

Partner Opportunities with Microsoft Dynamics NAV 2009 R2

Using Web Services with Light User licensing model



Partner Profile

MindQuad Solutions Private Limited is a multi-competency, enterprise solutions and services provider. As a Microsoft Dynamics Solution Provider, we have proven expertise in providing Enterprise Resource Planning (ERP) solutions from Microsoft, viz. Microsoft Dynamics NAV and Microsoft Dynamics AX. Our additional competencies in Microsoft Dynamics CRM, Business Reporting & Analytics and Business Collaboration solutions enable us to design, customize and deliver highly integrated and affordable enterprise solutions to Small and Medium Enterprises (SMEs) – locally and globally. We are also focused in development of custom software, maintenance and support of software applications, development of add-ons for Microsoft Dynamics NAV.

Business Case

Generally, all users in customer organizations do not require full access licenses. Yet, the customers are forced to invest in costly full access licenses after ascertaining the total number of users to concurrent user's ratio. What is needed is a cost-effective way to bring functionality to customers who only use certain features of Microsoft Dynamics NAV, without requiring them to buy full access license.

Solution

MindQuad uses Web services in Microsoft Dynamics NAV 2009 R2 combined with Microsoft Dynamics Light User licensing, to develop and integrate external applications using Microsoft .Net technologies, extending the business solution to more users in their organizations at a fraction of the full license cost.

Benefits

- Reduce ERP acquisition cost and provide customers with more value.
- Deliver Microsoft Dynamics NAV 2009 functionality on the Web enabling multi-location customers to share a single platform in real-time.

Introduction

The three-tier architecture in Dynamics NAV 2009 has enabled wonderful things to happen and create endless possibilities. You get better scalability by separating the business logic from the presentation layer, but there are a couple of other things you get as a result of the Microsoft Dynamics NAV Service Tier – Web services enablement and Multiple Presentation Layers. The RoleTailored client is an example of a presentation layer. Web services enablement opens up a whole new world for NAV implementations.

According to Mike Ehrenberg, Microsoft's chief architect for Dynamics products, "The web service capabilities are one of the coolest things." The big reason, explains Jan Silleman, a Microsoft general manager and chief overseer of Dynamics NAV, is it "provides a major opportunity for our partners. This is something of high interest to them. They have started building solutions." He further adds "partners have to figure out what web services mean. We think (web services) will attract a new type of partner." He suggests that the creative opportunities for third-party development will expand as NAV 2009 evolves, "You'll see us coming together and sharing concepts and code."

As one example, the web services enable Outlook users in a company to access NAV 2009. The web services "can give ERP information for many more users than before, in an environment they know." As another example, web services enable warehouse managers to use PDAs to easily scan bar codes so as to record shipment arrivals and inventory movements.

Programs talk to other programs

Web services are a new major feature of the Microsoft Dynamics NAV 2009 three-tier implementation which will have a big impact on the development experience as well. Integration of partner developed vertical applications will be done in a whole different way, creating many new opportunities. Web services is very powerful, because it allows us to take advantage of the NAV Service Tier and expose NAV business logic, user authentication, and data access/validation to external processes or applications. It is the new API for any application that has the ability to consume web services provided by Microsoft Dynamics NAV 2009 R2.

Web Services is a standardized format, which is a big advantage as many other environments and applications will be able to consume the NAV web services. Typically, web service could be used in:

- Applications Integration
- System to system communication
- Same paradigm used for – Intranet, Extranet and Internet

Extending the Microsoft Dynamics NAV 2009 ERP solution

Web service integration with Microsoft Dynamics NAV is supported through Web service-enabled pages and codeunits. With proper authentication and authorization, external systems / third party applications can read and write data on pages and call codeunits as XML Web services using SOAP over HTTP and having their interfaces exposed in a WSDL. When pages and codeunits are published as Web services from Microsoft Dynamics NAV, they are immediately available for Web service requests over the network. When a page is exposed as a Web service, a default set of operations is exposed to developers so that they can manage common record handling operations such as Create, Read, Update, and Delete. Page-based Web services offer built-in optimistic concurrency management. Each operation call in a page-based Web service is managed as a single transaction.

Web services in Microsoft Dynamics NAV 2009 make data and business logic available to other applications, simplifying information exchange and integration with other IT systems. Microsoft Dynamics NAV 2009 is based on the Microsoft .NET Framework, so partners can efficiently integrate with or build add-on .NET applications. Web services make it easy to share data with other applications, while helping to maintain data integrity and security. It helps the customers to get more from their Microsoft Dynamics® NAV 2009 investment. Even tighter integration with Microsoft® Office programs enables customers' employees to access Microsoft Office Outlook®, Microsoft Office Excel®, and Microsoft Office Word® from their Role Centers or custom-build applications, so they can easily find, use, and share information. Most Microsoft Dynamics NAV 2009 functionalities are exposed as Web Services. You can call any Codeunit or Page from within NAV 2009 with pretty much any customized software application that you can extend; there are limitless possibilities to create fantastic productivity applications for the business.

Here are just a few more examples:

- Let staff submit their expenses from Excel, or from their mobile phone, without needing to re-key them into the finance system.
- Allow users to create new customer accounts from within Word or from an intranet web page.
- Provide a Vista Sidebar gadget that shows the number of documents requiring approval and allows the user to approve the document without needing to open the ERP.
- Provide a simple single-task Windows application that will let staff see where stock is.
- Provide a web interface portal for field sales personnel to look-up item inventory, query A/R and enter sales orders—all on the move.
- Provide a web interface to field service technicians to co-ordinate tasks better and have efficient, real-time communications with dispatchers.

Benefits to Customers

Improved employee decision-making - Accelerate productivity across your business by providing employees with quick access to business information.

