



IBM Software Group

**2004 WDI / WBIC Customer Conference**  
*Global Business Transformation*

**B2B Architectural Overview (WBIC and WDI)**

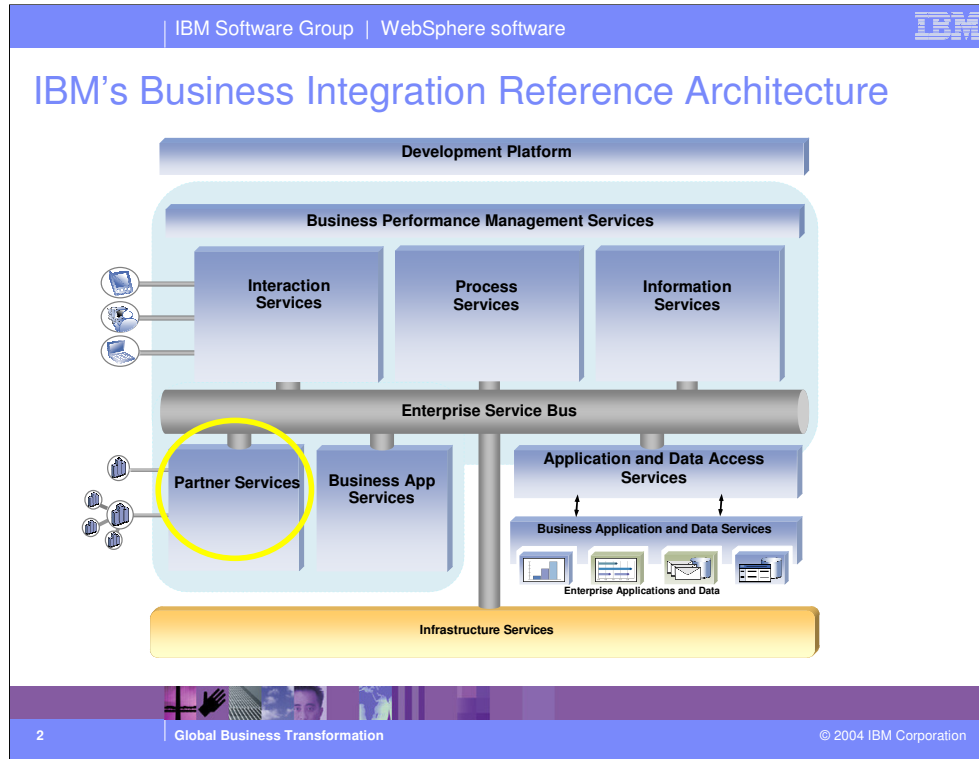
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**WebSphere.** software



 e-business software

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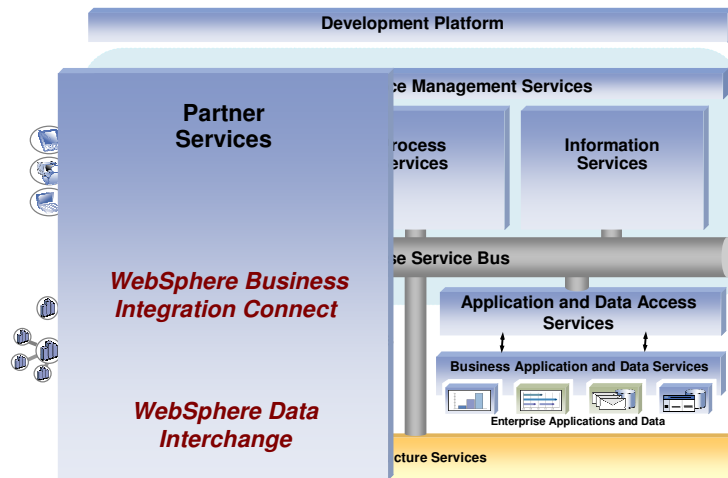
Partner Services is the discussion topic for this presentation.

Business logic services provide the capability to implement and integrate business functions into sequences of operation that implement business processes. These services allow existing applications and data to be re-used, new business logic to be added, and services of third party systems to be fully utilized.

**Partner Services – This layer of services provides support for traditional B2B partner integration solutions**

- Community:** Allows for the management of the trading community for both the hub manager as well as providing partner self-management functions
- Document:** Enables the support for business protocols such as RosettaNet and AS1/AS2 as well as state management for public process conversations
- Protocol:** Provides transport level services including authentication, document routing and other edge services for automated document interchange

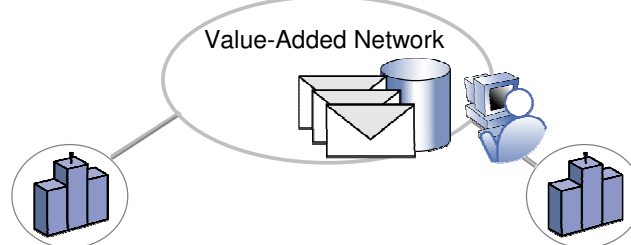
## Business Integration Reference Architecture



WebSphere Business Integration Connect and WebSphere Data Interchange are the two primary products which provide Partner Integration Services – additionally other B2B solution architectures are possible with other IBM BI products as well (and these will be covered within the presentation)

## Business-to-Business Models

- First generation Business-to-Business
  - Electronic Data Interchange (EDI), used to transmit business elements in an electronic form over VANs
    - EDl provides a way to normalize data into a form that represents business transactions such as Purchase Orders, Invoices and Advance Ship Notices
- Second generation Business-to-Business
  - VANs start selling translation software to customers cutting the translation cost and moved some business to software maintenance model.
  - Software had links to the VAN for connectivity to retain customers.



B2B has moved through a series of generations – the initial development of EDI gave rise quickly to VANs to manage trading partner relationships. A value-added network (VAN) is a private network provider (sometimes called a turnkey communications line) that is hired by a company to facilitate electronic data interchange (EDI) or provide other network services. Before the arrival of the Internet, some companies hired value-added networks to move data from their company to other companies.

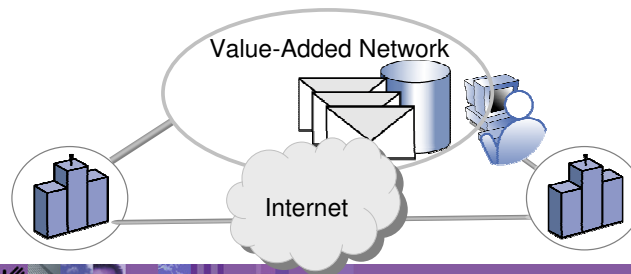
## Value Added Network(s)

- Basic VAN Service
  - Receive, store, and forward EDI transactions (electronic mailbox)
  - Provide audit trail for EDI transactions
  - Security & Privacy by definition
  - Interconnect (between different VANs)
  - In-network translation (usually charged extra)
- Extra Services
  - Trading Partner Ramping (\$50-\$400/partner)
  - Mapping & Translation of Data
  - Outsourcing of Complete EDI program
- New ASP models being Introduced
  - Flat fee pricing per partner
  - Other options: forms based, browser front-end, EDIINT
  - XML-centric data translation

A value-added network (VAN) is a private network provider (sometimes called a turnkey communications line) that is hired by a company to facilitate electronic data interchange (EDI) or provide other network services. Before the arrival of the World Wide Web, some companies hired value-added networks to move data from their company to other companies. With the arrival of the World Wide Web, many companies found it more cost-efficient to move their data over the Internet instead of paying the minimum monthly fees and per-character charges found in typical VAN contracts. In response, contemporary value-added network providers now focus on offering EDI translation, [encryption](#), secure e-mail, management reporting, and other extra services for their customers.

## Business-to-Business Models

- Third generation Business-to-Business (Hybrid)
  - Introduces the Internet using secure Internet protocols (EDIINT, SSL, SSH, VPN) or “extranets”.
  - Provides Peer-to-Peer communications eliminating the use of VAN connectivity
  - Translation software required on both ends
  - 80 percent of EDI Business-to-Business still transferred through VANs



With the arrival of the Internet, many companies found it more cost-efficient to move their data over the Internet instead of paying the minimum monthly fees and per-character charges found in typical VAN contracts. In response, contemporary value-added network providers now focus on offering EDI translation, encryption, secure e-mail, management reporting, and other extra services for their customers. It should be noted that in the wake of the Internet-based solutions, the VAN/traditional EDI vendors have enabled Internet integration and have slashed prices for VAN integration to be competitive. Bit VANs are not going away for the near to mid term.

## Technical Challenges

- Platforms – AIX, Linux, Solaris, Windows, OS/400, z/OS...
- Integration – 3 Generations
  - ETL – Extract Transform and Load
  - EAI – Enterprise Application Integration
  - ESB – Enterprise Service Bus
- Security – PKI, Self-Sign Certificates, Firewall...
- Service Providers – VAN, Vertical Market Places

## Business Challenges

- Reduce Communication Costs
- Speed to Enable Partner Connections
- Management of Partners from a Single Gateway
- Reporting and Tracking



## Why EDI?

- EDI Provides Speed
  - Data travels in seconds or minutes across the Globe
  - Data is available immediately
  - Reduced Business Cycle Time
- EDI Improves Accuracy
  - Data is usually derived from a database or end system
  - Accurate transfer regardless of size
  - Eliminates manual processing which incurs errors
- EDI Reduces Costs
  - Reduction of overhead costs
  - Cost savings from reduced error rates
  - Reduction of inventory costs through shortening of cycle times
- EDI is Flexible
  - Phased in approach
- EDI is a Powerful Management tool
  - Improves business process management

EDI provides a standard communication data format that... EDI provides Speed, Improves Accuracy, Reduces Cost, Has flexibility, Improves process



## EDI Formatting

- **Data Element:** a unitary piece of information; describes:
  - the type of data
  - min/max length,
  - conditional values
- **Segment:** a logical group of data elements; defines:
  - All mandatory data elements
  - Any optional or conditional data elements
  - Required sequence of data elements
  - Maximum number of occurrences of segment
- **Message:** segments collected together to form a complete electronic document. The definition of a message includes:
  - Which segments may be used in message
  - Required sequence of messages
  - Which segments are mandatory versus optional
  - How many times a segment can be repeated
  - Specific rules for repeating, looping, and usage  
*(NB- message structure will depend on EDI standard)*

EDI Formatting is the exchange of business documents in a commonly agreed format that comply with EDI standards such as ANSI X12 or EDIFACT. EDI standards are basically data standards that provide the syntax and semantics of the data being exchanged. For example Data Elements, Data Segments and the Data Message all need to meet guidelines in the subsections above.



