

UNIX[®] NEWS

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London, May 1989

Number 3

SUN'S PRODUCT BLITZ AIMS TO MAINTAIN WORKSTATION LEAD

In its first major hardware launch since the Intel-based 386i one year ago, April saw a shower of new products from Sun Microsystems. Most significant is the Sparcstation 1, a PC sized desktop system that uses a 20MHz Sparc processor sourced from LSI Logic. The VLSI board has eight custom CMOS chips, and less than 50 components all told. Rated at 12.5 MIPS, and 1.4 MFlops with Sun's new FPA+ floating point accelerator, the machine includes up to 16Mb memory and 64Mb cache. It can house up to 208Mb hard disk storage, and the machine also includes a 3.5" floppy drive. A new expansion bus - the S-Bus - connecting direct to memory, SCSI bus, an Ethernet adaptor, and two serial I/O boards are also included. It comes with a new DOS emulation package which allow DOS software to be run in a Sun window with cut and paste facilities. Sparcstations come with a pre-loaded Unix-based SunOS workstation, and includes audio input/output facilities including 8-bit sampling facilities. Basic systems include 17" monochrome and 8 Mbyte memory, and cost £7,400. A 16" colour system with 8MB RAM, 208Mb storage and 3.5" floppy drive costs £12,700.

Unclear future

Although the future for Sun's Motorola products looks unclear - effort is going into an Intel i486-based system - the firm has introduced 68030-based versions of its ageing Sun-3 series, including its lowest price system ever - the Sun-3/80. Using VLSI technology, Sun has implemented the 20MHz machine onto a single board, and uses the same enclosure as the Sparcstation 1. The system is rated at 3 MIPS, and like the Sparcstation can have up to 16Mb memory and 208Mb internal hard disk. The starting price is £4,900 for a 4Mb mono version. And Sun has also introduced a 33MHz 68030 system, the Sun 3-400, which expands the Sun-3 range to 7 MIPS and 6 MFLOPS performance. The 12, slot, 8-128Mb machine can support up to 1.3Gb internal memory, and has a starting price of £33,600. Fileserver, database and multi-user servers are also available.

Sparcstation 300 - Sun's fastest systems

At the top-end of its RISC range, Sun has introduced a new family of workstations and servers, the Sparcstation 300 series. Delivering 16 MIPS and 2.6 MFLOPS, the new systems are Sun's fastest, and use the Cypress Semiconductor version of the Sparc, running at 25MHz: they offer double the performance of the existing Sun 4/110 for around the same price. The workstations include two models: the Sparcstation 330 and Sparcstation 370. The 330 comes with five slots, 8-40Mb main memory, and 1.3Gb of SCSI storage, while the 370 includes 12 slots, up to 56Mb memory, and 5.5Gb storage. The server configurations can support up to 36 users (Model 330) or 68 users (Model 370), and there is an additional Sparcserver 390, which includes an Intelligent Peripheral Interface mass storage option for faster I/O performance. The 390 has a 16 slot cabinet, and half inch tape drive for high-speed backup. Sparcstation 300 systems are priced from £24,000 to £33,000, and server configurations from £23,700 up to £124,600 for a 4Gb 390 system.

Enhanced graphics across the range

In addition new GX accelerated graphics technology is offered right across the workstation range. Using two Sun-designed VLSI chips, the GX technology supports area fills, transformations, fast scrolling, anti-aliasing and fast rendering of vectors and flat shaded polygons. It comes as standard on all Sun mid-range and high-end systems, and as an option on the desktop models. For 24-bit, 3-D solids modelling, Sun offers GXP technology, which is optimised to accelerate advanced PHIGS+ functions. The company also extended its TAAC software toolkits for 3-D photorealistic imaging.

DEC HITS AT AS/400 WITH MVAX 3800, 3900

DEC is launching a major attack on IBM's AS/400 series with the addition of two top-end supermicros, the Micro-VAX 3800 and 3900, which replace the 3500 and 3600 models launched in September 1987. DEC says the new models, which cost approximately 5% more than the 3500-3600 line, deliver up to 50% more CPU performance and four times more storage capacity than the two models they replace - adding that the next two top-end models in the family are already in the pipeline. Supporting Ultrix as well as VMS, prices start at £59,000 for the 3800, £87,000 for the 3900; or £41,000 and 62,000 for the server version.

...AND PLANS 7 MIPS, \$7,000 RISCSTATION

...And DEC's late-life love affair with Unix is expected soon to lead to a low-end version of the MIPS Computer Systems Inc R2000- based DECstation 3100 to bring its base price down to \$7,000 for an 8 MIPS workstation - versus 14 MIPS and \$11,900 for the 3100. DEC has not decided whether to offer it as a cheapo workstation or a Unix personal computer.

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FORTHCOMING EVENTS

88Open the consortium promoting Motorola's 88000 processor, is holding its Spring general meeting in Stockholm on May 9-10th.

UK Computer Measurement Group '89. 30 May-2 June, Scottish Exhibition and Conference Centre. UKCMG, 0753 22204.

Computer Training Show. 31 May-2 June, Olympia 11, London. Montbuild, 01 486 1951.

Digital Cordless Telephone Services Conference. 1 June, Marriott Hotel, London. IBC, 01 236 4080.

Computer North. 6-8 June, G-Mex Exhibition Centre, Manchester. Cahners Exhibitions, 061 832 4242.

European Unix User Show. 6-8 June, Alexandra Palace, London. EMAP Exhibitions, 01 404 4844.

Network '89. 6-8 June, NEC, Birmingham. Blenheim Online, 01 868 4466.

IT in Government '89. 13-15 June, Wembley Exhibition Centre. Blenheim Online, 01 868 4466.

Software Tools '89. 13-15 June, Wembley Exhibition Centre, London. Blenheim Online, 01 868 4466.