Standardize Processes - Help ensure business management processes are followed in a consistent manner by embedding common tasks within Microsoft Office system programs.

Reduce burden on Finance and IT - Key Finance and IT staff have time to focus on more value-added activities, as employees are answering their own questions.

Fits with your employee's tasks and needs - Workers are presented with information that is specific to their role, including appropriate access privileges.

Meet specific business needs by extending your Business Management Solution - Create powerful office business applications that combine information from multiple sources, such as business management solutions, e-mail and Office SharePoint Server 2007 sites, and customize them to meet unique business needs.

Write Custom Applications - Use Visual Studio to write .Net applications to publish to your intranet. Access business information views and objects via Web browser, from any location, to stay on top of key business drivers.

Web Services – a standards-based framework for integration

What is a Web Service? A 'Web service' (also Web Services) is defined by the W3C as 'a software system designed to support interoperable machine-to-machine interaction over a network'. Web services are frequently just Web APIs that can be accessed over a network, such as the Internet, and executed on a remote system hosting the requested services.

“Web service is to a computer what a web site is to a person”

Web services are software components that can be accessed over the Web through standards-based protocols such as HTTP or SMTP for use in other applications. They provide a fundamentally new framework and set of standards for a computing environment that can include servers, workstations, desktop clients, and lightweight "pervasive" clients such as phones and PDAs. Web services are not limited to the Internet; they supply a powerful architecture for all types of distributed computing.

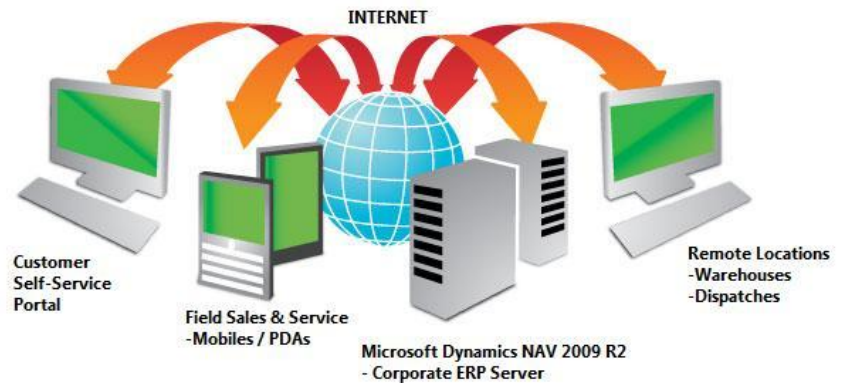


Figure: Web Services integration chart

The Web Services Description Language (WSDL) forms the basis for Web Services. The adjoining figure illustrates the use of WSDL. At the left is a Microsoft Dynamics NAV 2009; service provider. At the right is a service consumer; SharePoint, MS Office, 3rd Party Application. The term *Web services* describes a standardized way of integrating applications using the XML, SOAP, WSDL and UDDI open standards over an Internet / Intranet protocol backbone. XML is used to tag the data, SOAP is used to transfer the data, WSDL is used for describing the services available and UDDI is used for listing what services are available.

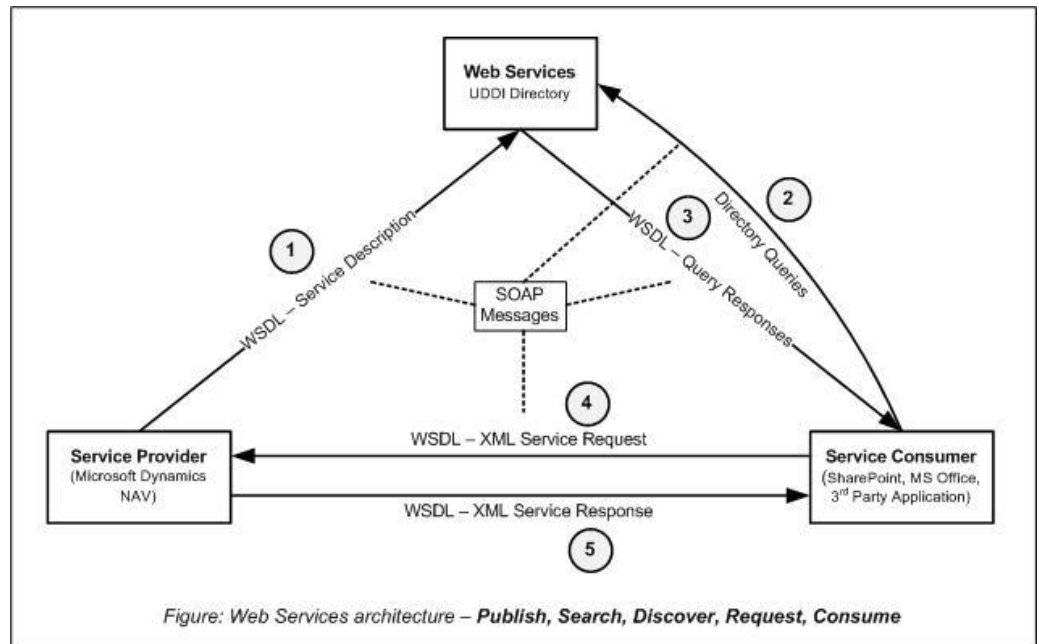


Figure: Web Services architecture – Publish, Search, Discover, Request, Consume

The steps involved in providing and consuming a service are:

1. A service provider describes its service using WSDL. This definition is published to a directory of services. The directory could use Universal Description, Discovery, and Integration (UDDI). Other forms of directories can also be used.
2. A service consumer issues one or more queries to the directory to locate a web service and determine how to communicate with that service.
3. Part of the WSDL provided by the service provider is passed to the service consumer. This tells the service consumer what the requests and responses are for the service provider.
4. The service consumer uses the WSDL to send a request to the service provider.
5. The service provider provides the expected response to the service consumer.

