Governance

Improving Governance between Business and IT Services

Contents

1. Context of this White Paper

This white paper is the sixth in a series from Capgemini identifying individual elements of technologies that are already commercially feasible or will become so. It defines the overall impact that their combination implies. The terms Collaborative Business, Adaptive IT and Adaptive Enterprise refer to Capgemini Points of View on behavior. The terms Adaptive Architecture and, Collaborative Architecture refer to a detailed method of using and integrating technology to build the capabilities.

The six white papers are presented in chronological order by date of release. They chart the introduction of a new generation of technologies arising from the internal use of three or n-tier architecture. They also look at the emergence of Service-Oriented Architectures that deliver granular services using an architectural model more aligned to that of the Internet and the Web.

1. AA1 (Adaptive Architecture1), was released in early 1999 and developed the concept of the three layer, sometimes referred to as n-layer, architectural model. This was a replacement for the then ubiquitous two layer client server model. The term Adaptive IT was used to denote the ability for regular and frequent change in the manner that IT capability was delivered, moving beyond the application-centric two layer client server monolithic model to a process-centric three layer flexible architectural model. Five years later, by 2004, this had become the industry standard. Terms used by all major technology vendors were “adaptive”, referring to behavior and “agile”, referring to capability. The commercialization of the concepts of Adaptive Architecture 1 range from individual packaging of technology elements such as the application server, to the launching of compliant architectural frameworks from major vendors such as the HP adaptive infrastructure.

2. AA2 (Adaptive Architecture2), was released in early 2001, built upon the use of AA1 as an internal or enterprise model for delivering prescribed predetermined processes. It added an external-to-enterprise concept of services. The notion of ecosystem based commerce for effective market interaction precludes the concept of any proprietary architecture. That suggests one technology vendor selected and adopted by all members of the ecosystem market which is unlikely and impractical for many reasons. The term Service-Oriented Architecture is therefore being used to denote an environment where interaction and combination takes place around agreed definitions of the interchange necessary. This implies a loose coupled architecture as desirable. Such architecture allows any-to-any service interaction as opposed to traditional system integration, tight coupled principles used in AA1.

   Web services are now emerging rapidly, building on the concepts identified in AA2. More importantly perhaps is the business understanding of the way that pervasive IT can be used to support a new generation of shared technology interaction, or collaboration. This movement is led by the biggest and most successful players in each vertical market coming together to agree common

working structures for interaction. It started with data using XML schemas to ensure interchanged files could be read but is now rapidly moving to towards developing a standardized business language. That implies processes for common undifferentiated ecosystem activities such as invoicing and payments. This has tremendous implications for the speed of adoption, but also for the internal enterprise and its own processes, together with supporting IT.

3. Making IT Real (an introduction to collaboration), released in March 2004, moved beyond Web services as a single technology aspect and considered how a total technology refresh was becoming visible—and as fundamental as PC-networking was to business change in the early 90s. It considers the implications of a wholly new phenomenon: a combination of external business and IT standards not just affecting but driving individual enterprises' internal standards. The combination raises the possibility of linking the concept of a business service, the real world of a business activity and the provision of IT technology by making it a service too. Collaboration Architecture is the Capgemini conceptual architecture to address this and to provide the capability for the Collaborative Business Experience.

4. A Point of View on Business Intelligence and Service-Oriented Architecture, released in September 2004, added a bridge between current applications, with data marts and new processes being built on Service-Oriented Architectures as Web services. Business Intelligence had become an essential part of MIS activities, supporting both compliance requirements and faster decision making. It was driven in part, at least, by the increased interaction with buyers and sellers in markets though Internet–Web processes.

5. Moving from Big to Small updates the progress that various elements of the technology industry together with the standards bodies have made towards defining, designing, productizing, deploying and managing services using Service-Oriented Architectures. Progress and introduction of products are accelerating. At the same time, more practical issues are becoming recognizable. The fact that change is happening is inescapable. Most, if not all industry analysts believe that this new technology wave will turn out to be as significant as PC-networks/client-server in its impact.

   The overall impact can be described as a shift away from monolithic "big" applications that capture an entire business departmental set of functions. Instead, "small" highly granular services are assembled either into fixed processes, or orchestrated into an optimum process dynamically in response to an event.

6. Governance is the model by which IT is managed within an enterprise so that it aligns with business needs. It has always been difficult given the many different expectations and aims that it attempts to embrace. The last few years have been even more difficult, with pressure on cost reduction and a rising parallel pressure for frequent change as enterprises adapt to fast changing external circumstances. The introduction of Service-Oriented Architecture, delivering in a different manner, may prove to be too much for many existing models. This white paper concerns practical methods to determine existing and future needs. It considers how to build decision frameworks that are more suited to the new circumstances.

Copies of any of the white papers are available on request to Capgemini with the latest versions available on the Capgemini website at www.capgemini.com

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2. Executive Summary

The opportunity to create a global business market has arrived alongside a new wave of technology.

Suddenly technology is back at the leading edge of business practice, capable of transforming an enterprise's dealings with the edge of its business—the place where it meets the market and the ultimate area for the creation of business value. Yet this is new territory both for business and IT management and the rules are not clear. IT has not generally been used for market facing inter business trading, direct customer interfacing or supplier interfacing.

Examples such as eBay show that it is possible to create an entirely new business area where none has existed before. Such an area can bring value to buyers and sellers as well as the financial markets or shareholders. More importantly, the examples of a transformation of existing markets by one player taking an early adopter stance abound. Those examples include travel, transport, PCs and almost anything else you care to name. To the business manager, this is analogous to the impact of the adoption of the networked PC in forever changing business practice, and efficiency. To the internal IT manager it represents a challenge that it is not an application centric technology. For both it means moving from well understood vertical functional silos built around business departments to horizontal processes that cut across the business to offer market driven effectiveness.

Computing and Information Technology

Over the past three major waves, computing has merged with Information Technology. The word "merged" is deliberate: much is present and in use from each wave and likely to remain so. In parallel, the role of computing within an enterprise has changed from cost based corporate accounting, through automation of departmental activities for efficiency, into personal work forms using information and communication for effectiveness. Measures of successful implementation, and operation, are different in each case and all three cases are present simultaneously in many enterprises. It isn't therefore surprising that there is less than complete satisfaction with the governance or management of the current, complicated environment.

There are a variety of terms used for the department responsible for the operation of computing and information services. For simplicity, "MIS" (Management Information Systems) will be used as a generic in this white paper. It is interesting that this has become the most widely used term as it implies that "information" has become the single most important commodity produced by the various forms of computing technology. Even the widely used term "IT" (Information Technology) only became popular in the early part of the nineties. Again for simplicity, the term IT will be used as a generic for the entire range of computing and communication based technology in an enterprise, unless a particular type of technology is being referenced.

Suddenly everyone and everything is part of a common network, coupled to the Web and its stunning ability to provide information

The "Governance" model of business working with the MIS department to optimize and align the management of the investment in IT has become a critical subject. Expenditure on IT has been high and though nobody doubts the need for its continued operation the question posed over the last few years has been one of goals. The impact of 9/11 triggered a global cutback in trade. That in turn gave an immediate goal centered on cost. However at the same time something else was making itself felt—at worst fraud, at best perhaps an inability to control the speeding up of business transactions that were now making full use of electronic communications thus bypassing traditional controlling management systems.

