



Making sense of SOA and today's IT innovations.

Contents

- 2 Overview**
- 3 Technology interrelation**
- 5 Cloud computing**
- 6 Information On Demand**
- 7 Service-oriented architecture**
- 8 Web 2.0**
- 8 Virtualization**
- 9 Software as a Service**
- 10 Service management**
- 11 Summary**
- 11 For more information**

Overview

The way we work and live has evolved continuously and will undoubtedly continue to do so in the future. Meanwhile, information technology has evolved with us on a parallel path. At the dawn of IT, we were forced to adjust ourselves and our behavior to act almost as extensions of the machine in order to make use of IT systems. Command line interfaces, assembly language code and manual database queries all required humans to behave like machines ourselves in order to extract any benefit from IT.

But with every stage of evolution, IT has grown successively closer to becoming a natural extension of how we work and live. We have pushed IT's evolution so that its outcomes and benefits are increasingly abstracted from the machine itself. IT performs a service. We want to consume the service without concern for what is taking place behind the veil of abstraction. The way we work and live has always been "service-oriented" in this respect. We want to focus on the outcome rather than what, how, or where the outcome was produced. We care about the ends rather than the means. IT is now becoming similarly service-oriented and has brought the co-evolving paths of our behavior and IT significantly closer together. The cell phone serves as a prime example of this evolution. Once viewed as technology, it has become simply a lifestyle and business extension, and to many teenagers, a fashion accessory. The technology is invisible.

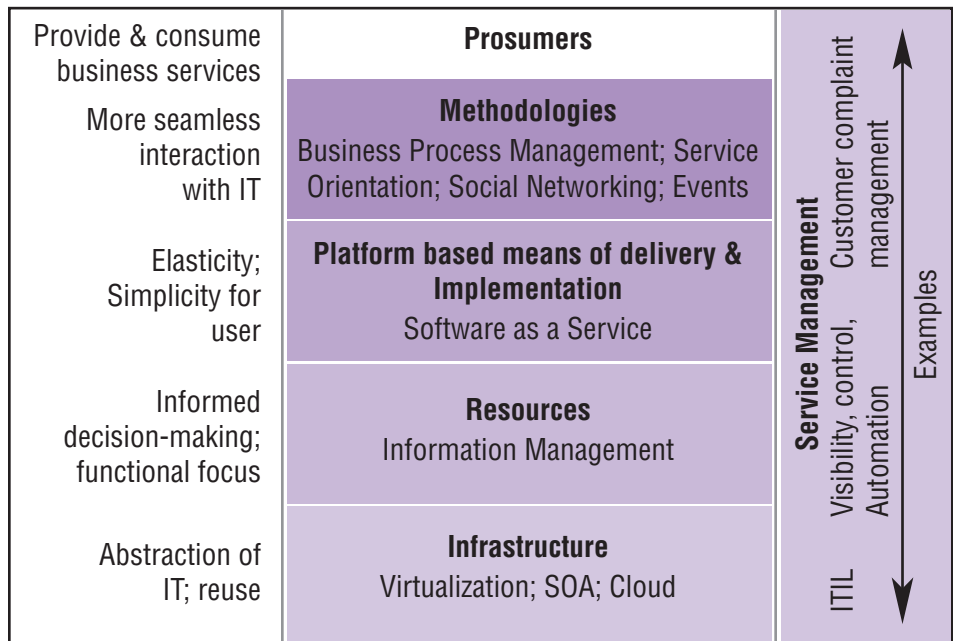
A number of interrelated IT innovations have sprung up in an effort to further close the gap between IT and the way we work and live. As this gap narrows, the business world is increasingly recognizing the strategic importance of technology initiatives in today's ultra-competitive environment. But keeping track of these initiatives can be daunting. What are they all about? Where are the overlaps? How do they complement each other? Thinking of these initiatives as independent, unrelated technology is not merely overwhelming, it is incorrect. Instead, we should consider the interrelation of these initiatives with a focus not on the technologies involved, but on how the initiatives complement each other to further close the gap between IT and our own service-oriented needs.

This paper summarizes some of the higher-profile business technology initiatives dotting today's landscape and explains some of the interrelations among them. It also delineates a common element that ties them together – business services as a reusable, dynamic means of executing tasks tailored to an industry's users, policies and methods. The purpose is to help readers cut through the sometimes intimidating array of buzzwords by illuminating real contributions that make IT fit more naturally into our lives rather than the reverse.

Technology interrelation

One way of examining interrelations among some of these initiatives is to look at how they depend on each other to deliver value to the end user. One representation of this interrelation is depicted in Figure 1. Its shortcoming is its rigid boundaries, when in fact what is depicted as distinct layers actually overlap in function and blend into each other.

