Mark Claypool's MQP Projects

Network Games

Streaming Media

Silicon Valley

Silicon Valley Project Center

- C-term (winter in California!)
- Housing costs covered
- *Sponsored* projects

endicia

Qt

Juniper

NVIDIA

SHAPE SECURITY
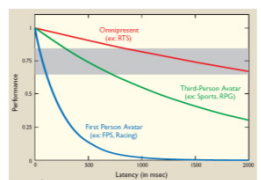
http://www.wpi.edu/+globalportal
Click on "Browse Programs" and
search for "Silicon Valley"

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

MQP Projects
3

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 (Grid, Sony, RDP, X, VNC …)
  - Run experiments
  - Feedback to drive innovation

Co-advisor: Prof. Finkel
4

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

MQP Projects

Mobile Network Measurements

- New networks deployed promising greatness

  verizon wireless 4G   versus   at&t 4G

- 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)
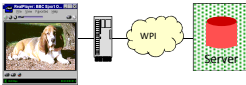 - Run and analyze → apply to applications

MQP Projects

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

MQP Projects   9

Questions?

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

claypool@cs.wpi.edu