

Bundle Protocol YANG Model

[draft-blanchet-dtn-bp-YANG-model](#)

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Rationale

- Motivation: manage BP nodes using IETF Network Management protocols (netconf, restconf).
- Use cases:
 - IP network on planetary bodies (see various space agencies architecture documents): some BP nodes are dual-stack(BP and IP). Managed over IP « locally »
 - BP-only nodes (not on an IP network, such as in transit in space or not yet docked to an IP network) may be managed using restconf (and YANG models) over http over BP (see draft). Do not need an IP stack, just an HTTP listener on the bundle agent as a service.
- Enables reuse of all network management tools available.
- Can be augmented with contact plans (see TVR work)
- Complementary to DTNMA

Design Considerations

- Looked at data structures of some implementations. Tried to be as close as possible while remaining generic
- Is augmented by contact plan (see TVR [draft-qu-tvr-schedule-yang](#) and [draft-blanchet-tvr-contactplan](#))

YANG Model Tree View

```
module: ietf-bundle-protocol
  +--rw node
    +--rw version*                bundle-types:bundle-protocol-version
    +--rw endpoint_identifier?    bundle-types:bundle-endpoint-identifier
    +--rw bundle-lifetime?        uint32
    +--rw maximum-bundle-size?    uint32
    +--rw send-status-reports?    boolean
    +--rw forwarding?             boolean
    +--rw neighbors
      | +--rw neighbor* [endpoint-identifier]
      | | +--rw activate?          boolean
      | | +--ro active?            boolean
      | | +--rw endpoint-identifier bundle-types:bundle-endpoint-identifier
      | | +--rw convergence-layer-adapters
      | | | +--rw convergence-layer-adapter* [id]
      | | | | +--rw id              yang:yang-identifier
      | | | | +--rw type?           bundle-types:convergence-layer-adapter-type
      | | | | +--rw (transport)?
      | | | | | +--:(udp-and-tcp)
      | | | | | | +--rw host?       inet:host
      | | | | | | +--rw port?       inet:port-number
      | | +--rw bundle-queue-size? uint32
```

YANG Model Tree View

```
+--rw convergence-layer-adapters
|  +--rw convergence-layer-adapter* [id]
|    +--rw id          yang:yang-identifier
|    +--rw type?       bundle-types:convergence-layer-adapter-type
|    +--rw (transport)?
|      +--:(udp-and-tcp)
|        +--rw host?   inet:host
|        +--rw port?   inet:port-number
+--rw store
  +--rw maximum-size?    uint32
  +--ro current-size?    uint32
  +--rw maximum-bundles? uint32
  +--ro bundles-number?  uint32
  +--rw bundles* [id]
    +--rw id              yang:yang-identifier
    +--rw version?        bundle-protocol-version
    +--rw processing-control-flags* bundle-processing-control-flag
    +--rw destination-endpoint-identifier? bundle-endpoint-identifier
    +--rw source-node-endpoint-identifier? bundle-endpoint-identifier
    +--rw report-to-endpoint-identifier? bundle-endpoint-identifier
    +--rw creation-timestamp? yang:timestamp
    +--rw lifetime?       uint32
    +--rw application-data-unit-length? uint32
```

Considerations

- Thanks to early reviewers (Felix Walter)
- If a node supports BP6 and BP7, should it appear as a single node with two versions, or two virtual nodes one supporting each version?
 - Personal opinion: do as with IPv4 and IPv6: single node with multiple versions (not yet reflected in the draft)
- A neighbour has a single CLA or may have multiple CLAs. Modelled as multiple neighbours or as a neighbour with multiple CLAs.
 - Personal opinion: single neighbour with multiple CLAs. (Currently in the draft)

Next Steps

- WG Adoption?
- Specification:
 - [draft-blanchet-dtn-bp-yang-model](#)
 - TVR Contact plan/schedule augmentation: [draft-qu-tvr-schedule-yang](#) and [draft-blanchet-tvr-contactplan](#)
- Looking for more comments
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