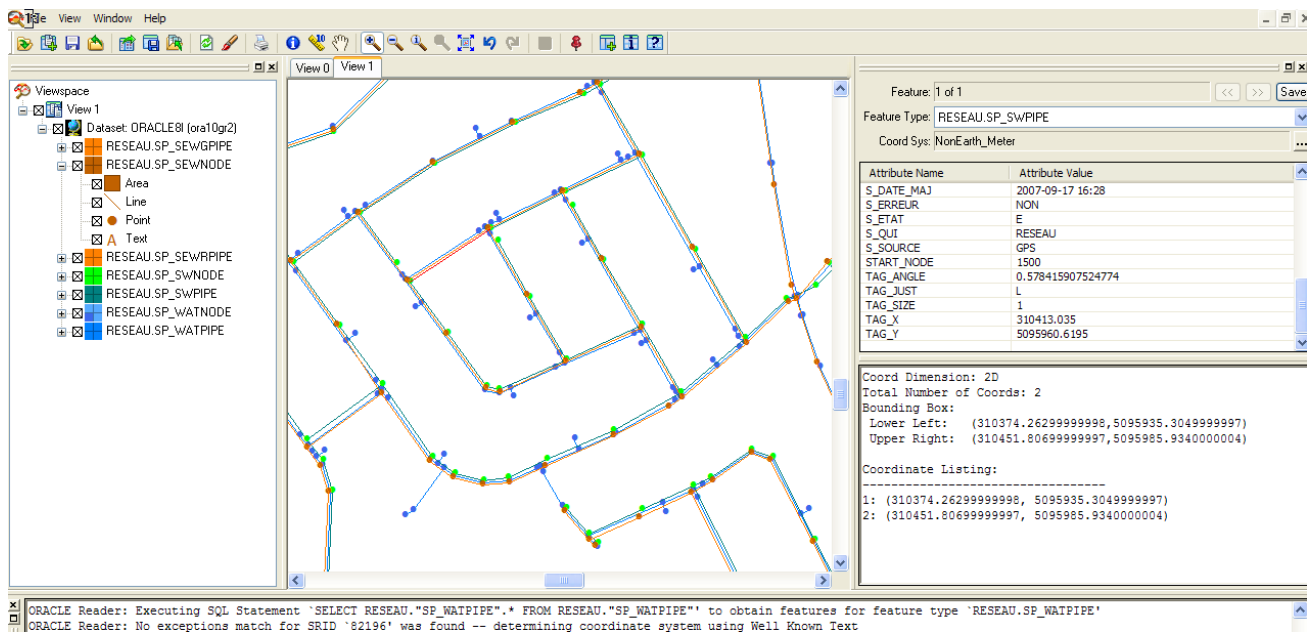


## Converting Oracle Spatial Data into an AutoCAD Map 3D Drawing with Object Data

### Introduction

In this example, a municipality stores its infrastructure data in an Oracle Spatial database and provides local access through an in-house application. However, a key requirement is to make the data available to other departments and contractors who use different applications; in this case AutoCAD Map 3D. In particular, the conversion of GIS data into an AutoCAD drawing where attributes are available via object data is a challenge; one that can be met through the AutoCAD Map 3D Object Data Reader/Writer available in FME 2008.

As illustrated in the FME Universal Viewer below, several layers of the data are available in the Oracle database, for example, sewer pipes and sewer nodes (manholes, valves, etc). In this example, we will outline the steps required to export this data to an AutoCAD drawing with object data.



The screenshot shows the FME Universal Viewer interface. On the left, the 'Viewspace' pane displays a tree view of the Oracle database layers, including 'RESEAU.SP\_SEWPIPE', 'RESEAU.SP\_SEWNODE', and 'RESEAU.SP\_WATPIPE'. The main window shows a 2D map of the sewer network with various colored lines and points. On the right, the 'Feature: 1 of 1' pane displays the attribute table for the selected 'RESEAU.SP\_SWPIPE' feature.

