

Implementing an Industry e-Business Initiative: Getting to RosettaNet

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ABSTRACT

As Intel looked at the cost of its own successful early implementation of Web-based e-Commerce, it became clear that an industry-wide standards-based approach to e-Business is the only way to go.

We decided to help build the right business-to-business (B2B) specifications with the right industry initiative (RosettaNet* is our main focus) and then implement those specifications. As early adopters, this has turned out to be much more of an enterprise readiness effort than initially appreciated. Team composition, technical and business knowledge coalescence, formal and informal communication channels, cross-enterprise visibility, and establishment of appropriate resource levels are just some of the challenges we face.

We anticipate that an evolving, more robust infrastructure, together with lessons learnt from pilot projects, team experience, and more mature standards will lead to the full realization of expected benefits from RosettaNet. However, we offer here a "readiness model" that we hope can be used by others to "spin up" faster.

INTRODUCTION

In early 1998, Paul Otellini, then Sr. Vice President of Intel's Sales and Marketing Group, crystallized much of our early thinking and experimenting with Internet-based e-Commerce into a simple challenge: take in \$1Billion in sales orders via the Web in Q4'98. We took our first such order in July 1998 and had arrived at

\$1B *per month* by the start of Q4'98—success beyond our wildest dreams!

So, with that success, one may well ask what the problem is. Well, each customer's internal processes and systems are almost always different from ours, so we had no way to ensure that our applications, which worked well for us, did not introduce extra work or become otherwise burdensome for our customers. And, our customers buy many products from many suppliers in order to make up their complete product lines, so they are potentially facing extra work from *each* of their suppliers. As we moved forward with various plans to Internet-enable the way we do business with our customers, we also realized that the part of Intel that *buys* products was getting ready to establish a whole series of web-based procurement applications that we wanted our suppliers to use.

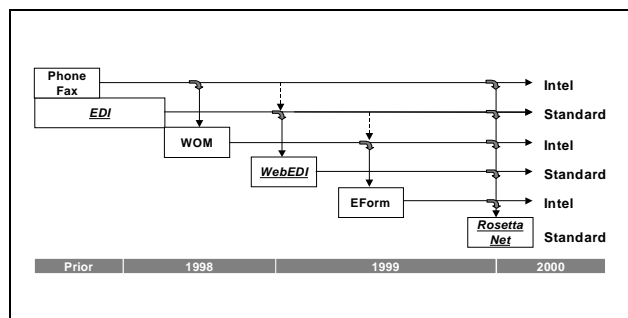
So, not only were we building a suite of applications that did not necessarily optimize e-Business for our trading partners (the phrase used generally in the e-Business arena to refer to other companies with which we do business, whether as customers, suppliers, or other), but we were facing the prospect of developing and/or buying a whole slew of applications that we (and our trading partners) would have to support and maintain over time.

What we needed were standards! However, we did **not** want standards that took years to develop; rather, we needed those that evolved at the same pace as the Internet, at the same pace as the emerging "killer app" of e-Business, and at the same pace as the technologies that underlay that growth. Furthermore, these standards had to focus on the real-world business processes of the supply chains that we are a part of, not those that tried to create a single universal e-Business solution or that sacrificed implementation to elegant technical solutions.

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Of equal importance, these standards would need a sound, extensible architecture; would have to be adopted rapidly; and would have to be *demand*ed by management and supported by business and technology stakeholders within our business environment.

Figure 1 illustrates the tension between some of Intel's e-Commerce solutions and our desire to use standard



solutions, as projected over time.

Figure 1: Intel standards challenge

As is true throughout history, but even more noticeable in today's Internet economy, timing is everything. In late 1997, an executive from one of the largest computing products distributors in the world approached us (as well as other leading players in the "IT Products" supply chain) with a vision and a plan. The vision was to create a common vocabulary and process set for e-Business in the context of a well understood supply chain. The plan was to pull together a fast-moving business consortium of companies representing over half the revenue of that supply chain, managed by a board of top executives from member companies, who would *precommit* to implementing the specifications that their members would jointly develop and vote upon.

At Intel, we pulled together a quick evaluation team, surveyed both our internal e-Business initiatives (such as Web Order Management (WOM), Supply Line Management (SLM), and eFORM) and the external e-Business standards/initiatives environment, and we quickly concluded that we needed to help realize this effort, and the sooner, the better. In the words of Colin Evans, Intel's Sales & Marketing e-Business architect, our competitive advantage would have to move from "first to move" to "first to standards."

And thus begins the lessons we have learned (and are still learning) about implementing business-to-business standards across the enterprise.

INTEL'S ROSETTANET IMPLEMENTATION

Today we are preparing to meet our first major commitment to have a production-level implementation of at least one of the RosettaNet "partner interface process" (PIP) specifications (which are described more fully below) running on a robust infrastructure, with at least one trading partner. Among RosettaNet members, this milestone is known as "2.2.2000," which is the date that we will all be ready to demonstrate our success. We are in the thick of this implementation, learning lessons every hour.

The main focus of this paper is on what it takes to be internally *ready* to adopt and implement the suite of specifications collectively known as RosettaNet. We try to make these observations as concrete as possible, without being necessarily RosettaNet-specific. They should be of interest to anyone who is preparing to implement any standards-based approach to e-Business.

In order to understand the magnitude of our implementation effort (both initial and longer-term), it is necessary to provide a little background on the RosettaNet business and technical architecture. The bulk of this paper focuses on our use of a readiness model to ensure that our solutions could be deployed.

ROSETTANET OVERVIEW

Although RosettaNet's supply chain scope began with IT products (e.g., boards, systems, peripherals, finished systems), it has expanded to include electronic components (e.g., chips, connectors). Intel obviously plays a role in both of these supply chains (often abbreviated as IT and EC). As maturity is gained in these environments, it is likely that RosettaNet's business scope will expand to other supply chains as well. Each supply chain's standardization efforts are overseen by a managing board composed of member company executives, who prioritize efforts, ensure synergy between supply chains as much as possible, and oversee resource allocation as administered by a paid staff.

