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Generic Policy Data Model for  
Simplified Use of Policy Abstractions (SUPA)  
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## Abstract

This document defines two YANG policy data modules. The first is a generic policy model that is meant to be extended on an application-specific basis. The second is an exemplary extension of the first generic policy model, and defines rules as event-condition-action policies. Both models are independent of the level of abstraction of the content and meaning of a policy.

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## [1.](#) Overview

This document defines two YANG [[RFC6020](#)] [[RFC6991](#)] policy data models. The first is a generic policy model that is meant to be extended on an application-specific basis. It is derived from the Generic Policy Information Model (GPIM) defined in [[1](#)]. The second is an exemplary extension of the first (generic policy) model, and defines policy rules as event-condition-action tuples. Both models are independent of the level of abstraction of the content and meaning of a policy.

The GPIM defines a common framework as a set of model elements (e.g., classes, attributes, and relationships) that specify a common set of policy management concepts that are independent of the type of policy (e.g., imperative, procedural, declarative, or

otherwise). The first YANG data model is a translation of the GPIM to a YANG module. The ECA Policy Rule Information Model (EPRIM), also defined in [1], extends the GPIM to represent policy rules that use the Event-Condition-Action (ECA) paradigm. The second YANG data model maps the EPRIM to YANG. The second YANG data model MAY be used to augment the functionality of the first YANG data model.

## [2.](#) Conventions Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119]. In this document, these words will appear with that interpretation only when in ALL CAPS. Lower case uses of these words are not to be interpreted as carrying [RFC2119] significance.

## [3.](#) Terminology

This section defines acronyms, terms, and symbology used in the rest of this document.

### [3.1.](#) Acronyms

CNF	Conjunctive Normal Form
DNF	Disjunctive Normal Form
ECA	Event-Condition-Action
EPRIM	(SUPA) ECA Policy Rule Information Model [1]
FQDN	Fully Qualified Domain Name
FQPN	Fully Qualified Path Name
GPIM	(SUPA) Generic Policy Information Model [1]
GUID	Globally Unique Identifier
NETCONF	Network Configuration protocol
OAM&P	Operations, Administration, Management, and Provisioning
OCL	Object Constraint Language [2] [3]
OID	Object Identifier
SUPA	Simplified Use of Policy Abstractions

UML	Unified Modeling Language
URI	Uniform Resource Identifier
UUID	Universally Unique Identifier

### [3.2.](#) Definitions

Action: a set of activities that have a set of associated behavior.

Boolean Clause: a logical statement that evaluates to either TRUE or FALSE. Also called Boolean Expression.

Condition: a set of attributes, features, and/or values that are to be compared with a set of known attributes, features, and/or values in order to make a decision. A Condition, when used in the context of a Policy Rule, is used to determine whether or not the set of Actions in that Policy Rule can be executed or not.

Constraint: A constraint is a limitation or restriction. Constraints may be added to any type of object (e.g., events, conditions, and actions in Policy Rules).

Data Model: a data model is a representation of concepts of interest to an environment in a form that is dependent on data repository, data definition language, query language, implementation language, and protocol (typically one or more of these). This definition is taken from [\[1\]](#).

ECA: Event - Condition - Action (a type of policy).

Event: an Event is defined as any important occurrence in time in the system being managed, and/or in the environment of the system being managed. An Event may represent the changing or maintaining of the state of a managed object. An Event, when used in the context of a Policy Rule, is used to determine whether the Condition clause of an imperative (i.e., ECA) Policy Rule can be evaluated or not.

FQPN (Fully Qualified Path Name)

The specification of a path to a file in a system that unambiguously resolves to only that specific file. In this sense, "fully qualified" is independent of context. However, in a distributed system, it may be dependent on the specific format of an operating system. Hence, implementations should consider such issues before allowing the use of FQPNs.

Information Model: an information model is a representation of concepts of interest to an environment in a form that is independent of data repository, data definition language, query language, implementation language, and protocol. This definition is taken from [1].

Metadata: metadata is data that provides descriptive and/or prescriptive information about the object(s) to which it is associated. This enables structure and content of the object(s) to which it applies, as well as usage and other information, to be represented in an extensible manner. It avoids "burying" common information in specific classes, and increases reuse.

SUPAPolicy: A SUPAPolicy is, in this version of this document, an ECA policy rule that MUST contain an ECA policy rule, SHOULD contain one or more SUPAPolicyMetadata objects, and MAY contain other elements that define the semantics of the policy rule. An ECA Policy Rule MUST contain an event clause, a condition clause, and an action clause. Policies are generically defined as a means to monitor and control the changing and/or maintaining of the state of one or more managed objects. This definition is based on the definition of SUPAPolicy in [1].

### 3.3. Symbology

The following representation is used to describe YANG data modules defined in this draft.

- o Brackets "[" and "]" enclose list keys.
- o Abbreviations before data node names: "rw" means configuration data (read-write), and "ro" means state data (read-only).
- o Symbols after data node names: "?" means an optional node, "!" means a presence container, and "\*" denotes a list and leaf-list.
- o Parentheses enclose choice and case nodes, and case nodes are also

marked with a colon (":").

- o Ellipsis ("...") stands for contents of subtrees that are not shown.

#### [4.](#) Design of the SUPA Policy Data Models

This section describes the design philosophy of the YANG data model, and how they will be maintained.

##### [4.1.](#) Objectives

These Data Models are derived from the SUPA Generic Policy Information Model [[1](#)]. The overall objective is to faithfully transform that information model into a YANG data model that can be used for communicating policy. The policy scope to be covered is that defined by [[1](#)]; please refer to it for more details and background information.

This model is an extensible framework that is independent of the implementation approach for storing policies, as well as being independent of the content and meaning of specific policies. These models can be extended (generally by using the groupings here and defining additional containers for concrete classes) to represent domain- and/or application-specific policies. The ECA model in this document is an example of extending the general policy model towards specific policies.

By using this approach, different policy models will use common semantics, enabling them to be more easily integrated.

One of the important goals of this work is for the semantics of these models to align with those of the generic policy information model. Thus, most of this model was generated by a quasi-algorithmic transformation of the information model. This was done by hand. Certain changes were made to reflect the fact that this is a YANG data model, and therefore, does not need to generically allow for all data modelling languages. Details of the process are described

below in [section 4.3](#).

## [4.2](#) Yang Data Model maintenance

All model changes should be done to both the information model and the data model in parallel. Care is being taken during development of this model to ensure that is the case.

In general, structural changes will be applied to both the information model and the data model, and then any necessary YANG repairs taken to preserve the validity of the YANG data model.

## [4.3](#) YANG Data Model Overview

This YANG data model is generated by applying suitable YANG constructs to represent the information in the information model.

There are three key information modeling concepts that this data model needs to represent consistently. These are classes, class inheritance (also known as subclassing) and associations. The SUPA generic policy information model [[1](#)] makes extensive use of these concepts.

Each class in the model is represented by a YANG identity and by a YANG grouping. The use of groupings enables us to define these classes abstractly. Each grouping begins with two leaves (either defined in the grouping or inherited via a uses clause), which provide common functionality. One leaf is used for the system-wide unique identifier for this instance. This is either named supa-policy-ID (for the SUPAPolicyObject tree, which contains everything EXCEPT metadata objects) or supa-policy-metadata-id (for the SUPAPolicyMetadata tree, which ONLY contains metadata). All associations use supa-policy-IDs. The second leaf is always called the entity-class. It is an identityref which is set to the identity of the instance. The default value for this leaf is always correctly defined by the grouping. It is read-write in the YANG formalism due to restrictions on the use of MUST clauses.

Class inheritance (or subclassing) is done by defining an identity and a grouping for the new class. The identity is based on the parent identity, and is given a new name to represent this class. The new grouping uses the parent grouping. It refines the entity-class of the parent, replacing the default value of the entity-class with the correct value for this class.

Associations are represented by the use of instance-identifiers and association classes. Association classes are classes, using the above construction, which contain leaves representing the set of instance-identifiers for each end of the association, along with any other properties the information model assigns to the association. The two associated classes each have a leaf with an instance-identifier that points to the association class instance. Each instance-identifier leaf is defined with a must clause. That must clause references the entity-class of the target of the instance-identifier, and specifies that the entity class type must be the same as, or subclassed from, a specific named class. Thus, associations can point to any instance of a selected class, or any instance of any subclass of that target.

While not mandated by the YANG, it is expected that the xpath for the instance-identifier will end with an array selection specifying the supa-policy-ID or supa-policy-metadata-id of the target. This enables us to construct the abstract class tree, with inheritance and associations. It is noted and accepted that this process does lose the distinction between containment, association, and aggregation used by the information model.

The concrete class tree is constructed as follows. The YANG model defines a container for each class that is defined as concrete by the information model. That container contains a single list, keyed by either the supa-policy-id or the supa-policy-metadata-id. The content of the list is defined by a uses clause referencing the grouping that defines the class. After this was done, certain additional modifications were made. Specifically, any information model constructs intended to represent lists of possible values were recast as YANG enumerations. Where these lists are used more than once, they are factored out into reusable enumerations.

Certain attributes that are not needed in the YANG (e.g., to represent the range of choices different data models might use for policy identification) were removed for simplicity and clarity.

#### [4.4.](#) YANG Tree Diagram

The YANG Tree Diagram starts on the next page. It uses the following abbreviations for datatypes:

- B: Boolean
- E: enumeration
- II: instance-identifier
- IR: identityref
- PC: policy-constraint-language-list
- PD: policy-data-type-encoding-list
- S: string
- YD: yang:date-and-time



Internet-Draft

SUPA Generic Policy YANG Data Model

April 2017

```
module: ietf-supa-policy
  +--rw supa-encoding-clause-container
  |   +--rw supa-encoding-clause-list* [supa-policy-ID]
  |   |   +--rw entity-class? IR
  |   |   +--rw supa-policy-ID S
  |   |   +--rw supa-policy-name? S
  |   |   +--rw supa-policy-object-description? S
  |   |   +--rw supa-has-policy-metadata-agg-ptr* II
  |   |   +--rw supa-has-policy-component-decorator-part-ptr II
  |   |   +--rw supa-policy-clause-deploy-status E
  |   |   +--rw supa-has-policy-clause-part-ptr* II
  |   |   +--rw supa-encoded-clause-content S
  |   |   +--rw supa-encoded-clause-language E
  |   +--rw supa-policy-variable-container
  |   |   +--rw supa-policy-variable-list* [supa-policy-ID]
  |   |   |   +--rw entity-class? IR
  |   |   |   +--rw supa-policy-ID S
  |   |   |   +--rw supa-policy-name? S
  |   |   |   +--rw supa-policy-object-description? S
  |   |   |   +--rw supa-has-policy-metadata-agg-ptr* II
  |   |   |   +--rw supa-has-policy-component-decorator-part-ptr II
  |   |   |   +--rw supa-has-policy-component-decorator-agg-ptr* II
  |   |   |   +--rw supa-decorator-constraints* S
  |   |   |   +--rw supa-has-decorator-constraint-encoding? PC
  |   |   |   +--rw supa-policy-term-is-negated? B
  |   |   |   +--rw supa-policy-variable-name? S
  |   +--rw supa-policy-operator-container
  |   |   +--rw supa-policy-operator-list* [supa-policy-ID]
  |   |   |   +--rw entity-class? IR
  |   |   |   +--rw supa-policy-ID S
  |   |   |   +--rw supa-policy-name? S
  |   |   |   +--rw supa-policy-object-description? S
  |   |   |   +--rw supa-has-policy-metadata-agg-ptr* II
  |   |   |   +--rw supa-has-policy-component-decorator-part-ptr II
  |   |   |   +--rw supa-has-policy-component-decorator-agg-ptr* II
  |   |   |   +--rw supa-decorator-constraints* S
  |   |   |   +--rw supa-has-decorator-constraint-encoding? PC
  |   |   |   +--rw supa-policy-term-is-negated? B
  |   |   |   +--rw supa-policy-value-op-type E
  |   +--rw supa-policy-value-container
  |   |   +--rw supa-policy-value-list* [supa-policy-ID]
  |   |   |   +--rw entity-class? IR
```

```

|   +--rw supa-policy-ID                               S
|   +--rw supa-policy-name?                           S
|   +--rw supa-policy-object-description?             S
|   +--rw supa-has-policy-metadata-agg-ptr*          II
|   +--rw supa-has-policy-component-decorator-part-ptr II
|   +--rw supa-has-policy-component-decorator-agg-ptr* II
|   +--rw supa-decorator-constraints*                S
|   +--rw supa-has-decorator-constraint-encoding?   PC
|   +--rw supa-policy-term-is-negated?              B