The third wave

The functional model largely built during the second wave of IT was around departmental mini computers running applications that captured and automated (mainframes automating the calculations of corporate accounts were the first wave of IT). The business case for the third-wave introduction of PCs on networks has moved further than anticipated in providing a wider set of capabilities when networked via the Internet. The networked PC involved every office worker in making use of the data, and processes created by mainframe and the mini computer. Along with local knowledge of the worker, this speeded up operational efficiencies to deliver a new competitive edge of effectiveness. The new edge could provide crucial operational advantages or differentiation to those enterprises that used it well, creating new benchmarks by which to measure success.

The ability to make decisions, and take actions, leading to complete transactions within controlled environments, quickly became an established business norm as ERP (Enterprises Resource Planning) systems took the lead. These internally operated and managed client-server based systems have not always, perhaps, delivered quite the values expected. Nevertheless, they provide a cohesive and easy to understand management environment on one side of the PC. It is the other side, that of the Internet and Web, that is the issue. The arrival of the Internet opened the closed corporate network up to the world. Suddenly everyone and everything is part of a common network, coupled to the Web and its stunning ability to provide information. This is truly innovative change. The disruptive influence to existing internally driven and managed IT is huge, but at the same time the value provided is so overwhelming that connectivity, and functionality, cannot be denied in most cases.

Person-to-person collaboration

Already individuals have changed their behavior, both at work, and in their private lives. They are embracing the ability to always be connected. This finally achieves the long predicted convergence between voice and data but more importantly it changes their expectations of support. Consider how a marketing department organizes an event today as opposed to perhaps only 5 years ago. To start with, the notice given will short as the business must move much more quickly and reactively to the fast moving market place, exhibiting adaptive, or dynamic, behavior rather than long term fixed planning as in the past. Against this collapsed time span the marketing staff must move quickly to establish what possibilities, prices, timing, etc. are on offer. They must then use this information as the basis for discussing with suppliers if certain changes could be accommodated to provide more closely what they would really like.

These online and very interactive discussions or negotiations, using email, text, instant messaging or phone, are a whole new phenomenon generically called "collaboration". It is defined as the ability for a group of people to use rapid communication together with on-hand information to mutually reach and agree upon an optimized transaction. This is a highly efficient and effective method of win-win business between all involved. The problem is that the resulting agreement maybe taken as a firm commitment but it has totally bypassed all the exacting controls designed to avoid problems. What happens? The paperwork is completed with all the correct stages, and signatures, after the event.

At worst, this can be used to hide transactions by keeping then outside the safe process. Generally, though, it is little more than the reality of modern business in some areas. A small number of high profile fraud cases led the authorities in some markets (e.g. the famous USA Sarbanes-Oxley act), and the auditors in all countries, calling for a new attention to re-establishing control of online/electronic transactions through compliance. At its most basic this call represents little more than asking for the creation of new processes that are definable, controllable, and manageable in the same manner as the older paper based systems. With accelerating spread of online business at all levels, this must be seen not as a tiresome burden but as good business sense. If achieved, it should provide a better informed enterprise with more information and business intelligence to make these rapid decisions correctly.

Seamless environment

These points can be summarized as follows. The fourth wave of IT is starting to make itself felt as for the first time IT is directly providing the means to connect to and trade with the business market place. The fourth wave is able to offer a new environment for competitive advantages, even in some cases the creation of entirely new business value such as eBay. As such it will eventually prove as unstoppable as the PC-network technology did in the last wave. Late adopters in that case were eventually driven to adoption merely to stay in business. But as with any innovation, short term affects are disruptive and in no area is the impact more challenging than that of governance. If much of the "new" lies across or even outside the enterprise, how can we stretch already difficult Business and IT governance to cover yet a further set of capabilities and technology?

The simple answer in the case of the new capabilities or technologies is to manage internally in the same manner as externally. Organizations need to grasp and use the same technology model to form a seamless environment for those areas of the enterprise gaining business advantage from this external market facing technology capability. Would this be every part? Actually, no. The so-called back office will continue to use existing IT in the same role as before, namely to record transactions that have taken place. It is the front office that will change most, though this will cause pressure on the department based functional application model as it is streamlined to become a more efficient process in-between the two zones.

This white paper presents Capgemini thinking on how to address the governance challenge. It gives in outline a method for determining the issues to address their relative importance and to decide who should gather information to recommend action. We look at who should be taking which decisions and the basic considerations for the different type of changes. A short reprise of fourth wave IT based upon Service-Oriented Architecture delivered via Web services is provided but it is recommended that you read the Capgemini white paper *From Big (functional applications) to Small (shared services)* to grasp the full implications of the technology.

3. The Compliance Challenge

The concept of the office as a geographically common location where workers can divide tasks up whilst being close enough to share common filing cabinets for information and communication is around 100 years old.

Email has become a de facto dynamic process for solving complex process issues but without formal process or records

As enterprises grew larger, departmental divisions were introduced to accommodate the need for scale by providing pools of knowledge around a single function—Purchasing, for example. This same model allowed work moving from one function to another to be checked, perhaps even be signed off, by the departmental head or managers. With time and increasing business complexity, a myriad of smaller sub tasks were added within the main function. The mini computer targeted this departmental model with specialized applications that could handle all the tasks within the overall function around the common data.

This approach of automating the existing functions individually provided excellent cost efficiency benefits but the data in each application was in a different application-specific format. That made it difficult to understand the overall view of enterprise performance—the beginning of the so called vertical silo problem that has been the cause of many operational and IT issues ever since. Auditors were the first to recognize the issue as they began to struggle to interpret the rising amount of data in different applications, each with different formats, values and time stamps, trying to gain a meaningful financial position.

The need for data harmonization drove the adoption of a whole new generation of software aimed at improving the operational efficiency of the enterprise as well as being able to satisfy the auditors' demands for clarity of data. Enterprise Resource Planning (ERP) also showed the need for business process reorganization to reorientate department-centric application models into an enterprise-centric data model. The individual applications of the ERP package might still be vertical in function, but the data model was a common, shared horizontal resource.

The front office

ERP creates an internal application-centric model for tracking and business management of the key back office resources but the challenge has moved to the front office, as workers use the simpler and faster external capabilities available over the Internet. They do business with other enterprises, bypassing internal capabilities as too slow. Frequently, email has become a de facto dynamic process for solving complex process issues but without formal process or records. Auditors find they are unable to verify that business management controls are in place and are asking, in much the same way as with data in the past, for attention to this issue.

