

The Virtualization of the Enterprise

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Porter conceptualized, in the 80s, the Value Chain (VC) of an Enterprise. A VC categorizes the business functions of a company in primary (operations) and secondary (support) functions. Porter also introduced Value Networks or Systems consisting of a string of Value Chains contributing to the delivery of the end product or value where each VC is implemented by a separate Enterprise.

A business model specifies, amongst other things, the specific way a firm approaches and segments the market, delivers value to its customers, manages relationships with customers and partners, and customizes its value chain and core capabilities to return value.

In this article, we are concerned with the business model as it characterizes "the architecture of the firm and its network of partners."

A Business Architecture should be structured on the Value Chain and Business Model of the Enterprise, since this is how the business perceives architecture.

To succeed in Today's business world, being competitive presents new challenges in this era of globalization. Strategic alliances and collaboration are necessary and partnerships are key. With the pace of competition today, outsourcing becomes an important strategy. And through outsourcing, the supplier company will become part of your Value Chain.

From a technology viewpoint, IT virtualization makes inroads in the Enterprise by decoupling the concerns of business and IT, and between applications and technology, while enabling outsourcing. Technology virtualization allows the creation of abstract services, hiding their physical implementation, and enables their exploitation over generic interfaces.

The Virtual Enterprise (VE)

Many business functions of your organization can be outsourced. What traditionally were considered core functions are no longer a sacred territory and are available for outsourcing. The difference in cost and efficiency between an "on demand" or pay per usage outsourced service and an on-premises and self-manned typical function could be significant and hard to ignore.

This presents a problem requiring a solution for an Enterprise that outsources most or all its business functions but retains governance for planning, coordinating operations, budgeting, and making all key decisions. In a Wikipedia definition, "a virtual organization is a firm that outsources the majority of its functions." The Virtual Enterprise (VE) can be successful, assuming it employs best of breed outsourced services in a "virtual" Value Chain implementation consisting of company and partner links.

A VE operates over a virtual Value Chain, i.e., a chain whose links are owned by a company and its partners, blurring the borders between the Value Chain of the firm and the Value Network it is a part of.

The Governance is the business function that defines and identifies the Virtual Enterprise, since most or all other functions of the Enterprise (primary and secondary in Porter's definition) could be outsourced.

The VE is defined by a new operating model promoting collaboration and B2B to take advantage of best of breed applications on the market. This VE business model is increasingly achievable by the adoption of business process outsourcing (BPO), application outsourcing – Software as a Service (SaaS) – and, in general, by the fast adoption of infrastructure virtualization technologies, Web Services, SOA, and collaborative technologies of the Web2.0.

The "Virtual" Enterprise could be the darling of the entrepreneurial world, specializing in management and governance skills while outsourcing most of the Functions of the Enterprise today.

The Virtualization of the Enterprise IT

Today, for historical reasons, the interface between business and IT is quite convoluted and low level. The result is that Business, with limited knowledge of IT, must accept IT's decisions, and conversely, IT, with limited knowledge of Business, must struggle to understand Business requirements. That's why, when meetings occur between IT and Business personnel, the discussion frequently becomes a debate on the merits of WS SOAP relative to REST, resulting in a communication breakdown between the two contingencies.

The choice of technology should be in the IT domain rather than on the business agenda, and business should be able to change processes, rules, and content directly without IT intervention.

In this fast moving world, the business of an Enterprise, its logic, should not depend on IT technology, that is what it is or its implementation. Business activities should be performed regardless of technology and free from tomorrow's new IT hype. Why be concerned whether it is mainframe, COBOL, JavaEE or .NET, Smalltalk, 4GL or AS400 RPG! At the same cost/performance level, IT should decide technology realizing that ongoing change is inevitable.

Business should be willing to adopt technology virtualization to be able to interact with IT technology at a service level, where the negotiation between business and IT is performed in a communication language structured in terms of capabilities, relative feature merits, and their cost. IT functional and non-functional capabilities will be delivered under SLAs at an agreed price.

IT virtualization is adding an interface layer hiding the IT implementation complexity and technology.