Attribute Name	Attribute Value
S_DATE_MAJ	2007-09-17 16:28
S_ERREUR	NON
S_ETAT	E
S_QUI	RESEAU
S_SOURCE	GPS
START_NODE	1500
TAG_ANGLE	0.578415907524774
TAG_JUST	L
TAG_SIZE	1
TAG_X	310413.035
TAG_Y	5095960.6195

Below the attribute table, the coordinate information is displayed:

```

Coord Dimension: 2D
Total Number of Coords: 2
Bounding Box:
Lower Left: (310374.26299999998, 5095935.30499999997)
Upper Right: (310451.80699999997, 5095985.93400000004)
Coordinate Listing:
-----
1: (310374.26299999998, 5095935.30499999997)
2: (310451.80699999997, 5095985.93400000004)

```

The status bar at the bottom shows the following messages:

```

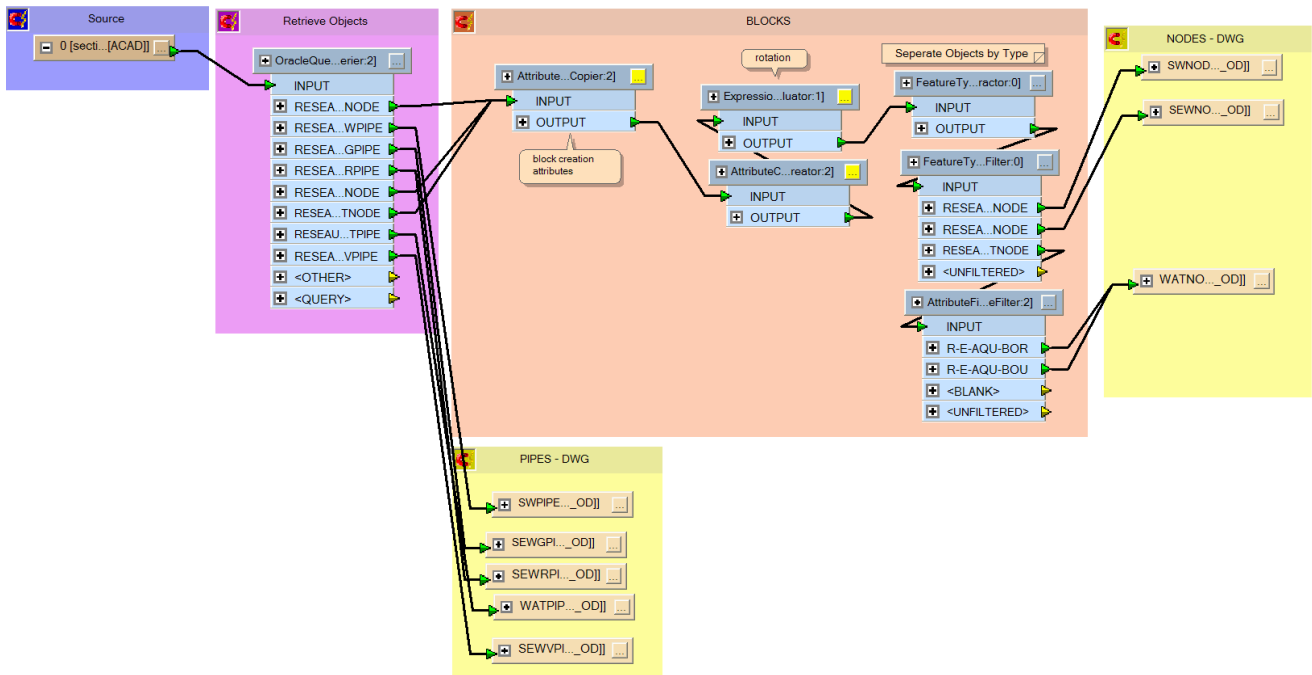
ORACLE Reader: Executing SQL Statement 'SELECT RESEAU."SP_WATPIPE".* FROM RESEAU."SP_WATPIPE"' to obtain features for feature type 'RESEAU.SP_WATPIPE'
ORACLE Reader: No exceptions match for SRID '82196' was found -- determining coordinate system using Well Known Text

```

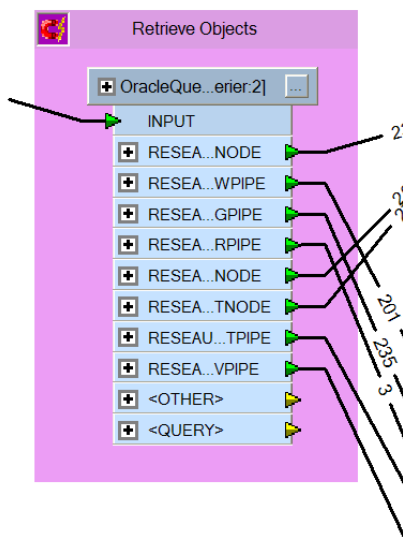
Authored by:

