NIST Internal Report
NIST IR 8278Ar1 ipd

National Online Informative References (OLIR) Program:

Submission Guidance for OLIR Developers

Initial Public Draft

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NIST NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
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U.S. Department of Commerce
Gina M. Raimondo, Secretary

National Institute of Standards and Technology
Laurie E. Locascio, NIST Director and Under Secretary of Commerce for Standards and Technology

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Public Comment Period
December 8, 2022 – January 20, 2023

Submit Comments
olir@nist.gov

National Institute of Standards and Technology
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All comments are subject to release under the Freedom of Information Act (FOIA).

Abstract

The National Online Informative References (OLIR) Program is a NIST effort to facilitate subject matter experts in defining standardized Online Informative References (OLIRs), which are relationships between elements of documents from cybersecurity, privacy, and other information and communications technology domains. This document assists OLIR Developers in understanding the processes and requirements for participating in the Program. The primary focus of the document is to instruct Developers on how to complete an OLIR Template when submitting an OLIR to NIST for inclusion in the OLIR Catalog.

Keywords

crosswalk; Informative References; mapping; National OLIR Program; Online Informative References (OLIR).

Reports on Computer Systems Technology

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Audience

The primary audience for this publication are individuals interested in developing OLIRs for the National OLIR Program.

Acknowledgments

The authors would like to thank all of those who commented on and contributed to this document, particularly Murugiah Souppaya from NIST.

Trademark Information

Note to Reviewers

This specification is not meant to be read in sequential order. It is a reference for developers of OLIRs to provide clarity and direction when creating an OLIR. Developers are encouraged to review other OLIRs listed in the OLIR Catalog to better understand what is required to develop

and submit an OLIR to NIST. Developers are also encouraged to contact NIST at olir@nist.gov with any questions about the development and submission process.

This specification includes changes from the original version, NIST IR 8278A. These changes will not be required until this revision of IR 8278A is finalized. In the meantime, developers may continue submitting OLIRs based on the original version. Additionally, the National OLIR Program will not require developers to resubmit existing OLIRs because of specification changes.

Call for Patent Claims

This public review includes a call for information on essential patent claims (claims whose use would be required for compliance with the guidance or requirements in this Information Technology Laboratory (ITL) draft publication). Such guidance and/or requirements may be directly stated in this ITL Publication or by reference to another publication. This call also includes disclosure, where known, of the existence of pending U.S. or foreign patent applications relating to this ITL draft publication and of any relevant unexpired U.S. or foreign patents.

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The assurance shall also indicate that it is intended to be binding on successors-in-interest regardless of whether such provisions are included in the relevant transfer documents.

Such statements should be addressed to: olir@nist.gov

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1. Introduction

The National Online Informative References (OLIR) Program evolved from the need to identify related concepts between NIST documents and other documents within the information and communication technology (ICT) domain. For example, the *Framework for Improving Critical Infrastructure Cybersecurity* (the "Cybersecurity Framework") lists several related cybersecurity documents as Informative References [1]. Informative References show relationships between the Functions, Categories, and Subcategories of the Cybersecurity Framework and specific sections of standards, guidelines, and best practices. Informative References can be more detailed or more general than the Functions, Categories, and Subcategories and can illustrate ways to achieve those outcomes.

Historically, NIST has published only a small subset of Informative References in its ICT frameworks (e.g., Cybersecurity Framework, Privacy Framework) to maintain their readability. The National OLIR Program scales to accommodate a greater number of relationships and provide a more agile support model to account for the varying update cycles of documents with relationships. The OLIR specification also provides a more robust method for clearly defining relationships.

The following are definitions of key terms from NIST Interagency or Internal Report (IR) 8278, Revision 1 [2] that are also used in this document:

- A ***Focal Document*** is a NIST document that is used as the basis for comparing its elements with elements from another document. A ***Reference Document*** is a document being compared to a Focal Document.
- A ***Focal Document Element*** is a discrete section, sentence, phrase, or other identifiable piece of content from a Focal Document. Similarly, a ***Reference Document Element*** is a discrete section, sentence, phrase, or other identifiable piece of content from a Reference Document.
- A ***crosswalk*** indicates that a possible relationship exists between a Focal Document Element and a Reference Document Element without any additional characterization of that relationship.
- A ***mapping*** indicates the relationships between a Focal Document Element and a Reference Document Element by both qualifying the rationale for indicating the connection between elements (semantic, syntactic, or functional) and classifying the relationship utilizing set theory principles (subset of, intersects with, equal, superset of, not related to). A mapping also indicates whether the Reference Document Element completely fulfills the Focal Document Element.
- An ***OLIR*** shows the relationships between the Reference Document Elements and Focal Document Elements as a crosswalk (a ***crosswalk OLIR***) or a mapping (a ***mapping OLIR***) that complies with the standard defined in this publication and the related templates.
- An ***OLIR Developer (Developer)*** is an individual, group, or organization that creates an OLIR and submits it to the National OLIR Program. An OLIR Developer is often the owner of the Reference Document but may also be a subject matter expert on the Reference Document who is not the owner.

OLIRs provide a consistent and authoritative way of specifying relationships that can be used by both humans and automation. Each OLIR is displayed in a centralized location: the OLIR Catalog. The OLIR Catalog is publicly accessible, so anyone can use it to access, view, and download OLIRs for various pairs of documents. OLIR Developers can use the OLIR Program as a mechanism for communicating with the owners and users of other documents. Given the National OLIR Program's nature, OLIR Developers also have the flexibility to update their documents and then update their OLIRs according to their own unique requirements and schedules.

1.1. Purpose and Scope

The purpose of this document is to assist OLIR Developers in understanding the processes and requirements for participating in the National OLIR Program.

Before reading this document, OLIR Developers should first read NIST IR 8278, Revision 1, *National Online Informative References (OLIR) Program: Overview, Benefits, and Use* [2]. NIST IR 8278, Rev. 1 describes the OLIR Program and explains the features, benefits, and use of the OLIR Catalog.

1.2. Document Structure

The remainder of this document is organized into the following sections:

- Section 2 describes the general processes for developing OLIRs, submitting them to NIST for inclusion in the OLIR Catalog, updating them, and archiving them.
- Section 3 provides guidance for completing an OLIR Template when submitting an OLIR.
- The References section lists the references cited in this publication.
- Appendix A defines the Participation Agreement for the OLIR Program for Developers.
- Appendix B contains a list of the acronyms used throughout this document.
- Appendix C provides a glossary of terminology used throughout this document.
- Appendix D offers a brief change log for this revision of the document.

2. OLIR Life Cycle

This section describes the general process for developing OLIRs and submitting them to NIST for inclusion in the National OLIR Program's Catalog. It includes an overview of the process that NIST will follow to screen the OLIR submissions and publish them in the OLIR Catalog. This section also describes the process that NIST and Developers will follow to update and archive OLIRs. Potential OLIR Developers – who may be individuals, teams, or organizations – should review the Participation Agreement in Appendix A. The agreement contains the administrative requirements for participating in the National OLIR Program.

