million. Headed by Kirk Pond, an experienced executive as president and CEO, the new management team decided it could build a profitable business by defining a new business model for multi-market products and by focusing on operating margins and streamlining its supply chain planning and production processes.

Fairchild has prospered in the multi-market semiconductor marketplace by introducing new devices that meet customer demand, by gaining market share at the expense of its competitors, and by making strategic acquisitions of various production facilities to fill in holes in its product line.

Business Environment

Semiconductor manufacturing, however, remains a capital intensive business characterized by boom-and-bust product cycles. Customers have the upper hand when supply is plentiful. If one producer cannot meet a customer's requirement for particular devices on specific delivery dates, buyers can shop around and find alternative suppliers who can.

The devices themselves are often designed for specific purposes. There can be a significant time lag—ranging from 13 to 52 weeks or more—between beginning a production run for a device and having the finished goods

available for delivery.¹ Anticipating customer demand is a key competitive factor.

If Fairchild can correctly predict business and technology trends, and has the right devices in volume production when customers need them, the company can reap handsome profits. But, if it misses its forecasts or does not foresee downturns in customer demand for particular products, the company both loses the revenue opportunity and is left with the expense of excess inventory.

Competitive Issues

Beyond forecasting customer demand, Fairchild's success depends upon achieving economies of scale in three areas:

- Product innovation
- Cost effective manufacturing
- Superior customer service

The company faces a number of significant business challenges as it seeks to gain at least a 10 percent market share in the projected \$56 billion target market segments where it competes.

- Semiconductor devices continue to increase exponentially in complexity, following both Moore's Law² as well as packaging innovations. Fairchild continually needs to optimize its existing manufacturing processes and make strategic investments in new ones.

¹ Manufacturing semiconductor devices involves a three step process: fabricate, sort, and assemble. Devices begin as integrated circuits that are etched on silicon wafers; often 1,000,000 to 2,000,000 individual circuits are fabricated during a single production run. Each wafer is then run through a sorting and testing process where any defective circuits are identified and tagged. Finally, during the assembly phase, the individual circuits are cut from the wafers, conductors are attached to the circuits, and the entire assembly is encased in plastic packaging to create a finished device.

² Gordon E. Moore, who began his career at Fairchild and is now Chairman Emeritus at Intel Corporation, first observed the "doubling of transistor density on a manufactured die every year" in 1965. This insight has now become known as Moore's law.

- Customers are shifting their own manufacturing activities from in-house production facilities to outsourced contractors. Fairchild needs to track many more factors in order to develop accurate forecasts of customer demand and prospective orders.
- Competitors are continuing to improve their own customer service and product innovation capabilities. Fairchild must continually enhance its internal business operations in order to remain competitive.

As a result, Fairchild is focusing on manufacturing agility and supply chain planning as the keys to sustained profitability and growth.

IBM GLOBAL SERVICES SOLUTIONS

SOLUTION: IBM Global Services' Business Consulting Services worked closely with i2, an IBM strategic alliance partner, to design, deploy, and implement an enterprise-wide supply chain management environment at Fairchild Semiconductor.

SOFTWARE: Demand Forecasting, Master Planning, and Demand Fulfillment modules from i2.

BUSINESS BENEFITS: Fairchild is able to differentiate itself in a highly competitive market by establishing better service levels for its customers. It has put into operation an advanced planning system to enhance its ability to match supply and demand and to capture a complete view of supply and plant capacity. Working with i2 and IBM Global Services' Business Consulting Services, Fairchild has developed a strategy for implementing a solution that provides a quick ROI and streamlines business processes across all of the company's product lines, beginning first with its Interface & Logic product line.

Centralizing Supply Chain Planning

When it relaunched itself as an independent company, Fairchild operated largely with manual planning processes. Each product group managed its own product planning and production activities—tracking customer orders, forecasting demand, and scheduling manufacturing runs in particular fabs or assembly and test facilities. The interface and logic product line, for example, had little visibility into what the analog and mixed signal product line was planning. When the necessary products were not in stock to meet customer demands, manual reallocation of inventory was necessary to fulfill committed orders.

The problem revolved around supply chain planning. Fairchild had difficulty linking its marketing and regional planning activities, which developed estimates of customer orders, with the business unit planning activities, which created the manufacturing capacity and revenue plans, and the factory planning activities that determined production schedules. Sales groups, in turn, relied on separate demand fulfillment systems to track product delivery schedules and inventories, and determine when they could promise product deliveries to meet customers' orders. Moreover, all product lines—including analog and mixed signal products, discrete products, and interface and logic products—utilized the same manufacturing capacity and competed within the company for limited production resources. Not surprisingly, planning organizations within each product group had separate islands of information that they manually managed.

From an operational perspective, the monthly planning cycle generated outdated information, and that led to difficulties meeting customer demands. Product groups frequently had 4 to 6 weeks of finished goods in inventory, the result of poor forecasting and the need to maintain reserves to cover spikes in orders. Revising a manufacturing plan required an additional 10 to 14 days and was usually out-of-date by the time it was completed. Best in-class semiconductor manufacturers, by comparison, reduced their forecasting frequency to a day or less, ensuring that they always had accurate information about both inventory and future production schedules on hand in order to meet customer requests.

THE e-business INITIATIVE: FAIRCHILD'S ADVANCED PLANNING SOLUTION

Launching a Strategic Initiative

By the late 1990s, within two years of its reemergence as an independent firm and with the growth of the Internet for cost-effectively communicating business information around the world, Fairchild executives decided to centralize the company's supply chain planning processes by developing an Advanced Planning Solution (APS). Fairchild needed to evolve from its outdated and legacy (and largely stovepiped) forecasting activities to an enterprise-wide solution which rapidly provided accurate

information about customer orders, product availability, and customer demand. Fairchild's most progressive customers—such as Dell, Nortel, and IBM—were already driving towards an end-to-end, fully integrated supply chain model. To remain competitive, Fairchild needed to reengineer its core business processes by combining advanced information technologies with innovative supply chain management techniques.

