



OTTAWA PC NEWS

Vol. 19 number 8

The newsletter of the Ottawa PC Users' Group

October 2002

CLUB NEWS

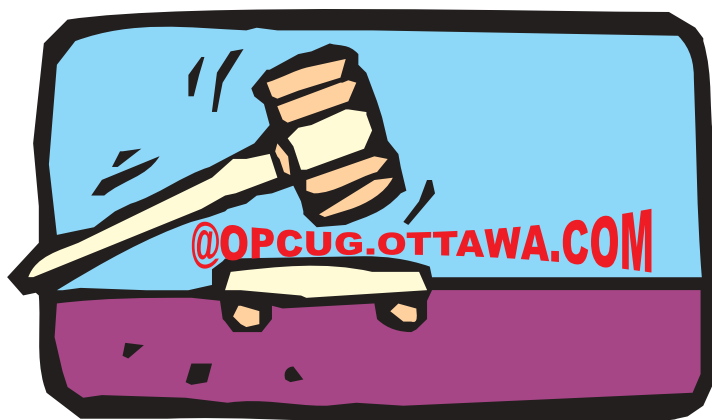
Old Domain Name Going, Going... *by Chris Taylor*

Last fall, we were told by Southam (owners of the ottawa.com domain), that we could no longer use the sub-domain opcug.ottawa.com. So we bought our own domain name, opcug.ca. Southam were kind enough to allow us to continue using opcug.ottawa.com for a transition period.

Well the time has come to start cutting any dependencies on the old domain name. We will be starting with e-mail. Check your e-mail address book. If you have any entries pointing to @opcug.ottawa.com, you should change them to @opcug.ca. If you receive e-mail to your OPCUG address addressed to @opcug.ottawa.com, be sure to let the sender know they have to change to @opcug.ca.

As of mid-October, the mail host running on PUB II will no longer accept mail addressed to the opcug.ottawa.com domain.

We will eventually be dropping opcug.ottawa.com for all OPCUG services. So, if you have bookmarks in your browser, point to the news server on PUB II, pick up POP3 mail from PUB II, or FTP into PUB II, you might want to check your configuration files to make sure none of them are pointing to opcug.ottawa.com. If they are, just change them to opcug.ca and you won't have to worry about not being able to connect to PUB II at some point in the future.



@OPCUG.CA



INSIDE

Club news — Club life

Calendar / Coming Up / Elections	2
September Raffle	5

Features

CD-R and CD-RW Burning 101 - part I	3-5
SpamNet	6-8

Next meeting: **WEDNESDAY, October 9th, 2002**

Is work a pain in the neck, back, wrists, hands....?

by Tim Mahoney

It shouldn't be!

Come Wednesday, October 9th, to a presentation on Office Ergonomics and prevention of Repetitive Strain Injury (RSI) and other musculoskeletal disorders commonly associated with prolonged sitting at computers.

You will learn about:

- RSIs & how they are caused
- Anatomy/Posture
- Optimal workstation setup
- Stretching exercises

Cheryl Witoski of Injury Prevention Plus*, a local Ergonomics consulting firm, will be giving an informative, visual presentation that will enable you to go back to your office and start making some simple ergonomic modifications and changes to your work habits that will help you finish your work day feeling good.

To learn more about Injury Prevention Plus, check out their web site at: www.injurypreventionplus.com



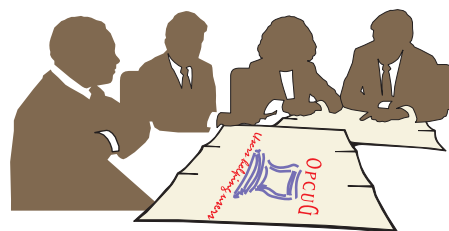
Election Notice

by Chris Taylor

Once a year, the OPCUG holds elections for the 9-member Board of Directors. We are once again coming up to this annual event.

I encourage all members to consider running for a board position or getting involved in some other manner in the operations of the OPCUG. I have found it to be a fun and rewarding experience over the years. If you want more information about what is involved, please talk to any current or past board member.

As well, we need a member to come forward to act as the head of the election committee. The duties are minimal. All you need to do is collect nominations by e-mail, postal mail, or in person at general meetings. If more than nine nominations are received, you would then need to select two other members to join you in an election committee and oversee the actual elections. If you are interested, please let one of the existing board members know.



