Figure 1: OASIS

ACAL v1.0 XPath Profile Version 1.0

Committee Specification Draft 01

18 February 2026

This version

- https://docs.oasis-open.org/xacml/acal/acal/profiles/xpath/v1.0/csd01/acal-xpath-v1.0-csd01.html (Authoritative)

- https://docs.oasis-open.org/xacml/acal/acal/profiles/xpath/v1.0/csd01/acal-xpath-v1.0-csd01.pdf

- https://docs.oasis-open.org/xacml/acal/acal/profiles/xpath/v1.0/csd01/acal-xpath-v1.0-csd01.md

Previous version

N/A

Latest version

- https://docs.oasis-open.org/xacml/acal/acal/profiles/xpath/v1.0/csd01/acal-xpath-v1.0-csd01.html (Authoritative)

- https://docs.oasis-open.org/xacml/acal/acal/profiles/xpath/v1.0/csd01/acal-xpath-v1.0-csd01.pdf

- https://docs.oasis-open.org/xacml/acal/acal/profiles/xpath/v1.0/csd01/acal-xpath-v1.0-csd01.md

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Abstract

This specification is a profile of ACAL that provides ACAL extensions based on the XPath standard, such as XPath expression data-type, XPath-based functions and AttributeSelector.

Citation Format

When referencing this document, the following citation format should be used:

[**ACAL-XPath-1.0**] *ACAL v1.0 XPath Profile Version 1.0.* Edited by Steven Legg and Cyril Dangerville. 18 February 2026. OASIS Committee Specification Draft 01. https://docs.oasis-open.org/xacml/acal/acal/profiles/xpath/v1.0/csd01/acal-xpath-v1.0-csd01.html . Latest stage: https://docs.oasis-open.org/xacml/acal/acal/profiles/xpath/v1.0/csd01/acal-xpath-v1.0-csd01.html .

Related Work

This document is related to:

- *Attribute-Centric Authorization Language (ACAL) Version 1.0*.

License, Document Status, and Notices

Table of Contents

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1 Scope

This ACAL profile defines an ACAL data-type for XPath expressions, ACAL functions based on XPath, concrete types of `AttributeSelector` and `EntityAttributeSelector` using XPath expressions to extract attributes from ACAL Request's `Content`, as well as default values for XPath evaluation, i.e. concrete types of `RequestDefaults` and `PolicyDefaults`.

Concrete representations (data formats) are to be provided as separate specifications and therefore out of scope of this document.

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2 Definitions and Acronyms

2.1 Definitions

2.1.1 Terms Defined Elsewhere

This document uses the following terms defined elsewhere:

See Section 2 of [ACAL-Core-1.0].

2.1.2 Terms Defined in this Document

None.

2.1.3 Related terms

None.

2.2 Abbreviations and Acronyms

None.

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3 Document Conventions

3.1 Key Words

The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL NOT**", "**SHOULD**", "**SHOULD NOT**", "**RECOMMENDED**", "**NOT RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3.2 Typographical Conventions

None.

4 Introduction (non-normative)

4.1 Requirements

XML is a common format to represent complex structured documents that may be supplied by the PEP as subject attribute or resource attribute's Content inside the Request to the PDP, typically a SAML token in the case of subject attribute, or any XML document as resource data. For such cases, supporting XPath expressions in ACAL is the standard way and therefore a must-have to extract the necessary values from the XML content for policy evaluation. For instance, a common rule of a privacy policy is that a person should be allowed to read records (in XML) for which he or she is the subject. The corresponding policy must contain a reference - XPath expression - to the subject identified in the information resource - XML record - itself.

4.2 Policies Based on Subject and Resource Attributes

Attribute selectors (`AttributeSelectorType` objects) defined by this profile use an XPath expression over the `ContentType` object of the subject (resp. resource) to identify a particular subject (resp. resource) attribute value by its location in the context (see Section 4.11 of [ACAL-Core-1.0] for an explanation of context).

4.3 Operators

The ACAL method of representing XPath-based functions borrows from the XPath and XQuery Functions and Operators 3.1 specification [XF].

4.4 Example

This section contains an example XML document, an example request *context* and example ACAL *rules* illustrating the use of XPathAttributeSelectors and xpathExpression data-type defined in this Profile. The XML document is a medical record. Four separate *rules* are defined.

4.4.1 Example medical record instance

The following is an instance of a medical record to which the example ACAL *rules* can be applied. The `<record>` schema is defined in the registered namespace administered by Medi Corp.

```
<?xml version="1.0" encoding="UTF-8"?>
<record xmlns="urn:example:med:schemas:record">
    <patient>
        <patientName>
            <first>Bartholomew</first>
            <last>Simpson</last>
        </patientName>
        <patientContact>
            <street>27 Shelbyville Road</street>
            <city>Springfield</city>
            <state>MA</state>
            <zip>12345</zip>
            <phone>555.123.4567</phone>
            <fax />
            <email />
        </patientContact>
        <patientDoB>1992-03-21</patientDoB>
        <patientGender>male</patientGender>
        <patient-number>555555</patient-number>
    </patient>
    <parentGuardian>
        <parentGuardianId>HS001</parentGuardianId>
        <parentGuardianName>
            <first>Homer</first>
            <last>Simpson</last>
        </parentGuardianName>
        <parentGuardianContact>
            <street>27 Shelbyville Road</street>
            <city>Springfield</city>
            <state>MA</state>
            <zip>12345</zip>
            <phone>555.123.4567</phone>
            <fax />
            <email>homers@aol.com</email>
        </parentGuardianContact>
    </parentGuardian>
    <primaryCarePhysician>
        <physicianName>
            <first>Julius</first>
            <last>Hibbert</last>
        </physicianName>
        <physicianContact>
            <street>1 First St</street>
            <city>Springfield</city>
            <state>MA</state>
            <zip>12345</zip>
            <phone>555.123.9012</phone>
            <fax>555.123.9013</fax>
            <email />
        </physicianContact>
        <registrationID>ABC123</registrationID>
    </primaryCarePhysician>
    <insurer>
        <name>Blue Cross</name>
        <street>1234 Main St</street>
        <city>Springfield</city>
        <state>MA</state>
        <zip>12345</zip>
        <phone>555.123.5678</phone>
        <fax>555.123.5679</fax>
        <email />
    </insurer>
    <medical>
        <treatment>
            <drug>
                <name>methylphenidate hydrochloride</name>
                <dailyDosage>30mgs</dailyDosage>
                <startDate>1999-01-12</startDate>
            </drug>
            <comment> patient exhibits side-effects of skin coloration and carpal degeneration </comment>
        </treatment>
        <result>
            <test>blood pressure</test>
            <value>120/80</value>
            <date>2001-06-09</date>
            <performedBy>Nurse Betty</performedBy>
        </result>
    </medical>
</record>
```

4.4.2 Example request context

The following example illustrates a request *context*, using XACML representation (XML representation of ACAL), to which the example *rules* may be applicable. It represents a request by the physician Julius Hibbert to read the patient date of birth in the record of Bartholomew Simpson.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request xmlns="urn:oasis:names:tc:xacml:4.0:core:schema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <RequestEntity Category="urn:oasis:names:tc:acal:1.0:subject-category:access-subject">
        <RequestAttribute
            AttributeId="urn:oasis:names:tc:acal:1.0:subject:subject-id" Issuer="med.example.com">
            <Value >CN=Julius Hibbert</Value>
```

```
 8         </RequestAttribute>
 9         <RequestAttribute
10             AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:role"
11             Issuer="med.example.com">
12             <Value>physician</Value>
13         </RequestAttribute>
14         <RequestAttribute
15             AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:physician-id"
16             Issuer="med.example.com">
17             <Value>jh1234</Value>
18         </RequestAttribute>
19     </RequestEntity>
20     <RequestEntity Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource">
21         <Content>
22             <Body>
23                 <md:record xmlns:md="urn:example:med:schemas:record"
24                     xsi:schemaLocation="urn:example:med:schemas:record http://www.med.example.com/schemas/record.xsd">
25                     <md:patient>
26                         <md:patientDoB>1992-03-21</md:patientDoB>
27                         <md:patient-number>555555</md:patient-number>
28                         <md:patientContact>
29                             <md:email>b.simpson@example.com</md:email>
30                         </md:patientContact>
31                     </md:patient>
32                 </md:record>
33             </Body>
34         </Content>
35         <RequestAttribute
36             AttributeId="urn:oasis:names:tc:acal:1.0:content-selector"
37             DataType="urn:oasis:names:tc:acal:1.0:data-type:xpathExpression">
38             <Value
39                 XPathCategory="urn:oasis:names:tc:acal:1.0:attribute-category:resource" XPath="md:record/md:patient/md:patientD
40         </RequestAttribute>
41         <RequestAttribute
42             AttributeId="urn:oasis:names:tc:acal:1.0:resource:target-namespace"
43             DataType="urn:oasis:names:tc:acal:1.0:data-type:anyURI">
44             <Value>urn:example:med:schemas:record</Value>
45         </RequestAttribute>
46     </RequestEntity>
47     <RequestEntity Category="urn:oasis:names:tc:acal:1.0:attribute-category:action">
48         <RequestAttribute
49             AttributeId="urn:oasis:names:tc:acal:1.0:action:action-id">
50             <Value>read</Value>
51         </RequestAttribute>
52     </RequestEntity>
53     <RequestEntity Category="urn:oasis:names:tc:acal:1.0:attribute-category:environment">
54         <RequestAttribute
55             AttributeId="urn:oasis:names:tc:acal:1.0:environment:current-date"
56             DataType="urn:oasis:names:tc:acal:1.0:data-type:date">
57             <Value>2010-01-11</Value>
58         </RequestAttribute>
59     </RequestEntity>
60 </Request>
```

Lines 21-34: Resource content. The XML resource instance, access to all or part of which may be requested, is placed here. The xpathExpression value(s) in the Request and in the Rules, as well as XPathAttributeSelectors in the Rules will apply to that content.

Lines 35-40: The identifier of the Resource instance for which access is requested, which is an XPath expression into the `<Content>` element that selects the data to be accessed.

Here is the equivalent example using JACAL representation (JSON representation of ACAL):

