DKUUG-Nyt

Nr. 88 — November 1996

World Wide Virum

Forlaget Kampass går på Internettet.

MIPS ABI

Hvilke benefits kan opnås gennem MIPS ABI.

Java

Java er andet og mere end god kaffe.

Indhold

OH, frodige kvinde

Alt imens livet går sin vandte gang, og DKUUG-Nyt igen er på gaden, kan man den 13. oktober i Berlingske Tidende læse en klumme om kvinden. I følge Henrik Schultz er det ok for kvinden at være fed. Han mener, at kvindefedt er det stof som store drømme gøres af. Han protestere mon den slanke kvinde, og mener den frodige kvinde skal bringes til at forstå, at hun er elsket. I hvert fald af stenaldermanden, idet der garanteret går flere mænd fra familien Flitstone rundt på gaderne, end mange bryder sig om at tænke på.

Er du en stenaldermand, så dyrk den frodige kvinde. Lad hende vide at hun er elsket. Komplimentér hende, så hun igen kan finde sit kvindelige selvværd. Det giver måske nogle knubs i starten. Men al begyndelse er svær. Tag de stikkende/dræbende blikke og de svingende håndtasker, der følger med.

Når det så er sagt, så kan du jo læse lidt i DKUUG-Nyt, om hvordan forlaget Kompass går på Internettet og de udfordringer der i forbindelse med sådant et stort projekt.

Vi bringer også en artikel om JAVA, der stadigt er Hot. Desværre måtte DKUUG aflyse seminaret om COSE. Det er jo dybt tragisk, at interressen for sådan et spændende emne ikke kan trække nok deltagere. Men måske skulle DKUUG interessere sig noget mere for andre emner?

Fung. redaktør
Gitte D'Arcy

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World Wide Virum

Ole Farbøl

Både hard- og software er rene sprintere og spritny 64-bit og knap nok frigiven teknologi. Ambitionerne er tilsvarende høje hos Rambøll og Kompass: Den nye web-site skal blive den ultimative businessmans website og med 350.000 hits om dagen blive en af de 15 mest traffikerede i verden.

Et to Megabit "hul igennem" skal foreløbigt sørge for acceptable opkoblingstider, men otte Megabit og ATM står på agendaen, for i projektgruppen har man overvejet om to Megabit nu virkelig kan være nok.

Men research ude i den virkelige verden viste, at en jysk pornobutik, der befolker cyberspace med afklædte damer, klarer 100.000 hits om dagen på en 512 kilobit linie. Så når jysk ersatz-sex med tvivlsomme billeder i tvivlsom opløsning kan holdes i luften på de konditioner, burde to Megabit være tilstrækkeligt til seriøse forretningsfolk, der højst vil klæde deres konkurrenter af til skindet.

WWW

High speed isenkram

Rambøll var i første omgang i kontakt med Bonnier-koncernen, der er franchisetager for Kompass International i Skandinavien og som ville udnytte de nye muligheder for markedsføring på webben. Ideerne blev på et møde i Dublin vist frem for den øvrige Kompass-organisation, der straks besluttede, at so ein ding skulle de have world wide.

Lynhurtigt blev der strikket et konsortie sammen. Kompass International og de 72 franchise-tagere leverer data, det amerikanske Intellimedia brugerinterface, det engelske forlag Reed står for reklamesiden, mens Rambøll står for database-siden og facility management.

Gennem DDE har Rambøll fået listet et par SGI Challenge 10000 servere

ud - 64 bit og 194 Mhz processorer - de absolut hotteste unix-bokse, der kan købes for penge. Som databaseprocessorer og kommunikationsmaskiner nagler de enhver mainframe til væggen.

I Virum hos Rambøll står den ene Challenge som webserver (48 samtidige Netscape-processer), en SGI Indy er firewall, som beskytter den anden Challenge, der er databaseserver med en splinterny 64-bit Oracle af de dyre med ubegrænset brugerlicens kørende.

Konstellationen af SGI og Netscape Enterprise Server kører på alle de 15 mest trafikerede Websites i verden. Selv Microsoft gør det, men taler naturligvis ikke højt om det.

Hele showet køres spejlet på maskiner i San José i USA, hvor trafikken fra fjernøsten og USA primært skal afvikles.

Men hjertet er Virum, World Wide Virum.

High speed projekt

'Oprindeligt' var det planen at etablere fire sites, men telekommunikation i Danmark fungerer så fænomenalt godt, at det er skrinlagt.

Oprindeligt er nu så meget sagt. Efter mødet i Dublin kunne Rambøll gå igang med jobbet som systemintegrator den 15. august!

Allerede 30. oktober gik prototypen, som Kompass's franchistagere kunne teste og muntre sig med, i luften. Softlaunch er programsat til 15. november, her skal siten være oppe at køre, men uden nogen reklame for systemet. To måneder senere kommer den officielle world wide launch.

- Det er meget kort tid, siger projektleder John D'Arcy, Rambøll, uden at ryste på hånd eller stemme og med fuld tillid til, at han og hans tre kolleger skal nå at løfte projektets skarpe deadlines.

Herefter starter næste fase, der skal gøre Kompass & World Wide Virum til en global elektronisk markedsplads. Fra april skal det være muligt at afslutte transaktioner, dog uden betaling, men det er der ideer om at koble på senere. Muligvis skal der også etableres et jobmarked og integration til EDIFACT.

Rambøll's kontrakt med Kompass løber over fem år, og med det nuværende high speed tempo i projektet er der ikke langt fra idé til realisering.

High speed positionering

Med den nye Web-site er Kompass ved at udmanøvrere alle sine konkurrenter i en verden, hvor nøgleordet er globalisering, og i takt medden stadigt mere grænseoverskridende handel vokser behovet for grænseoverskridende information.

Virksomheder har altid overvåget samhandelspartnere og konkurrenter, nu befinder venner og fjender blot i stadigt stigende grad at befinde sig uden for nationale opslagsværkers rækkevidde. Greens er udmærket til at fortælle om danske virksomheder, men der skal et Kompass til i en universel hverdag.

Og i en global skala er Kompass unik. Der er masser af stærke lokale, nationale konkurrenter, men ingen

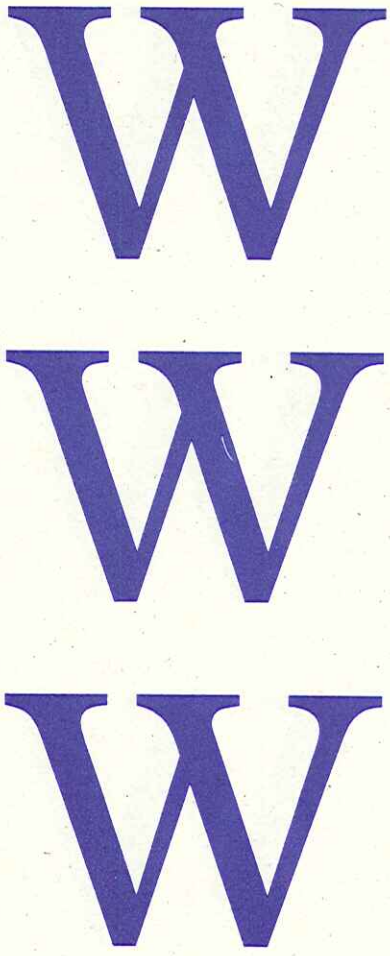
der kan tilbyde højkvalitetsdata på tværs af grænser og kontinenter.