Electronic Data Interchange. 28-29 June, Ramada Renaissance Hotel, Brighton. Frost and Sullivan, 01 730 3438.

Oxford/Berkeley Summer Engineering Programme. 3-14 July, Oxford University. 0865 270708.

ECOP '89. European Conference on Object Orientated Programming. 10-14 July. East Midlands Conference Centre, University of Nottingham. British Informatics Society Ltd, 13 Mansfield Street, London W1M 0BP.

The Open Software Foundation's next member's meeting, scheduled for May 21st in glamorous Monte Carlo, should provide more details on the organisation's future release

SHOWCASE

LONDON: Prime Computer UK took advantage of its Prime Time exhibition last week at London's Olympia, to preview its new low-end EXL system due for official launch soon. The Prime "Matchbox" will be a two-to-10 user system with an AT bus, intended as a multi-user server rather than a personal computer, insists the company. It will be out in mid-May; pricing is not set. The company is also to adopt the multi-processor Intel 80386-based Unix machines from Sequent Computer Systems Inc, Beaverton, Oregon, which already numbers Apricot Computers Plc, Siemens AG and Unisys Corp among its OEM customers. Prime will market Sequent Symmetry machines as the mid-range and high-end of its Unix family, coming in above the EXL-316 single processor Unix machines the company makes. The agreement is valued at an estimated \$100m to Sequent over five years, and Prime will market the machines as database servers under the EXL 1200 Series name.

GLASGOW: Toshiba Corp chose the Scottish Computer Show to launch the T5200, a new version of its portable Unix workstation launched last year - the T5200 has a 40Mb hard disk drive option as opposed to the usual 100Mb, and is available now, priced £5,495: Toshiba has a 56% share of the 386 transportable market in the UK according to figures from Romtec .

HARDWARE NEWS: WORKSTATIONS

Acorn Computers Plc has added three new models to its Archimedes 400 family of low-cost RISC-based workstations and promises a new machine between the 300s and 400s next month. The new models run up to 10% faster than their predecessors by virtue of improved memory cycle efficiency, and run the company's new RISC OS multi-tasking operating system, which supports up to 4Mb of main memory but runs all existing Archimedes packages. The machines come with built-in graphics and hard disk controllers, four slot backplane and co-processor bus, for which a floating point co-processor will be available in the summer. The base 410 has the operating system in 512Kb of ROM, 1Mb of main memory and 800Kb 3.5" floppy for £1,200. The 420 adds a 20Mb internal Winchester and has 2Mb RAM, running Acorn's software emulator of MS-DOS; it costs £1,700. And the 440 has 50Mb disk and 4Mb RAM, and costs £2,500. They are available now.

Apricot Sigmex, Horsham, West Sussex, has launched a range of real time graphics workstations and subsystems - re-badged and ruggedised versions of Tucker, Georgia based Chromatics' Baja and Le Mans CX2000 workstations. The AS 6700 graphics terminal subsystem uses a 68020 running at 16MHz with 12 MIPS performance claimed to deliver one million 2D GKS vectors. It has an optional PHIGS like 3D extension, and supports both Unix and VAX/VMS environments. Priced at £20,000 the AS 6700 is available now. The AS 8500 version of the Le Mans workstation, incorporating the AS 6700 subsystem, has a Sun-3/E workstation processor - a 20Mhz version of the 68020 with Sun's memory management unit - 4Mb memory expandable to 16Mb, and 300Mb hard disk. It runs Unix and supports all Sun software and tools including NFS.

Grid Systems Corp, Fremont, California, has launched the Grid-Desk 386isx which uses a 16MHz version of the 80386. It comes in three models. Model 1 has a 1.4Mb floppy drive, Models 40 and 80 come with a 40Mb and 80Mb SCSI hard drives respectively. Each has 1Mb RAM expandable to 16Mb, five AT compatible expansion slots and supports SmartDrive storage devices. Running Xenix, OS/2 and MS-Dos the workstations ship in June. Prices are \$2,795, \$3,995 and \$4,495.

Hard on the heels of Solbourne Computer, (UN No 1), Mission Electronics Ltd of Huntingdon in Cambridgeshire, is to launch a series of Sun/4 workstation clones based on the Sparc chip, which will use a version of the SunOS operating system licenced from Phoenix Technologies, Norwood, Massachusetts. They will run a full library of IBM PC applications, via the Phoenix MS-DOS software co-processor.

HP has added the entry level Model 332 to its HP9000 Series 300 family, where it replaces the existing Model 310. It runs a 16.67MHz 68030 and is rated at 4 MIPS. To maintain compatibility the new machine uses the same 16 bit bus as the 310 and a 1Mb memory will be expandable to 8Mb. It supports HP Basic, Pascal Workstation and HP-UX. 310 systems can be upgraded to the 332 by swapping processor boards. The 332 costs £3,969. HP is also to offer its R Series controller as an alternative to the low end 300s for measurement automation. A 310 CPU, 332 CPU or Vectra ES/RS board can be attached to it. In addition it has a new member of its Vectra PC family. The QS/20 is based on a 20MHz version of the 80386 and has up to 16Mb RAM. It features dual bus architecture and comes in four models which are available now. The Model 46, with 1Mb memory costs £3,584.

Tektronix has added raw compute power to its existing graphics engine in preparation for future expansion into the arena of visualisation technology, launching the the RISC based XD88 family of graphics workstations. Based on 88000 processors the family includes two workstations, an applications processor and a file server. The VME based systems clock at 20MHz and have from 8Mb to 176Mb memory. Rated at 17 MIPS, and 12 MFLOPS, the compute engines have four 64Kbunits of cache memory. All run Unix System V.3 with Berkeley extensions and X-Windows, and have TCP/IP, NFS, PLOT 10, GKS, PHIGS and IBM PC/AT emulation. The XD88/30 is a 3-D graphics workstation in wireframe, shaded solid and or true colour configurations, supporting 256, 4,096 or 1.3 million colours respectively, from £29,950. The XD/88/20 is a 2-D model with 256 colours, costing £24,950. The XD/88/01 applications generator can drive existing Tektronix terminals or netstations, priced £19,950. Finally, there is the XD/88/05 file server with 1.8Gb of disk.

