

ANAND PARTHASARATHY

Anand Parthasarathy was one of the first recipients of The PoleStar Award. His journalistic career started in 1994 when he joined The Hindu as its IT Correspondent. He is currently the Consulting Editor (Information Technology), The Hindu. Prior to his entry into Journalism, Anand served the (Indian) Defence Research and Development Organisation (DRDO) for over twenty years. He was part of the formation team of Anurag, the DRDO Parallel Processing Lab, and later joined the Indian Missile Programme where he served for five years as Systems Manager. In 2003, he was selected for the first International PANOS-GKP Media Award given jointly by the London-based environmental agency PANOS and the Malaysia-based Global Knowledge Partnership for his coverage of the Kerala e-literacy programme in The Hindu. The award was presented at the first UN-sponsored Global Summit on the Information Society (WSIS). Anand is a graduate in Instrumentation and Control from Poona University and has a Masters in Systems Engineering (specialized in Underwater Systems) from Birmingham University (UK).

Anand won The PoleStar Award titled, 'IT for the Masses', for 1998 for a series of articles on IT in The Hindu.

COMPUTER ANIMATION AT THE CROSSROADS

This week's release of "ANTZ" to be followed soon by "A Bug's Life" signals the creative coming-of-age of the all-computer feature film.



"Antz" - a sophisticated product

A worker ant refuses to toe the rigid disciplinary line of his ant colony. His non-conformist ideas lead him into trouble. But when the entire colony is threatened with extinction at the hands of a superior force, the 'loner' emerges as the ant of the hour, and yes, before fadeout, he wins the hand of the female-ant of his dreams.

Question: Is this the plot of Dreamworks pictures maiden animated film "Antz" - or of Disney - Pixar's second collaborative venture "A Bug's Life"?

Answer: Both

In one of the most bizarre coincidences in the mainstream entertainment cinema business, two American production companies chose almost

identical themes to peg their prestigious venture into all computer animated feature films for the family. Disney, which collaborated with the computer animation company Pixar, on the path breaking 1995 film "Toy Story," began developing its second film featuring life in a colony of ants heading off an attack by grasshoppers, immediately thereafter.

Almost a year later, Dreamworks, the new studio created by Steven Spielberg in partnership with music Mughal David Geffen & Jeffrey Katzenberg, a former studio head at Disney, announced a collaboration with the visual effects and animation company PDI on a completely computer-made film featuring insect characters. It soon became apparent that both teams were working on very similar storylines, and the accusations flew. The director of "A Bug's Life", John Lasseter said: "Good competition is always good. Sneaky underhand competition is always bad." He implied that Katzenberg took the plot with him when he quit Disney and cloned it for his new studio. Dreamworks denied the charge. Whatever the truth, it looked as if the end of 1998 would be one big bug fest for the audiences with two computer-conjured ant hills hitting the screens.

This week's release of "Antz" to be followed soon by "A Bug's Life", signals the creative coming-of-age of the all-computer feature film. Anand Parthasarathy writes.

"Antz", the late starter, was in movie halls first (it opens all over India today). But "A Bug's life" was only six weeks behind and opened in the US

on November 25. It is due to come to India early in the new year. Interestingly, both films seem poised to make lots of money for their makers and the happy ring of cash registers may erase the initial bad blood between the studios. Critics wherever both films have been released, have been almost unanimous in saying in effect: It would be a mistake to see one and think: "what's the point in seeing the other one."

Both are astounding technical feats and there is a subtle difference in the audience targeted by the films.



Another scene from the film

"Antz" is the more sophisticated product, a subtle repositioning of the animation film for teenagers and adults rather than for the very young. This is achieved by dialogue that is witty, wicked and occasionally 'naughty'. And the stroke of genius lies in giving the ant characters, not just the voices but the entire persona of a procession of adult cinema icons. The latest in animation software makes the mouths of the intersects look like the real life actors who lend their voices.

Z (Voice of Woody Allen) is a worker ant with ideas above his station. He resents working as just another foot soldier under the fascist General

Mandible (voice by Gene Hackman), who has convinced the Queen ant (voice by Anne Bancroft) that they should launch a pre-emptive strike against the enemy - a colony of termites. While day dreaming happily about a great place above, called Insectopia sort of ant utopia where non conformists like him can thrive. Z bumps into beautiful female ant and the two break the strict discipline of a group dance to do the equivalent of a sensual insect tango. Z discovers that his partner is in fact the Princess Bala betrothed to general mandible. Clearly smitten, Z persuades his soldier-buddy, weaver (Voice of Sylvester Stallone) to switch places with him. So that he can get closer to Bala. For his trouble he finds himself sent out to fight a battle with the termites. The deadly Spielberg a bloody "D" Day opener in Saving Private Ryan" - leaves Z as the sole survivor - and hero.

Thrust by accident into the outside world, with Bala in tow, and the minions of vengeful suitor Mandible in hot pursuit, Z encounters a pair of wasps - and this is where the true genius of the film flowers.