```

```

|   +--rw supa-policy-value-content*                   S
|   +--rw supa-policy-value-encoding?                 PD
+--rw supa-policy-generic-decorated-container
|   +--rw supa-encoding-clause-list* [supa-policy-ID]
|   +--rw entity-class?                               IR
|   +--rw supa-policy-ID                             S
|   +--rw supa-policy-name?                           S
|   +--rw supa-policy-object-description?             S
|   +--rw supa-has-policy-metadata-agg-ptr*          II
|   +--rw supa-has-policy-component-decorator-part-ptr II
|   +--rw supa-has-policy-component-decorator-agg-ptr* II
|   +--rw supa-decorator-constraints*                S
|   +--rw supa-has-decorator-constraint-encoding?   PC
|   +--rw supa-policy-generic-decorated-content*     S
|   +--rw supa-policy-generic-decorated-encoding?   PD
+--rw supa-policy-source-container
|   +--rw supa-source-list* [supa-policy-ID]
|   +--rw entity-class?                               IR
|   +--rw supa-policy-ID                             S
|   +--rw supa-policy-name?                           S
|   +--rw supa-policy-object-description?             S
|   +--rw supa-has-policy-metadata-agg-ptr*          II
|   +--rw supa-has-policy-source-part-ptr            II
+--rw supa-policy-target-container
|   +--rw supa-target-list* [supa-policy-ID]
|   +--rw entity-class?                               IR
|   +--rw supa-policy-ID                             S
|   +--rw supa-policy-name?                           S
|   +--rw supa-policy-object-description?             S
|   +--rw supa-has-policy-metadata-agg-ptr*          II
|   +--rw supa-has-policy-target-part-ptr            II
+--rw supa-policy-concrete-metadata-container
|   +--rw supa-policy-concrete-metadata-list*
|       [supa-policy-metadata-id]

```

```

|   +--rw entity-class?                               IR
|   +--rw supa-policy-metadata-id                     S
|   +--rw supa-policy-metadata-description?          S
|   +--rw supa-policy-metadata-name?                 S
|   +--rw supa-has-policy-metadata-part-ptr*         II
|   +--rw supa-has-policy-metadata-dec-part-ptr*     II
|   +--rw supa-policy-metadata-valid-period-end?     YD
|   +--rw supa-policy-metadata-valid-period-start?   YD
+--rw supa-policy-metadata-decorator-access-container
|   +--rw supa-policy-metadata-decorator-access-list*
|       [supa-policy-metadata-id]
|
|   +--rw entity-class?                               IR
|   +--rw supa-policy-metadata-id                     S
|   +--rw supa-policy-metadata-description?          S
|   +--rw supa-policy-metadata-name?                 S
|   +--rw supa-has-policy-metadata-part-ptr*         II
|   +--rw supa-has-policy-metadata-dec-part-ptr*     II
|   +--rw supa-has-policy-metadata-dec-agg-ptr?      II

```

```

+--rw supa-policy-metadata-decorator-version-container
|   +--rw supa-policy-metadata-decorator-version-list*
|       [supa-policy-metadata-id]
|
|   +--rw entity-class?                               IR
|   +--rw supa-policy-metadata-id                     S
|   +--rw supa-policy-metadata-description?          S
|   +--rw supa-policy-metadata-name?                 S
|   +--rw supa-has-policy-metadata-part-ptr*         II
|   +--rw supa-has-policy-metadata-dec-part-ptr*     II
|   +--rw supa-has-policy-metadata-dec-agg-ptr?      II
+--rw supa-policy-metadata-detail-container
|   +--rw supa-policy-metadata-detail-list [supa-policy-ID]
|       +--rw entity-class?                               IR
|       +--rw supa-policy-ID                             S
|       +--rw supa-policy-name?                         S
|       +--rw supa-policy-object-description?          S
|       +--rw supa-has-policy-metadata-agg-ptr*        II
|       +--rw supa-has-policy-metadata-detail-agg-ptr? II
|       +--rw supa-has-policy-metadata-detail-part-ptr? II
|       +--rw supa-policy-metadata-detail-is-applicable? B
|       +--rw supa-policy-metadata-detail-constraint*  S
|       +--rw supa-policy-metadata-detail-constraint-encoding? PC
+--rw supa-policy-component-decorator-detail-container
|   +--rw supa-policy-component-decorator-detail-list*
|       [supa-policy-ID]
|
|   +--rw entity-class?                               IR

```

	+++rw supa-policy-ID	S
	+++rw supa-policy-name?	S
	+++rw supa-policy-object-description?	S
	+++rw supa-has-policy-metadata-agg-ptr*	II
	+++rw supa-has-policy-component-decorator-agg-ptr?	II
	+++rw supa-has-policy-component-decorator-part-ptr?	II
	+++rw supa-has-decorator-constraint*	S
	+++rw supa-has-decorator-constraint-encoding	PC
+	+++rw supa-policy-source-detail-container	
	+++rw supa-policy-source-detail-list* [supa-policy-ID]	
	+++rw entity-class?	IR
	+++rw supa-policy-ID	S
	+++rw supa-policy-name?	S
	+++rw supa-policy-object-description?	S
	+++rw supa-has-policy-metadata-agg-ptr*	II
I	+++rw supa-has-policy-source-detail-agg-ptr?	II
I	+++rw supa-has-policy-source-detail-part-ptr?	II
I	+++rw supa-policy-source-is-authenticated?	B
I	+++rw supa-policy-source-is-trusted?	B
+	+++rw supa-policy-target-detail-container	
	+++rw supa-policy-target-detail-list* [supa-policy-ID]	
	+++rw entity-class?	IR
	+++rw supa-policy-ID	S
	+++rw supa-policy-name?	S
	+++rw supa-policy-object-description?	S
	+++rw supa-has-policy-metadata-agg-ptr*	II

I	+++rw supa-has-policy-target-detail-agg-ptr?	II
I	+++rw supa-has-policy-target-detail-part-ptr?	II
I	+++rw supa-policy-target-is-authenticated?	B
I	+++rw supa-policy-target-is-enabled?	B
+	+++rw supa-policy-clause-detail-container	
	+++rw supa-policy-clause-detail-list* [supa-policy-ID]	
	+++rw entity-class?	IR
	+++rw supa-policy-ID	S
	+++rw supa-policy-name?	S
	+++rw supa-policy-object-description?	S
	+++rw supa-has-policy-metadata-agg-ptr*	II
	+++rw supa-has-policy-clause-detail-agg-ptr?	II
	+++rw supa-has-policy-clause-detail-part-ptr?	II
+	+++rw supa-policy-exec-fail-take-action-detail-container	
	+++rw supa-policy-exec-fail-take-action-detail-list* [supa-policy-ID]	
	+++rw entity-class?	IR
	+++rw supa-policy-ID	S

	+++rw supa-policy-name?	S
	+++rw supa-policy-object-description?	S
	+++rw supa-has-policy-metadata-agg-ptr*	II
	+++rw supa-has-exec-fail-action-detail-agg-ptr?	II
	+++rw supa-has-exec-fail-action-detail-part-ptr?	II
	+++rw supa-policy-exec-fail-take-action-name*	S
+++rw	supa-policy-metadata-decorator-detail-container	
+++rw	supa-policy-metadata-decorator-detail-list*	
	[supa-policy-metadata-id]	
+++rw	entity-class?	IR
+++rw	supa-policy-metadata-id	S
+++rw	supa-policy-metadata-description?	S
+++rw	supa-policy-metadata-name?	S
+++rw	supa-has-policy-metadata-part-ptr*	II
+++rw	supa-has-policy-metadata-dec-part-ptr*	II
+++rw	supa-has-policy-metadata-detail-dec-agg-ptr?	II
+++rw	supa-has-policy-metadata-detail-dec-part-ptr?	II

## [5.](#) SUPA Policy Data Model YANG Module

The SUPA YANG data model module is divided into two main parts:

- 1) a set of containers that represent the objects that make

- updated a Policy Rule and its Policy Rule Components
- 2) a set of containers that represent the objects that define and apply metadata to Policy Rules and/or Policy Rule Components

Editor's note: This will be described in more detail in version 03

```

module ietf-sup-a-policy {

    yang-version 1.1;
    namespace "urn:ietf:params:xml:ns:yang:ietf-sup-a-policy";
    prefix sup-a-pdm;

    import ietf-yang-types {
        prefix yang;
    }

    organization "IETF";
        contact
            "Editor: Joel Halpern
            email: jmh@joelhalpern.com;
            Editor: John Strassner
            email: strazpdj@gmail.com;";

    description
        "This module defines a data model for generic high level
        definition of policies to be applied to a network.
        This module is derived from and aligns with
        draft-ietf-sup-a-generic-policy-info-model-01.
        Details on all classes, associations, and attributes
        can be found there.
        Copyright (c) 2015 IETF Trust and the persons identified
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        BSD License set forth in Section 4.c of the IETF Trust's
        Legal Provisions Relating to IETF Documents
        (http://trustee.ietf.org/license-info).";

    revision "2017-04-15" {
        description
            "20170415: Updated SUPABooleanClause based on
            implementation experience from SNMPO example;
            reworded definitions of sup-a-PolMetadataID and
            sup-a-EncodedClauseEncoding attribute.
            20170117: updated class and attribute names in the YANG
            to match those in the IM, except where noted.
            20161210: Incorporated input from IISOMI
            20161010: Changed back to transitive identities (to
            enforce inheritance) after determining that
            errors were from a confdc bug.
            20161008: Fixed errors found in latest pyang compiler
            and from YANG Doctors.
            20161001: Minor edits in association definitions.
            20160928: Generated yang tree.

```

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```
20160924:  Rewrote association documentation; rebuilt
           how all classes are named for consistency.
20160904:  Optimization of module by eliminating leaves
           that are not needed; rewrote section 4.
20160824:  Edits to sync data model to info model.
20160720:  Conversion to WG draft. Fixed pyang 1.1
           compilation errors. Fixed must clause
           derefencing used in grouping statements.
           Reformatted and expanded descriptions.
           Fixed various typos.
20160321:  Initial version.";
reference
  "draft-ietf-supa-policy-data-model-02";
}

typedef policy-constraint-language-list {
  type enumeration {
    enum "error" {
      description
        "This signifies an error state.";
    }
    enum "init" {
      description
        "This signifies a generic initialization state.";
    }
    enum "OCL2.4" {
      description
        "Object Constraint Language v2.4 [2]. This is a
        declarative language for describing rules for
        defining constraints and query expressions.";
    }
    enum "OCL2.x" {
      description
        "Object Constraint Language, v2.0 through 2.3.1
        [2].";
    }
    enum "OCL1.x" {
      description
        "Object Constraint Language, any version prior
        to v2.0 [3].";
    }
    enum "QVT1.2 Relational Language" {
      description
```



```

        "QVT Relational Language [5].";
    }
    enum "QVT1.2 Operational Language" {
        description
            "QVT Operational Language [5].";
    }

```

```

    enum "Alloy" {
        description
            "A language for defining structures and
            and relations using constraints [4].";
    }
    enum "Text" {
        description
            "The constraints are written in plain text.";
    }
}
description
    "The language used to encode the constraints that
    relevant to the relationship between the metadata
    and the underlying policy object.";
}

typedef policy-data-type-id-encoding-list {
    type enumeration {
        enum "error" {
            description
                "This signifies an error state.";
        }
        enum "init" {
            description
                "This signifies a generic initialization state.";
        }
        enum "primary_key" {
            description
                "This represents the primary key of a table, which
                uniquely identifies each record in that table.
                It MUST NOT be NULL. It MAY consist of a single
                or multiple fields. Note that a YANG data model
                implementation does NOT have to implement this
                enumeration.";
        }
    }
}

```

```

enum "foreign_key" {
    description
        "This represents the foreign key, which is a set
        or more fields in one table that uniquely
        identify a row in another table. It MAY be
        NULL. Note that a YANG data model implementation
        does NOT have to implement this enumeration.";
}
enum "GUID" {
    description
        "The object is referenced by this GUID.";
}
enum "UUID" {
    description
        "The object is referenced by this UUID.";
}
}

```

```

enum "URI" {
    description
        "The object is referenced by this URI.";
}
enum "FQDN" {
    description
        "The object is referenced by this FQDN.";
}
enum "FQPN" {
    description
        "The object is referenced by this FQPN. Note that
        FQPNs assume that all components can access a
        single logical file repository.";
}
enum "string_instance_id" {
    description
        "A string that is the canonical representation,
        in ASCII, of an instance ID of this object.";
}
}
description
    "The list of possible data types used to represent object
    IDs for all SUPA object instances.";
}

typedef policy-data-type-encoding-list {
    type enumeration {

```

```

enum "error" {
    description
        "This signifies an error state.";
}
enum "init" {
    description
        "This signifies an initialization state.";
}
enum "string" {
    description
        "This represents a string data type.";
}
enum "integer" {
    description
        "This represents an integer data type.";
}
enum "boolean" {
    description
        "This represents a Boolean data type.";
}
enum "floating point" {
    description
        "This represents a floating point data type.";
}

```