The APS project would implement world class supply chain management (SCM) practices for all Fairchild plants and divisions. It would include demand forecasting and response, supply and demand matching, strategic capacity planning, factory loading, allocation management, inventory transfers, regional/customer warehouse management, and order promising. Equally significant, the APS project would not introduce new data sources. Rather it would utilize the data captured by Fairchild's enterprise-wide implementation of PeopleSoft, its existing ERP system. Illustration 1 shows overall timeline for the project.

If Fairchild can correctly predict business and technology trends, and has the right devices in volume production when customers need them, the company can reap handsome profits.

Organizing the APS Project by Separating Implementation from Business Process Redesign

In September, 1999, Fairchild executives chartered a cross-functional business team to develop and implement a centralized supply chain planning solution for the company. Headed by Daniel Janson, then director of purchasing and reporting to the vice president of supply chain, the team was composed of over 60 Fairchild employees from sales, marketing, manufacturing, and engineering, who were familiar with all aspects of the company's internal operations.

At the same time, Fairchild executives made a second strategic decision—to separate the implementation and application development activities from the business process redesign efforts. Fairchild would rely on an enterprise solutions vendor, i2, to provide the enabling technical applications for centralized supply chain management. In addition, Fairchild contracted with IBM Global Services' Business Consulting Services to provide the business consulting and operational expertise to ensure the successful design and implementation of the i2-based solutions.

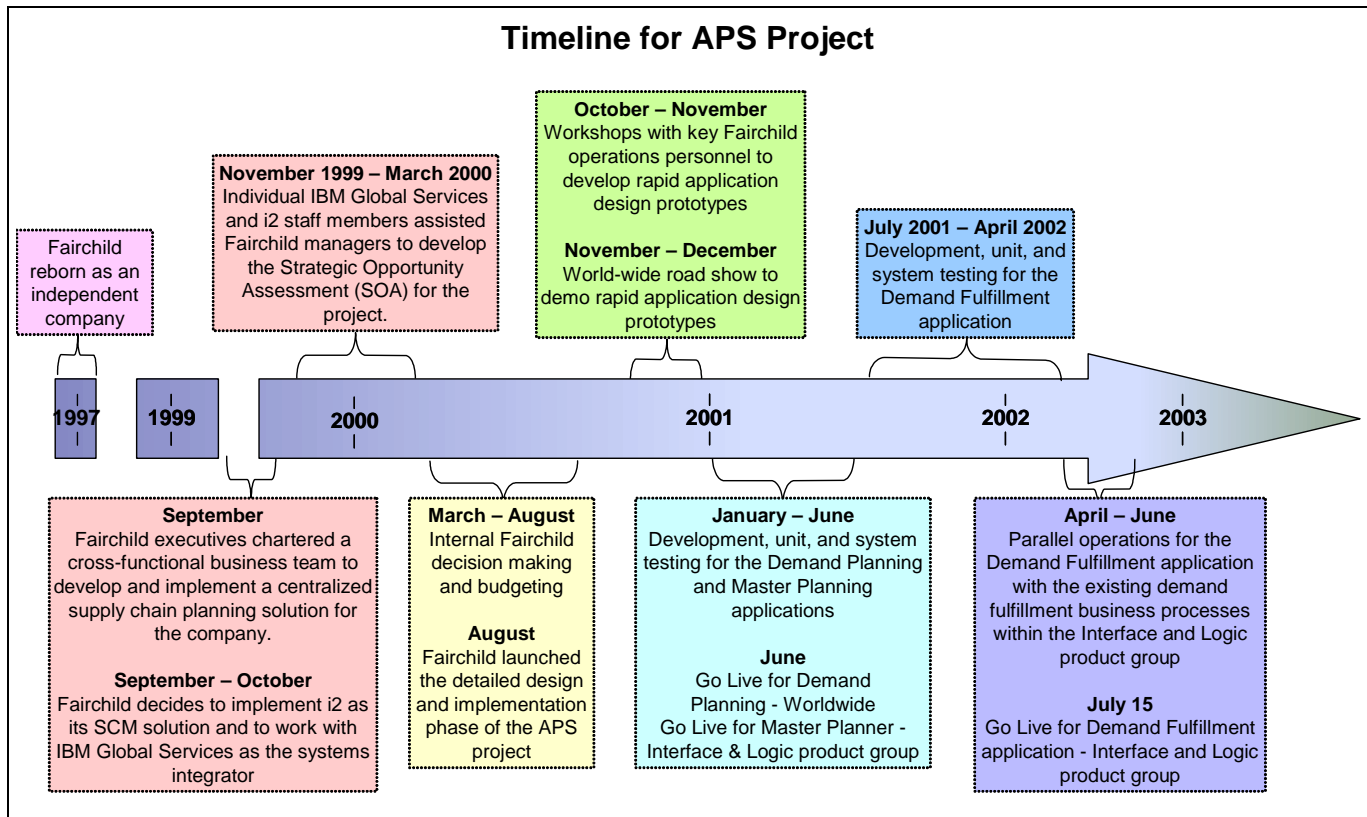


Illustration 1. The APS Project at Fairchild was a multi-year, enterprise-wide effort tied to the strategic objectives of the enterprise. Fairchild executives launched the supply chain planning initiative in September, 1999. Demand Fulfillment, the third and final i2 supply chain planning application, went live in a production environment over two years later, in July, 2002.

IBM, in turn, had already formed a corporate strategic alliance partnership with i2 for SCM solutions and services. Thus, IBM Global Services' Business Consulting Services, as a systems integration organization, had already invested in trained staff members who could successfully advise and lead i2 deployments.

Adopting i2 as an Enterprise Solution

Fairchild was looking for a single solution that would address all of its supply chain planning requirements. After some deliberation, it decided to adopt i2 as the technology provider for its SCM application environment. This decision was based in large part on this vendor's reputation in the semiconductor manufacturing industry and the fact that buying an existing enterprise application would be more cost-effective than sponsoring an internal development project.

The i2 solution met Fairchild's systems requirements. Moreover, it was the SCM leader in the semiconductor industry—many of Fairchild's competitors and customers were in the midst of deploying i2-based solutions.

Fairchild believed that it could leverage i2's significant research and development investments to tailor a comprehensive, yet customized, SCM solution. In addition, i2 had the technical staff and implementation expertise to adapt its individual application modules to meet the needs of Fairchild's global business operations.

