BJA
Bureau of Justice Assistance
U.S. Department of Justice

Global Reference Architecture

Service Specification Guidelines

Version 1.0

April 2012

Global
Information
Sharing Standard

Global Standards

Global's collection of normative standards has been versioned independently and assembled into a package of composable, interoperable solutions specifically supporting an information exchange. The package is known as the Global Standards Package (GSP). GSP solutions are generally technically focused but also may include associated guidelines and operating documents. GSP deliverables include artifacts associated with many of the Global product areas, including but not limited to:

- **Global Reference Architecture (GRA):** Offers guidance on the design, specification, and implementation of services (and related infrastructure) as part of a justice Service-Oriented Architecture (SOA).
- **Global Service Specification Packages (SSPs):** Reference services that serve as the means by which the information needs of a consumer are connected with the information capabilities of an information provider.
- **Global Federated Identity and Privilege Management (GFIPM):** Guidelines and standards for establishing, implementing, and governing federated identity management approaches.
- **Global Privacy Technology Framework:** A framework for automating access control (in particular, privacy) policy as part of information exchange.

For More Information

For more information on the GSP and the Global Standards Council (GSC)—the Global group responsible for developing, maintaining, and sustaining the same—please visit http://www.it.ojp.gov/gsc.

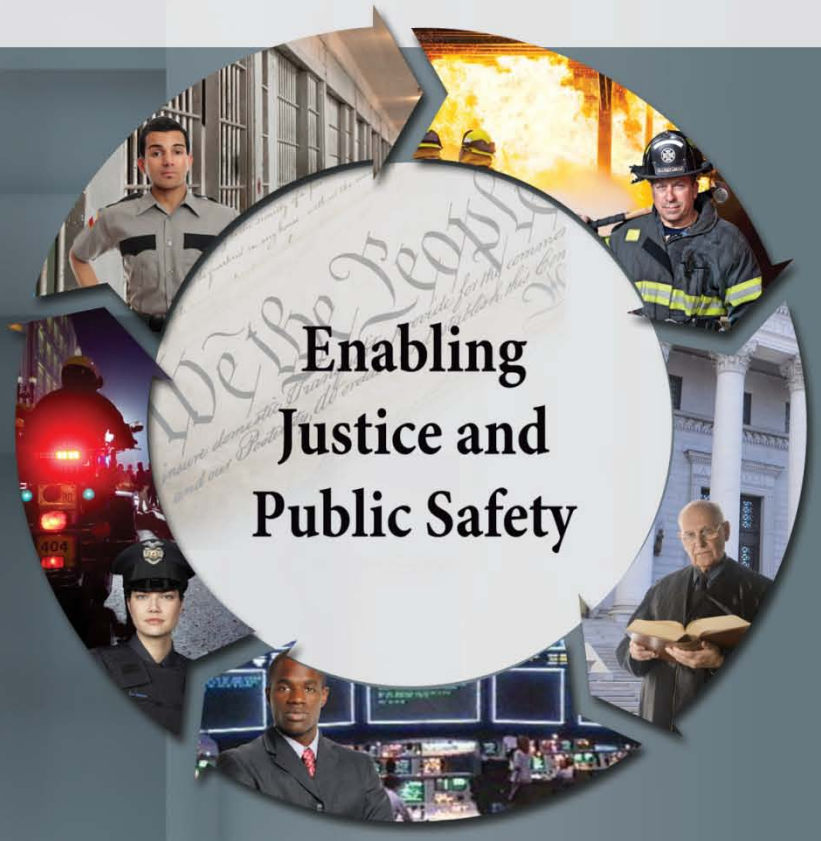

Table of Contents

Acknowledgements ii
How to Use This Document iii
Document Conventions iv
Executive Summary v
1. Introduction 1
2. Service Specification Namespace 4
3. Conformance Requirements 4
3.1. Conformance Targets 4
4. General Conformance Requirements (Normative) 5
4.1. Service Description 5
4.2. Service Interface Description 5
4.3. Service Metadata 6
4.4. Service Catalog 6
4.5. Service Specification Change Log 7
4.6. Service Specification Information Model 7
4.7. Service Specification Behavior Model 7
4.8. Service Specification Schemas 8
4.9. Service Specification Samples 8
4.10. Service Specification Package 8
5. Service Specification Package (Normative) 9
5.1. Service Specification Package Structure 9
6. Service Specification Package Metadata 23
7. Service Catalog 29
8. Service Description 29
9. Service Interface Description 38
10. Implementation Notes (Non-Normative) 43
10.1. Creating a Service Specification Package 43
11. Using a Service Specification Package 44
Appendix A—References 45
Appendix B—Glossary 46
Appendix C—Document History 47

Acknowledgements

The Global Reference Architecture (GRA) was developed through a collaborative effort of the U.S. Department of Justice's (DOJ) Global Justice Information Sharing Initiative (Global).

Global aids its member organizations and the people they serve through a series of important initiatives. These include the facilitation of Global working groups. Chaired by Tom Clarke, Ph.D., the Global Standards Council (GSC) is one of three Global working groups covering critical topics such as intelligence, privacy, security, and standards. Global would like to thank and acknowledge the following contributing authors—Scott Came, SEARCH; Iveta Topalova, Microsoft Corporation, Jim Douglas, SEARCH, James Dyche, JNET, and Sharad Rao, Tetrus Consulting Group. Without their dedication, this work product would not have been possible.

For more information about the Global efforts, including the Global Reference Architecture initiative and corresponding deliverables, please refer to the Global Web site, http://www.it.ojp.gov/gra, for official announcements.

How to Use This Document

The GRA Service Specification Guidelines (GRA SSG) is one of the key GRA Service Specification artifacts. The GRA SSG contains practical information on how to use the GRA Service Specification Package (GRA SSP) and the sample conformant GRA package and set of templates included in it. In addition, the GRA SSG contains the normative requirements to be followed when creating GRA SSPs.

Document Conventions

In this document, use of a bold small-caps typeface, as in this **EXAMPLE**, indicates an important concept or a term defined either in the glossary or in the body of the text at the point where the term or concept is first used.

In this document, use of a bold caps typeface, as in this **[EXAMPLE]**, indicates an important resource document noted in the Reference Section of this document.

Executive Summary

This document is one of several normative documents which make up the GRA. It provides formal, standardized means for using, creating, and understanding Service Specifications and Service Specification Packages.

While the GRA Service Identification and Design Guidelines **[GRA SIDG]** define the methodology for identifying services, the GRA Service Specification Guideline **[GRA SSG]** provides a method for describing and documenting the scope, in addition to the functional and technical requirements of a service in sufficient detail to allow service providers to develop interoperable service implementations and service consumers to review, select, and use these services by referring to the same specification. While a Service Specification should provide enough information to fulfill the above requirements, the Service Specification is not intended to provide a comprehensive view of the service technical design or implementation.

1. Introduction

In the context of the GRA and Service-Oriented Architecture [SOA] in general, a service is the means by which one partner gains access to one or more capabilities offered by another partner. Capabilities generate real-world effects that can be as simple as sharing information or can involve performing a function as part of a complex process or changing the state of other related processes. Government organizations have numerous capabilities and a multitude of partner organizations, both inside and outside of their traditional communities. There are significant benefits for these organizations to share information and have access to each other's capabilities. Achieving interoperability among these organizations requires alignment of business and technical requirements and capabilities. In addition, it is critical to have a consistent way of specifying these requirements and capabilities and sharing them across organizational boundaries. The GRA was developed to facilitate interoperability and to assist in meeting other key requirements common in a complex government information sharing environment. In order to achieve interoperability, a consistent approach must be defined to identify, describe, and package services and their interactions in many different technical environments, across multiple government lines of business, at all levels of government, and with partner organizations.

The GRA defines a service interface as "the means for interacting with a service." It includes specific protocols, commands, and information exchange by which actions are initiated on the service. A service interface is what a system designer or implementer (programmer) uses to design or build executable software that interacts with the service. That is, the service interface represents the "how" of the interaction. Since the service interface is the physical manifestation of the service, best practices call for service interfaces which can be described in an open-standard, machine-referenceable format (that is, a format which could be automatically processed by a computer).

A Service Specification is a formal document describing the capabilities made available through the service; the service model that defines the semantics of the service by representing its behavioral model, information model, and interactions; the policies that constrain the use of the service; and the service interfaces which provide a means to interacting with the service. A Service Specification is analogous to the software documentation of an Application Programming Interface [API]. It provides stakeholders with an understanding of the structure of the service and the rules applicable to its implementation. It gives service consumers the information necessary for consuming a particular service and service providers the information necessary for implementing the service in a consistent and interoperable way.

The main components of a Service Specification are the Service Description, one or more Service Interface Descriptions, and the schemas and the samples used to implement and test the service.

A Service Description contains information about all aspects of the service which are not directly tied to the physical implementation of the service; in other words, the service interface. A Service Interface Description is a description of the physical implementation; specifically, the service interface used in a specific implementation of the service. Since a service can leverage multiple Service Interfaces, the Service Specification might contain more than one Service Interface Description, as depicted in the diagrams below.

