

7. METHODOLOGY

To enable an Internet browsing client to search and discover information through a federated metadatabase, four elements must be in place.

1. The client must be able to communicate with the clearinghouse using normal web communications.
2. The clearinghouse must offer an Internet communication protocol and associated utilities that permit search and discovery of federated metadata records.
3. Each federated partner must maintain metadata records using a standard that is supported by the communication protocol.
4. Each federated partner must serve the Internet through a server that is conversant in the communication protocol and hosts metadata records in the proper standard. Figure 7.1 shows these elements.

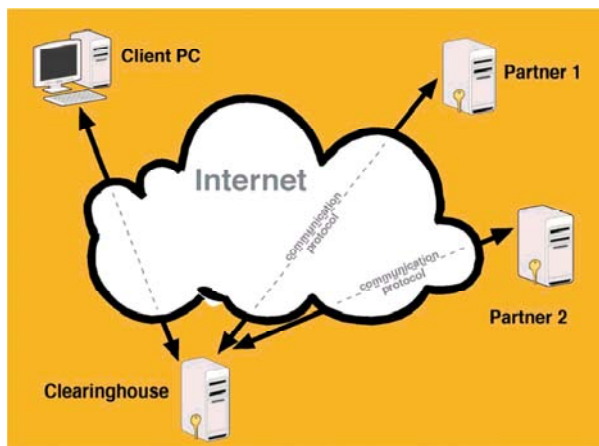


Fig. 7.1 An Internet metadata federation requires a clearinghouse and partners sharing a communication protocol and serving metadata using the same standard.

There are three main steps to creating a Clearinghouse node. Figure 7.2 illustrates the required components and steps to developing a node.

1. Create a FGDC metadata or take existing metadata and make them compliant with the FGDC's CSDGM.

2. Provide a server with the Isite software suite installed to allow the NSDI Clearinghouse server to connect.
3. Register the server node with the NSDI Clearinghouse to allow metadata to be indexed, searched and retrieved by remote users.

The following list describes the processes shown in Fig. 7.2.

- Obtain or create new metadata,
- Download a pre-parser (CNS) and the metadata parser (MP),
- Download Isite,
- Configure Isite,
- Index metadata,
- Test index,
- Server index,
- Test server,
- Register server.

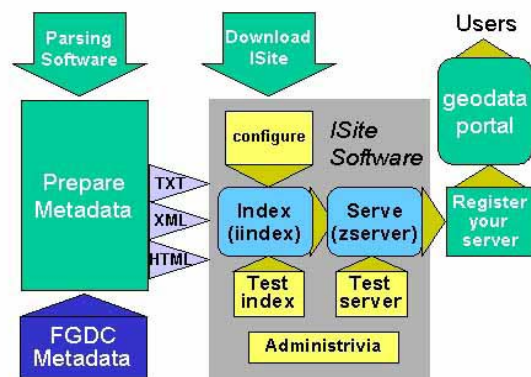


Fig. 7.2 A Clearinghouse node component and development diagram, <http://www.fgdc.gov/dataand services/isite tutorial>.

7.1. FGDC metadata

In order to develop a clearinghouse node, the PICES Metadata Federation partner must first have, or convert to, metadata that comply with the U.S. Federal Geographic Data Committee's workbook CSDGM. The current standard is in version 2 (FGDC-STD-001-1998; Federal Geographic Data Committee, 1998).

The CSDGM consists of seven main sections and three supporting sections. Within in each section there are various component elements. Figure 7.3 depicts a color-coded diagram that provides a graphical representation of the ten sections. Refer

to Appendix 15.4 for diagrams of all sections. Each section diagram provides color-coded element boxes contained within the section and the conditionality of the elements.

