# Simplified Use of Policy Abstractions (SUPA) Policy Data Model Overview

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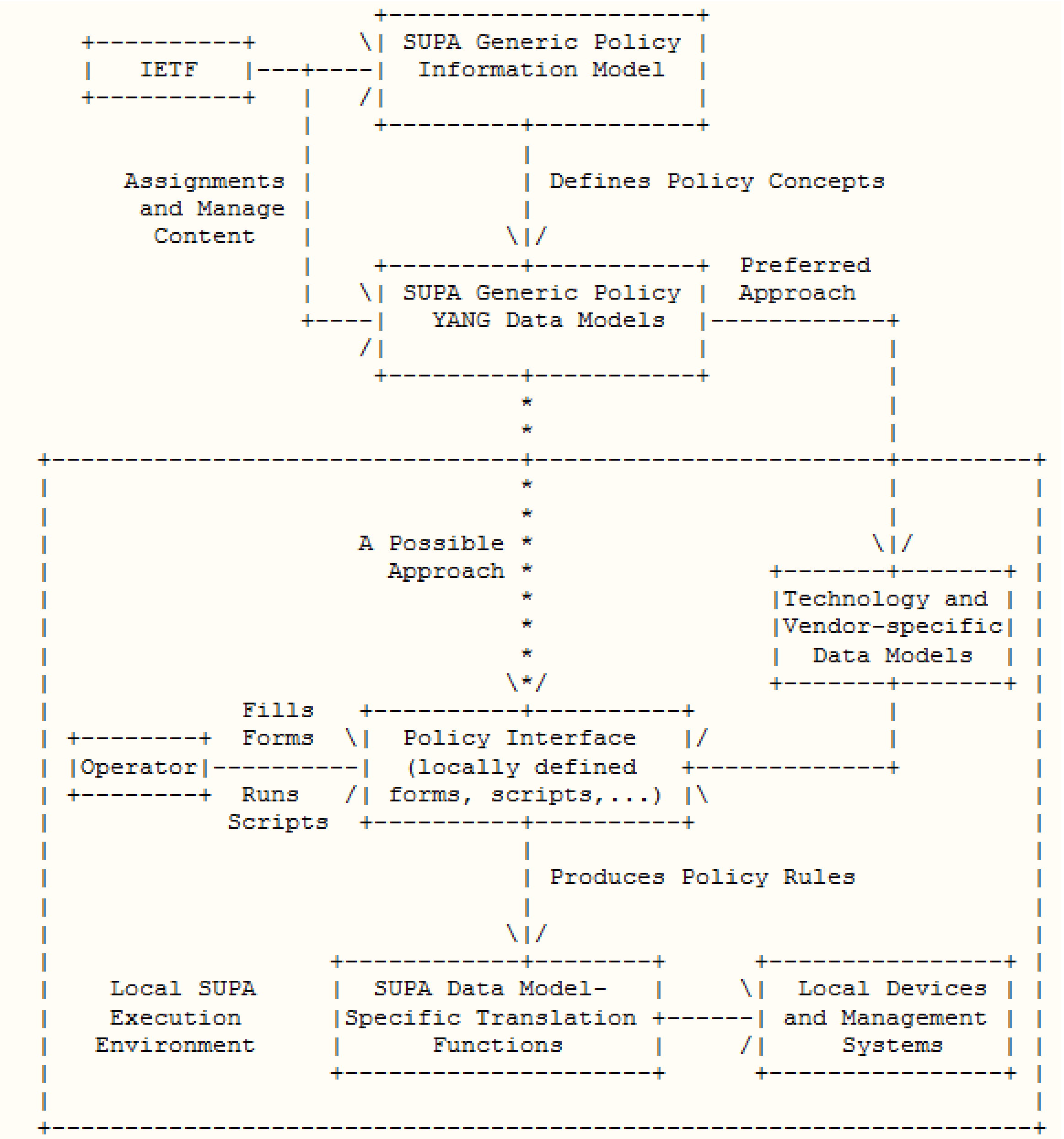
# SUPA Framework



```
                         +---------------------+
     +----------+       \| SUPA Generic Policy |
     |   IETF   |---+----|  Information Model   |
     +----------+   |   /|                     |
                    |    +---------+-----------+
                    |              |
        Assignments |              | Defines Policy Concepts
         and Manage |              |
          Content   |             \|/
                    |    +---------+-----------+ Preferred
                    |   \| SUPA Generic Policy | Approach
                    +----|   YANG Data Models  |------------+
                        /|                     |            |
                         +---------+-----------+            |
                                   *                        |
                                   *                        |
  +--------------------------------+------------------------+---------+
  |                                *                        |         |
  |                                *                        |         |
  |                     A Possible *                       \|/        |
  |                       Approach *               +--------+------+  |
  |                                *               |Technology and |  |
  |                                *               |Vendor-specific|  |
  |                                *               |  Data Models  |  |
  |                               \*/              +--------+------+  |
  |             Fills   +----------+----------+             |         |
  | +--------+  Forms  \|  Policy Interface   |/            |         |
  | |Operator|----------|  (locally defined   +-------------+         |
  | +--------+  Runs   /| forms, scripts,...) |\                      |
  |            Scripts  +----------+----------+                       |
  |                                |                                  |
  |                                | Produces Policy Rules            |
  |                                |                                  |
  |                               \|/                                 |
  |                   +------------+--------+      +---------------+  |
  |    Local SUPA     |  SUPA Data Model-   |     \| Local Devices |  |
  |    Execution      |Specific Translation +------|and Management |  |
  |   Environment     |     Functions       |     /|    Systems    |  |
  |                   +---------------------+      +---------------+  |
  |                                                                  |
  +-------------------------------------------------------------------+
```