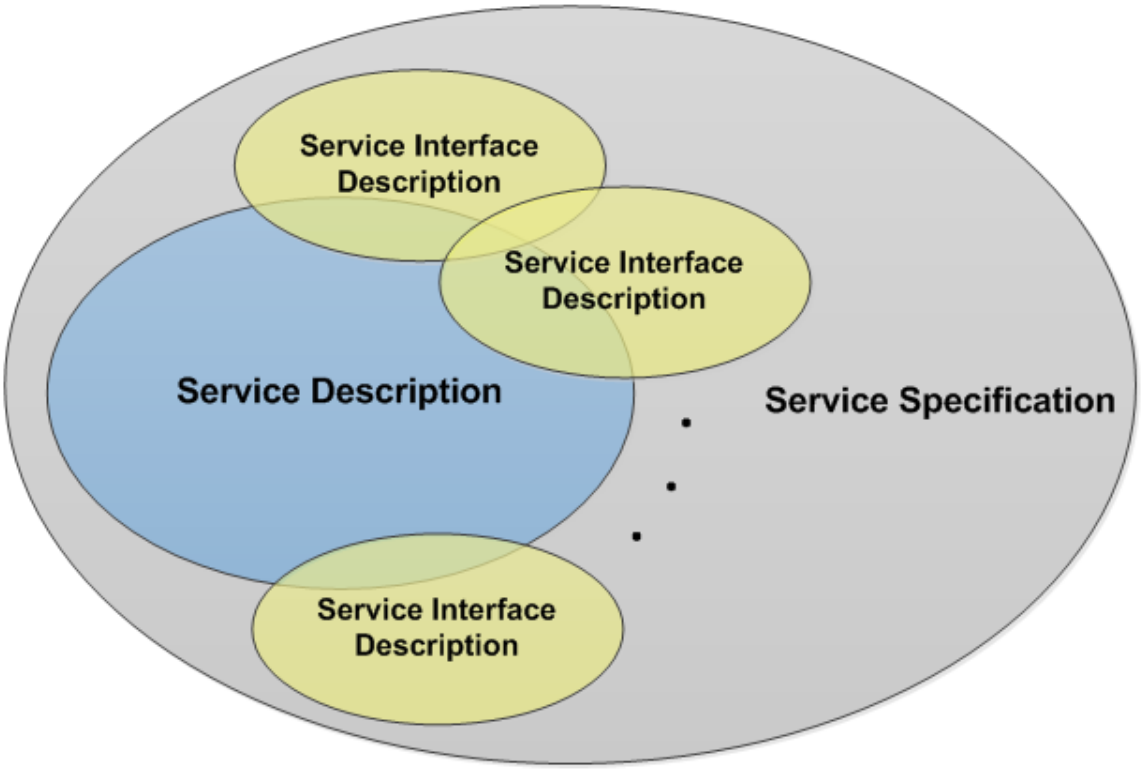

Figure 1—Service Specification Components[1]

Dividing a service specification in this way allows for the following:

- Service Providers may provide the same service using more than one service interface.
- Different Service Providers may provide comparable services irrespective of the underlying technology.

[1] This diagram presents a simplified view of the service specification components for a single service. In many cases, the business logic of a service will invoke other services which have their respective Service Descriptions and Service Interface Descriptions. These services will be choreographed or orchestrated together to achieve specific real-world effects. Each of these services will have its own Service Specification.

- Service Consumers may compare and choose between like services and have the flexibility to change Service Providers while maintaining the same business process.

- National groups may define reference service specifications that can be implemented independently by industry and jurisdictions across the country while providing a high degree of interoperability.

In this way, Service Specifications support the two primary use cases of the GRA:

1) To provide the information sharing community with an architecture and supporting specifications and guidance such that practitioners can implement SOA in an interoperable way across government and its partners. As such, the GRA and related documents seek to provide an 80 percent solution that eliminates the need for individual agencies and practitioners to invent their SOA solutions from scratch and enhances the likelihood of reuse.

2) To provide a framework within which the GRA can be maintained and enhanced and national reference services can be developed to enhance interoperability.

The boundary between the Service Description and the Service Interface Description (the combination of which is the Service Specification) is semipermeable, with many concepts overlapping, and requires documentation in both places. For example, the GRA identifies four architectural elements that guide the design and description of service interfaces such as service interaction requirements, interface description requirements, message exchange patterns, and message definition mechanisms. Service Descriptions need to describe on a conceptual, nontechnical level the service interaction requirements and the message exchange patterns envisioned for the service interface.

The Service Interface Description will also describe in more detail the specific implementation of service interaction requirements and message exchange patterns consistent with the service model and service interaction profile being used. This represents an overlap between the Service Description and the Service Interface Description for these two architectural elements of the GRA. At the same time, interface description requirements and message definition mechanisms are implementation-specific and are described as part of the physical model as governed by the service interaction profiles. As a result, they are described only in the Service Interface Description, and there is no overlap between the Service Description and the Service Interface Description for these two architectural elements of the GRA. Similarly, in the ideal case, all policies and contracts would be instantiated in the contract of the service interface. However, some of those requirements may need to be identified and documented in the Service Description to assure interoperability and comparability of like services.

Service Specifications are similar to the National Information Exchange Model **[NIEM]** Information Exchange Package Documentation **[IEPD]**, commonly used within a number of government domains, in that they document the conceptual, logical, and physical models of a service in the same way NIEM IEPDs document the conceptual, logical, and physical models of a data exchange. Also, in similarity with IEPDs, the service specifications are a composite set of documentation, models, policies, contracts, and schemas that together provide a clear view of the service capabilities and business and technical requirements. While both Service Specifications and NIEM IEPDs are sets of artifacts which enable agencies to effectively share information and are of similar construction, they are not equivalent concepts. From a GRA perspective, NIEM IEPDs will be used to describe the information model of a service and, as such, become a part of the Service Specification.

All components of a Service Specification are compiled together in a GRA Service Specification Package **[GRA SSP]**. The SSP is portable, self-contained, and self-documented. The SSP is human and machine-readable and can be used independently or can become a part of a service registry and/or repository. The Service Descriptions are represented in the SSP as Service Description Documents **[SDDs]** and related artifacts referenced in the document. The Service Interface Descriptions manifest themselves as Service Interface Description Documents **[SIDDs]** and the related artifacts for each service interface which are referenced in the respective document for this interface. Among the templates provided as part of the SSP, there are templates for the Service Description Document and the Service Interface Description Document.

2. Service Specification Namespace

The namespace for this version of the specification and all related and supporting artifacts is http://it.ojp.gov/gsp/services/1.0.0. We strongly recommend that Service Specification designers and developers leverage this namespace as required and applicable.

3. Conformance Requirements

This section describes what it means to "conform to" this Service Specification Guideline (SSG).

3.1. Conformance Targets

A conformance target is any element or aspect of the Service Specification Package whose implementation or behavior is constrained by the Service Specification Guideline. The Service Specification Guideline places such constraints in order to ensure consistent documentation of services and as a result, interoperable implementations of those services. The Service Specification Guideline identifies the following conformance targets:

- **SERVICE DESCRIPTION**
- **SERVICE INTERFACE DESCRIPTION**
- **SERVICE METADATA**

- **SERVICE CATALOG**
- **SERVICE SPECIFICATION CHANGE LOG**
- **SERVICE SPECIFICATION INFORMATION MODEL**
- **SERVICE SPECIFICATION BEHAVIOR MODEL**
- **SERVICE SPECIFICATION SCHEMAS**
- **SERVICE SPECIFICATION SAMPLES**
- **SERVICE SPECIFICATION PACKAGE**

That is, the Service Specification Guideline addresses, specifies, or constrains only these ten conformance targets. Other elements of the Service Specification Package are not currently addressed, specified, or constrained by this Service Specification Guideline. Future versions of this Service Specification Guideline may address, specify, or constrain additional elements of the Service Specification Package.

4. General Conformance Requirements (Normative[2])

4.1. Service Description

In order for a Service Description to conform to this guideline:

- All required sections of the Service Description MUST contain information and SHOULD contain sufficient details so that a Service Provider can use the Service Description to develop interoperable service implementations and a Service Consumer who is unfamiliar with the service can review, select, and use the service. If a required section is not applicable, an N/A MUST be included in the section with an explanation for why the section is not applicable or necessary.

- The Service Description Document name MUST follow the mandatory naming convention for this document.[3]

4.2. Service Interface Description

In order for a Service Interface Description to conform to this guideline:

- All required sections of the Service Interface Description MUST contain information and SHOULD contain sufficient details so that a Service Provider can use the Service Interface Description to develop interoperable service implementations and a Service Consumer who is

[2] In this sections, the key words "MUST," "MUST NOT," "REQUIRED," "SHALL," "SHALL NOT," "SHOULD," "SHOULD NOT," "RECOMMENDED," "MAY," and "OPTIONAL" are to be interpreted as described in Network Working Group Request for Comments: 2119, S. Bradner, Harvard University, March 1997 **[RFC 2119]**.

[3] The required naming convention for the SDD is discussed later in this document.

unfamiliar with the service and its interfaces can review, select, and use the service and its interfaces. If a required section is not applicable, an N/A MUST be included in the section with an explanation for why the section is not applicable or necessary.

- The Service Interface Description Document MUST reference a Service Description Document.
- The Service Interface Description MUST conform to one or more GRA Service Interaction Profiles **[GRA SIP]**.
- The Service Interface Description Document name MUST follow the mandatory naming convention for this document[4].

4.3. Service Metadata

In order for the Service Metadata to conform to this guideline:

- The Service Metadata file MUST conform to the provided schema.
- All required elements of the Service Metadata MUST be provided and SHOULD contain sufficient information so that a Service Consumer who is unfamiliar with the service can discover the service.
- The Service Metadata MUST leverage the GRA recommended namespace http://it.ojp.gov/gsp/services/1.0.0 (This is a place-holder link. The site and link will be activated in the future once this SSG has been approved).
- The Service Metadata file MUST be located in the root folder of the Service Specification Package.
- The Service Metadata file MUST be a valid Extensible Markup Language (XML) document and be named metadata.xml.

4.4. Service Catalog

In order for the Service Catalog to conform to this guideline:

- The machine-readable Service Catalog file MUST be provided and located in the root folder of the Service Specification Package.
- The human-readable Service Catalog file MUST be provided and located in the root folder of the Service Specification Package.

[4] The required naming convention for the SIDD is discussed later in this document.

- The machine-readable Service Catalog file MUST follow the provided template.

- The human-readable Service Catalog file MUST follow the provided template and SHOULD contain the required metadata and all the information from the machine-readable Service Catalog file.

- The machine-readable Service Catalog file MUST be a valid Extensible Markup Language (XML) document and be named catalog.xml.

- The human-readable Service Catalog file MUST be a valid Hypertext Markup Language (HTML) file named catalog.html.

4.5. Service Specification Change Log

- The Service Specification Package change log MUST be located in the artifacts folder and SHOULD follow the OPTIONAL change_log.txt template for documenting all changes to the SSP.

- The change log MUST be an American Standard Code for Information Interchange 2 (ASCII) text file.

