Mark Claypool’s MQP Projects

Network Games

Streaming Media

http://www.cs.wpi.edu/~claypool

Latency and Games

• Latency affects how players experience online gameplay
• Latency compensation techniques to mitigate latency → how effective?
• Goal: Test effects of latency on gameplay and visual
• Methodology:
  – build/mod game
  – design game maps
  – run user studies
  – analyze data

Games on Thin Clients

• Server streams game to lightweight (“thin”) client
  – Mobile phone, PDA, Sony PSP (remote play)
  – OnLive, Gaikai (Sony PS4)
• What is the network turbulence? Best way to use bandwidth with low latency?
• Goal: Measure thin client performance for games, propose improvements, implement and evaluate
• Methodology:
  – Determine “streaming” game environment
  – Performance evaluation of thin clients (OnLive, Sony, RDP, X, VNC …)
  – Run experiments
  – Feedback to drive innovation

Twitch TV

• Traditional video on demand (e.g., YouTube) – pre-recorded, on server, with camera
• New phenomena is game video (e.g., Twitch) – live, on clients, screen capture of game
• Differences? Encoding, length, compression …
• Build tool and run experiments!
  – Done a Media Tracker and Real Tracker, now TwitchTracker
• Methodology:
  – Understand twitch player/site
  – Write app to crawl and analyze content
  – Run experiments to evaluate performance
League Crawling

- League of Legends popular MOBA game
- Matchmaking challenge — Skill (ELO), team comp
- Effects of latency on game
- Effects of team-champ on game
- Difference in Regions/servers

Methodology
- Previous work built crawler
- Examine data set → new results
- (Re-)build crawler → new data

HTTP Streaming Tracker

- Video streaming is becoming HTTP streaming
  — YouTube over HTTP ~15% of the Internet’s global traffic
  — Apple HTTP Live Streaming (HLS)
  — Microsoft Silverlight Smooth Streaming
- Performance of commercial HTTP streaming video?
  — Largely unknown, but important to design better networks
- Build tool and run experiments!
  — Done a Media Tracker and Real Tracker, now HTTP Streaming Tracker

Methodology:
- Understand media players (e.g. YouTube API, Javascript)
- Write wrapper to control/instrument application
- Run experiments to evaluate performance

Mobile Network Measurements

- New networks deployed promising greatness
- Actual performance largely marketing
  — What does computer science say about performance?
- Goal: Measure performance for existing 4G network through experiments

Methodology:
- Setup end host (network card)
- Develop measurement software (e.g. bandwidth estimation)
- Design experiments (location, parameters)
- Run and analyze → apply to applications

Video Buffer Sizing

- Client side buffer critical for streaming video
  — Avoid dreaded “rebuffering”
- But how is buffer size chosen?
  — Unknown! But evidence suggests poor (e.g., fixed size)
- We have: method to determine optimal buffer size
  — Includes heuristic to approximate optimal
- Goal: Measure existing buffering, compare to optimal

Methodology:
- Setup testbed
- Design and Run experiments
- Analyze data

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Questions?

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