

Working Group Next Steps

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Previously...

At IETF 105 and 106 a discussion was started on re-chartering the working group to work on new topics.

The general consensus was the following topics were of interest:

- Bundle-in-Bundle Encapsulation
 - Custody Transfer and Tunnelling
- Bundle Protocol Additional Blocks
 - Manifest block
- Neighbor Discovery
- Naming and Addressing
 - Routing
 - Registry of Service Identifiers
- Asynchronous Management
 - AMA Application Data Model (ADM)
 - Asynchronous Management Protocol
 - Asynchronous Management Protocol Agent ADM
 - Various protocol components agent ADM (D) Security Key
- Additional Convergence Layers
- Additional BPsec Security Contexts

Concerns

That list is long, and includes a number of complex subjects, and the IESG (quite correctly) wants to ensure that we set ourselves achievable targets.

The WG must be mindful of the amount of work it is committing to attempt.

It should be noted that there is already activity on some topics:

- Bundle-in-bundle Encapsulation (BIBE).
- UDP-CL.
- DTN Key administration.
- Asynchronous Management.
- COSE Security Context.

Process

The remainder of this WG meeting will be taken up with a discussion of what the working group tackles next.

1. The chairs will introduce the current new topics proposals, with some comment.
2. Then the participants are welcome to suggest additional new topics, and discuss the current new topics.
3. After the meeting the compiled list will be sent to the mailing list, so others unable to attend can also add their input.

The chairs suggest that a final decision on the new charter be confirmed at the IETF-111 meeting, unless the WG thinks otherwise.

Interim meetings can be held to discuss particular topics in more detail; e.g. Naming and Addressing.

Topic break-down

To aid with estimate effort, we will split the new topic proposals into 2 categories:

- Extensions to existing work.
 - Expected to be reasonably uncontentious and have similarity to existing DTN technology; e.g. new CLs, new Block types.
- New work building on top of the Bundle Protocol and DTN architecture.
 - Expected to be more contentious, and take could take some time to get consensus; e.g. Routing.

This is not to say that new work is to be avoided. The consensus is that some new topics are vital to get right; e.g. Naming and Addressing.

Extensions to existing work

- **Bundle-in-Bundle Encapsulation** (active)
 - <https://datatracker.ietf.org/doc/draft-ietf-dtn-bibect/>
- **Bundle Manifest Block** (discussed)
- **Additional Convergence Layers**
 - **UDP-CL** (proposed)
 - **SMTP-CL, HTTP/REST-CL** (discussed)
- **Additional BPSec Security Contexts**
 - **COSE Security Context** (active)
- **Asynchronous Management** (v. active)

Asynchronous Management

- Asynchronous Management is considered vital to manage devices in a DTN network.
- Asynchronous Management Architecture is a current charter item.
 - Ready for WG Last Call
 - <https://datatracker.ietf.org/doc/draft-ietf-dtn-ama/>
- There are additional personal drafts and lots of activity/energy in this area.

Current new work proposals

- Naming and Addressing
- Registry of Service Identifiers
- Neighbor Discovery
- Routing
- DTN Key administration

Naming and Addressing

BPv7 describes just enough detail about naming and addressing for the protocol to function.

With the concept of the “late binding” of endpoints, BPv7 suggests Locator/Identity separation.

- A BP endpoint has an identity (EID), but the EID encodings do not necessarily describe how to ‘find’ node(s) supporting the endpoint.

BPv7 describes and registers the format of the *dt*n and *ip*n schemes, but does not define the scope of a *dt*n or *ip*n EID.

- Global or some ‘administrative domain’?
 - If Global, who controls assignment? ICANN via IANA?

BPv7 EIDs may be shared by multiple nodes, allowing multicast/anycast functionality

- Does this need to be explicit in the naming scheme encoding?

Registry of Service Identifiers

There is an existing working group milestone to define a 'Registry of Service Identifiers'.

- Is there value in defining a registry of common services, analogous to TCP/UDP well-known port numbers?
- The `ipn` scheme defines a "service number", but the `dtm` scheme does not.
 - Should a service number be a mandatory component of any DTN scheme?
- Does the current DTN architecture have a set of common services per-se?
- How does the 'service' concept align with the EID concept.

Neighbour Discovery

This appears to be divisible into many sub-topics:

- BP level discovery.
 - Equivalent of ARP/ND, with some kind of ‘Neighbour discovery’ bundle format and protocol, or perhaps an extension block.
- Service/Endpoint Discovery
 - Not only discover reachable neighbours NodeIDs, but also the supported EIDs and/or ‘services’?
- Convergence Layer level discovery.
 - Convergence Layers may have knowledge of reachable neighbours, and that information can be pushed up to the BP agent.
- Hybrid approaches
 - Leverage CL knowledge to kick-start BP endpoint discovery?

Routing

Routing is a massive subject with some existing proposed solutions:

- Contact Graph Routing (CGR/SABR)
- Probabilistic Routing (PROPHET, etc...)
- And we can/should expect more...

However, attempting to standardise one or more of the above may be beyond the current bandwidth of the working group.

One proposal would be to divide the problem into a forwarding problem, and a routing problem...

Forwarding specification

In the IP world, all routing protocols perform some kind of decision on accumulated information, referred to as the 'Routing Information Base' (RIB) in the literature, and apply the result to the system 'Forwarding Information Base' (FIB). It is then the responsibility of the system to consult the FIB when forwarding.

Would it be helpful for the WG to define a standard model of a DTN FIB, and its use by BPv7?

- It would provide a baseline target for routing protocols.
 - A DTN FIB is not as trivial as initially imagined, and defining it well once could be useful.
- It might be useful as a target for the Neighbor Discovery protocols as well.
- Has interactions with convergence layer addresses.

BPv7 describes the act of forwarding, but does not describe the source of the forwarding decision, suggesting either some encoding of the EID, or an alternate method (Section 5.4, step 2).

- The subject of routing will come up when trying to work on Naming and Addressing topics and a standard DTN FIB abstraction may de-couple the addressing discussion from the intimacies of routing protocols.

DTN Key Administration

- Both BPSec and convergence layers require cryptographic key material.
 - Undoubtedly applications will as well.
- Managing key provisioning and update in disrupted networks is a hard problem that needs a good solution.
 - There is existing work presented at IETF 100.
 - <https://datatracker.ietf.org/doc/slides-100-dtn-architecture-for-delay-tolerant-key-administration/>

Over to you...

Open mic discussion