

# draft-shaikh-rtgwg-policy-model

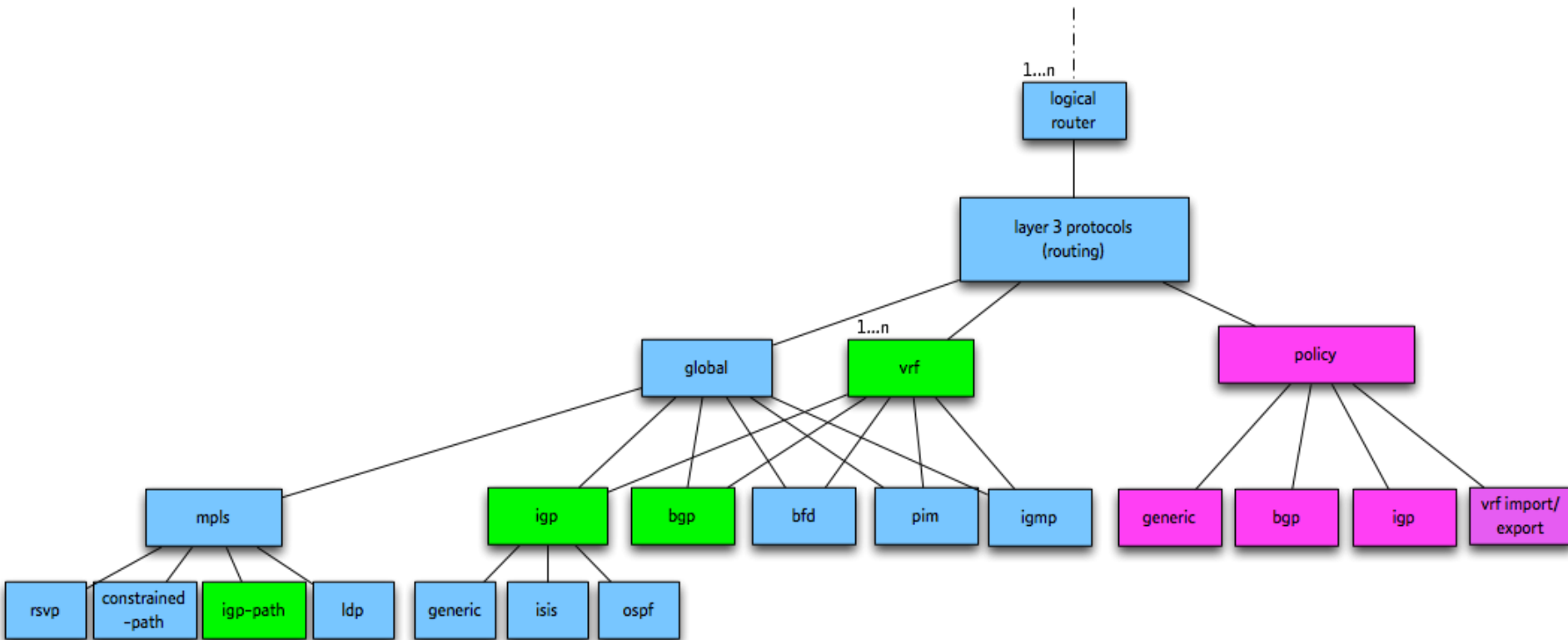
openconfig – [www.openconfig.net](http://www.openconfig.net)

Anees Shaikh (Google), [Rob Shakir \(BT\)](#), Kevin D'Souza (AT&T), Chris Chase (AT&T)