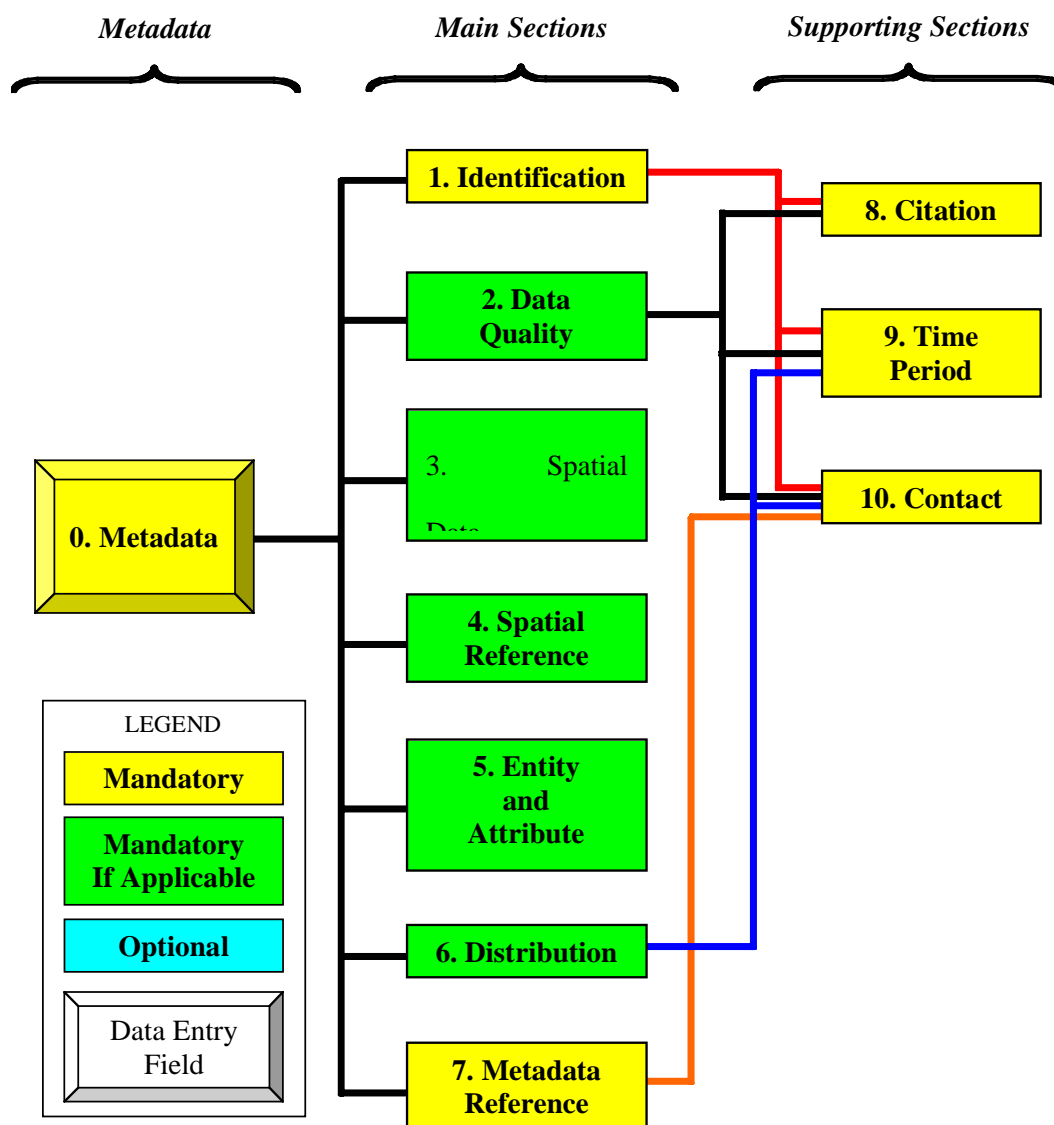


Fig. 7.3 FDGC Metadata Sections of the Standards.

For a basic but still complete metadata record, sections one and seven are required. With the two main required sections, supporting sections: 8, 9, and 10 must be included. Each section is made up of compound elements, which are made up of data elements. All sections and elements are either mandatory, mandatory if applicable, or optional. Review the CSDGM workbook for a complete and sample description of all sections and elements.

Sections are the main chapters of the standards. Each section is composed of a section definition; list of elements, definitions, types, and values; and information about what is mandatory and repeatable.

Metadata contain the following sections and elements. Section 0, “Metadata” provides the starting point. It is composed of the main sections of the standard.

7.1.1. Main sections

Sections 1 through 7 are the main sections of the standard. Providing sections 1, 7, 8, 9, and 10 of metadata, basically answers the “who”, “what”, “where”, “when”, “why”, and “how” of a data set. If more information about the data set is to be provided, review the additional “mandatory if applicable” sections.

1. Identification Information (*mandatory*)
2. Data Quality Information (*mandatory if applicable*)
3. Spatial Data Organization Information (*mandatory if applicable*)
4. Spatial Reference Information (*mandatory if applicable*)
5. Entity and Attribute Information (*mandatory if applicable*)
6. Distribution Information (*mandatory if applicable*)
7. Metadata Reference Information

7.1.2. Supporting sections

Sections 8, 9, and 10 support other main sections and are never used alone.