MindQuad's initiative using the .NET technologies

It is a common knowledge in the ERP industry that customers are usually frustrated with a small deployment of 10-15 users who need to use the system continuously, every day. Due to prohibitive licensing costs they cannot extend the system functionality to those vast groups of users in the organization, who would require accessing only limited functionality from the ERP a few times during the day.

With the announcement of **DCO** licensing; **Dynamics Client for Office** (re-branded as **Light User** in September 2010) by Microsoft in 2009, MindQuad's leadership saw an opportunity to offer prospective customers with a cost effective Microsoft Dynamics NAV 2009 solution based on mixed licensing model – Full Access and Light User. MindQuad has since then focused on developing custom interfaces using .Net technologies (ASP.Net and C#) to access data and business logic from Microsoft Dynamics NAV 2009. The technology developed by MindQuad uses the web services integration capability of Microsoft Dynamics NAV 2009 to generate user interfaces speedily – either as an ASP.Net web page or a C# Windows application, based on the customers' requirement.

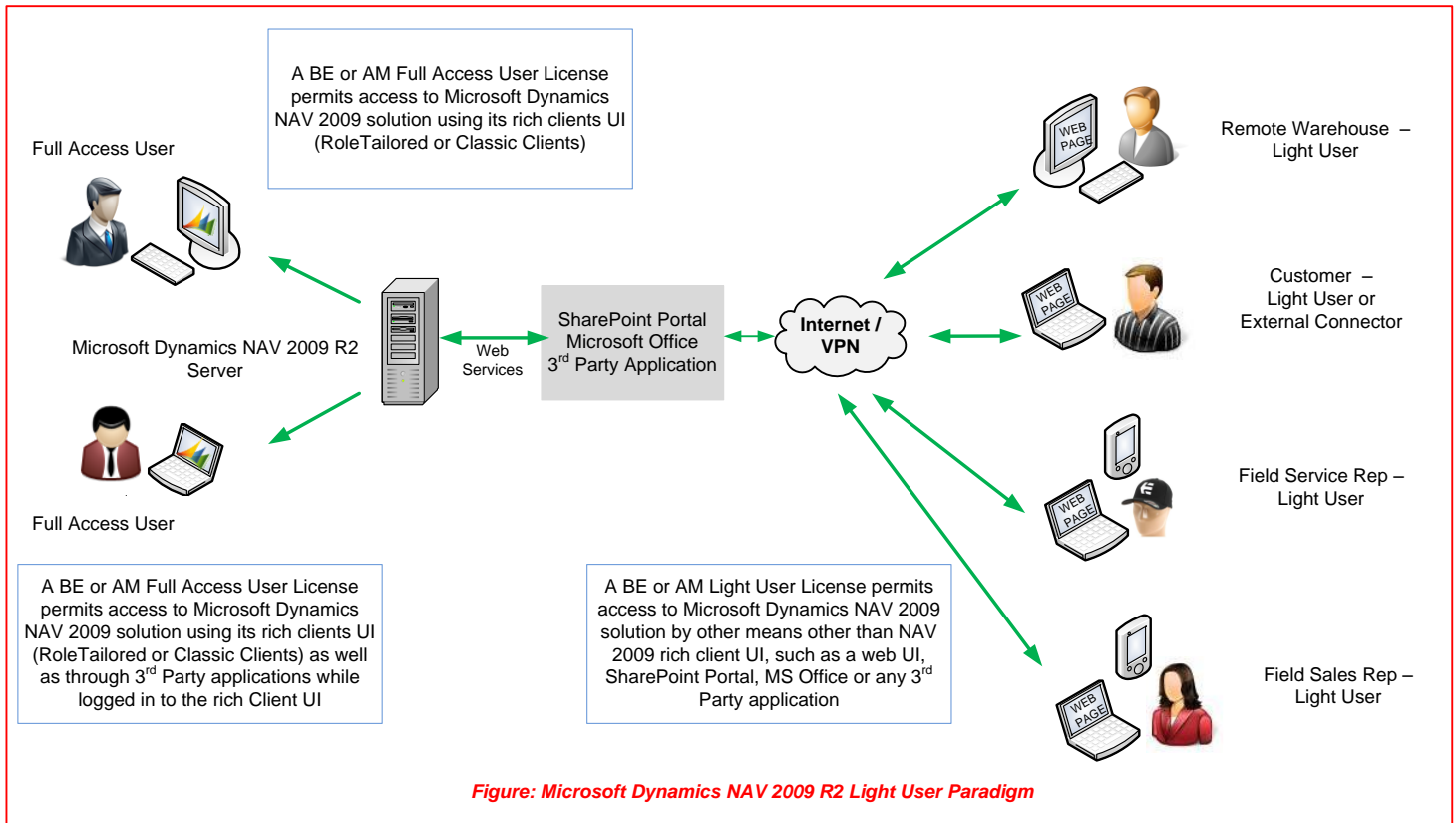
The custom user interfaces could be consolidated into a Web portal used by a large group of users each using a Light User license. Limited or "only required" functionalities could be extended dynamically through the custom interfaces. The web services ensure that the data being accessed or written from the custom interfaces are validated as per Microsoft Dynamics NAV 2009 business logic leaving zero scope for errors. **MindQuad has mastered the technology of "dynamically" generating pages or reports based on the item selected in the menu. This makes the application lean, fast and easy to maintain.**

Advantages:

1. Reduced internal C/SIDE customization costs.
2. Faster and larger implementations.
3. Document Approvals, Status Alerts, Reports etc. offered to selected users on the web client allowing them freedom to work even when they are on-the-move.
4. All user roles and securities defined in Microsoft Dynamics NAV 2009 SP1 or R2 will be automatically applied to the web client too. The authentication required is "Windows Authentication" on a Domain Server.
5. Any C/SIDE customizations will be reflected on the web client within minutes, with a minimum effort and without additional coding in C/SIDE or Microsoft .Net.
6. The customers get more value from their Microsoft Dynamics NAV 2009 investment as the large group of Light Users in their organizations gain access to the same underlying business functionalities through their custom interfaces.

