

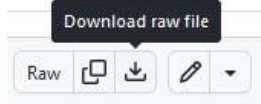
Dota 2 Low Latency DOCSIS Trial Instructions

Purpose

Dota 2, a free to play game, provides network statistics and the ability to enable/disable Low Latency DOCSIS from within the game client. For this trial, we would like to collect measurable network statistics for different scenarios while LLD is enabled and disabled.

Setup

1. Install the Steam application: <https://store.steampowered.com/>
2. Install Dota 2 from within the Steam app.
3. Once installed, in your Steam library list, right click on Dota 2 and select "Properties..."
 - Under "Launch Options", type the following: `-console -sw`
 - i. `-console` allows opening of the console window to enter game commands
 - ii. `-sw` allows the game to be run in a window instead of full screen. It also allows moving the mouse cursor outside of the game window to use other apps like Notepad and the iPerf traffic tool.
4. Download the iPerf traffic tool that will generate upstream traffic. Please download this version even if you have done so previously:
 - <https://github.com/jlivingood/IETF-L4S-Deployment/blob/main/iperf3-gui.zip>
 - Click the "Download Raw file" button to properly save the .zip file.



- Open the .zip file and place the iperf3-gui.exe somewhere you can find it again later.

Note: Currently only the Windows version of Dota 2 supports LLD

Run the game in windowed mode

To make switching out of the game to the iPerf tool easier, run the game in windowed mode.

1. In the Steam app, select Dota 2 in the game list and click Play.
2. After the game loads, click the cog icon in the upper left of the window.
3. Click Video at the top of the options window
4. Under "Display Mode" select "windowed"
5. Type Esc to exit the options

Configuring the Match Settings

1. Click the Play DOTA in the lower right of the game window.
2. Under Custom Lobbies, click +CREATE.
3. To the right of Lobby Settings, click EDIT.
4. Configure the settings as shown below:
5. Server location: Pick US West or US East based on your location.
6. Set lobby visibility to “unlisted” and set a lobby password to make sure other players do not bother you.
7. Click OK.

The screenshot shows the 'GENERAL LOBBY SETTINGS' window in Dota 2. The window is dark-themed with white text. At the top, it says 'GENERAL LOBBY SETTINGS'. Below this, there are three main sections: 'GAME NAME', 'GAME MODE', and 'LOBBY PASSWORD'. 'GAME NAME' has a text input field with 'My Game'. 'GAME MODE' is a dropdown menu set to 'ALL RANDOM'. 'LOBBY PASSWORD' is a text input field with a password icon. Below these, there are 'SERVER LOCATION' (dropdown set to 'US WEST') and 'LOBBY VISIBILITY' (dropdown set to 'UNLISTED'). To the right of these are checkboxes for 'HIDE PASSWORD', 'ENABLE CHEATS', and 'IMMORTAL DRAFT'. Below the 'LOBBY VISIBILITY' section is a section titled 'ADVANCED LOBBY SETTINGS' with a downward arrow. This section contains three columns of settings: 'COMPETITIVE' (with settings for Selection Priority, Starting Team, Penalty - Radiant, Penalty - Dire, and League), 'GAMEPLAY RULES' (with settings for Spectators, Dota TV Delay, Pausing, and Series Type), and 'BOT SETTINGS' (with a checkbox for 'Fill Empty Slots with Bots' and difficulty settings for Radiant and Dire). At the bottom right, there are 'OK' and 'CANCEL' buttons.

GENERAL LOBBY SETTINGS

GAME NAME: My Game

GAME MODE: ALL RANDOM

LOBBY PASSWORD: |

SERVER LOCATION: US WEST

LOBBY VISIBILITY: UNLISTED

☐ Hide Password

☐ ENABLE CHEATS

☐ IMMORTAL DRAFT ⓘ

▼ ADVANCED LOBBY SETTINGS

COMPETITIVE

SELECTION PRIORITY: MANUAL

STARTING TEAM: RANDOM

PENALTY - RADIANT: NO PENALTY

PENALTY - DIRE: NO PENALTY

LEAGUE: NONE

GAMEPLAY RULES

SPECTATORS: DISABLED

DOTA TV DELAY: 10 SECONDS

PAUSING: UNLIMITED

SERIES TYPE: NO SERIES

BOT SETTINGS

☒ FILL EMPTY SLOTS WITH BOTS

RADIANT DIFFICULTY: EASY

RADIANT BOTS: DEFAULT BOTS

DIRE DIFFICULTY: EASY

DIRE BOTS: DEFAULT BOTS

OK CANCEL

Running the Tests

There are five scenarios we would like you to gather stats for.