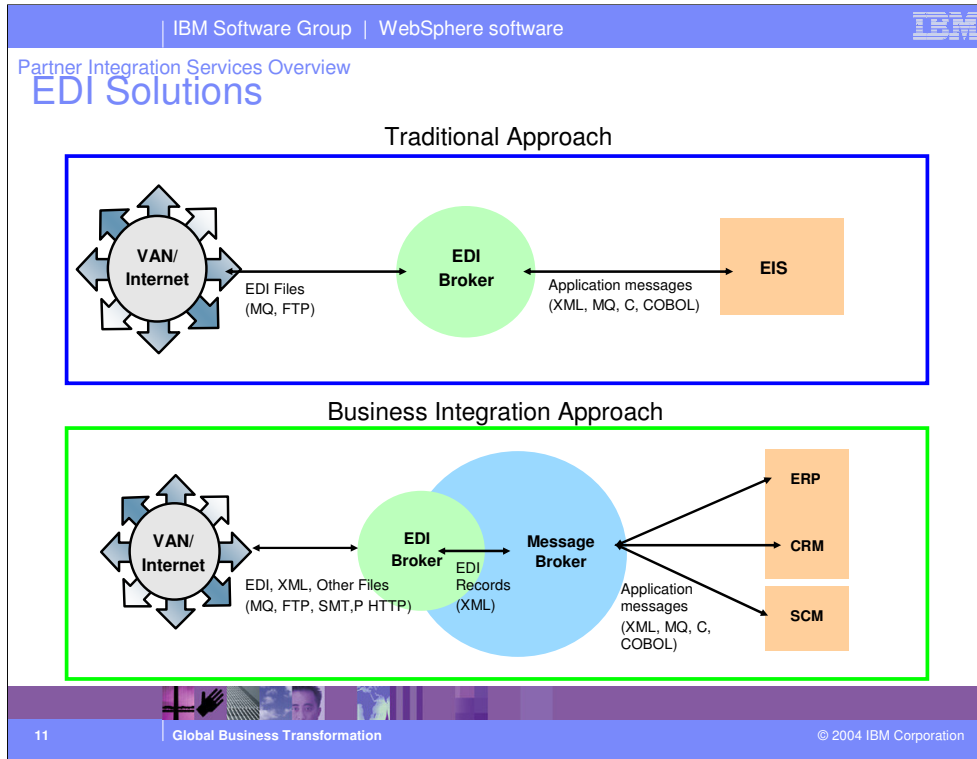
## Example of EDI Document

Date: 12/31/97	Purchase Order # 4001		
<b>PURCHASE ORDER</b>			
Vendor: ABC Supplies P.O. Box 180 Baltimore, MD 21239	Ship To: Concurrent Technologies Corporation 1450 Scalp Ave Johnstown, PA 15904		
Quantity	Description	Price	Amount
2	Legal Pads LP8X11	\$8.00/DZ	\$16.00

```

ISA*00*          *00*          *01*192062998  *12*6022433990
GS*PS*192062008*6022433000*970316
ST*850*0001^
BEG*00*NE*4001**971231^
N1*VN*ABC Supplies^
N3*P.O.Box 180^
N4*Baltimore*MD*21239^
N1*ST*Concurrent Technologies Corporation^
N3*1450 Scalp Ave^
N4*Johnstown*PA*15904^
PO1*1*2*DZ*8.00**VP*LP8X11^
CTT*1^
SE*11*0001
GE*1*1184...
IEA*1*000600143...
    
```

Here is an example of an EDI document, how it would look if it were printed on Purchase Order form and how it would be sent if it were an EDI document. Notice that there are two additional segments to envelope the transaction.



The traditional EDI architecture includes the business application(s), an EDI translator and a Value Added Network (or VAN) to provide communications with the trading partner community. This method reduces cycle times, provides a level of automation and integration and reduces errors associated with rekeying of information.

The business integration architecture incorporates the EDI component within the message broker to provide a more seamless and flexible flow of information between the trading community and the business applications.

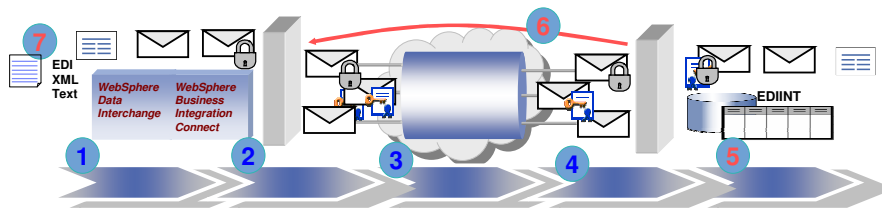
Partner Integration Services Overview  
Basics Of EDI-INT

- **EDI-INT: What is it?**
  - **Electronic Data Interchange over the Internet (EDI-INT) is an Internet standard, defining a common transport method for sending EDI messages over the Internet. EDI-INT enables EDI transactions through SMTP email with enhanced encryption and security through S/MIME.**
- **Strengths:**
  - Low Cost, high access, instant transactions (not batch)
- **Weaknesses:**
  - Complexity of implementation, overall traction in B2B
  - Security and authentication, message audit logging
- EDI-INT is a transport methodology, not a different EDI standard
- Other “wannabe EDI retro” methods:
  - XML/EDI; EDI over FTP; EDI in XML, EDI Gateways
  - IEDIT (client-server), Forms-based EDI, and more...

The purpose of the EDIINT specification is to ensure interoperability between EDI user agents that invoke a commonly expected security feature.

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*Electronic Data Interchange over the Internet (EDI-INT) is an Internet standard, defining a common transport method for sending EDI messages over the Internet. EDI-INT enables EDI transactions through SMTP email with enhanced encryption and security through S/MIME.* This document is also NOT limited to strict EDI use, but applies to any electronic commerce application where business data needs to be exchanged over the Internet in a secure manner.

## How does EDI-INT work?

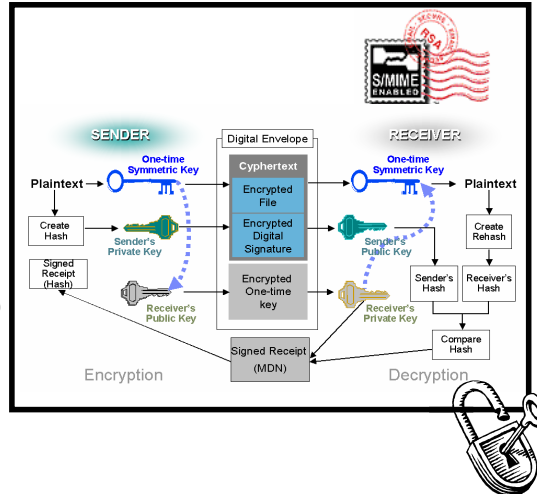


- |  |   |
|--|---|
| 1. Translate a document                | 5. Decryption / Validation  |
| 2. Apply Profile Management & Security | 6. Non-repudiation of receipt<br>Message Disposition Notification (MDN) |
| 3. Communication Management            | 7. Message Signals, Events and Reporting<br>to applications             |
| 4. Authentication                      |   |

This slide will step you through the process of a round-trip EDIINT document.

## EDI-INT Provides Secure Packaging

- **Basic S/MIME packaging**
- **Provides standards based security**
  - Privacy/Confidentiality
  - Authentication
  - Integrity
- **EDI-INT adds:**
  - Non-Repudiation (Digital Receipt)
    - Message Disposition Notification (MDN)
  - Tested for Interoperability
- **Uses Digital Certificates**

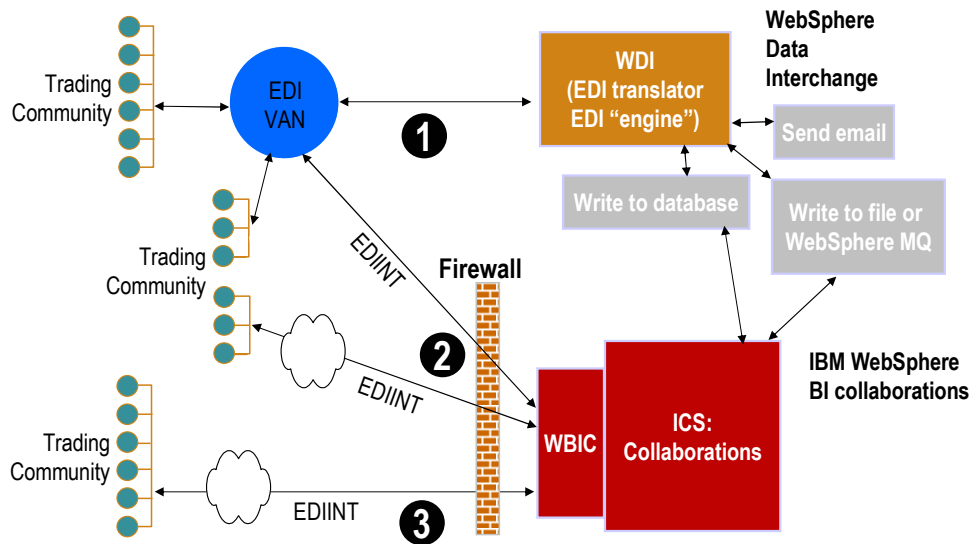


**EDIINT** places ordinary X12 messages in an s/mime envelope. The s/mime guarantees confidentiality and non-repudiation of the transaction source. S/mime communicates digital signatures, encryption parameters, certificates and keys. Secret keys are generated for each message, RSA encrypted and exchanged in-band as part of the EDIINT exchange. EDIINT includes specification of message disposition notification (MDN) to provide for receipt and notification of appropriate message decryption and authenticity verification. EDIINT explicitly supports a variety of data transport protocols: SMTP, FTP and HTTP.

Relevance:

Example:

## EDI/VAN vs. XML/Internet :



Segue:

1. Currently, all trading partners are using the VAN to transfer EDI documents. The WebSphere Data Interchange software translates the EDI data into a human readable email message as well as writing information into a file and into a database. There are over 100,000 lines of WebSphere Data Interchange scripts that perform various tasks, but these scripts were written over a decade and none of the WebSphere Data Interchange scripting authors are available.
2. While some trading partners want to move off of the VAN and use EDIINT software, others might still require or demand using the VAN. Some expense can be saved on the receiving end since the VAN is not responsible for as many features, such as security.
3. Eventually, all trading partners move off of the VAN, and send encrypted documents using the Internet. The Internet is shown as a cloud in the slides.

