

IMPROVED ORDER FILL RATE, DSI AND OPERATIONAL EFFICIENCY FOR DEMAND DRIVEN SUPPLY CHAIN BY UPGRADING AND INTEGRATING MANUGISTICS SCPO AND COLLABORATE SOLUTION TO JDA 7.4.X SUCCESSFULLY

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Project Summary:

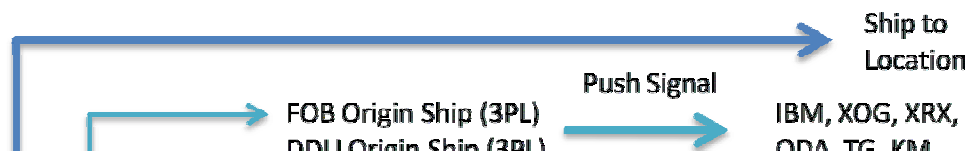
- Upgraded Manugistics SCPO 6.1.5 client server to JDA 7.4.x web enable solution with interface manager for hi-tech digital network printer company
- Upgraded Manugistics Network Collaborate 7.0.2 to JDA 7.4.x solution to collaborate with trading partners, supplier and VMI customers.
- Improved order fill rate to OEM customer and improves operational efficiency through demand driven planning analysis and decision support systems.
- Reduce bottleneck process constraints in the supply chain by business process reengineering and standardizing interface program
- Seamless integration with Oracle 11i and JDA solution with OWB tool.
- Enable web services oriented architecture (SOA) using OWB tools for mapping data and executing jobs through process flow
- Automate and integrate the scheduling of jobs with upgraded Appworx 7.2
- End-to-End integration provide synchronized supply and demand information for Fulfillment, Replenishment and web portal
- Successfully completed deliverables on schedule, under budget with quality
- Lower total cost of ownership.

Customer:

Xerox International Partners (XIP), established in 1991 as a joint venture between Fuji Xerox Co. Ltd. and Xerox Corporation. XIP sells digital marking engines, full-system printers and digital copiers to original equipment manufacturers for resale under the OEM brand name. The products (IOT/OPT/CRU) are developed and manufactured by both companies in Japan, China, South Korea and Taiwan facilities. These products may be sold under the Xerox brand name. XIP sales and distributes the digital network printer products to OEM customer mostly in Americas, Europe, and Asia. Fuji Xerox will build on its strong patent portfolio, which is shared with Xerox Corporation, and manufacturing capabilities to provide world-class technology based on OEM strategy and specifications. XIP offers digital marking engines, including printers and other document imaging systems, for resale under other companies' brand names.

EXECUTIVE SUMMARY:

XIP is a subsidiary of Fuji and Xerox and channels the digital printer products, spare parts and services to OEM Customer. XIP captures customer demand and place a Purchase Order against the FX supplier based on agreed distribution lead time. XIP maintains inventory and manages VMI customer demand with a pull signal, where as replenish the FOB origin customer demand with drop shipment from the supplier with push signal (fig 1). The shipment information is captured to recognize the revenue at XIP. Fuji negotiated a Freight-on-board (FOB) price and Delivered Duty Unpaid (DDU) at Hong Kong logistics location to XIP for any shipments and recognizes a transfer price before the product is shipped. Xerox recognizes the revenue after the product is sold and shipped from the warehouse to the OEM customer. This revenue recognition process drives XIP to maintain and own partial inventory to meet customer demands. XIP receives order from OEM customer (Dell, Lexmark, OKI Data, Apple, and IBM etc.) and replenish the orders from its factory that are shipped to warehouses near to the OEM customer. The transactional shipments are made at the FOB or DDU locations (Hong Kong) to fulfill the order within 90 days. OEM customer further sales and distributes printer products through various channels i.e. Retailer, Reseller chain, Value Add reseller and online to end customers. The physical movements of goods for VMI customers and FOB origin start as early as 90 days prior to customer orders.