Along the same lines, Silicon Graphics Inc, Mountain View, California has launched its Live Video Digitiser option for the Iris 4D/GTX Series stations enabling users to integrate real-time three- dimensional graphics with full colour video imagery. The Live Video Digitiser takes a signal from a video source - TV camera, video tape recorder, integrates it into the graphics system of the workstation and displays it in a window on the screen - and the 4Sight windowing systems enable this to be done while other applications run concurrently in a multi-windowed environment. It digitises and displays at up to 30 frames a second; has inputs for RGB and composite video at NTSC and PAL resolution. It is available in four configurations, running at from 15 to 30 frames a second in both the US NTSC and PAL - for most of Europe - TV standards, will sell for from \$6,000, with first shipments set for July.

TRANSPUTERS

Tiny Tektite Ltd of Felixstowe, Suffolk, is using the Intel 80860 RISC microprocessor - alongside the Inmos International Transputer. The Flute range of add-on boards for personal computers is claimed to implement a distributed graphics supercomputer. The Flute graphics and processing module consists of 40MHz 80860 with 24Mb main memory, 4Mb of dual-ported display memory, programmable display controller supporting both 8-bit per pixel video at 1,280 by 1,024 with 256 colours from a colour palette of 16.7m, and 24-bit per pixel at 1,024 by 800, using all 16.7m colours. A 10 MIPS Inmos T222 Transputer communicates with the 80860 via 8Kb of dual-port memory and handles system services with bootstrap support from 64Kb of flash EPROM, and the four 20Mbps serial communications channels to processing modules. The base module is offered as an AT expansion board, and can support multiple Processing Modules implemented in the 16-pin Inmos TRAM format, so that they can be installed in MS- DOS micros, DEC VAXes or Sun Microsystems workstations. The Graphics and Processing Module is £17,500, the Processing Module £7,500, and they will be available in the third quarter.

..And Bristol-based Transputer specialists, Meiko Scientific, has re-packaged its Computing Surface as an integrated parallel processing system to fit within a Sun 3 or Sun 4 workstation. The new product, the MK200 In-Sun Computing Surface promises performance of up from six to 40 MFLOPS and from 40 to 1250 MIPS, according to Meiko, by using up to 96 Inmos Transputers. It can be used either as a Sun-hosted parallel processing system for supercomputer-like performance, or as a multi-processing resource for the network, giving high throughput for compute-intensive multi- user workloads.

NEWS ROUNDUP

Microprocessors again dominated the news this month with the launch of **Intel Corp's i486**, which with a reduced instruction set core is rated at up to 20 Mips in the higher speed, 20MHz version, but remains fully compatible with the 80386 line. Motorola Inc tried to steal the thunder by previewing its 68040, but included no dates or performance figures. Unfortunately for **Motorola**, fault-tolerant systems manufacturer **Stratus Computer** chose the same week to abandon its Motorola 88000 product development in favour of **Intel's** latest RISC product, the i860. And **Computer Consoles Inc**, now owned by **ICL**, was forced to abandon work on its proprietary RISC for the SPARC, **ICL's** choice of processor.

The i486 could be the beginning of the end for the standard AT bus on PC-based systems: its speed limitations would become a serious bottleneck. **IBM**, of course, sees this as the big chance for its Micro Channel Architecture, and this month demonstrated a PS/2 Model 70 with the new chip inside, hinting that production models should be available next year. Meanwhile, the Micro Channel looks like it could be a hit with hardware manufacturers working on SPARC-based systems. **Phoenix Technology** of Norwood, Massachusetts, says it is working with "at least half a dozen companies" on SPARC/Micro Channel systems, the first to be announced comes from UK company **Mission Electronics** from Huntingdon in Cambridgeshire.

In the US, Unix was the subject of some major mass distribution deals, the most interesting being **IBM PS/2s** running **AIX**, and the futuristic **Next Inc** boxes from **Apple** founder Steve Jobs, which are to be sold through the **Businessland** chain on both sides of the channel. **Next Inc** was originally intending to sell only to the education market, but the deal prompted a range of commercial software vendors, including **Aldus**, **Novell**, **Lotus**, and **Sybase**, to announce their support for the machine.

The **Open Software Foundation** made news by issuing its second Request for Technology, which aims to find an alternative to **Unix International's** Applications Binary Interface with its so called Architecture Neutral Distribution Format, which aims to find a hardware independent format for distributing software, even across different processor types. **Unix International** made a similar request to the industry for multi-processor Unix technology. And **Hewlett-Packard** was one of eight companies that make up a new object management group, formed to promote the concept of object oriented programming.

But state of the art technology is not always a success in the marketplace. This month saw the closure of **Control Data's** supercomputer arm, **ETA Systems**. And the **Xerox** spin-off **Envos Corp**, which recently released some promising hypertext software for Sun workstations, has apparently bitten the dust, and **Xerox** is currently considering the fate of the artificial intelligence research it leaves behind.

MINIS AND MID RANGE

Altos has a new 33MHz version of its Series 1000 Intel 80386-based line. It supports up to 64 users, the 8 MIPS machine comes with 4Mb memory (expandable to 28Mb), 32Kb cache, eight serial ports, and a 1.6Mb floppy disk drive. There are two configurations: with 145Mb or 300Mb full height SCSI disks. Available immediately, with terminals and Altos' AIO office automation software it costs from £23,500.