Med den nye Web lægger Kompass afgørende afstand til konkurrenter, derfor har Kompass så travlt med at positionere sig som elektronisk udbyder af world wide business information. Via den nye service bliver der adgang til oplysninger om cirka 1,6 mio. firmaer med 12-13 mio. produkter, hvilket tager omkring 4 Gb diskplads som ren tekst, men det vil nu svulme op, når reklamer med GIF og JPEG filer lægges til.

High class data

Kompass er alment anerkendt for at have den mindst ringe datakvalitet og for sit klassifikationssystem, der også anvendes af FN-organisationer.

Men de 72 franchisetagere under Kompass International har naturligt nok haft frit slag til at vælge databasesystem og har anvendt mange forskellige. Via formatfiler bliver alle data nu hældt ind databaseserveren i Virum, der bliver Kompass's fremtidige centrale omdrejningspunkt.



Franchisetagerne vil selv kunne opdatere databasen i Virum, hvor hvert eneste firma får et unikt nummer svarende nogenlunde til ISBN-systemet, hvor alle bøger i verden har en helt entydig identifikation.

Fra Rambøll vil de også kunne få leveret data tilbage til udkørsel på for eksempel CD.

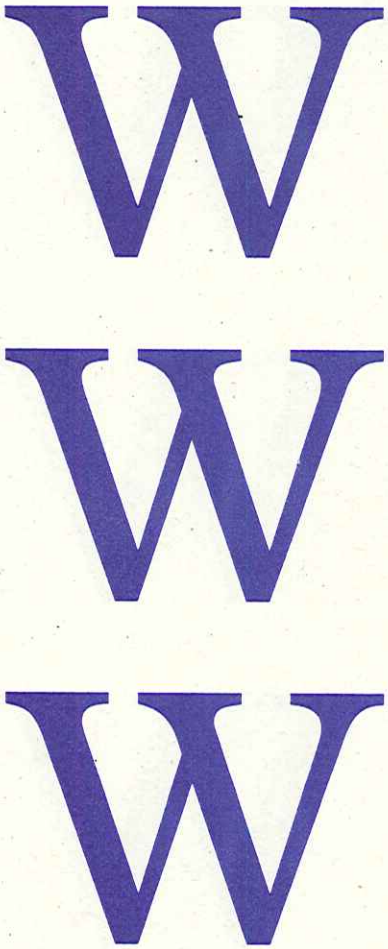
I kraft af den unikke firmaidentifikation (der ellers kan volde problemer i bl.a. nogle asiatiske lande), datamodellen og datakvaliteten vil større firmaer med fordel kunne bruge Kompass-databasen som deres egen database via Intranet.

- Der bliver mange muligheder på den nye service. Fra at lave nye, ajourførte mailinglister til at finde nye leverandører, siger John D'Arcy.

Alle firmaers basale data ligger i basen. Hvis et firma ønsker det, kander mod betaling lægges supplerende information og reklamer ind, og der kan oprettes en

slags homepage - dog uden eksterne links.

Alle WWW-brugere kan komme ind på de indledende skærmbilleder, men der kræves et login-abonnement for at grave dybere i dataene.



Og de langhårede problemer

Fra mastersiten hos Rambøll er der en to Mbit linie til telefoncentralen i Virum, som får otte Mbit forbindelse til telefonhuset på Borups AllÀ, hvorfra der er en fire Mbit-linie til MCI i USA (p.t. kører al dansk internet-trafik til USA på en to Mbit linie) og videre til den spejlede database med alle tabeller replikeret i San José.

Som hovedregel kører Asien og Amerika på USA-maskinen, men brugerne og franchisetagerne balanceres mellem de to sites. Det betyder, at der har skullet knækkes hårde nødder omkring krydsopdatering, som kan ske samtidig på begge sites, og brugerregistrering.

Her begyndte finesserne at gå hen over hovedet på DKUUG-Nyts udsendte medarbejder (som dog til sit forsvar skal påpege, at der ikke er ret mange, som spejler databaser på dén måde - og det var meget nemmere at forstå den der med pornobutikken), men det var noget med, at firewall'en i Virum og kollegaen i San JosÀ står i et indbyrdes særligt intimt forhold. De kan ihvertfald kommunikere direkte, hvilket medvirker til at sikre at eksempelvis en reklame først "offentliggøres", når opdatering er sket i alle databaser.

Målsætningen er 350.000 hits om dagen. Hvis den nuværende installation mod forventning ikke skulle kunne holde disse i luften med acceptable svartider, kan den opgraderes med større transmissionskapacitet og flere CPU'er i SGI-maskinerne.

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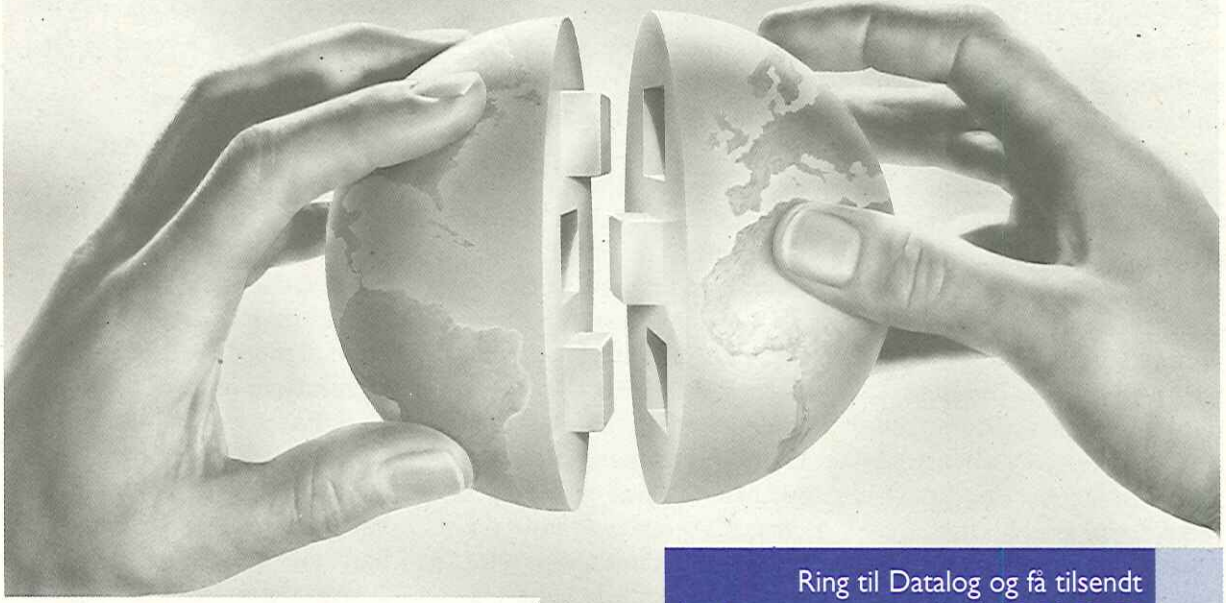
INTERNATIONAL UNIX TEKNOLOGI KONFERENCE 3. DECEMBER 1996

Deltag i konferencen, der fokuserer på de nyskabelser, der sikrer UNIX teknologiens forspring langt ind i det 21. århundrede



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MIPS ABI benefits for the End User and MIS Departments

The MIPS ABI Group delivers on the promise of UNIX binary compatibility across systems from multiple vendors. The benefits of UNIX systems are well known: scalability, performance, fault-tolerance, advanced features and security to name a few. The problem has been that each computer manufacturer used a slightly different version of UNIX, resulting in an overabundance of UNIX versions, each incompatible with the others. Independent software vendors (ISVs) had too many hardware platforms to support in a cost-effective and timely manner. As a result, customers in industry often suffered through slow application software release cycles and enjoyed fewer new features...ISVs were simply too busy porting and maintaining their applications.

