

# InfoWorld

## 2006

# TECHNOLOGY

## OF THE YEAR

## AWARDS

**I**N BROAD STROKES, 2005 WILL BE REMEMBERED for the emergence of multicore CPUs, the rise of enterprise x86, and even the quiet realization in datacenters throughout the land that CPU virtualization works wonders. But these weren't the only technologies making waves. The year also brought important — if perhaps more subtle — progress to nearly the entire IT landscape. *InfoWorld*

followed the action, analyzing the advances and lifting the hood on the latest innovations. What will be the most meaningful developments in 2006? What were the best products of 2005? Read on to find answers to these questions and more.

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# Sun delivered a much-needed jolt to its x86 and SPARC server base with Solaris 10.

## SYSTEM ARCHITECTURES

### Fast Times for Industry-Standard Hardware

AMD-Intel battle promises more cores, denser servers, and surprises

IF 2004 WAS THE YEAR THAT AMD'S 64-BIT x86 technology caught the attention of IT, then 2005 was the year that AMD began reaping the benefits of being noticed. In April 2005, AMD transitioned its Opteron server CPUs from single to dual cores, clearing the path for eight-way servers with the same footprint and power consumption of four-way machines. Budget-sensitive buyers were thrilled with affordable quad servers that occupied a single rack unit, and AMD's share of x86 server sales passed the 10 percent mark.

This triumph of technology over marketing seems uncharacteristic of an IT market that is often slow to embrace new technology. A key enabler in AMD's growth was the market's acceptance that CPU clock speed is useless as a core criterion for selecting x86 servers. Instead, factors such as acquisition and operating costs, expandability, and throughput — areas in which AMD leads — have been elevated to the top of the list.

Also key to AMD's surge has been the company's refusal to give ground to Intel in any area of technology. Intel expended considerable money and energy touting the fast, scalable PCI Express expansion bus as a differentiator, but it took no time at all for AMD servers to take up the PCI Express bus as a standard. Intel's vaunted advances in front-side bus clock speed impress only when compared with prior Intel architectures; AMD servers integrate the features of the front-side bus into the CPU, leaving Intel's technology at a disadvantage.

In 2006, the arrival of four cores, hardware-assisted virtualization, and Intel's stop-gap fixes to its squeezed shared

bus are sure things, but trench warfare between AMD and Intel will mean flexible road maps and, we think, the vendors holding back the most interesting bits as trade secrets. The first one or two quarters will play out as planned, but third quarter 2006 through first quarter 2007 will be a hootenanny.

Sun's low-power, low-clock-speed Ultra-SPARC T1 (code-named Niagara) — an eight-core, 32-thread CPU — foreshadows some of Intel's approach in 2006. Multiple cores and threads running simultaneously

equates to more work per clock tick, and slower clocks mean cooler chips, an Intel objective that makes us very happy. Intel would also do well to address its trailing math performance, but its traditional passion for large cache — and for getting ahead of AMD on cores per chip — will probably win out as they're sure attention-getters in competitive ads.

Meanwhile, AMD is heading for the big iron and the Fortune 100. Intel will force AMD to focus on maxing out cores per chip, but while that horse race goes on,

## OPERATING SYSTEMS

### Vendors Prep for Next-Gen Hardware

Windows, Linux, Solaris embrace x64, leave the polish to Apple

IT ORGANIZATIONS USUALLY STAY LOYAL to the OS choices they make, but every once in a while, vendors and projects yield a bumper crop of OSes so compelling that the strength of ties binding IT to their chosen operating systems are tested.

Evolution of the Linux 2.6 kernel continued to accelerate in 2005 with the delivery of four significant milestone releases. A relatively new Linux distribution, Ubuntu, is rapidly gaining devotees with its promise to supply a commercial-grade OS without setting aside enterprise features for a commercial release. Sun Microsystems delivered a much-needed jolt to its x86 and SPARC server base with Solaris 10, providing stiff competition to Windows and Linux for the 64-bit x86 platform. Microsoft was

particularly busy in the past year as well, with the hallmark being the long-awaited delivery of native 64-bit editions of Windows Server 2003 and Windows XP.

While all of these new operating systems delight for their attention to enhancing stability and technical features, we found only one — Apple's OS X v10.4 Tiger — that addresses productivity at the client and server level in ways that dig much deeper than Apple's trademarked glitz.

That Tiger, from kernel to browser, makes the Mac give-to-your-grandmother easy goes without saying. But Tiger also strikes us as the first major release of a desktop OS in which the new features are targeted mainly at professional users.

Spotlight's metadata-based, content-

AMD will play its extraordinary advantage in memory controllers, I/O buses, and CPU interconnects. With 20 percent of the server market next year, even more strength in desktops, and tight relationships with ATI and NVidia, AMD will have the clout to get direct HyperTransport peripherals made.

Finally, AMD will have the ability to put a 32-way Opteron server in a 3U chassis, with the power consumption of an eight-way server, as soon as AMD and one of its key OEMs see a market for it. Intel and AMD are pulling in their cards and are leaving us all guessing, but what's sure is that 2006 and 2007 will leave us with a choice of x86 technologies born of brutal competition in engineering and price.