Prime has added the 2850 to its 50 Series mini line, it takes up to six input-output and communications controllers for up to 64 async lines, and up to five 5.25" drives, including up to four 5.25" 258Mb or 328Mb disk drives. There are 8Mb, 16Mb and 32Mb memory boards and a 60Mb quarter inch cartridge tape and 8mm helical scan tape subsystem storing 2.3Gb presumably from Cipher Data. The 2850 with 328Mb disk, 8Mb, Primos and terminal is \$46,460; with 16Mb, two 328Mb disks and tape subsystem it's \$89,135, available from this June.

Data General Corp has announced its new Eclipse MV/1000 DC, costing \$8,150. With the Personal Computer Integration software, it can be configured as a low-end file on a local net, and it supports AOS/VS, AOS/VS II, DG/UX Unix and DG/RDOS. The single board computer has a CMOS gate-array CPU, floating point unit and 4Mb memory, with Winchester, floppy and cartridge tape interfaces; two RS-232 modem ports; eight RS-232/RS-422 ports and parallel printer port. Main memory is up to 121Mb and disk goes to 322Mb.

AEG AG's Modular Computer Systems Inc, ModComp, has extended its Tri-D family downwards with four models of the 9300 line of single-board computers. The line, based on a VLSI Technology gate array supported by Motorola 88000 and 68030 chips, comprises the 9310, 9320, 9330, and 9340. The bigger three use a VMEbus, all feature SCSI interface and have a floating point accelerator. The new line is rated at 2.5 MIPS, 80,000 interrupts per second and input-output throughput 1.5Mbytes per second. Main memory currently goes to 8Mb. They run MAX- 32 or ModComp's Realix real-time Unix and ship in May at from \$20,000.

Philips Telecommunications and Data Systems has announced the long awaited P9600 minicomputer. It is based on the Edgcore 2000 system, and uses a Motorola 68000-compatible processor clocked at 20MHz and rated at 18 MIPS, with 32-128Mb memory. Philips has added a VME to UPL bus converter, allowing the machines to take advantage of the same peripherals and add-on cards as the rest of the P9000 range, and has ported its MPX version of Unix V.2 onto the 9600.

SUPER-----

Stellar Computer Inc, Newton, Massachusetts, has introduced variants of its GS1000 graphics supercomputer. DS1000 Departmental Supercomputers use a custom parallel, multi-processor architecture with 25 MIPS performance and up to 40m vector and scalar floating point operations per second. It comes with 16Mb to 256Mb main memory, 1Mb cache, one to four internal 380Mb or 760Mb disks, 150Mb cartridge tape, three user-accessible VME slots, four to 12 serial ports, two to four input-output processors, Stellix operating system, X Window system, and a local console. Disk can go to 27Gb with an EU-1000 Expansion Unit. DS1000 prices start at \$83,000.

SERVERS AND STORAGE

Advanced Microsystems Technology Ltd of London NW has a new 80386 system, the Platform 307, which is designed for use as a Unix or Novell Inc NetWare file server as well as for advanced CAD/CAM and desk-top publishing systems: priced at £9,000 the Platform uses a 30MHz processor with 64Kb of cache to deliver a claimed 7 MIPS; the system incorporates SCSI disk transfer controllers, a 620Mb hard disk with average access time of 18mS, a 16-bit VGA card, and is shipping now.

Cisco Systems Inc, Menlo Park, California, has introduced a network device combining multi-protocol internet-work routing and TCP/IP terminal service. It supports DEC-net, XNS and X.25 protocol environments and up to 16 asynchronous devices using cisco's multi-port communications interface board. It gives small workgroups access to LANs and WANs, plus connectivity for modems, printers and PCs - without buying a terminal server and a router. Prices start at \$13,675.

Hewlett-Packard Co has erasable optical disk drives based on Sony Corp's 5.25" device, using the magneto-optical record-erase system. The C1710A optical disk library system holds 32 platters, each with 650Mb capacity for a library capacity of 20.8Gb. The C1711A is a stand-alone optical disk subsystem with 95mS average seek time, 680Kbytes-per-second read-transfer rate and an SCSI interface. The library with two drives is \$29,900. The stand-alone system is \$6,190 plus \$250 per disk.

Motorola's Computer Systems Division has added to its 68030- based VME Delta series with the Model 3200 family of network servers. Using 16.7 or 25MHz version of the chip, the new systems accept up to three VMEbus cards each, come with up to 12 serial communications ports and a parallel port, and support up to three 3.5 inch peripherals. SCSI peripherals are supported by an on-board SCSI controller. The 25MHz version also comes with built-in Ethernet network interface, has up to 8Mb memory and can support disk drives with capacities of up to 344Mb: on the 16.7 MHz version the network interface is optional, memory is 4Mb, and disk drives of up to 208Mb are supported. Prices are \$7,500 for the immediately available slower version, and \$19,800 for the 25 MHz system, available in June.

Brisbane, Australia-based Anvil Designs Pty Ltd's intelligent I/O subsystem for PS/2-based is available in the UK, via PC Distribution Ltd of Birmingham. Claimed to consume less than 1% of cpu power with 16 users hooked up a standard OnBoard2 has four ports on a single expansion card, with an increase of up to 16 users with add-on units supporting four users each. 16-user versions have a 256Kb dual port RAM. Prices in the UK start at £495 for a four serial port system, with "snap-on" modules priced at £250. Device drivers for SCO Xenix, Interactive 386/ix, Microport Unix and MS-DOS are also available.

-----SPEEDY

...And a French company with a payroll of just 10 claims to have brought out the world's fastest personal computer, Agence France Presse reports from Paris. Technology Research SA has developed the 386 Multi-X, equipped with an Intel 80386 processor that it drives at a breakneck 42MHz, with a data access time on the hard disk of just 0.6ms. Running Unix or the French Prologue operating system, the 386 Multi-X will sell for around £10,000.

