

E-invoice Exchange Framework: Requirements for Oversight



Prepared by the
Business Payments Coalition
E-invoice Standards Oversight Assessment
(SOA) Work Group
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2 Executive Summary

The Business Payments Coalition (BPC) is a volunteer group of organizations and individuals working together to promote greater adoption of electronic business-to-business (B2B) payments, remittance data and invoices. The BPC's wide-ranging goal is to make B2B electronic payments more efficient across the end-to-end process. Since 2018, the BPC has convened industry stakeholders to assess the state of the industry challenges with invoice processing and feasible approaches to solving them. The assessments concluded that establishing an e-invoice exchange framework, which would create a virtual, interoperable electronic delivery network for the purpose of exchanging electronic documents, is the approach most likely to succeed in resolving the challenges that have obstructed automated B2B invoice processing to date. That is because it complements existing Service Provider and Electronic Data Interchange (EDI) solutions that currently work well by extending their reach. It does so by establishing policies, rules and guidelines to help B2B Service Providers identify where to send an electronic invoice (Discovery), what electronic delivery communication protocols to use (Delivery) and what invoice data to send (Data).

In 2019, the BPC published the [*e-Invoice Interoperability Framework – e-Delivery Network Feasibility Assessment Report*](#)¹, which concluded the United States should proceed with:

1. conducting a proof of concept (POC) test of a federated registry services model².
2. establishing a work group to assess the oversight requirements for exchange frameworks and the approach to managing the prescriptive standards and
3. establishing an e-invoice exchange framework modeled after existing frameworks and adapting it to meet U.S. market requirements.

Shortly after this report, a POC federated registry test was completed. This was an important milestone in that it confirmed the key capabilities required to support this U.S. market requirement and laid the foundation for progress on a U.S. e-invoice exchange framework. Making good on this progress, the BPC convened the Standards Oversight Assessment (SOA) Work Group in 2021 to identify requirements for an appropriate exchange framework standards oversight approach and provide recommendations for next steps.

To conduct this work, the SOA Work Group reviewed how several oversight organizations manage the standards used within their frameworks, including those who support the private and public sector and one standards organization. The analysis concluded that there are multiple approaches and organization types that can effectively provide the necessary operational oversight for an exchange framework. Further, the analysis found that the requirements for such oversight, and a consensus process for establishing a new

1 e-Invoice Interoperability Framework – e-Delivery Network Feasibility Framework Assessment Report <https://businesspaymentscoalition.org/wp-content/uploads/20191031-bpc-e-delivery-network-feasibility-assessment.pdf>

2 The BPC completed the POC in the Fall of 2020. [*e-Invoice Exchange Framework – Approach to Managing a Federated Registry Services Model in a Four-Corner Network*](#) (PDF) 2021 <https://businesspaymentscoalition.org/wp-content/uploads/bpc-e-delivery-network-validation-exercise-2020.pdf>

organization or selecting an existing organization, are the primary determinants for selecting the best organization for oversight.

In addition to identifying the oversight requirements, the work group concluded that it would be appropriate to capture the desired characteristics and attributes of an oversight organization. Such attributes can enhance the evaluation of selection criteria that will be integral in making the final determination of the oversight organization.

Finally, the work group identified the need for an interim oversight committee to assess and develop the policies, rules and guidelines required for the oversight of the prescriptive standards for the exchange framework. As a next step, the BPC is launching an E-invoice Exchange Market Pilot (Market Pilot) where participants will coordinate the technical implementation requirements, address end user adoption considerations and provide interim oversight of the exchange framework.

For the Market Pilot, it was agreed that an Interim Oversight Committee (IOC) will provide temporary oversight and follow the guiding principles and objectives that are outlined within this document. Furthermore, Market Pilot participants will follow the recommended BPC architectural and technical implementation requirements published within the [*e-Invoice Exchange Framework – Approach to Managing a Federated Registry Services Model in a Four-Corner Network*](#) report.

In addition, the IOC will be asked to:

1. Review and assess the policies/procedures, operating rules and agreements of existing frameworks and publish a recommendations report including learnings from the Market Pilot. The report will be provided to the final oversight organization and serve as the initial operations guide for the exchange framework.
2. Establish a work group to support the next steps to determine the final oversight organization. The work group will evaluate scenarios, such as “build, establish or partner” for the oversight organization.
 - Note, it was agreed that a BPC work group should be established to select the final oversight organization. The long-term oversight group will be required to follow the guiding principles, objectives and prescriptive standards outlined in this report and any additional specifications and recommendations established from the market pilot and documented in the BPC Interim Oversight Committee Report.

Further, the IOC will establish a Market Pilot Steering Committee (MPSC) that will consist of approximately 9 - 11 members and represent a cross section of stakeholders participating in the Market Pilot. For example, the IOC might determine that representation from all “four corners³” (e.g., Access Point providers, Service Metadata Location (SML) & Service Metadata Publisher (SMP) registry operators and corporate end-users) of the framework provide the requisite balance. The steering committee will select 3-5 subject matter experts on select topics such as standards development. Final composition of the MPSC will be determined and voted upon by IOC members. The MPSC will have decision-making authority for the duration of the Market Pilot.

For additional information on this initiative or to share ideas, please contact the Business Payments Coalition at business.payments.smb@mpls.frb.org.

³ See Figure 1 The Four-Corner Model of an Exchange Framework for additional details.

For more information about the BPC, visit the website at <https://businesspaymentscoalition.org/>.

3 Audience

The *E-invoice Exchange Framework: Requirements for Oversight Report* is primarily intended for U.S. business and technology stakeholders interested in advancing broad adoption of e-invoicing and the supporting processes needed to facilitate process automation. It provides this audience with an overview and deeper understanding of the requirements for oversight of an e-invoice exchange framework in the U.S. market. A secondary audience that can benefit from this document is any country considering the establishment of an e-invoice exchange framework.

4 Terms and Definitions

The terms and definitions are listed in section 12.1 Appendix A – Terms and Definitions.

5 Disclaimers, Copyright and Acknowledgments

Views expressed here are not necessarily those of, and should not be attributed to, any particular Business Payments Coalition participant or organization or the Federal Reserve Banks or the Federal Reserve System. They are not intended to provide business or legal advice, nor are they intended to promote or advocate a specific action, payment strategy or product. Readers should consult with their own business and legal advisors.

