openconfig-network-instance

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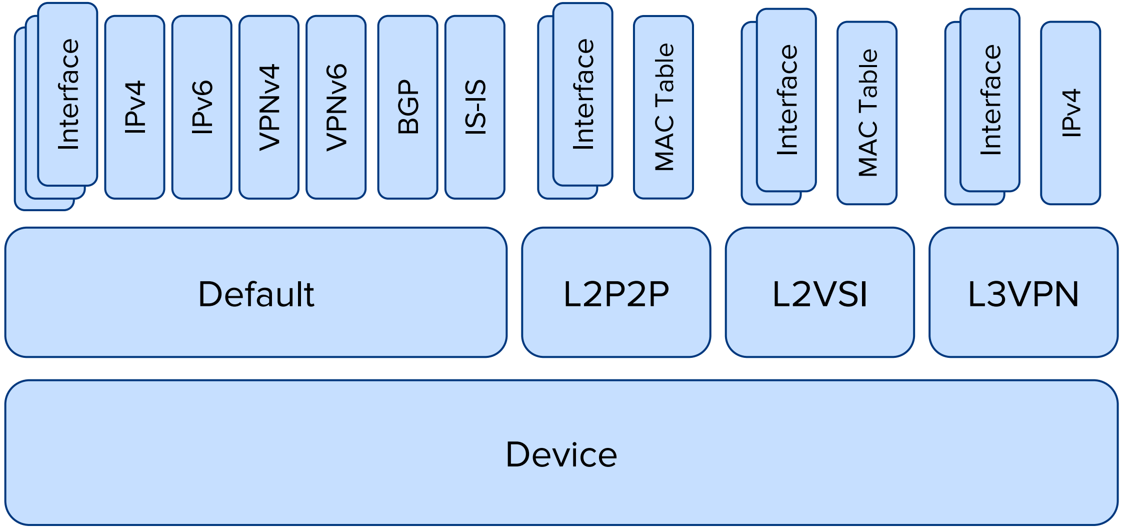
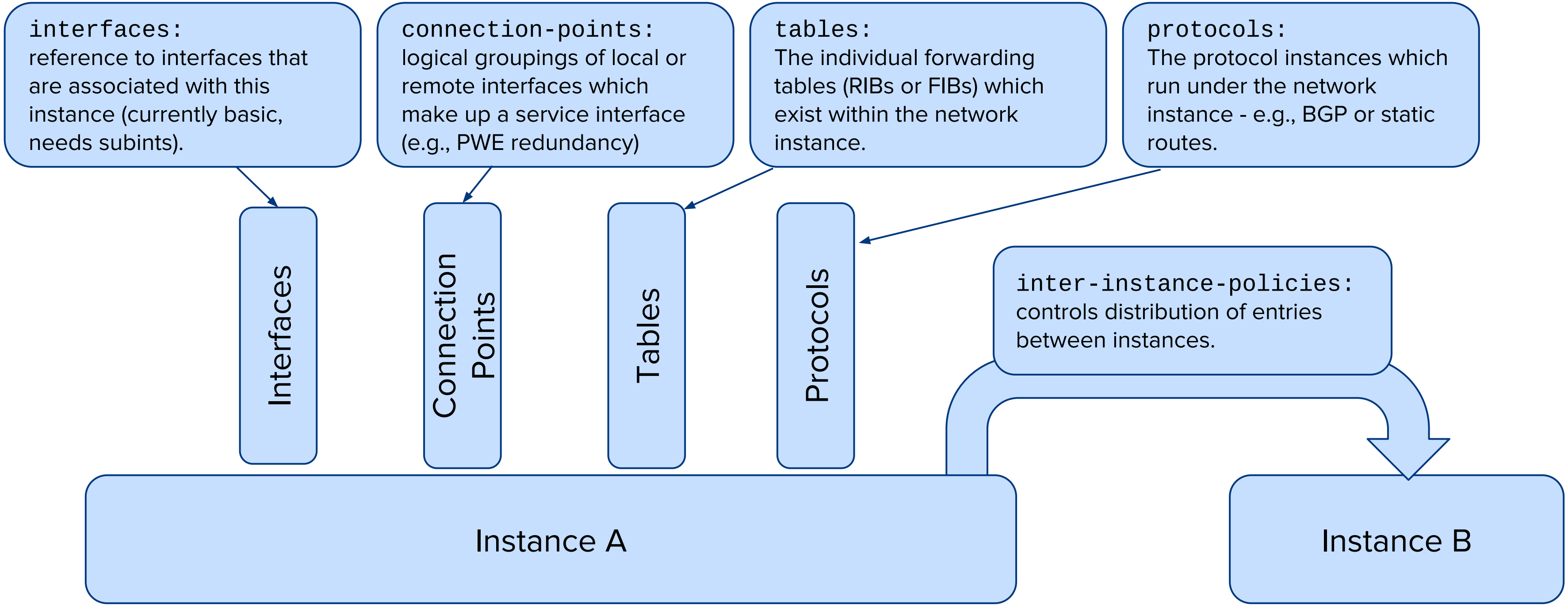
Overview and Motivation.