Forging a Relationship with IBM Global Services' Business Consulting Services

Fairchild executives also realized that the company did not have the in-house skills and experience needed to transform its entire supply chain. The scale and scope of the APS project was larger and far more complex than any other reengineering initiative they had attempted.

While Fairchild managers had a detailed understanding of business requirements, they sought the advice and guidance of an independent organization with the knowledge, know-how, and methodologies for implementing supply chain management projects within the semiconductor industry.

For its part, IBM Global Services' Business Consulting Services began building executive-level relationships with Fairchild senior managers in the late 1990s, well in advance of any specific initiative. Rob Blackburn, IBM Business Consulting Services Electronics Industry Executive, emphasized IBM's core competency in industry business consulting, supply chain management, IBM's strategic relationship with i2, as well as IBM's proven methodologies for gathering systems requirements, developing implementation plans, and adding business-driven insights to technology-based operational decisions.

When Fairchild launched the APS project, Rob Blackburn and Christophe Begue, a principal in the IBM Global Services' Business Consulting Services supply chain management practice area, were well positioned to negotiate the services engagement with little direct competition. IBM Global Services' Business Consulting Services and i2 agreed to work together at Fairchild to deliver a comprehensive SCM solution that would transform their customer's business operations.

IBM Global Services' Business Consulting Services also stressed its capabilities to implement a solution without necessarily favoring IBM-developed hardware or software platforms. Its strategic partnership with i2 was thus the key aspect of this enterprise engagement.

RESULTS: CHARTING AN ENTERPRISE-WIDE REENGINEERING EFFORT

Creating the Strategic Opportunity Assessment

The first objective for the APS project was to develop an action plan that identified (and quantified) the various business benefits. Between November, 1999 and March, 2000, individual IBM Global Services' Business Consulting Services and i2 staff members assisted Janson (who had transitioned into a corporate leadership posi-

tion as Director of Business Systems) and members of his team to develop the Strategic Opportunity Assessment (SOA) for the project. This group documented the company's current supply chain planning processes, identified opportunities for improvement, and proposed specific recommendations for achieving a future state for business operations.

APS would encompass four application modules—demand planning, master planning, demand fulfillment, and factory planning—as shown in Illustration 2.

DEMAND PLANNING. The Demand Planning application assembles forecasts from world-wide market sectors. It tracks overlapping estimates and conflicts from multiple sources, such as estimated purchases from several contract manufacturers bidding on the same job from a computer hardware vendor. Based on complex analyses of customer orders, customer forecasts for forthcoming orders, and market trends, the Demand Planning application creates statistical models of future product demand over various future time periods.

MASTER PLANNING. The Master Planning application seeks to match supply and demand by optimizing product production cycles in light of forecasts, manufacturing capabilities, inventory available on hand, and scheduled delivery dates. It uses the results of the Demand Planning forecasts as inputs for its planning activities. The Master Planning application thus provides the data that determines the production of goods through specific manufacturing plants. It also provides the data about product delivery schedules and availability required for managing demand fulfillment.

DEMAND FULFILLMENT. The Demand Fulfillment application maintains accurate and up-to-date data about product inventory on hand, work in progress, and the available capability to produce product within manufacturing. It matches the available and the projected inventory to customer orders, based on specific business rules. For instance, a premier customer may receive a shipment of products that are in short supply, while an occasional customer making a spot purchase may receive an immediate sales confirmation only when particular products are in inventory and available to promise. The Demand

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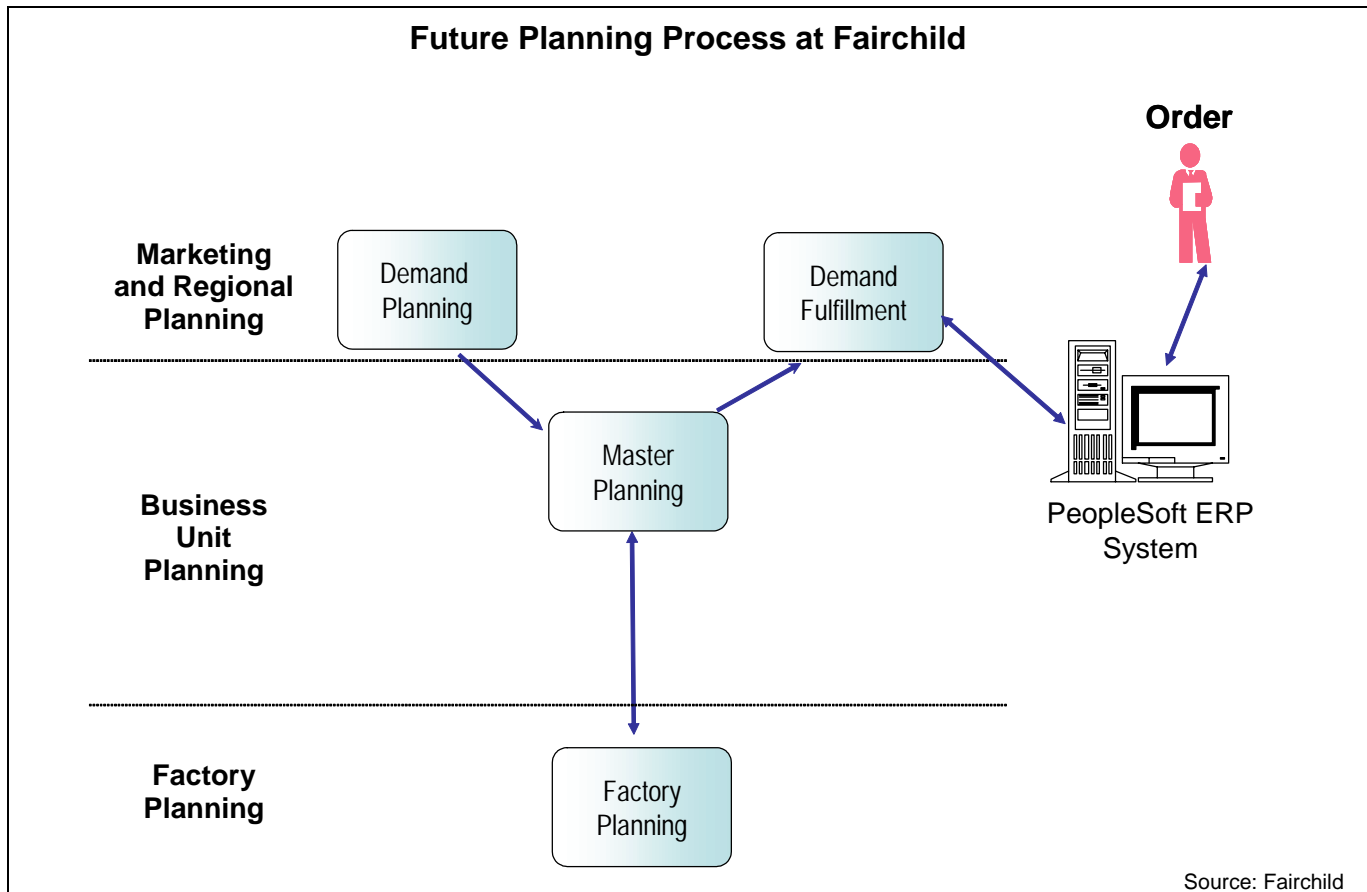


