Resource Virtualization

Reading List

Note: We will not read all of these papers in class. The syllabus is the final word on the specific papers that we shall read in class.

Most of these papers are available from the web (use http://scholar.google.com and http://citeseer.ist.psu.edu to find them. I will make photocopies of the older, non-web papers available as needed.)

Books

J. Smith, R. Nair, *Virtual Machines: Versatile Platforms For Systems And Processes*, Morgan Kaufmann, 2005.

C. Wolf, E. Halter, *Virtualization From the Desktop to the Enterprise*, APress, 2005.

Intel Corporation, *Intel 64 and IA-32 Architectures Software Developers Manual, Volumes 1, 2A, 2B, 3A, and 3B.* (Available for free online and on paper)

AMD Corporation, *AMD64 Architecture Programmer's Manual, Volumes 1, 2, 3, 4, and 5*. (Available for free online)

Collection

R. Figueiredo, P. Dinda, J. Fortes, Editors, *Resource Virtualization Renaissance*, IEEE Computer, May, 2005. This issue includes these papers

- J. Smith, R. Nair, *The Architecture of Virtual Machines*
- M. Rosenblum, T. Garfinkel, *Virtual Machine Monitors: Current Technology and Future Trends*
- R. Uhlig, et al, *Intel Virtualization Technology*
- A. Whitaker, et al, *Rethinking the Design of Virtual Machine Monitors*,
- P. Ruth, et al, *Virtual Distributed Environments in a Shared Infrastructure*
- P. Magnusson, *The Virtual Test Lab*

Virtualization-based Computing Environments

1. F. Corbato, V. Vyssostsky, *Introduction and Overview of the Multics System*, Fall Joint Computer Conference, 1965. Note: Multics was **not** a VM-based computing environment. Nonetheless, it gives you an idea of the "vision" of many of these environments.

2. C. Waldsburger. T. Hogg, *Spawn: A Distributed Computational Economy*, IEEE Transactions on Software Engineering, 18(2), 1992. Note: not VM-based, but an excellent paper on computation economies.
3. R. Figueiredo, P. Dinda, J. Fortes, *A Case for Grid Computing on Virtual Machines*, ICDCS 2003.
4. S. Hand, et al, *Controlling the XenoServer Open Platform*, OpenARCH 2003.
5. K. Fraser, et al, *The XenoServer Computing Infrastructure*, Technical Report UCAM-CL-TR-552, University of Cambridge, 2003.
6. C. Sapuntzakis, et al, *Virtual Appliances for Deploying and Maintaining Software*, LISA 2003.
7. T. Garfinkel, et al, *Terra: A Virtual Machine-based Platform for Trusted Computing*, SOSP 2003.
8. X. Jiang, D. Xu, *SODA: A Service-on-demand Architecture for Application Service Hosting Utility Platforms*, HPDC 2003.
9. A. Shoykhet, et al, *Virtuoso: A System for Virtual Machine Marketplaces*, Technical Report NWU-CS-04-39, Northwestern University, 2004.
10. R. Potter, *One-click Distribution of Preconfigured Linux Runtime State*, USENIX VM 2004 (WIP).
11. A. Bavier, et al, *Operating System Support for Planetary-scale Network Services*, NSDI 2004.
12. S. Adablala, et al, *From Virtualized Resources to Virtual Computing Grids: The In-VIGO System*, Future Generation Computer Systems 21:6, April, 2005
13. R. Chandra, et al, *The Collective: A Cache-based System Management Architecture*, NSDI 2005.
14. P. Ruth, et al, *VioCluster: Virtualization for Dynamic Computational Domains*, Cluster 2005.
15. M. Satyanarayanan, et al, *Towards Seamless Mobility on Pervasive Hardware*, Pervasive and Mobile Computing 1:2, June, 2005. The home page of the ISR deployment at CMU is at http://isr.cmu.edu/
16. K. Keahey, et al, *Virtual Workspaces in the Grid*, Euro-Par 2005.
17. A. Maccabe, et al, *Panel on Whole System Virtualization In High End Computing Systems*, HPDC 2005. (slides available from http://www.caip.rutgers.edu/hpdc2005/program.html)
18. A. Ganguly, et al, *WOW: Self-Organizing Wide Area Overlay Networks of Virtual Workstations*, HPDC 2006.
19. P. Fabian, et al, *Virtualization in the Enterprise*, Intel Technology Journal, Volume 10, Number 3, August, 2006.
20. D. Gupta, et al, *Difference Engine: Harnessing Memory Redundancy in Virtual Machines*, OSDI 2008.