```

enum "date-and-time" {
    description
        "This represents a data type that can specify
        date and/or time.";
}
enum "GUID" {
    description
        "This represents a GUID data type.";
}
enum "UUID" {
    description
        "This represents a UUID data type.";
}
enum "URI" {
    description
        "This represents a URI data type.";
}
enum "DN" {
    description

```

```

        "This represents a DN data type.";
    }
    enum "FQDN" {
        description
            "The object is referenced by this FQDN.";
    }
    enum "FQPN" {
        description
            "The object is referenced by this FQPN. Note that
            FQPNs assume that all components can access a
            single logical file repository.";
    }
    enum "NULL" {
        description
            "This represents a NULL data type. NULL means the
            absence of an actual value. NULL is frequently
            used to represent a missing or invalid value.";
    }
    enum "string_instance_id" {
        description
            "A string that is the canonical representation,
            in ASCII, of an instance ID of this object.";
    }
}
description
    "The set of allowable data types used to encode
    multi-valued SUPA Policy attributes.";
}

```

```

// Identities are used in this model as a means to provide simple
// introspection to allow an instance-identifier to be tested as to
// what class it represents. This allows must clauses to specify
// that the target of a particular instance-identifier leaf must be a
// specific class, or within a certain branch of the inheritance tree.
// This depends upon the ability to refine the entity class default
// value. The entity class should be read-only. However, as this is
// the target of a MUST condition, it cannot be config-false. Also,
// it appears that we cannot put a MUST condition on its definition,
// as the default (actual) value changes for each inherited object.

```

```
// Finally, note that since identities are irreflexive, we define a
// parent identitym called SUPA-ROOT-TYPE, to serve as the single root
// from which all identity statements are derived.
```

```
identity SUPA-ROOT-TYPE {
  description
    "The identity corresponding to a single root for all
    identities in the SUPA Data Model. Note that section
    7.18.2 in \[RFC7950\] says that identity derivation is
    irreflexive (i.e., an identity cannot be derived
    from itself.");
}
```

```
identity POLICY-OBJECT-TYPE {
  base SUPA-ROOT-TYPE;
  description
    "The identity corresponding to a SUPAPolicyObject
    object instance.";
}
```

```
grouping supa-policy-object-type {
  leaf entity-class {
    type identityref {
      base SUPA-ROOT-TYPE;
    }
    default POLICY-OBJECT-TYPE;
    description
      "The identifier of the class of this grouping.";
  }
  leaf supa-policy-ID {
    type string;
    mandatory true;
    description
```

```
"The string identifier of this policy object, which
functions as the unique object identifier of this
object instance. This attribute MUST be unique within
```

```

    the policy system. This attribute is named
    supaPolObjIDContent in [1], and is used with another
    attribute (supaPolObjIDEncoding); since the YANG data
    model does not need this genericity, the
    supaPolObjIDContent attribute was renamed, and the
    supaObjectIDEncoding attribute was removed.";
}
leaf supa-policy-name {
    type string;
    description
        "A human-readable name for this policy object. Note
        that this is NOT the object ID.";
}
leaf supa-policy-object-description {
    type string;
    description
        "A human-readable description of the characteristics
        and behavior of this policy object.";
}
leaf-list supa-has-policy-metadata-agg-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
        'SUPA-HAS-POLICY-METADATA-ASSOC'))";
    description
        "This leaf-list holds instance-identifiers that
        reference a SUPAHasPolicyMetadata association [1].
        This association is represented by the grouping
        supa-has-policy-metadata-detail. This association
        describes how each SUPAPolicyMetadata instance is
        related to a given SUPAPolicyObject instance. Since
        this association class contains attributes, the
        instance-identifier MUST point to an instance using
        the grouping supa-has-policy-metadata-detail (which
        includes subclasses of this association class).";
}
description
    "This represents the SUPAPolicyObject [1] class. It is the
    superclass for all SUPA Policy objects (i.e., all objects
    that are either Policies or components of Policies). Note
    that SUPA Policy Metadata objects are NOT subclassed from
    this class; they are instead subclassed from the
    SUPAPolicyMetadata (i.e., supa-policy-metadata-type)
    object. This class (supa-policy-object-type) is used to
    define common attributes and relationships that all SUPA
    Policy subclasses inherit. It MAY be augmented with a set
    of zero or more SUPAPolicyMetadata objects using the
    SUPAHasPolicyMetadata association, which is represented
    by the supa-has-policy-metadata-agg leaf-list.";
}

```

```
identity POLICY-COMPONENT-TYPE {
  base POLICY-OBJECT-TYPE;
  description
    "The identity corresponding to a
     SUPAPolicyComponentStructure object instance.";
}

grouping supa-policy-component-structure-type {
  uses supa-policy-object-type {
    refine entity-class {
      default POLICY-COMPONENT-TYPE;
    }
  }
  leaf supa-has-policy-component-decorator-part-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
      'SUPA-HAS-POLICY-COMPONENT-DECORATOR-ASSOC'))";
    mandatory true;
    description
      "This leaf holds instance-identifiers that
       reference a SUPAHasDecoratedPolicyComponent
       association [1], and is represented by the grouping
       supa-has-decorator-policy-component-detail. This
       association describes how each
       SUPAPolicyComponentStructure instance is related to a
       given SUPAPolicyComponentDecorator instance. Multiple
       SUPAPolicyComponentDecorator instances may be attached
       to a SUPAPolicyComponentStructure instance that is
       referenced in this association by using the Decorator
       pattern [1]. Since this association class contains
       attributes, the instance-identifier MUST point to an
       instance using the grouping
       supa-has-decorator-policy-component-detail (which
       includes subclasses of this association class).";
  }
  description
    "This represents the SUPAPolicyComponent class [1], which is
     the superclass for all objects that represent different
     components of a Policy. Important subclasses include the
     SUPAPolicyClause and the SUPAPolicyComponentDecorator.
     This object is the root of the Decorator pattern [1]; as
     such, it enables all of its concrete subclasses to be
     wrapped with other concrete subclasses of the
     SUPAPolicyComponentDecorator class.";
}

identity POLICY-COMPONENT-DECORATOR-TYPE {
```

```
base POLICY-COMPONENT-TYPE;
description
    "The identity corresponding to a
    SUPAPolicyComponentDecorator object instance.";
}
```

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```
grouping supa-policy-component-decorator-type {
  uses supa-policy-component-structure-type {
    refine entity-class {
      default POLICY-COMPONENT-DECORATOR-TYPE;
    }
  }
  leaf-list supa-has-policy-component-decorator-agg-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
      'SUPA-HAS-POLICY-COMPONENT-DECORATOR-ASSOC'))";
    min-elements 1;
    description
      "This leaf-list holds instance-identifiers that
      reference a SUPAHasDecoratedPolicyComponent
      association [1]. This association is represented by the
      grouping supa-has-decorator-policy-component-detail.
      This leaf-list helps implement the Decorator pattern
      [1], which enables all or part of one or more object
      instances to wrap another object instance. For
      example, any concrete subclass of SUPAPolicyClause,
      such as SUPAEncodedClause, may be wrapped by any
      concrete subclass of SUPAPolicyComponentDecorator
      (e.g., SUPAPolicyEvent). Since this association class
      contains attributes, the instance-identifier MUST
      point to an instance using the grouping
      supa-has-decorator-policy-component-detail (which
      includes subclasses of this association class).";
  }
  leaf-list supa-decorator-constraints {
    type string;
    description
      "This is a set of constraint expressions that are
      applied to this decorator, allowing the specification
      of details not captured in its subclasses, using an
      appropriate constraint language that is specified in
      the supa-has-decorator-constraint-encoding leaf.";
  }
  leaf supa-has-decorator-constraint-encoding {
```



```

    type policy-constraint-language-list;
    description
      "The language in which the constraints on the
       policy component decorator is expressed. Examples
       include OCL 2.4 [2], Alloy [3], and English text.";
  }
  description
    "This object implements the Decorator pattern [1], which
     enables all or part of one or more concrete objects to
     wrap another concrete object.";
}

```

```

identity POLICY-COMPONENT-CLAUSE-TYPE {
  base POLICY-COMPONENT-TYPE;
  description
    "The identity corresponding to a SUPAPolicyClause
     object instance.";
}

grouping supa-policy-clause-type {
  uses supa-policy-component-structure-type {
    refine entity-class {
      default POLICY-COMPONENT-CLAUSE-TYPE;
    }
  }
  leaf supa-policy-clause-deploy-status {
    type enumeration {
      enum "error" {
        description
          "This signifies an error state. OAM&P Policies
           SHOULD NOT use this SUPAPolicyClause if the
           value of this attribute is error.";
      }
      enum "init" {
        description
          "This signifies an initialization state.";
      }
      enum "deployed and enabled" {
        description
          "This SUPAPolicyClause has been deployed in
           the system and is currently enabled.";
      }
      enum "deployed and in test" {

```

```

        description
            "This SUPAPolicyClause has been deployed in the
            system, but is currently in a test state and
            SHOULD NOT be used in OAM&P policies.";
    }
    enum "deployed but not enabled" {
        description
            "This SUPAPolicyClause has been deployed in the
            system, but has been administratively
            disabled. Therefore, it MUST NOT be used in
            OAM&P Policies.";
    }
    enum "ready to be deployed" {
        description
            "This SUPAPolicyClause has been properly
            initialized, and is now ready to be deployed.";
    }
}

```

```

    enum "cannot be deployed" {
        description
            "This SUPAPolicyClause has been administratively
            disabled, and MUST NOT be used as part of
            an OAM&P policy.";
    }
}
mandatory true;
description
    "This defines whether this SUPAPolicy has been
    deployed and, if so, whether it is enabled and
    ready to be used or not.";
}
leaf-list supa-has-policy-clause-part-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
        'SUPA-HAS-POLICY-CLAUSE-ASSOC'))";
    min-elements 1;
    description
        "This leaf-list holds instance-identifiers that
        reference a SUPAHasPolicyClause association [1],
        and is represented by the grouping
        supa-has-policy-clause-detail. This association

```

```

        describes how each SUPAPolicyClause instance is
        related to this particular SUPAPolicyStructure
        instance. For example, this association may restrict
        which concrete subclasses of the SUPAPolicyStructure
        class can be associated with which concrete subclasses
        of the SUPAPolicyClause class. The set of
        SUPAPolicyClauses, identified by this leaf-list,
        define the content of this SUPAPolicyStructure.
        Since this association class contains attributes, the
        instance-identifier MUST point to an instance using
        the grouping supa-has-policy-clause-detail (which
        includes subclasses of this association class).";
    }
description
    "The parent class for all SUPA Policy Clauses. A
    SUPAPolicyClause is a fundamental building block for
    creating SUPA Policies. A SUPAPolicy is a set of
    statements, and a SUPAPolicyClause can be thought of as all
    or part of a statement. The Decorator pattern [1] is used,
    which enables the contents of a SUPAPolicyClause to be
    adjusted dynamically at runtime without affecting other
    objects of either type.";
}

```

```

identity POLICY-ENCODED-CLAUSE-TYPE {
    base POLICY-COMPONENT-CLAUSE-TYPE;
    description
        "The identity corresponding to a SUPAEncodedClause
        object instance.";
}

grouping supa-encoded-clause-type {
    uses supa-policy-clause-type {
        refine entity-class {
            default POLICY-ENCODED-CLAUSE-TYPE;
        }
    }
}

leaf supa-encoded-clause-content {
    type string;
}

```

```

    mandatory true;
    description
        "This defines the content of this SUPAEncodedClause.
        Since the target is YANG, the supaEncodedClauseEncoding
        attribute is NOT required, and therefore, not mapped.";
}
leaf supa-encoded-clause-language {
    type enumeration {
        enum "error" {
            description
                "This signifies an error state. OAM&P Policies
                SHOULD NOT use this SUPAEncodedClause if the
                value of this attribute is error.";
        }
        enum "init" {
            description
                "This signifies an initialization state.";
        }
        enum "YANG" {
            description
                "This defines the language used in this
                SUPAEncodedClause as a type of YANG.
                Additional details may be provided by
                attaching a SUPAPolicyMetadata object to
                this SUPAEncodedClause object instance.";
        }
        enum "XML" {
            description
                "This defines the language as a type of XML.
                Additional details may be provided by
                attaching a SUPAPolicyMetadata object to
                this SUPAEncodedClause object instance.";
        }
    }
}

```

```

enum "TL1" {
    description
        "This defines the language as a type of
        Transaction Language 1. Additional details may
        be provided by attaching a SUPAPolicyMetadata
        object to this SUPAEncodedClause object
        instance.";
}