```
{
    "Request": {
        "RequestDefaults": {
            "XPathRequestDefaults": {
                "XPathVersion": "https://www.w3.org/TR/xpath20/",
                "Namespace": [
                    {
                        "Prefix": "md",
                        "Name": "urn:example:med:schemas:record"
                    }
                ]
            }
        },
        "RequestEntity": [
            {
                "Category": "urn:oasis:names:tc:acal:1.0:subject-category:access-subject",
                "RequestAttribute": [
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:subject:subject-id",
                        "Issuer": "med.example.com",
                        "Value": [
                            "CN=Julius Hibbert"
                        ]
                    },
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:role",
                        "Issuer": "med.example.com",
                        "Value": [
                            "physician"
                        ]
                    },
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:physician-id",
                        "Issuer": "med.example.com",
                        "Value": [
                            "jh1234"
                        ]
                    }
                ]
            },
            {
                "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                "Content": {
                    "Body": "<md:record xmlns:md=\"urn:example:med:schemas:record\" xsi:schemaLocation=\"urn:example:med:schemas
                },
                "RequestAttribute": [
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:content-selector",
                        "DataType": "urn:oasis:names:tc:acal:1.0:data-type:xpathExpression",
                        "Value": [
                            {
                                "XPathCategory": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                "XPath": "md:record/md:patient/md:patientDoB"
                            }
                        ]
                    },
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:resource:target-namespace",
                        "DataType": "urn:oasis:names:tc:acal:1.0:data-type:anyURI",
                        "Value": [
                            "urn:example:med:schemas:record"
                        ]
                    }
                ]
            },
            {
                "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:action",
                "RequestAttribute": [
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:action:action-id",
                        "Value": [
                            "read"
                        ]
                    }
                ]
            },
            {
                "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:action",
                "RequestAttribute": [
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:environment:current-date",
                        "DataType": "urn:oasis:names:tc:acal:1.0:data-type:date",
                        "Value": [
                            "2010-01-11"
                        ]
                    }
                ]
            }
        ]
```

```
    }
}
```

4.4.3 Example plain-language rules

The following plain-language rules are to be enforced:

- Rule 1: A person, identified by his or her patient number, may read any record for which he or she is the designated patient.
- Rule 2: A person may read any record for which he or she is the designated parent or guardian, and for which the patient is under 16 years of age.
- Rule 3: A physician may write to any medical element for which he or she is the designated primary care physician, provided an email is sent to the patient.

These rules may be written by different PAPs operating independently, or by a single PAP.

4.4.4 Example ACAL rule instances

4.4.4.1 Rule 1 The following ACAL `<Rule>` instance expresses *Rule* 1:

```
<?xml version="1.0" encoding="UTF-8"?>
<Policy xmlns="urn:oasis:names:tc:xacml:4.0:core:schema"
    xmlns:xpath="urn:oasis:names:tc:xacml:4.0:xpath:schema"
    xmlns:md="urn:example:med:schemas:record"
    PolicyId="urn:oasis:names:tc:acal:1.0:example:policyid:1"
    CombiningAlgId="urn:oasis:names:tc:acal:1.0:combining-algorithm:deny-overrides"
    Version="1.0">
    <xpath:XPathPolicyDefaults XPathVersion="https://www.w3.org/TR/xpath20/"/>
    <VariableDefinition VariableId="patient_number_matched">
        <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-equal">
            <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-one-and-only">
                <AttributeDesignator
                    Category="urn:oasis:names:tc:acal:1.0:subject-category:access-subject"
                    AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:patient-number"/>
            </Apply>
            <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-one-and-only">
                <xpath:XPathAttributeSelector
                    Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
                    Path="md:record/md:patient/md:patient-number/text()"/>
            </Apply>
        </Apply>
    </VariableDefinition>
    <Rule Id="example_rule_1" Effect="Permit">
        <Description>A person may read any medical record in the urn:example:med:schemas:record
            namespace for which he or she is the designated patient</Description>
        <Condition>
            <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:and">
                <VariableReference VariableId="patient_number_matched" />
                <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-is-in">
                    <Value>read</Value>
                    <AttributeDesignator
                        Category="urn:oasis:names:tc:acal:1.0:attribute-category:action"
                        AttributeId="urn:oasis:names:tc:acal:1.0:action:action-id" />
                </Apply>
                <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:anyURI-is-in">
                    <Value>urn:example:med:schemas:record</Value>
                    <AttributeDesignator
                        Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
                        AttributeId="urn:oasis:names:tc:acal:1.0:resource:target-namespace"/>
                </Apply>
                <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:any-of">
                    <Function Id="urn:oasis:names:tc:acal:1.0:function:xpath-node-match" />
                    <Value
                        XPathCategory="urn:oasis:names:tc:acal:1.0:attribute-category:resource" XPath="md:record" />
                    <AttributeDesignator
                        Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
                        AttributeId="urn:oasis:names:tc:acal:1.0:content-selector"/>
                </Apply>
            </Apply>
        </Condition>
    </Rule>
</Policy>
```

Line 8: XPath expressions in the policy are to be interpreted according to the 2.0 version of the XPath specification.

Line 17: The `<XPathAttributeSelector>` element selects a bag of values from the resource content using a free-form XPath expression. In this case, it selects the value of the patient-number in the resource. Note that the namespace prefixes in the XPath expression are resolved with the standard XML namespace declarations.

Lines 41-48: This Apply expression compares the results of two XPath expressions applied to the `<Content>` element of the resource category in the Request earlier. The second XPath expression is the location path to the requested XML element and the first XPath expression is the literal value `md:record`. The `xpath-node-match` function evaluates to `True` if the requested XML element is below the `md:record` element.

Here is the equivalent example in JACAL syntax (JSON representation of ACAL):

```
{
    "Policy": {
        "PolicyId": "urn:oasis:names:tc:acal:1.0:example:policyid:1",
        "Version": "1.0",
        "CombiningAlgId": "urn:oasis:names:tc:acal:1.0:combining-algorithm:deny-overrides",
        "PolicyDefaults": {
            "XPathPolicyDefaults": {
                "XPathVersion": "https://www.w3.org/TR/xpath20/",
                "Namespace": [
                    {
                        "Prefix": "md",
                        "Name": "urn:example:med:schemas:record"
                    }
                ]
            }
        },
        "VariableDefinition": [
            {
                "VariableId": "patient_number_matched",
                "Expression": {
                    "Apply": {
                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-equal",
                        "Expression": [
                            {
                                "Apply": {
                                    "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-one-and-only",
                                    "Expression": [
                                        {
                                            "AttributeDesignator": {
                                                "Category": "urn:oasis:names:tc:acal:1.0:subject-category:access-subject",
                                                "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:patient-number"
                                            }
                                        }
                                    ]
                                }
                            },
                            {
                                "Apply": {
                                    "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-one-and-only",
                                    "Expression": [
                                        {
                                            "XPathAttributeSelector": {
                                                "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                "Path": "md:record/md:patient/md:patient-number/text()"
                                            }
                                        }
                                    ]
                                }
                            }
                        ]
                    }
                }
            }
        ],
        "CombinerInput": [
            {
                "Rule": {
                    "Id": "example_rule_1",
                    "Effect": "Permit",
                    "Description": "A person may read any medical record in the urn:example:med:schemas:record namespace for whi
                    "Condition": {
                        "Apply": {
                            "FunctionId": "urn:oasis:names:tc:acal:1.0:function:and",
                            "Expression": [
                                {
                                    "VariableReference": {
                                        "VariableId": "patient_number_matched"
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-is-in",
                                        "Expression": [
                                            {
                                                "Value": "read"
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:action",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:action:action-id"
                                                }
                                            }
                                        ]
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:anyURI-is-in",
                                        "Expression": [
                                            {
                                                "Value": "urn:example:med:schemas:record"
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:resource:target-namespace"
                                                }
                                            }
                                        ]
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:any-of",
                                        "Expression": [
                                            {
                                                "Function": {
                                                    "Id": "urn:oasis:names:tc:acal:1.0:function:xpath-node-match"
                                                }
                                            },
                                            {
                                                "Value": {
                                                    "XPathCategory": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                    "XPath": "md:record"
                                                }
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:content-selector"
                                                }
                                            }
                                        ]
                                    }
                                }
                            ]
                        }
                    }
                }
            }
        ]
    }
}
```

4.4.4.2 Rule 2

The following ACAL `<Rule>` instance expresses *Rule* 2:

```
<?xml version="1.0" encoding="UTF-8"?>
<Policy xmlns="urn:oasis:names:tc:xacml:4.0:core:schema"
```

