

Touro College Student Chapter of the ACM Newsletter



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Welcome to the Touro College ACM Student Chapter

Welcome, once again, to the Touro College ACM Student Chapter for the year 2000/2001. In the past, the Chapter has always provided the means for students to become more involved in the computer industry, outside the classroom. Participating in ACM activities has always been rewarding to the student as well as the college.

At the Touro ACM Student Chapter, we look forward to advancing the technological environment that educates us. Our guest speakers will raise the expectation both of technology and us. Our newsletter will have additional features, contributed by the students and officers, which will broaden our horizons way beyond the classroom. The articles address advanced technological issues. We look forward to your suggestions and contributions as well. Together we

will raise the level of academic technological discourse in and out of the classroom.

I wish to thank the officers, members and staff for their contributions, participation and guidance during past and present terms. We look forward to working together to achieve, advance, and make this year memorable for all ACM members. The times of technological advances are upon us, creating unprecedented opportunities. Let's ride the crest of the technological wave together.

Professor Joseph Herbst,
Faculty Advisor
Student Chapter of the ACM

Current Events & Future Plans for the Touro ACM Student Chapter

Current Events

The Touro College ACM Student Chapter has continued to achieve significant growth and success over the past semester. Our last meeting received some of the most positive feedback we have ever experienced. In an effort to continue to bring our student members interesting speakers and diverse topics, in our last meeting we focused on some of the practical issues that can face a religious Jew while working in the IT field. Our sincerest thanks go out to our Faculty Advisor, Professor Joseph Herbst, for extending the extra effort to ensure a smooth operation. In addition, we thank former ACMSC president, Zev Wolman, for a job well done, and for his continued contributions in spite of his retirement.

We are pleased to announce that we are currently registered with The Job Resource, a career management service that will assist our members in their search for internship/job opportunities. Please look for it on our web site, <http://www.touro.edu/ACM>, in the coming weeks.

We would like to congratulate the Touro College Queens Campus on the inaugural meeting of their very own ACM chapter. Our thanks to their officers for their contributions to our newsletter, and a special thanks to Faculty Advisor Professor Shmuel Fink for his continued assistance in spite of his added responsibilities. We wish all of the officers and members, and particularly former Ave J ACMSC officer and current Queens President, Jonathan Rhine, success in all of their endeavors.

In closing, we bid farewell to and congratulate outgoing officers Yitzchak Novick and Joel Edelstein, as well as newsletter editor-in-chief Sholom Dreyfuss, on their upcoming graduation. Thank-you all for your tireless efforts. Best wishes to our newest officer, Shaul Taub, for continued success in future ACMSC activities. Positions are opening... GET INVOLVED!

In the Future

We are continuing the development of our website. We would like to lay the groundwork for the students and alumni section of our site, which will hopefully serve the entire Touro College community as a communications tool in the computer industry workplace. In addition, we would like to add to our website the capability to submit your ACM applications online. Just imagine — no more paper work!

As always, we encourage our student members to take the initiative and contact us if they would like to introduce and/or participate in a project that will benefit our society. If you are interested in helping out, or just have a good idea, please don't hesitate to speak to one of the officers or email us at compsoc@touro.edu. And be sure to check out our website at <http://www.touro.edu/acm/inform.htm>.

Linux: The Time to Change is Now!

By Shaul Taub

Do you often find yourself staring into the gloom of the blue screen of death? Have you experienced just one too many critical errors or illegal operations? If so, you belong to a frustrated group of people that includes just about everyone who has ever used Microsoft Windows. Why then, you may ask yourself, is almost everyone using Windows as their operating system? As a matter of fact, according to statmarket.com almost ninety-five percent of all web users are using some version of Microsoft Windows. Certainly, if a product proves to be unreliable people should not be embracing it. The obvious answer must be that Windows is the best operating system currently available. However, the obvious answer is the wrong answer! There is definitely an operating system currently available that is more reliable than Windows. The operating system that I am referring to is Linux.

What is Linux?

Linux is a free, UNIX-like operating system. It is the brainchild of a fellow named Linus Torvalds. He started it as a hobby while studying at the University of Helsinki in Finland, with no intention of ever creating a commercial operating system. For this reason he always made the source code of his operating system freely available to the public. He wanted people to be able to use it and make any necessary modifications to it that they saw fit. A system was developed in which if a programmer believed his modification of the source code should be included in the official release of the next version of Linux, he sent his suggestion to a group of people that included Torvalds, who then decided if the change merited inclusion. This system is still in place today. Thus, Linux is an operating system that was, and is still being built by thousands of programmers around the world.

What does free mean?

Most people, when referring to Linux, are referring to a complete operating system. In actuality, however, Linux is only the kernel of an operating system. The complete operating system that they are referring to is known as a distribution. A distribution of Linux is an operating system that uses the Linux kernel as its base. The Linux kernel is written and distributed under the GNU General Public License. This means that its source code is freely distributed and available to the general public. It does not mean that one cannot charge for distributing a product using the Linux kernel. Thus, there are hundreds of

individuals, and many companies, that have come out with their own Linux distributions. Many of these distributions are available free of charge, but others are sold for a nominal cost.

What are some of the advantages of Linux?

The first thing that comes to mind with the mention of Linux is stability. Many Linux systems have been documented to be up and running for months and even years without crashing. Now think about the last time you had to restart your Windows machine. Microsoft does not come close to Linux when comparing stability. In fact, with each new release of Windows, Microsoft always promises increased stability, which means that they admit their products are unstable. Linux users often like to poke fun at the instability of Windows by way of screensavers like BSOD (Blue Screen of Death, which displays crash screens from Windows). One of the reasons for Linux's incredible stability is that it is an ongoing project being worked on by thousands of programmers. When a bug is detected that could cause a crash, these programmers get to work immediately and usually release a patch within hours or days. Another reason for its stability is that it is not being programmed for the corporate world. In the corporate world, many times programs are rushed to release (for a shopping season or to beat the competition) before they undergo proper quality assurance testing. Linux programmers have no deadlines. Linux versions are only released when they are ready for public use.