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Partner Integration Services Overview  
**B2B Process Integration**

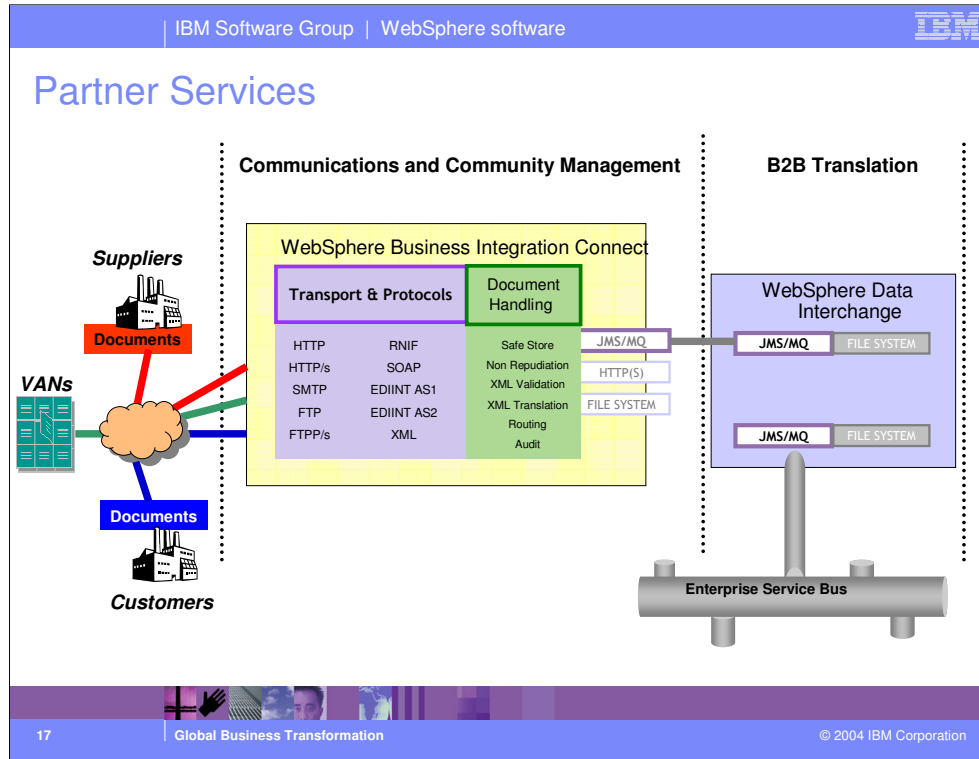
Message-centric	Process-centric
<ul style="list-style-type: none"> <li>▪ Batch</li> <li>▪ 10% of B2B processes</li> <li>▪ VAN-enabled</li> <li>▪ EDI X12/EDIFACT/JECALS</li> <li>▪ Regional – NA / EMEA / AP</li> <li>▪ Large businesses</li> <li>▪ Custom industry dictionaries</li> </ul>	<ul style="list-style-type: none"> <li>▪ Real-time</li> <li>▪ 100% of B2B processes</li> <li>▪ Internet-enabled</li> <li>▪ XML</li> <li>▪ Global</li> <li>▪ All businesses</li> <li>▪ Standard industry dictionaries</li> </ul>

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Lingua franca for eBusiness

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B2B integration is moving from a Message-Centric Batch approach of moving business data to a Process-Centric approach. The slide above shows the differences between these integration solutions – in a nutshell, we are moving away from a document exchange solution to a conversational approach for interacting with partners – much of the reason for this is to increase the efficiency and preciseness of B2B interactions.





So what is “Partner Services”? If we look at it from a software point of view, there are two primary components:

WebSphere Business Integration Connect primary function is to handle the Communication and Community Management function of integrating with your trading partners. It manages the transport protocols, such as HTTP and FTP, etc. It also manages the Message protocols such as EDIINT AS1, AS2. And it provides for some basic validation and translation (XML Stylesheets) and routing to the appropriate next process.

Note that I show the next process is WDI for translation, the data actually could be routed to the ESB or directly to an application using MQ, HTTP or file structures

The other component is WebSphere Data Interchange. Its primary function is to provide data transformations between the file formats used by the trading partner (EDI, XML, Flatfile) and the formats provided by the internal environment. It also provides for some specific value added functions such as Functional Acknowledgemtn generation and reconciliation, data content validation and substitution, and routing.

Note that I show the next process is the ESB for disposition, response data (another transaction or Functional acknowledgement) actually could be routed to back to WBIC for sending to trading parnters, or directly to an application using MQ, file structures.

## Partner Services

- **Framework Services**
  - Console-based viewing and administration
  - Document and event search services
  - Partner on-boarding services
    - Connection test services
    - Profile creation
  - Alert/exception management (event and volume alerts)
  - Security Management
    - Certificate management
    - User and group registration
- **Hub Management Services**
  - Configuration Management (Hub/Console)
  - Operations Management
- **Partner Management Services**
  - Connection Provisioning
  - Profile Management
  - User/group management

This provides for community integration services and is the key differentiator of the WBI Connect solution architecture.

## Services Provided within Partner Integration

- **Community:** Allows for the management of the trading community for both the hub manager as well as providing partner self-management functions
- **Document:** Enables the support for business protocols such as RosettaNet and EDIINT AS1/AS2 as well as state management for public process conversations
- **Protocol:** Provides transport level services including authentication, document routing and other edge services for automated document interchange

### **Partner Services – This layer of services provides support for traditional B2B partner integration solutions**

- **Community:** Allows for the management of the trading community
- **Document:** Enables the support for business protocols and document standards
- **Protocol:** Provides transport level services

## Protocol Services

- Transport Management (HTTP/HTTPS, FTP, SMTP)
  - Non-EDI Document Exchange via AS/2 or HTTP/HTTPS
  - EDIINT (AS1 and AS2)
  - RNIF 1.1 and 2.0
  - JMS/WebSphere MQ
  - Web Services/SOAP
  - cXML Support
- Transport Level Security/Client Authentication (HTTPS/SSL)
- Transport Level Retry
- Message Header Parsing/Processing
- “Pluggable” protocol support

You may remember the “delivery” component from the architecture schematic. This is the component responsible for TRP to partners as well as to EAI.

Supports multiple transports to partners: HTTP/S, FTP, SFTP, SMTP

Supports multiple transports to EAI: HTTP/S, JMS

### Interoperability

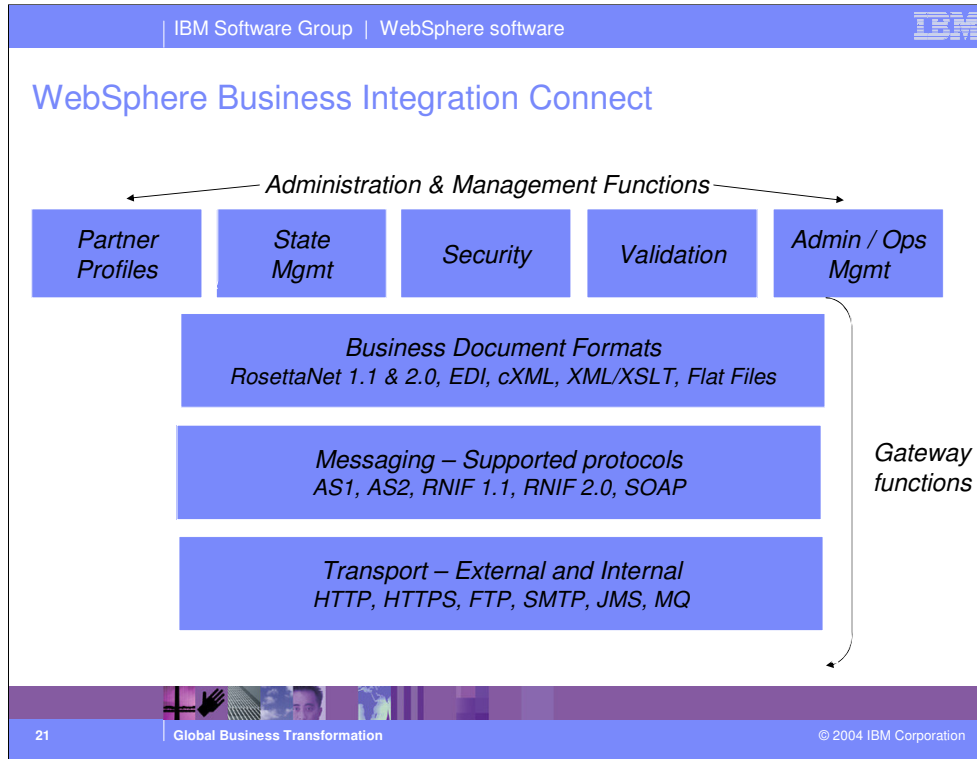
- Within the enterprise
- Outside the enterprise: facilitated by compliance with industry standards

### Retries

- HTTP-level transport retries
- RN-level and business level process retries based on trading partner agreements (as part of document services)

### Message queuing

- Messages that cannot be delivered are queued for delivery at a later time
- Queuing and retry parameters are all configurable



IBM has recognised that community integration is not achieved out of the box. It requires considerable expertise in planning and support to build, run and manage an integrated community of trading partners. IBM has recognised that the likely participants in the new generation of B2B environments have different requirements.

Accordingly, WebSphere BI Connect is available in three editions.

- Express** is designed for small to medium-sized businesses that want to integrate with a very small number of partners as quickly, simply and affordably as possible. The number of partners could be as many as five under a single license. Typically, the Express customer needs to connect to a large and important trading partner at that partner's request, while maybe not possessing a great amount of in-house IT expertise.
- Advanced Edition** is designed for companies that need to connect to a growing number of trading partners, with a potentially high number of trading partner connection definitions or a large number of transactions. Trading communities are fluid, thus the number of connections maintained by a company will fluctuate. Advanced Edition provides the flexibility to connect to all trading partners as required. It supports multiple partners, transports and multiple data formats
- Enterprise Edition** is ideal for large enterprises building a hub where any number of partner connections may be required. As such, it permits unlimited connection definitions.

Community Management operations are enabled via the Console component which administers the hub instance. In addition to providing visibility into hub operations, partners can log into the Community Console to view specific information related to the relationship with the Community Hub operations e.g. their partner profile, partner-specific interactions (inbound and outbound) with the hub) etc.

