Emerging technologies
Új technológiák megjelenése

Bakonyi Péter
c. docens

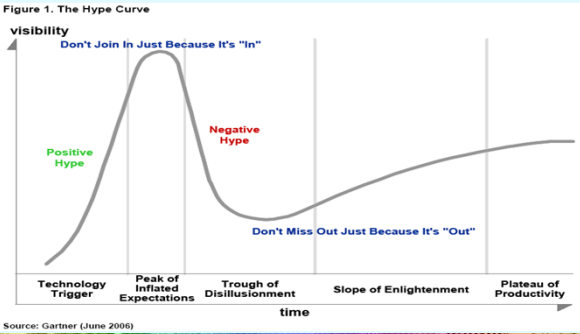
Mi a Gartner Hype görbe jelentése

Gartner's Hype Cycle characterizes the typical progression of an emerging technology, from overenthusiasm, through a period of disillusionment, to an eventual understanding of the technology's relevance and role in a market or domain.

Gartner analysts position technologies on the Hype Cycle based on a consensus assessment of hype and maturity. During the first part of the Hype Cycle, when there are many uncertainties regarding a technology, its position on the hype curve is guided more by its hype levels than its perceived maturity. At the later stages, as more information about maturity, performance and adoption becomes available, the hype plays a lesser role in determining the technology's position on the Hype Cycle.

A hype görbe

Figure 1. The Hype Curve

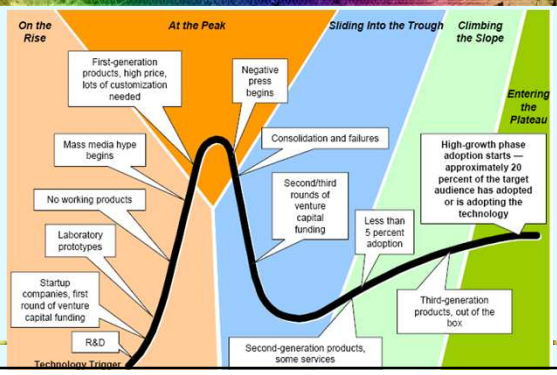


Source: Gartner (June 2006)

Hype görbe fázisai

Phase	Definition
Technology Trigger	A breakthrough, public demonstration, product launch or other event generates significant press and industry interest.
Peak of Inflated Expectations	During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the technology is pushed to its limits. The only enterprises making money are conference organizers and magazine publishers.
Trough of Disillusionment	Because the technology does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.
Slope of Enlightenment	Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the technology's applicability, risks and benefits. Commercial, off-the-shelf methodologies and tools ease the development process.
Plateau of Productivity	The real-world benefits of the technology are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. The final height of the plateau varies according to whether the technology is broadly applicable or benefits only a niche market. Approximately 20 percent of the technology's target audience has adopted or is adopting the technology as it enters the Plateau.
Years to Mainstream Adoption	The time required for the technology to reach the Plateau of Productivity.

Hype görbe fázisai



Prioritás mátrix

Figure 8. Priority Matrix

benefit	years to mainstream adoption			
	less than 2 years	2 to 5 years	5 to 10 years	more than 10 years
transformational	Invest aggressively if not already adopted	Conservative (Type C) investment profile	Moderate (Type B) investment profile	Aggressive (Type A) investment profile
high	Conservative (Type C) investment profile	Moderate (Type B) investment profile	Aggressive (Type A) investment profile	Invest with caution
moderate	Moderate (Type B) investment profile	Aggressive (Type A) investment profile	Invest with caution	Invest with extreme caution
low	Aggressive (Type A) investment profile	Invest with caution	Invest with extreme caution	Invest with extreme caution

As of June 2006

Source: Gartner (June 2006)

Priority matrix

Table 2. Benefit Ratings

Benefit Rating	Definition
Transformational	Enables new ways of doing business across industries that will result in major shifts in industry dynamics
High	Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise
Moderate	Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise
Low	Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings

Source: Gartner (June 2006)

Table 3. Maturity Levels

Maturity Level	Status	Products/Vendors
Embryonic	In labs	None
Emerging	Commercialization by vendors Pilots and deployments by industry leaders	First generation High price Much customization

Hype cycle 2007

The Hype Cycle

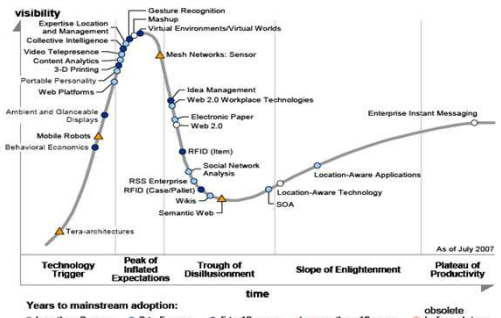
This Hype Cycle focuses on the emerging or strategic technology and innovation function within IT. It is the broadest aggregate Gartner Hype Cycle, highlighting emerging technologies from all areas of IT that technology planners should evaluate as part of their emerging-technology scans.