## Steps

Converting GIS data into AutoCAD DWG drawings with object data is quite simple with FME. As depicted in the below image, FME can be used to create a simple spatial ETL data flow that extracts, transforms and loads the data in the required destination format and data model; in this case, an AutoCAD DWG drawing where attributes are written as object data. This spatial ETL data flow is authored using FME Workbench and referred to as an FME workspace.



As illustrated above, one data source is being accessed in this example data flow, an AutoCAD drawing file that contains a polygon outlining the area to extract the infrastructure data for.



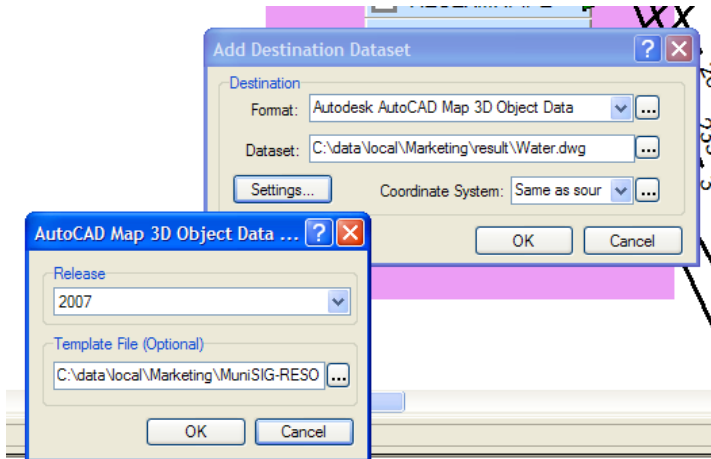
To extract the data, we first use the OracleQuerier to retrieve all the objects that are within the area of interest. The Output of the OracleQuerier includes an out port for each layer of data retrieved from the query. This allows us to use an Oracle Spatial query to retrieve data instead of having to read all the objects and then filter them in the FME workspace.

Each table retrieved from Oracle has its own set of attributes. The relationship of geometries to attributes is 1:1. For example, in this case there is one set of attributes for each pipe. The goal of this project was to produce a drawing with a selection of the attributes added as object data to the geometries in the drawing.

The client also had a set of predefined layers and blocks that he wanted to use for the data. For example a specific type of block should be used to represent hydrants.