## Transport, Routing, and Packaging

- Supports multiple transports, including HTTP/S, FTP/S, and SMTP
- Proven interoperability with other B2B software
- Transport-level and Process-level retries
- Messages queued on failure for resubmit
- Supports multiple transports/protocols
  - EDIINT (AS1 and AS2)
  - Traditional Document Exchange via AS/2 or HTTP/HTTPS
  - RNIF 1.1 and 2.0
  - JMS/WebSphere MQ for internal integration
  - SOAP – RPC and Document Literal (Rel. 4.2.1)
  - XML

You may remember the “delivery” component from the architecture schematic. This is the component responsible for TRP to partners as well as to EAI.

Supports multiple transports to partners: HTTP/S, FTP, SFTP, SMTP

Supports multiple transports to EAI: HTTP/S, JMS

### Interoperability

- Within the enterprise: with WebSphere BI (Interchange) Server as well as with WebSphere Data Interchange
- Outside the enterprise: facilitated by compliance with industry standards. We intend for both our AS2 and RN capabilities to be certified

### Retries

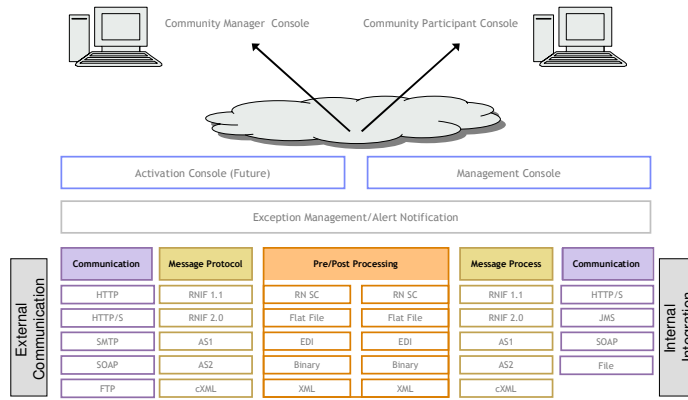
- HTTP-level transport retries
- RN-level process retries based on trading partner agreements

### Message queuing

- Messages that cannot be delivered are queued for delivery at a later time
- Queuing and retry parameters are all configurable



## Community Integration Document Processing



## Document Validation and Pre/Post-Processing

- Structure and syntax validation assures file format compliant with corresponding XML schema at runtime
  - Data validation includes type, length, and range checks
  - Cardinality checks for optional and required fields
- Document Pre/Post-Processing
  - XSLT can provide additional processing at the “edge”
  - XSLT can be authored with WebSphere Studio (or other tools) during design time and deployed for run time use
- Integration with WebSphere Data Interchange and 3<sup>rd</sup> Party EDI Transformation Tools via JMS/WebSphere MQ and File integration

The delivery component also performs validation

- Structure and Syntax

- XML schema for RN PIPS will be available as a download

- Data

- Can be validated based on preloaded XSD as part

Appropriate people can be notified validation exceptions via e-mail as well as other exception conditions



## Security

- Support for authentication, authorization, encryption services, and audit/non-repudiation
- WebSphere BI Connect integrated certificate management via private secured keystore
- System Security
  - Access control using permission model for configuring and enforcing user/developer access rights
  - Ability to restrict document routing and SOAP operations
  - Transport-layer security (SSL) provides server-based and client-based authentication
  - Provides for concurrent support of digital certificates from multiple certificate authorities
- Document Security
  - Supports encryption / decryption and digital signatures
  - Ability to secure and validate the authenticity of documents
- Full support for proxy and reverse proxy services

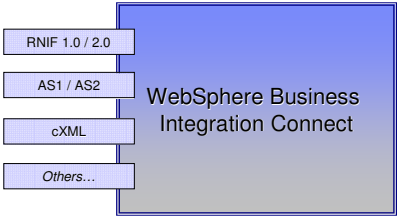
We're using PKI and industry-standard encryption and security tools to safeguard the transmission of all data. As new technologies emerge in core WAS (e.g. WS-Security, WS-Federation) as part of the code refactoring, these features will be directly supported within WebSphere BI Connect as well.

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WebSphere Business Integration Connect – Technical Features

## Extensible Architecture

- Pluggable Protocols and Packagers
  - Provide interface to create and 'plug-in' protocols
  - Documented for Customers, Services and Partners
    - Establish Business Partner Program
  - WBI Connect to leverage framework for supported protocols



The diagram illustrates the extensible architecture of WebSphere Business Integration Connect. It features a central blue box labeled 'WebSphere Business Integration Connect'. To its left, four light blue boxes represent pluggable protocols: 'RNIF 1.0 / 2.0', 'AS1 / AS2', 'cXML', and 'Others...'. Each protocol box is connected to the central component by a thin line, indicating its integration into the framework.

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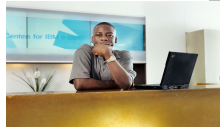
### **User Exits Protocols and Packagers:**

One of the challenges we are currently faced with in WBI Connect (and frankly any b2b product faces), is supporting the countless protocols that our customers/prospects need. While we will have some core protocols we'll want to build into the product, we have many others that are just not practical for IBM to development. This is very similar to the Adapter model. With the User Exits: Protocols & Packagers, we will provide the ability for customers, services and Partners to develop and seamlessly plug-in Protocols they need.

Of course, to ensure customers and partners can truly leverage the power of the user exits, we will provide complete documentation.



## Real-time Visibility for Community Participants



### Community Participant

Reports		Tools/Utilities	
Volume	Exceptions	Document Analysis	Original Document
Processes	Document Status	Partner Connection	Data Validation
Viewers		Administration	
Process Viewer	Event Viewer	User Mgmt	Profile Mgmt
Activation Console (Services Offering)		Alerts	
Process Guidelines	Readiness Assessment	Exception Alerts	Timed Alerts
Phase & Step Status	Document Library	Inactivity Alerts	Custom Alerts

- Real-time views into trading operations
- Full administration and monitoring
- Views are partner-specific



## Real-time Visibility for Community Managers



- Tools to provide community management services
- Full administration and monitoring for community

Community Manager			
Viewers		Tools	
Community Events		Post Test Message	
Activation Console (Future)		Administration	
Community Status		Partner Mgmt	Security Mgmt
Reports		Tools/Utilities	
Volume	Exceptions	Document Analysis	Original Document
Processes	Document Status	Partner Connection	Data Validation
Viewers		Administration	
Process Viewer	Event Viewer	User Mgmt	Profile Mgmt
Activation Console (Services Offering)		Alerts	
Process Guidelines	Readiness Assessment	Exception Alerts	Timed Alerts
Phase & Step Status	Document Library	Inactivity Alerts	Custom Alerts



## Real-time Visibility for Community Operators

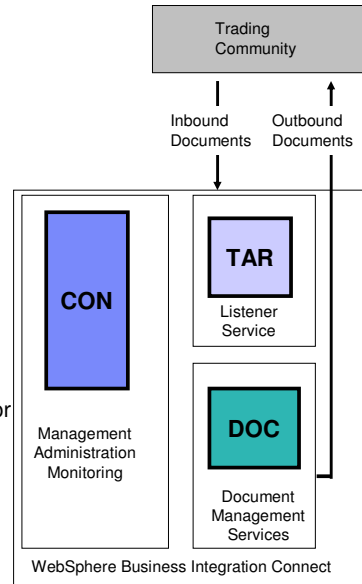


- Tools to provide hub operation and configuration services
- Operation management tools

Community Operator			
Viewers		Community Administration	
Activity Viewer		Console Branding Mgmt	Process Mgmt
Gateway Queue		Password Policy Mgmt	Document Mgmt
Activation Console		Administration	
Content Mgmt		Channel Mgmt	Gateway Mgmt
Viewers		Tools	
Community Events		Post Test Message	
Activation Console (Future)		Administration	
Community Status		Partner Mgmt	Security Mgmt
Reports		Tools/Utilities	
Volume	Exceptions	Document Analysis	Original Document
Processes	Document Status	Partner Connection	Data Validation
Viewers		Administration	
Process Viewer	Event Viewer	User Mgmt	Profile Mgmt
Activation Console (Services Offering)		Alerts	
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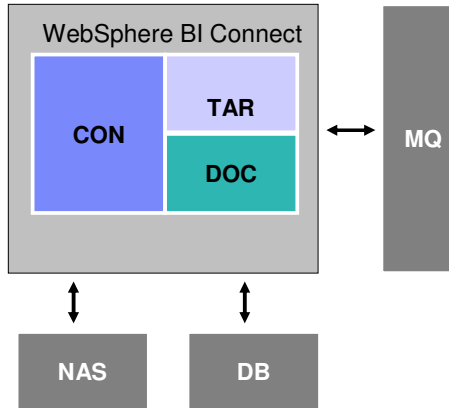
## Software Components

- Target (TAR)
- Document Manager (DOC)
  - State Engine (STE)
  - Document Processing Engine (DPE)
  - Delivery Manager (DM)
- Community Console (CON)
- WAS provides container management for components



## Infrastructure Architecture

- Shared Storage
  - Role: Document Storage
  - Components Access Same File System
  - NAS/NFS Recommended
- Database
  - Role: Metadata Storage
  - Oracle 9i (9.2)
  - DB2 8.1.2
- Messaging Queue
  - Role: Event Management
  - JMS/WebSphere MQ 5.3



## Representative Configuration Topologies

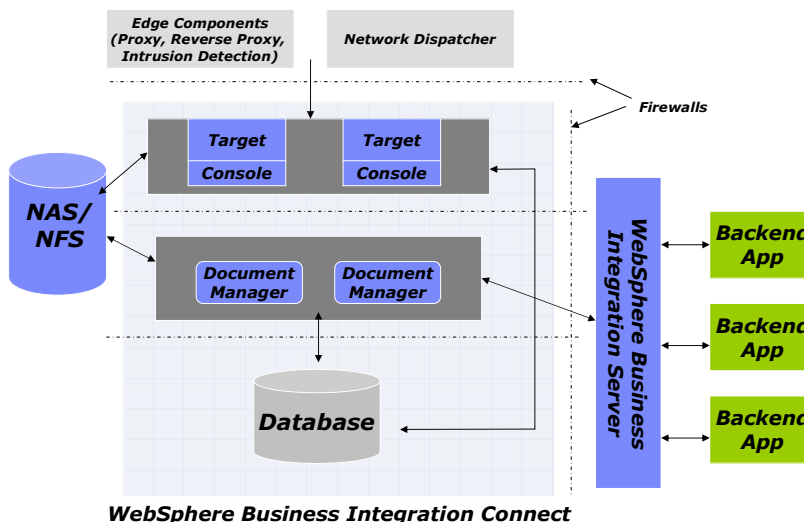
- Consolidated Server
  - Single Server (CON, TAR, DOC)
- Split Server
  - Front-End Server (CON, TAR)
  - Document Manager (DOC)
- Distributed Server
  - Console Server (CON)
  - Document Target Server (TAR)
  - Document Manager (DOC)
- WebSphere MQ and DB2 can be on same processor or external
- Factors affecting topology decisions include availability and scalability requirements as well as integration with existing security infrastructures

This slide lists the three major configuration topologies – however many other solution architectures can be supported as well due to loosely coupled architecture of the product.