The OLIR life cycle comprises the following steps:

Pre-Submission:

1. **Initial OLIR Development:** The Developer becomes familiar with the procedures and requirements of the National OLIR Program, downloads the General Information template and the desired Focal Document Template from the Program's website, performs the initial development of the OLIR, and checks the OLIR's syntax using the OLIR Validation (OLIRVal) Tool.
2. **OLIR Submission to NIST:** The Developer submits a package consisting of the OLIR, general information, and documentation to NIST for screening and public review.

Post-Submission:

3. **NIST Screening:** NIST screens the submission package's information, confirms that the OLIR conforms to this specification, and addresses any issues with the Developer prior to public review.
4. **OLIR Posting:** The Developer posts the screened and updated OLIR on a publicly available website chosen by the Developer.
5. **Public Review and Feedback:** NIST holds a 30-day public review of the draft candidate OLIR. The Developer then addresses comments as necessary, and additional candidates are released for public comment if desired or needed.
6. **Final Listing in the OLIR Catalog:** NIST updates the OLIR listing status in the OLIR Catalog to "final" and announces the OLIR's availability.
7. **OLIR Maintenance and Archival:** Anyone can provide feedback on the OLIR throughout its life cycle. The Developer periodically updates the OLIR, as necessary. The OLIR is archived when it is no longer maintained or needed (e.g., if the Reference Document is withdrawn or deprecated).

Each step should be carried out to ensure that the OLIR is accurate, well-formed, and documented throughout its development and subsequent publication, update, or archival. The following sections describe considerations for each step.

2.1. Pre-Submission Steps for OLIR Developers

The first two steps in the OLIR life cycle involve the developer creating and submitting an OLIR. The quality of OLIR documentation can significantly impact an OLIR's effectiveness. Sections 2.1.1 and 2.1.2 describe each of the steps in greater detail.

2.1.1. Step 1: Initial OLIR Development

During initial OLIR development, a Developer becomes familiar with the requirements of the National OLIR Program and all procedures involved during the OLIR life cycle. At this point, a Developer would presumably agree to the requirements for participation in the National OLIR Program before continuing to develop the OLIR. Appendix A of this publication provides the latest version of the Participation Agreement that the Developer must sign.

The Developer next decides which Focal Document will be the target for their OLIR. To promote consistency and facilitate the review of OLIRs by NIST and the public, NIST has created a spreadsheet (.xlsx) template – an *OLIR Template* – for each Focal Document and may also release OLIR Templates for Focal Documents in other formats, like CSV (.csv) and JSON (.json). The developer chooses an OLIR Template, downloads it, and decides whether they are creating a crosswalk OLIR or mapping OLIR. The developer also downloads the General Information Template.[1]

The Developer fills out the downloaded OLIR Template and General Information Template, following the instructions and guidance in Section 3 of this publication.[2] The Developer must use the NIST-provided OLIRVal tool[3] to ensure that the completed OLIR Template conforms to the specifications in this publication.

2.1.2. Step 2: OLIR Submission to NIST

At this point, the Developer has completed the OLIR. The Developer now emails a submission package to the National OLIR Program at olir@nist.gov. The email must include the following:

- A copy of the completed OLIR using the OLIR Template;
- The completed General Information Template;
- Supporting documentation, such as a copy of the Reference Document for internal NIST use; and
- A signed Participation Agreement (see Appendix A).

2.2. Post-Submission Steps for NIST and OLIR Developers

The processes for screening, publishing, and maintaining an OLIR – which correspond to steps 3 through 7 in the OLIR life cycle – are described in the following sections.

2.2.1. Step 3: NIST Screening of the Submission Package

NIST reviews the submission and determines whether the OLIR and other submitted materials are ready for public review. NIST screens the submission package for completeness and

[1] In the original OLIR version, the General Information fields were on a separate tab within the OLIR Template spreadsheets. They have been moved into a separate template primarily so that changes to the General Information fields do not require resubmitting the OLIR crosswalk or mapping.
[2] The OLIR Templates are available at https://csrc.nist.gov/Projects/olir/focal-document-templates.
[3] The OLIRVal tool is a .jar file that can be downloaded from https://csrc.nist.gov/Projects/olir/validation-tool.

accuracy and ensures that the content is well-formed. NIST may contact the Developer with questions about the submitted materials during the screening period.

2.2.2. Step 4: OLIR Posting

After the submission package has been screened and the Developer has addressed any issues, the Developer posts the OLIR to a public website of their choosing. This posting enables NIST to link to the OLIR during both the comment period and the listing phase.

2.2.3. Step 5: Public Review and Feedback for the Candidate OLIR

Once the Developer posts the screened and updated OLIR, the Developer will provide the link to NIST. NIST will then post an entry for the OLIR in the OLIR Catalog[4] as a candidate for a 30-day public review period. NIST will invite the public to review and comment on the candidate OLIR and provide feedback to the Developer.

Each candidate being posted for a public review period is assigned one of the following statuses:

- **Work-in-progress draft:** It is currently in an early stage of development and is incomplete. It has not been extensively edited or vetted. Work-in-progress drafts are solely informational in nature and are not intended to be implemented.
- **Preliminary draft:** It is considered stable, but changes are expected to occur. There are gaps in the content, and the document is still incomplete. Early adopters may consider experimenting with the content with the understanding that they will identify gaps and challenges.
- **Draft:** It is a complete draft that is proposed as a candidate for Final status. Changes may occur based on public comments, but such changes are expected to be relatively minor. Early adopters may attempt to use the content.

An OLIR reviewer can email olir@nist.gov to provide comments on the reviewer's implementation environment, procedures, and other relevant information. Depending on the review, the Developer may need to respond to comments. NIST may also consult independent expert reviewers, as appropriate. For example, NIST may decide that it does not have the expertise to determine whether the comments have been addressed satisfactorily. Additionally, NIST may disagree with the proposed issue resolutions and seek additional perspectives from third-party reviewers.

At the end of the public review period, NIST will give the Developer 30 days to respond to comments and address any outstanding issues.

- If the candidate was a work-in-progress draft or preliminary draft, an updated version will need to be submitted to NIST for another public comment period, typically as a preliminary draft or regular draft.

[4] The OLIR Catalog is located at https://csrc.nist.gov/projects/olir/informative-reference-catalog.

- If the candidate was a regular draft, NIST will work with the developer to determine whether the candidate is ready to be finalized or if it needs to be updated and released for another public comment period.

2.2.4. Step 6: Final Listing in the OLIR Catalog

Once the OLIR is ready to be finalized, NIST will change the OLIR's status to "final" in the OLIR Catalog and announce its availability. The listing will provide data about the OLIR, downloadable formats, and links to OLIR materials.