The MIPS ABI Group, Inc. represents all of the leading UNIX computer vendors who support MIPSÂ RISC-based systems from MIPS Technologies, Inc. Today, this roster of companies includes Concurrent Computer Corporation, Control Data Systems, Dansk Data Elektronik, NEC, Pyramid Technology, Siemens-Nixdorf, Silicon Graphics Sony and Tandem Computers. In 1991, these companies began working together to achieve binary compatibility across all of their MIPS RISC UNIX SVR4-based systems. Today more than 75 business-critical applications from over 20 leading ISVs are available for MIPS ABI compliant systems including leading vendors such as Oracle, SAS Institute, Informix and many others. (An online current listing can be found here) In addition to these, there are hundreds of additional vertical market applications which are built using ABI-compliant versions of Informix, Oracle, Acucobol, Liant Cobol and others.

End-users and IS benefit from the MIPS ABI in several ways

The MIPS ABI represents a wider variety of quality software for users of MIPS ABI-compliant systems. By working together, the MIPS ABI Group member companies have created a larger binary compatible market for software sales worldwide. The result is a greater variety of software in a more timely fashion on all MIPS ABI-compliant systems. The MIPS ABI Group represents the fourth largest UNIX market worldwide, a significant sales and marketing opportunity for ISVs.

In addition, because the MIPS ABI represents a large market opportunity for ISVs, MIPS ABI ports are generally

MIPS ABI

considered "first tier", meaning that ISVs port to the MIPS ABI in their first group of ports, along with HP, Sun and IBM. This provides parity of application availability across systems from MIPS ABI vendors as well as other leading UNIX system vendors. The same features found in ports on Sun or HP machines are generally found in the current versions of the same software on MIPS ABI systems.

Another benefit is the MIPS ABI consolidates up to nine ports into one. As a result, ISVs have fewer platforms to support, and can spend more of their time and resources developing and enhancing their applications.

Many users, including many large IS groups, develop their applications in-house. By adhering to the MIPS ABI Conformance Guide standards, IS groups can develop applications that will run, without modification, on a variety of compliant-systems. MIPS ABI compliant systems range from small workstations and 3-D graphics workstations to departmental and mid-size servers and mainframe class systems. A MIPS ABI compliant application can run on all of these systems without any recompilation or changes to the code. This provides corporate developers with the freedom to choose from a variety of open system solutions and reduce their costs of computing and development.

End users and corporate IS groups using MIPS RISC technology from MIPS Technologies, Inc. receive the benefits of using the most advanced RISC microprocessor technology available today. The MIPS RISC architecture was the first to utilize dual 32- and 64-bit technology, ensuring continued support for newly developed 64-bit applications while continuing support for industry-standard 32-bit applications. Further, MIPS RISC technology has consistently provided industry-leading performance for

both commercial and technical applications. The family of R3000, R4000 and R10000-based systems provide balanced integer and floating point performance.

The MIPS ABI Group is continually evolving the MIPS ABI Conformance Guide to include emerging standards for new technologies including asynchronous I/O, long file names and C++ support, to name a few. The MIPS ABI Group doesn't create new standards. Rather, the Group adopts existing standards and does so in a coordinated manner to ensure that all MIPS ABI-compliant systems are supported in an identical fashion, guaranteeing application portability across all platforms.

Since its inception, the MIPS ABI group has worked closely with leading software industry vendors including SAS Institute, Oracle, Informix and others. these ISVs participate in the development and implementation of technical specifications such as the MIPS ABI conformance guide which address valuable new technologies for the MIPS ABI group. The result is a full-featured, standardized ABI that supports most all leading applications' requirements.

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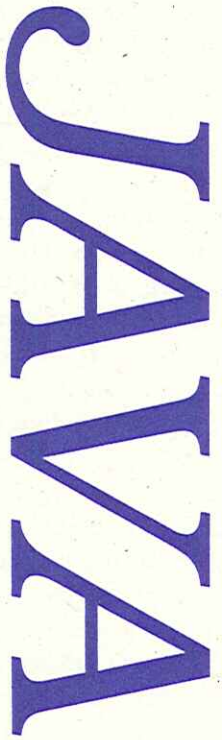
MIPS ABI

Java Computing Changes Everything

Revolutionary Concept Now Taking Root in the Enterprise

Bud Tribble



Internet time. Never before in the history of technology has a new computing concept changed time as we know it. The seemingly overnight popularity among the masses of the Internet and intranets, accompanied by Sun Microsystems' JavaTM platform, have created such widespread, focused development work that the usual speed of technology adoption is in hyperdrive. A Java year is like a dog year — it moves seven times faster than ordinary years. And the pace is still accelerating to such a degree that dog years may soon become too long.

From revolutionary concept to the darling of the programmers' underground to a platform for corporate applications — in less than a normal year, the Java language turned the Information Technology world on its head. Today, only the uninformed think Java is just a tool to liven up World Wide Web pages with interactive, animated applets. "Java has substance" is a statement from one impressed user that was printed recently in a magazine story. Countless others have said similar things in private, such as the CIO of a large transportation firm whose staff spent $1 million developing a major corporate application programmed in Java to run on Java. A traditional developed-and-deployed-on-PCs approach would have cost $7 million, he said.

Java Computing Will Change the Corporate Desktop

According to a survey of Fortune 1000 companies performed by Forrester Research, 62% already use Java for some development and 42% expect Java to play a strategic role in their company within the year. This is remarkable, considering that Java was first unveiled publicly on May 23, 1995. Perhaps the biggest revolution spawned by the platform-independent, easy-to-use, object-oriented Java language is its key role in the new Network Computer (NC), also called a "thin client." The emerging new Java devices are streamlined systems that exploit network servers for much of their processing power, storage, content and administration.

So profound is the change these Java devices will bring about — near term, in the corporate enterprise and longer term (in Java years), way beyond — and so fast the universal acceptance that no words yet exist for this new enabling technology. Thus Sun has created the term "Java Computing" for this new paradigm that will take its place in line behind older waves of computing: terminal/host, PC computing, client/server, and now Java Computing (which will include enterprise systems as well as devices other than traditional computers).

In the enterprise, Java Computing holds the promise to transform IT as it is now known. This new paradigm can make long-in-the-tooth legacy solutions obsolete — or irrelevant — where they should be, but will also embrace old technology as well. The fundamental open systems/platform independent premise on which Java Computing is based is capturing the imagination of many CIOs in today's dollar-conscious economy. This enthusiasm springs from several decisive advantages inherent in Java Computing as deployed in the enterprise:

- The realization of true open computing for the first time.
- Sharply reduced cost of client administration as well as big savings in total cost of ownership.
- Rapid development and deployment of new computing applications.
- Fuller use of existing legacy systems.
- Improved security.

