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MUUGlines

The Manitoba UNIX User Group Newsletter

March 13, 2001: Usenet News Readers Plus! Linux On Mainframes

This month, MUUG member Chris Hill will be giving us a look at Usenet. The session will cover a brief history of the Usenet and news groups, how to get a new news group assigned in the hierarchy, how to use news readers such as Pine, Pan, and others, what `uuencode` is, what the binaries news groups are, and the meanings of the hierarchies.

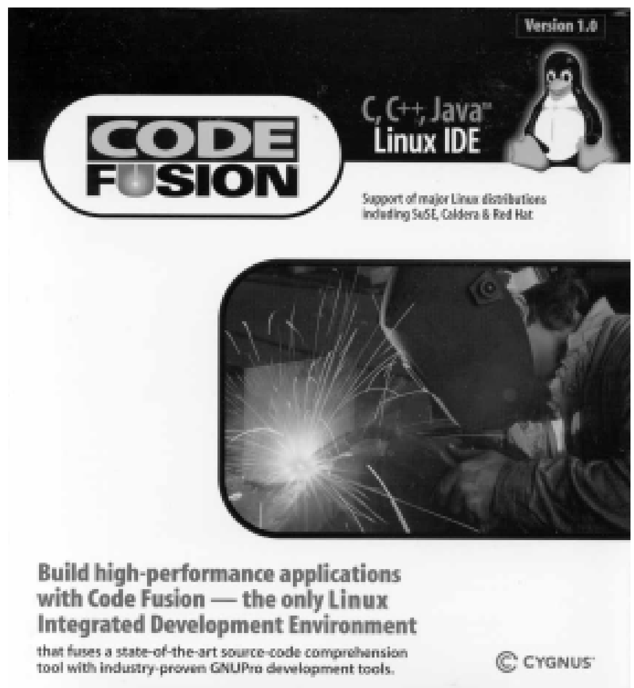
We're also expecting a talk from an IBM representative on IBM's Linux strategy, particularly in regard to Linux running on mainframes. Think of thousands of copies of Linux running on one mainframe! Don't miss this meeting.

Please note our meeting location: IBM Canada's offices in the TD Centre, at the corner of Portage and Main. We gather in the lobby on the main floor – please try to be there by about 7:15 PM. Steve Moffat will then take us up to the meeting room just before the meeting starts at 7:30. Don't be late, or you may not get in.

Parking is available either in the parkade behind the TD building, off Albert Street, or in the ground level lot just north of the TD building. Entrance to the lot is from Albert Street, behind the parkade. Either way, parking is a $1.25 flat rate for the evening. You purchase your ticket from a dispenser, so make sure you've got exact change – a loonie and a quarter, or 5 quarters.

Yes, We Have Door Prizes

We know you love to attend our meetings, and the door prizes are just icing on the cake. Still, we like to share the wealth as we acquire it, so we do have some fantastic door prizes! We have boxed sets of OpenLinux eDesktop 2.4 and the Linux Technology Preview Developer Release (featuring the 2.4 kernel) from Caldera Systems, *and* both the highly sought-after GNUPro Dev Kit for Linux (IDE for C and C++ with visual debugger) and the Code Fusion C, C++ and Java Linux IDE from Cygnus. How could you consider being anywhere else on that night? We'll see you there.



OpenLinux eDesktop 2.4 comes as a boxed set with a 500-page User Guide, a boot diskette and four CDs: Binaries, Commercial Packages and Source Code, plus the OMNIS Studio Rapid Application Development tools. Also in the box you'll find two "Powered by Caldera Systems" stickers for your computer AND a Caldera Systems bumper sticker! The Technology Preview box includes an Installation Guide, plus Installation Disk and a Source Code disk.

The packages from Cygnus come with all kinds of goodies, including ANSI C and ANSI-tracking C++ compilers, visual debugger, assembler, linker, Java compiler, class libraries, integrated source-code editor, symbol, class and include browsers and much more.

Single-Floppy Linux In The Enterprise

By Kevin McGregor

After you've got past the "Why should I use Linux at all" barrier, the next question usually asked is "Why should I use a mini-distribution instead of a [name of a full Linux distribution]? Is it faster/better/safer to do it another way?"

You're not going to notice a speed difference for many applications. However, consider these advantages:

Read-only boot media Loading from read-only media and running from a RAMdisk provides great security and stability. If you've got a problem or suspect a compromise, simply power-cycle the computer to restore functionality and hunt down the problem at your leisure.

