Sistemas Operacionais Avançados

1. Objetivos

Esta é uma disciplina de pós-graduação em sistemas operacionais. Como tal, essa disciplina dará uma compreensão mais profunda dos subsistemas do sistema operacional para gerenciamento de processos, gerenciamento de memória e assim por diante (ver ementa), além de expor o aluno à literatura clássica e contemporânea sobre o assunto.

2. Ementa

Sistemas Operacionais Prévios, Estruturas Alternativas de SO, Gerenciamento de Processos, Controle de Concorrência, Gerenciamento de Memória, Sistemas de arquivos, Comunicação, Confiabilidade, isolamento de falhas e depuração.

3. Programa e Bibliografia

Sistemas Operacionais Prévios

- **[Ritchie:Unix]** Ritchie, Dennis M., Thompson, Ken, The UNIX Time-sharing System, *Commun. ACM*, Vol. **17**, No. 7, pp. 365--375, ACM, New York, NY, USA, July 1974. **[HTML]**
- **[Ritchie:Evolution]** Dennis M. Ritchie, The Evolution of the Unix Time-sharing System, *Communications of the ACM*, Vol. **17**, pp. 365--375, 1984. **[PDF]**

Estruturas Alternativas de SO

- **[Engler:Exokernel]** Engler, D. R., Kaashoek, M. F., O'Toole,Jr., J., Exokernel: An Operating System Architecture for Application-level Resource Management, *Proceedings of the Fifteenth ACM Symposium on Operating Systems Principles*, pp. 251--266, ACM, New York, NY, USA, 1995. **[HTML]**
- **[Barham:Xen]** Barham, Paul, Dragovic, Boris, Fraser, Keir, Hand, Steven, Harris, Tim, Ho, Alex, Neugebauer, Rolf, Pratt, Ian, Warfield, Andrew, Xen and the Art of Virtualization, *Proceedings of the Nineteenth ACM Symposium on Operating Systems Principles*, pp. 164--177, ACM, New York, NY, USA, 2003. **[HTML]**
- **[Hunt:Singularity]** Larus, James, Hunt, Galen, The Singularity System, *Commun. ACM*, Vol. **53**, No. 8, pp. 72--79, ACM, New York, NY, USA, August 2010. **[HTML]**

Gerenciamento de Processos e Controle de Concorrência I

- **[Anderson:Activations]** Anderson, Thomas E., Bershad, Brian N., Lazowska, Edward D., Levy, Henry M., Scheduler Activations: Effective

Kernel Support for the User-level Management of Parallelism, *Proceedings of the Thirteenth ACM Symposium on Operating Systems Principles*, pp. 95--109, ACM, New York, NY, USA, 1991. **[HTML]**

- **[Waldspurger:Lottery]** Waldspurger, Carl A., Weihl, William E., Lottery Scheduling: Flexible Proportional-share Resource Management, *Proceedings of the 1st USENIX Conference on Operating Systems Design and Implementation*, USENIX Association, Berkeley, CA, USA, 1994. **[HTML]**
- **[Savage:Eraser]** Savage, Stefan, Burrows, Michael, Nelson, Greg, Sobalvarro, Patrick, Anderson, Thomas, Eraser: A Dynamic Data Race Detector for Multithreaded Programs, *ACM Trans. Comput. Syst.*, Vol. **15**, No. 4, pp. 391--411, ACM, New York, NY, USA, November 1997. **[HTML]**
- **[Boyd-Wickizer:Non-scalable]** Silas Boyd-wickizer, M. Frans Kaashoek, Robert Morris, Nickolai Zeldovich, Non-scalable locks are dangerous. **[PDF]**

Gerenciamento de Memória

- **[Navarro:Superpages]** Navarro, Juan, Iyer, Sitararn, Druschel, Peter, Cox, Alan, Practical, Transparent Operating System Support for Superpages, *SIGOPS Oper. Syst. Rev.*, Vol. **36**, No. SI, pp. 89--104, ACM, New York, NY, USA, December 2002. **[HTML]**
- **[Waldspurger:VMWare]** Waldspurger, Carl A., Memory Resource Management in VMware ESX Server, *SIGOPS Oper. Syst. Rev.*, Vol. **36**, No. SI, pp. 181--194, ACM, New York, NY, USA, December 2002. **[HTML]**
- **[Clements:RadixVM]** A. Clements, M. Frans Kaashoek, N. Zeldovich, RadixVM: Scalable Address Spaces for Multithreaded Applications, *Proc. Eurosys*, 2013. **[PDF]**

Sistemas de arquivos

- **[Patterson:RAID]** Patterson, David A., Gibson, Garth, Katz, Randy H., A Case for Redundant Arrays of Inexpensive Disks (RAID), *Proceedings of the 1988 ACM SIGMOD International Conference on Management of Data*, pp. 109--116, ACM, New York, NY, USA, 1988. **[HTML]**
- **[Rosenblum:LFS]** Rosenblum, Mendel, Ousterhout, John K., The Design and Implementation of a Log-structured File System, *ACM Trans. Comput. Syst.*, Vol. **10**, No. 1, pp. 26--52, ACM, New York, NY, USA, February 1992. **[HTML]**
- **[Tweedie:Journaling]** Stephen Tweedie, Journaling the Linux ext2fs Filesystem, *Linux Expo*, 1998. **[PDF]**
- **[Ghemawat:GFS]** Ghemawat, Sanjay, Gobioff, Howard, Leung, Shun-Tak, The Google File System, *Proceedings of the Nineteenth ACM Symposium on Operating Systems Principles*, pp. 29--43, ACM, New York, NY, USA, 2003. **[HTML]**