CALENDAR

Meetings	Date	Time and venue
OPCUG General Meeting	Wednesday, Oct. 9 th	7:30 p.m. Auditorium of the National Museum of Science and Technology, 1867 St. Laurent Blvd.
Internet SIG (I-SIG)	Wednesday, Oct. 9 th	Come and join our discussions!
Developers SIG	Wednesday, Oct. 9 th	Immediately following the main OPCUG presentation, and occasionally at other locations in the region.
Delphi User Group	TBA	8:00 p.m. at Chapters Store in the Pinecrest Mall (at the Queensway)
Ottawa Paradox Users Group	3 rd Thursday each month	6:00-8:00 p.m. — Corel Bldg 1600 Carling Ave

Please note that unless otherwise noted, SIGs meet at 9:00 p.m. (immediately following the OPCUG General Meeting).

CD-R and CD-RW Burning 101 - part I

by Dunc Petrie

The September Orphans' SIG generated a vigorous discussion about the techniques to burn a CD-R or CD-RW. Or, more precisely, why the burner didn't burn. Further to that discussion here is an assortment of tips and techniques. Some are gleaned from user forums and colleagues but many are from the "school of hard knocks."

Unlike the mystery that surrounded the dawn of the home computer age, today's hardware installations are simple: mount the burner in a drive bay, attach the power and data cables and (optionally) the audio cable. The software installation, with its wizards and default options can be considered a no-brainer. Most of the bundled software also offers default settings that address most configurations and help the newcomer to avoid grappling with technical choices. Now, you're ready to go: hit the burn button and... what did you say: "A coaster?"

To preface the following, I use Win 2000 and Nero. My system is not spectacular (Pentium II, 266 MHz & 256 MB RAM) and my 12X burner does not have buffer-underrun protection. I currently do not use a packet writer (for example, Adaptec's Direct CD or Nero's InCD); I will expand upon my rationale later. Having upgraded to this Windows 2000 system from one running Win 9x (but not Me) and, incidentally, Adaptec Easy CD Creator/Direct CD, I know that this platform is more stable than Win 9x/Me (no blue screens of death). Identifying the culprit is another story. While it is easy to blame the operating system (OS), the burner drivers or the burning software — singly or collectively — this is too simplistic. There are too many potential weak links: for example, incompatible BIOS settings and hardware/motherboard conflicts.

As a rough rule of thumb the more potent your system and the more recent your operating system, the less likely you will experience problems (yes, there are exceptions). Microsoft is gradually drying up support for legacy operating systems; the longer you remain with one of them then the greater your potential for problems since hardware manufacturers won't devote resources to old hardware. As a result you may soon experience problems to obtain new hardware drivers that are compatible with an older OS. However, I am not advocating that you purchase the latest Pentium-4 system. Installing legacy equipment (for example, a 2X burner on a recent Pentium-3 or Pentium-4 system) to save a few bucks is often a false economy. Sometimes this works (I have had good success with older Hewlett Packards and Plectors — the latter, although initially expensive, have achieved cult status) but often there are subtle, behind-the-scenes interactions of older firmware (code that is embedded within the electronics of the burner — a sort of BIOS, if you wish) with newer OS's. It is worthwhile checking the

hardware manufacturer's website to locate a firmware update. Sadly, I expect that this will become less frequent. As the price of burners continues to plummet, the profit margins continue to shrink. Manufacturers are more interested in selling the latest and greatest and minimizing expensive support for yesterday's "obsolete" hardware.

Most of this is personal experience: it worked for me. But — as in most, if not all, things concerning computers — there is more than one road to success. These comments are, of necessity, pretty general. There are so many configurations that determining why it doesn't work often has to be a hands-on affair with a particular system. I am assuming that the Hardware Device Manager has not flagged (the yellow triangle with the exclamation mark or the stop sign) the burner as a problem. If it has, then the cause(s) must be addressed first.



The best creation software (both brand and version) was supplied with the machine. While software tweaking, by the hardware manufacturer, is extremely unlikely the

Continued on page 4...