Limitations:

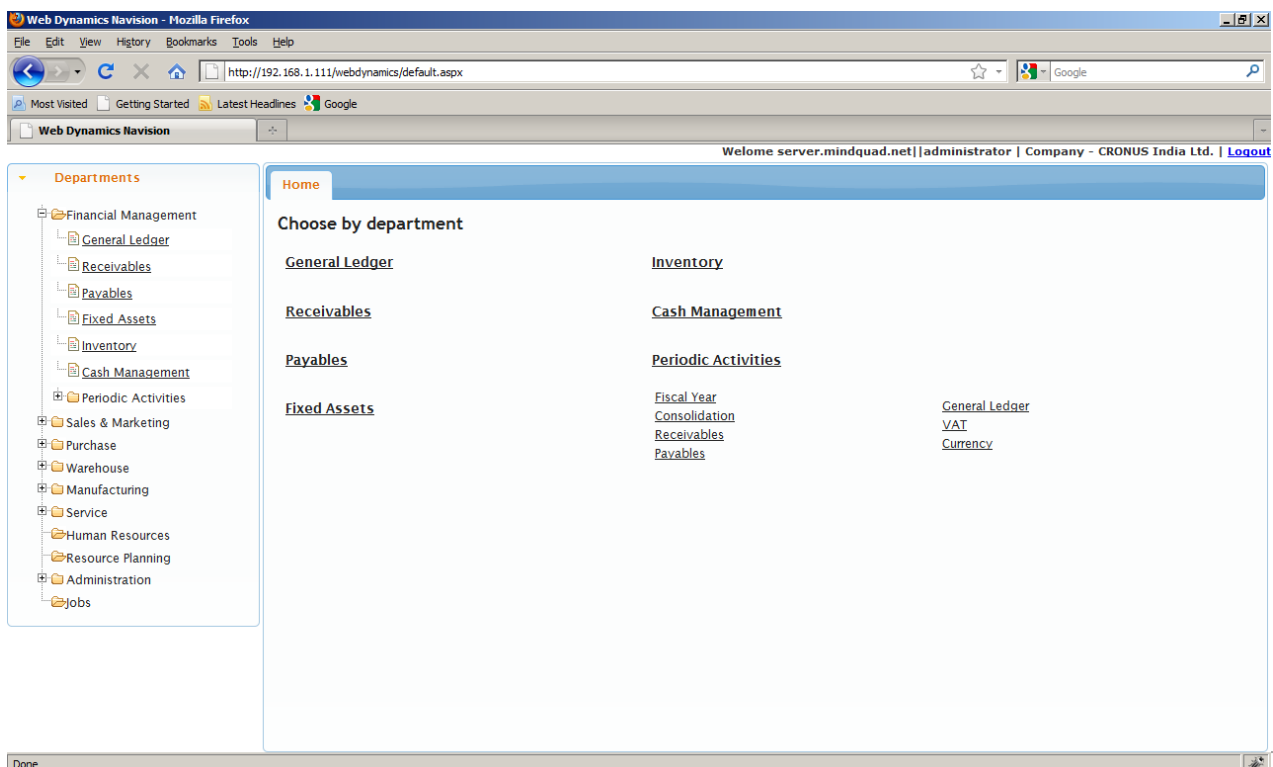
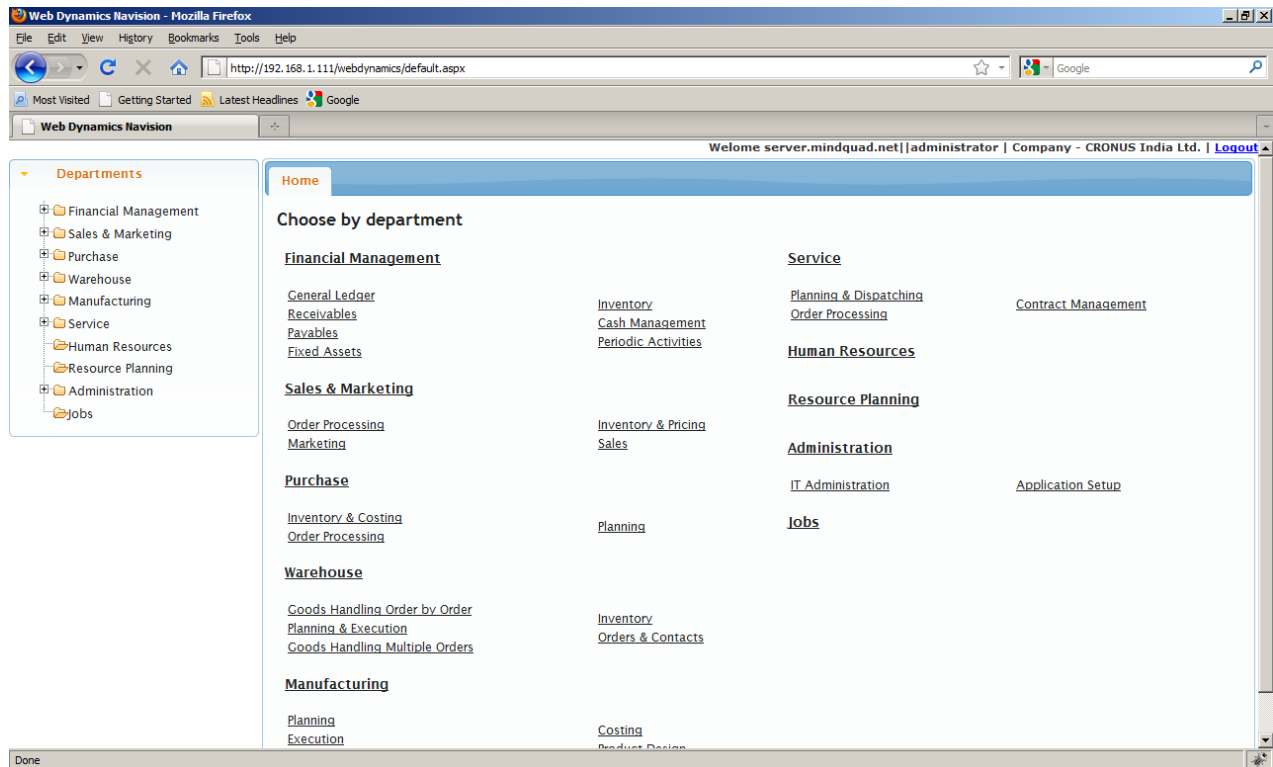
1. Any actions which are executed through a C/SIDE code will not be available automatically on the web page but could be individually customized, for e.g. in Item Card → Invoicing tab → Standard Cost field. Here the drill down is executed through a C/SIDE code on the Item Card form, which will not be available on the web client automatically.
2. The web pages for all matrix forms, e.g. Analysis by Dimension, will have to be customized independently and with limited functionality only.
3. The web pages for all worksheet forms, e.g. Item Journal, will have to be customized independently and with limited functionality only.
4. All document reports will be available dynamically on the web page provided that a single document number is used. E.g. Sales Order.
5. Reports, such as Customer Aging will be available automatically provided that pre-defined filters have been used on the Role Tailored Client.