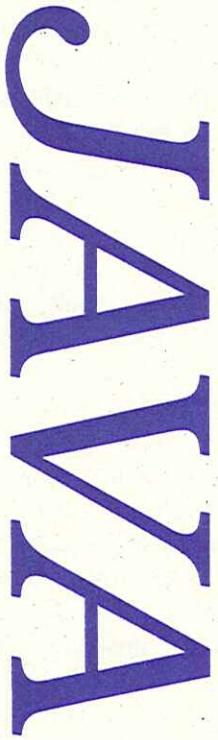
Equally important, Java Computing in the enterprise can be adopted incrementally at far lower cost than older technologies. Owing to its platform independence, Java can build on the established infrastructure, leveraging existing systems such as legacy mainframes and PCs. Far from requiring companies to abandon past investments, Java helps to maximize the return.

Remaking the Enterprise

As just stated, the best news for CIOs is that Java delivers advantages that all systems in the enterprise can share. Leading computer platforms

(Windows, Macintosh, UNIX, OS/2) will soon feature built-in Java support. A groundswell of supporting applications and Java development tools is appearing in Java time, alleviating many of the complications that usually slow implementation of leading-edge technologies. For example, IBM has announced it is rewriting its development libraries in Java. In fact, nearly all of the software industry has licensed Java, has committed to use it or is performing extensive Java evaluations. According to the Forrester report, "By year-end 1997, Java will have been used to create at least 60% of Internet Computing applications — an astonishing ramp for any new language."

Indeed, a growing number of Global Fortune 1000 corporations have embraced Java as a facet of their enterprise computing systems. Many are now designing large-scale Java applications to serve thousands of users. These are not simple



applets for enhancing Web pages; they are full-fledged mission-critical applications that adopters believe will change the way business is done in their industries and confer significant competitive advantages. For example, National Semiconductor is using Java as a way to keep the entire company and its partners up-to-date — online — about the company's latest parts inventory. Many other companies are using Java as their secret weapon to cut costs and improve efficiency.

Java Devices Emerging

Today, Java Computing is making its mark on the corporate enterprise in two basic ways. First, as the foundation for streamlined applications running primarily on existing systems, as described in the previous paragraph. Meanwhile, a growing number of firms in industries such as telecommunications, transportation, finance, banking, healthcare and retail are

planning to combine the open networking approach of Java with new Java thin clients. To these companies, moving computing from desktop-centric to network-centric offers the greatest benefits of all. Various industry analysts put the cost of ownership of PC networks between $12,000 and $15,000 per year per seat. While the two companies that control the PC platform — i.e., its base hardware and software — argue that the selling price of PCs is shrinking, many users wonder why they are not addressing the cost-of-ownership issue. For some, the lack of a compelling, believable argument has led them to look in new directions.

Particularly for applications where a PC is too complicated and expensive to operate, Java Computing devices deliver a powerful new option. Sun estimates based on extensive study by its CIO reveal that Java devices cost only $2,500 per seat per year, vs. $11,900 (one of the most conservative estimates; this one from Gartner Group) for conventional fat clients such as PCs. The savings stem from a variety of sources, including the lower acquisition cost of hardware, the lower cost of developing and deploying software and the decreased system administration burden.

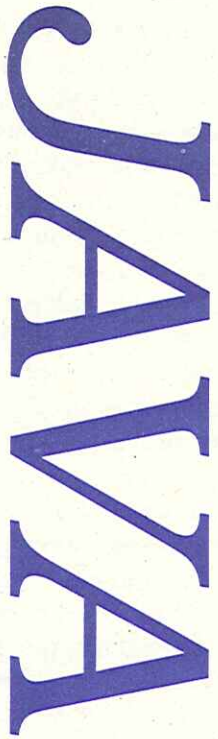
To more precisely plot the potential savings, Sun sought feedback from many customers and also studied the typical enterprises — larger Fortune 1000 companies with several hundred thousand nodes — where interest in Java Computing is currently the greatest. According to their internal studies, many of these customers ultimately intend to convert as much as 90% of all their existing desktops to Java devices. While Sun was pleased over these enthusiastic plans, we decided to use very conservative estimates to develop a savings metric: we based calculations on an organization in which 100,000 of the corporate nodes — existing PCs and new nodes planned for very-near-term installation — were among the first wave of likely candidates for conversion. Next, we estimated a conversion rate of 75% among these candidates only, which was quite moderate based on customer feedback. Finally, we used total-cost-of-ownership figures of $2,500 (see above) for Java devices versus $10,000 for fat clients. The latter figure is

The calculations revealed that the amount of money a company could save using Java Computing is staggering — $562.5 million annually for this theoretical 100,000-potential-nodes corporation.

Dedicated applications where a company is currently using dumb terminals, PCs or no system at all make up this first wave for Java Computing devices in the enterprise. But few observers expect Java Computing to stop there. Many CIOs who have seen these Java devices at work might well decide that further savings and efficiencies can be made by adopting this paradigm in

other places in the enterprise. And as the expected flood of Java applications appears, the options will increase. For example, Java-based word processing, spreadsheet and presentation applications are under development by at least three major vendors and are expected soon.

Many major ISVs are revamping their enterprise applications using Java, such as Oracle, SAP, PeopleSoft, Baan, Dun & Bradstreet and others. In addition, some analysts and users are saying that the future of network management is Java — specifically, Java-based tools for remote device control via the Web. For example, UB Networks just introduced a Java product for this purpose. The message is clear: huge amounts of software based on Java will be available. In fact, at the end of August 1996, there were 300 commercial applications from ISVs listed in Sun's Java catalog; hundreds of additional applications are presented to Sun by their developers for inclusion each week. And thousands of free Java applications and applets are available on the Web.



After Java devices expand their role in the enterprise, what comes next? The third wave will be a migration of Java Computing beyond the corporate IT world, into games, cellular phones, beepers, set-top boxes and other devices. And this phase will likely unfold in Java years. Already, Corel has announced plans to develop a Java-based handheld organizer with Internet functions that could appear by late winter or spring.

The Benefits of Java Computing

The Java revolution has created the first true, platform-independent computing solution in the enterprise, which also leverages today's most promising development, the Internet. Java Computing is moving into the business world

from both ends simultaneously — via thousands of programmers captivated by the many features of Java, as well as via far-sighted CEOs and CIOs who want the enormous cost-saving benefits of Java Computing now. And they aren't alone. A fast-growing army of analysts and consultants is beating the Java drum. Richard Finkelstein, president of Links Technology Corp. in Chicago, publicly predicts that the new paradigm "will displace PCs as the preferred desktop machine for large organizations and home users." He believes this network computing solution "will be accepted as a mainstream alternative to PCs within three years."

Given the significance of Java Computing, its key benefits need to be understood by everyone. How is Java Computing going to change the enterprise?