CD-R and CD-RW Burning 101 ...continued from page 3

hardware may be subtly primed to look its best. This does pose a problem when an older burner is in a system that has the OS upgraded. Often, burning software must be upgraded to remain compatible (that is computerese for “working”). If you do not need to upgrade to accommodate a new operating system and your burner hardware/software combination is working, I urge you not to try to fix “what ain’t broke.” As I will relate later, a lot of problems arise trying to upgrade the software to the latest “dot” variant. While not true in every case, many of these upgrades are released simply to add support for the latest burner models. If you do not own that new model, why do you want to install software to support it?

If you do not own that new model, why do you want to install software to support it?

Try to burn, at all times, at the maximum speed of the burner. Assorted Internet-based forums suggest that this is the most reliable approach (how fast is not the issue) since the write-laser is tuned to perform best under this condition. Try the test burn option (emulates the burn process without actually powering the write-laser) if your software supports it. If you get an error reported, try to de-activate background processes to free more cpu cycles for this task.

Use name-brand blank media. Some machines, particularly older hardware, will like a brand (or a few brands) and gag on others. Check that the media is speed compatible. As already stated burn blank media as close to the maximum rated speed as possible. If you have, for example, a 12x speed burner, buy the appropriate speed-rated media and not the latest, fastest — and more expensive — on the market. Evidently, planned obsolescence is at work here: in a while, the media that is optimized at 12x or 16x will no longer be on the market. You may have to try a few brands of faster media to achieve a working compromise.

Name-brand hardware is always preferred; it doesn’t have to be the most expensive but it should be known. There are too many good brand names at reasonable prices to warrant taking a chance on an obscure brand to save (likely) less than \$10–\$15. Besides, should you require help, it is more likely that the technicians will have information about popular brands than the white-box special.

Avoid the media that is labelled as suitable for music CDs. These blanks are optimized for compatibility with burners attached to hi-fi systems. They may — or may not — perform correctly in a computer-controlled environment. Realistically, they should fail; after all, they are designed for systems whose burn speeds are well below current specifications in the computer arena.

I am reluctant to burn any media to its full capacity. I prefer a cushion — to err on the side of caution if you will — of a few megabytes. Earlier burner models may not support the 700 MB/80 minute media that is

available (despite your burning software’s capabilities). If in doubt, restrict your archives to less than 650 MB (you can use the 700 MB capacity media, however). Similarly, overburning is a complicated routine that requires hardware/firmware support, compatible software and suitable media. Some makes and models perform well; others are decidedly flaky. No manufacturer will go on record to support this: I wonder why? While it may be initially successful, there is some suspicion about data longevity compared to similar, non-overburnt media. Theory aside, consider this dilemma: should you ever have to replace the burner that made these overstuffed marvels will your new burner be able to read them?

The discussions about dye type (green, blue or yellow) and reflective material (silver or gold) as factors in data longevity are, for me at least, a non-starter. As long as they are name-brand and your burner likes them then you should be content. Why do I make this recommendation? As a parallel, consider the known tendency of magnetic media (for example, floppy disks and tape media) to lose data over time (let’s leave the physics to explain the “why” aside). Assuming you have your eight inch floppy disks handy, whether the data is intact is moot — show me the hardware to read them! *My point:* in 20 years “CD-whatever” will be history. The media will be frisbees, not actively-used data repositories. Presumably, if the data on this media remains important it will have been re-archived on the contemporary media. The data-media combination used today, despite boasts of archival properties of 50 years or more, cannot change this immutable law.

Avoid, if possible, writing music to CD-RW (harder to read on a machine that did not perform the original recording and many hi-fi players (as distinct from computer hardware) won’t read them properly.

If your system is more than a few years old and you are buying a burner for the first time, I would recommend avoiding the ultra-fast ones (currently 24X or 32X upwards). In any event, pay the premium (very minimal) and get a burner with buffer-underrun protection (should be available in some 12X and likely

all 16X upwards). This is device (hardware/firmware) based; it cannot be implemented by software alone (although the burning software must support this feature, it is not, per se, implemented by it). Make sure that your burning software (if it is not the bundled application) supports this feature.