Another big advantage of Linux is cost. The cost of obtaining and maintaining Linux is significantly less than that of any other operating system. The cost of Linux depends on the distribution one wants. Many of the distributions are available free of charge. Even those that you do have to pay for can be purchased for well under one hundred dollars (typically between \$2 and \$60). When a new version of Linux is available, an upgrade can be downloaded from the Internet free of charge. Compare that to the cost of using Windows, where your initial copy will cost close to two hundred dollars and approximately every two to four years after that you will be required to pay around one hundred dollars to receive an upgrade to the next version.

A third advantage of Linux is the large amount of compatible quality software available for it, much of it gratis. Manufacturers of operating systems that do not support open source code have the unfair edge of creating

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software optimized for their system while everyone else is left guessing. This limits the amount of quality software that can be created for the operating system. With Linux, everyone has the same opportunity to create software optimized for it. Furthermore, the idea that Linux brings along with it, that of free software, seems to have caught on with thousands of computer programmers. Many of these programmers now develop free software of their own to work specifically with the Linux operating system. Most distributions of Linux come loaded with hundreds of these free programs. These include word processors, spread sheet managers, and even entire productivity suites that rival those produced by commercial software companies. Even if you do not find the program that you need included with your distribution it can usually be downloaded from the Internet. Furthermore, any program that was designed for Unix is compatible with Linux, so if you cannot find a Linux version you can always look for a Unix version. Linux is also a programmer's dream as it comes with a complete development environment including compilers for C, C++, and Fortran, toolkits such as Qt, and scripting languages such as Perl, Awk and Sed. If by chance you are still not satisfied with the free programs, many commercial companies such as Corel and IBM are now developing software for Linux.

A fourth advantage that Linux has over any other desktop operating system is security. Since Linux was created to be a UNIX like system for the desktop, from its start it was built to be a multi-user operating system. In the creation of any multi-user operating system, security is a primary concern, as it was in the development of Linux. Linux has many of the same security features as UNIX, including access permissions, which prevents users from accessing or deleting files that they do not have authorization to access. The robust security features of Linux also make it much less susceptible to viruses. If a virus were to attempt to delete critical files it would receive the same "permission denied" message as an unauthorized user.

Yet another advantage of the Linux OS is portability. Linux was originally only programmed to run on an x86 machine. However, once its popularity started to spread, the ability to port Linux to other architectures became a concern. Since then great care has been taken to keep the Linux kernel code independent of specific computer architectures. This is done by what Linus Torvalds calls "smart programming", which is, finding the common denominator of the many different architectures available and writing code that only refers to these similarities. The Linux OS has already been ported to many architectures including Alpha, IBM, Motorola 6800, SUN Sparc, MIPS, Power PC, and Ultrasparc. The portability of Linux is probably one of its biggest advantages. With the trillions of computer devices that are in use today, eventually there is going to have to be a standard that will

let these gadgets coexist and work with one another. Linux's ability to port to the chip architectures of these devices will very possibly allow it to be that standard.

Why are people scared to switch to Linux?

There are many answers to this question. For one, people believe that in order to use Linux you must know how to use UNIX. This is because the standard Linux user interface and commands are similar to those used in UNIX shells. In truth, users who have experience with UNIX may have an easier time with Linux, with the use of Xwindows (which comes standard with most Linux distributions) Linux can be customized to work with graphical user interfaces that mimic the GUI's of any operating system including Windows and Mac. In fact, it may very well be that from appearance alone, the only way you would know you are not using a Windows platform is because the Microsoft logo is missing from the start button.

Another reason why people do not want to switch to Linux is because they are afraid that if they do not like it they will have to go through the hassle of reinstalling their old operating system and programs. What they do not realize is that Linux can be installed on the same hard drive as their current operating system. This can be accomplished by partitioning the hard drive. I do not want make things sound easier than they are. Normally partitioning a hard drive is no easy feat and should be left to experienced users. However, most distributions of Linux come with simple installation programs and easy to use reference manuals that guide new users through this process. If you try Linux and are unsatisfied, all you have to do is boot up your old OS. There are also a few Windows emulators available that enable the running of Windows programs under the Linux operating system. However, these emulators are not one hundred percent reliable as of yet. The best suggestion is to install multiple operating systems.

By now you may be wondering, if Linux is really so great why isn't anyone in the corporate world taking notice and trying to capitalize on it? If it is so much better, eventually everyone is going to wake up, smell the coffee, and make the switch. While the individual user might not realize this, big corporations should have such visions. Surely the whole thing must be a myth! The answer: while in truth some companies might be ignoring Linux, some very big ones have definitely taken notice. In fact, according to their 2000 Annual Report, IBM is investing one billion dollars in Linux. They are also dedicating 1,500 programmers to enable every IBM hardware and software product for Linux. Why are they doing this? In the words of IBM:

"We think that, at the end of the day, the operating system that provides the most flexibility to customers is the one that is going to end up winning. We're voting with our customers on this one. We're

Clash of the Tiny Titans: An Inside Look at PDAs

By Samuel Abrahamson

They've become companions as ever-present as the venerable wallet. They can be spotted nestled in the palms of high school students and top executives alike. These curious little devices are Personal Digital Assistants, or PDAs. At first glance, these cute little gadgets merely seem to be fancy organizers. In fact, these pocket-sized marvels hail from one of two slightly different genres: the PocketPC and the Palm OS-based handheld, each having their own unique strong points.

Pocket PCs

These \$400 and up units, mostly based on the Microsoft Windows CE 3.0 operating system, boast color screens at a 240x320 resolution, lots of RAM, and a whole host of other goodies. These include Pocket versions of Microsoft's familiar Explorer, Word and Excel, and others, which together with Windows CE provide a look and feel similar to that of a desktop running Windows 9x with the equivalent full applications.

The processor, usually in the 200MHZ range, provides plenty of juice to power the included (subset of) Windows Media Player, for the MP3 files on the 32-64 MB of included RAM. While on the topic of MP3 files, various models include MultiMediaCard or CompactFlash slots, so there is no want for storage space after downloading a few tunes, as these slots can complement respective units' built-in storage, with up to an additional 64MB.

Other sources of entertainment include reading E-books, viewing snapshot-quality pictures, or showing off a family video, all of which take full advantage of the relatively high screen resolution.

Note taking, a potentially frustrating chore, is actually implemented quite nicely on PocketPCs. Transcriber, an included (though, by default, not preinstalled) application is more streamlined and flexible than the already included Character Recognizer software, which recognizes handwriting relatively well.

