

REFERENCES

- [1] C.J. Watson, P. Billingsley, D.J. Croft, and D.V. Huntsberger, "STATISTICS FOR MANAGEMENT AND ECONOMICS", Fourth Edition, Printed in the United States of America, 1990.
- [2] R.E. Walpole, "Introduction to Statistics", Third Edition, Macmillan Publishing Co.,Inc, 1990.
- [3] J. G. VAN MATRE and , G.H. Gilbreath, "Statistics for Business and Economics", Business Publications INC, 1980.
- [4] W. Stevens, "TCP/IP Illustrated Volume 3, TCP for Transactions, HTTP. NNTP. And Unix Domain Protocols", Addison –Wesley Professional Computing Series, 1996.
- [5] Burce A. Mah, "An Empirical Model of HTTP Network Traffic", Telnet Group, computer Science division University of California at Berkley.
- [6] Ying Shi, Edward watson, and Ye-sho Chen., "Model-Driven Simulation of World-Wide-Web Cache Policies", Technical report, Department of Information Systems and Decision Science, 1997.
- [7] Netscape Communications Corporation, Netscape Navigator, 1996, this document is available at <http://home.netscape.com/>.
- [8] R.Eddy, HTTP analysis of IP level traces, February 1996, this document is available at <http://cataria.use.edu/eddy/http-traffic-http-traces.html>.
- [9] National Science foundation, NSFNET Backbone Statistics. This document is available at <http://www.nsf.gov>.
- [10] C. Kesa, "Increasing Service Performance of HTTP" Technical Report, The Regional Centre for Manufacturing Systems Engineering, Warwick University and Chulalongkorn University, 1999.

APPENDIX A:

Cache Information

Info:161.200.80.51:8080

Dated Fri Jul 9 09:42:22 1999

Connection Information for squid:

Number of TCP connections:	192745
Number of UDP connections:	240579

Cache information for squid:

Storage Swap size:	180 MB
Maximum Swap size:	200 MB
Storage LRU Expiration Age:	0.02 days
Requests given to unlinkd:	4288

Resource usage for squid:

CPU Time:	5098 seconds (1925 user 3173)
CPU Usage:	3%
Maximum Resident Size:	4932 KB

Memory usage for squid via mallinfo():

Total space in arena:	4635 KB
Ordinary blocks:	1813 KB
Small blocks:	2096 KB
Holding blocks:	6 KB
Free Small blocks:	229 KB
Free Ordinary blocks:	485 KB
Total in use:	3917 KB 85%
Total free:	718 KB 15%

File descriptor usage for squid:

Maximum number of file descriptors:	1024
Number of file descriptors in use:	194
Largest file dec currently in use:	219
Available number of file descriptors:	830
Reserve number of file descriptors:	256

Table Utilization of 161.200.80.51:8080

Protocol	Object count	Max KB	Current KB	Min KB	Hit rate	Transferred KB
HTTP						
HTTP	16484	195106	175149	156105	0.22	1185007
FTP	72	26954	10462	311	0.06	51977
GOPHER	0	0	0	0	0.00	0
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	3	0	0	0.00	7
TOTAL	16556	222063	185611	156416	0.22	1236991
ICP						
HTTP	0	0	0	0	0.00	241213
FTP	0	0	0	0	0.00	397
GOPHER	0	0	0	0	0.00	3
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	0	0	0	0.00	0
TOTAL	0	0	0	0	0.00	241616

Info:161.200.80.51:8080

Dated Wed Jul 7 14:38:38 1999

Connection Information for squid:

Number of TCP connections:	21470
Number of UDP connections:	15568

Cache information for squid:

Storage Swap size:	269 MB	
Maximum Swap size:	300 MB	
Storage LRU Expiration Age:		0.03 days
Requests given to unlinkd:	310	

Resource usage for squid:

CPU Time:	605 seconds	(201 user 404 sys)
CPU Usage:	7%	
Maximum Resident Size:	5064 KB	

Memory usage for squid via mallinfo():

Total space in arena:	4851 KB	
Ordinary blocks:	1723 KB	
Small blocks:	2254 KB	
Holding blocks:	6 KB	
Free Small blocks:	269 KB	
Free Ordinary blocks:	596 KB	
Total in use:	3985 KB	82%
Total free:	866 KB	18%