OBJECT ORIENTATION - A NEW SPECIES OF SOFTWARE DESIGN

by Katy Ring and William Fellows

Object-orientation is a software buzz-word of the 1980s - but who really knows what it is? The identity crisis was one of many fundamental issues addressed by a MOOSE, Methods for Object-Oriented Software Engineering event, held by the British Computer Society's Object-Oriented Programming and Systems, OOPS, Specialist Group, appropriately enough, at London Zoo in Regent's park earlier this month.

According to independent consultant John Daniels, object-orientation "is like a religion" - the latest in a long line of panaceas stretching from assemblers, through fourth generation languages, to Computer-Aided Software Engineering tools. Converts to object-oriented methods are said to intuitively believe in their benefits, but have no empirical evidence to prove that they are beneficial. What is clear however, is that as design tools, object orientated methodologies are becoming increasingly popular for solving software problems, particularly those associated with distributed information systems, which, consisting of a number of disparate objects, map conveniently on to the concept. Object orientated design is today what 'structured' methodologies were in the 1970s - a theoretical paradigm for problem solving which lacks a universal model or clearly defined set of techniques.

Inheritance

So what is object orientation? Conventional methods - from Structured System And Design Methodology through to Jackson System Design - operate like oil refineries, turning crude data into refined and useful information. To do this, a problem is functionally decomposed into procedures and data. Procedures describe how the manipulation of data is to take place. Rather than taking a problem and working sequentially to its conclusion, object orientated design starts everywhere, separating the problem into objects and events, or messages. Objects are packets of information and a description of its manipulation. Messages merely specify the manipulations that a sender wants done and the receiver determines exactly what will happen. The qualities and characteristics pertaining to object and events are described only once, and are 'inherited' by others, eliminating duplication. In practical terms, despite the present lack of a uniform object-oriented design method, there is consensual opinion that four general design stages have to be followed, which using the conventional tools of information system design. First of all, programmers specify the system using entity models and data flow diagrams based on the real world. Next an object model has to be produced from the entity model, and functioning components of the data flow diagrams mapped on to the objects. Finally, the object interfaces have to be defined. Object orientated design is based on the principle of abstraction from the real world - the same as the way people learn - and is rooted in the philosophy of Heidegger, who examined what it is to be in the world. Advantages of its methods are that objects conveniently bolt together, are easily modified, are eminently transportable and reusable. Furthermore, the method is not prescriptive, so that if two people are given the same problem they are unlikely to come up with the same answer. The real problem facing object orientated design, as explained by conference chairman Ralph Hodgson, of Interactive Development Environments Ltd, is to establish a unified abstraction model, a methodology to which people can work, and a common vocabulary. Object orientated design is not just restricted to programming style or system implementation, and Professor S Schuman of Surrey University argued that it can be used during all stages of the project lifecycle, including formal specification.

Design

Object orientated design is currently employed in several key areas of information system design. The most familiar of these is the object-oriented user interfaces - such as GEM and MacDraw - which represent the tasks a user has to perform as icons on the screen. These are object-oriented in the sense that the user deals directly with the objects to be manipulated rather than with the program which does the manipulation. Object orientation is also to be found in design.

Ada

It was Grady Booch who pioneered work with real-time systems in the late 1970s, developing Ada as a "package" construct. Ada is one of several design methods are founded on the idea that problems can be solved by creating a model of the "real" world in software. Despite the fact that Ada follows the general design premises outlined above, Daniels feels that it is more of a teaching aid than a workable design concept for programmers. One of the problems is its failure to consider the life histories or the "inheritance" of real life entities. After all if a programmer knows why, how and for what a component was designed he or she is more capable of re-using that component in future designs. Unfortunately Ada does not incorporate the formal specification techniques already embedded as standard industry practice. Nevertheless, within the Ada community some major systems are now being designed with the Hierarchic Object Oriented Design, HOOD, developed by the European Space Agency with Ada as its target programming language. Despite the fact that HOOD has only a weak link to object orientated design - it incorporates virtually no inheritance - longer term benefits for object orientated design are likely to accrue from here, simply due to the amount of research time and money that a project of this nature attracts. Further to the task of creating some universal models and methods work on clarifying data abstraction is required. Daniels suggested that research on semantic data modelling - as found in the development of relational databases - would prove useful in the OOPS sphere. Existing notations can identify whole-part and inheritance hierarchies, and are therefore invaluable to entity-relationship modellers. Building on these notations finds a third area where object-oriented models are in use. Object-oriented databases should soon be developed that are able to connect behaviour directly to database entities. Computer-aided software engineering tools are a particularly important within the context of object oriented design at present, particularly in conjunction with C++, Ada and Modula-2 languages. However companies like Oracle Corp will be pleased to know that among programmers represented at the event, CASE tools appear to be suffering something of a backlash. Apparently software engineering abuse amongst the unqualified is assuming unprecedented levels, because all too frequently "they have a effect similar to a machine gun in the hands of an idiot."

Smalltalk

Finally, object-oriented methods are of course found in systems that have Smalltalk as their basis. Developed by Xerox specifically for object orientated design, the Smalltalk language has defined much of the enterprise's nomenclature. Ironically it has been badly promoted and has the reputation of being far too slow for practical purposes. As a result it lacks industry acceptance. However the rise of C++ as a hybrid object orientated language with Interactive Software Engineering Inc's Eiffel, ParcPlace Inc's Synergy and Stepstone Inc's Objective C languages - the latter being chosen by Steve Jobs for the NeXT machine - look set to redress this imbalance. Object orientated design's real watershed then is not merely to establish acceptance or respectability, but to construct a uniform object-oriented view of software development. After all, many a real-world panacea has suffered from having too many interpretive possibilities.

