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## REFERENCES

- ANDE92** D. Anderson, Y. Osawa, R. Govindan, "A File System for Continuous Media", *ACM Transactions on Computer Systems*, Vol. 10, No. 4, Nov, 1992, pp. 311-337.
- ARAS94** C.M. Aras, J.F. Kurose, D.S. Reeves, H. Schulzrinne, "Real-time Communication in Packet Switched Networks", *Proceedings of the IEEE*, Vol. 82, No. 1, pp. 122-139, Jan. 1994.
- BANE94** A. Banerjea, E.W. Knightly, F.L. Templin, H. Zhang, "Experiments with the Tenet Real-Time Protocol Suite on the Sequoia 2000 Wide Area Network", In *Proceedings of ACM Multimedia 1994*, San Francisco, CA, Oct. 1994, pp. 183-191.
- CCUB91** C-Cube Microsystems, "Designing JPEG Video Systems with the C-Cube CL550", C-Cube Microsystems, Milpitas, CA, 1991.
- CCIT93** CCITT Recommendation MPEG-1, "Coded Representation of Picture, Audio, and Multimedia/Hypermedia Information," ISO/IEC 11172, Geneva Switzerland, 1993.
- CHEN94** M.S. Chen, D.D. Kandlur, P.S. Yu, "Support for Fully Interactive Playout in a Disk-Array-Based Video Server", In *Proceedings of ACM Multimedia 1994*, San Francisco, CA, Oct. 1994, pp. 391-398.
- COHE94** D.M. Cohen, D.P. Heyman, "A Simulation Study of Video Teleconferencing Traffic in ATM Networks", In *Proceedings of IEEE INFOCOM 1993*, pp. 894-901.
- DAN94** A. Dan, D. Sitaram, P. Shahabuddin, "Scheduling Policies for an On-Demand Video Server with Batching", In *Proceedings of ACM Multimedia 1994*, San Francisco, CA, Oct. 1994, pp. 15-23.
- DAN94a** A. Dan, P. Shahabuddin, D. Sitaram, D. Towsley, "Channel Allocation under Batching and VCR Control in Movie-On-Demand Servers", *IBM Research Report RC19588*, Yorktown Heights, NY, 1994.
- DEGE95** M. Degermark, T. Kohler, S. Pink and O. Schelen, "Advance Reservations for Predictive Service", In *Proceedings of 5th Intl. Workshop on Network and Operating System Support for Digital Audio and Video*, Durham, New Hampshire, April 18-21, 1995, pp. 3-14.
- DEY94** J.K. Dey, C.S. Shih, M. Kumar, "Storage Subsystem in a Large Multimedia Server for High-Speed Network Environments," In *Proceedings of IS&T/SPIE Symposium on Electronic Imaging Science and Technology*, San Jose, CA, Feb. 1994.
- DEYS94** J. Dey-Sircar, J. Salehi, J. Kurose, D. Towsley, "Providing VCR Capabilities in Large-Scale Video Servers", In *Proceedings of ACM Multimedia 1994*, San Francisco, CA, Oct. 1994, pp. 25-32.
- FEDE94** C. Federighi, L. Rowe, "A Distributed Hierarchical Storage Manager for a Video-on-Demand System", In *Proceedings of 1994 IS&T/SPIE Symposium on Electronic Imaging: Science and Technology*, San Jose, CA Feb. 1994.
- FENG95** W. Feng, S. Sechrest, "Smoothing and Buffering for Delivery of Prerecorded Compressed Video", In *Proceedings of IS&T/SPIE Multimedia Computing and Networking*, Feb. 1995, San Jose, CA, pp. 234-242.
- FENG95a** W. Feng, S. Sechrest, "Critical Bandwidth Allocation for the Delivery of Compressed Prerecorded Video", *Computer Communications*, Vol. 18, No. 10, Oct. 1995, pp. 709-717.