Java Computing Changes the Balance of Power in the IT Industry

Java Computing is the key to transparent, universal connectivity and information exchange — the "one world, one network" vision. It is likewise the missing ingredient needed to realize the much-anticipated merging of computing, telephony, publishing/media and entertainment. Networking technology has aspired toward these goals for years, but has been stymied by the incompatibility of computing platforms. Disparate computer systems and other incompatible devices prevented smooth and seamless interaction across and among enterprises and systems. Users and applications have remained isolated on their own networks, crossing technological boundaries only with difficulty. Java is the bridge and the great equalizer, a universal language that allows all kinds of systems to talk to each other and share applications. That's because Java is platform independent. It allows the same applications to run on every kind of device: PC, Mac, UNIX machine, set-top box, PDA, cellular phone, even smart appliances. For example, in corporations, no longer will users be frustrated because some PC applications are not available to all of them, since the non-heterogeneity of PCs means some applications may need to be ported, or are too expensive for wide deployment.

At the enterprise level, Java represents the next stage in the evolution of distributed computing. First came terminal/host networks with a big centralized brain and many dumb terminals. These were largely replaced by a decentralized collection of more-or-less discrete desktop systems with processing power and data localized and isolated. (Note that even when such desktop systems were linked by a local area network, they were still highly autonomous, with their own software, data and administration needs.) Both approaches have their

strengths and drawbacks. The terminal/host approach made for greater control and easier administration, and provided the huge storage and processing capacity to handle massive databases and other monster applications. Desktop systems are more flexible, more responsive to the user and have friendlier interfaces, but make management difficult and lack the horsepower and storage needed for the largest tasks.

Java represents a new, more fluid model in which processing power and software functionality are distributed where they're needed when they're needed, in just the right measure. Processing is neither entirely centralized nor entirely localized: it's flexibly distributed depending on the requirements of the job. Where appropriate, companies can use stripped-down Java devices with lower-performance processors that leave storage and some heavy-duty computation to the server. The client simply downloads Java applications as the occasion demands. There's no need for large memories and disks, since the client doesn't have to host huge, multi-megabyte application programs. On the other hand, there is also a place for "fat" clients such as workstations and PCs in tasks that require local processing muscle. Take the example of complex graphics rendering, where the need for instantaneous response demands that the graphics machinery be located on the desktop close to the display screen.

JAVA

Java Computing Changes the Cost-of-Ownership Equation on the Desktop

Java remedies the increasingly critical and crippling problem in corporate system administration. PCs, initially so liberating, have grown into an MIS nightmare — myriad independent systems and data that have to be individually updated,

managed, maintained, backed up and reconciled. As previously mentioned, in Gartner Group's conservative estimate, PCs cost companies $11,900 per seat per year. Many corporations are now convinced they can't keep proliferating desktop PCs while keeping costs down. Nor do many of them believe that the upgrade roller coaster makes their organizations more productive. The ugly little secret of PC corporate networks is that sales to businesses have been going down since November 1995, as reported by Computer Intelligence. Companies are stepping off the PC upgrade chipmunk wheel and expanding their spending in areas like intranets and training, instead.

In the Java scenario, businesses no longer individually tend to a huge population of isolated PCs, each burdened by an ever-growing quantity of bloatware — as seen in fat new operating systems and tubby new revs of applications. Rather, information and software reside mainly on servers and are delivered on-demand to the client. Maintenance efforts can concentrate on the relatively few servers, which can be backed up, updated and managed efficiently from one central point. The prospect of this centralized administration — much simpler, far less costly — has persuaded a growing number of companies to trade dedicated PCs, such as those used by call-in support staff, ticketing agents and service desks, for inexpensive Java devices. Those in this first wave of Java Computing estimate they'll save hundreds of thousands or millions of dollars annually in administration costs.

In much the same way that it eases the predicament of MIS managers and system administrators, Java makes life much easier for end users, who have previously had to become self-schooled experts just to keep their PCs up and running. Chasing down bugs, installing and upgrading programs, managing data and rebooting crashed systems several times a day consume hours of labor and cause endless frustration. The Java-based, network-centric model, by contrast, offers a strikingly simple alternative, in which most computing resources are maintained on servers operated by experts. Users just plug in and do what they need to do. They don't have to worry about the underlying hardware and software technologies any more than they have to master the details of the telephone switching system when they make a phone call, or the workings of the power grid when they plug in an electrical appliance. Computing becomes much more like a public utility --convenient, reliable and economical.

Java Computing Changes the Way Programs Are Developed

Java's platform independence means software developers can create one version of an application and deploy it on a wide array of systems.

This "write once/run anywhere" ability saves companies the difficulty and time of mastering many different programming environments and tools, and it frees them from having to port software to multiple platforms. By the same token, it opens up computing platforms to a much broader spectrum of software solutions. PCs, Macintoshes, computers running OS/2, UNIX systems, or AS400s: all will have access to the same expanding universe of Java-based applications.

A common refrain among experienced programmers who have tried Java is that it is an easy language to work with and actually encourages the production of reliable code. As an object-oriented language, Java promotes reuse of code, saving time and also enhancing application reliability. Java also encourages good software engineering practices with clear separation of interfaces and implementations, as well as easy exception handling. In addition, Java's automatic memory management and lack of pointers removes some of the leading causes of programming errors.

Companies that have already developed Java Computing applications report they are seeing a two-and-a-half-time speed-up compared to those developed with conventional programming using languages like C and C++. Another development advantage of Java Computing is that with MIS staff spending up to 80% of its time maintaining fat clients, few hours are left to create the new applications that would improve efficiency in the company. And with time available, programmers will happily learn that the dynamic nature of Java means that applications can be extended and redeveloped on the fly with minimal disruptions or downtime.

Java Computing Changes the Role of Legacy Systems in an Intranet

Through platform independence, Java provides much wider access to existing legacy systems such as mainframe databases. American companies alone have spent about $1 trillion on such systems in the last few decades; maximizing the return on this investment is an overriding imperative. Traditionally, such legacy systems were designed to communicate with one kind of terminal or client, such as 3270 terminals, making access difficult or impossible for users with other kinds of systems. Java throws off this constraint.

Using Sun's Java application programming interfaces (APIs), companies and software developers can build Java-based applications that tap into legacy systems through easy-to-use browser software, offering access to anyone on the cor-

porate intranet and, if the company chooses, the external Internet as well. Opening corporate information systems to selective Internet use, in turn, gives companies a way to more fully leverage their information resources, to better serve customers and to eliminate costs. Businesses can, for instance, offer a range of self-serve applications through which customers can log on to company databases to place their own orders, do their own banking or track their own packages without need of support staff. The savings can be tremendous.

Java Computing Changes Security Requirements in the Enterprise

It is well known that with the growth of PCs in the enterprise has come greatly increased data insecurity. CIOs have long wished to eliminate the security risk posed by local access devices such as floppy disk and CD-ROM drives, which make PCs vulnerable to unauthorized use, viruses and other threats. For example, PCs have memory cells that contain the addresses of — and thus point to — other memory cells in other PCs.

Java, however, includes many security features such as strong memory protection, encryption and signatures, rules enforcement and run-time verification. For instance, using Java Computing removes the possibility that — either maliciously or inadvertently — memory locations outside the boundaries of the program can be read or corrupted. Java also supports the use of powerful encryption technology to verify that an applet came from an authorized source and has not been modified. Java also provides a run-time verification system that ensures that all applets downloaded to the client will not violate the integrity of the environment.

In addition, since Java devices get all of their programs and data over the network, they can be configured without local removable storage. In some situations, this is desirable in order to keep data within the network, or keep viruses out of the network. In essence, the network-centric nature of Java greatly simplifies security solutions. Which is easier: guarding a single server or guarding its network of individual clients?

