SONG: Half Life Counter-Strike Network Traffic Trace Files

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*Abstract-***This technical report describes the conditions under which network traffic was generated and captured for a range of traffic traces available on the SONG database. In this case the traffic traces concern network traffic generated by the Half Life Counter-Strike game running on a central server with between two and nine players and two different maps. This dataset is made publicly available as part of the SONG database project of the Smart Internet CRC (http://caia.swin.edu.au/sitcrc/song) to assist researchers in accessing databases of network game traffic generated under known conditions. This report and the SONG website should be referenced in any work which uses any of the corresponding dump files.**

Keywords- **Traffic trace, Smart Internet CRC**

I. INTRODUCTION

SONG (Simulating Online Network Games) is a sub-project of the Smart Networks Stream 4, itself a project of the Smart Internet CRC. More information the CRC and the Smart Networks Projects can be found here [1, 2]. The goal of this project is to develop a publicly available library of network traffic traces and simulation models that can be used to augment existing IP network engineering tools and to demonstrate any new models developed to assist in the design of networks to carry game traffic.

This document describes the conditions under which the corresponding network traces were both generated and captures. This information should be considered when analysing any statistical results generated from the trace file as well as when comparing the properties of data from two different trace files.

II. TRAFFIC CAPTURE SCENARIO

This report deals with traffic captured during networked sessions of the Half Life Counter-Strike game [3]. The report is relevant to numerous trace files available on the SONG website and describes the game scenarios, number of players and network configuration under which the trace files were captured.

A. Game Details

Half Life Counter-Strike is a client-server based game with client software running on standard PCs. Player actions are transmitted from the client to the server. The server constructs a game state for distribution to all players based on these actions. The game state is then distributed to all players. The game state may be different for players to limit the possibility of cheating, particularly wall-hacks.

For all trace files described in this report the game was played across a switched Ethernet LAN.

B. Server configuration

The server configuration for this series of trials is described in the following table.

Table 1. Server configuration

IP address	136.186.229.146
CPU	Intel Celeron 2.8GHz (8kb L1 cache, 128kb L2 cache)
RAM	1GB PC3200 DDR RAM (2 x 512MB in dual channel configuration)
Motherboard	ASUS P4-P800VM
Onboard NIC	Intel 82801BA (D865) Pro/100 VE
Onboard Video	Intel 82865G (865G GMCH) SVGA controller (reported by FreeBSD dmesg)
HDD	Seagate ST380011A/8.01 80GB PATA UDMA100
OS	FreeBSD 5.4-RELEASE

OS KERNEL CONFIG	Kernel config file: GENERIC+ALTQ
	Commented the line: cpu I486_CPU
	Commented the line: cpu I586_CPU
	Added the line: options ALTQ
	Added the line: options ALTQ_CBQ
	Added the line: options ALTQ_PRIQ
	Added the line: options ALTQ_HFSC
OS CONFIG PARAMETERS	Relevant sysctl variable/value pairs:
	kern.clockrate = { hz = 1000, tick = 1000, profhz = 1024, stathz = 128 }
RELEVANT HALF LIFE COUNTER-STRIKE CONFIG PARAMETERS	HLDS version: 3.1.1.1

C. Client configuration

There were nine different client machines involved in the trials. Each trial used between two and nine clients. The IP addresses of the clients and the client machine configuration (hardware and operating system) and Half Life Counter-Strike configuration is described in each table

The last two entries in the table describe the Half Life Counter-Strike configuration used by the client. This differed between clients. However, the following Half Life Counter-Strike configuration was common to all clients.

