members meeting
8 feb 00

research tools and analyses

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outline

- passive workload char.: coralReef
- skitter
  - deployment status
  - asia connectivity study
  - dns study
  - other tools in library/package
- hyperbolic graph/viz tool
  - current features
  - potential future features
  - solicit your input

workload characterization: coralReef

insights for

- usage profiling
  - h/w, protocol, application design
  - architecture optimizing
- capacity and peering planning
- network control and management
- security
- performance analysis
  - delay, loss, jitter?
- QOS assurance across ISPs
- accounting and billing

- tools: netramet, netflow, cflowd, coral
  - some suck less? ...evolution requires use

coralReef

passive data analysis at 0C3,12,48,gigE

- packet headers, filters for more
- ATM, POS
- integration w RRDtool, JChart (java), GD.pm for graphics
- profile detection
- SLA support

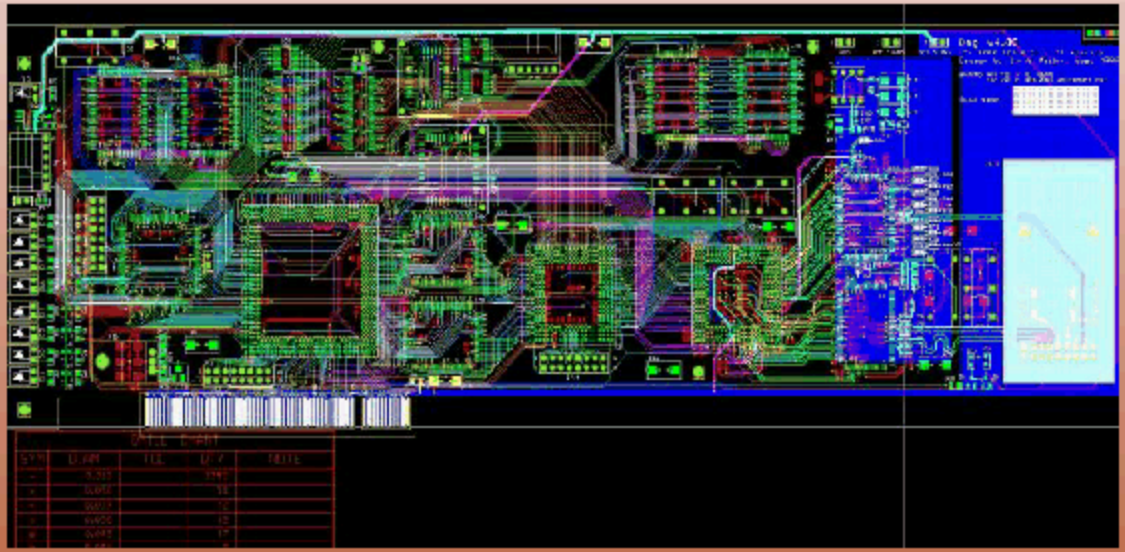
hardware side

- dag3 (test, license)
- dag4 (develop, test, license)
- benchmark / calibrate accuracy