## Representative Deployment Configuration



As a result of the loosely coupled component architecture of WebSphere BI Connect – this diagram shows a possible configuration for a deployment solution. Additionally Reverse Proxy, Intrusion Detection Solutions, Network Load Dispatching can be in front of the Target as well and are directly supported as part of the overall topology. There is a technical brief on security topology which goes into more depth on this area.



## WebSphere Data Interchange Introduction

### WDI is an ANY to ANY Data Transformation application

- WDI integrates electronic data interchange (EDI) into the business process and Internet-based B2B capabilities provided by the WebSphere family, for a seamless, integrated EDI Solution.
  - WDI is functionally consistent across all platforms
  - WDI is part of an overall product integration strategy...

*\*.....subsequent product releases, to further integrate WebSphere Data Interchange with WebSphere MQ Integrator, WebSphere Business Integration Connect and other WebSphere products.....\**

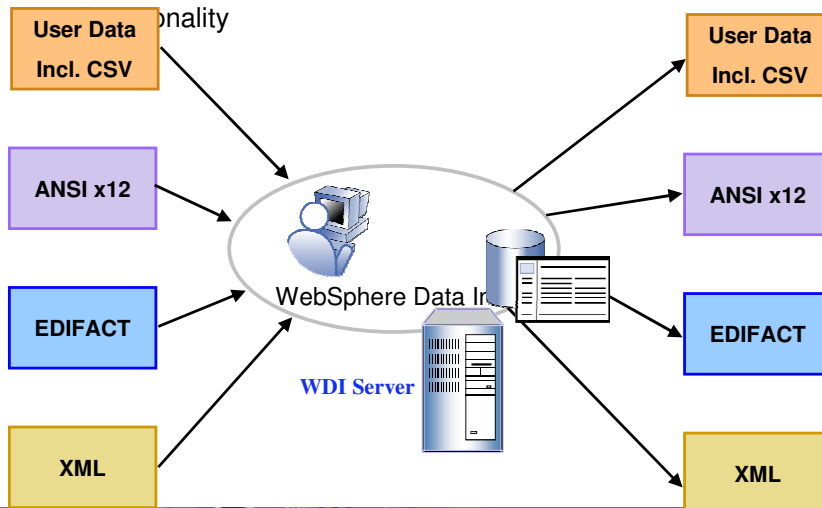
Supported Standards (all versions)	X12	EDIFACT	ODETTE	UNTDI	TDCC	UCS	Tradacoms
	VICS	Standards Variations	XML	ebXML Payload	Customized	Flat Files	Comma Delim

Data Translation application: WDI operates on multiple platforms including Windows 2000, AIX, OS/390 and z/OS.

Data Mapping Tool: WDI Client operates on Windows platforms including WIN 98, 2000 and NT.

## WebSphere Data Interchange: Supported Formats

- Any-to-any Data Translation



WebSphere Data Interchange provides Any-to-Any data transformation. The DI Client interface includes a new Create Map Wizard and new mapping screens to support Any-to-Any mapping.

## WebSphere Data Interchange v3.2: Overview

### ➤ Data Mapping Tool

WDI Client

**common user interface** for Multiplatforms and z/OS servers

Port Maps across platforms

create and deploy maps, add Trading Partners



**WDI  
Client**

### ➤ Data Translation application

WDI v3.2 Server (W2K, AIX and z/OS)

Provides translation of data from one format to another i.e. EDI (X12, EDIFACT), XML or Application Data Formats (User Data)

Native application formats can be mapped directly to a standard, without intermediate formatting or programming steps



**WDI  
Server**

- Customize data standards to fit business needs
- Manage transactions securely and efficiently
- Utilize WebSphere MQ message queuing and other communications methods
- Integrate with existing applications i.e. WebSphere MQ Integrator

Data Translation application: WDI operates on multiple platforms including Windows 2000, AIX, OS/390 and z/OS.

Data Mapping Tool: WDI Client operates on Windows platforms including WIN 98, 2000 and NT.

## WDI Client: Tooling and Administration

- Used to create and manage your
  - Data formats (application data definitions)
  - Standards
  - Maps
  - Profiles
  - Rules
- Create map wizard used to create and deploy maps
  - Choose data transformation source/target
  - a map is set of instructions to translate data from one format to another
  - allows the description of meta-data format definitions i.e.,
- Maps are compiled for efficiency
- No additional charge for WDI Client

An improved WDI Client provides support for target based mapping. The new Create Map Wizard also provides setup support for new Data Transformation maps.

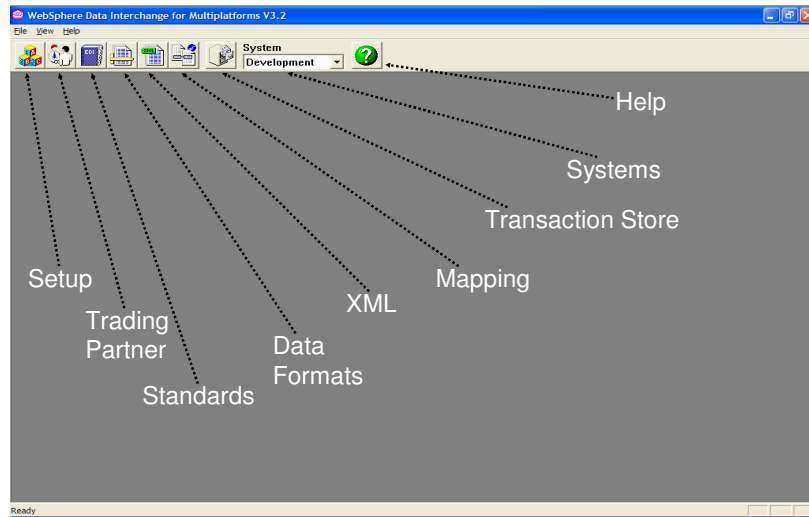
## Functional Highlights

- **Multi-process (multi-threaded) capability**
  - Support for concurrent users and applications
- **Compiled maps**
  - Byte-code representation
  - Reduces I/O operations, improves performance
- **One-Pass Inbound translation**
  - adds mapping flexibility
- **Execute from command line or API**
  - Application program interface (API) to integrate directly with your application
  - Map promotion from development to production
- **Continuous throughput API**
  - High performance option, start and forget
- **Event driven**
  - use included WMQ trigger program (multi-platform version)
  - or CICS (z/OS version)

- **Mapping support includes:**
  - Any-to-any mapping
  - XML DTD import
  - Literals/constants
  - Accumulators, arithmetic and logical operations
  - Qualified loop and element mapping
  - Hierarchical loop mapping
  - Envelope field mapping
  - User exits at the field level
  - User-defined translation and validation tables
  - Boolean logic
  - Deferred Mapping, Special Logic (DIMAPSWITCH, DI MAPCHAIN)
- **Trading Partner Maps**
  - Specific; One to many (shared); Multiple versions
  - Migration – Between Standards & Systems
- **EDI Reporting and Auditing**
  - Trading partner relationships including
    - transaction sets used
    - last communication exchange
  - Envelope and transaction status Exception information
  - SAP R/3 certified
  - Management (statistical) reporting



## WDI Client Main Screen



# WDI Client: Send/Receive Mapping

The screenshot displays the WebSphere Data Interchange for Multiplatforms V3.2 interface. The window title is "WebSphere Data Interchange for Multiplatforms V3.2 - [Development - Send Map - MMTHL1DS]". The interface is divided into two main panes. The left pane, titled "Data Format", shows a tree structure under "DAVES" with nodes: MMTHL1REC, TRADINGPART, ACFELD, FILLER, ELIGBEGDATE, ELIGENDDATE, SUBSCRIBER, DEPFIRSTNAME, DEPLASTNAME, and DEPOB. The right pane, titled "EDI Standard", shows a tree structure under "Application Control Fields" with nodes: 271 [Health Care Eligibility/Benefit Information], 20 M BHT [Beginning of Hierarchical Transaction], 1 M 1005 [Hierarchical Structure Code], Literal of: 0022, 2 M 353 [Transaction Set Purpose Code], Literal of: 11, 3 O 127 [Reference Number], ACFIELD in MMTHL1REC, 4 O 373 [Date], Literal of: Adate, 5 O 337 [Time], Literal of: :dtime, 6 O 640 [Transaction Type Code], 10 M HL Loop: Qualified by HL Logic - Qualified by Base Node 1, Node 1, HL03 Value of 20, 10 M HL [Hierarchical Level], 20 O TRN [Trace], 25 O AAA [Request Validation], 30 O NM1 Loop: Qualified by Occurrence # 1, 10 M HL Loop Repeated: Qualified by HL Logic - Qualified by Base Node 1, Node 2, HL03 Value of 21, P, 10 M HL Loop Repeated: Qualified by HL Logic - Qualified by Base Node 1, Node 3, HL03 Value of 22, P, 10 M HL Loop Repeated: Qualified by HL Logic - Qualified by Base Node 1, Node 4, HL03 Value of 23, P. A blue dashed arrow points from the "MMTHL1REC" node in the left pane to the "ACFIELD in MMTHL1REC" node in the right pane. The text "Data Format" is written in red in the left pane, and "EDI Standard" is written in red in the right pane. The bottom of the window shows a taskbar with "Ready", "40", "Global Business Transformation", and "© 2004 IBM Corporation".