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The BPC would like to acknowledge the work of the E-invoice Standards Oversight Assessment (SOA) Work Group and other contributors which can be found in section 12.3 Appendix E - Acknowledgements.

6 Background

U.S. businesses are striving to increase the adoption rate of e-invoicing for themselves and their supply chains, yet little to no progress has been made to coordinate amongst stakeholders to identify and address the barriers. In 2016, a BPC report was published outlining the challenges and opportunities for achieving broad adoption of e-invoicing. Then, in 2017, the BPC initiated a work group that catalogued all of the electronic invoice technical standards in use, thereby revealing the extent of the fragmentation and interoperability challenges that businesses and Service Providers face when trying to automate invoicing. This lack of interoperability negatively impacts U.S. businesses by increasing the complexity and operating costs involved in sending and receiving e-invoices. In the meantime, other markets with similar challenges have begun to make progress through the implementation of e-invoice exchange frameworks. E-invoice exchange frameworks employ common exchange standards used between independent Service Providers. They do not displace, but rather serve as a bridge between varying standards, Service Providers and business systems and are complementary to existing EDI and Service Provider solutions. They set policies and prescriptive exchange standards for Service Providers that enable sending e-invoices independent of their customer's payment, accounting and ERP systems.⁴

In 2018, the BPC initiated a feasibility assessment for implementing an e-invoice exchange framework in the United States. This included assessing several e-invoice exchange frameworks and concluded that implementing an exchange framework is a feasible and attractive path to overcoming the challenges that have obstructed automated invoice processing to date.

Independently, in 2020, the Federal Reserve, in conjunction with external consultants, Kearney and Glenbrook Partners, performed a market assessment to determine industry initiatives that have the greatest potential for improving B2B payment efficiency. The assessment included outreach to over 100 individuals from 60 organizations and concurred that the establishment of an e-invoice exchange framework would have the greatest near-term potential for improving B2B payments efficiency, and be complementary to the payment industry's growing use of instant payments.⁵ This market assessment further affirmed the feasibility of implementing such an exchange framework for the United States, citing the groundwork laid by the BPC and the progress achieved by exchange frameworks in other countries.

⁴ An e-invoice is defined as an invoice that has been issued by the seller and transmitted and received by the buyer in a structured digital format that allows for automated processing.

⁵ The New Payments Platform (NPP) has highlighted how OpenPeppol through an invoice domain is complementary to the payment's domain. The NPP payment messages can contain invoice attributes, allowing to easily tie them back to themselves. The BPC semantic model contains a similar capability through a reference field that allows for the ISO 20022 pain 013 message ID to be passed allowing for the association between the e-invoice and the payment message. *eInvoicing and the New Payments Platform – Enhancing automated invoice processing with real-time payments*

<https://nppa.com.au/wp-content/uploads/2020/02/Einvoicing-and-NPP-whitepaper.pdf>

7 Scope

The BPC formed the E-invoice Standards Oversight Assessment (SOA) Work Group to analyze the oversight needs for a U.S. e-invoice exchange framework and to document oversight requirements and identify next steps based on the conclusions.

The underlying capabilities of the exchange framework planned for the U.S. market, and of those in operation in other markets, provide the ability to exchange a wide variety of electronic documents and are not limited to a specific market segment. As it is agnostic to the data, format and syntax, the exchange framework has the potential to expand its functionality to deliver remittance information and other supporting documents for electronic payments.

The scope of this work is focused on the oversight organization requirements for e-invoice exchange, but does not preclude expanding use of the exchange framework to support other payment and supply chain documents in the future.

The market segment scope for the exchange framework includes all B2B and Business-to-Government (B2G) sectors, market verticals and business sizes for the U.S. market. In addition, it includes future considerations to support interoperability with global exchange frameworks.

Out of scope for the SOA Work Group:

- Establishing or identifying the exchange framework oversight, entity or drafting governance documents (i.e., charter, bylaws, rules, etc.).
- Documenting the specific prescriptive setting or profiles⁶ of the standards⁷ for the exchange framework.
- Defining new standards or debating the merits of each of the standards used within the framework⁸.
- Advocating changes to the exchange framework architectural and operational approach⁹.
- Establishing oversight requirements for the data of other e-documents that could be delivered through the exchange framework.

⁶ Profiles are the implementation guidelines used by the Service Providers to establish Access Points. A profile would exist for discovery, delivery and data standards.

⁷ This is the responsibility of the BPC Technical/Market Pilot work groups until the long-term oversight organization is established.

⁸ This is the responsibility of the BPC Technical/Market Pilot work groups until the long-term oversight organization is established.

⁹ This is the responsibility of the BPC Technical/Market Pilot work groups until the long-term oversight organization is established.

8 Work Group Approach

The SOA Work Group consisted of a diverse set of domestic and international stakeholders including invoice Service Providers, B2B networks, financial institutions, standards organizations and consulting firms.

The work group identified four key steps to conduct its work: (i) gain a shared understanding of the discovery, delivery and data standards for the exchange framework; (ii) review oversight approaches of similar exchange frameworks; (iii) review alternative approaches, including the methodology used by standards development organizations; and (iv) identify the key attributes for an oversight organization.

To assure consensus among the work group members on key aspects of this report, two voting processes were followed. First, periodic checkpoints were held where work group members were asked to voice their support for the current state and direction of the work. A majority consensus of greater than 67 percent was required to proceed forward. In all cases, after discussion and adjustments, unanimous support was achieved. Second, a formal final vote was held on the contents of this report with the same majority affirmative response requirement.

9 Exchange Framework – Business and Operational Objectives and Oversight Requirements

This section documents guiding principles, business and operational objectives and business oversight requirements for the exchange framework.

9.1 Guiding Principles

The following are guiding principles for the framework:

1. Must be payment-method agnostic
 - Although not a payment system, the framework will support the exchange of e-invoices, and possibly other information, and therein supports all current and future electronic payment types.
2. Must focus on corporate end user and supporting Service Provider needs
 - Resolves pain points of the corporate end users and their supporting Service Providers for invoice exchange.
3. Must be provider agnostic
 - Enhances the collaboration and capabilities of all stakeholders for the benefit of the industry, while not favoring one proprietary solution over another.
4. Must be complementary to what is working well today and extend the reach and capabilities of existing businesses serving the e-invoicing and supply chain

environment.