- The GPIM defines a generic structure for imperative and declarative policies.
- This is converted to generic YANG data models.
- In the preferred approach, SUPA generic policy data models are then used to create vendor- and technology-specific data models.

## SUPA Policy 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, but not necessarily, all three).
- SUPA generic policy data model is derived from GPIM with semantics defined by GPIM.
- SUPA generic policy YANG data models contain enough information for the Policy Interface to create appropriate input mechanisms for the operator to define policies.
- SUPA Data Model-Specific Translation Function transfers SUPA generic policy data model to vendor- and technology- specific data models .
- For example, an application developer could build an application that uses the SUPA information and data models to directly output configuration snippets.

## Structure of Policy Abstractions

```
           +----------------------------------------+
           | SUPA Generic Policy Information Model (GPIM) |
           +----------------------+-----------------+
                                 / \
                                  |
                                  |
                +-----------------+--------------+
                |                                |
                |                                |
   +------------+---------------+  +-------------+------------+
   |    SUPAECAPolicyRule       |  |   SUPA Logic Statement   |
   | Information Model (EPRIM)  |  | Information Model (LSIM) |
   +------------+---------------+  +-------------+------------+
               / \                              / \
                |                                |
                |                                |
   +------------+-----------+       +------------+------------+
   |      ECAPolicyRule     |       |     Logic Statement     |
   |       Data Model       |       |       Data Model        |
   +------------------------+       +-------------------------+
```

Figure 1: Overview of SUPA Policy Rule Abstractions

- The combination of the GPIM and the EPRIM can be used to construct an Event-Condition-Action (ECA) policy data model

# Current Issue on Policy Data Model

- The format and content of the Data model is not decided.
  - Scripts or structure or something in between.
  - From Juergen:

    “*What I find valuable is a framework that allows to write policies that can operate on arbitrary YANG configuration data models. I want to be able to apply policies how my network interfaces are configured without having to write an interface policy data model first.”*

  - How and who to use the data model ?
    - Operators use data model to define policy or they just define the policy, SUPA does the rest.
  - Need more example to show how it works

