

Developing a long-term EDI strategy with IBM B2B Cloud Services



Redguides
for Business Leaders

Matt Bucey



- Understand how IBM B2B Cloud Services can help you grow your business
- Learn how to improve B2B collaboration using the Cloud
- Accelerate electronic B2B collaboration with customers and suppliers to achieve a competitive advantage



Executive overview

Electronic data interchange (EDI) was the standard for exchanging business transactions, purchase orders, invoices, shipping notices, and electronic funds transfers for over 25 years. In the last 10 years, EDI evolved with newer technology, especially with the ubiquity of the Internet. Because of these technological advancements, EDI is nearly as easy to use as email and is no longer an option for doing business. Instead, EDI is a business requirement.

One of the major concerns of IT and business decision makers responsible for managing supply chains and the activities of their trading partners is how to enable more effective collaboration with business partners that have individual regulatory requirements. The varying degrees of technical expertise, communications protocols, data standards, and information systems of those business partners also are of concern.

Adding to this complexity is the short supply of EDI or business-to-business (B2B) process expertise and the technologies required to achieve successful B2B collaboration. This shortage is even more difficult to overcome as most businesses search for administrative savings and vital performance improvements. Businesses also are trying to keep pace with the growing demand for accommodating new global partners, automating more interactions, and managing older EDI systems. Adding to this difficulty is the growing number of data types, standards, and protocols.

Organizations need a secure, agile, flexible, and global B2B integration platform to respond to these challenges. When combined with real-time business process visibility to achieve the highest level of B2B collaboration, the EDI platform can accommodate resource limitations with a skilled, experienced staff to offload the responsibilities from your own IT personnel. These responsibilities include bringing on new partners to managing your entire EDI and B2B operations. IBM® B2B Cloud Services delivers the technology, expertise, and range of Cloud solutions to address your global B2B needs.

This IBM Redguide® publication is for IT and business decision makers to help them understand how IBM B2B Cloud Services can meet their global B2B needs.

Business challenges

For organizations that seek to drive growth in an increasingly competitive global marketplace, the ability to trade electronically is key. Electronic trading facilitates B2B collaboration. Electronic trading also provides real-time, end-to-end visibility and control over the business processes that organizations share with their customers, suppliers, banks, and trading partners.

EDI in the beginning

EDI was created in the 1960s and is a widely used technology for the automated exchange of documents between dissimilar applications. Value chain partners use EDI to exchange purchase orders, invoices, advance ship notices, and other business documents directly from one business system to the other, without human intervention.

But EDI is more than a technology. The term also refers to the implementation and operation of systems and processes for creating, transmitting, and receiving EDI documents.

In this expanded context, the essential elements required to implement electronic data interchange can be systems and processes used for creating, transmitting, and receiving EDI data by using standards such as UN/EDIFACT, ANSI ASC X12, TRADACOMS, and ODETTE. These information sources also include non-EDI data such as XML, spreadsheets, and other text-based documents.

The essential systems and processes used for creating, transmitting, and receiving EDI data include an electronic communication medium to send and receive the data in a timely manner. These systems and processes include the following types of electronic communication:

- ▶ Managed file transfer to facilitate point-to-point connections with trading partners
- ▶ Value Added Network (VAN) to facilitate one-to-many connections with trading partners

EDI was used because the cost of handling a paper document was more than 10 times the cost of handling an EDI document. When companies began running on central enterprise resource planning (ERP) systems, the order-to-cash process was automated. This automation further drove down costs and gave an incentive to move all high-volume suppliers to trade by way of EDI.

Helping EDI become the norm

As organizations started to realize the benefits of automating by using EDI, many of the larger hubs in the supply chain implemented initiatives to automate their trading community. For example, many buying organizations realized that their smaller and lower-volume suppliers (who are a critical part of the business) cost more to do business with because those suppliers were still processing paper. Many studies done on the cost of paper transactions showed that the transactions cost from USD5 - USD50 per transaction. The cost of an EDI transaction often is less than USD0.65 per transaction.

