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MUUG Lines

Manitoba UNIX® User Group

Newsletter of the Manitoba UNIX© User Group

A Modest Proposal

by Arne Grimstrup and Doug Shewfelt.

To: MUUG Executive
From: Computer Architecture Reseach Group MUUG Laboratories
Subject: Grant proposal
Topic: The Effects of an Environmental Contaminant on Supercomputers

Background

Supercomputers provide the high levels of speed and accuracy required for some specialized applications. However, due to the sheer volume of work they can perform, we are becoming less able to determine whether the machines are operating as expected. Supercomputer manufacturers have very rigorous quality control regimens in place to detect and prevent errant behavior, and for the most part have successfully delivered satisfactory machines. Unfortunately, once the machine leaves the factory, it becomes susceptable to a large number of contaminants at the install site.

Research work on alien superheroes, like Superman and on human mutants like the Fantastic Four or the X-Men, suggests that strong correlation exists between the strength of the test subject's extraordinary power and exposure to environmental contaminants. ("Overview of Contaminant Research", Mutagen Today, Vol. 11, Issue 3.) Perhaps the most well documented of these is Superman's susceptability to kryptonite exposure.

Superman and supercomputers share two common characteristics. Both have "super" in their names, but more importantly, both are capable of performing tasks at tremendous speeds. Society has become dependent on both for this very reason; supercomputers for defence and research purposes, and Superman for crime-fighting.

Our research is aimed at determining whether supercomputers share Superman's susceptability to kryptonite exposure and to document the effects of same.

Expectations

The wide variance in response to treatment found in biological organisms make it very difficult to make accurate predictions. We expect that using the documented reports about Superman's vulnerabilities as a benchmark is imprecise at best. However, given the similarities discussed above, we expect the following responses to exposure:

Green Kryptonite:	The supercomputer will crash;
Gold Kryptonite:	Processing speed will be permanently decreased;
Red Kryptonite:	The supercomputer will grow to a tremendous size. Collateral damage is expected; and
Blue Kryptonite:	Will affect only imperfect copies of supercomputers. Supercomputer clones (ie the Conniption Machine, a hypercube of a few hundred Pentium processors) will suffer performance degradation or will crash while true supercomputers will be unaffected.

(Continued on page 6)

This Month's Meeting

Meeting Location:
Our next meeting is scheduled for Tuesday, April 11, at 7:30 PM. Once again, the meeting will be held in the auditorium of the St-Boniface Hospital Research Centre, just south of the hospital itself, at 351 Taché. You don't have to sign in at the security desk — just say you're attending the meeting of the Manitoba UNIX User Group. The auditorium is on the main floor, and is easily found from the entrance.

Meeting Agenda: See inside for details.

Inside This Issue

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RAMBLINGS

Can't be Invented Here Syndrome

By Andrew Tauzzi

Imagine that you're the IS manager of a large corporation (some of you may not have to imagine). A request lands on your desk to design and build a moderately complex computerized widget system. A few years ago this would have been easy, but today you have less staff, less time, and more complex systems. What do you do?

The current knee-jerk trend is to immediately outsource the whole project from start to finish. In this way, you don't take up any of your resources, and have less blame if the system doesn't work out. You will be following the company line, derived from countless hours of research.

Your company spent a large amount of money on business consultants last year, and the final reports said that outsourcing was good. Really? Wow! Imagine that — consultants said that consulting was good. That's like asking Bill Gates what operating system your company should use!

What is the Solution?

Employees are the most important asset in your company. More important than the product you are making, and certainly more important than consultants. Without their drive for success and loyalty, your company would soon be worthless. Employees, like all other company assets, require a great deal of attention. When you constantly try to train and upgrade employees' skills, you are displaying the faith you have in them. When you hire consultants, you show that you don't have the time or desire to improve their skills. These points may seem blatantly obvious, but it seems that many employers are ignoring basic work principles in order to meet the current bottom line.

When Does Consulting Help?

Consultants can be extremely useful if your company has no IS department, and has no long-term need for one. Consultants are also useful if you wish to transfer their skills to your employees through a mentorship or training seminar. They can also fill a short-term void as employees of a larger corporate team. Keep in mind though, that consultants don't have your bottom line in mind. Treat them with the respect that they deserve, but don't glorify them and make your employees feel like crap.