```

```

    }

    enum "Text" {
        description
            "This is a textual string that can be used to
            define a language choice that is not listed
            by a specific enumerated value. This string
            MUST be parsed by the policy system to
            identify the language being used. A
            SUPAPolicyMetadata object (represented as a
            supa-policy-metadata-type leaf) can be used to
            provide further details about the language";
    }
}
mandatory true;
description
    "Indicates the language used for this SUPAEncodedClause
    object instance. Prescriptive and/or descriptive
    information about the usage of this SUPAEncodedClause
    may be provided by one or more SUPAPolicyMetadata
    objects, which are each attached to the object
    instance of this SUPAEncodedClause.";
}
description
    "This class refines the behavior of the supa-policy-clause
    by encoding the contents of the clause into the attributes
    of this object. This enables clauses that are not based on
    other SUPA objects to be modeled. For example, a POLICY
    Application could define a CLI or YANG configuration
    snippet and encode that snippet into a SUPAEncodedClause.
    Note that a SUPAEncodedClause simply defines the content
    of the clause. In particular, it does NOT provide a
    response. The policy engine that is parsing and evaluating
    the SUPAPolicy needs to assign a response to any
    SUPAEncodedClause that it encounters.";
}

container supa-encoding-clause-container {
    description
        "This is a container to collect all object instances of
        type SUPAEncodedClause.";
}

```

```

list supra-encoding-clause-list {
  key supra-policy-ID;
  uses supra-encoded-clause-type;
  description
    "A list of all instances of supra-encoding-clause-type.
    If a module defines subclasses of the encoding clause,
    those will be stored in a separate container.";
}
}

identity POLICY-COMPONENT-TERM-TYPE {
  base POLICY-COMPONENT-DECORATOR-TYPE;
  description
    "The identity corresponding to a SUPAPolicyTerm object
    instance.";
}

grouping supra-policy-term-type {
  uses supra-policy-component-decorator-type {
    refine entity-class {
      default POLICY-COMPONENT-TERM-TYPE;
    }
  }
  leaf supra-policy-term-is-negated {
    type boolean;
    description
      "If the value of this attribute is true, then
      this particular term is negated.";
  }
  description
    "This is the superclass of all SUPA policy objects that are
    used to test or set the value of a variable. It does this
    by defining a {variable-operator-value} three-tuple, where
    each element of the three-tuple is defined by a concrete
    subclass of the appropriate type (e.g., SUPAPolicyVariable,
    SUPAPolicyOperator, or SUPAPolicyVariable).";
}

identity POLICY-COMPONENT-VARIABLE-TYPE {
  base POLICY-COMPONENT-TERM-TYPE;
  description
    "The identity corresponding to a SUPAPolicyVariable
    object instance.";
}

grouping supra-policy-variable-type {
  uses supra-policy-term-type {
    refine entity-class {
      default POLICY-COMPONENT-VARIABLE-TYPE;
    }
  }
}

```

```
}
```

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```
    leaf supa-policy-variable-name {
        type string;
        description
            "A human-readable name for this policy variable.";
    }
    description
        "This is one formulation of a SUPA Policy Clause. It uses
        the canonical form of an expression, which is a three-tuple
        in the form {variable, operator, value}. In this approach,
        each of the three terms can either be a subclass of the
        appropriate SUPAPolicyTerm class, or another object that
        plays the role (i.e., a variable) of that term. The
        attribute defined by the supa-policy-variable-name
        specifies the name of an attribute whose content should be
        compared to the value portion of a SUPAPolicyTerm, which is
        typically specified by a SUPAPolicyValue object.";
}

container supa-policy-variable-container {
    description
        "This is a container to collect all object instances of
        type SUPAPolicyVariable.";
    list supa-policy-variable-list {
        key supa-policy-ID;
        uses supa-policy-variable-type;
        description
            "List of all instances of supa-policy-variable-type.
            If a module defines subclasses of this class,
            those will be stored in a separate container.";
    }
}

identity POLICY-COMPONENT-OPERATOR-TYPE {
    base POLICY-COMPONENT-TERM-TYPE;
    description
        "The identity corresponding to a SUPAPolicyOperator
        object instance.";
}

grouping supa-policy-operator-type {
    uses supa-policy-term-type {
        refine entity-class {
```

```

        default POLICY-COMPONENT-OPERATOR-TYPE;
    }
}
leaf supa-policy-value-op-type {
    type enumeration {
        enum "error" {
            description
                "This signifies an error state.";
        }
    }
}

```

```

enum "init" {
    description
        "This signifies an initialization state.";
}
enum "greater than" {
    description
        "A greater-than operator.";
}
enum "greater than or equal to" {
    description
        "A greater-than-or-equal-to operator.";
}
enum "less than" {
    description
        "A less-than operator.";
}
enum "less than or equal to" {
    description
        "A less-than-or-equal-to operator.";
}
enum "equal to" {
    description
        "An equal-to operator.";
}
enum "not equal to" {
    description
        "A not-equal-to operator.";
}
enum "IN" {
    description
        "An operator that determines whether a given
        value of a variable in a SUPAPolicyTerm
        matches a value in a SUPAPolicyTerm.";
}

```



```

enum "NOT IN" {
    description
        "An operator that determines whether a given
        variable in a SUPAPolicyTerm does not match
        any of the specified values in a
        SUPAPolicyTerm.";
}
enum "SET" {
    description
        "An operator that makes the value of the
        result equal to the input value.";
}

```

```

enum "CLEAR"{
    description
        "An operator that sets the value of the
        specified object to a value that is 0 for
        integer datatypes, an empty string for
        textual datatypes, and FALSE for Boolean
        datatypes. This value MUST NOT be NULL.";
}
enum "BETWEEN" {
    description
        "An operator that determines whether a given
        value is within a specified range of values.
        Note that this is an inclusive operator.";
}
}
mandatory true;
description
    "The type of operator used to compare the variable
    and value portions of this SUPAPolicyTerm.";
}
description
    "This is one formulation of a SUPA Policy Clause. It uses
    the canonical form of an expression, which is a three-tuple
    in the form {variable, operator, value}. In this approach,
    each of the three terms can either be a subclass of the
    appropriate SUPAPolicyTerm class, or another object that

```

```

        plays the role (i.e., an operator) of that term.
        The value of the supa-policy-value-op-type attribute
        specifies an operator that SHOULD be used to compare the
        variable and value portions of a SUPAPolicyTerm. This is
        typically specified by a SUPAPolicyOperator object.";
    }

    container supa-policy-operator-container {
        description
            "This is a container to collect all object instances of
            type SUPAPolicyOperator.";
        list supa-policy-operator-list {
            key supa-policy-ID;
            uses supa-policy-operator-type;
            description
                "List of all instances of supa-policy-operator-type.
                If a module defines subclasses of this class,
                those will be stored in a separate container.";
        }
    }
}

```

```

identity POLICY-COMPONENT-VALUE-TYPE {
    base POLICY-COMPONENT-TERM-TYPE;
    description
        "The identity corresponding to a SUPAPolicyValue
        object instance.";
}

grouping supa-policy-value-type {
    uses supa-policy-term-type {
        refine entity-class {
            default POLICY-COMPONENT-VALUE-TYPE;
        }
    }
}

leaf-list supa-policy-value-content {
    type string;
    description
        "The content of the value portion of this SUPA Policy
        Clause. The data type of the content is specified in

```

```

        the supra-policy-value-encoding attribute.";
    }
    leaf supra-policy-value-encoding {
        type policy-data-type-encoding-list;
        description
            "The data type of the supra-policy-value-content
            attribute.";
    }
    description
        "This is one formulation of a SUPA Policy Clause. It uses
        the canonical form of an expression, which is a three-tuple
        in the form {variable, operator, value}. In this approach,
        each of the three terms can either be a subclass of the
        appropriate SUPAPolicyTerm class, or another object that
        plays the role (i.e., a value) of that term. The
        attribute defined by supra-policy-value-content specifies a
        a value (which is typically specified by a subclass of
        SUPAPolicyVariable) that should be compared to a value in
        the variable portion of the SUPAPolicyTerm.";
}

container supra-policy-value-container {
    description
        "This is a container to collect all object instances of
        type SUPAPolicyValue.";
    list supra-policy-value-list {
        key supra-policy-ID;
        uses supra-policy-value-type;
        description
            "List of all instances of supra-policy-value-type.
            If a module defines subclasses of this class,
            those will be stored in a separate container.";
    }
}

```

```

identity POLICY-GENERIC-DECORATED-TYPE {
    base POLICY-COMPONENT-DECORATOR-TYPE;
    description
        "The identity corresponding to a
        SUPAGenericDecoratedComponent object instance.";
}
grouping supra-policy-generic-decorated-type {
    uses supra-policy-component-decorator-type {
        refine entity-class {
            default POLICY-GENERIC-DECORATED-TYPE;
        }
    }
}

```

```

    }
  }
  leaf-list supa-policy-generic-decorated-content {
    type string;
    description
      "The content of this SUPAGenericDecoratedComponent
      object instance. The data type of this attribute is
      specified in the leaf
      supa-policy-generic-decorated-encoding.";
  }
  leaf supa-policy-generic-decorated-encoding {
    type policy-data-type-encoding-list;
    description
      "The datatype of the
      supa-policy-generic-decorated-content attribute.";
  }
  description
    "This class enables a generic object to be defined and
    used as a decorator in a SUPA Policy Clause. This class
    should not be confused with the SUPAEncodedClause class.
    A SUPAGenericDecoratedComponent object represents a single,
    atomic object that defines a portion of the contents of a
    SUPAPolicyClause, whereas a SUPAPolicyEncodedClause
    represents the entire contents of a SUPAPolicyClause.";
}

container supa-policy-generic-decorated-container {
  description
    "This is a container to collect all object instances of
    type SUPAGenericDecoratedComponent.";
  list supa-encoding-clause-list {
    key supa-policy-ID;
    uses supa-policy-generic-decorated-type;
    description
      "List of all instances of
      supa-policy-generic-decorated-type. If a module
      defines subclasses of this class, those will be
      stored in a separate container.";
  }
}

```

```

identity POLICY-STRUCTURE-TYPE {
  base POLICY-OBJECT-TYPE;

```

```

description
  "The identity corresponding to a SUPAPolicyStructure
  object instance.";
}

grouping supa-policy-structure-type {
  uses supa-policy-object-type {
    refine entity-class {
      default POLICY-STRUCTURE-TYPE;
    }
  }
  leaf supa-policy-admin-status {
    type enumeration {
      enum "error" {
        description
          "This signifies an error state. OAM&P Policies
          SHOULD NOT use this SUPAPolicy if the value
          of this attribute is error.";
      }
      enum "init" {
        description
          "This signifies an initialization state.";
      }
      enum "enabled" {
        description
          "This signifies that this SUPAPolicy has been
          administratively enabled.";
      }
      enum "disabled" {
        description
          "This signifies that this SUPAPolicy has been
          administratively disabled.";
      }
      enum "in test" {
        description
          "This signifies that this SUPAPolicy has been
          administratively placed into test mode, and
          SHOULD NOT be used as part of an operational
          policy rule.";
      }
    }
    mandatory true;
    description
      "The current administrative status of this SUPAPolicy.";
  }
}

```

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```
leaf supa-policy-continuum-level {
  type uint32;
  description
    "This is the current level of abstraction of this
    particular SUPAPolicyRule. By convention, the
    values 0 and 1 should be used for error and
    initialization states; a value of 2 is the most
    abstract level, and higher values denote more
    concrete levels.";
}
leaf supa-policy-deploy-status {
  type enumeration {
    enum "error" {
      description
        "This signifies an error state.";
    }
    enum "init" {
      description
        "This signifies an initialization state.";
    }
    enum "deployed and enabled" {
      description
        "This SUPAPolicy has been deployed in the
        system and is currently enabled.";
    }
    enum "deployed and in test" {
      description
        "This SUPAPolicy has been deployed in the
        system, but is currently in test and SHOULD
        NOT be used in OAM&P policies.";
    }
    enum "deployed but not enabled" {
      description
        "This SUPAPolicy has been deployed in the
        system, but has been administratively
        disabled.";
    }
    enum "ready to be deployed" {
      description
        "This SUPAPolicy has been properly initialized,
        and is now ready to be deployed.";
    }
    enum "cannot be deployed" {
      description
```

```
        "This SUPAPolicy has been administratively
        disabled, and SHOULD NOT be used as part of
        an OAM&P policy.";
    }
}
mandatory true;
```

```
    description
        "This attribute defines whether this SUPAPolicy has
        been deployed and, if so, whether it is enabled and
        ready to be used or not.";
}
leaf supa-policy-exec-fail-strategy {
    type enumeration {
        enum "error" {
            description
                "This signifies an error state.";
        }
        enum "init" {
            description
                "This signifies an initialization state.";
        }
        enum "rollback all" {
            description
                "This means that execution of this SUPAPolicy
                SHOULD be stopped, and rollback of all
                SUPAPolicyActions (whether they were
                successfully executed or not) performed by
                this particular SUPAPolicy is attempted. Also,
                all SUPAPolicies that otherwise would have
                been executed as a result of this SUPAPolicy
                SHOULD NOT be executed.";
        }
        enum "rollback single" {
            description
                "This means that execution of this SUPAPolicy
                SHOULD be stopped, and rollback is attempted
                for ONLY the SUPAPolicyAction (belonging to
                this particular SUPAPolicy) that failed to
                execute correctly. All remaining actions
                including SUPAPolicyActions and SUPAPolicies
                that otherwise would have been executed as a
                result of this SUPAPolicy, SHOULD NOT
```

```

        be executed.";
    }
    enum "stop execution" {
        description
            "This means that execution of this SUPAPolicy
            SHOULD be stopped without any other action
            being performed; this includes corrective
            actions, such as rollback, as well as any
            SUPAPolicyActions or SUPAPolicies that
            otherwise would have been executed.";
    }
}

