

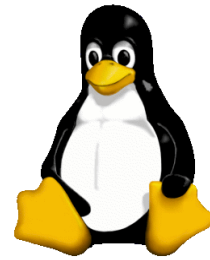
Linux Use at Bucknell

Aaron Seymour 2005

Linux, created in 1991 by Linux Torvalds, was originally intended to be a miniature version of UNIX that would run on minicomputers. Since then it has grown into a full-featured operating system with all the functionality of a traditional UNIX. However, unlike UNIX, Linux is free. This is possible due to an international community of developers who freely share Linux source code. The combination of being free, having thousands of developers, and being easily modified has made Linux an attractive choice for all sorts of computing purposes.

At Bucknell Linux is being used in a number of places. Since the start of this semester, ACM has been sponsoring a Bucknell Linux users group. According to Ian Wat, one of the founding members, the group exists to help novice users get into Linux and at the same time allow advanced users to share information about their experiences with Linux. The BLUG, as it is called, meets biweekly in Dana. Those who are interested should contact Ian at iwat@bucknell.edu for more information.

Linux usage has not been limited to students only. For several years, the physics department has been using Linux to run simulations. Professor Vollmayr-Lee has even developed his own utilities written for Linux. More information on his research and these programs can be found at his website at <http://www.eg.bucknell.edu/physics/bvl.html>.



Linux has also made its way into ISR. This summer ECST will set up five Linux workstations in the Breakiron 167 lab. This small lab will allow ISR to see if Linux workstations can effectively replace Sun Solaris workstations. If the results are positive, ECST will consider replacing the Breakiron 164 lab with Linux workstations. Since Linux is based on UNIX, the computing experience will not be noticeably different for most users. All of the current applications, such as Emacs, Vim, Mozilla, and Open Office, already run on Linux. Furthermore, users of the Linux workstations will access their files on unixspace in the same way that current users of Solaris do. Overall, ECST expects that there will not be any major changes.

ISR in general is very interested in the growing popularity of Linux and is monitoring the situation very carefully. Although Linux use is still limited, its flexibility and low cost will almost certainly ensure its continued growth.

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Switch From C++ to Java

John Bednarz 2004

The recent switch in the national Computer Science Advanced Placement exam from C++ to Java and the multitude of other college and university computer science departments using Java as the programming language taught in introductory courses prompted Bucknell's Computer Science department to analyze their own teaching techniques. Beginning in fall 2004, CSCI203 will be taught using Java instead of C++. In addition, in spring 2005, CSCI204 will also use Java rather than C++. This decision to switch to Java is a result of thorough investigation and discussion in collaboration between the Computer Science Department and approval of the Electrical Engineering Department which requires their majors to take CSCI203. According to Professor Daniel Hyde, there are many com-



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From the Chair

Gary Haggard

Another busy year coming to an end. After three years of trying, we finally found a new faculty member in the area of programming languages to take long term responsibility for that area of the curriculum. In the fall, Lea Wittie will be joining us after completing her Ph.D. at Dartmouth. Her special area of interest involves the semantic analysis of operating system code. The Dartmouth group has developed the language Clay to facilitate safety checks at compile time on elements such as data locks.

Last fall Dr. Luiz Felipe Perrone joined us after completing a post-doc with the computer security group at Dartmouth. His course this spring about computer security (and the ways around it) included both a day-trip to the computer security museum in Washington, DC and a film series that included *Enigma*, and *The KGB, The Computer and Me*. The course involved the students in the process of maintaining security in a small isolated network. Some students were very inventive in finding ways around the security on a machine.

Jerry Mead is on sabbatical in Tours, France this year and will be leading the Bucknell en France program in the fall. I am sure he would welcome visitors and email (mead@bucknell.edu).