We would like to hear your views on the whole area of object orientated design, and welcome contributions, comment and opinion on this, and any other topics. Also we'd like to hear suggestions for future articles on this page, and indeed any ideas for what you would like to see on the pages of Unix News.

SOFTWARE NEWS

DATABASES

Oracle Corp has launched the first products from its new Office Automation Division, the Oracle*Mail electronic mail system and CASE*Generator. The latter generates SQL programs from the company's computer-aided software engineering dictionary. Oracle*Mail in its first incarnation runs only on DEC VAX/VMS systems and Sun Microsystems workstations; it includes the Oracle database kernel and costs £1,800 on a Sun-3. It is designed to enable users to send images, spreadsheets and applications as well as test messages to each other, and can exchange files with 1-2-3, All-In-1, Comprehensive Electronic Office, SQLCalc, Uniplex's Oracle Link, Quadratron's Q-Office, Applix' Alis. The next release will include gateways to facsimile and telex.

Racal Imaging Systems has chosen the Sybase relational database management system for its commercial optical disk-based document image capture, processing and management system, REOS: the management system is aimed at banks, insurance companies and libraries that frequently process large amounts of printed, handwritten and graphical information, as well as often needing to make enquiries of such information; Racal will offer REOS with the Sybase database under DEC VAX/VMS and Sun Microsystems SunOS Unix hardware, and is designed for companies performing high-volume online transaction processing applications that need regular updating.

GRAPHICS

Stellar Computer Inc, Newton, Massachusetts has a new piece of software designed to make it easier to study scientific and engineering data. The Application Visualisation System is claimed to obviate the need for users to "wrestle with" graphics programming interface standards such as PHIGS and GKS or proprietary interfaces such as GL2 and Dore, instead offering "graphics supercomputing without graphics programming." The system is claimed to provide an environment as radically different from traditional graphics programming interfaces as the spreadsheet is from Cobol. The system is built on a foundation of PHIGS+ and the X Window System, providing portability as well as performance. It uses data filters to convert existing data into geometry suitable for display and comes with a range of filters for commonly used geometry and application data formats, including data from Wavefront, Mathematica and MCS/Nastran. The Visualisation System is the application layer of Stellar's previously announced StellarVision visualisation environment, and is bundled at no charge with all Stellar graphics supercomputers.

Ardent Computer Corp, Sunnyvale, California, has opened up its Dore interactive visualisation software to other hardware platforms with a new portable version. Dore, or Dynamic Object Rendering Environment, has been available on Ardent's Titan range of graphics superworkstations since May 1988, but the company now claims to have shipped the product to around 50 companies with other hardware - including the Convex C210, DEC's VAX 11/750, and workstations from Sun, Apollo and Silicon Graphics. The 150,000 lines of C code within Dore include a device driver that runs on a Sun-3 or Sun-4 CXP graphics system under SunView, and can be modified for other hosts. Portable Dore costs \$15,000 for commercial users, and \$250 for academic users.

COMMUNICATIONS AND NETWORKING

DEC UK Ltd has released the X25Portal 2000 and made enhancements to its VAX File Transfer and Access Management, FTAM, software; the X25Portal is a dedicated communications server that enables X25 systems to send information across a DECnet backbone, while DEC says the enhancements to its FTAM software mean that it is now fully compliant with US and UK Government OSI profiles, GOSIP.

After attracting a great deal of attention with its Portable NetWare architecture, networking specialists Novell Inc of Provo, Utah, has added the NetWare T-1 Bridge to its range. This will allow users to connect geographically separate NetWare LANs through their high speed T-1 WAN links. Available from the third quarter it costs \$6,000. Also on offer now is a new version of the NetWare Asynchronous Remote Bridge which supports the new generation of high speed dial up modems - up to 19.2 Kbps - available in the next quarter it costs \$395.

Completing a string of new arrivals from Novell is the NetWare Access Server - software which allows up to 15 remote PC users to gain access to NetWare LAN applications and utilities simultaneously, through a single 80836-based dedicated server. The Access Server was jointly developed with Quarterdeck, and Dynamic Microprocessor Associates. It incorporates DMA's PC/Anywhere remote control software, and Quarterdeck's Desqview 386, which allows the server to operate as a multitasking system running MS-DOS, multiple applications and the remote server software at the same time. Available this quarter Access Server costs \$2,000.

On the communications front, Prime has an X400 message handling application programming interface development kit for its 50 Series minis, with an end-user mail application for both 50 and EXL Series users on the way. It also plans to support the Fibre Distributed Data Interface for high-speed fibre optic local nets on both families. For the 50 Series, it has implemented Sun Microsystems' Network File System for the 50 Series, enabling other NFS users to access files on the 50s over local and wide-area nets, and has also adopted Apollo Computer Inc's Network Computing System. Its SNA offerings have been extended with the Prime/SNA LU6.2 implementation of IBM's Advanced Program-to-Program Communications /Logical Unit 6.2 and Physical Unit 2.1. Network File System starts at \$1,000, Network Computing System at \$1,200, and LU 6.2 at \$1,500, all out now.

Microsoft Corp has joined forces with Digital Communications Associates Inc, Alpharetta, Georgia to add an IBM host mainframe gateway for its OS/2 LAN Manager program, so that nodes on the network can get through to access data on a host. The DCA/Microsoft Communications Server will provide an Application Program Interface and terminal emulation functions compatible with IBM's Systems Network Architecture. It will support most of the major networking protocols supported by Token Ring and packet-switched networks, including SDLC, DFT, X25, bisync and async links. The Communications Server software is being written for 80386 boxes - 80286 at a pinch - running OS/2 on a LAN Manager network, and will act as a gateway server for communication between nodes - running MS-DOS as well as OS/2 - on the local net and the remote host. Software developers will be able to develop applications using the Communications Server architecture, which is being designed to be transparent to the MS-DOS or OS/2 user, so that micro applications can be drawing data from a host without the user needing to know about it. Version 1.0 is promised for fourth quarter 1988 with an eight-user licence to sell for \$3,000, and a single-user version for peer-to-peer mainframe access will be \$500.