Traditional OS-level Virtual Machines

21. R. Goldberg, *Architecture of Virtual Machines*, Proceedings of the Workshop on Virtual Computer Systems, Cambridge, Mass, 1973, pp 74-11
22. R. Goldberg, *Survey of Virtual Machine Research*, IEEE Computer, June 1974, pp 34-45.

23. L. Seawright, R. MacKinnon, *VM/370: A Study of Multiplicity and Usefulness*, IBM Systems Journal 18(1), 1979.
24. R. Creasy, *The Origin of the VM/370 Time-Sharing System*, IBM Systems Journal 25(5), 1981.
25. VM/370: The subject of IBM Systems Journal 18(1), 1979 (9 articles)
26. VM/386 (http://www.igcinc.com/vm386.htm)
27. Virtual 8086 mode: http://www.openbg.net/sto/os/xml/v86.html
28. P. Karger, et al, *A Retrospective on the VAX VMM Security Kernel*, IEEE Transactions on Software Engineering, November, 1991.
29. K. Lawton, *Running Multiple Operating Systems Concurrently on an IA32 PC Using Virtualization Techniques.*
30. Plex/86: http://plex86.sourceforge.net/
31. J. Nieh, O. Leonard. *Examining VMWare*, Dr. Dobb's Journal, August 2000.
32. C. Waldsburger, *Memory Resource Management in VMWare ESX Server*, OSDI 2002.
33. VMWare, Inc., *Introducing the VMWare Virtual Platform*
34. Devine, S., et al, *Virtualization System Including A Virtual Machine Monitor For a Computer With A Segmented Architecture*, U.S. Patent #6397242. (VMWare Patent)
35. J. Honneycutt, *Microsoft Virtual PC 2004 Technical Overview*.
36. Y. Dong, et al, *Extending Xen with Intel Virtualization Technology*, Intel Technology Journal, Volume 10, Number 3, August 2006.
37. K. Adams, O. Agesen, *A Comparison of Software and Hardware Techniques for x86 Virtualization*, ASPLOS 2006.
38. Ian Pratt, *Linux World Xen Master Class Notes*, 2006.

Paravirtualized Virtual Machines

39. D. Engler, et al, *Exokernel: An Operating System Architecture for Application-Level Resource Management*, SOSP 1995.
40. E. Bugnion, et al, *Disco: Running Commodity Operating Systems on Scalable Multiprocessors*, ACM Transactions on Computer Systems, 18(3), August 2000.
41. J. Dike, *A User-mode Port of the Linux Kernel*, Linux Showcase and Conference 2000. (see also http://user-mode-linux.sourceforge.net/)
42. H. Hoxer, et al, *Implementing a User-mode Linux with Minimal Changes from the Original Kernel*, 2002 Linux System Technology Conference.
43. Whitaker, et al, *Scale and Performance in the Denali Isolation Kernel*, OSDI 2002.
44. P. Barham, et al, *Xen and the Art of Virtualization*, SOSP 2003.
45. S. Hand, et al, *Are Virtual Machine Monitors Microkernels Done Right?*, HOTOS X (2005).
46. Heiser, et al, *Are Virtual-Machine Monitors Microkernels Done Right?*, Technical Report PA005130, National ICT, Australia, 2005. (A heated response to the previous paper by people who do microkernels)

47. J. LeVasseur, et al, *Pre-Virtualization: Slashing the Cost of Virtualization*, Technical Report 2005-30, Fakultaet fuer Informatik, Universitaet Karlsruhe, 2005.
48. T. Roscoe, et al, *Hype and Virtue*, HOT OS XI (2007)