— Tom Yager

#### AWARD WINNERS

##### Best Enterprise Server

###### IBM eServer OpenPower 710

Multiprocessing powerhouse with excellent fault-tolerance features

##### Best Industry Standard Server

###### HP ProLiant DL585

Outstanding out-of-band management and serviceability

##### Most Innovative Server

###### Sun Fire T2000

Eight-core, cool-running UltraSPARC T1 changes the math for threaded performance and power consumption

##### Best Blade System

###### ClearCube PC Blade System

Innovative hardware and powerful management software for high-availability workstations

##### Best Workstation

###### Apple Power Mac G5 Quad

Dual-core PowerPC system boasts impressive hardware specs, sub-\$5,000 price tag, and the magic of OS X

aware, pervasive, rapid, intelligent file searching is wasted on a machine with only a few hundred files, but it is a boon for professionals for whom the volume and poor organization of their data drags on their productivity like an anchor. Spotlight scans the contents and metadata of most types of rich documents in a flash, and it incorporates e-mail, calendar, and contact data in every search.

Day-to-day work with a client system isn't just about data, but the way it's passed from one stage in a workflow to another. OS X's Automator gives users the ability to capture and distill multistep operations that cross application and vendor boundaries into one-click desktop workflows. Automator leverages facilities already in OS X for transparent systemwide application integration, which Apple considers an essential OS-level service.

And that's just the client side. For its part, OS X Server v10.4 also stands alone in its class, being the only full-power, undiluted,

fully extensible, open, and standards-based commercial OS that emerges from the box in a true turnkey state. We don't use the term "turnkey" to mean locked down; OS X Server wraps best-of-breed, commercially validated open source services in a powerful management GUI for local and remote management and monitoring of hardware, services, and client system policies. Whatever you don't find in Tiger you can pull down as open source and build, or buy from commercial vendors, including Oracle and Tibco. And here's one feature Windows can never match: OS X's kernel is open source as well.

The only limitation to OS X is that it won't run on any system that doesn't bear Apple's brand. For many, that's a deal killer, but for others, OS X is enough to pull them into the Mac.

2006 will host the debut of Windows Vista, the first major update to the Windows client OS since Windows XP. Vista looks like Microsoft's best effort to trans-

plant OS X's legendary usability, productivity, visual appeal, and developer enthusiasm into Windows without sacrificing Windows' massive application library. There will be plenty of action on the server front as well, but the battle between Apple and Microsoft will be the one to watch.

— T.Y.

#### AWARD WINNERS

##### Best Server Operating System

###### Mac OS X Server v10.4

A powerful, extensible Unix server with a uniquely robust set of standard features

##### Best Client Operating System

###### Mac OS X v10.4 Tiger

A rich and friendly desktop operating system built with professional users in mind

# Internal networks continue to get faster every couple of years, but WANs remain slow and expensive.

## VIRTUALIZATION

### Widespread Adoption Awaits Help From the Hardware

Hardware-assisted CPU virtualization will bring big-iron adaptability to x86 enterprises

2005 WAS A TRAINING YEAR FOR THE X86 virtualization race just around the corner, or rather, the quarter. At present, virtualization is primarily associated with carving one physical computer into multiple independent virtual systems. Virtualization is also providing a mechanism for helping shops that, overnight, watched their 1U rack boxes bloom into four-way servers, enabling them to carve up server resources into units of one or two CPUs each so they can be managed in a familiar way.

The introduction of Windows XP and Windows Server 2003 x64 Editions precipitated the greatest need for x86 virtualization. Many Windows applications, including Microsoft's own, can survive only in a 32-bit universe. Virtualization mocks up that smaller universe, yet allows 64-bit applications to run natively, albeit more slowly, thanks to the overhead of the virtualization runtime.

Did we say "more slowly"? We meant to say "a lot more slowly," a fact that explains why x86 virtualization has never been a must-have. Turning one speedy Xeon into two or three Pentium Pro-grade systems doesn't grab the imagination. If hardware-accelerated virtualization features that Intel and AMD will bake into their CPUs in 2006 live up to our hopes, virtualization will be far more commonplace.

Beyond the world of Linux under Windows and Windows under Windows is another level of technology — enterprise virtualization — that has very little in common with the hosted variety. Embodied in VMware's ESX Server and VirtualCenter, enterprise virtualization pools CPU, memory, networking, storage, and application resources.

Ordinarily, when you buy a new rack server, you load it with a static software image and assign it a fixed, likely permanent role. With enterprise virtualization, adding a rack server adds that new server's internal resources to an enterprisewide pool that's shared among all tasks and which you provision and reprovision to suit you. In addition to the fine-grained load balancing and ad hoc clustering that the solution brings to mind, relocating a server to another building on campus (or

even to a partner's site) is reduced simply to pointing and clicking or working on a few lines of script code. The actual server can live anywhere. And the disk storage that each virtual server sees as local can be pulled together from multiple sources on the network.

When someone calls you to request a new server, you sit down at your desk and build a server or cluster that matches his or her requirements before you hang up the phone. If a demanding application

## NETWORKING

### Traffic Optimization Takes Center Stage

Speeding up WAN links gets priority over IPv6, 10GbE, VoIP

IN MANY WAYS, 2005 WAS A "SO WHAT?" year for networking. After all, anyone who expected major breakthroughs on a number of key issues ended the year sorely disappointed. There's been little progress on IPv6 adoption, the United States is still claiming it owns the Internet, wireless networking made little progress on fronts political or technical, and IP telephony remains hot — though whether VoIP's future lies in hardware, software, or both is still a topic that will drive a conference panel, or three, for years.