Major themes on this year's Hype Cycle include:

- **Web 2.0:** The community, technology and business innovations of the Web continue to evolve. Specific approaches and technologies have progressed since last year's edition, including wikis, mashups, enterprise RSS, social network analysis and collective intelligence. The product and platform underpinnings have been more tightly defined in the 2007 Hype Cycle, with entries for Web platforms and Web 2.0 workplace technologies.
- **User Interfaces:** After many years of stagnation, a number of emerging user interface technologies are entering serious commercialization, including electronic paper (for mobile devices and signage), gesture recognition (as incorporated in the Nintendo Wii and Microsoft Surface) and virtual environments/virtual worlds (such as Second Life). Other interface technologies, such as ambient and glanceable displays, are still being used experimentally to establish their role and utility.
- **Mobile:** Mobile and wireless technologies, devices, and services continue to be an active area for emerging technology groups. Areas such as RFID, sensor networks, and location-aware technologies and applications continue to mature slowly, but still offer

Hype Cycle-2007

Figure 1. Hype Cycle for Emerging Technologies, 2007



Source: Gartner (July 2007)

Prioritás mátrix-2007

Figure 2. Priority Matrix for Emerging Technologies, 2007

benefit	less than 2 years	2 to 5 years	5 to 10 years	more than 10 years
transformational	Web 2.0	SOA Web 2.0 Workplace Technologies Web Platforms	3-D Printing Collective Intelligence RFID (Case/Pallet) RFID (Item) Virtual Environments/ Virtual Worlds	Mobile Robots
high	Enterprise Instant Messaging Location-Aware Technology Mashup	Electronic Paper Expertise Location and Management Location-Aware Applications Portable Personality Social Network Analysis	Behavioral Economics	Mesh Networks: Sensor Semantic Web Tera-architectures
moderate		Content Analytics RSS Enterprise Video Telepresence Wikis	Ambient and Glanceable Displays Idea Management	
low			Gesture Recognition	

As of July 2007

Source: Gartner (July 2007)

Gartner

Prioritás mátrix

The following technologies have been rated transformational:

- For their ability to drive major advances in automation — mobile robots, RFID (item) and RFID (case/pallet)
- Because they will drive new products, services and commerce — 3-D printing and virtual environments/virtual worlds
- For transforming business processes and models — collective intelligence, Web 2.0 and Web platforms
- For driving deep changes in the role and capabilities of IT — SOA and Web 2.0 workplace technologies

Tera-architectures

Analysis By: Martin Reynolds; Paul McGuckin

Definition: These are large-scale computing systems that self-assemble from components and implement resilience through software architecture. Software will have to change to operate in such an environment.

Mobile Robots

Analysis By: Jackie Fenn

Definition: Mobile robots move and navigate in an autonomous or semiautonomous (that is, via remote control) manner and have the ability to sense or influence their local environment. Mobile robots may be purely functional, like vacuum-cleaning or lawn-mowing robots, or may be humanlike in their appearance and capabilities.

Mobil robots

Position and Adoption Speed Justification: Mobile robots have emerged from their traditional niches in the military, toy and hobbyist markets, and are starting to provide practical value in home and enterprise markets. Early enterprise applications include mobile videoconferencing (for example, for physicians in hospitals) and delivery of items to specific locations. More advanced capabilities under development include safely lifting an object or person.

At the high end of the market, Sony and Honda have developed human-looking robots that can walk, run, jump and respond to gestures and voice commands. These are still research prototypes and not yet at commercially viable prices, but they indicate the level of physical performance and responsiveness that will be available in the next decade.

User Advice: Evaluate mobile robots for delivery, security and mobile videoconferencing applications. As robots start to hit price levels that are comparable to a person's salary, prepare for mobile robots to appear as new endpoints in corporate IT networks.

Business Impact: Within the next five years, applications for mobile robots will include cleaning, delivery, security patrols, greeting visitors and a range of other applications enabled by mobile videoconferencing. Longer term, they will deliver a broader spectrum of home help and healthcare capabilities, and as costs fall they may play a growing role in automating low-wage tasks in activities such as food preparation.