The global recession that started in 2008 still drives many IT and business decisions and places intense focus on continual improvement to the bottom line. Supply chain disruptions are an expensive component of operating costs. Most organizations are operating with a limited staff that must effectively manage thousands of trading relationships and millions of transactions. Any manual intervention into these automated processes causes inefficiencies that can escalate costs.

The options for electronic communication expanded beyond the VAN and managed file transfer to include the following possibilities:

- ▶ *EDI outsourcing*: EDI outsourcing is the provision of software and services by an external company for the implementation and operation of systems and processes. These systems and processes are responsible for creating, transmitting, and receiving EDI documents. The VAN is the core of the earliest forms of EDI outsourcing.
- ▶ *EDI transformation*: EDI transformation software facilitates data exchange standards and enables the messages transmitted and received to be translated, mapped, interpreted, and checked for compliance. This process evolved to become B2B gateways. These gateways are software that provides the transformation, process integration, and point-to-point file transfer capabilities that incorporate Internet protocols.

Moving beyond basic EDI

One of the major concerns of IT and business decision makers is how to enable more effective collaboration with business partners around the world. Adding to the collaboration issues are the individual regulatory requirements, varying degrees of technical expertise, communications protocols, data standards, and back-office information systems used by partners. EDI is one of the most effective technologies for creating transaction efficiencies among business partners. However, the global business landscape shifted and other tools are now necessary.

The limitation of EDI technology to support more complex relationships is becoming a barrier to growth for many companies. As companies are forced by marketplace factors to become globally integrated enterprises, they increasingly need to expand their business with more partners. Supply chains and trading partner relationships are no longer linear. These relationships are a complex network that requires much more coordination. For example, a typical manufacturing company relies on more than 35 contract manufacturers around the world to provide the necessary parts for its goods. For some companies, such as automobile and airplane manufacturers, the number of manufacturers can range in the tens of thousands. As a result of these trade changes, the number of standards grew to the extent that the term *standards* in this context can be an oxymoron.

EDI technology designed for transaction efficiency and standardization imposed limitations on new trading relationships. Diverse customer requirements and mandates led to disparate systems with multiple environments to support and maintain. Limited flexibility also limited the number of enabled trading partners.

EDI systems are the norm for the exchange of standard business electronic documents in many sectors. It is unlikely that EDI disappears from most of the companies that rely on it, but newer alternatives beyond EDI have advantages. Companies that use EDI are considering (and use) these alternatives.

Supporting B2B collaboration

As the global trading environment grows more complex, the need for EDI technologies becomes the need for B2B collaboration capabilities that can enhance partner integration, process automation, and comprehensive visibility. Companies realize the importance of B2B integration to their business.

B2B integration also evolved as the focus moved away from the provision of pure EDI to B2B integration that supports supply chain and trading partner activities. This move to B2B integration enabled more effective collaboration with business partners.

The VAN also evolved to meet the needs of its customers. This evolution is seen in the following integration paradigms:

- ▶ Integration as a Service (IaaS)
- ▶ B2B collaboration network
- ▶ Integration on demand
- ▶ Business process network
- ▶ B2B integration Cloud
- ▶ Integration Platform as a Service (iPaaS)

How transport and deployment options changed to further enable B2B integration is an example of iPaaS.

Addressing future challenges

As companies develop long-term EDI strategies to scale up to large B2B and EDI projects with many customers and partners, they must address the following requirements:

- ▶ How to handle the challenges to service global growth markets based on the diversity of suppliers, the effect of trade regulation and finances, and the complexity of supply chain delivery. Companies need to respond to all customers and manage all partners cost-effectively.
- ▶ How to integrate on-premise systems with those systems used from the Cloud.
- ▶ How to integrate with business partners who also use systems and applications in the Cloud.

Business decision makers responsible for the success of B2B integration found that B2B process experts and technologies are in short supply. Businesses in search of administrative savings and vital performance improvements also face the difficulties of obtaining the resources needed to address these new requirements. Businesses also must address the challenge of managing older EDI systems complete with the growing numbers of data types, standards, and protocols. As a result, these critical collaboration projects often are postponed. Delays and complexity further increase the total cost of ownership (TCO) for B2B collaboration.