OPERATING SYSTEMS

Future releases of Unix from the Santa Cruz Operation will benefit from a newly signed licensing agreement with Acer Counterpoint Inc, which will allow SCO to include Acer's Fast File System within its System V/386 version of Unix. According to Acer Counterpoint, the file system has been benchmarked as the industry's highest performance Unix file system, and uses a proprietary "bit map" technique for contiguously allocating space on the disk, which allows more information to be transferred each time the disk is accessed than with conventional Unix file system. Developed by Unix software engineers at Counterpoint Computers Inc, a wholly-owned subsidiary of the Taiwanese Acer/Multitech group the Fast File System should be incorporated into the next release of System V/386.

Oracle can now be accessed from geographically remote sites as a distributed database, through Banyan Systems' Vines virtual network operating system. Release 6 of Oracle's RDBMS - the on-line transaction processing version - has been ported to Banyan Systems' Unix based Vines/386 by software engineers from both companies using the Vines applications toolkit. The result, unimaginatively dubbed the 'Oracle Server for Vines,' is a SQL database server for organisational networks supporting PC, XT or AT compatible clients, as well as Apple Macintoshes running Oracle Macintosh and other TCP/IP hosts such as Sun workstations. Local or global applications can be implemented using Oracle application and development tools as well as PC end user tools. The software includes the RDBMS itself, SQL*Net and Vines Oracle support services, which run off a 386 PC with a minimum 8Mb RAM acting as a server. Up to 20 concurrent users can be supported by the server. Oracle Server for Vines begins shipping in the US in May, both Banyan and Oracle are to sell it in the UK - out in the third quarter it will cost £4,500.

Hewlett Packard has announced Release 6.5 of its HP-UX operating system for the Series 300. This looks like being a stop gap measure before the launch of HP-UX 7.0 later this year, which will begin to converge the technology of HP's two strains of Unix running on Series 300 and Series 800 systems. This release conforms to X/Open's CAE and Portability Guide 2, and has enhanced security features. It incorporates X-Windows, which merges with HP Starbase, GKS and PHIGS.

Forth Inc, Manhattan Beach, California has come out with a multi-tasking, multi-user operating system for Harris Corp's RTX 2000 microcontroller chip. The RTX 2000 is a 16-bit microprocessor designed specifically to run the Forth programming language efficiently. The new pF/x is optimised for real-time control applications in data communications, robotics, process control and instrumentation. PF/x can be used alongside MS-DOS on a micro using the RTX 2000 as a co-processor, and interprocessor communication is implemented automatically by pF/x via the use of mailboxes that enable the RTX 2000 to be dedicated to such as data collection, while the micro is used for data analysis. PF/X is \$3,350 and is part of the polyForth program development environment, which also includes integrated editor, interpreter, compiler and debugger. It is out already for Silicon Composers' FOX Forth board and arrives this month for the Harris RTX 2000 Demonstration Board.

SCO and Hewlett-Packard have opted for SecureWare Inc's Portable Security Module Package, PSMP, which, when integrated into their Unix kernels achieves C2 security level, according to the US government's Orange Book requirements. SecureWare says the security extensions - claimed to be a quarter of the price of similar solutions - have also been ported to Apple A/UX, Interactive and Microport Unix. Due to the flourishing trade in X-Windows applications on workstations and servers, the US government - which originally intended its standards to be applied to systems running dumb terminals - has awarded five contracts to develop secure system standards incorporating X-Windows, called the Compartmented Mode Workstation - or CMW - to SecureWare, DEC, IBM, Sun and Harris. SecureWare's CMW sits on top of PSMP Plus and was done for Apple's A/UX, but it also claims that it is the only version that can be ported to any version of Unix, saying it has done the same for "every major European vendor except one."

OTHER SOFTWARE NEWS

Version 1.0 of Display Postscript from Adobe Systems is due next month, according to Microbytes Daily. The current version is 0.9. The new version will also appear on the new DECstations DEC buys OEM from Mips Computer System Inc, and on IBM PS/2s running AIX. Unlike conventional Postscript, which can take several minutes to assemble an image, Display Postscript takes less than a second, according to Adobe, and the new version will include optimised features, such as primitives for generating rectangles, and caching for frequently used objects such as icons.

Procyon Research Ltd of Cambridge has a microcomputer implementation of the Common Lisp Object System (CLOS) which it claims will help object-oriented programming fulfil its promise of modularity and reusability. Procyon's CLOS is implemented on the Apple Macintosh Plus, SE and Macintosh II environments and is designed for both development and training.

Expert systems are popping up left, right and centre these days - and now NCR has come up with Planmaster, a PC based application, which aims to bring personal financial planning advice to customers of banks, building societies and other financial institutions at their local high street branch. Written in C, a production rule system with an inference engine employing both forward and backward chaining, it is basically an anglicised version of Sterling Wentworth Corp's Planman advice system used widely in the US. NCR claims that with a store of several thousand rules, representing the collective knowledge of financial advisors as well as information on the current legislative environment in the light of the Financial Services Act, Planmaster is bringing expert system technology to bear upon personal finance advice. It incorporates a graphics package and client database and generates a report of recommendations based upon individual customers requirements and circumstances. Planmaster runs on NCR's PC and workstation products, it costs £6,000 per copy.

