

## Bibliography

- [1] Y. Yasuda, M. Takagi, S. Kato, and T. Awano, "Step by step transmission and display of still pictures by a hierarchical coding method", IEICE Trans. Commun, Vol.J63-B, no.4, pp.379-386, Apr 1980.
- [2] P. J. Burt and E. H. Adelson, "The Laplacian pyramid as a compact image code", IEEE Trans. Commun, Vol.31, no.4 pp.532-540, Apr 1983.
- [3] I. Daubechies, "Orthogonal bases of compactly supported wavelets", Comm. Pure Appl. Math, pp.909-996, Nov 1988.
- [4] M. Vetterli, "Multi-dimensional subband coding: some theory and algorithms", Signal Processing, 6, pp.97-112, Apr 1984.
- [5] Y. Yasuda, T. Yasuno, F. Katayama, T. Toida, and H. Sakata, "Image database system featuring graceful oblivion", IEICE Trans., Commun., Vol.E79-B, No.8, pp.1015-1021, Aug 1996.
- [6] K. Kamogawa, D. Nakajima, and Y. Yasuda, "Proxy server systems with hierarchical image caching", IEEEJ, Vol.27 No.5, pp.548-556, Oct 1998.
- [7] A. Ortega, F. Carignano, S. Ayer, and M. Vetterli, "Soft Caching: Web cache management techniques for images", Proc. IEEE Signal Society Workshop on Multimedia Signal Processing, (Princeton, NJ), June 1997.
- [8] J. Kangasharju, Y. Kwon, A. Ortega, X. Yang and K. Ramchandran, "Implementation of Optimized Cache Replenishment Algorithms in a Soft Caching System", Proc. In IEEE Signal Society Workshop on Multimedia Signal Processing, Redondo Beach, CA, Dec 1998.
- [9] M. Arlitt, R. Friedrich, and T. Jin: "Performance evaluation of web proxy cache replacement policies", Lect. Notes Computer Science, Vol.1469, pp.193-206 1998.
- [10] E. Markatos and C. E. Chronaki: "A Top-10 approach to prefetching on the Web", Proc. INET' 98, Geneva, Switzerland, Jul 1998.
- [11] V. A. F. Almeida, M. A. G. Gesrio et al "Analyzing the behavior of a proxy server in the light of regional and cultural issues," Proc. 3rd International WWW Caching Workshop, Manchester, UK, Jun 1998.

- [12] L. Breslao, P. Cao, L. Fan, G. Phillips, and S. Shenker "Web caching and Zip-like distributions: Evidence and implications", Proc. IEEE INFOCOM'99, New York, NY, USA, Mar 1999.
- [13] T. Ishikawa, W. B. Hui, H. Ohsawa, and Y. Yasuda "A method of improving response time in still database based on CD-ROM changers by Graceful Caching", IEEEJ, Vol 28, No 5 pp.605-611, Oct 1999.
- [14] W. Pennebaker and J. Mitchell, "JPEG still image data compression standard", Van Nostrand Reinhold, 1994.
- [15] J. Gwertzman. "Autonomous replication in Wide-Area networks", Technical Report 17-95, Harvard University, 1995.
- [16] L. Fan, Q. Jacobson, P. Cao and W. Lin "Web prefetching between low-bandwidth clients and proxies: potential and performance", Proc. ACM SIGMETRICS Atlanta, Georgia, USA, pp.178-187, May 1999.
- [17] K. M. Koeger, D. D. E.long, and J. C. Mogul, "Exploring the bounds of web latency reduction from caching and prefetching", Proc. USENIX Symposium on Internet Technology and System, Monterey, California, USA Dec 1997.
- [18] Z. Su, T. Washizawa, J. Katto, Y. Yasuda, "A new prefetching algorithm for Graceful Caching system", 2001 General Conference of IEICE, Mar 2001.
- [19] Z. Su, T. Washizawa, J. Katto, Y. Yasuda, "Performance improvement of Graceful Caching by using request frequency based pre-fetching algorithm", IEEE TENCON, Singapore, Aug 2001.
- [20] K Saito "Performance improvement of caching by using human's access degree for images", Graduate Thesis, Waseda University, Mar 2001.
- [21] Z. Su, T. Washizawa, J. Katto, Y. Yasuda; "A new and robust replacement algorithm for proxy caching with hierarchical image coding", Proc. IMPS2001, Nov 2001.
- [22] J.Kangasharju and K.W. Ross," Performance evaluation of redirection schemes in content distribution networks", the 5th International Web Caching and Content Delivery Workshop, Lisbon, Portugal, May 2000.
- [23] R.P. Doyle, J.S. Chase, S.Gadde, A. M. Vahdat "The trickle-down effect: web caching and server request distribution", the 6th International Web Caching and Content Delivery Workshop, Boston, Jun 2001.
- [24] R. Tewari, H. Vin, A. Dan, and D. Sitaram, "Resource based caching for web servers," in Proceedings of SPIE/ACM Conference on Multimedia Computing, San Jose, CA, 1998.