Business value

Companies that want to develop a long-term, global EDI strategy to encourage growth and increase efficiency are adopting B2B collaboration strategies that use the Cloud. The goal of these strategies is to reduce cost and increase profitability through real-time, comprehensive visibility and control over the business processes they share with customers, suppliers, banks, and other outside partners.

Designed to alleviate the burden on internal resources, IBM B2B Cloud Services can take responsibility for part of or virtually all B2B and EDI electronic commerce infrastructure and processes. By taking this responsibility, IBM B2B Cloud Services enable clients to achieve the following results:

- ▶ Reduce the TCO of B2B and EDI operations and use internal resources where they are needed most.
- ▶ Increase profitability by increasing the reliability of B2B operations.
- ▶ Accelerate B2B collaboration with customers, partners, and suppliers to achieve a competitive advantage.

Reducing TCO and using internal resources

IBM provides the following resources to manage your B2B integration technology so you can rapidly grow and adapt your B2B community:

- ▶ Integrating business partner transactions with back-end applications by using IBM experts and a service-oriented architecture (SOA)-based platform
- ▶ Offering flexible delivery options, in which you can take as much or as little responsibility as needed so you can transfer ownership as needed
- ▶ Offering security-enhanced communication with any partner around the world, independently of protocols or gateway
- ▶ Improving the agility and control of your supply chain with real-time business process intelligence

Increasing profitability and driving competitive differentiation

IBM helps drive increased reliability and competitive differentiation through the following B2B and EDI reliability benefits:

- ▶ Reducing order, price, and invoice errors by using our expertise to manage your document delivery process
- ▶ Providing skilled consultants to enhance your e-commerce strategy
- ▶ Achieving cost efficiencies with our world-class support 24 hours a day, every day of the week and “dial tone” reliable infrastructure
- ▶ Making it easier for customers and partners to do business with you

Accelerating B2B collaboration to achieve a competitive advantage

IBM helps accelerate B2B collaboration through the following benefits:

- ▶ Improve supplier compliance by using our experts to monitor and manage your community.
- ▶ Provide document expertise that reduces order, price, and invoice errors, and manages your document delivery process times.
- ▶ Decrease time to market for new products and services with our B2B expertise.

Teaming with IBM sends a strong message to your customers that they can rely on the integrity of the data you send them. The partnership with IBM also shows that you can keep pace with changes and upgrades. With IBM expertise on your side, you can better earn client loyalty as you profit internally through more agility, control, and visibility into shared business processes.

Solution overview

IBM B2B Cloud Services securely connect and rapidly build your partner communities by using B2B Cloud solutions. IBM B2B Cloud Services solutions range from on demand to fully managed solutions and provide you with the flexibility to quickly adapt as the needs of your business change. You can take advantage of and benefit from the fast implementations and lower start-up costs to help you optimize your business community with the following core solutions:

- ▶ IBM Sterling B2B Collaboration Network
- ▶ IBM Sterling B2B Integration Services

IBM Sterling B2B Collaboration Network

IBM Sterling B2B Collaboration Network is a foundational component of IBM B2B Cloud Services. Sterling B2B Collaboration Network is the IBM B2B Integration on Cloud platform, which differs from traditional VANs. A VAN delivers information from one point to another. B2B Integration on Cloud gives you visibility into that information in real time. Your view of that data can be linked within a business context to monitor whole processes (such as order-to-cash) instead of only individual transactions.

Built on a security-rich and flexible SOA, Sterling B2B Collaboration Network processes more than five million transactions daily. This high volume gives you visibility into transaction content as the business data is processed through the network. The data can come from almost any system inside or outside your organization. With Sterling B2B Collaboration Network, you can help support almost any data type, format, or communication protocol.

This comprehensive process visibility helps you improve strategic decision making with accurate, real-time data, even as you enhance the experience of customers through corporate-wide, real-time views into order status. You also can analyze trading partner performance through the key metrics of Sterling B2B Collaboration Network.