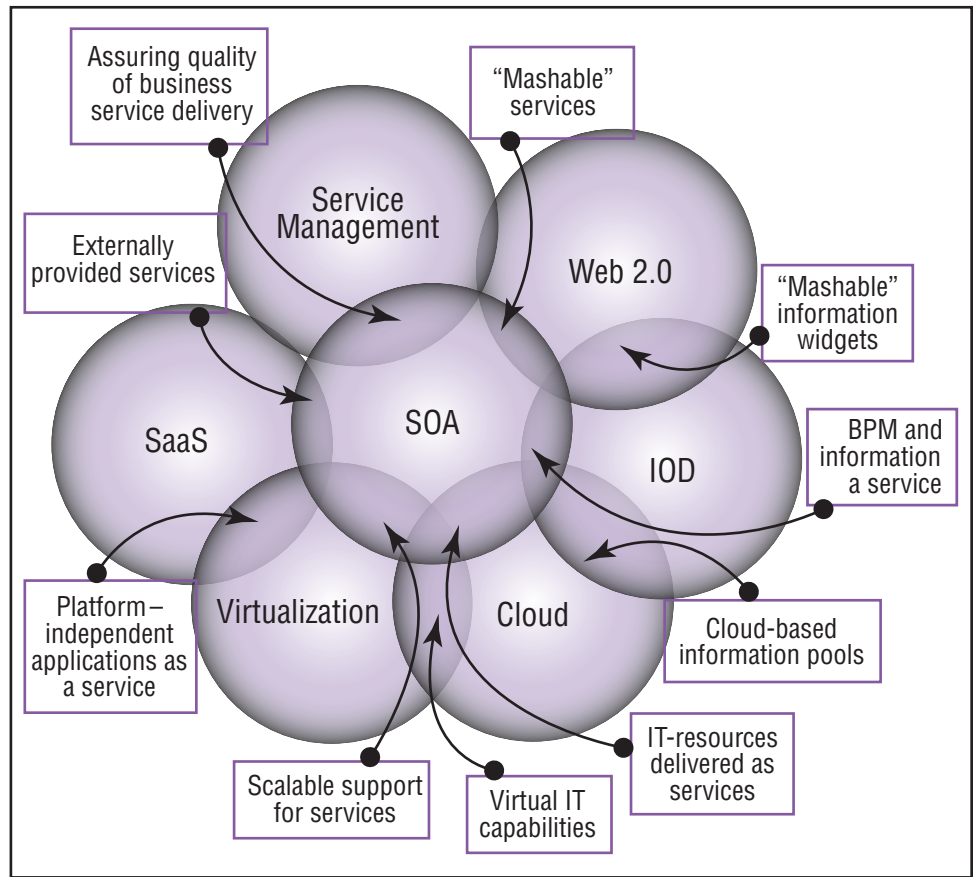
Figure 1: Technology layers



Consumers use methodologies to get what they want out of IT. Examples include business process management, service orientation and social networking. Supporting these methodologies are the means of delivering them, which are normally hidden from end users. These means of delivery include cloud and software as a service. They channel resources such as information and the correlated events that constitute a pattern. Supporting all of this are infrastructure considerations such as service-oriented architecture and virtualization. Service management provides oversight and control over every layer in different ways, including customer complaint management at the consumer extreme and IT Infrastructure Library® (ITIL®) at the infrastructure extreme.

Another imperfect but useful way of depicting the interrelation of some of these initiatives is to look at their points of overlap. While Figure 2 highlights only the intersection and overlap of some of these IT innovations, it is useful in that it highlights interdependencies and relationships.

Figure 2: Technology overlap



Highlights

Cloud resources are acquired by users as a service, paid for on a per-usage basis, accessed through the Internet, and can be rapidly scaled up and down in a secure way to deliver a high quality of service.

Cloud computing

To paraphrase Gartner, cloud computing is a style of computing in which massively scalable IT-enabled capabilities (specifically, deployment environments, computation, storage and networking) are delivered as a service to customers using Internet technologies. Cloud resources are acquired by users as a service, paid for on a per-usage basis, accessed through the Internet, and can be rapidly scaled up and down in a secure way to deliver a high quality of service. Clouds can be created for internal (private) or external (public) use but always with scalability, elasticity and shareability of the application deployment and management environment in mind. Clouds deliver request-driven provisioning and scheduling and are an economical way to set up an infrastructure to manage this infrastructure delivery style. A cloud is not an individual technology – there are many individual technologies that are useful in creating clouds, but in and of themselves they are not clouds.