Compliance is the broad heading given to the need for a new approach in defining key business processes, those empowered to play roles in them, and the keeping of records

Compliance is the broad heading given to the need for a new approach in defining key business processes, those empowered to play roles in them, and the keeping of records. All of these should match actions in a manner that is suitable for electronic online business processes. This may sound simple, but these new electronic interactions use different technology to the existing systems and are therefore not visible, or recorded, in the older application-centric systems. As an extreme example, an online electronic activity resulting in an order placed on an external website only requires the user to have a simple browser. That will leave no data in any existing application for an Auditor or Compliance Officer to check. Generally, these actions will be followed by "registering" the purchase on the existing internal system and its various applications to "catch up the paperwork." At that point the purchase would become visible, but only after the event has happened.

Actually the online purchase would have left an auditable trail at the external website on which the purchase was made. This is built around the principles of a Web service. If the user had been forced to operate internally through a Web service as well then the entire transaction would have been visible. More importantly, full business management could be established to manage which users can use what services, re-establishing full process control to the satisfaction of all. There are therefore only two broad choices: 1) deny all access externally to market activity and electronic business; 2) adopt the use of Internet and Web technology internally (called Service-Oriented Architecture) to establish "end to end" interactions. This allows internal recording of format and timing as transactions are occurring before transferring relevant data into existing internal applications for processing.

Fortunately, the major ERP vendors are providing the technology and the products to do just this, and more with the ability to support faster, cheaper across the enterprise processes. The ability to redesign processes to be more effective from a market view point as opposed to an internal accounting view has become a key competitive differentiator in some cases and will become so in all cases. The question is how does business and MIS management already struggling with its existing governance model manage the successful adoption and management of this change? This new market driven approach, capable of regular and quick change to adapt new demands, working horizontally through the enterprise, requires a very different governance model.

4. From Big (applications) to Small (shared services)

The following is taken from the Capgemini white paper on this topic, précised from the section defining the business value of using "small" services in a Service-Oriented Architecture.

It is reproduced here to assist in understanding the business value that services bring and therefore a better understanding of what must be managed by new forms of governance;

Cutting down 'Big' functions into 'Small' pieces that are defined, and built in a different manner, is not entirely the answer though admittedly it is moving in the right direction. The whole concept, its goals, values, and how to achieve them is actually the most important part to understand, otherwise individual 'Services' will fail to be able to integrate properly. This will become increasingly important with time, and the global adoption of Client-Services, raising expectations as to how individual enterprises will be integrated in business trading threads, or make use of technology products. After all a non globally standardised Browser or Web Server would be a complete non starter, but this does not only mean technically accurate, it means adopting perceived expectations in how Information is shown by a Browser or a Web Server.

PC-Network established different ways to work that were never present in the previous Mini computer model as well as causing much debate with in IT circles on how to split applications up into client and server elements. However the really expensive issue was the implementation of PCs, and even networks, to solve individual or departmental requirements, on a project by project basis buying 'best suited specifications. The time and cost that went into replacing, and standardising, in the early to mid 1990s when the conceptual model of a common working environment became understood was a bill that no Enterprise would like to face again. PC-Network was the first 'common' technology and led to 'common' applications from Office, to ERP, all of which reinforced the 'Big' functional applications mindset started with Mainframes, and trained IT professionals in the approach of ensuring total functionality capture as the starting point. So how to understand conceptually what 'Small' means in a cohesive sense? Fortunately examples exist to help with this challenge.

One of the most successful phenomenon has been eBay, in April 2004 electricnews.net[3] reported revenues up nearly 60% from the same quarter a year ago with an 9.9 million users added in the quarter making a total of 105 million members. More importantly, 45 million were active, selling an average US $550 in the preceding 12 months. By any standards an outstanding success for a business, indeed a business model, that only came into being in 1996! In comparison the boom in e-commerce hubs being set up in the excitement of the 'Internet boom' is a tale of failure, with much money being lost even by well known, long established enterprises extending already successful business models. Today e-commerce hubs still exist, but those that do are the survivors who have learnt to adapt their original model. The challenge for the 'Big' functionally complete e-commerce hubs was described at the Telecoms Infotechnology conference[4] on successful Business to Business, B2B, in February 2001, after the so called 'bust' as;

B2B e-commerce (EC) remains the future, but what future? EC can radically reduce costs of business procurement but is this just a once off. EC can extend business reach, but does this offer opportunity for small and medium sized enterprises, or does it simply remove the protection of local barriers to trade? EC can automate value chain procedures, and reduce information costs, but at what price to retrain people, pay for hardware, and software upgrades, and meeting other hidden costs? So what drives electronic marketplaces?

But is this a fair comparison? eBay is primarily operating around Consumer to Consumer (C2C) and e-commerce hubs were for Business to Business (B2B) operations. Ignoring the fact that eBay is certainly doing B2B business today and is a large well established player in the Business to Customer (B2C) market, it actually proves the point rather well. Catering for the trading needs of millions of individuals selling thousands of different items in many different countries is infinitely more difficult than handling trade to standard commercial rules in one type of goods within in single defined market. In fact so much more difficult that anyone faced with defining the requirement functionally alone would think it close to impossible, let alone thinking about the time, cost and testing to implement, yet eBay has done it, it works, more importantly it scales!

Actually a growing number of businesses are using eBay to buy straight forward items from each other purely because it has the principle characteristic of any successful market; volume. For both buyers and sellers to be satisfied there must be adequate numbers to match the diversity of offerings, but isn't this an example of 'Big'? Actually, its an example of the efficiency of the aggregation of 'Small', each buyer or seller is interested in only a small part of the market, but the small markets aggregate to provide an overall high chance of finding your 'small' piece and being satisfied enough to keep returning. It's the key principle that created the World Wide Web!

There are some other key principles to observe as well; firstly that eBay is easy, and intuitive, requiring no user manuals, or training, for the user with an interface that hides the complexity of the services behind it. Those services are all granular, subject to change, in all manner of ways, from simple process improvement to the introduction of a whole new market set of services, but these 'upgrades' occur incrementally in a manner that accommodates continually change without attracting user problems. Testing, regression and final launch all happen parallel to, and without impacting any existing services, or activities. Those users, who wish to, can have some control over their own way of using the services, etc, etc. It's a different model in every respect, all based on 'Small' working in a granular whole created by Service-Orientated Architecture.

Returning to the *Harvard Business Review* with the all important business question concerning differentiation, the ability to create this through, or in, the market, (see Executive Summary 2.0), how does it measure up? eBay clearly passes the test, but where is the intellectual property that makes eBay a business to have a value for investors, if it is all based on 'standards' that can be used by anyone, including start-up competitors? The answer is in the internal method of binding and orchestrating together the externally facing technology standardised interactions. Its something of a revelation to think of 'integration' as a competitive differentiator, rather than a cost or a problem, but it's the common principle that underpins all trading activities, the integration of buying and selling by adding value. It's also apparent in the success of many businesses who have mastered the new; Expedia.com—now the world's largest travel agency; LastMinute.com an eBay for experiences, etc. Harvard Business School *Working Knowledge* magazine described the Dell model as 'managing