4.6. Service Specification Information Model

- The IEPD leveraged as the information model of the service MUST be included in its entirety in the information model folder of the Service Specification Package.

- The IEPDs leveraged as the information model of the service SHOULD conform to the NIEM Model Package Design (MPD).

- The IEPDs leveraged as the information model of the service MUST conform to NIEM as specified in NIEM Conformance and NIEM Naming and Design Rules (NDR). Additionally, the conformance report demonstrating this conformance MUST be included in the information model folder of the Service Specification Package.

4.7. Service Specification Behavior Model

- The behavior model folder of the Service Specification Package MUST contain the source files for all diagrams in the Service Description Document which represent the behavior model of the service.

4.8. Service Specification Schemas

- The naming convention of the subfolders and files under the schemas folder MUST follow Network Working Group Request for Comments: 3986, T. Berners-Lee, et al., January 2005 (RFC 3986). Based on implementation experience, Global recommends that space(s) and the following characters "/", "\", ":", "[", "]" MUST be avoided in subfolder and file names under the schemas folder. In the schemas folder, an underscore character ("_") MUST be used as a separator instead of a space.

- Where applicable, the schemas included in the schemas folder SHOULD leverage the GRA recommended namespace for the current version (http://it.ojp.gov/gsp/services/1.0.0).

- The IEPD XSD schemas which represent the information model of the service MUST be included under the information model subfolder of the schemas folder.

- The schemas representing the service and its interfaces MUST be included under the schemas folder.

- The schemas representing the service and its interfaces MUST be conformant to one or more GRA SIPs as described in the Service Interface Description Document.

- The schemas representing the service and its interfaces MUST be well formed.

- In the case of a Web services implementation, the schemas folder MUST contain only one definition of a namespace per service.

4.9. Service Specification Samples

- Samples of the message(s) exchanged by the service MUST be included under the information model folder of the samples folder.

- Samples representing each service implementation, interface(s), and action(s) MUST be included in the samples folder.

4.10. Service Specification Package

In order for a Service Specification Package to conform to this guideline:

- The required folders in the Service Specification Package MUST follow the REQUIRED folder structure and naming convention described in this document.

- All mandatory folders and documents that are part of the Service Specification Package MUST be provided and SHOULD contain sufficient details so that a Service Provider can use the Service Specification Package to develop interoperable service implementations and a Service Consumer who is unfamiliar with the service can review, select, and use the service.

- The Service Specification Package MUST contain one conformant Service Description and MUST contain at least one conformant Service Interface Description.

- The Service Specification Package MUST be included in a single compressed archive of files that represents and preserves the Service Specification Package structure.

- The Service Specification Package name MUST follow the convention defined and specified in this document.

5. Service Specification Package (Normative[5])

5.1. Service Specification Package Structure

A Service Specification Package (SSP) MUST be named using the naming convention specified below:

[Service Abbreviation]_SSP_v_[major].[minor].[revision]

For example, a proper SSP name for Request for Information Service (abbreviated as RFI) is:

FP_SSP_v_1.0.0

Invalid examples include:

RFI-SSP-v-1-0-0
RFI SSP v.1.0.0
RFI SSP-v.1.0.0

[5] In this section, the key words "MUST," "MUST NOT," "REQUIRED," "SHALL," "SHALL NOT," "SHOULD," "SHOULD NOT," "RECOMMENDED," "MAY," and "OPTIONAL" are to be interpreted as described in **[RFC 2119]**.

RFI-SSP v.1.0.0
RFI_SSP-v.1.0.0
RFI-SSP.v.1.0.0

A Service Specification Package MUST follow the predefined structure. This structure is depicted in the diagram below. All folders identified in this structure are REQUIRED and MUST be included in the Service Specification Package.

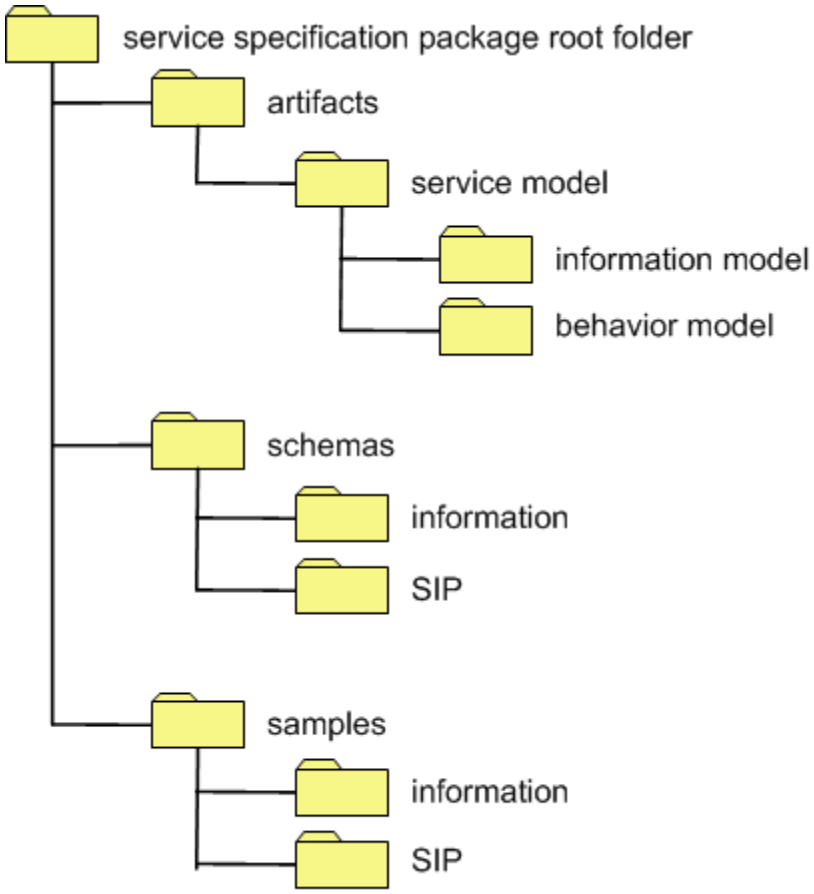

Figure 2—High-Level Service Specification Package Structure

An example Service Specification Package is available on the http://www.it.ojp.gov/gra Web site to assist in creating Service Specification Packages which conform to the required structure.

Provided below is a brief description of the purpose and content of the main folders of the Service Specification Package.

root folder (\)

The root folder contains information regarding the service and service specification such as the metadata file and the catalog files. The metadata file is a collection of the elements required to facilitate service discovery. This file MUST be named metadata.xml and be a valid XML document to facilitate automated discovery and processing. The catalog files are designed to assist navigation of the package and its main artifacts. There are two catalog files—one machine-readable and one human-readable. The machine-readable catalog file MUST be named catalog.xml and be a valid XML document to facilitate automated discovery and processing. The human readable catalog file MUST be named catalog.html and written as an American Standard Code for Information Interchange (ASCII) file to facilitate automated generation of the file.

artifacts (\artifacts)

The artifacts folder contains the Service Description and all Service Interface Description documents. It is critical that the services and their interfaces be assigned meaningful names and abbreviations. That increases the usability of the service specification.

In addition, all artifacts related to the Service Description and Service Interface Descriptions are included in this folder.

The Service Description document for the service is placed in this folder. In the example Service Specification package, a Service Description document template can be found under this folder. This template can be used for developing service description documents for a particular service.

The Service Description document MUST be named following the below naming convention.

[Service Abbreviation]_SDD_v_[major].[minor].[revision].

The Service Interface Description documents for all service interfaces are placed under this folder. Optionally, if there are many service interfaces and/or there are a number of artifacts per service interface, a subfolder could be created for each service interface.

The Service Interface Description documents MUST be named following the below naming convention.

[Service Abbreviation]_SIDD_[Service Interface Abbreviation] v_[major].[minor].[revision].

RFI_SDD_v_1.0.0 and RFI_SIDD_v_1.0.0 are valid example names for the Request for Information service description and service interface description documents.

Please note that the Service Interface Abbreviation in the above naming convention is mandatory only in case there are multiple service interfaces for a service.

Caution: When Microsoft Word is used to update the SSD and/or SIDD, particular combinations of Microsoft Windows and Microsoft Word will drop the periods in the naming convention when performing a direct save after opening the document from an e-mail attachment. To overcome this issue when opening the document from an e-mail attachment, please do a "Save As" in place of a "Save" and place the periods back into the name before saving it.

This folder also contains the service model folder, which has folders to represent the information model of the service and the behavior model of the service.

In case there are numerous documents of a particular type and with a particular purpose related to the service, the structure of the artifacts folder could be further developed by creating a "various artifacts folder." The various artifacts folder is optional, and it could contain a set of documents or a set of folders or a combination of both. That would depend on the type of content and the number of content artifacts and documents per category. It is critical that a consistent naming convention (provided below) be followed when naming the documents or folders located in the various artifacts folder.

Type of Artifact	Folder Name	Document Name
Dependencies	assumptions	[Service Abbreviation] Assumptions.xxx
Dependencies	dependencies	[Service Abbreviation] Dependencies.xxx
Execution Context	execution context	[Service Abbreviation] Execution Context.xxx
Policies and Contracts	policies and contracts	[Service Abbreviation] Policies and Contracts.xxx
Security	security	[Service Abbreviation] Security.xxx
Privacy	privacy	[Service Abbreviation] Privacy.xxx
Testing	testing	[Service Abbreviation] Testing.xxx
Monitoring	monitoring	[Service Abbreviation] Monitoring.xxx
Other	other	[Service Abbreviation] Other.xxx

schemas (\schemas)

The schemas folder contains all the schemas required for implementing the service in an interoperable way.

This folder is composed of an information model folder and folders for each of the Service Interaction Profiles (SIPs) which the service implements.

The information model folder contains all schemas associated with the information model of the service. In other words, all schemas for the messages exchanged by the service would be located in this folder. Generally, these schemas will be available as part of and will be reused directly from the IEPD, which is the information model of the service.

The folders containing all the schemas related to the service are organized by Service Interaction Profiles (SIPs). Optionally, these folders could be further subdivided by service interface in case there are many service interfaces or there are many schemas per service interface.

