

technology viewpoints

July 2008

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This issue of CGI's *Technology Viewpoints* takes a look at today's major business developments and IT enablers, including:

- Web 2.0
- Service oriented architecture (SOA)
- Business process management (BPM)
- Identity and access management (IAM)
- Cloud computing and Software as a Service (SaaS)

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Perspectives in Technology for Evolving and Adapting Enterprises

Change is a fact of life – particularly with technology, which continuously evolves and influences the way we do business. In general, we cannot predict what changes will affect us. Yet successful enterprises are those that embrace change and use it, rather than resist or merely accept it. To achieve agility, the business models and technologies leading organizations adopt must be designed to adapt.

Vendors present easy, one-size-fits-all solutions – ready-to-use “silver bullets.” In information technology, these silver bullets arise with increasing rapidity, each supposedly overcoming the shortcomings of their predecessors and, of course, representing the one true gospel of the future. We also are presented with multiple silver bullets – each providing similar yet slightly different capabilities.

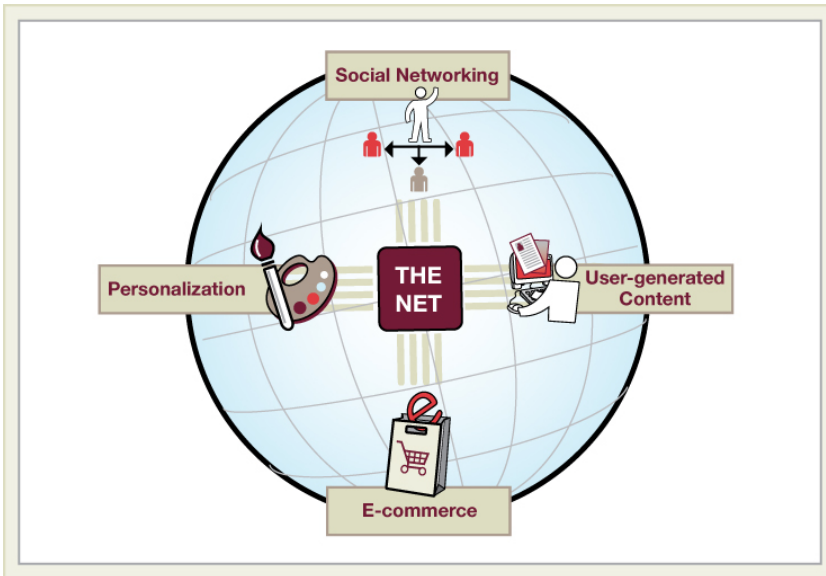
In CGI's experience, most of these miracle solutions deliver some value, but none of them alone can deliver what is promised. The best solutions understand how all of them relate to one another and to long-standing best practices (and bad practices – those who forget the past are bound to repeat it).

In this issue of *Technology Viewpoints*, we present a vision of the key, current business developments and their IT enablers, in which the whole is truly greater than the sum of the parts. We look at the challenges and opportunities presented to today's evolving and adapting enterprise from six key viewpoints:

1. **Web 2.0 and the networked world:** A discussion on the interrelationship of Web 2.0, user interaction and involvement styles, and emerging business models
2. **Changing business models:** A look at where we've been, where we are and where we need to evolve
3. **The role of key technologies and practices:** Insights into how business models need to evolve in relation to SOA, BPM, Web 2.0 and IAM
4. **SOA and BPM:** The value that SOA and BPM can bring without forgetting “the legacy”
5. **IAM and semantics:** The challenges of IAM, which have been made more critical by the capabilities of the networked world
6. **Cloud computing and SaaS:** The effect of cloud computing and SaaS on the whole picture

Finally, we conclude with advice on how organizations can take the information described within all of these viewpoints to develop solutions that evolve and adapt within our ever-changing world.