The Bottom Line

Despite its revolutionary impact, Java is not so much a break with recent history as it is a vital piece of a puzzle that has been coming together for some time. Java completes some of computing's most important trends: the gradual linking of diverse networks; the migration of processing power from the mainframe to the desktop to the network, in search of a perfect equilibrium; the effort to balance the needs of system administrators against those of individual users.

The transition to Java, moreover, is remarkably

painless compared to the alternatives (such as Windows NT) currently facing corporate IT managers. In fact, many CIOs are asking themselves if upgrading to yet another version of a platform based on 16-year-old, single-vendor technology is the best solution for the networked age. How will this platform solve the biggest problems, which are high overall cost of ownership, incessant, expensive upgrades and a lack of heterogeneity? Instead, Java builds on and helps unify the existing infrastructure — client/server networks, diverse computing platforms, legacy systems, intranets and the Internet. Rather than adding complexity and cost, it greatly reduces both.

All of which explains why so many corporate leaders now see Java as the logical next step in their enterprise computing strategy. And why the two powerful vendors that have made unprecedented profits based on the concept of eternal customer lock-in oppose the concept of open Java Computing as presented in this paper. But two unchangeable facts about Java have limited the options of the monopolists:

- Java has long since reached critical mass in terms of the sheer volume of individual programmers, users, software development firms, hardware vendors, corporations and other key groups included among its avid supporters. It's too late to stop the tide, which is why efforts at a Java Killer to date revolve around inferior, costly, single-vendor-controlled alternatives offering few of the key benefits of Java Computing.
- Java time. Those who would kill or control Java underestimate just how quickly this revolutionary open technology is taking root in the enterprise. The biggest mistake a critic could make about Java is to assume what exists today will be the same tomorrow. Literally.

Bob Evans, editor-in-chief of Information Week, summed up the Java Computing story well in the August 12, 1996 issue: "Java is set to explode onto the enterprise-level application development scene with a suddenness that will dramatically alter the way many large organizations plan and execute such projects," he wrote. "It will do so not because it can perform tricks like animation, but because it can deliver the results that businesses need from IT systems and projects."

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Billedkodning til tiden

Søren Forchhammer og Henrik Jakobsen

I løbet af året begynder Danmarks Radio at sende digital TV. I først omgang sendes den eksisterende DR TV-kanal også i en digital version. Ud på efteråret er planen at en ny DR TV-kanal skal sendes digitalt. Dette er muliggjort af MPEG-2 standarden til kodning af bl.a. digitale TV-kanaler.

Under titlen "Kodning af information på lyd, billede samt multi- og hypermedia" arbejder en ISO underkomité med at udforme standarder til kodning af digitale billeder. Man kan i dag få en CD med både billeder i video kvalitet og CD kvalitet lyd - en video CD-ROM. Dette skyldes komitéens MPEG-1 standard til kodning af video.

Den omtalte ISO underkomité benævnes ISO/IEC JTC1/SC29. Udover kodning af både still og levende billeder omfatter komitéens arbejde den til billederne hørende lyd samt multimedie aspekter. Vi vil dog fokusere på billedkodningen i denne artikel.

MPEG - kodning af digital video og TV

MPEG står for Moving Pictures Expert Group, og består af a. 400 eksperter i transmission og kodning af video og audio. MPEG startede i 1988 med det formål at definere en standard for den kodede repræsentation af video og tilhørende audio, til brug for lagring på digitale medier. Målene var bl.a. multimedie på CD-ROM (MPEG-1), standard TV, og HDTV (MPEG-2).

MPEG-1 er nu international standard under den officielle titel ISO/IEC 11172, og består af 3 dele: transmission, videokodning og audiokodning. MPEG-1 understøtter SIF videoformat (352 x 288 billedelementer) op til en bithastighed på 1,5 Mbit/s, typisk for medier som CD-ROM og DAT. Audiodelen understøtter to lydkanaler på hver 128 Kbit/s.

Syntaksen for MPEG-1 standarden viste sig nemt at kunne udvides til at beskrive større bithastigheder. MPEG-2 skulle omfatte generisk kodning af video og tilhørende audio, med bithastigheder op til 100 Mbit/s. MPEG-2 består i dag af 9 dele, hvoraf de første 5 er internationale standarder under den officielle titel ISO/IEC 13818. Disse 5 omfatter transmission, videokodning, audiokodning, overensstemmelsestestning og softwaresimulation, og danner grundlag for et bredt udvalg af VLSI komponenter, der kan dekode en MPEG-2 bitstrøm. De resterende dele omfatter kontrol af det digitale lagermedie samt overensstemmelsestestning, ikke-bagudkompatibel audiokodning og realtidsinterface.

MPEG-2's generiske egenskaber er opfyldt ved en høj grad af skalerbarhed. Dette opnås ved at definere et antal profiles og indenfor hver profile et antal levels. Levels er begrænsningen på de parametre, der angiver kvaliteten af den originale video (antal billedelementer og antal billeder pr. sekund), og er inddelt i 4 grupper: Low (352 x 288 billedelementer x 25 billeder pr. sekund), Main (720 x 576 x 25), High-1440 (1440 x 1152 x 50), og High (1920 x 1152 x 50). Desuden understøtter alle levels både PAL- og NTSC-billedfrekvens på henh. 25 og 30 billeder pr. sekund. Profiles angiver en delmængde af den fulde syntaks for MPEG-2, og er inddelt i 5 grupper: Simple, Main, SNR, Spatial og High. Disse 5 angiver hvordan video-bitstrømmen er kodet, og er implicit en angivelse af kompleksiteten i (de-)kodningen. Videokodningen omfatter 3 typer billeder: I-, P- og B-billeder. I-billeder er intrakodede billeder, P-billeder er predikteret ud fra I-billeder, og B-billeder er bidirektionelt interpoleret ud fra P- og/eller I-billeder. I profile simple anvendes kun I- og P-billeder, og i profile main anvendes alle 3 typer. Dette har muliggjort at VLSI chips har kunnet udvikles relativt hurtigt til profile simple, og derefter videreudvikles til profile main, hvor der i dag findes et stort udvalg. For de øvrige 3 profiles udnyttes en lagdeling i videokodningen, hvor et basislag giver den basale information nødvendig for at opbygge videobilleder, imedens enhancement layers giver information, der forbedrer kvaliteten af det dekodede billede. Dette muliggør at mindre komplekse dekodere også kan vise video, der er kodet efter de mere komplekse profiles, ved kun at bruge informationerne i basislaget, og omvendt kan mere komplekse dekodere vise video kodet efter mindre komplekse profiles uden den kvalitetsforbedrende information. Skalerbarheden giver mulighed for tilpasning til det digitale medies båndbredde, således at der er rige muligheder for at finde et kompromis imellem billedkvaliteten og den båndbredde, der er til rådighed.

Billederne i en MPEG billedsekvens kodes blokvis. Til højre for billederne (Red. er kun vist i den trykte udgave) er vist hvor mange bit der er brugt på hver blok i billedet. Billede 1 er kodet uafhængigt af andre billeder. Billede 2 er bevægelses kompenseret med billede 1 før kodning. Det ses (på bitmønstrene til højre) at der kræves færre bit efter bevægelses kompensationen.

