

**Implementing the RosettaNet eBusiness Standard:
Automating High-tech Supply Chains using
BusinessWare for RosettaNet™**

A Vitria Technology White Paper

Supply Chain Automation Challenge

Manufacturers, suppliers, distributors and resellers in the Information Technology (IT) and Electronic Components (EC) industries are currently wasting billions of dollars a year through time and cost inefficiencies at every point across their extended supply chains. These inefficiencies are driven by the lack of industry-wide process and data standards that enable system-to-system automation of core supply chain processes such as catalog management, order management, inventory management, and customer service and support. Supply chain partners currently use slow and expensive manual collaboration techniques, such as phone and fax, to exchange the information and transactions required to support such processes. The time and cost wasted by such manual techniques translates directly into lost or incorrect orders, late deliveries, high clerical and labor costs, excessive buffer and obsolete inventory costs, and ultimately, low customer loyalty and retention. Typical supply chain problems include the following:

- Manufacturers must maintain expensive buffer inventories because they can only guess at inventory levels and locations across the supply chain without agreement on how a part number is defined or a standard process to automatically query inventory levels in a partner's inventory system
- Distributors waste time and money trying to compare tens of thousands of products from hundreds of manufacturers because each manufacturer has their own unique part number scheme and their own proprietary scheme for describing product structures
- Resellers waste valuable clerical resources on learning and using product ordering and return processes that are unique to each distributor and manufacturer they do business with, rather than focus those resources on sales or customer service

Manual supply chain collaboration is simply too slow and too expensive for companies that wish to compete successfully in today's hyper-competitive industries operating on razor-thin margins. To remain competitive, companies need an end-to-end supply chain automation solution that provides global visibility and control across their entire extended supply chain. Specifically, these companies must replace slow and expensive manual collaborations with fast, low-cost electronic collaborations in which each supply chain partner's internal IT systems automatically exchanges business information and transactions with any other partner's systems in real-time.

Supply Chain Automation Benefits

The benefits of end-to-end supply chain automation are enormous. Improved demand visibility up the supply chain enables manufacturers, distributors and resellers to make informed forecasting, production and stocking decisions based on accurate and timely demand information – resulting in dramatic

reductions in inventory carrying costs and inventory obsolescence costs. Improved supply visibility down the supply chain enables consumers, resellers and distributors to make informed purchase decisions based on accurate product, pricing and availability information – resulting in fewer orders for the wrong product and fewer product returns. Automating the flow of supply and demand information up and down the supply chain also reduces the significant clerical costs associated with manual communications between partners via phone and fax, manually re-keying of information into IT systems, and manually handling of business exceptions like lost, late or inaccurate orders.

Enabling Supply Chain Automation

Enabling IT systems to exchange information and transactions electronically poses a number of significant business and technology challenges. First, it requires supply chain partners to agree upon explicit and unambiguous standards that specify precisely the data that these systems can exchange and, more importantly, the step-by-step process by which they must exchange the data. Second, it requires a global communications network that provides a low-cost medium for secure and reliable exchange of data between each supply chain partner and their internal IT systems. And finally, it requires a software solution that sits between each trading partner's internal IT systems and the business-to-business communication network and implements the business process and data standards to enable automatic exchange of information and transactions between supply chain partners.

Standard Business Data is the First Step

The first and most obvious prerequisite for supply chain automation is for trading partners to agree upon a common standard for describing and exchanging information and transactions. Initial attempts to impose such data standards revolved around Electronic Data Interchange (EDI). Over a period of several years, standards bodies like the American National Standards Institute (ANSI) defined standard formats for common business documents, such as purchase orders and invoices, to enable electronic exchange of these documents over private Value-added Networks (VANs). While an obvious improvement over manual techniques, EDI has seen limited adoption due to the complexity and cost of the software required to interface internal IT systems to VANs, and the high, transaction-based costs of the VAN itself.

