

10TH EXPERT GROUP MEETING ON

Statistical Data and Metadata eXchange

JANUARY 25-28, 2021

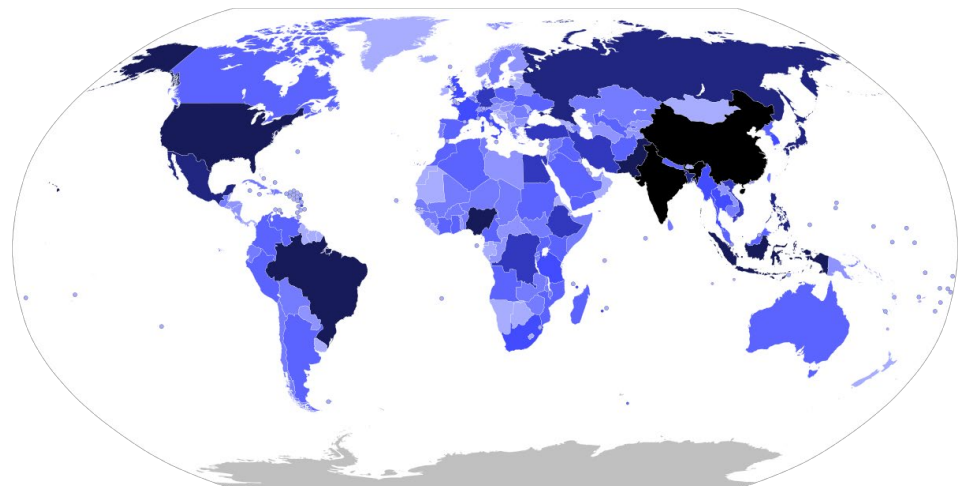
Support for Geospatial Information

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Extended Capability to Represent Geospatial Information

- Statistical units and facts can be referenced to geodesic coordinates
- SDMX 3.0 expands the capability of the standard to geo-reference information
- Former versions made possible only to geo-code information



Ways SDMX 3.0 Supports Geospatial Data

SDMX 3.0 will be able to reference geospatial data by means of:

1. Indirect Reference to Geospatial Information

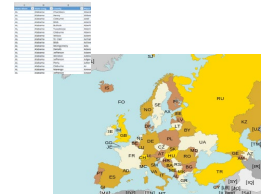
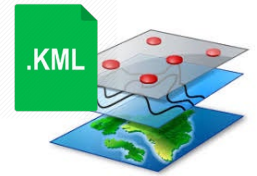
- Referencing external files

2. Geographic Coordinates

- Including coordinates

3. A Geographic Codelist

- Specialized codelists

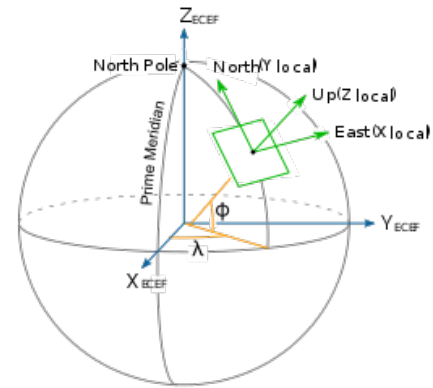


Indirect Reference to Geospatial Information



- Provides a way to include external references to geospatial information through a file containing it
- All the processing of geospatial data is made through external applications that can interpret the information in different formats
- SDMX attributes:
 - GEO_INFO_TEXT, description of the kind of information
 - GEO_INFO_URL, location of the file
 - GEO_INFO_TYPE, information about the standard format
 - Codelist: CL_GEO_FORMATS

Geographic Coordinates

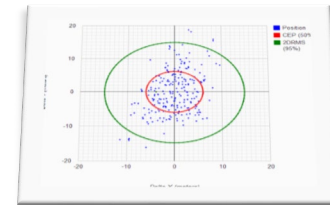
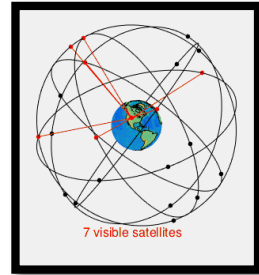