• cstrike.exe binary started with "-console" command line option

Table 2. Half Life Counter-Strike common configuration

Configuration->Controls->Adv Controls->Autoaim	On
Configuration->Audio->High Quality Sound	On
Configuration->Video->Video Options->Draw Faster Software Sprites	Off
Configuration->Multiplayer->Customize->High Quality Models	Off
Configuration->Multiplayer->Customize->Enable Voice In Mod	Off
Configuration->Multiplayer->Customize->Use Mic As Input	Off
Configuration->Multiplayer->Customize->Adv->Time Before Dead Bodies Disappear	600
Configuration->Multiplayer->Customize->Adv->Multiplayer Decal Limit	300
Configuration->Multiplayer->Customize->Adv->Max Shells	50
Configuration->Multiplayer->Customize->Adv->Max Smoke Puffs	20
Configuration->Multiplayer->Customize->Adv->Smoke Gas Grenade Sprite Quality	Best Looking, Slowest
Configuration->Multiplayer->Customize->Adv->Weapon Alignment	Right Handed
Configuration->Multiplayer->Customize->Adv->Buy Menu Type	VGUI Menus
Configuration->Multiplayer->Customize->Adv->Auto Switch To Better Weapon	On
Configuration->Multiplayer->Customize->Adv->Center Player Names	On
Configuration->Multiplayer->Customize->Adv->Auto Help	On
Configuration->Multiplayer->Customize->Adv->Auto Take End Game Screenshots	Off

Table 3. Client 1 configuration

IP address	136.186.229.70
CPU	Intel Celeron 2.4GHz (8kb L1 cache, 128kb L2 cache)
RAM	512MB DDR RAM (2 x 256MB in dual channel configuration)
Motherboard	ASUS P4-P800VM
Onboard NIC	Intel 82801BA (D865) Pro/100 VE
Onboard Video	Sparkle Nvidia GeForce 6600 256MB AGP 8x graphics card (BIOS revision 5.43.02.46T5DH)
HDD	Western Digital WD400JB 40GB PATA UDMA100
OS	MS Windows XP Professional SP2 + all critical security patches as at 09/01/2006
Other	NVIDIA DRIVER: 81.98_forceware_winxp2k_english_whql.exe
Video Rendering Mode	OpenGL
Video Mode	800x600

Table 4. Client 2 configuration

IP address	136.186.229.71
CPU	Intel Celeron 2.8GHz (8kb L1 cache, 128kb L2 cache)
RAM	1GB DDR RAM (2 x 512MB in dual channel configuration)
Motherboard	ASUS P4-P800VM
Onboard NIC	Intel 82801BA (D865) Pro/100 VE
Onboard Video	Sparkle Nvidia GeForce 6600 256MB AGP 8x graphics card (BIOS revision 5.43.02.46T5DH)
HDD	Seagate ST380011A/8.01 80GB PATA UDMA100
OS	MS Windows XP Professional SP2 + all critical security patches as at 09/01/2006
Other	NVIDIA DRIVER: 81.98_forceware_winxp2k_english_whql.exe
Video Rendering Mode	OpenGL
Video Mode	1024x768

Table 5. Client 3 configuration

IP address	136.186.229.72
Specs same as 136.186.229.71	
Video Rendering Mode	OpenGL
Video Mode	1024x768

Table 6. Client 4 configuration

IP address	136.186.229.73
Specs same as 136.186.229.71 except for NVIDIA driver version. 78.01_winxp2k_english_whql.exe	
Video Rendering Mode	OpenGL
Video Mode	1024x768

Table 7. Client 5 configuration

IP address	136.186.229.74
Specs same as 136.186.229.71 except for NVIDIA driver version. 7.1.8.9 (from device manager -> display adapter -> driver tab)	
Video Rendering Mode	Direct3D
Video Mode	1024x768

Table 8. Client 6 configuration

IP address	136.186.229.75
Specs same as 136.186.229.71	
Video Rendering Mode	OpenGL
Video Mode	800x600

Table 9. Client 7 configuration

IP address	136.186.229.92
CPU	Intel P4 3.0GHz
RAM	512MB DDR RAM (1x512MB)
Motherboard	Gigabyte GA81865 GM-775
Onboard NIC	Marvel Yukon Gigabit Ethernet 10/100/1000
Onboard Video	Sparkle Nvidia GeForce 6600 256MB AGP 8x graphics card (BIOS revision 5.43.02.46T5DH)
HDD	Seagate ST380817AS 80GB SATA150
OS	MS Windows XP Professional SP2 + all critical security patches as at 09/01/2006
Other	NVIDIA DRIVER: 7.7.7.7
Video Rendering Mode	OpenGL
Video Mode	1280x960

