sync’ed clients and traffic trends

Matsuzaki ‘maz’ Yoshinobu
<maz@iij.ad.jp>
traffic and network design

• we plan upgrading based on traffic trend
  – to avoid congestions
network design #1

• over-subscription
  – only some of users uses the network at once
  – expecting statistical multiplexing effect
  – need to estimate utilization to avoid congestion
network design #2

• over-provisioning
  – provide more bandwidth than needed
backbone network design

• based on over-subscription
  – we can expect more statistical multiplexing effect
  – cost effective
• over-provisioning to its utilization
  – for redundancy
  – low latency
typical traffic

• enterprises
• consumers
• CDN
• IX
• mobile
enterprise
enterprise weekday
consumer (broadband)
consumer weekday
consumer weekend
CDN (contents distribution network)
CDN weekday
CDN weekend
IX (Internet Exchange)
IX weekday
IX weekend
mobile
mobile weekday
mobile weekend
traffic trend

• we can upgrade based on that
  – important!
• know your customer
  – how they are using network
traffic concentration

• it sometimes happens
• ‘statistical multiplexing effect’ is reduced
how to deal with concentrations

• upgrade
  – more bandwidth
  – cost +

• wait and see
  – congestion
  – customer experience -

• something else
  – ??
new year greetings

• January 1st 00:00-02:00
  – phone call
  – SMS
  – e-mail
  – SNS

• about 7 times more messages than usual

• mobile operators have asked users to avoid such messages during the peak time
software/data distribution

- Windows Update
- iOS/MacOS Update
- game update
- karaoke update

- several giga byte data
- at the same time
- many clients
iOS8

- it seems Apple introduced some kinds of queuing mechanism

![Graph showing data related to iOS8 distribution](image-url)
mobile device

• people bring it always
  – they can use it anytime

• it changed traffic pattern
  – commuting and lunch time

• commuting is a challenge for mobile in Tokyo
  – about 3000 persons per train
  – 47 trains per hour
  – somehow you need to do handover 😞
mobile devices and alarm clock

• clock on mobile devices is well synced
  – you can use mobile as a clock
• mobile devices ‘sleep’ to reduce battery usage
  – and once wakeup, it starts to communicate

• mobile operators see high traffic peek at
  – 6:30, 7:00, 7:30....
  – very short period traffic
summary

• ‘Statistical multiplexing effect’ is a key of backbone network design
• There could be concentrations because of social and technical reasons
• Network operators should give feedback
  – to users, CDNs and application developers
  – to avoid concentrations where possible