The most essential feature in a PDA, arguably, is its ability to organize and manage information. In that regard as well, PocketPCs all come with a nice array of features. These include the powerful Contacts application, which provides over 40 fields for information. The Calendar application, on some models, turns them into great appointment books. They also have a meeting invitation feature for MS Schedule+ and Outlook. Synchronization capability (the two-way exchange of information between the PC and the PDA) is, of course, included.

Although Pocket Microsoft Outlook is included on most units for E-mail access away from the office, very few units have modems built in. They usually start at a pricey \$300.

For financial data management, the Pocket version of Microsoft Money is included as well.

Palm OS Handhelds

Costing as little as \$100, Palms come with many organizational and data management features, along with some expansion capabilities (varies by manufacturer) and more. Depending on the manufacturer, it is either powered by the twenty five year old (yes, that's 25) Motorola Strong ARM 16 - 25MHZ chip or the 33MHZ Motorola Dragonball VZ chip. These units provide some entertainment value as well, with some Palms stronger than others in this area.

The Palm OS, having been around for 6 years, has millions of third party applications written for it, both commercially and as shareware/freeware. Thus users can supplement the included applications with virtually anything they could desire. The most significant limitation to taking advantage of these add-on applications and utilities is the amount of RAM included, which ranges from 2 - 8MB built-in, depending on the model.

Despite a mere 160x160 resolution, the power and flexibility of the Palm remains strong. Besides for the requisite address book, date book, notepad, Calendar/Scheduler, To Do, and other applications, the Palm melds tasks and appointments well.

An important function of the Palm is its ability to synchronize to a Desktop or laptop computer. The complementary Palm desktop software suite contains applets that synchronize with the date book, address book, to do list, and memo pad.

Expansion is handled differently from one PDA manufacturer to another, with options such as proprietary expansion slots, memory card slots, and the ever-present choice of the actual pins/contacts that would otherwise go into the synchronization cradle doing double duty as the expansion "port".

The Palm makes for a great mobile E-mail client, by using an add-on modem (or the built-in wireless one on one particular model), and the Palm Mail client, which synchronizes with Microsoft Outlook, on the desktop.

In the gaming arena, Palms include a number of games out of the box, with many more available. One model even comes with video-playing software.

In terms of note taking, once the initial mastery of the graffiti character-recognition language has been achieved, writing with the included stylus can take on an almost natural character flow.

Expense reports, from the feature-rich Palm Expense application, can also be exported to Microsoft Excel on the desktop, via the synchronization cradle. The Expense applica-

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tion dumps its data into one of five editable expense report templates, and maps the results into professional-looking spreadsheets. Personal finance (Quicken/MS Money compatible) software is available as a \$15 add-on (known as Personal Expense Manager).

What's New

Two of the newest Palms feature Secure Digital/MultiMediaCard (SD/MMC) slots, which provide many expansion capabilities, including memory, storage, applications, multimedia mini-devices, and more.

Two new models now include 16-bit color screens, to further increase the enjoyment factor. But their low native 160x160 resolution still limits that enjoyment somewhat.

The inclusion of a wireless connection kit on two other models allows for web and/or e-mail access on the go, for those with a data-enabled cell-phone to connect it to.

Alternatives

The \$80 Royal DaVinci features a graffiti-like language with bare-bones PDA functionality including contacts, calendar, and task list. Its OS is similar to the Palm OS.

The \$400 S3 Diamond Mako uses the EPOC 32 5.1 OS, and comes with 32 MB RAM, a 36Mhz processor, a laptop-like design with a keyboard, and is feature-filled.

The \$99 Rex 6000, a Type II PC Card-sized PDA, comes with a touch-screen, 2 MB of non-volatile memory, and synchronizes via a cradle or a notebook's PC card slot.

Palm versus PocketPC

So which one is the winner? As is evident from the comparison charts on the next page, Palm-based handhelds are appreciably less expensive than their Windows CE-based counterparts, despite recent price drops on both sides of the fence. On the other hand, the PocketPCs do much more, and include more RAM and expansion capabilities as well, even with the increasingly better expansion options on the newest Palms. So which is the superior choice? The answer most likely depends on what the main tasks are that the PDA must perform.

Task 1 – Note taking:

- o **Winner:** PocketPCs *iPaqs*, *EM-500*, and *Jornada 720*
- o **Summary:** PocketPCs include superior Transcriber handwriting recognition software, which accepts characters scrawled on any part of the screen, to put that text in the location it was drawn in.
 - § *IPaqs and EM-500:* include Transcriber
 - § *Jornada 720:* relatively large, fairly usable built-in keyboard

Task 2 – Information Management:

- o **Winner:** PocketPCs *EM-500*, and *iPaqs*
- o **Summary:** Bright screens, shortcut menus,

and handy pick lists simplify adding and viewing appointments, tasks, and contact information. Also includes Contacts application (as noted), with 40 fields for information, and meeting invitation feature for Outlook and Schedule+.

§ *EM-500 and iPaqs:* include Calendar app to turn these units into great appointment books with Day, week, month, and year views.

Task 3 – E-Mail on the Go

- o **Winner:** *Palm VII*
- o **Summary:** Despite its Mail client being plainer than CE's Outlook, it is still a very good program, with easy reading, sorting and reply capabilities.
 - § *Palm VII:* includes a wireless modem that is activated by flipping up its antenna.

Task 4 – Money Management

- o **Winner:** *PalmOS*-based PDAs
- o **Summary:** All but the budget-level M100 include Expense, which tracks expenses on the Palm OS. It records payment methods, currency (any of 23), vendor, location, and expense type. Exports well to Excel spreadsheets.

Task 5 – Document management

- o **Winner:** *Mako*, *PocketPC Jornada 720*
- o **Summary:** Pocket Word and Excel offer the most common features.
 - § *Jornada:* largest screen: 6 x 2.2 in., along with built-in keyboard.
 - § *Mako:* includes Excel-like Sheets application with charts and graphs features, along with a built-in keyboard.

Task 6 – Entertainment

- o **Winner:** *PocketPC EM-500*
- o **Summary:** PocketPCs can play MP3s, display pictures, and more.
 - § *EM-500:* Built-in MultiMediaCard (MMC) slot offers up to an additional 64MB of expandability. Its picture and video player offers even better compression than the *iPaqs'*. LCD color depth displays a very high 16-bit (65,536) color depth.