Nevertheless, the year wasn't a complete loss. For starters, PBX vendors such as Avaya, Cisco Systems, and Siemens have added improved SIP hardware to their product lines. Although complete cross-vendor interoperability is still a

pipe dream, it's now possible to deliver basic functionality without pulling out all of one's hair.

On the 10 Gigabit Ethernet front, switch vendors kept increasing their product offerings. Much of the buzz surrounding 10 Gig revolves around its potential as an infinitely less-expensive substitute for SONet (Synchronous Optical Network) in metropolitan networking schemes. Analysts, however, are pointing out that ever-increasing backup requirements in the datacenter might make the business case more plausible.

But the networking technology that defined 2005 is traffic optimization. After all, few application-layer protocols were designed to run across the WAN, especially when they were developed

bogs down others sharing the same server, you pick up its virtual machine instance, while it's still running, and drop it onto another physical server with more available resources. Users have no idea that SAP has just teleported down two floors. All they see is that it's running smoothly again, without missing a beat.

In 2006, the addition of hardware acceleration to AMD and Intel x86 processors will expand the market for virtualization. Microsoft has already moved Virtual Server 2005 closer to being a standard part of Windows Server operating systems, with licensing that permits running multiple instances of Windows on a single machine at substantially reduced license costs. This will put the pinch on VMware's

**AWARD WINNERS**

**Best Server Virtualization**

**VMware ESX Server and VirtualCenter**

Dynamic duo points to new possibilities in datacenter management

**Best Workstation Virtualization**

**VMware Workstation 5.5**

An indispensable companion to software developers and testers

GSX Server, but ESX Server will become the foundation of a lucrative services franchise. Contracts for deployment and

management of large virtualized enterprises will be the brass ring in consulting for the coming year, but we hope to see a strong counter to this in the form of Xen and other open source solutions.

Apart from performance, a primary benefit of hardware acceleration for x86 virtualization is that it will be far easier for developers to work with than the torturous software-only approaches required for current x86 architectures. If you're looking at anything less than ESX Server's full enterprise solution, we recommend that you wait until AMD and Intel bake virtualization into their CPUs. When the hardware's ready, download a trial and see why we think 2006 will be the year of the virtual x86.

— T.Y.

with a certain monopoly OS in mind. The trick in most cases is to keep redundant requests on the local network, passing on only the meaningful parts of the TCP-level conversation.

Fortunately, creating the network equivalent of carpool lanes with technologies such as QoS actually works. Prioritizing traffic as a set of higher-layer protocols isn't itself a new idea; the problem has always been implementing the concept, followed by the actual management of the traffic — including the inevitable breakdowns. The initial efforts in recent years led to single-role appliances, which initially have met with warm receptions — in the cases where the traffic proved amenable to the individual boxes' specialties.

But the one-box solutions that companies such as Juniper, Riverbed, and Swan Labs are turning out appear to be the wave of the future.

By combining caching, compression, and acceleration — at both the application and TCP levels — into a single chassis, these products appeal to the natural desire to

reduce complexity, even if they might seem to violate a cardinal rule of network management: Isolate it.

— P.J. Connolly

**AWARD WINNERS**

**Best Enterprise Switch**

**Cisco Catalyst 4500 Series Supervisor Engine II-Plus-10GE**

Wire-rate 10-Gig switching and granular QoS support for the edge

**Best SMB Switch**

**Dell PowerConnect 3424P**

Delivers an array of enterprise-class features in a tidy package

**Best WAN Traffic Manager**

**Packeteer PacketShaper 9500**

The Cadillac of QoS for WAN circuits, topped by extensive reporting

**Best WAN Accelerator**

**Riverbed Steelhead 3010**

Amazing caching and optimization overcome chatty apps and slow links

**Best IP PBX**

**Siemens HiPath 8000 Real-Time IP System**

Full-featured, scalable phone system set the standard for SIP support in our test

**Best Network Analysis Tool**

**Niksun NetVCR 2005**

A complete network analysis package that never forgets

**STORAGE**

## Vendors Look Beyond Blocks and LUNs

Innovations, acquisitions address the need for smarter storage

NO SINGLE STORAGE TECHNOLOGY STOLE the spotlight in 2005, but the year was nonetheless an exciting one that featured new products in areas such as data protection and virtualization as well as important developments in disks, tapes, and switches.

For example, a number of 4Gbps FC (Fibre Channel) products, including host adapters, switches, and disk arrays, proved that the technology is ready to be installed in every corner of your SAN. And by the end of the year, most disk vendors had released drives with 500GB capacity, increasing the previous maximum by 25 percent.

Shopping for disk arrays has never been more challenging, thanks to an unprecedented array of choices ranging from impressive entry-level units (Dell/EMC's AX100) to top-tier models (Hitachi's TagmaStor and EMC's Symmetrix DMX). Innovative products from new vendors such as Compellent and Pillar Data Systems proved that you can teach an old technology new tricks. This year the combination of high-capacity SATA and high-performance SAS (Serial Attached SCSI) drives will create versatile enclosures that are easy to adjust for varying capacity and performance requirements.