File descriptor usage for squid:

Maximum number of file descriptors:	1024
Number of file descriptors in use:	154
Largest file dec currently in use:	202
Available number of file descriptors:	867
Reserve number of file descriptors:	256

Table Utilization of 161.200.80.51:8080

Protocol	Object count	Max KB	Current KB	Min KB	Hit rate	Transferred KB
HTTP						
HTTP	18206	289074	266344	260099	0.28	155450
FTP	58	15674	9351	9348	0.06	3
GOPHER	0	0	0	0	0.00	0
WAIS	0	0	0	0	0.00	1
CACHE_ OB	0	3	0	0	0.00	0
TOTAL	18264	304749	275695	269447	0.28	155454
ICP						
HTTP	0	0	0	0	0.00	15329
FTP	0	0	0	0	0.00	23
GOPHER	0	0	0	0	0.00	3
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	0	0	0	0.00	0
TOTAL	0	0	0	0	0.00	15352

Info:161.200.80.51:8080*Dated Sat Jul 10 11:17:03 1999*

Connection Information for squid:

Number of TCP connections:	150603
Number of UDP connections:	162720

Cache information for squid:

Storage Swap size:	88 MB
Maximum Swap size:	100 MB
Storage LRU Expiration Age:	0.11 days
Requests given to unlinkd:	983

Resource usage for squid:

CPU Time:	4021 seconds (1521 user 2500)
CPU Usage:	4%
Maximum Resident Size:	5452 KB

Memory usage for squid via mallinfo():

Total space in arena:	5231 KB
Ordinary blocks:	1147 KB
Small blocks:	1179 KB
Holding blocks:	66 KB
Free Small blocks:	509 KB
Free Ordinary blocks:	2329 KB
Total in use:	2339 KB 46%
Total free:	2898 KB 54%

File descriptor usage for squid:

Maximum number of file descriptors:	1024
Number of file descriptors in use:	68
Largest file dec currently in use:	80
Available number of file descriptors:	956
Reserve number of file descriptors:	256

Table Utilization of 161.200.80.51:8080

Protocol	Object count	Max KB	Current KB	Min KB	Hit rate	Transferred KB
HTTP						
HTTP	8969	97651	90076	72701	0.20	898929
FTP	20	19002	47	13	0.13	22604
GOPHER	0	0	0	0	0.00	0
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	3	0	0	0.00	22
TOTAL	8969	116656	90123	72714	0.20	921555
ICP						
HTTP	0	0	0	0	0.00	163055
FTP	0	0	0	0	0.00	199
GOPHER	0	0	0	0	0.00	8
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	0	0	0	0.00	0
TOTAL	0	0	0	0	0.00	163263

Info:161.200.80.51:8080*Dated Mon Jul 19 15:11:03 1999*

Connection Information for squid:

Number of TCP connections:	95043
Number of UDP connections:	184419

Cache information for squid:

Storage Swap size:	75 MB	
Maximum Swap size:	80 MB	
Storage LRU Expiration Age:		0.00 days
Requests given to unlinkd:	1615	

Resource usage for squid:

CPU Time:	2977 seconds (1144 user 1833)
CPU Usage:	3%
Maximum Resident Size:	3512 KB

Memory usage for squid via mallinfo():

Total space in arena:	3219 KB
Ordinary blocks:	1281 KB
Small blocks:	881 KB
Holding blocks:	3 KB
Free Small blocks:	254 KB
Free Ordinary blocks:	797 KB
Total in use:	2166 KB 67%
Total free:	1052 KB 33%

File descriptor usage for squid:

Maximum number of file descriptors:	1024
Number of file descriptors in use:	70
Largest file dec currently in use:	119
Available number of file descriptors:	954
Reserve number of file descriptors:	256

Table Utilization of 161.200.80.51:8080

Protocol	Object count	Max KB	Current KB	Min KB	Hit rate	Transferred KB
HTTP						
HTTP	6309	87285	74984	42043	0.15	666554
FTP	17	17160	864	0	0.05	49956
GOPHER	0	0	0	0	0.00	0
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	3	0	0	0.00	19
TOTAL	6362	104448	75848	42043	0.14	716529
ICP						
HTTP	0	0	0	0	0.00	184286
FTP	0	0	0	0	0.00	512
GOPHER	0	0	0	0	0.00	0
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	0	0	0	0.00	0
TOTAL	0	0	0	0	0.00	184798