Fortunately, a simple, low-cost alternative to EDI has arrived with the emergence of eXtended Markup Language (XML) and the Internet. XML-encoded business documents are much more simple to understand and much easier to customize and extend. More importantly, XML documents can be exchanged over the public Internet – offering a significant advantage over EDI that requires expensive VANs with limited reach. Since XML provides little more than an alphabet to describe business

documents, companies augment XML with the use of Document Type Definitions (DTDs) to unambiguously describe the structure of XML-encoded business documents. While a significant improvement over EDI, however, the use of XML, DTDs, and the Internet to enable convenient, low-cost exchange of information and transactions between trading partners is not a panacea for end-to-end, system-to-system supply chain automation.

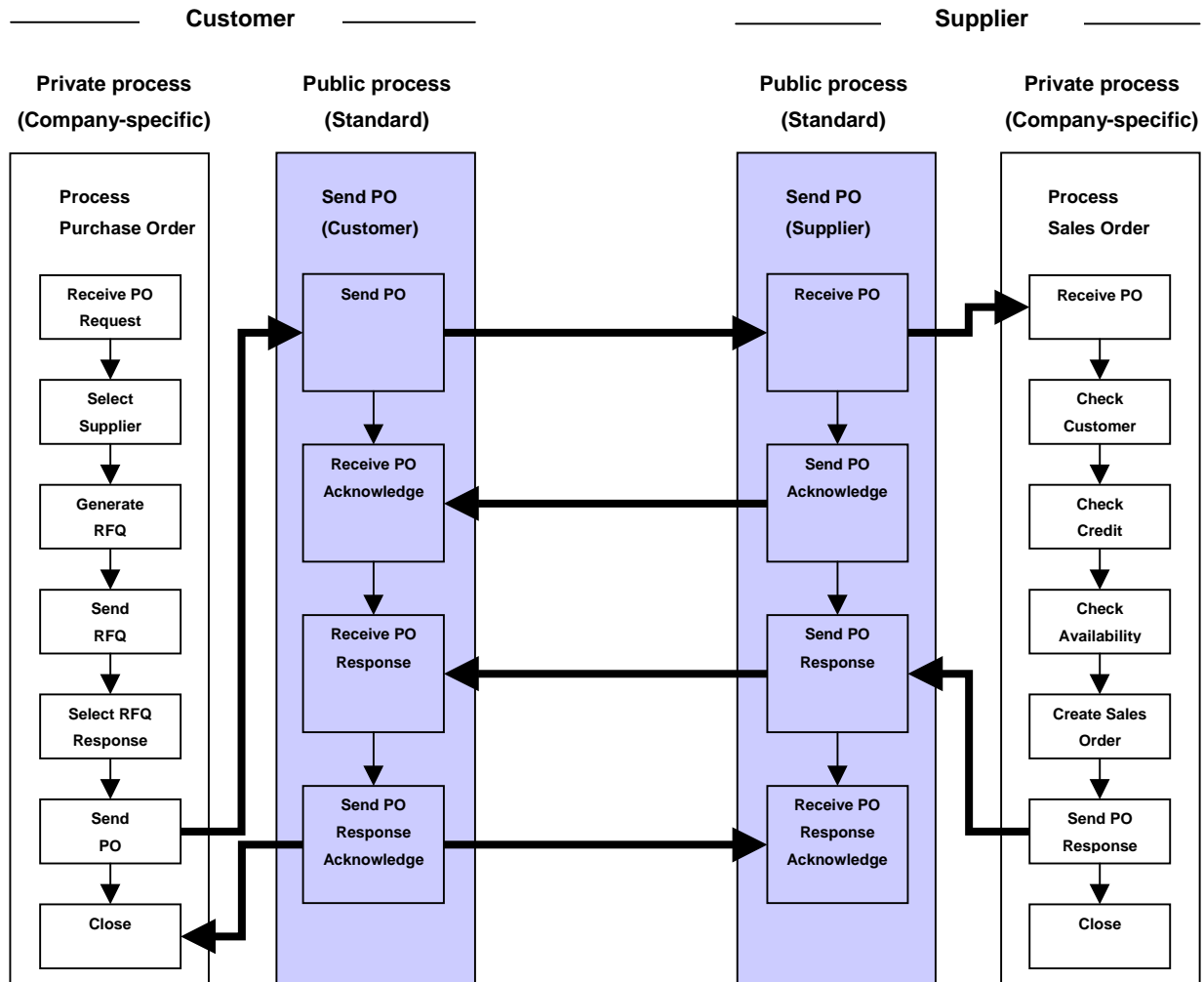
Business Process Standards are also Essential

