



U.S. Government Real Property Asset Data Standard, a Geospatial Data Content Standard

Standards Working Group
Federal Geographic Data Committee

Federal Geographic Data Committee

Established by Office of Management and Budget Circular A-16, the Federal Geographic Data Committee (FGDC) promotes the coordinated development, use, sharing, and dissemination of geographic data.

The FGDC is chaired by the Secretary of the Department of the Interior, with the Deputy Director for Management, OMB, serving as Vice-Chair. Chair and Vice-Chair may designate an individual to act in their stead. All agencies responsible for spatial data themes are required to be members of the FGDC.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality, and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of effort. Working groups are established for issues that transcend data categories.

For more information about the committee, or to be added to the committee's newsletter mailing list, please contact:

Federal Geographic Data Committee Secretariat
c/o U.S. Geological Survey
590 National Center
Reston, Virginia 22092

Fax: (703) 648-5755
email: fgdc@usgs.gov
World Wide Web: www.fgdc.gov

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1. Introduction

The Office of Management and Budget (OMB) Circular A-16, “Coordination of Geographic Information and Related Spatial Data Activities,” facilitates stronger coordination between users of and more effective management of spatial data. Data management, particularly geospatial data management, is essential to the sound stewardship of government resources and to the effective and economical use of tax dollars. OMB A-16 provides the foundation for a portfolio management approach to a National Geospatial Data Asset (NGDA) Portfolio comprised of National Geospatial Data Asset Themes (NGDA Themes) and their associated National Geospatial Data Asset Datasets (NGDA Datasets). A NGDA Theme (synonymous with “A-16 Theme”) is an organizational construct under which multiple related NGDA Datasets are logically grouped and managed as a unit. NGDA Theme Leads will work with their respective Thematic Committees and other appropriate communities of interest to identify and evaluate geospatial datasets that are candidates for consideration as NGDA Datasets within the NGDA Theme.

The National Spatial Data Infrastructure (NSDI) is a physical, organizational, and virtual network designed to enable the development and sharing of the nation's digital geographic information resources. The NSDI geospatial data theme principles are:

- Principle 1: Themes are logical groupings of related national capital assets serving the needs of citizens, readily discoverable, and accessible to anyone.
- Principle 2: Themes are national in scope and are created and managed in response to well defined spatial data requirements that are common across multiple Federal agencies and other organizations.
- Principle 3: Themes reflect legislated mandates, clearly defined directives, or core spatial reference datasets.
- Principle 4: Themes promote cohesive and collaborative development, maintenance, and evolution of multiple related datasets across Federal, State, Tribal, and local governments and the private or nonprofit sectors.
- Principle 5: Themes focus on the spatial representation of natural and manmade assets that are important to the Nation, including boundaries (jurisdictional, legal, and analytical).

The Federal Geographic Data Committee (FGDC) will use these principles to establish, modify, and maintain the list of data Themes that compose the entire portfolio. The FGDC is an interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis.

The U.S. General Services Administration (GSA) is the designated Theme Lead for the Real Property Data Theme. This Real Property Asset Data Standard (RPADS) serves as the primary data content standard for geolocating real property assets (RPA). This standard should be applicable for many federal uses, with minimal extensions needed.

1.1 Objective

The objectives of this geospatial data content standard, as defined in the original 2010 proposal and approved by the FGDC, are:

- To establish fundamental definitions for RPAs. These are foundational data essential to federal asset accountability. The data will provide the basis for support of federal real property management, homeland security, emergency response, high-performance green buildings management, and other federal government initiatives.
- To develop a minimum set of attributes describing RPAs, with standardized attribute values where appropriate.
- To provide minimum geospatial standards for the collection of geospatial data on RPAs.
- To minimize the duplication of data collection and maintenance on federal RPA information and to allow aggregation of data from different sources.