- Current EDI and B2B networks have effective customer solutions within their reach and provide value-added services beyond e-invoice delivery. Ideally, the exchange framework will facilitate innovation and extensibility beyond their current network reach.

The framework's oversight organization also will be accountable for managing the following business and operational objectives, as well as complying with any legal and regulatory requirements applicable to the U.S. market.

9.2 Business Objectives

The following are business objectives that the oversight organization will be responsible for achieving. Though this list is comprehensive, it should not be considered an exhaustive one.

- Establish flexible agreements, operating procedures and policies that address and/or account for domestic and international market complexities.
- Establish cost-effective tools and solutions to support implementation by small and medium-size businesses.
- Incorporate well-established non-proprietary standards that are open, royalty-free and vendor-agnostic to minimize industry change requirements.
- Deploy operating tools and protocols designed to complement, rather than supplant, existing investments in technology infrastructure and service relationships.
- Prescribe use of extensible and flexible standards.
- Develop policies and operational rules to address gaps and future requirements without burdensome rework or costly investment.
- Foster easy integration with existing business and technical processes without disruption while retaining independence from adjacent payment, accounting and enterprise resource planning (ERP) systems.
- Leverage the models deployed in the current eco-system (e.g., current EDI B2B connections).
- Facilitate global compatibility and accessibility with existing exchange frameworks.
- Ensure trusted authentication procedures and policies for onboarding the Access Points and corporate customers. Flexibility for corporate customers to determine their desired level of exposure and security within the context of the framework options.

9.3 Operational Objectives

The following are priority operational objectives for the oversight organization. Though the list below covers an array of objectives, it is limited to those identified as top-priority and, therefore, should not be considered an exhaustive one.

The oversight organization's priority objectives are to:

- Establish appropriate policies and procedures to ensure technical and non-technical interoperability and compliance amongst network Service Providers.
- Provide sufficient administrative support to develop and document policy, procedures, operational rules and agreements.
- Provide sufficient support for the ongoing improvement and maintenance of the exchange framework standards.
- Provide sufficient support for adoption and promotional activities to network Service Providers. Provide sufficient capabilities and resources to measure the progress of adoption, participation and compliance.
- Provide effective support for cooperation and participation with Standards Development Organizations in a liaison and advisory capacity, and in some cases, with memoranda of understanding.
- Establish and maintain transparent oversight rules and guidelines that are publicly accessible at no cost.
- Provide active support to address implementation questions for small businesses.

The following are the governance duties and responsibilities for which the oversight organization will be responsible. Notably, the list of responsibilities captured here is not an exhaustive one. Instead, it captures core elements of providing effective governance and oversight. Once in place, the oversight organization will likely evolve this summary. The oversight organization's governance duties include:

1. Oversight Structure

The organization should have an appropriate nonprofit organization status (e.g. 501(c)) and will need a Board of Directors, along with an appropriate number of committees, chairs and reporting structure to perform the necessary duties.

2. Policies and Guidelines for Applying the Exchange Standards

The oversight organization will define the overall guidelines for Access Point implementation of the exchange standards including the determination of (i) the use of identifiers; (ii) discoverability of an end point; and (iii) all profile configuration settings for all of the standards listed within this document and required for the operation of the exchange framework. In addition, the oversight organization is responsible for ensuring that compliance with the implementation of the standards is applied equally across all Access Point Service Providers.

3. Operating Rules

The oversight organization will develop and manage operating rules that cover areas such as (i) rules for required business profiles and processes; (ii) required information elements; (iii) specific calculations (e.g., the relationship between the totals and sub-totals of an invoice); (iv) document formats; (v) the use of invoices other than commercial invoices; (vi) the use of credit notes; (vii) the expectations for support of fiscal compliance; and (viii) the provision of status information on transactions. The e-invoice exchange framework may address some of these directly, and additional requirements can be agreed to by trading parties and their sending Access Point providers.

4. Exchange Participation Agreements

The oversight organization will provide implementation guidance and ongoing governance of the multi-lateral agreements used between exchange parties. The rules

and interoperability requirements for a successful framework focus not only on the technical connections between Access Point providers, but also on the relationships between corporate end users who send and receive e-invoices. For if end users are not confident that their data is protected end-to-end, it is likely that significant onboarding challenges would arise. Therefore, exchange agreements should include, but not be limited to, (i) an appropriate approach to accreditation and service levels for Service Providers with periodic reviews; (ii) dispute process and remedies; (iii) clauses covering customer privacy, data protection and data sovereignty; and (iv) no fees for exchanging documents between Access Point Service Providers, as this is a basic tenet for existing frameworks; and (v) an open market allowing any Service Provider that complies with the requirements to participate in the network.

The contractual relationship between end users is outside the scope of the framework and counter parties retain the right to decide how to engage in exchanges with one another. The framework supports the ability for sending and receiving corporations to implement additional proprietary end-to-end security for exchanges between them.

5. Compliance Requirements

The oversight organization will address U.S. regulatory requirements and participant compliance in accordance with policies and operating rules. Enforcement of the compliance requirements will be noted in the participation agreement required of Service Providers for participation in the framework.

- Regulatory

Below are common regulatory requirements that participants will need to comply with in order to operate within the framework. Requirements may include:

- Rules relating to the taxation and fiscal compliance environment
- Mandated processes for the compulsory use of digital processes
- Provisions for transaction reporting
- Anti-money laundering rules
- Know your customer (KYC)
- Data Privacy
- Archiving
- Contractual and statutory requirements

- Participant

Below are requirements that Access Point providers will need to adhere to while participating within the framework. A governing body will have rights to take action against non-compliant Access Points to prevent performance problems. The agreement between these Service Providers should include provisions such as:

- A prohibition on charging inter-connect or similar fees between Access Point providers.
- A recognition that the end users own the data and the Service Providers may only use the data for the purpose of facilitating the exchange of the e-invoice.