8. Citation Information (*mandatory*)
9. Time Period Information (*mandatory*)
10. Contact Information (*mandatory*)

See Appendix 15.4 or the CSDGM workbook to view all metadata sections and elements.

Figure 7.4 provides a diagram of the CSDGM Section 1 Identification Information (FGDC-STD-001-1998; Federal Geographic Data Committee, 1998). Provide at least the first 10 compound elements.

Figure 7.5 is the Section 7 Metadata Reference (FGDC-STD-001-1998; Federal Geographic Data Committee, 1998). This section also requires a supporting section within. Provide elements 7.1, 7.4, 7.5, and 7.6 to meet the requirements.

Figure 7.6 is a diagram of the metadata Supporting Sections 8, 9, and 10 (FGDC-STD-001-1998; Federal Geographic Data Committee, 1998).

With the understanding of the FGDC metadata standards, metadata can now be created. To create metadata, use one of the many metadata creation tools written for different user communities. A list of tools can be found at <http://www.fgdc.gov/metadata/geospatial-metadata-tools>. The tools may be freely or commercially available. Most metadata creation tools provide a user input form to enter, update and output metadata. Metadata should be in one of the following formats: TXT, HTML, SGML, or XML. The XML form is the recommended format and the only required form by the FGDC Isite use. For more information regarding the FGDC metadata standard structure and content, refer to the FGDC CSDGM Document Type Definition (DTD) available through the Internet at <http://geochange.er.usgs.gov/pub/tools/metadata/tools/doc/metadata.dtd> and an XML Schema Document (XSD) representation available on-line at <http://www.csc.noaa.gov/metadata/xml/fgdc-std-001-1998-ann.zip>.

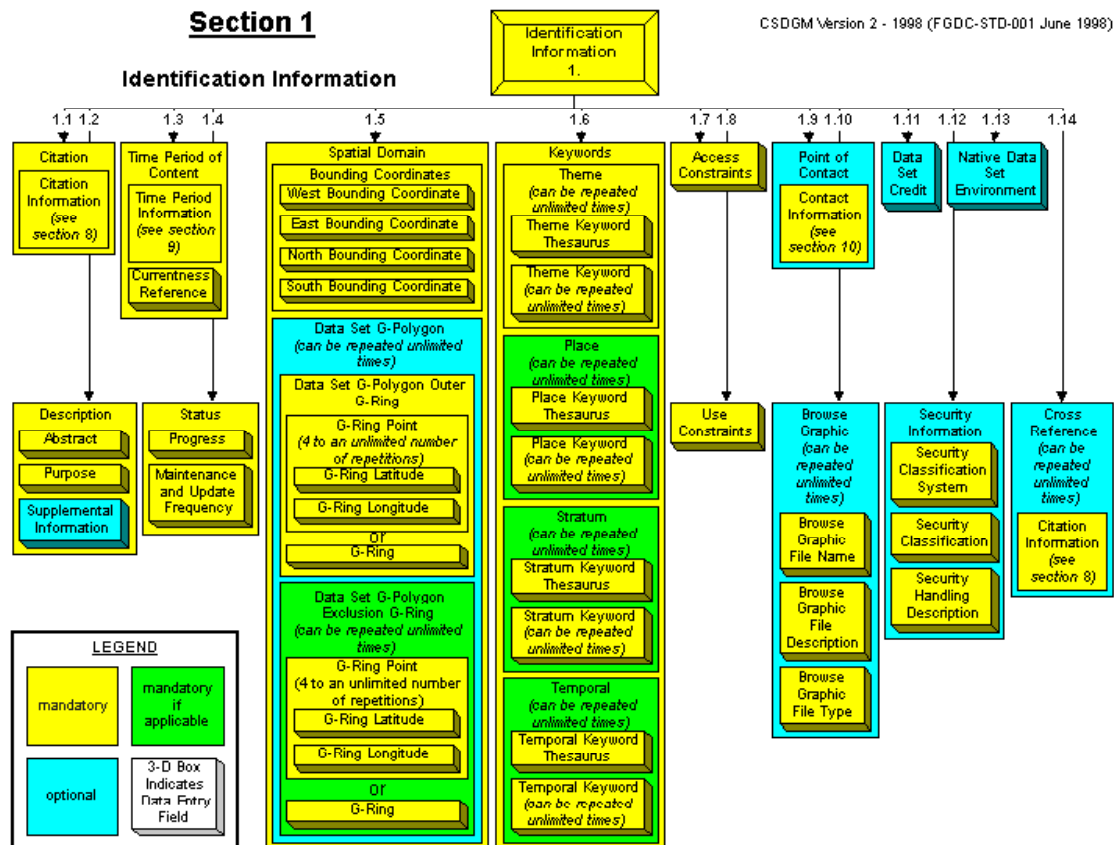


Fig. 7.4 CSDGM Section 1 Identification Information
(http://www.fgdc.gov/metadata/documents/workbook_0501_bmk.pdf).