Users can gain access to their applications from any location through their connected devices. Typically, a simplified user interface makes the infrastructure supporting the applications transparent to users. At their core, cloud environments offer virtualized “infrastructure as a service.” A great example of this is an offering that IBM has called “Cloud in a Box.” It is a pre-configured IBM BladeCenter® stack that includes the hardware, storage and management capabilities as well as an Ajax-based user interface. Our customers use this as a virtualized infrastructure core to create their own request-driven scheduling and provisioning infrastructure environments for their end users. Building on this “infrastructure as a service” core is a “deployment environment as a service.” In the “Cloud in a Box” example, our customers add middleware components of their choosing into the stack that we provide in order to create an application deployment environment. This environment is designed to meet the needs of the target end users, and access to this environment is offered as a service. Applications themselves are deployed in this environment and externalized on a “software as a service” basis. These can be traditional packaged applications or composite applications.

Highlights

Clouds bring IT into closer alignment with the way we live and work by exposing only the services they provide and making the means for doing so invisible.

Business outcome: Clouds free up business resources to focus attention on truly differentiating pursuits by reducing cost and complexity for organizations who do not consider deployment environments and infrastructure to be their core competency. They bring IT into closer alignment with the way we live and work by exposing only the services they provide and hiding the means for doing so.

Sample interrelationships:

- Cloud heavily relies on SOA as an architectural principle in that it delivers computing capabilities as componentized services with well-defined interfaces.
- Cloud leverages IBM Information On Demand (IOD) capabilities to deliver access to pooled information to authorized users. Cloud is a channel for making cleansed, trusted information available in the same way that it is a channel for delivering computing power.
- Clouds are virtualized in that the services and resources they deliver are not dependent on operating system, location or platform.
- Clouds can be used as a delivery vehicle for business services.

Information On Demand

Information On Demand is a vision for unlocking the business value of information by enabling organizations to establish and leverage trusted information to optimize business performance. IOD is the goal of information management, which is the organization of and control over the structure, processing and delivery of information to the appropriate audiences. This information can be structured as well-organized and defined fields or unstructured, such as audio, video, and text in the body of an email or word processor document.

Business outcome: Trustworthy, available, manageable information drives a more informed, proactive business decision-making process.

Sample interrelationships:

- All IT initiatives and business processes utilize information in some capacity. Delivering trustworthy information in-context, in-line and in-time is tremendously relevant to any other business or IT goal.
- IOD can be used to create, deliver and manage the information and content involved in business services.

Highlights

SOA aligns the needs of the business with the actions of IT by giving all roles a common vocabulary, model and goal.

Service-oriented architecture

Service-oriented architecture (SOA) is a business-driven IT architectural approach that supports integrating the business as linked, repeatable business tasks, or services. Reusable services act as “contracts” to perform a discrete task such as “check credit rating” or “re-order merchandise.” Services have well-defined interfaces and can be assembled at runtime to support business processes such as “loan origination” or “claims processing.” SOA aligns the needs of the business with the actions of IT by giving all roles a common vocabulary, model and goal.

Business outcome: SOA provides unprecedented levels of agility by allowing the business to respond to rapidly changing forces quickly, easily and with a minimum of risk. It robustly connects business processes end to end, allowing for easy and non-disruptive changes, and it reduces IT costs with reusable, composable services. As a key technology enabler of service orientation, it is at the heart of emphasizing outcomes and results of technology with separation of concerns for the underlying technology itself.

Sample interrelationships:

- SOA and IOD complement each other; SOA provides an infrastructure for creating new business value out of enterprise information by leveraging it as a service.
- SOA acts as a pre-requisite for cloud computing by providing the support needed to treat IT resources and assets as services.
- Services created to support SOA can be extended using Web 2.0-styles of mashing services together into situational applications.
- Virtualization can support SOA by adding scalability to the systems that support shared services, thereby removing risk of over-taxing these systems with spikes in sometimes unpredictable demand.
- SOA can be used to create reusable business services, discover existing business services within and beyond your environment, manage business services throughout their lifecycle, assemble business services to support an end-to-end business process, and deliver the outcome of business services in deployment.

Web 2.0

Web 2.0 is a set of new Web-based technologies that enable the Web to become a platform for dynamic content creation, collaboration and distribution. Using the Web as such a platform helps foster a new generation of Web-based communities and hosted services such as social-networking sites, wikis and folksonomies, which aim to facilitate creativity, collaboration and sharing between users.

Business outcome: Web 2.0 can help build communities for greater customer loyalty. It can also make non-IT knowledge workers more productive and collaborative by empowering them to create their own self-service “enterprise mashups.” While such usage patterns are not yet ubiquitous, simpler Web 2.0 usages include blogs, social networking and Twitter-like offerings which are closely linked to how we live our lives.