# OpenConfig...?

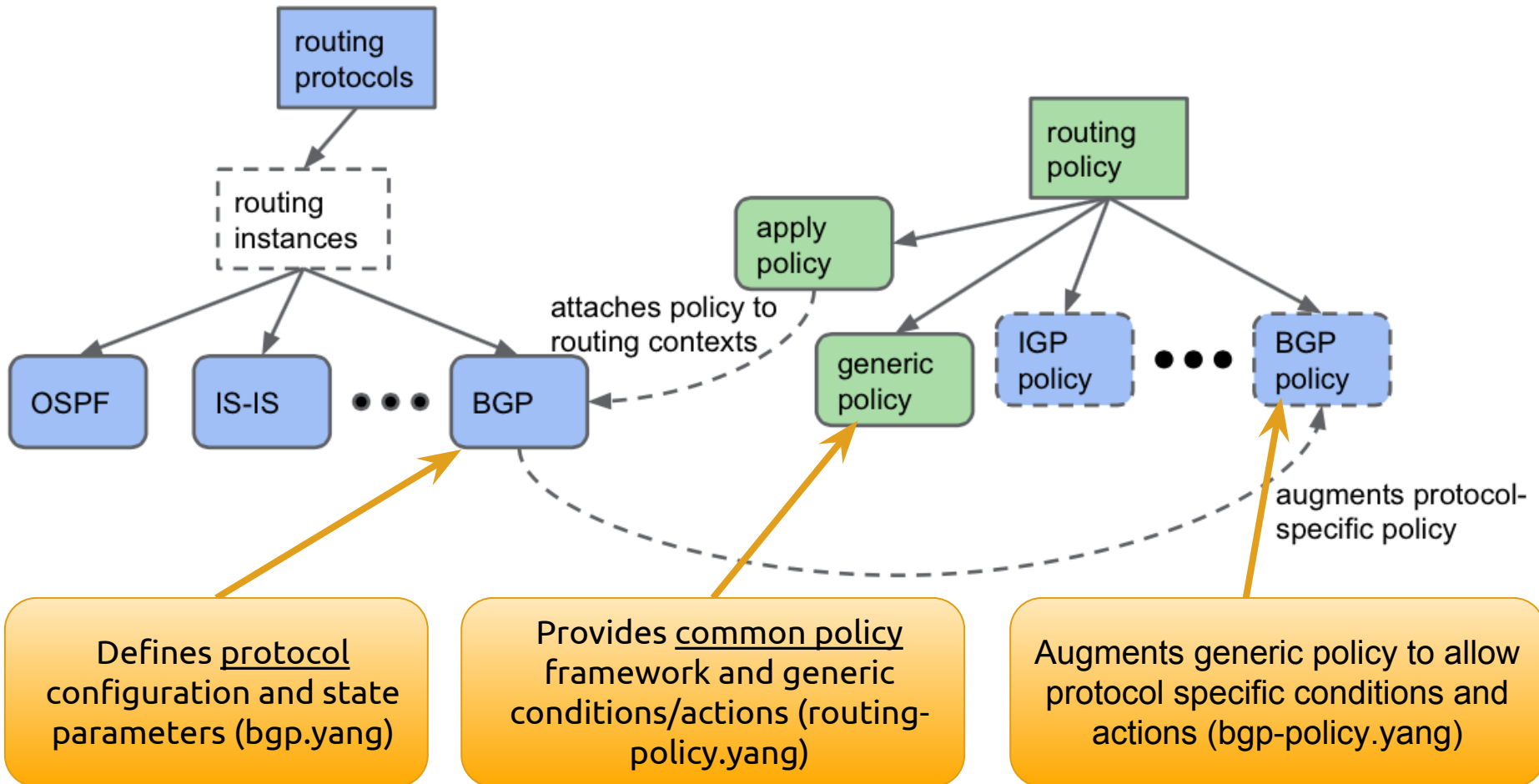
- Loosely-coupled set of operators working to define YANG models:
  - examining our own configuration and state requirements.
  - items included are available in (multiple) major implementations.
  - initial focuses around BGP, policy, and MPLS...
- Not claiming to be feature complete – motivated by being able to apply configuration and extract operational state from today's network deployments.

# OpenConfig Evisaged Model Layout



- Policy is fundamental for network operation.
- Only Layer 3 routing elements pictured, **require policy**, **define policy**.

# Current YANG Model Approach.



# Generic Routing Policy Structure.

```
+--rw routing-policy
  +--rw defined-sets
  | +--rw prefix-sets
  | | +--rw prefix-set* [prefix-set-name]
  | |   +--rw prefix-set-name    string
  | |   +--rw prefix* [address masklength masklength-range]
  | |   ...
  | +--rw neighbor-sets
  | | +--rw neighbor-set* [neighbor-set-name]
  | |   +--rw neighbor-set-name  string
  | |   +--rw neighbor* [address]
  | |   ...
  | +--rw tag-sets
  |   +--rw tag-set* [tag-set-name]
  |     +--rw tag-set-name      string
  |     ...
+--rw policy-definitions
  +--rw policy-definition* [name]
  +--rw name                string
  +--rw statements
  +--rw statement* [name]
  +--rw name                string
  +--rw conditions
  | ...
  +--rw actions
  ...
```

'set' definition –  
re-used sets of  
entities that are  
referenced across  
conditions and/or  
actions.