- [25] S. Williams, M. Abrams, C. R. Standridge, G. Abdulla, and E. A. Fox, "Removal policies in network caches for world-wide web documents," in Proceedings of the ACM SIGCOMM, Stanford, CA, 1996, pp. 293-305.
- [26] P. Cao and S. Irani, "Cost-aware WWW proxy caching algorithms," in Proceedings of the USENIX Symposium on Internet Technologies and Systems, Dec. 1997, pp. 193-206.
- [27] R. T. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach, and T. Berners Lee. RFC 2616: Hypertext Transfer Protocol HTTP/1.1, June 1999.
- [28] T. Berners-Lee, L. Masinter, and M. McCahill. RFC1738: Uniform Resource Locators (URL), December 1994.
- [29] World Wide Web Consortium. HTML 4.01 Specification, December 24, 1999. W3C Recommendation.
- [30] A. S. Tanenbaum. Modern Operating Systems. Prentice Hall, 1992.
- [31] Squid Internet Object Cache. <<http://www.squid-cache.org/>>.
- [32] I. Cooper, I. Melve, and G. Tomlinson. RFC 3040: Internet Web Replication and Caching Taxonomy, January 2001.
- [33] IEFT: RFC3040: <http://www.ietf.org/rfc/rfc3040.txt>.
- [34] Napster. <<http://www.napster.com>>.
- [35] E. Adar and B. A. Huberman. Free riding on Gnutella. Technical report, Internet Ecologies Area, Xerox Palo Alto Research Center, September 2000.
- [36] A. Shaikh, R. Tewari, and M. Agrawal, "On the effectiveness of DNS-based server selection," in Proceedings of the IEEE Infocom2001 Conference, (Anchorage, Alaska USA), Apr. 2001.
- [37] Adero. <<http://www.adero.com>>.
- [38] NetCaching. <<http://www.netcaching.com>>.
- [39] Unitech Networks' IntelliDNS. <<http://www.unitechnetworks.com>>.
- [40] Akamai. <<http://www.akamai.com>>.
- [41] Digital Island. <<http://www.digitalisland.com>>.
- [42] Mirrorimage. <<http://www.mirror-image.com>>.
- [43] Solidspeed. <<http://www.solidspeed.com>>.
- [44] Speedera. <<http://www.sSpeedera.com>>.
- [45] Fasttide. <<http://www.fasttide.com>>.
- [46] Gnutella web site. <<http://www.gnutella.co.uk/>>.
- [47] Freenet project. <<http://freenet.sourceforge.net/>>.
- [48] FastTrack. <<http://www.fasttrack.nu/>>.
- [49] Morpheus. <<http://www.musiccity.com/>>.

