Active Measurement Project

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on behalf of Brendon Jones

What is AMP?

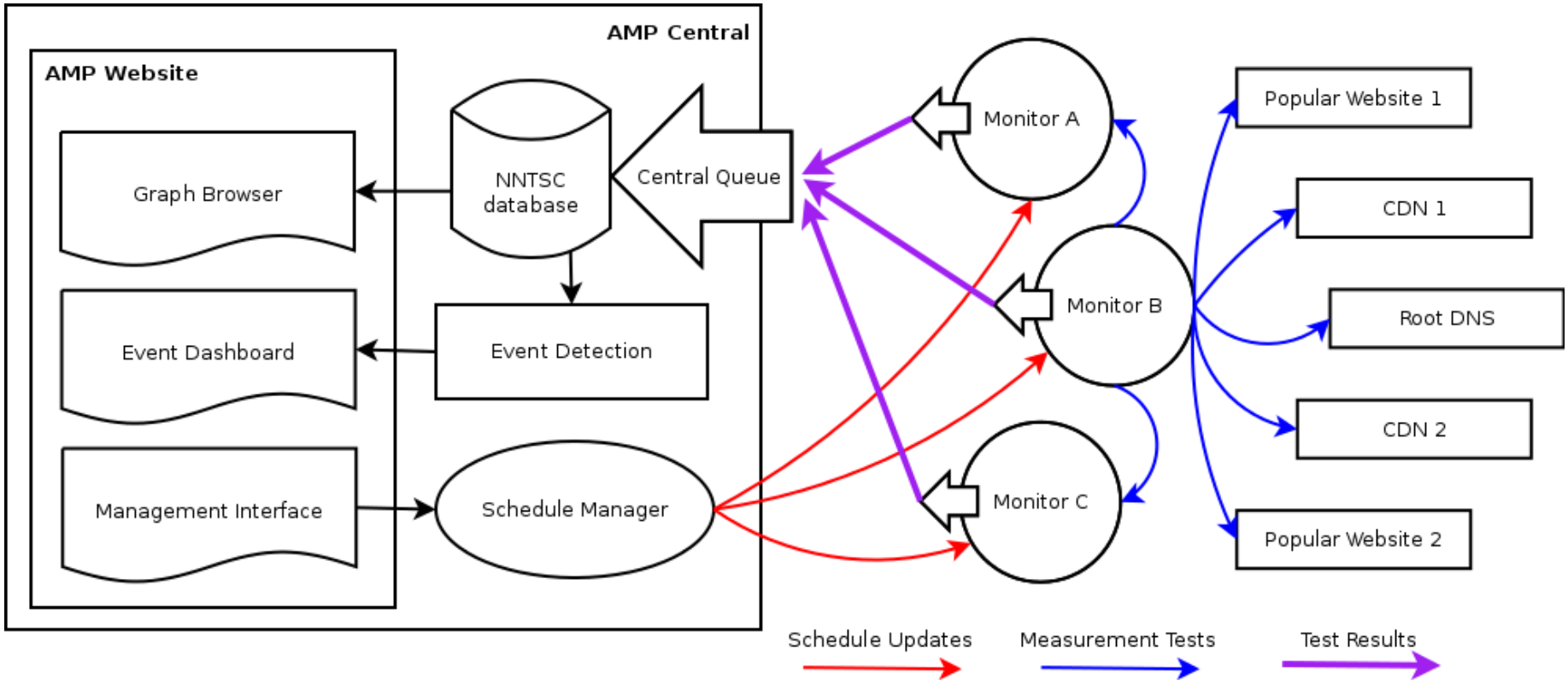
- Originally an NLANR project, led by Tony McGregor
  - Continuously measure R&E networks, e.g. Internet2
  - Test between monitors, as well as other targets

- 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!