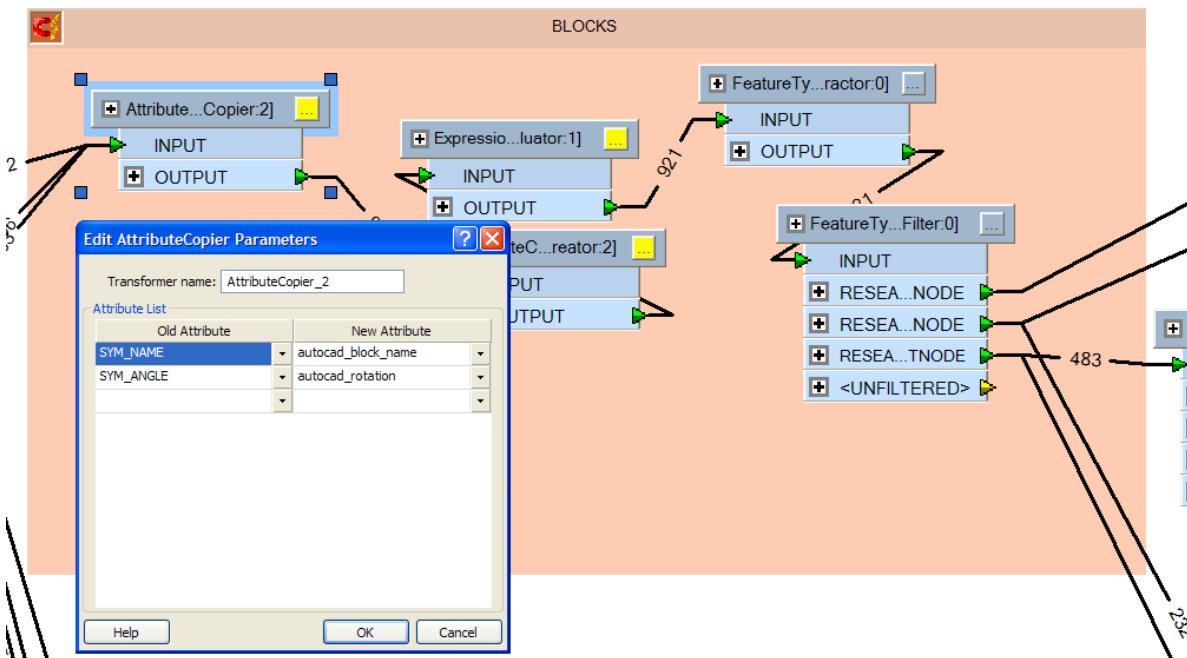


Next, as illustrated below, when using the Map 3D Object Data Writer in FME, you can choose the version of drawing you want, as well as a template file.

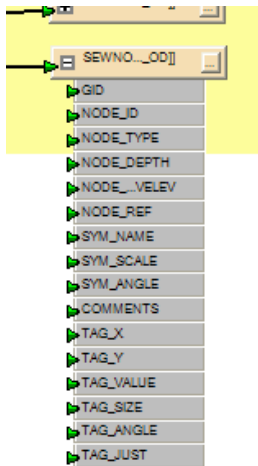


When writing the drawing, it is then possible to produce blocks and to use predefined layers and symbology defined in a prototype drawing. When FME writes the object to the layer, the object automatically picks up the properties (linetype, color) from that layer.

As highlighted below, the names of the blocks and the rotation of the objects for the point data are actually represented as attributes in the Oracle data. For the point layers, the attributes are mapped to the 'autocad\_entity' and 'autocad\_rotation' feature attributes.

