

Factsheet

Tests – Gaming

Gaming

Steam

Supported clients: Whiteboxes, Routers

The Steam client measures download speed of a game from Steam's game distribution network.

Measurement begins by fetching the manifest file for a freely available and publicly accessible game hosted by Steam. The manifest file provides information on the different "cells" (regions) that host the content and the chunks that are available in those cells (Steam files are split into chunks).

The client carries out the measurement phase by establishing one or more concurrent TCP connections to the user's local cell that host the chunks. These chunks are downloaded repeatedly for a configurable duration (defaulting to 10 seconds).

The client fetches the manifest itself, without the use of an offload server, so any geographic or ISP-specific logic implemented by Steam will equally affect our measurement client.

The client captures the following metrics:

1. The cell that was used
2. The average DNS lookup time
3. The average TCP connection time
4. The average download speed across all concurrent TCP connections

DOTA 2 (ICMP)

Supported clients: Whiteboxes, Routers

The DOTA2 measurement client measures round-trip latency and packet loss to the DOTA2 game servers. DOTA2 divides game

servers into regions, with multiple game servers (and relays on top of that) serving gameplay traffic amongst peers. Valve, the producer of DOTA2, publish a list of game servers and relays at http://cdn.dota2.com/apps/sdr/network_config.json, which is updated frequently. The game will periodically refresh its local cached copy of this server list. DOTA2's uses an encrypted UDP stream for its gameplay traffic.

The SamKnows DOTA2 measurement client carries out latency and packet loss measurements to one server from each of the different DOTA2 regions. The client will periodically (up to 6 times per day) refresh the list of DOTA2 servers from the Valve CDN. Ten ICMP Echo requests (pings) are sent to each server once per hour.

The measurement client records the following for each DOTA2 region:

- The IP address of the node that the user was directed to.
- The average, minimum and maximum round-trip times of the ten packets.
- The number of packets sent and received, allowing packet loss to be calculated.

FIFA 2018/2019 (ICMP)

Supported clients: Whiteboxes, Routers

The FIFA 2018/2019 measurement measures round-trip latency and packet loss to the EA (Electronic Arts) game servers that are used during gameplay. The game exchanges traffic over TCP port 80 with the EA CDN, located at the hostname FIFA18.content.easports.com. This single hostname is geographically load

balanced, with EA directing users to servers local to their region.

The FIFA 18/19 measurement sends ten ICMP Echo requests (pings) to the FIFA 18/19 CDN once per hour. The measurement client records:

- The IP address of the CDN node that the user was directed to
- The average, minimum and maximum round-trip times of the ten packets
- The number of packets sent and received, allowing packet loss to be calculated

League of Legends (ICMP)

Supported clients: Whiteboxes, Routers

The League of Legends measurement client measures round-trip latency and packet loss to the Riot network infrastructure in each of the League of Legends regions. Riot operates the following distinct regions that users can play in:

- North America
- Europe West
- Europe Nordic & East
- Oceania
- Russia
- Turkey
- Brazil
- Latin America North
- Latin America South
- Japan

In each of these regions, Riot operates a POP (Point of Presence) where traffic is exchanged with local ISPs and the game servers are hosted. These game servers utilise a modified version of the ENET protocol (based upon UDP) with supplemental encryption.

Whilst the game servers themselves cannot be measured reliably (due to the safeguards Riot employs to prevent cheating), the network infrastructure directly in front of the game servers can be measured.

The SamKnows League of Legends measurement client carries out latency and packet loss measurements to a router in each League of Legends POP. Ten ICMP Echo requests (pings) are sent to each endpoint once per hour.

The measurement client records the following for each League of Legends region:

- The IP address of the node that the user was directed to.
- The average, minimum and maximum round-trip times of the ten packets.
- The number of packets sent and received, allowing packet loss to be calculated.

Fortnite

Supported clients: Whiteboxes, Routers

The SamKnows Fortnite client measures round-trip latency and packet loss to the Epic Games infrastructure that hosts the Fortnite gameplay servers. These servers are segregated by region. The real Fortnite game will automatically choose the region to exchange gameplay traffic with, whilst the SamKnows client will carry out measurements to all regions. Fortnite currently relies on Amazon's AWS for all of its gameplay infrastructure.

Fortnite divides infrastructure into the following region definitions:

- North America - East
- North America - West
- Europe
- Oceania
- Brazil
- Asia

Each region is served by multiple servers. The SamKnows Fortnite client selects one active server per region to carry out its measurements to on each test run. Ten ICMP Echo requests (pings) are sent to each endpoint once per hour. A two second timeout is configured per ping.

The measurement client records the following for each Fortnite region:

- The IP address of the node that the user was directed to.
- The average, minimum and maximum round-trip times of the ten packets.
- The number of packets sent and received, allowing packet loss to be calculated.

The measurement client records the following for each Apex Legends region:

- The IP address of the node that the user was directed to.
- The average, minimum and maximum round-trip times of the ten packets.
- The number of packets sent and received, allowing packet loss to be calculated.

Apex Legends

Supported clients: Whiteboxes, Routers

SamKnows has developed a measurement client that assesses round-trip latency and packet loss to the Apex Legends gameplay infrastructure. Like other gaming providers, Apex Legends segregates its infrastructure by region. Apex Legends hosts its infrastructure with multiple cloud platforms (Amazon AWS and Google GCE) and colocation providers.

Apex Legends divides infrastructure into the following region definitions:

- North America - East
- North America - Central
- North America - West
- Brazil - South
- Europe - West
- Asia
- South East Asia
- Japan
- Korea
- Australia

Each region is often served by multiple datacenters from different hosting/colocation providers. For example, "North America - West" is served by AWS, GCE and also by a third-party colocation operator.

SamKnows' Apex Legends measurement client carries out latency and packet loss measurements to all server regions, rather than just choosing the nearest one. Ten ICMP Echo requests (pings) are sent to each endpoint once per hour. A two second timeout is configured per ping.