```
3       xmlns:xpath="urn:oasis:names:tc:xacml:4.0:xpath:schema"
4       xmlns:md="urn:example:med:schemas:record"
5       PolicyId="urn:oasis:names:tc:acal:1.0:example:policyid:2" Version="1.0"
6       CombiningAlgId="urn:oasis:names:tc:acal:1.0:combining-algorithm:deny-overrides">
7       <xpath:XPathPolicyDefaults XPathVersion="https://www.w3.org/TR/xpath20/" />
8       <VariableDefinition
9           VariableId="patient_under_16">
10          <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:date-less-or-equal">
11              <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:date-one-and-only">
12                  <AttributeDesignator
13                      Category="urn:oasis:names:tc:acal:1.0:attribute-category:environment"
14                      AttributeId="urn:oasis:names:tc:acal:1.0:environment:current-date"/>
15              </Apply>
16              <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:date-add-yearMonthDuration">
17                  <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:date-one-and-only">
18                      <xpath:XPathAttributeSelector
19                          Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
20                          Path="md:record/md:patient/md:patientDoB/text()"/>
21                  </Apply>
22                  <Value>P16Y</Value>
23              </Apply>
24          </Apply>
25      </VariableDefinition>
26      <Rule Id="example_rule_2" Effect="Permit">
27          <Description>A person may read any medical record in the urn:example:med:schemas:record
28              namespace for which he or she is the designated parent or guardian, and for which the
29              patient is under 16 years of age</Description>
30          <Condition>
31              <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:and">
32                  <VariableReference VariableId="patient_under_16" />
33                  <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-is-in">
34                      <Value>read</Value>
35                      <AttributeDesignator
36                          Category="urn:oasis:names:tc:acal:1.0:attribute-category:action"
37                          AttributeId="urn:oasis:names:tc:acal:1.0:action:action-id" />
38                  </Apply>
39                  <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:anyURI-is-in">
40                      <Value>urn:example:med:schemas:record</Value>
41                      <AttributeDesignator
42                          Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
43                          AttributeId="urn:oasis:names:tc:acal:1.0:resource:target-namespace"/>
44                  </Apply>
45                  <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:any-of">
46                      <Function Id="urn:oasis:names:tc:acal:1.0:function:xpath-node-match" />
47                      <Value
48                          XPathCategory="urn:oasis:names:tc:acal:1.0:attribute-category:resource" XPath="md:record" />
49                      <AttributeDesignator
50                          Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
51                          AttributeId="urn:oasis:names:tc:acal:1.0:content-selector"/>
52                  </Apply>
53                  <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-equal">
54                      <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-one-and-only">
55                          <AttributeDesignator
56                              Category="urn:oasis:names:tc:acal:1.0:subject-category:access-subject"
57                              AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:physician-id" />
58                      </Apply>
59                      <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-one-and-only">
60                          <xpath:XPathAttributeSelector
61                              Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
62                              Path="md:record/md:parentGuardian/md:parentGuardianId/text()" />
63                      </Apply>
64                  </Apply>
65              </Apply>
66          </Condition>
67      </Rule>
68  </Policy>
```

Line 18: The `<XPathAttributeSelector>` element selects the patient's date of birth by taking the XPath expression over the resource content.

Line 59: The second argument selects the value of the `<md:parentGuardianId>` element from the resource content using the `<XPathAttributeSelector>` element. This element contains a free-form XPath expression, pointing into the `<Content>` element of the resource category. Note that all namespace prefixes in the XPath expression are resolved with standard namespace declarations. The AttributeSelector evaluates to the bag of values of type `urn:oasis:names:tc:acal:1.0:data-type:string`.

Here is the equivalent example in JACAL syntax (JSON representation of ACAL):

```
{
    "Policy": {
        "PolicyId": "urn:oasis:names:tc:acal:1.0:example:policyid:2",
        "Version": "1.0",
        "CombiningAlgId": "urn:oasis:names:tc:acal:1.0:combining-algorithm:deny-overrides",
        "PolicyDefaults": {
            "XPathPolicyDefaults": {
                "XPathVersion": "https://www.w3.org/TR/xpath20/",
                "Namespace": [
                    {
                        "Prefix": "md",
                        "Name": "urn:example:med:schemas:record"
                    }
                ]
            }
        },
        "VariableDefinition": [
            {
                "VariableId": "patient_under_16",
                "Expression": {
                    "Apply": {
                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:date-less-or-equal",
                        "Expression": [
                            {
                                "Apply": {
                                    "FunctionId": "urn:oasis:names:tc:acal:1.0:function:date-one-and-only",
                                    "Expression": [
                                        {
                                            "AttributeDesignator": {
                                                "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:environment",
                                                "AttributeId": "urn:oasis:names:tc:acal:1.0:environment:current-date"
                                            }
                                        }
                                    ]
                                }
                            },
                            {
                                "Apply": {
                                    "FunctionId": "urn:oasis:names:tc:acal:1.0:function:date-add-yearMonthDuration",
                                    "Expression": [
                                        {
                                            "Apply": {
                                                "FunctionId": "urn:oasis:names:tc:acal:1.0:function:date-one-and-only",
                                                "Expression": [
                                                    {
                                                        "XPathAttributeSelector": {
                                                            "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource
                                                            "Path": "md:record/md:patient/md:patientDoB/text()"
                                                        }
                                                    }
                                                ]
                                            }
                                        },
                                        {
                                            "Value": "P16Y"
                                        }
                                    ]
                                }
                            }
                        ]
                    }
                }
            }
        ],
        "CombinerInput": [
            {
                "Rule": {
                    "Id": "example_rule_2",
                    "Effect": "Permit",
                    "Description": "A person may read any medical record in the urn:example:med:schemas:record namespace for whi
                    "Condition": {
                        "Apply": {
                            "FunctionId": "urn:oasis:names:tc:acal:1.0:function:and",
                            "Expression": [
                                {
                                    "VariableReference": {
                                        "VariableId": "patient_under_16"
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-is-in",
                                        "Expression": [
                                            {
                                                "Value": "read"
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:action",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:action:action-id"
                                                }
                                            }
                                        ]
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:anyURI-is-in",
                                        "Expression": [
                                            {
                                                "Value": "urn:example:med:schemas:record"
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:resource:target-namespace"
                                                }
                                            }
                                        ]
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:any-of",
                                        "Expression": [
                                            {
                                                "Function": {
                                                    "Id": "urn:oasis:names:tc:acal:1.0:function:xpath-node-match"
                                                }
                                            },
                                            {
                                                "Value": {
                                                    "XPathCategory": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                    "XPath": "md:record"
                                                }
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:content-selector"
                                                }
                                            }
                                        ]
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-equal",
                                        "Expression": [
                                            {
                                                "Apply": {
                                                    "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-one-and-only",
                                                    "Expression": [
                                                        {
                                                            "AttributeDesignator": {
                                                                "Category": "urn:oasis:names:tc:acal:1.0:subject-category:acces
                                                                "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:pl
                                                            }
                                                        }
                                                    ]
                                                }
                                            },
                                            {
                                                "Apply": {
                                                    "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-one-and-only",
                                                    "Expression": [
                                                        {
                                                            "XPathAttributeSelector": {
                                                                "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:res
                                                                "Path": "md:record/md:parentGuardian/md:parentGuardianId/text()
                                                            }
                                                        }
                                                    ]
                                                }
                                            }
                                        ]
                                    }
                                }
                            ]
                        }
                    }
                }
            }
        ]
    }
}
```

4.4.4.3 Rule 3

The following ACAL `<Rule>` instance expresses *Rule* 3:

```
<?xml version="1.0" encoding="UTF-8"?>
<Policy xmlns="urn:oasis:names:tc:xacml:4.0:core:schema"
    xmlns:xpath="urn:oasis:names:tc:xacml:4.0:xpath:schema"
    xmlns:md="urn:example:med:schemas:record"
    PolicyId="urn:oasis:names:tc:acal:1.0:example:policyid:3" Version="1.0"
    CombiningAlgId="urn:oasis:names:tc:acal:1.0:combining-algorithm:deny-overrides">
    <Description>Policy for any medical record in the urn:example:med:schemas:record namespace</Description>
    <xpath:XPathPolicyDefaults XPathVersion="https://www.w3.org/TR/xpath20/" />
    <Target>
        <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:anyURI-is-in">
            <Value>urn:example:med:schemas:record</Value>
            <AttributeDesignator
                Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
                AttributeId="urn:oasis:names:tc:acal:2.0:resource:target-namespace"/>
        </Apply>
    </Target>
    <Rule Id="example_rule_3" Effect="Permit">
        <Description>A physician may write any medical element in a record for which he or she is
            the designated primary care physician, provided an email is sent to the patient.</Description>
        <Condition>
            <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:and">
                <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-is-in">
                    <Value>physician</Value>
                    <AttributeDesignator
                        Category="urn:oasis:names:tc:acal:1.0:subject-category:access-subject"
                        AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:role"/>
                </Apply>
                <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:any-of">
                    <Function Id="urn:oasis:names:tc:acal:1.0:function:xpath-node-match" />
                    <Value
                        XPathCategory="urn:oasis:names:tc:acal:1.0:attribute-category:resource" XPath="md:record/md:medical"/>
                    <AttributeDesignator
                        Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
                        AttributeId="urn:oasis:names:tc:acal:1.0:content-selector" />
                </Apply>
                <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-is-in">
                    <Value>write</Value>
                    <AttributeDesignator
                        Category="urn:oasis:names:tc:acal:1.0:attribute-category:action"
                        AttributeId="urn:oasis:names:tc:acal:1.0:action:action-id"/>
                </Apply>
                <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-equal">
                    <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-one-and-only">
                        <AttributeDesignator
                            Category="urn:oasis:names:tc:acal:1.0:subject-category:access-subject"
                            AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:physician-id"/>
                    </Apply>
                    <Apply FunctionId="urn:oasis:names:tc:acal:1.0:function:string-one-and-only">
```