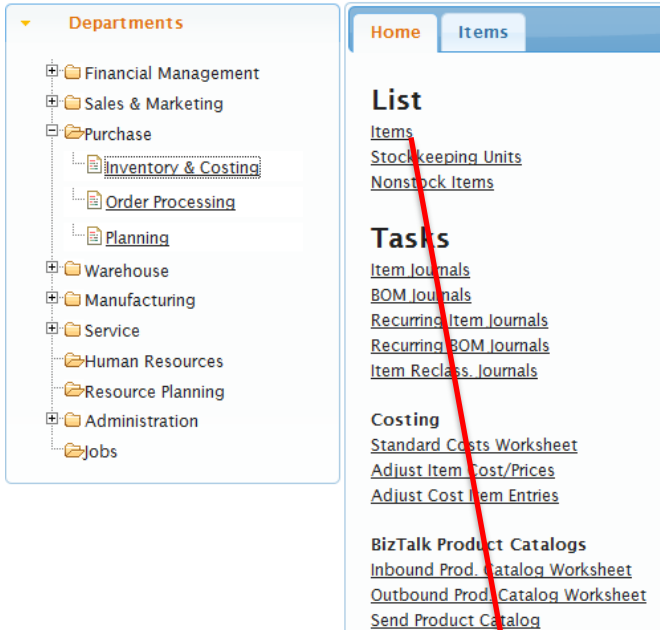
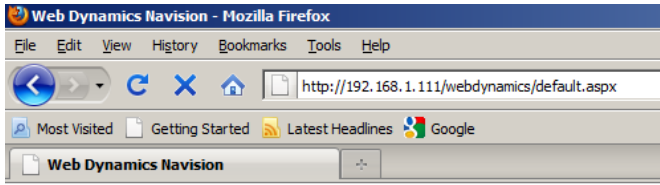
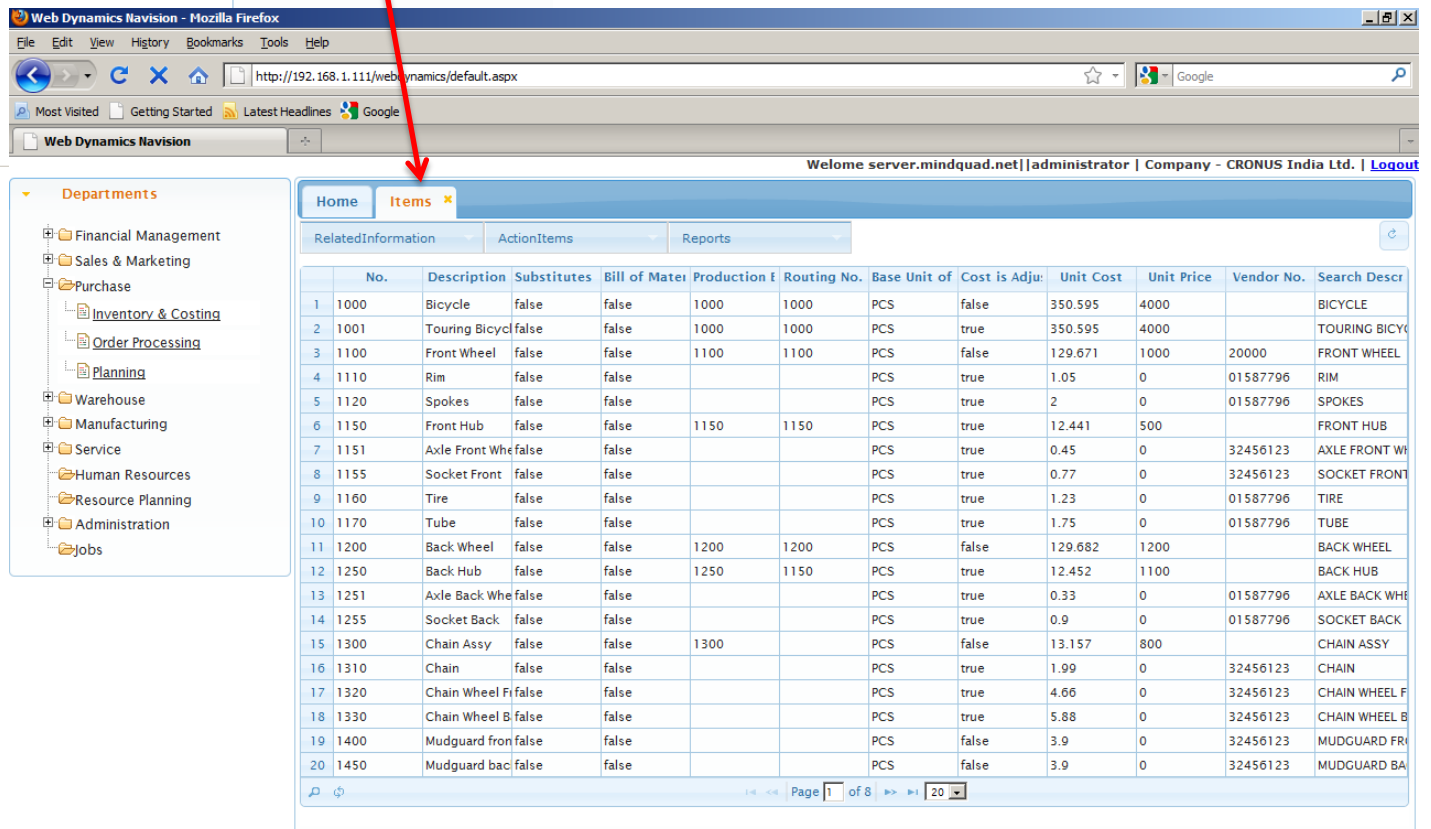