CD-RW media for packet writing (copying files individually to the CD-RW media as though you are writing to a floppy drive) must be formatted before the media is usable. Never attempt to format a CD-R; you will render it useless if you succeed. Many CD-RW blank media are sold at retail pre-formatted for Adaptec/Roxio software (Direct CD is Roxio's Easy CD-Creator packet writing software). This pre-formatted media is useless (without re-formatting) if your burning software is Nero InCD. I have never seen pre-formatted media for Nero in the stores. To the best of my knowledge, other manufacturers' software would also require a proprietary format. Since the format is different (Yes, I know that there is supposed to be a standard but... 'nuff said) you can't read data written by Roxio on its formatted media by Nero's InCD and vice versa.

Do not attempt to pick-and-choose burning software. For example, do not try to use Roxio's Easy CD Creator for CD-R but Nero's InCD to write CD-RW. These are known to be incompatible. Nero has offered at times a utility to permit co-existence with variable results. It is not accepted by all operating systems. As an aside, if you insist on packet writing, Roxio's DirectCD packet writing software seems to garner better reviews than Nero's InCD. There are other burning software packages out there but I have not used them. Some of these may, however, prove compatible.

For a long time Adaptec (now Roxio) software was the favorite. For beginners, Easy CD Creator was, well, "easy to use". I used an early version very satisfactorily with a 2X Hewlett Packard burner. Then came Version 5.0. The user forums are full of horror stories with it. As a non-user (my current burner shipped with Nero) I do not know the source of the problems but they are real and apparently fairly common. I would be comfortable recommending version 4.x. Note: verify that this version supports buffer-underrun equipped hardware. The latest Roxio (Ver 5.3, I think) seems to be doing better but I am not certain if it is stable under all conditions. See my comments about problems upgrading software. How much of this is Roxio's fault and how much devolves to Microsoft's Windows XP multimedia problems resurrects the old chicken-and-egg tale.

I gather from forums that Windows XP has a lot of multimedia problems. You can translate this anyway you please but I gather it does include burning problems. Easy CD Creator Ver 5 was supposed to be tailored for Windows XP but somehow... Since I am not running Win XP, I can't help much here, I'm afraid. Maybe Roxio Ver 5.3 is OK here, I don't know. Then again, add Service Pack 1 and... here we go, again?

The attachment of the drives to the EIDE/ATAPI controllers is important. If you have one hard drive and one CD burner then the hard

drive should be the Master on the Primary IDE channel and the burner should be the Master on the Secondary IDE channel. Since burning requires reading the hard drive to obtain data to burn to the CD-R-RW it is preferable to utilize different channels. EIDE/ATA/ATAPI topology does not allow simultaneous activity on both devices on a channel. Indeed, to avoid this very problem SCSI was the choice for early burners.

If you have two hard drives, then both should be on the Primary channel; the boot drive should be the master. The CD devices should be together on the Secondary channel with the burner as the Master. There is discussion of these setups on both *PC Magazine's* Extreme Tech (www.pcmag.com) and Tom's Hardware (www.tomshardware.com).

While most current burners support direct memory access (DMA) paradoxically, there are a few that do not. Older burners often require that DMA be disabled. While DMA compliance is preferable, if your burner doesn't support it then you will endure constant problems until this setting is corrected (drive properties). Make certain that this setting corresponds with the manufacturer's specifications.

What processes are active in the background? Newer systems (faster, more powerful CPU and presumably more memory) have more flexibility to accommodate overhead (processes not directly related to burning), particularly with buffer-underrun protection enabled. With today's high-speed burners the few minutes required to create a new CD-R can likely be spared: shut down any non-essential processes.

...

Got a burning need?

Check back in next month's
Ottawa PC News for
the conclusion of this hot article!

SpamNet by Chris Taylor

Last month I took a generic look at the problem of spam. As a general rule, I still recommend that you deal with spam simply by deleting it and getting on with your life.

But, if you are *really* frustrated with the volume of spam you receive and you *really* want to do something to eliminate it, there are some products on the market that may be able to help you. This month I take a look at SpamNet from Cloudmark.

Most anti-spam software tries, with varying degrees of success, to identify spam by its own rules. It may look at information in the header, words or phrases in the subject or body of the message, etc. As you might imagine, this can be a really difficult way to identify spam. And it can be problematic. Every e-mail I have ever received that contained the word “Viagra” was in fact a spam trying to sell the drug to me. However, the same is not likely true for a doctor, hospital or drug supply house.

