Summer 2010

Initial, Preliminary, Draft, Partial
(you get the idea:-)
Results from the TCD/Intel/Tannak Summer 2010 Trial

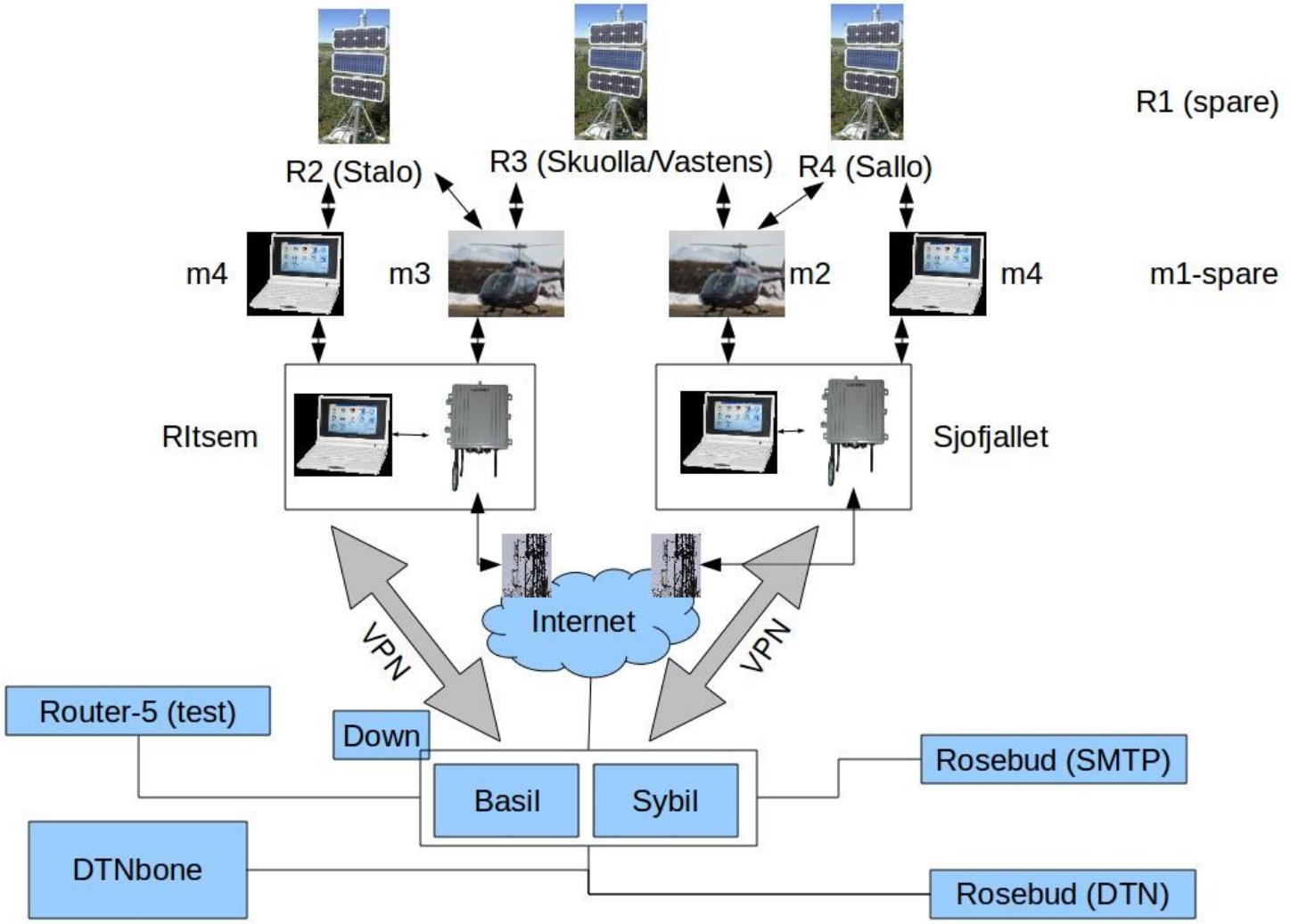
Stephen Farrell
stephen.farrell@cs.tcd.ie

N4C Project Meeting
Poznan, October 2010

Contents

- Test Setup
- Test Execution
- Results so far
- Tentative Conclusions

Test Setup: Network



Test Setup: Applications

- E-mail via BP
  - 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/
- 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

