Which factors affect access network performance?

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Motivation

- DSL and cable are wide-spread
  - But, we know little about these networks

- End-users
  - Which ISP should I pick? Which SLA?
  - Does my performance matches my SLA?

- Designers of networked applications/services
  - How to avoid paths with simultaneous degradation?

- Data to answer these questions is hard to get

French residential access and

grenouille.com
la météo du net depuis 2000

- Clients run at home computers

  - Pings

  - FTP download/upload

  - Metadata: ISP, SLA, and city

- Server reports "weather conditions" of each ISP

Orange

Free

rest of Internet

Neuf

Numericable
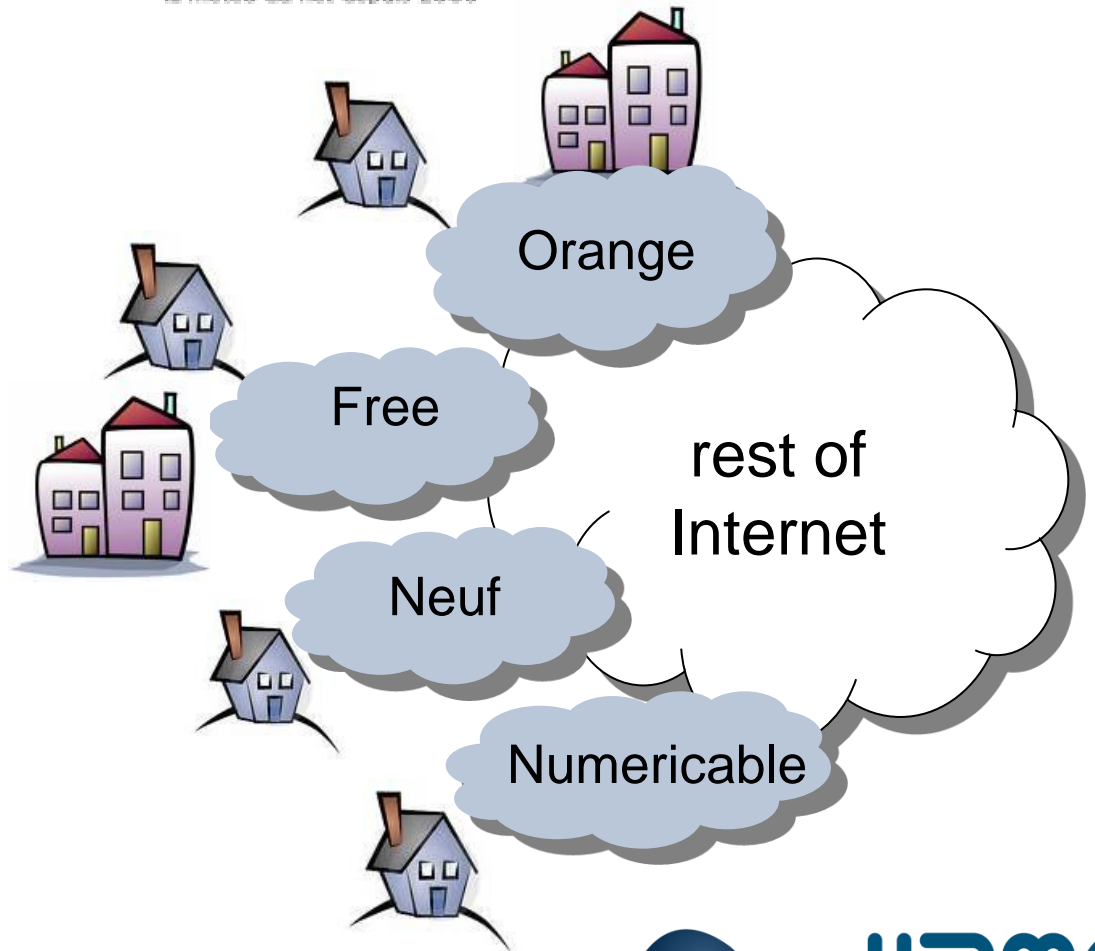
The grenouille data represents a unique opportunity

- Measurements taken directly from the home

- Measurements contain metadata from users
  - ISP, SLA, city

- Large dataset
  - 4.5 months of data from Jan. to June 2009
  - 7,149 unique users
  - All big cities and ISPs in France

But, there are some catches

- **Measurements from clients are not continuous**
  - Only measure when users are online

- **Measurements are coarse**
  - Measurements every 30 minutes
  - Average of 10 pings