```

```

    enum "ignore" {
        description
            "This means that any failures produced by this
            SUPAPolicy SHOULD be ignored, and hence, no
            corrective actions, such as rollback, will
            be performed at this time. Hence, any other
            SUPAPolicyActions or SUPAPolicies SHOULD
            continue to be executed.";
    }
}
mandatory true;
description
    "This defines what actions, if any, should be taken by
    this particular SUPA Policy Rule if it fails to
    execute correctly. Some implementations may not be
    able to accommodate the rollback failure options;
    hence, these options may be skipped.";
}
leaf-list supa-has-policy-source-agg-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./)/entity-class,
        'SUPA-HAS-POLICY-SOURCE-ASSOC')";
    description
        "This leaf-list holds instance-identifiers that
        reference SUPAHasPolicySource associations [1].
        This association is represented by the grouping
        supa-has-policy-source-detail, and describes how
        this SUPAPolicyStructure instance is related to a

```



```

        set of SUPAPolicySource instances. Each
        SUPAPolicySource instance defines a set of
        unambiguous sources of this SUPAPolicy. Since
        this association class contains attributes, the
        instance-identifier MUST point to an instance using
        the grouping supa-has-policy-source-detail (which
        includes subclasses of this association class).";
    }
leaf-list supa-has-policy-target-agg-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref())/entity-class,
        'SUPA-HAS-POLICY-TARGET-ASSOC'";
    description
        "This leaf-list holds instance-identifiers that
        reference SUPAHasPolicyTarget associations [1].
        This association is represented by the grouping
        supa-has-policy-target-detail, and describes how
        this SUPAPolicyStructure instance is related to a
        set of SUPAPolicyTarget instances.

```

```

        Each SUPAPolicyTarget instance defines a set of
        unambiguous managed entities to which this
        SUPAPolicy will be applied to. Since this association
        class contains attributes, the instance-identifier
        MUST point to an instance using the grouping
        supa-has-policy-target-detail (which includes
        subclasses of this association class).";
    }
leaf-list supa-has-policy-clause-agg-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref())/entity-class,
        'SUPA-HAS-POLICY-CLAUSE-ASSOC'";
    description
        "This leaf-list holds instance-identifiers that
        reference SUPAHasPolicyClause associations [1]. This
        association is represented by the grouping
        supa-has-policy-clause-detail. This association
        describes how this particular SUPAPolicyStructure
        instance is related to this set of SUPAPolicyClause
        instances. Since this association class contains

```

```

        attributes, the instance-identifier MUST point to an
        instance using the supa-has-policy-clause-detail
        (which includes subclasses of this association
        class).";
    }
leaf-list supa-has-policy-exec-fail-action-agg-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
        'SUPA-HAS-POLICY-EXEC-ACTION-ASSOC'))";
    description
        "This leaf-list holds instance-identifiers that
        reference a SUPAHasPolExecFailActionToTake
        association [1]. This association is represented by
        the supa-has-policy-exec-action-detail grouping. This
        association relates this SUPAPolicyStructure instance
        (the parent) to one or more SUPAPolicyStructure
        instances (the children), where each child
        SUPAPolicyStructure contains one or more
        SUPAPolicyActions to be executed if the parent
        SUPAPolicyStructure instance generates an error while
        it is executing. Since this association class contains
        attributes, the instance-identifier MUST point to an
        instance using the grouping
        supa-has-policy-exec-action-detail (which includes
        subclasses of this association class).";
    }
leaf-list supa-has-policy-exec-fail-action-part-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
        'SUPA-HAS-POLICY-EXEC-ACTION-ASSOC'))";
    min-elements 1;
    description

```

```

    "This leaf-list holds instance-identifiers that
    reference a SUPAHasPolExecFailActionToTake
    association [1]. This association is represented by
    the supa-has-policy-exec-action-detail grouping. This
    association relates this SUPAPolicyStructure instance
    (the child) to another SUPAPolicyStructure instance
    (the parent). The child SUPAPolicyStructure contains
    one or more SUPAPolicyActions to be executed if the
    parent SUPAPolicyStructure instance generates an error
    while it is executing; the parent SUPAPolicyStructure
    contains one or more child SUPAPolicyStructure
    instances to enable it to choose how to handle each

```

```

        type of failure. Since this association class contains
        attributes, the instance-identifier MUST point to an
        instance using the grouping
        supa-has-policy-exec-action-detail (which includes
        subclasses of this association class).";
    }
description
    "A superclass for all objects that represent different types
    of SUPAPolicies. Currently, this is limited to a single
    type, which is the event-condition-action (ECA) Policy
    Rule. A SUPA Policy may be an individual policy, or a set
    of policies. Subclasses MAY support this feature by
    implementing the composite pattern.";
}

identity POLICY-SOURCE-TYPE {
    base POLICY-OBJECT-TYPE;
description
    "The identity corresponding to a SUPAPolicySource
    object instance.";
}

grouping supa-policy-source-type {
    uses supa-policy-object-type {
        refine entity-class {
            default POLICY-SOURCE-TYPE;
        }
    }
}

leaf-list supa-has-policy-source-part-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
        'SUPA-HAS-POLICY-SOURCE-ASSOC'))";
description
    "This leaf-list holds the instance-identifiers that
    reference a SUPAHasPolicySource association [1], which
    is represented by the supa-has-policy-source-detail
    grouping. This association describes how each
    SUPAPolicySource instance is related to this
    particular SUPAPolicyStructure instance.

```

Since this association class contains attributes, the instance-identifier MUST point to an instance using the grouping supa-has-policy-source-detail (which includes subclasses of this association class).";

```

}
description
    "This object defines a set of managed entities that
    authored, or are otherwise responsible for, this
    SUPAPolicy. Note that a SUPAPolicySource does NOT evaluate
    or execute SUPAPolicies. Its primary use is for
    auditability and the implementation of deontic logic (i.e.,
    how concepts such as obligation and permission work) and/or
    alethic logic (i.e., how concepts such as necessity,
    possibility, and contingency work). It is expected that this
    grouping will be extended (i.e., subclassed) when used, so
    that the system can add specific information appropriate to
    sources of policy of that particular system.";
}

container supa-policy-source-container {
    description
        "This is a container to collect all object instances of
        type SUPAPolicySource.";
    list supa-policy-source-list {
        key supa-policy-ID;
        uses supa-policy-source-type;
        description
            "A list of all supa-policy-source instances in the
            system.";
    }
}

identity POLICY-TARGET-TYPE {
    base POLICY-OBJECT-TYPE;
    description
        "The identity corresponding to a SUPAPolicyTarget
        object instance.";
}

grouping supa-policy-target-type {
    uses supa-policy-object-type {
        refine entity-class {
            default POLICY-TARGET-TYPE;
        }
    }
    leaf-list supa-has-policy-target-part-ptr {
        type instance-identifier;
        must "derived-from-or-self (deref(./entity-class,
            'SUPA-HAS-POLICY-TARGET-ASSOC'))";
        description

```

```
    "This leaf-list holds instance-identifiers that
    reference a SUPAHasPolicyTarget association. This is
    represented by the supa-has-policy-target-detail
    grouping. This association describes how each
    SUPAPolicyTarget instance is related to a particular
    SUPAPolicyStructure instance. For example, this
    association may restrict which SUPAPolicyTarget
    instances can be used by which SUPAPolicyStructure
    instances. The SUPAPolicyTarget defines a
    set of managed entities that this SUPAPolicyStructure
    will be applied to. Since this association class
    contains attributes, the instance-identifier MUST
    point to an instance using the grouping
    supa-has-policy-target-detail (which
    includes subclasses of this association class).";
  }
  description
    "This object defines a set of managed entities that a
    SUPAPolicy is applied to. It is expected that this
    grouping will be extended (i.e., subclassed) when used,
    so that the system can add specific information
    appropriate to policy targets of that particular system.";
}

container supa-policy-target-container {
  description
    "This is a container to collect all object instances of
    type SUPAPolicyTarget.";
  list supa-policy-target-list {
    key supa-policy-ID;
    uses supa-policy-target-type;
    description
      "A list of all supa-policy-target instances in the
      system.";
  }
}

identity POLICY-METADATA-TYPE {
  base SUPA-ROOT-TYPE;
  description
    "The identity corresponding to a SUPAPolicyMetadata
    object instance.";
}

grouping supa-policy-metadata-type {
  leaf entity-class {
    type identityref {
      base SUPA-ROOT-TYPE;
    }
  }
}
```

```
    }
    description
        "The identifier of the class of this grouping.";
}
```

```
leaf supa-policy-metadata-id {
    type string;
    mandatory true;
    description
        "This represents the object identifier of an instance
        of this class. This attribute is named
        supaPolMetadataIDContent in [1], and is used with
        another attribute (supaPolMetadataIDEncoding); since
        the YANG data model does not need this genericity, the
        supaPolMetadataIDContent attribute was renamed to
        supa-policy-metadata-id, and the
        supaPolMetadataIDEncoding attribute was not mapped.";
}
leaf supa-policy-metadata-description {
    type string;
    description
        "This contains a free-form textual description of this
        metadata object (e.g., what it may be used for).";
}
leaf supa-policy-metadata-name {
    type string;
    description
        "This contains a human-readable name for this
        metadata object.";
}
leaf-list supa-has-policy-metadata-part-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
        'SUPA-HAS-POLICY-METADATA-ASSOC'))";
    description
        "This leaf-list holds instance-identifiers that
        reference a SUPAHasPolicyMetadata association [1],
        which is represented by the grouping
        supa-has-policy-metadata-detail. Each instance-
        identifier defines a unique set of information that
        describe and/or prescribe additional information,
        provided by this SUPAPolicyMetadata instance, that can
        be associated with this SUPAPolicyObject instance.
        Multiple SUPAPolicyMetadata objects may be attached to
        a concrete subclass of the SUPAPolicyObject class that
```

```

    is referenced in this association by using the
    Decorator pattern [1]. For example, a
    SUPAPolicyVersionMetadataDef instance could wrap a
    SUPAECAPolicyRuleAtomic instance; this would define
    the version of this particular SUPAECAPolicyRuleAtomic
    instance. Since this association class contains
    attributes, the instance-identifier MUST point to an
    instance using the grouping
    supa-has-policy-metadata-detail (which includes
    subclasses of this association class).";
}

```

```

leaf-list supa-has-policy-metadata-dec-part-ptr {
  type instance-identifier;
  must "derived-from-or-self (deref(./entity-class,
    'SUPA-HAS-POLICY-METADATA-DECORATOR-DETAIL-ASSOC'))";
  min-elements 1;
  description
    "This leaf-list holds instance-identifiers that
    reference a SUPAHasMetadaDecorator association [1].
    This association is represented by the grouping
    supa-has-policy-metadata-dec-detail. This association
    describes how a SUPAPolicyMetadataDecorator instance
    wraps a given SUPAPolicyMetadata instance using the
    Decorator pattern [1]. Multiple concrete subclasses
    of SUPAPolicyMetadataDecorator may be used to wrap
    the same SUPAPolicyMetadata instance. Since this
    association class contains attributes, the
    instance-identifier MUST point to an instance using
    the grouping supa-has-policy-metadata-dec-detail (which
    includes subclasses of this association class).";
}
description
  "This is the superclass of all metadata classes. Metadata
  is information that describes and/or prescribes the
  characteristics and behavior of another object that is
  not an inherent, distinguishing characteristics or
  behavior of that object.";
}

identity POLICY-METADATA-CONCRETE-TYPE {
  base POLICY-METADATA-TYPE;
  description
    "The identity corresponding to a SUPAPolicyConcreteMetadata