Visual highlights include the "Massed" together to form a huge wrecking ball and the dizzyingly captured scene where Z and Bala find themselves stuck to the sole of a human's sports shoe with a blob of chewing gum. Fans of Woody Allen will fall over, laughing at the familiar neurotic antics of Z. The film opens with Z on a psychiatrist's couch talking about his insecurity - he is a "middle child" in a family of five million baby ants.

"Antz" Co-director explains: "We didn't want to turn off the family audience but we didn't want to make a film for really young kids either", other recent animated films - like Warner's "Quest for Camelot" have also aimed to push the age envelop of the traditional (read Disney) animated film, and thus broaden the appeal of the genre, once dismissed as school kid fodder. Historian Jerry Beck who has been chronicling the growth of the

animated genre says: "If you aim at the adults, the kids will follow." It remains to be seen if this mantra will work.

Not every one in the industry is convinced that it is commercially viable to make animated films, which appear to say: no children under 10 admitted. Twentieth century Fox which marched into Disney territory earlier this year with the animated version of 'Anastasia', stuck to the traditional mode.

And Disney's own poke at the anthill. "A bug`s life" was firmly crafted with the staple audience, the very young, in mind.

Life is tough on Ant Island. Once the ants have assembled the harvest for winter, a gang of grasshoppers descends every year to demand their portion, This is a situation not very different from the premise of "The Magnificent Seven", the classic western, based on Kurosawa`s "Seven Samurai." Instead of the leering bandit king played by Eli Wallach, we have the menacing Hopper (voice of Kevin Spacey). The ants have a hero amongst them – Filk, who gets outside help. But his mercenary "recruits" are distinctly unmagnificent: a troupe of unemployed bugs from a second rate flea circus. They include such colorful non-performers like Heimlich the food loving caterpillars, Rosie the big hearted black widow spider, a male ladybug named Francis and a wise walking stick insect called Slim. With this motley crew, Flik must fight the grasshoppers and his own prize is the hand of the ant Princess Atta...

Their computer skills honed on their previous joint venture: "Toy Story", Pixar and Disney create a bold and colorful look for "A Bug's Life" , rather than too many dramatic high points which might scare the very young. Except Spacey who brings the mean-spirited Hopper alive, the makers do

not go for too many big name voices. They concentrate on the rich blend of comic action and adventure which makes the end product more "children friendly" than "Antz".

Which set of bugs is the better bet? Hard to say, we must wait to see both products before judging. And even then, it may be unimportant. What is important is that mainstream production companies are putting big money into such ventures which exploit frontline computer technologies even as they take the cinematic art back to its very roots to make uncomplicated entertainers that be shared by the young and the old. ■■■■■

CONVERGENCE OF COLLABORATIVE COMPUTING

IT Trends

IT is the best of times and the worst of times. A leading software company has already announced a key product to be launched during an important trade fare. A white paper must be prepared and posted on the company's Website simultaneously with the CEO's keynote where he will unveil details to the national media. The deadline is six hours away.

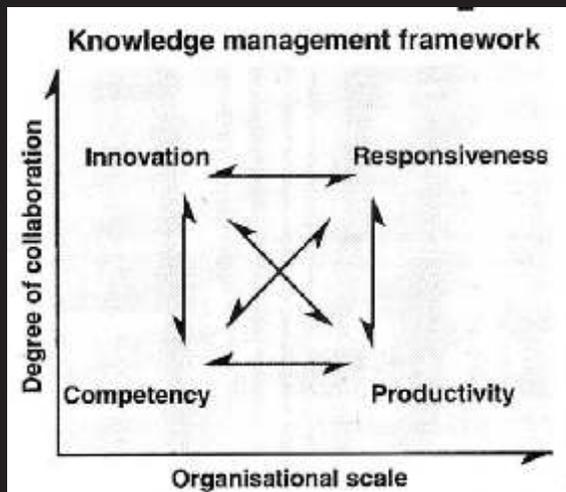
Then Murphy's Law takes over - and everything seems to go wrong. The software has revealed some glitches - which have been quickly patched: but the white paper must be modified in key areas, including some graphics - and at least half a dozen individuals are involved. There is no way the document can pass serially from hand to hand in the time available.

Fortunately it is written in 'Lotus Notes' a groupware that is standard in the company. This 'client' product which began life as a simple email feature now works in tandem with 'Domino' the Lotus messaging server software. To overcome the crisis, the company invokes a new feature offered by Domino - called 'SameTime'. Based on software developed by two communication companies acquired recently by Lotus - DataBeam and Ubique - it allows real time messaging and collaboration. In effect, the software documentation manager, who is responsible for the white paper, goes on the company's intranet and polls all the other five staffers who need to look at the document and revise it. Blinking icons on her terminal tell her three of the five have their terminals switched on. The 'SameTime' feature alerts them to bring up the white paper on their screens - and a

pop-up window conveys a live message from the documentation manager: "Can you guys all look at para 10 and see if the changes I have made are OK No? then will you work on it?" The 'awareness' information on the screen now shows that the graphic artist has logged on. He gets in smoothly into the act and polls all the others through pop up messages; "I suggest we changed the system diagram. This is how I think it should look:... with a few mouse clicks, he 'corrects' the diagram and within seconds he gets the feedback he requires. Within half an hour the 20 page document has bounced back and forth on the net between the participants - like a football being dribbled and passed between the forward line. A final message 'broadcast' to all those working on the document - and the thumbs-up is signaled.