The term "virtualization" has no doubt been overused, but during 2005, various twists on the technology flourished in the storage arena, bringing us virtualized tape libraries, LUNs (logical unit numbers), and file systems. For example, EMC finally revealed its strategy in network storage virtualization, based on its own box, Invista, and intelligent switches from the triad of major vendors. QLogic played quick catch up in that space, pur-

chasing Troika's hardware acceleration and virtualization platform, and Network Appliance also introduced virtualization capabilities.

And just about every major vendor is adding virtual tape products to its portfolio, often combining basic backup functionality with other data-protection or data-migration features. Acquisitions played a big role in 2005; many of them, such as Sun's purchase of StorageTek and NetApp's nabbing of Decru, suggest the tides of data protection, compliance, and security will continue to rise this year.

Similarly, Hewlett-Packard's acquisition of AppIQ should stoke the fires of competition in SAN management and better position HP against competing solutions from rivals such as Computer Associates and Symantec/Veritas.

All things considered, it is reasonable to expect this year's storage solutions to be more secure, scalable, and easy to manage. But focusing only on those traditional aspects would be to miss an important part of the story. Storage vendors are once again becoming more attentive to customers' real, app-driven needs, giving them powerful and scalable file systems rather than merely serving blocks and LUNs.

This is the reason behind acquisitions such as EMC-Rainfinity and NetApp-Spinnaker and alliances such as HP-PolyServe. These partnerships all combine different technologies, but they share in common a view of storage as a large, flexible repository of files, and the desire to make underlying technical differences disappear. Not a bad goal for storage vendors, and good news for storage customers.

— Mario Apicella

**AWARD WINNERS**

**Best SAN**

**Compellent Storage Center QuickStart**

Extensive management, strong performance and scalability, and great ease-of-use

**Best iSCSI SAN**

**EqualLogic PS200E**

A well-designed and superbly executed storage array

**Best Director Switch**

**McData Intrepid i10K Director**

Fabric partitioning and long-haul connectivity take the sting out of distributed SANs

**Best NAS**

**NetApp FAS3020c**

Solid performance, flawless fail-over, and exceptional scalability

**Best NAS Killer**

**HP StorageWorks Enterprise File Services Clustered Gateway with PolyServe Matrix Server**

Brings the processing power and high-availability of clustering to Linux and Windows

**Best Storage Management Software**

**HP Storage Essentials 4.0**

Accurate discovery, powerful provisioning, and seamless support for heterogeneous hardware

**Best Storage Virtualization**

**EMC Invista**

Preserves investments in existing hardware without sacrificing manageability or performance

# We now have the entire middleware market, including IBM, moving to the ESB model.

## APP DEV

### Tool Vendors Focus on Team Process and Code Quality

Static code analysis, role-based IDEs, threading on the rise; Visual Studio transformed

IT WAS A YEAR THAT SAW THE RESURGENCE of old tools and the redesign of new ones. Static code analysis, which was abandoned long ago, became the latest craze in 2005 following concerns about security, code quality, and code ownership. Today, impressive offerings in all three areas are available; 18 months ago, the vendors themselves barely existed. Likely, these products will coalesce and one or two packages will emerge that can perform all three forms of code analysis.

Despite only a minor update in 2005, the much-heralded, oft-awarded Eclipse project enjoyed a breakout year, attracting partners and inducing them to forgo their IDEs in favor of Eclipse plug-ins. The hold-outs — notably, Apple Computer, Microsoft, Oracle, and Sun Microsystems — showed how much can be accomplished when companies follow their own vision rather than play along as part of a consortium. Oracle did a yeoman's job revving JDeveloper 10.1.3 into one of the best free Java IDEs. And we found plenty to get excited about in Apple's Xcode 2.2, especially its new cross-platform and object mapping capabilities.

But there is no question that Microsoft's Visual Studio 2005, once known as Whidbey, is the most important release among IDEs in 2005. Technically, VS 2005 is masterfully done. Microsoft, however, earns credit not only for technology but also for the way it designed the IDE and brought it to market.

Visual Studio 2005 is made from the best stuff: the imaginations, frustrations, and workflow work-arounds of Microsoft's own developers. It dawned on Microsoft that its approach to internal development

was counterproductive. Instead of mounting its huge product line atop hundreds of reinvented wheels, Microsoft drove toward a unified, end-to-end toolset. If you want to know what developers need, ask developers.

Microsoft extended Visual Studio's reach in all directions. Developers with tight budgets and limited requirements can get Visual Studio Express Editions. At the high end of the Visual Studio 2005 product hierarchy is VSTS (Visual Studio Team System), which provides developer collabora-

tion, issue tracking, QA, automated builds, and robust source-code control — all uncharted territories for Microsoft, which has always left such critical things to third-party plug-ins. By wiring VSTS into Visual Studio, Microsoft transformed its toolset into an instant and consistent enterprise development system of surprisingly little complexity. While the Java IDEs have had many of these features for a while, Microsoft did a superb job of integrating them and making them simple to use.

In 2006, we expect developer tools to

## APPLICATIONS AND MIDDLEWARE

### Middleware Finds Its Mojo Again

The focus on SOA shifts from development to deployment

FEW AREAS OF TECHNOLOGY UNDERWENT greater advances in 2005 than middleware. And 2006 looks as if it'll be no different. Between new architectures, maturing standards, and innovative technologies, the dream of integration within and without the enterprise is becoming a reality. Even better, it does not require the rip-and-replace approach of the past.

