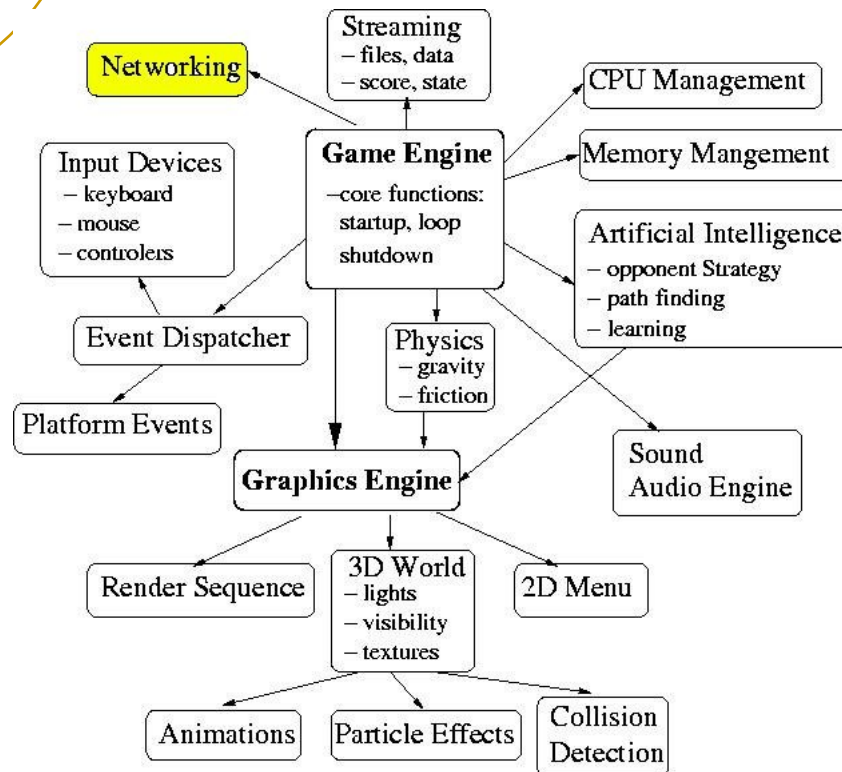


Unity Networking

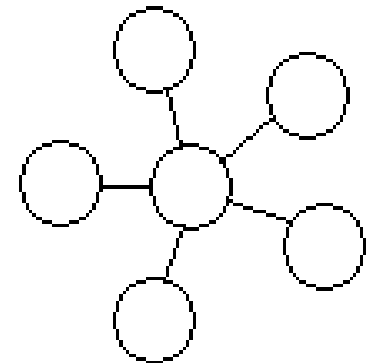


Game Networking



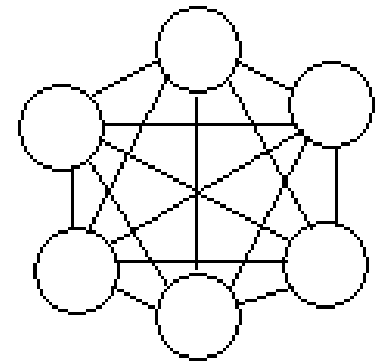
Game Networking Topology

- Star (client/server) Topology
 - All devices are connected to a central hub (server)
 - Nodes communicate across the network by passing data through the hub



Game Networking Topology

- Mesh (peer to peer) Topology
 - every node has a connection to every other node in the network.
 - provides faster communication
 - burden on clients to enforce application rules
 - minimize size of messages



Game Networking Data

- What is communicated across networks?
 - player locations
 - player states
 - player orientation
 - voice communications
- Note: send the minimum amount of data necessary
 - minimize data type sizes (bytes are nice)

