



Global Grid:
The Quiet
Revolution
So, where's the good news?



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The Advent of the Global Grid

Looking for the Next Killer App

In the last decade, local area networking, e-mail, Internetworking, palmtop computing, wireless networks, peer-to-peer and distributed computing each failed to fully deliver on their respective promises. While there is no question that the Internet has effected both the philosophies and behavior of business computing, it has nonetheless failed to produce a unique and sustainable market segment able to displace (or for that matter even compare to) that of previous generations.

So where is the good news? It is, in fact, just around the corner. While alone, neither the Internet nor peer-to-peer nor wireless computing will provide the next dominant computing paradigm, imagine the potential of these forces combined. Indeed, the next major revolution in business computing has already arrived, it's called Grid Computing, and will provide access within the palm of your hand to virtually every known electronic resource.

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The Grid Computing paradigm, the first “killer app” to finally obsolete the desktop PC as we know it today, will arrive through the ability to access a world wide network of computing power from virtual any device, including handheld devices and embedded computers. The first commercial opportunities for Grid Computing will be a reality by next year, unleashing a new wave of wealth and innovation that will ultimately eclipse anything seen in the last decade.

The marketing copy nearly writes itself – “Wherever you go, there we are. . . we are the collective computing power of the entire world.” As incredible as this sounds today, it is amazingly close to becoming a reality. Just consider the possibilities . . .

While today you can check flight status, inventories and other predetermined data sources from a handheld device, by next year you will be able execute an entirely new set of complex operations from the same device from virtually any location without concern for network bandwidth or access.

Within 3 years you will be able to tap into the computing power of an entire server farm, one for which you may have no visibility to its location or ownership, offering access to the idle computing resources of your own servers as bartered currency – once again using a handheld device, that came free with a nominal service fee.

Within 5 years you will be able to enroll for employee benefits, diagnose a chronic medical condition, initiate a product design change, identify sales leads, investigate an emerging market trend, update your corporate website, and announce your availability to meet with nearby clients – simultaneously from your car while driving.

These are fantastic claims that may be familiar to some, but what is different now is the convergence of recent trends that, combined, have made this a near-term reality. Notably these are:

- Web Services & the Global Grid
- Wireless Networking & Handheld Computing
- Embedded Computers
- “Self-Aware” Applications & Self-Categorizing Content

The New Reality of Ubiquitous Computing

The great promise of ubiquitous computing has previously played to the much-lauded “Moore's Law” – that the power of computing devices would double every eighteen months. One of the notions here is that computing devices will eventually become so powerful as to provide any imaginable amount of computational ability within the palm of your hand. The problem, however, is that applications’ requirements have grown at a faster rate than the devices which support them. Just the operating system alone requires a hundred times more computing resources today than it did a decade ago. Handheld devices will not be able to keep pace with this model of computing.

Rather than piling heaps of new computing power on to a small device, think instead of a conduit to a much, much larger pool of resources. The analogy here is the telephone. The typical telephone of today's generation still has little more technical sophistication than a tin can on a piece of string, yet it provides access to the largest and most complicated computer network in the world.

Likewise, the handheld device of tomorrow will need to perform just three tasks:

- 1) Identify itself
- 2) Receive and display a thin stream of standardized content
- 3) Return simplified responses from the user

Everything else will be done offline through a complex network of computers (of which most users will be unaware). Servers will be responsible for everything from rendering the presentation layer to be sent out in tiny streams to converting responses as simple as a single tap on a screen into complex instructions to be distributed across an entire network. The device itself will not need to be aware of the context of these operations (no more so than does today's telephone as it transmits touch-tone commands).