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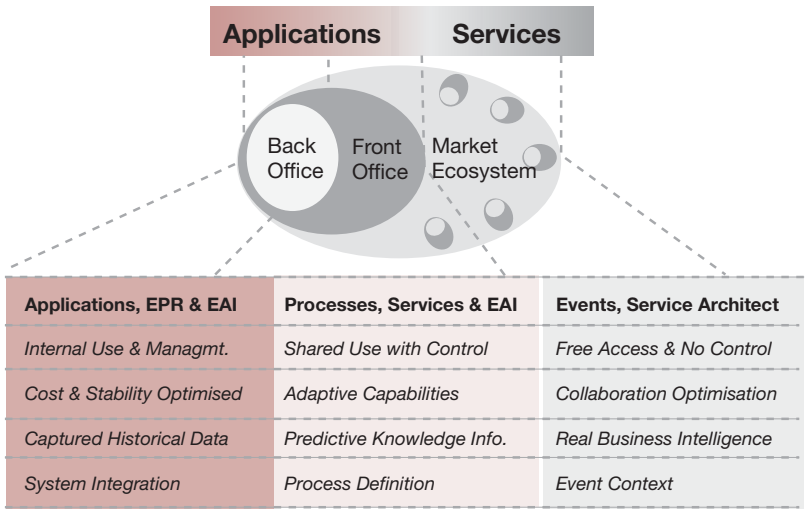
Figure 1



profitability, not inventory', going on to say that Dell matched supply to demand by using its unique systems. Dell manages other businesses external to its own for most elements of its business, thus qualifying to be seen as a trading business more than a manufacturing business, with margins to match as well. Are its actual products, PCs, Servers, etc, differentiated from competitors PCs, Servers, etc? No, but its way of doing business in the market, is differentiated, and that comes from its internal abilities to 'integrate' a myriad of 'Small' services into larger coherent business processes.

If Dell, or Cisco, or indeed any of the other examples, had sat down and tried to build their current abilities, together with the inherent flexibility, and low costs, from 'Big' functional applications, whether bought in, or bespoke, they would still be enmeshed in requirements gathering, just trying to keep up with the rate of change demands of the business! Most people can think of at least one example of a worthy, but failed attempt to give a business what it needed by the 'Big' approach. Is this an argument for abandoning existing 'Big' applications? No, it's about understanding the difference between an internal need to keep historical data on transactions carried out, versus an external need to provide integration services.

Capgemini first started to use figure 1 back in 2001; it still seems a good way to understand the differing IT zones and their characteristics. The diagram works just as well to illustrate the direction and products released by various vendors too. Taking two vendors as examples: SAP links R/3, its back office 'Big' application suite, by NetWeaver tools to provide 'Small' services for the front office or market services. Microsoft links its office and mobile solutions through to its range of Biztalk, Sharepoint and SQL Server products through .NET.

Business is looking to its MIS departments to provide new capabilities centered generically around three core issues: Compliance, Cost, and Competitive Advantage, (as well as continue to provide business as normal IT). The drivers are increasingly external so at least two, Compliance and Competitive advantage are likely to be best delivered through 'Small' and in so doing are also likely to meet the cost criteria, but the challenge is to really grasp what 'Small' means in a cohesive manner technically, managerially and business wise.

Service-Oriented Architecture is the framework to hold and orchestrate the services that create or consume data, both with each other and with the working data they require

5. Organizing Structures for MIS

The business case for delivering business requirements as services is becoming increasingly clear.

Here, a service means common definition of both a granular piece of business functionality and the technology capability to deliver it through the use of Service-Oriented Architecture. Drivers are a mixture of user driven activities, business advantage and, ever more, the need for process compliance. There are some compelling benefits for MIS too, as a faster, lower cost, more flexible development and operational environment using the same advantages attributed to the Web. Service-Oriented Architecture can hold together functionally a commonly interfaced set of standardized services running over a shared, and therefore cost optimized, common infrastructure.

This model, indeed the Internet and Web itself, is very different from the traditional application-centric model generically known as a vertical model, built around dedicated technology stacks: i.e. the application sitting over a dedicated server with dedicated storage. In the vertical model the business owner is usually very clear, often the supplier of the business case for the original implementation, and the organization of MIS resources will usually have a similar basis to align support, budgets, even service availability success measures. Shared services are usually limited to the network and specialized skills, such as security or possibly ERP systems.

Integration models are built either around using ERP Suites, or elsewhere probably EAI, with the odd point to point link. They might be said to be “shared” or “horizontal.” It is here that the greatest difference between the traditional application-centric and the new services-centric models can be found. The basis for ERP and EAI integration is structured data, or data that is fully defined in a manner that allows cross linkages to be established between the data in the different applications. Internally, an enterprise owns its own data and applications and can decide on its own naming conventions to create the necessary structure. When dealing with the external world this is not possible.

Data interchanges with the external world will be around unstructured data. Put more simply, the whole objective of the move towards a slew of new standards for data starting with XML, and continuing into OWL, RDF etc., is to create self describing data. Service-Oriented Architecture is the framework to hold and orchestrate the services that create or consume data, both with each other and with the working data they require. Indeed one of the key differences between a properly constructed service and an application is that a service will rarely ever contain its own data. This separation, plus the virtualization of the infrastructure allowing any service to run on any free server and the use of network based storage, all add up to a very different IT environment—one which introduces the need for a different MIS organizational model.

Some of the services being used may also be external, as in the case of a one-off purchase from another enterprise. That means consideration also needs to be given to how “end to end” business transactions are created by linking together services in “processes.” There is the opportunity to redesign business transactions from a market driven perspective for greater effectiveness, probably cutting across

Capgemini believes that there are four key layers that can be used both to retrospectively manage the traditional technology as a part of the new technology, and also to manage Service-Oriented Architecture

existing boundaries. To do this represents a major challenge in almost every aspect of MIS provisioning. For example: training business analysts to think in a very different way around granularity of tasks and transactions; moving from firewall perimeter security to securing processes; authenticating data and users within processes; understanding semantic data tags. Above all the challenge is finding a new approach to business-to-IT governance based on a dynamic set of multiple shared small services as opposed to fixed monolithic big applications delivering functions.

Governance elements

The starting point for governance is to establish what elements need to be managed. If they are no longer based around applications in a vertical model but around shared and common technology elements in a horizontal model, the starting point must be to define these new elements. A further challenge is how to create enough elements to allow genuine focused management, but not so many as to make too much work by having to micro manage. Capgemini believes that there are four key layers that can be used both to retrospectively manage the traditional technology as a part of the new technology, and also to manage Service-Oriented Architecture, the new technology supporting internal and external services. A fifth layer, "innovation", exists to help the adoption of the increasing number of new technical and business capabilities, that will arrive as Service-Oriented Architecture moves to become the mainstream for all IT. By definition genuine innovation must be disruptive to existing activities and cannot therefore be expected to fit neatly into one of the other four categories without some imaginative thought on its application.

The Five Horizontal Governance Layers

Innovation Understanding new technologies, products, and practices, to build propositions on how to improve any technology or business area.The ability to be able to make decisions on the best time to adopt, and in the value of changes, to ensure a persistent rate of improvement in all areas.

Information The form, content, and context, of data management to actively support business decisions and record both business and technology transactions. Current information on key business processes is becoming increasingly important with faster moving markets, and the demands of compliance.