1.2 Scope

The above objectives were expanded and give structure to the following four overarching constructs that frame the scope of this standard:

- The scope of this standard is to define the essential data needed to identify RPAs (buildings, land parcels, linear structures, and structures).
- While the objective of this effort is to define the geospatial context of RPAs, this standard is established within the context of the broader FGDC Real Property Theme. By first defining these fundamental elements of the Theme, the ability to adopt third -party consensus standards is increased, and the standard can be more readily adapted for other components (e.g. Public Housing) of the Real Property Geospatial Data Theme.
- This is a geospatial data content standard, but much of the attribute data inclusive to the standard is not geospatial in nature. Thus, where appropriate, harmonization with other data standardization efforts (e.g. NIEM, FRPP) should be maximized.
- The RPADS includes the minimal set of attributes needed to:
 - Locate RPAs on a map
 - Identify what the RPA is

1.3 Applicability

This standard exists to define the core minimum attributes needed to identify a RPA and its geospatial location as represented by a point, line, or polygon.

The standard is intended to meet the basic immediate requirements for federal priorities such as real property management, emergency response and management, and the requirements for federal agencies to develop situational awareness capability, among many other uses.

Agencies will have differing business needs to identify and track facilities, sites, installations, campuses, or other entities comprised of RPAs. To maintain consistency with the Federal Real Property Profile, the term “installation” is employed when a combination of RPAs is referred to. However, this standard provides the necessary flexibility to accommodate a different term for a combination of RPAs when an agency’s business needs dictate that one be used.

Future iterations of this geospatial data content standard may incorporate other RPA attributes of interest to specific governmental programs, as they relate to the Real Property Data Theme.

It is anticipated that this standard will be expanded in the future to include more detailed geospatial data as it relates to RPAs. It is intended to be used in conjunction with additional business-specific attributes maintained in separate database systems.

1.4 Related Standards

A goal for this standard is to leverage, to the greatest extent practicable, existing third party consensus standards; standards that pertain to a broader domain than the U.S. federal government. As such, users should reference the standards listed below.

- Address information: United States Thoroughfare, Landmark, and Postal Address Data Standard. (FGDC-STD-016-2011:2011)
- Federal Real Property Council: Guidance for Real Property Inventory Reporting (Federal Real Property Profile:2014)
- Country and State Code: Geopolitical Entities, Names, and Codes (GENC Standard, Ed 2.0/ NGA.STND.0033_2.0:2014)
- Geographic information – Schema for coverage geometry and functions. (ISO 19123:2005)
- Geographic information – Spatial Schema: (ISO 19107:2003)
- Latitude/Longitude - Standard Representation of Latitude, Longitude, and Altitude for Geographic Point Locations (ISO 6709:2008)
- Representation of Date and Time Data Standard. (ISO 8601:2004)
- National Building Information Model Standards (NBIMS)
- Statistics – Vocabulary and Symbols – Part 2: Applied Statistics. (ISO 3534: 2006)

1.5 Standards Development Procedures

The U.S. Government Real Property Asset Data Standard is a geospatial data content standard built upon several previously published data standards, as shown in section 1.4.

The Standard is the product of an interagency working group with participation from the General Services Administration, the Department of Defense, the Department of Housing and Urban Development, the Department of Homeland Security, and the Environmental Protection Agency.

1.6 Maintenance Authority

GSA is the designated lead for the National Geospatial Data Asset Real Property Data Theme. GSA was assigned responsibility to coordinate, manage, and disseminate Real Property spatial data under the policy guidance and oversight of the FGDC. GSA, in partnership with other government entities, professional societies, and industry stakeholders who have an interest real property spatial data, will oversee the maintenance and updating of the Standard through periodic reviews. Future revision of the Real Property Asset Data Standard shall follow the standards development process described in the FGDC Standards Reference Model (FGDC 1996a).

2. Data Objects, Attributes, and Business Rules

The following tables provide detailed information on the high level, intermediate and elemental RPA data groupings. Definitions, notes, recommended sources, and lists of allowed values are provided.

