Lab 9

The following will have topics on networking in video games. The topics will discuss issues and corresponding solutions to those issues.

Server Hosting

In a video game that will have multiplayer, the development team will need to have a network architecture that will support the multiplayer. There are two popular network architectures. peer to peer (P2P) and client to server. The challenge that the development team will have is to decide which of these architectures the development team will use for their game.

Peer to peer embodies the idea that data is exchanged between any pair of connected players. Some advantages of a P2P network is that it is very easy to maintain and doesn't require any specialists to manage the network because the architecture does not depend on a single machine to handle clients. Another advantage would be that it is not expensive to set up, as it doesn't require a machine to set up the network. A disadvantage of P2P is that it is not very secure therefore leading to situations where hackers would have an easier job to hack/cheat in games.

Client to server embodies the idea that all clients connect to the server and the server will update the clients with the necessary information that is required. Some advantages of a client to server is that it is a lot more secure, as the development team will have control over the server, so they can control the intake of clients in their game. This will make it easier to stop hackers/cheaters in a game. One disadvantage of a client to server would be that it's rather expensive to set up, as you need the machinery and development time to set up the server so that the clients can connect to your game.

In my personal opinion I would go with the client to server network architecture. The reason for this is because it is the most used architecture in the video game industry and it also allows a lot more control on how your network will behave in your game.

Network Protocol

There are two network protocols used commonly in games TCP (Transmission Control Protocol) and UDP (User Datagram Protocol) that are used in multiplayer games. The challenge for the development team will be to choose which protocol will best suit their game, that won't have impacts on performance on the client side.

TCP is a protocol that guarantees that the data will arrive at it's designated coordinates. This is done by having in-built checks for errors in the TCP packet. These in-built features are useful, but they bring a rather large overhead. If you can imagine a massive multiplayer game that has millions of concurrent players. Sending a TCP packet with this overhead will cause minor to major slowdown on the client and server side.

UDP is a much simpler protocol that is connectionless (by that I mean that UDP packets will be sent out to everybody no matter if they are online or not). This protocol has little to no information in the packet header, so therefore will reduce the overhead that TCP has. Because of this UDP is used commonly to update real-time communications between all clients.

The protocol I would suggest to use is the UDP protocol, as the UDP protocol will not increase overhead as much as the TCP protocol, where there is a massive intake of players in your video game.

Conclusion

In conclusion I would suggest using UDP and the client to server architecture. The reason why I would suggest using UDP is because UDP can be scalable with the video game you are making. If the game you are making is a massive multiplayer game (mmo), the less overhead you use on your network protocol the less stress you put into your server and client.
The reason why I would suggest using the client to server architecture, is because it allows a lot more control on how you want to set up your network for your game. This will allow the developers to easier maintain the network, as the game gets bigger and changes in terms of player intake. Also the client and server architecture will allow them to reinforce their server, so it’s a lot harder for hackers and cheaters to hack the server or cheat in the game, which will have a bad impact on the enjoyment of the game for the clients.