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Palm OS – based units

<i>Model</i>	<i>Version</i>	<i>Memory</i>	<i>Expansion Options</i>	<i>Extra Features</i>	<i>Manufacturer</i>	<i>Price</i>
CLIE	PEG-S300	8 MB + 8 MB stick	Memory Stick Slot	Memory Stick Slot	Sony	\$250
WorkPad	C3	8 MB	Serial expansion port	Palm OS version 3.5	IBM	\$300
Palm	M100	2 MB	None	inexpensive, IR port	Palm	\$130
Palm	M105	8 MB	None	Internet capability, 8MB	Palm	\$180
Palm	M500	8 MB	SD/MMC slot	Mobile Connectivity	Palm	\$350
Palm	M505	8 MB	SD/MMC slot	16-bit (65,536) color	Palm	\$425
Palm	Vx	8 MB	None	slim form factor, IR port, rechargeable	Palm	\$250
Palm	VIIx	8 MB	None	wireless modem, IR	Palm	\$275
TRGPro	n/a	8 MB	CompactFlash I or II	Speaker	TRG Products	\$220
Visor	Deluxe	8 MB	SpringBoard Slot	mic, IR port (all visors)	Handspring	\$225
Visor	Edge	8 MB	SpringBoard Slot adapter	Slim profile,	Handspring	\$375
Visor	Platinum	8 MB	SpringBoard Slot	mic, 33 Mhz processor	Handspring	\$275
Visor	Prism	8 MB	SpringBoard Slot	mic, 16-bit color screen	Handspring	\$400

Windows CE – based units (PocketPCs)

<i>Model</i>	<i>Version</i>	<i>Memory</i>	<i>Expansion options</i>	<i>Extra Features</i>	<i>Manufacturer</i>	<i>Price</i>
Aero	1550	16 MB	CompactFlash Type I	mic, spkr, stereo jack	Compaq	\$400
Cassiopeia	E-125	32 MB	CompactFlash Type II	mic, spkr, stereo jack	Casio	\$500
Cassiopeia	EM-500	16 MB	MultiMediaCard	mic, spkr, stereo jack	Casio	\$400
iPaq	H3650	32 MB	CF, PCMCIA, (optional)	mic, spkr, stereo jack	Compaq	\$500
iPaq	H3670	64 MB	Serial port (all for both)	Built-in 56kbps modem	Compaq	\$650
Jornada	548	32 MB	CompactFlash Type I	mic, spkr, stereo jack	Hewlett-Packard	\$400
Jornada	720	32 MB	PC Card, CF, Smart-Card	^, Handheld Win 2K OS	Hewlett-Packard	\$850

E-commerce: Is it safe to shop on the 'net?

By Joel Edelstein

While e-commerce companies have long claimed that credit card fraud is just as prevalent with Internet companies as with regular stores, a survey by the National Consumers League reveals that Internet fraud has increased over 600% in the past year alone, much greater than the two percent increase of regular credit card fraud. It is much easier to steal information from an Internet server than from its brick and mortar counterpart. Who is left with the bill when a hacker fraudulently places an order with your credit card? Is there something you can do to prevent this from happening to you? Should you be afraid to buy things from e-retailers?

The good news is that since e-commerce companies do not want to scare us from buying, they are shouldering the blunt of credit card fraud. According to federal law, consumers are merely liable up to \$50 if their credit card was used fraudulently, and even then most e-retailers will eat the entire loss. What will happen when a consumer indicates an instance of fraud is that the disputed amount is automatically removed from the merchant's account and credited back to the consumer. (There is a standard \$15 fee to the consumer for the "chargeback.")

Still, even if the consumer doesn't lose any money, there is someone "out there" with his personal credit information. It is therefore in the best interest of both the e-retailer and consumer to prevent credit card fraud. When giving credit card information over the Internet always make sure you are using a secure browser that will encrypt the data being sent. Either the URL should say <https://> or there should be a locked padlock symbol on the bottom of the screen.

In addition, shop only with reputable merchants. This will minimize the chance of your credit information being stolen from the merchant's server. Since the e-retailers have the most to lose from credit card fraud, they are instituting extraordinary measures to protect their servers from hackers, and most merchants will have lots of information posted about the security systems they have in place. It's worth spending the extra few dollars rather than buying from a no-name company and having your credit information stolen by zealous hackers.

The least secure way of transmitting information is through email. In general, it's not smart to email anything that you wouldn't want other people to read. Especially so, don't ever send payment information via email. If a merchant asks you to send them your credit card number through email, you know right there that they are not secure because no reputable e-retailer will ask you to email them your credit card number.

It's a good idea to keep track of your online purchases. That way, all the information about every order will be at your fingertips in case a problem arises. Keep all the purchase confirmation emails in a special folder in your email box. It also makes sense; just as you would save your receipts from a regular store in case you want to return an item. It's also smart to use one credit card for all your Internet purchases. Using one card will help you realize quicker when your card has been stolen when you see the unusual charges on your monthly statement, and it will limit the thief to only being able to steal one card.

If you suspect that your credit card has been compromised, call your credit card company as soon as possible to cancel the account. In addition, you should call the merchant because some merchants have additional rules and procedures to resolve fraudulent purchases.

You should also file a police report if your credit card has been stolen. Although this type of activity has long been considered by law enforcement agencies as too small to bother with, fraudulent credit card purchases over the Internet are quickly becoming a major issue. So much so, that the FBI recently had to define it as a serious federal felony. Most times they will open an investigation, and if the merchant has the proper software, it can provide the law enforcement agency with plenty of information about the hacker. In today's day and age, fingerprints have been quickly replaced by IP addresses, which is just as effective in identifying criminals.

Even with all the news about hackers, the Internet is becoming a safer place to shop. The bottom line is that the Internet is a very profitable place, and so e-retailers are doing everything possible to prevent thieves from scaring away their customers. They are therefore investing millions of dollars in developing sophisticated security protections that will keep the thieves away, and the customers coming back. As long as you take these precautions, you should be safe from the Internet thieves lurking around, waiting for the unsuspecting, foolish consumer.

All things considered, although the Internet is not as secure as shopping in an earthly store, if you're willing to be a little risky in exchange for the convenience of being able to shop in your underwear – knock yourself out. With the Internet, even the sky isn't the limit.

Extreme Programming: A Better Way to Make Software?