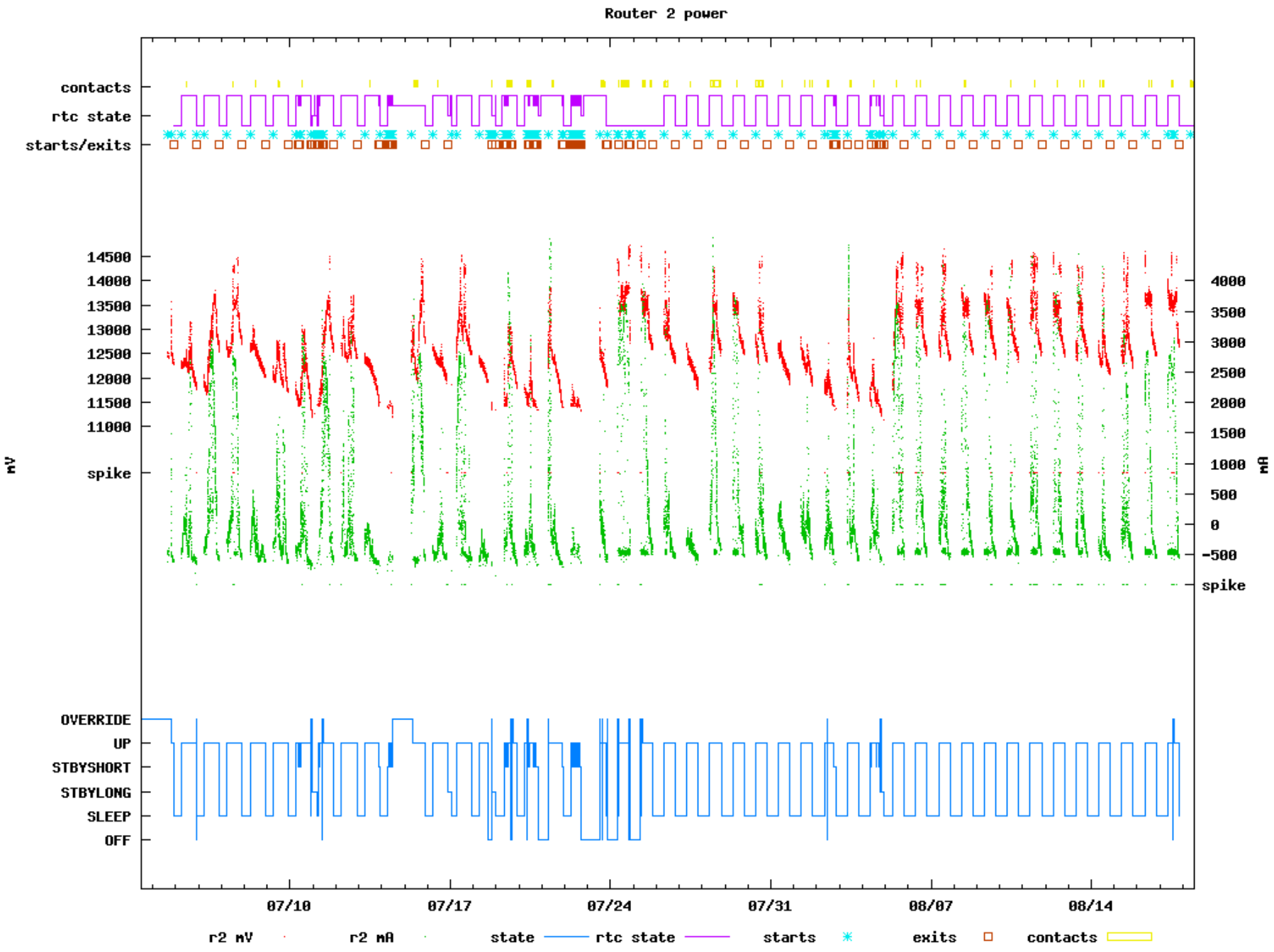
The Good News

- Village router hardware worked really well
  - Lovely power managment
- WRAP-based mule worked
  - But battery backup apparently didn't
- OSBridge gateways sort-of worked
  - Crappy badndwidth and gw-1 died half way 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
  - ...

