SUPA Information Model

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IETF95

Agenda

- **Motivation for building an Information Model**

- **I-D Status and Open Issues**

- **Next Steps**

Motivation (1)

- **Information Model is independent of language, protocol, repository, and content and structure of policy**
  - BUT, changes being made to help build YANG data models

- **Without an Information Model…**
  - Resulting data models will be silos, making interoperability difficult
  - Different types of policies (e.g., imperative, procedural, declarative, functional) will themselves be silos
  - Different actors want to author different policies using different grammars
  - No Interoperability with Chef/Puppet/, AWS Cloud Formation Templates, …

Motivation (2)

- **Policies are used by multiple actors**
  - App developers, operators, security and compliance teams, administrators, end-users, … **each has different concepts and terms**

- **Policies exist at different levels of abstraction**
  - Per-port, -device, -network, -VM, -application, -service, …

- **Different Policies exist for different operations on the same device**
  - Monitoring vs. configuration vs. audit
  - Deployment vs. backup vs. provisioning vs. billing vs. retirement …

- **Policies focused on different technologies and vendors must be able to work collaboratively**
  - Requires a **common set of concepts and vocabulary** across domains
  - An E2E policy affects multiple actors, technologies, and vendors

- *Policies help heterogeneous systems interoperate*

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Main Changes from -05

- **The Declarative Model Has Ceased To Be**
  - Even removed from the Appendix

- **Clarifications made in response to questions from the SUPA mailing list**

- **Relationship multiplicity has been fine-tuned**
  - Otherwise, class model is stable

- **Produced a **preliminary** YANG model (covered in Joel's presentation)**

- **Various additional typos have been fixed**

GPIM Class Hierarchy

```
(Class of another model that SUPA is integrating into)
      |
   +---SUPAPolicyObject (5.2)
   |    |
   |    +---SUPAPolicyStructure (5.3)
   |    |
   |    +---SUPAPolicyComponentStructure (5.4)
   |    |    |
   |    |    +---SUPAPolicyClause (5.5)                    |
   |    |    |    |                          +---SUPAPolicyMetadata (5.16)
   |    |    |    +---SUPAEncodedClause (5.6)       |
   |    |    |                                      +---SUPAPolicyConcreteMetadata (5.17)
   |    |    +---SUPAPolicyComponentDecorator (5.7) |
   |    |         |                                 +---SUPAPolicyMetadataDecorator (5.18)
   |    |         +---SUPAPolicyTerm (5.8)                |
   |    |         |    |                                  +---SUPAPolicyAccessMetadataDef (5.19)
   |    |         |    +---SUPAPolicyVariable (5.9)        |
   |    |         |    |                                  +---SUPAPolicyVersionMetadataDef (5.20)
   |    |         |    +---SUPAPolicyOperator (5.10)
   |    |         |    |
   |    |         |    +---SUPAPolicyValue (5.11)
   |    |         |
   |    |         +---SUPAGenericDecoratedComponent (5.12)
   |    |         |
   |    |         +---SUPAPolicyCollection (5.13)
   |    |
   |    +---SUPAPolicySource (5.14)
   |    |
   |    +---SUPAPolicyTarget (5.15)
```

EPRIM Class Hierarchy

```
(Class of another model that SUPA is integrating into)
    |
    +---SUPAPolicyObject (5.2)
            |
            +---SUPAPolicyStructure (5.3)
            |      |
            |      +---SUPAECAPolicyRule (6.4)
            |             |
            |             +---SUPAECAPolicyRuleAtomic (6.5)
            |             |
            |             +---SUPAECAPolicyRuleComposite (6.6)
            |
            +---SUPAPolicyComponentStructure (5.6)
                   |
                   +---SUPAPolicyClause (5.7)
                   |      |
                   |      +---SUPABooleanClause (6.7)
                   |             |
                   |             +---SUPAECAPolicyRuleAtomic (6.8)
                   |             |
                   |             +---SUPAECAPolicyRuleComposite (6.9)
                   |
                   +---SUPAPolicyComponentDecorator (5.9)
                          |
                          +---SUPAECAComponent (6.10)
                                 |
                                 +---SUPAPolicyEvent (6.11)
                                 |
                                 +---SUPAPolicyCondition (6.12)
                                 |
                                 +---SUPAPolicyAction (6.13)
```