Test 1: Baseline – No Low Latency with No Background Traffic

1. Press \ to open the console window.
2. Enter this command to disable Low Latency: `net_option ecn -1`
3. Click “Start Game”
4. Click “Skip Ahead” to enter the match immediately. There is no need to play the match and you can idle by the fountain.
5. After 5 minutes, type these commands:
 - a. `clear` : clear the console window first.
 - b. `net_option ecn` : record low latency setting for the record
 - c. `net_connections_stats` : outputs the game session's network stats
6. Right click in the console window and select “Save to Log”
7. Save the file with the name: `dota1.txt`
8. Quit the match by clicking the up arrow in the top left of the game
9. Click “Disconnect” on the lower right of the main screen.
10. Click “Leave the Game”

Commented [RM1]: Should I 'leave game' at this point? (assume yes?)

Test 2: Upstream - No Low Latency with Background Traffic

1. Open the iPerf traffic generator tool and click the **Upload** button.
2. On the main Dota2 screen, press \ to open the console window if it is not already.
3. Enter this command to disable Low Latency: `net_option ecn -1`
4. Click “Play DOTA”
5. Click “Create”
6. Click “Start Game”
7. Click “Skip Ahead” on the left side of the screen to enter the match immediately. There is no need to play and you can idle by the fountain.
 - a. **Note:** You should be able to move the mouse out of the game window while the console window is *open*. If not, alt-tab will let you switch back and forth between windows.
8. In the iPerf tool window, click the Play button. It will run for 5 minutes and then stop.
9. Just before the 5 minute timer runs out in the iPerf tool, run these commands in the Dota2 console window:
 - a. `clear` : clear the console window first.
 - b. `net_option ecn` : record low latency setting for the record
 - c. `net_connections_stats` : outputs the game session's network stats
10. Right click in the console window and select “Save to Log.”
11. Save the file with the name: `dota2.txt`
12. Quit the match by clicking the up arrow in the top left of the game
13. Click “Disconnect” on the lower right of the main screen.
14. Click “Leave the Game”

Commented [RM2]: Should I 'leave game' at this point? (assume yes?)

Test 3: Upstream - Low Latency with Background Traffic

1. Open the iPerf traffic generator tool and click the **Upload** button.
2. On the main Dota2 screen, press \ to open the console window if it is not already.

3. Enter this command to disable Low Latency: `net_option ecn 1`
4. Click "Play DOTA"
5. Click "Create"
6. Click "Start Game"
7. Click "Skip Ahead" to enter the match immediately. There is no need to play and you can idle by the fountain.
 - a. **Note:** You should be able to move the mouse out of the game window while the console window is *open*. If not, alt-tab will let you switch back and forth between windows.
8. In the iPerf tool window, click the Play button. It will run for 5 minutes and then stop.
9. Just before the 5 minute timer runs out in the iPerf tool, run these commands in the console window:
 - a. `clear` : clear the console window first.
 - b. `net_option ecn` : record low latency setting for the record
 - c. `net_connections_stats` : outputs the game session's network stats
10. Right click in the console window and select "Save to Log."
11. Save the file with the name: `dota3.txt`
12. Quit the match by clicking the up arrow in the top left of the game
13. Click "Disconnect" on the lower right of the main screen.
14. Click "Leave the Game"

Commented [RM3]: Should I 'leave game' at this point? (assume yes?)

Tests 4 and 5: Downstream Tests with background traffic, with and without Low Latency

1. Repeat the steps for Tests 2 and 3 but click the **Download** button in the iPerf tool during step 1 for each test.
2. Please save the data files with the names `dota4.txt` and `dota5.txt`

More Data Is Welcome!

Running additional tests and choosing a Dota 2 server location furthest away, i.e., selecting US West if you are in Pennsylvania, will provide additional data points because of added latency. The geographic area can be selected under "Server Location" when you are configuring the match settings.

Send In Your Results

Please use this form to upload your notepad files with collected game statistics:

<https://app.smartsheet.com/b/form/b1b7c10f57fa4750b1d140452b74f3f6>

Thank you!