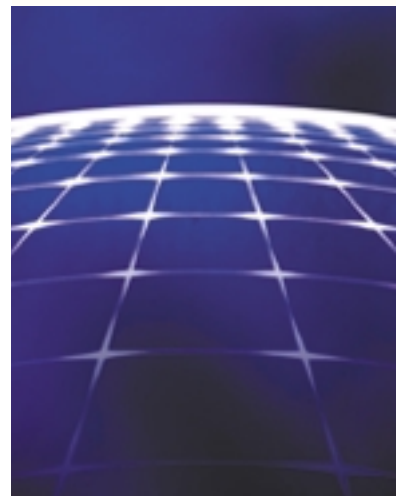
The most sophisticated devices will have a limited set of productivity and entertainment applications, which will synchronize in near real-time as the device hops along the global network of wireless hubs. The rest, however, will carry with them no more knowledge than a digital identity and the ability to present streamed content.

This form of radically distributed computing is enabled largely by two recent developments: Web Services and the Global Grid. Simply put, Web Services are the ability to break apart large applications and encapsulate these into tiny, self-describing chunks of software that can be recombined into a new set of functions.

The Global Grid, like the original Internet itself, is today a function of academic laboratories, but by next year will be for the first time utilized as a commercial resource. It is a growing network of large-scale computers linked through peer-to-peer connections in such a way as to present the aggregated computing power of the entire network as a single resource. The combined power provided exceeds that of any single computer ever imagined, and will grow exponentially as the network combines.

The New Currency of Computing

The price for entry to the Global Grid for most users will not be an access fee, but rather raw computing power. As a new twist on the time-sharing model of years' past, the Global Grid will present a world-wide barter system where idle resources are utilized by the collective network of participants, in exchange for access to others' computing power during times of peak demand. Minimal fees will be charged for the coordination and metering of this process, with the availability of value-added services for security and other areas of system management (as with today's Internet and other public infrastructure networks).



The opportunity for the “big money” here is through commercial delivery of micro-transactions. These include access to virtually infinite volumes of content, as well as vast libraries of mini software components delivered as Web Services. By lowering the threshold for participating in these services (by leveraging the set of standards emerging around Web Services and the Global Grid), a vast new market will emerge to support the many business processes now necessary to the running of most organizations, yet represent the core competency of just a few.

Consider the process of hiring a new employee. This requires any number of a vast set of services which include: skills assessment; orientation (perhaps through a corporate video and the creation of an employee profile); immigration authorization; benefits enrollment; housing relocation; office equipment procurement; password assignment and synchronization; background checks and security clearance; as well as scheduling of weeks’ worth of appointments with co-workers, partners, and clients.

Today this process might take well over a month for a single new employee. Tomorrow it will be accomplished almost entirely during one day’s commute to the office, with the balance completed on the way home. However, this will not require the significant investment infrastructure one might otherwise expect. No employer will be able to justify building a system to automate all of these functions on the basis of shaving a few weeks of employee ramp-up. But building a channeling device to coordinate these services and then paying as each is used will provide immediate economic benefit with only a nominal upfront cost.

The New Economy of Micro-Transactions

Both manufacturers and service providers will transform what were previously laborious tasks into a mix of fee-based Web Services, thereby greatly increasing the efficiency that they are delivered. Many cost centers will become new profit centers as the economy of micro-transactions offer the ability to charge for what was previously a nuisance, yet too insignificant to monetize.

Would you consider charging a prospective client for an online sales inquiry? Not likely, but in every sales process are hidden countless tiny costs that combined have a material impact on any balance sheet. Rather than taking the time to manually qualify a new prospect, consider a web service that automatically captures key information from a central source (a third party) and cross checks against an online credit reference (another third party) to categorizes and prioritizes the prospect by interests and purchasing power. The underpinnings of this sort of system are already in place with Microsoft’s Passport (an online authentication service) and various online services offered by the credit agency Equifax, including those which enable buyers to maintain individual profiles at their own cost – never shared with potential sellers.