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Next Steps

- **Feedback is Always Welcome**

- **In the Meantime…**

- **…Chairs Issued WG Call for Adoption…**

Questions?
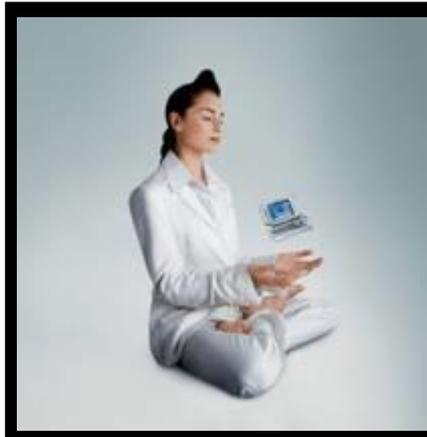
"Create like a god. Command like a king. Work like a slave"
- Constantin Brancusi

The GPIM

Base class for Policy Rules and Components of Policy Rules

```
                 A
          +------------------+
          | SUPAPolicyObject |
          +--------+---------+
                  / \
                   I
                   I
       +---------------+------------------+
       I                                  I
   A   I                       A          I
  +--------+-----------+       +-----------+----------------+
  | SUPAPolicyStructure |      | SUPAPolicyComponentStructure |
  +----+---------------+       +-----------+----------------+
```
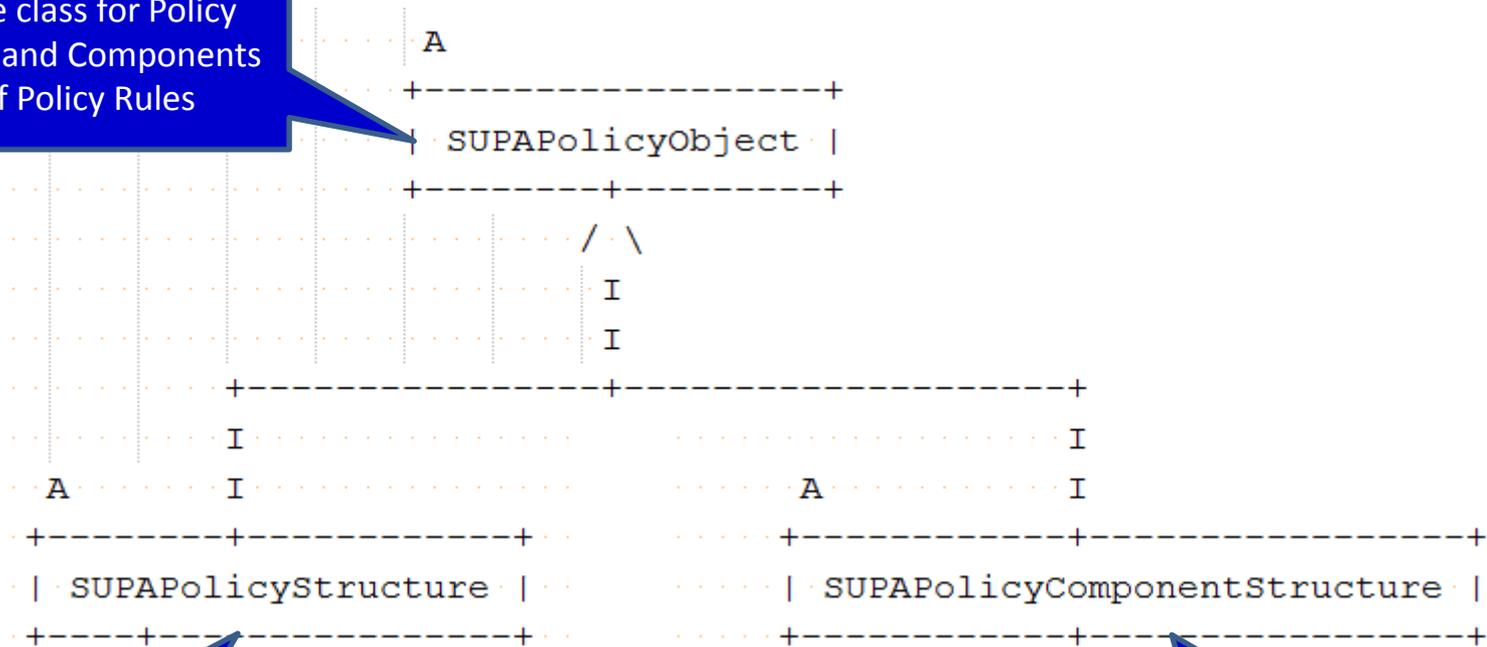
Different types of Policy Rules