- Provides an efficient way to include geographic information with different levels of granularity, because of its flexibility
- Geospatial information is represented using the `GeospatialInformation` type.
- A “**Geospatial**” role should be assigned to any attribute of this type.
- An attribute of the **`GeospatialInformation`** type can be attached to:
 - A dimension or a measure with the “Geospatial” role assigned
 - A data flow, a series, or an observation... and can be included in a data message or a metadata report

Components of GeospatialInformation Type

- **X_COORDINATE**: The horizontal (longitude)
- **Y_COORDINATE**: The vertical value (latitude)
- **ALT**: The height (altitude) from the reference surface is expressed in meters
- **CRS**: The code of the Coordinate Reference System
 - Default World Geodetic System 1984 (WGS 84, EPSG:4326).
- **PRECISION**: Possible deviation in meters from the exact geodesic point
- **GEO_DESCRIPTION**: Text for additional information about the place
 - A value of the **GeospatialInformation** type is a regular expression String in the following way:

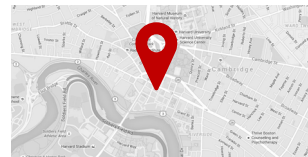
CRS, PRECISION: {GEO_FEATURE}, {GEO_FEATURE}, ...: GEO_DESCRIPTION



Representation of Geographic Features (GEO_FEATURE)

- Types of geographic features (GEO_FEATURE_TYPE)
 - “AREA”, a polygon defining a closed area.
 - “LINE”, a feature defining a line like a road, a river, or similar.
 - “POINT”, a specific geodesic point, like the centroid of a city or a hospital.
- Representing coordinates (COORDINATES): “X, Y, Z” or “X, Y”
- Geographic features (GEO_FEATURE_TYPE) are to be used to represent geographical areas like countries, regions, etc., or objects, like water bodies (e. g. rivers, lakes, oceans, etc.), roads (streets, highways, etc.), hospitals, schools, and the like. Represented as:

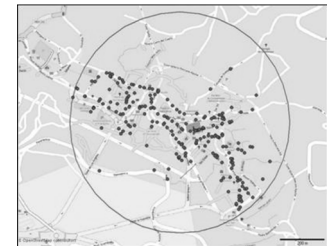
*“GEO_FEATURE_TYPE: COORDINATES; COORDINATES; COORDINATES;
...: GEO_DESCRIPTION”*



Expanded Representation of Geographical Information

- An attribute with the Geospatial role will contain a regex expression with the following format:

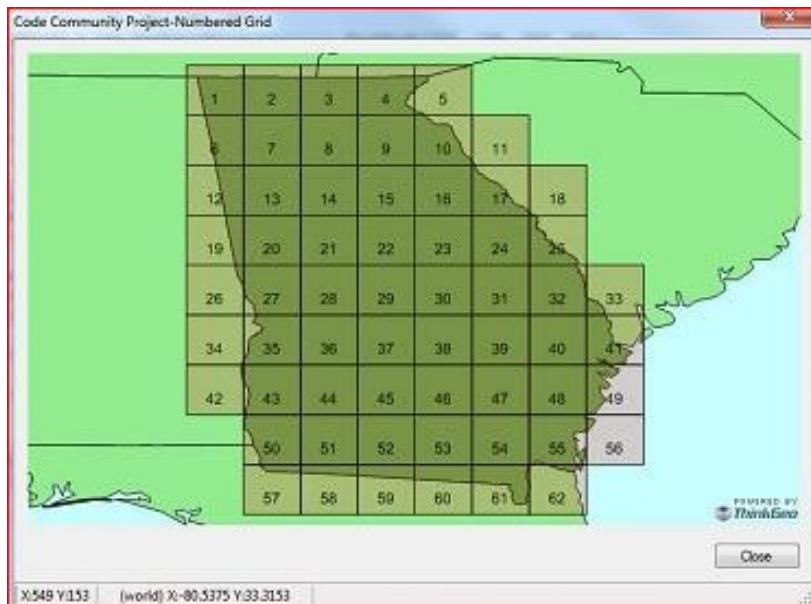
“CRS, PRECISION: {GEO_FEATURE_TYPE: X_COORDINATE, Y_COORDINATE, ALT; X_COORDINATE, Y_COORDINATE, ALT; X_COORDINATE, Y_COORDINATE, ALT;...:GEO_DESCRIPTION}, {GEO_FEATURE_TYPE: X_COORDINATE, Y_COORDINATE, ALT; X_COORDINATE, Y_COORDINATE, ALT; X_COORDINATE, Y_COORDINATE, ALT; X_COORDINATE, Y_COORDINATE, ALT;...:GEO_DESCRIPTION }, ...: GEO_DESCRIPTION”