By Zev Wolman

How many people can remember when floppy drives were the limit of PC storage? It has been a while since a truly modern program would feel comfortable on a floppy disk. Over the years, software packages have grown larger and larger. Yet the push to put programs on to the market as quickly as possible has grown in proportion to their size. As a result, we have come to accept bugs as an expected feature of even our most popular consumer software packages. It doesn't take a genius to realize that there's something wrong with the way software is developed. Recently there has been a great deal of talk about a different method whose proponents claim will solve all our software problems. This method of software development is called extreme programming.

The most commonly used method of software development uses a flawed divide-and-conquer method. A typical project is first planned out to a very detailed level – after all, any mistake in planning will be exponentially more costly to fix later. The project is then divided between groups, each member of each group being given specific pieces of the program to code. After the individual coding is done, each piece must be “sewn” together like an uneven patchwork quilt. The lopsided program is then debugged, tested and, after a long period of time, given to the end-users to inspect. Most often the end-users decide that the program isn't exactly what they wanted, either because their needs have changed or because they didn't quite know what they wanted to begin with! The program cycle must then start again and be repeated several times at a great cost. This nightmarish process is how most of today's software is developed.

Extreme programming, or simply XP, is a relatively new programming methodology, which aims to improve the process of software development. (Although extreme programming is often abbreviated “XP”, it has nothing to do with Microsoft's Windows XP and Office XP products.) The brainchild of Kent Beck, the extreme programming methodology envelops all areas of software development, from a program's initial design to its coding and through its testing cycles. In his book, Extreme Programming Explained, Beck explains the basis of XP. Namely, it takes “commonplace principles and practices to extreme levels.” That is, any practice that leads to the production of better programs should be practiced as much and as often as possible.

This tenet can be illustrated by the way code is written under the XP guidelines. Everyone knows that it's a good idea to review code. Therefore, code should be constantly reviewed. XP accomplishes this by demanding that all programming be done in pairs, thus allowing one partner to focus on hard code while allowing the other to review it and provide focus on the project at large.

Better code through pair programming is one of the

most apparent distinctions of XP, but it's far from the only one. XP attempts to have more consistent debugging and testing so that mistakes crop up less to begin with. To accomplish this, tests must be devised even before the code is written. They must be performed often and at regular intervals to ensure code that is free of bugs and accomplishes its purpose.

Another goal of XP is to identify what the end-users need as soon as possible in order to avoid wasted time and cost. In order to accomplish this, a minimalistically operational program is designed as soon as possible so that the end-users' needs can be more clearly identified and worked out correctly the first time. This flies in the face of traditional software development where it is expected that every last detail should be planned out first. Beck compares his method to driving a car. You don't first aim with the steering wheel and then close your eyes while you hope to reach your destination. The proper way is to constantly make small adjustments – with your eyes open!

There are other flaws that XP tries to resolve. For example, to increase feedback between end-users and programmers, the development cycle itself is dramatically shortened from weeks or months to hours or days. This programming method also demands that programmers leave out all the “extra” features they love to add, since they usually serve little or no purpose and only add to maintenance costs. The added feedback and focus on the main goals helps assure that the project maintains its proper course.

Beck has carefully weighed the biggest problems in today's software development methodologies in order to improve upon them. But the benefits of XP are still largely unproven. Still, the new methodology has a sizeable group of devotees, especially in universities, where courses in XP are being offered. There are large companies that are using XP to some extent, including IBM, Ford Motor Company, and Chrysler (for whom Beck originally invented the methodology). As radical as XP is, it is definitely becoming more accepted as its benefits are proven. So don't be surprised if the next time you sit down to write some code you are joined by a partner.

For more information about extreme programming, see the following resources:

- Extreme Programming Explained: Embrace Change, ISBN: 0-201-61641-6
- Planning Extreme Programming, ISBN: 0-201-71091-9
- “Extreme Programming: A gentle introduction”, <http://www.extremeprogramming.org/>
- XProgramming.com, an online XP community: <http://www.xprogramming.com/>

2001: An Earth Odyssey

By Rafi Draiman

You wake up in the morning to the sound of your buzzing alarm clock. After finally pulling yourself out of bed, you hit the off switch on the alarm, and the room lights suddenly turn on. Your coffee maker has started itself up as well. As you wait for your morning cappuccino, you check your PDA to find out that you received an urgent beep from an unrecognized phone number while you were sleeping. With the touch of a button on your PDA, your cell phone begins to dial this unfamiliar number. When you do at last get to sit down and eat breakfast, you put on your wireless headphones to listen to your favorite MP3 tunes while they are broadcast by your computer.

Does this sound like some futuristic science fiction novel? It isn't. Although it may be a little while before it is so thoroughly implemented, the technology is at our doorstep. It's called *Bluetooth*, and it may change the way we interact with technology every day.

What It's All About

Bluetooth is a radio technology for transmitting data without wires. The current Bluetooth home standard is expected to be for transmissions within a ten-meter area, about 33 feet. Bluetooth networks, however, and perhaps future device standards, will transmit data over a distance of up to 100 meters.

There are a lot of things going for Bluetooth. It was designed from the very beginning to be cost-efficient, have low power needs, require little space, and be usable worldwide. Although the trademark is owned by Ericsson, the specifications are open and royalty-free. It was formed in early 1998 as the *Bluetooth Special Interest Group* (SIG) by Ericsson, Intel, IBM, Nokia, and Toshiba, and was later joined by 3Com, Lucent, Microsoft, and Motorola. These nine core companies, each extremely powerful in their respective markets, lend very strong credibility and a uniform development standard throughout the industry.

How it Works

In order for a device to communicate via Bluetooth, it requires a tiny microchip radio. The Bluetooth specification was first published in July 1999, and called for Bluetooth connections to be instant, fast, and secure. Version 1.0b is currently available, and 2.0 is on the way. The specs, dependent on the particular radio class imple-

mentation, set 2.4 gigahertz as the frequency band, with a gross data rate of 1 megabyte per second.

Governments worldwide have deregulated the 2.4GHz spectrum for commercial use, lowering interference. Nevertheless, competing network technologies, microwave ovens, and some other devices still share this spectrum. This would still create potential for conflicts among Bluetooth communication systems.