If you hired consultants because your employees lack the necessary skills to implement a project, make sure that at the end of the consulting project your employees know as much as, or more as the consultant. The consultants can walk away at the end of the project — you can't.

The 1993-1994 Executive

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Ad copy must be submitted by the final copy deadline for an issue (usually 3 weeks prior to the monthly meeting) in a format acceptable to the editor. (Please make arrangements with editor beforehand.)

Internet E-mail: editor@muug.mb.ca

Group Information

The Manitoba UNIX User Group meets at 7:30 PM the second Tuesday of every month, except July and August. Meeting locations vary. The newsletter is mailed to all paid-up members one week prior to the meeting. Membership dues are $25 annually and are due as indicated by the renewal date on your newsletter's mailing label. Membership dues are accepted at any meeting, or by mail.

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PRESIDENT'S CORNER

A Few Net Points

By Bary Finch

As I had announced at our last meeting, I have mailed out a number of the refund cheques for our former MONA users that had a credit remaining in their MONA membership. There were only about 30 cheques sent out as that was all the cheques that we had! Unfortunately (or fortunately) the board doesn't tend to write many cheques, so we don't tend to reorder cheques when we still have (seemingly) plenty left.

As for the remaining former MONA members whom have not yet received cheques, please be patient. I will be issuing cheques to all of you as soon as our new cheques arrive. Unfortunately, we had our ordered cheques arrive, but they had mistakes on them and we had to return them. So now we wait for the next cheque order to arrive. As soon as they're here, I'll mail them out!

The other refund requirement is the UniForum members that never received memberships, due to UniForum Canada closing up. Once again, these refunds are waiting for the same cheque order that is delaying the MONA refunds. So, you UniForum members-to-be know who you are, and you will be getting a refund cheque just as soon as our cheque order arrives. Sorry for the delay!

Our presenter next month will be by David Hodge, Director, Technology Services of The North West Company. David will be presenting as a local Winnipeg company, and what they're doing with UNIX. I highly recommend this topic, but I may be prejudiced as I work for The North West Company, and David is my boss!

Regardless, David will be presenting an overview of what The North West Company is, and how they (we) are using UNIX in core technologies of the business. This will give people a good idea of how UNIX is more and more becoming the main stream of business processing information technology.

I'm sure this will be a great presentation, but unfortunately I will not be in town to enjoy it. So our Vice-President, Rob Wright, will be hosting the meeting in my absence. Thanks again Rob!

And if someone else would enjoy the thrill of hosting meetings, we are still in need of a SIG Coordinator! We have been getting presenters out to the SIG meetings, so we are in more and more need of someone to coordinate the meetings and ensure they continue. Otherwise the SIG is in danger of shutting down. For those of you that attend regularly, this would be most unfortunate. So come forward and help out!

On another volunteer topic, I have had no response to our upcoming Firewall seminar. We could use all the help we can get for this, as any seminar requires a large coordinated effort to make it happen. This is also the time to get the seminar going, to make sure we can get all the details done for October.

Enough prompting! That's it for this month. I won't see you at the next meeting, but enjoy!

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C++ Q&A

By Marshall P. Cline

This month's C++ Q&A completes last month's look at standards. The complete C++ FAQ is now available in a book format — Addison-Wesley Publishers 0-201-58958-3 $32.25.

Question 81: What source-file-name convention is best? 'foo.C'? 'foo.cc'? 'foo.cpp'?

Most Un*x compilers accept '.C' for C++ source files, g++ preferring '.cc', and cfront also accepting '.c'. Most DOS and OS/2 compilers require '.cpp' since DOS filesystems aren't case sensitive. Some also advocate '.cxx'. The impact of this decision is not great, since a trivial shell script can rename all .cc files into .C files. The only files that would have to be modified are the Makefiles, which is a very small piece of your maintenance costs. Note however that some versions of cfront accept a limited set of suffixes (ie: some can't handle '.cc'; in these cases it is easier to tell 'make' about CC's convention than vise versa).

You can use '.C' on DOS or OS/2 if the compiler provides a command-line option to tell it to always compile with C++ rules (ex: 'ztc -cpp foo.C' for Zortech, 'bcc -P foo.C' for Borland, etc).