Web Platforms

Analysis By: David Mitchell Smith

Definition: Web platforms use Web technologies to provide programmatic access to functionality on the Web, including capabilities enabled by not only technology but by community and business aspects as well. This includes, but is not limited to, storage and computing power. They have ecosystems similar to traditional platforms. Web platforms are emerging as a result of market and technology changes collectively known as "Web 2.0." These platforms will serve as broad, general-purpose platforms, but, more specifically, they will support business flexibility and speed

Portable Personality

Analysis By: Leslie Fiering; Neil MacDonald

Definition: Portable personality is a set of tools and technologies that decouples users from dependence on a specific computing device and enables them to recreate their preferred work environments across various system types and locations. At its core, a portable personality needs to be stored somewhere — in a centralized server, in the cloud or on a flash drive that the user carries. Gartner's portable personality architecture includes a set of user data, applications and preferences (the preferred work environment); a method to "package" these together; a place to store it; and a way to deliver it to any number of "target" systems, which could be PCs, notebooks, thin clients or smartphones.

3-D Printing

Analysis By: Jackie Fenn; Pete Basiliere

Definition: 3-D printers resemble inkjet printers, but instead of putting ink on paper, the jet deposits resin, plastic or another material, layer by layer, to build up a physical 3-D model from a 3-D data model. The technology has been around for two decades, primarily in the field of rapid prototyping for industrial design. More recently, the quality has increased, and printer and supply costs have decreased to a level that is likely to broaden the appeal of 3-D printing within five years.

Video Telepresence

Analysis By: Scott Morrison; Richard Costello; Elroy Jopling

Definition: Video telepresence is a form of immersive video communication, where everything is driven toward creating the impression of being in the same room as the other conference participants. Most telepresence suites run high-definition at 720p (progressive scan) resolution, and some support 1080p. Conference participants appear as life-size individuals on large plasma or projection screens. Multiple cameras and microphones pick up individuals or pairs of individuals, so that all audio-visual information becomes directional, with good eye contact and sound appearing to come from the proper speaker. Telepresence suites are often designed and assembled by the system supplier to provide the appropriate layout, acoustics, color tones and lighting that will maximize the perception of realism. The decor and furniture on both sides of the video are often identical, giving the appearance of sitting at the same table as the other participants.

Collective intelligence

Definition: Collective intelligence is an approach to producing intellectual content (such as code, documents, indexing and decisions) that relies on contributions from many individuals with no centralized authority. Contributors decide what needs to be done and where they can help. Quality is determined by peer acceptance of contributions as the basis for further work and development, and contributors tend to be motivated by reputation rather than financial rewards.

Collective intelligence can also arise from aggregating implicit or indirect contributions from many individuals, as in Google's use of hyperlinking to determine Web site quality or Amazon's use of buying patterns to drive customer recommendations.

Mashup

Definition: A "mashup" is a lightweight, tactical presentation layer integration of multisourced applications or content into a single, browser-compatible offering. It is a lightweight variant of the older notion of a composite application ("composite app"), and the heavier service-oriented architecture orchestration approach to composite apps. In the usual use of the term, composite apps are built on enterprise platforms, internal-facing and not necessarily Web-based.

Position and Adoption Speed Justification: Mashups are driven by the Web culture — that is, social networking sites tailored to communities of interest. There are thousands of mashups on the Web, often built by nonprofessional programmers. For example, housingmaps.com combines data from Google Maps with apartment rental information from craigslist to create a new application that shows the location of available apartments in a given city — all accomplished without the direct participation of Google or craigslist staffs.

Virtual Environments/Virtual Worlds

Analysis By: Waldir Arevolo; Steve Prentice

Definition: Virtual environments are online platforms in which participants are immersed in a three-dimensional representation of a virtual space. They can enable people to create personalities or "avatars" online that can interact with other avatars in the virtual world. These environments enable interactions that can be used by consumers, and ones that can be used internally and externally by organizations for many purposes, such as collaboration and training. Virtual environments can enable commerce and exchange of goods, knowledge and services — both virtual and physical — by the avatar and its owners.

Mesh Networks: Sensor

Analysis By: Nick Jones

Definition: Sensor networks are ad hoc networks formed by dynamic meshes of peer nodes, each of which includes simple networking, computing and sensing capabilities. Some implementations offer low-power operation and multiyear battery life.

Web 2.0 Workplace Technologies

Analysis By: Gene Phifer; James Lundy; Mark Gilbert

Definition: Web 2.0 delivers a plethora of consumer-based communications and collaboration technologies. Among them are word processing, spreadsheets, presentations, blogs, wikis, folksonomies (user-defined content tagging) and social networks. Many of these are popular on the Internet, especially among certain classes of users. For example, social networks are running rampant among teenagers and people in their twenties.

Web 2.0

Analysis By: David Mitchell Smith

Definition: We identify three anchor points that describe Web 2.0:

- Technology and architecture — consisting of Web platforms and Web-oriented architecture (WOA)
- Community — describing the "architecture of participation," dynamics of social networks, and other personal content publish/share models, including wikis and other collaborative content models
- Business model — consisting of Web-services-enabled business models, mashup/remix applications, long-tail economics, advertising and other monetization models

RFID (Item)

Analysis By: John Davison

Definition: This refers to radio frequency identification (RFID) solutions that are specifically targeted at tracking inventory at the item level.