Exchange services

You can move almost all of your information with the following exchange services:

- ▶ Comprehensive protocol support that includes async and Odette File Transfer Protocol (OFTP).
- ▶ Through most Internet protocols:
 - IBM Sterling Connect:Direct®
 - Transmission Control Protocol/Internet Protocol (TCP/IP)
 - File Transfer Protocol (FTP)
 - File Transfer Protocol/Pretty Good Privacy (FTP/PGP)
 - Simple Mail Transfer Protocol (SMTP)
 - X.400
 - Hypertext Transfer Protocol Secure (HTTPS)
 - WebSphere MQ
 - EDIINT protocols AS1 and AS2
- ▶ Support for multiple data types such as XML, CSV, iDoc, and many flat file formats and EDI standards.
- ▶ Support for 100 public and private networks worldwide.

Infrastructure services

IBM Sterling B2B Collaboration Network offers the following reliability benefits:

- ▶ Extensive disaster recovery planning and testing.
- ▶ Highly available network operations (99.95%+ uptime).
- ▶ Advanced data protection and integrity through comprehensive security capabilities.
- ▶ Semiannual audits, comprehensive physical security capabilities, firewalls, and encryption.
- ▶ Global multilingual customer support service centers that are always available.

IBM Sterling B2B Integration Services

IBM Sterling B2B Integration Services combines the IBM Sterling B2B Integration software products, VAN, and related trading community development and business process visibility services with B2B process management and trading partner support services to create B2B and EDI managed services solutions.

Building on the B2B integration and process visibility capabilities of the IBM Sterling B2B Collaboration Network, IBM Sterling B2B Integration Services reduces the burden on internal resources, as shown in Figure 1. The Integration Services also minimize your costs and accelerate your ability to achieve B2B collaboration through the addition of B2B process management and trading partner support.