Question 82: What header-file-name convention is best? 'foo.H'? 'foo.hh'? 'foo.hpp'?

The naming of your source files is cheap since it doesn't affect your source code. Your substantial investment is your source code. Therefore the names of your header files must be chosen with much greater care. The preprocessor will accept whatever name you give it in the #include line, but whatever you choose, you will want to plan on sticking with it for a long time, since it is more expensive to change (though certainly not as difficult as, say, porting to a new language).

Almost all vendors ship their C++ header files using a '.h' extension, which means you can reliably do things like: #include <iostream.h>

Some sites use '.H' for their own internally developed header files, but most simply use '.h'.

Question 83: Are there any lint-like guidelines for C++?

Yes, there are some practices which are generally considered dangerous. However none of these are universally 'bad', since situations arise when even the worst of these is needed:

- a class 'X's assignment operator should return '*this' as an 'X&' (allows chaining of assignments)
- a class with any virtual fns ought to have a virtual destructor
- a class with any of {dtor, assignment-op, copy-ctor} generally needs all 3
- a class 'X's copy-ctor and assignment-op should have 'const' in the param: 'X::X(const X&)' and 'X& X::operator=(const X&)' respectively
- always use initialization lists for class sub-objects rather than assignment the performance difference for user-defined classes can be substantial (3x!)
- many assignment operators should start by testing if 'we' are 'them'; ex:

```
X& X::operator=(const X& x)
{
if (this == &x) return *this;
//...normal assignment duties...
return *this; }
```

  sometimes there is no need to check, but these situations generally correspond to when there's no need for an explicit user-specified assignment op (as opposed to a compiler-synthesized assignment-op).
- in classes that define both '+=', '+' and '=', 'a+=b' and 'a=a+b' should generally do the same thing; ditto for the other identities of builtin types (ex: a+=1 and ++a; p[i] and *(p+i); etc). This can be enforced by writing the binary ops using the 'op=' forms; ex:

```
X operator+(const X& a, const X& b)
{
X ans = a;
ans += b;
return ans; }
```

  This way the 'constructive' binary ops don't even need to be friends. But it is sometimes possible to more efficiently implement common ops (ex: if class 'X' is actually 'String', and '+=' has to reallocate/copy string memory, it may be better to know the eventual length from the beginning).

SECTION 14: C++/Smalltalk differences and keys to learning C++

Question 84: Why does C++'s FAQ have a section on Smalltalk? Is this Smalltalk-bashing?

The two 'major' OOPLs in the world are C++ and Smalltalk. Due to its popularity as the OOPL with the second largest user pool, many new C++ programmers come from a Smalltalk background. This section answers the questions:

- what's different about the two languages
- what must a Smalltalk-turned-C++ programmer know to master C++

This section does NOT attempt to answer the questions:

- which language is 'better'?
- why is Smalltalk 'bad'?

Nor is it an open invitation for some Smalltalk terrorist to slash my tires while I sleep (on those rare occasions when I have time to rest these days :-).

Question 85: What's the difference between C++ and Smalltalk?

There are many differences such as compiled vs perceived-as-interpreted, pure vs hybrid, faster vs perceived-as-slower, etc. Some of these aren't true (ex: a large portion of a typical Smalltalk program can be compiled by current implementations, and some Smalltalk implementations perform reasonably well). But none of these affect the programmer as much as the following three issues:

- static typing vs dynamic typing ('strong' and 'weak' are synonyms)
- how you use inheritance
- value vs reference semantics

The first two differences are illuminated in the remainder of this section; the third point is the subject of the section that follows.

If you're a Smalltalk programmer who wants to learn C++, you'd be very wise to study the next three questions carefully. Historically there have been many attempts to 'make' C++ look/act like Smalltalk, even though the languages are very Very different. This hasn't always led to failures, but the differences are significant enough that it has led to a lot of needless frustration and expense. The quotable quote of the year goes to Bjarne Stroustrup at the 'C++ 1995' panel discussion, 1990 C++-At-Work conference, discussing library design: 'Smalltalk is the best Smalltalk around'. ➡

Dr. Marshall P. Cline is the founder and President of Paradigm Shift, Inc., a firm that specializes in on-site training for C++, OOD, OOA, consulting, and reusable/extensible C++ class libraries. For more information, send e-mail to "info@parashift.com". ➡

UNIX Q&A

Originally Compiled by Ted Timar

Submitted by Andrew Trauzzi

This month's UNIX Q&A examines some shell issues.

