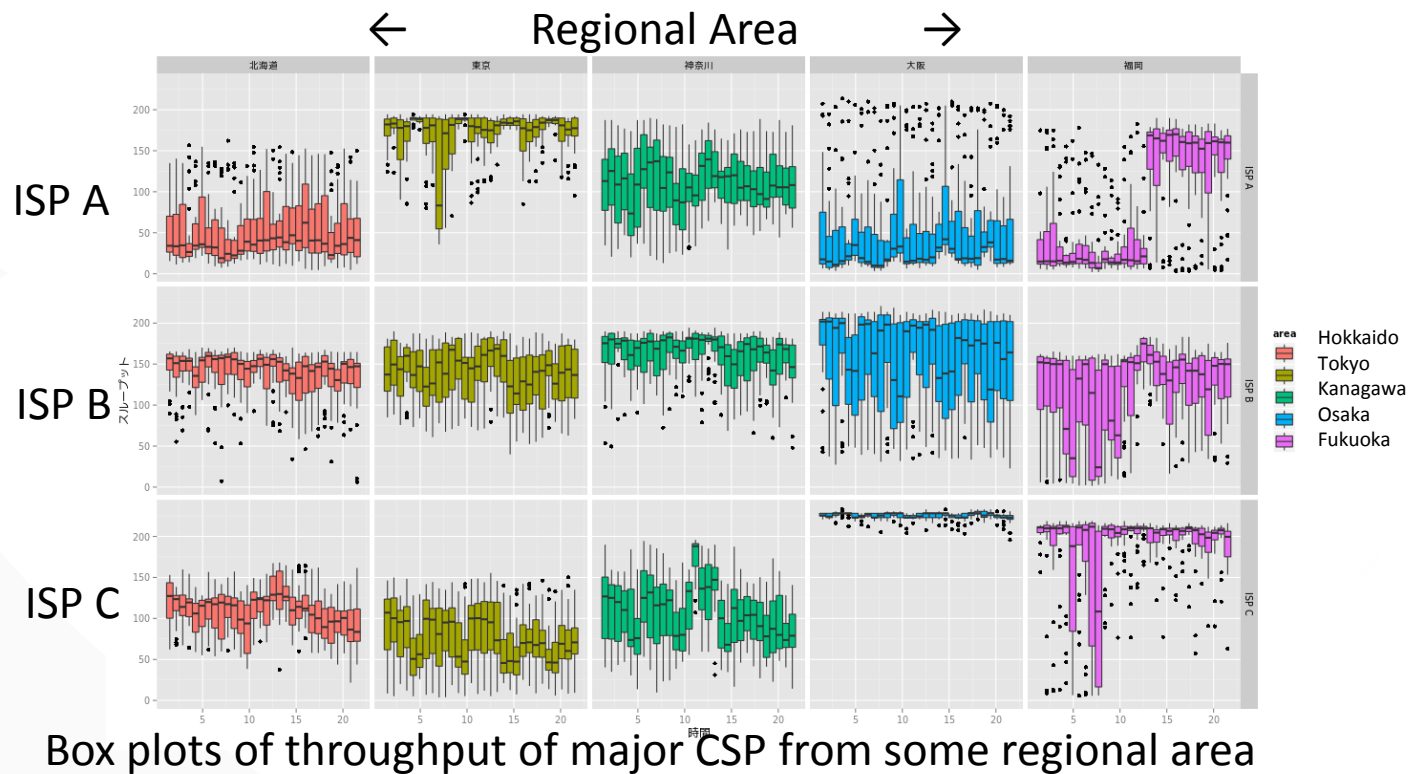


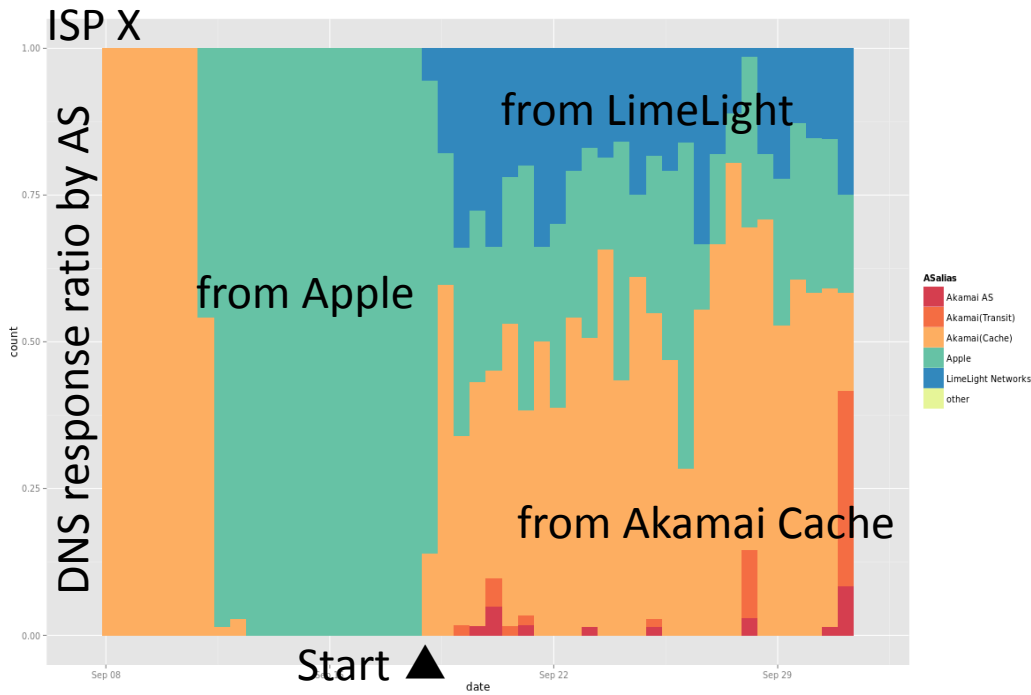
# Internet Structural Analysis by End-to-End Measurement

- Motivation and Research Interest
  - Focused on structural analysis of the Internet mainly using by end-to-end active measurement.
  - Our target is Improving customer satisfaction, Designing networks, and Planning business strategies, as a global Tier 1 carrier and a largest Japanese ISP operator.
  - Recently the large ISPs traffic share is decreasing, though they could gather many data from internal equipment.
  - In order to analyze structure of the Internet, we need end-to-end measurement.
- Measurement system
  - Setting over 150 active probes connected with residential FTTH access.
  - Measuring ICMP RTT, traceroute, DNS lookup and http contents throughput to some contents service providers, from the viewpoint of end-user.
- CDN analysis
  - Observed two big events, iOS8 and Windows10 distribution, the results are in following slides.
- Discussion
  - Passive and Internal equipment data is easy to collect but observation area is limited, and active measurement is easy to expand observation but difficult to planning.
  - We should share end-to-end measurement results and collaborative analysis to know the Internet and sound development of it.
  - Our proposal of measurement system is applied to IETF LMAP WG [\*].