Hardware requirements The two parts of your computer which are most likely to fail are the hard disk and the power-supply fan, which leads to the power supply itself failing. With a floppy-based distribution, you can remove the hard disk (and CD-ROM drive) and use it in some other computer. without the hard drive and CD-ROM, the computer will produce a much lower level of heat, reducing the likelihood and impact of a power-supply failure.

On the dialin server in my office, the 500 MB hard drive failed (after making some very disturbing noises). As a temporary measure, we're using a 10 GB hard drive, of which some 98% is unused!

Simplicity and security A single-floppy distribution can provide better security than a full Linux distribution. Install Red Hat, SuSE, Mandrake or another, and select only the bare minimum of packages that the installer will let you get away with. You end up with anywhere from 110 MB to 500 MB installed.

Now reboot and take a look at what's been installed, and ask yourself how many of these programs can be attacked with buffer overflows or will provide convenient tools for an attacker to use against other computers. Not to mention the simplicity makes it even easier to configure, maintain and debug. Several of the single-floppy distributions use the FAT file system, meaning even a basic Windows PC can be used to make configuration changes.

Now that I've convinced you, where do you start? First, make sure you have a *very* good idea of just what you're planning to implement. For example, I needed to set up a dialin server with just enough software to support mgetty and ppp. You may want to implement other services such as DNS, DHCP, DHCP Relay, a proxy server, telnet, ftp, ssh, http and many other services. You're only limited by your imagination and what will fit on one floppy.

What will fit on one floppy? Normally I'm referring to a standard 1440 KB 3.5" floppy. However there are ways to format a 3.5" floppy with even higher densities, up to 1743 KB.

What goes on this floppy? Here's where it starts to get interesting. Now that you have a good idea of which services are going to be implemented with this floppy, start by taking a look at the Linux Weekly News' Distributions page. This month's is at http://www.lwn.net/2001/0301/dists.php3. There you'll find a list on the left under the heading "Floppy-based". Take some time to browse through the various home pages to get a feel for what each of them does.

The Linux Router Project (http://www.linuxrouter.org/) has seen a lot of development, and there are many packages contributed to it. For one list, see http://wpkgate.kc.com.my.cpwright.com/lrp/ (yes, that's a long domain name).

You might also be interested at some point in "rolling your own". I will cover this option in a later article. If you're interested, see the Linux Bootdisk HOWTO (http://theoryx5.uwinnipeg.ca/LDP/HOWTO/Bootdisk-HOWTO/). This method requires a distribution with a compiler and the source code for the kernel. In a nutshell, select the bare minimum hardware support options when you configure the kernel, then compile and copy it to a floppy. Sound easy? There are many details, but I'm going to leave them for a later article.

This has just been the introduction. Next month, I will cover formatting an extra-high density floppy, and configuring the Linux Router Project floppy with optional packages for ppp support. The following month, I'll make a stab at explaining how to do it yourself, and the various snags you may encounter.

On Claude Shannon

By George Johnson, Organizer of this year's Conference on Shannon Sampling Theorems, SAMPTA 2001

Dr. Claude Elwood Shannon, the American mathematician and computer scientist whose theories laid the groundwork for the electronic communications networks that now lace the earth, died on Saturday in Medford, Mass., after a long fight with Alzheimer's disease. He was 84.

Understanding, before almost anyone, the power that springs from encoding information in a simple language of 1's and 0's, Dr. Shannon as a young man wrote two papers that remain monuments in the fields of computer science and information theory.

"Shannon was the person who saw that the binary digit was the fundamental element in all of communication," said Dr. Robert G. Gallager, a professor of electrical engineering who worked with Dr. Shannon at the Massachusetts Institute of Technology. "That was really his discovery, and from it the whole communications revolution has sprung."

Dr. Shannon's later work on chess- playing machines and an electronic mouse that could run a maze helped create the field of artificial intelligence, the effort to make machines that think. And his ability to combine abstract thinking with a practical approach — he had a penchant for building machines — inspired a generation of computer scientists.

Dr. Marvin Minsky of M.I.T., who as a young theorist worked closely with Dr. Shannon, was struck by his enthusiasm and enterprise. "Whatever came up, he engaged it with joy, and he attacked it with some surprising resource — which might be some new kind of technical concept or a hammer and saw with some scraps of wood," Dr. Minsky said. "For him, the harder a problem might seem, the better the chance to find something new."