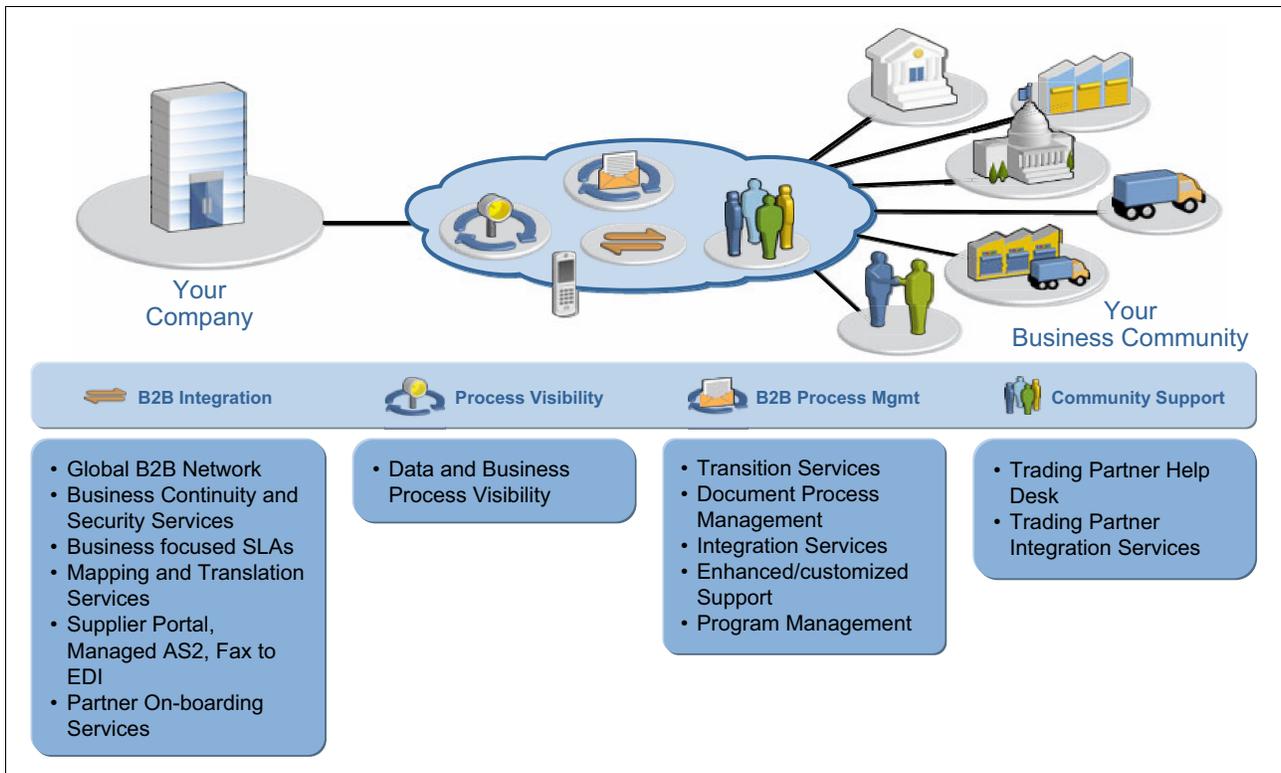


Figure 1 Service offerings built on Cloud technologies enable acceleration of ROI for B2B projects

IBM achieves economies of scale within our B2B integration on the Cloud environment by using efficient provisioning, B2B process management, and support and reporting tools. IBM also uses our own infrastructure, software, and network services. This environment provides a higher level of business benefit at a lower TCO than is available from a solution managed in-house. This lower-cost dynamic also features detailed monthly reports so you know the exact TCO of your B2B operations.

IBM Sterling B2B Integration Services consists of the following levels of service:

- ▶ IBM Sterling B2B Integration Services Basic
- ▶ IBM Sterling B2B Integration Services Plus

IBM Sterling B2B Integration Services Basic

IBM Sterling B2B Integration Services Basic takes responsibility for and provides on-demand access to the B2B Integration on Cloud infrastructure, business process visibility tools, and community development resources. You and your trading partners are transitioned onto the B2B Integration on Cloud platform. You are provided with ongoing management of the B2B infrastructure, which includes the following services:

- ▶ Transition services: The project coordination to support your transition to the B2B integration on Cloud platform.
- ▶ Infrastructure and communications management: The people skills, technology, and resources to monitor, maintain, and operate your B2B environment 24 hours a day, every day of the week.
- ▶ Support services: The geographical coverage, language support, availability, and level of expertise to meet your support needs.
- ▶ Visibility services: The reporting, alerting, and real-time view into your business processes and associated transaction data.
- ▶ Community services: Access to the community development people skills, tools, and processes developed and managed by IBM, to reach the goal of 100% electronic trading through the following metrics:
 - Trading partner conversion programs
 - Trading partner consolidation programs
 - Trading partner recruitment programs
 - Web forms
 - Fax conversion services
 - Managed AS2
- ▶ Translation and mapping services: Seamlessly integrate business partner transactions with your back-end applications. Support is available for any data type or format with the following data translation and custom mapping services:
 - Map development
 - Map maintenance
 - Map support
 - Mapping Report Specifications (MRS) testing
 - MRS maintenance

Designed to accelerate your ability to achieve B2B collaboration, with Sterling B2B Integration Services Basic you can use your internal resources where they are needed most. This flexibility helps you to rapidly grow and adapt your B2B community.

IBM Sterling B2B Integration Services Plus

IBM Sterling B2B Integration Services Plus builds on the capabilities of Sterling B2B Integration Services Basic with B2B and EDI process management.

Sterling B2B Integration Services Plus provides additional transition services, document process management, premium support, integration services, and optional trading partner support. These services result in cost savings because of full-time, world-class support and a “dial tone” reliable infrastructure. The services also reduce order, price, and invoice errors through the use of IBM expertise in managing your document delivery process. With Sterling B2B Integration Services Plus, skilled consultants are always available to optimize your e-commerce strategy and help make your business more successful.

Table 1 provides a detailed description of the additional services available in the Sterling B2B Integration Services Plus offering.