2.1 Real Property Asset

Table 1 Real Property Asset

Real Property Asset: A building, land parcel, linear structure, or structure			
Attribute	Definition	Data Type	Recommended Source
Real Property Asset Type	Acceptable values are building, land parcel, linear structure, and structure.	Text (20)	FRPP
Real Property Unique Identifier (RPUID)	A unique code for a Federal Real Property Asset that allows interoperability by providing linkages to other information systems	Alphanumeric (24)	FRPP
Real Property Asset Name	The public or commercial name of a Real Property Asset, or the name assigned by an agency when the name is ambiguous. It is not necessarily the name of the occupant organization.	Alphanumeric(100)	
Real Property Asset Address	The physical address of the RPA.	Text (350)	US Thoroughfare, Landmark and Postal Address Data Standard
Installation Name	The name that is used to refer to a combination of RPAs	Alphanumeric (100)	FRPP

Real Property Asset Business Rules:

- Each installation must have one or more associated RPAs
- Installation name is the FRPP term used to identify a combination of RPAs, and in this standard is used as the default designation for such a combination; however, the term may be replaced with another analogous term (facility, site, campus, etc) according to an agency's business needs
- Each RPA may be geospatially located by one or more geographic features
- Each RPA may have multiple unique identifiers, but only one per issuing agency (e.g. Real Property Unique Identifier or other identifier)
- For US Federal real property assets, the FRPP Installation Identifier serves as the primary identifier for identifying the same asset across multiple agencies/systems.
- RPAs may or may not be named

2.2 Geospatial Location

Geospatial Location Business Rules:

Geospatial Location: An expression of where a real world phenomenon exists, relative to the earth.			
Attribute	Definition	Data Type	Recommended Source
Line	A set of ordered coordinates that, when connected, represents the linear shape of a map object too narrow to be displayed as an area. Or, it could be a feature that has no width, such as a linear easement.	Text (100)	
Point	A zero-dimensional geometric primitive, representing a position (ISO 19107). A discrete location defining a geospatial feature whose boundaries or shape is too small to be shown as a line or area feature.	Text (100)	
Coordinate Reference System	A coordinate system that is related to the real world by a datum; a coordinate system is a set of mathematical rules for specifying how coordinates are to be assigned to points.	Text (100)	ISO 19111
Polygon	A line that represents the spatial extents of an entity. A closed figure whose boundary encloses a homogeneous area, such as a building footprint, site, or land parcel.	Text (100)	

- Each RPA must have a geospatial location expressed through a geospatial feature
 - Depending on the desired level of granularity, a RPA may be defined by a point, line, or polygon feature
- A RPA may have multiple geospatial features; however, each geospatial feature must represent one and only one RPA

2.3 Organization

Organization Business Rules:

- Many organizations may have a legal interest in a single RPA
- Identifiers for none federal assets may utilize other standard identifiers, (e.g. DUNS, CAGE, etc.) as long as the referenced source is identified.

3. Geometries by Real Property Asset Type

The table below provides possible and default geometric representations for each Real Property Asset type.

Table 2 Geometries by Real Property Asset Type

Real Property Type	Possible Geometry	Default Geometry
Building	Polygon, Point	Polygon
Land Parcel	Polygon, Point	Polygon
Linear Structure	Line	Line
Structure	Point, Line, Polygon	None