Table 10. Client 8 configuration

IP address	136.186.229.126
CPU	Intel Celeron 2.4GHz (8kb L1 cache, 128kb L2 cache)
RAM	1.25 GB DDR RAM
Motherboard	ASUS P4-P800VM
Onboard NIC	Intel 82801BA (D865) Pro/100 VE
Onboard Video	Sparkle Nvidia GeForce 6600 256MB AGP 8x graphics card (BIOS revision 5.43.02.46T5DH)
HDD	Western Digital WD400JB 40GB PATA UDMA100
OS	MS Windows XP Professional SP2 + all critical security patches as at 22/06/2005
Other	NVIDIA DRIVER: 7.1.8.4 (from device manager -> display adapter -> driver tab)
Video Rendering Mode	OpenGL
Video Mode	1024x768

Table 11. Client 9 configuration

IP address	136.186.229.138
CPU	Intel Celeron 2.4GHz (8kb L1 cache, 128kb L2 cache)
RAM	512 MB DDR RAM (2 x 256MB in dual channel)
Motherboard	ASUS P4-P800VM
Onboard NIC	Intel 82801BA (D865) Pro/100 VE
Onboard Video	Sparkle Nvidia GeForce 6600 256MB AGP 8x graphics card (BIOS revision 5.43.02.46T5DH)
HDD	Western Digital WD400JB 40GB PATA UDMA100
OS	FreeBSD 5.4 Release
Other	NVIDIA DRIVER: 1.0-7174 (from sysctl hw.nvidia.version) "sysctl kern.clockrate" = "kern.clockrate: { hz = 100, tick = 10000, profhz = 1024, stathz = 128 }"
Video Rendering Mode	OpenGL
Video Mode	1024x768

All Half Life Counter-Strike client software was patched to v1.5.

Teams never differed in numbers of players by more than one i.e. even numbers of players were equally divided between both teams, odd numbers of players were split such that one team had one extra player.

D. Network configuration

The Half Life Counter-Strike clients were attached to the central server via the CAIA LAN running at 100 Mbps. The traffic capturing was done on a bridge machine sitting between the Half Life Counter-Strike dedicated server and the CAIA LAN. The traffic was captured using **tcpdump** [4] to obtain a raw packet trace of all LAN traffic during each experiment.

The accuracy of the timestamps generated by tcpdump on the traffic capturing machine is documented in [5].

III.   NETWORK TRACES

This section describes the different Half Life Counter-Strike traffic traces that are available on the SONG databse. All traces can be found under the hierarchy **SONG – traffic traces – Half Life Counter-Strike.** The naming convention used for the tcpdump files described in this report is as follows: `hlcs_<trialdate>_<run#>_<mapname>_<numplayers>.dmp` `hlcs_<trialdate>_<run#>_<mapname>_<numplayers>_fragment.dmp.`

The naming convention used for the Half Life Counter-Strike log files described in this report is as follows: `<configfilename>-<date>_<time>_<pid>_<udpport>.log,` `<date>_<mapname>_<numplayers>.log.`

Traffic was captured on the game server machine using the following configuration:

- **tcpdump** has been configured to capture the first 100 bytes of each packet. This 100 bytes is made up of:
  - 14 bytes – Ethernet frame header
  - 20 bytes – IP header
  - 8 bytes – UDP header
  - 58 bytes – first part of the UDP payload

  The data collected has not been anonymised.

The tcpdump files that end in extension "_fragment.dmp" are for general consumption and are provided as a cut down sample of the full tcpdump files. The fragment files contain only packet header information for 5000*number_of_participating_clients packets. The packets are obtained from an offset of 10000 packets into the original full trace to ensure only active game traffic makes up the sample.

For example, the sample file for the `hlcs_170106_1_dedust_9.dmp` full trace is named `hlcs_170106_1_dedust_9_fragment.dmp` and contains 9*5000 = 45000 packet headers, for the packets numbered 10000 to 54999 (inclusive) in the full trace file.

A. Game Trials

Table 12. Trial 1

Number of clients	7
Game length	15 mins
Full Tcpdump file	hlcs_130106_1_dedust_7.dmp
Full Tcpdump MD5	c0012f4d0a3de286a38f074a07f57723
Sample Tcpdump file	hlcs_130106_1_dedust_7_fragment.dmp
Sample Tcpdump MD5	e49338d0fd5cbfed9ebf1b50b11a622f
Log files	server-130106_1840_35038_27015.log, 130106_dedust_7.log