For example, in the case of Web services, there could be a single .wsdl file under every SIP folder or there could be one "core" .wsdl file per SIP located under the SIP folder which references the interface .wsdl files located in their own optional folder(s) for each service interface. This would depend on design decisions/preferences and tool compatibility. Either the core .wsdl file or the interface .wsdl files will point to a consolidated information schema located in the information model folder under schemas.

It is important to mention that independent of the structure of the schemas folder, in the case of Web services implementation, there MUST be only one definition of a namespace per service.

For interoperability reasons, special considerations MUST be taken when naming the subfolders and files under the schemas folder. The naming convention MUST follow RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax." In addition to that, based on implementation experience, Global recommends that space and the following characters "/", "\", ":", "[", "]" MUST be avoided in subfolder and file names under the schemas folder. In the schemas folder, a "_" MUST be used as a separator instead of a space.

samples (\samples)

The samples folder contains any sample information which would assist developers in implementing the service.

This folder is composed of an information model folder and folders for each of the SIPs which the service implements.

The information model folder contains all samples associated with the information model of the service. In other words, all samples for the messages exchanged by the service, including the service interfaces, would be located in this folder. Generally, these samples will be exactly the same as the samples provided as part of the IEPD, which is leveraged as the information model of the service.

The folders containing all the samples related to each service implementation are included in folders subdivided by SIP. These samples provide information not only about the messages implemented by the service but additional envelope information as required by each SIP. Most often, these samples will contain and not reference the message samples available under the information model folder of the samples directory. Optionally, the folders containing samples for each implementation of the service could be further subdivided by service interface in case there are many service interfaces or there are many schemas per service interface. Otherwise, they can be placed directly in the samples root folder.

An important suggestion to developers is to use only test data as part of the samples in this folder. It is also strongly recommended that no real data or personally identifiable information is included in the sample files.

While not mandatory, it is suggested that the special consideration for naming subfolders and files under the schemas folder are also leveraged for the samples folder.

various templates (\various templates)

The various templates folder contains miscellaneous template documents which can be used for creating the artifacts for the service specification. This folder is optional and can be removed from the final service specification after all the required documents are developed.

registry and repository information (\registry and repository information)

This folder is optional and will be utilized by agencies which have an automated registry and repository capability. It contains the artifacts required to interact with a registry and repository. These artifacts are modeled after the ebXML standard.

The artifacts in the registry and repository information folder of the Service Specification Package are currently under development and would further evolve as the use of registries and repositories for storing service information becomes more prevalent.

In addition to the required folders, a Service Specification Package may contain optional folders.

The template provided for the Service Specification Package includes a number of optional folders grouped under the "various artifacts" folder, which is an optional folder under artifacts. In case the optional folders provided are not sufficient, additional folders could be created to group other types of artifacts. It is recommended that these additional folders be created under the various artifacts "other" folder and not randomly across the SSP.

The template provided for the Service Specification Package also contains an optional "Registry and Repository Information" folder under its root. This folder will be included and populated with information in case an automated registry and/or repository is used for the Service Specification.

There is also a "various templates" folder which comes with the Service Specification Package. This folder is optional and could be removed after the Service Specification Package development is complete and the package is ready for distribution.

The diagram below depicts the structure of the Service Specification Package including the optional folders described in the above section.

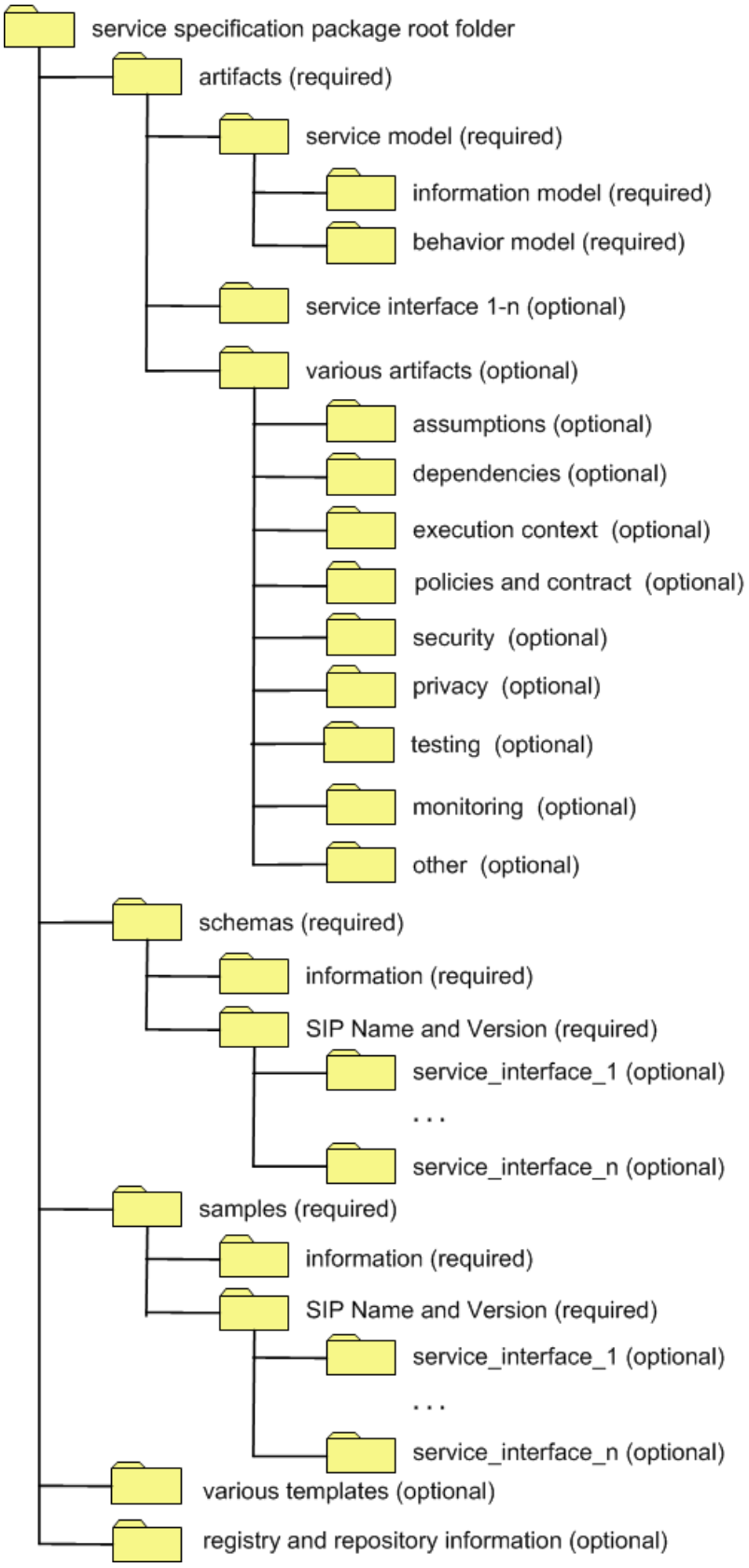

Figure 3—Service Specification Package Structure

Service Specification Package Artifacts

A Service Specification Package consists of multiple artifacts, some of which are required and some optional. The table below summarizes the most common type of artifacts and the destination folders of these artifacts in the Service Specification Package. A Service Specification Package could also contain additional artifacts to further describe the service.

Artifact	Description	File Types	Required Optional	Destination Folder Location
Service Documents				
Metadata	All metadata registered with the Service.	xml, xhtml	R	\
Catalog	List of artifacts in the Service Package that is machine-readable; in an open, portable format; and browser-displayable.	xml, xhtml	R	\
Catalog	A human-readable version of the entire Service Specification Documentation.	html	R	\
Service Description Document	This document is designed as a template for developing a Service Description.	rtf, doc	R	\artifacts
Service Interface Description Document	This document is designed as a template for developing a Service Interface Description.	rtf, doc	R	\artifacts or \artifacts\service interface abbreviation
Information Model Documents				
IEPD	All artifacts associated with the Information Exchange Package in a self-contained zip file.	zip	R	\artifacts\service model\information model
IEPD Schemas	All schemas defined as part of the IEPD and usually located in the schemas folder of the IEPD	xsd	R	\schemas and \artifacts\service model\information model

Artifact	Description	File Types	Required Optional	Destination Folder Location
IEPD Samples	Samples defined as part of the IEPD and usually located in the sample folder of the IEPD.	xml, doc, jpg, pdf, gif	R	\samples and \artifacts\service model\information model
Information Model Documents and Artifacts	The information model documents and artifacts as defined by NIEM in text format and graphic format. The graphic format is likely a Unified Modeling Language (UML) model.	xmi, vsd, zargo, jpg, gif, pdf	O	\artifacts\service model\information model
Various				
Service Change Log	Record of cumulative changes from previous service versions. The initial service entry simply records its creation date.	xml, txt, rtf, doc	R	\artifacts
Service Change Log by Interface	Record of cumulative changes from previous service interface versions. The initial service interface entry simply records its creation date.	xml, txt, rtf, doc	O	\artifacts or \artifacts\service interface abbreviation
Usage Guide	Explains how a consumer would use the service. The usage guide would show typical binding and requests.	rtf, doc	O	\artifacts
Exceptions and Fault Documents	This guide would also include any information necessary to handle exceptions or faults generated by the service.	rtf, doc	O	\artifacts

Artifact	Description	File Types	Required Optional	Destination Folder Location
Memoranda of Understanding (MOU) Documents	Memoranda of understanding among participating agencies. The service provider may requirement each consumer to sign an MOU before the consumption process can begin in production.	rtf, doc	O	\artifacts or \artifacts\various artifacts\policies and contract
Service-Level Agreement Documents	This needs to match Service-Level Agreement (SLA) documents/templates created by the M&P work group.	rtf, doc	O	\artifacts or \artifacts\service interface abbreviation
Service Requirements Document	The service/software requirements document captures the complete software requirements for the system, or a portion of the system.	rtf, doc	O	\artifacts
Requirements Traceability	The requirements traceability matrix is a table used to trace project life cycle activities and work products to the project requirements. The matrix establishes a thread that traces requirements from identification through implementation.	xls, pdf, rtf, doc	O	\artifacts
Detailed Design Document	The purpose of this document is to bring all of the models together in one document which satisfies the requirements.	rtf,doc	O	\artifacts
Business Process Analysis	This document defines the business process model and requirements which supports/defines this service.	rtf,doc	O	\artifacts