# WDI Client : Data Transformation Mapping

WebSphere Data Interchange for Multipatforms V3.2 - [Development - Data Transformation Map - POXML5SR-EDI]

File Actions Edit Navigate View Window Help

System Development

General Details Comments

Source: DTD\TESTS\POXML5SR

- OrderSR [(Header.DetailLoop\*Trailer)]
  - Header [(PONum,PODate,Sender,Receiver)]
    - Header.ATTLIST
      - typecode
    - PONum [(#PCDATA)]
    - PODate [(#PCDATA)]
    - Sender [(Id,Qualifier)]
    - Receiver [(Id,Qualifier)]
    - DetailLoop [(ItemNumber,SubDetail\*)]
    - Trailer [(ItemCount,TotalsBucks\*)]

Target: EDI Standard Transaction\X12\4R1\850

- Table: 1
  - 20 M BEG [Beginning Segment for Purchase Order]
  - 1 M 353 [Transaction Set Purpose Code]
  - 2 M 92 [Purchase Order Type Code]
  - 3 M 324 [Purchase Order Number]
  - 4 O 328 [Release Number]
  - 5 M 373 [Date]
  - 6 O 367 [Contract Number]
  - 7 O 567 [Acknowledgment Type]
  - 8 O 1019 [Invoice Type Code]
  - 9 O 1166 [Contract Type Code]
  - 10 O 1232 [Purchase Category]
  - 11 O 796 [Security Level Code]
  - 12 O 640 [Transaction Type Code]
  - 40 O CUR [Currency]
  - 50 O REF [Reference Identification]
  - 60 O PER [Administrative Communications Contact]
  - 70 O TAX [Tax Reference]
  - 80 O FOB [F.O.B. Related Instructions]
  - 90 O CTP [Timing Information]
  - 95 O PAM [Period Amount]
  - 110 O CSH [Sales Requirements]

Source

Target

POXML5SR-EDI

- OrderSR [(Header.DetailLoop\*Trailer)]
  - Header [(PONum,PODate,Sender,Receiver)]
    - Header.ATTLIST
      - Table: 1 20 M BEG [2 M 92\ = 'NE'
    - PONum [(#PCDATA)]
    - PODate [(#PCDATA)]
    - Sender [(Id,Qualifier)]
    - Receiver [(Id,Qualifier)]
    - DetailLoop [(ItemNumber,SubDetail\*)]
    - Trailer [(ItemCount,TotalsBucks\*)]

Mapping Commands

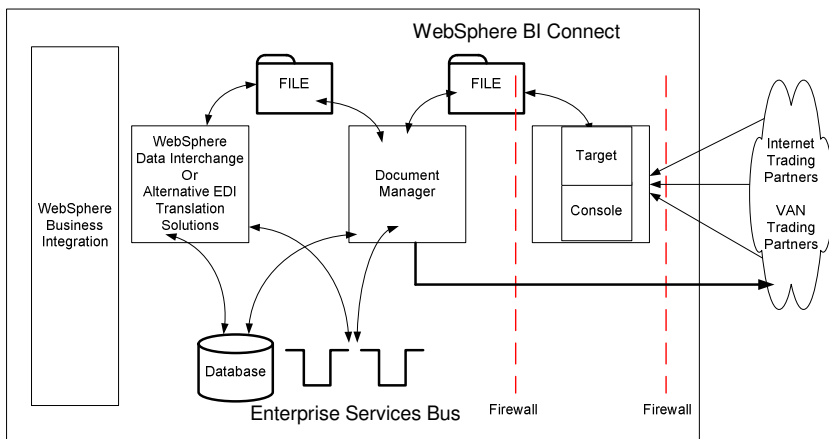
Global Variable Name	Local Variable Name	Special Variable Name	Scope	Data Type
	ItemCount	DIOUTType	Doc...	Character
		DIOUTFile	Doc...	Character

Variables

Ready

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## WebSphere Data Interchange Integration



WBI = WebSphere Business Integration Server  
 WDI = WebSphere Data Interchange  
 WBI-C = WebSphere Business Integration Connect  
 VAN = Value Added Network

In terms of integrating with EDI solution offerings (including WDI) the above diagram shows the basic document flow into and out of the EDI transformation engine. In the use of WebSphere BI Connect with non-WDI EDI transformation offerings which may already be installed at a customer site (e.g. Sterling Gentran, GXS Application Integrator or Inovis Harbinger), the technology could interface to WebSphere BI Connect either via JMS/MQ or via Files.



B2B Integration  
WebSphere Business Integration Connect -Express





## WebSphere Business Integration Connect – Express

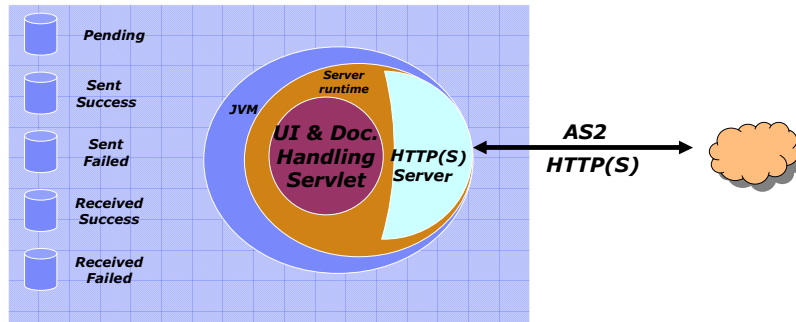
- WebSphere Business Integration Connect – Express is a light-weight, easy to use, cost-effective B2B connectivity tool, leveraging AS2 and HTTP standards for transmitting documents securely over the internet
- Differs from WebSphere BI Connect Advanced/Enterprise by providing a participant solution (versus gateway hub solution)
- AS2 certification from Drummond Group

WebSphere BI Connect Express V4.2 is designed to provide the same core functional capability of the Advanced and Enterprise products, but without the extensive scalability and features required for a community manager. As a result, WebSphere BI Connect Express provides a simple, browser based gateway with a very small footprint and low price. WebSphere BI Connect Express was designed for the company which is required to provide it's trading partner(s) with B2B capability, but has little to no IT expertise in house.

In short, WebSphere BI Connect – Express is a small, easy to install, easy to use, cost-effective B2B connectivity tool. It uses AS2 standards for transmitting documents securely over the internet and will be Drummond certified at release.

## WBI Connect – Express Architecture

Connect to a max of 5 partners with file based integration





## Browser-based GUI

- Analyze, track, and investigate all aspects of your B2B exchange
- View information about queued documents that are pending transmission and acknowledgement
- View historical information about successfully sent or failed documents
- View, add, and update public certificates and private key
- Configure email alert notifications for document transmission failure
- Send and receive documents

## Secure Message Routing

- Supports HTTP/S transport for SSL server and client authentication
- AS2 packaging for secure Internet connectivity
  - Supports document signing / verifying
  - Supports document encryption / decryption
  - Supports document compression
- Stores and transmits any document format, e.g.:
  - XML (OAG, proprietary, etc.)
  - EDI
  - Text Files
  - Binary, etc.



## Back-end System Integration

- Simple, file-based interface adaptable to any back-end system
- File-based interface enables direct integration with WebSphere Data Interchange
- Use in concert with JText Adapter to interface with WebSphere Business Integration Server
- Provides inbound and outbound directories for each partner along with appropriate error directories

WebSphere BI Connect Express uses a file-based transport scheme and directory structure to support document exchanges.



## WBI Connect – Express Partner Capabilities

WebSphere Business Integration Connect Express - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: Back to WebSphere Business Integration Connect Express

WebSphere Business Integration Connect - Express

Reports | AS2 | HTTP | Configuration | Security | Logout | Help

Participants | AS2 | HTTP | My Profile

Manage Participants

Create Participant

Edit	Participant	Capabilities				Alerts	Delete
		Inbound		Outbound			
		HTTP	AS2	HTTP	AS2		
	partnerOne						

= Full Capabilities = Partial Capabilities = Disabled

NOTE: The option to delete participants will not be displayed if the participant still has pending documents in any send directory.

Legend:  
 = Edit  
 = Delete

Local intranet

## WBI Connect – Express Partner Summary

WebSphere Business Integration Connect Express – Microsoft Internet Explorer

Address: http://localhost/qc/login.do;JSESSIONID=61h2krg9F49h

WebSphere Business Integration Connect – Express

Reports | AS2 | HTTP | Configuration | Security | Logout | Help

Document Summary | Participant Summary | Activity Logs

**Document Summary**

Participant	Pending Transmission	Pending MDN	Received			Sent			Clear
			Success	Failed	Size (MB)	Success	Failed	Size (MB)	
partnerOne	0	0	26	0	0.07	24	0	0.05	<input type="checkbox"/> All <input type="checkbox"/>

Clear

WebSphere software



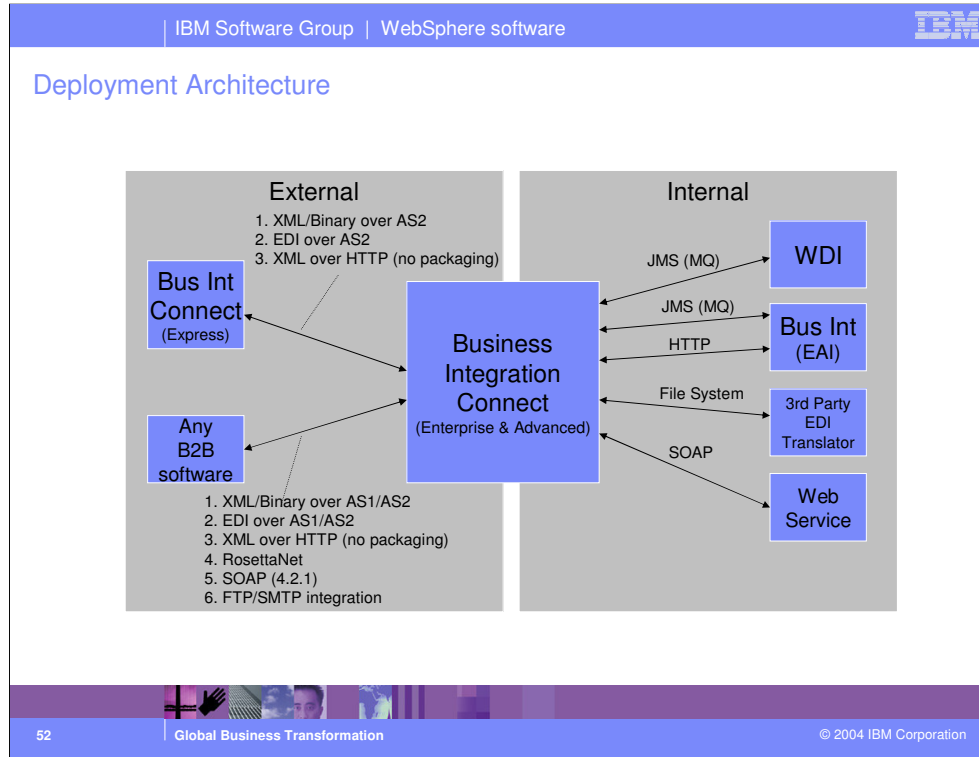
## WBI Connect – Express Sent Document Log

The screenshot shows the WebSphere Business Integration Connect Express interface in Microsoft Internet Explorer. The browser address bar shows the URL: http://localhost/qc/as2SentSummary.do. The page title is "WebSphere Business Integration Connect Express". The navigation menu includes Reports, AS2, HTTP, Configuration, Security, Logout, and Help. The main content area is titled "Sent Documents" and displays search filters and results.