- Network instance models a generic virtual forwarding table on a device.
- Each device has at least one network instance - which represents the global forwarding table.
- **Motivation**: Ensure that we can model mixed-mode entities (e.g., L2VSI with a numbered IP interface within it - rVPLS).

Basic Anatomy of a Network Instance.



`interfaces:` reference to interfaces that are associated with this instance (currently basic, needs subints).

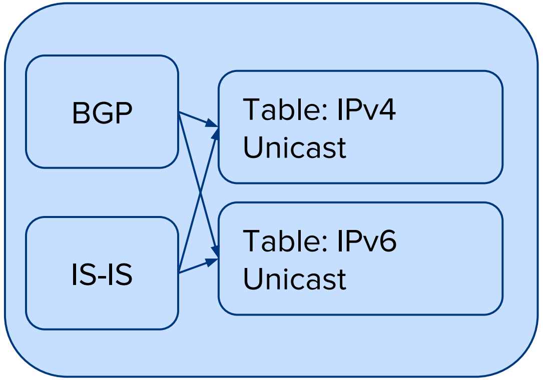
`connection-points:` logical groupings of local or remote interfaces which make up a service interface (e.g., PWE redundancy)

`tables:` The individual forwarding tables (RIBs or FIBs) which exist within the network instance.

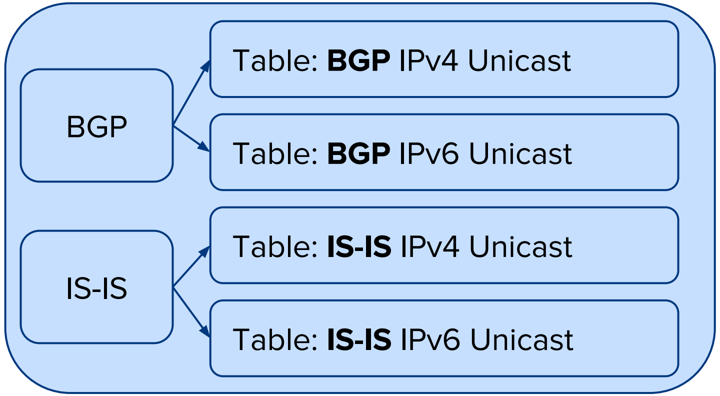
`protocols:` The protocol instances which run under the network instance - e.g., BGP or static routes.

`inter-instance-policies:` controls distribution of entries between instances.

Tables - Two Models.

