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Welcome to the MapInfo® Envinsa™ Platform Web Services. This guide provides descriptions and examples for the developer who is writing applications that access the Coordinate System Transform Service.

The Coordinate System Transform Service transforms the coordinates of a geometry from one coordinate reference system to another.

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What is the Coordinate System Transform Service?

The Coordinate System Transform Service transforms the coordinates of a GML geometry from one coordinate reference system to another. The user specifies the source coordinate reference system, target coordinate reference system, and the geometries to be transformed. The service then returns the transformed geometries. The Coordinate System Transform Service is able to transform multiple geometries in a single request.

The following GML geometries can be transformed by this service:

- CircleByCenterPoint
- CircularArc
- Ellipse
- Envelope
- LineString
- LinearRing
- MultiPolygon
- Polygon
- Point

You use the Coordinate System Transform Service when working with multiple data sets that use different coordinate systems. For example, suppose you want to display locations from a mobile device, such as a GPS unit, onto a map that uses a different coordinate system than the mobile device. You can use the Coordinate System Transform Service to translate the locations from the mobile device into the coordinate system used by the map.

What is a Coordinate System?

The terms "projection" and "coordinate system" are often used interchangeably. However they do not mean the same thing.

**Projection** – An equation or set of equations that contain mathematical parameters for a map. The exact number and nature of the parameters depends upon the type of projection. You can think of a projection as a method of reducing a map’s distortion caused by the curvature of the Earth, or more precisely, a projection compensates for the shortcomings of depicting maps in two dimensions when the coordinates exist in three dimensions.

**Coordinate System** – When parameters of a projection are assigned specific values, they become a coordinate system. A coordinate system is a collection of parameters that describe coordinates, one of which is a projection.
Coordinate System Transform Functionality

The Coordinate System Transform Service performs a single task: transforming geometries from one coordinate reference system to a different coordinate reference system.

The following section shows you how to use this capability: Changing from One Coordinate System to Another in Chapter 2 on page 8 – This section explains how to transform a geometry from a current coordinate system to a new coordinate system, and illustrates how multiple transformations can be performed in a single request.
Coordinate System Transform Capabilities

Before you create an application that uses the Coordinate System Transform Service functionality, it’s helpful to understand basic concepts and how these concepts are implemented in this service. This section describes how to develop and use the capabilities of the Coordinate System Transform Service.

The purpose of the Coordinate System Transform Service is to transform the coordinates of one or more geometries to a different coordinate reference system. Note that multiple transformations can be performed in a single request.

In this section:

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Changing from One Coordinate System to Another

A Coordinate System Transform request transforms the coordinates of a GML geometry from one coordinate reference system to another. You must specify the source coordinate reference system, target coordinate reference system, and the required details regarding the geometries that you wish to transform. The response returns the target coordinate reference system and the transformed geometries. The Coordinate System Transform Service is able to transform multiple geometries in a single request.

Rules for Specifying the Coordinate Systems

The Coordinate System Transform Service uses the spatial reference system identifier to specify the source and target coordinate systems for the transformation. The geometries in the request may have their own spatial reference system specified. The following rules are used to identify the source reference system of the geometries:

• If the position in the geometry has a spatial reference system specified (for example, EPSG:4326), this reference system is used as the source for the coordinates for that geometry.
• If the position in the geometry does not specify a spatial reference system, and the geometry specifies a reference system, this reference system is used for that geometry.
• If both the position and the geometry have no spatial reference system specified, the source reference system defined for the request is used.

Therefore the priority for specifying the source reference system in the request is:

1. Spatial reference system in the position of the geometry
2. Spatial reference system in the geometry
3. Source coordinate reference system in the request.

Transforming Multiple Geometries

When specifying multiple geometries within a single request in XML, the order of these geometries is important. The geometries must be specified in the order in which the geometry types are listed here:

• Circle By Center Point
• Circular Arc
• Ellipse
• Envelope
• Line String
• Linear Ring
• Multi Polygon
• Polygon
• Point

Note: The order in which multiple geometries are specified is important only for a request coded in XML directly. The order is not important in Java or .NET code.
Inputs and Behaviors

The request contains the following information:

<table>
<thead>
<tr>
<th>Input</th>
<th>Required</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Coordinate System</td>
<td>Yes</td>
<td>The source coordinate reference system of the geometries. This source coordinate reference system is used only if the spatial reference system is not specified in both the position and the geometry. For more information see Rules for Specifying the Coordinate Systems on page 8.</td>
</tr>
<tr>
<td>Target Coordinate System</td>
<td>Yes</td>
<td>The new coordinate reference system.</td>
</tr>
<tr>
<td>Geometry</td>
<td>Yes</td>
<td>The geometries to be transformed. Each of the geometries can specify the source coordinate reference system to be used for the transformation.</td>
</tr>
</tbody>
</table>

Output

The response contains the following pieces of information:

<table>
<thead>
<tr>
<th>Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Coordinate System</td>
<td>The new coordinate reference system for all the transformed geometries in the response.</td>
</tr>
<tr>
<td>Geometry</td>
<td>The transformed geometries with the new coordinate reference system. These geometries are returned in the same order as was specified in the request.</td>
</tr>
</tbody>
</table>

XML Sample

The following example describes a request to transform two points and a circle from the EPSG:4326 (Lat/Long WGS84) reference system to the EPSG:32617 (UTM/WGS84 Zone17) reference system. The srsName attribute is used to specify the source and target coordinate systems for the start and end transformations. Note that the order in which the geometries are specified is important.

```xml
<RequestParameters xsi:type="ns3:CoordSysRequestType" xmlns:ns3="http://www.mapinfo.com/xls">
  <ns3:SourceCoordSys srsName="EPSG:4326"/>
  <ns3:TargetCoordSys srsName="EPSG:32617"/>
  <ns3:Geometry>
    <ns4:CircleByCenterPoint interpolation="circularArcCenterPointWithRadius" numArc="1" xmlns:ns4="http://www.opengis.net/gml">
      <ns4:pos dimension="2">-78.8324 42.8477</ns4:pos>
      <ns4:radius uom="M">200.0</ns4:radius>
    </ns4:CircleByCenterPoint>
    <ns5:Point xmlns:ns5="http://www.opengis.net/gml">
      <ns5:pos dimension="2">-78.8324 42.8477</ns5:pos>
    </ns5:Point>
    <ns6:Point xmlns:ns6="http://www.opengis.net/gml" srsName="EPSG:4326">
      <ns6:pos dimension="2">-78.8324 42.8477</ns6:pos>
    </ns6:Point>
  </ns3:Geometry>
</RequestParameters>
```