**Sent Documents Search Results**

Date/Time	Successful	Failed	Document Size (kb)		Time to Process (hh:mm:ss)	
			Average	Max	Average	Max
2003-11-13 16:00:00	0	0	0	0	00:00:00	00:00:00
2003-11-13 15:00:00	2	0	4	4	00:00:00	00:00:00
2003-11-13 14:00:00	3	0	4	4	00:00:01	00:00:02
2003-11-13 13:00:00	1	0	4	4	00:00:01	00:00:01
2003-11-13 12:00:00	0	0	0	0	00:00:00	00:00:00

Search filters: Participant: All Participants, Content Type: All, File Size: All, Date/Time: Between 11:00 11/13/2003 - 16:00 11/13/2003.



WebSphere Business Integration Connect (Business Integration Connect) 4.2.1 Advanced and Enterprise supports a number of transport protocols for document exchange between Business Integration Connect and internal application integration, including JMS, HTTP, and file system. XML, flat file, EDI, binary and RosettaNet are examples of document types exchanged between Business Integration Connect and internal applications. UTF-8 encoding, at the transport level, is used both inbound and outbound document exchange.

WebSphere BI Connect Adv/Ent can support all protocols e.g. FTP, SMTP, RN, SOAP (whereas WebSphere BI Connect Express supports only HTTP, HTTPS and AS2). WebSphere BI Connect (both Advanced/Enterprise as well as Express) can interact with other solutions as well – and this will be a logical configuration for many partner interactions.

## WebSphere Business Integration Connect and WebSphere Data Interchange Review

- WebSphere Business Integration Connect enables *complete* community integration
- Capability to translate EDI documents
- Scalable from small to large communities
- Provides complete visibility of trading partner community
- Enables rapid implementation of trading partner communities
- Leverages WebSphere MQ/JMS for WebSphere Business Integration connectivity
- Supports any data type, EDI, XML, Binary, Custom
- Support for multiple security trust models based on topology and partner requirements

Business requirements are changing and the technology is morphing as well. Managing Networks of trading partners is far more challenging and more related to the “Business Management” acumen of our Enterprises than ever before, as opposed to being only an IT challenge of connectivity and reporting. It is key to stay current on the developments in this space esp. with respect to Web Services and Standards.

Trading partner agreements are defined in much more detailed, broader terms. They may be constituted by multiple data exchange formats, such as EDI, or specified File Formats (FTP, as an example), or the trading partner agreement may include process related standards exchange, like adherence to NEMI (National Electronics manufacturing Institute) PDX messages or OAG BOD process content. Regardless the details, a B2B relationship now encompasses a more complete set of issues relating to the Community Integration. These factors enable the WebSphere BI Connect approach to offer a comprehensive solution for the problem set faced by our customers.

Solve complex problems easily – for example, compliance to service level agreements is a powerful analytic tool, which is necessary in a B2B platform. Captured in a disciplined, and routine manner, capturing compliance to acknowledgement turn-around, business volume statistics and the like can enrich the relationships established electronically.

Lastly – start simple – focus on the problem and don’t “boil the ocean” – if you provide a solution to the problem – you have won half of the battle. By addressing B2B requirements as a set of compelling events, you be successful in driving a solution oriented approach for B2B solution architecture. With the WebSphere BI Connect technology, customers can scale from a small trading community consisting of 3-5 partners to a complete trading community consisting of tens, hundreds and thousands of trading partners.

## The use of patterns enable architects to implement solutions through the reuse of components.

### Pattern Types

- **Business patterns**
  - identify interaction between users, businesses, and data.
- **Integration patterns**
  - tie multiple Business patterns together when a single Business pattern won't do
- **Composite patterns**
  - represent commonly occurring combinations of Business patterns and Integration patterns.
- **Application patterns**
  - provide a conceptual layout describing how application components and data interact within a Business pattern or Integration pattern.
- **Runtime patterns**
  - define the logical middleware structure supporting an Application pattern... depicting major middleware nodes, roles, and interfaces between these nodes.

### The Patterns for e-business layered asset model

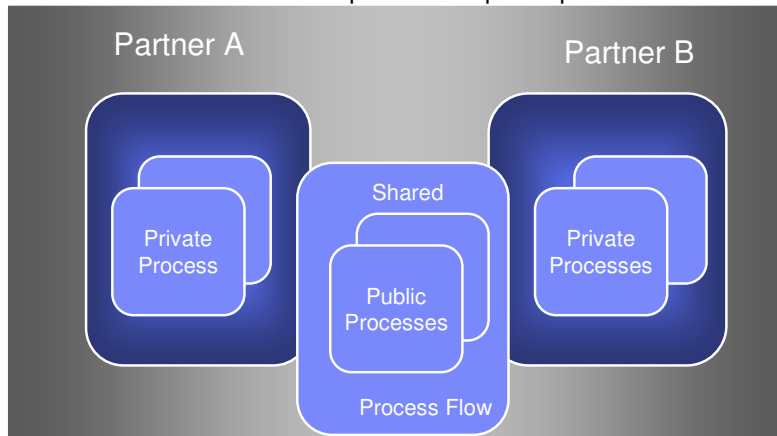
The Patterns for e-business approach enables architects to implement successful e-business solutions through the re-use of components and solution elements from proven successful experiences. The Patterns approach is based on a set of layered assets that can be exploited by any existing development methodology. These layered assets are structured in a way that each level of detail builds on the last. These assets include:

- Business patterns that identify the interaction between users, businesses, and data.
- Integration patterns that tie multiple Business patterns together when a solution cannot be provided based on a single Business pattern.
- Composite patterns that represent commonly occurring combinations of Business patterns and Integration patterns.
- Application patterns that provide a conceptual layout describing how the application components and data within a Business pattern or Integration pattern interact.
- Runtime patterns that define the logical middleware structure supporting an Application pattern. Runtime patterns depict the major middleware nodes, their roles, and the interfaces between these nodes.
- Product mappings that identify proven and tested software implementations for each Runtime pattern.
- Best-practice guidelines for design, development, deployment, and management of e-business applications.

## Extended Enterprise Patterns

### Business patterns

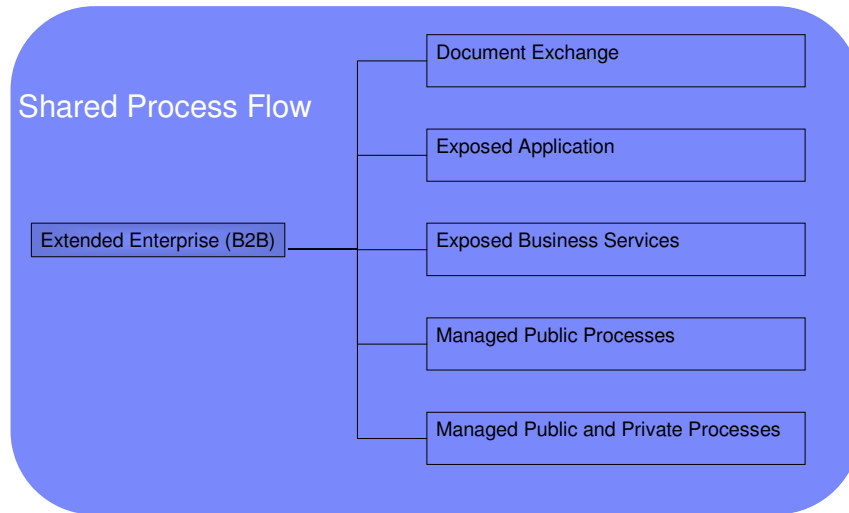
- Identify interaction between users, businesses, and data.
- Describes the interaction of private and public processes.



There are many ways to describe interactions between trading partners, from a public process, or multiple distinct public processes to basic data exchange. Each public process integrates into the private business process creating a layer of abstraction between trading partners. What is necessary to understand in this slide is that the Public Process should provide a loose coupling from the Private Processes and Applications. This provides better access controls into the organization while maintaining standards across industries.

The “golden rule” of business-to-business integration is, the less you know about the business partner's private processes and the implementation details of their applications, the better off you are. This loose coupling enables organizations to evolve their applications without affecting business partner's applications.

When looking at the Shared Process Flow there are 5 patterns used for integrating the Extended Enterprise.



In the Shared Process Flow there are several approaches that have been successful for Extending the Enterprise with Public Processes, from simple Document Exchange to Managed Public and Private Processes. Examples: RosettaNet

These five patterns are shown in the diagram.





## Extended Enterprise (B2B) Business Driver Patterns

Business Drivers	Document Exchange	Exposed Application	Exposed Business Services	Managed Public Processes	Managed Public and Private Processes
Improve the organizational efficiency.	✓	✓	✓	✓	✓
Reduce the latency of business events.	✓	✓	✓	✓	✓
Support a structured exchange with business partners.	✓	✓	✓	✓	✓
Support partner real-time access to/from applications.		✓	✓	✓	✓
Support partner real-time access to/from business services.			✓	✓	✓
Support shared public process flows with partners.				✓	✓
Integrate the internal workflow manager with partner-shared business process flows..					✓

Business Drivers also play a key role into the Extended Enterprise Pattern. Business decisions are usually found through the use of score cards that enable efficiency throughout the value chain, the higher the score the more efficient the process. This may cut trading partners from doing business with a particular business. As seen in the chart above simple Document Exchange improves the organizational efficiency since all organizations still have some form of manual process, through mail or fax. There is still a driver to get partners on an electronic form of exchange of documents. When we look at Managed Public/Private process companies can now have visibility into processes for time to perform types of events supporting more real-time access to services. This can be a considerable cost savings for businesses.