For companies' internal IT systems to automatically exchange data, they must not only have explicit agreement on data format and communication network – for example XML documents over the Internet – but also explicit agreement on the step-by-step process by which the data is exchanged. These business processes can be divided into two broad classes: “public” (or partner-facing) business processes and “private” (or system-facing) business processes. Public processes describe the processing steps required to exchange information or transaction with a trading partner. Typically, a single business activity, such as the transmission of a purchase order, will require two distinct public processes: one for the company sending the purchase order (e.g. a customer), and one for the company responding to the purchase order (e.g. a supplier). Note that the successful completion of the business transaction requires both companies to complete their role in the transaction by executing all the steps in their respective public process. Collectively, public process standards, and the associated data format standards, provide a clearly defined interface for automated, system-to-system exchange of information and transactions between trading partners.

The second class of business process required for supply chain automation is the private process. Unlike public processes, that must be agreed-upon and mutually enforced by both trading partners, private business processes are unique to each trading partner. Private processes define the processing steps required to move data between a company's partner-facing public processes and its internal IT systems. A typical private process, such as the processing of an inbound sales order, will often involve multiple processing steps that will almost always vary from company to company. On receipt of a purchase order, for example, one company may need to validate the customer's credit worthiness against its Billing system, check the availability of the requested product or service against a Supply Chain Management system, and create a new sales order in the Order Management system. Another company may have a totally different private process for handling the incoming order. **Private processes are often much more complex than public processes, and the task of automating these private processes, and then linking them into internal IT systems, is often the most difficult and time-consuming component of a supply chain automation solution.**

The concepts of public and private business processes are illustrated in Figure 1 below. The thick arrows show the flow of data between private and public processes within and between two trading partners. This simple example illustrates very clearly the need for explicit business process management to control and coordinate the flow of information and transactions required for end-to-end supply chain automation.

Figure 1. Public and Private Business Processes for Purchase and Sales Order Processing



Supply Chain Automation using the RosettaNet eBusiness standard

RosettaNet is an independent industry consortium formed in 1998 by leading manufacturers, suppliers, distributors and resellers in the IT industry to specifically address the supply chain automation challenge. Assuming that the business-to-business communications network will be the Internet, RosettaNet has developed a comprehensive set of standards and guidelines for automatic, system-to-system exchange of

business information and transactions between supply chain partners linked by the Internet. Notably, RosettaNet was the first eBusiness standards organization to recognize the importance of defining business-to-business **process** standards in addition to business-to-business **data** standards. It is important to note that RosettaNet focuses exclusively on the public (partner-facing) business processes that describe the step-by-step exchange of business data between trading partners' internal IT systems. RosettaNet makes this important delineation because private (system-facing) processes are invariably unique to each company's specific business and technical environment and therefore impossible to predict and standardize.

The RosettaNet standard is divided into three broad groups of data and process specifications: RosettaNet Business and Technical dictionaries, the RosettaNet Implementation Framework (RNIF), and RosettaNet Partner Interface Processes (PIPs).