RFID (Case/Pallet)

Analysis By: John Davison

Definition: This technology consists of radio frequency identification (RFID) solutions that are specifically targeted at tracking inventory at the case and pallet level.

Wikis

Analysis By: Nikos Drakos; Whit Andrews

Definition: A wiki is a simple collaborative system for creating and maintaining hyperlinked collections of Web pages. A wiki usually enables users to add or change pages "in context" without having to worry about where and how the content is physically stored. Wikis also offer built-in search, visual comparisons between versions and full audit trails.

Semantic Web

Analysis By: David Cearley; Rita E. Knox

Definition: The Semantic Web is a grand vision for the future of the Web, as well as a collection of individual technologies to implement this vision. The Semantic Web was first described in detail by Tim Berners-Lee in 2000. It envisions a shift from the current "Web of documents" to a future "Web of data," where information is richly described in data structures. It uses an array of technology standards, formats and languages (for example, XML, Resource Description Framework [RDF] and Web Ontology Language [OWL]) to enable this idealized future. It is focused on creating comprehensive vocabularies and ontologies to describe not only data elements and their relationships to one another, but also higher-level concepts that can only be inferred from these relationships. The Semantic Web deals with the content continuum from unstructured to structured data, and it emphasizes the creation of RDF and XML databases to store the semantic information. A primary goal of the Semantic Web is to make it easier for machines to understand and process information through the use of these semantic elements. No single vendor provides the "Semantic Web," but various vendors provide tools (such as RDF stores and ontology management) to build elements of the Semantic Web or incorporate Semantic Web technologies within a broader solution (such as programming environments and metadata management).

SOA

Analysis By: Roy Schulte; Yefim Natis

Definition: Service-oriented architecture (SOA) is a style of application architecture. An application is an SOA application if it is modular; the modules are distributable; software developers have written or generated interface metadata that specifies an explicit contract so that another developer can find and use the service; the interface is separate from the implementation (code and data) of the service provider; and the services are shareable — that is, designed and deployed in a manner that enables them to be invoked successively by disparate consumers. Unlike some other types of distributed computing, services in SOA can be shared across applications running on disparate platforms and are inherently easier to integrate with software from other development teams.

Location-Aware Technology

Analysis By: Monica Basso

Definition: Location-aware technology is the use of GPS, assisted GPS (A-GPS), Enhanced Observed Time Difference (EOTD), enhanced GPS (E-GPS) and other technologies in the wireless networks (WAN and LAN) and handsets to locate a mobile user.

Location-Aware Applications

Analysis By: Monica Basso

Definition: Location-aware applications are mobile enterprise applications that exploit the geographical position of a mobile worker or an asset, mainly through satellite positioning technologies, such as GPS, or through location technologies in the cellular network and mobile devices — for example, fleet management applications with mapping, navigation and routing functionalities; government inspections; and integration with geographic information system applications.

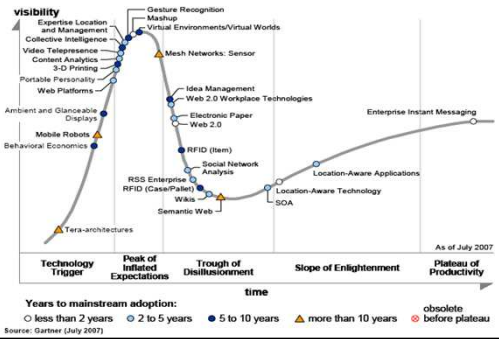
Enterprise Instant Messaging

Analysis By: David Mario Smith

Definition: Enterprise instant messaging (IM) is real-time messaging that passes within private and public networks between two or more endpoints or people. It is a business-grade system that can help satisfy internal business concerns for security and legal compliance.

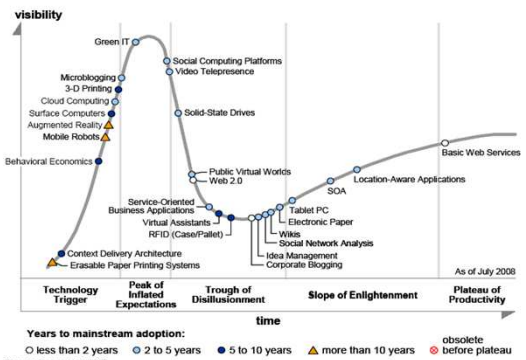
Hype Cycle-2007

Figure 1. Hype Cycle for Emerging Technologies, 2007



Source: Gartner (July 2007)

Figure 1. Hype Cycle for Emerging Technologies, 2008



Source: Gartner (July 2008)

