EPSG v10 data model changes

1. Changes to relational tables\(^1\)

For details listed by table, see here. In summary:

a) The epsg_area table is removed and replaced by an epsg_extent table. The first seven fields will be renamed, with some reordering. The area_polygon_file_ref field is removed. Five new fields will be added. For all fields in the area table other than area_polygon_file_ref there is a 1:1 mapping from the area table to a field in the extent table. A new epsg_areapolygon table will be included in the repository but not in the Access database export.

b) In addition to the extent table, seven new tables are added:
   - epsg_conventionalRS
   - epsg_datumEnsemble
   - epsg_datumEnsembleMember
   - epsg_datumRealizationMethod
   - epsg_heightTransformation
   - epsg_scope
   - epsg_usage


c) In the epsg_coordinatereferencesystem, epsg_datum and epsg_coordinateoperation tables, the area_of_use_code and scope fields will be deprecated. They will be changed from mandatory to optional and left unpopulated. These fields will be replaced by the new epsg_usage intersection table.

d) In the epsg_coordinateAxis table, the uom_code field is changed from mandatory to optional.

e) There is a change to one field name in the epsg_coordinateReferenceSystem table.

f) Additional fields are added at the end of the epsg_datum table.

g) There are changes to some field lengths in the following tables:
   - epsg_coordinateAxisName
   - epsg_coordinateSystem
   - epsg_coordinateOperation
   - epsg_coordinateOperationMethod
   - epsg_coordinateOperationParameter
   - epsg_datum
   - epsg_ellipsoid
   - epsg_namingsystem
   - epsg_primeMeridian
   - epsg_unitOfMeasure

h) There are no changes to the following tables:
   - epsg_alias
   - epsg_change
   - epsg_coordinateOperationParamUsage
   - epsg_coordinateOperationParamValue
   - epsg_coordinateOperationPath
   - epsg_deprecation
   - epsg_supersession
   - epsg_versionHistory

\(^1\) In this document Camel case is used to facilitate reading of table names. In implementation, in the SQL relational tables no upper case characters are used.
2. Changes to GML schema

ISO 19136 (GML v3.2.1) is not being updated to track the data model changes in ISO 19111. IOGP has therefore decided to retain unchanged as much of these schemas as possible, adding the new model through extensions and additional EPSG structures in an EPSG namespace. The following is highlighted:

- Where elements need to be added to gml structures, data has been added as metadata declarations similar to how gml was extended with IOGP specific information in the previous model. See epsg:CommonMetaData or epsg:CRSMetaData. This applies to the conventionalRSName and realizationMethod for datums, and to geoidModel and velocityModel for CRSs.

- New classes are supported by extension and substitution groups:
  - The introduction of dynamic geodetic and dynamic vertical datums is made such that epsg:dynamicGeodeticDatum is extending gml:geodeticDatum with frame reference epoch and epsg:dynamicVerticalDatum is extending gml:verticalDatum with frame reference epoch. geodeticDatumEnsemble and verticalDatumEnsemble are added using substitution groups gml:GeodeticDatum and gml:VerticalDatum and extending gml:GeodeticDatumType and gml:VerticalDatumType with the element ensembleAccuracy. This is done to allow the use of datum ensembles in place of datums in CRS classes.
  - A new OrdinalCS class is added using substitution group gml:AbstractCoordinateSystem and derived from gml:AbstractCoordinateSystemType and for this the coordinateAxisUom is must be value of “1” to indicate it is unitless.
  - A new PointMotion class is added using substitution group gml:Transformation and derived from gml:TransformationType, no elements are added but it is required that targetCRS is either blank or exactly the same as sourceCRS.

- The attribute of publicationDate for datums is handled by simply using the current realizationEpoch element for the publicationDate data.

- The combination of scope and extent into a new complex element Usage is handled by creating Usage as having two elements, gml:domainOfValidity and gml:scope. Usage is then added to the previously defined epsg:CommonMetaData structure. Any number of Usage elements can be present.

The updated epsg.xsd file may be obtained from here.