RosettaNet focuses on three key areas requiring standardization in order to automate business interchanges between trading partners. First, vocabulary needs to be aligned; this includes both business and technical terminology germane to the transaction at hand. The RosettaNet Dictionary, drawing upon existing industry standards wherever possible, fills this need. Second, the way in which business messages are wrapped and transported must be specified. The RosettaNet Implementation Framework, which specifies the use of XML (Extensible Markup

Language), the World Wide Web (WWW), and other protocols serves this need. And third (and most important) the business processes governing the interchange of the business messages themselves must be analyzed, harmonized, and specified. RosettaNet terms these “Partner Interface Processes” or PIPs. Figure 2 shows these RosettaNet “ingredients.”

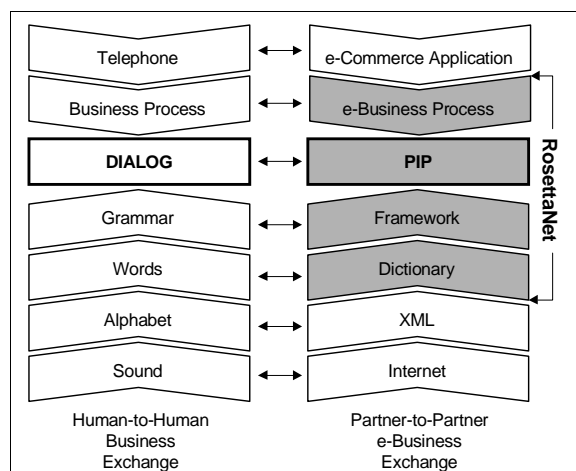


Figure 2: RosettaNet ingredients

To perform the work of analyzing, recommending, and documenting proposals for voting by the membership, RosettaNet member companies volunteer expert resources, both business and technical people, to lead and/or be a part of project teams. These people are either on part-time project duty or on detached full-time (short-term) assignments.

At present, six “clusters” of business activities (such as “Order Management”) have been identified as initial targets of RosettaNet standardization efforts by the RosettaNet Managing Boards. Within those clusters, “segments” have been identified (e.g., within the Order Management cluster, “Quote & Order Entry” is one of four segments). Each segment is then analyzed in workshops that identify the necessary PIPs and document the choreography and business requirements around each PIP. RosettaNet anticipates that between 100 and 120 PIPs will result from the six clusters.

It is worth noting that when the second supply chain (EC) was added to RosettaNet’s business scope, only two additional segments (and no additional clusters) had to be added. There is more synergy among related supply chains than many had guessed; this gives us more optimistic expectations for the addition of related supply chains.

Current RosettaNet clusters and segments are as follows:

- review segments: partner review; product/service review
- product introduction segments: preparation for distribution; product change notification
- marketing management segments: marketing campaign management; lead and opportunity management; design win management (EC only)
- order management segments: quote and order entry; transportation and distribution; product configuration; returns and finance management
- inventory management segments: price protection; collaborative forecasting; inventory allocation and replenishment; inventory and sales reporting; ship from stock and debit/credit (EC only)
- service and support segments: warranty management; asset management; technical support

RosettaNet member companies are increasingly realizing that, although the PIPs specify processes only at the point of interface between trading partners, the full value of their implementations will come when they align their internal processes with the PIPs as well. This makes it all the more imperative to have a tool with which to evaluate internal readiness for making the shift to standards-based e-Business.

IMPLEMENTATION READINESS MODEL

Implementing a business-to-business (B2B) message exchange environment such as RosettaNet* has turned out to be much more of an enterprise readiness effort than initially anticipated. Team composition (size, diversity), technical and business knowledge coalescence, communication channels, at-large evangelism, cross-enterprise visibility, and establishing appropriate resource levels are just some of the challenges.

As an early adopter, we of course experience more pain than those who will follow. More supply chain experience, B2B gateway products, internal infrastructure, pilot projects, internal experience, and standards maturation will all ease the way. However, knowing where to look for “readiness” (or lack thereof) is critical to putting together a workable implementation

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plan. To that end, our Implementation Readiness Model has identified four primary and six secondary readiness tracks to date.

The primary readiness tracks are as follows:

1. business strategy
2. B2B infrastructure
3. business process
4. application development

The secondary readiness tracks are as follows:

1. B2B external initiative
2. trading partner
3. solution provider
4. legal
5. security
6. audit

These tracks were identified as Intel went through the following process:

- early pilot (proof of concept) initiated by our Sales and Marketing Group (Internet Marketing and e-Commerce organization) and one trading partner (completed in August 1998)
- engagement with Intel IT (e-Business Integration) to provide necessary infrastructure to ramp into production mode
- involvement of Intel Planning and Logistics Group to rationalize current business processes and ERP (Enterprise Resource Planning) systems with RosettaNet processes
- cross-enterprise collaboration to get to 2.2.2000

Our next steps will be to drive a significant increase in participation by business process and application development groups in order to further deploy RosettaNet.

We are using this Readiness Model to help us get there.

BUSINESS STRATEGY READINESS

The purpose of this track is to assess the maturity of an enterprise's B2B strategy at large. This is important because B2B solutions are currently strategically divided between browser-based (user-interface) on-demand applications and automated service applications that do not require user interfaces. RosettaNet implementers are primarily focused on trading partner automation to either rehost their Electronic Data

Interchange (EDI) processes or reduce the need for browser-based applications. At present, little or no attention is being focused on feeding a B2B gateway with RosettaNet messages generated by browser-based application backend processes. Implementers should recognize that over time, as more trading partner business processes are automated, RosettaNet would reduce the need for on-demand B2B applications that provide a user interface. Therefore, many current browser-based B2B projects, funding initiatives, and roadmaps need to be re-evaluated to see whether an end of life timeframe exists. Key criteria in this track include a company's B2B strategy and a company's buy-side and sell-side motivations.