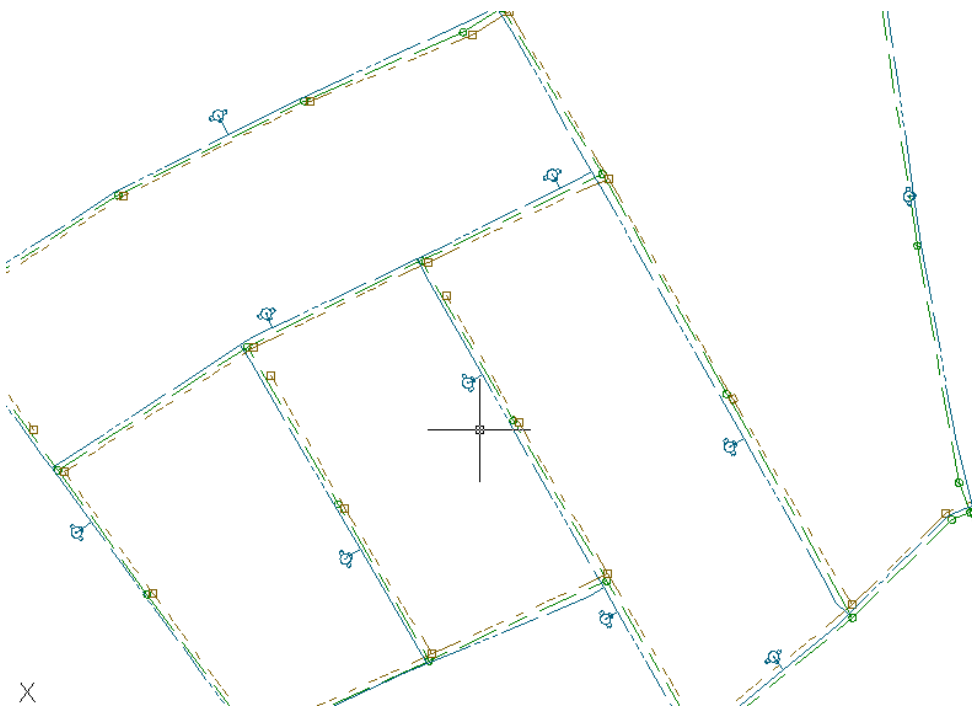


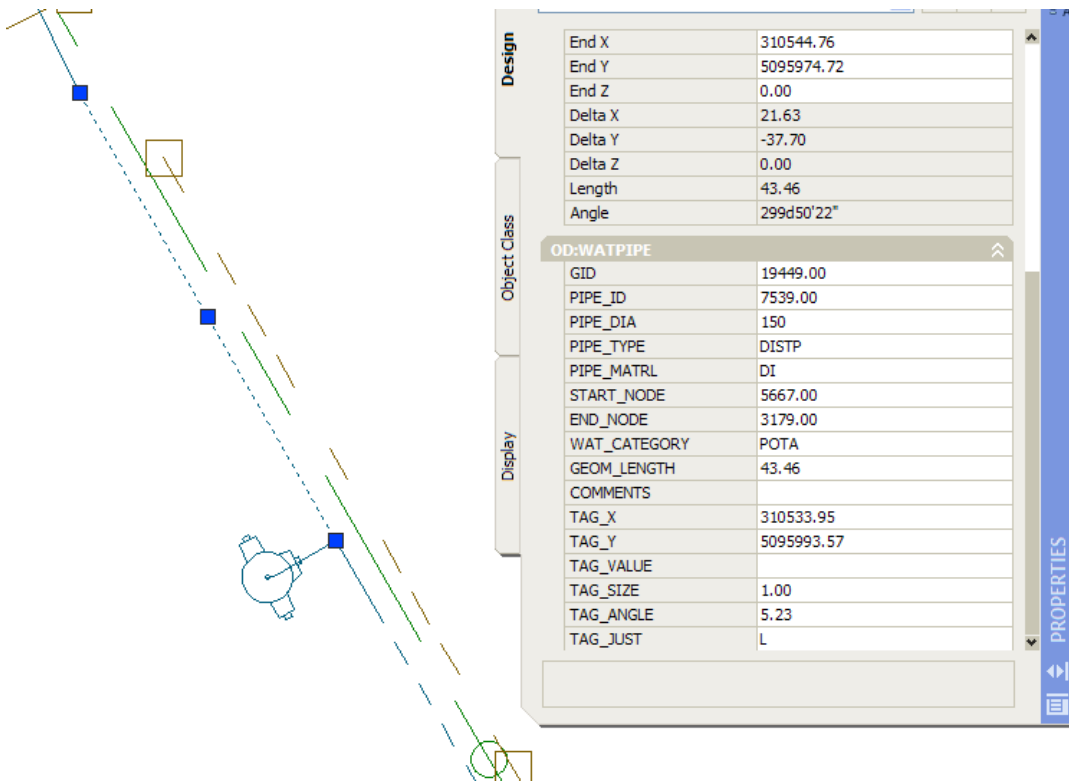
The rest of the attributes are sent to the table on the destination feature type. The easiest ways to add the attributes quickly is to copy them from an existing input feature type, or to use the **Destination > Import Feature Type Definitions** option from the menus. The attributes that you do not want to export to the client are simply eliminated afterwards.



## Results

At the end of the translation, we have a drawing that contains the standard layers, colors, linetypes, and blocks that the client wanted to use with the object data attached to each feature.





## Other Potential Use Cases

By using the new FME Server, you can expand this concept further. For example, you could offer a system that allows clients to resubmit the data and then applies automatic checks to ensure that a certain data quality in the result exists and a certain standard has been maintained. You could also publish the workspace in this example to FME Server to enable users to extract the data themselves. In this case, the user would benefit from being able to obtain the data on demand, while the publisher of the data benefits from not having to spend a lot of time extracting data for clients.

## Conclusion

Even with the development of the Open Source FDO module in AutoCAD Map, which allows the direct connection of GIS data such as Oracle Spatial, Shapefiles, and SDF3, Consortech still sees a need from clients to transfer data from GIS formats (especially databases like ArcSDE or Oracle) to AutoCAD DWG formats. In the past, there were limitations that prevented the object data from being handled correctly. But now with the new object data reading and writing support in FME 2008, users can design a fairly simple workspace that will produce the required - with no added steps, no additional translations, and no extra work to perform in AutoCAD Map 3D.

## Find Out More

To learn more about FME's object data reading and writing capabilities, access a variety of additional resources at: <http://www.safe.com/fme2008/unlock-object-data.php>.