Illustration 2. Fairchild envisioned an overall “future planning” SCM process which was the foundation for its i2 implementation, utilizing specific application packages.

Fulfillment application is designed to track all products through the supply chain and provides the ability to produce accurate sales quotes and delivery dates.

FACTORY PLANNING. The Factory Planning application identifies the manufacturing activities in individual plants by matching the required product production levels determined by the Master Planning application with the capabilities of various facilities. The Factory Planning application determines the outputs by optimizing product production across the enterprise.

The end result of the APS would be Fairchild’s improved ability to have just the right inventory on hand to fulfill customers’ orders and meet their desired delivery dates. Fairchild would have the visibility into (and accurate information about) its product forecasting, planning, and production activities. Fairchild would be able to track

customers’ commitments weeks or months in advance of when they actually received particular shipments.

Financially, APS would lead to a number of direct business benefits. Fairchild would increase its operating margin, reduce its inventory carrying costs, reduce inventory obsolescence, and improve the throughput of its factories. It would also reduce outsourcing expenses and reduce purchasing costs.

When they made their final report to senior executives in March, 2000, the SOA team estimated that Fairchild would save \$64.2 million over five years by investing in the APS project. This payback provided the necessary financial justification to fund the SCM initiative of roughly \$30 million. The team estimated that the APS project itself would require a 16 to 22 month implementation effort.

Guiding the APS Implementation

Following several months of internal decision making, Fairchild launched the detailed design and implementation phase of the APS project in August, 2000. "From a responsibility perspective," Begue commented, "the definition of the design and the development of business processes fell to IBM Global Services. i2 had integration responsibility and a QA [quality assurance] role on the technical side." Fairchild functioned as both the customer and the prime contractor. It directly managed the overall implementation and roll out.

The APS project team decided on a phased approach to development and deployment. It would first focus on the Demand Planning and Master Planning applications. Once these were operational and producing the master planning data, the project team would turn its attention to the Demand Fulfillment and Factory Planning applications.

IBM Global Services' Business Consulting Services provided the guidance for implementing APS. "IBM Global Services had a great suite of [project management] templates which we used to define the business requirements, the system design, the user acceptance testing, as well as the super-user and end-user training," Janson noted. "A large part of what we did was help people understand what they wanted" in order to run their aspect of the business. IBM Global Services had the business expertise for a mission-critical implementation and could offer an extra set of eyes and an additional perspective for all decisions.

This business perspective proved invaluable. Janson continued, "For instance, when designing the Master Planning application, we needed to identify a 'frozen zone' when the number of items in production would not change. From a technical perspective, i2 could implement this functionality in five different ways. IBM Global Services staff worked through the alternatives and identified the one with the best business case."

Developing Enterprise Applications

IBM Global Services' Business Consulting Services provided key resources and template-driven process expertise for the overall systems design and implementation

activities. Fairchild coordinated and managed the overall project and relied on IBM Global Services' Business Consulting Services for its systems implementation methodologies and documentation templates.

Fairchild staff members, IBM Global Services' Business Consulting Services consultants, and subject matter experts from OPD Consultants (a small firm specializing in process reengineering within the semiconductor manufacturing industry) first documented the "as-is" operating conditions for demand forecasting and master planning. Once they were able to accurately describe the current processes, this group went on to create the "to-be" designs for the reengineered business processes within Fairchild and then specified how the individual SCM applications would function.

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In October and November, 2000, IBM Global Services' Business Consulting Services consultants helped to facilitate a series of workshops with key operations personnel from various Fairchild planning organizations around the world. Eight to ten planners in each workshop documented their current business processes as well as the forecasting and planning data they were collect-

ing and using. APS team members used the information from these workshops to create working prototypes of the demand forecasting and master planning applications.

IBM Global Services' Business Consulting Services participated in a world-wide road show, coordinated by Fairchild, in December, 2000. Team members traveled to 14 different Fairchild facilities to demo the prototypes and to get feedback about the proposed solutions. They incorporated the feedback into the revised application designs. As a result, forecasters and planners from all of Fairchild's world-wide operations could get an initial view of the new system and could identify missing steps in the business processes.

Launching APS Applications

Following the road show, the APS team proceeded to develop, test, and deploy the individual enterprise applications. The Demand Planning went live in June, 2001, across the entire corporation. This same month, the Master Planning application went live within the interface and logic product line. (It was rolled out to the other two