Gerenciamento de Processos e Controle de Concorrência II

- **[Baumann:Barrelfish]** Baumann, Andrew, Barham, Paul, Dagand, Pierre-Evariste, Harris, Tim, Isaacs, Rebecca, Peter, Simon, Roscoe, Timothy, Sch\"upbach, Adrian, Singhania, Akhilesh, The Multikernel: A New OS Architecture for Scalable Multicore Systems, *Proceedings of the ACM*

SIGOPS 22Nd Symposium on Operating Systems Principles, pp. 29--44, ACM, New York, NY, USA, 2009. **[HTML]**

- **[Clements:Commutativity]** Clements, Austin T., Kaashoek, M. Frans, Zeldovich, Nickolai, Morris, Robert T., Kohler, Eddie, The Scalable Commutativity Rule: Designing Scalable Software for Multicore Processors, *Proceedings of the Twenty-Fourth ACM Symposium on Operating Systems Principles*, pp. 1--17, ACM, New York, NY, USA, 2013. **[HTML]**
- **[Belay:Dune]** Belay, Adam, Bittau, Andrea, Mashtizadeh, Ali, Terei, David, Mazi\`eres, David, Kozyrakis, Christos, Dune: Safe User-level Access to Privileged CPU Features, *Proceedings of the 10th USENIX Conference on Operating Systems Design and Implementation*, pp. 335--348, USENIX Association, Berkeley, CA, USA, 2012. **[PDF]**

Comunicação

- **[Bershad:LRPC]** Bershad, Brian N., Anderson, Thomas E., Lazowska, Edward D., Levy, Henry M., Lightweight Remote Procedure Call, *ACM Trans. Comput. Syst.*, Vol. **8**, No. 1, pp. 37--55, ACM, New York, NY, USA, February 1990. **[HTML]**
- **[Liedtke:IPC]** Liedtke, Jochen, Improving IPC by Kernel Design, *Proceedings of the Fourteenth ACM Symposium on Operating Systems Principles*, pp. 175--188, ACM, New York, NY, USA, 1993. **[HTML]**
- **[Belay:IX]** Adam Belay, George Prekas, Ana Klimovic, Samuel Grossman, Christos Kozyrakis, Edouard Bugnion, IX: A Protected Dataplane Operating System for High Throughput and Low Latency, *11th USENIX Symposium on Operating Systems Design and Implementation (OSDI 14)*, pp. 49--65, USENIX Association, Broomfield, CO, October 2014. **[HTML]**

Confiabilidade, isolamento de falhas e depuração

- **[Gray:Stop]** Jim Gray, Why Do Computers Stop And What Can Be Done About It?, 1985. **[PDF]**
- **[Wahbe:SFI]** Wahbe, Robert, Lucco, Steven, Anderson, Thomas E., Graham, Susan L., Efficient Software-based Fault Isolation, *SIGOPS Oper. Syst. Rev.*, Vol. **27**, No. 5, pp. 203--216, ACM, New York, NY, USA, December 1993. **[HTML]**
- **[Engler:Bugs]** Engler, Dawson, Chen, David Yu, Hallem, Seth, Chou, Andy, Chelf, Benjamin, Bugs As Deviant Behavior: A General Approach to Inferring Errors in Systems Code, *Proceedings of the Eighteenth ACM Symposium on Operating Systems Principles*, pp. 57--72, ACM, New York, NY, USA, 2001. **[HTML]**
- **[Bessey:Billion]** Bessey, Al, Block, Ken, Chelf, Ben, Chou, Andy, Fulton, Bryan, Hallem, Seth, Henri-Gros, Charles, Kamsky, Asya, McPeak, Scott, Engler, Dawson, A Few Billion Lines of Code Later: Using Static Analysis to Find Bugs in the Real World, *Commun. ACM*, Vol. **53**, No. 2, pp. 66--75, ACM, New York, NY, USA, February 2010. **[HTML]**

Lições

- **[Waldo:System]** Waldo, Jim, On System Design, *Proceedings of the 21st*

Annual ACM SIGPLAN Conference on Object-oriented Programming Systems, Languages, and Applications, pp. 467--480, ACM, New York, NY, USA, 2006. **[HTML]**

- **[Lampson:Hints]** Lampson, Butler W., Hints for Computer System Design, *SIGOPS Oper. Syst. Rev.*, Vol. **17**, No. 5, pp. 33--48, ACM, New York, NY, USA, October 1983. **[HTML]**
- **[Levin:SOSP]** Levin, Roy, Redell, David D., An Evaluation of the Ninth SOSP Submissions or How (and How Not) to Write a Good Systems Paper, *SIGGRAPH Comput. Graph.*, Vol. **22**, No. 5, pp. 264--266, ACM, New York, NY, USA, October 1988. **[HTML]**