Active Measurement Project

Shane Alcock
on behalf of Brendon Jones
What is AMP?

• Originally an NLANR project, led by Tony McGregor
  ○ Continuously measure R&E networks, e.g. Internet2
  ○ Test between monitors, as well as other targets

• AMP software was inherited by WAND
  ○ Continued development and maintenance
  ○ Deployed monitors throughout NZ
Current Project

• Funded by NZ Government (MBIE)

• NZ Internet as critical infrastructure
  ○ Redevelop AMP as a reliable, user-friendly tool
  ○ Deploy within ISP networks
  ○ Recognise network problems and alert
  ○ Increase visibility for both operators and users
Architecture
Measurement Strategy

- Long-term regular testing
  - Controlled by a schedule
  - Tests run once per minute for latency and path tests
  - Some AMP monitors have been active for 10 years
Deployment Strategy

• Small to medium scale deployments
  ○ Each deployment can have a different purpose

• Work closely with the monitor hosts
  ○ Identify targets that matter most to them
  ○ Design test schedules to suit deployment purpose
  ○ Knowledge sharing for mutual understanding
Test Design and Implementation

• Development is driven by the needs of monitor hosts
  ○ Focus on user experience
    • Resolve test targets using DNS
    • HTTP test downloads all embedded objects
  ○ ISPs request tests for specific services
    • Current tests: DNS, HTTP
    • VOIP, streaming video
Latency and Loss Testing

• ICMP
  ○ Send ICMP Echo Request to target

• TCP Ping
  ○ Send TCP SYN to known listening port on target
  ○ Good for targets that block or limit ICMP
Latency and Loss Testing

• DNS
  ○ Query DNS server to resolve a name
  ○ Measure time to get a response
  ○ Configurable DNS options (recursion, DNSSEC)
Path Testing

• Traceroute
  ○ Record path from monitor to target
  ○ Map hops to ASNs to create an AS path
  ○ Standard UDP traceroute
Download Testing

- HTTP
  - Fetch target webpage
  - Parse HTML and fetch all embedded objects
    - CSS, images, Javascript

- Throughput (between AMP monitors only)
  - Send as much data over TCP as possible
  - High network impact, test infrequently
Data Availability

• http://amp.wand.net.nz/
  ○ Public graphs and data for the NZ AMP mesh
  ○ Matrix: compare measurements at a glance

• Downloadable raw data
  ○ Can be reused for other research purposes
Current Uses

• Network monitoring and anomaly detection
  ○ At ISP scale and national (NZ) scale

• Broadband performance comparisons

• Network visibility
  ○ Operators, users, content providers
Future Directions

• AMP project is funded until September

• New funding = consider new directions, ideas
  ○ New tests / metrics?
  ○ Alternate use cases?
  ○ International collaborations?

• We're open to suggestions and/or feedback!