```

```

        object instance.";
    }

    grouping supa-policy-concrete-metadata-type {
        uses supa-policy-metadata-type {
            refine entity-class {
                default POLICY-METADATA-CONCRETE-TYPE;
            }
        }
        leaf supa-policy-metadata-valid-period-end {
            type yang:date-and-time;
            description
                "This defines the ending date and time that this
                metadata object is valid for.";
        }
    }

```

```

        leaf supa-policy-metadata-valid-period-start {
            type yang:date-and-time;
            description
                "This defines the starting date and time that this
                metadata object is valid for.";
        }
        description
            "This is a concrete class that will be wrapped by concrete
            instances of the SUPA Policy Metadata Decorator class. It
            can be viewed as a container for metadata that will be
            attached to a subclass of SUPA Policy Object. It may
            contain all or part of one or more metadata subclasses.";
    }

    container supa-policy-concrete-metadata-container {
        description
            "This is a container to collect all object instances of
            type SUPAPolicyConcreteMetadata.";
        list supa-policy-concrete-metadata-list {
            key supa-policy-metadata-id;
            uses supa-policy-concrete-metadata-type;
            description
                "A list of all supa-policy-metadata instances in the
                system.";
        }
    }

```



```

    }
}

identity POLICY-METADATA-DECORATOR-TYPE {
    base POLICY-METADATA-TYPE;
    description
        "The identity corresponding to a
        SUPAPolicyMetadataDecorator object instance.";
}

grouping supa-policy-metadata-decorator-type {
    uses supa-policy-metadata-type {
        refine entity-class {
            default POLICY-METADATA-DECORATOR-TYPE;
        }
    }
    leaf supa-has-policy-metadata-dec-agg-ptr {
        type instance-identifier;
        must "derived-from-or-self (deref(./entity-class,
            'SUPA-HAS-POLICY-METADATA-DECORATOR-DETAIL-ASSOC'))";
        description
            "This leaf-list holds instance-identifiers that
            reference a SUPAHasMetadaDecorator association [1].
            This association is represented by the grouping
            supa-has-policy-metadata-dec-detail. This association
            describes how a SUPAPolicyMetadataDecorator instance
            wraps a given SUPAPolicyMetadata instance";
    }
}

```

using the Decorator pattern [1]. Multiple concrete subclasses of SUPAPolicyMetadataDecorator may be used to wrap the same SUPAPolicyMetadata instance. Since this association class contains attributes, the instance-identifier MUST point to an instance using the grouping supa-has-policy-metadata-dec-detail (which includes subclasses of this association class).";

```

}
description
    "This object implements the Decorator pattern [1] for all
    SUPA metadata objects. This enables all or part of one or
    more metadata objects to wrap another concrete metadata
    object. The only concrete subclass of SUPAPolicyMetadata
    in this document is SUPAPolicyConcreteMetadata.";
}

```

```

identity POLICY-METADATA-DECORATOR-ACCESS-TYPE {
  base POLICY-METADATA-DECORATOR-TYPE;
  description
    "The identity corresponding to a
    SUPAPolicyAccessMetadataDef object instance.";
}

grouping supa-policy-metadata-decorator-access-type {
  uses supa-policy-metadata-decorator-type {
    refine entity-class {
      default POLICY-METADATA-DECORATOR-ACCESS-TYPE;
    }
  }
}

leaf supa-policy-metadata-access-priv-def {
  type enumeration {
    enum "error" {
      description
        "This signifies an error state. OAM&P Policies
        SHOULD NOT use this SUPAPolicyAccessMetadataDef
        if the value of this attribute is error.";
    }
    enum "init" {
      description
        "This signifies an initialization state.";
    }
    enum "read only" {
      description
        "This defines access as read only for ALL
        SUPAPolicyObject objects that are adorned
        with this SUPAPolicyAccessMetadataDef object.
        As such, an explicit access control model,
        such as RBAC [7], is NOT present.";
    }
  }
}

```

```

enum "read write" {
  description
    "This defines access as read and/or write for
    ALL SUPAPolicyObject objects that are adorned
    with this SUPAPolicyAccessMetadataDef object.
    As such, an explicit access control model,
    such as RBAC [7], is NOT present.";
}

```

```

enum "specified by MAC" {
  description
    "This uses an external Mandatory Access Control
    (MAC) [7] model to define access control for
    ALL SUPAPolicyObject objects that are adorned
    with this SUPAPolicyAccessMetadataDef object.
    The name and location of this access control
    model are specified, respectively, in the
    supa-policy-metadata-access-priv-model-name
    and supa-policy-metadata-access-priv-model-ref
    attributes of this SUPAPolicyAccessMetadataDef
    object.";
}
enum "specified by DAC" {
  description
    "This uses an external Discretionary Access
    Control (DAC) [7] model to define access
    control for ALL SUPAPolicyObject objects that
    are adorned with this
    SUPAPolicyAccessMetadataDef object. The name
    and location of this access control model are
    specified, respectively, in the
    supa-policy-metadata-access-priv-model-name
    and supa-policy-metadata-access-priv-model-ref
    attributes of this SUPAPolicyAccessMetadataDef
    object.";
}
enum "specified by RBAC" {
  description
    "This uses an external Role-Based Access Control
    (RBAC) [7] model to define access control for
    ALL SUPAPolicyObject objects that are adorned
    with this SUPAPolicyAccessMetadataDef object.
    The name and location of this access control
    model are specified, respectively, in the
    supa-policy-metadata-access-priv-model-name
    and supa-policy-metadata-access-priv-model-ref
    attributes of this SUPAPolicyAccessMetadataDef
    object.";
}

```

```

enum "specified by ABAC" {
    description
        "This uses an external Attribute-Based Access Control (ABAC) [8] model to define access control for ALL SUPAPolicyObject objects that are adorned with this SUPAPolicyAccessMetadataDef object. The name and location of this access control model are specified, respectively, in the supa-policy-metadata-access-priv-model-name and supa-policy-metadata-access-priv-model-ref attributes of this SUPAPolicyAccessMetadataDef object.";
}
enum "specified by custom" {
    description
        "This uses an external Custom Access Control model to define access control for ALL SUPAPolicyObject objects that are adorned with this SUPAPolicyAccessMetadataDef object. The name and location of this access control model are specified, respectively, in the supa-policy-metadata-access-priv-model-name and supa-policy-metadata-access-priv-model-ref attributes of this SUPAPolicyAccessMetadataDef object.";
}
}
description
    "This defines the type of access control model that is used by this SUPAPolicyObject object instance.";
}
leaf supa-policy-metadata-access-priv-model-name {
    type string;
    description
        "This contains the name of the access control model being used. If the value of the supa-policy-metadata-access-priv-model-ref is error, then this SUPAPolicyAccessMetadataDef object MUST NOT be used. If the value of the supa-policy-metadata-access-priv-model-ref is init, then this SUPAPolicyAccessMetadataDef object has been properly initialized, and is ready to be used. If the value of the supa-policy-metadata-access-priv-model-ref is read only or read write, then the value of this attribute is not applicable (because a type of model is NOT being defined; instead, the access control for all SUPAPolicyObjects is being defined).

```

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Otherwise, the text in this class attribute SHOULD be interpreted according to the value of the supa-policy-metadata-access-priv-model-ref class attribute.";

```
}
leaf supa-policy-metadata-access-priv-model-ref {
  type enumeration {
    enum "error" {
      description
        "This signifies an error state. OAM&P Policies
        SHOULD NOT use this SUPAPolicyAccessMetadataDef
        object if the value of this attribute is
        error.";
    }
    enum "init" {
      description
        "This signifies an initialization state.";
    }
    enum "URI" {
      description
        "The access control model is referenced by
        this URI.";
    }
    enum "GUID" {
      description
        "The access control model is referenced by
        this GUID.";
    }
    enum "UUID" {
      description
        "The access control model is referenced by
        this UUID.";
    }
    enum "FQDN" {
      description
        "The access control model is referenced by
        this FQDN.";
    }
    enum "FQPN" {
      description
        "The access control model is referenced by
        this FQPN.";
    }
  }
}
```

```

        enum "string_instance_id" {
            description
                "A string that is the canonical representation,
                in ASCII, of an instance ID of this object.";
        }
    }
}

```

```

        description
            "This defines the data type of the
            supa-policy-metadata-access-priv-model-name
            attribute.";
    }
description
    "This is a concrete class that defines metadata for access
    control information that can be added to any
    SUPAPolicyObject object instance.
    This is done using the SUPAHasPolicyMetadata association
    in conjunction with the Decorator pattern [1].";
}

container supa-policy-metadata-decorator-access-container {
    description
        "This is a container to collect all object instances of
        type SUPAPolicyAccessMetadataDef.";
    list supa-policy-metadata-decorator-access-list {
        key supa-policy-metadata-id;
        uses supa-policy-metadata-decorator-type;
        description
            "A list of all supa-policy-metadata-decorator-access
            instances in the system. Instances of subclasses
            will be in a separate list.";
    }
}

identity POLICY-METADATA-DECORATOR-VERSION-TYPE {
    base POLICY-METADATA-DECORATOR-TYPE;
    description
        "The identity corresponding to a
        SUPAPolicyVersionMetadataDef object instance.";
}

grouping supa-policy-metadata-decorator-version-type {

```

```

uses supra-policy-metadata-decorator-type {
    refine entity-class {
        default POLICY-METADATA-DECORATOR-VERSION-TYPE;
    }
}
leaf supra-policy-metadata-version-major {
    type string;
    description
        "This contains a string representation of an integer
        that is greater than or equal to zero. It indicates
        that a significant increase in functionality is present
        in this version. It MAY also indicate that this version
        has changes that are NOT backwards-compatible (the
        supra-policy-metadata-version-build class attribute is
        used to denote such changes). The string 0.1.0

```

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```

defines an initial version that MUST NOT be considered
stable. Improvements to this initial version are
denoted by incrementing the minor and patch class
attributes (supra-policy-metadata-version-major and
supra-policy-metadata-version-patch, respectively). The
major version X (i.e., X.y.z, where X > 0) MUST be
incremented if any backwards-incompatible changes are
introduced. It MAY include minor and patch level
changes. The minor and patch version numbers MUST be
reset to 0 when the major version number is
incremented.";
}
leaf supra-policy-metadata-version-minor {
    type string;
    description
        "This contains a string representation of an integer
        that is greater than or equal to zero. It indicates
        that this release contains a set of features and/or
        bug fixes that MUST be backwards-compatible. The
        minor version Y (i.e., x.Y.z, where x > 0) MUST be
        incremented if new, backwards-compatible changes are
        introduced. It MUST be incremented if any features are
        marked as deprecated. It MAY be incremented if new
        functionality or improvements are introduced, and MAY
        include patch level changes. The patch version number
        MUST be reset to 0 when the minor version number is
        incremented.";

```

```

}
leaf supa-policy-metadata-version-patch {
    type string;
    description
        "This contains a string representation of an integer
        that is greater than or equal to zero. It indicates
        that this version contains ONLY bug fixes. The patch
        version Z (i.e., x.y.Z, where x > 0) MUST be
        incremented if new, backwards-compatible changes are
        introduced. A bug fix is defined as an internal change
        that fixes incorrect behavior.";
}
leaf supa-policy-metadata-version-prerelease {
    type string;
    description
        "This contains a string that defines the pre-release
        version. A pre-release version MAY be denoted by
        appending a hyphen and a series of dot-separated
        identifiers immediately following the patch version.
        Identifiers MUST comprise only ASCII alphanumerics and
        a hyphen. Identifiers MUST NOT be empty. Numeric
        identifiers MUST NOT include leading zeroes.
        Pre-release versions have a lower precedence than the
        associated normal version. A pre-release version
        indicates that the version is unstable and might not

```

satisfy the intended compatibility requirements as denoted by its associated normal version. Examples include: 1.0.0-alpha and 1.0.0-0.3.7.";

```

}
leaf supa-policy-metadata-version-build {
    type string;
    description
        "This contains a string that defines the metadata of
        this build. Build metadata is optional. If present,
        build metadata MAY be denoted by appending a plus
        (+) sign to the version, followed by a series of
        dot-separated identifiers. This may follow either
        the patch or pre-release portions of the version.
        If build metadata is present, then any identifiers
        that it uses MUST be made up of only ASCII
        alphanumerics and a hyphen. The identifier portion of
        the build metadata MUST NOT be empty. Build metadata
        SHOULD be ignored when determining version precedence.
        Examples include: 1.0.0.-alpha+1, 1.0.0.-alpha+1.1,

```