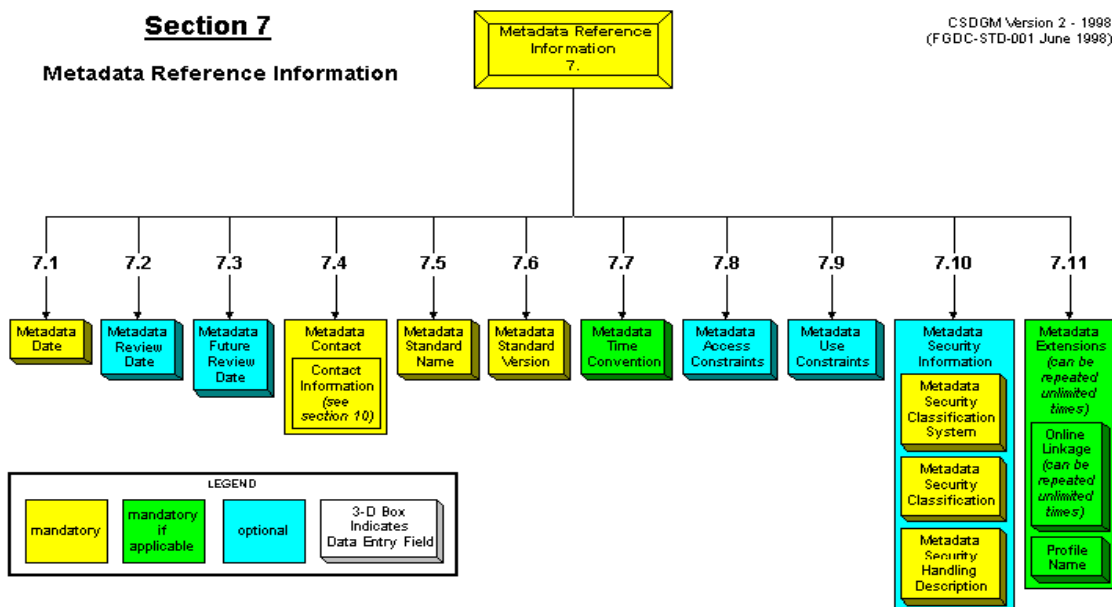


Fig. 7.5 CSDGM metadata Section 7 Metadata Reference Information
(http://www.fgdc.gov/metadata/documents/workbook_0501_bmk.pdf).