Prioritás mátrix-2007

Figure 2. Priority Matrix for Emerging Technologies, 2007

benefit	less than 2 years	2 to 5 years	5 to 10 years	more than 10 years
transformational	Web 2.0	SOA Web 2.0 Workplace Technologies Web Platforms	3-D Printing Collective Intelligence RFID (Case/Pallet) RFID (Item) Virtual Environments/ Virtual Worlds	Mobile Robots
high	Enterprise Instant Messaging Location-Aware Technology Mashup	Electronic Paper Expertise Location and Management Location-Aware Applications Portable Personality Social Network Analysis	Behavioral Economics	Mesh Networks: Sensor Semantic Web Tera-architectures
moderate		Content Analytics RSS Enterprise Video Telepresence Wikis	Ambient and Glanceable Displays Idea Management	
low			Gesture Recognition	

As of July 2007

Source: Gartner (July 2007)

Publication Date: 13 July 2007/ID Number: G00149712

Gartner

Figure 2. Priority Matrix for Emerging Technologies, 2008

benefit	less than 2 years	2 to 5 years	5 to 10 years	more than 10 years
transformational	Web 2.0	Cloud Computing Public Virtual Worlds SOA	3-D Printing Context Delivery Architecture RFID (Case/Pallet)	Mobile Robots
high		Electronic Paper Green IT Location-Aware Applications Service-Oriented Business Applications Solid-State Drives	Behavioral Economics	Augmented Reality
moderate	Basic Web Services Corporate Blogging	Idea Management Microblogging Social Computing Platforms Social Network Analysis Tablet PC Video Telepresence Wikis	Surface Computers Virtual Assistants	Erasable Paper Printing Systems
low				

As of July 2008

Source: Gartner (July 2008)

The following technologies and trends are at or around the peak of hype during 2008:

- **Green IT.** Along with broader societal pressure for environmentally sustainable solutions, IT has the opportunity — and in many cases, a requirement — to improve the "greenness" of its own activities, as well as to contribute to broader company and industry environmental initiatives.
- **Cloud computing.** As enterprises seek to consume their IT services in the most cost-effective way, interest is growing in drawing a broad range of services (for example, computational power, storage and business applications) from the "cloud," rather than from on-premises equipment. Many types of technology providers are aligning themselves with this trend, with the result that confusion and hype will continue for at least another year before distinct submarkets and market leaders emerge.
- **Social computing platforms.** Following the phenomenal success of consumer-oriented social networking sites, such as MySpace and Facebook, enterprises are examining the role that these sites, or their enterprise-grade equivalents, will play in future collaboration environments. The scope is also expanding to incorporate the notion of social "platforms," or environments for a broad range of developers to build on the basic application.
- **Video telepresence.** High-end videoconferencing systems (for example, from HP, Cisco, Teliris and others) that utilize large, high-definition (HD) displays and components to show life-size images of participants in meeting rooms or suites have proven significantly more-effective than earlier generations of videoconferencing technology in providing a strong sense of in-room presence between remote participants. High cost is currently the barrier to broader adoption.
- **Microblogging.** Pioneered by Twitter (although other services are becoming available), microblogging is a relatively new addition to the world of social networking, in which contributors post a stream of very short (less than 140 characters) messages providing information about their current activity or thoughts, which can then be subscribed to by others. The phenomenon has caught on among certain online communities, and leading-edge enterprises are investigating its role in enhancing other social media and channels.

Új elemek

- Context Delivery Architecture
- Surface Computing
- Cloud Computing
- Green IT
- Public Virtual World
- Basic Web services

CODA-Context Delivery architecture

Definition: "Context" describes the environment or setting in which something occurs. From a business perspective, context can be an employee making a decision with the help of colleagues who happen to be online at that moment, or a consumer who, based on proximity and previous history, decides to frequent a particular merchant or restaurant. In these cases, context is used from a subjective perspective — most end users grasp the concept of the added value of making informed, context-aware decisions. From a software perspective, context is information that is relevant to the functioning of the process, but is not essential to it, and, in the absence of it, the software still is operational. In some scenarios, context-aware systems monitor context for notable changes and patterns, and may be the only function of software — the anticipation of needs. Context-aware computing is implemented in silos that anticipate where a particular person, group or business process profits from being situationally aware. To replicate, scale and integrate such systems, certain repeatable patterns emerge that will require a new enterprise solution architecture known as context delivery architecture (CoDA).

Context delivery architecture

Business Impact: Context awareness is a distinguishing characteristic of some leading software solutions, including Amazon e-commerce, Google Search and documents, Facebook, and others. During the next three to five years, CoDA will have high impact among Type A businesses in two areas: extending e-commerce and m-commerce initiatives toward consumers, and increasing the efficiency and productivity of the businesses' knowledge workers and business partners. Context-aware computing will evolve incrementally, without the use of a standard or shared CoDA model. Emergence of formal CoDA protocols and principles in future years will translate into a new technology category and feature set affecting all application infrastructure and business application providers.