Key to this transition is the fact that Web services are maturing and becoming accepted. In years past, the lack of standards, the competing consortia, and the uncertainty about how best to integrate services into the enterprises were all troublesome issues that held back adoption. In 2005, however, Web services began to settle down to hard work: Standards

firmed up, and two critical technologies — ESB (enterprise service bus) and SOA — drove adoption of services.

The coming of SOA was critical. At this time last year, we hailed its advent. This year, we acknowledge its deployments and the considerable interest it now elicits from the jaded bastions of the glass house. It's one thing to hook two disparate servers in a point-to-point fashion using Web services; it's a whole other thing to design enterprise integration with a standards-based bus that helps orchestrate sequences of services to perform complex business processes.

That bus, the ESB, performs intelligent routing and the necessary transformations of data as the bits are on the fly.

focus more on threading issues as multi-core processors become widely accepted on PCs and notebooks. Visual Studio 2005 added the OpenMP portable threading

library for just this purpose. We expect that the tools needed to resolve the unique problems posed by threads will become much more prominent both in IDEs and

as stand-alone solutions and will lead the final rejection of the single-threaded program model.

— Andrew Binstock and Tom Yager

## AWARD WINNERS

### Best IDE

#### Visual Studio 2005

Unified, end-to-end toolset and team system extends the IDE's reach in all directions

### Best Java IDE

#### IBM Rational Software Architect 6.0

The most feature-complete Java development environment for architects and coders

### Best AJAX Toolkit

#### Tibco General Interface 3.1

Friendly, capable toolkit builds sophisticated JavaScript applications that run in a browser

### Best Application Test Tool

#### Agitar Agitator 3.0 and Parasoft Jtest 7.0

Two powerful packages for exercising code forced us to call it a draw

### Best Security Analysis Tool

#### Fortify Source Code Analysis 3.0

Thorough analysis and detailed recommendations make remedial action quick and effective

### Best Rules Management

#### ILOG JRules 5.0

Strong performance and a rich set of tools, including the ability to create your own rule language

While relying on common piping such as JMS (Java Message Service) or MOM (message-oriented middleware), ESBs add value with their smarts and their use of nonproprietary technologies. Our first comprehensive comparative review of ESBs appeared in July ([infoworld.com/3132](http://infoworld.com/3132)); we'll continue to bring new ESBs under the microscope, including one from the last holdout: IBM.

For years, Big Blue denied that ESBs offered anything that couldn't be found in the company's own messaging middleware. But market realities forced realization of ESB's specific benefits, and we now have the entire middleware market, including IBM, moving to the ESB model.

Web services and ESB will drive further into the enterprise in 2006, with coverage focusing far more on management of Web services than on development and deployment. Not so with Java, which is undergoing an identity crisis in server-side deployment, driven by the quest for a simpler

computing model. Frameworks such as Spring are stripping J2EE down to a container and a handful of needed application services. EJB 3.0 and other initiatives from Sun and the Java community are further efforts in this direction.

Java is already the language and platform of choice for Web services, a status enhanced with the unveiling at midyear of JBI (Java Business Integration), a framework that runs plug-in components and enables them to interact via WSDL-based messaging. In sum, application servers will themselves integrate Web services. And as a result, these servers and middleware will be permanently transformed. We expect 2006 to be the year of the tipping point in this process — the year in which

the biggest issues will not be how, when, or where to implement Web services, but how to attain the scalability necessary for true enterprisewide deployments.

— A.B.

## AWARD WINNERS

### Best CRM Application

#### Salesforce.com Winter '05 Enterprise Edition

The undisputed champ of hosted CRM combines strong features and unparalleled extensibility

### Best Enterprise Service Bus

#### Sonic SOA Suite 6.1

Complete, flexible, and powerful, delivering the reliability necessary for high-volume transaction

### Best Application Performance Manager

#### Indicative Service Director and SLA Manager 6.5

Especially strong at linking real-time performance measures with service-level agreements

The next step in the evolution of enterprise search is putting vast repositories of data in context.

## DATABASES

# Data Protection and Change Control Drive Developments

Auditing and encryption products address top concerns; Microsoft SQL Server shoots the moon

MOST OF THE MAJOR VENDORS CAME out with major releases in 2005. Oracle Database 10g went to Release 2, giving customers transparent data encryption, enhanced grid management, and a number of performance and security improvements. MySQL released Version 5.0, which gives users the ability to use stored procedures, triggers, and views. Sybase ASE 15 brings truly integrated data partitioning and lays the groundwork for native encryption.

But the biggest news of the year was Microsoft's release of SQL Server 2005 ([infoworld.com/3544](http://infoworld.com/3544)). This highly anticipated release is without a doubt Microsoft's most ambitious SQL upgrade to date, and it includes greatly increased security, .Net integration, and stronger high-availability features, among other things. This release finally makes SQL Server competitive with Oracle in the enterprise market.

As predicted last year, database grids — or dynamic clusters — still haven't caught on in the mainstream market ([infoworld.com/3725](http://infoworld.com/3725)), although they continue to make headway in specialized niches. It will be a couple more years before there will be any significant rise in grid deployments, and unless the technology finds a way around current limitations, such as in resource sharing and workload division, it will remain a limited market.