Artifact	Description	File Types	Required Optional	Destination Folder Location
Business Process Model	This is the actual document which describes the business process model for the Web service. In many cases, this can be used to import/export the process model for the service.	BPMN, BPEL, JIEM, UML	R	\artifacts\service model\behavior model
Use Case Specification	The use case specification contains information regarding the use case model of the service. This information could be part of the service description document or included in a separate specification document referenced by the service description document. The use case specification document contains use case diagrams and use case scenarios.	rtf,doc	O	\artifacts
Use Case Diagrams	Use case diagram in standard open format and standard graphic, likely UML.	xmi, vsd, zargo, jpg, pdf	O	\artifacts\service model\behavior model
Project Charter	A document that contains the project overview, scope, objectives, constraints, sponsors, and participants. This document is useful to gain a general understanding of the project/effort used to create this service.	rtf,doc	O	\artifacts

Artifact	Description	File Types	Required Optional	Destination Folder Location
Test Cases	This document describes the specific functions and objectives for exercising the producers service. Specific actions are identified and measured against expected testing results and outcomes.	rtf, doc	O	\artifacts or \artifacts\various artifacts\testing
Testing Results Report	Description and results of validation and conformance testing performed—may include testing output or products.	rtf, doc	O	\artifacts or \artifacts\various artifacts\testing
Asset Cost	Document which identifies the cost for building the service package necessary to support the business capabilities. The asset cost is not cumulative (from version to version). Rather, this documents the costs associated with this particular service package.	xls	O	\artifacts
Interface Files				
Web Service				
WSDL	The Web Service Description Language file for the service being implemented.	wsdl	R	\schemas\[sip] or \schemas\[sip]\[service interface]
Sample SOAP Request(s)	Sample Web service requests for this service which utilizes one of the actions defined for the service.	xml	O	\samples\[sip] or \samples\[sip]\[service interface]
Sample SOAP Reply(s)	Sample Web service reply which corresponds to the Web service request.	xml	O	\samples\[sip] or \samples\[sip]\[service interface]

Artifact	Description	File Types	Required Optional	Destination Folder Location
ebXML				
ebXML	The ebXML schemas files for the service being implemented.	xsd	R	\schemas\[sip] or \schemas\[sip]\[service interface]
Sample ebXML Request(s)	Sample ebXML requests for this service which utilizes one of the actions defined for the service.	xml	O	\samples\[sip] or \samples\[sip]\[service interface]
Sample ebXML Reply(s)	Sample ebXML reply message which corresponds to the ebXML request.	xml	O	\samples\[sip] or \samples\[sip]\[service interface]
Security and Privacy Information				
Security and Privacy Documentation	This document would identify the security and privacy necessary for accessing and handling the information provided by the service.	rtf, doc, pdf	O	\artifacts or \artifacts\various artifacts\security or \artifacts\various artifacts\privacy
GFIPM Metadata	This is the GFIPM Metadata Schema and the respective sample XML which is used to authorize access to the service.	xsd, xml	O	\artifacts or \artifacts\various artifacts\security or \schemas or \samples
Access Control Policy Maps	This would identify all security federations and networks which this service is secured and available for use.	xls	O	\artifacts or \artifacts\various artifacts\security
XACML	The XML Access Control (XACML) representation of the security policy necessary for accessing this service.	xml	O	\artifacts or \artifacts\various artifacts\security or \schemas or \samples

6. Service Specification Package Metadata

The Service Specification Metadata contains descriptive information about the SSP and the information included in it. The metadata is specified by an XML schema so that an instance of the metadata for a given SSP can be parsed, loaded into a registry, and used to search and discover services.

As stated previously in this document, the Service Metadata file MUST follow the schema defined and provided as part of the Service Specification Package. The file MUST be placed in the root folder of the Service Specification Package, and its names MUST follow the mandatory naming convention. More specifically, the file MUST be named metadata.xml.

The table below summarizes the service specification metadata and provides information about the required and optional elements of the metadata.

Metadata Item	Description	Required Optional	Cardinality
Service Identification	**A means of uniquely identifying a service.**	**R**	**(1,1)**
Service Name	Human-readable identification for this service (e.g., Fingerprint Identification Service, Biometric Service, Consolidated Warrant Service).	R	(1,1)
Service ID	An identification of the service in a service registry and/or repository.	O	(0,1)
Service URI	Fully qualified locator of the service interface potentially including version and environment.	O	(0,1)
Service Name Abbreviation Text	Human-readable abbreviation of the Service Name.	R	(1,1)
Service Description	**A set of details describing a service.**	**R**	**(1,1)**
Service Purpose Text	Defines the purpose the service intends or resolve, to perform or accomplish.	R	(1,1)
Service Scope Description Text	Defines the scope of the service.	R	(1,1)
Service Description Summary Text	Brief summary of this service for short display purposes— maximum of 160 characters including spaces.	R	(0,1)
Service Description Text	Human-readable narrative description of this service—may contain as much detail as you think useful to those with a potential interest in this service and its business usage/application.	O	(0,1)

Metadata Item	Description	Required Optional	Cardinality
Service Description Keyword Text	Search terms that would not otherwise be in other metadata attributes (e.g., Child Support Warrant, Domestic Relations Warrant, Domestics).	O	(0,1)
Service Capabilities	An enumeration of the capabilities provided by a service. The capabilities will be described in a free text format.	R	(1,*)
Service Real-World Effects	An enumeration of the Real-World Effects Provided by the Service. The Real-World Effects will be described in a free text format.	R	(1,*)
Security Classification Text	Any applicable classification of the security level of the information exchanged by the service, such as SBU, Secret, etc. If there is no strict classification, this field can contain a brief statement regarding the security of the data.	O	(0,1)
Dependencies	Enumeration or reference to all services on which the service directly depends to deliver its real-world effects.	O	(0,1)
Service Full Name Text	A human-readable identification of the service.	O	(0,*)
Service ID	An identification of the service in a service registry and/or repository.	O	(0,*)
Service URI	Fully qualified locator of the service interface potentially including version and environment.	O	(0,*)
Service Name Abbreviation Text	A human-readable abbreviation of the Service Name.	O	(0,*)
IEPD references	This identifies or references all of the Information Exchange Package Documents which the service uses in its data model.	O	(0,1)
IEPD Name	A human-readable identification of the IEPD.	O	(0,*)
IEPD URL	A URL where the IEPD is posted and available.	O	(0,*)
Version Information	**A structured representation of a version for something, such as a service, document, etc.**	**R**	**(1,1)**
Major Version	Service Major Version Number.	R	(1,1)
Minor Version	Service Minor Version Number.	R	(1,1)
Revision Version	Service Minor Version Number.	R	(1,1)

Metadata Item	Description	Required Optional	Cardinality
Creation Date	YYYY-MM. This is the date when the service was first created. Do NOT confuse with the date you submitted this service to a registry.	R	(1,1)
Activation Date	YYYY-MM. This is the date when the service was or will be first available in production. Do NOT confuse with the date you submitted this service to a registry.	O	(0,1)
Last Revision Date	Year and month (YYYY-MM) this service information was last revised. Do NOT confuse with the date the service itself was last revised with generating new service documentation.	O	(0,1)
Next Revision Date	Year and month (YYYY-MM) this service is expected to be revised.	O	(0,1)
Expiration Date	Year and month (YYYY-MM) this service is expected to be no longer available (if applicable).	O	(0,1)
Life Cycle Status	Identifies the current stage of the service within the development life cycle. Valid values are In Design, In Development, Release Candidate, Operational/Production, Deprecated.	R	(1,1)
Alerts and Notifications	Identifies the URL to sign up for alerts and notifications on this service.	O	(0,1)
Related Organization Information	**A collection of organizations that are somehow related to the service.**	**R**	**(1,*)**
Organization Name	The full name of the agency.	R	(1,1)
Organization Acronym	The acronym for the agency.	O	(0,1)
Organization Full Address	A physical address of an agency in full text form.	O	(0,1)
Organization Web Site URL	Internet address of the agency's Web site.	O	(0,1)
Organization Role Description Text	The organization role defined in free form text. That could be creator, provider, owner, maintainer, authorities source, etc.	R	(1,1)
Organization Role Detailed Description Text	More detailed text explaining the role of the organization responsibilities.	O	(0,1)
Contact Person Name	Person designated as the point of contact for the organization.	R	(1,1)

Metadata Item	Description	Required Optional	Cardinality
Contact Person E-mail	E-mail of the person designated as the point of contact for the organization.	R	(1,1)
Contact Person Phone	Phone number of the person designated as the point of contact for the organization.	R	(1,1)
Contact Person Address	Physical address of the person designated as the point of contact for the organization.	O	(0,1)
Business Context	**A collection of details describing the business context in which the service operates.**	**R**	**(1,1)**
Domains	Primary domains or line(s) of business (LoB) that this service covers.	R	(1,1)
Classification	Any classification information to define the relationship between the service and applicable enterprise architecture and business reference model.	O	(0,*)
Exchange Partner Types	Types of organizations that would commonly use this service.	O	(0,*)
Endorsers	Names and acronyms of professional or governmental organizations that endorse this service as an official business exchange.	O	(0,*)
Sponsors	Names and acronyms of professional or governmental organization(s) that sponsored, contributed, or participated in the development of the service.	O	(0,*)
Service Interface	**A set of details relating to the interface of a service.**	**O**	**(0,*)**
URI	A complex element containing URIs information.	O	(0,*)
URI Address	Fully qualified locator of the service interface potentially including version and environment.	R	(1,1)
URI Description	Description of the URI. This would provide better understanding of what is actually at the URI address.	R	(1,1)
Service Action	A complex element containing Actions information.	R	(1,*)
Action Name	Service Action performed within this service interface.	R	(1,1)
Action Purpose	Description of the Service Action purpose performed by this service interface.	R	(1,1)
Message Exchange Pattern	Category of transaction this service is designed and used for: query/response, message, publish/subscribe, document, etc.	R	(1,1)

