Traffic Measurement Activities of the WIDE project

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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
○ vizualization of network information

collaboraton 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)
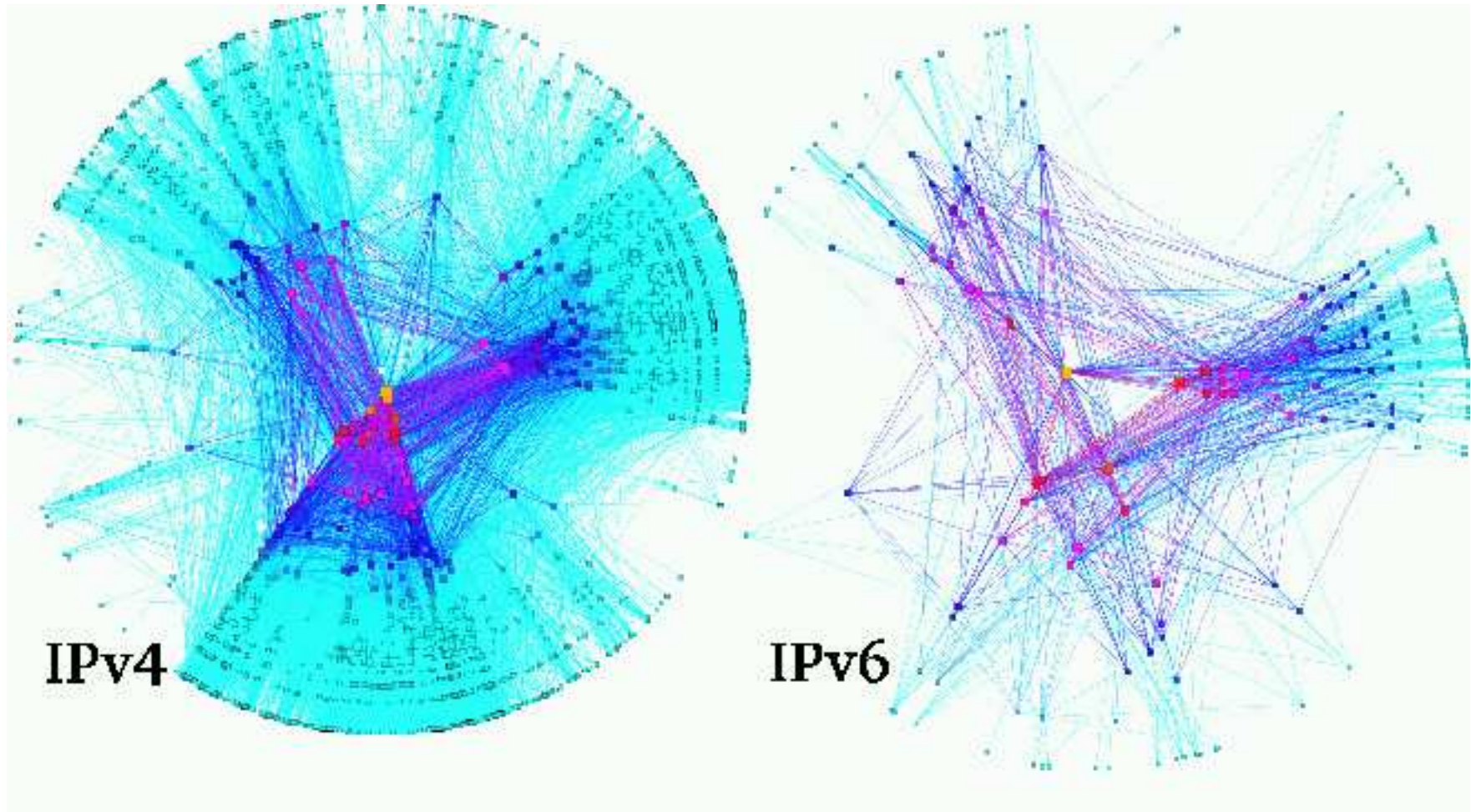○ geographic traffic matrix poster