Compliance remained a top concern for database managers and will continue as such next year, with specific concentration on auditing database activity and change control. This year saw interesting offerings in this area, among them Quest's SQL Watch, a tool that monitors your SQL

Server databases for schema changes. Lumigent also came to the table with Audit DB, a hearty tool for auditing databases.

Lumigent made news on another front with its August release of Vulnerability Manager 3.0, which is intended to compete directly with AppSecInc's AppDetective. Both of these products assess and manage server and database vulnerabilities. Many

of the companies playing in this space are just now getting their functionality kinks worked out, so next year you can expect the introduction of much richer database vulnerability management solutions.

The database backup wars continued in 2005, fought mainly by Imceda and Idera, although Red Gate Software arrived in February with a strong play to the low-

## CONTENT MANAGEMENT

# Wanted: Methods for Moving Mountains

Document management fosters compliance; desktop search wears pinstripes

REGULATED INDUSTRIES SUCH AS PHARMACEUTICALS and financial services have used EDM (enterprise document management) for years to prove compliance in handling important information such as customer records. Throughout 2005, compliance gaps hit home — and the headlines — in organizations that overlooked these rigorous controls. But regardless of compliance requirements, companies of all stripes grappled with the overarching problem of managing and searching the mountains of data that enterprises generate every day.

Yet progress occurred on both fronts. And this momentum should continue into 2006. Arguably, EMC Documentum offers the most complete ECM (enterprise content management) solution, with a book-long list of modules ranging from workflow and business process automa-

tion to Web content publishing to records management, compliance, and archiving essentials.

Document lifecycle management, however, doesn't have to be so complex or expensive to give enterprises good ROI. An increasing number of midmarket Web content management products now integrate document management and business process workflow. And we've tested several good ones. Admittedly lacking Documentum's scalability and breadth, solutions such as Ektron CMS.Net, Red-Dot XCMS, and Xerox DocuShare belong on the short list of many organizations seeking more control over document creation and use.

Content management hasn't emerged as a full-fledged SOA yet, but it continues to move in this direction. Our favorite hosted Web content manager, CrownPeak CMS,

end market. Imceda then shocked the playing field in May when it announced a merger with Quest Software. The move may have ensured Imceda/Quest's place in the backup winner's circle, if Quest is willing to invest enough resources to overwhelm the two smaller vendors.

Encryption technology also made a good showing this year and will continue to do so in 2006. Companies such as AppSecInc and Vormetric proved that database encryption can be successfully implemented in various ways. AppSecInc encrypts at the column level, protecting sensitive data such as credit card and

**AWARD WINNERS**

**Best Enterprise Database**

**Microsoft SQL Server 2005**

Ambitious, enterprise-oriented overhaul creates a new measuring stick for database management

**Best XML Database**

**eXist 1.0**

A smooth, even pleasurable introduction to the power of XQuery and XML content management

Social Security numbers directly so that only authorized personnel can see them. Vormetric encrypts the database files at the server level, so that the files, copies, or backups can't be reloaded and viewed if they're stolen.

The coming year will also bring exciting companion products in the wake of SQL Server 2005. One company to watch is SQL Farms, a startup that already has a revolutionary new SQL editor and will be coming out with a new admin tool that offers some amazing new functionality. Stay tuned.

— Sean McCown

for example, extends asset repositories and records management to CRM integration. Moreover, SilkRoad's Eprise 2006 not only bundles document management but integrates well with multiple services technologies.

Search also reached several milestones in 2005. First, desktop search delivered on the promise of federating results of local and enterprise information from a single interface. In one case, Google strengthened its partnership with IBM, extending Google Desktop Search into IBM enterprise databases. More recently, Microsoft's Windows Desktop Search learned to crawl e-mail stores and file shares.

The next step in the evolution of enterprise search is putting all this data into context. Some questioned the wisdom of the Autonomy-Verity merger, given the complications of integrating their disparate search technologies. But the pairing has merit: By putting their resources together, the two may give customers better technology choices. For instance, both companies have taxonomy technology, which analysts say could converge into a solution to challenge another market

force, Fast Search and Transfer.

While the big-name vendors wrangled, search breakthroughs from upstarts appeared this year. Vivísimo introduced Velocity, an elegant, real-time way to federate and cluster search results from both enterprise and public search engines. Now Velocity is incorporating query routing, where users are directed to the appropriate search engine or specialized search path according to their questions.

Although others' offerings are not as sophisticated, 2006 will certainly see accelerated adoption of search federation. Naturally, ECM vendors such as EMC Documentum, who's Content Integration Services coalesce 300 disparate data sources, also continue working to open data silos. Not all at once, but the walls between business users and the information they seek are coming down.

— Mike Heck

**AWARD WINNERS**

**Best Enterprise CMS**

**EMC Documentum 5, Collaborative Edition**

Impressively unified approach to managing content creation, reuse, archiving, and disposal

**Best Enterprise Search**

**Vivísimo Velocity 4.2**

Advanced capabilities that can be deployed faster and less expensively than competing solutions

**Best Document Manager**

**Xerox DocuShare 4.0.1**

A strong mix of collaboration, personalization, ease-of-use, and extensibility

**Best Web Analytics**

**Omniture SiteCatalyst 12**

Makes site traffic data easier to analyze and streamlines the process of fixing problematic pages

# We may have seen the beginning of the end of the traditional integrated collaboration environment.

## COLLABORATION

### Scaled-Up Hosted Services Challenge the Old Paradigm

Linux-based “Exchange killers” show promise, but WebEx might have the secret sauce

THE COLLABORATION LANDSCAPE SAW some improvement last year, as 2005 was the year challengers to Microsoft Exchange made their case, podcasting became a national pastime, and WebEx’s management realized that small customers have money, too.