```
49                          <xpath:XPathAttributeSelector
50                              Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
51                              Path="md:record/md:primaryCarePhysician/md:registrationID/text()" />
52                      </Apply>
53                  </Apply>
54              </Apply>
55          </Condition>
56      </Rule>
57      <NoticeExpression Id="urn:oasis:names:tc:acal:example:obligation:email"
58          AppliesTo="Permit" IsObligation="true">
59          <AttributeAssignmentExpression
60              AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:mailto">
61              <xpath:XPathAttributeSelector MustBePresent="true"
62                  Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
63                  Path="md:record/md:patient/md:patientContact/md:email/text()" />
64          </AttributeAssignmentExpression>
65          <AttributeAssignmentExpression
66              AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:text">
67              <Value>Your medical record has been accessed by: </Value>
68          </AttributeAssignmentExpression>
69          <AttributeAssignmentExpression
70              AttributeId="urn:oasis:names:tc:acal:1.0:example:attribute:text">
71              <AttributeDesignator
72                  Category="urn:oasis:names:tc:acal:1.0:subject-category:access-subject"
73                  AttributeId="urn:oasis:names:tc:acal:1.0:subject:subject-id" />
74          </AttributeAssignmentExpression>
75      </NoticeExpression>
76  </Policy>
```

Lines 28-35: The `<Apply>` element targets resources that match the XPath expression `md:record/md:medical`.

Lines 59-64: The first parameter of the obligation indicates where the PEP will find the email address in the resource. The PDP will evaluate the `<XPathAttributeSelector>` and return the result to the PEP inside the resulting obligation.

Here is the equivalent example in JACAL syntax (JSON representation of ACAL):

```
{
    "Policy": {
        "PolicyId": "urn:oasis:names:tc:acal:1.0:example:policyid:3",
        "Version": "1.0",
        "CombiningAlgId": "urn:oasis:names:tc:acal:1.0:combining-algorithm:deny-overrides",
        "Description": "Policy for any medical record in the urn:example:med:schemas:record namespace",
        "PolicyDefaults": {
            "XPathPolicyDefaults": {
                "XPathVersion": "https://www.w3.org/TR/xpath20/",
                "Namespace": [
                    {
                        "Prefix": "md",
                        "Name": "urn:example:med:schemas:record"
                    }
                ]
            }
        },
        "Target": {
            "Apply": {
                "FunctionId": "urn:oasis:names:tc:acal:1.0:function:anyURI-is-in",
                "Expression": [
                    {
                        "Value": "urn:example:med:schemas:record"
                    },
                    {
                        "AttributeDesignator": {
                            "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                            "AttributeId": "urn:oasis:names:tc:acal:1.0:resource:target-namespace"
                        }
                    }
                ]
            }
        },
        "CombinerInput": [
            {
                "Rule": {
                    "Id": "example_rule_3",
                    "Effect": "Permit",
                    "Description": "A physician may write any medical element in a record for which he or she is the designated
                    "Condition": {
                        "Apply": {
                            "FunctionId": "urn:oasis:names:tc:acal:1.0:function:and",
                            "Expression": [
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-is-in",
                                        "Expression": [
                                            {
                                                "Value": "physician"
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:subject-category:access-subject",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:role"
                                                }
                                            }
                                        ]
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:any-of",
                                        "Expression": [
                                            {
                                                "Function": {
                                                    "Id": "urn:oasis:names:tc:acal:1.0:function:xpath-node-match"
                                                }
                                            },
                                            {
                                                "Value": {
                                                    "XPathCategory": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                    "XPath": "md:record/md:medical"
                                                }
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:content-selector"
                                                }
                                            }
                                        ]
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-is-in",
                                        "Expression": [
                                            {
                                                "Value": "write"
                                            },
                                            {
                                                "AttributeDesignator": {
                                                    "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:action",
                                                    "AttributeId": "urn:oasis:names:tc:acal:1.0:action:action-id"
                                                }
                                            }
                                        ]
                                    }
                                },
                                {
                                    "Apply": {
                                        "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-equal",
                                        "Expression": [
                                            {
                                                "Apply": {
                                                    "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-one-and-only",
                                                    "Expression": [
                                                        {
                                                            "AttributeDesignator": {
                                                                "Category": "urn:oasis:names:tc:acal:1.0:subject-category:acces
                                                                "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:p
                                                            }
                                                        }
                                                    ]
                                                }
                                            },
                                            {
                                                "Apply": {
                                                    "FunctionId": "urn:oasis:names:tc:acal:1.0:function:string-one-and-only",
                                                    "Expression": [
                                                        {
                                                            "XPathAttributeSelector": {
                                                                "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:reso
                                                                "Path": "md:record/md:primaryCarePhysician/md:registrationID/tex
                                                            }
                                                        }
                                                    ]
                                                }
                                            }
                                        ]
                                    }
                                }
                            ]
                        }
                    }
                }
            }
        ],
        "NoticeExpression": [
            {
                "Id": "urn:oasis:names:tc:acal:example:obligation:email",
                "AppliesTo": "Permit",
                "IsObligation": true,
                "AttributeAssignmentExpression": [
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:mailto",
                        "Expression": {
                            "XPathAttributeSelector": {
                                "MustBePresent": true,
                                "Category": "urn:oasis:names:tc:acal:1.0:attribute-category:resource",
                                "Path": "md:record/md:patient/md:patientContact/md:email/text()"
                            }
                        }
                    },
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:text",
                        "Expression": {
                            "Value": "Your medical record has been accessed by: "
                        }
                    },
                    {
                        "AttributeId": "urn:oasis:names:tc:acal:1.0:example:attribute:text",
                        "Expression": {
                            "AttributeDesignator": {
                                "Category": "urn:oasis:names:tc:acal:1.0:subject-category:access-subject",
                                "AttributeId": "urn:oasis:names:tc:acal:1.0:subject:subject-id"
                            }
                        }
                    }
                ]
            }
        ]
    }
}
```

4.5 Changes From the Previous Version

None. This is the first version of this profile.

---

5 Structures

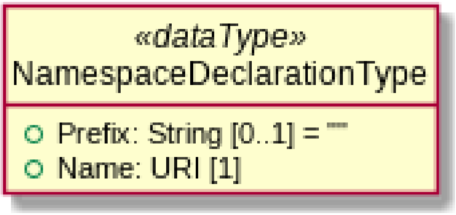
5.1 ContentType restrictions

This profile applies to a `Content` object (defined in [ACAL-Core-1.0]) in the Request if and only if: - The `MediaType` property is set to `application/xml`. - The `Body` property value is a XML document.

5.2 NamespaceDeclarationType (optional)

A `NamespaceDeclarationType` object describes a single XML namespace declaration [NAMESPACES] that is usable in any XPath expression property specified in this profile, i.e. in `XPathAttributeSelectorType`, `XPathEntityAttributeSelectorType` objects, and `xpathExpression` values. This object type is not used in the XML representation of ACAL (XACML) which has native support for XML namespaces. However, it is useful in any non-XML representation of ACAL that does not support namespaces (e.g. JSON) in a standard native way.

UML definition (class diagram):



A `NamespaceDeclarationType` object contains the following properties:

`Prefix` **[Optional, Default** `""`**]**
This property defines the namespace prefix. In the case of a namespace declaration for the default namespace, the value SHALL be omitted (default value is the empty string) or set to the empty string.

`Name` **[Required]**
This property defines the namespace name (URI) itself to which the prefix is mapped. The `URI` datatype is defined in [ACAL-Core-1.0].

5.3 ACAL extension types

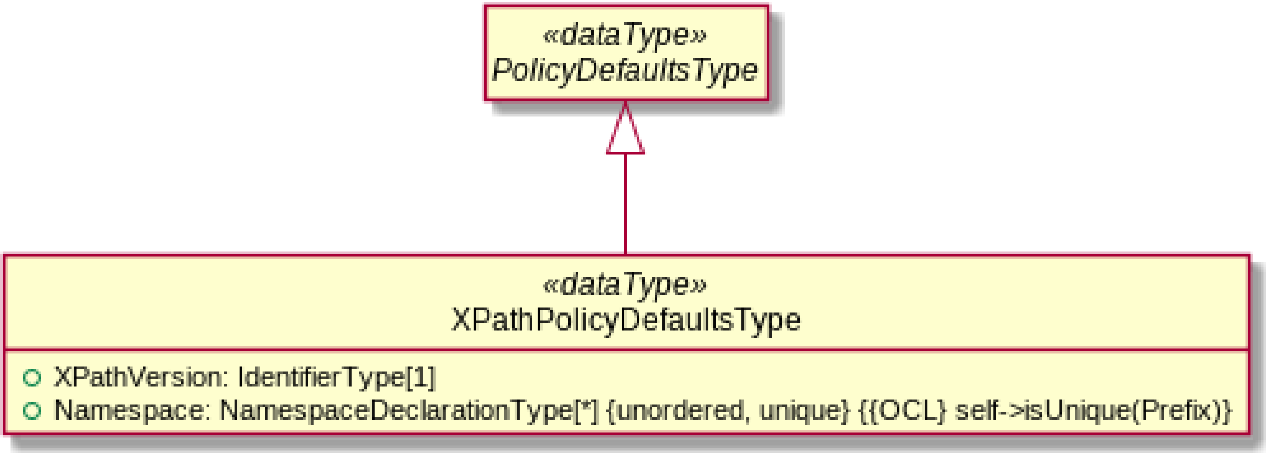
The structures in this section are extensions to [ACAL-Core-1.0] model and described here in abstract terms. The concrete representations of these structures are defined for a variety of syntaxes each in a separate profile.

The types `IdentifierType`, `ValueType`, `SimpleValueType`, `PolicyDefaultsType` and `RequestDefaultsType`, `AttributeSelectorType` and `EntityAttributeSelectorType` used in the next UML models are defined in [ACAL-Core-1.0].

5.3.1 PolicyDefaultsType extension - XPathPolicyDefaultsType

A `XPathPolicyDefaultsType` object extends `PolicyDefaultsType` from [ACAL-Core-1.0] to specify default XPath settings that apply to the evaluation of `XPathAttributeSelectorType` and `XPathEntityAttributeSelectorType` objects, `xpathExpression` values and XPath-based functions in the enclosing `PolicyType` object.

UML definition (class diagram):


«dataType»
PolicyDefaultsType
«dataType»
XPathPolicyDefaultsType
XPathVersion: IdentifierType[1]
Namespace: NamespaceDeclarationType[*] {unordered, unique} {{OCL} self->isUnique(Prefix)}

A `XPathDefaultsType` object contains the following properties:

`XPathVersion` **[Required]**
An `IdentifierType` value specifying the XPath version for XPath expressions occurring in the policy.

XPath expressions are used by attribute selectors and as arguments to XPath-based functions. See the Supported XPath versions in [XPath Definitions] section.

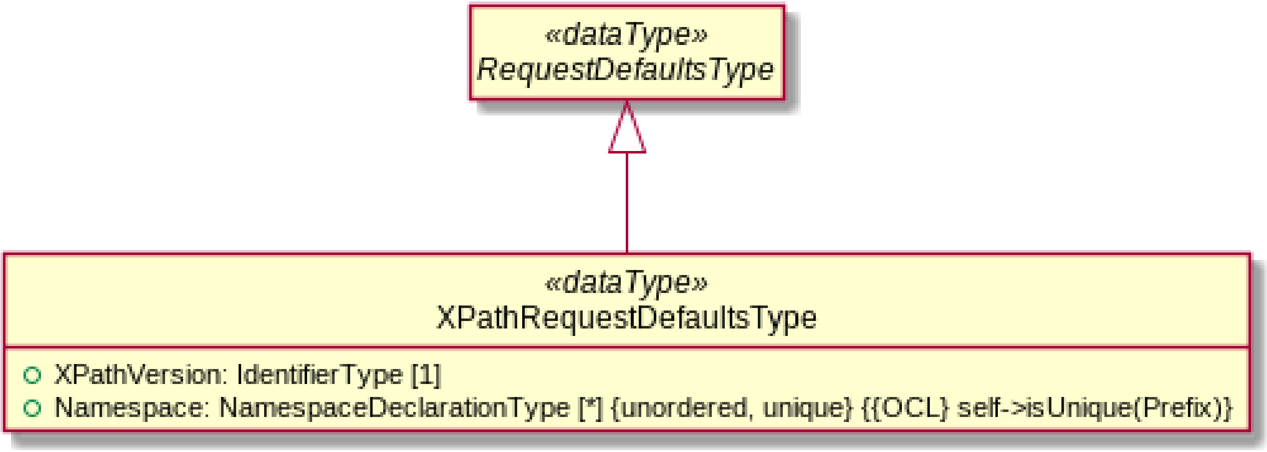
`Namespace` **[Any number]**

Optional collection of XML namespace declaration(s) (zero or more) that SHALL contain a `NamespaceDeclarationType` object for each of the namespace prefixes used in the XPath expression(s) ocurring in the Policy. There SHALL NOT be more than one `NamespaceDeclarationType` object for the same namespace prefix (`Prefix` property). In other words, each `Prefix` SHALL be unique.

5.3.2 RequestDefaultsType extension - XPathRequestDefaultsType

A `XPathRequestDefaultsType` object extends `RequestDefaultsType` from [ACAL-Core-1.0] to specify default XPath settings that apply to the evaluation of `XPathAttributeSelectorType` and `XPathEntityAttributeSelectorType` objects, `xpathExpression` values and XPath-based functions in the enclosing `RequestType` object.

UML definition (class diagram):


«dataType»
RequestDefaultsType
«dataType»
XPathRequestDefaultsType
XPathVersion: IdentifierType [1]
Namespace: NamespaceDeclarationType [*] {unordered, unique} {{OCL} self->isUnique(Prefix)}

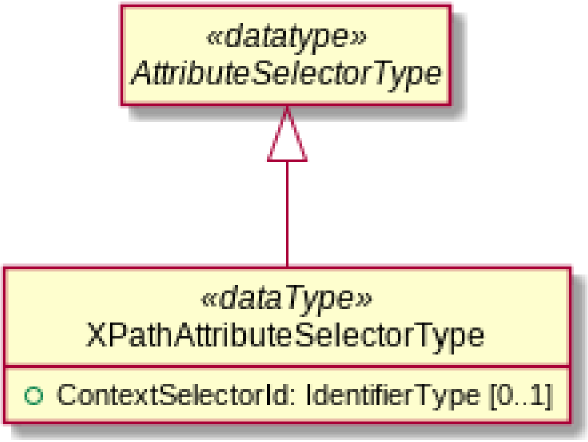
Same property(ies) as `XPathPolicyDefaultsType` in the previous section.

5.3.3 AttributeSelectorType extension - XPathAttributeSelectorType

An `XPatAttributeSelectorType` object is a concrete type of `AttributeSelectorType` from [ACAL-Core-1.0] that uses [XPath] for `Path` expressions and expect an XML document in the `Body` property of the `Content` object of the `RequestEntityType` object matching the `Category` property. More precisely, the returned values shall be constructed from the node(s) selected by applying the XPath expression given by the attribute selector's `Path` property to the XML document in the `Body` property of the `Content` object of the `RequestEntityType` object matching the attribute selector's `Category` property.

See the section 9 for details of attribute selector evaluation.

UML definition (class diagram):


«datatype»
AttributeSelectorType
«dataType»
XPathAttributeSelectorType
ContextSelectorId: IdentifierType [0..1]

The `XPathAttributeSelectorType` object type extends the `AttributeSelectorType` object type with the following property:

`ContextSelectorId` [Optional]

An `IdentifierType` value specifying an ACAL attribute (by its `AttributeId`) in the attribute category (`RequestEntityType` object with `Category` matching this attribute selector's `Category`) containing the XML content. The referenced attribute MUST have a single value of data type `urn:oasis:names:tc:acal:1.0:data-type:xpathExpression` (see Annex C) and the XPath expression represented by that value must select a single node in the XML content. The `XPathCategory` property of the referenced ACAL attribute value SHALL be ignored.

More importantly, in the context of this profile, the value of the `Path` property inherited from supertype `AttributeSelectorType` SHALL be an XPath expression [XPath]. In addition, this XPath expression may reference one or more XPath variables, in which case each XPath variable's value(s) is taken(s) from the corresponding so-called *ACAL variable*, i.e. the variable defined by a `<VariableDefinition>` with a `VariableId` matching the XPath variable name, in the scope of this element. Only XPath variables of primitive atomic type or array of primitive atomic type are allowed in this XPath expression; in the first case (respectively the second case), the corresponding ACAL variable must return a single value (respectively a bag) of a primitive datatype that is convertible to that XPath atomic type. How to do this conversion is described in section 8.4.7 of [ACAL-Core-1.0].

For example, in the following `XPathAttributeSelectorType` object in XML representation format:

