Some ICN/DTN Plans

Initial, Preliminary, Draft, Partial
(you get the idea:-)

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2010 Test Setup: Network
Test Setup: Applications

- E-mail via Bundle Protocol (BP – RFC 5050)
  - Including mail account provisioning
  - Otherwise mostly same as 2009 but with 6 message store replicas!
- HTTP URL fetching application
  - Almost same as 2009
- Pushed web content
  - List of URLs configured in TCD pushed daily to all routers
Test Execution

- [http://down.dsg.cs.tcd.ie/s10inf/](http://down.dsg.cs.tcd.ie/s10inf/)
- Eoin, Kerry, Shane, Stephen, Stefan and Alex all visited during July
  - Got lots of good help from LTU (Samo, Fritte, John) and Tannak (Susanne, Karin)
  - Thanks!
- Elwyn, Karl-Johann and Arne-Wilhelm visited (Stalo) in August
The Good News

- Village router hardware worked really well
  - Lovely power management
- WRAP-based mule worked
  - But battery backup apparently didn't
- OSBridge gateways sort-of worked
  - Crappy bandwidth and gw-1 died halfway through
- Applications all worked, with a few bug fixes along the way
- DTN worked
  - 3 DTN2 bugs seen (1 found, 1 workaround, 1 tbd)
- Basic log data = 13GB (compressed)
- Order of magnitude more of everything than 2009
  - 9449 application layer bundles vs. 127
  - 45 “remote” days vs. 3
  - ...
Power – Router 2

Router 2 power

contacts
rtc state
starts/exits

spike

r2 nV r2 mA state rtc state starts exits contacts

07/10 07/17 07/24 07/31 08/07 08/14

4000 3500 3000 2500 2000 1500 1000 500 0 500 1000 1500 2000 2500 3000 3500 4000

spike
basil,gw-2,m3,r2 Contacts

Summer 2010 Contacts: n4cmule-3-n4router-2
Count=114, Duration=22693, Average=199.061, Min=32, Max=736

Summer 2010 Contacts: n4gateway-2-n4cmule-3
Count=583, Duration=610317, Average=1046.86, Min=30, Max=77039

Summer 2010 Contacts: basil-n4gateway-2
Count=3533, Duration=13765985, Average=3896.4, Min=1, Max=750581
Bundles

- 9449 bundle submissions
  - Details of the path for all 9449 at: [http://down.dsg.cs.tcd.ie/summer10/bundles](http://down.dsg.cs.tcd.ie/summer10/bundles)
  - 522 bundle were reactively split into 2267 fragments
- 40794 bundles delivered
  - Many multiple-deliveries
- 162764 unique bundle IDs seen
  - Above plus custody acks, status reports and Norut/Folly bundles
- 1005434 bundle “RX” events
- ~318 bundles involving Folly/Norut EIDs
- We had a bundle storm!
An Interesting Bundle

Bundle 332857648,008 from router-1:maileync to basil:maileync size 133120 cent 2010-07-19:12:17:28
A Naughty Bundle
ICN Bundle Protocol Extension

- BP gives us a fine way to move things in a DTN
  - Involves queueing content in BP nodes
- It'd be nice to be able to pull query responses from the queues of BP nodes on the route between a querying node and answering node
- BPQ extension block aims to do that
  - draft-farrell-dtnrg-bpq
  - Co-authors: Aidan Lynch, Dirk Kutscher, Anders Lindgren
  - Not the first such attempt (let us know about missing related work)
BPQ Extension

- Present in Queries and Answers, only nodes supporting this extension block need to know about this

- BPQ fields:
  - Kind: “query” or “answer”
  - Matching rule: only “exact” defined for now
  - Value: some octets
  - (Fragments already returned: optional for queries)

- When a node sees a query with a BPQ and it has a queued bundle with a matching BPQ, then that node sends an answer
  - Fragments ok (I think); not so sure about report-to etc.
Summer 2011 Plans

- TCD/SICS (within SAIL) aim to try out BPQ for video in Skuolla around the 2011 Sirges calf-marking
  - Replicate our 2010 setup for the end-users
- Note: Not committed yet, aiming for go/no-go about late Jan
- Interested in what ICN things we can try
Winter Weather

Ireland is having a winter this year!
We have a node on the roof in TCD for testing.
Note the up/down pattern for Dec 4th!
Dec 4th
(for those without 20:20 vision:-)
Summary

- Mixed 2010 results: great router h/w; maybe fewer real users than hoped-for
  - News/Weather actually useful and generated interest
  - Lack of local directory-type services noticed
  - Facebook (kids) and banking (adults) most common request
- ICN in challenging networks imposes constraints that we'd like to meet
  - Short, less predictable, contacts are the norm
  - Handling (reactive) fragmentation may be more important in this context
  - We're going to investigate whether BPQ approach works for that
  - What else might?