Table 13. Trial 2

Number of clients	6
Game length	15 mins
Full Tcpdump file	hlcs_130106_1_dedust_6.dmp
Full Tcpdump MD5	1eac482364426d9aecc083887b1fc468
Sample Tcpdump file	hlcs_130106_1_dedust_6_fragment.dmp
Sample Tcpdump MD5	8f9a0176449d0b4369878c435d1550ac
Log files	server-130106_1859_35131_27015.log, 130106_dedust_6.log

Table 14. Trial 3

Number of clients	5
Game length	15 mins
Full Tcpdump file	hlcs_130106_1_dedust_5.dmp
Full Tcpdump MD5	5f5a7b7bef19b92de216dfbe28f75bd8
Sample Tcpdump file	hlcs_130106_1_dedust_5_fragment.dmp
Sample Tcpdump MD5	da71307a333cdbb5e1a103120afaaab3
Log files	server-130106_1918_35229_27015.log, 130106_dedust_5.log

Table 15. Trial 4

Number of clients	4
Game length	20 mins
Full Tcpdump file	hlcs_160106_1_dedust_4.dmp
Full Tcpdump MD5	994aa512a8b81c1ac14b845705b6970d
Sample Tcpdump file	hlcs_160106_1_dedust_4_fragment.dmp
Sample Tcpdump MD5	22b4c796b715c356ba35d26fcfe73bfd
Log files	server-160106_1515_44564_27015.log, 160106_dedust_4.log

Table 16. Trial 5

Number of clients	3
Game length	20 mins
Full Tcpdump file	hlcs_160106_1_dedust_3.dmp
Full Tcpdump MD5	5c515fe2e4816fc078bca22bb26e63a5
Sample Tcpdump file	hlcs_160106_1_dedust_3_fragment.dmp
Sample Tcpdump MD5	e04ff0209761d3805a59a48719c97f20
Log files	server-160106_1541_44666_27015.log, 160106_dedust_3.log

Table 17. Trial 6

Number of clients	2
Game length	20 mins
Full Tcpdump file	hlcs_160106_1_dedust_2.dmp
Full Tcpdump MD5	5f4c445c6e059fb24ca0fc3e5872348f
Sample Tcpdump file	hlcs_160106_1_dedust_2_fragment.dmp
Sample Tcpdump MD5	19a54469dead7e00164c6a3c7f4e261a
Log files	server-160106_1606_44782_27015.log, 160106_dedust_3.log

Table 18. Trial 7

Number of clients	8
Game length	15 mins
Full Tcpdump file	hlcs_160106_1_dedust_8.dmp
Full Tcpdump MD5	9127e05405a6db0af6a0480b7e908e56
Sample Tcpdump file	hlcs_160106_1_dedust_8.dmp
Sample Tcpdump MD5	c8f49c5b0dade75bc11a07279a752125
Log files	server-160106_1645_44921_27015.log, 160106_dedust_8.log

Table 19. Trial 8

Number of clients	6
Game length	15 mins
Full Tcpdump file	hlcs_160106_1_csitaly_6.dmp
Full Tcpdump MD5	4f01eeec1ce9cbfbe3fd93fbeffca147
Sample Tcpdump file	hlcs_160106_1_csitaly_6_fragment.dmp
Sample Tcpdump MD5	1113df0d3fbead1fa41376e869fb1158
Log file directory name	server-160106_1715_45107_27015.log, 160106_csitaly_6.log

Table 20. Trial 9

Number of clients	7
Game length	15 mins
Full Tcpdump file	hlcs_160106_1_csitaly_7.dmp
Full Tcpdump MD5	1ac0835965de93d84759ac18d2c1526e
Sample Tcpdump file	hlcs_160106_1_csitaly_7_fragment.dmp
Sample Tcpdump MD5	a5b7e2b6eadb6bc40c355bd994e99889
Log files	server-160106_1738_45204_27015.log, 160106_csitaly_7.log

Table 21. Trial 10

Number of clients	9
Game length	15 mins
Full Tcpdump file	hlcs_170106_1_dedust_9.dmp
Full Tcpdump MD5	edecd375036498f6ed608e94a6ddd92c
Sample Tcpdump file	hlcs_170106_1_dedust_9_fragment.dmp
Sample Tcpdump MD5	7cb2b830ebb2a5e8303a8b77654ba528
Log file directory name	server-170106_1703_48731_27015.log, 170106_dedust_9.log

How To Cite

This section provides examples of how to cite any tracefiles or their related technical reports obtained from the online SONG database.

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