Table 1 Additional offerings available in Sterling B2B Integration Services Plus

Services offering	Description
Transition services	<p>The following services are available to transition customers of the service:</p> <ul style="list-style-type: none"> ▶ Project management: Dedicated project manager to manage your transition to the B2B integration services platform. ▶ Architectural design: Develop the architectural plan that includes requirements for process and infrastructure. ▶ Integration testing: Testing process to verify that the customer and itstrading partners are receiving data to their back-office systems from the B2B integration services platform. ▶ Optional services: Customize the service to meet your business needs.
Integration services	<p>The following Integration services are available after your service is active:</p> <ul style="list-style-type: none"> ▶ Map integration testing: Ensures maps created for you and your trading partners are functioning correctly. ▶ E-commerce strategy services: Consultation to develop your B2B integration service in support of your business requirements for the next 1 - 3 years. ▶ Optional services: Includes integration testing, training, architectural design, process design, and application consulting from skilled and experienced B2B resources to develop and customize your service.
Premium support	<p>This level of support offers a higher degree of proactive support through the following services:</p> <ul style="list-style-type: none"> ▶ Dedicated phone number for handling calls with personnel available for extended hours. ▶ Calls handled by senior customer support representatives. ▶ Faster escalation of any items not handled in Level 1 support. ▶ Support access to all customer employees. ▶ Named customer service representatives. ▶ Configurable automated alerts.
Document process management	<p>IBM manages the document send and receive process and works with your staff to resolve any issues.</p>
Program and Service management	<p>The role of the Program and Service manager goes beyond the services provided by support. The role also is designed to develop a partner-based relationship with the customer to align the service to facilitate the following strategic growth objectives:</p> <ul style="list-style-type: none"> ▶ Single point of contact for business and strategic issues. ▶ Project and resource oversight for projects during the operations phase. ▶ Identify, evaluate, and prioritize B2B opportunities. ▶ Regular business reporting and scheduled on-site meetings with the customer executives. ▶ Annual reassessment of the B2B business plan.

Services offering	Description
Trading partner support	<p>An optional service that provides experts that assist in resolving document processing and other B2B integration issues with your trading partner community. This service is available regardless of time zones, geographical location, and spoken languages and includes the following support:</p> <ul style="list-style-type: none"> ▶ Functional acknowledgement monitoring and tracking at the trading partner level. ▶ Trading partner direct dial access to assigned IBM customer service representatives who can answer calls as your company. ▶ Level 1 telephone, web, and email support for each registered trading partner that includes: communications, mapping, document processing, problem diagnosis and resolution, data tracking, document testing, and system setup and maintenance.
Supplier portal development	<p>An optional service providing a branded supplier portal for the customer. This service enables suppliers to access information that includes B2B specifications for documents, protocols required, and information about new initiatives.</p>

Real-time multi-enterprise processing

IBM continues to build upon the IBM B2B integration on Cloud infrastructure by providing extended process integration end-to-end between the enterprise and business partners. This integration is delivered from a single, virtualized platform with real-time, multi-enterprise process services. These services are the next generation of integration-as-a-service or *integration brokerage* capabilities. These capabilities expand the reach of B2B by allowing real-time B2B document exchange and document enrichment. This service further expands the integration brokerage capabilities, which allow customers to connect to anyone, anywhere, at anytime.

IBM Sterling Synchronous B2B Process Service

IBM Sterling Synchronous B2B Process Service provides real-time website inquiry and response processing, and the synchronous exchange of supply chain documents. Companies can synchronously exchange messages with partners through the IBM B2B Cloud Services environment regardless of differing web services interfaces.

IBM Sterling Process Enrichment Service

Within a standard B2B document flow, IBM Sterling Process Enrichment Service can connect to an external data source to validate information within the business document. Additional information also can be gathered and used to enrich the business document content.

Figure 2 on page 11 shows the B2B integration on Cloud architecture.