Web 2.0 and the networked world



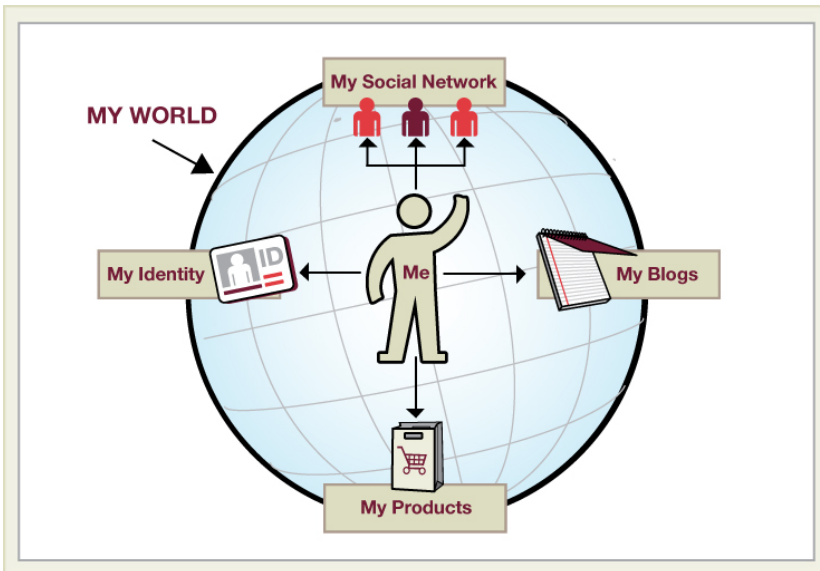
With so much media coverage and water cooler discussion, Web 2.0 has its share of definitions. So what is it really? Web 2.0 is a convenient term for the current stage of the continuing evolution of IT and communication as applied to the Internet.

It's clear that there has been a qualitative and quantitative change in how people use the Internet compared with just five years ago. People and organizations are involved increasingly in communicating and doing business in a distributed, collaborative and network-centric manner. This also can be called the networked world.

Significantly, it is people – not large organizations – who are leading these new developments. In the diagram above, some of the key elements of Web 2.0 are represented. Most of these are independent of any enterprise specifics. Only the area of e-commerce (or e-government, e-health and so on) reasonably can be said to be enterprise-led, and this is the area currently least well adapted to Web 2.0 practices.

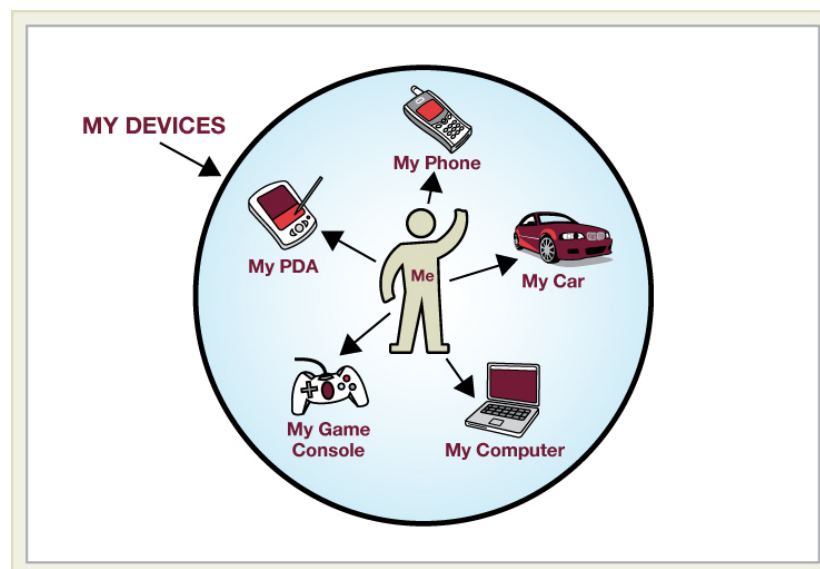
For an enterprise to successfully adopt these practices, it must understand what it means to inhabit this networked world and the needs and desires of the consumers of its services in that context. It also must understand that evolution does not cease and that the organization must adapt to new developments coming out of “left field.” Without such an understanding, all the mashups, blogs and collaboration offerings will result in a time consuming and risk-laden waste of money.

User-centricity



One of the key features of the networked world is its user-centric nature. The relationship of the individual to networked services has changed from a passive consumer to an increasingly active participant. The individual can have many roles in the network as consumer, contributor or supplier; as an individual or as a representative of an enterprise; as a customer; or as an employee. It's unsurprising therefore that one of the characteristics emerging in Web 2.0 is the demand for user control over identity.