- [50] Mojo nation. <<http://www.mojonation.net>>.
- [51] S. Ratnasamy, P. Francis, M. Handley, R. Karp, and S. Shenker. A scalable content addressable network. In Proceedings of ACM SIGCOMM, San Diego, CA, Aug 2001.
- [52] I. Stoica, R. Morris, D. Karger, M. F. Kaashoek, and H. Balakrishnan. Chord: A scalable peer-to-peer lookup service for internet applications. In Proceedings of ACM SIGCOMM, San Diego, CA, Aug 2001.
- [53] A. Rowstron and P. Druschel. Pastry: Scalable, distributed object location and routing for large-scale peer-to-peer systems. In IFIP/ACM International Conference on Distributed Systems Platforms (Middleware), Heidelberg, Germany, November 2001.
- [54] B. Y. Zhao, J. D. Kubiatowicz, and A. D. Joseph. Tapestry: An infrastructure for fault-tolerant wide-area location and routing. Technical Report UCB//CSD-01-1141, University of California, Berkeley, Apr 2000.
- [55] J. Kubiatowicz, D. Bindel, Y. Chen, S. Czerwinski, P. Eaton, D. Geels, R. Gummadi, S. Rhea, H. Weatherspoon, W. Weimer, C. Wells, and B. Zhao. OceanStore: An architecture for global-scale persistent storage. In Proceedings of International Conference on Architectural Support for Programming Languages and Operating Systems, Boston, MA, November 2000.
- [56] Farsite. <<http://research.microsoft.com/sn/Farsite/>>.
- [57] J. Kangasharju and K.W. Ross, "Performance Evaluation of Redirection Schemes in Content Distribution Networks", The 5th International Web Caching and Content Delivery Workshop, May 2000.
- [58] A. Beck and M. Hofmann, "Enabling the Internet to Delivery Content-Oriented Services," Proc. The 6th International Web Caching and Content Distribution, Boston, USA Jun 2001.
- [59] M. Chesire, A. Wolman, G.M. Voelker, and H.M. Levy, "Measurement and Analysis of a Stream Media Workload", USITIS'01, San Francisco, CA, Mar. 2001.
- [60] S. Acharya and B. Smith and P. Parnes, "Characterizing User Access To Videos on the World Wide Web" SPIE/ACM MMCN 2000, San Jose, CA, Jan 2000.
- [61] M. Arlitt, R. Friedrich, and T. Jin: "Performance Evaluation of Web Proxy Cache Replacement Policies", Lect. Notes Computer Science, Vol. 1469, pp. 193-206 1998.
- [62] Z. Miao and A. Ortega, "Proxy caching for efficient video services over the Internet", Packet Video Workshop'99, New York, NY, Apr 1999.

- [63] T. Ishikawa, "A Study on Improving the Replacement Algorithm for the Graceful Caching" Master Thesis, Waseda Univ, 2000 (in Japanese).
- [64] Zhou SU, Teruyoshi WASHIZAWA, Jiro KATTO and Yasuhiko YASUDA, "Hierarchical Image Caching in Content Distribution Networks", Proceedings of IEEE TENCON2002, pp 786-790, Peiking, Oct, 2002.
- [65] P. Rodriguez, C. Spanner, E. W. Biersack, " Web Caching Architectures: Hierarchical and Distributed Caching" The 4<sup>th</sup> International Web Caching Workshop, Mar.1999
- [66] S. Paul, Z.Fei, " Distributed Caching with Centralized Control" The 5<sup>th</sup> International Web Caching and Delivery Workshop, May.2000.
- [67] J.Kangasharju, F.Hartanto, M.Reisslein, K.W. Ross, "Distributing Layered Encoded Video through Caches", IEEE Transactions on Computers, vol. 51, n. 6, pp. 622-636, June 2002.
- [68] S.Sen, J.Rexford,and D.Towsley, " Proxy Prefix Caching for Multimedia Streams," IEEE INFOCOM99, N.Y, Mar.1999.
- [69] Sung-Ju Lee, Wei-Ying Ma, and Bo Shen"An Interactive Video Delivery and Caching System Using Video Summarization", WCW2001, Boston, MA, June 2001.
- [70] V. A. F. Almeida, M. A. G. Gesrio et al" Analyzing the Behavior of a Proxy Server in the Light of Regional and Cultural Issues" 1998.
- [71] L. Breslau, P. Cao, L. Fan, G. Phillips, and S. Shenker, "On the Implications of Zipf's Law for Web Caching", In 3rd International WWW Caching Workshop, June 1998.
- [72] J. Gwertzman. "Autonomous Replication in Wide-Area Networks". Technical Report 17-95, Harvard University.
- [73] K.Ebisawa, J.Katto and Y.Yasuda, "A Study on Distributed Caching for Multimedia Streams," IEICE Autumn Conference, B-7-84, Sep.2000 (in Japanese).
- [74] K.Ebisawa, J.Katto and Y.Yasuda, "A Web-Friendly Streaming Caching Scheme," IEICE Spring Conference, B-7-206, Mar.2001 (in Japanese).
- [75] M.Sasabe, N.Wakamiya, M.Murata, and H.Miyahara, "Proxy caching mechanisms with video quality adjustment", SPIE ITCom Feb. 2001.
- [76] J.Byers, J.Considine, and M.Mitzenmacher "Informed Content Delivery Across Adaptive Overlay Networks" SIGCOMM 2002, Pittsburgh, PA, Aug.2002.
- [77] R. Rejaie, H. Yu, M. Handley, and D. Estrin, " Multimedia proxy caching mechanism for quality adaptive streaming applications in the Internet, " IEEE INFOCOM 2000, Mar 2000.