```
<XPathAttributeSelector
 Path="if ($classif_name = 'SECRET') then 3 else if ($classif_name = 'CONFIDENTIAL') then 2 else if ($classif_name = 'RESTRICTE
 Category="urn:oasis:names:tc:acal:1.0:attribute-category:resource"
 DataType="urn:oasis:names:tc:acal:1.0:data-type:integer"
 MustBePresent="true" />
```

The XPath expression references the XPath variable `classif_name`, which requires a `<VariableDefinition VariableId="classif_name">some_expression</VariableDefinition>` to be defined in the enclosing `Policy`, where `some_expression` is any Expression of returning a value of type `urn:oasis:names:tc:acal:1.0:data-type:s`

If no such variable is found (in the current scope) or the datatype is incompatible (ACAL-to-XPath type conversion is not possible), the XPath expression and therefore this `Path` attribute must be considered invalid and a syntax error returned (status code `urn:oasis:names:tc:acal:1.0:status:syntax-error`). See Section 7 for more details.

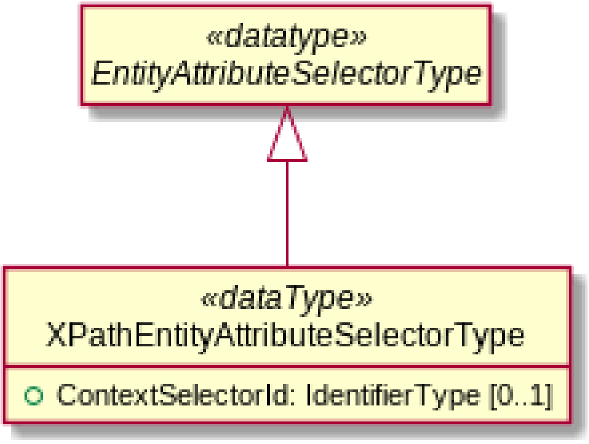
The namespace context for the value of the Path attribute is given by the [in-scope namespaces] [INFOSET] of the `<XPathAttributeSelector>` element.

5.3.4 EntityAttributeSelectorType extension - XPathEntityAttributeSelectorType

An `XPathEntityAttributeSelectorType` object is a concrete type of `EntityAttributeSelectorType` [ACAL-Core-1.0] that uses [XPath] for `Path` expressions and expects XML content in the value returned by the attribute selector's `Expression` property. In other words, the values shall be constructed from the node(s) selected by applying the XPath expression given by the entity attribute selector's `Path` property to the XML document in the `Body` property of the `Content` property in either an attribute category in the request context (`RequestEntity`) or the value of the `urn:oasis:names:tc:acal:1.0:data-type:entity` data type returned by its `Expression` evaluation.

See the Section 9 for details of entity attribute selector evaluation.

UML definition (class diagram):

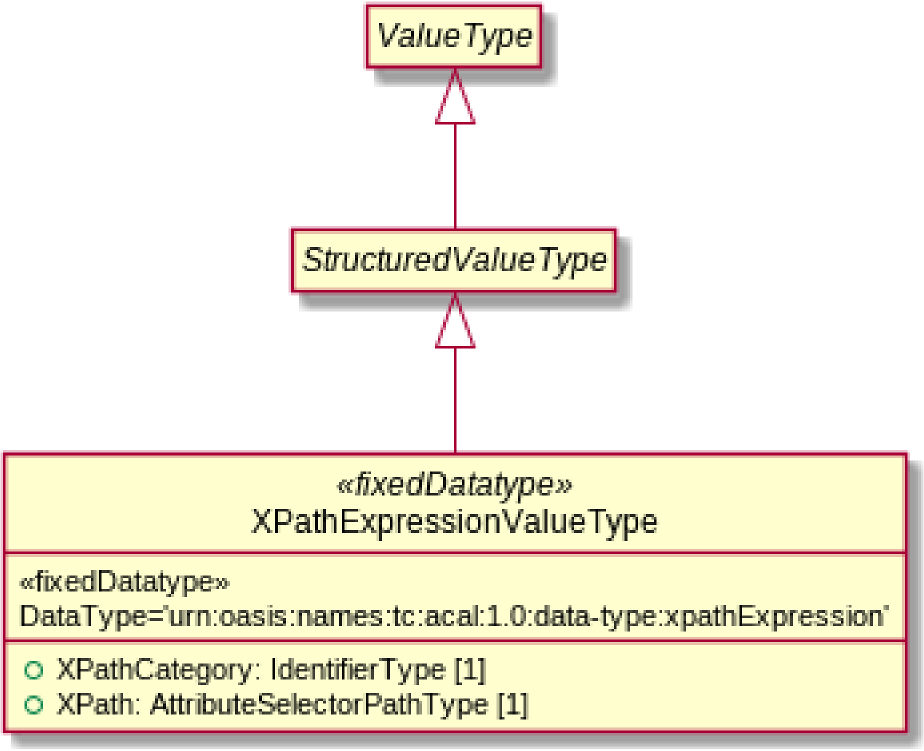

«datatype»
EntityAttributeSelectorType
«dataType»
XPathEntityAttributeSelectorType
ContextSelectorId: IdentifierType [0..1]

The XPathEntityAttributeSelectorType object type extends the EntityAttributeSelectorType object type with the same ContextSelectorId property as XPathAttributeSelectorType. The Path property is also defined the same as in XPathAttributeSelectorType.

5.3.5 DataType extension - XPathExpressionValueType

The urn:oasis:names:tc:acal:1.0:data-type:xpathExpression values (Annex C) can be modeled as a subtype of SimpleValueType [ACAL-Core-1.0] called XPathExpressionValueType.

UML model (class diagram):


ValueType
StructuredValueType
«fixedDatatype»
XPathExpressionValueType
«fixedDatatype»
DataType='urn:oasis:names:tc:acal:1.0:data-type:xpathExpression'
XPathCategory: IdentifierType [1]
XPath: AttributeSelectorPathType [1]

A XPathExpressionValueType object has the following properties:

Value [Required]
The XPath expression (the AttributeSelectorPathType is defined in [ACAL-Core-1.0])

XPathCategory [Required]
The Category of the RequestEntityType object containing the XML Content to which the XPath expression applies.

6 XPath Definitions

Supported XPath versions

The `XPathVersion` property in a `XPathDefaultsType`, `XPathPolicyDefaultsType` or `XPathRequestDefaultsType` object contains an `IdentifierType` value that specifies the XPath version that applies for a policy or request, respectively.

To specify XPath 2.0 the `IdentifierType` value MUST evaluate to `https://www.w3.org/TR/xpath20/`.

To specify XPath 3.0, the `IdentifierType` value MUST evaluate to `http://www.w3.org/TR/xpath-30/`.

To specify XPath 3.1, the `IdentifierType` value MUST evaluate to `http://www.w3.org/TR/xpath-31/`.

XPath 1.0 , and therefore the XPath 1.0 identifier `https://www.w3.org/TR/1999/REC-xpath-19991116/`, is deprecated.

The XPath specification leaves a number of aspects of behavior implementation-defined. The following sections defines how XPath 2.0 and later versions SHALL behave in an ACAL implementation.

XPath 2.0 Implementation-Defined Items

XPath 2.0 - Appendix D defines the following items:

1. **The version of Unicode that is used to construct expressions.**
   ACAL leaves this implementation defined. It is RECOMMENDED that the latest version is used.
2. **The statically-known collations.**
   ACAL leaves this implementation defined.
3. **The implicit timezone.**
   ACAL defines the implicit time zone as UTC.
4. **The circumstances in which warnings are raised, and the ways in which warnings are handled.**
   ACAL leaves this implementation defined.
5. **The method by which errors are reported to the external processing environment.**
   An XPath error in the evaluation of an attribute selector causes the result to be `Indeterminate`. The status code SHALL be `urn:oasis:names:tc:acal:1.0:status:processing-error`. Implementations MAY provide additional details about the error in the response or by some other means.
6. **Whether the implementation is based on the rules of XML 1.0 or 1.1.**
   ACAL is based on XML 1.0.
7. **Whether the implementation supports the namespace axis.**
   ACAL leaves this implementation defined. It is RECOMMENDED that users of ACAL do not make use of the namespace axis.
8. **Any static typing extensions supported by the implementation, if the Static Typing Feature is supported.**
   ACAL leaves this implementation defined.

XPath 2.0 Data Model - Appendix F defines the following items:

1. **Support for additional user-defined or implementation-defined types is implementation-defined.**
   It is RECOMMENDED that implementations of ACAL do not define any additional types and it is RECOMMENDED that users of ACAL do not make use of any additional types.
2. **Some typed values in the data model are undefined. Attempting to access an undefined property is always an error. Behavior in these cases is implementation-defined and the host language is responsible for determining the result.**
   An XPath error in the evaluation of an attribute selector causes the result to be `Indeterminate`. The status code SHALL be `urn:oasis:names:tc:acal:1.0:status:processing-error`. Implementations MAY provide additional details about the error in the response or by some other means.

XPath Functions defines the following items:

1. **The destination of the trace output is implementation-defined.**
   ACAL leaves this implementation defined.

2. **For `xs:integer` operations, implementations that support limited-precision integer operations must either raise an error [err:FOAR0002] or provide an implementation-defined mechanism that allows users to choose between raising an error and returning a result that is modulo the largest representable integer value.**
   ACAL leaves this implementation defined. If an implementation chooses to raise an error, the status code SHALL be `urn:oasis:names:tc:acal:1.0:status:processing-error`. Implementations MAY provide additional details about the error in the response or by some other means.
3. **For `xs:decimal` values the number of digits of precision returned by the numeric operators is implementation-defined.**
   ACAL leaves this implementation defined.
4. **If the number of digits in the result of a numeric operation exceeds the number of digits that the implementation supports, the result is truncated or rounded in an implementation-defined manner.**
   ACAL leaves this implementation defined.
5. **It is implementation-defined which version of Unicode is supported.**
   ACAL leaves this implementation defined. It is RECOMMENDED that the latest version is used.
6. **For `fn:normalize-unicode`, conforming implementations must support normalization form "NFC" and may support normalization forms "NFD", "NFKC", "NFKD", "FULLY-NORMALIZED". They may also support other normalization forms with implementation-defined semantics.**
   ACAL leaves this implementation defined.
7. **The ability to decompose strings into collation units suitable for substring matching is an implementation-defined property of a collation.**
   ACAL leaves this implementation defined.
8. **All minimally conforming processors must support year values with a minimum of 4 digits (i.e., YYYY) and a minimum fractional second precision of 1 millisecond or three digits (i.e., s.sss). However, conforming processors may set larger implementation-defined limits on the maximum number of digits they support in these two situations.**
   ACAL leaves this implementation defined, and it is RECOMMENDED that users of ACAL do not expect greater limits and precision.
9. **The result of casting a string to `xs:decimal`, when the resulting value is not too large or too small but nevertheless has too many decimal digits to be accurately represented, is implementation-defined.**
   ACAL leaves this implementation defined.
10. **Various aspects of the processing provided by `fn:doc` are implementation-defined. Implementations may provide external configuration options that allow any aspect of the processing to be controlled by the user.**
    ACAL leaves this implementation defined.
11. **The manner in which implementations provide options to weaken the stable characteristic of `fn:collection` and `fn:doc` are implementation-defined.**
    ACAL leaves this implementation defined.

XPath 3.0 additional implementation-defined items

XPath 3.0 Appendix D defines the following additional items to XPath 2.0 items:

1. **How XDM instances are created from sources other than an Infoset or PSVI.**
   ACAL implementations should not have to create XDM instances from sources other than an Infoset or PSVI.
2. **The signatures of functions provided by the implementation or via an implementation-defined API.**
   It is RECOMMENDED that implementations of ACAL do not define any additional XPath functions and it is RECOMMENDED that users of ACAL do not make use of any additional XPath functions.
3. **Any environment variables provided by the implementation.**
   It is RECOMMENDED that users of ACAL use ACAL-defined VariableDefinitions (based on AttributeDesignator and appropriate PIP to obtain the values) in order to capture environment variables,

then use the ACAL-defined Variables as XPath variables in XPath expressions, as specified by ACAL. If this is hardly feasible, as an alternative, ACAL users may use implementation-defined environment variables in their XPath expressions only if they are standard, e.g. POSIX environment variables.

XQuery and XPath Data Model (XDM) 3.0 - Appendix F.1 defines the following additional item(s):

1. **When converting from an xs:string to an xs:float or xs:double, it is implementation-defined whether the lexical value `-0` (and similar forms such as `-0.0`) convert to negative zero or to positive zero in the value space.**
   ACAL leaves this implementation-defined.

XQuery and XPath Functions and Operators 3.0 (Appendix D) defines the following additional items:

1. Item #39: implementations SHALL apply schema validation to ACAL documents instead of DTD validation.
2. Item #44: implementations SHALL invoke schema validation instead of DTD validation, and use an XML 1.0 parser.
3. Item #45: implementations SHALL use an XML 1.0 parser.
4. Item #50: implementations SHALL support (at least) version 2025b of the *tz* timezone database.
5. ACAL leaves other features of Appendix D implementation-defined, unless otherwise specified by the previous section (XPath 2.0 implementation-defined items).

XPath 3.1 additional implementation-defined items

For addressing Implementation-Defined Items sections of XPath 3.1 standard, Appendix D and XQuery and XPath Data Model 3.1, refer to the previous sections for XPath 2.0 and 3.0.

XQuery and XPath Functions and Operators 3.1 (Appendix E) defines the following additional item(s):

1. Item #45: schema validation SHALL be applied to the source document.
2. Items #52, #53: schema validation SHALL be invoked and an XML 1.0 parser SHALL be used.
3. Item #66: implementations SHALL support (at least) version 2025b of the *tz* timezone database.
4. ACAL leaves other features of Appendix E implementation-defined, unless otherwise specified by the previous section (XPath 2.0 and 3.0 implementation-defined items).

---

7 Attribute Selector Evaluation

An `XPathAttributeSelectorType` or `XPathEntityAttributeSelector` object SHALL be evaluated according to the following processing model.
Note: It is not necessary for an implementation to exactly follow this model. It is only necessary to produce results identical to those that would be produced by following this model.

The first steps are already described in [ACAL-Core-1.0] section 8.4.7 (Attribute selector evaluation) and provided here as a reminder:

- If the attribute category given by the `Category` property is not found or does not have a `Content` property, then the return value is either `Indeterminate` or an empty bag as determined by the `MustBePresent` property.
- If the `Expression` property of an `XPathEntityAttributeSelector` object evaluates to a value of the `urn:oasis:names:tc:acal:1.0:data-type:entity` data type and that value does not have a `Content` property, then the return value is either `Indeterminate` or an empty bag as determined by the `MustBePresent` property.
- If the `Expression` property of an `XPathEntityAttributeSelector` object evaluates to a value of the `urn:oasis:names:tc:acal:1.0:data-type:anyURI` data type and an attribute category with that value as its `Category` is not found or does not have a `Content` property, then the return value is either `Indeterminate` or an empty bag as determined by the `MustBePresent` property.

If the designated attribute category or entity value has a `Content` property, then follow the steps below:

1. Construct an XML data structure suitable for XPath processing from the value of the `Body` property of the `Content` object. The data structure shall be constructed so that the document node of this structure contains a single document element which corresponds to the single child element of the `Body` property. The constructed data structure shall be equivalent to one that would result from parsing a stand-alone