Intel, like many other companies, is using the Internet as a means to improve and simplify processes and services with its trading partners. Due to RosettaNet and similar initiatives, B2B solutions are evolving from trading partner portals or point applications requiring user interaction to automated solutions. This B2B automation evolution is enabling a shift from "engage customer eyeballs" to "customer at work," allowing customers (indeed, all trading partners) to use their own internal solutions while having immediate access to all information within their global enterprise. In other words, by enabling RosettaNet, companies should be able to reduce overall data entry and data interpretation costs. Automated data exchange and processes provide for higher quality data and faster processing time, as well as create the possibility of an event-driven global enterprise.

The motivations to implement RosettaNet may be greater within a company's buy-side or sell-side. However, implementing RosettaNet ultimately needs to encompass both the buy-side and sell-side of an enterprise's at-large B2B strategy. Implementers need to be sure to identify benefits by looking at the entire supply chain; that is, their customers' customers through their suppliers' suppliers. (This level of impact upon one's strategy will depend greatly upon how much of a company's purchased materials and finished products fall within the RosettaNet consortium scope of coverage.) Implementers should identify their other supply chains on both their sell and buy sides, and they should investigate how other B2B initiatives for trading partner automation are evolving.

The push to implement RosettaNet currently appears to be driven more by buyers in an attempt to simplify and improve productivity and margins. This may be because buyers naturally tend to engage suppliers with whom they can work more easily. However, as B2B automation spreads, we should see suppliers using their proven benefits to persuade their non-automated

customers to participate in automated services. For example, a seller should be able to provide its customers with improved pricing and availability when its customers provide real-time demand and inventory/sales out reporting instead of infrequent non-automated inputs. (Now, imagine the gains if an entire supply chain were to automate its demand and inventory/sales out reporting from end to end—this is one of RosettaNet's objectives).

A company's B2B strategy also needs to take into account the integration of mergers and acquisitions. Another of RosettaNet's benefits would be improved flexibility and agility as companies grow their core business by enabling a standard message exchange framework.

Finally, a company's B2B strategy needs to recognize the full potential of RosettaNet. Through the use of a self-describing message structure that includes a supply-chain dictionary-driven schema and meta-model for more than 100 business processes, RosettaNet supplies a strategic benefit. This message structure holds the potential of becoming a de facto message exchange standard in the near future as agent-to-service and service-to-service architectures evolve. The RosettaNet message structure is in fact sufficiently rich that it could be said to be a document database; RosettaNet messages could be used as disconnected documents passed between applications and databases within a disparate and distributed architecture.

B2B Infrastructure Readiness

The purpose of this track is to define the infrastructure and to assess the level of effort needed to achieve it. This is important because becoming RosettaNet-compliant is only a small portion of the big picture. Although RosettaNet specifies a message structure, a message dictionary, a message exchange framework, and a message exchange protocol, it does not specify the infrastructure needed nor the backend processes required to receive, process, or send messages. Infrastructure is individually managed by each trading partner. Key criteria in this track include infrastructure components, e-Business standards and guidelines, and B2B gateway capabilities.

B2B message integration involves both public and private aspects. Receiving, unpacking, and routing a message, or assembling and sending a message (the public part) is relatively easy. The private (and more difficult) part of message integration includes process automation, workflow, and application integration that link into enterprise applications. In other words, the private part is the intra-enterprise application integration

portion of enterprise application integration (EAI), while RosettaNet is the public trading partner application integration part of EAI.

RosettaNet is targeted for use within e-Business applications, predominantly B2B service-to-service applications; however, much of the infrastructure needed to support this is the same as required for B2C (business-to-consumer) and B2B browser-based applications. Many infrastructure components need to exist in order to proceed. Major infrastructure elements include an e-Business "landing zone," facilities, firewalls, proxy servers, networks, routers, communication services, and web servers.

A B2B gateway is needed. It must provide for inbound message receipt, authentication, authorization, entitlement, logging, and routing to a process automation workflow tool. This gateway also must support outbound message construction, packaging and logging. The B2B gateway must be able to provide RosettaNet-compliant messaging and also should be capable of supporting other B2B specifications, perhaps even EDI, file transfer protocol (FTP) and simple mail transfer protocol (SMTP) transport protocols. The build vs. buy study needs to be completed, while looking at maturing product offerings from solution providers.

RosettaNet provides for two basic types of messages: a transaction process message (Figure 3); and a subscription model message (Figure 4).

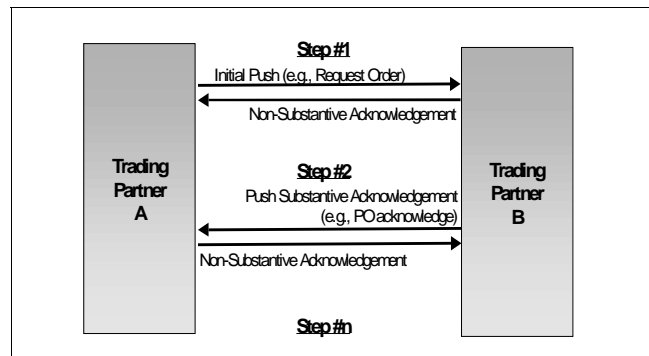


Figure 3: Transaction process model

In order to implement subscriptions, a collection of document repository, subscription, notification, and publication services needs to be provided. This is potentially a very large effort, and again, a few solution providers are working in this space.

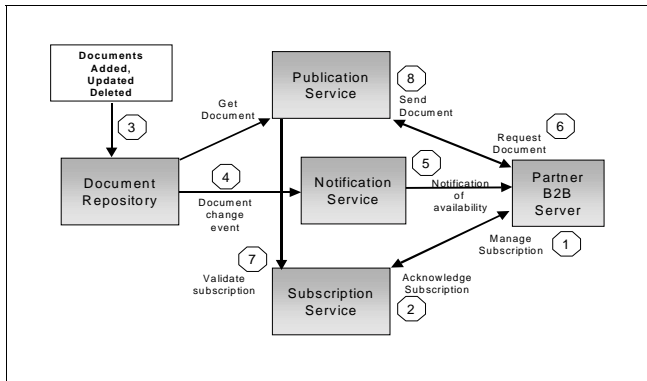


Figure 4: Subscription model

The major services within a B2B gateway include the following:

1. a trading partner database for a directory of trading partners, trading partner processes, and process parameters and their entitlements
2. non-repudiation (legal proof) archiving of message origin and content
3. public key infrastructure (PKI) repository of digital certificates and signatures for encryption, authorization, and authentication
4. PIP templates for integration to public and private process/workflow automation processes
5. virus detection capabilities for message attachments

The B2B gateway will likely coincide or integrate with existing gateways for FTP, value added network (VAN/EDI), and SMTP. Each of these gateways should comply with similar guidelines, designs, and implementations of authorization, entitlement, authentication, privacy, confidential document, and legal trade agreement practices.