It might also have been the year that we glimpsed the beginning of the end of the traditional “integrated collaboration environment.” What other explanation is there when two of the top three collaboration products release major upgrades — coincidentally, both IBM Lotus Notes and Novell GroupWise ratcheted themselves to Version 7 within weeks of each other — but to little more coverage than rewritten press releases and brave-sounding quotes from the conference calls?

Although both IBM and Novell sputter on about solid customer bases, the former’s customers are tired of one slide-ware initiative after another, while those of the latter still have reason to wonder whether there’s anything more to collaboration than e-mail and IM.

IBM’s talk of an eighth release — and perhaps a ninth — of Notes does little more than tease users while they wait for a Workplace that may never arrive. Meanwhile, Novell is struggling to keep its customers long enough to get them moved over to GroupWise-on-Linux.

It’s no surprise that some of the loudest buzz this year centered around Linux-based “Exchange killers” ([infoworld.com/3330](http://infoworld.com/3330)). While vendors such as Scalix and Zimbra strove to clean out the chunk of the market that requires more than Postfix from their collaboration tools, Microsoft appeased its own customers by delivering

a significant service pack for Exchange Server 2003 and announcing the first trials of Exchange Server 12. That would be enough for most people, but on top of that, Microsoft bought Groove Networks and put Ray Ozzie in charge of its collaboration efforts. If Microsoft doesn’t actually own the collaboration market, it’s so No. 1 that there really is no No. 2.

But the collaboration sphere isn’t a permanent satellite of Planet Redmond.

Hope appeared when WebEx leapt into the micro-enterprise market by acquiring Intranets.com. The new WebExOne division delivers the “asynchronous” side of collaboration — calendaring, database management, and document management — in effect taking a credible intranet-as-a-service package and adding a new \$49-per-month Web conferencing feature. If anything’s going to kill Exchange, it’s a scaled-up version of these services.

## IDENTITY MANAGEMENT

### End-to-End Suites Still Coming Together

Juggernauts round out the portfolios as consolidation continues

THE IDENTITY MANAGEMENT MARKET IS one that we watch closely. And while it has yet to fully explode into the mainstream, 2005 saw it steadily gaining momentum. Identity is so compelling because it’s far more than just a security technology. Authentication, fine-grained access control, and SSO (single sign-on) are all advantageous, but they only represent the tip of the iceberg of what an identity suite can accomplish.

Ultimately identity will serve as the foundation for managing distributed webs of application services, paving the way for smoother, SOA-based business integration. But, of course, that’s a long way off. In the meantime, most enterprises will embrace it for its ability to automate provisioning and deprovisioning of user accounts, as well as for its centralized authentication

logging and auditing capabilities, both of which can play a crucial role in regulatory compliance measures.

For many companies, however, setting up an identity infrastructure remains a daunting task. Not only is the technology complex, but it also inevitably touches countless areas of an enterprise and its business processes. Reducing the perceived barriers to entry will be Job No. 1 for identity vendors as we move into the new year.

For starters, that means shrinking the playing field. For 2006, expect to see the identity market continue to consolidate around a handful of top-tier vendors with established track records in enterprise IT.

IBM grabbed Access360 in 2002 and Sun Microsystems nabbed Waveset in 2003.

Although cynics have tagged podcasting as a flavor of the month, it also appears to be the future for one-way content delivery to niche audiences. The problem remains how to make money narrowcasting in a billing structure built for broadcasting.

Meanwhile, businesses continue to inch toward unified messaging. Although the Holy Grail of a single inbox for e-mail, instant messaging, and voice sounds appealing, customers are taking their time in adopting the concept. Some of this reluctance must stem from the inevitable realization that unified messaging still requires a PBX, as well as a CT (computer telephony) server to connect the PBX to the mail server. If vendors expect wide-

spread adoption of unified messaging, they are living in a dream until they can deliver a solution that requires less hardware instead of more.

In short, more questions were asked about collaboration during 2005 than there were answers. Customers are still trying to decide whether e-mail, instant messaging, and voice mail should be no-frills operations, or if they ought to offer every service conceivable at the expense of compatibility. But there's a future in collaboration-as-a-service; agile vendors such as WebEx are infinitely better placed to deliver something usable than the dinosaurs of years past.

— P.J.C.

Last year, HP's acquisition of TruLogica and CA's acquisition of Netegrity showed that identity shopping continued to be the rage. And this year, Oracle snapped up identity pure-plays Oblix, OctetString, and Thor Technologies, giving the database and applications vendor a formidable product line. Moreover, Hewlett-Packard rounded out its identity portfolio by adding federation vendor Trustgenix last month.

Unlikely as it may sound, CA, HP, and Oracle can still be seen as the underdogs in the identity management space. With heavy-hitting competitors such as IBM Tivoli, Microsoft, Novell, and Sun to contend with, emerging as the market leader will be an uphill battle for any vendor. As a result, expect more pure-plays to fall under the umbrellas of these big names as the heavyweights continue to strengthen their identity portfolios in the coming year.