MPEG-2 audiodelen omfatter 3/2 stereo, dvs. surround sound med 3 fronthøjtalere og 2 baghøjtalere, der sendes med 128 Kbit/s pr. kanal. Desuden kan der anvendes en ekstra kanal til at transmittere meget lave frekvenser (15-120 Hz) til brug for specielle effekter med f.eks. en subwoofer højtaler. Denne kanal svarer til filmindustriens digitale systemers lavfrekvente kanal. For de 5 almindelige lydkanaler anvendes sample frekvenser på 48.0, 44.1 eller 32.0 kHz, med kvantisering op til 24

bits/sample i PCM. Audiodelen vil formentlig få en udvidelse, der ikke er bagudkompatibel, som bliver baseret på Dolby AC3 systemet.

Transmissionssystemet giver mulighed for at sende databitstrømme parallelt med video- og audiobitstrømmene. Det kan anvendes til f.eks. tekst-tv, men også nye og mere avancerede services som elektronisk programguide m.m. Inden for kort tid vil MPEG specifikationen for kontrol af det digitale lagermedie (kaldet DSM-CC) blive international standard. Denne standard beskriver samspillet imellem MPEG-2 dekoderen, lager-/transmissionsmediet, samt de serviceudbydere, der genererer MPEG-2 bitstrømmene. Standarden danner bro imellem MPEG bitstrømmene og MHEG multimedie standarden.

Standarder til kodning af digitale still billeder

MPEG koden og udviklingen deraf baserer sig i høj grad på JPEG standarden til kodning af still billeder. MPEG kan også beskrives som JPEG kodning af bevægelses-kompenserede billeder, så det kun er forskellen fra billede til billede der kodes. (JPEG standarden blev beskrevet i IT Standardnyt, Sept. 1993.)

JBIG standarden blev udviklet til kodning af FAX billeder og er i dag inkluderet som en mere effektiv option til tidligere FAX koder. Både JPEG- og JBIG standarden vedligeholdes i SC29-regi. Arbejdet med nyere koder til at supplere disse er dog allerede i fuld gang.

Fremtidige standarder

JPEG standarden benytter forskellige metoder til kodning af billederne med og uden tab. Kodningen med tab er udviklet så den tilstræber en visuel tabsfri kvalitet. Dvs. at forskellen med original og kodet version ikke kan ses med det blotte øje (under almindelige betragningsforhold). Ved applikationer som fx. transmission af satellit-billeder der skal anvendes i efterfølgende beregninger er en visuel tabsfri kvalitet ikke tilstrækkelig.
Transmisionsbåndbredden er kostbar og derfor begrænset. Da kompressionsfaktoren er afhængig af billedet der kodes kan koderen og forbindelsen ikke altid følge med. Dette kan løses ved at øge kompressionen på bekostning af mindre tab i billedet. Den nye standard sigter på at løse dette problem ved at have een metode som både kan kode med og uden tab og som dynamisk kan skifte mellem de to modes. Når der kodes med tab skal det kunne specificeres at disse holder sig indenfor bestemte numeriske rammer. (Arbejdstitlen er "Lossless compression of continous-tone still pictures".) Visuel tabsfri kodning med høj kompression overlades stadig til den eksisterende JPEG kode. JPEG koden er farveblind i den forstand at for farvebilleder fx. RGB-billeder kodes hver

farve(komponent) for sig uafhængig af de andre. Højere kompression kan opnås hvis man udnytter den information en komponent indeholder om de andre. Dette adresseres under arbejdstitlen "Compression of up to 5-D images".

FAX koderne er i dag tabsfrie kodere. JBIG standarden giver dog mulighed for billeder i lavere opløsning som mellemresultat. Der arbejdes i øjeblikket med at opnå højere kompression med visuel tabsfri kvalitet. Det vigtige er at bogstaverne ser rigtige ud og ikke præcis hvordan bit-mønstret ser ud hvis man tager en lup frem. Med udgangspunkt i denne umiddelbare iagttagelse har man i over 20 år arbejdet med at erstatte bogstaverne i fax-billeder med bit-mønstre som man så har kodet. Problemet har dog været at ombyttes bare et bogstav per side vurderes det som værende for usikkert til at anvendes. Problemet synes dog løst i forbindelse med det igangværende standiseringsarbejde.

Arbejdet i MPEG er nu gået ind i en fase, hvor en stor del af gruppen koncentrerer sig om MPEG-4, der bliver en standard for video-/audiokodning med meget lav transmissionshastighed, til brug for billedtelefonmøder/-konferencer og lignende. Dette opnås ved færre billeder pr. sekund og færre billedelementer, og ved at anvende en kompressionsalgoritme, der baseres på objektkodning, dvs. at opdele billedet i objekter og baggrund, således at baggrunden kan opdateres med lav frekvens, imedens objekterne opdateres hyppigere.

Det er hidtil lykkedes at komme med billedkodningsstandarderne tids nok. Dette er fortsat et mål som ligger SC29 komitéen meget på sinde, og som den store aktivitet omkring nye projekter vidner om.

Referencer

- DS/ISO/IEC 10918 Informationsteknologi. Digital datakomprimering og kodning af halvtone fastbilleder. (Bedre kendt som JPEG.)
- DS/ISO/IEC 11544 Informationsteknologi. Kodet repræsentation af billed- og lydinformation. Progressiv bi-level billedkompression. (JBIG)
- DS/ISO/IEC 11172 Informationsteknologi. Kodning af levende billeder og tilhørende lyd til digitale lagermedier op til 1,5 Mbit/s. (MPEG-1)
- ISO/IEC 13818 Generic coding of moving pictures and associated audio information. (MPEG-2)
- ISO/IEC 13522 Coding of multimedia and hypermedia information. Part 1: MHEG objects representation - Base notation (ASN.1) (MHEG)
- Digital kompression af lyd og billeder. IT Standardnyt. Feb. 1994, pp. 6-8.
- Nye standarder til kodning af billeder. IT Standardnyt. Sept. 1993, pp. 3-5.MPEG