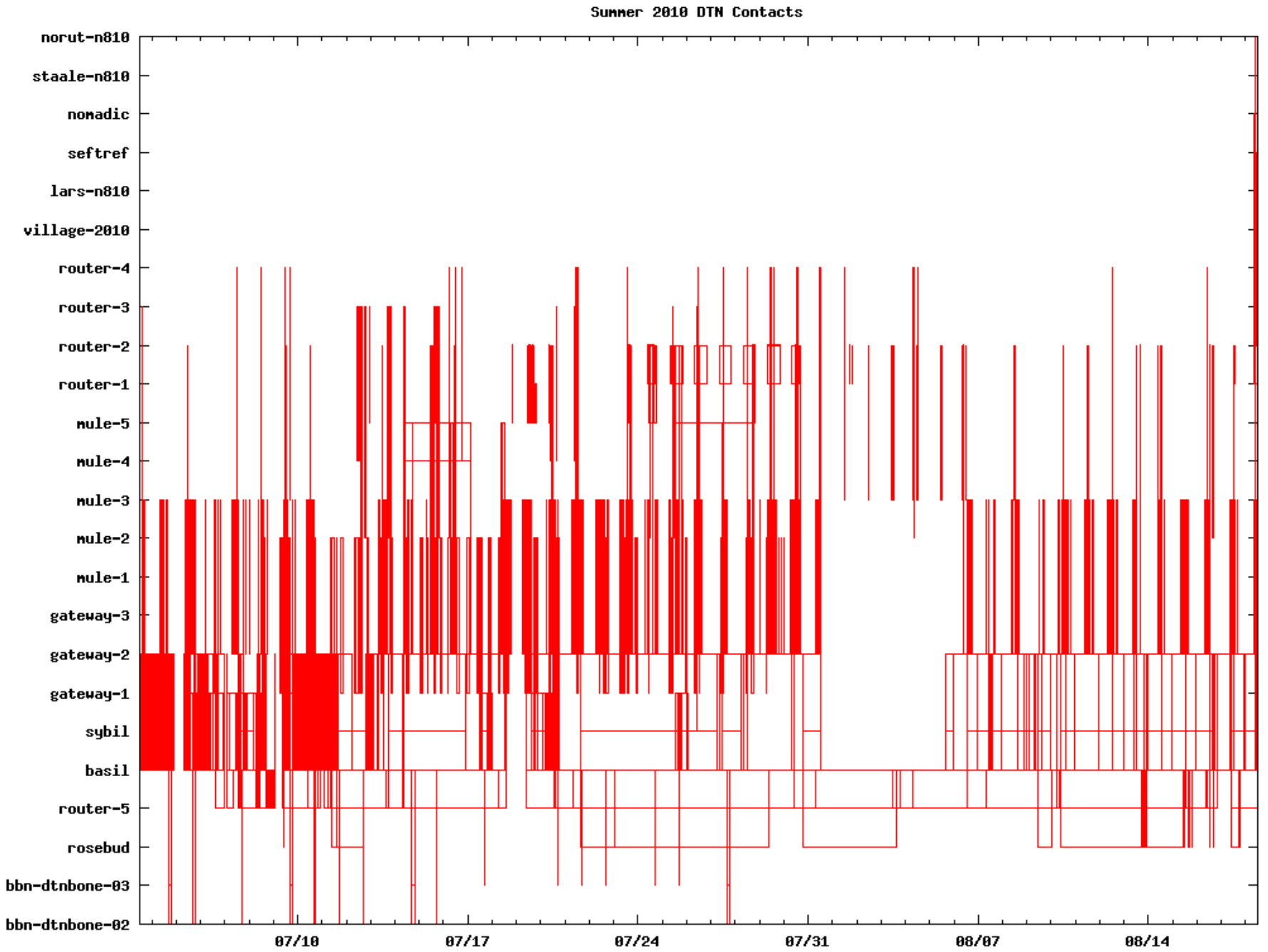
Initial Results

- Power
- DHCPACKs
- Contacts
- DTN2 dtnd daemon start/exits
- Bundles
- (Mail, Web and DTN apps TBD)
- (Numeric analysis TBD)