- 
- FENG95b** W. Feng, F. Jahanian, S. Sechrest, "An Optimal Bandwidth Allocation Strategy for the Delivery of Compressed Prerecorded Video", CSE-Technical Report 260-95, University of Michigan, Sept. 1995.
- FENG97** W. Feng, F. Jahanian, S. Sechrest, "An Optimal Bandwidth Allocation Strategy for the Delivery of Compressed Prerecorded Video", *ACM/Springer-Verlag Multimedia Systems Journal*, 1997.
- FENG97a** W. Feng, "Rate-Constrained Bandwidth Smoothing for the Delivery of Stored Video", in *Proceedings of the 1997 SPIE Multimedia Computing and Networking Conference*, San Jose, CA, Feb. 1997.
- FENG95c** W. Feng, F. Jahanian, S. Sechrest, "A Network Cost Model for the Critical Bandwidth Allocation Approach," In *Proceedings of IASTD/ISMM International Conference on Distributed Multimedia Systems and Applications*, Stanford, CA, Aug. 1995.
- FENG96** W. Feng, F. Jahanian, S. Sechrest, "Providing VCR Functionality in a Constant Quality Video-On-Demand Transportation Service", In *Proceedings of 3rd IEEE International Conference on Multimedia Computing and Systems*, Hiroshima, Japan, June 1996.
- FENG95d** W. Feng, F. Jahanian, S. Sechrest, "Providing VCR Functionality in a Constant Quality Video-On-Demand Transportation Service", CSE-TechReport 271-95, Dec. 1995.
- FENG96a** W. Feng, S. Sechrest, "Improving Data Caching for Software MPEG Video Decompression", In *IS&T/SPIE Digital Video Compression: Algorithms and Technologies 1996*, San Jose, CA, Feb. 1996.
- FENG96b** W. Feng, "Video-On-Demand Services: Efficient Transportation and Decompression of Variable Bit Rate Video", Ph.D. Thesis, University of Michigan, April 1996.
- FERR94** D. Ferrari, A. Banerjea, H. Zhang, "Network Support for Multimedia: A Discussion of the Tenet Approach", *Computer Networks and ISDN Systems*, Vol. 26, 1994, pp. 1267-1280
- FERR95** D. Ferrari, A. Gupta and G. Ventre, "Distributed Advance Reservation of Real-Time Connections", In *Proceedings of 5th Intl. Workshop on Network and Operating System Support for Digital Audio and Video*, Durham, New Hampshire, April 18-21, 1995, pp. 15-26.
- GEMM95** D.J. Gemmell, H.M. Vin, D. Kandlur, P.V. Rangan, L.A. Rowe, "Multimedia Storage Servers: A Tutorial", *IEEE Computer*, Vol. 28, No. 5, May 1995, pp. 40-49.
- GEMM92** D.J. Gemmell, J.Han, "Principles of Delay Sensitive Multimedia Data Storage and Retrieval," *ACM Transactions on Information Systems*, Vol. 10, No. 1, Jan. 1992, pp. 51-90.
- GHAN93** M. Ghanbari, V. Seferidis, "Cell-Loss Concealment in ATM Video Codecs", *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 3, No. 3, June 1993, pp. 238-247.
- GONG95** K.L. Gong, L.A. Rowe, "Berkeley MPEG-1 User's Guide", University of California - Berkeley, Jan. 1995.
- GOYA96** Pawan Goyal, Harrick M. Vin, "Network Algorithms and Protocol for Multimedia Servers", In *Proceedings of INFOCOM 1996*, San Francisco, CA, March 1996, pp. 1371-1379.
- GROS95** M. Grossglauser, S. Keshav, and D. Tse, "RCBR: A Simple and Efficient Service for Multiple Time-Scale Traffic", in *Proceedings of ACM SIGCOMM*, pp. 219-230, Aug. 1995.
- JEFF92** K. Jeffay, D.L. Stone, T. Talley, F.D. Smith, "Adaptive, Best-Effort, Delivery of Audio and Video Data Across Packet-Switched Networks", In *Proceedings of Third International Workshop on Network and Operating System Support for Digital Audio and Video*, La Jolla, CA, Nov. 1992, pp. 3-14.
- KANA93** H. Kanakia, P.P. Mishra, A. Reibman, "An Adaptive Congestion Control Scheme for Real-Time Packet Video Transport", In *Proceedings of ACM SIGCOMM 1993*, September 1993, pp. 20-31.