IPv6 AS CORE MAP, collaboration with CAIDA

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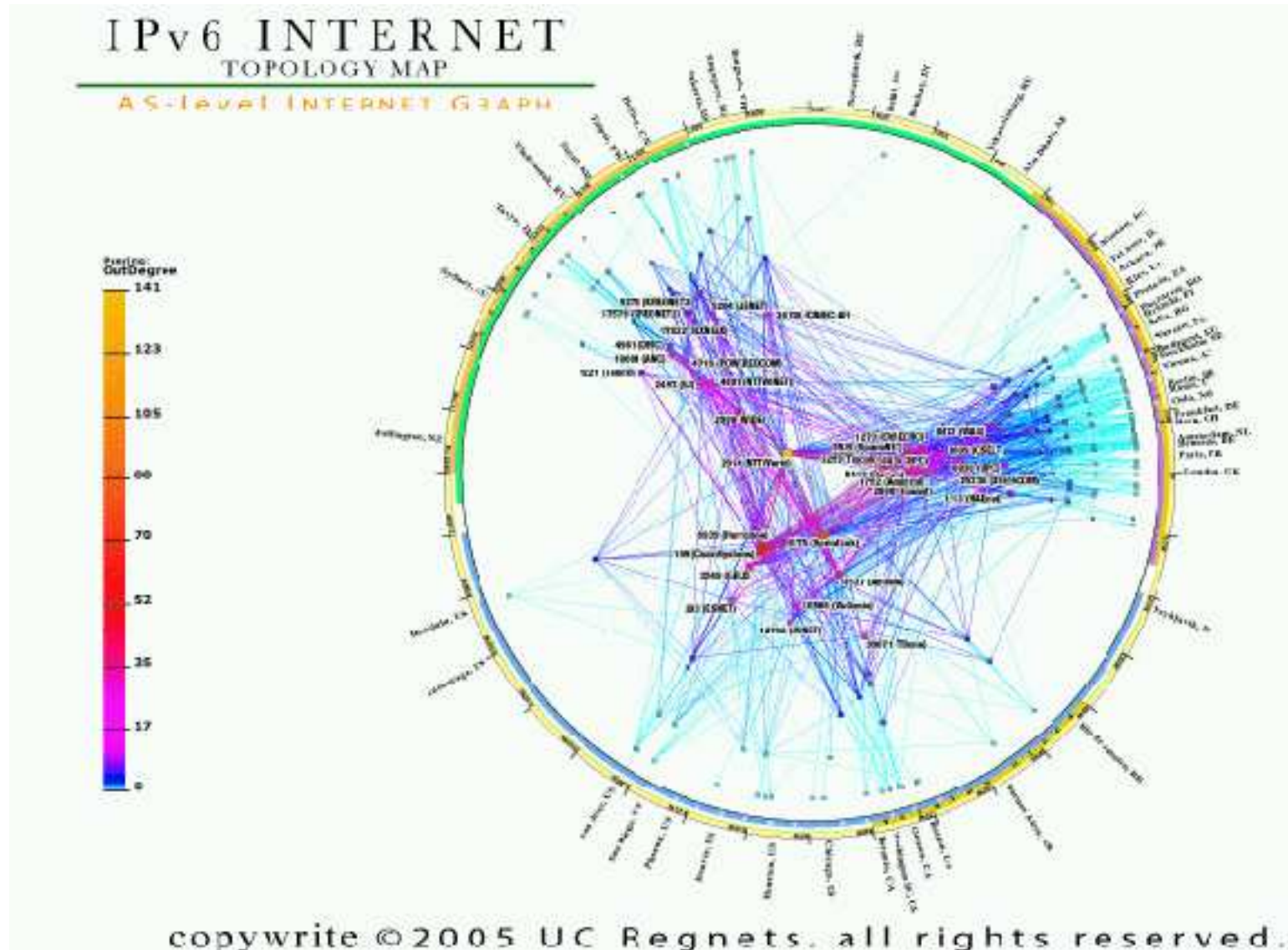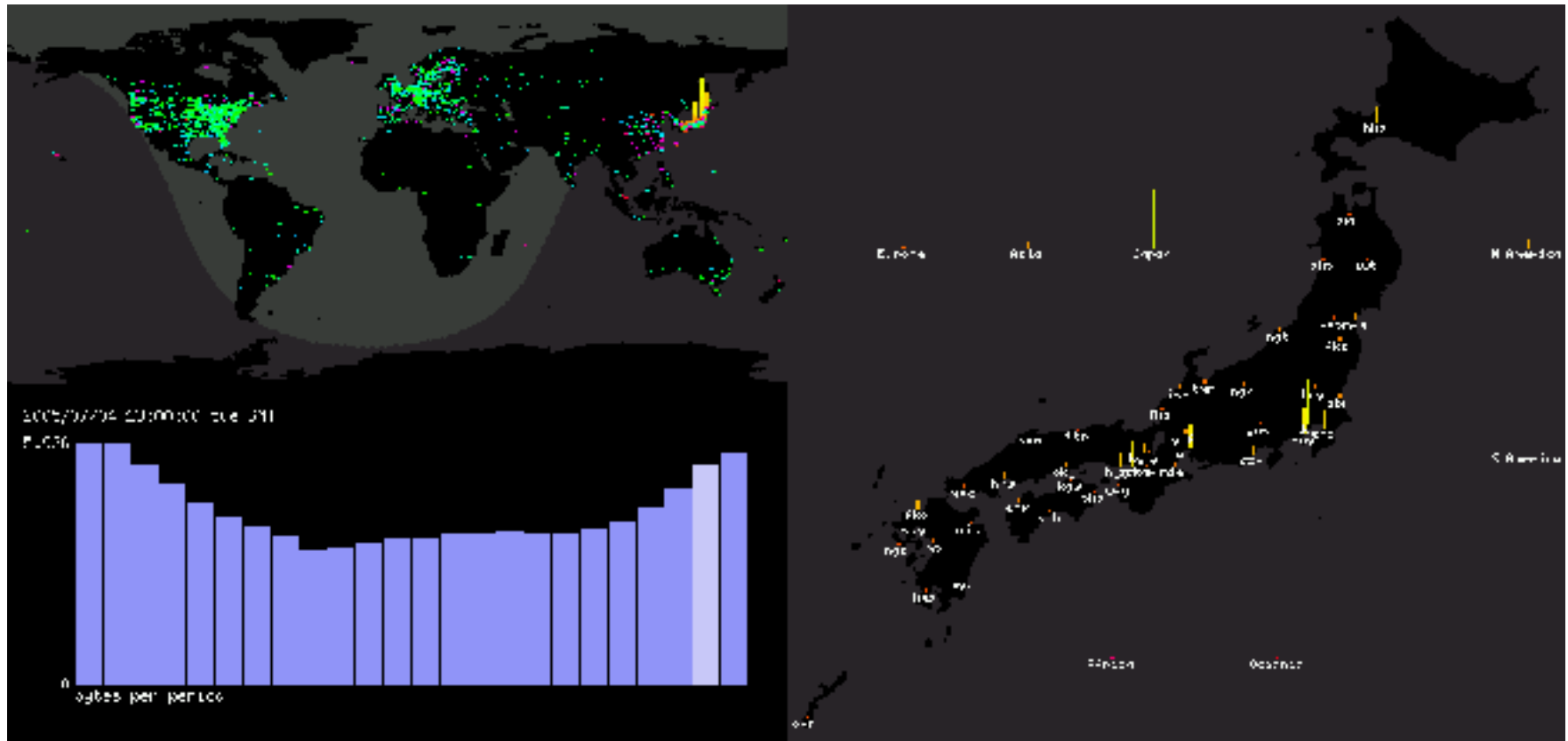
IPv4 vs IPv6