Always on



WHAT'S IN A NAME

During the early development of technology tools and business approaches, terms can take on various meanings. Here are CGI's definitions of the main terms used in this paper:

- **Web 2.0:** From an enterprise focus, Web 2.0 is about bringing the enterprise to the consumer and the consumer to the enterprise.
- **SOA (service oriented architecture):** SOA is an architectural approach built on a technology foundation that packages reusable business activity components as well-defined services.
- **BPM (business process modeling):** BPM is a practice and set of technologies and standards for the design, execution, monitoring and optimization of complex business processes.
- **IAM (identity and access management):** IAM strategies and tools enable the creative use of personal profiles and reputation and help to ensure the privacy and proper use of information and services.
- **Cloud computing:** This term refers to computing resources accessed on-demand over the Web and includes **Software as a Service (SaaS)**.

Another key feature of the networked world is ubiquitous connectivity. People can go online with their desktop, laptop, PDA, phone, games console and even their car. These devices differ in appearance and how they operate – and have different capabilities – yet we want them to perform many common activities. The “always on” preference, therefore, demonstrates how Web 2.0 is changing the landscape: Enterprises must adapt and respond to the preferences of their customers regardless and in spite of technology capabilities and restrictions.

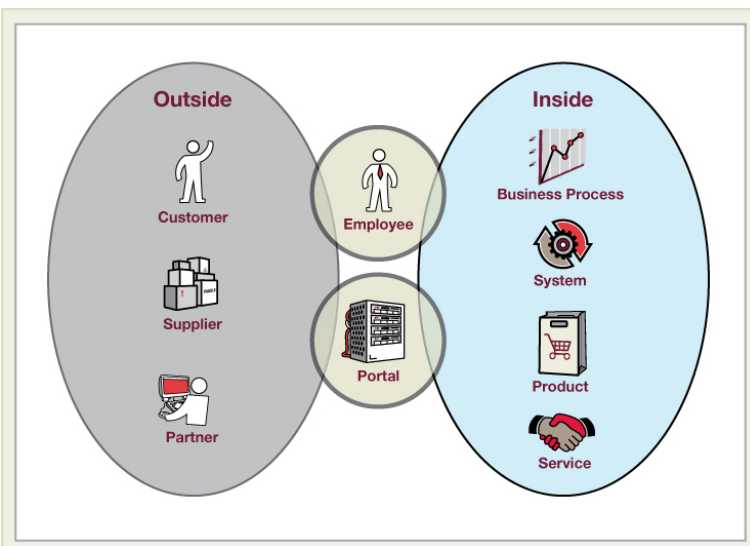
On the one hand, Web 2.0 is characterized by ubiquitous connectivity and, on the other, it's actually the major stimulus for the continued development of that connectivity. Conversely, the existence of multiple device types drives the need for Web 2.0 solutions to be suitable for multiple devices and interfaces.

One day there may be one device that is capable of and convenient for all kinds of circumstances. Perhaps it will be a portable core device that simply plugs into all of our different interface and display devices. That may be one of the key enablers of the next generation of networked applications – yet the demands described above are happening now.

Changing business models

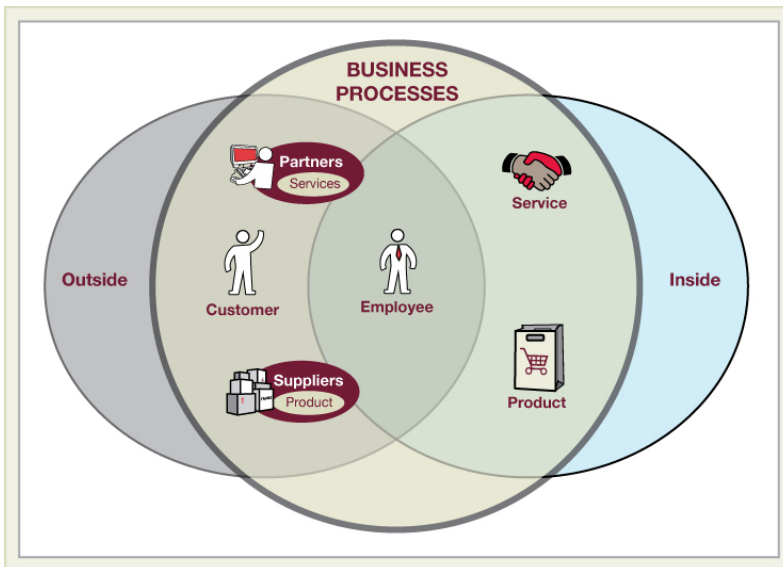
The way we were

Most enterprise IT systems still look inward. There is an “inside” – the enterprise – and an “outside” – customers, partners and suppliers. What lies outside only communicates with the enterprise through a layer of employees, paper, faxes and perhaps EDI exchanges. Even where some kind of B2C portal exists, it is often a façade on an existing manual process. As a result, the enterprise's IT infrastructure is built on a business model that is increasingly out of date, resulting in the inability of IT to support organizations in the way they need to interact today.