XML document consisting of the contents of the Body property (including any comment and processing-instruction markup). **In a XML representation, namespace declarations from the <Body> element and its ancestor elements for namespace prefixes that are "visibly utilized", as defined by [exc-c14n], within the contents MUST be present.** Namespace declarations from the single child element or its ancestor elements for namespace prefixes that are not "visibly utilized" MAY be present. The data structure must meet the requirements of the applicable XPath version.

2. If there is a `ContextSelectorId` property, the context node shall be the node selected by applying the XPath expression given in the attribute value of the designated ACAL attribute. It shall be an error if this evaluation returns no node or more than one node, in which case the return value MUST be `Indeterminate` with status code `urn:oasis:names:tc:acal:1.0:status:syntax-error`. If there is no `ContextSelectorId` property, then the document node of the data structure shall be the context node.
3. Evaluate the XPath expression given in the `Path` property against the context node selected in the previous step, according to the [XPath] standard in the version indicated in the `PolicyDefaults` property for this profile. This XPath expression may reference one or more XPath variables, in which case each XPath variable's value(s) is taken(s) from the corresponding so-called *ACAL variable*, i.e. the variable defined by a `<VariableDefinition>` with a `VariableId` matching the XPath variable name, in the scope of this element. Only XPath variables of primitive atomic type or array of primitive atomic type are allowed in this XPath expression; in the first case (respectively the second case), the corresponding ACAL variable must return a single value (respectively a bag) of a primitive datatype that is convertible to that XPath atomic type. How to do this conversion is the same as in step 4 below. If no such variable is found (in the current scope) or the datatype is incompatible (ACAL-to-XPath type conversion is not possible), the XPath expression and therefore this `Path` attribute must be considered invalid and a syntax error returned (status code `urn:oasis:names:tc:acal:1.0:status:syntax-error`).
4. The result of step 3 is converted to ACAL value(s) according to the same rules as in the last step of [ACAL-Core-1.0] section 8.4.7 (Attribute Selector evaluation).

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8 Safety, Security, and Data Protection Considerations

Refer to [ACAL-Core-1.0] section 11.

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9 Conformance

9.1 Introduction

The specification addresses the following aspect of conformance:

The specification defines a number of functions, etc. that have somewhat special applications, therefore they are not required to be implemented in an implementation that claims to conform with to this specification.

9.2 Conformance Tables

This section lists those portions of the specification that MUST be included in an implementation of a PDP that claims to conform to this profile.
Note: "M" means mandatory-to-implement. "O" means optional.

The implementation MUST follow Section 5, Section 6, Section 7, Annex C, Annex D where they apply to implemented items in the following tables.

Many of these items are associated with versions of XACML preceding ACAL but have been assigned new identifiers with the `urn:oasis:names:tc:acal:1.0:` prefix. The older XACML identifiers have been listed in the tables as deprecated identifiers. Implementations MUST support a new identifier defined in this specification but MAY recognize the corresponding deprecated identifier as equivalent. It is RECOMMENDED that these deprecated identifiers not be used in new policies and requests; they are planned to be removed in a subsequent version of ACAL. Note that some items appear to be carried over from a preceding version of XACML but do not list the XACML identifier. This is because ACAL has redefined the item in some way that means it is no longer identical to the original definition in XACML, and so the identifiers can no longer be considered equivalent. Items new to ACAL 1.0 will also not list an XACML identifier.

9.2.1 Object Types

The implementation MUST support the object types that are marked `M`.

Object Type	M/O
XPathAttributeSelectorType	M
XPathEntityAttributeSelectorType	O
XPathExpressionValueType	O
XPathPolicyDefaultsType or XPathDefaultsType	M
XPathRequestDefaultsType or XPathDefaultsType	M

9.2.2 Data Types

The implementation MUST support the data types associated with the following identifiers marked `M`.

Identifier	M/O	Deprecated Identifier
urn:oasis:names:tc:acal:1.0:data-type:xpathExpression	O	urn:oasis:names:tc:xacml:3.0:data-type:xpathExpression

9.2.3 Functions

The implementation MUST properly process those functions associated with the identifiers marked with an `M`.

Function	M/O	Deprecated Identifier
urn:oasis:names:tc:acal:1.0:function:xpath-node-count	O	urn:oasis:names:tc:xacml:3.0:function:xpath-node-count
urn:oasis:names:tc:acal:1.0:function:xpath-node-equal	O	urn:oasis:names:tc:xacml:3.0:function:xpath-node-equal
urn:oasis:names:tc:acal:1.0:function:xpath-node-match	O	urn:oasis:names:tc:xacml:3.0:function:xpath-node-match

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Annex A License, Document Status and Notices

(This annex forms an integral part of this Specification.)

A.1 Document Status

This document was last revised or approved by the OASIS eXtensible Access Control Markup Language (XACML) TC on the above date. The level of approval is also listed above. Check the “Latest version” location noted above for possible later revisions of this document. Any other numbered Versions and other technical work produced by the Technical Committee (TC) are listed at https://groups.oasis-open.org/communities/tc-community-home2?CommunityKey=67afe552-0921-49b7-9a85-018dc7d3ef1d#technical.

TC members should send comments on this document to the TC’s email list. Others should send comments to the TC’s public comment list, after subscribing to it by following the instructions at the “Send A Comment” button on the TC’s web page at https://www.oasis-open.org/committees/xacml/.

NOTE: any machine-readable content (Computer Language Definitions) declared Normative for this Work Product is provided in separate plain text files. In the event of a discrepancy between any such plain text file and display content in the Work Product’s prose narrative document(s), the content in the separate plain text file prevails.

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Annex B References

(This annex forms an integral part of this Specification.)

This section contains the normative and informative references that are used in this document.

Normative references are specific (identified by date of publication and/or edition number or version number) and Informative references are either specific or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies. While any hyperlinks included in this section were valid at the time of publication, OASIS cannot guarantee their long term validity.

B.1 Normative References

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Annex C Data Types and Functions

(This annex forms an integral part of this Specification.)

C.1 Introduction

This section specifies the data types and functions used in ACAL to create predicates for conditions and targets.

This specification combines the various standards set forth by IEEE and ANSI for string representation of numeric values, as well as the evaluation of arithmetic functions. The standard functions are named and their operational semantics are described.

C.2 Data Types

Although a syntactic representation of ACAL objects may represent most data types as strings, an ACAL PDP must operate on types of data that, while they have string representations, are not just strings. Types such as `Boolean`, `Integer`, and `Double` MUST be converted from their string representations to values that can be compared with values in their domain of discourse, such as numbers. The following data types are specified for use with ACAL and have explicit data representations:

- `urn:oasis:names:tc:acal:1.0:data-type:xpathExpression`.

C.2.1 XPath Expression

Support for this data-type is OPTIONAL.

This section needs to be aligned with the JSON profile's handling of values of the xpathExpression data type.

The `urn:oasis:names:tc:acal:1.0:data-type:xpathExpression` data type represents an XPath expression over the XML in a `ContentType` object. The syntax is defined by the XPath W3C recommendation. The content of this data-type also includes the context in which namespaces prefixes in the expression are resolved, which distinguishes it from a plain string and the ACAL attribute category of the `ContentType` object to which it applies. When the value is encoded in a `ValueType` object, the namespace context is given by the [in-scope namespaces] (see [INFOSET]) of the `ValueType` object for the XML representation, or, for non-XML representations, the `Namespaces` property in the Request's `XPathRequestDefaults` property or the Policy's `XPathPolicyDefaults`, and an XML attribute called `XPathCategory` gives the category of the `ContentType` object where the expression applies.

The XPath expression MUST be evaluated in a context which is equivalent of a stand alone XML document with the only child of the `ContentType` object's `Body` property value as the document element. The context node of the XPath expression is the document node of this standalone document. Namespace declarations from the `ContentType` object and its ancestor elements for namespace prefixes that are "visibly utilized", as defined by [exc-c14n], within the contents MUST be present. **In a XML representation, namespace declarations from the `<Body>` element or its ancestor elements for namespace prefixes that are not "visibly utilized" MAY be present.**

C.3 Functions

Unless otherwise specified, if an argument of one of these functions were to evaluate to `Indeterminate`, then the function SHALL evaluates to `Indeterminate`.

Note that in each case an implementation is conformant as long as it produces the same result as is specified here, regardless of how and in what order the implementation behaves internally.

C.3.1 XPath-based Functions

Supporting these functions is optional.

This section specifies functions that take XPath expressions for arguments. An XPath expression evaluates to a node-set, which is a set of XML nodes that match the expression. A node or node-set is not in the formal data type system of ACAL. All comparison or other operations on node-sets are performed in isolation of the particular function specified. The context nodes and namespace mappings of the XPath expressions are defined by the XPath data type, see Annex C.2.1. The following functions are defined:

`urn:oasis:names:tc:acal:1.0:function:xpath-node-count`
This function SHALL take an `urn:oasis:names:tc:acal:1.0:data-type:xpathExpression` as an argument and evaluates to an `urn:oasis:names:tc:acal:1.0:data-type:integer`. The value returned from the function SHALL be the count of the nodes within the node-set that match the given XPath expression. If the `ContentType` object of the category to which the XPath expression applies is not present in the request, this function SHALL return a value of zero.

`urn:oasis:names:tc:acal:1.0:function:xpath-node-equal`
This function SHALL take two `urn:oasis:names:tc:acal:1.0:data-type:xpathExpression` arguments and SHALL return an `urn:oasis:names:tc:acal:1.0:data-type:boolean`. The function SHALL return `true` if any of the XML nodes in the node-set matched by the first argument equals any of the XML nodes in the node-set matched by the second argument. Two nodes are considered equal if they have the same identity. If the `ContentType` object of the category to which either XPath expression applies is not present in the request, this function SHALL return a value of `false`.

`urn:oasis:names:tc:acal:1.0:function:xpath-node-match`

> This function SHALL take two `urn:oasis:names:tc:acal:1.0:data-type:xpathExpression` arguments and SHALL return an `urn:oasis:names:tc:acal:1.0:data-type:boolean`. This function SHALL evaluate to `true` if one of the following two conditions is satisfied: (1) Any of the XML nodes in the node-set matched by the first argument is equal to any of the XML nodes in the node-set matched by the second argument; (2) any node below any of the XML nodes in the node-set matched by the first argument is equal to any of the XML nodes in the node-set matched by the second argument. Two nodes are considered equal if they have the same identity. If the `ContentType` object of the category to which either XPath expression applies is not present in the request, this function SHALL return a value of `false`. Note: The first condition is equivalent to `xpath-node-equal`, and guarantees that `xpath-node-equal` is a special case of `xpath-node-match`.

Annex D ACAL Identifiers

(This annex forms an integral part of this Specification.)

This section defines standard identifiers for commonly used definitions.

D.1 ACAL Namespaces

This ACAL Profile is defined using this identifier.

`urn:oasis:names:tc:acal:1.0:xpath:schema`

D.2 Data Types

The following identifiers indicate data types that are defined in Annex C.2:

- `urn:oasis:names:tc:acal:1.0:data-type:xpathExpression`.

Annex E How to generate HTML and PDF versions

Online generation

HTML/PDF versions are generated automatically online via Github Actions after each update pushed to the main branch of OASIS XACML TC Github repository. Go to Github Actions on the github repository, then go to the latest workflow run, and, if the run succeeded, the summary should display the links to the generated HTML/PDF documents.

Offline generation

Prerequisites

The following tools are required:

- Pandoc;
- Pandoc-include filter.
- PlantUML

Either install them on your system or, if you have Docker installed already, simply use the following shell alias:

Install Pandoc, Graphviz and PlantUML on your system; or simply use Docker with the following shell alias:

