Anycast for dtn: URI Scheme
Introducing draft-davies-dtnrg-find-01
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DTNRG Naming and Addressing Discussion
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Motivation

• Service location in DTN networks, e.g.,
  – find a service or service proxy
  – deliver email to nomadic users
• Integration of networks using alternative addressing schemes, e.g.,
  – getting to a bundle agent via gateway + DNS
• Support for intentional naming
  – Locating a node that satisfies intent
Will proposed dtn: scheme suffice?

- All of the above require 'anycast'
- Capabilities in dtn: scheme described in draft-irtf-dtnrg-uri-scheme-00 imply either
  - Bundle creator knows destination has specified capability, or
  - Flood it to every neighbor you have/meet.
- So ... no. (*but at least one person says that there might be implicit anycast)
Proposal: The 'find' operation

• Define an extra operation as per existing dtn: uri scheme draft
• Intention: Delegate decisions about how to access a 'service' to bundle agent
• Implication: DTN Forwarding/Routing needs to have some knowledge to help
  – but stick to DTN principle of working independently as far as possible
What is a 'service'?

- 'Conventional' service (such as might be found using the Service Location Protocol – RFC 2608)
  - e.g., printing service, HTTP proxy, RFC2822 email service
  - Decapsulated payload is delivered

- Delivering bundles to nodes addressed by names/locators in other spaces
  - Supports seamless integration with IP Internet
'Conventional' Services

- General case: use service: (RFC 2609) service template to specify service, e.g.,
  - `dtn:find:service:printer?printer-color-supported=true`

- Payload delivered to local service agent
  - Along with parameters from uri.

- Possible special cases:
  - `dtn:find:mailto:user@example.com`

- Intentional naming
  - `dtn:find:intent:<intentional predicate>`
Alternative Naming/Addressing

• Base DTN EIDs form global naming scheme
  – Potential scaling problem for routing
• Leverage existing (IP addressed) Internet to deliver bundles
  – 'Seamless Integration'
• Cope with partitioned DTN/IP network
• Support notion of 'associations' as a way of scaling DTN routing
Alternative Addressing

Examples 1

• Use DNS service to locate target
  – `dtn:find:dns:somename.example.com`
  – Find suitable IP gateway with DNS resolver
  – Deliver over IPv4 or IPv6 according to DNS records returned and network capabilities
  – Find bundle agent port and protocol by either
    • well known port, or
    • DNS service record lookup
Alternative Addressing Examples 2

• Use IPv4 from an IP gateway
  – dtn:find:ipv4:192.0.2.7
  – Find suitable IP gateway
  – Deliver over IPv4
  – Find bundle agent port/protocol by either
    • well known port, or
    • Reverse DNS service record lookup
    • Parameters on uri.

• Equivalent IPv6 case: dtn:find:ipv6:|...
Alternative Addressing

Examples 3

• Finding a node in another association
  – `dtn:find:assoc:foo.assocx.base.dtn`
  – Use local knowledge from routing or gateway to find appropriate delivery path
  – Uses standard DTN forwarding
Implications for (Dynamic) Routing

• Routing service (static or dynamic) needs to collect information about services available at nodes

• How to do this requires further work!
  – Static configuration of gateways as fallback?

• Thought: Any agent originating a bundle could add a metadata block listing services from source node
  – needs authentication/integrity protection
Next Steps

• Discuss in RG., especially with uri scheme authors and anybody else with a view
• Update the uri scheme in the light of conclusions
• Find resources to prototype in DTN2