6. Implementation Guidelines

The oversight organization will develop and maintain the implementation guidelines for the prescriptive standards. These guidelines include, but are not limited to (i) rules for identifiers; (ii) Access Point development and implementation tools; (iii) registry guidelines; (iv) semantic model; (v) delivery implementation guidelines for message transport protocols and message envelope; and (vi) establishing network trust through credentialing such as digital certificate management or the use of accreditation tokens.

10 Exchange Framework – Technical Standard Oversight Requirements and Objectives

This section documents the exchange framework standards and their corresponding oversight requirements. The exchange framework consists of a collection of standards addressing how to identify where to send an electronic invoice (Discovery), the electronic delivery communication protocols (Delivery) and the invoice data content (Data). Through the remainder of this section, these functions will be referred to as discovery, delivery and data. The exchange framework's oversight organization will be responsible for maintaining the prescriptive configuration, application, extensions and ongoing enhancements of open-consensus standards to meet the ever-evolving industry needs and minimize the burden on corporates and providers. The exchange framework standards and support tools apply specifically to Access Point providers (both sending and receiving) and does not require broad market adoption by corporate accounting systems.

Documentation of the prescriptive settings of the standards is out of scope for this work and, as such, the detailed parameter settings for the standards are not included.

The following are technical objectives for which the oversight organization will be responsible. As this list will evolve upon inception and evolution of the oversight organization, this list is not an exhaustive one.

Technical oversight to include:

- **Fit-for-purpose network infrastructure** that is robust, secure and ensures end-to-end message delivery between corners 2 and 3 without duplication of messages and with non-repudiation.
- **Delivery assurance** regardless of whether the receiving gateway is available at the time of delivery.
- **Scalability** to support large numbers of connected parties and high-volume messaging throughput of exchange transactions.
- **Capability** to support and transmit large multi-part business document messages (up to 50 MB or as otherwise agreed).
- **Diverse means for identifying parties** and discovering routing addresses to enable the **broadest possible reach**.
- **Security architecture** that supports **secure message envelopes end-to-end** for e-invoices, other supply chain e-documents and associated structured and unstructured documents and attachments.

- **Encryption support** for both documents and the delivery channel between corners 2 and 3 and the ability to support enveloping technology to support end-to-end encryption, if needed by the corporate end point participants.
- **Authentication protection and tamper-proof integrity** of information transmitted through the network.
- **Trusted authentication procedures while accessing customer address information** that ensures confidentiality of trading parties and Access Points.
- **Data privacy protections** that preserve the confidentiality of customer information.
- **Messaging functionality** supporting a range of **response, status and servicing messages** to permit a dynamic flow of information and asynchronous interactions.

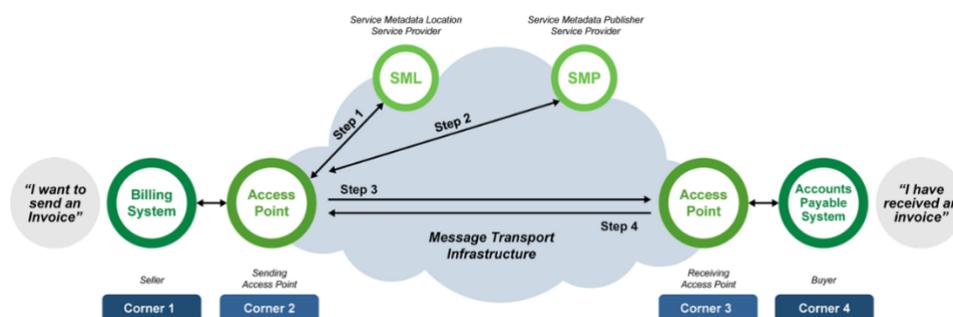
The exchange framework is based on a four-corner network model which, by providing pervasive reach for all parties, addresses the complexity and inefficiencies that businesses must navigate when exchanging invoices and other supply chain documents.

The four-corner framework consists of the following stakeholders and roles for each corner:

- Corner 1 (C1) = Sending Business (Seller)
- Corner 2 (C2) = Sending Access Point Service Provider (Sending Access Point)
- Corner 3 (C3) = Receiving Access Point Service Provider (Receiving Access Point)
- Corner 4 (C4) = Receiving Business (Buyer)

The sending and receiving businesses in corners 1 and 4 are the primary benefactors of the exchange framework and do not need to adopt the exchange standards or make changes to their existing systems. The sending and receiving Access Points in corners 2 and 3 are the stakeholders that need to implement support for the exchange standards and facilitate the delivery of e-invoices. The following graphic provides a detailed description of the process of sending and receiving an e-invoice through an e-invoice exchange framework and illustrates the role of each stakeholder in the four-corner model. Understanding the architecture of the framework and workflow provides foundational background on the functional standards, discovery, delivery and data.

Figure 1
The Four-Corner Model of an Exchange Framework¹⁰



¹⁰ Adapted from the e-Invoice Interoperability Framework, Digital Business Council, Version 1.0, July 27, 2016. http://www.icb.org.au/out/130497/eInvoicing_Interoperability_Report.pdf

Sending an E-invoice

The process begins when the Seller (Corner 1) initiates sending an invoice intended for a Buyer (Corner 4). The seller sends the invoice to its Sending Access Point (Corner 2) in a format its current system supports. The Sending Access Point (Corner 2) then converts the invoice into the common data exchange standard and uses the discovery process to determine how and where to send the invoice. The discovery process includes contacting the SML registry, which contains the Internet Protocol (IP) address of the appropriate SMP to retrieve the receiving party's electronic delivery information and digital capabilities (e.g., data requirements, invoice business process). Once the Sending Access Point (Corner 2) has this information, it can send the e-invoice to the Receiving Access Point (Corner 3).

Receiving an E-invoice

The Receiving Access Point (Corner 3) receives the e-invoice and then proceeds to convert it to the format required by the intended corner 4 recipient.

The rest of section 10 provides specific details on the standards included within the discovery, delivery and data functions and the corresponding oversight required within them.

