**Process**

While the geometries are not required as part of the final product, they are integral in extracting the topological relationships, hence this workflow will include this aspect of the process. The NAME values of States and LGAs were not stored in the geometry tables, so additional manipulation was required to consolidate the required fields. This may not be the case for the Oracle dump files.

It has been suggested to process State by State to initially avoid the overlapping geometries at the State borders. This may cause more complication doing partial processing later and aligning the unique IDs in the FSDF\_UNIT table back to the geometries. It is better to have all the geometries together initially and filter them with SQL for processing, leaving the IDs set, stable and appearing in a logical order.

**Preparing the data for Spatial Analysis**

* Copy STATE\_POLYGON and LGA\_POLYGON form PSMA data to work area
* Delete all except NSW and VIC (for initial trial area)
* Since the FSDF\_UNIT table is essentially a standalone extract of the geometry attribute table, the FSDF\_UNIT structure was established in the geometry attribute table and exported
* Add new fields to STATE\_POLYGON and LGA\_POLYGON
  + ID (Long integer)
  + UNIT\_ID (Long integer) *In hindsight, probably not needed*
  + NAME (Text 50)
  + PSMA\_ID (Text 50)
  + TYPE (Text 50)
* Calculate fields as appropriate:
  + ID will be retrieved from the FSDF\_UNIT table once it is populated and will provide the linkage from the FSDF\_UNIT table back to the geometry
  + UNIT\_ID from the XX\_POLYGON\_ID *In hindsight, probably not needed*
  + NAME need not be populated here but will be in the extracted FSDF\_UNIT table
    - PSMA\_ID from the XX\_PID field
    - TYPE entered as appropriate “STATE”, “LGA” etc
  + Merge STATE\_POLYGON and LGA\_POLYGON to FSDF\_AREA (using Field Mapping to remove unwanted fields)
  + ArcMap – switch off all fields in FSDF\_AREA except those for the FSDF\_UNIT table and export table to FSDF\_UNIT
  + Calculate remaining fields in FSDF\_UNIT (ID and NAME)
    - ID = OBJECTID (to get sequential numbering)
    - NAME retrieved from original PSMA tables by joining (one table at a time) the STATE and LGA tables (PSMA\_ID >> XX\_PID)
      * NAME = STATE.STATE\_NAME
      * NAME = LGA.LGA\_NAME
      * NB on 2nd calc, select LGAs only, or else the State names become NULL
  + Apply the unique ID from FSDF\_UNIT to FSDF\_AREA
    - Join FSDF\_UNIT onto FSDF\_AREA on PSMA\_ID
    - Calculate FSDF\_AREA.ID = FSDF\_UNIT.ID

**Spatial Analysis**

It has been suggested to conduct topology analysis horizontally across each tier of Government at first for the ADJACENT relationships, and then work vertically across tiers. In the initial phase, just STATE and LGA tiers will be processed. It is recognised that mismatching geometries (mostly across jurisdictions) needs to be accounted for. This generally equates to adapting a variety of spatial relationship queries to achieve the desired output.

**Adjacent** (Horizontal)**:**

* INTERSECTS = ADJACENT except the State polygon is selected if all geometries are in the one dataset
* **If a selection is placed on the FSDF\_AREA layer to process single tier at a time (TYPE = ‘LGA’ or TYPE = ‘STATE’), then run the INTERSECT parameter. This results in the correct ADJACENT result**
* Then manually select the border LGA polygons, get their ID and add an ADJACENT entry to FSDF\_SPATIAL along with the relevant ID for the neighbouring State (which was excluded due to single tier processing)
* Manually add an ADJACENT entry for each State OR filter for TYPE = ‘STATE’ and run INTERSECTS and label it ADJACENT to account for poor geometries
* NB At first glance there do not appear to be enough entries in the FSDF\_SPATIAL table compared with the number of polygons, however there are many State polygons which are small islands which have no adjacency

**Contains** (Vertical)**:**

* For each state polygon, select the LGAs whose centroid sits inside it, labelled CONTAINS
* For each LGA, select the State its own centroid sits in and label CONTAINED BY
* Add Commonwealth level (coastline) and manually attribute top level hierarchy
* In the case of LGA > LOCALITY vertical relationships, the geometries do not always align, so a mechanism needs to be devised to equate to “Major Contained” or equivalent. An assessment of the % overlap will need to be determined during processing. This will be more code intensive.
* Set up relationship classes in ArcCatalog to validate results
  + AREAa\_UNITa ID to ID 1:1
  + UNITa\_SPATIALa ID to UNIT1\_ID 1:Many
  + SPATIALa\_UNITa UNIT2\_ID to ID 1:1