Architectural Issues

49. E. Mallach, *On the Relationship Between Virtual Machines and Emulators*, Proceedings of the Workshop on Virtual Computer Systems, Cambridge, Mass, 1973, pp 117-126.
50. G. Popek, R. Goldberg, *Formal Requirements for Virtualizable Third Generation Architectures*, Communications of the ACM, 17(7), July, 1974, pp 413-421.
51. J. Hall, P. Robinson, *Virtualizing the VAX Architecture*, Proceedings of ISCA 1991, pp 380-389
52. J. Robin, C. Irvine, *Analysis of the Intel Pentium's Ability to Support a Secure Virtual Machine Monitor*, Proceedings of of the 9th USENIX Security Symposium, Denver, CO, August 2000.
53. Intel Corporation, *Intel Vanderpool Technology for IA-32 Processors (VT), http://www.intel.com/technology/computing/vptech/*
54. AMD Corporation, *Pacifica Virtualization Extensions, http://enterprise.amd.com/Enterprise/serverVirtualization.aspx*
55. G. Neiger, et al, *Intel Virtualization Technology: Hardware Support for Efficient Processor Virtualization*, Intel Technology Journal, Volume 10, Number 3, August, 2006.
56. S. Hu and J. Smith, *Reducing Startup Time in Co-designed Virtual Machines*, ISCA 2006.
57. P. Karger, *Performance and Security Lessons Learned from Virtualizing the Alpha Processor*, ISCA 2007.

.

Emulation, Simulation, and Binary Translation

58. E. Mallach, *On the Relationship Between Virtual Machines and Emulators*, Proceedings of the Workshop on Virtual Computer Systems, Cambridge, Mass, 1973, pp 117-126.
59. R. Sites, et al, *Binary Translation*, Communications of the ACM, 36(2), February, 1993.
60. P. Magnusson, et al, *Simics: A Full System Simulation Platform*, IEEE Computer 35(2), 2002.
61. Microsoft Virtual PC for Mac
62. K. Lawton, Bochs IA-32 Emulator: http://bochs.sourceforge.net/
63. F. Bellard, *QEMU: A Fast and Portable Dynamic Translator*, USENIX 2005.
64. C-K Luk, et al, *Pin: Building Customized Program Analysis Tools With Dynamic Instrumentation*, PLDI 2005.

65. P. Bugale, C-K Luk, *PinOS: A Programmable Framework for Whole System Dynamic Instrumentation*, VEE 2007.

Language-level Virtual Machines

66. W. Dobrusky, T. Steel, *UNCOL: Universal Computer-Oriented Language*, Communications of the ACM 4(3), 1961. (abstract only)
67. P. Bagley, *Principles and Problems of a Universal Computer-Oriented Language*, The Computer Journal 4(4), 1962.
68. UCSD p-system: http://www.threedee.com/jcm/psystem/, http://www.ics.uci.edu/~archive/documentation/p-system/p-system.html
69. T. Lindholm, F. Yellin, *The Java Virtual Machine Specification, 2nd Edition.* Available from http://java.sun.com/docs/books/vmspec/2nd-edition/html/VMSpecTOC.doc.html
70. A. Adl-Tabatabai et al, *Fast, Effective Code Generation in a Just-in-Time Java Compiler*, PLDI 1998.
71. E. Meijer, J. Gough, *Technical Overview of the Common Language Runtime.*
72. Microsoft .NET/CLR documentation: http://msdn.microsoft.com/netframework/
73. W. Vogels, *HPC.NET: Are CLI-based Virtual Machines Suitable for High Performance Computing?*, SC 2003.

Virtual Servers

74. Ensim, Inc, *Virtual Private Servers*
75. *Free VSD: http://www.freevsd.org*
76. *Linux V-server: http://www.linux-vserver.org/*
77. P. Kam, R. Watson, *Jails: Confining the Omnipotent Root*, SANE 2000.
78. D. Price, R. Tucker, *Solaris Zones: Operating System Support for Consolidating Commerical Workloads*, LISA 2004.
79. Y. Yu, *A Featherweight Virtual Machine for Windows Applications*, VEE 2006.

Virtual Devices

80. J. Sugarman, G. Venkitachalam, B-H Lim, *Virtualizing I/O Devices on VMWare Workstation's Virtual Machine Monitor*, USENIX 2001.
81. S. King, et al, *Operating System Support for Virtual Machines*, USENIX 2003.
82. K. Fraser, et al, *Reconstructing I/O*, Technical Report UCAM-CL-TR-596, University of Cambridge.
83. J. LeVasseur, et al, *Unmodified Device Driver Reuse and Improved System Dependability Via Virtual Machines*, OSDI 2004.
84. A. Whitaker, et al, *Constructing Services With Interposable Virtual Hardware*, NSDI 2004.