To avoid this problem and remain secure, Bluetooth implements a technique called *Frequency Hopping Spread Spectrum*, also known as the abbreviated Frequency Hopping, or simply FHSS. This technique divides the spectrum into different channels - up to 79 in most countries, but as few as 23 in some. The concept is for data to be sent in packets and 'hop' to a new channel before each packet is sent out.

The particular hopping pattern used by the network can be used to determine which devices are part of the Bluetooth network, also called a *piconet*. Essentially, Bluetooth anticipates interference, and therefore is capable of handling it appropriately. Channel hopping occurs at the astounding rate of 1,600 times per second. This method also facilitates the privacy of phone calls and data transmissions made using Bluetooth networks.

Bluetooth in the Industry

The Home User

Two different markets are being affected by Bluetooth. The first market, composed of individual users, currently uses either infrared or traditional cables. Infrared is a short-distance, line-of-sight, wireless technology. The problem with infrared is that it requires a direct, unobstructed path between two infrared-enabled devices. Although the technology is already in over 100 million electronic devices, very few people are actually using it, with the notable exception of the *Personal Digital Assistant (PDA)* market. But even those who regularly use infrared note the volatility of the technology, and the line-of-sight requirement appears to be a severe setback to its widespread use.

Additionally, Bluetooth offers significant speed advantages over infrared technology. In industry testing, the top transfer rate found on Palm, Visor, and Windows CE devices is 115.2 Kbps. Bluetooth, on the other hand, has a usable data rate of 721 Kbps. Moreover, infrared has been found to have significant conflicts with devices of other types, specifically between PDAs and laptops,

whereas Bluetooth has been specifically designed for widespread device-independent compatibility. Also, Bluetooth requires no user intervention. When two Bluetooth devices come within range, they synchronize automatically.

Even notebook PC manufacturers are starting to sound the death knell for infrared. Most big names in the laptop industry, in their search for the perfect ultralight notebook, have eschewed infrared ports, saying they did so to save space. Furthermore, with the onset of USB, many computers are going legacy-free. This means more heavy-duty devices that used to rely on parallel and serial ports are going to need to find new interfaces, many of which may choose to go wireless, and most would not be appropriate for infrared.

The Workplace

In the workgroup market, Bluetooth competes with other wireless LAN technologies, including IEEE-802.11b High Rate, 802.11a, HiperLAN, and HomeRF. HomeRF is intended for home workgroups, and operates in the 1-2 Mbps range. 802.11b (often referred to as *Wi-Fi*), on the other hand, is designed for wireless Ethernet-type LANs, and has a maximum of 11 Mbps with a real-world throughput of about 4-6 Mbps. While this is much faster than Bluetooth's 1 Mbps, Bluetooth has advantages over 802.11b in other areas.

The developing 802.11a, unlike 802.11b, operates at 5 GHz, so although it will be more difficult to penetrate walls, it will be able to carry more data – up to an amazing 54 Mbps. Because of the differences, many industry manufacturers who are reluctant to produce expensive dual-standard systems are looking for a fair compromise, such as a doubled 802.11b. HiperLAN is similar to the 802.11a initiative.

Because of conflicting new technologies and the need for expensive transceiver circuits, neither 802.11a nor HiperLAN are expected to succeed. On the other hand, 802.11b has already gained a small foothold in the industry. Nevertheless, if Bluetooth is successfully implemented, it may well supercede all the other technologies, if for no other reason than for need of a fair, reliable standard throughout the industries.

The Draw of Bluetooth

What is it about Bluetooth that is so special? More importantly, what can it do for the individual? Today's home or office user requires a complex degree of knowledge and peripherals to stay connected. For example, take your typical road warrior in today's society. He may use a HotSync cable to synchronize his PDA with his laptop, another cable to transfer numbers between his phone and laptop, another cable for transferring files from

peer to peer, another cable for connecting to the network, another cable for a phone headset, the list goes on and on. Many of these applications also require complex setup configurations and software changes performed manually by the user.

The appeal of Bluetooth is that it will allow all these day-to-day activities to function seamlessly, wirelessly, and easily. No wires, all fast, instantaneous connections – that's the concept in a nutshell. It will allow the individual, as well as organizations, to provide for simple, ubiquitous connectivity, and will afford them the opportunity to stay synchronized with all their electronic devices.

Implementation of Bluetooth

Support

According to a press release from Motorola based on a report by Cahners In-Stat Group made on April 25th, 2001, the emerging Bluetooth market is still expected to shine despite delays, economic slowdown and a recent slew of negative reports.

“The high-tech market research firm forecasts that demands for Bluetooth-enabled devices will provide substantial opportunities for the technology with Bluetooth-enabled equipment shipments soaring to 955 million units in 2005, a 360 percent five-year compound annual growth rate (CAGR).

“The semiconductor opportunity in this area will also be substantial as Bluetooth radio and baseband silicon will rise to \$4.4 billion in 2005.

“The first "hot spot" projects have already appeared in hotels, shopping malls, golf courses, airports, and more are expected to come to fruition by the end of the year. Aside from hardware, there is a plethora of activity happening in application development, both on the client side and the server/services side. In-Stat expects that this activity will only increase.”

People in the industry are clearly beginning to take notice of Bluetooth. Handspring has already announced plans to ship Bluetooth-enabled versions of its Visor handhelds, and Palm is looking into the same. Nevertheless, recognizing the current popularity of infrared, and perhaps to make the transition smoother, Bluetooth has been designed to harmoniously coexist with it, thus providing the best of both worlds for those of us stuck in-between.

Many information technology companies are already supporting products with Bluetooth, including names such as Pocit Labs, KDDI Corp (Japan's number two carrier), Red-M, XEMICS, AvantGo, Broadcom, Nexthaus, Imsys, Hewlett-Packard, Mitac, Sunderland Technologies, Parthus, Sony, Palm, Pocit, Toshiba, Psion,

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IBM, Linux, Britain's CSR, and many others.

Potential Obstacles

The industry-wide support and investment in Bluetooth clearly seems to indicate a stable, strongly grounded, and reliable forthcoming technology. Unfortunately, however, as many long-time members of the IT industry can verify, the acceptance of a new technology into the world market is not based solely on the efficacy and merits of the technology alone. Many other factors are involved, including pricing, timing, and marketing.