Where we are

In reality, “inside” and “outside” are overlapping concepts – as identified in the diagram below. This doesn’t mean that enterprise boundaries are unclear, but simply that enterprises increasingly interact with their customers, partners and suppliers in a value network often referred to as the extended enterprise. What characterizes the extended enterprise is that each enterprise’s business processes encompass the activities of other parties acting as partners and suppliers. IT systems still don’t support this well. Yet technology is not the problem; rather, IT doesn’t make the transition to new models easily.



Where we need to be

Web 2.0 and the extended enterprise will combine to create new opportunities and challenges. If enterprises are to successfully adapt, much will need to change in how information technology is delivered and managed. This involves an evolution of business models, the Internet and both human and organizational behaviors.

Key technologies and practices

The following section examines key technologies and practices that will support the evolution cited above – and that will make it easier to support whatever new technologies and business processes come our way.

THE ENTERPRISE EVOLUTION

Most enterprise systems still look inward, meaning that the organization communicates with customers, suppliers and the like through a layer of business processes and supporting technologies that are often a façade for underlying manual processes.

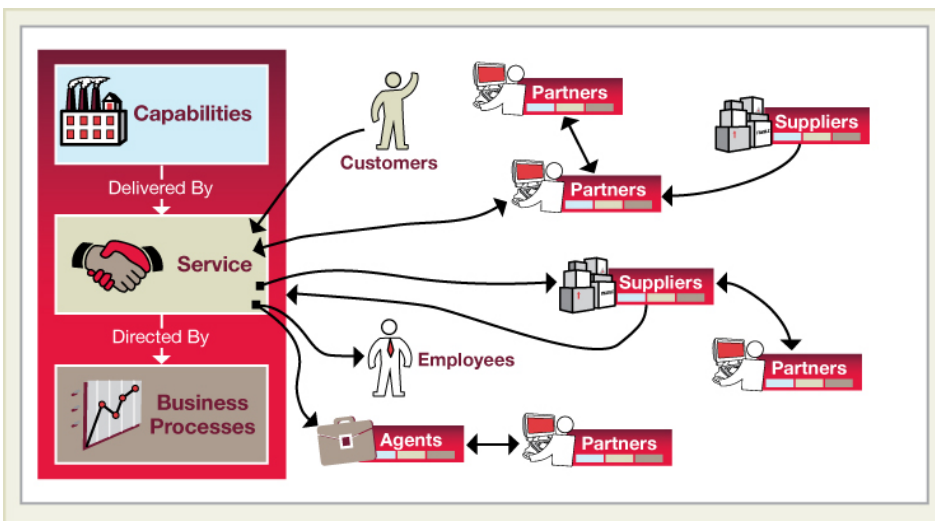
Organizations are evolving from this stance to interact with their external stakeholders in a more dynamic manner. This concept of the extended enterprise allows the organization’s business processes and supporting technologies to automatically support and include the activities of its partners, suppliers and customers. Yet, for most, the transition to this model is still a large work in process.

In looking at the rapid movement toward Web 2.0, organizations need to successfully adopt the true extended enterprise model. This involves a focus on people (change management), processes (the evolution of business models) and technologies (a focus on how IT is delivered and managed).

The role of BPM and SOA

The below diagram – “The Extended Enterprise” – presents an enterprise-centric view of the extended enterprise. It describes how the enterprise is part of a network of collaborating entities, each of which has services to deliver and business processes, which use and reuse those services. In the extended enterprise, the business processes of each individual enterprise are dependent on the services of other enterprises. When looking at the whole picture, it's apparent that one enterprise is only central from the perspective of its own business processes. If we superimpose the views of all the individual enterprises, we see a complex network of collaboration.

Inside that network, each partner has its own capabilities, which define the roles the partner can play within the network. These capabilities are delivered to the rest of the network on request as services. Services provide a well-structured, easy-to-use and business-centric interface for partners who need to know nothing about how the capabilities are implemented as long as they see the results they expect. Services are combined and recombined by all the business processes that use them. Business processes themselves are not static but must be monitored constantly and optimized to respond to changing circumstances.