Integration The definition of all standards, naming conventions, practices, and architecture reference models, to support cost effective integration technology aspects. Creates the ability to be adaptive and collaborative in terms of creating business flows internally, and externally, to meet business requirements quickly.

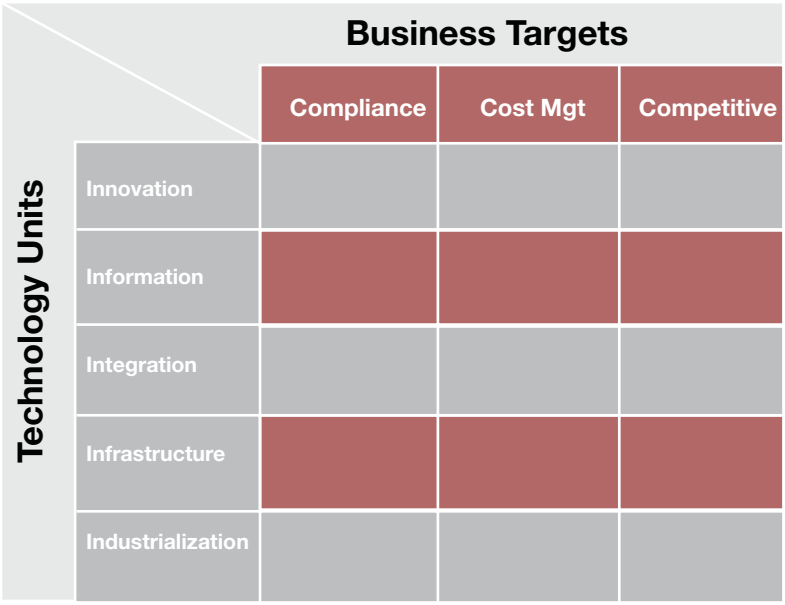
Infrastructure Provisioning shared service capability to support common IT elements; networks, directories, security, and increasingly MIPs, and storage.Provides low cost flexibility with high re-use of expensive fixed assets, together with high reliability, and the provision of charge/management metrics.

Industrialization The awareness of methods and practices, even suppliers, that can be used to reduce operational and maintenance costs and time. Ensures a market competitive provision of IT by matching, and maintaining, the best or at least optimal levels of cost, manning, or time for operations.

The de-coupling of technology areas supports specialization, re-use or even types of outsourcing by focusing on the service interfaces between the areas as opposed to having to define and micro-manage the specifications for each application or project

This approach can be linked to the business defined goals for MIS to provide alignment. The matrix below shows this with the three most common requirements from the business for MIS: delivery of support for the demands of compliance; continued focus on cost containment/reduction; and delivery of competitive advantage through nominated projects. Capgemini refers to this as the 5i & 3c matrix, and it forms the first step in identifying the goals for MIS governance by setting out technology in terms of what they provide to the enterprise overall as opposed to an application-centric model that is based around how it is delivered.

Figure 2



Each of the 15 matrix boxes can now be used to move to the next level of detail by establishing both strategic and tactical requirements to cover both business, and IT needs. The level of detail is for individual enterprises to decide upon, but the framework can be used to establish who is in charge of each box, or layer; what the resources available to be managed are; or even what the overall issues to be considered might be. It's also possible to characterize technology vendors' products by using the boxes to see what individual products deliver against the goals. Appendix A contains examples of Capgemini templates.

The de-coupling of technology areas supports specialization, re-use or even types of outsourcing by focusing on the service interfaces between the areas as opposed to having to define and micro-manage the specifications for each application or project. This is clearly vital for the adoption of a Service-Oriented Architecture where a consistent set of standards must be developed. However it also allows existing IT to be accommodated by characterizing it in terms of its deliverables and interactions. This approach is entirely consistent with the direction of the ERP vendors themselves, as SAP introduce their "Enterprise Services Architecture" through "Netweaver", Oracle their "Fusion Architecture" delivered by the "Oracle Technologies" layer and so on.

6. Defining Responsibilities

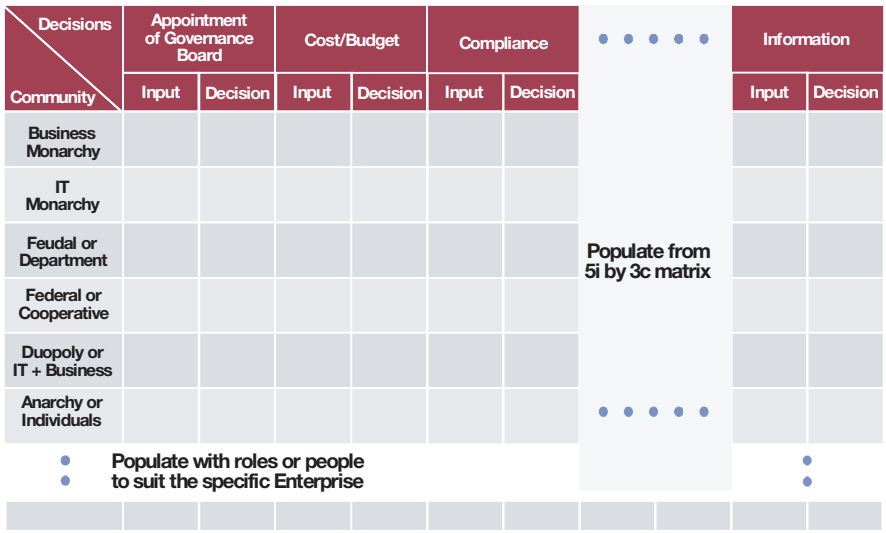
The decision-making element of governance—who makes what decision, when and based on what information—while not easy has been relatively straightforward in traditional application-centric IT.

The clarity of an application relating to a departmental function makes the business owner easy to identify, whilst the responsibility for the technology element belonged to MIS. Actually it is more complicated in reality for a whole series of practical reasons, not least of which is the increasing amount of business driven requests for changes and the knock on impact of these changes across other integrated systems. Moving to deploying services is the answer in one sense. That's because these are if correctly implemented a single business and technology instance that is independent and does not affect any other system. They are also less expensive and quicker to build but additional smaller services will overload the existing business/MIS governance arrangements.

Operational measurements and goals have previously been associated with management-to-strategic goals, with the MIS department choosing its own tools and techniques for the operational management of the technologies. However, it all gets rather more complicated if business decisions and technology decisions have to become synonymous. Peter Weill, the principle of the MIT Sloan Business School explored this under the heading of "How top performers manage IT decision rights for superior results." The key finding from analyzing one hundred top performing enterprises was that there was always a clear structure that was well understood for determining who would take what decision around what issues. He defined the following as decision makers in the current governance models that he examined.

Group of People	Characteristics
Business Monarchy	Individuals, or group of senior business executives, up to and including CxO level but not including IT senior executives other than the CIO.
IT Monarchy	Individuals, or a group of senior IT executives, including the CTO.
Feudal	Business unit leaders, key function or process owners and their delegates.
Federal	A mixed team of business and IT senior executives representing a democratic cross section of the enterprise to balance decisions.
IT Duopoly	IT senior executives working with only one business function or department.
Anarchy	Individual users, and/or IT staff making decisions to suit their individual needs.