Pre-requisites:

1. The Microsoft Dynamics NAV 2009 SP1 or R2 solution must be deployed on Microsoft SQL Server 2005/2008.
2. Installed free SQLite Database Engine.
3. Additional Forms & Pages – 3 Nos.
4. Additional Codeunits – 5 Nos.
5. The number of Forms, Pages and Codeunits would increase in case of extensive customizations.

Graphical examples below – for illustrative purposes only
(ASP.Net / C# application using Microsoft Dynamics NAV 2009 R2 Web Services)



No.	Description	Substitutes	Bill of Mater	Production I	Routing No.	Base Unit of	Cost is Adju	Unit Cost	Unit Price	Vendor No.	Search Descr
1	1000 Bicycle	false	false	1000	1000	PCS	false	350.595	4000		BICYCLE
2	1001 Touring Bicycl	false	false	1000	1000	PCS	true	350.595	4000		TOURING BICYC
3	1100 Front Wheel	false	false	1100	1100	PCS	false	129.671	1000	20000	FRONT WHEEL
4	1110 Rim	false	false			PCS	true	1.05	0	01587796	RIM
5	1120 Spokes	false	false			PCS	true	2	0	01587796	SPOKES
6	1150 Front Hub	false	false	1150	1150	PCS	true	12.441	500		FRONT HUB
7	1151 Axle Front Whe	false	false			PCS	true	0.45	0	32456123	AXLE FRONT WH
8	1155 Socket Front	false	false			PCS	true	0.77	0	32456123	SOCKET FRONT
9	1160 Tire	false	false			PCS	true	1.23	0	01587796	TIRE
10	1170 Tube	false	false			PCS	true	1.75	0	01587796	TUBE
11	1200 Back Wheel	false	false	1200	1200	PCS	false	129.682	1200		BACK WHEEL
12	1250 Back Hub	false	false	1250	1150	PCS	true	12.452	1100		BACK HUB
13	1251 Axle Back Whe	false	false			PCS	true	0.33	0	01587796	AXLE BACK WH
14	1255 Socket Back	false	false			PCS	true	0.9	0	01587796	SOCKET BACK
15	1300 Chain Assy	false	false	1300		PCS	false	13.157	800		CHAIN ASSY
16	1310 Chain	false	false			PCS	true	1.99	0	32456123	CHAIN
17	1320 Chain Wheel Fr	false	false			PCS	true	4.66	0	32456123	CHAIN WHEEL F
18	1330 Chain Wheel B	false	false			PCS	true	5.88	0	32456123	CHAIN WHEEL B
19	1400 Mudguard fron	false	false			PCS	false	3.9	0	32456123	MUDGUARD FR
20	1450 Mudguard bac	false	false			PCS	false	3.9	0	32456123	MUDGUARD BA

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- Financial Management
- Sales & Marketing
- Purchase
 - Inventory & Costing
 - Order Processing
 - Planning
- Warehouse
- Manufacturing
- Service
- Human Resources
- Resource Planning
- Administration
- Jobs

Home Items No. x

RelatedInformation ActionItems

General Invoicing Replenishment Planning Foreign Trade Item Tracking E-Commerce Warehouse Tax Information