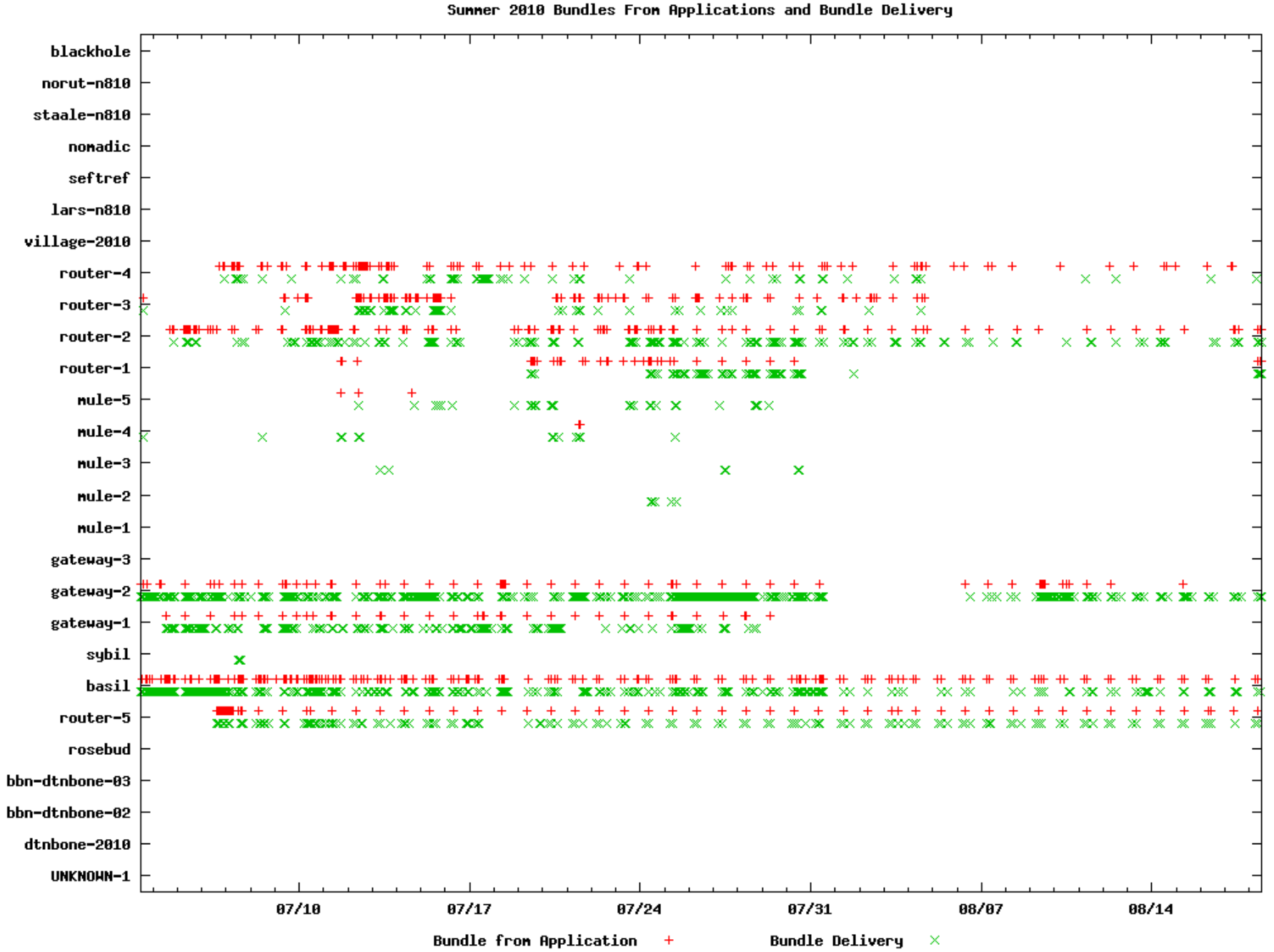
Power – Router 2



Contacts (~9084)