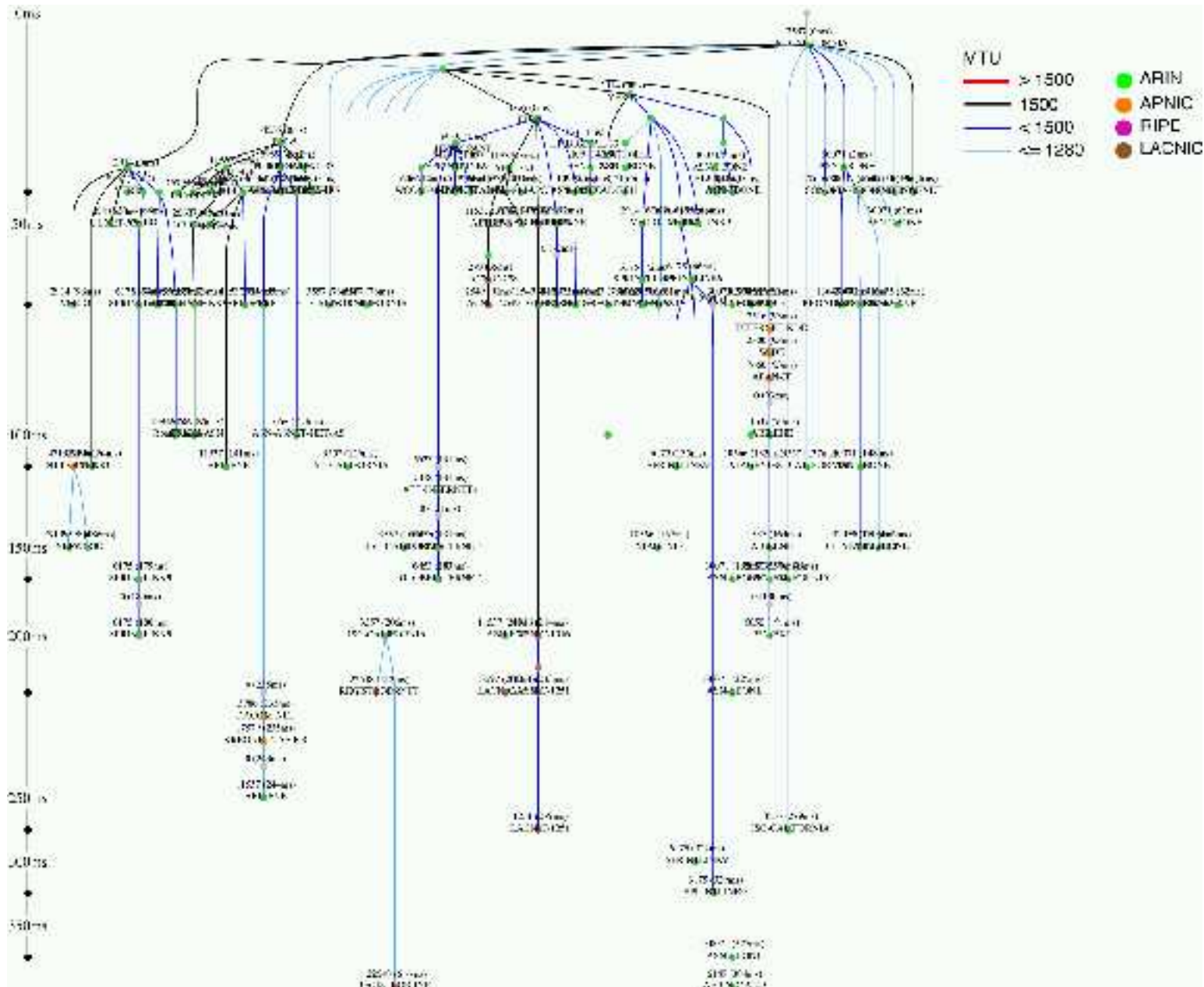◦ IPv6 AS graph is much sparser, less US-centric
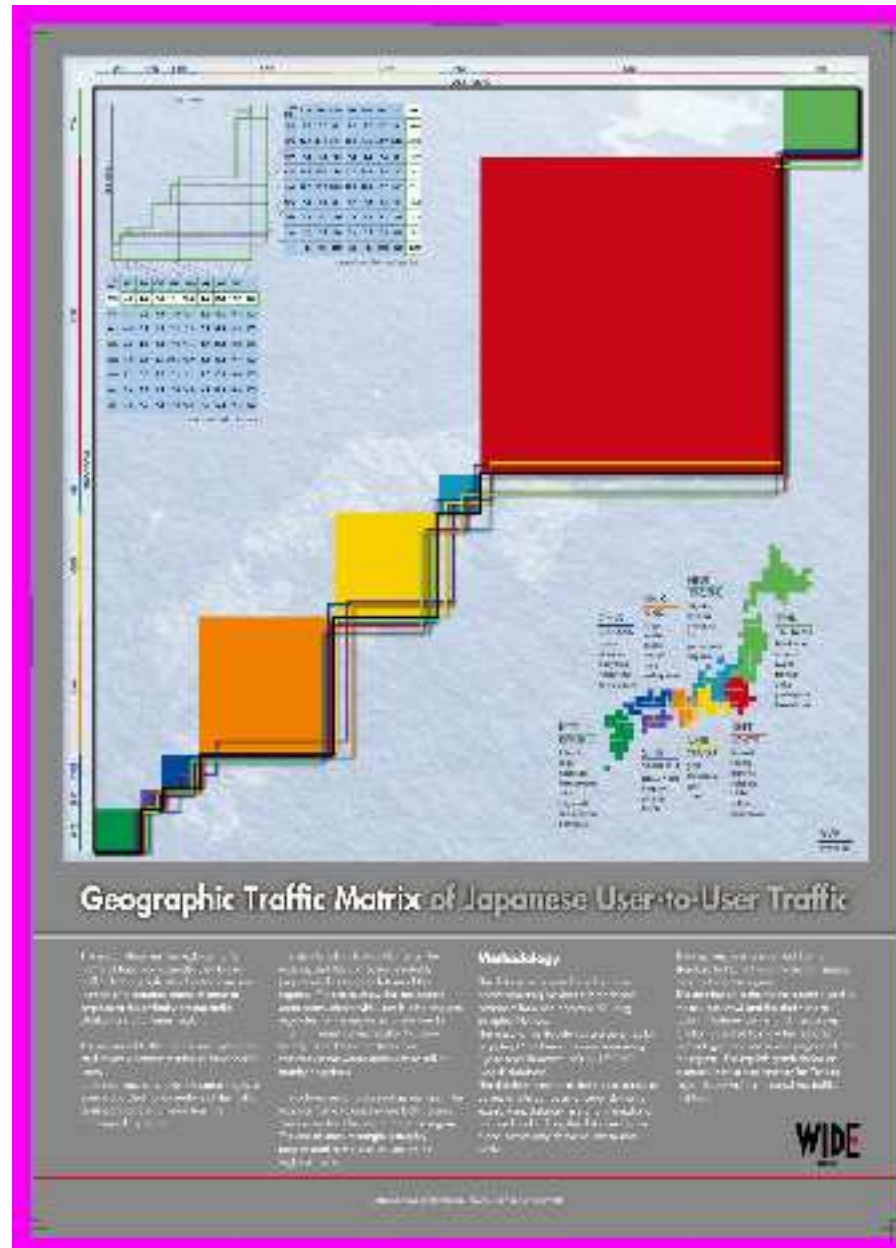
cuttlefish: geographic animation tool

○ japanese residential user traffic
  - from a commercial ISP

PMTU visualization

geographic traffic matrix poster

Geographic Traffic Matrix of Japanese User-to-User Traffic

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