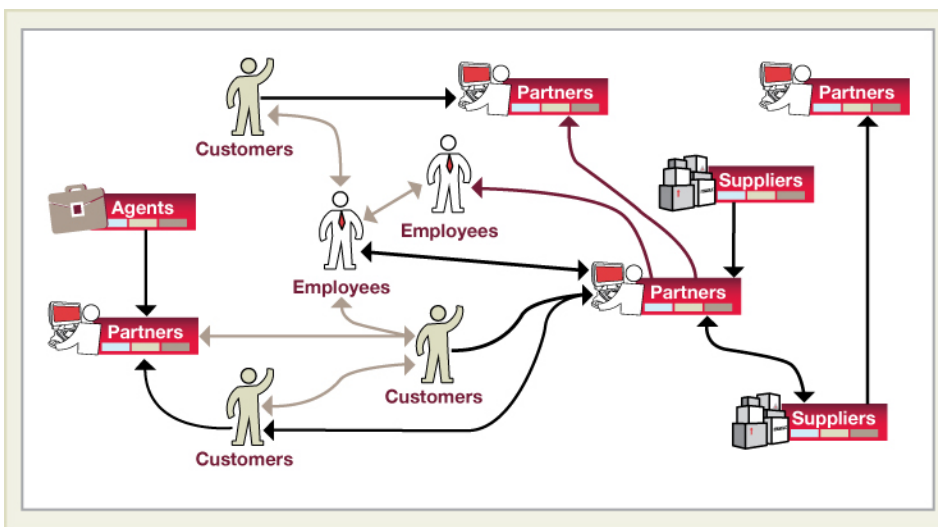


The role of Web 2.0

The diagram on the following page – “The role of Web 2.0” – presents a collaboration-centric view of the extended enterprise. Enterprises are increasingly aware that they have to adopt Web 2.0 concepts. Doing so will increase their popularity and services take-up among customers. It also will help motivate employees by giving them more opportunities to make use of enterprise intelligence and to leverage the Web to help them in their work. Failing to do so will eventually leave an enterprise isolated and unable to respond to change.

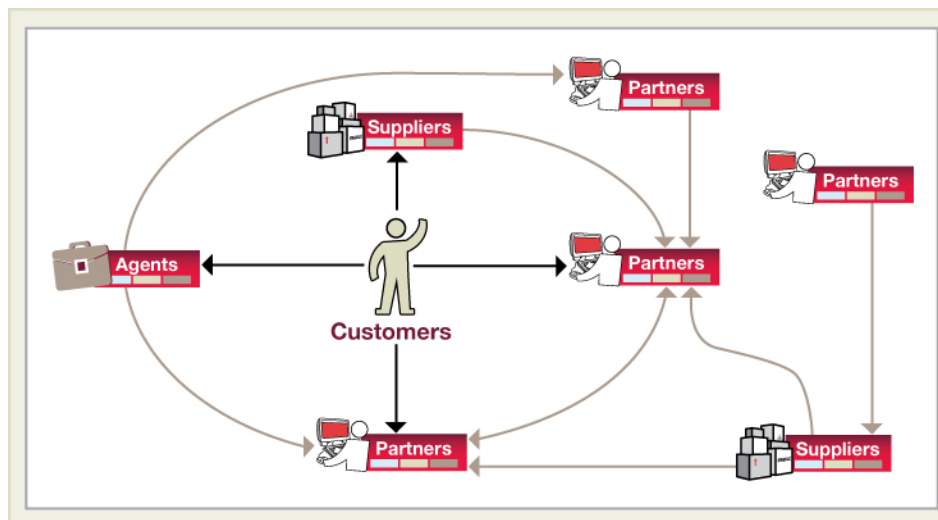
Enterprises can adopt Web 2.0 both internally and externally. Knowledge networks can be developed rapidly using collaboration tools, and social networking techniques can be used to communicate, learn and personalize both service to customers and delivery by employees. Enterprise mash-up enablement can help both customers and employees get increased value from existing enterprise resources.

An organization's adoption of Web 2.0 is often referred to as Enterprise 2.0. CGI regards this as just a part of the universe of changes that leading organizations are adopting in their efforts to continuously adapt and evolve.



The role of identity

In the below customer-centric view of the extended enterprise, the diagram depicts how the role of the customer will change significantly. This will happen as a result of several influences, including the movement toward the extended enterprise, the evolution of Enterprise 2.0 features, and other external developments.