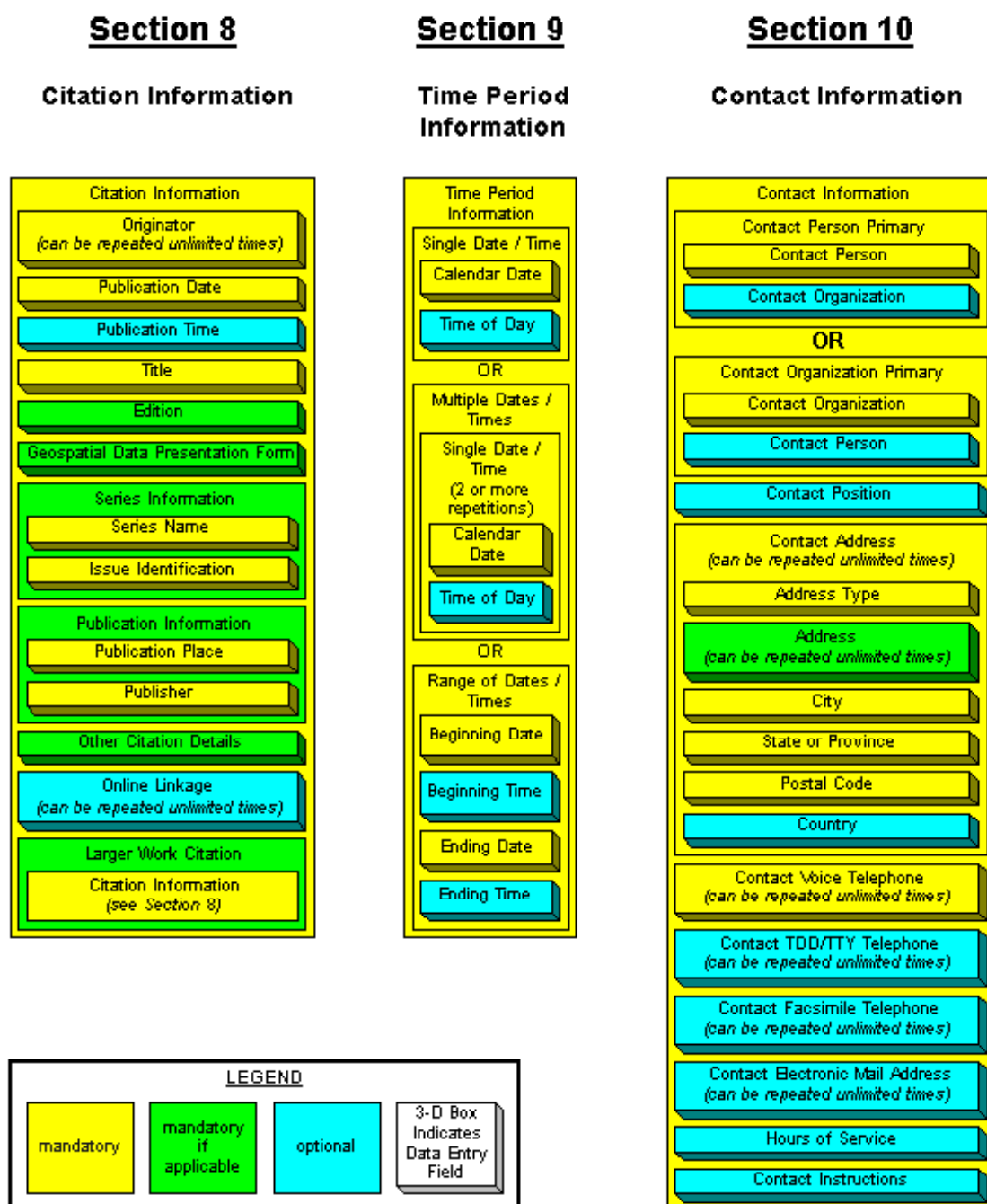


Fig. 7.6 A diagram of CSDGM Sections 8, 9, and 10
http://www.fgdc.gov/metadata/documents/workbook_0501_bmk.pdf.

7.1.3. *Metadata validation*

For Isite to index metadata properly, all metadata files must be validated. Download metadata parser (MP) and pre-parser (CNS) to validate and reformat FGDC metadata. The MP program is a compiler for formal metadata that checks the structure of each metadata record against the FGDC standard. The CNS is a pre-parser for formal metadata. This validation is important because in order for metadata entries to be queried, correct tag names must be assigned to the search engine when the metadata documents are loaded; CNS and MP software can be obtained from <http://geology.usgs.gov/tools/metadata>.

If the existing metadata have been created using a different metadata standard, XSLT (XSL Transformations) style sheets created by different organizations maybe obtained to convert to the FGDC standard.

The MP and CNS software may be installed in a common-use directory. It is recommended that the executable file be renamed to its prefix (*e.g.*, MP) after download.

7.2. **Getting a copy of Isite**

Isite is available for free use from the FGDC website. To acquire and use Isite, download the latest version of the Isite software from the FGDC

FTP webpage at <http://clearinghouse4.fgdc.gov/ftp/>.

7.3. **NSDI Clearinghouse**

This section provides a tutorial on how to set up the Clearinghouse node server. The Isite software suite will be installed, run to tag the metadata files, and tested locally and externally. Once the server and software configuration is complete, the server can be registered with the NSDI Clearinghouse Network.

The NSDI Clearinghouse Network allows a repository of data servers or clearinghouse nodes to be searched for metadata and to retrieve those metadata. Registering on the NSDI Clearinghouse Network is very simple. Just fill out an on-line form on the NSDI Clearinghouse website at <http://registry.gsdi.org/>. During registration, the agency or the project responsible for the Clearinghouse node and its metadata will be allowed to provide a description of the project and its metadata. To conform to the PICES Metadata Federation project and its Clearinghouse node naming convention, name your node as “PICES – [agency name or project name]”. This will allow searching for metadata among the PICES members Clearinghouse nodes easier. See Section 9 of this report to view a search tutorial and examples of metadata.