Facilities, Equipment, and Other Resources

University of Washington Computer Science and Engineering Department

General Resources

The Department maintains a wide variety of state-of-the-art computing facilities for research and instructional use, housed in the Paul G. Allen Center for Computer Science & Engineering. The Computer Science Laboratory coordinates the acquisition, maintenance, and operation of the computing equipment and network services. General-purpose research computing is provided by over 900 Windows and Unix-based workstations and servers, located in laboratories, machine rooms and offices. The back-end infrastructure is comprised of general-purpose compute, file, web, mail and print servers, operating as a well-integrated Linux and Windows 7 environment. In addition, around a dozen compute clusters are used by a range of research projects. Departmental networking utilizes 1 and 10 gigabit Ethernet connections to servers and desktop machines, and a dual-band wireless network provides 802.11b/g/n connectivity throughout the building and in surrounding exterior areas. Several large plasma screens and a 56" HDTV provide high-definition video display for networking and graphics research and for video conferencing.

Research Resources

Research in computer systems (including architecture, networking, operating systems, and distributed systems) involves a wide and constantly updated variety of hardware, software, and networks. Current hardware includes high-performance Intel multicore platforms, a 200-node Intel cluster with several tens of terabytes of networked storage, a networking testbed cluster, and PC workstations. Our facilities include Linux, FreeBSD, and Windows systems, and our clusters enjoy 1 and 10 gigabit switched Ethernet connectivity and an Abilene network feed. In addition, the Systems lab provides a common workspace for operating systems, networking, and architecture students, and features Windows workstations, a video projector, and floor-to-ceiling whiteboards.

Research in VLSI, digital hardware, and embedded systems is supported by a set of PC workstations and multiprocessor compute servers. A large collection of both commercial and university computer-aided design tools form the core of the design environment providing capabilities for the design of CMOS VLSI chips, FPGA and microprocessor-based systems, and printed-circuit boards. A variety of specialized equipment for the prototyping, debugging, and testing of microelectronic systems is also available and is housed within the Hardware and Embedded Systems Research Laboratory. These resources are utilized by research projects involved in the design of configurable computing architectures, devices to support ubiquitous and invisible computing, embedded systems, neurally-inspired computing and learning devices. Additional equipment and facilities are available in the W.T. Baxter Computer Engineering Laboratory, which is used for graduate and undergraduate courses including VLSI and embedded system design.

Research in graphics, image processing, and user interfaces, centered in the Graphics and Imaging Laboratories, utilizes a set of high-end graphics workstations, a multiprocessor compute server, and a variety of special-purpose devices, including a real-time motion capture system, digital cameras (still and video), a computer-controlled lighting grid, a desktop Cyberware 3D laser scanner, video projectors for shape capture, and rotational and translational motion control platforms. Most of the lighting and imaging hardware resides in a special-purpose scanning and imaging laboratory, which is ideal for experiments that require controlled illumination. The motion capture system resides in a large studio with ample space to capture running, walking, and jumping motions. The main lab spaces contain an array of workstations and an audio/video hardware suite with non-linear digital video editing capabilities. The workstations in the main

labs are also used as development stations for experimental teaching software in graphics and vision.

Research in robotics is carried out in the Robotics and State Estimation Laboratory, which is equipped with several mobile robots, including one RWI B21r robot, three ActiveMedia Pioneer robots, nine ActiveMediaAmigoBots, and nine Sony AIBO robots. All robots utilize wireless networking to communicate with each other and the lab PCs running Linux. The B21 robot and all three Pioneer robots are equipped with SICK laser range-finders.

Research in data management is supported by a combination of laptops, desktops, and a machine-cluster all running a suite of software systems. The current hardware configuration for the cluster includes over 50 high-performance, Intel multicore servers with several tens of terabytes of storage and hundreds of gigabytes of RAM in total. The machines are configured with either Windows or Linux and run several state-of-the art database management systems including SQL Server, Oracle, DB2, and Hadoop. In addition, the Database lab provides a common workspace for students, and features Windows and Linux workstations, a video projector, and floor-to-ceiling whiteboards.

Many other research groups utilize equipment located in a set of research laboratories, plus about a dozen compute clusters with a total of around 2400 cores. Additional information can be found in the web pages for individual research projects, at `http://cs.washington.edu/research`.

Instructional Resources

Instructional computing is provided through laboratories and back-end services operated within the department. These include three general use laboratories with 75 Intel-based PCs running Windows 7 and Linux. Additional back-end resources are provided by Intel-based compute, web, database, and file servers, in an integrated Linux/Windows infrastructure.

The department also operates four special-purpose laboratories containing approximately 100 Intel Pentium PCs. To support digital system design courses, the Baxter Computer Engineering Laboratory and the Embedded Systems Project Laboratory, with over fifty Pentium workstations for design entry and simulation along with Tektronix logic analyzers, digital oscilloscopes and other test equipment. Capstone courses utilize the Capstone Computing Lab, containing 11 Intel quad-core workstations, and often specialized equipment to fit the needs of the course. The Laboratory for Animation Arts includes 22 Intel PCs and digital video production equipment, and is used for teaching interdisciplinary courses in computer animation. The Special Projects Lab contains 20 Intel quad-core workstations, and is used to teach capstone courses in operating systems and other courses requiring specialized equipment or dedicated access. The SPL runs different systems and software at different times, depending on course needs.