Different types of Policy Rule Components

Types of Policy Components

```
    A
    +-----------------------------+
    |                             | 1..n
    | SUPAPolicyComponentStructure +--------+
    |                             |        | used to wrap
    +-----------------------------+        | concrete
                        / \               | subclasses of
                         I                | PolicyClause
                         I                |
        +----------------+-------------+  / \
        I                             I    A
    A   I                    A        I    \ / 0..1
    +---------+---------+    +-------------+-----+--------+
    |  SUPAPolicyClause  |   | SUPAPolicyComponentDecorator |
    +---------+---------+    +-------------+-------------+
              I                            I
              I                            I
             / \                          / \
       Concrete Subclasses,        Concrete Subclasses
    (e.g., SUPAEncodedClause)    (e.g., SUPAPolicyCollection)
    (object being wrapped)          (wrapping object(s))
```
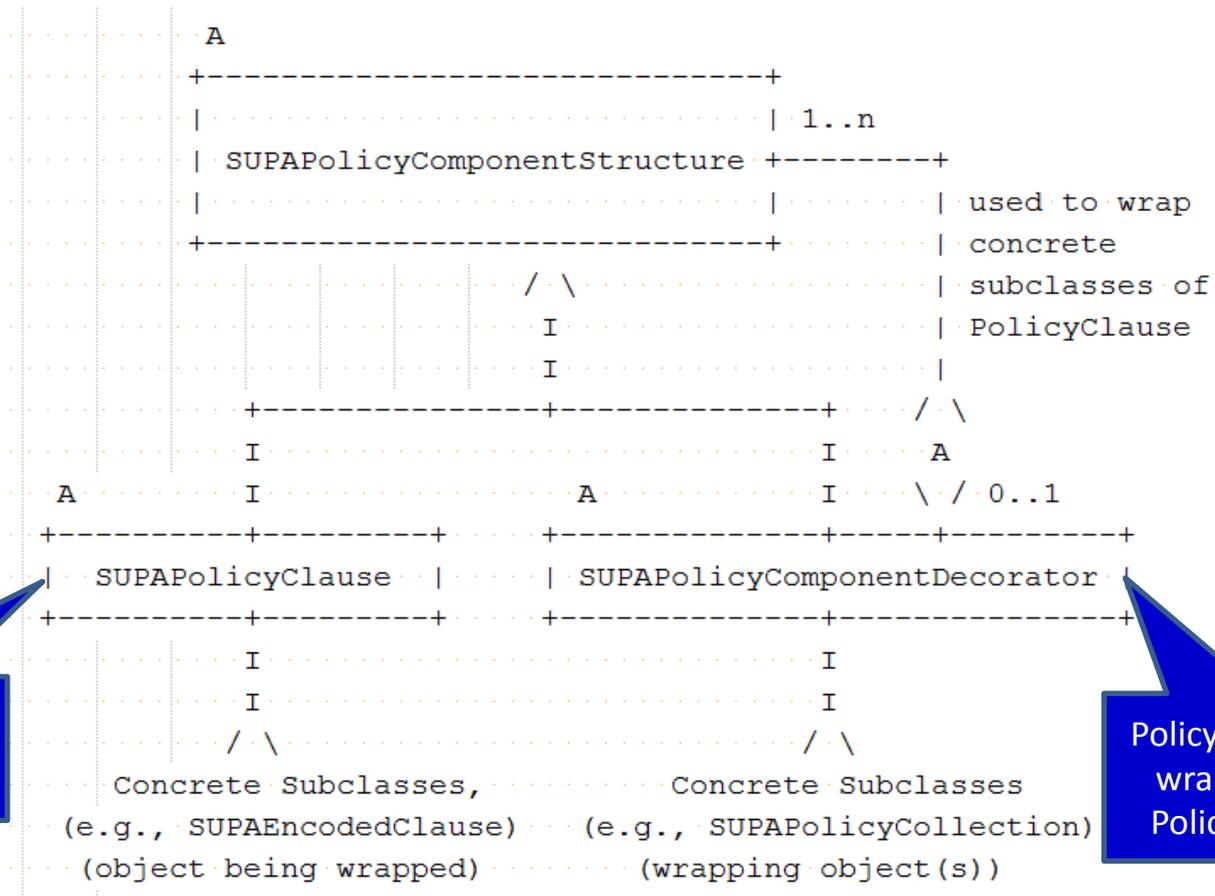
Policies are made up of PolicyClauses

