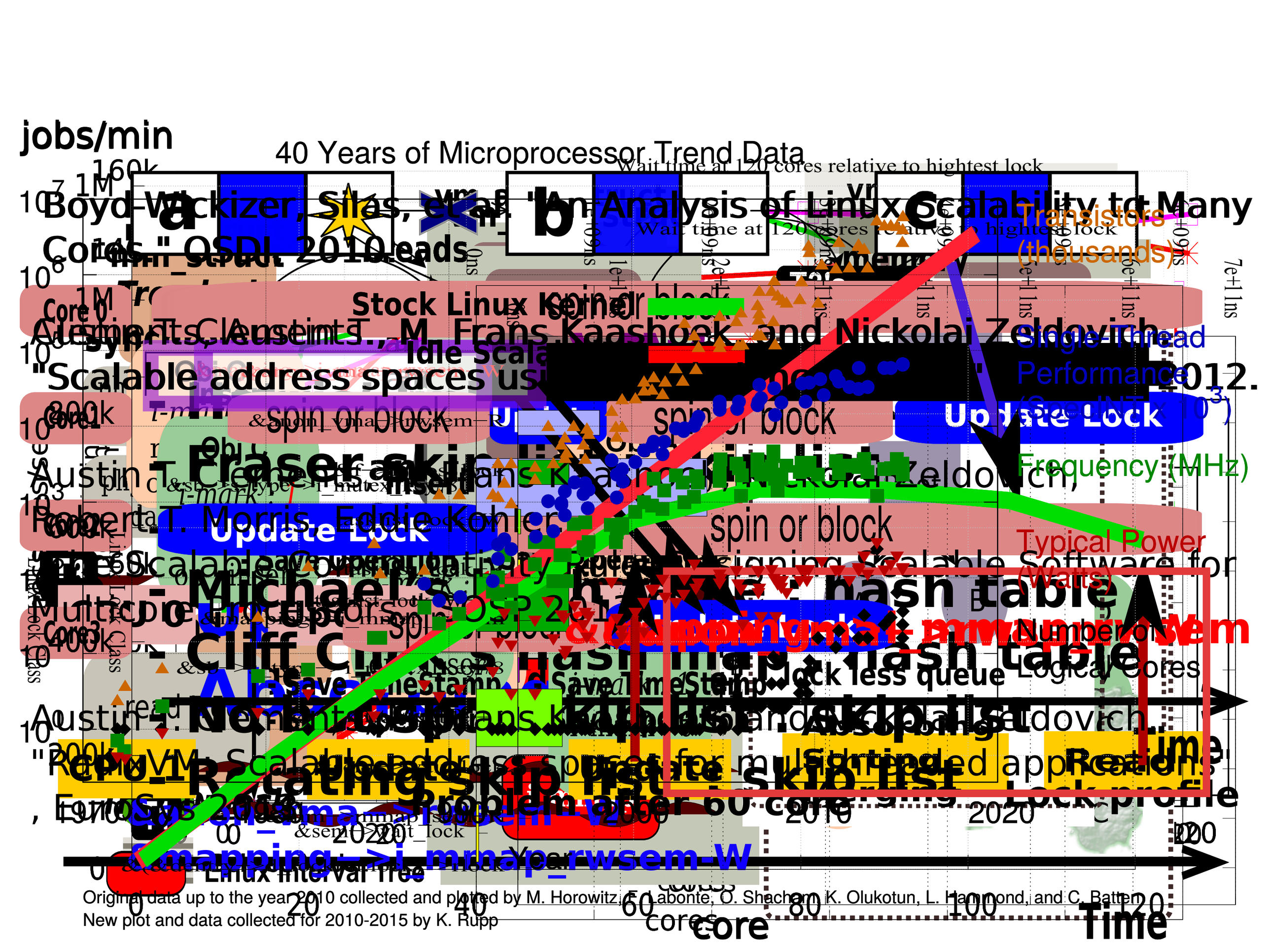
40 Years of Microprocessor Trend Data
Original data up to the year 2010 collected and plotted by M. Horowitz, F. Labonte, O. Shacham, K. Olukotun, L. Hammond, and C. Batten
New plot and data collected for 2010-2015 by K. Rupp
Transistors (thousands)
Single-Thread Performance (SpecINT x 10^3)
Frequency (MHz)
Typical Power (Watts)
Number of Logical Cores
Year
Wait time at 120 cores relative to highest lock
Stock Linux Kernel
Update Lock
spin or block
Time
Core
Boyd-Wickizer, Silas, et al. "An Analysis of Linux Scalability to Many Cores." OSDI 2010.
Austin T. Clements, M. Frans Kaashoek, and Nickolai Zeldovich. "Scalable address spaces using RCU balanced trees." ASPLOS 2012.
Austin T. Clements, Frans Kaashoek, and Nickolai Zeldovich. "RadixVM: Scalable address spaces for multi-threaded applications." EuroSys 2013.
Robert T. Morris, Eddie Kohler. "Bonsai: Ordered Concurrent Data Structures for Multicore Hardware." Unpublished, 2012.
Michael L. Fraser. "Lock-free Data Structures and Transactional Memory." Ph.D. Thesis, 2004.
Cliff Click. "A Lock-Free Hash Table." JavaOne, 2007.
Keir Fraser, Tim Harris. "Concurrent Programming without Locks." ACM TOCS, 2007.
Mathieu Desnoyers, Paul E. McKenney, Alan Stern, Michel R. Dagenais, Jonathan Walpole. "User-level implementations of read-copy-update." IEEE TPDS, 2012.
Linux interval tree
Linux VM Scalable address space for multi-threaded applications
Lock-free skip list
Lock-free hash table
Lock less queue
Lock profile
Rating skip list after 60 cores
Problem after 60 cores
Scaling
Scaling
Scaling