Marketing in particular stands out as a prominent factor in the acceptance of a new technology. Fans of the superior Sony Beta video system remember how VHS won due simply to better marketing. A more recent example of the effects of better marketing in the IT industry is the widespread use of the Iomega Zip drive, despite the clearly superior advantages of other backward-compatible and more ample media such as 3M's SuperDisk and Sony's Hi-Fi. Thus, notwithstanding the clear advantages and promise of Bluetooth, it remains to be seen how well the public is convinced of such.

Moreover, a recent development that poses a significant setback to the immediate spread of Bluetooth is the announcement by Microsoft that it has dropped support of Bluetooth from their upcoming operating system, Windows XP, reportedly due to the lack of sufficient hardware standards and support for Bluetooth released to date.

Real World Applications

Automatic Synchronization

Synchronization is the initial key application for Bluetooth technology products. Synchronization of *Personal Information Manager (PIM)* information or business card exchange from a PDA to a PDA, to a cellular phone, or a business/home PC is of paramount importance to many customers. In meetings and conferences one could transfer selected documents instantly with selected participants, and exchange electronic business cards automatically, without any wired connections. From a convenience and cost-effectiveness standpoint, less time spent transferring files is more time that can be spent on another project. Likewise, any cost savings due to reduced time to interconnect devices can be allocated to other projects.

This automatic synchronization of a hand-held PDA device with a desktop/notebook PC or a mobile telephone will be made possible with Bluetooth. It could be configured to occur whenever the user comes within range of these devices. For instance, as soon as you enter your office the address list and calendar in your notebook

could automatically be updated to agree with the one in your desktop, or vice versa.

Multi-use Telephones

Another hopeful application for Bluetooth concerns a multiuse telephone system that serves as a short-range communicator, wide-area cellular, and at-home portable. Bluetooth runs in the office and at home, cellular runs wide-area. In other words, at home your phone functions as a portable phone, with a fixed line charge. When you're on the move, it functions as a mobile phone, with a cellular charge. When your phone comes within range of another mobile phone with built-in Bluetooth wireless technology it functions as a walkie-talkie, with no telephone charges whatsoever.

Wireless Car Kits

Car manufacturers will be able to install hands-free car kits that work with any Bluetooth-compliant mobile telephone. Headsets enabled with Bluetooth technology promote a hands-free audio environment providing connectivity to a cell phone worn on your belt or mounted in your automobile. Car Kits with Bluetooth technology devices allow users to keep their hands on the steering wheel while conducting necessary mobile calls.

Hands-free Internet Access

Bluetooth Internet access can be achieved by patching in a laptop via wireless Bluetooth local networking, essentially serving as a bridge. Hotel and airport Internet 'jacks' could be established for the mobile user. The advantages of this would be low cost, easy access, and speed. The ability to remain cordlessly connected to a PC means that the mobile telephone and the PC can be linked even while the PC is in a briefcase. The user can be notified of incoming e-mail via the telephone, and can even read the titles of e-mails on the telephone screen.

Users can also write e-mails while traveling on an aircraft, and have them sent automatically upon powering up the mobile telephone, once back on the ground.

Consumers will respond favorably if additional bandwidth is made available at a reasonable price, and if it requires little or no additional effort to achieve. A Bluetooth PDA or notebook could connect with a local access point or utilize a Bluetooth-compatible cellular telephone to access e-mail or the Internet.

The concept is well illustrated through the following example. Once you arrive at your new destination when on business travel, the notebook in your carry-on luggage could communicate with your cell phone via a local Bluetooth connection. With access through your cell phone via the *Public Switched Telephone Network (PSTN)*, you could access the Internet or synchronize your e-mail while on your way to the rental car counter or in

transit to your hotel.

Other Implementations

However, if we take a closer look, the real-world applications for Bluetooth are limited only by the imagination. Realistically, we can expect to see many of these implementations almost immediately upon the introduction of Bluetooth. Some of the more fanciful ideas may depend on the extent to which Bluetooth catches on, but they certainly sound promising and innovative. Some of these ideas include:

- Wireless network connections could be established utilizing wireless Bluetooth hubs.
- Digital cameras could use Bluetooth to transfer to a laptop/handheld instantaneously, or post to the Internet via a cellular Bluetooth phone.
- Smart appliances could notify you of their needs via Bluetooth. Imagine a coffee machine that reports when it needs a filter refill, or an oven that informs you it needs cleaning. This concept could even be taken a step further, where smart appliances are set up to automatically order new parts for themselves over the Bluetooth-connected Internet.
- Some obvious but very useful implementations are for some more mundane Bluetooth products, such as cordless computer mice, keyboards, speakers, etc. that avoid all the hassles of infrared that exist today.
- Pens have already been introduced that could use Bluetooth to transmit data directly to your laptop while you are writing on paper using invisible grids (to recognize where the pen is on the paper), or perhaps even standard notebook paper could be used if the technology improves. This would allow the user to function normally, taking notes using pen and paper, but maintaining a permanent editable record in digital format simultaneously.

The Success of Bluetooth

Only time will truly tell whether the enchantment of Bluetooth will draw industry-wide acceptance. Nevertheless, there is clearly a thrilling prospect on the horizon of a wireless, connected world where devices can easily interact with little or no intervention by the user. If it

does become fully integrated into society, Bluetooth may well be the technology that persuades all the 'computer-shy' to join the world of technology, which may well provide the much-needed boost the IT industry currently needs.

With the straightforward, industry supported, long distance, low cost, seamless, and best of all, automatic nature of wireless Bluetooth, more and more manufacturers may start choosing it as their standard communication medium. And the world around us continues to change, as technology evolves...for better or worse.

Resources

Bluetooth.com, Ericsson.com, Zdnet.com, Motorola.com, Thinkmobile.com, Laptop Magazine, PC Magazine, PC World, PC Plus Magazine (UK)

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Summary

So after all is said and done, while both platforms take care of the basics of personal organizing, PocketPCs seem to excel in 4 of the 6 other main areas, whereas Palms grab only 2 out of the 6 top spots (though the newer incarnations take a not too distant second in some areas). But all these extras come at a price; is it worth those extra dollars for the PocketPC?

If expense management and note-taking functionality are important factors, not to mention a slew of entertainment choices, and the Windows 9x / Windows CE quick interchange of information is also taken into account, a PocketPC might make a very attractive choice, especially at the current price levels.