- **Limited set of measurements**
  - Can only use FTP/ping

- **Clients measure one or two hosts only**
  - Single destination host for all pings and FTP uploads
  - Each ISP has a destination host for FTP download

A new grenouille

- New client
  - Modular, easy to plug in new measurements
  - More control over destination list

- Collaborative grenouille
  - Clients can't communicate directly
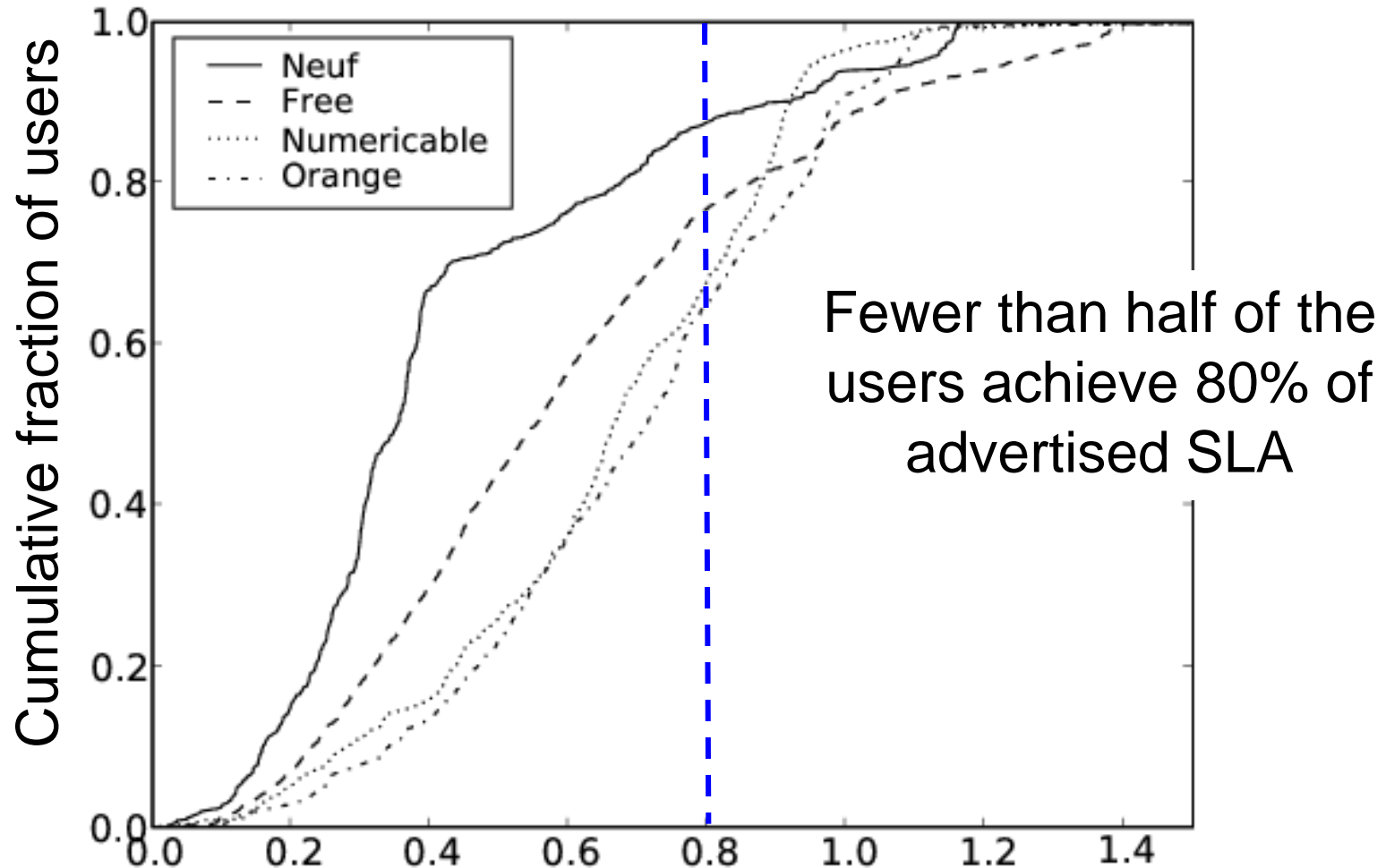 - Server coordinates measurements from clients

http://cmon.grenouille.com

Studied questions

- Does performance match the SLA?

- Which factors affect user performance?

- How does performance correlate across time?

Does performance match SLA?