Even today, the demand for user-centric identity is growing. This is a result of the increasing number of Web sites and applications requiring users to provide the same or similar information about themselves. Irritation in remembering many user IDs and passwords aside, more and more sites are requiring additional personal information. The inhabitants of the networked world want to see this simplified; however, they also want to control what information they provide to what supplier under what circumstances.

Social networking in particular provides an additional stimulus, as people often want to have different “identities” on different sites. Identity is not just about access control. In the Web 2.0 world it is clear that the concepts of reputation and trust are increasingly important. Both individuals and enterprises have a vital interest in establishing and protecting their reputation. Without a good reputation, you can't do business in this world. Strong, trusted relationships and supporting standards and software are the glue that will hold the network together.

SOA and BPM

Two of the key practices that help us to deliver the big picture are SOA and BPM. Originally emerging from quite different areas, they are in fact essential partners in delivering the agility that enterprises need.

Using BPM to manage, control and improve

As enterprises' business processes are increasingly integrated with those of partners and suppliers, the demands on business process management increase. Processes must be flexible, well managed and monitored, and continually adaptable for optimizations. The underlying toolset, typically referred to as a business process management suite (BPMS), must support the whole process lifecycle. Simple BPEL execution engines are no longer satisfactory.

Using SOA to deliver service

At the same time, the services involved in the business process must be equally well designed, business-centric and technically adept. A meaningful SOA always has been far more about architecture than technology, but this is true now more than ever. ESBs and associated technology only can deliver the needed flexibility if the end-to-end architecture is designed with this in mind – and if maximum use is made of open standards.

Legacy enablement

One of the largest benefits of SOA is its ability to make use of current investments. Enterprise legacy applications are great stores of functional knowledge and capability, making them difficult to replace. While we can't continue to use them via their old monolithic structures and inflexible user interfaces, with approaches such as SOA we can find ways to deliver their functionality in an improved way – one that supports business services that can be integrated into an enterprise's business processes. Achieving this objective is not a trivial exercise; yet there are techniques and technologies available that deliver great value at relatively low cost.

Identity and Access Management (IAM)

Identity continues to become more business relevant and complex. No longer a mere aspect of controlling enterprise IT systems access, identity is a key part of doing business. As such, it carries the elevated importance of protecting trusted relationships and the reputations of both consumers and providers. The same factors of user-centricity, extended enterprise and ubiquitous connectivity, which create the business need, also mean that traditional patterns of user provisioning and management are no longer adequate. Sticking to the old patterns will lead to monstrous and uncontrollable complexity – not just in identity management but in roles and rights management as well.

A well architected solution for IAM is a vital component of any good solution for the agile enterprise. It cannot be “grafted on” after the event.

Semantics

Relationships between parties involved in communication and commerce over the Web are vastly more numerous and complex than in traditional consumer/provider models. This is exemplified by the extended enterprise and the social computing and collaboration aspects of Web 2.0. The number of entities sharing and exchanging information is much greater and their relationships more complex and less regulated.

Even within a single enterprise, achieving a consistent understanding of the meaning and use of a piece of information has long been a difficult problem. This has roots in organizational issues – such as line of business “stovepiping” or mergers and acquisitions – and in multiple IT systems with their own data models and semantics. Creating and enforcing a single data model is virtually impossible and mapping schemas between all of the individual data sources bears a huge maintenance overhead with no direct business value.

Various approaches to addressing this problem exist. They include (inter)enterprise information architecture, master data management (MDM), self describing data (XML extensions), industry or domain specific ontologies and taxonomies, and universal translators. We group these under the general heading of semantic technology. Each approach has advantages and disadvantages in terms of scope (enterprise, web, semantics and control), agility (adaptability to change) and maturity (completeness and acceptance).

The vision of the semantic Web perhaps best sums up the final goal of these technologies; however, it is not yet a mature technology. In fact, it has been characterized by its own proponents as Web 3.0. The problems, however, will not wait that long to be resolved. CGI recognizes that any useful solution will require some combination of several approaches and a strong element of governance.

Cloud Computing and Software as a Service (SaaS)

SaaS, to some extent, is already a mature technology, but its very success raises a whole range of new demands on SaaS providers. As more enterprises adopt SaaS solutions, the goals and problems identified for enterprise IT can be exported to another platform, whose operator has no organizational loyalty to the enterprise – no reason to commit to resolutions.