The software manager accesses the company's external Web Server and since Lotus Notes are Java and HTML compliant (standards for writing material that appears on the Internet sites). The document is almost instantly linked in the Web site. Any surfer as of that minute will find a 'button' which will enable him to either read online or download the white paper.

A critical issue in business computing is how well - and fast - an entire organisation can share a pool of information and resources. Anand Parthasarathy, previews some hot new technologies which are subtly pushing traditional 'groupware' towards the new frontiers of 'knowledge management'



They just made it in time: the CEO who is even now at the conference venue and the same Notes/Domino-based groupware, which runs on his notebook via PC Card link and his cellular phone, has made corresponding changes in the presentation slide show sitting on the notebook. When the slides go up on the giant screen in a few minutes, they will reflect the final glitch-free version of the company's prestigious product (with the eleventh hour changes in graphics). This is the sort of collaborative computing that users will soon expect - even demand from their messaging products. Last week in Delhi, Lotus Corporation unveiled details of the new Version 5 of their Notes/Domino combo that will be available in the last quarter of this year, with free downloadable 'beta' versions available from the Lotus website two weeks from now.

Version 5 will include the 'SameTime' feature which enables 'synchronous' messaging and the possibility of 'live' chat between emailers - as well as a number of other new improvements.

Including a 'Domino Designer' which enables lay 'dummies' level users to create Web pages using many industry-standard tools like Java, C++,

VisualBasic, LotusScript. to create documents which comply with JavaScript and Hyper Text Markup Language (HTML 4.0) - the lingua franca of the Web.

All these new features are aimed at whipping together many standard features - email, document sharing, calendaring and scheduling, text chat, audio and video conferencing - and making them available across the network. The umbilical which links a private network to the Internet is now a crucial business tool - so 'Groupware' - software that is designed to support multiple users that work on related tasks has now evolved to make the to-and-fro movement of documents from Internet to one's private intranet, as painless, even transparent as possible

Lotus is generally recognized as a pioneer of the 'groupware' concept, and by nudging its frontline products, Notes and Domino, towards the Internet, it is ensuring that it received its share of the huge bonanza that awaits the early prospectors, when the Net-based Electronics Commerce business finally hits the mother lode.

Knowledge Management

But merely enabling collaboration across the boards is not enough. An organization in this Information Age must optimally deploy its most valuable asset the knowledge available (but sometimes not apparent) with people and databases. Management is all about locating and using such information to create value. The new name of the game is Knowledge Management (KM).

This means many things: accessing your 'corporate memory bank' to check how a particular crisis was handled in the past - identifying who all among your employees possesses the specific skill that is required: what Lotus calls

'people profiling', and what IBM is developing in a new product called Knowledge Utility - retrieving or 'mining' data using special text search engines. (Domino Extended Search is the new feature in Version 5 that will do this) In short, Knowledge Management (to quote a Microsoft document) is the use of technology to make information relevant and accessible, where ever it may reside. Lotus suggests a framework for knowledge management which has two dimensions: the degree of collaboration and the growing scale of the organization. Within this framework, lies a matrix with four variables: Improved collaboration or resource sharing can transform mere competency into innovation.



Jim Waldo, chief architect of Sun Microsystems' new Jini technology, gives a demonstration showing multiple devices being hooked up at Sun's research and development facility in the U.S. The new Jini software will make connecting computer devices to networks as easy as plugging in a phone. Waldo is with Sun's prototype monitor device as he holds a Nokia cellular phone. Upper left is Epson's Web Panel; lower left is Wireless Palm Pilot, upper right is Canon portable printer, lower right is Sun's Jini prototype storage device. - AP

But this competitiveness (or innovation) must filter through the organization if it is to lead to productivity on one hand and a response to the market on the other (see diagram). KM1 is becoming the latest buzz

phrase, and executives in India too will target it as a critical business tool in the months to come. And for developers like Lotus, the bull's eye of their strategy is the point where collaborative computing meets knowledge management. But Lotus is not alone anymore. Other well known products competing on the Notes turf are GroupWise and Microsoft Exchange. Microsoft in particular is pushing hard to position its own slate of solutions for web-enabled group ware, a package that includes, MS Mail, Office, Exchange and Outlook.

The monopoly position that Microsoft enjoys on the desktop with its Windows software will ensure that many potential 'clients' will take a long hard look at its line up in the groupware arena. But Lotus has an edge as the earlier and established player in this niche: The battle for the high ground in collaborative knowledge-based computing is on.