Benefit Rating: Transformational

Market Penetration: Less than 1% of target audience

Surface Computers

Analysis By: Jackie Fenn

Definition: Surface computers are large-screen displays that support interaction via touch or gesture. The display can recognize more than one touch at a time, enabling multiple users to interact or work collaboratively. They may be delivered as wall-mounted displays or may be built into a tabletop. Some also have the capability to recognize physical objects marked with a special ID tag, allowing context-sensitive information to be provided when items are placed on the display.

Position and Adoption Speed Justification: Building on many years of research, surface computers have been commercialized during 2007 and 2008, including the high-profile launch of Microsoft's Surface tabletop computer targeted at the hospitality and retail industries, and HP's consumer-oriented TouchSmart system. Microsoft's Surface joins other pioneering displays, such as Applied Minds' TouchTable (spun out as TouchTable Inc.) and Savant's Rosie Surface coffee table. Because of the novelty of the technology, it will take several years for the industry to identify the most useful applications and to refine the performance and the development tools.

User Advice: Early adopters with customer-facing, kiosk-style uses should evaluate current products, particularly where high levels of graphical content are involved. However, the justification for individual workstation use or simple transactional kiosks is not yet compelling. Longer term, there is a major potential for innovative redesign of applications and interactions based on surface computing, with touch and gesture interfaces as well as interactions with real-world objects on or near the screen.

Cloud Computing

Analysis By: Gene Phifer; David Mitchell Smith

Definition: Gartner defines "cloud computing" as "a style of computing where massively scalable IT-enabled capabilities are delivered 'as a service' to external customers using Internet technologies."

Position and Adoption Speed Justification: Users are already changing their buying behaviors. Although it is unlikely that they will completely abandon on-premises models, or that they will buy complex mission-critical processes as services through the cloud, there will be a movement to consume services in a more cost-effective way.

User Advice: Vendor organizations must get to cloud-enabled products within the next 12 months, while user organizations must demand road maps for the cloud from their vendors today. Once this has been done, vendors and users must agree on whether the cloud model will work in the long term.

Business Impact: The cloud-computing model is changing the way the IT industry looks at user and vendor relationships. As service provisions (a critical aspect of cloud computing) grow, vendors must become or partner with service providers to deliver their technologies indirectly to users. User organizations will watch portfolios of owned technologies decline as service portfolios grow. The key activity will be to determine which cloud services will be viable, and when.

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Green IT

Analysis By: Simon Mingay

Definition: Green IT involves the optimal use of information and communication technology (ICT) for managing the environmental sustainability of enterprise operations and the supply chain, as well as that of its products, services and resources throughout their life cycles. This definition addresses the environmental issues associated with IT infrastructure itself, as well as with the applications of IT.

Position and Adoption Speed Justification: The tipping point for the issue of green IT, or environmental sustainability in the IT industry, came in 2007. We expect this issue to gain momentum through 2009, driven primarily by increased concerns about climate change, as well as the clear opportunity for organizations to save money and avoid cost through increased energy efficiency. More importantly, 2008 and 2009 will bring an accelerated debate, innovation and exploration in terms of how IT can be used to help tackle climate change.

Note that a "high" benefit rating applies to the impact of green IT on organizations, not the impact on climate change, which is outside the scope of this research (and potentially transformational). Note also that, as with many technologies and trends, the benefit rating varies by industry.

User Advice: The IT-related issues associated with environmental sustainability must influence and be built into an IT strategy. That includes assessing IT's environmental impact, as well as what must be done to help the enterprise meet growing environment-related challenges and exploit environment-related opportunities. The IT organization should create its own set of environmental metrics, and integrate those metrics into its overall IT dashboard.

Business Impact: Environmental concerns — and, most directly, climate change — will have a substantial impact on the IT industry's products and services, as well as the choices that IT organizations will make. By 2009, more than one-third of IT organizations will have one or more environmental criteria in their top six buying criteria for IT-related goods and services. In most cases, the benefit of green IT initiatives includes potentially exploiting the business opportunities of a low-carbon and energy-constrained economy through new or modified products or services, and improved resource efficiency (in particular, energy and carbon) across the business, with the associated cost-benefits. For example, IT has a major role to play in reducing travel. But the benefits associated with both corporate social responsibility/branding and risk management will be increasingly important.

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Emerging

Public Virtual Worlds

Definition: A public virtual world is an online (and hosted on a publicly accessible infrastructure) networked virtual environment in which participants are immersed in a 3-D representation of a virtual space and interact with other participants through an avatar — a representation of themselves in the virtual world.