2.2.5. Step 7: OLIR Maintenance and Archival

Throughout an OLIR's life cycle, any reviewer can submit comments or questions to olir@nist.gov. NIST will forward feedback to the Developer. Users who subscribe to the mailing list can receive announcements about updates or other issues related to an OLIR. The selected OLIR's description in the OLIR Catalog will contain instructions for subscribing to the mailing address list.

NIST will periodically review the OLIR Catalog to determine whether individual OLIRs are still relevant or if changes need to be made. If the Developer decides to update the OLIR at any time, NIST will announce that the OLIR is in the process of being updated via a notification in the OLIR Catalog. If the revised OLIR contains major changes (see Section 3.1.2 for version definitions), it will be considered a new submission and will be required to undergo the same review process as a new submission. If the OLIR contains minor changes, it will undergo a 30-day public comment period. If the OLIR contains administrative changes, no comment period is required, and the updated OLIR will be listed in the OLIR Catalog with an appropriate version number to annotate the update.

At the discretion of NIST or the Developer, the OLIR can either be archived or removed from the OLIR Catalog altogether. Typical reasons for such actions might be that the Reference Document is no longer supported or is obsolete, or the Developer no longer wishes to provide support for the OLIR. Unless otherwise requested by the Developer, withdrawn OLIRs will be deleted from the OLIR Catalog, and an entry will remain to indicate that an OLIR was previously available.

If a Developer first submitted a crosswalk OLIR and later submits a mapping OLIR for the same Focal Document/Reference Document pair, the developer should decide whether they want to support both OLIRs in the Catalog or if they want the crosswalk OLIR to be archived and only the mapping OLIR to be in the Catalog.

3. Template Instructions and Guidance

This section provides instructions and guidance to Developers for completing a General Information Template and an OLIR Template. The Developer must complete both templates as explained in Sections 3.1 and 3.2, respectively. Section 3.3 provides additional examples of how to document relationships.

3.1. Documenting the General Information

Developers must complete their OLIR description via the General Information Template fields. This metadata will be used by NIST to update the OLIR Catalog entry for the OLIR. Table 1 shows the fields that Developers should complete, along with an example for each field. Sections 3.1.1 through 3.1.15 contain additional information on each field, including more examples.

Table 1. General Information Template Field Descriptions

Field Name	Description	Example
Informative Reference Name	The name by which the OLIR listing will be known	NIST-SP800-171-to-Framework-v1.1 (1.0.0)
Reference Version	The version of the OLIR itself	1.0.0
Web Address	The URL where the OLIR can be found	https://www.nist.gov/files/xxxxxx
Focal Document Version	The Focal Document version used in creating the OLIR	Cybersecurity Framework v1.1
Summary (optional)	The purpose of the OLIR	The purpose of this OLIR is to provide a relationship between NIST SP 800-171 and the Cybersecurity Framework.
Target Audience (Community) (optional)	The intended audience for the OLIR	The intended audience for this OLIR are those seeking to protect controlled unclassified information using the Cybersecurity Framework.
Comprehensive	Whether the OLIR maps *all* elements in the Reference Document to the Focal Document (“Yes”) or not (“No”)	Yes
Reference Document Author	The organization(s) and/or person(s) that authored the Reference Document	National Institute of Standards and Technology
Reference Document	The full Reference Document name and version that is being compared to the Focal Document	Special Publication 800-171, Revision 1: *Protecting Controlled Unclassified Information in Nonfederal Systems and Organizations*
Reference Document Date	The date that the Reference Document was published and, if applicable, amended	12/00/2016, updated on 06/07/2018
Reference Document URL	The URL where the Reference Document can be viewed, downloaded, or purchased	https://csrc.nist.gov/publications/detail/sp/800-171/rev-1/final
Informative Reference Developer	The creator of the OLIR (e.g., person, team, organization)	National Institute of Standards and Technology
Comments (optional)	Notes to NIST or implementers	None

Field Name	Description	Example
Point of Contact	At least one person's name (optional), email address (required), and phone number (optional) within the OLIR Developer's organization	Jane Doe +1 555-555-5555 example@nist.gov
Citations (optional)	A listing of source material (beyond the Focal Document and Reference Document) that supported development of the OLIR	Mapping of Cybersecurity Framework v.1.0 to SP 800 171 Rev. 1, https://csrc.nist.gov/CSRC/media//Publications/sp/800-171/rev-1/final/documents/csf-v1-0-to-sp800-171rev1-mapping.xlsx

3.1.1. Informative Reference Name

The *Informative Reference Name* field refers to the name of the completed OLIR Template that contains the OLIR. This name will remain static over time. It includes three distinct components in the following order:

1. Reference Document abbreviation
2. Focal Document abbreviation
3. Reference Version (see Section 3.1.2)

Spaces are replaced with hyphens except that a space is used to separate the Focal Document from the Reference Version. Note that the preposition "to" separates the Reference Document from the Focal Document. Lastly, the Reference Version is contained in parentheses.

Examples:

"CSF-v1.1-to-Privacy-Framework-v1.0 (1.0.0)"

"SP800-171-to-CSF-v1.1 (1.0.0)"

"SP800-213A-v1.0-to-SP800-53r5 (1.0.0)"

To improve consistency and readability of these names, OLIR Developers must use existing abbreviations whenever available for both the Reference Document and Focal Document when naming their OLIR Template. NIST is currently developing a standard list of abbreviations for its own Focal Documents and Reference Documents. OLIR Developers who need to create a new abbreviation for a non-NIST document must limit it to a maximum of 35 characters. The following are examples of possible abbreviations:

- "COBIT-2019"
- "HITRUST-CSF-v9.2"
- "IoTSF-Security-Framework-v2.1"

3.1.2. Reference Version

The *Reference Version* indicates a *major*, *minor*, or *administrative* designation of the OLIR material. Generally, the version format follows a typical software release pattern:

- *Major* version – Changes to the OLIR may require current implementations based on the previous version to be modified.
- *Minor* version – Changes include one or more new relationships without the removal or modification of existing relationships.
- *Administrative* version – Changes are typographical or stylistic for usability.

The field format is **[major version].[minor version].[administrative version]**, and the initial submission uses "1.0.0".

Examples: "1.0.0"; "1.1.3"; "2.0.1"

3.1.3. Web Address

The *Web Address* denotes the publicly available online location of the OLIR. It must respond to standard HTTP(S) requests.

3.1.4. Focal Document Version

The *Focal Document Version* is the version of the Focal Document used for the OLIR. NIST recommends that Developers begin with the latest version of the Focal Document.[5]

Examples:

"Cybersecurity Framework v1.1"

"Privacy Framework v1.0"

"SP 800-53 Rev. 5"

3.1.5. Summary

The *Summary* should be a short description of the crosswalk or mapping. This field is optional.

Example: "A mapping of Cybersecurity Framework version 1.1 Core to NIST Special Publication 800-53, Revision 5 controls."

3.1.6. Target Audience (Community)

The *Target Audience* is the intended consuming audience of the OLIR. The audience should be a critical infrastructure sector or community of interest. Multiple audiences are denoted by populating this field with a value of "General." This field is optional.