Cadnetix is touting a lower cost version of its Sun-3/60 based CDX-56000SP PCB layout workstation, previously only offered with the Cadnetix Graphics Accelerator: the CDX-5600 PCB CAD workstation has 4Mb memory, 141Mb disk, and can be upgraded to the CDX-56000SP - no price given.

The second major release of C++, the object-oriented implementation of C from AT&T, is due out on June 30th: C++ version 2.0 is said to incorporate two significant improvements over the previous version, 1.2 - it supports multiple inheritance and type-safe linkage.

DEC is to bundle its Rdb relational database in with the VMS operating system this week: the move is to counteract the IBM AS/400, which has a database built in, but could also affect **Oracle Corp**, which relies on DEC sales for a high proportion of its business.

The **Santa Cruz Operation** has delayed the release of its latest version of Unix until June: SCO Unix (previously Xenix) Release 3.2 was due for general release in March - the delay is said to be due to additional testing of the new features, including full Posix compliance and C2 security features.

Macintosh users are being offered full access to TCP/IP based local and wide area networks with TCP/Connect, from **Maxima Communications plc**, Exeter, Devon, UK, providing connectivity to the terminal emulation (Telnet), and file transfer (FTP), facilities of TCP/IP host machines, and allowing up to 20 concurrent sessions to the same or multiple host systems on a range of terminal types - Maxima also has a set of six utilities that use Mac windows under A/UX to simplify the use of Apple's Unix alike operating system: StarNine Utilities allows copying to and from A/UX and Mac HFS volumes and Audit System - TCP/Connect costs £315, StarNine Utilities is £70.

Standard Platforms, Blackburn, Lancashire, is now offering a Posix compliant version of **Charles River Data Systems'** Unos real time Unix operating system.

Marc Software International Palo Alto, California, is offering a new NROFF/TROFF to WordMARC filter for users who would rather use an interactive menu driven word processor with desktop publishing capabilities than NROFF/TROFF's batch orientated system - the WordMARC filter is available for all Unix systems, ranging from \$250 to \$9,500 depending on CPU.

And **Marc** has WordMARC-Oracle Connection - a program that provides two way integration between the WordMARC word processor and Oracle's database - running on Unix systems prices go from \$900 up to \$19,000.

OS/2 versions of Unix vi editor, the Awk language and a revision control system are now shipping from **MKS Waterloo**, Ontario, Canada - they are all compatible with other MKS software for DOS and OS/2: MKS Awk is \$179, MKS Remote Control System costs \$395 and MKS Vi is \$199.

Unify and **Oracle** are to interface their respective Accell/SQL and Oracle RDBMS applications. Unify is also offering four year old Atlanta, Georgia based **Programmed Intelligence Corp's** visual information retrieval and analysis tool, Intelligent Query, on its Accell 4GL technology - Accell/IQ is priced from \$750 to \$45,000 depending on hardware configuration.

The European Unix systems User Group, EUUG, has published a European research and development E-Mail directory listing R&D institutes which are connected to EUnet and EARN, together with their electronic addresses - it costs 18, from the EUUG.

WHEELIN' AND DEALIN'

April's shower of bids and takeovers saw ambitious Sheffield Pick specialist **Sanderson Electronics Plc** buying the business and assets of **XSoft Ltd** and **XTech UK** from **Erskine House Group Plc**, paying over £300,000 in cash. **Modcomp** bought part of **Gould Computer Inc**, the **Industrial Applications Systems Group**, responsible for Gould's Pace-32 industrial software. **Topologix Inc**, Denver, Colorado, is buying **NBI Inc's** real time Unix house **Integrated Solutions Inc**. **Cullinet Software Inc**, of Westwood, Massachusetts, has retained **Goldman Sachs & Co** to evaluate new sources of finance for the loss-ridden database company, giving rise to speculation that the company may want to put itself up for sale: it declined comment on the suggestion. Despite rumours flying about to the contrary, it seems that there is no financial problem at the Westboro, Massachusetts based office automation company **Applix Inc**, manufacturers of **Alis** software - the company is restructuring, and aims to be positioned more as a marketing than development enterprise. And, just before going to press, we heard that **Dynatech Corp**, Burlington, Massachusetts, has acquired **Santa Clara**, California based **Parallax Graphics**. Following blue job news in March, (UN No 2), **Ferranti** painted April the same colour - 700 jobs are to go in the closure of its Wythenshawe plant. In sunnier news - **Migration Technology**, Bourne End, Buckinghamshire - formerly known as **MS Associates** - has been bought from its parent, **TIS Group**, by a management group, and, in a party mood, has slashed £2,500 off the cost of its CGen Basic to C translator. The **UK Home Office** is to install 130 mid range Unix systems for its **LIDS II**, (Local Inmates Database System), part of the computerisation of the Prison Service and the first contract to take place under its **HOUSE** - Home Office Unix Systems Environment - initiative. The SD consultancy arm of **SD-Scicon** has been selected by the **European Space Technology Centre** as a lead contractor for an 18 month research project, combining the **Inmos International Transputer** and **Ada** programming technologies. **Olivetti's** UK subsidiary has re-structured into two separate companies: **Olivetti Office UK** and **Olivetti Systems and Networks**. **Level V Distribution Ltd**, Matlock, Derbyshire, has become exclusive distributor of the **Sea-Change** range of 4GL accounting products in the UK. Finally **/usr/group**, the US based commercial Unix based user group is changing its name to **UniForum** in a move to appear less esoteric to non technical users.

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UNIX NEWS

UNIX NEWS is published monthly by **Unigram Products Ltd**, 4th Floor, 12 Sutton Row, London W1V 5FH.

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Subscription Orders: £55 per 12 issues. Enquiries and payment to **Unigram Products**, 4th Floor, 12 Sutton Row, London W1V 5FH.

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