What TCD and Intel did
Summer 2009
IETF-76 DTNRG

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DTN design

• DTN2

• Static routing setup
  – Route from Router -> Mule -> Relay > GW > Basil (TCD)

• Setup multiple routes from all routers to all mules and all gateways and also to Nomadic mail for roaming mail test.

www.n4c.eu
Saltoluokta – Location of Router
WEB and email@village.n4c.eu

Gateway
DTN Relay
In Ritsem

Mule transporter

Mule 901 Atom eeePC

www.n4c.eu
Applications

• WEB Application to take either public or Private web Requests e.g. www.n4c.eu
  – WEB front end, MySQL DB, Cookie tracking for security
  – Middleware
  – Wget to level 1 on web site and TarBall results back to router and unzip into directory structure via the mule.
Applications

- EMAIL – provided by mail servers hosted on the router
  - IMAP Server – Dovecot - userNNN@village.n4c.eu
    - •
    - •
    - •
    - •
    - •

  - SMTP Server – Postfix – Outgoing mail
  - Internal routing rule sends email to "dtndrop" service, a script which invokes dtnsend
  - 1 email per bundle
  - Tracks bundle ID and requests ack from the DTN

- Incoming mail
  - Village Router and Basil both "village.n4c.eu"
  - Timed process to sync imap mail stores via tarballs over DTN

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Timeline

- 27th Jul – Shipping to Lulea took 7 days.
- 2nd Aug - Travel to Lulea to setup and test
- 7th Aug – Drive to Ritsem, testing
  - Setup hiker user emails and made some WEB requests
- 9th - Helicopter to Saltoluokta, setup again
- 11th Completed 2 full return rotations
- 12th Hikers arrive in Saltoluokta and check email and WEB requests
- 13th Packup and move to Staloluokta, setup system and users pickup more mail.
- 15th Home!
Results

• We were able to send and receive mail
• We were able to send WEB requests and receive back level 1 pages without pictures.
• Portable Solar stand worked very well, box was water proof and robust, small solar panels good.
  – Solar charging worked as expected
• Routing worked, remote access to Mule when in Ritsem from TCD
Findings

• Working on extracting data from logs to show volume and delays
  – We have a bunch of changes to do to the apps and a few for DTN2

• Note: still some oddities I don't understand
  – Clock issues, log-extraction issues
  – Work ongoing to validate this stuff
  – Caveat lector!
Networking for Communications Challenged Communities:
Architecture, Test Beds and Innovative Alliances

Mail transit times (Village Router - Internet)
Plans

• Write it up properly somewhere
• Summer 2010 test
  – Aiming for 3 months
  – 5 village routers
  – 6 mules (helicopters)
  – 2 gateways
  – Improved apps
  – Some management