Introduction

- Massively Multiplayer Games (MMPGs) are becoming more and more popular
  - Final Fantasy XI - 500,000+ subscribers
  - Sony’s Everquest - 450,000 subscribers
  - Lineage (famous Asian MMPG) claims to have 4,000,000 subscribers
- At peak times, tens of thousands of players are online
- No server can support all players simultaneously → Players are distributed over “shards”

Motivation

- Bringing all players together in a single game instance, allowing them to share the experience
- Providing an infrastructure that puts no limits on the number of players
  - Client/Server won’t do – costs increase with growing number of players
  - Gamers tend to have powerful PCs

Issues Involved

- Data Dissemination
  - Game state has to be distributed to all players
  - Usually based on player’s location and his perception
  - Minimize bandwidth requirements
- Synchronization
  - Players want to have a consistent view of game state
  - Network latency induces delays (“lag”)
  - Latency compensation techniques needed, e.g. dead reckoning
- Availability
  - Players pay a monthly fee and may play as much as they want
  - Server downtimes are a major annoyance to players → They prevent them from getting what they paid for
- Persistence
  - Most games are based on developing a virtual character (“Avatar”)
  - All achievements and possessions of an avatar must be saved to persistent storage on a regular base
  - Players loosing hours or even days of “work” because of data loss will likely cancel their subscriptions

The way to go…

- Building a framework for scalable peer-to-peer MMPG infrastructures
  - Imposes many challenges in a fully distributed environment, e.g.
    - Utilize clients’ resources by distributing load among players
- Detecting cheaters is difficult due to lack of a central game state authority
- Apply group’s experience to tackle some of these challenges

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