www.caida.org/Tools/CoralReef

workload char of high perf. networks

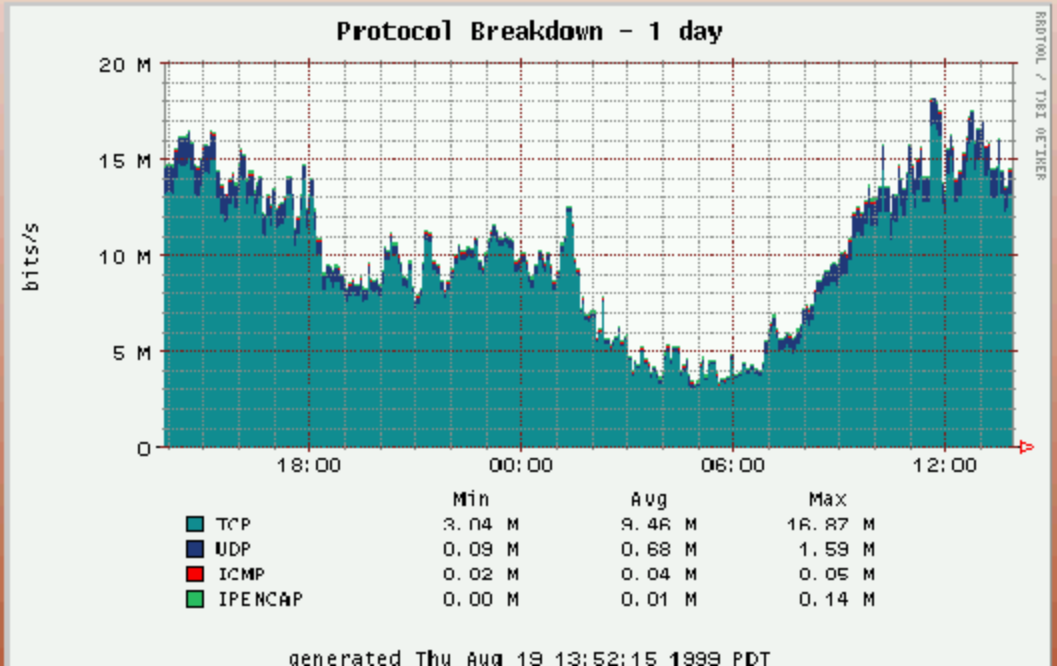
- coral/ocXmon testing (oc3,12,48,gE)
- persistent real-time full frame collection
- integration w coralreef analysis s/w
- dag4.0 testing 'down'-underway