RosettaNet is based upon the hypertext transfer protocol/secure (HTTP/HTTPS) protocol in an automated service-to-service framework that does not need visible or attended Web pages. Because HTTPS is needed for security, internal corporate guidelines for PKI and secure socket layer (SSL) encryption must be established. These guidelines should be compatible with existing B2B browser-based implementations that use HTTP/HTTPS.

The B2B gateway will also need a set of complementary services, such as the following:

- Receipt and routing—a public processing area that receives, authenticates, validates entitlement, archives, and routes inbound messages
- Package and delivery—a public processing area that packages, encrypts, validates entitlement, digitally signs, archives, and delivers outbound messages
- Process automation and application integration—a private processing area that provides for process automation and backend integration of inbound messages and outbound messages
- Infrastructure for non-repudiation database (NRdb), trading partner database (TPdb) and PKI
- Notification services for e-mail, pager, etc.
- XML/HTML scraping—ability to extract data from remote trading partner Web pages, in addition to or in lieu of data passed within RosettaNet messages
- Trading partner portal—a portal where trading partners can self-administer their RosettaNet processes and subscriptions
- Testing facilities—the ability for trading partners to test their RosettaNet messages against a test site; after self-testing, the B2B gateway would then promote the trading partner from “test” to “production” status, and thereby allow trading partners to control their production messaging processes
- Satellite capability—a “host” could provide its non-automated trading partners with a B2B satellite solution, thereby acting as a hub, developing and supporting a B2B application at its trading partner facilities

Figure 5 illustrates an integrated B2B gateway, complete with support for RosettaNet, other B2B initiatives, and SMTP, FTP, and VAN/EDI.

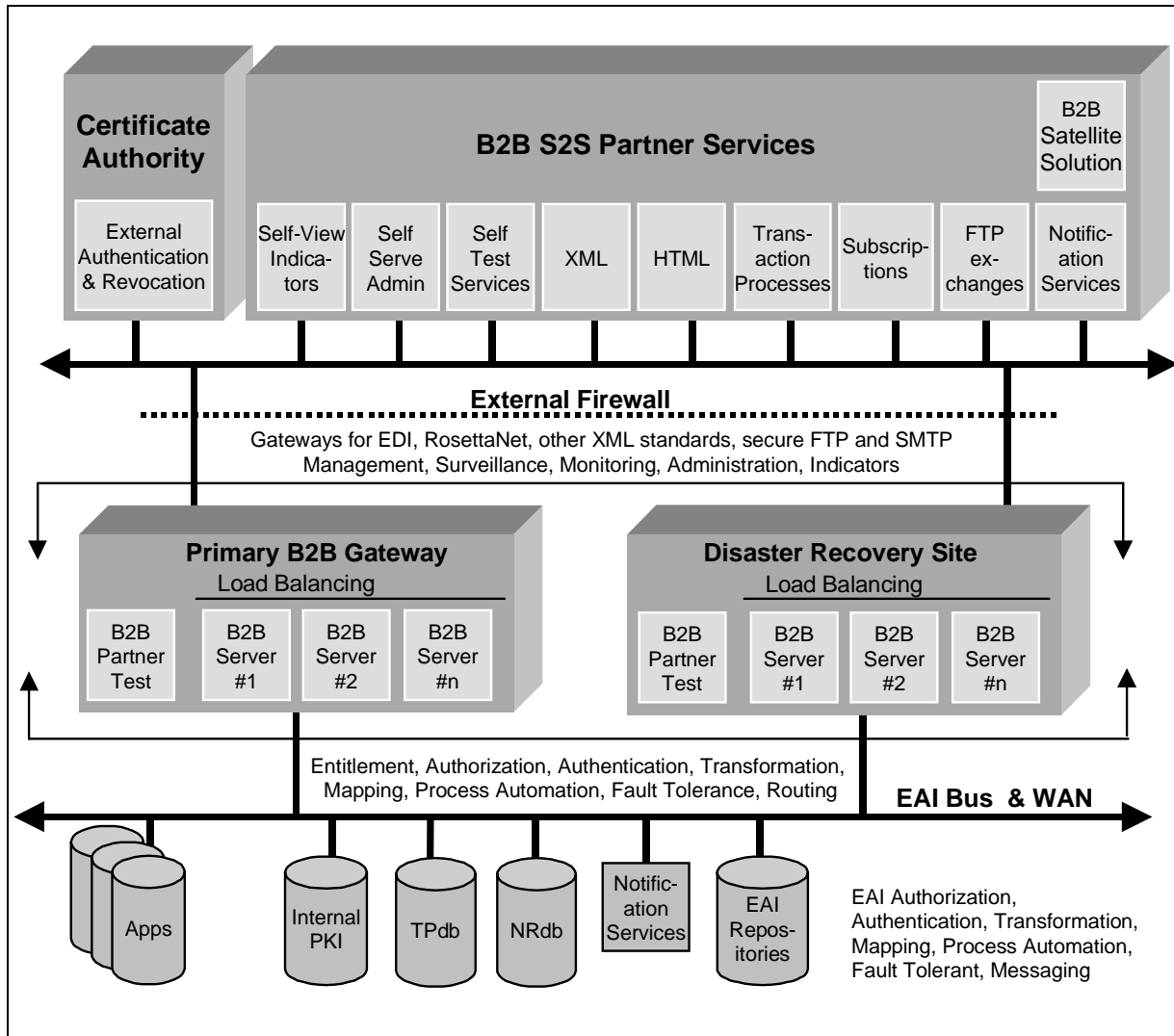


Figure 5: An integrated B2B gateway

Infrastructure readiness can be a huge task. However, it is not necessary to do it all at once. It is possible to install a solution from a RosettaNet solution provider within a few weeks and be up and running for a small implementation. Performing a comprehensive review of third-party solutions and then choosing a solution provider could take several months. However, even then one has only just started on the journey to overall infrastructure readiness.