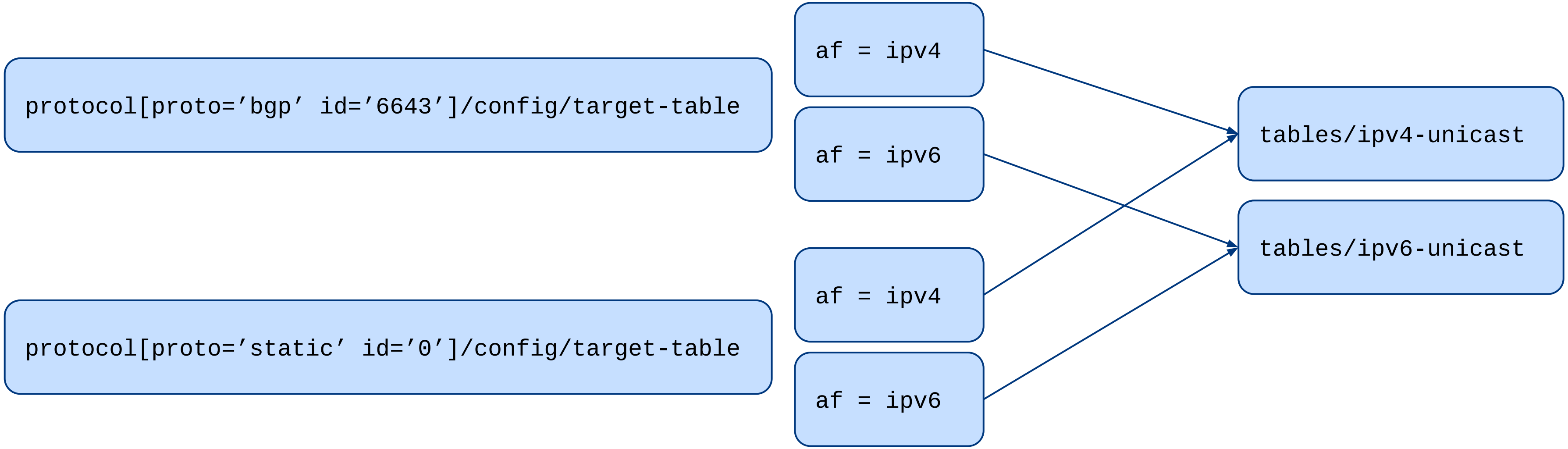


- All protocols install their entries into a single table (per-address-family).
- ‘Leaking’ happens by default between tables (an export policy in BGP can match ‘install-protocol-eq IS-IS’ when exporting from ‘ipv4-unicast’ table.


BGP
IS-IS
Table: **BGP** IPv4 Unicast
Table: **BGP** IPv6 Unicast
Table: **IS-IS** IPv4 Unicast
Table: **IS-IS** IPv6 Unicast

- Each protocol installs entries into its own (per-address-family) table.
- Leaking does not happen by default - an export policy in BGP matching ‘install-protocol-eq’ IS-IS does not match any entries.
- Requires explicit connection of tables.

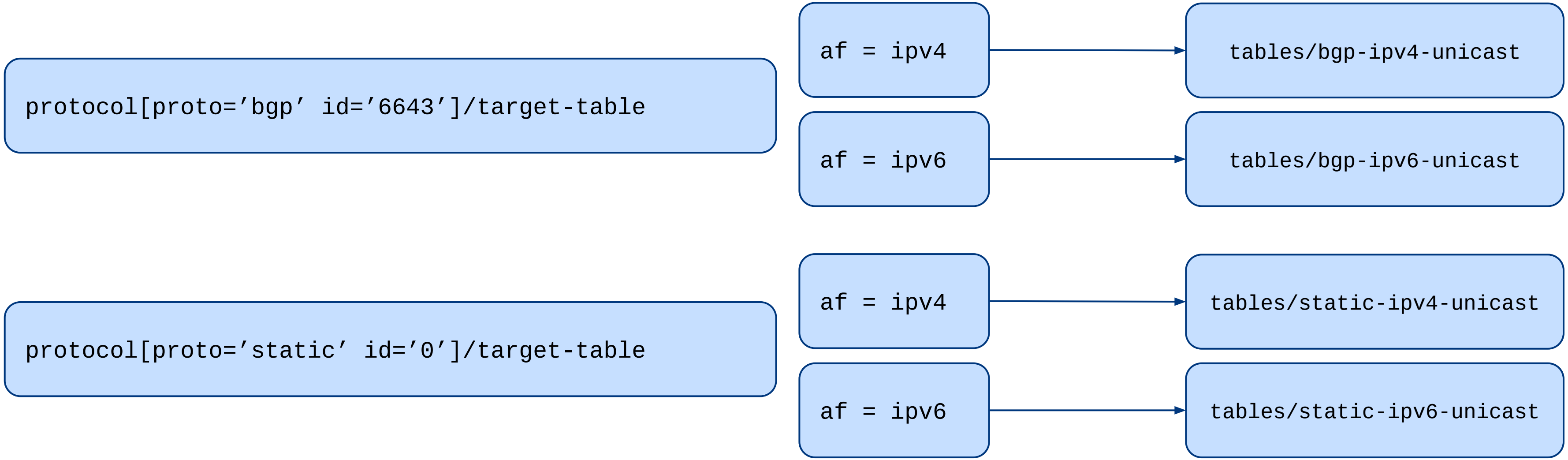
Table Configuration - Per-AF Table.


protocol[proto='bgp' id='6643']/config/target-table
af = ipv4
af = ipv6
tables/ipv4-unicast
tables/ipv6-unicast
af = ipv4
protocol[proto='static' id='0']/config/target-table
af = ipv6

- Each protocol specifies its 'target-table' to install entries into, on a per-address-family basis.
- For an implementation with a single table per-AFI, this specifies the same table as the target for all protocols.