Figure 3



These roles are certainly adequate to start to working with so we can determine the "who" aspects, though in most cases there would need to be more detail right down to naming individuals within the roles. The challenge now is to define what types of decisions should be taken by which people and, in order to do this, who should be responsible for preparing the information on which the decision is made and how reporting back on the results in the following operational period should be handled. This is where the work in the previous section "Organizing Structures for MIS" should be used as defining the "what."

A new matrix can be constructed based on the example provided here, though each enterprise will have its own unique specifications to further clarify the roles within the community column. Even if the first version is more a working draft, this provides the basis for easy recognition by all of who to approach for which decision or to gain access to information on a topic.

Consider the previously constructed "5i by 3c" matrix for populating the horizontal headings on which decisions will have to be made. It groups together the business ownership decisions around the "c" axis. In the case of Competitive, this can be extended to a number of projects or functions. The "i" axis represents technology ownership; the intersections are deliverables that should be measured for individual performance metrics and accountability. The rows and columns are the basis for overall management of, say, compliance on the business axis and infrastructure on the technology axis to ensure cohesion. Individuals may be responsible for individual intersection where in this case storage would need to be provided. Cost may belong to the CFO or the CIO as an overall MIS budget with managers for each of the five technology groupings working to their individual budgets. Competitive is likely to be split into different business functions and can therefore be used to link the business function and the traditional delivering application as well. The application will have information, integration, infrastructure and industrialization elements individually. Increasingly, these will need to be shared.

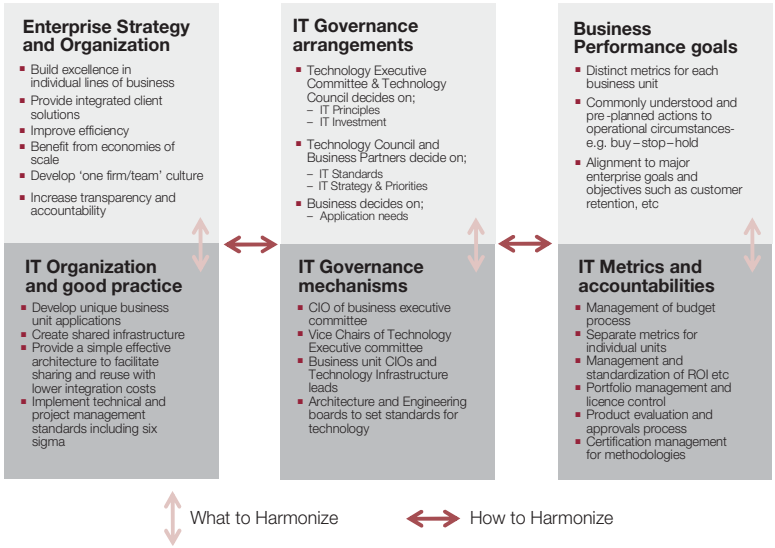
Who and what

It is instructive to break down the "who" and "what" by using both an existing project and compliance case as the first examples. The project will have immediately recognizable values and working owners so it will quickly show the issues that need to be understood to cover the more abstract elements.

Compliance is a good example of the new world as it is not an application. Indeed, it crosses all the regular functional boundaries quite deliberately as the requirement is to see comprehensive trading views of the enterprise to form a complete picture rather than individual data in application silos.

Compliance will almost certainly turn out to be one of the great drivers of change as it has to be handled differently from current practice. After all, that is the whole reason for its introduction! Trying to address compliance by tuning either a data warehouse or more probably a data mart might just be possible, though the complications of continually maintaining this through all the changes in applications are daunting. As described earlier, the requirement is caused by the introduction of new technology around the Internet and the Web and the answer comes from using the new technology correctly internally to provide services within a Service-Oriented Architecture. It must be solved by combining small services, each covering a compliance piece within a functional department, making the requirement for a different form of governance from an application clear.

Figure 4



Having constructed a framework to determine who makes what decision around the multitude of small operational matters, there is then the need to decide how to achieve overall coherent effectiveness and efficiency. This will need to cover the measurement and management aspects internally in a manner that links everything together. It will also have to cover the increasing external aspects of business and MIS activities. An example of what form this might take is illustrated in Figure 4, again coming from the work of Peter Weill of MIT Sloan Business School. The combination of "how to optimize" with "what to optimize" in management teams, together with responsibilities and goals, provides the method to link with the people in the teams.

External governance will be needed in cases where a project or an outsourcing agreement, or even a long term trading relationship, requires its own defined management to ensure that it contributes satisfactorily. The approach will have to be collaborative. That is to say, both partners will need to set out common goals and behaviors to ensure that their individual actions, even if apparently justified, are not against their overall mutual goals. Capgemini has pioneered this approach in the Collaborative Business Experience and details are included in the Appendix as an example.

7. Criteria for Decision Making

In an ideal world, all IT deployed by MIS would result in significant business differentiation.

A more real world is perhaps one where it is capable of a significant return on investment. In fact, in many cases, IT services are operating in mature roles within the enterprise with the goal of nothing more than cost management of certain processes. The challenge of understanding the role that IT should play, or is playing in the enterprise, was launched by Nicholas Carr in the *Harvard Business Review* in May 2003 under the title "Does IT matter?" Understandably this controversial statement provoked much reaction!

Effective investment?

Nicholas Carr's argument was that if all enterprises are using the same packaged applications to support the same functions, differentiation cannot be possible. This makes the years of investments effectively into little more than a mutual arms race that nobody has won. There are two basic flaws to this point of view, and some would say many minor ones, too. Firstly, it treats all IT as the same whereas clearly an office suite for word processing is not aiming at the same business goals as a field service engineers' work management system. Secondly, it ignores the recent rise of the new technology wave of non application-centric services introduced through the Internet and Web. Considering what the Internet and the Web has already done to transform all aspects of business and private life, it seems remarkable to leave this out of the reckoning. Overall, the argument was on a par with asking "Does entertainment matter?" suggesting that reduced figures for some aspects such as books or theater meant other forms cannot be working either.

Actually, this association has parallels given that the impact of electronic entertainment using low cost technology with broadband, Internet, and the Web, together with PCs, cell phones, iPods, etc, has totally revolutionized entertainment. There are now markets for the supply of music, videos, even cell phone ring tones that never existed before. There are therefore new markets within which Enterprises can seize the initiative and lead. The rise of Web-based services using Service-Oriented Architecture is set to do the same for business as it focuses on the edge of the enterprise, and around doing business with the market place.

So differentiation, meaning a unique application of business and technology to create a competitive advantage, is certainly one aspect of deciding on the value of IT. There are the cost reduction aspects to consider as well. Clearly a "one size fits all" set of metrics is not going to work. In real life the use of the ubiquitous ROI, or Return On Investment, calculation is viewed with increasing suspicion that it will not accurately measure the returned value on a particular investment. It is worth considering why this is. In part, it's certainly down to the variety of uses to which IT is put, with the resulting difficulties in measurement.