Metadata Item	Description	Required Optional	Cardinality
SIP	A complex element containing information about the Service Interaction Profile implemented.	R	(0,*)
SIP Name	Name of the Service Interaction Profile implemented.	R	(1,1)
SIP Version	Version of the Service Interaction Profile implemented.	R	(1,1)
Security Implemented	Identifies if security has been implemented to access this service. This is a Yes/No field.	R	(1,1)
Security Description	Identifies the security which was implemented to protect this service interface (GFIPM, Trusted Broker, etc).	O	(0,1)
Service-Level Agreements	**A collection of policies, agreements, licensing, and any other governance or performance documentation specifying constraints and any other details regarding the realization of a service.**	**R**	**(1,1)**
Service Policy and Contracts	A collection of policies and other agreement documentation specifying constraints and any other details regarding the realization of a service.	R	(1,1)
Applicable Policies Indicator	True when there are any applicable policies governing the use, administration, or implementation of a service.	R	(1,1)
Applicable Policies	A description or references to an applicable policy governing the use, administration, or implementation of a service.	O	(0,*)
Applicable Contracts Indicator	True when there are any applicable contracts relating to the use, administration, or implementation of a service.	R	(1,1)
Applicable Contracts	A description or references to an applicable contract governing the use, administration, or implementation of a service.	O	(0,*)
Applicable Agreements Indicator	True when there are any applicable agreements or memoranda of understanding (MOUs) relating to the use, administration, or implementation of a service.	R	(1,1)
Applicable Agreements	A description or reference to an applicable agreement or MOU governing the use, administration, or implementation of a service.	O	(0,*)
Applicable Umbrella Agreements Indicator	True when there are any applicable umbrella agreements relating to the use, administration, or implementation of a service; false otherwise.	R	(1,1)
Applicable Umbrella Agreements	A description or reference to an applicable umbrella agreement governing the use, administration, or implementation of a service.	O	(0,*)
Performance/Quality of Service Metrics	A collection of performance and quality of service (QoS) characteristics that a service is either expected or required to meet once implemented.	R	(1,1)

Metadata Item	Description	Required Optional	Cardinality
Service Response Time	A description of the average response time for a service. The response time is calculated as the time input is provided to the service until the service completes its process or provides output for the consumer.	R	(1,1)
Service Average Throughput	A description of how often a service is expected to be, or is actually used, averaged over a period of time.	O	(0,1)
Service Maximum Throughput	A description of the limit of how often a service is able to be accessed or used at, over a period of time during peak capacity.	O	(0,1)
Service Availability	A description or measurement of the expected availability that a service is usable.	O	(0,1)
Service Usage Details	A collection of licensing and any other usage governance constraints regarding the realization of a service.	R	(1,1)
Approval Required Indicator	Identifies if a consumer must first obtain the approval prior to using the service. (true=approval required or false=approval not required).	R	(1,1)
Licensing Required Indicator	True when a license is required to use the service; false otherwise.	R	(1,1)
Licensing Agreement Description	Defines the type of licensing for the service. Could be In House, No License, Open Source, Purchase License, etc.	O	(0,1)
Cost to Use	A monetary amount identifying the cost in (USD) to use the service.	O	(0,1)
Cost to Use Unit	A description of the units by which the cost to use (e.g., transaction, unlimited transactions, minutes of use) is determined.	O	(0,1)
Creation Cost	A monetary amount identifying the cost in (USD) to create the service. This includes the full cost to design, manage, develop, test, and implement this version.	O	(0,1)

To assist with the development of the metadata, the Service Specification Package contains in its root folder the schema for the metadata artifact and a sample instance for this artifact. An Excel spreadsheet containing all of the metadata elements is also available in the root folder of the Service Specification Package. This spreadsheet can be used to collect and organize the metadata.

7. Service Catalog

The machine-readable Service Catalog file SHOULD follow the schema defined and provided as part of the Service Specification Package. The human-readable Service Catalog file MUST follow the template provided as part of the Service Specification Package. Both files MUST be placed in the root folder of the Service Specification Package, and their names MUST follow the mandatory naming conventions. More specifically, the machine-readable Service Catalog file MUST be named catalog.xml, and the human-readable Service Catalog file MUST be named catalog.html.

To assist with the development of the catalog, the Service Specification Package contains in its root folder the schema for the machine-readable Service Catalog file and a template for the human-readable Service Catalog file.

8. Service Description

A Service Description SHOULD follow the Service Description Document Template provided as part of the Service Specification Package.

The service description document name MUST be named following the below naming convention.

[Service Abbreviation]_SDD_v_[major].[minor].[revision].

The main sections of the Service Description Document are listed below:

- Service Overview
- Business Scenarios
- Service Interoperability Requirements
- Additional Information
- Service Model

The table below provides more information about the information included in each of the sections:

Section Name	Section Description	Required Optional
Service Overview	The service overview section contains the scope and structure of the service being described. This section will explain why the service is needed and what it is intended to do, and relates the service to its business objectives. It should be clear and concise and targeted for a nontechnical audience. The questions that need to be answered in the service overview subsection are: • What is the scope of the service and its capabilities? • What are its real-world effects? • What are the conditions under which this service is applicable? This section should be treated as a narrative description of the service. The purpose of this section should be to provide a good understanding of the service and its actions for people who may have an interest in this service.	R
Purpose	This section provides a short textual description of the intended purpose of the service. This section aids the consumer in quickly determining whether the service being specified has applicability to the consumer's needs.	R
Scope	This section defines the overall scope of the service and could enumerate the actions that the service supports. Additionally, this section identifies high-level items which are not in scope.	R
Capabilities	The capabilities of the service describe the means of providing business value by one partner to another partner. As defined by the GRA, each capability produces one or more real-world effects, each of which is an outcome of the business value sought by one of the partners.	R
Real-World Effects	The real-world effects of the service describe the result of invoking the various actions of the service. As defined by the GRA, each capability produces one or more real-world effects, each of which is an outcome of the business value sought by one of the partners. A real-world effect can be either the obtaining of information, the changing of something of business relevance to the participating partners, or both. Because capabilities are implemented by provider systems, real-world effects consist of the business outcomes of provider systems. That is, real-world effects in the GRA are essentially the information made available by provider systems or the outcomes resulting from business processes and workflows automated by provider systems, or both. Each action of the service can produce its own real-world effect; the aggregation of all the actions' real-world effects is the service's real-world effect. The Service Identification and Design Guidelines provides principles and guidance that govern the grouping of actions into services, ensuring cohesiveness and making a description of the service's real-world effect practical. If the diversity of actions makes the service's real-world effects difficult to describe concisely, the service should be refactored.	R

Section Name	Section Description	Required Optional
Summary	This section defines the conditions under which the service is relevant. It identifies likely service consumers and describes how the service is currently being used or is likely to be used. The purpose of this subsection is to assist the service consumer in making a decision of whether to utilize this service. This section is limited to 160 characters including spaces.	R
Description	This section defines in more detail the conditions under which the service is relevant. It identifies likely service consumers and describes how the service is currently being used or is likely to be used. The purpose of this subsection is to assist the service consumer in making a decision of whether to utilize this service.	R
Security Classification	This section lists any applicable classification of the security level of the information exchanged by the service, such as SBU, Secret, etc. If there is no strict classification, this section can contain a brief statement regarding the security of the data.	R
Service Specification Package Version	This section defines the Service Specification Package version under which this service specification is developed.	R
Business Scenarios	This section of the document provides a more detailed, but still high-level, narrative description that may be supported by industry standard modeling notation where appropriate. Again, care should be taken to be as clear and precise as possible and to define real scenarios that would be relevant to a significant number of organizations. This section presents the conceptual model for the actions supported by the service. The business scenarios section should be used to identify the typical usage of the service in a context. This defines the primary flow. This would be similar to a high-level business use case, elaborated in technology-agnostic terms. If the business scenario has alternative flows, these should also be documented. Simple alternative flows can be documented in text within the primary flow. Complex alternative flows may need a separate section to describe the flow. It is recommended that diagrams be utilized to augment the narrative description of each business scenario. The use of BPMN, JIEM, UML, work and process flow models or similar open-standard notation to develop the diagrams is recommended. Ultimately, business scenarios will better describe the service than explanatory text, since they are illustrations of the role the service is envisioned to play. There is no need to identify and elaborate dozens of scenarios in this section. A service description could contain more than one business scenario. In this case, this document will contain more than one business scenario section.	R

Section Name	Section Description	Required Optional
Business Scenario	A short description that briefly conveys the role and purpose of the business scenario. A single paragraph should suffice for this description. Every process and event flow should show the beginning or triggering event as the initial context statement of the flow.	R
Primary Flow	The GRA speaks of services in terms of system-to-system interaction. Often, the consuming system is simply mediating a human interaction; however, services are system-to-system and the information about the human actor is passed between systems. In describing the primary flow, start with the initiating system and describe what behaviors occur between systems. The business scenario describes what the initiating system does and what the partner system does in response. It is phrased in the form of a dialog between systems. The business scenario should describe what happens inside the systems but not how or why. If information is exchanged, the use case should describe the messages that are passed back and forth.	R
Alternative Flows	More complex alternatives are described in a separate section, referred to in the primary flow subsection. The alternative flow subsections could be considered as alternative behaviors. Each alternative flow represents alternative behavior, usually due to exceptions that occur in the main flow. They may be as long as necessary to describe the events associated with the alternative behavior. When an alternative flow ends, the events of the main flow of events are resumed unless otherwise stated. Alternative flows may, in turn, be divided into subsections if that approach improves clarity. This section is optional.	O
Service Interoperability Requirements	While service descriptions are technology agnostic and do not detail the physical model of a service, certain requirements need to be outlined to increase the likelihood of interoperability across services based on the same service description. This section outlines those requirements, describing the service interaction requirements, relevant assumptions and dependencies, and policies and contracts.	O
Service Interaction Requirements	This section describes any service interaction requirements which should be followed by the service interface to ensure service interoperability. The requirements in this section should be technology agnostic and should not be specific to any service implementation. This section is intended to inform the interaction requirements section of the SIDD.	O
Service Assumptions	This section lists all assumptions on which the service depends to deliver its real-world effects.	O