Position and Adoption Speed Justification: The growth of publicly accessible virtual worlds — such as Second Life (from Linden Lab), There (built by Makena Technologies), Cyworld, Habbo (owned and operated by Sulake) and many others — has been rapid, with initial sign-ups increasing exponentially, although there is a steep dropout rate. Media attention is high, and significant numbers of enterprises are building a presence to take advantage of a potentially significant new channel and market. Second Life remains the primary target for mainstream corporate activity, but availability and security issues remain, and resident behavior remains somewhat negative toward enterprises. Considerable skepticism still exists among business and IT leaders as to the value of the consumer-led phenomenon of publicly accessible virtual worlds, which will further accelerate the move into the Trough of Disillusionment.

In contrast, public virtual worlds launched as direct media-related tie-ins, such as Virtual Hills and similar worlds operated on behalf of MTV, were developed to support physical products (especially toys) such as those from Mattel. Barbie Girls and virtual worlds targeted generally at subteens (Disney's Club Penguin, for example) are growing rapidly, with new offerings launched every week. The success of these tightly focused environments contrasts starkly with the slow growth and stagnation of virtual worlds targeted at older audiences or at a more general (that is, less focused) "social networking" function.

User Advice: The value of virtual worlds for enterprises lies primarily in their ability to deliver a rich and immersive collaborative environment. However, security and reliability concerns make public worlds less desirable for use inside enterprises, where sensitive discussions may occur. Enterprises should investigate the possible use of private worlds in this context, but they should continue to investigate and experiment with public worlds as valuable learning environments and to better understand the dynamics and values of these rapidly evolving and emergent environments. In the longer term, virtual worlds will emerge as important media channels and community access mechanisms for enterprises seeking to tap into the broader community and to engage the community actively in their business models.

Basic Web Services

Analysis By: Daniel Sholler

Definition: Basic Web services have remotely accessible software interfaces that use core Web services standards — Web Services Description Language (WSDL) for service interface definition and Simple Object Access Protocol (SOAP) for service interface invocation. The interfaces may be implemented by dedicated software modules, by adapters for pre-existing software systems, or by tools that implement orchestrated or composed assemblies of software modules. The consumer is unaware of these distinctions.

Service calls are typically request/reply, although they can be one-way, or (in an increasing number of cases) event-driven. In all cases, the caller addresses the service directly by name and is dependent on service availability at the time of the call. In other words, the caller has a "dependent relationship" with the service.

Basic Web services are primarily used to achieve interoperability between corporate systems, and can be leveraged across the Internet. However, they don't offer capabilities beyond basic connectivity. Transaction management, context propagation, access control and other enterprise-class intersystem communication features require second-generation, advanced Web services support. Therefore, basic Web services are typically deployed for stateless client-to-server connections.

Basic Web services standards have achieved a remarkable level of adoption. They're specified by a number of industry consortia — most notably, the Organization for the Advancement of Structured Information Standards (OASIS). The Web Services Interoperability Organization (www.ws-i.org) has created a set of profiles that describe the appropriate use of standards to achieve interoperability. Web services have become an essential, supported feature for most modern software products.

Position and Adoption Speed Justification: Basic Web services are used widely and supported by the vast majority of software tools. However, their basic quality-of-service support prevents them from being used for more-demanding and mission-critical transactions. The technology is approaching its plateau and will re-emerge with advanced Web-services-enabled products.

User Advice: Recognize the core objectives and limitations of basic Web services design. Avoid overloading the technology, but assume that properly using basic Web services is a safe, long-term investment.

Business Impact: With Web services support, more applications are created that leverage a variety of shared resources. This reinvigorates desktop-based software offerings and improves the reuse of server-based solutions. However, most of the effect today remains on client/server information-retrieval application styles, and on the least-demanding transactional applications.

Benefit Rating: Moderate

Market Penetration: More than 50% of target audience

Maturity: Early mainstream

Recommended Reading: "Predicts 2008: Web Technologies Continue to Drive Business Innovation"

"Predicts 2006: Web Services Continue to Mature"

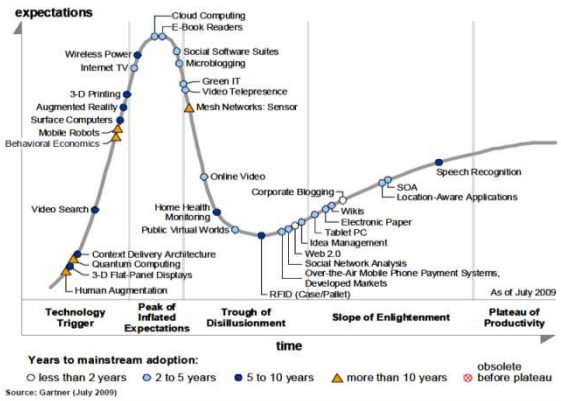
"Predicts 2005: The Impact of Web Services Still Grows"