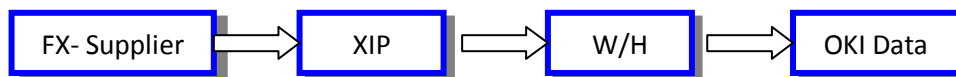


SUPPLY CHAIN SOLUTIONS:

XIP fulfill two types of demand from OEM customer i.e. VMI customer and FOB Origin Customer. The VMI Customer (Dell, Lexmark) pulls the inventory from a warehouse managed by XIP near to OEM customer. XIP receives order from OEM customer (Dell, Lexmark, OKI Data, and IBM etc.) and replenish the orders from its warehouse near to the OEM customer. The supply chain includes the

demand and supply planning processes for IOT/OPT/CRU and Spares materials. XIP follows a combination of make to order (MTO), Vendor Managed Inventory (VMI) and consignment supply chain model to replenish customer demand. VMI relationships allows XIP and OEM distributor to gain visibility about OEM's actual usage rather than just seeing a customer's orders. The XIP (Distributor) is then responsible for creating and maintaining the proper level of inventory. The customer PO Forecast and Sales Forecast are provided to the XIP (Vendor) via electronic data interchange (EDI). Under VMI, the distributor, not the end customer, generates the order. It also uses a consignment model where XIP owns the inventory at customer location without receiving payments until the goods are sold.

The following simplified network represents physical inventory flow from a supplier to a FOB or DDU Origin Customer.



JDA Supply Chain solutions improve the order fill rate, operational efficiency of XIP and enable the collaboration with supplier, customers and trading partners. The Supply Chain Planning and Optimization (SCPO) suite of products is a web-based decision-support system that provides tools for planning and controlling manufacturing and distribution operations. SCPO is supported by the JDA Foundation software, which provides common security administration and a central launch point for the applications.

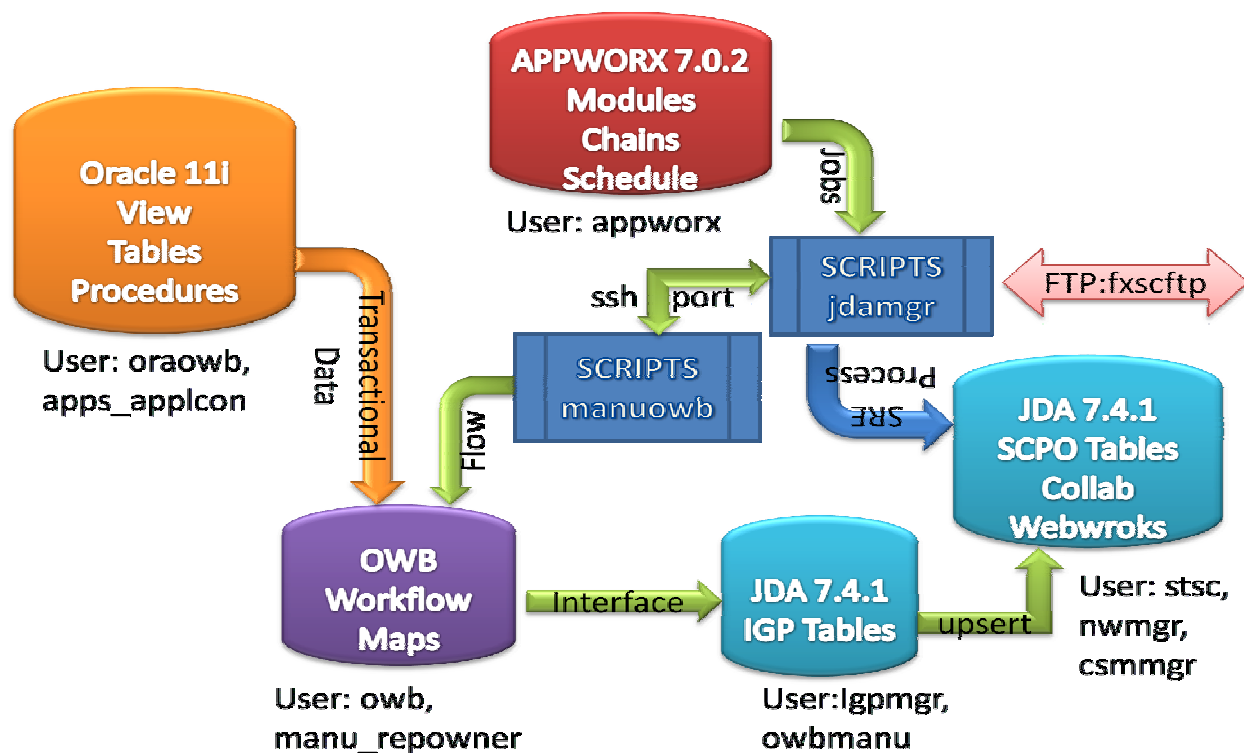
JDA Fulfillment optimizes inventory and replenishment planning to create time-phased inventory plans that respect multiple time horizons-days, weeks, and months-and that recognize the interdependencies of the network on customer service and inventory investment. Collaborate is a real-time supply-chain collaboration tool that enables manufacturers and their suppliers to share information about inventories, production demand, and parts availability. Consensus forecasting- Perform basic analysis of multiple forecast streams, revenue, and market data, and basic calculations for developing a consensus forecast number.