# Measurement system

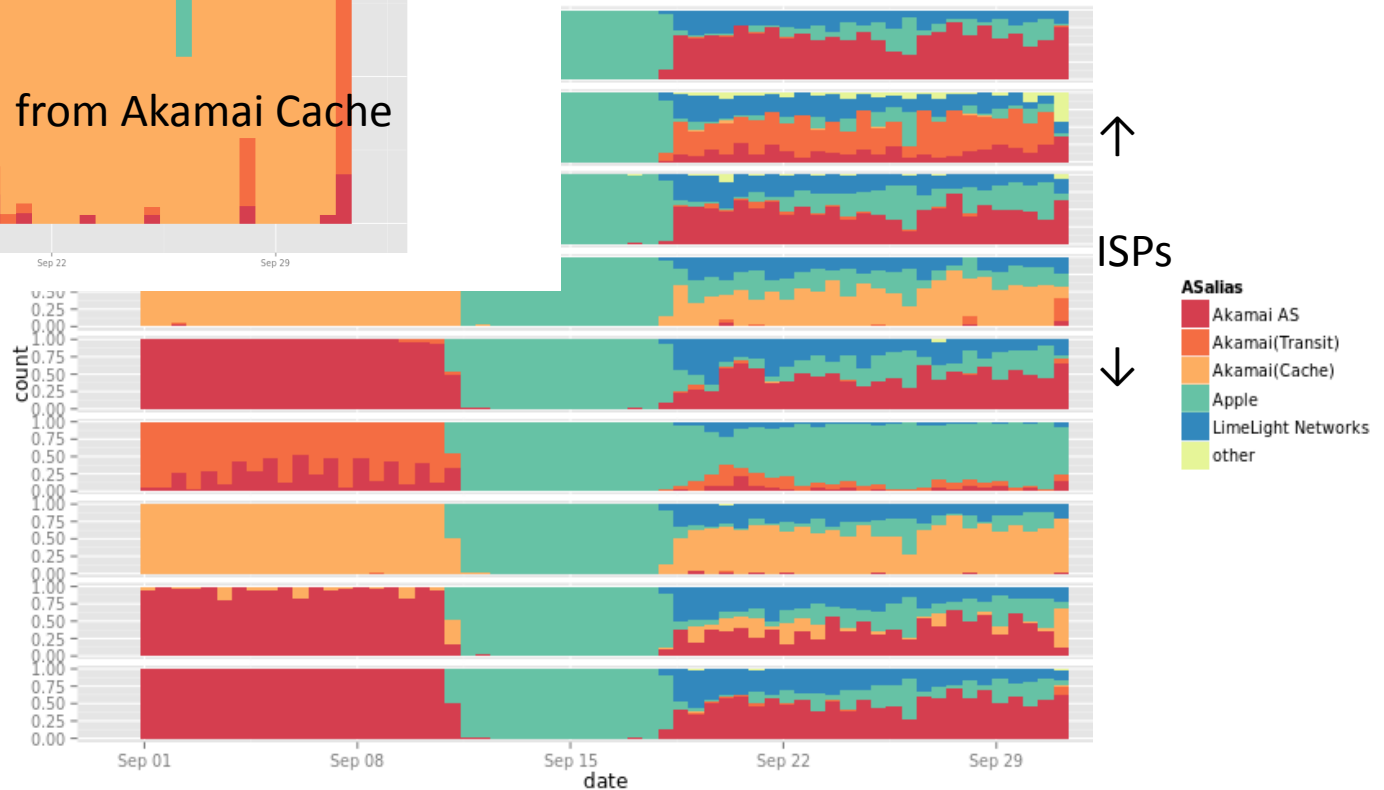


# CDN analysis (iOS8 update : 2014/09)

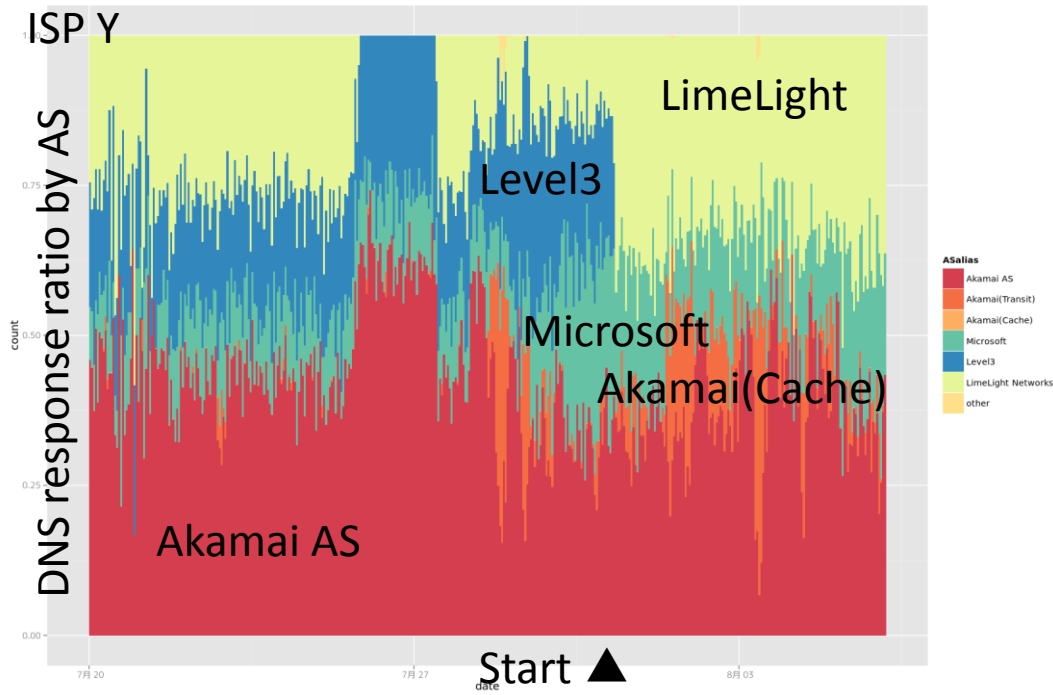


DNS response analysis from 9 ISPs

iOS8 may mainly from apple AS and Some traffics are offloaded to CDNs.



# CDN analysis (Windows10: 2015/08)



DNS response analysis from 10 ISPs

Win10 may distributed from two CDNs.  
Microsoft traffic is very small.

Some ISPs Akamai cache are not used.  
Level3 may not used for Win10.