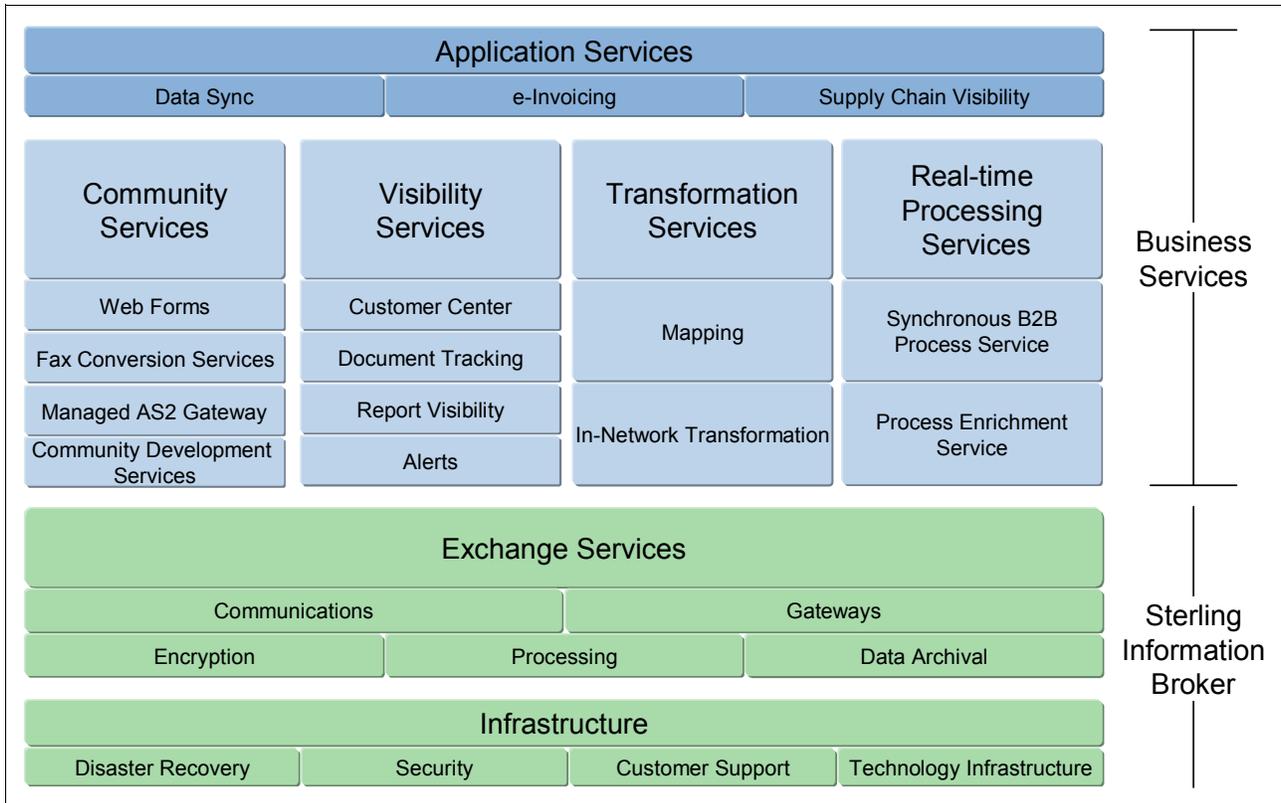


Figure 2 B2B integration on Cloud architecture

The VAN evolved into a B2B integration Cloud featuring the core components of community services, visibility services, transformation services, and real-time processing services. A B2B integration Cloud is the core technology behind B2B integration services. The Cloud includes the electronic communication medium to send and receive the data in a timely manner. The Cloud also includes the B2B integration gateway software. This software enables process orchestration of the messages transmitted and received to be translated, interpreted, and checked for compliance. Instead of a dedicated or large shared instance of specific software, all of these services are now in the Cloud, via a multi-tenancy environment, built on a SOA platform.

B2B Integration Cloud evolved from technology-based EDI outsourcing to include B2B integration, process visibility, B2B process management, and community support. These functions enable an organization to have a single connection to the B2B integration Cloud and use the economies of scale available to a B2B integration services provider.

Summary

The ability of a company to respond to the demands and needs of its trading partners (customers and suppliers) increases the burden for B2B integration expertise across time zones, languages, and technologies or standards. Failure to meet these needs or demands can affect customer satisfaction, increase the time required to move new products and services to the marketplace, and increase the cost of doing business. Companies expect their partners to provide a service that meets these evolving challenges.

Expect B2B collaboration requirements to continue to grow and change. As Cloud adoption continues to evolve, companies face new integration challenges: integrate on-premise

systems with those systems used from the Cloud, and implement B2B integration with trading partners that also use systems in the Cloud.