Fewer than half of the users achieve 80% of advertised SLA

95th percentile of download speeds / advertised SLA

Does performance match SLA?

Cumulative fraction of users

- Neuf
- - Free
- Numericable
- Orange

95th percentile of download speeds / advertised SLA
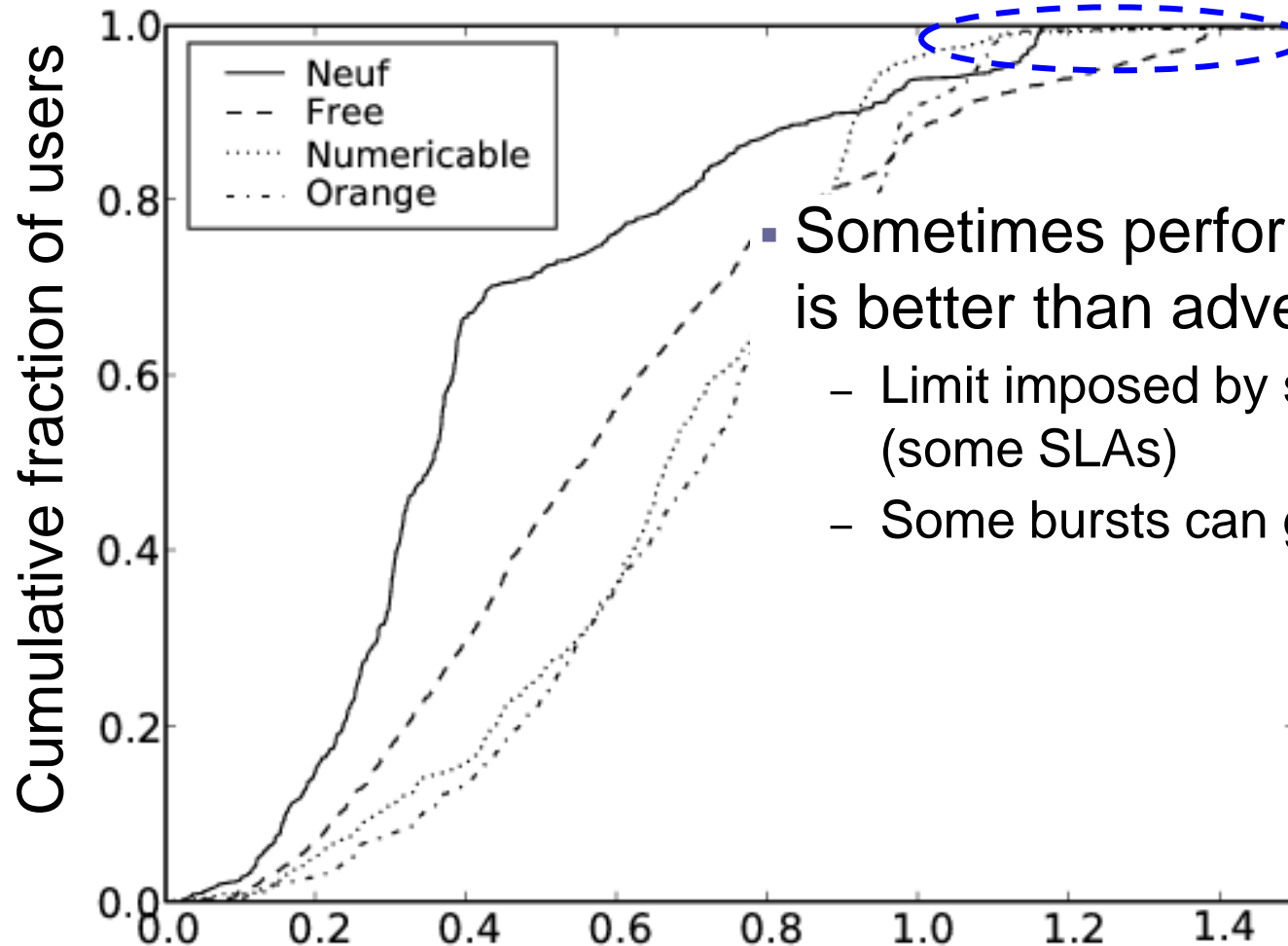
- Sometimes performance is better than advertised
  – Limit imposed by shaping (some SLAs)
  – Some bursts can go higher

Other observations

- Uploads are more consistent than downloads
  - Performance is closer to advertised SLA
  - Advertised upload capacities are lower
    - Between 128 kbps and 2 Mbps

- Ability to match SLA depends on the SLA
  - Lower rates are easier to match