SYSTEMS OVERVIEW:

XIP runs its daily operation using Oracle E-business 11.5.10 and gather transactional data for further processing downstream processes to support supply chain planning. The supply chain and planning optimization (SCPO) application version 6.1.5 and Network Collaborate 7.0.2 was used to manage

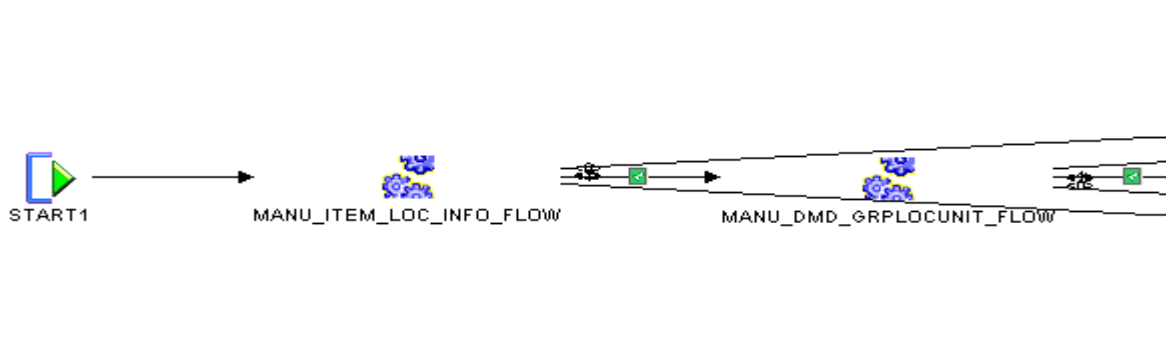
demand planning and fulfillment functionality. The transactional systems and planning systems are integrated fully using Web connect tools and batch jobs. The batch jobs were written in the scripting language and running in Unix operating system. Appworx scheduling tool was used to run the daily, weekly, monthly and on-demand jobs to support Manugistics supply chain solution.

Due to changes in the supply chain application technology, robust integration interface, webworks foundation, new functionality, maintainability, and web user interface, XIP decided to upgrade the existing systems to JDA solution 7.4.1. This gives us a window of opportunity to enhance the bottleneck operation through business process reengineering and improve the performance by adapting to the new technology. Most of the batch jobs are replaced by database driven architecture using Oracle Warehouse Builder (OWB) tool. The system architecture diagram describes the relationship between systems and information flow.



Oracle Warehouse Builder (**OWB**) is Oracle's comprehensive tool for ETL (extract, transform and load), fully integrated relational and dimensional modeling, data quality, data auditing, and full life cycle management of data and metadata. It supports data integration and metadata management activities including extraction, transformation, and loading (ETL) for data warehouses and Data modeling of relational and dimensional structures by calling external Web Services. Oracle Warehouse

builder is the only enterprise Business Intelligence integration design tool that manages the full life-cycle of data and metadata for the Oracle database.