```
$ alias pandoc='docker run --rm --volume "$(pwd):/data" cdang/pandoc-plantuml'
```

The Dockerfile (named `Dockerfile`) of the docker image used in the alias above is provided in the pandoc folder next to this markdown file for your convenience if you wish to build it yourself.

OASIS staff are currently using pandoc 3.0 from https://github.com/jgm/pandoc/releases/tag/3.0.

Git clone or get a local copy of OASIS XACML TC Github repository, open a terminal and **change your working directory to the root directory of your local copy of the repository**.

CSS stylesheet

The generation command uses a CSS stylesheet file (`-c` argument) provided by OASIS. It may be changed to one of these (or the local version in the `styles` folder) to get a different style of output: - https://docs.oasis-open.org/templates/css/markdown-styles-v1.7.3.css - https://docs.oasis-open.org/templates/css/markdown-styles-v1.7.3a.css (this one produces HTML that resembles the github display more closely, especially for blocks of code) This template already includes a reference (in HTML code) to this .css file.

HTML generation

Run the following command line to generate HTML from this markdown file (`acal-xpath-v1.0-csd01.md`) to an output file `/tmp/acal-xpath-v1.0-csd01.html`:

```
$ pandoc -f markdown+definition_lists+fenced_code_attributes -c styles/markdown-styles-v1.7.3a.css --standalone --filter pandoc-
```

Note this command generates a Table of Contents (TOC) in HTML which is located at the top of the HTML document, and which requires additional editing in order to be published in the expected OASIS style. This editing will be handled by OASIS staff during publication.

PDF generation

For PDF output (file `/tmp/acal-xpath-v1.0-csd01.pdf`), the command line is the following (different `-t` and `-H` arguments):