Indeed ever since Lotus first pronounced the 'Knowledge' mantra in late June, the two rivals have been engaging in a no-holds-barred contest via (what else!) Net-based documents, which analysts are gleefully calling the War of the White Papers. (Readers who feel sufficiently motivated to understand the respective perspectives of Lotus and Microsoft on KM can find them at www.microsoft.com/exchange/community/lotus-km.asp and [www.lotus.com/knowledge management](http://www.lotus.com/knowledge%20management)) For the cost-sensitive Indian customer, the bottom-line may not be strictly about technical issues.

The Total Cost of Ownership (TCO) here is a complex matrix in which existing infrastructure, pricing and licensing strategies of the vendor and the organization's manpower training or retraining costs are interlinked. As the various frontline developers who promise us the sunlit uplands of a truly collaborative, web-enabled computing environment, line up to chant: "mirror mirror on the wall, who is the savviest of us all", we can only say: We love you all, But which one can we afford to maintain?

When connectivity becomes king

Sometimes the turning points in the history of IT are not immediately perceivable. If you are too close to events you tend to overlook its potential. On the other hand some of the hyped technologies have turned out to be duds. Last week, Sun Microsystems, the California, US-based computer company best known for its workstations - and its development of 'Java', the lingua franca of the Web, unveiled new technology, which it calls 'Jini', that just might turn out to have a far reaching impact on the way the mass of ordinary computer users 'talk' to each other - and to their systems. And like other recent developments in software (see main article), it is all about connectivity and collaboration. What is 'Jini'? According to preliminary information posted on the Internet, Jini is a small bit of computer code that works with Sun's Java software to "smarten" just about any device from computer hard disk drives to digital cameras, fax machines to cellular phones. The software when embedded in these devices makes it extremely easy to connect them to a network - as easy as pushing a plug into a socket. The device then becomes part of a vast Java Virtual Machine (JVM). Once connected the device automatically performs what amounts to a self introduction, specifying what it is, what functions it can perform, what service it can provide ... like reciting an 'abhivadanam'!

The actual software is quite lean-and-mean: only 48 kilobytes which means it can be embedded in most devices in the form of a cheap chip. It is the brainchild of Sun's Co founder and Vice President (Research), Bill Joy, who calls the new feature 'composable computing' - you 'compose' your own network as you go along. It will be ready for public use by October this year and evaluation versions can be downloaded from Sun's website in August. The source code will be made available, free, to the developer community

to encourage more software applications and Sun will probably license the technology for embedding Jini, to device and hardware manufacturers. Where does the beauty of Jini lie? The following analogy will explain: When you buy a telephone receiver and bring it home, you can plug it into the telephone department's socket. If you get a dial tone, you know that you are 'online' and your telephone is working. But these days if you buy a peripheral for your PC, a printer, a multimedia kit or a modem, you have to do a lot of work to 'install' it. There is software on disks that have to be run, options that have to be selected. Even so-called 'plug and play' devices are not wholly hassle-free. With Jini, you can do 'spontaneous networking', the moment you link your device, it is up and working. For example, you come to a meeting and find you need slides which are back in your office. So you link your phone to the local net, and contact your office. The slides (a Powerpoint presentation, say) are downloaded into the local PC, Hard copies are printed out right there, in the conference room by a Jini-enabled laser printer and you can then give your lecture while a Jini-smart projector, beams the slides.

Other initiatives

Others are not sitting around either. Microsoft is said to be working on its own vision of 'tetherless' networking, which it has codenamed 'Millenium'. And Hewlett Packard too, is testing the waters of device-to-device connectivity with its technology, 'JetSend'. The AT&T associate company, Lucent, has also been working on a parallel track developing its "Inferno" operating system for the distributed device environment. 'Jini' is pronounced "genie" - like the genie in the bottle that grants your every wish. As of now, the technology is still in a nascent stage - when it is finally uncorked, Jini might yet grant the fervent wish of "net citizens" everywhere: making connecting as easy as talking to each other.

'UPWARDLY MOBILE' COMPUTING

You can tell them apart at 50 paces in airport lounges and queues - by their haggard looks, their bent backs and sweaty faces. They are the mobile computer professionals, straining their backs, lugging their notebook PCs, in their distinctive black leather carriers bags.

Weighing a good 4-5 kilos, their machines are too valuable to be left lying around even for a second, so the owners carry them all over the place, as cabin baggage, even into airport toilets. Computing on the move was a great idea, if you had the physical stamina to lug your hardware wherever you went, and the mental equanimity to put up with the hassles of finding the right plug-in sockets all over the world to match your battery charger and telephone jack.

And of course it was a pricey option: typically laptops and notebooks in this country cost at least twice that of a desktop with identical specifications.

Portable computing was always a pricy - and technologically inferior alternative. But new hardware developments seem poised to erase the distinction between desktop and notebook PCs. Anand Parthasarathy reviews the increasingly affordable options.