Examples: "Energy Sector"; "Legal Community"; "Restaurants"

[5] New Focal Document templates will become available as new Focal Documents are added to the OLIR Program and as existing Focal Documents are updated.

3.1.7. Comprehensive

The *Comprehensive* value indicates the completeness of the OLIR with respect to the Focal Document. This field must be marked as follows:

- "Yes" – *All* elements in the Reference Document are mapped to the Focal Document.
- "No" – One or more elements in the Reference Document are *not* mapped to the Focal Document.

3.1.8. Reference Document Author

The *Reference Document Author* refers to the organizations and/or persons who authored the Reference Document. For example, NIST would be listed as the Reference Document Author for NIST SP 800-171, even if a non-NIST Developer were to create an OLIR for it [3]. Multiple authors must be separated by commas.

Pseudonyms and group names not registered as organization names with the Internal Revenue Service or like organizations (e.g., Doing Business As names, working group names, committee names) must be listed in addition to the organizations and/or persons using the preface "prepared by the." Multiple pseudonyms and/or group names must be separated by commas. Authors must be separated from pseudonyms and group names using a semicolon.

Examples:

"National Institute of Standards and Technology; prepared by the Joint Task Force"

"ACME, Inc."

"Jane Doe, John Smith"

"International Organization for Standardization, International Electrotechnical Commission; prepared by the Joint Technical Committee ISO/IEC JTC 1, Information technology, Subcommittee SC 27, IT Security techniques"

3.1.9. Reference Document

The *Reference Document* field provides the full name of the Reference Document. The title of the publication is annotated in italics. The field also includes any unique identifiers associated with the version, revision, and/or edition.

Examples:

"Special Publication 800-53, Revision 5, *Security and Privacy Controls for Information Systems and Organizations*"

"Technical Report 27103:2018, *Information technology – Security techniques – Cybersecurity and ISO and IEC Standards"*

3.1.10. Reference Document Date

The *Reference Document Date* refers to the calendar date of the Reference Document version, revision, and/or edition, including any applicable amendment dates to account for any updates.

The Reference Document publication and amendment dates must appear in MM/DD/YYYY format. When publication and/or amendment dates list only the month and year, the day field must be recorded with "00." Publication and amendment dates must be separated by a comma, and amendment dates must be prepended with "updated on."

Examples:

"04/00/2013, updated on 01/22/2015"

"12/00/2016"

3.1.11. Reference Document URL

The *Reference Document URL* field denotes the publicly available online location of the Reference Document. It must respond to standard HTTP(S) requests.

3.1.12. Informative Reference Developer

The *Informative Reference Developer* is the author of the OLIR and may be a person, group, or organization. Multiple people must be separated by commas. Pseudonyms and group names not registered as organization names with the Internal Revenue Service or like organizations (e.g., Doing Business As names, working group names, committee names) must be listed in addition to the organizations and/or persons using the preface "prepared by the." Multiple pseudonyms and/or group names must be separated by commas. Individuals must be separated from pseudonyms and group names using a semicolon.

Examples:

"National Institute of Standards and Technology"

"John Doe"

3.1.13. Comments

The Developer can optionally use the *Comments* field to provide supplemental information to NIST and other OLIR users. Such information may include general background information, developer's notes, or customizations made to the OLIR Template.

3.1.14. Point of Contact

The *Point of Contact* is a person associated with the Developer. The person named within this field should have subject matter expertise with the OLIR and be able to answer questions related to the OLIR. The person's email address must be provided, and the person's name and phone number are optional but recommended. The format for this field is:

[First Name] [Last Name]\n+[country code] [area code]-[xxx]-[xxxx]\n[email address]

Example:

Jane Doe
+1 555-555-5555

example@nist.gov

3.1.15. Citations

The *Citations* field refers to documents other than the Focal and Reference Documents that are supplementary to the OLIR. These documents may be standards or other supporting material that would prove useful to NIST or third parties. If no citations exist, leave this field blank.

Examples:

"NIST Special Publication 800-53, Revision 5"

"ACME, Inc. Security Policy"

3.2. Documenting the OLIRs

The Developer indicates the relationships between the Reference Document and the Focal Document by filling out the OLIR Template. Table 2 describes the fields. The same OLIR Template is used for crosswalk OLIRs and mapping OLIRs. Mapping OLIRs include all of the crosswalk OLIR fields plus a few additional fields. The Crosswalk OLIR and Mapping OLIR columns in Table 2 indicate which fields are required, optional, or N/A (not to be included) for each OLIR type.

Table 2. OLIR Template Field Descriptions

Field Name	Description	Crosswalk OLIR	Mapping OLIR
Focal Document Element	The identifier of the Focal Document Element being mapped	Required	Required
Focal Document Element Description	A text description of the Focal Document Element	Required	Required
Security Control Baseline	This field is only applicable when utilizing an SP 800-53 Focal Document template. The identifier of the first applicable designation for a security control defined on a baseline for a low-impact, moderate-impact, or high-impact information system.	Required if using the SP 800-53 Focal Document template, otherwise N/A	Required if using the SP 800-53 Focal Document template, otherwise N/A
Rationale	The explanation for why a Reference Document Element and a Focal Document Element are related. This will be one of the following: syntactic, semantic, or functional.	N/A	Required
Relationship	The type of logical comparison that the OLIR Developer asserts for the Reference Document Element compared to the Focal Document Element for the specified rationale. The Developer conducting the assertion should focus on the perceived intent of each of the elements. This will be one of the following: • Subset of – The Focal Document Element is a subset of the Reference Document Element. In other words, the	N/A	Required

Field Name	Description	Crosswalk OLIR	Mapping OLIR
	Reference Document Element contains everything that the Focal Document Element does and more. • Intersects with – The two elements have some overlap, but each includes things that the other does not. • Equal – The two elements are very similar though not necessarily identical. • Superset of – The Focal Document Element is a superset of the Reference Document Element. In other words, the Focal Document Element contains everything that the Reference Document Element does and more. • Not related to – The two elements do not have anything in common.		
Reference Document Element	The identifier of the Reference Document Element being mapped	Required	Required
Reference Document Element Description	A description of the Reference Document Element	Required unless that text is protected by copyright or license restrictions	Required unless that text is protected by copyright or license restrictions
Fulfilled By	A Yes/No value indicating whether a Reference Document Element fulfills the entirety of the Focal Document Element	N/A	Required
Group Identifier	The designation given to a Reference Document Element when it is part of a group of Reference Document Elements that correlates to a Focal Document Element	Optional	Optional
Comments	Notes to NIST or implementers	Optional	Optional
Strength of Relationship	The extent to which a Reference Document Element and a Focal Document Element are similar	N/A	Optional

An OLIR Template includes an entry for every Focal Document Element. These entries are provided as a starting point. To document the relationships in the template, follow these guidelines:

- **If a Focal Document Element has only one relationship with the Reference Document**, fill out the necessary fields in its entry.
- **If a Focal Document Element has multiple relationships with the Reference Document**, add a new entry for each additional relationship, and duplicate the Focal Document Element and Focal Document Element Description fields (and the Security Control Baseline field for the SP 800-53 Focal Document Template) in each of the new entries. Then fill out the other necessary fields in each entry.