Born in Petoskey, Mich., on April 30, 1916, Claude Elwood Shannon got a bachelor's degree in mathematics and electrical engineering from the University of Michigan in 1936. He got both a master's degree in electrical engineering and his Ph.D. in mathematics from M.I.T. in 1940.

While at M.I.T., he worked with Dr. Vannevar Bush on one of the early calculating machines, the "differential analyzer," which used a precisely honed system of shafts, gears, wheels and disks to solve equations in calculus.

Though analog computers like this turned out to be little more than footnotes in the history of the computer, Dr. Shannon quickly made his mark with digital electronics, a considerably more influential idea.

In what has been described as one of the most important master's theses ever written, he showed how Boolean logic, in which problems can be solved by manipulating just two symbols, 1 and 0, could be carried out automatically with electrical switching circuits. The symbol 1 could be represented by a switch that was turned on; 0 would be a switch that was turned off.

The thesis, "A Symbolic Analysis of Relay and Switching Circuits," was largely motivated by the telephone industry's need to find a mathematical language to describe the behavior of the increasingly complex switching circuits that were replacing human operators. But the implications of the paper were far more broad, laying out a basic idea on which all modern computers are built.

George Boole, the 19th-century British mathematician who invented the two-symbol logic, grandiosely called his system "The Laws of Thought." The idea was not lost on Dr. Shannon, who realized early on that, as he once put it, a computer is "a lot more than an adding machine." The binary digits could be used to represent words, sounds, images — perhaps even ideas.

The year after graduating from M.I.T., Dr.

Shannon took a job at AT&T Bell Laboratories in New Jersey, where he became known for keeping to himself by day and riding his unicycle down the halls at night.

"Many of us brought our lunches to work and played mathematical blackboard games," said a former colleague, Dr. David Slepian. "Claude rarely came. He worked with his door closed, mostly. But if you went in, he would be very patient and help you along. He could grasp a problem in zero time. He really was quite a genius. He's the only person I know whom I'd apply that word to."

In 1948, Dr. Shannon published his masterpiece, "A Mathematical Theory of Communication," giving birth to the science called information theory. The motivation again was practical: how to transmit messages while keeping them from becoming garbled by noise.

To analyze this problem properly, he realized, he had to come up with a precise definition of information, a dauntingly slippery concept. The information content of a message, he proposed, has nothing to do with its content but simply with the number of 1's and 0's that it takes to transmit it.

This was a jarring notion to a generation of engineers who were accustomed to thinking of communication in terms of sending electromagnetic waveforms down a wire. "Nobody had come close to this idea before," Dr. Gallager said. "This was not something somebody else would have done for a very long time."

The overarching lesson was that the nature of the message did not matter — it could be numbers, words, music, video. Ultimately it was all just 1's and 0's.

Today, when gigabytes of movie trailers, Napster files and e-mail messages course through the same wires as telephone calls, the idea seems almost elemental. But it has its roots in Dr. Shannon's paper, which may contain the first published occurrence of the word "bit."

Dr. Shannon also showed that if enough extra bits were added to a message, to help correct for errors, it could tunnel through the noisiest channel, arriving unscathed at the end. This insight has been developed over the decades into sophisticated error-correction codes that ensure the integrity of the data on which society interacts.

In later years, his ideas spread beyond the fields of communications engineering and computer science, taking root in cryptography, the mathematics of probability and even investment theory. In biology, it has become second nature to think of DNA replication and hormonal signaling in terms of information.

And more than one English graduate student has written papers trying to apply information theory to literature — the kind of phenomenon that later caused Dr. Shannon to complain of what he called a "bandwagon effect."

In the last years of his life, Alzheimer's disease began to set in. "Something inside him was getting lost," Dr. Minsky said. "Yet none of us miss him the way you'd expect — for the image of that great stream of ideas still persists in everyone his mind ever touched."

Sending Us E-Mail?

Due to the amount of e-mail MUUG receives, we've set up an auto-reply to give you immediate feedback, and redirect some of the e-mail to the appropriate places. We will try to personally respond to your e-mail promptly, but please note that our group has a very small board of directors, consisting of a few very overworked volunteers. Please make sure you have used the right address, and are requesting information that is not found on our web site (www.muug.mb.ca).

For a full list and description of the addresses, see http://www.muug.mb.ca/pub/muuglines/pdf/muug0004.pdf.

We Like To Hear From You

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