**Project Overview**

- PuNDIT aims to automate the detection and localization of network problems
- Identify short-term events
- Produce results in near real-time
- Scale to a large number of agents
- Visualize useful summaries and statistics
- Display problematic links in topology

- PuNDIT agents run on perfSONAR hosts, reporting to a PuNDIT central server

**How PuNDIT Works**

1. Gather and Analyze Network Topologies
2. Collect Network Metrics
3. Detect Problem Signatures
4. Localize Problematic Links

**Problems Detected**

- Excessive Delays, Losses and Reordering
  - When these parameters exceed user-specified thresholds in 5-second windows
- Congestion
  - Delay increases correlated with losses, indicating possible congestion at a link
- Route Change
  - A route change resulting in a sudden and significant change in delay measurements
- Route Instability
  - Repeated route changes, which may cause poor application performance
- End-host Context Switching
  - Excessive context switching of the active measurement process at perfSONAR host (may be erroneously interpreted as a network problem)

**RabbitMQ**

- Flexible and robust messaging broker
- A common platform for sending, queuing, and receiving messages
- Safe and secure queuing and delivery of messages
- Offers persistence, delivery acknowledgement, high availability
- Scalable architecture
- Supports multiple configurations (different exchange types, clustering, federation)
- Open source

**A Better Traceroute**

- Our localization needs accurate traces
- perfSONAR uses standard traceroute
- Inconsistent traces if load balanced
- Multipath Detection Algorithm (MDA) from the paris-traceroute team overcomes this
- We are integrating scamper in perfSONAR, which also implements MDA

**Information Flow**

- Two main message types sent across network:
  - Status updates indicate the network metrics for 5 second windows, sent in a batch every minute
  - Traceroutes in JSON from the Traceroute MA on each host
- Central Service generates localization events that trigger UI, check_mk and notification daemon

**User Interface**

- Site Report GUI View
- Network Topology Analysis View

- These are mock-ups of a site-problems view and network topology analysis view a PuNDIT user might see via the PuNDIT web interface
- Site Report shows timestamped problems in a table
  - Historical information is presented in a graph with green bandwidth results, black packet loss problems, and blue delay problems.
- Network Topology shows the results of PuNDIT analysis of the reported problems correlated topology.
  - Problematic links are identified using red coloring
- The components support drilling down to find details, and hovering over items also provides additional information
- Mock up URL: http://punditui.aglt2.org/