workload char: coralReef

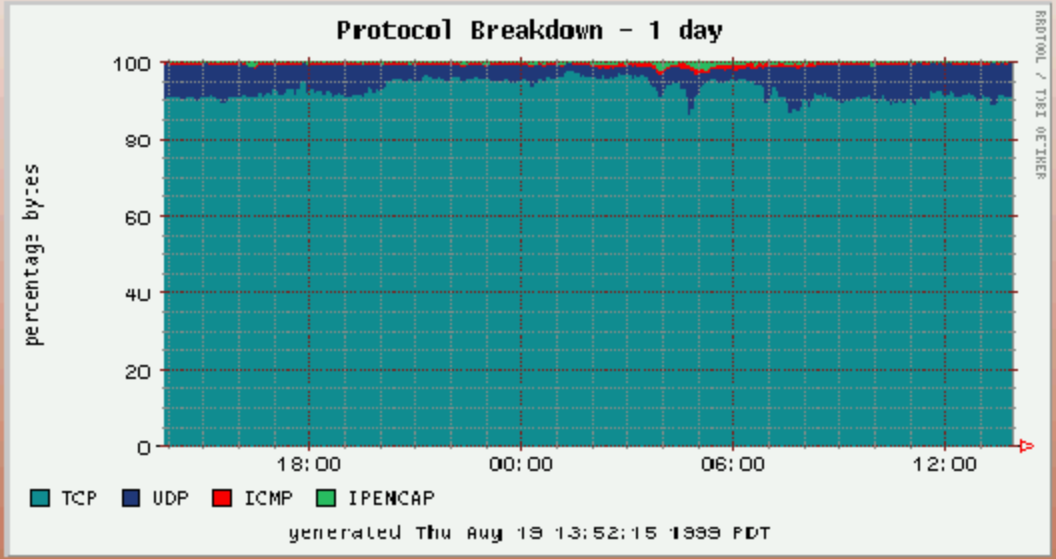
- what to measure
- how to viz

sample 19 aug 99, ucsd-cerfnet
https://anala.caida.org/CoralReef/Demos/

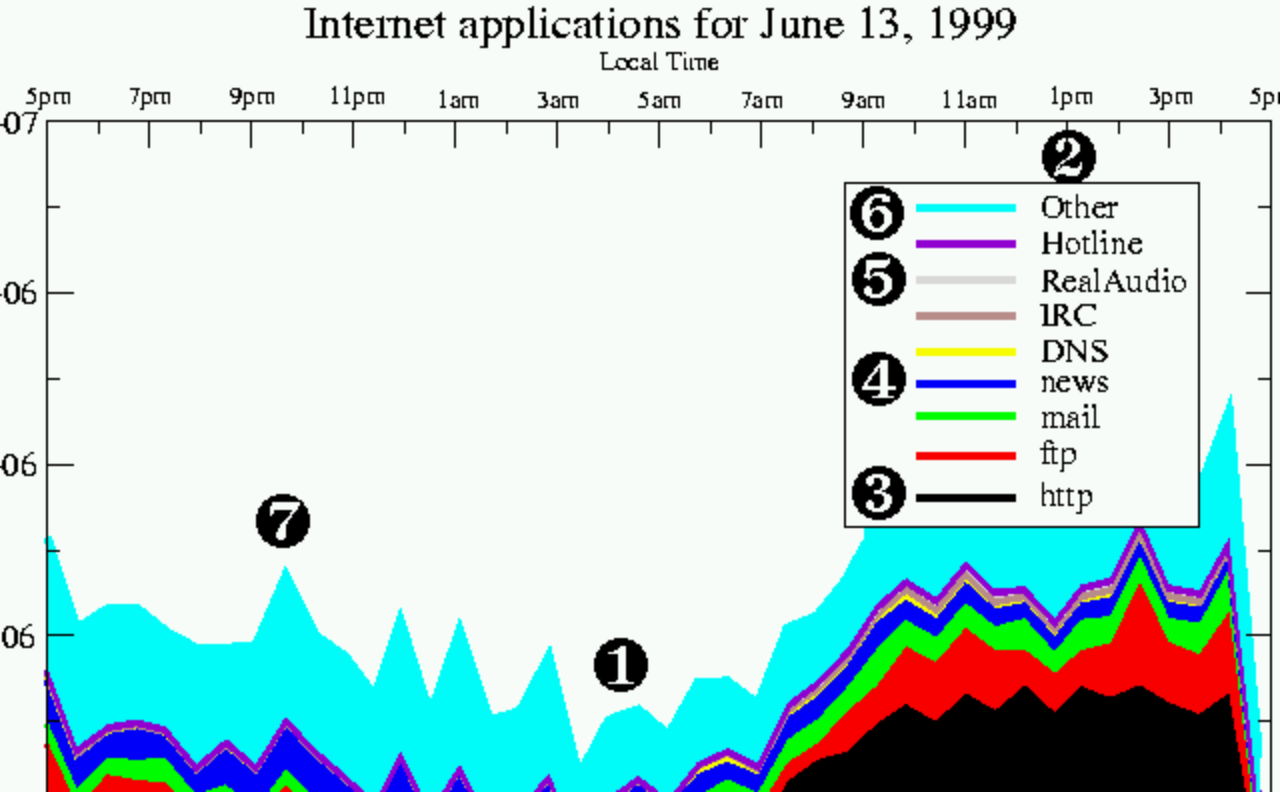


workload char.: protocol (proportion)