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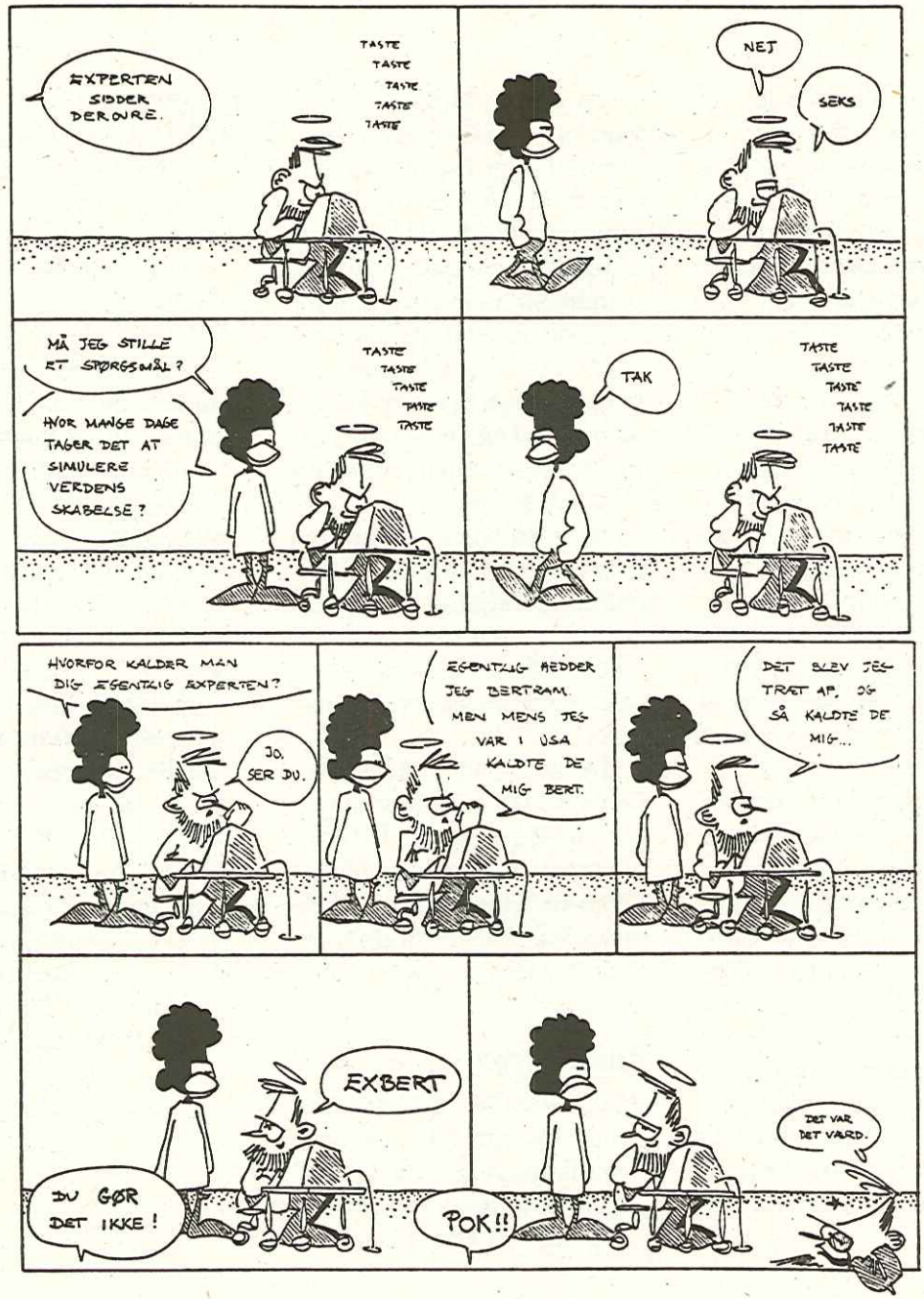
EXPERTEN SIDDER DERNÆRE.
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JO, SER DU.
EGENTLIG HEDDER JEG BERTRAM. MEN MENS JEG VAR I USA KALDTE DE MIG BERT.
DET BLEV JEG TRÆT AF, OG SÅ KALDTE DE MIG...
EXBERT
DU GØR DET IKKE!
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DET VAR DET VÆRD.

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afholder

Ordinær generalforsamling
Torsdag den 28. november 1996

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Dansk UNIX-system Bruger Gruppe
DKUUG, sekretariatet
Fruebjergvej 3
2100●København Ø
Tlf. 3917 9944
Fax 3120 8948
Email: sek@dkuug.dk
Man - fre kl. 9 - 16.00

Redaktion

Gitte D´Arcy (ansv.)

DKUUG-Nyt
Fruebjergvej 3
2100●København Ø
Tlf. 3917 9944
Fax 3120 8948
Email: dkuugnyt@dkuug.dk

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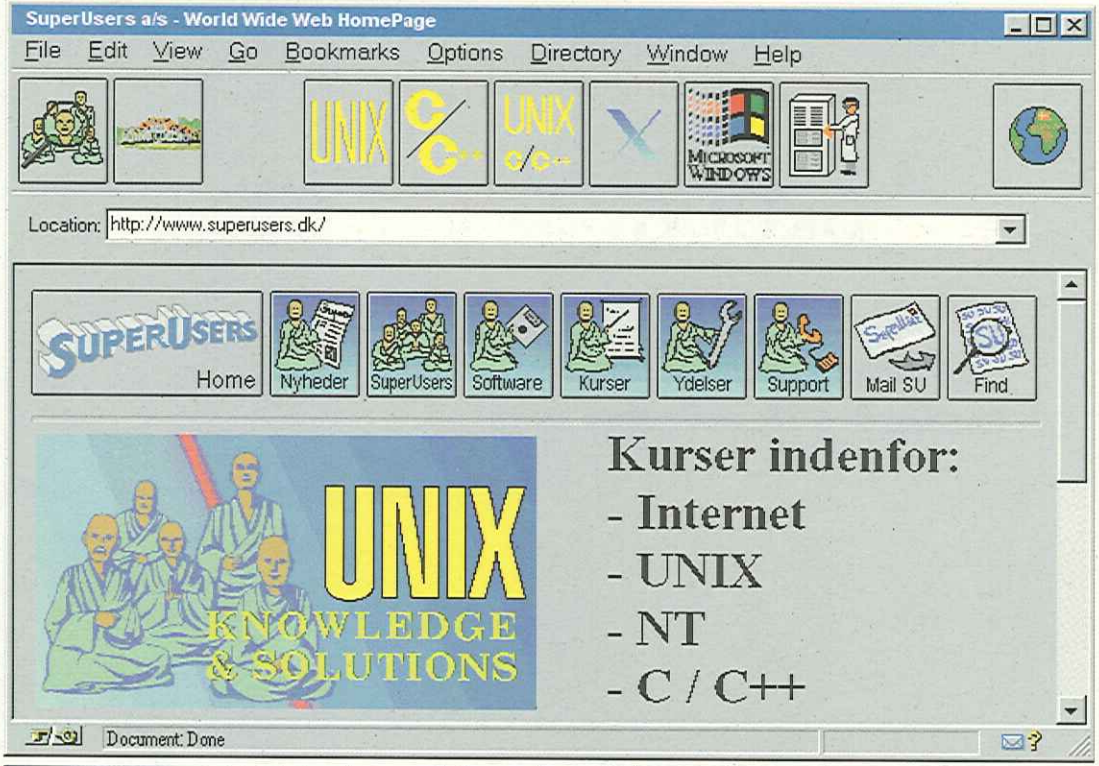

INTERNET	NOV.	NOV.	DEC.	DEC.	JAN.
SU-140 Internet Grundkursus					30-31/1
SU-142 Internet Systemadministration		18-21/11			
SU-144 Internet Homepage Redaktion			16-17/12		
SU-147 Internet Java Programming Basics	4-5/11				
SU-148 Internet Java Programming Advanced	6-7/11				
UNIX / NT					
SU-100 UNIX Grundkursus	11-14/11	18-21/11	2-5/12	9-12/12	6-9/1
SU-110 UNIX Systemadministration		18-21/11	2-5/12		13-16/1
SU-500 NT Grundkursus	4-5/11	25-26/11		16-17/12	16-17/1
SU-510 Supporting Windows NT	11-14/11			9-12/12	6-9/1

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EMAIL: katalog@superusers.dk
URL: http://www.superusers.dk

SuperUsers a/s
Karlebogaard
3400 Hillerød
TLF: 4281 0706
FAX: 4218 0705