General

No. 1000 Inventory 32 v

Description Bicycle Qty. on Purch. Order 0 v

Base Unit of Measure PCS Qty. on Prod. Order 44 v

Bill of Materials Qty. on Component Lines 0 v

Shelf No. F4 Qty. on Sales Order 116 v

Automatic Ext. Texts Qty. on Service Order 0 v

Created From Nonstock Item Service Item Group v

Item Category Code Blocked

Product Group Code Last Date Modified 12/12/2010

Search Description BICYCLE

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Home Items No. x

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General

No. 1000 Inventory 32 v

Description Bicycle Qty. on Purch. Order 0 v

Base Unit of Measure PCS Qty. on Prod. Order 44 v

Bill of Materials Qty. on Component Lines 0 v

Inventory

Posting I	Entry Ty	Documer	Documer	Item No.	Descript	Location	Quantity	Invoiced	Remainir	Sales Am	Cost Am	Cost Am	Open	Entry No
1	9/9/2011 Output	_blank_	1011001	1000			5	0	5	0	0	0	true	308
2	9/10/201 Output	_blank_	1011002	1000			27	0	27	0	0	0	true	309

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- Sales & Marketing
 - Order Processing
 - Marketing
 - Inventory & Pricing
 - Sales
- Purchase
- Warehouse
- Manufacturing
- Service
- Human Resources
- Resource Planning
- Administration
- Jobs

Home Sales Orders No. x

RelatedInformation ActionItems

General Invoicing Shipping Foreign Trade E-Commerce Prepayment Tax Information

General

No. 1002 Order Date 12/21/2010

Sell-to Customer No. 10000 Document Date 12/21/2010

Sell-to Contact No. CT000001 Requested Delivery Date

Sell-to Customer Name The Cannon Group PLC Promised Delivery Date

Sell-to Address Chirak Delhi Road 28 Quote No.

Sell-to Address 2 External Document No.

Sell-to Post Code IN-110001 Salesperson Code PS

Sell-to City New Delhi Campaign No.

Sell-to Contact Mr. Andy Teal Opportunity No.

No. of Archived Versions 0 Responsibility Center CHENNAI

Structure Assigned User ID

Posting Date 12/21/2010 Status Open

Type	No.	Description	Location Code	TCS Nature of Collection	Quantity	Reserved Quantity
<input type="checkbox"/> Item					0	0

Add Remove Selected

Welcome server.mindquad.net | admini

Departments

- Financial Management
- Sales & Marketing
 - Order Processing
 - Marketing
 - Inventory & Pricing
 - Sales
- Purchase
- Warehouse
- Manufacturing
- Service
- Human Resources
- Resource Planning
- Administration
- Jobs

Home Sales Orders No. x

RelatedInformation ActionItems

General Invoicing

General

No. 1002

Sell-to Customer No. 10000

Sell-to Contact No. CT000001

Sell-to Customer Name The Cannon Group PLC

Sell-to Address Chirak Delhi Road 28

Sell-to Address 2

Sell-to Post Code IN-110001

Sell-to City New Delhi

Sell-to Contact Mr. Andy Teal

No. of Archived Versions 0

Structure

Posting Date 12/21/2010

Functions

- Posting
- Print

Calculate Invoice Discount

Get Std. Cust. Sales Codes

Copy Document

Archive Document

Move Negative Lines

Create Whse. Shipment

Create Inventory Put-away / Pick

Send Approval Request

Cancel Approval Request

Release

Reopen

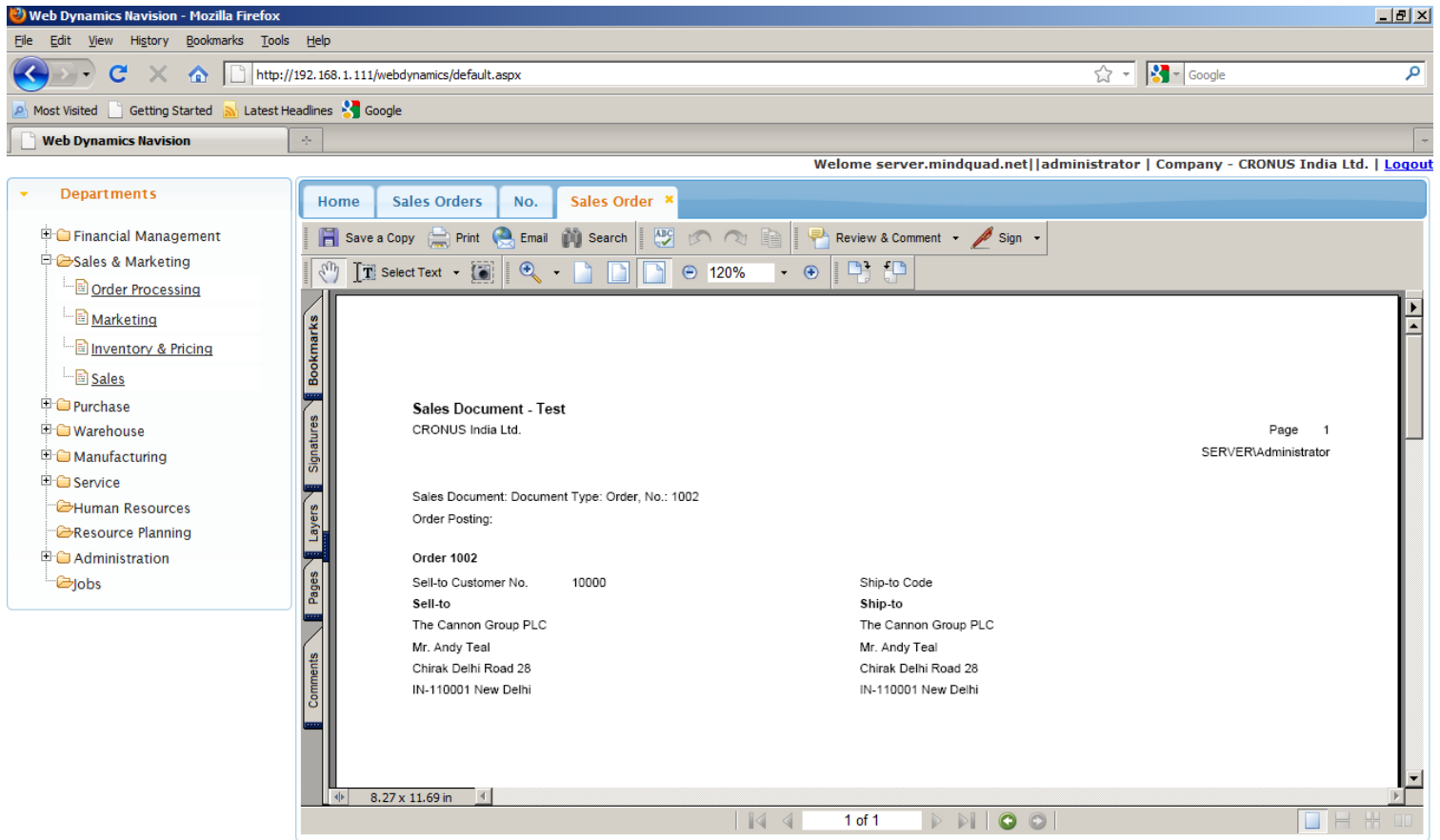
Send BizTalk Sales Order Cnfm.