RosettaNet Business and Technical Dictionaries

The RosettaNet Business and Technical dictionaries define common properties for products, trading partners and business transactions. The Technical Dictionary specifies common properties for IT products to make it easy for companies to query and compare the pricing and availability of similar products from multiple vendors. The Business Dictionary defines common properties for trading partners and transactions to make it easy for companies to identify each other and conduct common business transactions. These dictionaries, coupled with the RNIF, provide a common foundation for each RosettaNet PIP.

RosettaNet Implementation Framework

The RNIF provides specific details on how the RosettaNet process and data standards should be implemented assuming that supply chain partners will use XML documents and the Internet for business-to-business exchange of information and transactions.

RosettaNet PIPs

RosettaNet PIPs define the specific sequence of steps required to complete a business-to-business process, such as the distribution of catalog update or the placement of a purchase order with a supplier, and the specific exchange of information and transactions triggered by each step in the business process. Specifically, RosettaNet PIPs defines the public processes – and related data – required to conduct common business transactions, such as Send Purchase Order, electronically over the Internet. RosettaNet

uses the Unified Modeling Language (UML) to define common business-to-business processes, and eXtended Markup Language (XML) to describe shared business-to-business data formats.

As of February, 2000, RosettaNet has published detailed specifications for the following ten PIPs:

- PIP1B1: Manage Product Information Subscription
- PIP2A1: Distribute New Product Information
- PIP2A2: Query New Product Information
- PIP2A5: Query Technical Information
- PIP2A8: Distribute Product SKU
- PIP3A2: Query Price and Availability
- PIP3A3: Transfer Shopping Cart
- PIP3A4: Manage Purchase Order
- PIP3A5: Query Order Status
- PIP3A6: Distribute Order Status

