B5 - Advanced C++

B-CPP-500

Advanced R-Type

Annexes to the project

Annexes

Further readings on Games and Networking

Networking development in video games is a really vast topic. Here is a few links toward interesting resources available on the Internet:

- A curated list of well-done articles, talks, libraries and tools on this topic:
  - Game Networking Resources
- For a nice introduction to the Client/Server model in multiplayer games:
  - Fast-Paced Multiplayer (Part I): Client-Server Game Architecture

The article then goes on to more advanced topics in Part II and following, such as *Client Side Prediction*, *Entity Interpolation*, *Lag Compensation*, etc. This is a very interesting and recommended reading.

- An explanation of key differences between TCP and UDP:
  - On UDP vs. TCP
- A small online application allowing to better understand the issue of network latency (client A, server, client B have different views of the world at time T):
  - `http://ernestwong.nz/crystalorb/demo/`

For the curious, here is some articles about how things are implemented in well-known multiplayer FPS games (they are all based on the Client/Authoritative Server model too):

- Quake 3
- Valorant
- Overwatch

Tools to simulate degraded network conditions

Here is some useful tools to evaluate the behavior of programs under degraded network conditions (simulate lag, packet losses, duplication, reordering, low bandwidth, throttling, etc.):

- on Windows: clumsy
- on Linux: netem

Be sure to test your game under degraded network conditions. You might want to test what is the behavior of your game with the following configurations:

- A 2% packet drop or duplication ?
- A latency > 150ms ?
- A very low bandwidth, such as 5KB/sec ?