```

        1.0.0+20130313144700, and 1.0.0-beta+exp.sha.5114f85.";
    }
    description
        "This is a concrete class that defines metadata for version
        control information that can be added to any
        SUPAPolicyObject. This is done using the
        SUPAHasPolicyMetadata association. This class uses the
        Semantic Versioning Specification [6] as follows:
        <major>.<minor>.<patch>[<pre-release>][<build-metadata>]
        where the first three components (major, minor, and patch)
        MUST be present, and the latter two components (pre-release
        and build-metadata) MAY be present. A version number MUST
        take the form <major>.<minor>.<patch>, where <major>,
        <minor>, and <patch> are each non-negative integers that
        MUST NOT contain leading zeros. In addition, the value of
        each of these three elements MUST increase numerically.
        In this approach, supaVersionMajor denotes a new release;
        supaVersionMinor denotes a minor release; supaVersionPatch
        denotes a version that consists ONLY of bug fixes. Version
        precedence MUST be calculated by separating the version
        into major, minor, patch, and pre-release identifiers, in
        that order. See [1] for more information.";
    }

```

```

container supa-policy-metadata-decorator-version-container {
    description
        "This is a container to collect all object instances of
        type SUPAPolicyVersionMetadataDef.";
    list supa-policy-metadata-decorator-version-list {
        key supa-policy-metadata-id;
        uses supa-policy-metadata-decorator-type;
    }
}

```

```

        description
            "A list of all supa-policy-metadata-decorator-version
            instances in the system. Instances of subclasses
            will be in a separate list.";
    }
}

identity SUPA-HAS-POLICY-METADATA-DECORATOR-TYPE {
    base POLICY-OBJECT-TYPE;
    description
        "The identity corresponding to a

```

```

        SUPAHasPolicyMetadataDetail association class
        object instance.";
    }

grouping supa-has-policy-metadata-detail {
    uses supa-policy-object-type {
        refine entity-class {
            default SUPA-HAS-POLICY-METADATA-DECORATOR-TYPE;
        }
    }
    leaf supa-has-policy-metadata-detail-agg-ptr {
        type instance-identifier;
        must "derived-from-or-self (deref(./entity-class,
            'POLICY-OBJECT-TYPE'))";
        description
            "This leaf is an instance-identifier that references
            the SUPAPolicyObject instance end point of the
            association represented by this instance of the
            SUPAHasPolicyMetadata association [1]. The groupings
            supa-policy-object-type and supa-policy-metadata-type
            represent the SUPAPolicyObject and SUPAPolicyMetadata
            classes, respectively. Thus, the instance identified
            by this leaf is the SUPAPolicyObject instance that is
            associated by this association to the set of
            SUPAPolicyMetadata instances referenced by the
            supa-has-policy-metadata-detail-part-ptr leaf of
            this grouping.";
    }
    leaf supa-has-policy-metadata-detail-part-ptr {
        type instance-identifier;
        must "derived-from-or-self (deref(./entity-class,
            'POLICY-METADATA-TYPE'))";
        description
            "This leaf is an instance-identifier that references
            the SUPAPolicyMetadata instance end point of the
            association represented by this instance of the
            SUPAHasPolicyMetadata association [1]. The groupings
            supa-policy-object-type and supa-policy-metadata-type
            represents the SUPAPolicyObject and SUPAPolicyMetadata
            classes, respectively. Thus, the instance

```

identified by this leaf is the SUPAPolicyMetadata instance that is associated by this association to the set of SUPAPolicyObject instances referenced by

```

        the supa-has-policy-metadata-detail-agg-ptr leaf of
        this grouping.";
    }

leaf supa-policy-metadata-detail-is-applicable {
    type boolean;
    description
        "This attribute controls whether the associated
        metadata is currently considered applicable to this
        SUPAPolicyObject; this enables metadata to be turned
        on and off when needed without disturbing the
        structure of the object that the metadata applies to,
        or affecting other objects in the system.";
}

leaf-list supa-policy-metadata-detail-constraint {
    type string;
    description
        "A list of constraints, expressed as strings, in
        the language defined by the
        supa-policy-metadata-detail-encoding attribute.
        If there are no constraints on using this
        SUPAPolicyMetadata object with this particular
        SUPAPolicyObject object, then this leaf-list will
        consist of a list of a single null string.";
}

leaf supa-policy-metadata-detail-constraint-encoding {
    type policy-constraint-language-list;
    description
        "The language used to encode the constraints relevant
        to the relationship between the SUPAPolicyMetadata
        object and the underlying SUPAPolicyObject.";
}

description
    "This is a concrete association class that defines the
    semantics of the SUPAHasPolicyMetadata association. This
    enables the attributes and relationships of the
    SUPAHasPolicyMetadataDetail class to be used to constrain
    which SUPAPolicyMetadata objects can be associated by
    this particular SUPAPolicyObject instance.";
}

container supa-policy-metadata-detail-container {
    description
        "This is a container to collect all object instances of
        type SUPAPolicyMetadataDetail.";
    list supa-policy-metadata-detail-list {
        key supa-policy-ID;
        uses supa-has-policy-metadata-detail;
    }
}

```

---

```
        description
            "This is a list of all supa-policy-metadata-detail
            instances in the system. Instances of subclasses
            will be in a separate list. Note that this association
            class is made concrete for exemplary purposes. To be
            useful, it almost certainly needs refinement.";
    }
}

identity SUPA-HAS-POLICY-COMPONENT-DECORATOR-ASSOC {
    base POLICY-COMPONENT-TYPE;
    description
        "The identity corresponding to a
        SUPAHasDecoratedPolicyComponentDetail association class
        object instance.";
}

grouping supa-has-decorator-policy-component-detail {
    uses supa-policy-object-type {
        refine entity-class {
            default SUPA-HAS-POLICY-COMPONENT-DECORATOR-ASSOC;
        }
    }
    leaf supa-has-policy-component-decorator-agg-ptr {
        type instance-identifier;
        must "derived-from-or-self (deref())/entity-class,
            'POLICY-COMPONENT-DECORATOR-TYPE'";
        description
            "This leaf is an instance-identifier that references
            the SUPAPolicyComponentDecorator instance end point of
            the association represented by this instance of the
            SUPAHasDecoratedPolicyComponent association [1]. The
            groupings supa-policy-component-decorator-type and
            supa-policy-component-structure-type represent the
            SUPAPolicyComponentDecorator and
            SUPAPolicyComponentStructure classes, respectively.
            Thus, the instance identified by this leaf is the
            SUPAPolicyComponentDecorator instance that is
            associated by this association to the set of
            SUPAPolicyComponentStructure instances referenced by
            the supa-has-policy-component-decorator-part-ptr leaf
            of this grouping.";
    }
    leaf supa-has-policy-component-decorator-part-ptr {
        type instance-identifier;
        must "derived-from-or-self (deref())/entity-class,
            'POLICY-COMPONENT-TYPE'";
    }
}
```

description

"This leaf is an instance-identifier that references the SUPAPolicyComponentStructure instance end point of the association represented by this instance of the SUPAHasDecoratedPolicyComponent association [[1](#)]."

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The groupings supa-policy-component-decorator-type and supa-policy-component-structure-type represent the SUPAPolicyComponentDecorator and SUPAPolicyComponentStructure classes, respectively. Thus, the instance identified by this leaf is the SUPAPolicyComponentStructure instance that is associated by this association to the set of SUPAPolicyComponentStructure instances referenced by the supa-has-policy-component-decorator-agg-ptr leaf of this grouping.";

}

leaf-list supa-has-decorator-constraint {

type string;

description

"A constraint expression applying to this association between a SUPAPolicyComponentDecorator and the decorated component (which is a concrete subclass of the SUPAPolicyComponentStructure class, such as SUPAEncodedClause or SUPABooleanClauseAtomic). The supa-has-decorator-constraint-encoding attribute specifies the language used to write the set of constraint expressions.";

}

leaf supa-has-decorator-constraint-encoding {

type policy-constraint-language-list;

description

"The language used to encode the constraints relevant to the relationship between the SUPAPolicyComponentDecorator and the SUPAPolicyComponentStructure object instances.";

}

description

"This is a concrete association class that defines the semantics of the SUPAHasDecoratedPolicyComponent association. The purpose of this class is to use the Decorator pattern [[1](#)] to determine which SUPAPolicyComponentDecorator object instances, if any, are required to augment the functionality of a concrete subclass of SUPAPolicyClause that is being used.";

```

}

container supa-policy-component-decorator-detail-container {
  description
    "This is a container to collect all object instances of
    type SUPAPolicyComponentDecoratorDetail.";
  list supa-policy-component-decorator-detail-list {
    key supa-policy-ID;
    uses supa-has-decorator-policy-component-detail;
  }
}

```

```

    description
      "This is a list of all
      supa-policy-component-decorator-details.";
  }
}

identity SUPA-HAS-POLICY-SOURCE-ASSOC {
  base POLICY-OBJECT-TYPE;
  description
    "The identity corresponding to a SUPAHasPolicySource
    association class object instance.";
}

grouping supa-has-policy-source-detail {
  uses supa-policy-object-type {
    refine entity-class {
      default SUPA-HAS-POLICY-SOURCE-ASSOC;
    }
  }
  leaf supa-has-policy-source-detail-agg-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
    'POLICY-STRUCTURE-TYPE'))";
    description
      "This leaf is an instance-identifier that references
      a SUPAPolicyStructure instance end point of the
      association represented by this instance of the
      SUPAHasPolicySource association [1]. The grouping
      supa-has-policy-source-detail represents the
      SUPAHasPolicySourceDetail class. Thus, the instance
      identified by this leaf is the SUPAPolicyStructure

```

```

        instance that is associated by this association to the
        SUPAPolicySource instance referenced by the
        supa-has-policy-source-detail-part-ptr leaf of
        this grouping.";
    }
    leaf supa-has-policy-source-detail-part-ptr {
        type instance-identifier;
        must "derived-from-or-self (deref(./entity-class,
            'POLICY-SOURCE-TYPE'))";
        description
            "This leaf is an instance-identifier that references
            a SUPAPolicySource instance end point of the
            association represented by this instance of the
            SUPAHasPolicySource association [1]. The grouping
            supa-has-policy-source-detail represents the
            SUPAHasPolicySourceDetail class. Thus, the instance
            identified by this leaf is the SUPAPolicySource

```

```

        instance that is associated by this association to the
        SUPAPolicyStructure instance referenced by the
        supa-has-policy-source-detail-agg-ptr leaf of
        this grouping.";
    }
    leaf supa-policy-source-is-authenticated {
        type boolean;
        description
            "If the value of this attribute is true, then this
            SUPAPolicySource object has been authenticated by
            a policy engine or application that is executing this
            particular SUPAPolicyStructure object.";
    }
    leaf supa-policy-source-is-trusted {
        type boolean;
        description
            "If the value of this attribute is true, then this
            SUPAPolicySource object has been verified to be
            trusted by a policy engine or application that is
            executing this particular SUPAPolicyStructure object.";
    }
    description
        "This is an association class, and defines the semantics of

```

```

        the SUPAHasPolicySource association. The attributes and
        relationships of this class can be used to define which
        SUPAPolicySource objects can be attached to which
        particular set of SUPAPolicyStructure objects. Note that a
        SUPAPolicySource object is NOT responsible for evaluating
        or executing SUPAPolicies; rather, it identifies the set
        of entities that are responsible for managing this
        SUPAPolicySource object. Its primary uses are for
        auditability, as well as processing deontic logic. This
        object represents the semantics of associating a
        SUPAPolicySource to a SUPAPolicyTarget.";
    }

    container supa-policy-source-detail-container {
        description
            "This is a container to collect all object instances of
            type SUPAPolicySourceDetail.";
        list supa-policy-source-detail-list {
            key supa-policy-ID;
            uses supa-has-policy-source-detail;
            description
                "This is a list of all supa-policy-source-detail
                objects.";
        }
    }
}

```

```

identity SUPA-HAS-POLICY-TARGET-ASSOC {
    base POLICY-OBJECT-TYPE;
    description
        "The identity corresponding to a SUPAHasPolicyTarget
        association class object instance.";
}

grouping supa-has-policy-target-detail {
    uses supa-policy-object-type {
        refine entity-class {
            default SUPA-HAS-POLICY-TARGET-ASSOC;
        }
    }
    leaf supa-has-policy-target-detail-agg-ptr {
        type instance-identifier;
    }
}

```



