SONG: Half Life Deathmatch 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 Deathmatch 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 subproject 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 Deathmatch game [3]. The report is relevant to numerous trace files

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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 Deathmatch 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	Kernel config file: GENERIC+ALTQ
CONFIG	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	Relevant sysctl variable/value pairs:
PARAMETERS	kern.clockrate = { hz = 1000, tick = 1000, profhz = 1024, stathz = 128 }
RELEVANT	HLDS version: 3.1.1.1
HALF LIFE DEATHMATCH	
CONFIG PARAMETERS	

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 Deathmatch configuration is described in each table

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

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

Table 2. Half Life Deathmatch common configuration

Configuration->Controls->Adv Controls->Autoaim	On
Configuration->Audio->High Quality Sound	On
	Max
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->Decal	300

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
	.186.229.71 except for NVIDIA driver version. e 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	1280x1024

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 Deathmatch client software was patched to v1.0.

D. Network configuration

The Half Life Deathmatch 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 Deathmatch 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 Deathmatch traffic traces that are available on the SONG databse. All traces can be found under the hierarchy SONG – traffic traces – Half Life Deathmatch. The naming convention used for the tepdump files described in this report is as follows: hldm_<trialdate>_<run#>_<mapname>_<numplayers>.dmp hldm_<trialdate>_<run#>_<mapname>_<numplayers>_fragm ent.dmp.

The naming convention used for the Half Life Deathmatch log files described in this report is as follows:

| log-<configfilename>| date>_<time>_<pid>_<udpport>.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 $hldm_120106_1$ _frenzy_9.dmp full trace is named $hldm_120106_1$ _frenzy_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	9
Game length	15 mins
Full Tepdump file	hldm_120106_1_frenzy_9.dmp
Full Tepdump MD5	9b1bd19f396e55bc03cb6d9f266b3056
Sample Tcpdump file	hldm_120106_1_frenzy_9_fragment.dmp
Sample Tcpdump MD5	b80b427df80d5ceb8603bfd9d745d715
Log file directory name	log-trials-120106_1715_30868_27015

Table 13. Trial 2

Number of clients	8
Game length	15 mins
Full Tcpdump file	hldm_120106_1_frenzy_8.dmp
Full Tepdump MD5	9222fa24ea81e4c5ccfc13862ddb1a81
Sample Tcpdump file	hldm_120106_1_frenzy_8_fragment.dmp
Sample Tcpdump MD5	749c1beed0d919e5400ee7db5e2002c9
Log file directory name	log-trials-120106_1733_30945_27015

Table 14. Trial 3

Number of clients	7
Game length	15 mins
Full Tcpdump file	hldm_120106_1_frenzy_7.dmp
Full Tcpdump MD5	18cd125bd0d65f9409367f614af38dde
Sample Tcpdump file	hldm_120106_1_frenzy_7_fragment.dmp
Sample Tcpdump MD5	1b19b224aaea16c6a0057ef581cce664
Log file directory name	log-trials-120106_1751_31010_27015

Table 15. Trial 4

Number of clients	5
Game length	20 mins
Full Tcpdump file	hldm_120106_1_gasworks_5.dmp
Full Tcpdump MD5	2c3e86c87d2ceee77248a57597f6b968
Sample Tcpdump file	hldm_120106_1_gasworks_5_fragment.d
Sample Tcpdump MD5	93586f3628ddf21d8e65bd1827f4b2d8
Log file directory name	log-trials-120106_1821_31151_27015

Table 16. Trial 5

Number of clients	2
Game length	20 mins
Full Tcpdump file	hldm_120106_1_frenzy_2.dmp
Full Tepdump MD5	c7f9fc0fba5e7dc629a1b5d4064d1f29
Sample Tcpdump file	hldm_120106_1_frenzy_2_fragment.dmp
Sample Tcpdump MD5	8d236b833d9475c9c61405a24161dbb6
Log file directory name	log-trials-120106_1845_31246_27015

Table 17. Trial 6

Number of clients	5
Game length	20 mins
Full Topdump file	hldm_130106_1_frenzy_5.dmp
Full Tepdump MD5	66d4288f8dc86b93638c94c8bb58ed3d
Sample Tcpdump file	hldm_130106_1_frenzy_5_fragment.dmp
Sample Tcpdump MD5	ef92c73b921ed95a1761e32d0d73be9e
Log file directory name	log-trials-130106_1624_34288_27015

Table 18. Trial 7

Number of clients	6
Game length	15 mins
Full Tcpdump file	hldm_130106_1_frenzy_6.dmp
Full Tcpdump MD5	ae57e1fd0cc6070749bc3865596318a4
Sample Tcpdump file	hldm_130106_1_frenzy_6_fragment.dmp
Sample Tcpdump MD5	1dc7847947bf75a36e26cae109e8e360
Log file directory name	log-trials-130106_1648_34371_27015

Table 19. Trial 8

Number of clients	4
Game length	15 mins
Full Topdump file	hldm_130106_1_frenzy_4.dmp
Full Tcpdump MD5	9d931caba9d67542786ae58c8fcbba87
Sample Tcpdump file	hldm_130106_1_frenzy_4_fragment.dmp
Sample Tcpdump MD5	968c259755a9df4736916e0221067c5f
Log file directory name	log-trials-130106_1709_34452_27015

Table 20. Trial 9

Number of clients	3
Game length	20 mins
Full Tcpdump file	hldm_130106_1_frenzy_3.dmp
Full Tcpdump MD5	d89079a6deac8d83e1addec859e9b2db
Sample Tcpdump file	hldm_130106_1_frenzy_3_fragment.dmp
Sample Tcpdump MD5	4b8668eece409a1fc44b1d72bcde640a
Log file directory name	log-trials-130106_1727_34530_27015

Table 21. Trial 10

Number of clients	6
Game length	20 mins
Full Topdump file	hldm_160106_1_gasworks_6.dmp
Full Tepdump MD5	e27f0b191c09396786d5247b9c998566
Sample Tcpdump file	hldm_160106_1_gasworks_6_fragment.d
Sample Tcpdump MD5	5648f7c8f793aaa21cc3f1f6f340d0aa
Log file directory name	log-trials-160106_1822_45511_27015

How To CITE

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

- L. Stewart, P. Branch, "HLCS, Map: dedust, 5 players, 13Jan2006", Centre for Advanced Internet Architectures SONG Database, http://caia.swin.edu.au/sitcre, hlcs_130106_1_dedust_5_fragment.tar.gz, April 4th, 2006.
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