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25 years ago: the strategic move to PCs in high-energy physics

In September 1995, 25 years ago, a paper entitled “The PC as Physics Computer for LHC?” was presented at the CHEP-95 conference. It paved the way to a new era in high-energy physics computing. One of its authors, Sverre Jarp, recalls:

“When the Large Electron-Positron Collider (LEP), the LHC’s predecessor, started running in 1989 the central computing facilities were almost entirely based on mainframes and supercomputers. These computers offered reliable services but were very expensive so that the installed capacity was rather limited.

Due to the high costs, the CERN IT department (then “CN”) and the LEP physicists started turning to RISC workstations and servers running UNIX. These computers were mainly targeting interactive users, but when used for batch they offered a much more attractive price/performance.

Having observed this advantageous move to RISC, we decided to investigate if the same “trick” could be done with PCs and started a batch porting and benchmarking project inside the RD47 collaboration.

PCs had become prevalent as office and home computers but were not really targeting “serious” batch computing.

Fortunately, for us, the Intel Pentium processors which were announced in 1993, had much better floating-point support than the previous generations and High-Energy Physics (HEP) programs need good floating-point performance.

But even with improved hardware the porting and benchmarking turned out to be rather difficult. We had to choose from multiple operating systems and a large number of compilers and each environment offered challenges.

By the summer of 1995 we had finally obtained encouraging results and we decided to present at CHEP-95, the 8th International Conference on Computing in High Energy and Nuclear Physics, held in Rio de Janeiro in the week of September 18-22. The paper was entitled “[The PC as Physics Computer for LHC?](#)” and was well received. The decisive argument was, as it had been for RISC servers, that the price/performance was drastically improved.

After CHEP, we presented the results in several HEP institutes, such as FNAL, SLAC and DESY. One thing, however, needed to be corrected. We had chosen Windows/NT as the operating system because it supported dual-processor PCs, allowing the best price/performance, but the physicists greatly preferred UNIX/Linux. This was solved a year later when Linux 2.0 added SMP support. With this combination of hardware and software the PCs quickly conquered all the HEP computing centres and quite amazingly, PCs have remained practically unchallenged ever since. HEP has, of course, not driven this evolution, but has piggybacked on the fact that “everybody” decided to move to PCs over the years.

It is hard to predict what the next 25 years will bring but PC technology is, by no means, ready to leave the scene.”



<http://cds.cern.ch/record/739125> CERN-IT-0406002-01

By 2004, the mainframes and supercomputers had disappeared from the CERN Data Centre, which was turned into a PC farm where PCs were sitting on shelves.

The following video illustrates how the CERN Data Centre evolved over the years:
<https://videos.cern.ch/record/2731052>