Integration brokerage is the answer. Companies expect B2B services providers with the experience of using a Cloud-enabled B2B integration platform to be in the forefront. Ask your customer representative to show you how IBM B2B Cloud Services are leading that evolution with complex integration brokerage capabilities.

IBM B2B Cloud Services are part of the IBM SmartCloud™ Solutions portfolio, which combines capabilities that accelerate business process innovation and delivers business analysis. The portfolio also enables collaboration by creating and linking business networks to address business challenges. For more information, see the IBM Smart Cloud website:

<http://www.ibm.com/cloud-computing/us/en/saas.html>

For more information

For more information about the topics in this paper, see the following publications and websites:

- ▶ IBM B2B Cloud Services website:
<http://www.ibm.com/software/commerce/b2b/b2b-integration/cloud-services/>
- ▶ IDC Whitepaper, *Business Value of IBM Sterling B2B Integration Services*:
<ftp://submit.boulder.ibm.com/sales/ssi/ecm/en/uvw12359usen/UWV12359USEN.PDF>
- ▶ IBM Redbooks publications:
 - *IBM Sterling Business Integration Suite: A Packaged Solution to Solve Your Business Integration Challenges*, REDP-4723:
<http://www.redbooks.ibm.com/abstracts/redp4723.html?Open>
 - *IBM Sterling Managed File Transfer Integration with WebSphere Connectivity for a Multi-Enterprise Solution*, SG24-7927:
<http://www.redbooks.ibm.com/abstracts/sg247927.html?Open>

The author who wrote this guide

This guide was produced by a specialist working with the International Technical Support Organization (ITSO).

Matt Bucey is a Product Marketing Professional for IBM B2B integration solutions in the US. He has over 12 years of experience in both the wireless telecommunications and B2B and MFT software/SaaS technology fields. He holds a degree in marketing from the University of Kentucky and an MBA in strategy and finance from the Ohio State University. His primary area of expertise focuses on EDI and B2B integration in the Cloud, which includes integration brokerage and integration services, EDI/B2B-managed services, and file transfer in the Cloud.

Thanks to Debbie Landon, International Technical Support Organization, Rochester Center, for her contributions to this project.

Now you can become a published author, too!

Here's an opportunity to spotlight your skills, grow your career, and become a published author—all at the same time! Join an ITSO residency project and help write a book in your area of expertise, while honing your experience by using leading-edge technologies. Your efforts will help to increase product acceptance and customer satisfaction, as you expand your network of technical contacts and relationships. Residencies run from two to six weeks in length, and you can participate either in person or as a remote resident working from your home base.

Find out more about the residency program, browse the residency index, and apply online at:

ibm.com/redbooks/residencies.html

Stay connected to IBM Redbooks

- ▶ Find us on Facebook:
<http://www.facebook.com/IBMRedbooks>
- ▶ Follow us on Twitter:
<http://twitter.com/ibmredbooks>
- ▶ Look for us on LinkedIn:
<http://www.linkedin.com/groups?home=&gid=2130806>
- ▶ Explore new IBM Redbooks® publications, residencies, and workshops with the IBM Redbooks weekly newsletter:
<https://www.redbooks.ibm.com/Redbooks.nsf/subscribe?OpenForm>
- ▶ Stay current on recent Redbooks publications with RSS Feeds:
<http://www.redbooks.ibm.com/rss.html>

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing, IBM Corporation, North Castle Drive, Armonk, NY 10504-1785 U.S.A.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

This document, REDP-4857-00, was created or updated on August 21, 2012.



Trademarks

IBM, the IBM logo, and [ibm.com](http://www.ibm.com) are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. These and other IBM trademarked terms are marked on their first occurrence in this information with the appropriate symbol (® or ™), indicating US registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at <http://www.ibm.com/legal/copytrade.shtml>



The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

The following terms are trademarks of other companies:

Connect:Direct, and N logo are trademarks or registered trademarks of IBM International Group B.V., an IBM Company.

IBM SmartCloud™
IBM®

Redbooks®
Redbooks (logo) ®

WebSphere®

Other company, product, or service names may be trademarks or service marks of others.