Traffic Measurement Activities of the WIDE project

Kenjiro Cho
IIJ Research Lab
traffic measurement and analysis in WIDE

- measurement activities across research groups
- broad perspectives
  - tracking long-term trends
  - analysis (with wide range of granularity)
  - operational tools (trouble-detection/shooting)
  - evaluation of new technologies
- emphasis on
  - wide-area
  - multi-point
    - measurement on backbone
  - long-term
    - continuation by group effort
international collaboration

- CAIDA (the Cooperative Association for Internet Data Analysis)
  - collaboration since 2003 on DNS, topology, routing measurement
  - WIDE/CAIDA measurement workshops were held 5 times
- University of Waikato
  - development of the scamper tool for topology measurement
- CNRS
  - measurement of emerging applications, detection of security threats
- RSSAC (ICANN Root Server Systems Advisory Committee)
  - root name server measurement
  - WIDE, CAIDA, ISC OARC, USC/ISI
- other collaboration
  - routeviews, RIPE, INRIA, AIT
traffic measurement activities within WIDE

- IPv6 measurement
  - IPv4/IPv6 comparative analysis to improve IPv6 Internet
- DNS measurement
  - active and passive DNS measurement (root and ccTLD servers)
  - anomaly analysis
  - server selection and server placement
- aggregation-based traffic profiler
- routing information measurement (BGP, OSPF)
  - analysis of long-term routing information
- NetFlow/sFlow based measurement
  - hybrid anomaly detection system
- a framework for SNMP-based measurement
- visualization of network information
collaboration between CAIDA and WIDE

- IPv4/IPv6 topology measurement
  - scamper (mjl), presented at IMC2005
  - cuttlefish (bhuffake)
  - pmtuviz (kjc), presented at NANOG36
- DNS measurement
  - dsc (wessels), presented at NANOG36
  - active measurement (sekiya)
  - passive measurement (nevil)
- events
  - 5th caida/wide measurement workshop in Mar 2005
  - bhuffake visited WIDE/IIJ in Jun-Jul 2005
  - kjc visited caida in Nov 2005
  - kc joined CNRS-WIDE workshop in Tokyo in Feb 2006
  - jun invited kc to OECD in Paris in Mar 2006
  - 6th caida/wide measurement workshop in Mar 2006
recent activities

- IPv6 AS core map and cuttlefish (geographic animation tool)
  - collaboration with CAIDA
- residential broadband traffic analysis
  - with 7 major Japanese ISPs and government
- dual-stack path analysis
  - identify IPv6 network problems by comparative path analysis
- DNS measurement
  - root-server measurement
  - tracking trends (e.g., EDNS0, DNSSEC, AAAA)
- geographic traffic matrix poster
IPv6 AS CORE MAP, collaboration with CAIDA

- visualize the outdegree of ASes, locations are mapped to longitude
IPv4 vs IPv6

- IPv6 AS graph is much sparser, less US-centric
cuttlefish: geographic animation tool

- japanese residential user traffic
  - from a commercial ISP
PMTU visualization
geographic traffic matrix poster
geographic traffic matrix

- first artwork using traffic data by WIDE
  - collaboration with designers

- step functions: distributions of regional user-to-user traffic volume
  - similar distributions for all regions, Internet has poor locality
- rectangulars: the traffic volume for the regions