Section Name	Section Description	Required Optional
Service Dependencies	In many cases, services are orchestrated or choreographed together to perform a business function and deliver capabilities. This section lists and references all services, if any, which the service invokes directly in order to deliver its capabilities. The list of service dependencies represents only first-level correlations between services. In practice, this means that if the services invoked directly by the service and documented in the list of dependencies invoke other services to perform their tasks, these additional services are not included in the list of dependencies for the service. These additional services are included only in the list of the dependencies of the invoked services.	O
Execution Context	Service descriptions should include all information pertinent to the production or consumption of the service, including expected infrastructure functions and other dependencies. No information directly pertaining to implementation platform or technology should be included in the service description. Conversely, platform capabilities which are technology-independent should be included. For example, stating in the service description that technology capabilities, such as encryption, are being provided by the infrastructure is preferred compared to stating that the Public Key Infrastructure (PKI) infrastructure is expected. It is expected that the services defined using this document will minimize the dependence on specific technical infrastructure to provide the greatest flexibility and interoperability for service providers and service consumers. It is also important to note that the information in this section will be applicable to more than one service, and these required capabilities will be provisioned as part of the infrastructure layer of the architecture. For instance, if information is to be exchanged securely within the execution context, enabling this functionality at the infrastructure level and not per a specific SSP or SIP is the strongly preferred direction for enabling the GRA. In other words, these commonly used technical functions would be most effectively achieved by an infrastructure solution which supports the GRA.	O
Policies and Contracts	Service policies and contracts express rules that govern the interaction between a service consumer and a service. A policy is an assertion by either a consumer or a service provider of that participant's requirements for willingness to interact. Policies state conditions, obligations, and constraints. A contract is an agreement by the parties involved. Whereas a policy is an assertion by one participant in the interaction, a contract is an agreement between the participants that expresses some expectation or requirement of the interaction. And whereas policy enforcement is generally the responsibility of the participant who asserts the policy, contract enforcement may involve resolution of disputes that arise between the parties.	O

Section Name	Section Description	Required Optional
	Services can be provided with simple policy statements that constrain the provider but not the consumer. This is true especially for the release of public information using non-mission critical services. However, it is likely that within the information sharing space, most services will require development of contracts that bind all parties. Some of these contracts will be service-specific, others will be umbrella memoranda of understanding or more detailed service agreements that relate to more than one service. The Service Description should identify any existing memorandum of understanding or agreements that constrain the implementation of the service and should identify any policy requirements not otherwise covered by these umbrella agreements that are necessary for the service. The requirements from these documents should be included here in a technology agnostic form. Each service action can have distinct policy constraints that apply, though those elements should be amenable to aggregation into a single policy for the service. Future versions of this document will provide additional guidance on defining policy and contract requirements for the service and its actions at the service description level.	
Security	While service descriptions are technology agnostic and do not detail the physical model of a service, certain security requirements are applicable to the service and need to be carried through all its implementations. This section outlines those requirements.	O
Privacy	While service descriptions are technology agnostic and do not detail the physical model of a service, certain privacy requirements are applicable to the service and need to be carried through all its implementations. This section outlines those requirements.	O
Other Requirements	This section lists any other requirements which have to be met and on which the service depends to deliver its capabilities.	O
Additional Information	This section contains any additional information pertinent to the service which should be included in this document but does not belong in the document sections above. This could be information about future capabilities the service could provide, information regarding specific conditions which govern the use of the service, information regarding specific domain capabilities the service fulfills, etc. If required, subsections can be created to further structure the information provided in this section.	O

Section Name	Section Description	Required Optional
Service Model	Ultimately, the service description requires a detailed elaboration of each action the service is capable of performing. This section describes the inputs, outputs, and behavior of the service and its actions. The requirements for such detailed information are addressed by the concept of a service's information model and behavior model, collectively called the service model in the GRA. The concepts of the information and behavior models are described in the subsections which follow. It is essential for the service model to describe what the service will be doing but not how it is expected to perform the function. Implementers of the service must have freedom to innovate, and overspecification can render a model to be of little value. Analysts must ensure that the service is adequately specified so that it performs as expected across multiple implementation approaches and technologies and still provides the intended functionality. The service description should also be able to stand on its own regardless of any technical specification or implementation. As a result, this section must be precise. For example, input/output parameters identified should be designated as mandatory or optional and related to specific data types, semantics, and structure as appropriate.	
	The following rules of thumb should be followed when documenting the detailed description of the service model: • In the event interoperability may be compromised if something is deferred to implementation, it should be included in this document. • If there is an expectation within the information sharing community that a behavior or information construct behave a certain way, it should be specified in this document.	
Information Model	The Information Model describes the data which comprises the inputs and outputs of the service and its actions. Information content representations (logical description) of the inputs and outputs should be represented in a platform-agnostic formalism. Industry open-standard notation (e.g., UML) is preferred to represent the information model. The following principles shall be followed for specifying the information model: • Reference use of the National Information Exchange Model (NIEM) if possible. • Existing NIEM IEPDs should be used and/or extended when possible. These IEPDs should be described in a high level in this section and placed in the respective information model folder of the service package. If certain constrains dictate the use of non-NIEM information content, conformance to the NIEM MPD and the NIEM NDR is recommended.	R

Section Name	Section Description	Required Optional
IEPD Reference	This section identifies any IEPDs that exist and are to be used as either references for further development/enhancement or as-is. All IEPDs referenced in this section should be included in their entirety in the information model folder of the service package. The schema files also should be included in the schemas folder of the service package. Sample files should be included in the samples folder of the service package.	R
Data Inputs	Enumerate all data inputs, both mandatory and optional, and provide a logical representation. This section is intended to summarize the data inputs of all service actions and is not mandatory if the data inputs are described in detail under each action.	O
Data Outputs	Enumerate all data outputs, both mandatory and optional, and provide a logical representation. This section is intended to summarize the data outputs of all service actions and is not mandatory if the data outputs are described in detail under each action.	O
Provenance	Provenance is defined as the agency, office, or person of origin of records, i.e., the entity that created, received, or accumulated and used the records in the conduct of their business activities. Any applicable provenance information or restrictions should be provided in this section.	O
Behavior Model	The behavior model describes the behavior of the service. The behavior model consists of two components—action model and process model.	R
Action Model	The action model defines the operations available to consumers (in effect, what the service "does"). This normally needs to be done in the context of a process model (see below). Each action may utilize part or a subset of the service information model. The following information is provided in detail for each service action: • Action Name • Action Purpose • Action Inputs • Action Outputs • Action Provenance	R

Section Name	Section Description	Required Optional
Process Model	Process models define how consumers may invoke the service's actions together or in a sequence to accomplish some larger business process. They do not describe the process of interaction among multiple services within a business process. Process models describe processing rules and fault handling and should provide a step-by-step description of the logic carried out by the service actions including any pre- or post-conditions. This should be supplemented with algorithms, workflow diagrams, or even entire business process definitions. The process model could be described utilizing variety of business process modeling notations and languages which are further described in business process modeling profiles. Listed below are some commonly used process modeling profiles: • BPMN Profile • JIEM Profile • UML Profile All processing model profile artifacts used to describe the service should be made available in the behavior model folder of the respective service package folder.	R
Appendix A–References	This section is used to list applicable references.	O
Appendix B–Glossary	This section is used to list glossary terms used in the document.	O
Appendix C–Document History	This section is used to document the history of the service description document.	R

The artifacts folder of the Service Specification Package contains a document named template_SDD_v_1.0.0.doc, which SHOULD be used as a template for creating a Service Description Document.

9. Service Interface Description

A Service Interface Description SHOULD follow the Service Interface Description Document Template provided as part of the Service Specification Package.

The service interface description documents MUST be named following the below naming convention.

[Service Abbreviation]_SIDD_[Service Interface Abbreviation]_ v_[major].[minor].[revision].

The main sections of the Service Interface Description Document are listed below:

- Physical Model
- Service Interaction Requirements
- Interface Description Requirements
- Message Exchange Patterns
- Message Definition Mechanisms
- Policies and Contracts
- Security
- Privacy
- Service Testing

The table below provides more information about the information included in each of the sections of the Service Interface Description Document:

Section Name	Section Description	Required Optional
Physical Model	This section should describe directly, or by reference, the technical implementation (physical model) of the service implemented via the described service interface (e.g., Web Services definition, schema, electronic policies, and performance/quality of service metrics or other similar structures). The physical model should sufficiently describe the set of actions implemented by the service interface and the physical endpoint(s) for accessing these actions. This section will also include any relevant details of the Service Interaction Profile (SIP) that will govern how the service interaction requirements of the service will be met. The physical model described in this document will also provide details regarding the message schema(s) for the information model of the service. The above information can be made part of this document or included by reference in this document.	R
Service Interaction Requirements	Service Interaction Profiles identify 14 service interaction requirements that facilitate the interaction of consumers and providers and establish technical solutions to meet those requirements. Typically, these requirements are not directly related to the capability used by the service consumer, nor are they related to the real-world effect resulting from use of that capability. Rather, the requirements enforce (or support the enforcement of) policies or contracts or otherwise protect the interests of particular business partners or the business organization overall. Not all of these 14 requirements might be required to support the actions of the service. Service Interface Descriptions should identify which interaction requirements are necessary. Any related special conditions should also be described.	R
Interface Description Requirements	This section should contain any interface description requirements dictated by the service actions. Per the GRA, interface description requirements define common rules of service interaction. Typically, these requirements are not directly related to the capability used by the service consumer, nor are they related to the real-world effect resulting from use of that capability. Rather, the requirements enforce (or support the enforcement of) policies or contracts or otherwise protect the interests of particular business partners or the business organization overall.	R