Demand Planning Application in Operation

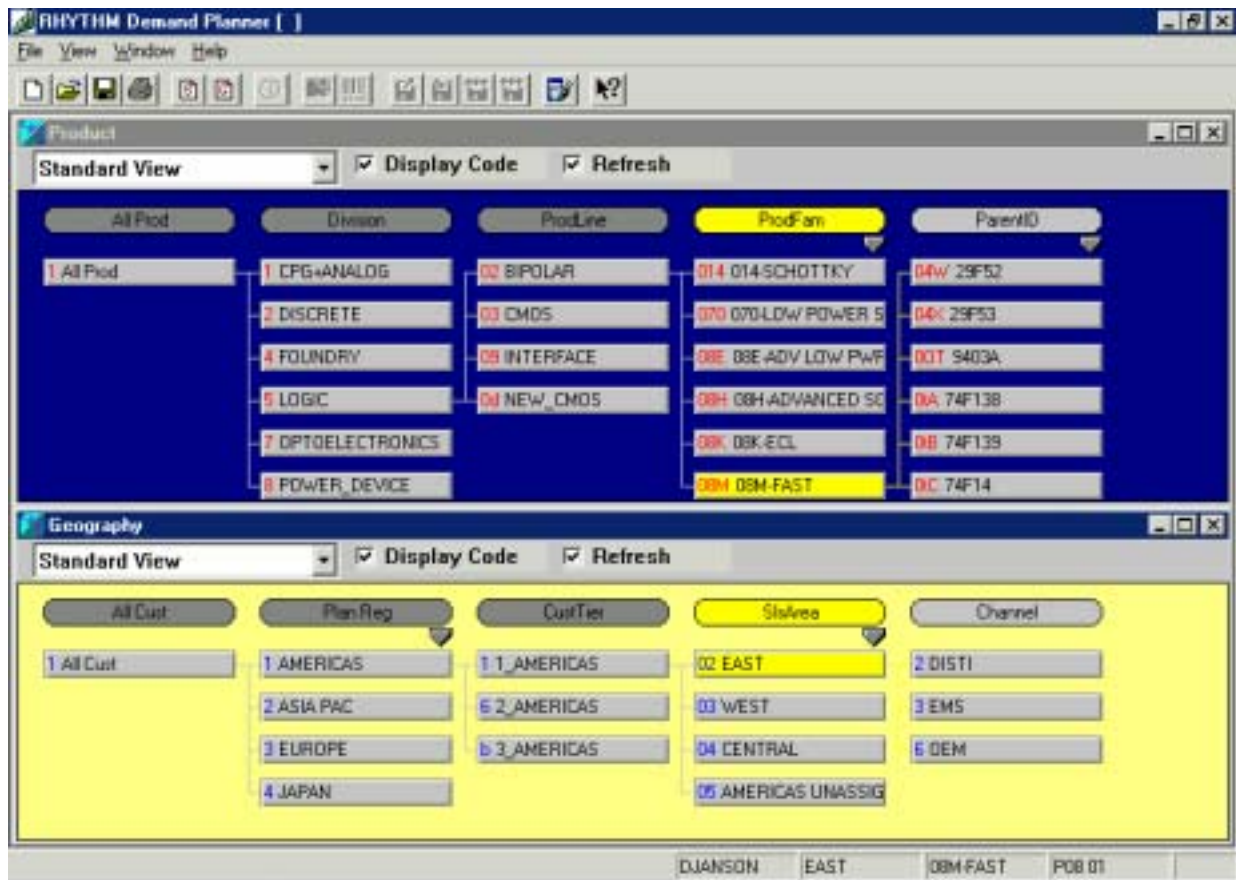


Illustration 3. The Demand Planning application in operation presents a planner with access to all critical variables for entering planning-related information and for making decisions. Underlying this application is a robust and comprehensive Advanced Data Warehouse.

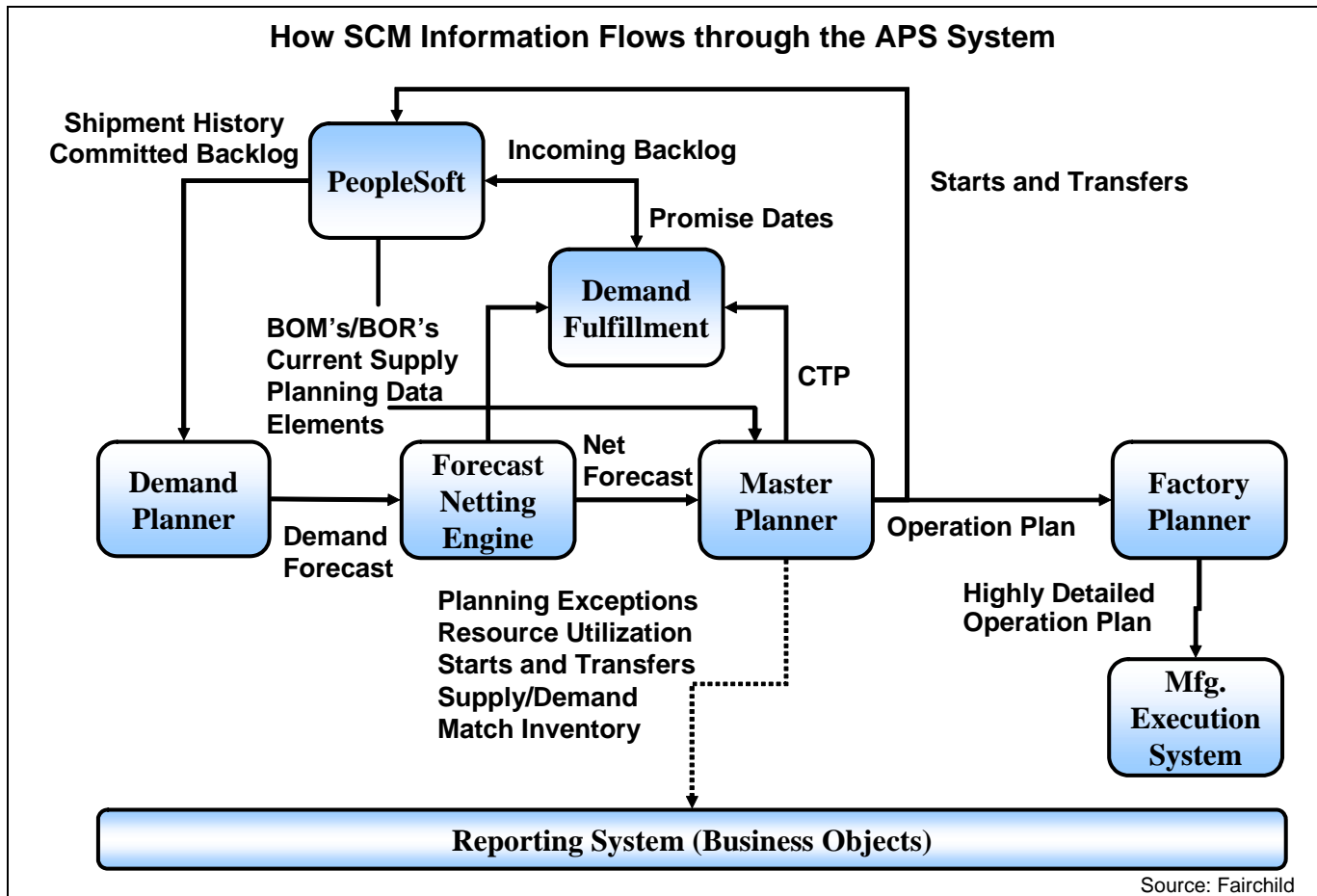
product lines over the next twelve months and is now running across the corporation.) These applications provided the baseline forecasting and planning data which were critical to the next stage of the reengineering effort. Illustration 3 shows a screen shot of the Demand Planning application in operation.