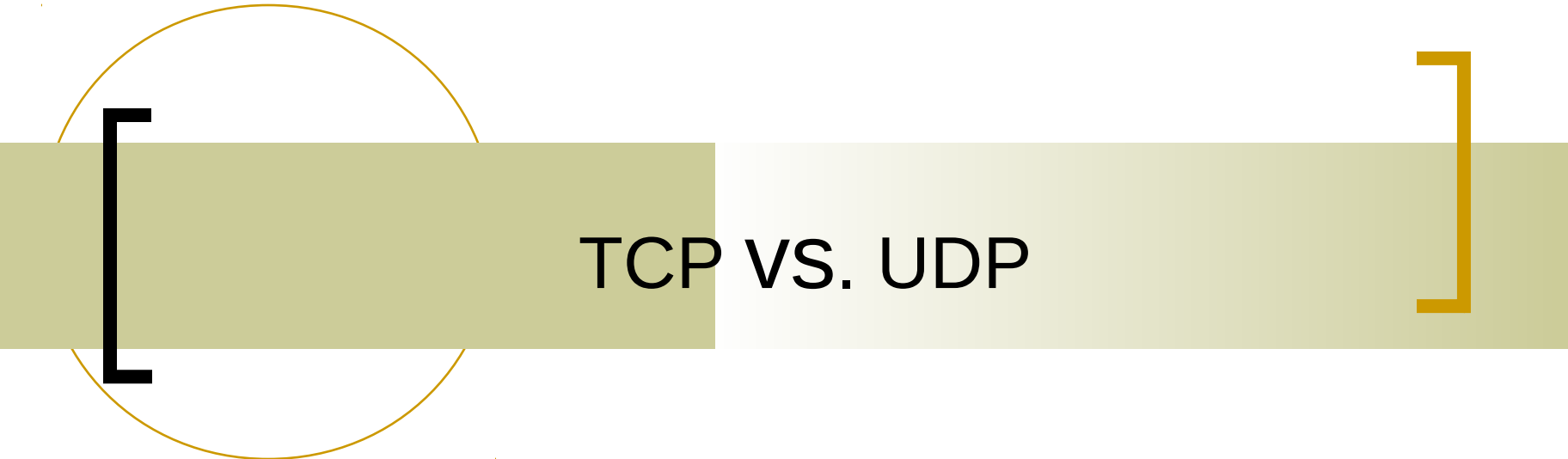
Game Networking

- Networked games must be:
 - fast
 - reliable
- Which should be used (client/server or peer-to-peer) for MMOs?
 - it depends, but mostly client/server
- Architectures in use:
 - pure client/server
 - pure peer to peer
 - hybrid client/server & peer to peer



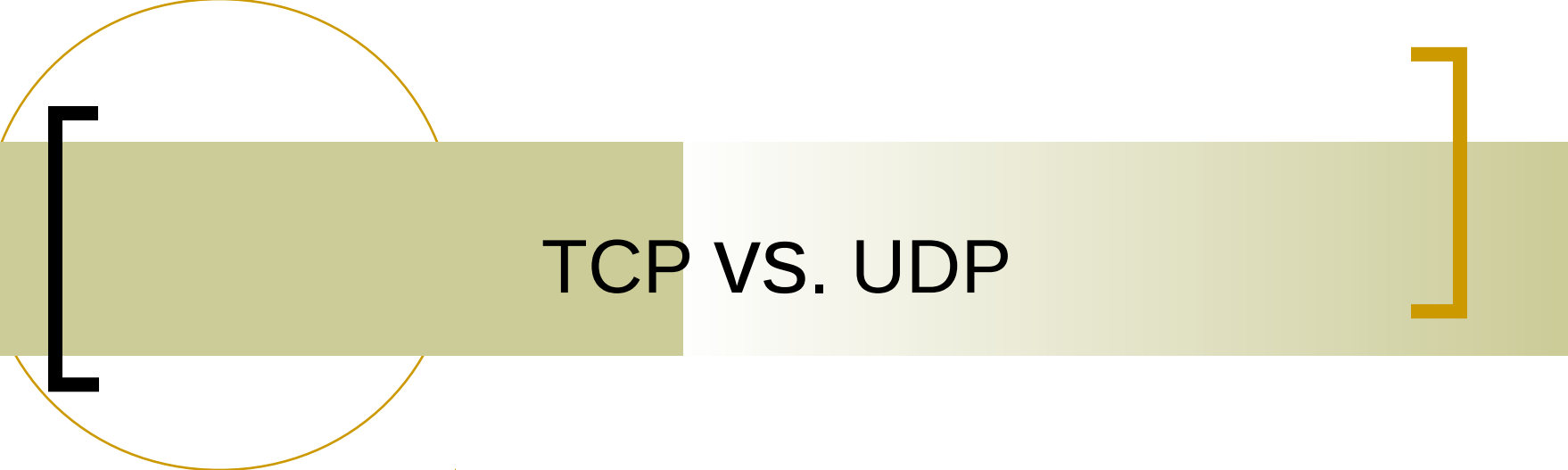
Game Networking

- Latency
 - a difficult issue in multiplayer games
 - How do you handle communication delays?
 - Where is the delay?
 - ➔ lag is commonly due to overloaded networks



TCP VS. UDP

- What UDP (User Datagram Protocol) gives you:
 - unreliable delivery
 - no retransmission, packets not ACKnowledged, no reordering
 - no congestion control
 - speed & low overhead (good for streaming audio/video)



TCP VS. UDP

- Both transport layer protocols on top of IP.
 - TCP is lossless.
 - What TCP (Transmission Control Protocol) gives you:
 - reliable delivery
 - retransmission and reordering
 - congestion control

TCP VS. UDP

- Some game data can be *interpolated*.
 - if packet is lost, the game can continue.
- Some game data must be guaranteed to be received.
 - some things can't and shouldn't be interpolated.
- Understand TCP is slower, but safer.
- Both are used, both have virtues, both have drawbacks.
- Programmers are always looking for UDP opportunities.
- Alternative: use a “Reliable UDP” and use for certain types of info sent.

Unity Network Info

- Unity Networking
- Other Resources
- More
- Unity Network Classes
- Unity Network Server
- SmartFox
- SmartFox Tutorial
- Google “unity 3d smartfox examples”