85. A. Menon, et al, *Diagnosing Performance Overheads in the Xen Virtual Machine Environment*, VEE 2005.
86. L. Cherkasova, R. Gardner, *Measuring CPU Overhead for I/O Processing in the Xen Virtual Machine Monitor*, USENIX 2005.
87. A. Menon, et al, *Optimizing Network Virtualization in Xen*, USENIX 2006
88. J. Liu, et al, *High Performance VMM-Bypass I/O in Virtual Machines*, USENIX 2006.
89. D. Abramson, et al, *Intel Virtualization Technology for Directed I/O*, Intel Technology Journal, Volume 10, Number 3, August, 2006.
90. H. Raj, et al, *High Performance and Scalable I/O Virtualization via Self-virtualized Devices*, HPDC 2007.
91. J. Shafer, et al, *Concurrent Direct Network Access for Virtual Machine Monitors*, HPCA 2007.
92. H. Lager-Cavilla, *VMM-Independent Graphics Acceleration*, VEE 2007.

Virtual Storage / SANs

93. G. Alvarez, et al, *MINERVA: An Automated Resource Provisioning Tool for Large-Scale Storage Systems*, ACM Transactions on Computer Systems 19(4), 2001.
94. M. Beck, et al, *An End-to-end Approach to Globally Scalable Network Storage*, SIGCOMM 2002. (see also http://loci.cs.utk.edu/)
95. C. Lumb, et al, *Façade: Virtual Storage Devices with Performance Guarantees*, USENIX FAST 2003.
96. L. Huang, et al, *Multidimensional Storage Virtualization*, SIGMETRICS 2004.
97. Wikipedia, *Storage Area Networks*, http://en.wikipedia.org/wiki/Storage_area_network. Brief Intro. Includes pointer to the excellent and highly detailed IBM Redbook on SANs.
98. B. Pfaff, et al, *Virtualization Aware File Systems: Getting Beyond the Limitations of Virtual Disks*, NSDI 2006.
99. P. Nath, et al, *Design Tradeoffs In Applying Content Addressable Storage to Enterprise-scale Systems Based On Virtual Machines*, USENIX 2006.
100. T. Hirofuchi, et al, *USB/IP – A Peripheral Bus Extension For Device Sharing Over IP Networks*, USENIX 2005.
101. B. Pfaff, et al, *Virtualization-aware File Systems: Getting Beyond the Limitations of Virtual Disks*, NSDI 2006.

Virtual Services

102. J. Weissman, B. Lee, *The Virtual Service Grid: an architecture for delivering high-end network services*, Concurrency: Practice and Experience, 14(4), 2002.
103. M. Zhao, et al, *Distributed File System Support For Virtual Machines in Grid Computing*, HPDC 2004

104. I. Foster, et al, *The Open Grid Services Architecture, Version 1.0,* Global Grid Forum Informational Draft, 2005.

Virtual Networking and Overlays

105. P. Ferguson, G. Huston, *What is a VPN?*, Technical Report, Cisco Systems, March 1998.
106. B. Gleeson, et al, *A Framework for IP-based Virtual Private Networks*, IETF RFC 2764, February 2000.
107. G. Italiano, et al, *Restoration Algorithms for Virtual Private Networks in the Hose Model*, INFOCOM 2002.
108. IEEE 802.1Q Working Group, *802.1q: Virtual LANs,* IEEE, 2001.
109. J. Jannotti, et al, *Overcast: Reliable Multicasting With An Overlay Network*, OSDI 2000.
110. D. Andersen, et al, *Resilient Overlay Networks*, SOSP 2001.
111. Y-H Chu, et al, *A Case For End-System Multicast*, IEEE JSAC 20:8, 2002.
112. S. Shi, J. Turner, *Routing In Overlay Multicast Networks*, INFOCOM 2002.
113. J. Rosenberg, et al, *STUN: Simple Traversal Of User Datagram Protocol (UDP) Through Network Address Translators (NATs)*, IETF RFC 3489, 2003.
114. S. Banerjee, et al, *Resilient Multicast Using Overlays*, SIGMETRICS 2003.
115. A. Sundararaj, P. Dinda, *Towards Virtual Networks for Virtual Machine Grid Computing,* USENIX VM 2004.
116. X. Jiang, D. Xu, *VIOLIN: Virtual Internetworking on Overlay Infrastructure*, Technical Report CSD TR 03-027, Department of Computer Science, Purdue University.
117. M. Walfish, et al, *Middleboxes No Longer Considered Harmful*, OSDI 2004.
118. L. Subramanian, I. Stoica, *OverQoS: An Overlay-based Architecture for Enhancing Internet QoS,* NSDI 2004.
119. S. Birrer, et al, *Building a Resilient Multisource Multicast Fat Tree*, WCCD 2004.
120. A. Ganguly, et al, *IP over P2P: Enabling Self-configuring Virtual IP Networks for Grid Computing*, IPDPS 2006.
121. M. Tsugawa, J. Fortes, *A Virtual Network (ViNe) Architecture for Grid Computing*, IPDPS 2006.
122. J. Lange, P. Dinda, *Transparent Network Services via a Virtual Traffic Layer for Virtual Machines*, HPDC 2007.
123. A. Gunguly, et al, *Improving Peer Connectivity in Wide-area Overlays of Virtual Workstations*, HPDC 2008.