Sample interrelationships:

- Mashups are one of the most compelling business-focused uses of Web 2.0, allowing knowledge workers to assemble their own situational applications. SOA-style services are the building blocks of mashups.
- IOD supports transformation of information-centric resources into “mashable” content to be mixed into new feeds.
- Web 2.0 provides a means of discovering business services inside and beyond your environment, assembling their output into a mashup and delivering the end result to the user.

Virtualization

Virtualization is a broad term that refers to the abstraction of computer resources from their underlying source in order to increase efficiency, utilization, elasticity (scale up/scale down), flexibility and manageability. Four main levels of virtualization are:

- Application – Separating packaged or custom applications from their operating systems, thus improving portability, manageability and compatibility.
- Server (compute) – Dividing a pool of physical servers into individual isolated virtual environments to increase utilization.

Highlights

Virtualization can lower delivery and maintenance costs in high-volume environments. It can also improve elasticity, quality of service, and customer satisfaction.

- Storage – Pooling of physical storage from multiple network storage devices into what appears to be a single centrally managed resource. This makes device backup, archiving and recovery faster and easier.
- Network – Combining hardware and software network resources and network functionality into a single, software-based administrative entity.

Business outcome: Virtualization can lower delivery and maintenance costs in high-volume situations. More importantly, it can improve elasticity, and therefore, quality of service and customer satisfaction when applied to systems that experience large spikes in demand. It brings IT closer to how we live and work in that it abstracts the physical resources for delivering a service and lets us focus on the service itself. It also reflects that our lives ebb and flow in how great a demand we place on services.

Sample interrelationships:

- SOA, IOD and cloud can use the principle of virtualization to help create separation between capabilities and the means used to create that capability.
- Virtualization can help support business services by making them more elastic, available and manageable.

Software as a Service

Software as a Service (SaaS) is a software deployment model in which vendors host applications and offer customers the use of them across the Internet. By eliminating the need to install and run the application in the customer's own environment, SaaS reduces the burden of maintenance, operations and support. Using SaaS can also reduce the up-front expense of software purchases by making an otherwise fixed cost more variable with usage-based pricing.

Business outcome: SaaS can drive down the total cost of ownership of applications as well as making them more accessible to users.

Sample interrelationships:

- SaaS is relevant to application virtualization in that SaaS users are not tied to the underlying application's operating system.

Highlights

Service management is being used to help create a more seamless business infrastructure throughout the networked world by helping provide greater oversight and control of many IT initiatives.

- Independent software vendors (ISVs) can use SaaS models to make individual portions of their applications available as SOA-style services that customers can incorporate into their own business processes.
- In this way, SaaS can be used as a means of delivering business services.

Service management

Service management is a discipline for managing business technology systems, philosophically centered on the end user's experience of consuming business services. Comprised of management methods and supported by software, service management is being used to help create a more seamless business infrastructure throughout the networked world by helping provide greater oversight and control of many of the IT initiatives mentioned earlier. Included in the service management discipline are technology domains of security, business resilience and enterprise asset management.

Customers focus on deployment of service management in these ways:

- Discover – Automated discovery of changes in the business system infrastructure, business system continuity exposures, and business system operational risks.
- Monitor – Monitoring of IT and non-IT assets for performance, utilization, energy consumption, and preventive maintenance for workload balancing and energy efficiency.
- Protect – Security services for business services and the information contained within them, resulting in continuous business system operations during component or system outages.
- Integrate – Convergence of business devices outside of the data center and IT devices within the data center, including those provisioned via a cloud, resulting in integration of customer assets into one business system infrastructure for management.
- Industrialize – Engineering of the quality of service in business service infrastructures and the cost of service outside of them.

Business outcome: Service management aims to improve the quality of service delivered to end users, consumers and enterprise partners while reducing the cost per service. Attainment of committed service levels is improved. Changes in business models and business strategies of enterprises are supported by flexible infrastructures.

Sample interrelationships:

Service management provides the infrastructure management, methods and middleware to support SOA. You can deploy service management without SOA, but you should not deploy SOA without service management.

Summary

Recent IT advances, including SOA and cloud computing, blend seamlessly together to provide practical and customizable solutions to ever-changing business needs. These flexible technologies deliver lower costs and higher levels of service and customer satisfaction precisely because they are designed to respond on human terms to human problems. By implementing innovations such as virtualization and IOD, businesses that provide information as a service will find multiple new avenues of collaboration and knowledge fluidity, resulting in exponential growth and continuous progress toward human and business ideals.

For more information

For more information about SOA solutions and other IT strategies that can help your infrastructure evolve to better meet your business needs, contact your IBM representative or IBM Business Partner, or visit ibm.com/soa



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