Semantic Addressing in Multi-Organisation Delay Tolerant Networks

John Dowdell, Airbus

To route, you need an address, however vague …

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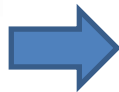
How does my letter get to Santa?

FIB
(with default egress)

FIB
(with multiple egress)

Destination

What is routing?

- The process of moving a packet of data from source to destination (Webopedia)

- Routing is the process of selecting best paths in the network (Wikipedia)

- Routing is the scheduling of [an] itinerary (dictionary.com)

Unsure of how to reach the destination?

- Don't know exactly which next hop?
- Don't know when the next hop will be reachable?
- Does the destination move in space over time?
- Does the connectivity change over time?
- Are there multiple cooperating organisations operating in the same geographic area?

So what about when the destination keeps moving, in space or connectivity?

- Single organisation, large number of endpoints?

- Build a schedule of predicted waypoints and connectivity?

- Exhaustively calculate, or calculate on demand, or a mixture?

- Centralised or distributed calculation?

- How do you (can you?) summarise what is reachable through which next hop?

And what about multiple organisations operating in the same space?

- Multiple organisations, agreeing to collaborate on routing, in same geographic space?

- Each organisation calculates own locations and connectivity?

- External and internal destination exchanges (similar to BGP and OSPF routing table exchanges)?

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Back to the problem …

- Bus operators Red, White and Blue each run busses on separate routes around a city

- Each bus is given a URI dtn://<id>.bus.{red,white,blue}*

- Given:
  - Each route has a timetable.
  - Busses are allocated to routes according to serviceability.
  - Drivers are allocated to busses according to shift rosters.
  - Waypoints are formed when busses pass each other.

- Possible to model when and where waypoints are formed

- At every point in time, a static routing plan is defined

*example only, DTN URI structure is not defined yet

What's in the FIB?

- As the waypoint is approached, the routing function can populate the FIB from the RIB

- So, at the point in time when a waypoint is formed, what does the FIB on each side look like?
  - Does it contain the entire set of busses for that day? Is it possible to summarise this?

- Does the FIB contain sufficient information to make a decision to keep, forward or discard the bundle?