- **If a Focal Document Element does not have any relationships with the Reference Document**, leave the entry blank except for the Focal Document Element field.
- **If a Reference Document Element does not have any relationships with the Focal Document** (a gap in the Focal Document), add an entry for the Reference Document Element to the end of the OLIR Template with a relationship of "not related to" and the Fulfilled By field as "N." In this scenario, the Developer must also mark the Comprehensive field within the General Information Template as "No."

Section 3.3 demonstrates how to complete an OLIR Template for both crosswalk and mapping OLIRs.

3.2.1. Focal Document Element

The *Focal Document Element* refers to the identifier of the element of the Focal Document that is the target of the OLIR. The format of this field corresponds to the Focal Document Element identifiers.

Examples:

"ID"; "PR"; "RC.CO"; "DE.AE-1" for the Cybersecurity Framework v1.1 Focal Document template

"ID-P"; GV-P"; "CT.PO-P"; "CM.PO-P1" for the Privacy Framework v1.0 Focal Document template

"AC-1"; "RA-1"; "SC-4 (1)" for the SP 800-53, Rev. 5 Focal Document template

Developers should map to the lowest level of abstraction in the focal document where practical, applicable, and possible. For example, in NIST SP 800-53, Rev. 5, the lowest level of abstraction is the control enhancements, not the control or control family. For the Cybersecurity Framework, the lowest level of abstraction is the Subcategories. An OLIR submission may use a combination of levels of abstraction.

3.2.2. Focal Document Element Description

The *Focal Document Element Description* field contains the text description of the Focal Document Element. This description is a fixed value that is included here for convenience and readability.

Examples:

"Data at rest is protected."

"Impact of events is determined; privacy values, policies, and training are reviewed, and any updates are communicated."

"The organization reviews and updates the audited events [Assignment: organization-defined frequency]."

3.2.3. Security Control Baseline

This field is only applicable for a Developer utilizing an SP 800-53 Focal Document template.

The *Security Control Baseline* field contains the identifier of the first applicable designation for a security control defined on a baseline for a low-impact, moderate-impact, or high-impact information system. The identifiers are fixed values that are included here for convenience, readability, and additional sorting capabilities for the Developer. The possible identifiers are: *Low*, *Moderate*, *High*, *Not Selected*, *Withdrawn*, and *Not Associated*.

3.2.4. Rationale

The explanation for why a given Reference Document Element and Focal Document Element are related is attributed to one of three basic reasons: syntactic, semantic, or functional. The Developer will populate the corresponding *Rationale* field with one of these three. See Section 2.1.1 of NIST IR 8278, Rev. 1 for additional explanations and examples of each of these rationales.

When choosing a rationale, the Developer should generally select the strictest applicable selection according to its provability. A syntactic rationale is the strictest; it implies a word-for-word analysis of the relationship and no interpretation of the language (this is often the case where a document quotes from a source document). A semantic rationale implies some interpretation of the language. A functional rationale implies that the outcomes of the language rather than the words in the relationship have been analyzed. Therefore, the order of most strict to least strict rationale assertions is syntactic, semantic, then functional. The order also implies less reliance on the intention of the author and interpreter in syntactic and the most in functional assertions. See Section 3.2.5 for additional information on the interrelatedness of rationales and relationships.

3.2.5. Relationship

The *Relationship* field refers to the logical comparison between a Reference Document Element and a Focal Document Element. Relationships can be described using one of five cases derived from a branch of mathematics known as set theory: *subset of*, *intersects with*, *equal*, *superset of*, or *not related to*. Figure 1 depicts these conceptual relationships.

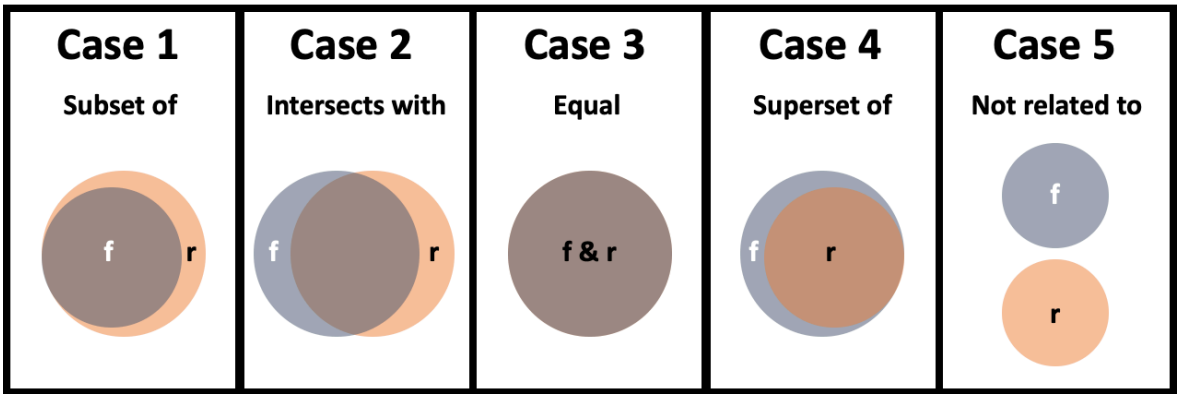

Fig. 1. Informative Reference Relationship Types

(f = Focal Document Element concept(s); r = Reference Document Element concept(s))

A relationship must be determined using one or more of the rationales defined in Section 3.2.4. The result of these comparative approaches is a set of concepts for the Focal Document Element and the Reference Document Element. These two sets of concepts are compared to determine the value of the *Relationship* field.

Relationship assertions have a natural order: equal, subset and superset, intersects with, and not related. *Equal* assertions indicate the most in common and *not related* assertions indicate nothing in common. The pairing of rationale and relationship provides the basis for a strength of relationship score, as discussed in Section 3.2.11. When selecting both rationale and relationship assertions, the Developer should seek to maximize the strength of relationship score.

For examples of each of the five relationship types, see Section 2.1.2 of NIST IR 8278, Rev. 1.

3.2.6. Reference Document Element

The *Reference Document Element* refers to the identifier of the element being mapped from the Reference Document. This field represents the core text or sections of text from the Reference Document. This field must be populated with values that are relative to the structure of the Reference Document and that capture the content being mapped. The Developer should populate this field with identifiers to signify sections of text relative to the Reference Document, or the Developer may choose to create identifiers for the OLIR. In other words,

> [Reference Document Element], where {Reference Document Element 1, Reference Document Element 2, Reference Document Element 3… Reference Document Element *n*} comprise the relevant Reference Document Elements.

Where Reference Document identifiers include a colon (":"), the Developer must create identifiers in the OLIR that do not use a colon.