Usability will be the next big battleground. So far, Novell has taken the lead in this area, offering sophisticated management tools atop its mature directory server foundation. The recently released

#### AWARD WINNER

##### Best Identity Manager

###### Novell Identity Manager 2

Powerful graphical workflow and design tools, intuitive user interface, and solid directory foundation give it an edge over strong competitors

Identity Manager 3 builds on an already solid product offering with automated provisioning capabilities and a visual policy designer based on the Eclipse framework. Expect the other vendors to follow suit with their own more accessible user interfaces as the competition for new customers heats up.

The key long-term play for the industry, however, is federated identity. The lure of centrally managed authentication and centralized access to resources across multiple network domains, including those of business partners and customers, is obvious. Unfortunately, this technology is still immature and federa-

#### AWARD WINNERS

##### Best Exchange Killer

###### Gordano Messaging Server 10.05

Feature-rich and strong-performing messaging server that eases the transition from Exchange with unique real-time mailbox migration

##### Best Live Collaboration

###### WebEx WebOffice

Shared databases, documents, and discussions, plus seamless integration with real-time meetings

tion remains somewhere on the horizon for most customers, although successful implementations have already begun appearing in the telecom industry and other verticals.

The arrival of SAML 2.0 from the Liberty Alliance should make it easier for vendors to implement standardized federation capabilities, but logistics remain the big challenge. The vendors will have to invest heavily in developing best practices and procedures for key industries before customers will be convinced that federation is worth the effort, or indeed is even feasible.

Over the long term, SOA may prove to be the ultimate driver of identity technologies, as identity management and service orchestration dovetail into a single infrastructure management discipline. For now, however, sustained growth will be the theme throughout 2006. Identity management is still in its early phases, but it's never too soon to get on board, because big things are ahead.

— Neil McAllister

**SECURITY**

## Threat Landscape and Lapses Justify Paranoia

Point solutions abounded in 2005; common sense remained AWOL for some

SECURITY REMAINED FOREMOST ON THE minds of IT leadership in 2005, and with good reason. The year saw a Microsoft research project discover the first so-called zero-day exploit; “identity theft,” “phishing,” and “spyware” became part of the popular lexicon; and the need grew for companies to treat any computer joining the network as hostile until proved secure. It’s no wonder IT people at all levels sound paranoid.

Incredibly, the year passed without a crippling event of global reach — although if one belongs to the glass-half-empty school, that bit of good luck can be interpreted as having simply prompted people to become complacent. After all, 2005 was a year in which some business, university, or government entity acknowledging that it had mishandled sensitive data seemed to be a weekly occurrence.

Network access control continues to be a hot marketing point, although vendors are taking myriad approaches to the subject. End-point security and device-based access controls appear to be the methods of choice, both for established vendors, including Juniper and Symantec — which bought Funk Software and Sygate, respectively — and relative newcomers such as ConSentry Networks, Elemental Security, and LockDown Networks. The ConSentry and Elemental solutions were the most promising we saw during the year, but the competition should be heavy in 2006.

The appliance approach to security management built some steam this year as well, with firewall vendors now offering IPS features and IPS boxes behaving more like firewalls and routers. This method seems to appeal most in situations where

network operations and the security team overlap substantially; where a strict delineation between the groups exists and all-in-one boxes are often considered a liability — or at least an audit point — instead of an asset. Even when they’re described as “unified threat management,” some IT organizations still don’t trust them.

But network management and security will continue to overlap in 2006; particularly given the jerry-built nature of many smaller corporate networks. Consolidating threat management and network usage policy enforcement into one device makes sense for shops that invested in a high-quality network infrastructure that adapts easily to the new requirements; those IT organizations that built their networks on the cheap will be shut out of this brave new world.

Mind-set will remain one of the biggest problems to implementing a sensible security strategy: Most customers still make their security purchases from a tactical perspective, in effect using Band-Aids where reconstructive surgery is more appropriate. But that’s all the budget can afford in too many cases.

Of course, all the gadgets in the world are pointless when basic security procedures aren’t enforced or don’t exist in the first place. Look at what happened this year: Unwiped hard drives with bank records showed up on auction blocks and backup tapes containing unencrypted personnel data went missing from the van transporting them. Moreover, the best place to look for a sensitive password continues to be a Post-It note. In many ways, it’s as if the last decade of “there but for the grace of God go I” security breaches

never happened. CTOs need to ask themselves: When the basics are so difficult, do all of the gadgets become money down the drain?

— P.J.C.

**AWARD WINNERS**

**Best Anti-Spam**

**Symantec Mail Security 8200 Series**

Best-in-class accuracy and ease-of-use with great policy-driven filtering and e-mail firewall features

**Best Anti-Spyware**

**F-Secure Anti-Virus Client Security 6**

The strongest real-time protection we’ve seen, backed by first-rate detection and removal

**Best Insider Threat Defense**

**Vontu 4.0**

Exceptional administration combined with a great collection of built-in compliance policies and in-line e-mail management

**Best Network Access Control**

**Elemental Compliance System 1.1**

Powerful policy engine and deep reporting constitute a major step toward enterprisewide NAC

**Best SSL VPN**

**Juniper Secure Access 5000**

A beast of a box that provides exceptional remote access capabilities with fine-grained control