Question 1: I would like to know more about the differences between the various shells. Is this information available some place?

A very detailed comparison of sh, csh, tcsh, ksh, bash, zsh, and rc is available via anon. ftp in several places:

```
cs.uwp.edu (131.210.1.4):pub/vi/shell-100.BetaA.Z
alf.uib.no (129.177.30.3):pub/lpf/misc/shell-100.BetaA.Z
utsun.s.u-tokyo.ac.jp (133.11.11.11):misc/vi/shell-100.BetaA.Z
```

This file compares the flags, the programming syntax, input/output redirection, and parameters/shell environment variables. It doesn't discuss what dot files are used and the inheritance for environment variables and functions.

A Very Brief Look at Unix History

Unix history goes back to 1969 and the famous "little-used PDP-7 in a corner" on which Ken Thompson, Dennis Ritchie (the R in K&R) and others started work on what was to become Unix. The name "Unix" was intended as a pun on Multics (and was written "Unics" at first — UNiplexed Information and Computing System).

For the first 10 years, Unix development was essentially confined to Bell Labs. These initial versions were labeled "Version n" or "Nth Edition" (of the manuals), and were for DEC's PDP-11 (16 bits) and later VAXen (32 bits). Some significant versions include:

V1 (1971): 1st Unix version, in assembler on a PDP-11/20. Included file system, fork(), roff, ed. Was used as a text processing tool for preparation of patents. Pipe() appeared first in V2!

V4 (1973): Rewritten in C, which is probably the most significant event in this OS's history: it means Unix can be ported to a new hardware in months, and changes are easy. The C language was originally designed for the Unix operating system, and hence there is a strong synergy between C and Unix.

V6 (1975): First version of Unix widely available outside Bell Labs (esp. in universities). This was also the start of Unix diversity and popularity. 1.xBSD (PDP-11) was derived from this version. J. Lions published "A commentary on the Unix Operating System" based on V6.

V7 (1979): For many, this is the "last true Unix", an "improvement over all preceding and following Unices" [Bourne]. It included full K&R C, uucp, Bourne shell. V7 was ported to the VAX as 32V. The V7 kernel was a mere 40 Kbytes!

Here (for reference) are the system calls of V7: `_exit, access, acct, alarm, brk, chdir, chmod, chown, chroot, close, creat, dup, dup2, exec*, exit, fork, fstat, ftime, getegid, geteuid, getgid, getpid, getuid, gtty, indir, ioctl, kill, link, lock, lseek, mknod, mount, mpxcall, nice, open, pause, phys, pipe, pkoff, pkon, profil, ptrace, read, sbrk, setgid, setuid, signal, stat, stime, stty, sync, tell, time, times, umask, umount, unlink, utime, wait, write.`

These Vn versions were developed by the Computer Research Group (CRG) of Bell Labs. Another group, the Unix System Group (USG), was responsible for support. A third group at Bell Labs was also involved in Unix development, the Programmer's WorkBench (PWB), to which we owe, for example, sccs, named pipes and other important ideas. Both groups were merged into Unix System Development Lab in 1983.

Work on Unix continued at Bell Labs in the 1980s. The V series was further developed by the CRG (Stroustrup mentions V10 in the 2nd edition of his book on C++), but we don't seem to hear much about this otherwise. The company now responsible for Unix (System V) is called Unix System Laboratories (USL) and is majority-owned by AT&T.

But much happened to Unix outside AT&T, especially at Berkeley (where the other major flavor comes from). Vendors (esp. of workstations) also contributed much (e.g. Sun's NFS).

The book *"Life with Unix"* by Don Libes and Sandy Ressler is fascinating reading for anyone interested in Unix, and covers a lot of the history, interactions, etc.. Much in the present section is summarized from this book.

Unix Glossary

Chorus: message-passing microkernel, may form basis for a future release of SV. Chorus already have SVR4 running on top (binary-compatible).