If creating identifiers, Developers must clearly identify which sections of text are being related to the Focal Document Element, as described in Section 3.2.7.

Examples:

Pertaining to ISO 27001 [4]:

> [A.6.3] – Designates A.6.3 as the Reference Document Element being mapped

Pertaining to NIST SP 800-53 [3]:

> [AC-13] – Designates AC-13 as the Reference Document Element being mapped

The OLIR should focus on the main intuitive topic of the Reference Document and Focal Document Elements being compared. If a Reference Document Element contains more than one main topic, the Developer should decompose it into multiple, discrete Reference Document Elements that belong to a single group. In this instance, the Developer should create additional sequential identifiers – each associated with the same Group Identifier value – to clearly identify which sections of text are being related to the Focal Document Element, as described in Section 3.2.9.

The Developer must use the following format when creating sequential identifiers:

> [Reference Document Element:Sequential Identifier], where {Reference Document Element 1, Reference Document Element 2, Reference Document Element 3… Reference Document Element *n*} comprise the elements of the Reference Document, and {1, 2, 3… n} describes the set of Group Sequential Identifiers.

Examples:

> Pertaining to ISO 27001 [4]:
>
> > [A.6.3:1] – Designates the first portion of A.6.3 being mapped
> >
> > [A.6.3:2] – Designates the second portion of A.6.3 being mapped
>
> Pertaining to NIST SP 800-53 [3]:
>
> > [AC-13:3] – Designates the third portion of AC-13 being mapped

Note that only one colon may be used in the identifier, specifically to separate the Reference Document Element from the sequential identifier.

3.2.7. Reference Document Element Description

The *Reference Document Element Description* field must be populated with the text description of a given Reference Document Element unless that text is protected by copyright or license restrictions.

3.2.8. Fulfilled By

The *Fulfilled By* field refers to the completeness of a Reference Document Element in relation to a Focal Document Element. Focal Document Elements that are subsets of or equal to Reference Document Elements must be marked "Yes." Focal Document Elements which are supersets of, intersect with, or are not related to Reference Document Elements must be marked "No."

When populated in conjunction with a group (see Section 3.2.9), the appropriate Yes/No value is selected relative to the entire group rather than the individual Reference Document Element. In these cases, the *Fulfilled By* value for each Reference Document Element must be the same as the collective Group Identifier value.

3.2.9. Group Identifier

The *Group Identifier* is a value defined by the Developer. This value indicates that individual Reference Document Elements are part of a group, and that group has a relationship with a Focal Document Element. The Group Identifier is the literal "G" followed by the sequential number, which designates the position of the group.

Examples:

> ID.BE-1:G1 – Designates the first Group in the ID.BE-1 Group Identifier of the Cybersecurity Framework element

ID.IM-P1:G2 – Designates the second Group in the decomposed Privacy Framework element ID.IM-P1 Group Identifier

AT-2:G1 – Designates the first (and only) Group in the AT-2 Group Identifier of the SP 800-53 Rev 5 element

Note that only one colon may be used in the identifier, specifically to separate the Reference Document Element from the Group Identifier.

NIST is currently developing the Group and Group Identifier concepts.

3.2.10. Comments

The *Comments* field refers to any explanatory or background text that may help OLIR users understand the Developer's decision-making or implementation considerations. Although this field is optional, NIST strongly encourages Developers to populate this field with the supporting information that informed their assertions.

Examples:

"Assets under consideration for this relationship are business systems."

"Developers used the DHS Critical Infrastructure definition."

3.2.11. Strength of Relationship

The *Strength of Relationship* field refers to the extent to which a Reference Document Element and a Focal Document Element are similar. The Strength of Relationship field builds upon the Relationship field. As Figure 2 depicts, in a relationship such as Subset of, two elements can have a relatively strong relationship (see Case 1) or a relatively weak relationship (see Case 2). See Section 3.2.5 for additional information on how the Relationship and Rationale fields relate to the Strength of Relationship field.

The Strength of Relationship field is optional, but Developers are encouraged to use it because it can help Reference users better understand the Developer's intent. Note that the field is intended for lateral comparisons, such as the Cybersecurity Framework and the Privacy Framework, rather than comparisons of documents at vastly different levels of abstraction, such as the Cybersecurity Framework and a research paper on a topic in quantum cryptography. To designate that two documents are not lateral, a Developer should set the Strength of Relationship field to "N/A."

When specified for lateral documents, the Strength of Relationship field must be an integer from 0 to 10, where 0 is the weakest and 10 is the strongest. There is no prescribed methodology for estimating a strength of relationship score. In general, a Developer using the Strength of Relationship field should use their expert judgment to assign a value based on the following criteria:

- If the two elements have an "equal" relationship, assign a score of 10.

- If the two elements have a "subset of," "superset of," or "intersects with" relationship, and
  - They are much more similar than they are dissimilar, assign a score of 7, 8, or 9.
  - They are roughly as similar as they are dissimilar, assign a score of 4, 5, or 6.
  - They are much more dissimilar than they are similar, assign a score of 1, 2, or 3.
- If the two elements have a "not related to" relationship, assign a score of 0.