```

    must "derived-from-or-self (deref(./entity-class,
        'POLICY-STRUCTURE-TYPE'))";
description
    "This leaf is an instance-identifier that references
    a SUPAPolicyStructure instance end point of the
    association represented by this instance of the
    SUPAHasPolicyTarget association [1]. The grouping
    supa-has-policy-target-detail represents the
    SUPAHasPolicyTargetDetail class. Thus, the instance
    identified by this leaf is the SUPAPolicyStructure
    instance that is associated by this association to the
    SUPAPolicyTarget instance referenced by the
    supa-has-policy-target-detail-part-ptr leaf of
    this grouping.";
}
leaf supa-has-policy-target-detail-part-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
        'POLICY-TARGET-TYPE'))";
description
    "This leaf is an instance-identifier that references
    a SUPAPolicyTarget instance end point of the
    association represented by this instance of the
    SUPAHasPolicyTarget association [1]. The grouping
    supa-has-policy-target-detail represents the
    SUPAHasPolicyTargetDetail class. Thus, the instance
    identified by this leaf is the SUPAPolicyTarget
    instance that is associated by this association to the
    SUPAPolicyStructure instance referenced by the
    supa-has-policy-source-detail-agg-ptr leaf of
    this grouping.";
}
}

```

```

leaf supa-policy-target-is-authenticated {
    type boolean;
description
    "If the value of this attribute is true, then this
    SUPAPolicyTarget object has been authenticated by
    a policy engine or application that is executing this
    particular SUPAPolicyStructure object.";
}

```

```

}
leaf supa-policy-target-is-enabled {
    type boolean;
    description
        "If the value of this attribute is true, then each
        SUPAPolicyTarget object that is referenced by this
        SUPAHasPolicyTarget aggregation is able to be used as
        a SUPAPolicyTarget by the SUPAPolicyStructure object
        that is referenced by this SUPAHasPolicyTarget
        aggregation. This means that this SUPAPolicyTarget has
        agreed to: 1) have SUPAPolicies applied to it, and 2)
        process (directly or with the aid of a proxy) one or
        more SUPAPolicies, or receive the results of a
        processed SUPAPolicy and apply those results to
        itself.";
}
description
    "This is an association class, and defines the semantics of
    the SUPAHasPolicyTarget association. The attributes and
    relationships of this class can be used to define which
    SUPAPolicyTarget objects can be attached to which
    particular set of SUPAPolicyStructure objects. Note that a
    SUPAPolicyTarget is used to identify a set of managed
    entities to which a SUPAPolicy should be applied; this
    object represents the semantics of applying a SUPAPolicy
    to a SUPAPolicyTarget.";
}

container supa-policy-target-detail-container {
description
    "This is a container to collect all object instances of
    type SUPAPolicyTargetDetail.";
list supa-policy-target-detail-list {
    key supa-policy-ID;
    uses supa-has-policy-target-detail;
    description
        "This is a list of all supa-policy-target-detail
        objects.";
}
}
}

```

```

identity SUPA-HAS-POLICY-CLAUSE-ASSOC {
  base POLICY-OBJECT-TYPE;
  description
    "The identity corresponding to a SUPAHasPolicyClause
    association class object instance.";
}

grouping supa-has-policy-clause-detail {
  uses supa-policy-object-type {
    refine entity-class {
      default SUPA-HAS-POLICY-CLAUSE-ASSOC;
    }
  }
  leaf supa-has-policy-clause-detail-agg-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
      'POLICY-STRUCTURE-TYPE'))";
    description
      "This leaf is an instance-identifier that references
      a concrete subclass of the SUPAPolicyStructure class
      end point of the association represented by this
      instance of the SUPAHasPolicyClause association [1].
      The grouping supa-has-policy-clause-detail represents
      the SUPAHasPolicyClauseDetail association class. Thus,
      the instance identified by this leaf is the
      SUPAPolicyStructure instance that is associated by
      this association to the set of SUPAPolicyClause
      instances referenced by the
      supa-has-policy-clause-detail-part-ptr leaf of this
      grouping.";
  }
  leaf supa-has-policy-clause-detail-part-ptr {
    type instance-identifier;
    must "derived-from-or-self (deref(./entity-class,
      'POLICY-CLAUSE-TYPE'))";
    description
      "This leaf is an instance-identifier that references
      a concrete subclass of the SUPAPolicyClause class
      end point of the association represented by this
      instance of the SUPAHasPolicyClause association [1].
      The grouping supa-has-policy-clause-detail represents
      the SUPAHasPolicyClauseDetail association class. Thus,
      the instance identified by this leaf is the
      SUPAPolicyClause instance that is associated by this
      association to the set of SUPAPolicyStructure
      instances referenced by the
      supa-has-policy-clause-detail-agg-ptr leaf of this
      grouping.";
  }
}

```

```
description
    "This is an association class, and defines the semantics of
    the SUPAHasPolicyClause association. The attributes and
    relationships of this class can be used to define which
    SUPAPolicyTarget objects can be used by which particular
    set of SUPAPolicyStructure objects. Every
    SUPAPolicyStructure instance MUST aggregate at
    least one SUPAPolicyClause instance. However, the
    converse is NOT true. For example, a SUPAPolicyStructure
    instance MUST aggregate at least one SUPAPolicyClause
    instance. However, a SUPAPolicyClause object could be
    instantiated and then stored for later use in a policy
    repository.";
}

container supa-policy-clause-detail-container {
    description
        "This is a container to collect all object instances of
        type SUPAPolicyClauseDetail.";
    list supa-policy-clause-detail-list {
        key supa-policy-ID;
        uses supa-has-policy-clause-detail;
        description
            "This is a list of all supa-policy-clause-detail
            objects.";
    }
}

identity SUPA-HAS-POLICY-EXEC-ACTION-ASSOC {
    base POLICY-OBJECT-TYPE;
    description
        "The identity corresponding to a
        SUPAHasPolExecFailActionToTake association class
        object instance.";
}

grouping supa-has-policy-exec-action-detail {
    uses supa-policy-object-type {
        refine entity-class {
            default SUPA-HAS-POLICY-EXEC-ACTION-ASSOC;
        }
    }
}
```

```
leaf supa-has-exec-fail-action-detail-agg-ptr {
  type instance-identifier;
  must "derived-from-or-self (deref(./entity-class,
    'POLICY-STRUCTURE-TYPE'))";
  description
    "This leaf is an instance-identifier that references
    a SUPAPolicyStructure instance end point of the
    association represented by this instance of the
    SUPAHasPolExecFailActionToTake association [1] that
    was executing a SUPAPolicy. This SUPAPolicyStructure
```

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```
is referred to as the 'parent' SUPAPolicyStructure
instance, while the other instance end point of this
association is called the 'child' SUPAPolicyStructure.
The grouping supa-policy-structure-type represents the
SUPAPolicyStructure class. Thus, the instance
identified by this leaf is the parent
SUPAPolicyStructure instance that is associated by this
association to the child SUPAPolicyStructure instance
referenced by the
supa-has-exec-fail-action-detail-part-ptr leaf of this
grouping.";
}
leaf supa-has-exec-fail-action-detail-part-ptr {
  type instance-identifier;
  must "derived-from-or-self (deref(./entity-class,
    'POLICY-STRUCTURE-TYPE'))";
  description
    "This leaf is an instance-identifier that references
    a SUPAPolicyStructure instance end point of the
    association represented by this instance of the
    SUPAHasPolExecFailActionToTake association [1] that
    was NOT currently executing a SUPAPolicy. This
    SUPAPolicyStructure is referred to as the 'child'
    SUPAPolicyStructure instance, while the other instance
    end point of this association is called the 'parent'
    SUPAPolicyStructure. The grouping
    supa-policy-structure-type represents the
    SUPAPolicyStructure class. Thus, the instance
    identified by this leaf is the child
    SUPAPolicyStructure instance that is associated by
    this association to the child SUPAPolicyStructure
    instance referenced by the
    supa-has-exec-fail-action-detail-part-ptr leaf of
    this grouping.";
```

```

}
leaf-list supa-policy-exec-fail-take-action-name {
    type string;
    description
        "This is a list that contains the set of names for
        SUPAPolicyActions to use if the SUPAPolicyStructure
        object that owns this association failed to execute
        properly. This association defines a set of child
        SUPAPolicyStructure objects to use if this (the parent)
        SUPAPolicyStructure object fails to execute correctly.
        Each child SUPAPolicyStructure object has one or more
        SUPAPolicyActions; this attribute defines the name(s)
        of each SUPAPolicyAction in each child
        SUPAPolicyStructure that should be used to try and
        remediate the failure.";
}

```

```

description
    "This is an association class, and defines the semantics of
    the SUPAHasPolExecFailTakeAction association. The
    attributes and relationships of this class can be used to
    determine which SUPAPolicyAction objects are executed in
    response to a failure of the SUPAPolicyStructure object
    instance that owns this association.";
}

container supa-policy-exec-fail-take-action-detail-container {
    description
        "This is a container to collect all object instances of
        type SUPAPolExecFailActionToTakeDetail.";
    list supa-policy-exec-fail-take-action-detail-list {
        key supa-policy-ID;
        uses supa-has-policy-exec-action-detail;
        description
            "This is a list of all
            supa-has-policy-exec-action-detail objects.";
    }
}

identity SUPA-HAS-POLICY-METADATA-DECORATOR-DETAIL-ASSOC {
    base POLICY-METADATA-TYPE;
    description
        "The identity corresponding to a

```

```

        SUPAHasMetadataDecoratorDetail association class
        object instance.";
    }

    grouping supa-has-policy-metadata-dec-detail {
        uses supa-policy-metadata-type {
            refine entity-class {
                default SUPA-HAS-POLICY-METADATA-DECORATOR-DETAIL-ASSOC;
            }
        }
        leaf supa-has-policy-metadata-detail-dec-agg-ptr {
            type instance-identifier;
            must "derived-from-or-self (deref(./entity-class,
                'POLICY-METADATA-TYPE'))";
            description
                "This leaf is an instance-identifier that references
                a SUPAPolicyMetadataDecorator instance end point of
                the association represented by this instance of the
                SUPAHasMetadataDecorator association [1]. The
                grouping supa-has-policy-metadata-detail represents
                the SUPAHasMetadataDecoratorDetail association class.

```

```

        Thus, the instance identified by this leaf is the
        SUPAPolicyMetadataDecorator instance that is
        associated by this association to the set of
        SUPAPolicyMetadata instances referenced by the
        supa-has-policy-metadata-detail-dec-part-ptr leaf of
        this grouping.";
    }
    leaf supa-has-policy-metadata-detail-dec-part-ptr {
        type instance-identifier;
        must "derived-from-or-self (deref(./entity-class,
            'POLICY-METADATA-TYPE'))";
        description
            "This leaf is an instance-identifier that references
            a SUPAPolicyMetadata instance end point of the
            association represented by this instance of the
            SUPAHasMetadataDecorator association [1]. The
            grouping supa-has-policy-metadata-detail represents
            the SUPAHasMetadataDecoratorDetail association class.

```

```

        Thus, the instance identified by this leaf is the
        SUPAPolicyMetadata instance that is associated by
        this association to the set of
        SUPAPolicyMetadataDecorator instances referenced by
        the supa-has-policy-metadata-detail-dec-agg-ptr leaf
        of this grouping.";
    }
    description
        "This is an association class, and defines the semantics of
        the SUPAHasMetadataDecorator association. The attributes
        and relationships of this class can be used to define which
        concrete subclasses of the SUPAPolicyMetadataDecorator
        class can be used to wrap which concrete subclasses of the
        SUPAPolicyMetadata class.";
}

container supa-policy-metadata-decorator-detail-container {
    description
        "This is a container to collect all object instances of
        type SUPAHasMetadataDecoratorDetail.";
    list supa-policy-metadata-decorator-detail-list {
        key supa-policy-metadata-id;
        uses supa-has-policy-metadata-dec-detail;
        description
            "This is a list of all supa-policy-metadata-detail
            objects.";
    }
}
}
}

<CODE ENDS>

```

## [6.](#) IANA Considerations

No IANA considerations exist for this document.

## [7.](#) Security Considerations

TBD



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## 9. References

This section defines normative and informative references for this document.

### 9.1. Normative References

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- [[RFC6991](#)] Schoenwaelder, J., "Common YANG Data Types", [RFC 6991](#), July 2013.
- [[RFC7950](#)] Bjorklund, M., Ed., "The YANG 1.1 Data Modeling Language", August 2016.

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- [1] Strassner, J., Halpern, J., Coleman, J., "Generic Policy Information Model for Simplified Use of Policy Abstractions (SUPA)", Jan 18, 2017, [draft-ietf-supa-generic-policy-info-model-02](#)
- [2] <http://www.omg.org/spec/OCL/>
- [3] <http://doc.omg.org/formal/2002-04-03.pdf>
- [4] <http://alloy.mit.edu/alloy/>
- [5] <http://www.omg.org/spec/QVT/>

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- [6] <http://semver.org/>

- [7] Definitions of DAC, MAC, and RBAC may be found here:  
<http://csrc.nist.gov/groups/SNS/rbac/faq.html#03>
- [8] ABAC is described here:  
<http://csrc.nist.gov/groups/SNS/rbac/index.html>

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