Business Process Readiness

The purpose of this track is to assess business and technical resources, legacy applications, and business process repositories. This is important because each RosettaNet PIP provides a mutually agreed supply-chain

view of key business processes. Key criteria in this track include understanding the RosettaNet message structure and process message sequencing, identifying business process architects, and defining new business processes.

Intel is completing its initial B2B infrastructure planning and design requirements gathering, which coincides with initial RosettaNet pilots. A key finding from our initial efforts is that a significant increase in participation by “business analysts” (one of two areas in which we had difficulty obtaining resources) is needed in order to forward engineer and plan for the anticipated levels of adoption.

We have also realized that process re-engineering for RosettaNet must be performed within the context of re-engineering enterprise at-large business processes that

include requirements for trading partner integration. Therefore, our RosettaNet effort is considered an integral part of our EAI initiative. RosettaNet is therefore one element of a strategy to become a real-time event-driven global enterprise. Process re-engineering is a huge task.

To appreciate why business process readiness is such a big task, we need to understand how constructing a distributed Internet application using a robust message structure with a rich meta-model impacts enterprise readiness.

A RosettaNet message is intended to be predictable (open standards-based format), somewhat human readable, and portable between trading partners. In order to produce a widely supported and long-lived message format, the RosettaNet consortium agreed to define a message structure incorporating a complete data and meta-data model common to the significant business processes within the IT and EC supply chains.

A RosettaNet message consists of several nested XML structures and data structures, namely,

1. nested XML envelopes to define action, transaction, service, agent, message, transfer, and security sections
2. XML message sections for preamble, header, and body
3. attributes expressed using XML tags based on a supply chain dictionary
4. meta-data schema structures expressed using XML document type definitions (DTDs) or XML schema consisting of attribute data type definitions, tag hierarchy, cardinality (1:1, 1:n), permissible values, and parent/child dependencies
5. data as message content

Therefore, this message was deliberately designed as a self-contained, stateful and intelligent message, complete with data, persistent state information, and a meta-data model. Conceptually, it could be used to populate an object class or produce a database structure. Moreover, it could be abstractly considered as a snapshot of a transactional sequence in a file-based database expressed using XML.

It is therefore important to recognize that a RosettaNet message contains more information than data alone. It is a rich, fully stateful, self-describing package of information.

A RosettaNet message does not include any implied, hard-coded positional, or delimited structures. On the contrary, other formats for message and document

exchange (namely EDI and non-standard comma-separated values (CSV) or tab-delimited file formats) provide a lesser degree or no level of schema definition, data constraints, dictionary-driven taxonomies, and process state information.

The completeness of a RosettaNet message structure across a supply chain (as defined in PIPs) requires significant forward engineering by trading partners within the RosettaNet consortium. As a result, trading partners should expect to re-engineer their back-end systems to become RosettaNet compliant. This may involve creating processes that currently don't exist internally or mapping processes that are currently different from RosettaNet processes.

Up-front business process architects need to participate in many activities:

1. RosettaNet PIP workshops to define each process, meta-model schema, dictionary, taxonomy, message sequencing, and run-time parameters (e.g., wait times, retry duration, acknowledgements)
2. determining impact upon existing business processes and existing applications
3. optimizing existing business processes by leveraging the capabilities provided by RosettaNet within the context of an at-large enterprise process re-engineering effort
4. determining new processes and data services

Application Development Readiness

The purpose of this track is to prepare PIP implementation development plans and roadmaps. This is important because this step represents how and when existing processes and systems will be modified and rolled out to support RosettaNet. Key criteria in this track include statements of work, budgets, and plans.

As in the Business Process Readiness track, substantial participation by application development group(s) is necessary to forward engineer and plan for the anticipated levels of adoption. Application development groups realize they need to re-engineer processes for RosettaNet within the context of re-engineering enterprise at-large business processes while at the same time including requirements for trading partner integration.

Key deliverables for this track include work scope; identification of impacted systems; identification of key business analysts and process architects; determination of RosettaNet compatibility with existing processes; preparation of project budgets and schedules; setting of release dates; provision of consolidated test

requirements; definition of necessary API components; and setting of incremental upgrade roadmaps.

This track is similar to most enterprise application development efforts and can use a variety of development methodologies (e.g., traditional waterfall, rapid application development (RAD), etc). This track, more than any other, is likely to require the greatest amount of effort and resources. What's important to understand is that this group is usually the last to participate in the RosettaNet implementation planning effort, yet it has to be the first to implement the plan in order for deployment to progress. Therefore, getting up-front participation from the application developers is mandatory.

B2B EXTERNAL INITIATIVE READINESS

The purpose of this track is to assess the completeness and usability of the work of the chosen B2B external initiative (in our case, RosettaNet). Specifications, policies, and architectures provided by the initiative must be understood and evaluated against internal policies, procedures, guidelines, and strategies. This is important because implementing RosettaNet is not "only" a technology; it is part of a strategy that must permeate an enterprise's trading partner integration strategy. Key criteria in this track include review of consortium supply chain, implementation framework, and process frameworks.

Each B2B initiative provides technical specifications that present the functional design and technical frameworks for message structure, message transport, and/or message content. In the case of RosettaNet, many technical documents and specifications have been written. For example, below is a collection of guidelines and specifications that are necessary in our implementation of the "Manage Purchase Order" PIP (which covers submit, acknowledge, change, and cancel purchase orders). This material addresses one of approximately 100 PIPs.