APPWORX Scheduling:

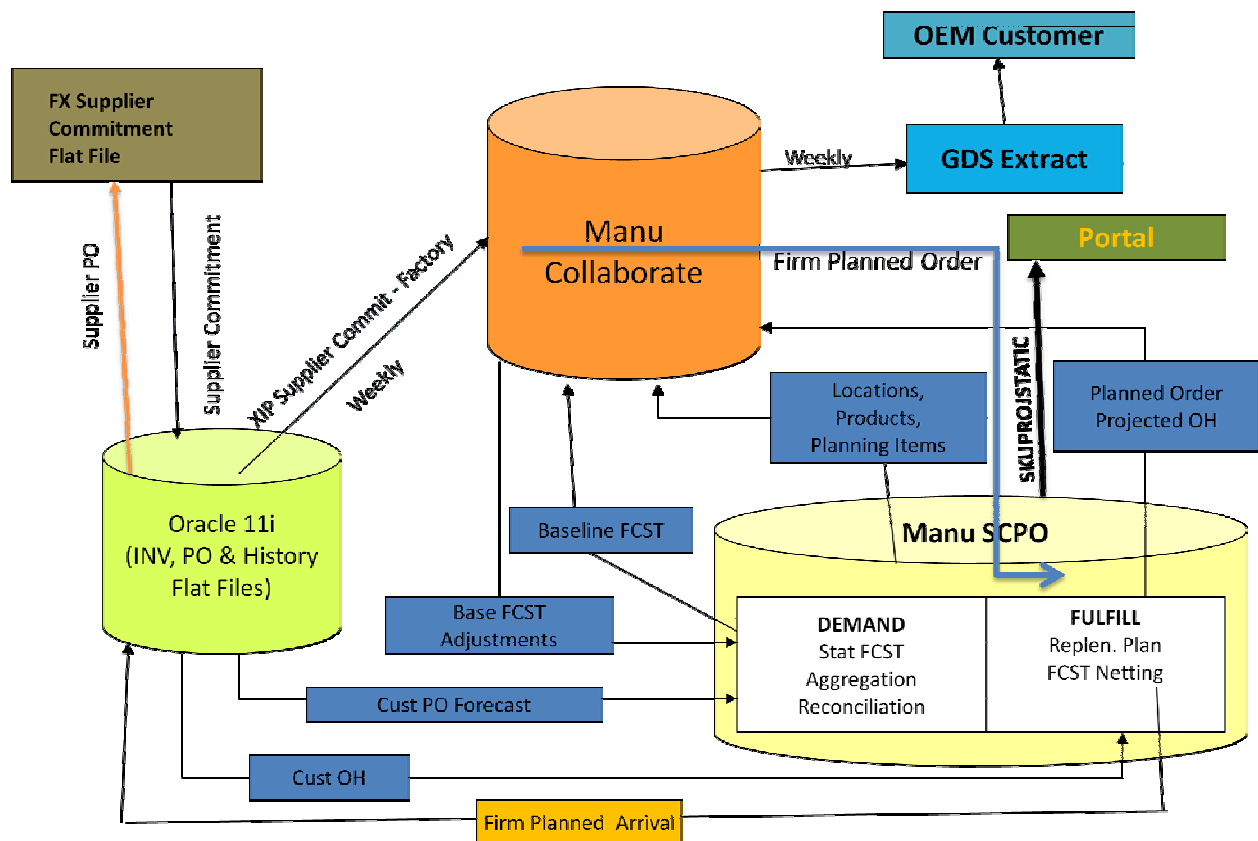
AppWorx version 7.0 has always been known for its industry leading and innovative capabilities in scheduling applications across enterprises. It was a great opportunity to upgrade Appworx Scheduling tool from 6.x to 7.x to support supply chain solution. Modules and Chains are the basic building block in AppWorx. For each program you want to run (for example: FTP, application, database load), you must create a module. A module contains all the information required to execute a program and handle its output. Modules are run both individually and as components of AppWorx chains. Chains can include one or more components (modules and other chains), general scheduling information for the chain, and specific eligibility for each of its components, and conditions that must be met for each component to run.