Cloudmark avoids the problem by not doing a single thing to identify spam. Instead, they let their customers identify spam. An ingenious turn-about. Once you install SpamNet, currently at beta 6d as I write this review, it begins filtering out spam automatically. As well, if you want, you can immediately begin to contribute to the body of knowledge of known spam. Here’s how it works.

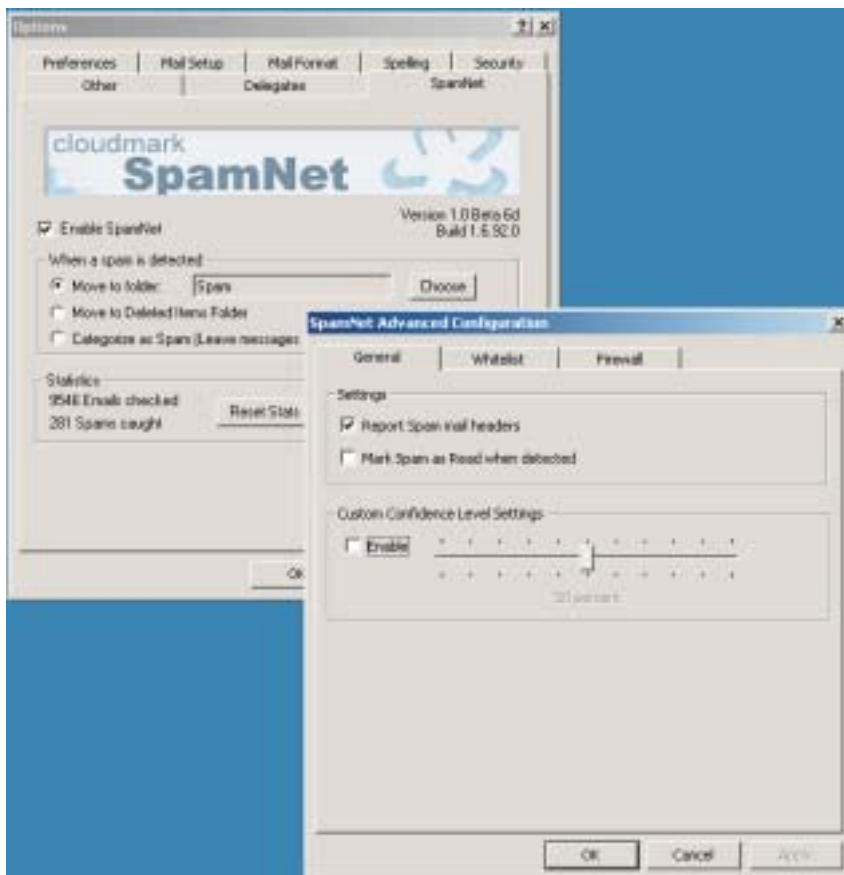
While it is difficult to describe a spam e-mail, everyone knows one when they see one. When you receive an e-mail and you identify it as being spam, you can click a button on your toolbar labelled *Block*. SpamNet takes a copy of the spam and sends it to a Cloudmark server. The Cloudmark server creates a statistical signature, or fingerprint of the message and stores this fingerprint in a database. Now, say someone else receives the same spam e-mail. When the e-mail arrives, a fingerprint for that message is created and then checked against the database of known spam to see if a similar

fingerprint already exists. When it finds the match, SpamNet knows that the e-mail is, in fact, spam and the software then moves the e-mail to a spam folder.

There is strength in numbers. As more and more people use SpamNet, more and more people are identifying spam and reporting it to Cloudmark. The more people are involved, the more likely it is that, by the time spam makes it to your mailbox, someone else has already identified the spam, and your copy of SpamNet can whisk it away to your *Spam* folder before you have to deal with it.

But things are seldom perfect. What if someone accidentally reports an innocent e-mail as spam? Perhaps they forgot that they actually did sign up at some web site to be kept informed about product information or whatever.

Besides the *Block* button on the toolbar, there is an *Unblock* button. If you notice that something was caught as spam that should not have been treated that way, you can click the *Unblock* button. When you do so, the statistical representation of the message is sent to Cloudmark to let them know that this e-mail was not spam. At the same time, the message is moved from the *spam* folder back to your Inbox.