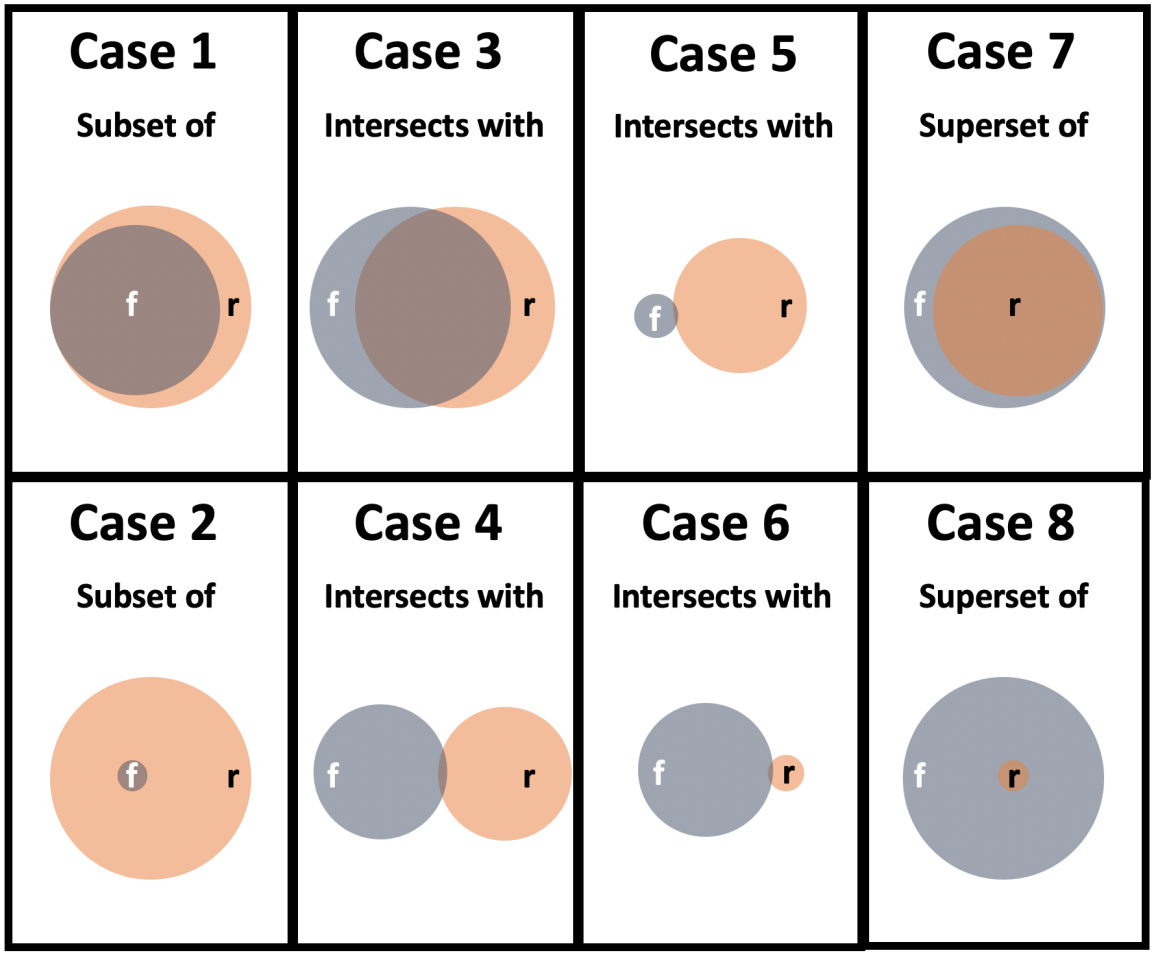

Fig. 2. Relative Strength of Relationships

3.3. Examples of Common Scenarios

The examples in this section represent common scenarios for the Developer. They illustrate well-formed relationship rows that correspond to a fictional Reference Document.

Example 1 *– A crosswalk OLIR shows that a single Reference Document Element has a relationship with a single Focal Document Element*. This example, shown in Table 3, illustrates a relationship between two elements as documented in a crosswalk OLIR. Note that several of the fields are left blank because they are only included in a mapping OLIR.

713 **Table 3.** OLIR Template Example 1

Focal Document Element	Focal Document Element Description	Rationale	Relationship	Reference Document Element	Reference Document Element Description	Fulfilled By (Y/N)	Group ID	Strength of Relationship
ID.IM-P	Data processing by systems, products, or services is understood and informs the management of privacy risk.			10.11.12	text			

714

715 ***Example 2*** *– A mapping OLIR shows that a single Reference Document Element is equivalent to*
716 *a single Focal Document Element*. This example in Table 4 illustrates use of the "equal"
717 relationship. The "Y" in the "Fulfilled By" column indicates that the Reference Document
718 Element entirely fulfills the Focal Document Element. Finally, the "10" under "Strength of
719 Relationship" indicates maximum similarity between the two elements.

720 **Table 4.** OLIR Template Example 2

Focal Document Element	Focal Document Element Description	Rationale	Relationship	Reference Document Element	Reference Document Element Description	Fulfilled By (Y/N)	Group ID	Strength of Relationship
ID.IM-P	Data processing by systems, products, or services is understood and informs the management of privacy risk.	Semantic	equal	10.11.12	text	Y		10

721

722 ***Example 3*** *– A mapping OLIR shows that a single Reference Document Element overlaps with a*
723 *Focal Document Element*. Table 5 depicts this example where the two elements have one or
724 more concepts in common, but each includes concepts that the other does not, hence the
725 "intersects with" relationship. The example also indicates that the relationship is weak (a strength
726 value of 2 on a 10-point scale).

727 **Table 5.** OLIR Template Example 3

Focal Document Element	Focal Document Element Description	Rationale	Relationship	Reference Document Element	Reference Document Element Description	Fulfilled By (Y/N)	Group ID (optional)	Strength of Relationship
IA-2	The information system uniquely identifies and authenticates organizational users (or processes that act on behalf of organizational users).	Functional	Intersects with	13.14.15	text	N		2

728

729 ***Example 4*** – A mapping OLIR shows that *multiple Reference Document Elements collectively*
730 *relate to the same Focal Document Element*. Each relationship with this Focal Document
731 Element is documented in its own row, as Table 6 illustrates. The GroupID is provided by the
732 Developer, and in this example, the GroupID is "RS.CO-4:G1." The total concepts in the group
733 of Reference Document Elements do not completely fulfill the total concepts in RS.CO-4, so the
734 *Fulfilled By* column is marked "N" for all rows.

735 **Table 6.** OLIR Template Example 4

Focal Document Element	Focal Document Element Description	Rationale	Relationship	Reference Document Element	Reference Document Element Description	Fulfilled By (Y/N)	Group ID	Strength of Relationship
RS.CO-4	Coordination with stakeholders occurs consistent with response plans.	Syntactic	superset of	1.2.3	text	N	RS.CO-4:G1	9
RS.CO-4	Coordination with stakeholders occurs consistent with response plans.	Semantic	intersects with	4.5.6	text	N	RS.CO-4:G1	9
RS.CO-4	Coordination with stakeholders occurs consistent with response plans.	Functional	superset of	7.8.9	text	N	RS.CO-4:G1	9

736

References

[1] National Institute of Standards and Technology (2018) Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1 (National Institute of Standards and Technology, Gaithersburg, MD). https://doi.org/10.6028/NIST.CSWP.6

[2] Keller N, Quinn SD, Scarfone KA, Smith MC, Johnson V (2022) National Online Informative References (OLIR) Program: Overview, Benefits, and Use (National Institute of Standards and Technology, Gaithersburg, MD), NIST Interagency or Internal Report (IR) 8278 Revision 1. https://doi.org/10.6028/NIST.IR.8278r1.ipd

[3] Joint Task Force Transformation Initiative (2020) Security and Privacy Controls for Information Systems and Organizations. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-53, Rev. 5, Includes updates as of December 10, 2020. https://doi.org/10.6028/NIST.SP.800-53r5

[4] ISO/IEC JTC 1/SC27 (2013) ISO/IEC 27001:2013(E) – *Information technology – Security techniques – Information security management systems* (International Organization for Standardization/International Electrotechnical Commission, Switzerland), 23 pp. Available at https://www.iso.org/standard/54534.html

Appendix A. Participation Agreement for the NIST OLIR Program

In order to submit a candidate OLIR to NIST, an OLIR Developer must first review, sign, and submit a Participation Agreement, which establishes the terms of agreement for participating in the NIST National Online Informative References (OLIR) Program.