In particular, IAM and associated issues of trust and reputation become even more significant. A large part of the whole picture remains outside of the SaaS provider's domain. Legacy enablement is not addressed at all by SaaS and can become more complex. A truly service oriented approach to IT is not supported by the current generation of SaaS, which is far more application than service oriented. In this sense, it is a step backward for agility.

These are not insurmountable problems. If SaaS providers can deliver more specialized application services and the cost of operation remains attractive, it is not unthinkable that it will be cheaper to replace the legacy than to service-enable it. User-centric identity may be made simpler if there are less target platforms to be managed. The development of identity providers may be accelerated for the same reasons.

Cloud computing is not a fundamentally new development. In some ways, it can be regarded as IT outsourcing exported to the Web. It has the same OpEx versus CapEx attractions as both outsourcing and SaaS. Neither SaaS nor cloud computing as such offer any technological or architectural advantage. If, however, the cloud (and we include SaaS in this concept) is understood to simply be the operational expression of the networked world, then its role is logical and perhaps inevitable.

As enterprises adopt new business developments and their IT enablers – from using cloud for parts of their computing environment to experimenting with Enterprise 2.0 and SOA – it will be only too easy to add complexity and lose sight of core business goals. As a result, organizations will need partners with experience in both the technology and practices of all of these aspects to help them understand how it all hangs together (and where it doesn't) and to help them gain real advantages from the big picture.

The Big Picture: How all of this relates and creates the agile enterprise

To pull the key viewpoints together, let's start with the always connected networked world.

First, the technologies and practices of Web 2.0 deliver the experience. In addition to social networking, mashups and the like, two other key features are fundamental to Web 2.0. As shown in the illustration on the following page, these are *mobility*, the technologies that enable ubiquitous connectivity and consistent service, and *e-commerce*, which includes the technologies and practices necessary to enable an enterprise to participate in the networked world.

PUTTING IT ALL TOGETHER

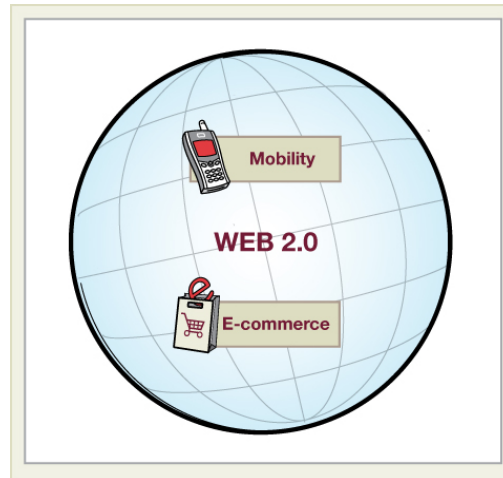
It is important to understand how the approaches and technologies discussed in this paper come together to help organizations become more agile and responsive.

To succeed, organizations need to understand how each of these technologies and practices work – and work together. It also is critical to focus on their practical, incremental adoption and evolution as it relates to organizations' business needs and goals.

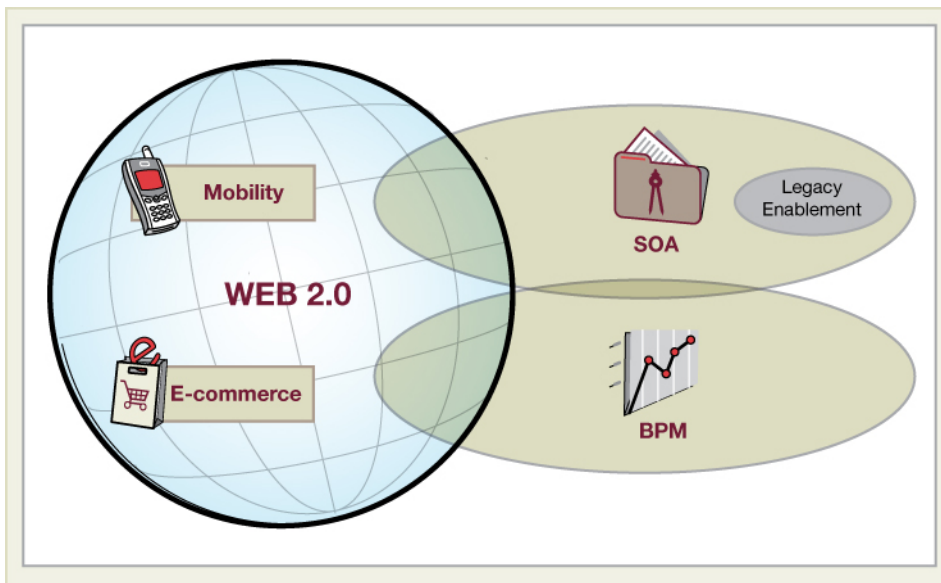
Organizations will need partners with experience in both the technology and practices of all of these aspects to help them gain real advantages from the "big picture."

