Event processing for large-scale distributed games

Motivation

- Peer-to-peer architecture
  - Ad-hoc instantiation
  - Distributed games state
  - Low-latency communication required
    - Exchange of all state information that affects the player and its focus
- Main challenges
  - Responsiveness: Equal relative latency for all players
  - Consistency: Equal view for all players
  - Efficiency: Bandwidth consumption, computation of situations
- Solution’s required properties
  - Scalable for Massively Multiplayer Online Game
  - Capable of the responsiveness-consistency trade-off despite dynamic behaviour

Approach

- Use of two communication services
  - Content-based event communication and complex situation detection
  - Multicast: efficient game state communication between close objects

System model

- Peer-to-Peer game Planet π

Demonstration Scenario

- Efficiency by introducing game semantics in services
- Employed semantics: area of interest (AOI)

Cordies

- Distributed in-network detection of situations (movement, meet, depart), thus reducing bandwidth consumption
- Distributed CORDIES instances detect situations occurring in separate AOIs, thus ensuring scalability

EONSON

- Overlay topology is dynamically restructured to reflect the inclusion relationship between the AOIs of game instances
- Ensures that only the peers interested in an area participate in forwarding and filtering the corresponding events

Additional contributions

- QoS:
  - Event communication to fulfill latency requirements, individual bandwidth restrictions
  - Correlation detection to measure confidence in detected situations
- Security:
  - Authentication, authorization and weak confidentiality for content-based publish/subscribe

References

- Cordies — Gerald G. Koch et al.: Cordies: Expressive event correlation in distributed systems (DEBS’10)
- EONSON — M. Adnan Tariq et al.: Dynamic publish/subscribe to meet subscriber-defined delay and bandwidth constraints (Euro-Par’10 – to appear)
- Planet π — Tonio Triebel et al.: Peer-to-peer voice communication for massively multiplayer online games (CCNC’09)