

# Controlling the unified portrayal of geospatial cross-border maps

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The possibility to portray geospatial information as maps based on different domain specific rules and symbolsets can help to interpret information from other domains more quickly. In safe and rescue as well as in natural disaster scenarios, where different rescue forces from different countries work together, it can improve the use of the available heterogeneous information by portraying maps in a standardized way and in such a style specific to the task force. The following two figures show street maps of the German/Netherlands border area.



Figure 1: German street map

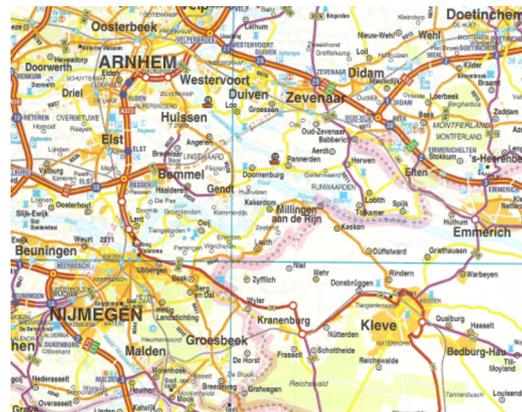


Figure 2: Dutch street map

In figure 1 is shown a German street map and in figure 2 is shown a Dutch street map of the same area. You can notice that the styling of highways of different; on the Dutch map the highways are red and on the German map the highways is orange.

The improvement comes from a system that allows a German disaster manager to portray a map in German styling even it contains Dutch terrain; or a Dutch disaster manager to portray a map in Dutch styling even it contains German terrain, an access control system shall regulate that the managers are requesting „cross border maps only“. A cross border map is considered a map that contains Dutch and German terrain. In cases where the Dutch / German disaster manager requests maps using the national styling containing the terrain of the other country only, access shall be denied.

The following table contains the access regulations for controlling access to the portraying of cross border maps:

Scenario	Description
#1	A German user can apply German styling to German features
#2	A Dutch user can apply Dutch styling to Dutch features
#3	A German user cannot access Dutch features only (no cross-border operation!)
#4	A Dutch user cannot access German features only (no cross-border operation!)
#5	A Dutch User can never apply German styling

#6	A German User can never apply Dutch styling
#7	A German user can apply German styling to German AND Dutch features (cross-border operation)
#8	A Dutch user can apply Dutch styling to German AND Dutch features (cross-border operation)

Table 1: Access Rights for controlling requesting cross border maps

In order to deploy an access control system, the OGC GeoXACML<sup>1</sup> standard provides the capabilities to realize a system that is able to enforce the access regulations as described above. GeoXACML is an OGC standard that extends the OASIS XACML 2.0<sup>2</sup> standard by defining the Geometry data type and geo-specific functions to express geo-specific access rights. The following policy snippet illustrates a GeoXACML <Condition> expressing the cross-border access right:

```
<Rule Effect="Permit" RuleId="R8">
  <Description>
    Scenario #8: A Dutch user can apply Dutch styling to German AND Dutch features (cross-
border operation)
  </Description>
  <Target/>
  <Condition>
    <Apply FunctionId="urn:ogc:def:function:geoxacml:1.0:geometry-crosses">
      <Apply FunctionId="urn:ogc:def:function:geoxacml:1.0:geometry-one-and-only">
        <AttributeSelector DataType="urn:ogc:def:dataType:geoxacml:1.0:geometry"
RequestContextPath="/xacml-context:Request/xacml-context:Resource/xacml-
context:ResourceContent/ogc:GetMap/ogc:BoundingBox"/>
        </Apply>
        <VariableReference VariableId="gBorder"/>
      </Apply>
    </Condition>
  </Rule>
```

<sup>1</sup> <http://www.opengeospatial.org/standards/geoxacml>

<sup>2</sup> [http://www.oasis-open.org/committees/tc\\_home.php?wg\\_abbrev=xacml](http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=xacml)