Last August we received the good news that our ABET and CAC accreditations for the B.S. degrees had been renewed. Not to rest on where we are, the department is involved this summer in the preparation needed to move from C++ as the language for implementation in CSCI 203 and CSCI 204 to the use of Java. As you see, the titles for these courses are still

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New Computer Labs in Breakiron

Shawn Walters 2006

The new Breakiron building will offer new opportunities to students. Two computer labs will be available to replace labs in Dana. The first of these labs is a replacement of Dana 350 that will be located on the first floor (Breakiron 164). The lab will have the capacity of 34 workstations, but only 30 stations are scheduled to be installed when the lab is first opened. The computers will be moved from the current Dana 350 and Dana 314 labs. These computers are expected to be replaced by new computers over the summer of 2005. The second computer lab will also be located on the first floor (Breakiron



167). This lab will replace Dana 314 and is designed to contain 10 workstations. The lab will contain 5 Sun workstations and 5 Intel-based Linux machines, on a trial-basis.

Breakiron will also offer several other opportunities to students and faculty. Six new general purpose classrooms are being scheduled for use next semester. These rooms are scattered throughout the ground, first and second floors. The rest of the building will contain faculty offices, labs, and many interactive spaces similar to those found in the Dana lobby. The building is scheduled to be available beginning July 12th.

2004 Computer Science Academic Award Winners

BSCSE Adam Smodic

BSCS Katie Heise

BA Robert Jannarone

Java from front page

elling pedagogical reasons to switch to Java in the first two courses.

Professor Hyde believes that Java is a smaller and cleaner object-oriented programming language compared to C++ and that the department as a whole feels that Java is a better way to teach object-oriented programming. In addition, Hyde claimed that exceptions, inheritance, and polymorphism are more clear in Java. With the clarifications of these topics and an extensive Application Programming Interface available, Java provides more for students. Java's graphical interface is better than the current Samba graphics package used in CSCI 203. It will make team projects in CSCI204 which implement graphical interfaces easier.

According to Professor Meng, Java will eventually affect the entire curriculum (CSCI206, CSCI208 and beyond). The future plans are to use C++ in CSCI315 (now uses Java), the reverse of the current strategy. In addition, Meng also believes that Java is a cleaner language with fewer traps for students to encounter (i.e. segmentation faults).

Professors Guattery, Hyde, Miranda, and Zaccone were awarded a University Curriculum Development Grant to develop CSCI203 and CSCI204 during the summer of 2004.

Brad Spengler 2005: Developer of Linux Security

Janet Forney 2004

Brad Spengler has been involved in computer security since he was sixteen. Brad states that his current "project focuses mainly in the operating system itself, trying to exhaust everything that can possibly be done for security in the operating system."

Brad's interest in security began when his interest in computers began. He found that he was teaching himself about the Internet and wanted to learn everything he could. As a result of his curiosity Brad came across viruses and worms which sparked his interests and led him to what he does today. "Malicious programs and exploits are generally small in size, and I wanted to learn more about developing larger programs. Mainly though, I enjoy working on difficult problems, and what better problem than one that is impossible to solve?"

Security, as Brad puts it, occurs at many different levels. There are opportunities in all aspects of the computer world in which security is the main focus. In system security, he finds himself trying to make previously difficult-to-use systems, easier to use. "Basically, what I'm doing with one component of my software is to take a military-grade security model, and make it so you don't need months of training to use it." The software Brad is referring to is PaX, which ideally will solve the buffer overflow exploitation problem. The software he is developing will set up a system that allows programs to only have access to required resources needed to complete their job. Brad says that the reason for this is "if an attacker breaks in, and tries to do something that is outside of what the system normally does, he won't be able to do it."

If you are interested in security as a career, Brad has the following advice, "If you want to

get into security research as a career and be successful at it, it is imperative that you understand as much as you can about the operating system you plan to focus on and any processor architectures involved. If you develop a security system without knowing how those lower levels work, you're placing yourself at a disadvantage. The hackers understand these things, and they'll break your security system. People who get involved with security should have an understanding of the operating system as deep as the hacker's." For more information, check out Brad's website: <http://www.grsecurity.net>.



Chair from front page

the same but the approach and content has continued to evolve in response to the developments in the discipline.

We all eagerly await the opening of the new Breakiron Engineering building. If you are in the neighborhood be sure to stop by and see the new facilities.

We all welcome news and will be establishing a web location so that we can all share the wonderful things all of you are doing.

Connection