19 aug 99, ucsd–cerfnet

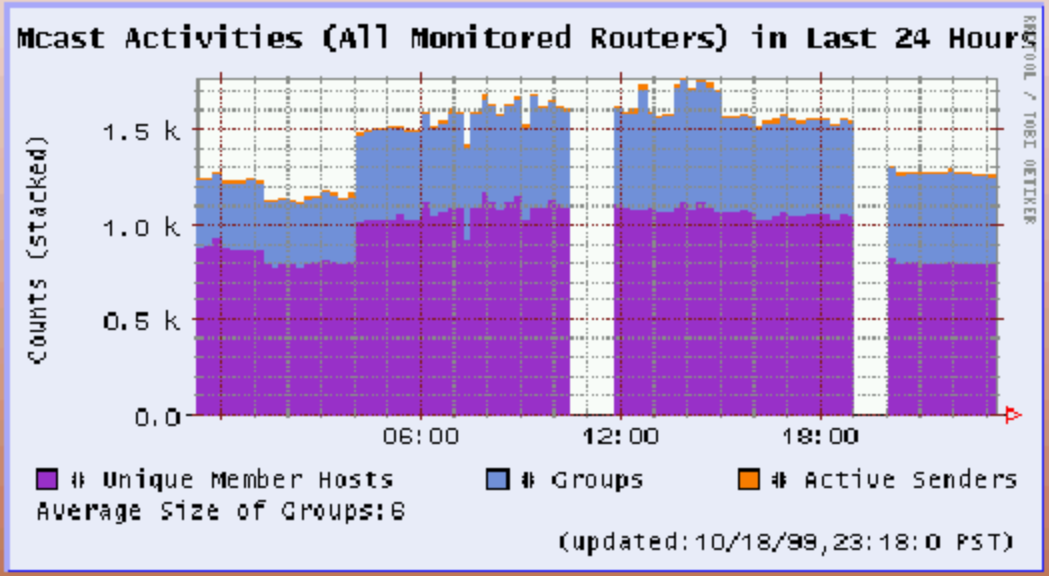


workload char: applications (ucsd–cerfnet)



workload char.: mantra

18 oct 99, fix-west.mbone.nasa.gov
http://www.caida.org/Tools/Mantra/



skitter: deployment status

- 17 monitors
- daily stats:

  www.caida.org/Tools/Skitter/Summary/
- make data sets available under AUP
- root server project off to slow start
  - infrastructure
  - target lists harder
  - we're cycle-starved
- initial asian study done
- some correlation w routing data
- need more disk space
- need better destination gathering

skitter: preliminary findings

- ~1% IP destinations disappearing monthly (re-addressing, firewalls)
- route announced path not matching forward path
- indication of potential routing configuration errors
  (by no means automatic)
- persistence of paths
- little correlation betw hop count & RTT
- US fundamental for global transit
- methods to identify critical infrastructure
- is there an Internet "core"?