And many desktop features - like a workstation environment - were just not available to those who wanted to do their computing on the hoof. But help is on the way - on both price and performance fronts.

The new generation of portable computing machines, which are just appearing in the market, are significantly lighter, both on shoulder and purse. And what's more, they include many frontline features, which match the best of what's available on the desktops. Indeed, the day is not far off when the technological distinction between desktop and mobile performance may be completely erased.

To complement the last edition of 'IT Trends' which focused on desktop developments, this week's column aims to alert readers and potential customers to what's new and exciting in the 'upwardly mobile' sector of the computer world.

New generation Notebooks

Bigger brighter screens, faster processor speeds, more multimedia options and better connectivity to the rest of the world characterize most of the new notebook PCs being offered. This has split the notebook arena into two distinct sectors - the frontline technology- driven end whose products seem to say: "anything desktops can do - we can do better". (What they don't tell you is "at triple the price")- the bargain end, which keeps costs low cutting down on some of the less essential specifications without compromising on core performance.

Aggressive marketing by half a dozen new vendors is driving notebook prices in this sector relentlessly downward. Hopefully at the Indian end, this may see multimedia notebooks soon breaking below the Rs. 50,000 barrier. For the price-is-no-drawback type of customer, the 2.5 inch hard drive developed by IBM in late 1997, first offered notebook users an awesome 6.4 to 8.1 gigabytes of memory - as good as anything available on the desktop.

Almost simultaneously, the 100 MB Zip drive shrunk to 15mm for notebooks as well as portable versions of the LS 120 (120 MB) 'super floppy' drive became available.

The major breakthrough on the notebook front has come this year in the processor business. In April 1998, Intel came out with the mobile version of the Pentium-II processor at 233 and 266MHz and in September, debuted the 300 MHz version.

This enabled many notebook manufacturers to offer notebooks which for the first time provided the environment of a desktop workstation running Windows NT. The Toshiba Tecra 8000, the Compaq Armada 7400, the NEC Versa SX and the IBM ThinkPad 770X are four among a dozen international brands of leading edge notebooks with Pentium-II (300) heating inside.

Healthy competition is being provided in this field by AMD, Cyrix and IDT, three companies whose chips have often matched Intel performance at sharply reduced price tags. AMD's answer to the mobile Pentium-II was its K6-2, which includes its proprietary set of 21 additional instructions to kick-up 3-D performance.

Like the Pentium-II, the K6 is manufactured to the D.15 micron accuracy. Cyrix has its own candidate, the M II and newcomer Integrated Device

Technology (IDT) has recently been pushing its 'Win chip C6'. By cleverly turning off its processor cache when not in use, the C6 reduces power consumption and heat - both important considerations for mobile computing. On September 22 IBM whose ThinkPad range of notebooks have acquired a sort of cult status with high flying executives, announced a new range - the 770X - with a new 13.7 inch liquid crystal screen with high (1280 x 1024) resolution.

For committed Apple fans, there is the latest Mac PowerBook, which was shipped out only last week (on October 1). Based on the 233 MHz Power PC 750 processor, it is by Apple standards, a 'low cost' machine (though priced over \$ 2000) - the company is due to release pricier notebooks based on the 300 MHz Power PC. Most of the frontline Windows / Intel notebooks come with 6-8 GB hard drives, 14.1 inch active matrix color displays, up to 64 MB of RAM, a DVD ROM drive 8 MB of video RAM and the state-of-art accelerated Graphics Port (AGP) for tomorrow's plug-and-play connectivity.

For communication, these notebooks include 56 kilobits-per-second modems. The operating environment is the mobile version of Windows 95 - Windows CE or optionally a bare bones windows NT. These are the heavyweights of today's mobile computing platforms - in every sense of the word. They weigh in at 4-5 kg and cost between \$ 3500-\$ 5000 in US - which makes them affordable only by a small minority anywhere in the world.

The 'bargain' notebook

For the rest of us, the world of portable computing is not entirely a closed (note)book. If the "sub-\$ 1 000 PC" is globally thought of as a bargain desktop, the "sub-\$ 2000" notebook was generally considered a bargain

portable PC. But a recent survey by CNET Labs who publish their result at the "computers.com" website shows that many of the new notebooks with perfectly adequate specifications cost nearer \$ 1000 than \$ 2000. What will you get for this price which translated into Indian rupees should cost about Rs. 75,000? Typical bargain notebooks come with Pentium 166 MHz MMX processors 2 GB hard drive 16 MB RAM, 12.1 inch active matrix color displays and a built in 56 KBPS modem. The multimedia features include a 20X CD drive.

Toshiba's Satellite 305 CDS Acer's Extensa 393C, Compaq's Presario 1220 and IBM's ThinkPad 310 ED fall in this category of (relatively!) affordable prices and technology just a whisker short of frontline. One should see this category making inroads fairly rapidly in the Indian notebook market - after years of near stagnation.