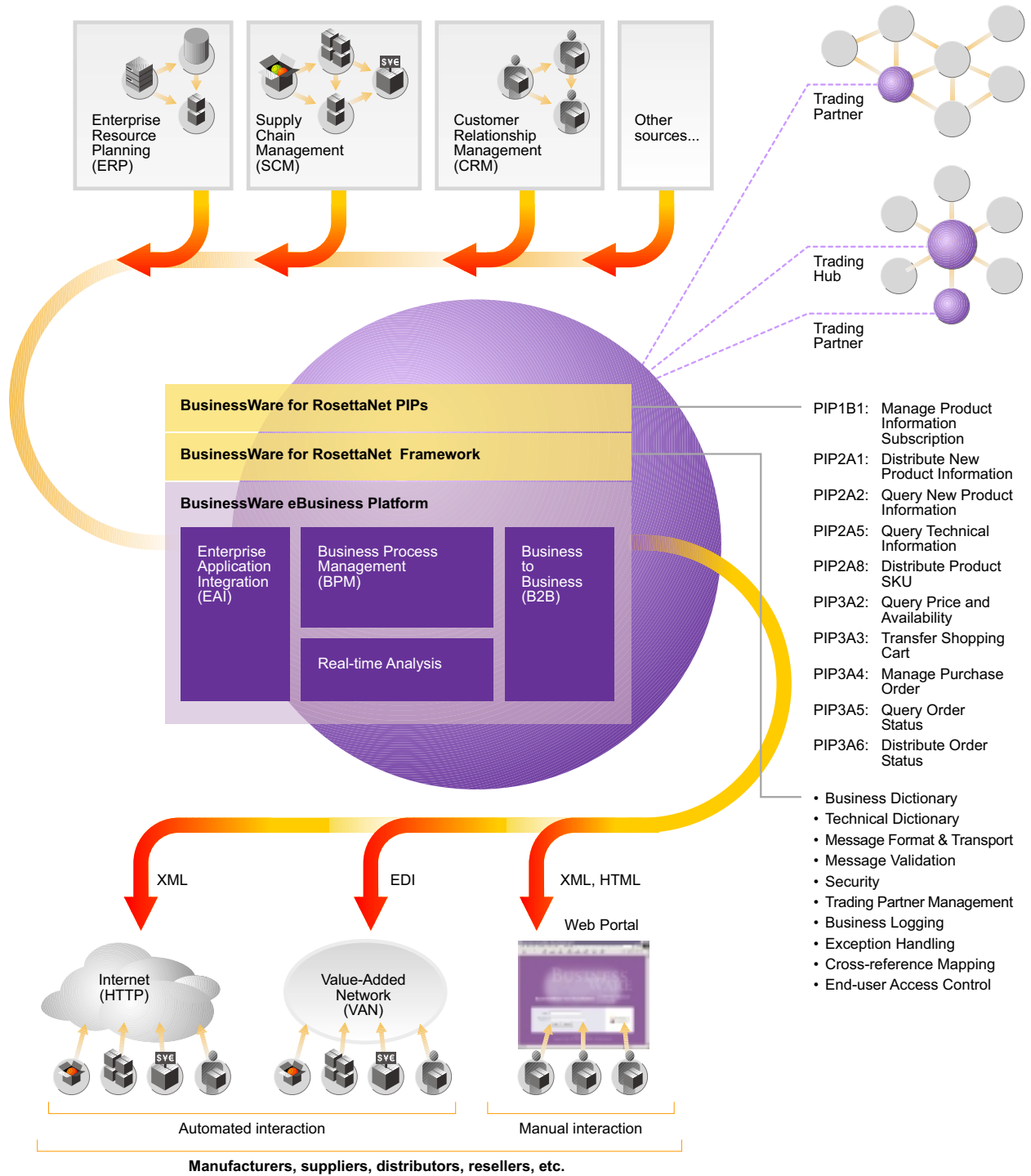
Implementing RosettaNet

Implementing RosettaNet requires a software solution that provides a complete, flexible, scalable implementation of all RosettaNet solution components, including:

Table 1. RosettaNet eBusiness Standard Components

| RosettaNet Component | Purpose |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Business Dictionary | Define standard properties for product information |
| Technical Dictionary | Define standard properties for trading partner and transaction information |
| Message Format and Transport | Exchange information and transactions as XML messages over the Internet |
| Message Validation | Ensure all messages include all required fields and that each field has the correct length and data type, and that each field contains a valid value |
| Security | Ensure all messages are fully authenticated, encrypted, authorized and non-repudiated |
| Trading Partner Management | Manage all trading partner information required for business-to-business collaboration including Web server URLs, digital signatures and digital certificates |
| Business Logging | Log key business events including inbound and out bound messages and non-repudiation |
| Exception Handling | Manage all exceptions related to message format, transport, validation, and security |
| Cross-reference Mapping | Map internal company, location, product and product structures to RosettaNet standard DUNS, DUNS+4, UNSPSC and GTIN codes |
| End-user Access Control | Control access to RosettaNet implementation solution |
| RosettaNet PIPs | Control and coordinate the exchange of messages between internal IT systems and trading partners to support specific business-to-business processes such as catalog management, order management, inventory management, and customer service and support |

BusinessWare for RosettaNet



BusinessWare for RosettaNet is a complete and flexible solution for automating high-tech supply chains using the RosettaNet standards for business-to-business e-commerce. Built on Vitria's proven eBusiness platform, BusinessWare, BusinessWare for RosettaNet enables manufacturers, suppliers, distributors and resellers to streamline key supply chain processes—like catalog management, order fulfillment and inventory replenishment—by automating the exchange of information and transactions between their internal IT systems and the IT systems of their partners and customers.

BusinessWare for RosettaNet gives companies end-to-end visibility and control of their extended supply chain, enabling them to improve the efficiency of their business operations, reduce time to market for new products and services, develop closer relationships with their partners and customers, and rapidly respond to fast-changing business conditions. In particular, BusinessWare for RosettaNet enables manufacturers and distributors to make more informed manufacturing and stocking decisions based on more accurate and timely demand information, and enables resellers and distributors to make more informed ordering decisions based on improved visibility of product, pricing and availability information across the supply chain.