Job ID	Job Name	Start Date	Started	Elapsed	Status	Agent
1	DELL_UPLD_SUPPLIER_COMMITM...	27-16:59	16:59	00:00:10	ABORTED	XIPM4000B
1	DELL_UPLD_SUPPLIER_COMMITM...	27-17:00	17:00	00:00:10	ABORTED	XIPM4000B
1	DELL_UPLD_SUPPLIER_COMMITM...	27-17:05	17:05	00:00:10	ABORTED	XIPM4000B
1	DELL_UPLD_SUPPLIER_COMMITM...	27-17:09	17:09	00:00:10	ABORTED	XIPM4000B
	DELL_SATURDAY_PROCESS	19-20:00	20:00	37 hours	RUNNING	XIPM4000B
	MANU_WEEKLY_PROCESS	19-21:30	21:30	36 hours	RUNNING	XIPM4000B
	MANU_DAILY_PROCESS	20-02:00	09:47	00:04:26	RUNNING	XIPM4000B
	MANU_DAILY_PROCESS	21-02:00	00:00:00		SELF WAIT	XIPM4000B

Integrated Information Flows:

Oracle 11i is uniquely positioned to provide the transactional data for the supply chain planning. The information flows are integrated across the supply chain for visibility and sharing with trading partners. The OEM customer PO forecast or Sales forecast is received in a flat file and loaded into Oracle 11i. These forecasts are transformed into recommended shipments and planned arrivals during the planning process. The SKU projection data are analyzed using plan analysis tool.

JDA Collaborate tool is used for importing various components from SCPO for collaboration. The planned orders are firmed up in the Collaborator to create supplier forecast. This supplier forecast is matched up with the supplier commitment from factory. The PO is created against FX supplier to get the firm commitment to meet customer demand.



The process flows are scheduled by executing batch job scripts through Appworx scheduler. This calls the OWB process flows which in turns run the daily data extraction from Oracle transactional system and execute Manu process to generate plan, recommended shipments and sku projections for further analysis by the planner. The systems are remotely integrated via secure shell between the host systems to transfer information through a scheduling tool.

Business Challenges:

It was very challenging to upgrade from 6.1.5 a client server to 7.4.x web enable platform due to multiple versioning steps, web technology, changes to database table structures, data definitions, webworks foundations and integration interface manager. The entire batch UNIX scripts programming language were completely reengineered and replaced by Oracle Warehouse Builder (OWB) tool that provides unique and enormous challenge to cross.

- Upgrading from 6.1.5 to 7.4.1 needs lots of planning, reengineering and upgrading with multiple versioning steps
- Integration Interface using IGPMGR (SCPO and Network Collaborate) that replaces Web Connect tool.
- Data definition changes are inconsistent posed a challenge during upgrade process
- Application foundation is changed to Web based (3 tier) enabling a common security architecture for SCPO and Collaborate applications
- Users from SCPO and Collaborate were merged with one user and roles are added to operate effectively
- New Search functionality was not upgraded successfully, needed a custom solution to migrate with proper security for the current business requirements
- Reengineering the business process to develop maps and flow using OWB tool to support SOA architecture and reduce cycle time.
- Lack of testing by the Application vendor caused more testing at our end and fixing the defects during the migration
- Performance issue with SRE foundation, Export process and Database objects during the process request
- Availability of the System hindered development and system testing cycle due to hardware configuration
- Integration testing scenario between Trading partners, supplier and customers took longer time than anticipated

Solutions:

Nuous conducted a full-scale study and documented as-is processes, to-be processes, operational procedures and information flows between various disparate systems of XIP. Major features of JDA SCPO and Collaborate solutions were exploited to offer a best-fit solution with a user friendly web interface. The solution was designed and developed using Oracle Warehouse Builder tool to enable

web services and low cost of ownership. The system configurations, technical interfaces and functional setups for JDA supply chain solutions were clearly identified with fewer customizations to accommodate business requirements. The pilot was conducted to show the fitment and Gaps of JDA solution for each business requirement and make the application user-friendly and maintainable. The upgrade process was improved by adding post-migration steps for searches and filters based on the security features. The Appworx scheduling tool was also upgraded to leverage the new features and functionality. Each activity of the project were carefully planned following best practices of project management and executed with minutest precision not to disturb Client operations.