New on the 2009 Hype Cycle for Emerging Technologies

The following items have been added to the 2009 Emerging Technologies Hype Cycle that were not part of the 2008 Hype Cycle:

- **Human Augmentation** has been added to highlight this embryonic but potentially highly disruptive research endeavor.
- **3-D Flat-Panel Displays, Video Search** and **Wireless Power** have been included to show the beginnings of real progress in these challenging technology areas.
- **Internet TV, Online Video** and **E-Book Readers** have been added due to their high levels of visibility. These topics have been tracked in previous years on the Media Industry Hype Cycle.
- **Home Health Monitoring** has been added as a topic that we have been covering as a trend in the broader emerging-trends research, but not as a specific entry on the Hype Cycle.
- **Quantum Computing, Mesh Networks: Sensor,** and **Over-the-Air Mobile Phone Payment Systems for Development Markets** have been added to revisit the slow development of "long fuse" (that is, slow-moving) technologies that we have tracked in earlier years on the Emerging Technologies Hype Cycle (in the case of Quantum Computing, for over a decade).
- **Speech Recognition** has been added as a single entry, unifying several entries on other Hype Cycles with different applications of speech recognition (for example, contact center, mobile and desktop), to revisit a topic that has been moving extremely slowly through the Hype Cycle since it was first created.

Figure 1. Hype Cycle for Emerging Technologies, 2009



Source: Gartner (July 2009)

Figure 2. Priority Matrix for Emerging Technologies, 2009

benefit	less than 2 years	2 to 5 years	5 to 10 years	more than 10 years
transformational	Web 2.0	Cloud Computing Internet TV Public Virtual Worlds SOA	3-D Printing Context Delivery Architecture RFID (Case/Pallet)	Human Augmentation Mobile Robots Quantum Computing
high		E-Book Readers Electronic Paper Green IT Location-Aware Applications Online Video Social Network Analysis Social Software Suites	Augmented Reality Home Health Monitoring Wireless Power	Behavioral Economics Mesh Networks: Sensor
moderate	Corporate Blogging	Idea Management Microblogging Over-the-Air Mobile Phone Payment Systems, Developed Markets Tablet PC Video Telepresence Wikis	3-D Flat-Panel Displays Speech Recognition Surface Computers Video Search	
low				

As of July 2009

Source: Gartner (July 2009)

On the Rise

Several slow-moving technologies are continuing their climb from the Technology Trigger to the Peak of Inflated Expectations:

- **3-D Printers**, which create a physical model from a digital design, have transformational potential in the manufacturing, replacement parts and design industries.
- **Augmented Reality**, where digital information is overlaid on the user's view of the real world, is moving from a niche industrial technology to an interface of broad applicability through location sensing and camera-based image recognition in mobile phones.
- **Surface Computing** has moved firmly from a research curiosity to deployed technology, with applications in retail, hospitality and other customer-facing environments that warrant the high price and custom development.
- **Mobile Robots** are starting to provide practical value in home and enterprise markets for mobile videoconferencing, security, warehousing, and carrying and delivering items.
- **Behavioral Economics**, the science of how people are influenced in their decision making, has enjoyed a higher level of visibility due to its well-publicized use in Obama's presidential campaign, but it remains a severely underutilized body of knowledge with high potential for driving good investment decisions.

At the Peak

The following technologies and trends are at the Peak of Inflated Expectations during 2009:

- **Cloud Computing.** As enterprises seek to consume their IT services in the most cost-effective way, interest is growing in drawing a broad range of services (for example, computational power, storage and business applications) from the "cloud," rather than from on-premises equipment. The levels of hype around cloud computing in the IT industry are deafening, with every vendor expounding its cloud strategy and variations, such as private cloud computing and hybrid approaches, compounding the hype.
- **E-Book Readers.** Sony's e-book reader and Amazon's Kindle have attracted a great deal of attention during 2009, which has led us to reassess our position of e-book readers from post-peak 35% (see "Hype Cycle for Consumer Technologies, 2008") back to the peak. However, the devices still suffer from proprietary file formats and digital rights management technologies, which along with price, are limiting their adoption and will drive them back toward the Trough of Disillusionment.
- **Wireless Power.** Wireless charging schemes are being designed for use in desktop surfaces and similar environments that will charge a mobile device when it is placed onto the surface. The core technologies have been around for many years (such as for recharging electric toothbrushes) but are being delivered in more flexible, efficient and addressable forms.
- **Internet TV.** The latest manifestation of the long-promised transformation of TV viewing through the power of the Internet is represented by sites such as Hulu, which deliver a TV-like experience (full-screen, long-form, professional content) using the Internet in place of conventional broadcast channels. The delivery of free, legal content supported by seemingly tolerable levels of commercial interruption is gaining traction as an alternative route for TV programming.