10.1 Discovery Function, Standards, Policies and Oversight

This section describes the technical components and mechanics of the discovery function, the standards involved and the corresponding oversight management requirements. The ability to find the target Buyer for the e-invoice in the virtual network is fundamental to the operation of the exchange framework. Discovery consists of the use of registries and open consensus standards that are prescriptively defined to facilitate dynamic discovery of participants in the framework. The discovery process and associated standards need be implemented only by the Sending and Receiving Access Points and is completely transparent to the corporate sender and receiver.

Registries are core to facilitating the discovery process. The BPC Technical Work Group determined that an exchange framework in the U.S. will require a federated registry service model wherein multiple registrars will register participants into the framework. This approach will address several challenges and needs within the market including, (i) the lack of a central federal or state governmental authority to establish and administer a central registry for the framework, or a mandate for B2B or B2G e-invoicing;¹¹ (ii) stakeholder concerns about contributing customer information to a centralized registry; and (iii) the requisite ability to perform discovery across multiple registries (e.g., federated registries) so as to enable global exchange with other frameworks.

¹¹ A core recommendation from the 2019 BPC technical assessment was "The U.S. should proceed with establishing an e-Invoice exchange framework modeled after existing frameworks with one primary difference of leveraging a federated registry services model using the Domain Name System (DNS) to enable discovery across all participants within the E-invoice exchange framework. The BPC concluded that a federated registry services approach addresses several challenges facing the market, including the lack of a central, federal or state governmental authority to establish and administer a framework or a mandate for Business-to-Business (B2B) or Business-to-Government (B2G) e-invoicing." [BPC e-Invoice Interoperability Framework – e-Delivery Network Feasibility Assessment Report \(PDF\) 2019](#)

10.1.1 The Discovery Function

The exchange framework standardizes the approach for discovery by defining the basis on which information about a trading party is accessible to another trading party and is usually facilitated by the respective sending Access Points. These standards enable dynamic discovery and routing across the federated network of Access Points. The dynamic discovery and routing process includes the destination corporate (Buyer) endpoint information such as the electronic location, capabilities and identifiers that facilitate electronic delivery of the e-invoice.

The following are the components that enable the discovery function:

1. **Registry Standards** – Includes Domain Name System (DNS) standards, OASIS BDXR business document exchange standards (i.e., SML and SMP).
2. **DNS Registry** – Includes DNS registries that facilitate similar dynamic discovery for e-mail systems and website domains.
3. **SML Registry services** – Maintains the participant identifiers and corresponding SMP into the DNS. SMPs are typically managed by an Access Point.
4. **SMP Registry services** – Used for entering participant Access Points and capabilities into the SMP registry.
5. **End Point Identifiers** – Incorporates participant identifiers into the registries for the discovery process to identify the participants.
 - Entity Participant Identifier in the DNS registry
 - Electronic Routing Addresses in the SMP registry
 - Electronic Address Identifier in the SMP registry
6. **Digital Capabilities** – Indicates capabilities the receiving corporate participant can support to process the e-invoice.
7. **Participant IDs** – Expresses the identity of a legal or fiscal entity, or a natural person via a unique digital identifier of a trading party or business entity. It may form a component or path to discover an electronic address or routing address.

10.1.2 Discovery Open Consensus Standards

The following standards, developed by open consensus bodies, will be applied in a prescriptive manner to support discovery in the exchange framework:

- OASIS Business Document Exchange Location (BDXL) v1.0¹²
- OASISOPEN Service Metadata Publisher (SMP) v2.0¹³

¹² To learn more about the set of OASIS standards for discovery and delivery go to the OASIS Business Document Exchange (BDXR) TC | OASIS ([oasis-open.org](https://www.oasis-open.org))
https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=bdxr

¹³OASISOPEN Service Metadata Publishing (SMP) Version 2.0, OASIS Committee Specification 02, 16 January 2020. <https://docs.oasis-open.org/bdxr/bdx-smp/v2.0/bdx-smp-v2.0.html>

10.1.3 Discovery Oversight Requirements

This section contains background on the oversight requirements for each of the discovery components listed in the previous section.

1. **Federated Registry** – Registries are managed by the SML and SMP providers according to the requirements set by the exchange framework oversight.
 - Items requiring oversight include:
 - Policies, rules and guidelines for:
 - Operating the SML and SMP registries
 - Registering and managing the end point participants (e.g., add, update and remove participants)
 - Registering and managing SML and SMP onboarding into the network as Service Providers
2. **DNS Registry** – The U.S. E-invoice Exchange Framework DNS registry enabling a federated registry of participants into the virtual network.
 - Items requiring oversight include:
 - The primary DNS
 - The secondary DNS'
 - Synchronization between the primary and secondary DNS'
3. **Service Metadata Location (SML)** – A registry service that facilitates the participant discovery by enabling Access Points to locate the SMP service associated with a participant. A registry contains technical information about identifiers including the legal or entity identifier, location and routing instructions to reach participants in the network. The SML provides technical interoperability and allows Access Point providers in corners 2 and 3 to conduct dynamic discovery of target businesses to send the e-invoice and create the necessary connections for secure message delivery.
 - Items requiring oversight include:
 - Registration services
 - Implementation version control, including compatibility requirements
 - Change management policies
4. **Service Metadata Publisher (SMP)** – A Service Metadata Publisher (SMP) service exposes metadata about the capabilities of a participant in the network. Metadata includes information about business document types and formats that the participant is capable of receiving, business processes supported or implemented by the participant, what information the participant expects to receive within a certain business document, as well as information about the technical endpoint(s) and transport protocol(s) where the participant will receive business documents.
 - Items requiring oversight include:
 - Version control, including compatibility requirements
 - Change management policy requirements for adopting changes by members. Define and manage a process that is specific to SMP changes and considers cost and impact to members.