4. References

- Department of Commerce, U.S. Census Bureau, 2011, United States Thoroughfare, Landmark, and Postal Address Data Standard, (FGDC-STD-016-2011)
- Federal Real Property Council(FRPC), Federal Real Property Profile (FRPP), updated yearly, Guidance for Real Property Inventory Reporting
- International Organization for Standardization (ISO), 2004 Data elements and interchange formats – Information interchange – Representation of dates and times, (ISO 8601)
- International Organization for Standardization (ISO), 2005, Geographic information – Schema for coverage geometry and functions, (ISO 19123)
- International Organization for Standardization (ISO), 2003, Geographic information – Spatial schema, (ISO 19107)
- International Organization for Standardization (ISO), 2008 Standard representation of geographic point location by coordinates, (ISO 6709)
- International Organization for Standardization (ISO), 2006, Statistics – Vocabulary and symbols – Part 2: Applied Statistics, (ISO 3534-2)
- National Geospatial Intelligence Agency, 2014, Geopolitical Entities, Names, and Codes, (GENC Ed 2.0) , (NGDA.STD.0033-2.0)
- Office of Management and Budget (OMB), 2010, OMB Circular A-16 Supplemental Guidance
- OMNICLASS Construction Classification System, 2013, Construction Entities by Function, (Table 11)
- OMNICLASS Construction Classification System, 2012, Properties, (Table 49)

5. Appendices

5.1 Glossary and symbols and abbreviations (normative)

Table 3 Glossary

Term	Definition
Address	This standard relies upon the US Thoroughfare, Landmark and Postal Address Data Standard, as adopted by FGDC in Feb 2011. The US Thoroughfare, Landmark and Postal Address Data Standard states that a standardized address is one that is fully spelled out, abbreviated by using the Postal Service standard abbreviations (shown in the publication or as shown in the current Postal Service ZIP+4 file), and uses the proper format for the address style (shown in the publication).
Alphanumeric	A combination of alphabetic (A-Z) and numeric (0-9) characters.
Building	A roofed and floored Real Property Asset enclosed by exterior walls and consisting of one or more levels that is suitable for single or multiple functions and that protect human beings and or their properties.
Geospatial Feature	A geospatial feature is an abstraction of a real world phenomenon that physically places the phenomenon via an implicit or explicit reference to a specific location relative to the Earth. This information must be accompanied by the applicable coordinate reference system, as defined by the International Organization for Standards (ISO). Real property geospatial features are typically expressed as a point, line or polygon.
Installation	A combination of RPAs.
Land Parcel	A specific area of land whose perimeter is delineated by a cadastral survey. (UFC 1-300-08)
Linear Structure	A real property asset whose function requires that it traverse land or water (e.g., runway, road, rail line, pipeline, fence, pavement, electrical distribution line, canal,) or is otherwise measured or reported by a linear unit of measure.
Metadata	Characteristics or quality of data.
Structure	A man-made Real Property Asset, other than a building or linear structure, permanently fixed to the earth's surface.

Term	Definition
Text	A sequence of alphabetic (A-Z) and numeric (0-9) characters, including special characters.

Table 4 Symbols and abbreviations

Acronym	Long Form Name
ANSI	American National Standards Institute
CAGE	Commercial and Government Entity
FGDC	Federal Geographic Data Committee
FRPP	Federal Real Property Profile
GENC	Geopolitical Entities, Names, and Codes
GSA	General Services Administration
ISO	International Organization for Standardization
NGDA	National Geospatial Data Asset
NIEM	National Information Exchange Model
NSDI	National Spatial Data Infrastructure
OGC	Open Geospatial Consortium
OMB	Office of Management and Budget
OSCRE	Open Standards Consortium for Real Estate
RPA	Real Property Asset
RPADS	Real Property Asset Data Standard, a Geospatial Data Content Standard

5.2 Cross-Standard Harmonization (informative)

Efforts will be made to harmonize, where practical, the subcomponents of this standard within the U.S. Federal government – with the Housing standard within the Federal Real Geographic Data Committee (FGDC) Real Property Standard, and with the National Information Exchange Model (NIEM). Once approved, this standards development workgroup may further work with the Open Geospatial Consortia (OGC) and the Open Standards Consortium for Real Estate (OSCRE) to make this standard applicable for broader commercial real property management concerns, and thus may pursue American National Standards Institute (ANSI) or International Standards Organization (ISO) designation.