Send IC Sales Order Cnfm.

Type	No.	Description
<input type="checkbox"/> Item		

Add Remove Selected

Sample Sales Order Test Report rendered in PDF Viewer



The screenshot shows a Mozilla Firefox browser window displaying a PDF report from the Microsoft Dynamics NAV web interface. The browser's address bar shows the URL `http://192.168.1.111/webdynamics/default.aspx`. The page title is "Web Dynamics Navigation". The browser's status bar at the bottom indicates the user is logged in as "administrator" for "Company - CRONUS India Ltd." and provides a "Logout" link.

On the left side of the browser window, there is a "Departments" sidebar with a tree view containing the following items:

- Financial Management
- Sales & Marketing
 - Order Processing
 - Marketing
 - Inventory & Pricing
 - Sales
- Purchase
- Warehouse
- Manufacturing
- Service
- Human Resources
- Resource Planning
- Administration
- Jobs

The main content area of the browser displays a PDF document titled "Sales Document - Test" from "CRONUS India Ltd.". The document is page 1 of 1, with the user "SERVERAdministrator" logged in. The PDF content includes the following details:

Sales Document: Document Type: Order, No.: 1002
Order Posting:

Order 1002

Sell-to Customer No.	10000	Ship-to Code	
Sell-to		Ship-to	
The Cannon Group PLC		The Cannon Group PLC	
Mr. Andy Teal		Mr. Andy Teal	
Chirak Delhi Road 28		Chirak Delhi Road 28	
IN-110001 New Delhi		IN-110001 New Delhi	

The PDF viewer interface includes a toolbar with options like "Save a Copy", "Print", "Email", "Search", "Review & Comment", and "Sign". The document is displayed at 120% zoom. The status bar at the bottom of the PDF viewer shows the dimensions "8.27 x 11.69 in" and "1 of 1".

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Departments

- Financial Management
 - General Ledger
 - Receivables
 - Payables
 - Fixed Assets
 - Inventory
 - Cash Management
- Periodic Activities
- Sales & Marketing
- Purchase
- Warehouse
- Manufacturing
- Service
- Human Resources
- Resource Planning
- Administration
- Jobs

Home Chart of Accounts

Related Information Action Items Reports

Add Delete Selected

	No.	Name	Income/Balance	Account Type	Totaling	Gen. Posting Ty	Gen. Bus. Posti	Gen. Prod. Post	Net Change
1	1000	BALANCE SHEET	Balance_Sheet	Heading		_blank_			0
2	1002	ASSETS	Balance_Sheet	Begin_Total		_blank_			0
3	1003	Fixed Assets	Balance_Sheet	Begin_Total		_blank_			0
4	1005	Tangible Fixed Assets	Balance_Sheet	Begin_Total		_blank_			0
5	1100	Land and Buildings	Balance_Sheet	Begin_Total		_blank_			0
6	1110	Land and Buildings	Balance_Sheet	Posting		_blank_			102731434.3
7	1120	Increases during the Year	Balance_Sheet	Posting		Purchase	NATIONAL	MISC	12822.6
8	1130	Decreases during the Year	Balance_Sheet	Posting		Sale	NATIONAL	MISC	0
9	1140	Accum. Depreciation, Building	Balance_Sheet	Posting		_blank_			-36567202.6
10	1190	Land and Buildings, Total	Balance_Sheet	End_Total	1100..1190	_blank_			66177054.3
11	1200	Operating Equipment	Balance_Sheet	Begin_Total		_blank_			0
12	1210	Operating Equipment	Balance_Sheet	Posting		_blank_			40473186.8
13	1220	Increases during the Year	Balance_Sheet	Posting		Purchase	NATIONAL	MISC	2079075.96
14	1230	Decreases during the Year	Balance_Sheet	Posting		Sale	NATIONAL	MISC	0
15	1240	Accum. Depr., Oper. Equip.	Balance_Sheet	Posting		_blank_			-35218889.3
16	1290	Operating Equipment, Total	Balance_Sheet	End_Total	1200..1290	_blank_			7333373.46
17	1300	Vehicles	Balance_Sheet	Begin_Total		_blank_			0
18	1310	Vehicles	Balance_Sheet	Posting		_blank_			3435344.4
19	1320	Increases during the Year	Balance_Sheet	Posting		Purchase	NATIONAL	MISC	7867466.9
20	1330	Decreases during the Year	Balance_Sheet	Posting		Sale	NATIONAL	MISC	0

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