Web 2.0 delivers the experience

Next, the picture expands to include components that deliver the business functionality that enables Web 2.0 features. SOA is a network of intra- and inter-enterprise services that allow an enterprise to provide service to its consumers and respond efficiently and effectively to new demands or other sources of change. We also use SOA techniques to deliver agility from legacy applications: we call this *legacy enablement*. BPM enables us to compose the services SOA provides into multiple and changing business processes and to monitor, analyze and optimize those services.

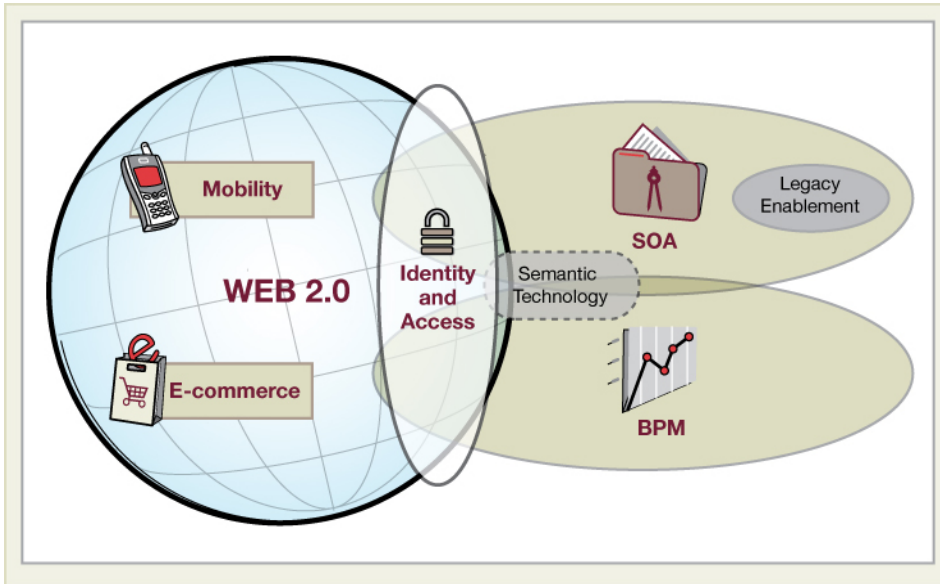


Business functionality enables Web 2.0 features



As the illustration depicts on the next page, completing the picture are the components that enable interoperability and protect information, privacy and reputation. IAM provides the capability to enable participation in business processes by all parties in the networked world. It simplifies that participation, protects all parties and creates confidence in trusted relationships and reputation. Lastly, *semantic technology* provides techniques to make information exchange reliable without enormously complex mapping systems.

The agile enterprise



CGI and the agile enterprise

CGI recognizes that adaptive and evolving enterprises only will achieve their goals if these technologies and practices are understood and applied with intelligence, vision and adaptability. With practice areas, frameworks and domain- or industry-specific applications for each of the elements described in this *Technology Viewpoints*, CGI helps clients address real-life business challenges in a manner that is designed to support change.

Our practice area specialists help clients build the picture that fits their own enterprise – the world it inhabits today and the world it will face tomorrow. Avoiding “silver bullet” offerings and one-size-fits-all solutions, CGI specializes in the intelligent application of information technology to solve real-world problems for real-world clients.

ABOUT CGI

At CGI, we're in the business of satisfying clients. For more than 30 years, we've operated upon the principles of sharing in clients' challenges and delivering quality services to address them.

A leading IT and business process services provider, CGI has approximately 27,000 professionals operating in 100+ offices worldwide, giving us close proximity to our clients. Through these offices, we offer local partnerships and a balanced blend of global delivery options to ensure clients receive the combination of value and expertise they require.

In the area of technology leadership, CGI helps organizations achieve the promises of new technologies and business approaches through a practical approach to transformation. We define success by exceeding clients' expectations and helping clients achieve superior performance.