## Current work

- ECA Policy YANG Data Model
- draft-chen-supa-eca-data-model-05

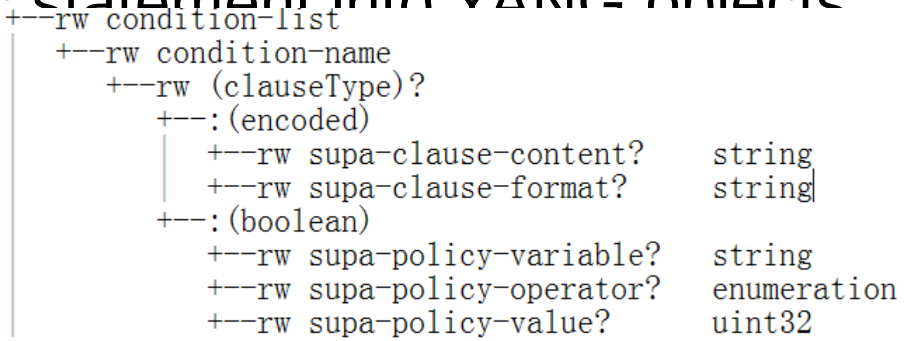
- Refined from GPIM and EPRIM to denote the ECA policy hierarchy.
- Not perfect but a good start for discussion.
- Still hand write policy rules with leaf, nodes…
- Lack of reusability

# Possible Solution on **Events**

- Predefine a set of events, such as:
  - 1. Interface Counter
  - 2. SNMP
  - 3. Syslog
  - 4. Timers
  - 5. Watchdog system monitor
  - 6. Application Specific
- Or use reference to a predefined service model
- Or leave this to user to fill in

# Possible Solution on Conditions

- Most tricky part and the key of reusability and generality
- Break logic statement into YANG objects:



```
+--rw condition-list
   +--rw condition-name
      +--rw (clauseType)?
         +--:(encoded)
         |  +--rw supa-clause-content?    string
         |  +--rw supa-clause-format?     string
         +--:(boolean)
            +--rw supa-policy-variable?   string
            +--rw supa-policy-operator?   enumeration
            +--rw supa-policy-value?      uint32
```

- Or use other scripts embedded in YANG and keep unparsed

```
<condition-linkThreshold>
      <conditionType>script</conditionType>     // entity or script or boolean
      <supa-script>
          <supa-script-content>
              <Script:Python>if Subnetwork.link.bandwidth >= 8M: return
TRUE</Script:Python>
         </supa-script-content>
          <supa-script-type>Python</supa-script-type> //Python or Perl or any other
script
      </supa-script>
 </condition-linkThreshold>
```

- Or use xpath statement

```
augment "/supa:supa-policy/supa:supa-policy-statement/supa:action";
Container action {
   when "xpath expression….";
}
```