Inference, Measurement, Adaptation, and Reservation

124. W. Tetzlaff, *State Sampling of Interactive VM/370 Users*, IBM Systems Journal 18(1), 1979.
125. A. Gupta, P. Dinda, *Inferring the Topology and Traffic Load of Parallel Programs Running in a Virtual Machine Environment*, JSSPPP 2004.
126. A. Sundararaj, et al, *Increasing Application Performance In Virtual Environments Through Run-time Inference and Adaptation*, HPDC 2005
127. J. Lange, et al, *Automatic Dynamic Run-time Optical Network Reservations*, HPDC 2005.
128. B. Lin, P. Dinda, *VSched: Mixing Batch and Interactive Virtual Machines Using Periodic Real-time Scheduling*, SC 2005.
129. J. Xu, et al, *Towards Autonomic Virtual Applications in the In-VIGO System*, ICAC 2005
130. A. Gupta, et al, *Free Network Measurement for Adaptive Virtualized Distributed Computing*, IPDPS 2006.
131. B. Lin, P. Dinda, *Putting the User in Direct Control of CPU Scheduling*, Technical Report NWU-EECS-06-07, Department of EECS, Northwestern University, 2006.
132. P. Ruth, et al, *Autonomic Live Adaptation of Virtual Computational Environments in a Multi-domain Infrastructure, ICAC 2006.*
133. S. Jones, et al, *AntFarm: Tracking Processes in a Virtual Machine Environment*, USENIX 2006.
134. A. Sundararaj, *Automatic, Run-time, and Dynamic Adaptation of Distributed Applications Executing in Virtual Environments*, 2006, Doctoral Dissertation, Department of EECS, Northwestern University. Available as NWU-EECS-06-18.
135. S. Jones, et al, *Geiger: Monitoring the Page Cache in a Virtual Machine Environment*, ASPLOS 2006.
136. B. Prosnitz, *Black Box No More: Reconstruction of Internal Virtual Machine State*, Technical Report NWU-EECS-07-01, Department of EECS, Northwestern University.
137. T. Wood, et al, *Black-box and Gray-box Strategies for Virtual Machine Migration*, NSDI 2007.
138. A. Gupta, *Black Box Methods for Inferring Parallel Applications' Properties in Virtual Environments*, Doctoral Dissertation, Department of EECS, Northwestern University. Available as NWU-EECS-08-04.

Power Management

139. J. Moore, et al, *Making Scheduling "Cool": Temperature-Aware Workload Placement in Data Centers*, USENIX 2005.
140. R. Nathuji, K. Schwan, *VirtualPower: Coordinated Power Management in Virtualized Enterprise Systems*, SOSP 2007.