DCE (Distributed Computing Environment, from OSF): Includes RPC (Apollo's NCS), directory service (local based on DNS, global on X.500), time, security, and threads services, DFS (distrib. file system), ... OS-independent.

DME (Distributed Management Environment, from OSF): future.

FFS (Fast File System): from Berkeley, 1983. Equivalent (exact?) of UFS in SunOS. Has notions such as cylinder groups, fragments.

Mach: modern kernels from CMU (Carnegie Mellon University) on which many Unices and other OSs are based (e.g. OSF/1, MacMach, ...): - 2.5: monolithic kernel with 4.2BSD - 3.0: microkernel with BSD Unix server in user space (and other OSs, e.g. MS-DOS) Newsgroup: comp.os.mach

MFS (Memory File System):

NeWS (Network extensible Window System), from Sun?: PostScript-based, networked, toolkits (and even clients) loaded in server. Part of OpenWindows.

(Continued in Next Month's Column)

SIG Sideline

By Andrew Trauzzi

The SIG group needs a new co-ordinator! If you are interested in taking an active role in MUUG activities, please contact the board at <board@muug.mb.ca>.

The next SIG meeting will be April 18, 1995, at 7:30 PM. As usual, the meeting will be at ISM, 400 Ellice Avenue (behind Portage Place). This month, Rick Horocholyn will be presenting PERL programming.

Front Page

A Modest Proposal

by Arne Grimstrup and Doug Shewfelt.Method

(Continued from Page 1)

Method

We have identified 15 pairs of identical supercomputer models. Half of the machines (one from each pair) will be set aside as a control group while the others will form the treatment group. Replacement machines will be added to the treatment group.

Machines in the treatment group will be given coolants which have be tainted with each of the types of kryptonite. We will repeat the tests on a six month schedule — this will allow adequate time for the owners to replace their machines after each treatment. A suite of performance benchmarks will be run on all machines in the treatment and control groups both before and after the treatment is applied.

Owners of the machines will not be told of our experiment in order to prevent distortion of the results.

Source of Resources

Krytonite is rather rare. A certain Lex Luther is a collector, but he is unwilling to sell any samples that he holds. Probably our best approach is to apply lobbying pressure on the government of Canada. We are given to understand that a number of samples of kryptonite are being stored in the Fortress of Solitude, an unregistered American-owned institution operating in the Canadian high arctic. ("*Janes Book of Secret Bases*", 1993). We beleive that these samples will be seized by Brian Toban, Minister of Gunboat Diplomacy and member of the powerful Ends and Means subcommittee.

Alternatively, the principals of the Fortress of Solitude may be interested in simply selling us some of these samples, as recent papers suggest a financial disaster in their dealings with Solomon Grundy. (Roberts, B., et al. "*Superman's Song*", 1990).

Funding Requirements

For acquisition of the necessary materials and personnel, this project will require 20 million US dollars in small, used bills that are non-sequentially numbered. ➜

Agenda

for

Tuesday, April 11, 1995, 7:30 PM
Samuel N. Cohen Auditorium
St-Boniface Hospital Research Centre
Main Floor, 351 Taché

1.	President's Welcome	7:30
3.	Business Meeting	7:35
4.	Short Topic	7:40
5.	Coffee Break and Informal Discussion	7:50
6.	Feature Topic David Hodge, Director, Technology Services of The North West Company will present the role of UNIX at the North West Company.	8:00

Note: Please try to arrive at the meeting between 7:15 and 7:30, to avoid disrupting the meeting in progress.

Coming Up

Meeting:
Next month's meeting is scheduled for Tuesday, May 9, at 7:30 PM. Meeting location will be the St-Boniface Research Centre, as usual. The May meeting topic is to be announced.

Got any ideas for meeting topics? Any particular speaker, company, or product you'd like to see at one of our meetings? Just let our new meeting coordinator, Doug McLean, know. You can e-mail him at <dmclean@muug.mb.ca>.

Newsletter:
If you are interested in a particular topic, let me know. I'm sure I could coerce you into writing an article! I could use a few articles — especially shorter ones — half a page to one page (400 to 1000 words) would be fine.

Monsieur Ex has also let me know that his mail-box has room for more of your wonderful queries again – please submit your questions to the old guy via e-mail to <m-ex@muug.mb.ca>. He may be old, but he's not ready for retirement yet!