Working with Plan Analysis Tool:

Plan Analysis tool allows you to review distribution plans for products in your supply chain. You can view the demand and supply for products at various levels of detail, from total demand, total supply, and projected on hand, to detailed components of that demand or supply.

The screenshot displays the 'Plan Analysis :XIP Weekly Plan' interface. It includes a header with navigation links, a search bar, and a table of data. The table shows demand and supply metrics for various dates from 11/03/08 to 02/28/09. The data is organized into columns for different time periods and rows for different metrics like Total Demand, FirmPlanOrder, RecShip, and Planned Arrivals.

	11/03/08	11/08/08	11/15/08	11/22/08	11/29/08	12/06/08	12/13/08	12/20/08	12/27/08	01/03/09	01/10/09	01/17/09	01/24/09	01/31/09	02/07/09	02/14/09	02/21/09	02/28/09
☒ Total Demand	0	0	1,144	1,107	1,604	1,856	1,520	2,444	5,475	4,982	5,234	4,982	4,982	5,150	5,066	4,562	3,359	3,204
☒ FirmPlanOrder	0	0	2,100	2,100	2,100	4,788	5,040	5,040	5,040	5,040	5,292	4,788	5,292	5,544	5,544	5,460	5,460	4,620
☒ RecShip	0	0	2,100	2,100	2,100	4,788	5,040	5,040	5,040	5,040	5,292	4,788	5,292	5,544	5,544	5,460	5,460	4,620

	11/03/08	11/08/08	11/15/08	11/22/08	11/29/08	12/06/08	12/13/08	12/20/08	12/27/08	01/03/09	01/10/09	01/17/09	01/24/09	01/31/09	02/07/09	02/14/09	02/21/09	02/28/09
☒ TOTAL DEMAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
☒ TotIntransit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
☒ SchedRcpts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
☒ RecArriv	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
☒ ConstrProjOH	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
☒ ConstrCovDur	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D	3650D
☒ Planned Arrivals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
☒ TotSupply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
☒ ProjOH	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77

Decision Support Workbench:

The Decision Support Workbench provides you with tools that aid in quick and effective decision making during the Demand Planning process. It provides you with a single platform that allows you to view and manipulate the required data in a single place. The Decision Support Workbench has been logically divided into tabs, based on the data to be viewed. The main tabs are the Demand Workbench, and DFU Information. You can access the features and data relevant to you by clicking

the tabs. The Demand application offers users much flexibility in developing and analyzing a forecast. User defined Data Streams extends this ability even further by enabling you to analyze inputs other than the standard nine forecast types.

The Demand Workbench graph is based on the data in the Demand Workbench grid. This interactive graph allows you to modify the data by right-clicking the required data point and adding the necessary Override, Lock, DDE, Target, or Mean value adjustment. The data in the grid is automatically updated to reflect the change in the graph. The Forecast grid is part of the Demand Workbench grid and displays the time-phased forecasting values across periods.

Working with Collaborate Worksheet:

Collaborate is a real-time supply-chain collaboration tool that enables manufacturers and their suppliers to share information about inventories, production demand, and parts availability. With JDA

The actual shipments, customer PO forecast, constraint on hand and days of supply of inventory (DSI) are shared using collaborate worksheet. The customer Forecasts are also shared with supplier for a better visibility and managing the cash flow based on the FOB shipment.