Solution Highlights

BusinessWare for RosettaNet provides complete support for RosettaNet Business and Technical Dictionaries, RosettaNet Implementation Framework and all published RosettaNet PIPs including those focused on Catalog management; Order management; Inventory management; and Customer service and support. BusinessWare for RosettaNet leverages BusinessWare's flexible, model-driven business process management component for quick and easy modeling and automation of all external (business-to-business) and internal (across internal IT system) business process flows. In addition, BusinessWare for RosettaNet provides robust and secure business-to-business communications for automated, Internet-based exchange of information and transactions between PIPs and external trading partners, and robust and secure application integration for automated exchange of information and transactions between PIPs and internal IT systems.

Solution Benefits

BusinessWare for RosettaNet provides many significant business benefits including:

- End-to-end visibility and control across the extended supply chain
- Reduced administration and clerical costs
- Lower buffer inventory and inventory obsolescence costs
- Fewer incorrect orders and related returns processing costs

- Shorter lead times and cycle times
- Faster time to market for new products and services
- Develop closer relationship with key partners and customers
- Leverage and extend investment in internal IT systems

Comprehensive

Vitria is the only RosettaNet solution provider that combines a complete and flexible solution for RosettaNet with a proven eBusiness platform for internal business process management and enterprise application integration. BusinessWare for RosettaNet offers a comprehensive, off-the-shelf implementation of the RosettaNet eBusiness standards—including support for the RosettaNet Business and Technical Dictionaries, RosettaNet Implementation Framework (RNIF) and RosettaNet Partner Interface Processes (PIPs). All aspects of the RosettaNet standard are addressed including message formatting, transport and validation, message authentication, encryption, authorization and non-repudiation, business activity performance controls and message exchange controls. In addition to the solution requirements specified by RosettaNet, BusinessWare for RosettaNet adds a Web-based administration console, trading partner management, business event logging, exception handling and notification, cross-reference mapping and end-user access control.

Since RosettaNet focuses exclusively on external, business-to-business interactions between trading partners, customers must implement their own solution for linking RosettaNet PIPs into their internal business processes and IT systems. Since BusinessWare for RosettaNet is built on BusinessWare, Vitria's industry-leading eBusiness platform, Vitria customers can use our proven process management and application integration components to quickly implement these vital links without recourse to custom code or a third-party point solution.

Flexible

BusinessWare for RosettaNet implements the RosettaNet Implementation Framework and PIPs as a suite of PIP-independent and PIP-specific process models that can be customized for each trading partner, PIP, PIP role and PIP activity using information stored in the Trading Partner Repository. The Trading Partner Repository stores information such as business activity performance controls and message exchange controls that are used to tailor each instance of a PIP-based interaction to the specific terms of the trading partner agreement in place between the two trading partners. Unlike "black box" approaches based on custom programming code, PIP process models and the Trading Partner Repository provide a visual

representation of the PIP specifications published by RosettaNet that is easy for business users to understand and change. For additional flexibility, BusinessWare for RosettaNet provides multiple implementation options including the use of non-Vitria solutions by trading partners.

Industrial-strength

BusinessWare for RosettaNet is built on BusinessWare, Vitria's industrial-strength platform for mission-critical eBusiness. BusinessWare delivers high performance and scalability through a federated architecture that combines a single, logical naming service with high-performance features including multithreading, multiprocessing, caching, replication and load balancing. Unlike hub-and-spoke and multi-hub architectures that introduce exponential administrative overhead as more servers are added, BusinessWare for RosettaNet can be distributed across multiple servers and locations without compromising performance or reliability. BusinessWare also provides industrial-strength features for security, reliability, availability, and systems management and administration.

Solution Components

BusinessWare for RosettaNet is comprised of three major components: BusinessWare, BusinessWare for RosettaNet Framework and BusinessWare for RosettaNet PIPs.