If, on the other hand, money management and mobile E-mail are the killer apps, any Palm OS based unit (including, to a lesser degree, the M100), will ably provide both of these capabilities, plus rudimentary, if not better, expansion capabilities, especially with the inclusion of MMC slots on new Palms. Plus, there are plenty of games, and, for that matter, other applications available for these units, and the price of the 8MB Visor Deluxe is only \$200 – half of the at least \$400 for a PocketPCs.

Resources

Palm vs. PocketPCs -
April 2001, PC World;
PDAs: Expanding Possibilities -
March 6, 2001, PC Magazine;
Handheld PCs –
March 2001, Computer Shopper;
Palm Organizers –
May 6, 2001, Pricescan.com;
IPaq 3600 Series –
May 6, 2001, Compaq.com;
Workpad C3 –
May 6, 2001, IBM.com;

Book Review: *'The Design and Evolution of C++'*

By Yitzchak Novick

Seldom in the course of a programmer's training do questions begin with the word 'why'. What few programmers realize is that behind every 'what' any number of 'why's may have motivated the seemingly dry syntactical rules that govern computer programming. In *'The Design and Evolution of C++'* Dr. Bjarne Stroustrup (pronounced dont-e-ven-bo-ther), the founder and designer of C++, explores some of the issues that inspired his milestone programming language.

Stroustrup gives a detailed account of almost every aspect of the programming language's history. He begins with a discussion of some of the deficiencies he experienced with third generation languages in his doctorate work at Cambridge University. He discusses all of the issues that arose in designing C++, and credits a number of diverse sources as inspiration. Readers will be surprised to find contemporary philosophy and political satire grouped with BNF notation manuals when Dr. Stroustrup lists the publications that had an impact on C++. The result is a fascinating new look at a computer programming language whose eclecticism will astonish even some of its most proficient users.

The discussions of the language itself provide numerous details ranging from trivial mind-teasers (such as the difference between compiling the following:

```
x = a /* divide */ b;
```

in C versus C++) to deep analyses of problems that arose when scope and name-matching rules were standardized. He also discusses general issues that were not as relevant to the actual syntax of the language, such as the goals of the development team, and the means by which disagreements were resolved. The reader gets a sense of the atmosphere in which the language was developed, and the diversity of the C++ community to which the designers were trying to appeal. Other topics covered include the different types of organizations that had (and continue to have) a say in developmental issues, and some of the libraries and related standards that had to be added over time. Stroustrup goes into painstaking detail on every issue, citing which members of the development group accepted which responsibilities, and which members were of which specific opinions on certain questions of design and style. The reader can extract a number of interesting programming tips from these arguments. (For example, using different, longer variable names in func-

tion prototypes than the names of the actual parameters in the function header as a means of documentation, such as in the following example:

```
void reverse(int* elements, int length_of_element_array); // prototype
void reverse(int* v, int n) // function definition
```

is considered excellent style by Stroustrup. Many of his peers disagree.) Stroustrup also offers direct answers to a number of questions which he anticipates the typical student asking such as 'I don't know C or C++, should I learn C first?' and 'How long does it take to learn C++?'

This book is noteworthy for various reasons. While Stroustrup may have to try again if he wants a Pulitzer, the book is well written and entertaining. The light, often humorous style differs greatly from the monotonous textbook tone that one may expect. Serious students of the C++ language (or geeks, as they are often affectionately referred to) will find it extremely interesting to study the language's evolution. (Others, or normal people, as they are often referred to with arguable validity, will find the book priceless as a safe alternative to somnia-inducing medications.) This book will offer interesting perspectives on some of the basic C++ constructs that programmers are already familiar with. While it lacks some of the appeal of action-packed page-turners, it will provide the interested programmer with some stimulating entertainment.

In addition to the potential enjoyment, programmers will benefit from reading *'The Design and Evolution of C++'* in other ways. Aside from providing the reader with the ability to present himself as an intellectual, well-rounded programmer, the issues raised in the book will give the reader a deep understanding of some of the less known features of C++. While contrasting C++ with C and some of the other languages that serve as C++'s competition, Stroustrup presents valuable insight into the world of object oriented programming in general. Understanding the many different questions that were dealt with when inheritance and polymorphism were being considered will give the reader a new perspective on OOP, and that will surely translate into a subtle edge in actual programming.

Aside from advantages directly related to C++, the reader will learn valuable lessons that apply to all areas of computer science, and the science's direct relationship to the business world. Even the most successful

college students often find that they are not entirely prepared for certain aspects of the business world. For example, some are often taken aback and unsure of how to react the first time a receptionist or other professional greets them in a manner slightly more polite than the tone they have grown accustomed to, which is normally reserved for convicted criminals. Students of the pure theoretical science of computers are particularly unprepared for the necessary adjustments forced on programming ideals in response to practical business demands. Often, less efficient code will be more valuable to a business's needs if the sacrifice in efficiency results in less planning and debugging on the part of the programmer. Computer scientists will learn the hard way that a programmer's bottom line is not exactly the same as a CEO's (and as any Touro business major will proudly attest, business people ALWAYS get their way). Students will be extremely surprised at how Stroustrup not only acquiesces to this need, but in fact, embraces it. Stroustrup states clearly that he always viewed computer science as a practical tool, and refuses to look at it from any other perspective. He details a number of areas where adjustments were made to make the language less prone to programming errors, even at the cost of the executable's ultimate efficiency. As languages such as Java and C# (which Microsoft eagerly points out is an entirely different language from Java, bragging of major advantages such as the actual name of the language requiring approximately half of the memory when stored as standard ASCII text) and the virtual machine environment gain acceptance one would assume that Stroustrup's decisions are outdated in light of new technology, and are in fact conservative by today's standards. However, the issues that motivated these decisions are timeless, and similar ones will always challenge computer scientists on the cutting edge of technology. While Stroustrup's insights may not ease the transition into the workplace, they will at least open the reader's eyes to the adjustments they should expect.

In conclusion the book is both enjoyable and

valuable. Someone looking for an addition to a resume would put his time to more productive use learning a new language, but a programmer with an intellectual's perspective (or an intellectual with a programmer's perspective for that matter) will not only find it an enjoyable book to read, but an informative look at C++, as well as at the world of computer science in general.

Note: The author would like to thank Professor Grund, whose contributions to this article extend far beyond his recommendation and subsequent lending of the actual

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