5. **End Point Identifiers** – Uniform Resource Name (URN) based identifier types are required in many electronic business exchanges as part of a mechanism for the identification of business partners. The ebCore Party ID Type is an OASIS¹⁴ standard and is in use by several exchange frameworks globally. Items requiring oversight include:
 - The identifier system needs three distinct types of identifiers including an:
 1. Entity (and sub-entity) Identifier which is a unique digital identifier of a trading party or business entity. This can be a legal entity identifier.
 2. Electronic Address Identifier which is a unique digital address used by a trading party to route digital documents and messages.
 3. Electronic Routing Address which is an Electronic Address Identifier that defines the Sending Access Point or platform that supports the routing and processing of digital documents and trading parties message exchange.
 - Items requiring oversight include:
 - Identifiers allowed or required. For more details on identifiers refer to the [e-Invoice Interoperability Framework – e-Delivery Network Feasibility Assessment Report](#)¹⁵, section 4.6.1.
 - Method for finding appropriate identifiers, for example, require use of the ebCore Party ID.
6. **Digital Capabilities** – Set of agreed-upon business process invoicing scenarios. Examples could include invoicing against a purchase order, invoicing based on a contract, partial invoicing and invoice cancellation.
 - Items requiring oversight include:
 - Business process scenarios allowed and their definition. (Currently, there are 13 processes defined in the BPC semantic model).
7. **Participant IDs** – These are in the SML and managed by the SML provider.
 - Items requiring oversight include:
 - Policy covering what identifiers are used for participants.

¹⁴ OASIS ebCore Party Id Type Technical Specification Version 1.0, Committee Draft 03, 9 July 2010
<http://docs.oasis-open.org/ebcore/PartyIdType/v1.0/CD03/PartyIdType-1.0.html>

¹⁵ e-Invoice Interoperability Framework – e-Delivery Network Feasibility Framework Assessment Report
<https://businesspaymentscoalition.org/wp-content/uploads/20191031-bpc-e-delivery-network-feasibility-assessment.pdf>

10.2 Delivery Function, Standards, Policies and Oversight

In the exchange framework, the delivery standards are used to ensure interoperability between Access Points in corners 2 and 3 to deliver messages between them. Delivery standards address the management of the network protocols and technical artifacts that enable technical interoperability and enable virtual connections. The following are the components of the delivery function:

- Message Transport Protocol
- Message Envelope
- Message Payload
- Digital Security Certificates

10.2.1 Delivery Open Consensus Standards

The following standards, developed by open consensus bodies, are applied in a prescriptive manner to support delivery in the exchange framework.

- OASIS Applicability Statement 4 (AS4 Profile) of ebXML (ebMS 3.0) version 1.0¹⁶
- OASIS Exchange Header Envelope (XHE)¹⁷

10.2.2 Delivery Standards Oversight Requirements

This section contains background on the oversight requirements for each of the delivery components listed in the previous section and the corresponding oversight requirements.

- 1. Message Transport Protocol ebMS3/AS4:** Technical transmission protocol used to create network connections between endpoints to deliver the message payload, such as an invoice and other documents.
 - Items requiring oversight include:
 - Message transport protocol P-Mode configuration.
 - Onboarding test process. For example, self-testing through tools provided or centralized testing governed by the oversight organization.
- 2. Message Envelope OASIS XHE:** A technical container or structured header that contains an embedded message.
 - Items requiring oversight include:
 - Message envelope standard.

¹⁶ OASIS AS4 Profile of ebMS 3.0 Version 1.0, OASIS Standard, 23 January 2013.

<http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/profiles/AS4-profile/v1.0/os/AS4-profile-v1.0-os.html>

¹⁷ OASISOPEN Exchange Header Envelope (XHE) Version 1.0, OASIS Standard, 25 April 2021

<https://docs.oasis-open.org/bdxx/xhe/v1.0/os/xhe-v1.0-os-oasis.pdf>

- Onboarding test process. For example, self-testing through tools provided or centralized testing governed by the oversight organization.
- 3. Message Payload:** The semantic content and machine-readable syntax of the business message or document.
- Items requiring oversight include:
 - Semantic model (see Section 7.3 Data Open Consensus Standards).
 - Onboarding test process. For example, self-testing through tools provided or centralized testing governed by the oversight organization.
- 4. Digital Security Certificates:** A method for ensuring trust between all the network components including Access Points, registrars, SMPs, and SMLs.
- Items requiring oversight include:
 - Certificate issuance and trust list management.
 - Digital certificate lifecycle, including, but not limited to, creation, distribution, monitoring, renewal and revocation of digital certificates.
 - May include issuing certificates or maintaining trust lists.

10.3 Data Open Consensus Standards

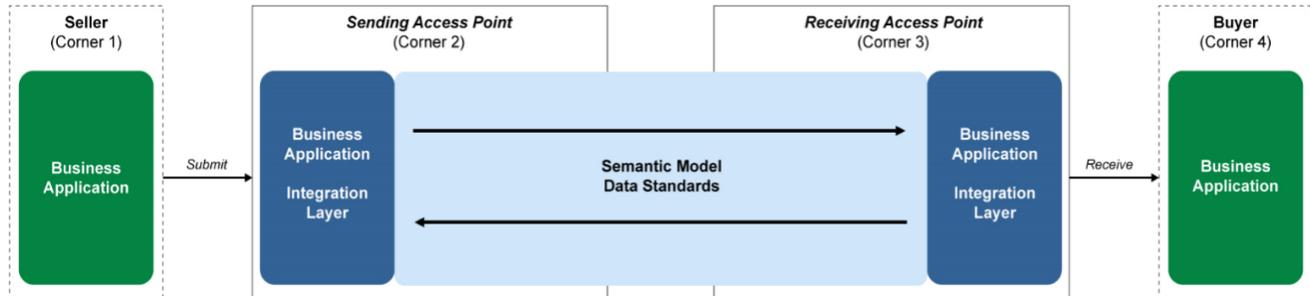
The data standards are used to ensure data exchange interoperability between the Sending and Receiving Access Points; corners 2 and 3. The data standards are defined through a semantic data model which describes the business terms, processes, rules and roles involved in e-invoice exchange.

The BPC assessed¹⁸ the European Committee for Standardization (CEN), European Norm (EN) 16931 e-invoice semantic model to determine if it meets U.S. market requirements. A key objective for the semantic model is to maintain close alignment with established and planned frameworks in other parts of the world to support eventual global interoperability. The assessment found that EN-16931 closely aligned to the U.S. market requirements, with minor exceptions and therefore was used as the basis for developing the semantic model for the U.S. exchange framework.

Figure 2 illustrates where the data standards apply within the exchange framework.

