

# DSERVER NETWORK PERFORMANCE TEST REPORT

## 1. Dserver (DS) Network Issues

- 1.1. DS allows too much packet loss to a player. Tests have shown that even with lasting packet loss of 25% a player can connect to the server and fly. It only starts to throw the player out at the loss rate of 30 %. Every fourth packet with the information on your shooting and location does not reach the DS, and there is no penalty for that.

User =FB=TL wrote in our personal correspondence that the rate of packet loss depends on the settings of maxClientPing in sds. I checked that, but found out that it did not really influence the allowed packet loss. Therefore, we do not have the opportunity to configure allowed packet loss separately by ourselves.

(Tested in version 2.004)

- 1.2. The value displayed as PING on the website <http://online.il2forever.com> or supplied to RCON does not really look like PING it in its common meaning. It looks more like time of packet one way trip. Roughly, this value must be multiplied by 2.

To be more precise, the formula for calculating the ping is:  $(DSping - 10) * 2 = \text{real PING}$ . Where 10 is a standard delay of DS.

The server list in the game interface shows the real PING.

(Tested in version 2.005)

### 1.3. Jitter (PING fluctuations)

DS calculates a player's PING as an average for the past 25 seconds. Therefore, a player may have the PING 10ms, then 2000ms, then again 10ms, and the average ping may not exceed the limit, the player will not be kicked out of the server.

Please find the example: sds settings - maxClientPing 150. The actual value of PING is 280 (see 1.2). I am the player with PING value from 0 to 600ms.

Here is the log:

*Response from 192.168.2.56: bytes = 32 time = 223ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 20ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 37ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 171ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 156ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 43ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 12ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 141ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 123ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 540ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 185ms TTL = 128*  
*Response from 192.168.2.56: bytes = 32 time = 124ms TTL = 128*

Response from 192.168.2.56: bytes = 32 time = 45ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 197ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 125ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 119ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 92ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 281ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 25ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 12ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 500ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 87ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 107ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 463ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 173ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 2ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 470ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 149ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 452ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 331ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 86ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 351ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 140ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 232ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 479ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 192ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 370ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 11ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 233ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 286ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 279ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 239ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 19ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 247ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 208ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 102ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 1ms TTL = 128  
Response from 192.168.2.56: bytes = 32 time = 253ms TTL = 128

Ping statistics for 192.168.2.56: Packets sent = 186, received = 186, lost = 0 (0% losses)  
Approximate round-trip time in ms: Minimum = 0ms, Max = 661ms, Average = 194ms

In such case, the enemy will see my flying erratically like a snipe. I checked this many times. It will be really a hard job for the enemy to catch me in the aiming ring and shoot me down. However, the server will not kick me out.

(Tested in version 2.004)

## 2. DServer's delay.

Please click <https://pastenow.ru> links for diagrams in this paragraph.

### 2.1. Network delays on the DS (version 2.005)

There is a DS parameter called SPS (simulations per second). That is how many times per second the game world is recalculated. We should keep the value of this parameter equal to 50 if we do not want to overload the server. Here is the SPS diagram of "Wings Of Liberty" server: <http://pastenow.ru/18APJ> . As you can see SPS value is 50.

When DS is started there is a "player" who appears immediately on the server with PING 10 and CID 0. It is a virtual player generated by DS. Value 10 stands for the delay of packets between this virtual player and DS time scale. To put it more simple - delay of the program itself.

Here is the latency diagram of this virtual player and two real ones: <http://pastenow.ru/18APQ> . All the three diagrams have common time scale. On the upper diagram (virtual player), you can see peaks. The other two players get picks (therefore lags) at the same time. I am one of the two players, and below are the PING measurement results for the server over this period:

- Ping statistics for 195.177.105.58: Packets: sent = 1354, received = 1354, lost = 0 (0% loss)
- Approximate round-trip time in ms: Minimum = 10ms, maximum = 20ms, average = 10ms

Another example: <http://pastenow.ru/18AQO>

Player "Archangel" in the bottom clearly repeats delays of DS.

More: <http://pastenow.ru/18AQ7>

Both players with stable ping lag together with DS.

In these tests I have chosen periods of time when the number and the amplitude of server latency peaks is not too high. Just to make it easier to see the coherence between the server and players' delays.

In all the tests SPS is stable and equal to 50, and this gives us illusory confidence that everything is fine with the server. However, I admit that sometimes there is no correlation between the server and the players' delays.

The explanation is in paragraph 1.3. DS calculates PING as an average of 25 seconds period and the result is updated every 3 seconds. Therefore, the peaks are smoothed out and become invisible. This also means that even a small peak on the diagram, may be several times higher in reality. The peak of 20-50 ms may be 150 ms. 100 ms may easily be 500 ms. Many online players remember freezes on the server lasting for 100-300 ms.

I checked a lot of diagrams like that. Sometimes PING of all players makes a peak at the same time with DS, sometimes only some of them, then PING jumps for no apparent reason. Anyway, we can be quite sure that DS itself is the source of latencies in most cases.

## 2.2. DS delays caused by RCON (version 2.005)

My data collection program is set to collect data via RCON every 3 seconds. I tried different data collection frequencies to check the load of DS. There is TICK value indicated by DC. It shows the time of one calculation cycle. Even at very high data collection frequency (like 10 times per second or more), I did not see any increase of TICK.

However, it turned out that in case data is collected via RCON once in a second there appears additional delay on DS. PING of the virtual player increases. This is strange, as data volume of the list of players of a full server is only 11 kilobytes. RCON is the only way to control the server and collect the data and unfortunately it adds delay to the server and therefore to the players.

### Conclusion to parts 1 and 2.

*DS does not give us efficient means to restrict entrance of players with poor internet connection to the server. Such players ruin the gameplay because their airplanes jump erratically over the skies.*

*On the other hand, the interference between the server and the players delay makes it difficult for us to tell "good connection" players from "bad connection" ones.*

### **3. Some notes on RCON problems. (Version 2.005)**

- 3.1. For unknown reason, random symbols appear in RCON's response from time to time. It happens about once a day. For example if the response should be "STATUS = 1" and then some data, sometimes it appears to be "":STATUS = 1" or ";;STATUS = 1". So please consider this if you write a parser for RCON responses.
- 3.2. Sometimes RCON freezes for a while. Just would not respond or freeze in the middle of data transfer. It happens several times per day for 10-30 seconds. Probably there is some trigger in DS that restarts RCON, as the freeze never lasts for longer than 30 seconds.
- 3.3. The way RCON works with the port looks weird. It closes the port in case of any false command or invalid authorization. However, the way it does it is not correct in my opinion, because the other side still thinks the port is open. If you try to write something there you get a mistake. I do not know if it can be configured in RFC. Anyway, I never saw it done in this way. What I had to do was to close the socket immediately as soon as I get response different from "STATUS = 1".

### **4. Some suggestions and notes**

- 4.1. Would be great to add players' ip addresses in DS and RCON interfaces.
- 4.2. Would be fine to add multitasking support, but it will not work in case the bugs described above are not cured.
- 4.3. The test was done long time ago, but as far as I can see there were no big changes in these issues.