For many suppliers, maintaining vast libraries of product information necessary to support OEM customers represents a major expense, which if broken down into a variety of value-added services offer a powerful means of differentiation and/or new revenue streams. Consider the value to a channel partner’s field service force to be able to access all up-to-date information on a part or component, its compatibility with other products,

just-in-time training on repair, or the ability to verify availability and order a replacement – all of this from any generally available handheld device.

Application Emancipation – The Empowerment of Self-Aware Applications

This new vision of computing would present an integration nightmare within today's modality of enterprise computing. Building the numerous connections between systems and data structures required to complete the various tasks above will present a Sisyphean struggle – completing one connection only to find that the ten others are now out of date.

What's worse, an integration project of this scope will involve costly technical staff and resources, who will have a harder time keeping pace with the changes in context of content and applications.

Will IT be aware of all the sensitivities around which partners should have access to what content? Or whether a service provider furnishes information in the right format for each purpose, or when product information changes and what those changes effect? Not likely. It would be nearly impossible to keep on top of all of possible changes, creating a significant bottleneck in the process of using and delivering these services.

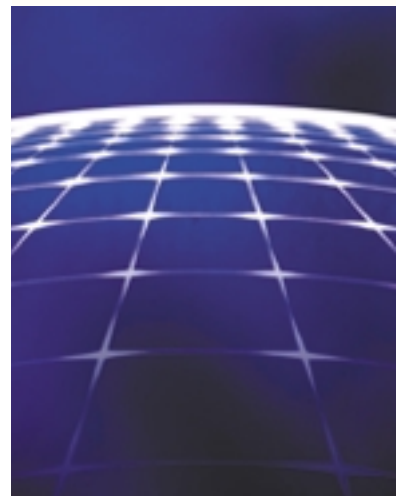
This challenge is in no small way why information and application services have remained largely inaccessible outside of very limited domains. This broad reach into process decisions and business context is beyond the charter of IT. Rather, IT must manage the underlying infrastructure, filling an increasingly valuable role in ensuring the availability of this new, complex web of systems and services. But business process owners must have the tools to manage the content and capabilities that these services provide.

The only manageable approach is for applications themselves to communicate the context and sensitivities necessary for the enabling of Web Services. This requires the content they provide to be self-categorizing. For example, content from the parts database must be able to identify itself after it has left its host system, and to find its way back again. Each application component – the mini “chunks” of software that define Web Services – must be aware of its own role and responsibilities.

This too may sound far-fetched today, but these capabilities are already beginning to be addressed by an emerging group of standards, which include WebDAV, SOAP, UDDI, and WSDL – all defined to address the portability of content and the delivery of Web Services. Platform initiatives such as Microsoft's .NET and Sun's J2EE are focusing today squarely on these issues. Specifically, the ability to enable existing content and application resources to be used across the Internet, and leveraging the commercial Global Grid as soon as it becomes a reality for business computing.

Breaking Through the Darkness of Uncertainty

There is an old business adage that states “refusing to decide is the worst decision you can make.” While sounding a bit like the wisdom of Yogi Berra, it is nonetheless apropos of the state of the market as we end this year.



Throughout the gloom of 2001, perhaps the greatest source of frustration has been the shroud of uncertainty looming overhead. "Sure things will get better, but is the worst yet to come?" This question has been the gating factor for most investments – in both companies and technology – and the inability to find an adequate answer has resulted in an epidemic of indecision. Yet the answer lies not in the overnight arrival of some magic remedy to finally "make it better." But rather it will be found in the market's ability to refocus its collective imagination from what "might happen" to what "can happen" – to envision the full potential of these converging technologies.

As enterprise buyers realize the sky is not falling after all, priorities will shift back to building businesses. The skepticism of any single "savior" technology should remain and is a healthy alternative to the frenzy at the end of the last decade. What comes next may be a quiet revolution, in contrast to over-the-top fanfare seen the last time around. But it will be no less revolutionary – lasting well into the next decade and offering virtually limitless opportunities for business innovation.

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