But what if the spammers got a copy of SpamNet and simply sent an *Unblock* for every spam they send out? Or what if you get some dolt who can't figure out what they are doing and are constantly pressing the wrong button?

Cloudmark has thought of that. Each user gets assigned a ranking in a "Truth Evaluation System". The more spams you accurately report, the higher your ranking and the more weight your blocks and unblocks carry. Anyone who consistently reports incorrectly will end up with a ranking that carries no weight.

Finally, if you have mail from a particular source that is always being accidentally treated as spam, or you don't want to take a chance of e-mails from a particular source being treated as spam, you can use the *Whitelist* option. This is a simple string match. For example, entering "Minisoft" would allow Minisoft-user@spammer.com or Connie-Coder@Minisoft.com through. Entering "@Minisoft.com" would allow the second example to pass through with no spam checking.

I would estimate that over 90% of the spam I received during my testing period was caught by SpamNet and moved to my spam folder.

Given the simple way that SpamNet works, the user controls are pretty limited. You can enable and disable SpamNet, specify the folder that spam should be moved to, create entries on the *Whitelist* and configure SpamNet to use a SOCKS 4 or 5 proxy (if required). There is a configuration option called *Custom Confidence Level Settings* which is currently disabled. I am intrigued, because I expect this will give a bit more control to the individual users over what is considered spam or not. We will have to wait and see!

About the only other thing you can do with SpamNet is run it against existing e-mail already in your mailbox. You can specify any folder and SpamNet will chug away checking

every e-mail in the folder. If you have thousands of messages, expect it to take some time.

So how effective is SpamNet? Well, Cloudmark's web site says you can expect SpamNet to catch about 75% of all spam. Their home page lists numbers for the day, and on September 14th, it was reporting that they had 72,456 users, they had processed 5,024,097 e-mails and had caught 1,721,925 spams. Not too shabby for a single day!

My experience with SpamNet's ability to catch spam has been very good. I would estimate that over 90% of the spam I received during my testing period was caught by SpamNet and moved to my *spam* folder.

But what about dreaded false positives? Everyone wants spams removed, but nobody wants legitimate, non-spam e-mails to be accidentally caught.

On this front, I found that SpamNet tended to catch one or two non-spam e-mails a day. For most of them, I could see why they might have been treated that way. I am signed up for a *lot* of electronic newsletters, most of them related to information technology. They are all legitimate and have clear instructions on how to unsubscribe. But perhaps some people had a hard time unsubscribing and decided to treat them as spam and use the *Block* button. I used the *unblock* button and it seems to have helped, but not eliminated, the problem of non-spam e-mails being blocked.

Quite a bit more puzzling was the result of running SpamNet against a couple of thousand e-mails in one of my existing folders. It identified an e-mail from my boss as spam! Ouch! Now, I am not sure how this could happen, except that the fingerprint calculated from this message happened to match the fingerprint of a completely unrelated spam that someone reported? I am told this can't happen and the e-mail was identified as spam "...because there was a common background, part, or signature within the messages." The proper thing to do is *unblock* the message so that it is not treated as spam in the future.

I had another e-mail, a daily humour digest and it was getting caught as spam every day. Every day I *unblocked* it. I finally gave up and *whitelisted* the sender address. But I guess that's part and parcel of being beta software!

And therein lies the rub. As with other anti-spam programs I have looked at, you cannot be absolutely sure it will catch all spam and you can't be absolutely sure that it won't have false positives. Not catching all spams is not really a problem, although you really do want it to catch the maximum possible. But most people have a pretty low tolerance for legitimate e-mail being treated as spam.

Most anti-spam programs, SpamNet included, handle the problem of false positives by refusing to silently purge spam so you never see it. They will only move it to another folder.

And therein lies the other rub. Even though SpamNet can move spam out of my Inbox for me, *I still have to deal with the spam at some point*. Until I am confident that there are *never* any false positives, I must look through the *spam* folder to make sure nothing was accidentally

OTTAWA PC NEWS



Ottawa PC News is the newsletter of the Ottawa PC Users' Group (OPCUG), and is published monthly except in July and August. The opinions expressed in this newsletter may not necessarily represent the views of the club or its members.