¹⁸BPC e-Invoice Interoperability Framework: Semantic Model Assessment (PDF) 2019
<https://businesspaymentscoalition.org/wp-content/uploads/e-invoice-interop-framework-semantic-model-assessment.pdf>

Figure 2
The Semantic Model Data Standards in Exchange Frameworks



10.3.1 Data Open Consensus Standards

The following are the data standards and functions that require oversight:

- BPC Semantic Model Specifications
- Rule-based schema validation tool¹⁹ (e.g., ISO/IEC 19757-3 Schematron)

10.3.2 Data Standards Oversight Requirements

This section contains components listed above that facilitate standardized data exchange within the framework along with the corresponding oversight requirements.

1. BPC semantic model

- Items requiring oversight include:
 - Modifications to support addition of invoice business processes.
 - Submission of change requests to the semantic model (additions, modifications).
 - Syntax binding support considerations – the BPC semantic model supports the flexibility to allow for multiple syntax bindings (e.g., UBL and X12 EDI), if a community determines the need for it.²⁰

¹⁹ ISO/IEC 19757-3:2020 - Information technology — Document Schema Definition Languages (DSDL) — Part 3: Rule-based validation using Schematron
<https://www.iso.org/standard/74515.html>

²⁰ Supporting more syntax bindings reduces overall interoperability. For example, Access Points would need to map to each binding, thus increasing complexity. Access Points may only decide to support only one syntax, creating situations where trading partners cannot exchange e-invoices through the framework unless new mapping is completed. Alternatively, the receiving Access Point (corner 3) could just “pass through” the message that contains an unsupported syntax binding directly to corner 4 without having to process the message.

2. **Rule-based schema validation** (e.g., ISO/IEC 19757-3 Schematron).
 - Items requiring oversight include:
 - Configuration of the rules, which are business process specific.
 - Business process scenarios allowed/supported.

3. **Message Payload:** The semantic content and machine-readable syntax of the business message or document.
 - Items requiring oversight include:
 - Semantic model and associated syntax binding, such as ISO/IEC 19845 - OASIS UBL v2.x in envelope and payload (Corners 2 & 3).
 - Onboarding test process. For example, self-testing through tools provided or centralized testing governed by the oversight organization.

11 Attributes for the Oversight Organization

The following are desired attributes for the exchange framework oversight organization. These characteristics are considered necessary for effective oversight of the exchange framework. The attributes are organized in the following categories and include related descriptions:

- Organization Type, Structure
- Key Oversight Focus
- Administration and Operations
- Convening Power
- Inclusive and Representative Alignment
- Interoperability Oversight Agreement

Organization Type, Structure
Is a U.S. based, not-for-profit organization.
The Board of Directors includes, but is not limited to, key industry stakeholders who are elected by the general membership of the oversight organization and are subject to term limits.
Has a funding mechanism sufficient to cover operational staff and expenses.
Is a neutral party, that can drive impartial decisions across a diverse set of stakeholder's interests and needs (e.g. non-Service Providers).
Supports stakeholder participation without the requirement to become a member of any specific organization other than the oversight organization (e.g. a SDO, for example).

Key Oversight Focus

Promotes continued market development and adoption and a corresponding budget funding it.

Promotes agreement on requirements to meet stakeholders needs relevant to the exchange framework.

Governing of the exchange framework operation and strategic direction.

Managing Rules and Model Agreements that form the operational and contractual basis for the framework.

Defining rules and procedures to select, define and drive adoption of the prescriptive Standards and Practices, including configuration profiles (implementation guidelines) that support the rules and agreements.

Enables small and medium size businesses and organizations participation in the data exchange by lowering the barrier for adopting e-invoicing.

Administration and Operations

Administrative functions to support membership and operations.

Processes for gathering and reporting on industry adoption progress and framework participation.

Policies and procedures to monitor and ensure technical and non-technical interoperability and compliance amongst the network Service Providers (e.g., imposing actions for non-compliance).

Budget to support marketing, education and promotion activities.

Provides administrative support for technical and business committees for the development and documentation of the work.

Processes to support agile and timely decision making.

Processes to provide effective feedback to support continuous improvement of the exchange framework. The processes and methodologies must be properly funded, appropriately managed, and participant driven.

Convening Power

Ability to develop strong brand recognition within the market.

Ability to attract a large / broad range of e-invoicing stakeholders (e.g., financial institutions and e-invoicing stakeholders such as Service Providers, Access Points, customers and buyers/suppliers).

Ability to facilitate continued stakeholder input to the prescriptive standards.

Inclusive and Representative Alignment

Aligned with broad representation of e-invoicing stakeholders (e.g., Service Providers and end users of e-invoicing services).

Ability to support the public and private sector (i.e., B2G, B2B) market requirements.

Interoperability Agreement

Legal counsel access to create, review and provide advice on agreements.

An agreement framework that provides contractual basis for enforcing compliance and introduction of any changes to the exchange framework specifications.

12 Appendices

12.1 Appendix A – Terms and Definitions

For the purpose of this report, important terms and definitions are listed below.

Access Point: An Access Point (AP) is a network service that facilitates the sending and receiving of business documents on behalf of a network participant. The AP of the participant initiating the exchange is referred to as Corner 2, while the AP of the receiving participant is referred to as Corner 3 of the document exchange.

AS4 Profile of ebMS 3.0: Applicability Statement 4 profile of ebXML Messaging Service

(ebMS²¹) – Using ebMS 3.0 as a base, this profile is a subset of functionality defined along with implementation guidelines adopted based on basic design principles and AS2 functional requirements to trim down ebMS 3.0 into a more simplified and AS2-like specification for Web Services B2B messaging.

Business Document Exchange Location (BDXL): The OASIS Business Document Exchange (BDXR) Technical Committee²² created the Business Document Metadata Service Location (BDXL) Version 1.0 standard²³ as a way to define a standardized implementation of an SML service using DNS.

Domain Name System (DNS): An interoperable, distributed and accessible network technology used as the core method to discover resources on the internet.

E-delivery Network: Refers to the components of the technical interoperability layer to deliver documents electronically across the Internet. E-invoices are just one of the many documents for which the e-delivery network can be used.

Electronic Address Identifier: Unique digital address used by a trading party for the routing of digital documents and messages from and to its systems.

Electronic Invoice (e-invoice): An invoice issued by the seller, transmitted and received by the buyer in a structured digital format that allows for automated processing.