- [78] R. Rejaie, M. Handley, D. Estrin, "RAP: An End-to-end Rate-based Congestion Control Mechanism for Realtime Streams in the Internet," Proceedings of IEEE Infocom'99, New York, NY., Mar 1999.
- [79] R. Rejaie, M. Handley, D. Estrin, "Quality Adaptation for Congestion Controlled Video Playback over the Internet" Proceedings of ACM SIGCOMM '99, Cambridge, MA., September 1999.
- [80] M. Kamath, K. Ramamritham, and D. Towsley, "Continuous media sharing in multimedia database systems," in Proceedings of the 4<sup>th</sup> International Conference on Database Systems for Advanced Applications, Apr. 1995.
- [81] S. Acharya and B. C. Smith, "Middleman: A video caching proxy server," in Workshop on Network and Operating System Support for Digital Audio and Video, June 2000.
- [82] S. Acharya and B. Smith, <sup>TM</sup>MiddleMan: A Video Caching Proxy Server,<sup>o</sup> Proc. 10th Int'l Workshop Network and Operating System Support for Digital Audio and Video (NOSSDAV), June 2000.
- [83] M. Chesire, A. Wolman, G.M. Voelker, and H.M. Levy, Measurement and Analysis of a Streaming Media Workload, Proc. Usenix Symp. Internet Technologies & Systems (USITS), Mar. 2001.
- [84] M. Reisslein, F. Hartanto, and K.W. Ross, Interactive Video Streaming with Proxy Servers, Information Sciences, An Int'l J., special issue on interactive virtual environment and distance education, vol. 140, nos. 1-2, pp. 3-31, Dec. 2001, a shorter version appeared in Proc. First Int'l Workshop Intelligent Multimedia Computing and Networking (IMMCN), pp. II-588-591, Feb. 2000.
- [85] R. Rajaie, J. Kangasharju, "A Quality Adaptive Multimedia Proxy Cache for Internet Streaming" Proceedings of the International Workshop on Network and Operating Systems Support for Digital Audio and Video, Port Jefferson, New York, June 2001.
- [86] I. Cidon, S. Kutten, and R. Soffer. Optimal allocation of electronic content. In Proceedings of IEEE Infocom, Anchorage, AK, Apr 22{26, 2001. 609} P. Krishnan, D. Raz, and Y. Shavitt. The cache location problem. IEEE/ACM Transactions on Networking, pp 568-582, October 2000.
- [87] B. Li, M. J. Golin, G. F. Italiano, and X. Deng. On the optimal placement of web proxies in the internet. In Proceedings of IEEE Infocom, New York, NY, pp 21-25, Mar 1999.