Ultralight and handheld PCs

For those who need the connectivity and storage of a PC environment but lack the sheer muscle power to carry the typical 4 kg monsters, a whole new line of ultra light notebooks has emerged - and understandably the biggest market for these machines is in Japan. Different ultra portables address needs of different 'road warriors' and the choice depends on what is one's main information application while on the move.

In general the ultra light notebook weighs 2.5 kg or less and is optimized for sending and receiving email, some light executive applications and little more. Usually based on a slightly slower - and hence less power-hungry - processor, like Pentium 166 or 200 MHz, these machines provide adequate hard disk space - around 2 GB - and slightly smaller screens (7- 10 inches).

The HP Omni Book 800 CT, the Toshiba Libret 100CT and the Hitachi

VisionBook Traveler fall in this category. NEC recently announced a new line of Ultralight notebooks with a very thin form factor (1.3 inches) - the Versa VX series - based on the Pentium - II 233 or 266 MHz processor, with a 14 inch TFT (thin film transistor) colour screen 2-4 GB hard disk, with slots for a 24X CD drive, a Zip drive or a 120 MB super floppy drive.

It can be loaded with either Windows 98 or Windows NT. At its June 1998 launch, it was the fastest ultra light notebook in the market, most ultra lights cost as much or more than the heavier and more versatile standard sized notebooks. In effect you pay money to lose weight! But that is not all: a lot of compromise in usability is involved: no ultra light notebook works more than 2 hours on a fully charged battery.

If screens are smaller than 10 inches across, readability is impaired; some makers squeeze the keyboard till one's fingers constantly strike adjacent keys. Any keyboard sized less than 90 per cent of the standard desktop QWERTY board, will prove awkward for a touch typist.

Instead of the mouse, all notebooks provide a touch pad but some of these are so tiny that most adults are hassled trying to use them. Portable computers are invariably used in awkward surroundings - in hotel rooms, waiting rooms or on board aircraft. So a minimum level of ergonomics is essential. Many manufacturers appear to have overlooked these aspects in their competitive drive to produce the cheapest and best featured machine. All ultra lights are strong when it comes to communication capabilities: E mail, Internet link etc.

But if this is your major reason for wanting to compute on the move, you have the option of going for one of the new breed of handheld PCs which are essentially portable communicators with small screen and a Windows environment for creating and editing small documents.

Fairly typical of this new breed is the Norand PEN.KEY 6110 launched a few months ago by the US based Intermec Technologies. Weighing about 800 gms, the 6100 can be held in the palm of your hand and is based on a 99 MHz AMD) 486 processor.

The grey scale display is a touch screen 240 by 320 pixels running Windows 95. The communications interface is based on cordless infrared which makes it easy to latch on other devices like a printer. Since the USP of such systems is easy connectivity to one's home base there is no need to provide a large on-board memory: however, one can enhance the 32 MB of RAM memory by adding additional PC cards or hard disks.

There a whole range of such mobile PC note takers-cum-communicators many from small start-up firms who are exploiting this new and lucrative niche in mobile computing. The price is around \$ 700.

But at the end of the day, mobile computing is still an activity where compromise is king: You want desktop capability without no technical compromises? Then take bodybuilding lessons because you are going to be lugging a 5 kg heavyweight ever after. You want a featherweight friend? Sure, you can have one - provided you can pay as much as you would for the more powerful models without half their features.

You want a fancy communicator which slips into the coal pocket beside your cellular phone? There is something for you - but please write a check for Rs.50,000. You want a "bargain" in notebooks? You can have one any day now but it will be based on a chip which every one told you was obsolete - at least on desktops. In addition, be prepared to get a crick in the neck and a new prescription for spectacles because the 'bargain' non-TFT display of the "bargain" notebook can be read only from some angles and is hardly visible in strong light.

But with a little give and take - a little performance loss here a bit of discomfort there - you will shortly be able to find a note - 'The Norand-hand held computer book to suit your purse' and do a lot of computing on the move. After playing the home PC market for all it's worth, many manufacturers see in mobile PC platforms the next big wave of computing. And where manufacturers see opportunity, they put in research money and invariably Come up with just the thing you wanted. Because, as Bob Dylan (almost) said, "The portable times, they are a-changing". ■■■■■

PREVIEWING TOMORROW'S ZIPPY NEW PROCESSORS

After a long lull, comes a frantic burst of aggressive action. Classic wars were fought like that. And things are, seemingly, no different on the technology battlefield. On February 4 this year, computer giant IBM announced that a 15 person team at its Austin Research Lab had produced a working processor chip clocking at over 1000 MHz - about three times as fast as the fastest Pentium currently available. The chip contained one million transistors and was developed using IBM's quarter micron technology (that meant the accuracy of the machining on the slab of silicon was one part in 4000 of a millimetre). However, commercial availability was two to three years away.