Geographic Codelist

- Uses a specialized form of SDMX Code list, named “**GeoCodelist**”
- Code List containing the Geography used to demarcate the geographic extent.
- We can implement this specialized kind of code list in two ways:
 1. **Geographic.** It is a regular code list that has been extended to add a geographical feature set to each of its items, typically, this would include all types of administrative geographies;
 2. **Grid.** As a code list that has defined a geographical grid composed of cells representing regular squared portions of the Earth.

Components of a Grid Codelist

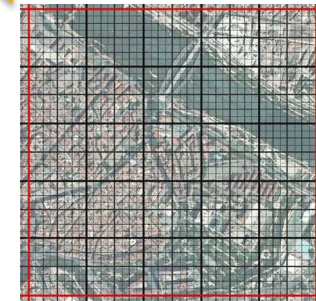
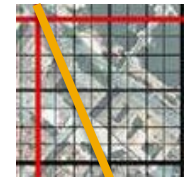


- A grid codelist is composed of:
 1. Definition of the grid (GRID_DEFINITION)
 2. Definition of each cell (GEO_CELL), the items of the codelist

Definition of the Geographical Grid

- It is composed by:
 - **CRS**: Code of the Coordinate Reference System
 - **REFERENCE_CORNER**: Position of the coordinates that will be used as a starting reference to locate the cells (UL, UR, LL, LR)
 - **REFERENCE_COORDINATES**: Represents the starting point to reference the cells of the grid
 - **CELL_WIDTH**: The size in meters of a horizontal side of the cells in the grid
 - **CELL_HEIGHT**: The size in meters of a vertical side of the cells in the grid
 - **GEO_STD**: A restricted text value expressing that the cells in the grid will provide information about matching codes existing in another reference system, like GeoHash, Open Location Code / Plus Code, the World Geographic Reference System, etc.
- The regex expression contained in **GRID_DEFINITION** will have the following format:

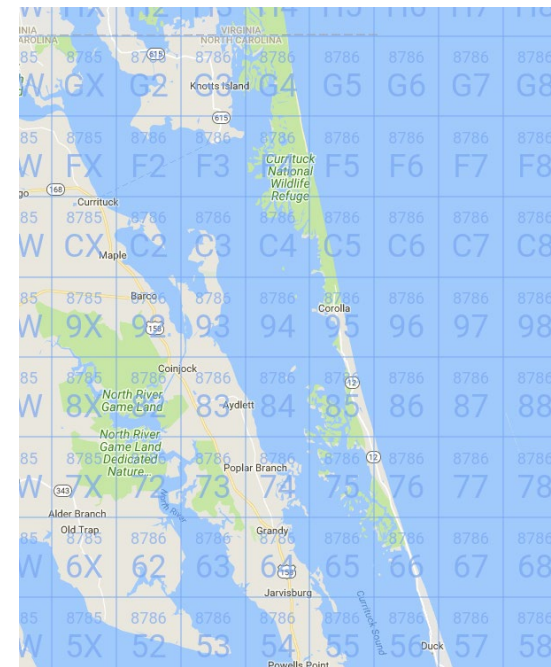
“CRS: REFERENCE_CORNER; REFERENCE_COORDINATES; CELL_WIDTH, CELL_HEIGHT: GEO_STD”



Items in a Grid Codelist

- Each cell in the grid adds the element GEO_CELL to each item of the code list
- GEO_CELL will contain the following elements:
 - **GEO_COL:** The number of the column in the grid starting by zero.
 - **GEO_ROW:** The number of the row in the grid starting by zero.
 - **GEO_TAG:** An optional text to include additional information to the cell.
- The regex expression contained in GRID_CELL will have the following format:

“GEO_COL, GEO_ROW: GEO_TAG”



Final Remarks

- The document defining the technical specifications to support geospatial information is not final yet. Some adjustments may occur before having the published version.

Questions?

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