- 
- KAND94** D. Kandlur, M. Chen, Z.Y. Shae, "Design of a Multimedia Storage Server", In *IS&T/SPIE Symposium on Electronic Imaging Science and Technology*, San Jose, CA, Feb. 1994.
- KATS94** H.P. Katseff, B.S. Robinson, "Predictive Prefetch in the Nemesis Multimedia Information Service", In *Proceedings of ACM Multimedia 1994*, San Francisco, CA, Oct. 1994, pp. 201-209.
- LAM94** S. Lam, S. Chow, D. Yau, "An Algorithm for Lossless Smoothing of MPEG Video", In *Proceedings of ACM SIGCOMM 1994*, 1994.
- LEGA91** D.J. LeGall, "A Video Compression Standard for Multimedia Applications," *Communications of the ACM*, Vol. 34, No. 4, (Apr. 1991), pp. 46-58.
- LITT94** T.D.C. Little, D. Venkatesh, "Prospects for Interactive Video-On-Demand", *IEEE Multimedia*, Vol. 1, No. 3, Fall 1994, pp. 14-24.
- LOUG93** P. Lougher, D. Shepherd, "The Design of a Storage Server for Continuous Media", *The Computer Journal*, Vol. 36, No. 1, Feb. 1993, pp. 32-42.
- MCMA96** J.M. McManus, K.W. Ross, "Video-On-Demand Over ATM: Constant-Rate Transmission and Transport", in *Proceedings of IEEE INFOCOM*, pp. 1357-1362, March 1996.
- MCMA97** J.M. McManus, K.W. Ross, "A Dynamic Programming Methodology for Managing Prerecorded VBR Sources in Packet-Switched Networks", Unpublished report (Univ. of Pennsylvania), January 1997.
- PANC94** P. Pancha, M. El Zarki, "MPEG Coding for Variable Bit-Rate Video Transmission", *IEEE Communications Magazine*, Vol. 32, No.5, May 1994, pp. 54-66.
- PANC92** P. Pancha, M. El Zarki, "Prioritized Transmission of Variable Bit Rate MPEG Video", In *IEEE GLOBECOM 1992*, Dec. 1992, pp. 1135-1139.
- PANC93** P. Pancha, M. El Zarki, "Bandwidth Allocation Schemes for Variable Bit Rate MPEG Sources in ATM Networks," *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 3, No. 3, June 1993, pp. 190-198.
- PANC93a** P. Pancha, M. El Zarki, "Bandwidth Requirements of Variable Bit Rate Sources in ATM Networks", In *Proceedings of INFOCOM 1993*, March 1993, pp. 902-909.
- PARE92** A. Parekh, "A Generalized Processor Sharing Approach to Flow Control in Integrated Services Networks", Ph.D. Thesis, The Massachusetts Institute of Technology, 1992.
- PATE93** K. Patel, B.C. Smith, L.A. Rowe, "Performance of a Software MPEG Video Decoder", In *Proceedings of ACM Multimedia 1993*, Anaheim, CA, August 1993, pp. 75-82.
- RAMA93** S. Ramanathan, P. V. Rangan, "Adaptive Feedback Techniques for Synchronized Multimedia Retrieval over Integrated Networks," *IEEE/ACM Transactions on Networking*, Vol. 1, No. 2, April 1993, pp. 246-260.
- RANG91** P. Venkat Rangan, H.M. Vin, "Designing File Systems for Digital Video and Audio", In *Proceedings of the 13th ACM Symposium on Operating Systems Principles*, Operating Systems Review, Vol. 25, No. 5, October 1991, pp. 81-94.
- RANG93** P. Venkat Rangan, H.M. Vin, "Efficient Storage Techniques for Digital Continuous Multimedia," *IEEE Transactions on Knowledge and Data Engineering*, Vol. 5, No. 4, Aug. 1993, pp. 564-573.
- REIN93** D. Reininger, D. Raychaudhuri, et. al, "Statistical Multiplexing of VBR MPEG Compressed Video on ATM Networks", In *Proceedings of IEEE INFOCOM 1993*, March 1993, pp. 919-926.
- REX97** J. Rexford, S. Sen, J. Dey, W. Feng, J. Kurose, J. Stankovic, D. Towsley, "Online Smoothing of Live, Variable-Bit-Rate Video", In *Proceedings of International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV '97)*, May 1997.

- 
- ROWE94** L.A. Rowe, K. D. Patel, B.C. Smith, K. Liu, "MPEG Video in Software: Representation, Transmission, and Playback", In Proceedings of *High Speed Networking and Multimedia Computing, IS&T/SPIE Symposium on Electronic Imaging, Science, and Technology*, San Jose, CA Feb. 1994.
- ROWE94a** L. Rowe, "Video Compression, What to Do When Everything is Changing", *Invited Talk Usenix 1994*.
- ROWE92** L.A. Rowe, B.C. Smith, "A Continuous Media Player", In Proceedings of the *3rd International Workshop on Network and Operating System Support for Digital Audio and Video*, San Diego, CA, Nov. 1992.
- SALE96** J.D. Slaehi, Z.L. Zhang, J.F. Kurose, D. Towsley, "Optimal Buffering for the Delivery of Compressed Pre-recorded Video", in *Proceedings of ACM SIGMETRICS*, pp. 222-231, May 1996.
- SHEN95** P. J. Shenoy, H. M. Vin, "Efficient Support for Scan Operations in Video Servers", In Proceedings of the *3rd ACM Conference on Multimedia*, October, 1995.
- STON93** D. Stone, K. Jeffay, "Queue Monitoring: A Delay Jitter Management Policy", In Proceedings of the *4th International Workshop on Network and OS Support for Digital Audio and Video*, 1993.
- VIN94** H.M. Vin, P. Goyal, A. Goyal, A. Goyal, "A Statistical Admission Control Algorithm for Multimedia Servers", In Proceedings of *ACM Multimedia 1994*, San Francisco, CA, Oct. 1994, pp. 33-40.
- VIN93** H.M. Vin, P.V. Rangan, "Designing a Multi-user HDTV Storage Server," *IEEE Journal on Selected Areas in Communications*, Vol. 11, No. 1, Jan. 1993, pp. 152-164.
- WALL91** G.K. Wallace, "The JPEG Still Picture Compression Standard," *Communications of the ACM*, Vol. 34, No. 4, (Apr. 1991), pp. 30-44.
- WILL93** P. Willis, "MPEG-2 Digital TV All Set to Go", *Electronics World and Wireless World*, Vol. 99, No. 5, May 1993, pp. 356-357.
- WOLF95** L. Wolf, L. Delgrossi, R. Steinmetz, S. Schaller and H. Wittig, "Issues of Reserving Resources in Advance", In Proceedings of *5th Intl. Workshop on Network and Operating System Support for Digital Audio and Video*, Durham, New Hampshire, April 18-21, 1995, pp. 27-37.
- ZHAN91** H. Zhang, S. Keshav, "Comparison of Rate-Based Service Disciplines", In Proceedings of *ACM SIGCOMM '91*, Sept. 1991, pp. 113-121.

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