



Networking for Communications Challenged Communities:
Architecture, Test Beds and Innovative Alliances
Grant Agreement: 223994

Anycast for dtn: URI Scheme

Introducing draft-davies-dtnrg-find-01

DTN Research Group, Hiroshima, 13 November 2009

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.,
 - `dtm:find:service:printer?printer-color-supported=true`
- Payload delivered to local service agent
 - Along with parameters from uri.
- Possible special cases:
 - `dtm:find:mailto:user@example.com`
- Intentional naming
 - `dtm: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
 - `dtm: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
 - `dtm:find:assoc:foo.assocx.base.dtm`
 - 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