```
$ pandoc -f markdown+definition_lists+fenced_code_attributes -c styles/markdown-styles-v1.7.3a.css -H pandoc/custom_latex_heade
```

Appendix 1 Acknowledgments

(This appendix does not form an integral part of this Specification and is informational.)

Leadership

The following individuals have had significant leadership positions during the development of this document, not just this version of the document, and they are gratefully acknowledged:

- Chairs
  - Bill Parducci, Individual
- Secretaries
  - Bill Parducci, Individual
- Editors
  - Steven Legg, ViewDS Identity Solutions
  - Cyril Dangerville, THALES

Special Thanks

The following individuals have made substantial contributions to this document, not just this version of the document, and their contributions are gratefully acknowledged:

- Steven Legg, ViewDS Identity Solutions
- Cyril Dangerville, THALES

Participants

The following individuals were members of this committee during the creation of this document, not just this version of the document, and their contributions are gratefully acknowledged:

XACML TC Members:

- Hal Lockhart, Individual
- Bill Parducci, Individual
- Steven Legg, ViewDS Identity Solutions
- Cyril Dangerville, THALES

Appendix 2 Changes From Previous Version

(This appendix does not form an integral part of this Specification and is informational.)

This ACAL Profile is a successor to the set of XPath-based features of XACML 3.0. This profile differs from XACML 3.0 original XPath features in the following ways:

- Like [ACAL-Core-1.0] core model, this profile's constructs can be represented in JSON, YAML or XML at the implementor's discretion.
- `AttributeSelector` has become abstract to support other kinds of AttributeSelector (e.g. JSONPath-based) and the former XPath-based AttributeSelectorType becomes the subtype `XPathAttributeSelectorType`
- Compared to XACML 3.0 AttributeSelectorType, `XPathAttributeSelectorType` supports a new feature:
  - `Path` expression (XPath) can use *ACAL* variables from `VariableDefinition`s as XPath variables.
- XPath versions: deprecated XPath version 1.0; added support for XPath 3.0 and 3.1.
- Deprecated prefixes `urn:oasis:names:tc:xacml:` and `https://www.w3.org/2001/XMLSchema#` in favor of `urn:oasis:names:tc:acal:` for all standard identifiers (algorithms, status codes, data-types, functions, attributes and categories)
- Namespaces (prefix-to-namespace bindings) may be be declared as part of `XPathRequestDefaultsType`/`XPathPolicyDef` to allow using namespace prefixes in non-XML representations of ACAL (e.g. JSON) like it was the case for Requests in JSON Profile of XACML 3.0.

Revision History

Latest revision history can be obtained from OASIS XACML TC's code repository.