141. R. Nathuhi, K. Schwan, *VPM Tokens: Virtual Machine-Aware Power Budgeting in Datacenters*, HPDC 2008.

Security and Reliability

142. S. Madnick, J. Donovan, *Application and Analysis of the Virtual Machine Approach to Information System Security and* Isolation, Proceedings of the Workshop on Virtual Computer Systems, Cambridge, Mass, 1973, pp 210-224.
143. G. Popek, C. Kline, *A Verifiable Protection System*, Proceedings of the International Conference on Reliable Software, LA, CA, 1975, pp 294-304.
144. T. Bressoud and F. Schneider, *Hypervisor-based Fault Tolerance*, ACM Transactions on Computer Systems, 14(1), 1996.
145. P. Chen, B. Noble, *When Virtual is Better Than Real*, HOT-OS 2001.
146. G. Dunlop, et al, *ReVirt: Enabling Intrusion Analysis Through Virtual Machine Logging and Replay*, OSDI 2002.
147. T. Garfinkel, M. Rosenblum, *A Virtual Machine Introspection-based Architecture for Intrusion Detection,* NDSS 2003.
148. P. Dinda, *Addressing the Trust Asymmetry Problem in Grid Computing Using Encrypted Computation,* LCR 2004.
149. S. King, et al, *Debugging Operating Systems With Time-traveling Virtual Machines*, USENIX 2005.
150. A. Seshadri, et al, *SecVisor: A Tiny Hypervisor to Provide Lifetime Kernel Code Integrity for Commodity OSes*, SOSP 2007.
151. B. Cully, et al, *Remus: High Availability via Asynchronous Virtual Machine Replication*, NSDI 2008.
152. S. Jones, et al, *VMM-based Hidden Process Detection and Identification using Lycosid*, VEE 2008.
153. X. Chen, et al, *Overshadow: A Virtualization-based Approach to Retrofitting Protection in Commodity Operating Systems,* ASPLOS 2008.
154. J. McCune, et al, *How Low Can You Go? Recommendations for Hardware-Supported Minimal TCB Code Execution,* ASPLOS 2008.

Migration of Virtual Machines

155. A. Muthitacharoen, et al, *A Low-bandwidth Network File System*, SOSP 2001.
156. M. Kozuch, et al, *Efficient State Transfer for Internet Suspend/Resume,* Technical Report IRP-TR-02-03, Intel Research Pittsburgh, 2002.
157. C. Sapuntzakis, et al, *Optimizing the Migration of Virtual Computers*, OSDI 2002.
158. S. Osman, *The Design and Implementation of Zap: A System for Migrating Computing Environments,* OSDI 2002.

159. T. Boyd, P. Dasgupta, *Process Migration: A Generalized Approach Using a Virtualizing Operating System*, ICDCS 2002.
160. C. Clark, et al, *Live Migration of Virtual Machines*, NSDI 2005.
161. M. Nelson, et al, *Fast Transparent Migration for Virtual Machines*, USENIX 2005.
162. W. Huang, et al, *Nomad: Migrating OS-bypass Networks in Virtual Machines*, VEE 2007.
163. R. Bradford, et al, *Live Wide-Area Migration of Virtual Machines Including Local Persistent State*, VEE 2007.
164. S. Kumar, K. Schwan, *A VMM-level Mechanism for Continuous, Transparent Device Access During VM Migration*, VEE 2008.

Remote Display

165. P. Romano, *ITU-T Recommendation T.128 (Application Sharing)*, ITU Technical Report, 1997.
166. T. Richardson, et al, *Virtual Network Computing*, IEEE Internet Computing 2:1, 1998.
167. B. Schmidt, et al, *The Interactive Performance of SLIM: A Stateless Thin-client Architecture*, SOSP 1999.
168. Microsoft, *Remote Desktop Protocol (RDP) Features and Performance*, 2000.
169. A. Lai, J. Nieh, *Limits of Wide-Area Thin-client Computing*, SIGMETRICS 2002.
170. R. Baratto, et al, *THINC: A Virtual Display Architecture for Thin-Client Computing*, SOSP 2005.
171. S. Rossoff, P. Dinda, *Prospects for Speculative Remote Display*, Technical Report NWU-EECS-06-08, Department of EECS, Northwestern University, 2006.
172. J. Lange, P. Dinda, S. Rossoff, *Experience with Client-based Speculative Remote Display*, USENIX 2008.

General Reference

173. B. Lampson, *Hints for Computer System Design*, ACM SIGOPS 15:5, October, 1983.
174. J. Salzer, et al, *End-to-end Arguments in System Design*, ACM TOCS 2:4, 1984.

Palacios Related Materials

175. D. Hovenmeyer, et al, *Running on the Bare Metal with GeekOS*, SIGCSE 2004.

176. J. Lange, P. Dinda, *An Introduction to the Palacios Virtual Machine Monitor---Release 1.0*, Technical Report NWU-EECS-08-11, Department of EECS, Northwestern University, 2008. (download Palacios from v3vee.org)
177. Sandia National Labs, *Kitten Lightweight Kernel*, https://software.sandia.gov/trac/kitten, 2008.

Humorous

178. The SCIgen Automatic CS Paper Generator and the story behind it, http://pdos.csail.mit.edu/scigen/