PolicyClauses may be wrapped by other PolicyComponents

SUPA Information Model - Strassner

The Decorator Pattern

```
          A
          +-----------------------------+
          |                             | 1..n
          | SUPAPolicyComponentStructure +--------+
          |                             |        | used to wrap
          +-----------------------------+        | concrete
                             / \                  | subclasses of
                              I                   | PolicyClause
                              I                   |
          +---------------+-------------+         / \
          I                          I    A
    A     I                 A        I    \ / 0..1
+---------+---------+    +------------+----+--------+
|  SUPAPolicyClause |    | SUPAPolicyComponentDecorator |
+---------+---------+    +------------+--------------+
          I                          I
          I                          I
         / \                        / \
    Concrete Subclasses,       Concrete Subclasses
  (e.g., SUPAEncodedClause)   (e.g., SUPAPolicyCollection)
   (object being wrapped)       (wrapping object(s))
```
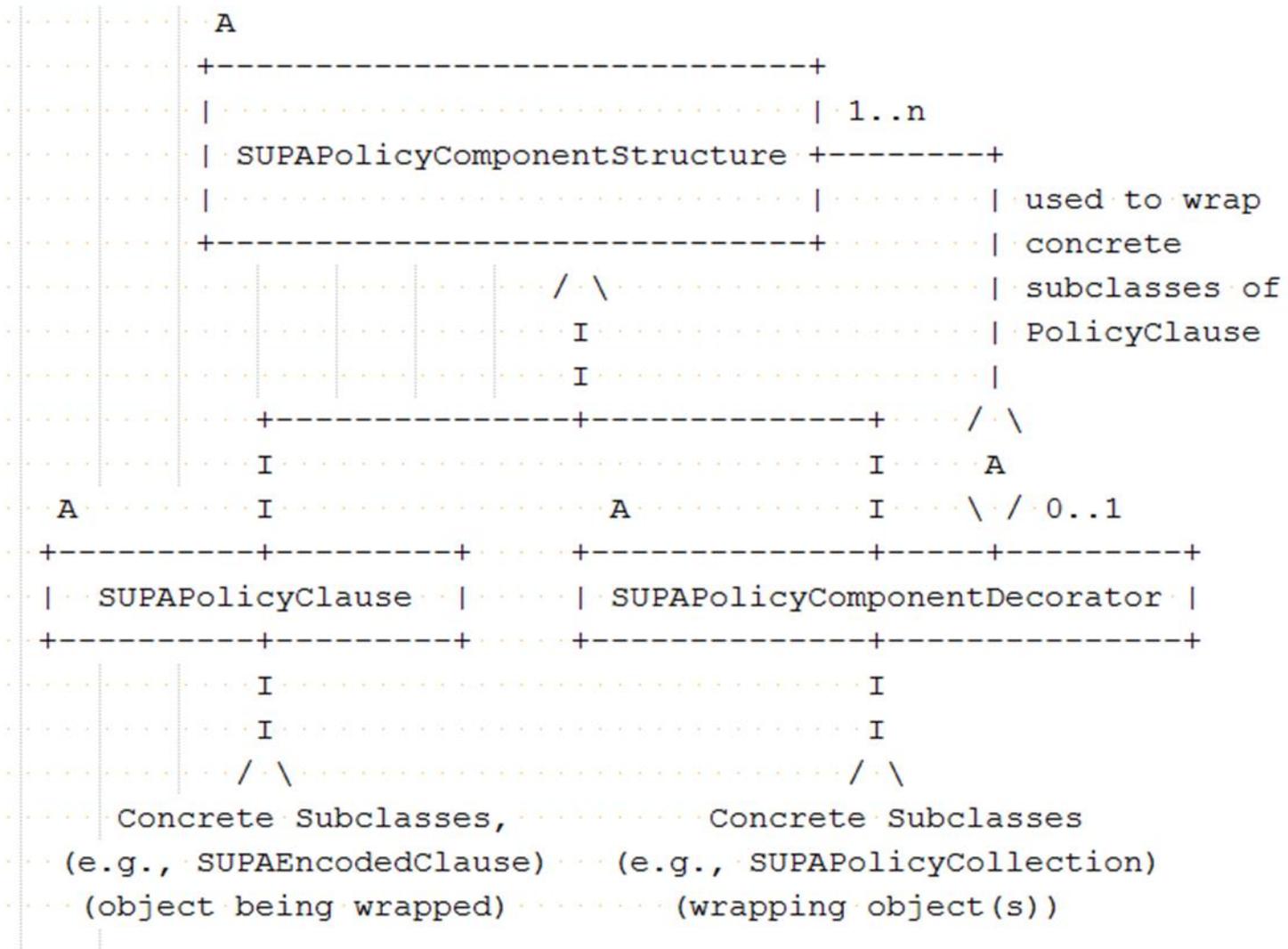
Decorated Policy Components

```
                                      A
                        +----------------------------+
                        | SUPAPolicyComponentDecorator |
                        +--------------+--------------+
                                      / \
                                       I
                                       I
                                       I
              +-----------+------------+-------------+
              I           I            I             I
      A       I           I    C       I             I
+--------+------+     I     +--------+----------+   I
| SUPAPolicyTerm |    I     | SUPAPolicyCollection |  I
+---------------+     I     +---------------------+   I
  (for defining     I     (for defining sets and/or  I
   clauses in       I         groups of objects)     I
 canonical form)    I                                I
                    I                                I
     C              I                     A          I
   +---------------+-------------+     +---------+--------+
   | SUPAGenericDecoratedComponent |     | SUPAECAComponent |
   +-----------------------------+     +-----------------+
      (for decorating concrete          (for defiing reusable
    subclasses of SUPAPolicyClause)     event, condition,
                                        and action objects)
```