The Demand Fulfillment application promises to have the greatest impact on the end-to-end business processes. It relies on the accurate analysis and results produced by the Master Planning application. Thus the Demand Fulfillment application manages the fulfillment of customers' orders based on their prior forecasts, their specific requests for products, their expected level of service

from Fairchild, and a variety of other business-related factors.

In effect, Demand Fulfillment is the customer-facing, order promising, and allocation management tracking engine which Fairchild uses to manage its business. It functions in parallel with the PeopleSoft ERP system, which continues to provide order management and order tracking functionality.

Deploying the Demand Fulfillment application changes the entire business operations of the company's sales process. As a result, the APS team ran the i2-based Demand Fulfillment application in parallel with its existing demand fulfillment operations for three months, between



Source: Fairchild

Illustration 4. Data provided by the PeopleSoft ERP system drives all SCM applications.

April and June, 2002, to ensure that the new application was working correctly. On July 15, 2002, Fairchild went live with the Demand Fulfillment application and, thus, has completely automated its enterprise-wide SCM activities.

Illustration 4 identifies the overall flow of forecasting, planning, and fulfillment information throughout the operational processes. The APS team is now in the process of linking the Master Planning data to existing Factory Planning applications as well as developing an overall reporting system. However, due to the downturn in the semiconductor industry, Fairchild has decided to economize on some of its investments for factory planning and is making more extensive use of existing systems than originally anticipated. This solution works well as long as the Master Planning application consistently generates the operational plans, which the Factory Planning systems then follow.

The Challenges of a Global Deployment

Implementing the APS system posed three sets of challenges: adapting business processes, enhancing enterprise data, and facilitating job changes.

BUSINESS PROCESSES. Redesigning the supply chain meant restructuring the detailed operational steps for producing semiconductors. As Janson observed, “We had to work with the individual businesses to figure out what they really wanted in order to redesign their operations.”

ENTERPRISE DATA. A second challenge was capturing the necessary enterprise data for planning. “Fairchild’s existing ERP systems,” Janson explained, “focused on financial controls and customers’ orders and did not track such things as production cycle times and materials routing at the level of accuracy and completeness that we needed for supply chain planning. We had

to add the required planning data to our PeopleSoft implementation.”

For instance, the Master Planning application required detailed data about work-in-progress activities within fabrication plants—when raw silicon wafers arrived, when they transitioned to various stages of production process, and when the electronic circuits (now embedded in the wafers) were ready for shipment to the assembly and test facilities. The APS team had to request changes to Fairchild’s ERP system in order to get the highly granular data they needed to track these work-in-progress activities. Not surprisingly, changes of this magnitude often required months to implement.

JOB CHANGES. Third, once the Demand Fulfillment application was deployed, many order managers’ jobs changed. Most people were used to dealing with inaccurate data and making on-the-fly adjustment—more than 50 percent of orders had required manual scheduling. By design, the Demand Fulfillment application generated accurate shipping dates and used sets of business rules to manage customers’ orders. By design, these rules required very little manual intervention.

Fairchild now has to focus on a set of human resources issues and manage job changes for its operational staff. Some have made the transition to “super users” who manage the implementations and ensure that the applications are working correctly. Others are being reassigned to other positions or are leaving the company.

Towards Measurable Business Benefits

Six weeks after transitioning to the automated Demand Fulfillment application and, hence, after linking up with the Demand Forecasting and Master Planning applications, Fairchild is beginning to benefit from a comprehensive SCM environment. While the metrics for the first year of operation are just beginning to be collected, Fairchild’s goal is to see a 10 percent incremental improvement in its customer service level, which it believes will lead to a 1 to 8 percent revenue uplift.

Only time will tell if Fairchild actually achieves this increase in customer service and revenues. The business logic driving these business benefits is compelling. “If Fairchild has a better service level [than competing manufacturers] and can deliver on the most aggressive date possible,” Janson reasons, “then we are entitled to a better margin. If we are the ‘go to’ supplier, then our customers will be willing to pay us a little more because we can give them the best date and we are the most predictable.”

Semiconductor firms are now going to compete with one another in terms of their abilities to respond to customer demands. If they cannot deliver what they promise and when they promise, then customers will not be willing to pay the premiums. “Fairchild cannot rest on its laurels,” Janson concludes. “The good news is that APS is an integrated system [showing lots of promise]. And the challenge is that it is an integrated system.” Fairchild now has an enterprise system in place for integrating demand forecasts with production planning and demand fulfillment and, thus, for matching the product supply with customers’ orders and shipments throughout the key phases of its production process.

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FUTURE DIRECTIONS: INTEGRATING WITH CUSTOMERS’ SYSTEMS

Beyond Internal Integration

APS promises to deliver additional business benefits for creating and managing customer-facing applications. Fairchild has now implemented an overall architecture for an extended SCM environment by integrating its key internal business processes.

The company is now well positioned to launch various customer-centric services in such areas as automated ordering and demand fulfillment, customer care, product development, and procurement services. When the investment climate is right, Fairchild has opportunities to integrate many of its customer-facing external business processes with its supply chain activities.

Opportunities for Future Developments

For instance, now that Fairchild can reliably fulfill orders and anticipate demand through its internal business processes, it can begin to interact directly with its customers through automated, business-to-business electronic connections. Fairchild has the infrastructure in place for supporting direct links with its major customers' systems, relying on RosettaNet standards for synchronizing private/public order processes. With little additional effort, Fairchild could communicate directly with its customers to provide information about product availability, price, and delivery dates. Fairchild could accept orders electronically, schedule delivery dates, and ship products as part of a seamless set of inter-enterprise business processes.