Electronic Routing Address: Defines the electronic address of a Service Provider platform that routes digital documents and messages on behalf of a trading party; it is associated with the Electronic Address Identifier.

European E-invoicing Service Providers Association (EESPA): A trade association for European e-invoicing Service Providers.

Federated Registry Services: A structure that enables non-affiliated providers to independently administer participants who can then access a shared registry.

Four-corner Network Model: An established networking model that connects four parties to deliver electronic documents and messages: the sender (C1), the sender's Access Point (C2), the receiver's Access Point (C3) and the receiver (C4).

Global Interoperability Framework (GIF): An approach created by Peppol, EESPA, ConnectOnce and the BPC on a set of recommended practices, policies and standards for the operation of any four-corner e-invoice network model organized within a collaborative governance framework wishing to be GIF compliant²⁴.

ISO/IEC 19845 - OASIS UBL v2.x: Defines a generic interchange format for business

²¹ OASIS AS4 Profile of ebMS 3.0 Version 1.0, OASIS Standard, 23 January 2013.

<http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/profiles/AS4-profile/v1.0/os/AS4-profile-v1.0-os.html>

²² OASIS Business Document Exchange (BDXR) TC – Defining a federated document transport infrastructure for business document exchange.

https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=bdxr

²³ OASIS Business Document Metadata Service Location Version 1.0 OASIS standard, 01 August 2017

<http://docs.oasis-open.org/bdxr/BDX-Location/v1.0/BDX-Location-v1.0.html>

²⁴ Global Interoperability Framework (GIF) <http://gifworks.io/>

documents that can be restricted or extended to meet the requirements of specific industries.

Message Envelope: A technical container or structured header that contains an embedded message.

Message Payload: The semantic content and machine-readable syntax of the actual business message or document.

Message Transport Protocols: Technical transmission protocols used to create network connections between endpoints to deliver the message payload, such as an invoice and other documents.

Organization for the Advancement of Structured Information Standards (OASIS): Non-profit consortium that drives the development, conversion and adoption of open standards for the global information society.

OpenPeppol: A non-profit, member driven international association under Belgian law established in 2012 with both public sector and private sector members. Member categories are End Users of Peppol based services; Service Providers offering Peppol based services; and Peppol Authorities, which are policy enablers at national level, predominantly, but not limited to, national authorities²⁵.

Participant (Business Participant): An entity, typically a business or government, which sends and/or receives invoices. In a four-corner model, network Corner 1 (C1) and Corner 4 (C4) are both participants.

Participant Discovery: The process used to discover (i.e., look-up) the digital location and capabilities of a participant, where and how to send an invoice and/or other message. This includes registry services and other decentralized discovery mechanisms.

Participant Identifier: The unique digital identifier of a trading party or business entity expressing the identity of a legal or fiscal entity, or a natural person. It may form a component or a path to discover an electronic address or routing address.

Peppol: The name of the e-delivery network (Peppol Network) and Business Interoperability Specifications (Peppol BIS) that OpenPeppol provide, as part of a comprehensive Peppol Interoperability Framework, which includes legal agreements, governance and compliance measures.

Registrar: An official, or organization, responsible for keeping and managing participant registrations in a network.

Registration Services: A service that enables the processes and mechanisms of enacting changes to the registry.

Registry: The complete collection of participants registered in the network, identified by their participant identifiers.

Sending Access Point: An organization that typically provides its customers with services for the creation, delivery and processing of e-invoices and other related e-business

²⁵ OpenPeppol <https://peppol.eu/about-openpeppol>

transactions as well as supporting software and services. In the network, they may provide Access Point or Service Metadata Publisher services.

Service Metadata Location (SML) Service: The Service Metadata Location (SML) facilitates the discovery of participants in a network by providing a standardized interface for looking up the associated Service Metadata Publisher (SMP) of a given participant. Using only an unambiguous identifier of the participant, the SML resolves the network address of the participant's associated SMP service. The SML service is, therefore, only required when a network comprises multiple SMP services where it is used in the first step of the network discovery process when sending a business document through the network.

Service Metadata Publisher (SMP) Service: A Service Metadata Publisher (SMP) service exposes metadata about the capabilities of a participant in the network. Metadata includes information about business document types and formats that the participant is capable of receiving, business processes supported or implemented by the participant, what information the participant expects to receive within a certain business document, as well as information about the technical endpoint(s) and transport protocol(s) where the participant will receive business documents.

Service Provider: An organization that typically provides its customers with services for the creation, delivery and processing of e-invoices and other related e-business transactions as well as supporting software and services. In the e-delivery network, they may provide Access Point or Service Metadata Publisher services.

Universal Business Language (UBL): An open library of standard electronic XML business documents for procurement and transportation such as purchase order, invoices, transport logistics and waybills.

Exchange Header Envelope (XHE): The Exchange Header Envelope (XHE) is a joint OASIS and UN/CEFACT specification, which supports both a header and an envelope and supersedes the two prevailing header/envelope standards (OASIS Business Document Envelope [BDE] and SBDH). XHE is currently the only envelope technology standard available that provides end-to-end envelope technology to support a four-corner network model.

12.2 Appendix D – References

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eInvoicing and the New Payments Platform – Enhancing automated invoice processing with real-time payments

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Electronic Code of Federal Regulations (e-CFR) – Title 19 CFR § 141.86 Contents of invoices and general requirements

<https://ecfr.io/Title-19/Section-141.86#:~:text=141.86%20Contents%20of%20invoices%20and%20general%20requirements.%20%C2%A7,of%20entry%20to%20which%20the%20merchandise%20is%20destined%3B>

Global Interoperability Framework (GIF)

<http://gifworks.io/>

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<https://docs.oasis-open.org/bdxx/xhe/v1.0/os/xhe-v1.0-os-oasis.pdf>

OASISOPEN Service Metadata Publishing (SMP) Version 2.0, OASIS Committee Specification 02, 16 January 2020.

<https://docs.oasis-open.org/bdxx/bdx-smp/v2.0/bdx-smp-v2.0.html>

OpenPeppol

<https://peppol.eu/about-openpeppol>

12.3 Appendix E – Acknowledgements

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