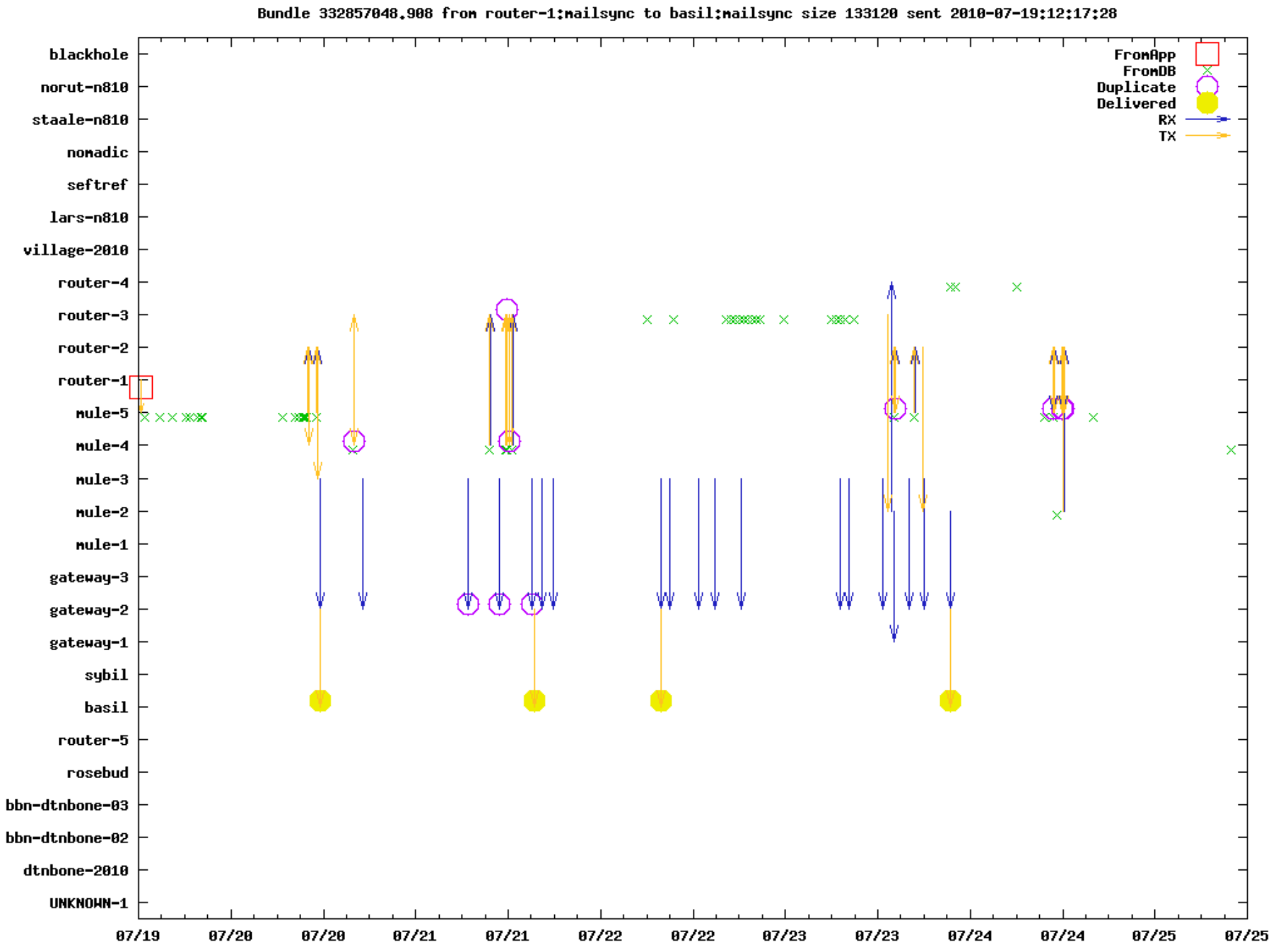
bundle origination (~9449) / delivery (~40974)