1. RosettaNet Implementation Framework v1.1
2. Manage Purchase Order Specification (3A4)
3. 3A4 Purchase Order Acceptance Message Guideline
4. 3A4 Purchase Order Acceptance Guideline DTD
5. 3A4 Purchase Order Cancellation Message Guideline
6. 3A4 Purchase Order Cancellation Guideline DTD
7. 3A4 Purchase Order Change Message Guideline

8. 3A4 Purchase Order Change Guideline DTD
9. 3A4 Purchase Order Request Message Guideline
10. 3A4 Purchase Order Request Guideline DTD
11. Preamble Part Message Guideline
12. Preamble Guideline DTD
13. Service Header Part Message Guideline
14. Service Header Guideline DTD
15. Acceptance Acknowledgement Message Guideline
16. Acceptance Acknowledgement Guideline DTD
17. Acceptance Acknowledgement Exception Message Guideline
18. Acceptance Acknowledgement Exception Guideline DTD
19. Receipt Acknowledgement Message Guideline
20. Receipt Acknowledgement Guideline DTD
21. Receipt Acknowledgement Exception Message Guideline
22. Receipt Acknowledgement Exception Guideline DTD
23. General Exception Guideline DTD
24. General Exception Message Guideline

A given consortium's documentation is usually targeted to a specific supply chain or e-Business market segment. The consortium's pervasiveness within its target markets must be considered. Moreover, due to the relative youth of Internet e-Business, frameworks and specifications may not be as complete or thorough as they could be. Therefore, participation in and achieving time-tested experience within the initiative enables trading partners to more accurately assess the applicability of the initiative to their businesses, as well as providing a means for influencing the initiative such that it *does* deliver the needed benefits. Finally, adopting a B2B framework needs to include a review of its compatibility with best known methods (BKM) within one's company.

Trading Partner Readiness

The purpose of this track is to assess the readiness of key trading partners. This is important because one cannot implement RosettaNet without at least one and hopefully many trading partners ready to do so. Key criteria in this track include selecting trading partners,

choosing processes, detailed integration, and achieving reliable results.

Each trading partner will need to provide a similar level of effort. It will be several years until the B2B trading partner automation technologies have matured to provide relatively inexpensive plug and play solutions; therefore, these next few years will only include trading partners who consider themselves early adopters. Trading partners must have the will and desire to deliberately re-engineer business processes based upon a rapid schedule and evolving processes. They must be able to move quickly, often with ad hoc funding and scavenging for equipment and resources. Although management commitment is essential to successful implementation of a RosettaNet-sized initiative, a skunk-works and entrepreneurial mentality in the early days can be helpful.

Selecting a RosettaNet trading partner is currently easy because only early adopters are playing; and, with a limited set of PIPs to choose from, it is easy to define a project. A key expectation is that the use of RosettaNet specifications will eliminate the currently high level of up-front trading partner analysis needed to conduct e-Business. This may lead to a rush of trading partners wishing to engage each other using RosettaNet processes (after initial successful implementations by early adopters) before the PIPs have matured and PIP implementation is a widely understood experience. At present, early adopter trading partners spend significant effort figuring out how to use the RosettaNet specifications with one another. Once sufficient infrastructure is in place, the full benefits of RosettaNet can be realized as trading partners self-administer their processes and subscriptions.

Currently, readiness must be planned with exact testing and production dates and known versions of specifications and guidelines. Legal issues need to be negotiated up front (see "Legal Readiness" below). Precise details of Global Trade Identification Number (GTIN), United Nations Standard Products and Services Classification (UN/SPSC), and Dun & Bradstreet-assigned unique corporate identifier (D-U-N-S*) must be managed. Personalized trade parameters such as part number, product lines, and interpretations of timeouts, retry and acknowledgements need to be exactly discussed. Trading partner agreements (TPAs) need to be signed. Current EDI processes with the trading partner may need to be changed. Digital certificates and

digital signatures will be needed. And, as always in a new venture, backup plans will be needed.

Solution Provider Readiness

The purpose of this track is to assess the readiness of your selected B2B gateway solution provider. This is important because the tool you have selected may not provide all the capabilities needed to implement a PIP with trading partners. Key criteria in this track include review of public and private PIP processes, review of PIP templates, and concurrence of PIP interpretation.

Some solution providers provide only the plumbing to enable RosettaNet. When no PIP templates are provided, the end user must provide all aspects of PIP implementation. In these cases the tool is ignorant of the exact meaning of retry periods, duplicate messages, acknowledgements, failure to receive, and other process specifics. These build-your-own solutions will require internal infrastructure for non-repudiation database (NRdb), trading partner database (TPdb) and PKI.

Other solution providers provide a robust framework for PIP implementation where the PIP template is quite cognizant of the PIP framework. PIP implementation would be easier and faster using these tools; however, the tool must be sufficiently flexible should the PIP framework prove incomplete in any given trading scenario. These all-encompassing solutions include infrastructure for NRdb, TPdb, and PKI.

Trading partners need to assess the capabilities of their solution provider(s). Some key questions include the following. What level of compliance does the tool provide for the implementation framework and process specifications? When is beta and general availability? Has the tool been sufficiently stress-tested for a variety of PIP scenarios? Does the tool provide diverse role-based control so different groups cannot access other groups' processes? Many other questions will be on the minds of individual trading partners.

Finally, RosettaNet is working on a Solution Provider Certification program and certification standards, which should help RosettaNet implementors perform their assessments more quickly and with greater assurance.

Legal Readiness

The purpose of this track is to assess relevant legal issues. This is important because RosettaNet has expanded the capabilities of trading partner integration beyond the current terms and conditions found with EDI agreements; therefore, legal precedence has not yet been established for RosettaNet interactions. Key criteria in this track include trading partner agreements and early participation by legal counsel.

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Performing RosettaNet message exchange with trading partners will require a trading partner agreement (TPA) between each pair of trading partners. These legal agreements need to be managed by each company's legal counsel. TPAs currently exist for EDI; however, a generalized RosettaNet TPA does not exist as of this writing (although creation of a model TPA is now underway). In addition, legal expertise for Internet-based e-Business using RosettaNet has not yet been attained. Experience gained in RosettaNet pilot programs will help legal counsel to understand the differences between RosettaNet and EDI and facilitate the preparation of a comprehensive TPA.