A further part is the difficulty in maintaining a "pure" project, as every part of everything in the MIS environment seems to have increasing interdependencies that can impact the original cost/time estimates during the implementation phase. These interdependencies will also probably result in unplanned changes with further costs during the operation phase.

Incidentally, these are all very good arguments for the rapid adoption of Service-Oriented Architecture and services with their clear cut defined scopes and in-built "any to any" inter-operablity.

Applying core values

Capgemini has developed the framework illustrated in Figure 5 as part of its work on governance. The intention is to assist in making decisions by establishing the core values that apply to each decision and to make possible use with the other frameworks. The framework is based on a magic quadrant that defines four potential areas. In most cases it easy to make a clear cut decision that places a project in one or other quadrants. For each quadrant an enterprise can develop its own set of metrics, and possibly a different management board to review new projects or check on operational metrics for those already in place. The approach generates expertise creation in each area as well as facilitating benchmarking with external information to reset any targets.

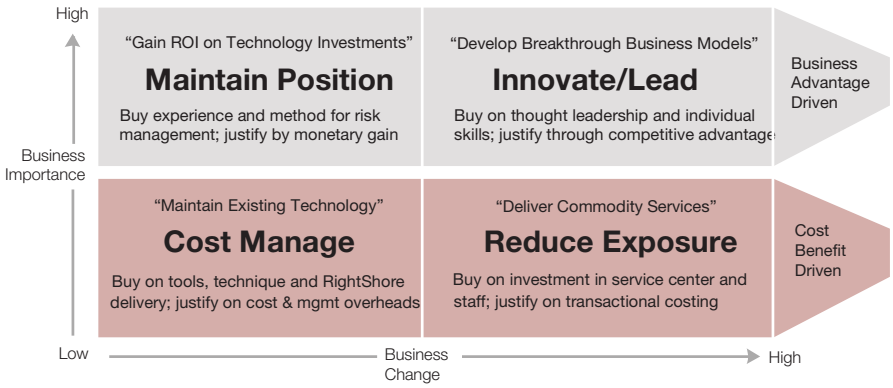
It is perfectly possible to have a bigger and more encompassing program covering more than one quadrant, involving different aspects of the enterprise and its activities in high level goals. The program will be delivered or implemented via a series of individual projects. Experience has shown that if an individual project cannot be defined into one of the four quadrants and overlaps into two or more quadrants then it will prove to be a problem as its goals and management are not clear-cut and distinct enough for success. There is a similar aspect to using the framework for the management definition of existing systems, and services, whereby clear single quadrant definitions provide strong management metrics.

The axes for the grid require some further explanation. The vertical axis is marked Business Importance, a term that at first sight would suggest that all IT should be striving to move from low to high. In fact, it is a check on whether the principle drivers for the project or service in question are genuinely business ones, in order to clarify who is best suited to make the decision. As an example, a business manager in sales is unlikely to be the right person to make a decision on storage technology, but he/she is the right person to make a decision on developing a set of services for sales force automation. The horizontal axis asks the question, to what extent is the enterprise's business changed by this activity? It therefore determines the extent to which an enterprise is making a strategic question about the way it does business. A high business importance with a high business change might be entering a different market, whereas a high business importance with a low business change is most likely to be a strategic question to outsource.

Internal vs. External

What is particularly interesting is that it is possible to see the horizontal axes also as a measure of the extent to which the change is internally driven (low business importance) or externally driven (high business value). Activities to the left hand side are probably "business as usual," and it's the activities to the right hand side around doing new things in new ways using new technology that are the real forces to both create differentiation and require a new approach to governance. Change that has external characteristics also means that the rules for success, both business and technology, are more complex than internal change. Factors from business requirements to technology standards are under the enterprise's direct control. Whilst there are some clear generic definitions for each quadrant, individual enterprises will wish to build their own detailed specifics that will relate to the information created in the other governance frameworks and provide the detailed elements from which clear, consistent, decisions can be made.

Figure 5



Since 9/11 MIS activities have been focused on the bottom left quadrant around cost management, or more correctly cost containment. Some have moved to the bottom right thus continuing the focus on cost benefit. Compliance moves activities to the top left as a business requirement to maintain position by meeting legal and auditing requirements. Can compliance be defined as business advantage? If more accurate and up to date data on actual business trading with the market can be used for Business Intelligence then the answer is a clear yes, but compliance also means redefining trading processes and so provides the real opportunity to redesign the processes to take advantage of the new wave of technology with its external effectiveness.

Using the framework for ongoing governance means determining if there is a benefit in moving individual new projects, or existing systems and services, from one quadrant to another in order to better define the value they can provide. There is a natural maturity movement from the top right "Innovation/Lead" quadrant anti clockwise round to the bottom right "Reduce Exposure" quadrant. This adjusts the governance goals for the changing value provided by the maturing and commoditizing capability. However there are other strategies that can be used for benefit, too.

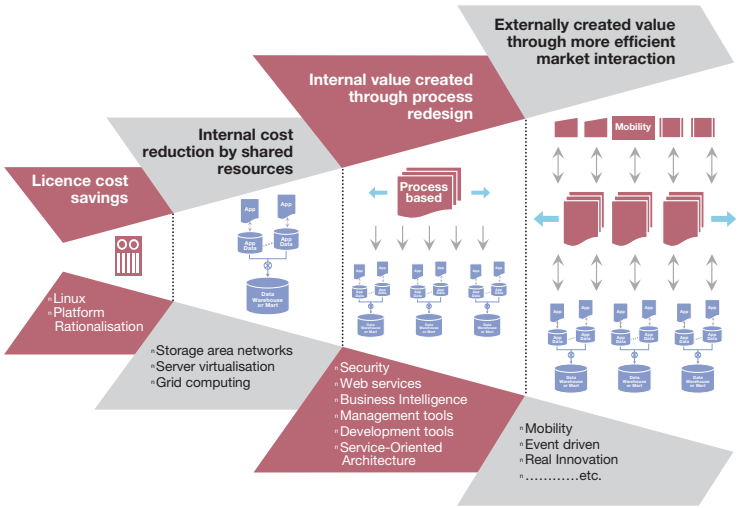
The business advantage driven layer should question if capabilities in the top left "Maintain Position" can be made to deliver more value by moving the goals to the right. Similarly, work in the bottom left "Cost Manage" might provide increased value by more ambitious business created goals. The boldest strategy with the biggest payoff is to link the top right and bottom right in a transformational outsource where by the resources and money are freed from maintaining the status quo systems to bring new innovation back into the enterprise in terms of its market competitiveness.

8. Summary: Technology Direction and Governance

The impact of the new wave of technologies may be the driver for a new approach to governance, but a summary of what the technology aspects of this change may bring in the form of a roadmap may help complete the picture.

A full explanation of the change is provided in the Capgemini white paper, *From Big (Applications) to Small (Shared Services)*. This charts the moves based initially on the common networked infrastructure for cost savings, but moving to build over this a very different business capability delivery model around services, as opposed to applications, using Service-Oriented Architecture. The following diagram lays this out visually as a broadening delta of change across the enterprise as time progresses. The text comments on the changes in respect of the "5i" headings of Infrastructure, Integration, Information, Industrialization and Innovation.