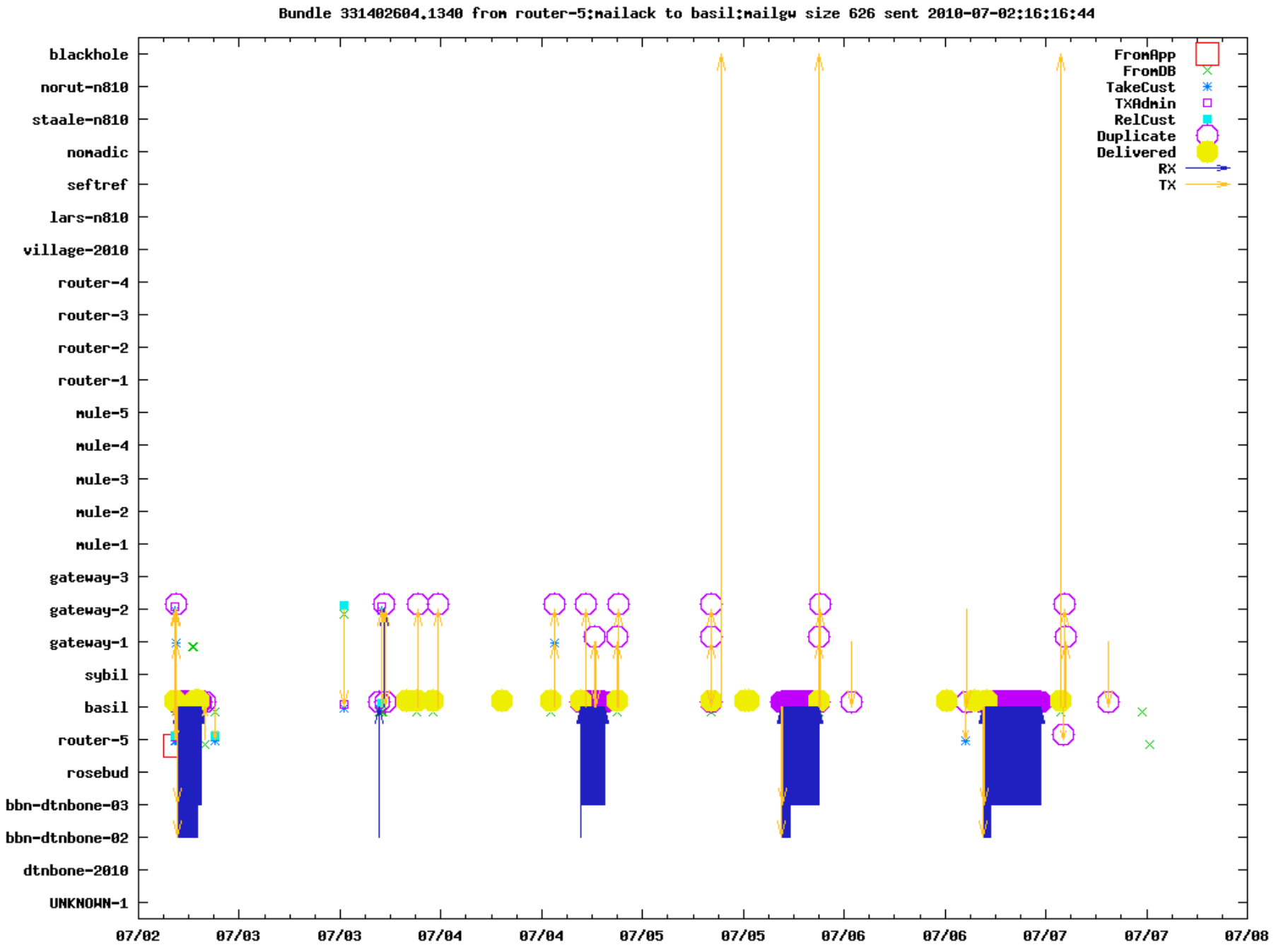
More on Bundles

- 9449 bundle submissions
  - Details of the path for all 9449 at: http://down.dsg.cs.tcd.ie/summer10/bundles
- 40794 bundles delivered
  - Many multiple-deliveries
- 162764 unique bundle IDs seen
  - Above plus custody acks, status reports and Norut/Folly bundles
- ~318 budles involving Folly/Norut EIDs
- We had a bundle storm!

An Interesting Bundle



A Naughty Bundle



Bundle Storm

- 1: Cause:
  - Largish queues due to flood routing on basil
  - Large queue => long time between events
  - Registration expired between delivery decision and actual delivery
    - Low probability with small queues
  - Bug in delivery code didn't delete bundle after delivery in just this case, or maybe DTN2 flooding just doesn't delete it
  - This bundle requested a status report, so it was generated
  - GOTO 1

Bug

```
BundleDaemon::event_handlers_completed(BundleEvent* event)
{
    log_debug("event handlers completed for (%p) %s", event, event-
>type_str());

    /**
     * Once bundle reception, transmission or delivery has been
     * processed by the router, check to see if it's still needed,
     * otherwise we delete it.
     */
    BundleRef bundle("BundleDaemon::event_handlers_completed");
    if (event->type_ == BUNDLE_RECEIVED) {
        bundle = ((BundleReceivedEvent*)event)->bundleref_;
    } else if (event->type_ == BUNDLE_TRANSMITTED) {
        bundle = ((BundleTransmittedEvent*)event)->bundleref_;
    } else if (event->type_ == BUNDLE_DELIVERED) {
        bundle = ((BundleTransmittedEvent*)event)->bundleref_;
    }

    if (bundle != NULL) {
        try_to_delete(bundle);
    }
```

Work Around

- Put “sybil” in place that only flooded to gateways and no-one else
- Reduced queue sizes
- No further storms AFAIK

Tentative Conclusions

- Mixed results: great router h/w; maybe fewer real users than hoped-for
  - Application layer analysis real soon now
  - Lack of local directory-type services noticed
  - Facebook (kids) and banking (adults) most common request
- BP performance and routing interesting
  - Data should show way to possible improvements in static/flood routing
- Contact graph should be of use to DTN researchers generally
- Storm figures will set record!