Because RosettaNet will be enabling supply chain automation across a lengthy chain of buyers (customers) and sellers (suppliers), the goal is to write the TPA from a neutral perspective. Use of such a neutral TPA may be a challenge for many companies, whose organizational practices may have dictated that they prescribe different terms and conditions within their EDI TPAs depending upon their role as buyer or seller.

The list of legal concerns is being compiled as we move forward. Although many issues have been identified, the full impact will likely not be comprehended until the infrastructure is in place and more time is spent in understanding legal ramifications. To date, some of these issues are

- encryption export to controlled countries
- frequently changing e-Commerce and e-Business legislation
- strict privacy laws
- the potential for hundreds of trading partners with varying capabilities
- restriction on use of confidential, proprietary, or trade secret information
- constantly changing landscape of trading partners, processes, messages, documents
- personalized TPAs with specific and different run-time parameters
- self-administered processes and subscriptions
- proper use of digital certificate and signatures for the accompanying document/message
- signed non-disclosure and confidentiality agreements

Security Readiness

The purpose of this track is to assess the security requirements for encryption, authentication, and authorization at both the network and the trading partner message exchange level. This is important because implementing RosettaNet means that trading partner systems penetrate their corporate external firewall and security mechanisms. And undoubtedly, most data will need to pass through the internal firewalls to core enterprise applications. RosettaNet also will enable trading partners of different types and privileges to exchange documents for many critical business processes (e.g., purchase order, quotes, product information, pricing, availability, inventory, technical specifications, trade secret and confidential documents, CAD drawings, design specifications, etc.). Key criteria in this track include an understanding of corporate security and document confidentiality policies; and encryption, authentication, and authorization.

Security needs to initially address the front-end and the back-end. Front-end security issues apply to firewalls, proxy servers, network routing and protecting the system from malicious attacks. Back-end security issues apply to the controlled access to message content to system users and intermediaries using a right-to-see approach. Unlike current point-to-point solutions where data handling is decentralized, a B2B gateway will provide for a centralized flow of critical business information; therefore, only users with the right to see specific data should be entitled. Role-based administration of the B2B gateway should be considered.

Security readiness is also a significant challenge due to the inherent solution complexities, need for managed risk, and elevated concerns. The RosettaNet implementation framework incorporates a public key infrastructure (PKI). Intel's current RosettaNet implementation is based on a single corporate guideline using multiple certificate authorities, digital certificates, and digital signatures. Intel also requires the use of 128-bit encryption, which is greater than common usage and also is prohibited for export to controlled countries. Obtaining, understanding, and incorporating these guidelines and technologies into the B2B gateway, although logically simple, has been technically difficult due to the inherent complexity of PKI.

An important aspect of security is the ability to immediately revoke the privileges of a trading partner, or of any of their processes or subscriptions. It is also important to be able to confirm that trading partners are sending messages as agreed. This includes being able to detect when a message was not correctly assembled and

transported according to the TPA in place between the trading partners. This also includes the ability to detect whether encryption, digital certificates and digital signatures were correctly used.

Audit Readiness

The purpose of this track is to assess one's readiness to be audited by internal company officials. This readiness is important because RosettaNet trading enables the interaction of critical business processes. Managers and executives should not be casual with their views of implementing RosettaNet. Key criteria in this track include understanding the seriousness of global electronic trading, and preparing for audits.

Knowing that a B2B gateway will eventually transport and manage a majority of e-Commerce transactions and e-Content interactions with trading partners, it is important to design the B2B infrastructure up front to withstand frequent and diverse auditing.

By design, RosettaNet and the capabilities it enables represent considerable risks to a company should something go wrong. Auditing is actually a good thing, as one should feel more assured that risks are under control. Some of the risks identified include

- potential to be majority revenue channel
- binding \$M transactions
- binding legal agreements
- international trade with an easy global reach
- rapidly changing trade and Internet laws
- many government enforcement authorities
- sensitive and confidential document/information exchange
- many micro projects with intangible ROI where something will be unforeseen
- potential for lost potential or mistakes
- needs to be fault tolerant without data loss
- many critical success factors
- pivotal and timely information exchanges
- potential for significant impact on internal systems
- significant visibility and expectation levels
- competitors waiting for your misstep!
- centralized administration of enterprise processes and data (need for role-based administration and management using a limited right-to-see basis)

CHALLENGES

Achieving a common language for e-Business offers challenges in a number of areas, including (but not limited to) the development of the specifications themselves; correctly identifying the internal barriers to success and successfully overcoming them; and

planning to keep up with an ever-changing business, technical, and standards environment.

Some of the specific challenges we see ahead include

1. *Internet Speed.* RosettaNet* is caught up in the frenzy of Internet time. As such, trading partner automation and XML messaging are very hot technologies; the leaders in this race will likely reap the greatest rewards. Most significantly, getting it done faster, better, and cheaper will remain a requirement that cannot be understated. Many challenges exist when trying to compress and accelerate planning, funding, scheduling, evangelizing, designing, building, and testing, especially when considering the Readiness Model presented above.
2. *Sustaining will (internally).* Maintaining momentum in the face of "short attention spans" seems to be a systemic symptom of today's Internet e-Business mentality. At an increasing rate, everyone seems to have less time to make informed decisions. An increased level of risk-taking will be necessary to proceed; management needs to remain committed even when the inevitable mistakes are made.
3. *Sustaining will (externally).* Early adopters of RosettaNet will find it neither easy nor inexpensive to initially embrace. Each supply-chain or endorsing adopter will face an inevitable debate of whether to continue or disengage. So far the will of the RosettaNet consortium is withstanding these stresses and the key motives for moving forward remain steadfast; however, further tests of will are likely before RosettaNet's adoption is widespread.
4. *Obtaining resources.* Planning in advance for resource needs is a challenge within any company; however, RosettaNet, like all e-Business initiatives, is driven by its constituents faster than any company could anticipate. Obtaining business and technical resources is a challenge; however, expanding to include sufficient forward-thinking resources from business analysts, technical analysts, system architects, and application architects requires resource allocation. This can be achieved either by additional funding or by cancelling other planned projects. This can be especially challenging if resources are being pulled from competing B2B initiatives.