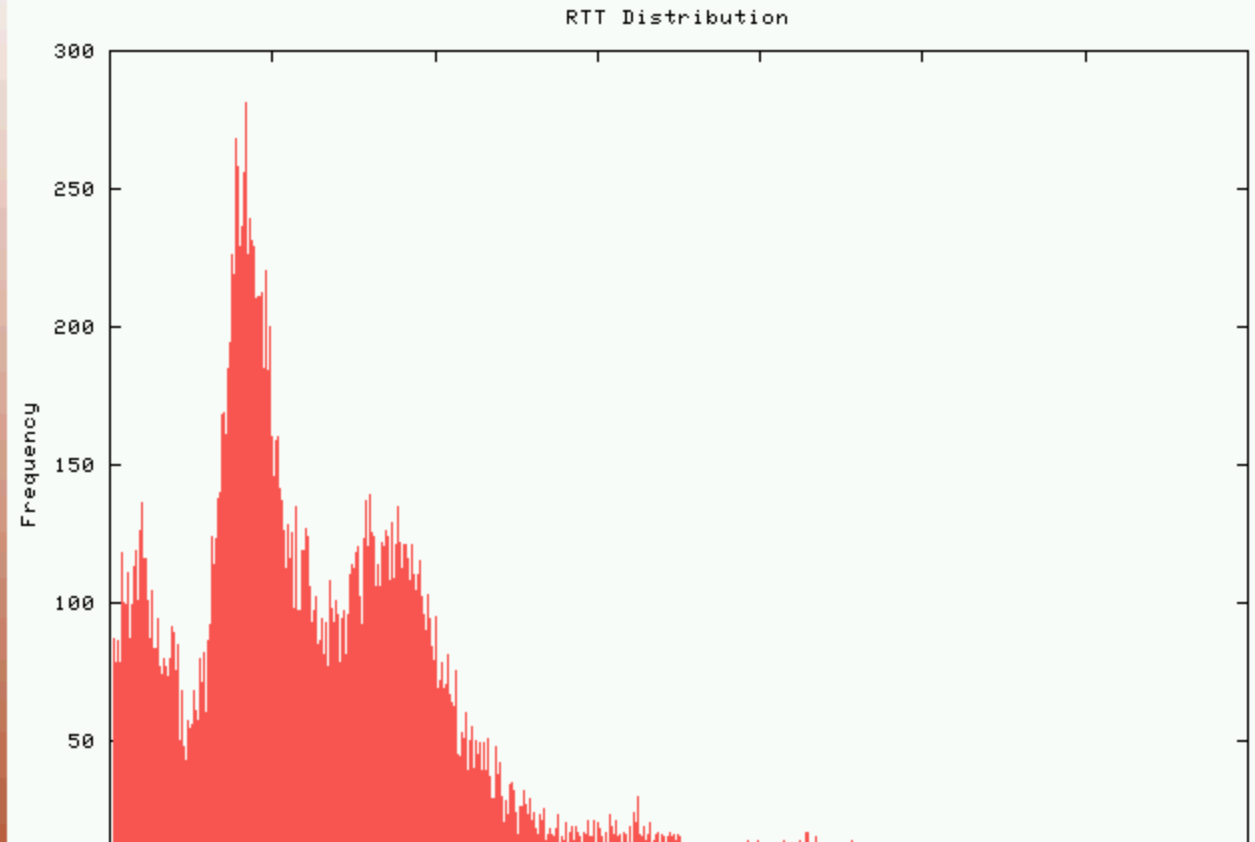
datasets available to researchers

skitter: DNS root server study

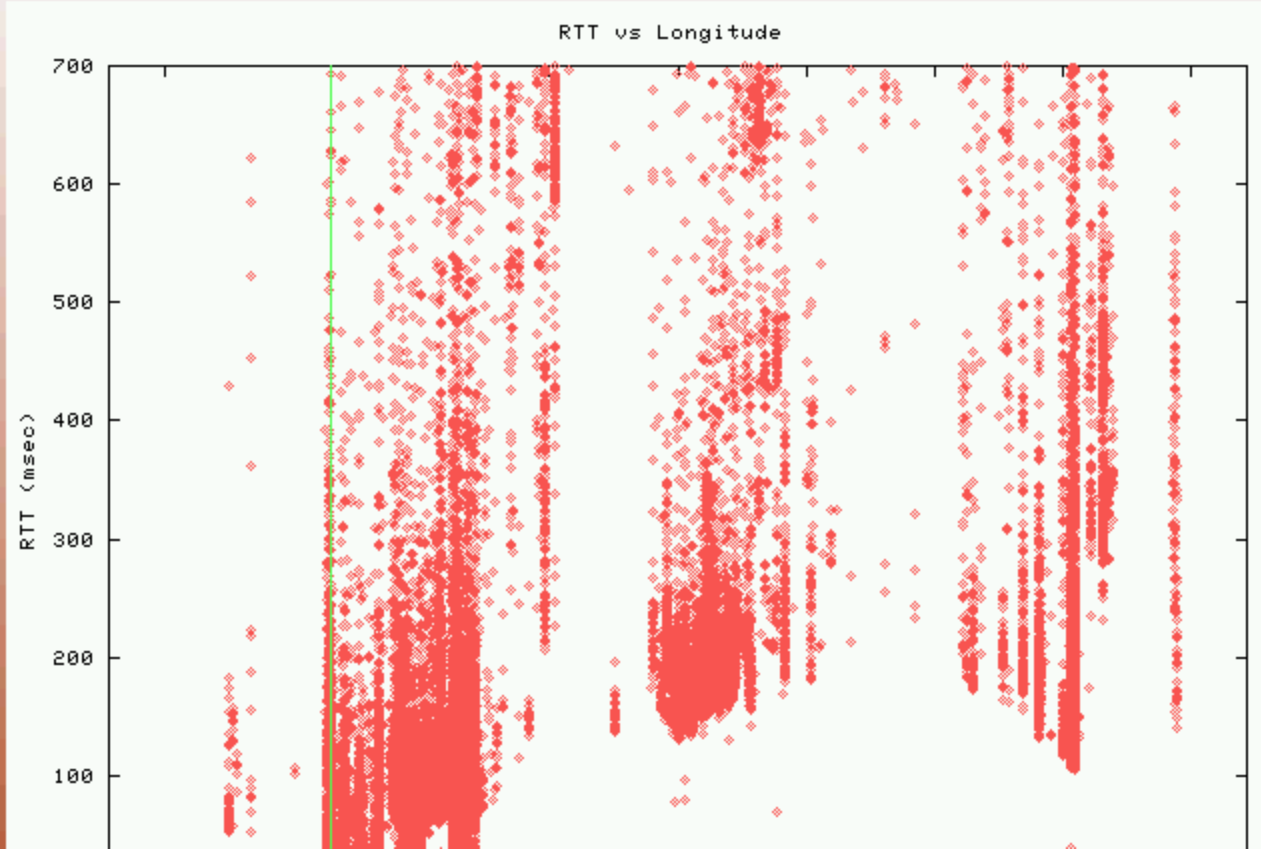
- RSSAC, DNS technical advisory committee to ICANN
- co–locate skitter hosts w root servers
- demonstrate root server performance in serving target community
- develop techniques for evaluating architectual optimality for root server placement
- great application for skitter
  - proactive participation
  - good cause

