

KEY IN-CLASS STUDENT ACTIVITY 2.3: WORK WITH THE NETWORK

Lesson Objective 2.3:

Work with the network. *Topics:* TCP and UDP.

Resources, software, and additional files needed for this lesson:

1. Internet access

Guiding questions:

1. **Describe how web services are created in Microsoft Visual Studio®.** Open Visual Studio and select File, Create New Project. Select WCF as Project Type, WCF Library Services to get started.
2. **How can the designer plan for geographic areas that do not have Internet access?** The designer can use a local network and a *PacketReader*.
3. **What types of games typically use TCP and UDP?** Multiplayer action games played in real time typically use UDP because the data is transferred much faster. Single-player games, or multiplayer games in which the users take turns, typically use TCP.

Student Activity:

Scenario:

Directions to the student:

1. Read the scenario.
2. Read the article: UDP vs. TCP: <http://gafferongames.com/networking-for-game-programmers/udp-vs-tcp/>
3. Follow the Think-Pair-Share discussion model:
 - a. **Think:** Respond to the first question without consulting anyone else in class.
 - b. **Pair:** Discuss your answer with a partner. Change or add to your response, then work together to come up with additional ideas.
 - c. **Share:** Each pair shares their thoughts with the class. Discuss interesting answers or answers you disagree with.
4. After this discussion, look over your response. Add good examples from other groups. Repeat this process for each discussion question.

Scenario:

Michael Allen has just graduated from the Graphic Design Institute with a degree in game design. He has been searching for a job and has his first interview scheduled with a prominent game design company. The company wants to hire only employees with a fundamental knowledge of networking as it relates to game design. Michael knows he is not ready for the interview but had found several online resources that will help him prepare.

Content:

1. For the following online/networked games, state whether UDP or TCP is the more likely transmission choice based upon what you have learned about data transmission. Explain your reasons for each choice.

a. Multiplayer football game	UDP
b. Gears of War (multiplayer)	UDP
c. Checkers	TCP
d. Halo®: Reach (multiplayer)	UDP
e. Single-player arcade game	TCP
f. FIFA Soccer 12	UDP
g. Backgammon	TCP
h. Microsoft Flight Simulator (multiplayer)	UDP
i. Tic-tac-toe	TCP
j. MMORPG	UDP
k. Chess	TCP
l. Zoo Tycoon 2	UDP
m. World of Warcraft	UDP
n. Lego Star Wars	TCP
o. Plants vs. Zombies	TCP

Reasons:

For any multiplayer game, UDP is the good option because the data is transferred faster and the game is not stalled while waiting for missing packets.

TCP is the better option when the scores and achievements are processed at the end of the game and the information is not necessary to continue game play, or when the game is a turn-based game and not real-time action.

2. Developers typically do not combine UDP and TCP when creating a networked game. Why?

TCP tends to induce packet loss in UDP packets. When combining the two network protocols, the server gets confused and actually takes more time to deliver the packets.

3. Why is UDP described as an “unreliable” protocol?

UDP converts data messages generated by an application into packets to be sent via Internet Protocol (IP), but it is “unreliable” because it does not establish a path between sender and receiver before transmitting and does not verify that messages have been delivered correctly.