That same day, Digital Equipment Corporation (DEC), the Maynard, Massachusetts - based company announced: No sweat: we have 1000 MHz technology already built into our present technology. The company unveiled the latest chip in its Alpha line - the 21264 - clocking at 600 MHz and announced that the series would pass 1 GHz (or 1000 MHz) by the year 2000, which - surprise, surprise - was more or less when the IBM chip was expected to be available. The alpha chip would have a dizzying 15.5 million transistors on the chip. If things seemed to be hotting up on the Eastern Front - you ain't seen nothin' yet. Or so they seemed to be saying at the other side of the US, in California, where Hewlett Packard and Intel have their bunkers in Palo Alto and Santa Clara respectively. They got together to make an announcement of Epic proportions: EPIC as in Explicitly Parallel Instruction Computing.

Say your obituaries for chip architectures as you know it now, they suggested: Kiss CISC (Complex Instruction Set Computing) goodbye. Bring down the curtain on RISC (Reduced Instruction Set Computing). We give you EPIC, the new standard architecture for 64-bit computing.

An 'Epic' start

The new architecture - a radical departure from the way processors have been functioning since the early 1980's - is unlike anything Intel and HP have developed in the past. Intel 'x86' series of processor chips found under the hoods of the IBM PC, starting with the 16 bit work-horse, the 80286, in 1978. By mid eighties, they launched a 32 bit version but the architecture was still the classic single instruction per command cycle.

HP's 32 bit RISC chip. PA-RISC was launched in 1986 and 64 bit extensions were stapled on to the product in 1996. Their new joint venture, originally code named IA-64 for Intel Architecture - 64 (bit), and now officially christened 'Merced', uses a new, 128-bit long instruction 'bundle', which includes three separate instructions. This allows Merced to consistently handle at least three instructions per cycle and to unearth and exploit any parallelism that might be lurking in the job on hand. Each of the three instructions within the 128-bit long word, allocates 40 bits for the operational code: 7 bits apiece for three general purpose register fields and a unique 'Predicate Register', 64 bits long. When the processor encounters a "branching" operation, the predication feature executes both branches

in parallel – then discards the result from the invalid path. This parallel approach, gives the processor a ‘head start’ over other types of processors. Another feature of the new architecture is what the developers call ‘Speculative Loading’. The concept is rather complicated: but in crudely simple terms it means the chip loads data from the memory (on ‘speculation’) even before it is required. The problem with the current generation of computer operations is that while processor speeds are screamingly high – up to 500 MHz – the speed at which memory chips work is still comparatively slow. There are many situations where the processor having completed the tasks on hand, relaxes smoking a beedi so to speak, while waiting for the slower memory chips to deliver the next chunk of data. Speculative Loading prevents such unhealthy recreational waits by scooping up data from the memory in advance of requirement.

Merced is expected to be commercially available by mid 1999. It is in any case being aimed primarily at high end platforms like workstations. “It is HP’s trump card in the 64-bit universe”, said the company’s Asia-Pacific Director for channels and marketing, Mr. Vikram Mehta, during a recent presentation in India on EPIC. Meanwhile Intel has signposted its processor roadmap to the next century and named the products it expects to launch: ‘Covington’, a poor man’s Pentium II, has already been released. This is the P-II minus the extra on board cache. With a clock speed of 266 MHz. and a price per chip of around \$ 100, Covington is aimed a providing a chip solution for the burgeoning low end PC market (in the US this means a full fledged multimedia machine for below \$ 1000.

- Deschutes’, due early 1999 will kick up the clock speed to 333 MHz, with a 450 MHz version by year end.
- ‘Katmani’ in early 1999 will contain 3 enhancements to the current

MMX multimedia extensions making it MMX2.

- ‘Wiliamette’, early to mid 1999, will have an as yet unspecified speed advantage as well as enhanced 3-D capability.
- ‘Merced’, mid 1999, with the new 64 bit instruction set and a clock speed likely to be 1000 MHz.
- ‘Flagstaff’, Intel’s first dual processor chip due early in the new century.

In a separate move, Intel has tied up with the Cambridge (UK) based, Advanced Risc Machines (ARM) makers of the Strong ARM, a tiny powerhouse of a processor chip which is to be found in TVs cards, and a variety of portable home and consumer appliances. The conventional Intel chip family, including the Pentiums, are unsuited for battery operated devices. “They such battery power from portable devices like 3 Com’s ‘PalmPilot’ or the Apple ‘Newton’, faster than a vampire sucks blood” says one analyst. The agreement allows Intel to produce, sell and enhance Strong ARM – a move which will allow it to enter the lucrative new markets for chips like digital cameras and PC/TV set-top converters.

With ARM opening the doors to the portable devices market. ‘Covington’ targeting the low cost PC, and the promised multi-media add-ons and enhanced 3-D capability scooping up the multimedia business, will ‘Intel Inside’ soon become ‘Intel Inside Everything’? Not if the aggressive clone makers of the Intel chip family can help it. “We are providing today, many of the enhancements Intel is as yet only talking about”, they are saying, ‘Intel Inside? More like Intel Aside!’