BusinessWare

BusinessWare combines four critical eBusiness capabilities in a single software platform, including: Business Process Management (BPM), Business-to-business communications (B2B), Enterprise Application Integration (EAI) and Real-time analysis:

- BusinessWare's Business Process Management (BPM) component controls and coordinates the exchange of information and transactions with trading partners. Customers can also use this component to model and automate private business processes that move information and transactions in and out of internal IT systems. Both public processes (i.e. PIPs) and private processes are implemented as graphical BusinessWare process models.
- BusinessWare's business-to-business communication (B2B) component enables secure and reliable exchange of information and transactions with trading partners over public networks such as the Internet. Graphical BusinessWare connection models provide all the protocol translation and content mapping services required to map internal information and transactions to the various protocols and data formats required by different trading partners.
- BusinessWare's Enterprise Application Integration (EAI) component enables secure and reliable movement of information and transactions in and out of internal business applications. Graphical BusinessWare connection models provide all the protocol translation and content mapping services

required to map internal information and transactions to the various protocols and data formats required by different internal IT systems.

BusinessWare for RosettaNet Framework

The BusinessWare for RosettaNet Framework comprises a set of common services that run on top of the BusinessWare platform to simplify the configuration, execution and administration of the RosettaNet Implementation Framework and RosettaNet PIPs. These services include message formatting, transport and validation, message authentication, encryption, authorization and non-repudiation, business activity performance controls and message exchange controls. BusinessWare for RosettaNet also provides a Web-based administration console and set of services for trading partner management, business event logging, exception handling and notification, cross-reference mapping and end-user access control.

BusinessWare for RosettaNet PIPs

BusinessWare for RosettaNet PIPs comprise a suite of pre-built BusinessWare components (including BusinessWare process models, connection models, channels and event interfaces) that run on top of the BusinessWare for RosettaNet Framework to implement RosettaNet PIPs. BusinessWare for RosettaNet PIPs are fully supported and maintained by Vitria and include all PIPs currently published by RosettaNet.

The following table illustrates the completeness of BusinessWare for RosettaNet's implementation of the RosettaNet eBusiness standard.

Table 2. BusinessWare for RosettaNet Solution Components

| RosettaNet Requirement | BusinessWare for RosettaNet Solution |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Business Dictionary | Full support |
| Technical Dictionary | Full support |
| Message Format and Transport | <ul style="list-style-type: none"> - Outbound messages—send RosettaNet-compliant XML messages to trading partners over the Internet. Encode messages to MIME and OBI formats and send with any required digital signatures - Inbound messages—receive RosettaNet-compliant XML messages from trading partners over the Internet. Un-encode messages from MIME and OBI formats to produce inbound XML documents |
| Message Validation | <ul style="list-style-type: none"> - Grammar validation—validate message structure against RosettaNet DTDs - Schema validation—validate message field type, length and valid values against RosettaNet message guidelines - Sequence validation—ensure that multiple messages pertaining to the same PIP, role and activity instance are received in the correct sequence - Business content validation—generate nonsubstantive acceptance messages using business logic specific to your business processes |
| Security | <ul style="list-style-type: none"> - Authentication—Use trading partners' digital signatures and certificates to ensure that an inbound message was sent by designated trading partner and has not been tampered with. Use digital signatures and certificates to assure trading partners that your outbound messages were sent by you and have not been tampered with - Encryption—Use SSL to encrypt all messages exchanged with trading partners over the Internet - Authorization—Authorize PIP participation at trading partner, PIP, PIP role and PIP activity levels - Non-repudiation—Non-repudiate message receipt, origin and content at trading partner, PIP, PIP role and PIP activity levels |
| Administration | <ul style="list-style-type: none"> - Use Web-based BusinessWare for RosettaNet Administration Console to configure, administer and monitor all aspects of BusinessWare for RosettaNet implementation: trading partner management; business logging; exception handling and notification; cross-reference mapping and end-user access control |