IT virtualization is a significant step forward in bridging the divide between business and IT that often occurs in the blame culture we all know. Business people often see the IT infrastructure and terminology as an obstruction. No amount of good will will solve this divide until a good insulation (interface) layer is inserted between the two. Business and IT will talk the language of business: services, QoS, SLAs, capacity, security – a vocabulary they all understand. The virtualization will free business people from the need to understand IT, and vice versa, and could, for the first time, be in charge of business processes.

IT, in turn, becomes a true business service provider negotiating SLAs and licenses, very much like an ASP (Application Server Provider) provider. An IT application suite would be offered as a set of business services now. New services, such as Software, Platform or Integration as a Service, recently appeared.

The virtualization of the Enterprise Architecture (EA) layers

An Enterprise may be described as a few typical Enterprise Architecture (EA) layers: business, information, applications, and infrastructure. To these, you might add people/organization and non-IT technology, which are sometimes neglected.

Layers, though, can be virtualized. This is the way it is done in the network OSI (Open Standard Interconnect) standard where each of the layers provides services over an interface to the layer above.

In the Enterprise space, the virtualization appears to seep upwards across EA layers, from infrastructure to applications and business processes.

The virtualization of the IT infrastructure

A current hot topic in the Enterprise is essentially about providing an abstraction to the IT technology – servers, storage, and networks. It is about an interface layer hiding the infrastructure implementation and its platform types. The benefits are compelling—namely, that server utilization grows significantly in inverse proportion to the number of servers, the cost of the occupied real estate, and cooling.

What does infrastructure virtualization promise? Independence from the HW infrastructure. Multiple applications and OSs run on one or multiple physical servers. Virtualization is supported by blade systems as well where processing power is modularly scaled.

Processing power can be consumed "on demand" (IBM parlance); MIPS can be purchased in a "utility"-like model (HP talk). Storage will be retailed as a commodity from a pool, and I/O is ultimately virtualized.

An analogy can be made to the networks world where the leased physical lines evolved into virtual circuits, VPNs, etc., where, newly, QoS matters in defining a virtual channel.

Virtualization evolves to "Real-Time Infrastructure" that enables configuration, scaling of applications, and dynamic allocation of computing resources, as dictated by the business calendar or load.

Virtualization provides light and less costly business continuity and easier management. Ultimately, the infrastructure can be outsourced to a 3rd party and paid on a per usage basis. There is no longer a need to hire highly skilled workers, providing costly training, buying hardware, upgrading HW/SW every so often, depreciating or disposing of hardware. The result is fewer headaches.

Applications Layer virtualization and SOA

At the EA application layer, virtualization is provided by SOA through standard interfaces and encapsulation, hiding the implementation technology. Further, SOA provides the standard integration technology with communications implemented over standard protocols and interfaces accessed in a standard manner.

SOA provides an abstraction layer above applications, hiding the communications and applications implementation technology. It should not matter, therefore, how the applications and network are realized or what the platforms are. Applications are, in effect, virtualized and offered as services.

Inside the application layer, Java and .NET have already introduced a virtual machine abstraction layer between the applications and OS, and Application Servers are providing even more abstracted functionality by adding distributed transactions, persistence, security, and other horizontal capabilities.

The Virtualization of the EA business layer

At the EA business layer, workflows would be implemented by process and rules engines as orchestration of SOA and Web Services listed and described in a catalogue (UDDI, WSDL).

This removes the complexity of IT and its applications under a layer which business people can understand and now model themselves. They would be able to design and change processes using BPEL (Business Process Execution Language) as a composition of SOA and SaaS business services, using graphical interfaces.

The Virtualization of Information layer

For the EA information layer, MDM (Master Data Management) adds a similar virtualization layer since most application will utilize now information provided by this layer rather than supplied by all other applications. The MDM implementation may be integrated to SOA since the MDM hub could become a SOA service for information access.