NB: target-table needs to be converted to a list in current YANG.

Table Configuration - Per-Protocol Per-AF Tables.

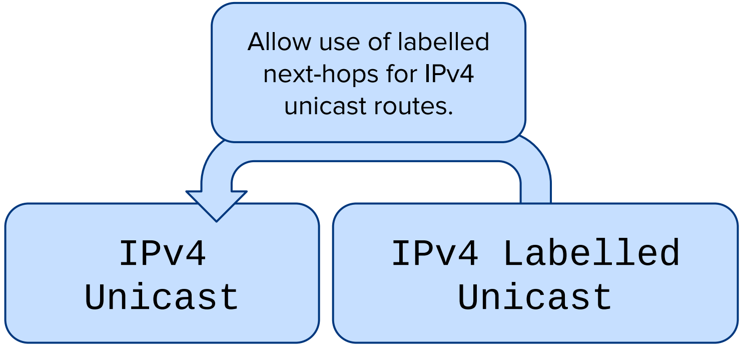


protocol[proto='bgp' id='6643']/target-table
af = ipv4
tables/bgp-ipv4-unicast
af = ipv6
tables/bgp-ipv6-unicast
protocol[proto='static' id='0']/target-table
af = ipv4
tables/static-ipv4-unicast
af = ipv6
tables/static-ipv6-unicast

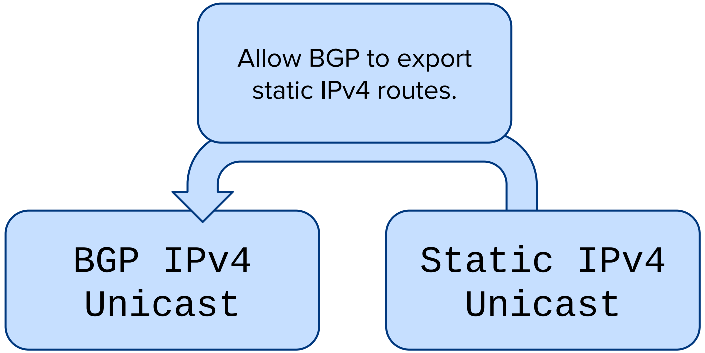
- For an implementation with per-protocol, per-AFI tables, then a separate table is defined (in tables/) per protocol, and the target-table specified as such for each protocol.

NB: target-table needs to be converted to a list in current YANG.

Leaking Between Tables.



```
“tables”: {
   “table”: {
      “ipv4-unicast”: { … },
      “ipv4-labelled-unicast”: { … }
   }
 },
 “table-connections”: {
     “table-connection”: {
         “ipv4-labelled-unicast ipv4-unicast”: {
             “src”: “ipv4-labelled-unicast”,
             “dst”: “ipv4-unicast”,
             “apply-policy”: { … }
         }
   }
```



```
“tables”: {
   “table”: {
      “bgp-ipv4-unicast”: { … },
      “static-ipv4-unicast”: { … }
   }
 },
 “table-connections”: {
     “table-connection”: {
         “static-ipv4-unicast bgp-ipv4-unicast”: {
             “src”: “static-ipv4-unicast”,
             “dst”: “bgp-ipv4-unicast”,
             “apply-policy”: { … }
         }
   }
```

network-instance Model TODO:

- ietf-bgp/openconfig-bgp can directly augment network-instances/network-instance/protocols/protocol today - no changes to model required (with described table changes).

- Integrate openconfig-mpls into this model - again, should be a case of augmenting protocols/protocol.

- Integrate RIB and LFIB model - determine how these interact with the `‘tables’` construct.

- `FIXME`:
    - target-table specified on a per-AF basis.
    - augment to interfaces/interface and interfaces/interface/subinterfaces/subinterface to reference network-instance to configure instance ownership - with state leaf-list of leafrefs within the network instance.
    - Add additional L2 configuration options (`MTU, control-word, signalling-protocol, FAT-PW…`)