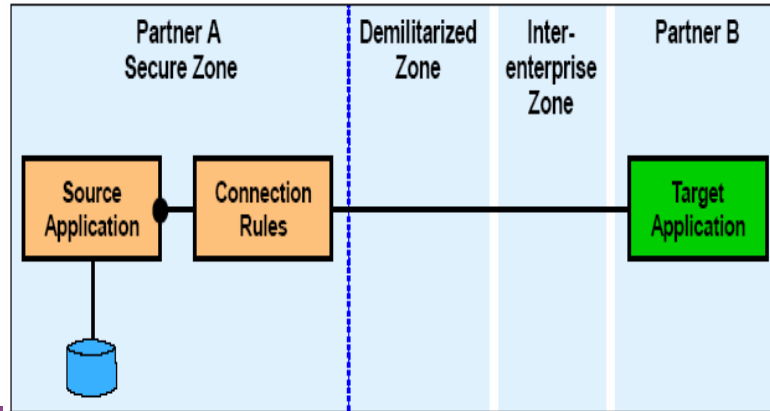
Additional information on patterns can be found in the Redbook below:

### Patterns: Broker Interactions for Intra- and Inter-enterprise

Revised: April 26, 2004 ISBN: 0738498890 292 pages – <http://www.redbooks.ibm.com/abstracts/sg246075.html>

## Exposed Direct Connection Pattern

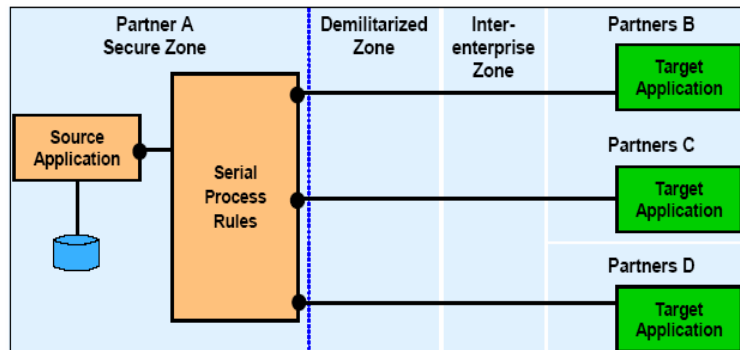
- Most Widely Use Connection Pattern
- Business data mapping rules (for adapter connectors)
- Autonomic rules (such as priority in a shared environment)
- Security rules
- Capacity and availability rules



The most common pattern is Exposed Direct Connection Pattern. Large organizations often require their business partners to exchange messages electronically. For example, they may mandate the use of Electronic Data Interchange (EDI) transaction sets over a particular Value Added Network (VAN) for certain interactions such as placing an order. In this pattern a direct connection can establish that same EDI transaction to a trading partner. Many companies use this pattern for EDI over the Internet.

## Exposed Serial Process (known as Managed Public Processes)

- Improve the organizational efficiency
- Reduce the latency of business events
- Support a structured exchange with business partner
- Support partner real-time access to/ from applications
- Support partner real-time access to/ from business service



The Managed Public Process pattern handles different business protocols with different business partners and maps long running external transactions to internal business processes and workflow.

The primary business driver for choosing this Extended Enterprise pattern is to enable business partner systems to gain direct access to specific business services. These services when invoked may in turn trigger multiple tasks on many backend applications. In other words, business requirements cannot be met by simple integration with a single backend application, as is the case with the Exposed Application application pattern.

More information can be found at the following sites.

### Patterns: Broker Interactions for Intra- and Inter-enterprise

Revised: April 26, 2004 ISBN: 0738498890 292 pages –  
<http://www.redbooks.ibm.com/abstracts/sg246075.html>

<http://www-106.ibm.com/developerworks/patterns/b2bi/select-application-topology.html>

## Community Integration Requirements Analysis

- Define Business Objectives (financial, upstream requirements, competitive)
- Project definition
  - High level objectives
  - Define current B2B solution environment
  - Identify client technology assumptions
  - Identify resources
  - Identify dependencies with other projects (e.g. EAI)
- Requirement definition
  - Identify key use cases
  - Identify Community Partners and their environments/requirements  
(NOTE: This is one of the most critical tasks and one of the most overlooked)
  - Prioritize requirements and establish high level project scope
- Identify and document constraints

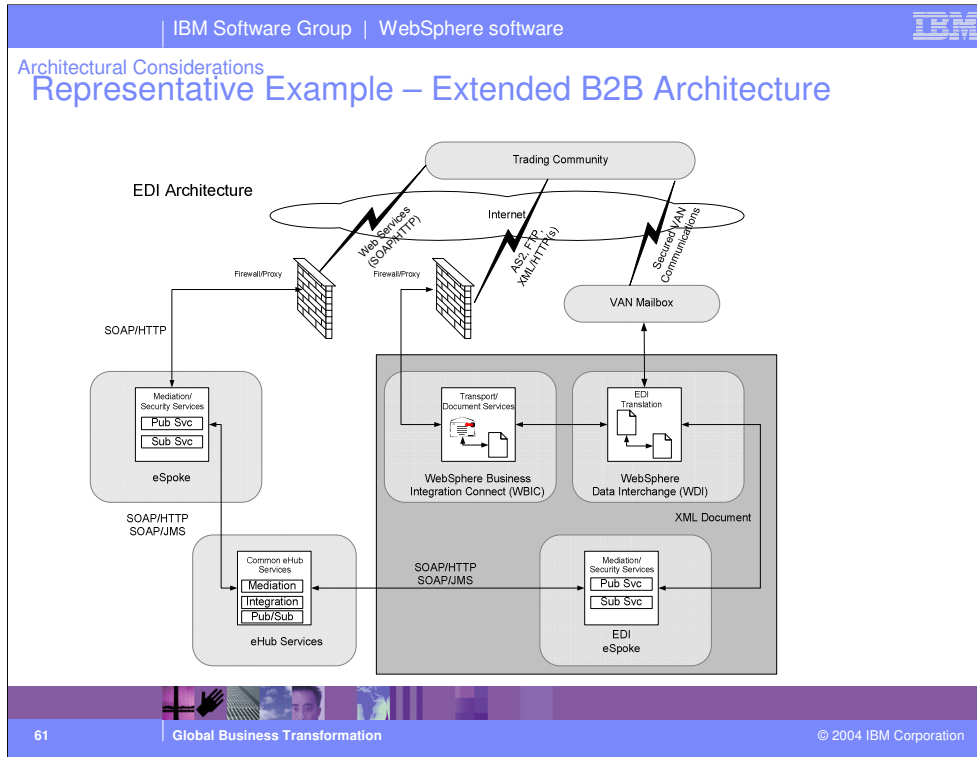
Requirements/Constraints is the logical place to start in terms of designing a B2B solution architecture. It is likely that the B2B component may not arise separately but become part of a larger integration effort. Nonetheless, it is important to appropriately segment the overall project in terms of definable project efforts with a containable scope.

The project definition should provide a relatively succinct statement of high level objectives reconciled with an understanding of the current B2B solution architecture. The objectives will include investment drivers, key features/functions as well as support objectives. It should also be clear in defining dependencies – as an example, a company that is currently implementing or upgrading an R/3 installation will impose many dependencies on a B2B solution architecture that needs to integrate with the ERP systems.

Requirement definition should concentrate on answering the “what” and stay away from the “how” and should provide the initial use cases. The identification of the community partners and their environments/requirements needs to be called out here – interestingly, this is often overlooked as part of the process. The key trading partner should have an active role in this process as well. The requirements will be pivotal in developing test cases. Lastly, prioritization is key and needs to be assessed as well with reference to resource and scope considerations within time and budget.

Constraints need to be addressed and conscientiously documented to determine those things that cannot be changed within the scope/lifetime of the project

The architect needs to be actively involved in review/gathering of requirements and assessment of project scope as well as constraint identification and assessment.



This solution architecture shows a hybrid solution – the customer has decided to embark on a leading edge initiative for SOA and anticipates the partner community will want to integrate on a services oriented basis – however the reality is that the world still consists of EDI and XML interactions requiring the use of WBI Connect (as well as their existing WDI solution for EDI transformation).

## Summary

- B2B is moving towards a community integration model
  - Relevance for small B2B “hubs” as well as large hubs
- IBM Community Integration Services
  - Protocol Services
  - Document Management Services
  - Community Management Services
- WebSphere Business Integration Connect
  - Provides a highly scalable trading community solution
  - Supports a wide range of transport and business protocols
  - Built on a solid foundation utilizing WebSphere architecture
- Developing B2B solutions requires architects and specialists to assess many areas
  - Functional requirements for B2B integration center on analyzing the document exchange processes and the required integration needed
  - Non-functional requirements center on assessing security, performance, availability and system management

Business requirements are changing and the technology is morphing as well. Managing Networks of trading partners is far more challenging and more related to the “Business Management” acumen of our Enterprises than ever before, as opposed to being only an IT challenge of connectivity and reporting. It is key to stay current on the developments in this space esp. with respect to Web Services and Standards and it is key to IBM’s ODOE.

IBM offers a number of solutions for partner integration. In most cases, the lead solution is WebSphere BI Connect. WebSphere BI Connect offers a comprehensive solution for the problem set faced by our customers. It provides a solution to solve complex problems easily – for example, compliance to service level agreements is a powerful analytic tool, which is necessary in a B2B platform. Captured in a disciplined, and routine manner, capturing compliance to acknowledgement turn-around, business volume statistics and the like can enrich the relationships established electronically. Combined with an outstanding foundation architecture providing high scalabilities, support for a wide range of transport protocols (with more coming soon) and a deep integration with the rest of the IBM portfolio, WebSphere BI Connect is on target to be the leading community integration solution.

## Resources

- URLs

- Standards – [www.rosettanet.org](http://www.rosettanet.org), [www.ebxml.org](http://www.ebxml.org), [www.oasis.org](http://www.oasis.org) , [www.oag.org](http://www.oag.org)

- External IBM Sites

- <http://www-306.ibm.com/software/integration/wbiconnect/>

- <http://www-306.ibm.com/software/integration/wdi/>

- <http://www-306.ibm.com/software/webservers/appserv/was/>

- <http://www-106.ibm.com/developerworks/webservices/>

- White Papers/Publications/Redbooks

- Redbooks

- Using Web Services for Business Integration, SG24-6583-00

- WebSphere Web Services Information Roadmap, REDP-3854-00

- WebSphere V5.1 Application Developer 5.1.1 Web Services Handbook, SG24-6891-01

- Web Services Wizardry with WebSphere Studio Application Developer, SG24-6292-00

- WebSphere Studio Application Developer and Web Services , SG24-6407-00

- Patterns: Direct Connections for Intra- and Inter-enterprise, SG24-6933-00

- Patterns: Service Oriented Architecture and Web Services, SG24-6303-00

- Patterns: Broker Interactions for Intra- and Inter-enterprise, SG24-6075-00

This slide lists the basic resources for further research.

## Courses/Classes

- WebSphere Data Interchange Implementation BI153DE
- WebSphere Business Integration Connect BI152
- Advanced Web Services Development with Application Developer v 5.1 XM481
- Introduction to Web Services XM371G
- IBM WebSphere Data Interchange Implementation-ANSI X12 Examples and Exercises SW334

This slide lists the classes available for IBM sales and technical personnel.