Policy instances,  
use conditions to  
match, and  
actions to change  
attributes and/or  
accept/deny.

# Example Augmentation – BGP.

```
+--rw routing-policy
  +--rw defined-sets
  | | ...
  | +--rw bgp-pol:bgp-defined-sets
  |   +--rw bgp-pol:community-sets
  |   +--rw bgp-pol:ext-community-sets
  |   +--rw bgp-pol:as-path-sets
+--rw policy-definitions
  +--rw policy-definition* [name]
    +--rw statements
      +--rw statement* [name]
        +--rw conditions
        | +--rw bgp-pol:bgp-conditions
        |   +--rw bgp-pol:match-community-set!
        |   +--rw bgp-pol:match-ext-community-set!
+--rw actions
  +--rw bgp-pol:bgp-actions
    +--rw bgp-pol:set-as-path-prepend!
    +--rw bgp-pol:set-community!
    +--rw bgp-pol:set-route-origin?
    +--rw bgp-pol:set-local-pref?
    +--rw bgp-pol:set-next-hop?
    +--rw bgp-pol:set-med?
```

Additional defined sets with protocol specific attributes.

Additional actions based on setting attributes associated with the protocol in question.

# Summary.

- Condition/action framework intended to be generic – reviewed by multiple operators – with feedback from a number of implementors.
  - Projects to use this model already in implementation phases.
- Aim is to support sufficient flexibility to be widely implementable.
- Models are regularly pushed to the YangModels github repo:

<http://github.com/YangModels/yang/tree/master/experimental/openconfig>

# Backup Slides



# Defining a Set (prefix-set & community-set)

```
<config>
  <routing-policy xmlns="http://openconfig.net/yang/routing-policy">
    <defined-sets>
      <prefix-set>
        <prefix-set-name>eighteen-to-thirtytwo</prefix-set-name>
        <prefix>
          <address>0.0.0.0</address>
          <masklength>0</masklength>
          <masklength-range>18..32</masklength-range>
        </prefix>
      </prefix-set>
      <bgp-defined-sets xmlns="http://openconfig.net/yang/bgp-policy">
        <community-set>
          <community-set-name>black-hole</community-set-name>
          <community-members>2856:9990</community-members>
          <community-members>2856:9999</community-members>
        </community-set>
      </bgp-defined-sets>
    </defined-sets>
  </routing-policy>
</config>
```

# Defining a Policy

```
<config>
  <routing-policy xmlns="http://openconfig.net/yang/routing-policy">
    <policy-definition>
      <name>black-hole-prefixes</name>
      <statement>
        <name>bh-prefixes</name>
        <conditions>
          <match-prefix-set>
            <prefix-set>eighteen-to-thirtytwo</prefix-set>
          </match-prefix-set>
        </conditions>
        <actions>
          <accept-route/>
          <bgp-actions xmlns="http://openconfig.net/yang/bgp-policy">
            <set-community>
              <communities>NO_EXPORT</communities>
              <communities>NO_ADVERTISE</communities>
            </set-community>
            <set-next-hop>192.0.2.1</set-next-hop>
          </bgp-actions>
        </actions>
      </statement>
    </policy-definition>
  </routing-policy>
</config>
```

# Applying a Policy (BGP)

```
<config>
  <bgp xmlns="http://openconfig.net/yang/bgp">
    <neighbors>
      <neighbor>
        <neighbor-address>192.0.2.254</neighbor-address>
        <config>
          <peer-as>2856</peer-as>
        </config>
        <apply-policy>
          <import-policies>black-hole</import-policies>
          <export-policies>accept-none</export-policies>
        </apply-policy>
      </neighbor>
    </neighbors>
  </bgp>
</config>
```