Metadata Hierarchy Overview

```
                    A
                    +-------------------+
                    |                   |  SUPAHasMetadataDecorator
                    | SUPAPolicyMetadata +-------------------+
                    |                   | 1..n              |
                    +---------+---------+                   |
                              I                             |
                              I                             |
                              I                             |
                    +-----------+---------------+           |
                    |                           |           |
         C          |                           |        / \
    +---------+-----------------+               |         A
    | SUPAPolicyConcreteMetadata |      A        |     0..1 \ /
    +--------------------------+    +-------+-----------+-------+
                                    | SUPAPolicyMetadataDecorator |
                                    +-----------+---------------+
                                                I
              +-----------------------------+--------+
              I                             I        I
              I                             I        I
         C    I                        C    I        I
    +--------------+-----------+    +-------------------+-------+
    | SUPAPolicyAccessMetadataDef |  | SUPAPolicyVersionMetadataDef |
    +---------------------------+    +---------------------------+
```
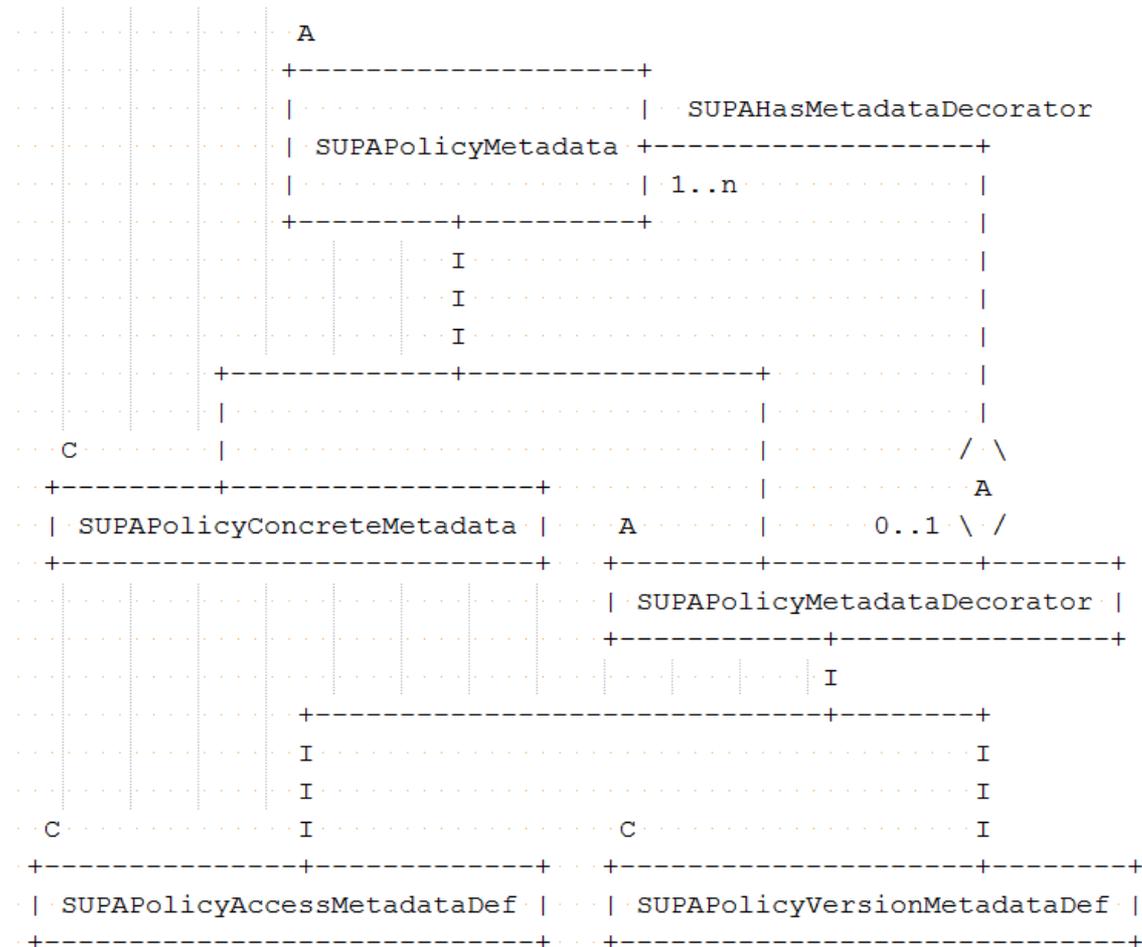
Constructing ECA Policies

```
  A                                      A
  +---------------------------+          +-----------------+
  |    SUPAPolicyStructure    |          | SUPAPolicyClause |
  +--------+--------+-------+  +          +-------+----+---+ +
           / \          / \ 0..1              1..n / \  / \
            I          A                           |    I
            I          \ /                         |    I
            I           |                          |    I
            I           | SUPAHasPolicyClause      |    I
            I           +----------------------+   |    I
    A       I                                      A    I
  +-----+-----------+                          +---------+------+
  | SUPAECAPolicyRule |                        | SUPAPolicyClause |
  +-----------------+                          +-----------------+
```