Member participation is encouraged! If you would like to contribute an article to *Ottawa PC News*, please submit it to the newsletter editor (contact info below). Deadline for submissions is three Saturdays before the next General Meeting.

Group Meetings

OPCUG meets on the second Wednesday in the month, except July and August, at the Canada Science and Technology Museum, 1867 St. Laurent Blvd, Ottawa. Meetings are 7:30–9:00 p.m. and Special Interest Groups go until 10 p.m.

Fees

OPCUG annual membership: \$25 per year.

Mailing Address

3 Thatcher St., Nepean, Ontario, K2G 1S6

Web address

<http://opcug.ca>

Bulletin board — the PUB II (BBS)

Up to 33.6 kbps V.34. 228-8951

Chairman and System Administrator

Chris Taylor ctaylor@nrcan.gc.ca 727-5453

Meeting Coordinator

Tim Mahoney timothy@cyberus.ca 225-2630

Treasurer

Vince Pizzamiglio vince@monisys.ca

Webmaster

Brigitte Lord opcug@iname.com

Secretary

(Mr.) Jocelyn Doire Jocelyn.Doire@opcug.ca

Membership Chairman

Mark Cayer Mark.Cayer@StatCan.Ca 823-0354

Newsletter

Bert Schopf (editor) bert@blackbirdpcd.com ... 232-8427

(Mr.) Jocelyn Doire (distributor, electronic version): Jocelyn.Doire@opcug.ca

Public Relations

Morris Turpin morris.turpin@rogers.com 729-6955

Historian

Bob Gowan gowanb@inac.gc.ca

Director without portfolio

Ted May tamay@rogers.com

Facilities

Bob Walker skywalk@iname.com 489-2084

Beginners' and Windows SIG coordinator

Duncan Petrie gdpetr@hotmail.com 841-6119

Internet SIG coordinator

Norm Dafoe ndafoe@sirius.ca

Paradox SIG coordinator

John Ladds laddsj@statcan.ca 951-4581

Delphi SIG coordinator

Stan Isbrandt isbrandt@trytel.com .. 992-8141 / 729-7793

Orphan SIG coordinator

Henry Sims ha4326@rogers.com

Developers' SIG

Bob Thomas bobthomas@msn.com

© OPCUG 2002. Reprint permission is granted* to non-profit organizations, provided credit is given to the author and *The Ottawa PC News*. OPCUG requests a copy of the newsletter in which reprints appear.

*Permission is granted only for articles written by OPCUG members, and which are not copyrighted by the author.

Spam ...continued from page 7

caught. If and when I ever get that confident, dealing with the spam will be a simple action of emptying the *spam* folder.

The final caution I have about SpamNet relates to your privacy. Normal e-mail arriving at your Inbox is not sent to Cloudmark – only the statistical signature is sent. Even when you *Unblock* a message that was accidentally treated as spam, only a signature is sent. But, when you hit the *Block* button, that message is sent to the Cloudmark server. In most cases, this is not a problem. The message is just a spam, right?

I can understand why the Cloudmark lawyers would insist it be in the license agreement, but users should be aware that any message they block by hitting the *block* button is sent in its entirety to a Cloudmark server and you “assign to Cloudmark any and all right, title, and interest that you may have (including any intellectual property or proprietary rights) in and to any such e-mail messages and digital signatures thereof.” I am promised by Cloudmark staff, “All I can do is assure you that we never look at, or acknowledge these messages in anyway. No human beings are doing anything with the reported messages, your privacy is protected.” But seeing the wording in the license agreement, I would say you better not accidentally hit the *Block* button when your partner sends you your latest business plan or the source code to your program that is going to make you a millionaire!

SpamNet requires Outlook 2000 or Outlook XP. A version for Outlook Express is in the works, but no release date has been announced. If you are behind a firewall, you need to be able to make an outbound connection with a destination on TCP port 2703. Most firewalls will allow such outbound connections.

The SpamNet beta is free and will remain free even after the final release hits the street. The final release version will cost you something, but the pricing has not yet been set. An Enterprise version is also in the works that will be appropriate for ISPs and large organizations.

You can download a copy of SpamNet from www.cloudmark.com.