Table 2. BusinessWare for RosettaNet Solution Components (Contd.)

| RosettaNet Requirement | BusinessWare for RosettaNet Solution |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trading Partner Management | <ul style="list-style-type: none"> - Create and maintain any system parameter for any permutation of trading partner, trading partner user, PIP, PIP version, PIP transaction, PIP action or PIP role - Manage PIP process model parameters and trading partner information in the Trading Partner Repository - Maintain PIP parameters at the trading partner, PIP, PIP role and PIP activity levels - PIP parameters include all RosettaNet business activity performance controls and message exchange controls plus additional parameters related to business logging, exception handling and notification, cross-reference mapping, plus trading partner information including Web server URLs and public encryption keys - Manage all RosettaNet business activity performance controls including: <i>Acknowledgement of Receipt Non-repudiation Required?</i> and <i>Non-repudiation of Origin and Content?</i> Default values are drawn from RosettaNet PIP specifications - Manage all RosettaNet message exchange controls including: <i>Secure Transport Required?</i>; <i>SSL Required?</i>; <i>Digital Signature Required?</i>; <i>Time to Acknowledge Receipt</i>; <i>Time to Acknowledge Acceptance</i>; <i>Time to Perform and Retry Count</i>. Default values are drawn from RosettaNet PIP specifications. |
| Business Logging | <ul style="list-style-type: none"> - Log key business events in the Business Log including: <i>Message received from trading partner</i>; <i>Message sent to trading partner</i>; <i>Message received from private process</i>; <i>Message sent to private process</i>; <i>Non-repudiation of origin and content</i>; <i>Non-repudiation of receipt</i>; <i>Exception logged</i> - Use Web GUI to search and sort logged business events by date and time logged, trading partner, PIP, PIP role, PIP activity, etc. |
| Exception Handling | <ul style="list-style-type: none"> - Log all RosettaNet security control exceptions related to message receipts, acknowledgements, timeouts and retries - Log all RosettaNet audit control exceptions related to authentication, encryption, authorization and non-repudiation - Email information messages, warnings and errors to internal users. Emails can be sent to named users or user groups based on specified interest, including trading partner, PIP, PIP role, PIP activity, etc. - Send exception signals to trading partners - Invoke Notification of Failure PIP (PIP0A1) to send failure notifications to trading partners |

Table 2. BusinessWare for RosettaNet Solution Components (Contd.)

| RosettaNet Requirement | BusinessWare for RosettaNet Solution |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cross-reference Mapping | <ul style="list-style-type: none"> - Map DUNS numbers to internal company/trading partner identifiers - Map DUNS+4 numbers to internal company location/trading partner location identifiers - Map UNSPSC codes to internal product or service classification identifiers - Map GTIN codes to internal product or service identifiers |
| End-user Access Control | <ul style="list-style-type: none"> - Create and maintain end-user profiles that specify access controls for BusinessWare for RosettaNet |
| RosettaNet PIPs | Support for all published PIPs including: <ul style="list-style-type: none"> - PIP1B1: Manage Product Information Subscription - PIP2A1: Distribute New Product Information - PIP2A2: Query New Product Information - PIP2A5: Query Technical Information - PIP2A8: Distribute Product SKU - PIP3A2: Query Price and Availability - PIP3A3: Transfer Shopping Cart - PIP3A4: Manage Purchase Order - PIP3A5: Query Order Status - PIP3A6: Distribute Order Status |

Summary

To compete successfully in today’s hyper-competitive business environment, manufacturers, suppliers, distributors and resellers across the IT and EC industries can no longer collaborate manually with their supply chain partners and remain competitive. The combination of the Internet, the RosettaNet process and data standards for supply chain automation, and Vitria BusinessWare for RosettaNet provides an unparalleled chance for these companies to implement an end-to-end supply chain automation solution that will transform their efficiency and flexibility of business execution.