Section Name	Section Description	Required Optional
Message Exchange Patterns	This section should include the message exchange patterns leveraged by the service actions. The GRA recognizes the following message exchange patterns: The **FIRE-AND-FORGET** pattern calls for the sender of a message (which could be the service consumer or service) to send the message and not expect a reply message back from the recipient. This pattern is useful for one-way transmission of information, such as notification that an event has occurred. The **REQUEST-REPLY** pattern calls for the sender of a message to send the message and expect a reply from the recipient. These two patterns are considered "primitive" patterns, in that they are the fundamental building blocks of more complex information exchange scenarios. For instance, the complex **PUBLISH-SUBSCRIBE** pattern involves an initial request-reply exchange in which the subscriber subscribes to a service, followed by the service using the fire-and-forget pattern to notify subscribers of an event. Within the service interface description, the behavioral model should describe message exchanges in terms of these two primitive exchange patterns. Each action can specify a different message exchange pattern.	R
Message Definition Mechanisms	This section includes information about the message definition mechanism utilized by the service actions. Per the GRA, message definition mechanisms are closely related to the interface description requirements, described above. Unlike interface description requirements, message definition mechanisms establish a standard way of defining the structure and contents of a message.	R
Policies and Contracts	This section includes information about any policies and contracts applicable to the specific implementation of the service.	R
Automated Service Policies	This section will include or reference any automated policies applicable to the implementation of the service.	O
Automated Service Contracts	This section will include or reference any automated services contracts applicable to implementation of the service.	O

Section Name	Section Description	Required Optional
Nonautomated Service Policies and Contracts	For those Service Interfaces that require out-of-band or nonautomated policies and contracts, this section will document those requirements. This section should include all out-of-band requirements not otherwise mentioned in the Service Description that are specific to and required for successful implementation of the service. This may include references to policy, contracts, and enforcement mechanisms and a description of: • Policy enforcement mechanisms. Rules and procedures for implementing security, privacy, service usage, and other policies. • Pricing/costs. Describes the costs model for the service. Cost model could be free, transaction-based, subscription-based, or other models. • Provisioning model and execution context. Describes the rules and procedures for providing the service and its operations. • Performance and quality of service metrics such as service availability, response times, and fault condition response processes. • Monitoring (auditing). Describes obligations for the collection of metrics for QOS assessment. • Operational constraints. Describes maintenance windows, testing/staging information for new releases, notification processes and emergency procedures, etc., and their monitoring obligations.	O
Umbrella Agreements	Some services will be governed by high-level umbrella MOUs that describe the high-level terms and conditions agreed to by both parties. The service interface description should reference any governing MOUs.	O
Security	This section should contain any information related to the specific security implementation of the service.	O
Privacy	This section should contain any information related to the specific privacy implementation of the service.	O

0

Section Name	Section Description	Required Optional
Service Testing	Service Providers may deploy testing facilities and specific testing environments for their services. Use of these testing facilities and environments may be required or optional. As consumers implement service interfaces, there will be a need to test those implementations. Service providers should document in this section testing options, testing prerequisites, test endpoints, environmental requirements, test schedules, and control procedures and sample data (inputs and expected outputs) for each supported action.	O
Appendix A—References	This section is used to list applicable references.	O
Appendix B—Glossary	This section is used to list glossary terms used in the document.	O
Appendix C—Document History	This section is used to document the history of the service description document.	R

The artifacts folder of the Service Specification Package contains a document named template_SIDD_v_1.0.0.doc, which SHOULD be used as a template for creating a Service Interface Description Document.

10. Implementation Notes (Non-Normative)

10.1. Creating a Service Specification Package

A predecessor for creating a Service Specification Package is following the Global Reference Architecture Service Identification and Design Document [GRA SIDG]. Following this methodology allows for identifying the capabilities provided by the service and the interaction requirements which the service has to fulfill. The methodology also provides means for prioritizing services and assessing the granularity of services which would provide the most opportunity for reuse.

Creating a Service Specification Package requires involvement of a representative group of potential service consumers and service providers.

The first step in creating a Service Specification Package is identifying the service scope, business use case, interoperability requirements, information model, and behavior model which are documented in the Service Description Document. This step requires the involvement of the business stakeholders from the potential service consumer and provider organizations.

The next step in creating a Service Specification Package requires documenting the service interfaces and creating the Service Interface Description Documents. This step requires the involvement of the technical stakeholders from the potential service consumer and provider organizations.

The development of the technical artifacts of the Service Specification Package is the next step of the development process. It comprises creating all of the necessary schemas and samples which developers would use to create the means for providing and creating the service.

Creating the resulting Service Specification Package is the final step of the development process. This step consists of creating the service metadata and catalog artifacts and packaging the service following the requirements of this guideline.

Many of the artifacts contained in the Service Specification Package, including the package itself, require versioning. There is a variety of strategies which can be leveraged to version those artifacts. For example, a synchronized versioning can be used for all artifacts in the package, which will lead to all artifacts having the same version as the package. Another option is for individual versioning to be applied to all artifacts or to group of artifacts. Both approaches have their respective pros and cons. The most important distinguishing characteristic of the synchronized approach is its simplicity and somewhat restricted

flexibility. This guideline does not prescribe a specific versioning approach, and it is recommended that an organization leverage its established versioning strategy when creating service specifications. If an organization does not have an established versioning strategy, it is suggested that the synchronized approach for versioning the Service Specification Package elements be leveraged for simplicity.

When multiple services are orchestrated or choreographed together to perform a larger task, it is recommended that a service specification package be created for each of the services. The relationship between orchestrated or choreographed services is documented in the Service Dependencies section of the Service Description Document, which lists all the services that a service invokes directly to deliver its real-world effects.

When selecting tools to be used for the creation of the artifacts included in the Service Specification Package, such as modeling tools or integrated development environment tools, it is recommended that these tools be nonproprietary and/or enable export of the artifacts in an open industry standard format. Following this recommendation will facilitate easy transition between tools and will result in a very high degree of interoperability among information sharing partners.

11. Using a Service Specification Package

A Service Specification Package is intended to provide sufficient detail to allow service providers to develop interoperable service implementations and service consumers to review, select, and use the resulting services by referring to the same specification.

The first step in using a Service Specification Package is reviewing the metadata information to assess that the service described in the package meets the scope and requirements of the potential service consumer or service provider.

The next step is reviewing the Service Specification Package artifacts for more detailed information about the service. The catalogue file contained in the root folder of the package can be used to assist in navigation of the different Service Specification Package artifacts.

The suggested order of reviewing these artifacts is the Service Description Document, Service Interface Description Documents, schemas, and samples.

Appendix A—References

Global Reference Architecture	http://www.it.ojp.gov/gra
[NIEM]	National Information Exchange Model (NIEM) Version 2.1 http://www.niem.gov
[NIEM Conformance]	NIEM Conformance, Version 1.0 (http://reference.niem.gov/niem/specification/conformance/1.0/conformance-1.0.pdf)
[NIEM NDR]	NIEM Naming and Design Rules (NDR), Version 1.3 (http://reference.niem.gov/niem/specification/naming-and-designrules/1.3/niem-ndr-1.3.pdf) NIEM Type Augmentation Supplement to NDR 1.3, Version 1.0 (http://reference.niem.gov/niem/specification/naming-and-designrules/1.3/type-augmentation/niem-type-augmentation.pdf)
[NIEM MPD]	NIEM Model Package Description Specification, Version 1.0 (http://reference.niem.gov/niem/specification/model-packagedescription/1.0/model-package-description-1.0.pdf)
[WSDL]	Web Services Description Language, Version 1.1 (http://www.w3.org/TR/wsdl#_Toc492291092)
[RFC 3986]	RFC 3986 Uniform Resource Identifier (URI): Generic Syntax (http://www.ietf.org/rfc/rfc3986.txt)
[RFC 2119]	RFC 2119 Key words for use in RFCs to Indicate Requirement Levels, (http://www.ietf.org/rfc/rfc2119.txt, IETF RFC 2119, March 1997)

Appendix B—Glossary

GRA	Global Reference Architecture
SOA	Service-Oriented Architecture
API	Application Programming Interface
NIEM	National Information Exchange Model
IEPD	Information Exchange Package Documentation
SSP	Service Specification Package
SDD	Service Description Document
SIDD	Service Interface Description Document
GRA SIDG	GRA Service Identification and Design Guidelines
GRA SSG	GRA Service Specification Guideline
GRA SSP	GRA Service Specification Package
GRA SIP	GRA Service Interaction Profile

Appendix C—Document History

Date	Version	Editor	Change
12/11/2011	1.0.0	James Dyche Iveta Topalova	Final 1.0.0 Revision
12/20/2011	1.0.0	David Gillespie	Initial Edit of 1.0.0 Revision
4/2012	1.0.0	Global Standards Council (GSC)	Global Advisory Committee approved

About Global

www.it.ojp.gov/global

The Global Justice Information Sharing Initiative (Global) serves as a Federal Advisory Committee to the U.S. Attorney General on critical justice information sharing initiatives. Global promotes standards-based electronic information exchange to provide justice and public safety communities with timely, accurate, complete, and accessible information in a secure and trusted environment. Global is administered by the U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Assistance.

For more information on Global and its products, including those referenced in this document, call (850) 385-0600 or visit http://www.it.ojp.gov/GIST.

About GSC

www.it.ojp.gov/gsc

In accordance with the founding principle of Global, the Global Standards Council (GSC) directly supports the broadscale exchange of pertinent justice and public safety information by promoting standards-based electronic information exchanges for the justice community as a whole. Specifically, the GSC develops, maintains, and sustains the standards—including this particular standard—associated with these aforementioned information exchanges. To further foster community participation and reuse, the GSC also receives, evaluates, and recommends to Global for adoption proposed standards submitted by Global consumers and stakeholders. In turn, the GSC employs an enterprise architecture approach for developing and maintaining the cohesive body of Global standards as one Global Standards Package (GSP), which can be accessed at http://www.it.ojp.gov/gsp.

http://www.it.ojp.gov/gsp

This project was supported by Grant No. 2009-DB-BX-K105 awarded by the Bureau of Justice Assistance, Office of Justice Programs, in collaboration with the U.S. Department of Justice's Global Justice Information Sharing Initiative. The opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Justice.