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5. *Creating the implementation plan.* Defining, planning, and estimating the scope of work to implement which of the ~100 RosettaNet PIPs across the enterprise at-large requires a diverse group of resources and a PIP-centric approach rather than a business group approach.
6. *Choosing a project management methodology.* RosettaNet implementation needs to be executed using a hybrid of rapid application development (RAD) project methodology. Determining a methodology could be challenging within companies that do not have a conscious process for selecting a methodology.
7. *Finding an optimal team structure.* Initial implementations of RosettaNet require participation from diverse groups within an enterprise (exact composition depends heavily on the PIPs chosen for implementation). Each PIP implementation becomes a mini-project within the bigger context of RosettaNet and B2B implementation. Maximizing team productivity and effectiveness is essential, especially considering that B2B and e-Business projects need to proceed at Internet speed. It will be challenging to form an optimal team structure, then clone it for the many PIP mini-projects.
8. *Managing information overload.* Implementing any enterprise-wide project (especially one which happens to affect the very way the enterprise conducts its business) is hugely complex and involves a tremendous amount of information assimilation. Implementing the same set of specifications across most of the members of an industry magnifies the problem of synchronized information assimilation enormously. Participants in the implementation process must remain current with respect to RosettaNet specifications; each of the open standards on which RosettaNet is based (e.g., XML, SSL, HTTP); software and hardware solution options; internal company guidelines; requirements and functional specifications; test plans; meeting minutes; and other common materials. Participants must also keep abreast of similar materials from trading partners with whom they are implementing the plan. Methods for assimilating and managing frequent knowledge and information change in the e-Business sphere are sadly lacking.

RESULTS

On a practical level, we have identified eight distinct roles within our B2B RosettaNet* deployment strategy. Table 1 lists these eight roles; it also shows the level of participation of each of these players within the readiness tracks discussed above. (As a point of departure for readers, the staffing levels for each role as we worked through to our 2.2.2000 deployment plans was as follows. One person each fulfilled roles 1 through 5. Role 6 consisted (in our case) of one full-time person plus parts of numerous other folks participating in PIP workshops, for another full-time equivalent. Multiple people participated for roles 7 and 8, typically one person for specific groups of PIPs or core applications. A total of 22 people participated for 2.2.2000 -- 13 from IT and 9 from the business units)

Intel performed several key tactical steps to address the diverse issues within the Readiness Model.

First we assembled the Intel RosettaNet Deployment Team consisting of six people in roles 1 through 6 in Table 1. We were slow in getting participants for roles 7 and 8 because these groups were extremely busy and up-front resource planning was required. In hindsight we recommend engaging these business analysts and application development groups in the early stages of RosettaNet planning.

Next, we engaged one trading partner (a major distributor) as part of our RosettaNet proof-of-concept pilot (August 1999) and initial implementation (2.2.2000). With our trading partner, we selected PIP3A4 ("Order Management"). Each of us selected our own solution provider and tools. This meant that four companies had to synchronize development and test plans. Since we were all first implementers, gaps and changes in the RosettaNet Implementation Framework and PIP guidelines needed to be ironed out. Infrastructure planning was a key focus from the beginning. Engineers within the core environment supporting EDI and our e-Business engineering groups worked together to integrate e-Business design requirements with existing EDI requirements. At present, we are creating a production environment that supports both EDI and RosettaNet running on Windows NT*.

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* Other brands and names are the property of their respective owners.

After a few months of assessing RosettaNet readiness and formulating the Readiness Model, we prepared and sent a PIP assessment and business impact survey to all business groups having a need for trading partner automation. We are now waiting for enterprise-wide responses. These responses, and additional partner readiness discussions, will be reviewed and become the basis for our post-2.2.2000 rollout.

The following recommendations are provided to assist with first-time RosettaNet deployment:

- Look for a quick win: pick one strategic PIP with one partner. Plan for the process to take 2-4 months. Assign 4 to 6 people.
- Engage the solution providers, letting them educate you on B2B and partner integration architectures. Perhaps even contract with one of them to build a

limited production pilot. Defer committing to your B2B vendor until a successful pilot is in production.

- Require the Business Manager and Technical Manager to hold weekly meetings to review progress and status.
- Incorporate the RosettaNet roadmap strategy within the company's overall B2B strategy.
- Include other B2B channels within the scope of the B2B gateway (e.g., secure file transfer, SMTP, EDI).
- Consider the impact on existing browser-based applications and partner portal strategies.

Table 1 :Participation levels of key roles in readiness model tracks

Role #	Description	Readiness Track									
		1 Biz Strat	2 Infra-structure	3 Biz Process	4 App Dev	5 B2B Initiative	6 Trading Partner	7 Solution Provider	8 Legal	9 Security	10 Audit
1	RosettaNet Business Program Management	L	M	S	S	M	S	M	M	M	M
2	RosettaNet Technical Program Management	M	L	S	S	S	S	L	L	L	L
3	PIP Management	S	M	S	S	S	S	M	M	M	M
4	Pilot Management	S	S	S	S	S	L	S	S	S	M
5	Application Integration Management	M	S	S	L	S	S	S	M	S	S
6	RosettaNet Standards-Development	M	M	S	M	L	M	M	M	S	N
7	Technical and Business Analysts, Business Process Analysts	S	M	L	S	S	S	M	M	S	S
8	Back-end Application Development Management	M	M	S	S	N	M	N	N	M	S

Legend: L = Leader S= Significant Participation M = modest participation N = little to no participation

CONCLUSION

Our team continually expands its understanding of what it takes to implement RosettaNet. As we complete a second-phase pilot, plan for future implementations, design the infrastructure, and expand our circle of influence, we foresee many new challenges. It is unclear when the rate of discovery of new issues and challenges will diminish. It is likely not to be until

widespread trading partner/PIP implementation occurs in several years.

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IT Architects, Strategists and Technologists: Bert Cave (IT Engineering, EAI Program Manager), Ralph Nitta (IT e-Business Integration Manager), Ed Balthasar (IT Strategy and Technology).

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