Participation Agreement
The NIST National Online Informative References Program

Version 1.3
July 15, 2022

The phrase "NIST National Online Informative References Program" is intended for use in association with specific documents for which a candidate OLIR has been created and that meet the requirements of the Program for final listing upon submission to the OLIR Catalog. You may participate in the Program if you agree in writing to the following terms and conditions:

1. OLIRs are made reasonably available.
2. You will follow the expectations of the Program as detailed in Sections 2 and 3 of NIST Interagency Report 8278A, Revision 1.
3. You will respond to comments and issues raised by a public review of your OLIR submission within 30 days of the end of the public review period. Any comments from reviewers and your responses may be made publicly available.
4. You agree to maintain the OLIR and respond to requests from NIST for information or assistance regarding the contents or structure of the OLIR within 10 business days.
5. You represent that, to the best of your knowledge, the use of your OLIR submission will not infringe on any intellectual property or proprietary rights of third parties. You will hold NIST harmless in any subsequent litigation involving the OLIR submission.
6. You may terminate your participation in the Program at any time. You will provide 10 business days' notice to NIST of your intention to terminate participation. NIST may terminate its consideration of an OLIR submission or your participation in the Program at any time. NIST will contact you 10 business days prior to its intention to terminate your participation. You may appeal the termination and provide convincing supporting evidence to rebut that termination within five business days.

7. You may not use the name or logo of NIST or the Department of Commerce on any advertisement, product, or service that is directly or indirectly related to this participation agreement.
8. NIST does not directly or indirectly endorse any product or service provided or to be provided by you, your successors, assignees, or licensees. You may not in any way imply that participation in this Program is an endorsement of any such product or service.
9. Your permission for advertising participation in the Program is conditioned on and limited to those OLIRs and the specific OLIR versions for which an OLIR is made currently available by NIST through the Program on its Final Informative References List.
10. Your permission for advertising participation in the Program is conditioned on and limited to those OLIR submitters who provide assistance and help to users of the OLIR with regard to the proper use of the OLIR and that the warranty for the OLIR and the specific OLIR versions is not changed by use of the OLIR.
11. NIST reserves the right to charge a participation fee in the future. No fee is required at present. No fees will be made retroactive.
12. NIST may terminate the Program at its discretion. NIST may terminate your participation in the Program for any violation of the terms and conditions of the program or for statutory, policy, or regulatory reasons. This Participation Agreement does not create legally enforceable rights or obligations on behalf of NIST.

By signing below, the developer agrees to the terms and conditions contained herein.

_____

Organization or company name

_____

Name and title of organization authorized person

_____

Signature

_____

Date

Appendix B. List of Symbols, Abbreviations, and Acronyms

CSV
Comma-Separated Values

FOIA
Freedom of Information Act

HTTP
Hypertext Transfer Protocol

HTTPS
Hypertext Transfer Protocol Secure

ICT
Information and Communication Technology

IR
Interagency or Internal Report

ISO
International Organization for Standardization

IT
Information Technology

ITL
Information Technology Laboratory

JSON
JavaScript Object Notation

NIST
National Institute of Standards and Technology

OLIR
Online Informative References

OLIRVal
Online Informative References Validation (Tool)

SP
Special Publication

URL
Uniform Resource Locator

Appendix C. Glossary

crosswalk OLIR
An OLIR that indicates relationships between pairs of elements without additional characterization of those relationships.

Developer
See *OLIR Developer*.

Focal Document
A source document that is used as the basis for comparing its elements with elements from another document. Examples of Focal Documents include the Cybersecurity Framework version 1.1, the Privacy Framework version 1.0, and SP 800-53, Revision 5.

Focal Document Element
A discrete section, sentence, phrase, or other identifiable piece of content from a Focal Document.

Informative Reference
See *Online Informative Reference*.

Informative Reference Developer
See *OLIR Developer*.

mapping OLIR
An OLIR that characterizes each relationship between pairs of elements, including the rationale for indicating the connection between the elements and the relationship type based on set theory principles.

OLIR Catalog
The National OLIR Program's online site for sharing OLIRs.

OLIR Developer
A person, team, or organization that creates an OLIR and submits it to the National OLIR Program.

OLIR Template
A spreadsheet that contains the fields necessary for creating a well-formed OLIR for submission to the OLIR Program. It serves as the starting point for the Developer.

Online Informative Reference
Relationships between elements of two documents that are recorded in a NIST IR 8278A-compliant format and shared by the OLIR Catalog, There are two types of OLIRs: crosswalk and mapping.

Rationale
The explanation for why a Reference Document Element and a Focal Document Element are related. This will be one of the following: syntactic, semantic, or functional.

Reference
See *Online Informative Reference*.

Reference Document
A document being compared to a Focal Document, such as traditional documents, products, services, education materials, and training.

Reference Document Element
A discrete section, sentence, phrase, or other identifiable piece of content from a Reference Document.

Reference Version
The version of the OLIR.

887 **Relationship**
888 The type of logical comparison that the Reference Document Developer asserts compared to the Focal Document.
889 This will be one of the following: subset of, intersects with, equal to, superset of, or not related to.

890 **Strength of Relationship**
891 The extent to which a Reference Document Element and a Focal Document Element are similar.

892 **User**
893 A person, team, or organization that accesses or otherwise uses an OLIR.

Appendix D. Change Log

In Revision 1 (NIST IR 8278Ar1), the following changes were made to this report:

- Reorganized the content and made editorial changes throughout the report to improve clarity and usability
- Reformatted all content to follow the latest NIST technical report template
- Section 1 – Added an overview of the National OLIR Program, including definitions of key terms (built largely from the material in the original Section 2.1 and 2.2), as well as new definitions for "crosswalk OLIR" and "mapping OLIR"
- Section 2 – Reframed the OLIR life cycle steps based on steps performed before and after OLIR submission; eliminated the original step 2, "Informative Reference Posting," and added a new step 4, "OLIR Posting" so that the OLIR does not need to be posted publicly until NIST's review has been completed
- Section 2.1.1 – Explains that there are now separate templates for OLIRs and General Information
- Section 2.2.3 – Describes the possible statuses for an OLIR draft
- Section 3.1 – Added examples to Table 1 and indicated which fields are optional
- Section 3.1 – Eliminated the "Dependencies/Requirements" field
- Section 3.1.1 – Changed the Informative Reference Name field conventions and examples
- Section 3.1.9 – Simplified the guidance for the Reference Document field
- Section 3.1.12 – Expanded the guidance for the Informative Reference Developer field
- Section 3.2 – Expanded Table 2 to specify which OLIR template fields are required, optional, or not applicable for crosswalk OLIRs and for mapping OLIRs
- Section 3.2.4 – Condensed the Rationale section and pointed readers to NIST IR 8278, Rev. 1 for more information
- Section 3.2.6 – Allowed for more flexibility in mapping prose documents
- Section 3.2.9 – Clarified the Group and Group Identifier concepts
- Section 3.3 – Updated the examples to include both crosswalk and mapping OLIRs
- Appendix A (original) – Eliminated the Relationship Examples appendix because the material was integrated into NIST IR 8278, Rev. 1
- Appendix D (original) – Eliminated the General Information Example appendix because the material was merged into Table 1