Of course, business-to-business integration initiatives require customer-supplier agreements to link separate enterprise systems for supporting specific kinds of transactions. These initiatives require investments and the decisions to collaborate on the part of multiple parties. Fairchild has not yet made any investment decisions per se, nor has it received specific customer requests for integrating supply chain activities. Nevertheless, it is only a matter of time before its customers will seek to do business through seamless business-to-business connections. When these requests arrive, Fairchild will be able to rapidly and effectively respond to them.

STAGES OF e-business ADOPTION

Fairchild is investing steadily in its e-business infrastructure and is achieving considerable success. As shown above in Illustration 5, it is focusing primarily on the integrate internally stage. Through its i2 implementation, it is integrating strategic aspects of its supply chain to ensure the seamless flow of information and insight. The Demand Planning, Master Planning, and Demand Fulfillment applications provide Fairchild employees around the world with accurate information and insight about key business processes.

Moreover, with its i2 application, Fairchild now has the enabling infrastructure in place to forge direct links with key suppliers and customers when business conditions warrant. Due to the current economic downturn within the high technology sector, Fairchild has not yet begun to do so. Nevertheless, it is well positioned technically to integrate with its business partners using RosettaNet or other technical standards for business-to-business integration.

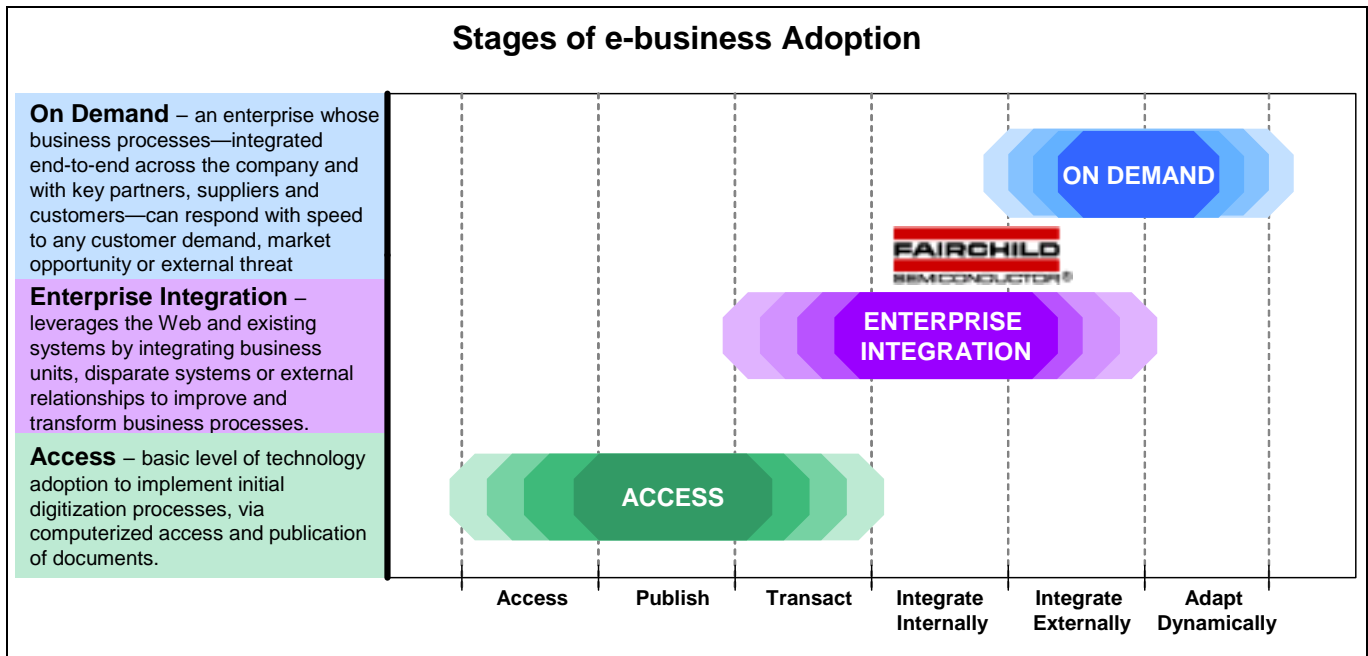


Illustration 5. The e-business environment at Fairchild builds on a major initiative to integrate key supply chain planning processes. Substantially improving internal integration becomes a key competitive factor and ensures that Fairchild will be able to promise and deliver goods to customers in a well coordinated fashion. The company has also created the links to integrate externally with key business partners, and will be able to do so when the business need arises to do so.

DEPLOYING i2 THROUGHOUT FAIRCHILD

Defining Roles and Responsibilities

Deploying i2 as an enterprise-wide supply chain management solution throughout Fairchild required the close coordination and collaboration of Fairchild IT staff members, i2 implementation specialists, and IBM Global Services' business consultants. Linda Linehan was the Fairchild technical lead on the project, reporting to Daniel Janson. She had overall technical ownership for the project and served as the knowledge transfer person between Fairchild and the consulting staff participating in the implementation.

The IT implementation team consisted of a technical lead, a senior programmer, and a junior programmer for each application module. The technical lead, always a Fairchild employee, worked with the business lead for that respective module to understand and define the business requirements and then to translate them into technical requirements. The senior programmer implemented the design provided by the technical lead. The junior programmer assisted during implementation and provided production support after deployment. This particular team structure ensured multiple layers of technical coverage at all times and allowed the technical lead to address strategic challenges like the next implementation and any software upgrades.