The three leaders in the anything Intel can do, we can do better an cheaper’ brigade are: advanced micros devices (AMD) with the ‘K6’ series of chips: Cyrix Corporation with the upcoming ‘Cayenne’ and integrated device technology (IDT) with the ‘Centaur’.

Clone war

K6 was AMD's answer for a cheaper alternative to the Pentium. The company has announced the imminent release of K6-3D, with initial clock speeds of 300 MHz going upto 50 MHz., 8.8 million transistors on the chip and with 32 new instructions offering enhancements suited to 3-D games manufacturers, including the MPEG-2 video standard.

It promises to provide 'near theatre quality' performance without the user having to leave the Microsoft / Windows PC environment. For those whose PCs have processors plugged into the familiar 'Socket 7' holders (which Intel forsook for the new edge mounted 'Slot 1' in the Pentium-2) AMD offers the attraction of not having to change the socket to achieve this enhanced performance. By mid 1998, AMD also plans to release 'K6+3D' which will have an additional on-board cache and 21.3 million transistors.

However their next chip, K7 due in 1999, will have a module which is interchangeable with the Intel Slot 1 mounting: a canny move since AMD apparently hopes that the K7's specifications – including a 500 MHz clock speed – will take on Pentium-II and its successors.

Cyrix which has been making Pentium clones under the name '6x86', will also beef up its multimedia instruction set for the new version code name 'Cayenne'. Its main claim to fame is likely to be a doubling tripling of the current 6x86 MX performance, due mainly to a powerful new floating point unit (FPU).

The main advantage of the clones like AMD and Cyrix is of course price: today the 233 MHz Pentium II sells internationally for about \$350 as compared to \$ 100-150 for the clones. But Intel has a policy of aggressive price cuts to maintain its advantage.

Bandwidth bumps

Regardless of whose chip you favour, your system will ultimately encounter a common hurdle that is manifesting itself these days: pumping up the processor clock speed from 200 to 300 to 500 MHz is fine – but there is only marginal overall performance improvement because PCs still use the old 66 MHz system bus – the communication framework which sends data and instruction whizzing between processor cache, main memory and other parts of the computer.

The biggest beneficiaries of the higher bus speed will be users of the conventional Socket 7 systems (that includes all Pentium based PC users except Pentium-II). For them the new bus will allow faster access to the cache memory. Very soon the 100 MHz bus will become the new standard, but at a price: it will add to the overall PC cost by something like 10 per cent.

And so it will be with most of the promised goodies riding on the back of these exciting new processor improvements. The terrain in the dozens of games spawned by "The Lost World" will appear more forbidding. That simulated ride in the fighter pilot's seat will be even more dizzying. But none of this is for free. Indeed as users are swiftly discovering, the Information Super highway many be great for an exhilarating ride – but it's no freeway. There are tollbooths around every bend.

Powering Hollywood's magic 'FX'

The fastest processor chips available today are rarely to be found ticking beneath the hoods of personal computers. Rather, chips like Digital's Alpha family of 64-bit RISC processors or Silicon Graphics' proprietary chips are at the heart of high end workstations and UNIX or NT machines which are optimized for graphic intensive number crunching.

And some of their most challenging application are to be found in the high tech 'FX' (short hand for Special Effects) factories – like 'Industrial Light and Magic' and 'Digital Domain' – that support Hollywood's megabudget productions.

To achieve the effects that have made "Titanic" the biggest movie money spinner of all time, Digital Domain a company owned by the film's director James Cameron, deployed 160 computers based on the DEC Alpha 21164, 433 MHz chip. Of these 105 machines ran Linus, the 'open' alternative to UNIX. The other 55 ran Windows NT. All were interconnected on a 100 megabits per second Ethernet, linked to a single monitor and housed in ten racks in a small room.

The very high floating point performance of the Alpha was essential for the 'bull work' associated with the sophisticated image 'rendering' and editing required for the Titanic assignment. Daryll Strauss, software engineer at Digital Domain recently described the process: Starting from original photographs, still or moving, scanned into the computer, a digital artist creates whole new elements such as animating or rendering 3D models, or isolating areas of interest. This work was done on Digital Domain's bank of 350 Silicon Graphics workstations.

The process is repeated for every frame of the final shot. This is where the number of Dec Alpha-based Linux machines count: since all available processors are put on the batch processing job. The final image was then 'composited' on SGI workstations. During this stage the individual elements are colour-corrected to match the original photography, spatially coordinated and layered to create the final image.

To avoid the expense of building a full scale mode of the Titanic, only a small portion was built full size and the rest of the scenes were shot using

miniatures. The digital effects added to the miniatures included the ocean, smoke, birds, crowds etc.

The mode of the ship was made to sail – and sink. At Digital Domain, they built a 3-D ship model, photographed 2-D elements to simulate underwater and airborne – then seamlessly fused them together. Five terabytes of hard disk space was deployed to achieve all this. Such jobs will increasingly form the hard core of applications addressed by the new high speed processors being developed. ■■■■■

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