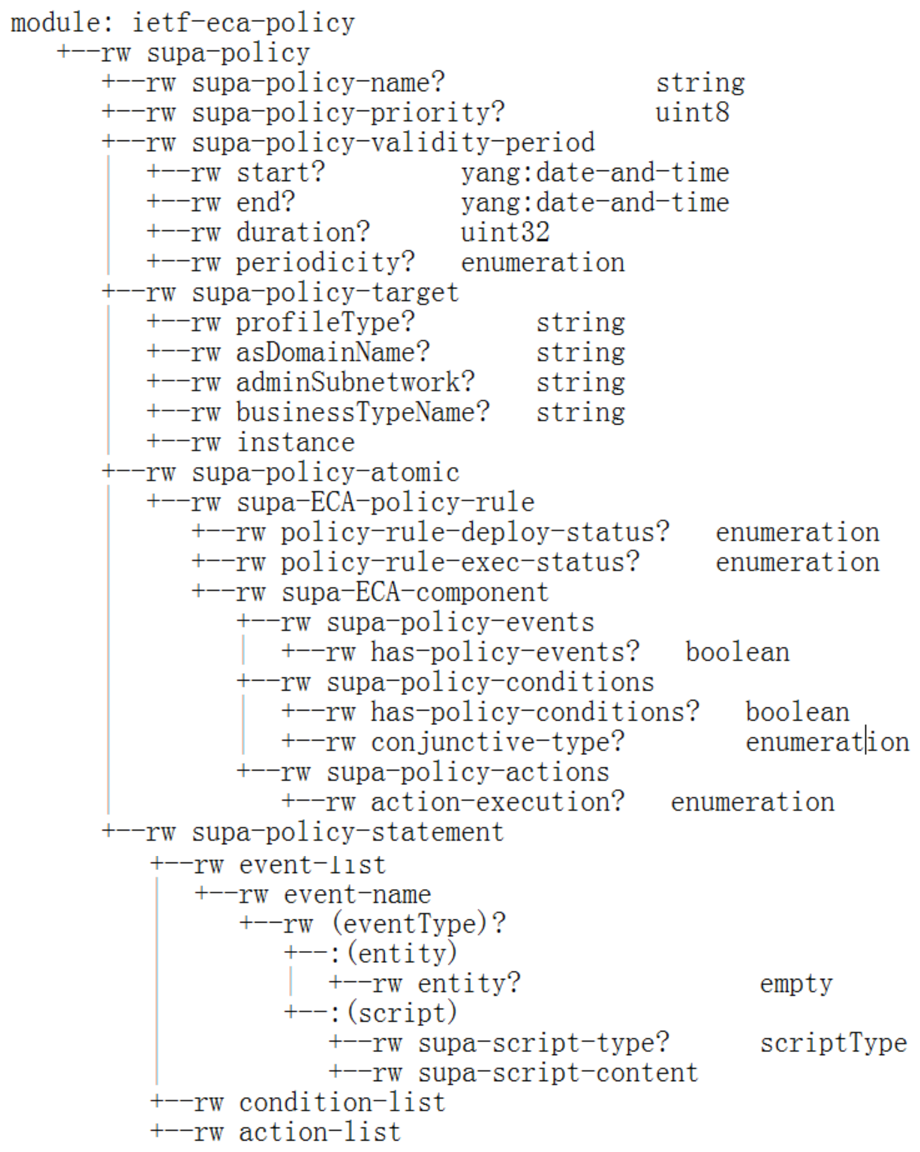
# Possible Solution on **Actions**

- Predefined a set of actions, user use it with choice statement. such as:

```
+--rw action-list
   +--rw (actionName)?
      +--:(remark)
      |  +--rw remarkVlanPri?     uint32
      |  +--rw remarkDscpValue?   uint32
      |  +--rw applySLALevel?     string
      +--:(car)
      |  +--rw cir?               uint32
      |  +--rw pir?               uint32
      |  +--rw Cbs?               uint32
      |  +--rw Pbs?               uint32
      +--:(redirect)
         +--rw egressInterface?   string
         +--rw egressVpnName?     uint32
         +--rw encapType?         enumeration
         +--rw encapValue?        uint32
         +--rw serviceId?         uint32
```

- Or leave this to user to fill in

# SUPA ECA Policy YANG Data Model



```
module: ietf-eca-policy
   +--rw supa-policy
      +--rw supa-policy-name?              string
      +--rw supa-policy-priority?          uint8
      +--rw supa-policy-validity-period
      |  +--rw start?          yang:date-and-time
      |  +--rw end?            yang:date-and-time
      |  +--rw duration?       uint32
      |  +--rw periodicity?    enumeration
      +--rw supa-policy-target
      |  +--rw profileType?         string
      |  +--rw asDomainName?        string
      |  +--rw adminSubnetwork?     string
      |  +--rw businessTypeName?    string
      |  +--rw instance
      +--rw supa-policy-atomic
      |  +--rw supa-ECA-policy-rule
      |     +--rw policy-rule-deploy-status?   enumeration
      |     +--rw policy-rule-exec-status?     enumeration
      |     +--rw supa-ECA-component
      |        +--rw supa-policy-events
      |        |  +--rw has-policy-events?    boolean
      |        +--rw supa-policy-conditions
      |        |  +--rw has-policy-conditions?    boolean
      |        |  +--rw conjunctive-type?         enumeration
      |        +--rw supa-policy-actions
      |           +--rw action-execution?    enumeration
      +--rw supa-policy-statement
         +--rw event-list
         |  +--rw event-name
         |     +--rw (eventType)?
         |        +--:(entity)
         |        |  +--rw entity?                empty
         |        +--:(script)
         |           +--rw supa-script-type?      scriptType
         |           +--rw supa-script-content
         +--rw condition-list
         +--rw action-list
```

Basic attributes

Policy target

ECA policy rules

Construct ECA clauses

## Q&A

Thanks!