Getting Started with the Base Platform

Once Fairchild decided to deploy i2 across its enterprise, it proceeded to size the implementation and purchase and install the necessary hardware and software. Fairchild's i2 hardware architecture consisted of four environments: development, test, stage, and production. Fairchild followed proper change control procedures in all environments to ensure the highest code quality control prior to any migrations to production. Since the majority of Fairchild's product divisions share the same manufacturing capacity, Fairchild needed to provide a supply chain management solution that encompasses all divisions. To accomplish this goal, Fairchild is in the process of implementing a single Master Planning and Demand Fulfillment engine across the entire enterprise. One of the major mandates issued by the executive sponsors at Fairchild was to avoid any and all customizations to the i2 software. At the project kickoff meeting, John Watkins, Fairchild's CIO, emphatically instructed the implementation team, "do not customize the software to match our business processes; instead, adjust our business proc-

esses to match the software." This guiding principle has been upheld throughout deployment of the i2 modules. Rather than customize the software, the company has simply used the base platform, supplied the appropriate enterprise data in the required formats, and made changes to the configuration parameters as needed. i2 included a great deal of functionality as an enterprise-wide supply chain management solution. Any changes Fairchild wanted made to the code are forwarded to i2 developers and these changes are then included in the next release of the i2 software.

Mapping Between "As Is" and "To Be"

The key design effort involved: determining the "as is" processes for specific supply chain management activities, identifying the "to be" requirements, and then determining how the required data would flow through the i2 application and be displayed to specific Fairchild employees under various conditions. The design team developed prototypes for all applications and then reviewed them with key Fairchild personnel during a series of international road shows.

Almost all data used in the i2 modules at Fairchild originates from the company's PeopleSoft ERP application. The systems integration effort consisted of designing and implementing various extraction programs for configuring the data as required and then handing the data off to the i2 suite of modules. After the i2 modules have completed their processing, the results are then interfaced back into the ERP system (refer to Illustration 6).

Processing Payoffs

Relying on i2 and paying careful attention to data mapping has led to a number of significant payoffs. With two product groups implemented on Master Planning, Fairchild now processes 17,000 lines of sales order demand through Master Planning, and the resulting plan is consistently of high quality. Key to the solution's success are attention to clean data and ensuring that the i2 application operates efficiently.

Runtime efficiency has been a major challenge. Managing the manufacturing scheduling, demand planning, and demand fulfillment for all Fairchild devices requires considerable computing power. Fairchild has had to re-size its hardware platform and add additional RAM and CPU processors to its systems in order to ensure adequate systems performance.

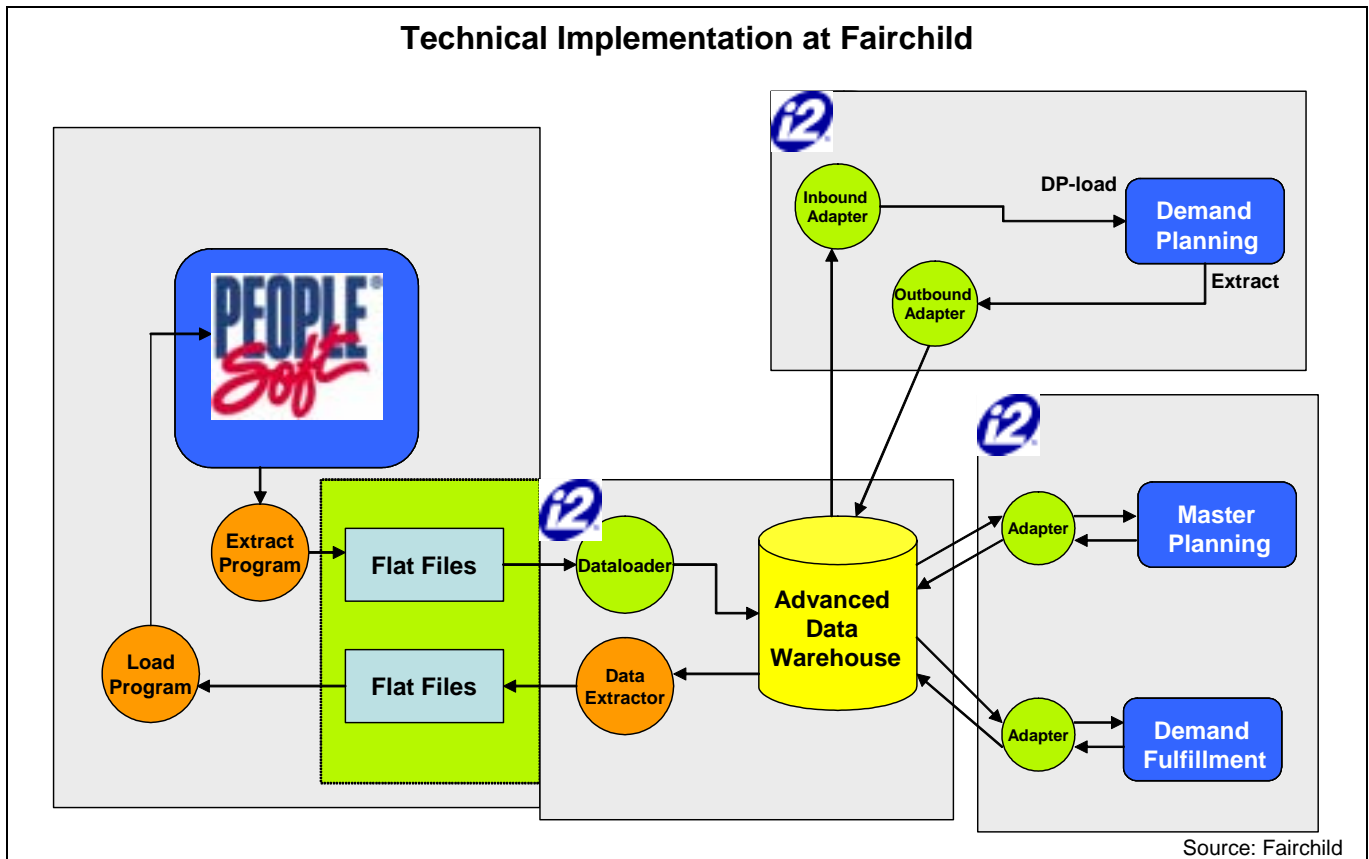


Illustration 6. Fairchild uses an extraction program and a database loader to transfer data from PeopleSoft to its advanced data warehouse (ADW). The ADW then serves as the central repository for all SCM activities. The Demand Planning (DP), Master Planning (MP), and Demand Fulfillment (DF) modules from i2 extract the data they need from this central data warehouse, perform the relevant calculations, and add their results to the repository.

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