Info:161.200.80.51:8080*Dated Wed Jul 14 16:46:44 1999*

Connection Information for squid:

Number of TCP connections:	56711
Number of UDP connections:	34885

Cache information for squid:

Storage Swap size:	343 MB	
Maximum Swap size:	372 MB	
Storage LRU Expiration Age:		0.01 days
Requests given to unlinkd:	657	

Resource usage for squid:

CPU Time:	1371 seconds (497 user 874)
CPU Usage:	6%
Maximum Resident Size:	5724 KB

Memory usage for squid via mallinfo():

Total space in arena:	5779 KB
Ordinary blocks:	2044 KB
Small blocks:	2800 KB
Holding blocks:	9 KB
Free Small blocks:	473 KB
Free Ordinary blocks:	456 KB
Total in use:	4853 KB 84%
Total free:	926 KB 16%

File descriptor usage for squid:

Maximum number of file descriptors:	1024
Number of file descriptors in use:	181
Largest file dec currently in use:	182
Available number of file descriptors:	843
Reserve number of file descriptors:	256

Table Utilization of 161.200.80.51:8080

Protocol	Object count	Max KB	Current KB	Min KB	Hit rate	Transferred KB
HTTP						
HTTP	22097	387500	319179	308929	0.32	333906
FTP	263	33993	31679	27956	0.13	7448
GOPHER	0	0	0	0	0.00	0
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	3	0	0	0.00	26
TOTAL	22360	421496	350858	336886	0.32	341380
ICP						
HTTP	0	0	0	0	0.00	34898
FTP	0	0	0	0	0.00	62
GOPHER	0	0	0	0	0.00	0
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	0	0	0	0.00	0
TOTAL	0	0	0	0	0.00	34960

Info:161.200.80.51:8080

Dated Thu Jul 15 18:57:41 1999

Connection Information for squid:

Number of TCP connections:	16467
Number of UDP connections:	12396

Cache information for squid:

Storage Swap size:	359 MB	
Maximum Swap size:	1000 MB	
Storage LRU Expiration Age:		60.00 days
Requests given to unlinkd:	0	

Resource usage for squid:

CPU Time:	509 seconds	(172 user 337)
CPU Usage:	7%	
Maximum Resident Size:	5968 KB	

Memory usage for squid via mallinfo():

Total space in arena:	5683 KB
Ordinary blocks:	1389 KB
Small blocks:	3369 KB
Holding blocks:	9 KB
Free Small blocks:	178 KB
Free Ordinary blocks:	736 KB
Total in use:	4768 KB 84%
Total free:	914 KB 16%

File descriptor usage for squid:

Maximum number of file descriptors:	1024
Number of file descriptors in use:	118
Largest file dec currently in use:	144
Available number of file descriptors:	906
Reserve number of file descriptors:	256

Table Utilization of 161.200.80.51:8080

Protocol	Object count	Max KB	Current KB	Min KB	Hit rate	Transferred KB
HTTP						
HTTP	27947	348413	348310	303178	0.24	120923
FTP	166	21387	20412	20412	0.50	974
GOPHER	0	0	0	0	0.00	0
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	3	0	0	0.00	62
TOTAL	28113	369803	368722	323590	0.24	121959
ICP						
HTTP	0	0	0	0	0.00	12744
FTP	0	0	0	0	0.00	39
GOPHER	0	0	0	0	0.00	8
WAIS	0	0	0	0	0.00	0
CACHE_ OB	0	0	0	0	0.00	0
TOTAL	0	0	0	0	0.00	12783

VITA

Chalermpon Kesa was born on 5 December 1971. He graduated from Department of Computer Engineering, Faculty of Engineer, Chulalongkorn University in 1993. He has continued to intend him graduate study in Engineering Management at The Regional Centre for Manufacturing Systems Engineering in 1996. Having some experiences of business deals, technical support, and project management mainly in Computer network.