www.caida.org/Tools/Skitter/RSSAC/

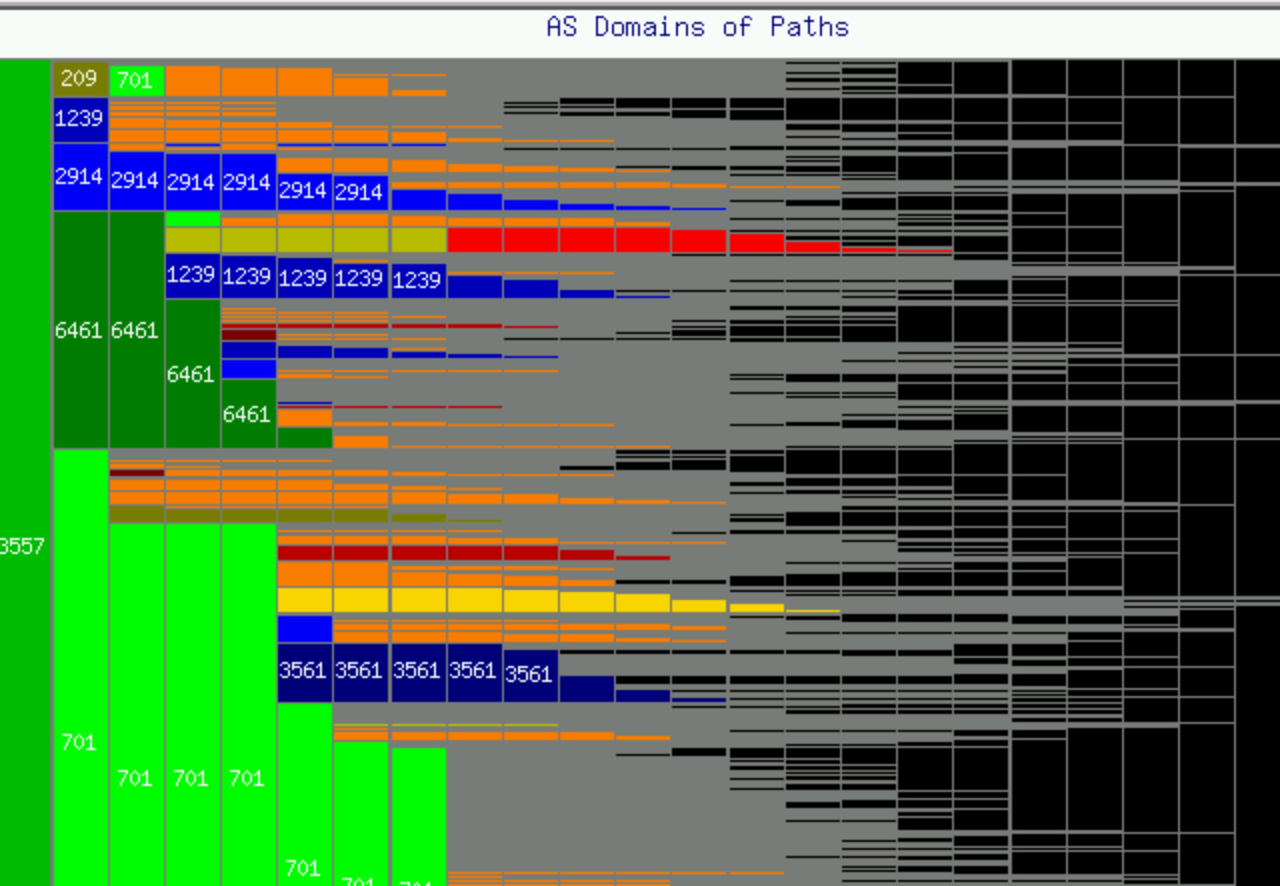
skitter: rtt distribution: tri-modal



skitter: rtt vs longitude (light cone)



dispersion among ASes across paths



skitter: imminent tasks

- clean up destination lists
- continue w metrics and analysis for 'center', 'core', 'close'
  (optimize dist. server architectures)
- metrics for 'change'
- better NetGeo support
- revisit Asia study, compare
- continue root server study
- correlation with routing, passive across time, sources, type
- model of the Internet (no, really)

- graphing/layout techniques....

hypview: 3D hyperbolic graph layout

potential future features

- connect w external data srcs
  - point directly to cisco BGP feed
  - netflow
  - skitter
  - netgeo
  - routing registries
- color, thickness, height of link/node by:
  - country, #routes, traffic, delay, damage
- drill-down
  - click to pop up info about nodes, links
- GUI to filter matching (unclear need)
  - 'draw all paths thru this AS [&|to this prefix]'
  - 'draw all paths > X [traffic|delay|routes]'
  - 'draw all paths through ATM infrastructure'
  - 'draw all paths not taking shortest paths'

hypview: as interface to the router

- histogram of AS paths through router
- tabular summaries of
  - routes vs traffic
  - AS path vs traffic
  - neighbors at levels of fanout
  - address space utilization
- digestable routing table abstractions for
  - multicast (mbgp, msdp, whatever next)
  - animation of routing snapshots over time
  - correlated with traffic, performance, calendar
  - GUI to what-if interdomain simulations (!peer)
    - need RIB
- it's just another graphing tool...

overall: meas't & analysis challenges

- new methods for data collection, reduction, aggregation, mining, viz
- large, complex datasets (~Pbyte)
  - geographically and logically distributed
  - dynamically changing
  - enable inter- and intra-ISP analysis and feature detection
- correlation among data sources/types
- user-friendly integration with network utilities and control systems
- proactive participation
  - top-down (app devel's scope constr.)
  - bottom-up (ISP cooperation)
  - vendors in middle (to right of research)

www.caida.org/Presentations/

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