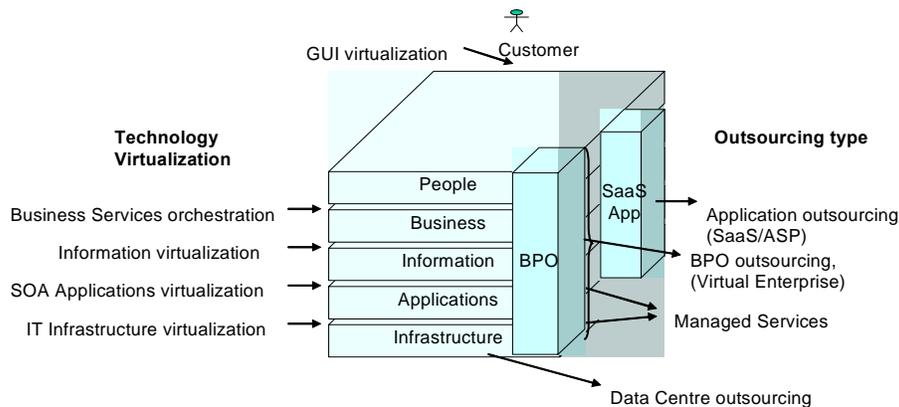
This will constitute a data abstraction layer for services and for people using the information.

The Virtualization of the User Interface

From a User Interface point of view, the fine grained Web2.0 interactivity further abstracts IT technology from business logic by providing a universal, ubiquitous web client, independent of the application and its implementation with the performance of client server applications. An abstraction layer is introduced that consists of web servers understanding AJAX, Adobe Flash, and MS Silverlight like technologies.

Key Findings of this Work

A Virtual Enterprise (VE), as defined here, is a company that outsources a majority of its business functions in a BPO (Business Process Outsourcing) manner; nonetheless, the corporate governance function is still maintained to coordinate all other function activities and legally identify the Enterprise. The BPO outsources the business processes, the technology and people executing them, and, as such, all layers of an Enterprise Architecture.



Virtualization, Outsourcing and the Enterprise Architecture layers

Figure 1. The IT Virtualization, Outsourcing, and the Enterprise Architecture layers

In Figure 1, IT virtualization appears at the interface between EA layers at the same time.

At the EA business layer, the business process orchestration and rules engines provide to business people the tool to rapidly change the Enterprise workflows and rules without support from IT.

At the EA application layer, virtualization is provided by SOA through standard interfaces and encapsulation of the application, while hiding the implementation technology. Further, SOA provides the standard service integration technology.

At the EA information layer, MDM (Master Data Management) adds a similar virtualization interface since most applications would utilize the information provided by this layer rather than that supplied by all other applications.

And IT infrastructure virtualization is adding an interface layer, while hiding the IT implementation complexity and enabling efficient management of the processing capacity, storage, and networks bandwidth. The IT infrastructure becomes increasingly a “real-time” on demand service.

Overall, the virtualization of IT provides technology services to business through defined interfaces which eliminate the nowadays tangled business-IT interaction and provide abstraction interfaces between the EA layers of the Enterprise. There are multiple vertical and horizontal dimensions to the Enterprise virtualization about to happen or happening, as in the picture.

So what

Companies could deploy a combination of outsourcing strategies and IT virtualization technologies:

- entirely outsourced business processes, including the people operating them, through Business Process Outsourcing
- applications outsourced to Software as a Service, SaaS providers (or ASPs) with their own people operating the application
- managed services where only the managing of your Applications and Infrastructure is outsourced
- the whole IT infrastructure outsourced to dedicated data centers
- IT virtualization will be pursued at all layers (BP orchestration and rules, MDM information, SOA services, and integration, IT infrastructure)

Enterprises will be consciously designed using SOA and SaaS services.

The business would take charge of its business processes through direct orchestration of SOA and SaaS services and direct access to the business rules technology.

Liberated from supporting most Value Chain functions, a company may focus on its business planning, investing, and creative management activities. The company will be lean, composed of a mix of best of breed outsourced services.

Other companies in the virtual Value Chain will similarly focus on fewer value chain links where they specifically have a competitive advantage like cheap or qualified labor; for instance, manufacturing in China, IT in India, consumer products in Japan, design in Europe, R&D in the US....

The new Enterprise business model is based on collaboration, virtualization technologies, and outsourcing of links in the Value Chain.

Author

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