Customer Name	Enterprise	Version	Component	9/27/08	10/4/08	10/11/08	10/18/08	10/25/08	11/1/08	11/8/08	11/15/08	11/22/08	11/29/08	12/6/08
DELL	XIP	0	XIP Actual Ships - Factory	61,578	62,671	54,374	60,723	52,114	12,494	0	0	0	0	0
	XIP	0	Cust PO Forecast - Factory	21,938	21,938	21,938	21,938	21,938	59,645	59,613	59,596	59,568	66,562	66,544
	XIP	0	Cust PO Forecast (-1w) - Factory	22,017	22,017	22,017	22,017	22,017	60,850	60,730	60,708	60,680	72,157	65,947
	XIP	0	XIP OH - Factory			353,053	0	0	0	339,833	332,896	0	0	0
	XIP	0	Supplier Intransit - Factory				0	1,260	0	0	55,703	46,426	30,153	16,240
	XIP	0	XIP Sched Rec - Factory				0	0	0	0	16	0	600	22,350
	XIP	0	XIP ConProj OH - Factory				0	0	0	0	348,057	341,957	311,923	274,297
	IWAT	0	Dell DSI - Factory				0	0	0	0	30	29	27	23
	XIP	0	XIP SS - Factory				0	0	0	0	86,070	86,025	85,907	82,269
	XIP	0	Supplier Sched Ship - Factory				0	16	0	12,528	48,698	54,259	32,565	0
	XIP	0	XIP Planned Orders - Factory				0	0	0	0	0	1,005	85,730	40,393
	XIP	0	XIP Supplier Forecast - Factory				0	0	0	0	0	0	52170	49267
	XIP	0	XIP Supplier Forecast (-1w) - Factory				0	0	0	0	0	59,584	52,170	47,142
	XIP	0	XIP Supplier Commitment - Factory				0	0	0	0	0	0	52170	49267
	XIP	0	XIP Supplier Commitment (-1w) - Factory				0	0	0	0	57,739	50,385	46,432	49,279
	XIP	0	FX Actual Ships - Factory	30,437	68,568	42,450	49,018	35,752	0	0	0	0	0	8,280

Key Deliverables:

1. Strategy, design and development of the data conversion programs using ETL tool
2. Business process reengineering to extract transactional data and create maps and process flow in the OWB tools
3. Developing the process flow to sequence the supply chain information flow between SCPO and Collaborate applications for Daily, Weekly and Monthly process
4. Created process options set, flexible editor pages and searches for Demand Planning and Fulfillment of customer orders
5. Developed the XML process request for SRE batch utility, imported data into Collaborate and exported the supplier forecast for communication with supplier
6. Integrated the Appworx, OWB, secured Host and JDA systems for information flow
7. Analyzed the Appworx job schedules and recommend the sequence of the batch jobs to reduce cycle time
8. Develop time dependent components to collaborate and support business requirements
9. Development of the interfaces with integration process manager (IGPMGR)

10. Generates Forecast, Plan with Level SKU for new items, store SKU projections and collaborate with trading partners.
11. Provided out of the box solution using Planning Component Copy to circumvent the problem with publishing derived component
12. Server Consolidation using server partitioning and sharing virtual memory provided performance and cost advantage
13. Support for Production Go-Live and sustaining activities
14. Training the Super User and international user to use the tools effectively

Achievements:

XIP, a digital network printer company distributes IOT/OPT/CRU products based on the customer demand. These demand-driven forecasts allow a distributor to ensure that the right products (IOT/OPT/CRU) are in stock at the right time and in the right quantities. Buying correctly increases operating cash flows by reducing excess inventory investments. Fewer out-of-date or obsolete products will remain in the warehouse, so that less inventory is eventually written off.

By receiving timely information directly from OEM customers, constantly monitoring inventory and demand stream, XIP can better respond to unexpected customers order as a result improve fill rate. The DSI (Days of supply Inventory) measures the level of constraint projected on hand against PO forecast. The DSI was improved based on collaboration between the supplier and demand pull signal from VMI customer. The suppliers own inventory requirements are reduced due to operational efficiency and increase level of customer satisfaction. The customer retention for XIP is improved due to trust and need for their demand is eliminated due to successful VMI program.

The visibility of published customer demands for FOB origin customer and sharing with supplier improves the net cash flow and profitability for XIP. The server consolidation strategy and sharing virtual memory between environments provided an added cost advantage during the upgrade.