- [88] L. Qiu, V. N. Padmanabhan, and G. M. Voelker. On the placement of web server replicas. In Proceedings of IEEE Infocom, Anchorage, AK, pp 22-26, Apr 2001.
- [89] H M. Radha, M.V.D. Schaar, and Y. Chen, “The MPEG-4 Fine Grained Scalable Video Coding Method for Multimedia Streaming Over IP ”, IEEE Trans. Multimedia Vol.3, No.1, pp.53-67, Mar 2001.
- [90] J.Kangasharju, J.Roberts, K.W.Ross, “Object replication strategies in Content Distribution Networks”, Computer Communications, Vol. 25, Mar 2002.

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## Publication List

### Reviewed Journal Papers:

- 1] Zhou SU, Jiro KATTO, Takayuki NISHIKAWA, Munetugu MURAKAMI and Yasuhiko YASUDA, “Stream Caching Using Hierarchically Distributed Proxies with Adaptive Segments Assignment”, IEICE Trans on Commun, Vol.E86-B, No.6, Jun, 2003, pp 1859-1869
- 2] Zhou SU, Teruyoshi WASHIZAWA, Jiro KATTO and Yasuhiko YASUDA, “Integrated Pre-fetching and Caching Algorithm for Graceful Image Caching”, (To be published by IEICE Trans on Commun, Vol.E89-B, No.9, Sep, 2003)

### Reviewed International Conference Papers:

- 3] Zhou SU, Teruyoshi WASHIZAWA, Jiro KATTO and Yasuhiko YASUDA, “Performance Improvement of Graceful Caching by Using Request Frequency Based Prefetching Algorithm”, Proceedings of IEEE TENCON2001, Singapore, pp 370-376, Aug, 2001
- 4] Zhou SU, Teruyoshi WASHIZAWA, Jiro KATTO and Yasuhiko YASUDA, “Hierarchical Image Caching in Content Distribution Networks”, Proceedings of IEEE TENCON2002, pp 786-790, Peiking, Oct, 2002
- 5] Zhou SU, Jiro KATTO, Takayuki NISHIKAWA, Munetugu MURAKAMI, Teruyoshi WASHIZAWA and Yasuhiko YASUDA, “An integrated Scheme to Distribute Segmented Streaming Media over Hierarchical Caches”, Proceedings of International Conference on Information Technology & Applications (ICITA 2002), pp240-14, Australia, Dec, 2002

Other Publications:

6] Zhou SU, Teruyoshi WASHIZAWA, Jiro KATTO and Yasuhiko YASUDA, “A New Pre-fetching Algorithm for Graceful Caching system”, 2001 General Conference of IEICE, Mar, 2001

7] Zhou SU, Teruyoshi WASHIZAWA, Jiro KATTO and Yasuhiko YASUDA, “A New and Robust Replacement Algorithm for Proxy Caching with Hierarchical Image Coding”, 2001 Image Media Processing Symposium (IMPS2001), Nov, 2001

8] Takayuki NISHIKAWA, Munetugu MURAKAMI, Zhou SU, Jiro KATTO and Yasuhiko YASUDA, “A Study on Distributed Streaming System”, 2002 General Conference of IEICE, B-7-60, Mar, 2002

9] Munetugu MURAKAMI, Takayuki NISHIKAWA, Zhou SU, Jiro KATTO and Yasuhiko YASUDA, “Replacment Algorithms for Stream Caching”, 2002 General Conference of IEICE, B-7-61, Mar, 2002

10] Zhou SU, and Yasuhiko YASUDA, “Research on Performance Improvement of Content Delivery over the Internet”, NII Seminar, Oct, 2002

11] Zhou SU, Atsushi FUJIMORI, Jiro KATTO, and Yasuhiko YASUDA, “Replication Algorithm for Hierarchical Streaming Media in Content Delivery Networks”, IEICE General Conference 2003, B-7-43, Mar, 2003