

Aspects of Networking in Multiplayer Computer Games

This article appeared in the journal The Electronic Library in 2002. The Electronic Library is published by Emerald, on their website they mention that the journal is ranked by Thomson Reuters (ISI). I wasn't able to find the acceptance rate for The Electronic Library.

This article attempts to explain some of the problems posed by distributed real-time Multiplayer Computer Games (MCG). The paper looks at four aspects affecting networking in MCGs: Networking resources, distribution concepts (I find that title a bit misleading, I was almost expecting them to talk about how games are distributed to users), scalability and security.

For networking resources the authors describe what each networking resource component is and how it affects performance. The three parts they describe are bandwidth, latency and computational power. All of this should be well known to most engineers with some knowledge of networking, they do mention a few interesting points though; like how different types of games can achieve acceptable performance with different levels of delay (ex: 500ms for RTS, 100ms for FPS) and how computational power can be a critical factor (that I would think some people tend to forget).

For distribution concepts they divide the talk about communication architectures (P2P, client/server and server/network). data and control architectures and compensatory techniques (architectures that aim at reducing resource needs). Then they look at scalability, and finally security (packet and traffic tampering, information exposure and design defects).

I found it a bit difficult to write a summary of this paper since I don't feel like I got a lot out of it. It gives a basic summary of some of the difficult aspects of MCG, but never really goes in depth into anything (which I guess is the point of the article, but still). In the start of the article I feel that they go a bit acronym crazy (CSCW, VR, CVE, DIS, DVE, and of course MCG), I also feel like they didn't give a clear definition of what they mean by MCG. In the abstract they mention that they are going to look at distributed real-time MCGs, I would have liked to see more discussion of the distributed nature of these games.

Even though the security chapter was the one I found most interesting, I feel like they missed a few things; they should have mentioned cheating with glitches (like the classic bunny-hop glitch from CS and the Javelin glitch from Modern Warfare).

A Traffic Characterization of Popular On-Line Games

This article was published in IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 13, NO. 3, JUNE 2005. I was not able to find the acceptance rate for this journal, but I assume it is fairly low given the well regarded publisher.

The article analyses a trace of networking data from a Counter-Strike server, the authors did a week long trace of a popular server. The article starts off with some background on online video games, specifically they discuss the size of the Counter-Strike player-base. The rest of the paper is basically a topic by topic walkthrough of what they found in the trace. The main findings are that traffic from video games are predictable, small incoming packets to the server (typically under 56kbps which is the LCD), larger outgoing packets, lots of packets that arrive in a predictable manner. The authors also analyze the players connected to the server, they find that about 50% are from the US, while the rest are from Europe and Asia. They also look at what time of day players from different regions are connected.

They finish of the article with an analyses of traces of other popular FPS games, and finally a discussion of the good and bad sides of this type of highly regular small packet but many packet traffic for the internet backbone designers.

The authors do a good job of looking at many aspects of the traffic trace, but I think they go a bit over board with the use of graphs, many of them convey very little information. Besides that I think the paper does a good job of analyzing online video game traffic.