Figure 6



Infrastructure

The initial stages of rationalizing server platforms were driven by sheer cost pressure of the last few years but have played their part by introducing new technologies and increasing awareness and building a base for further new technology upgrades. Linux has played its part here by introducing awareness of Open Source licensing as a cost reduction measure, but then so have increasingly sophisticated offerings from the major hardware vendors such as IBM, HP and Sun. These provide virtualization of capacity to achieve cost reductions by optimizing use of all server resources horizontally rather than the previous application-centric vertical architecture. This direction for hardware is continuing and accelerating towards the inclusion of other resources, with storage as the next big wave.

The case for the use of SOA to deliver services has strong business and technical foundations around flexibility and cost, but in the integration layer will require strong and active management to create new methods

Object based storage
Storage providers have over the past few years moved from an emphasis on hardware to focusing on the software that can enable "any to any" combinations of applications/servers/storage to be supported driven by operational needs. Overlaying this has been added what one vender, EMC, called "Content Addressed Storage." It's a good name as it defines its capability. Other vendors use different names: for example, HP calls its version RSSI. The overall generic name is "Object Based Storage." The importance of this can be seen by its almost mandatory use in any major well designed compliance solution where the ability to access data by content definition rather than application definition is necessary. The same ability is required for services and forms an important part of a Service-Oriented Architecture.

Similar changes are taking place across all so called common technologies that are generic to most if not all requirements, with the long term view of creating true grid computing. The definition of what is meant by the term "grid" is not precise, but it is broadly the capability for overlaying onto the Internet a common infrastructure that allows end to end shared services, supported and run whenever and wherever needed across any number of enterprises. The importance of understanding how the development of improvements in infrastructure need to be aligned to the over provision of enterprise supporting IT through MIS is considerable. The goal is to avoid treatment as a separate, or series of separate unrelated changes for technology or cost reasons.

Integration
It's a similar story with the changes in Integration technology as it moves from project driven use of Enterprise Application Integration (EAI) towards Service-Oriented Architecture (SOA) and the introduction of a new generation of Enterprise Services Bus (ESB) products. The simple way to explain the difference between SOA and its predecessor technologies of ERP and EAI is to examine the use of data in each technique. In both ERP and EAI the data is the basis for integration between monolithic functional applications. Data is "structured," i.e. all aspects are defined by the enterprise to ensure that they are understandable. In contrast, in SOA, and services the data is "unstructured". It is available to be interchanged between external enterprises as and when needed by their business interactions. Most importantly, it carries its own description so that any service can use it.

Actually, the self describing structure of data in SOA has many internal advantages in large Enterprises as it allows different divisions and operating units to interchange data too, without having to do all the work associated with traditional integration. However it makes very different demands on governance. As a general rule, SOA and services work best if they are a) broken down to the lowest possible level of granularity that can be associated with a recognizable business task; and b) contain no data of their own, working by consuming and creating data that can be used by any service when needed. SOA authorities argue that the true difference between a service and an application is in relationship to data models, not as some would suppose in the use of new protocols such as SOAP to write in a different way.

So, the case for the use of SOA to deliver services has strong business and technical foundations around flexibility and cost, but in the integration layer will require strong and active management to create new methods. There will also need to be a stronger appreciation of external conditions around how to create services and data architecturally in order to benefit not only internally, but also to support business requirements for external market based interactions with other enterprises. Added to this is the granularity issue that breaks down vertical monolithic functions into horizontal common granular tasks that can be orchestrated to form "end to end" processes of great effectiveness.

It is vital to appreciate the role that architecture as a formal technology method plays in making this possible, and to understand the firm link with the tools and methods under the heading of "industrialization."

Information
The choice of the word "Information" as opposed to "data" is deliberate and reflects the change from IT application-centric data recording transactional history to an altogether different model. The Web itself reflects this. It was designed to provide information for people, and various forms of searching have been developed that allow increasing sophisticated questions to be answered on the basis of what is currently the best answer. On the other hand, knowledge management tools use information in a different way, guiding even the unsure towards a defined and consistent answer. Both techniques have immense value. They open up very different approaches to Business Intelligence, when compared with traditional data mining of past history to look for patterns that may be applicable today.

Web services, as they were initially called, are designed to allow machines (any computer) to benefit from the same approach to using information. The entire approach to all aspects of this topic is correctly called "The Semantic Web," semantics being the term for conveying the kind of complex context that a human mind automatically provides by additions to the data description. There is a series of new extensions coming into use that provide this capability. Taken with the separation of information based data from services in the integration layer, this represents a different technology approach to data management when compared with traditional IT.

Again it's the framework of Service-Oriented Architecture that ties everything together but in the information layer the business benefits are often clearer, particularly when focusing on compliance and Business Intelligence. The design of information and its use is just starting, and offers as much or more opportunity for competitive differentiation as the design of processes. Also, as the Web first showed, it maximizes its value from cohesive entirety. The technology management of this is one of the challenges. The governance of who manages and uses what information for what purpose in an ever changing manner contains far more challenges, but starting with compliance will need to be faced immediately.

Industrialization
This is a term used to define the selection of tools and techniques that can deliver and maintain IT solutions at industrial strength and costs. The rise in various forms of standardization has changed the role of tools, ranging from financial and business transactions such as "book to bill" or "order to invoice," through to technology standards that ensure inter-operability across the market. As the goal for many products becomes the extent to which they are standards compliant, the extent of the actual differentiation of the product in terms of unique features becomes less. Application servers are a particularly good example of this. Instead, differentiation is becoming the ease of implementation and change management through the dedicated toolset that supports the product. Hence the recent changes that have seen Microsoft break its long time relationship with Rational and the introduction of its own tools. This change has seen even smaller players such as BEA introducing sophisticated tools to achieve the necessary competitive differentiation.

It is arguable that in the next few years, given the current rate of progress in this area of technology, the choice of development tools will be more based on their capacity to achieve industrialization of delivery and ongoing operational management of change, rather than focusing on an actual product. Indeed, it may be that the shift to using Open Source as the basis for License models (payment for maintenance of the code, not for the use of the code as in the traditional license model) will continue to see more and more commercial code being made available (this does not necessarily mean the use of Linux as the operating system). In this case, tool choices will become even more critical. An additional dimension starting to emerge is external collaborative developments where a group, or even an industry sector, chooses to jointly implement a standardized common process. Open Source projects have shown the way to achieve this. They use external sites on a pay as you use basis. This means a new generation of tools designed for multi-site working using a very different approach to governance.

The requirement to manage centrally the use, and deployment of a product portfolio, with alignment to a toolset portfolio is steadily increasing. With it comes a case for more control of licenses too. A lot of money could be saved by strong management in this area. Equally, it could be lost. However, it will take a determined effort to control project developers who are used to making individual choices almost by personal choice and experience versus the enterprise and MIS benefits of defined directions for development tools and developer training. Choosing well known, widely used, development tools with a strong architectural model also allows onshore and offshore development to be considered as an option.

Innovation

Every ten to fifteen years there has been a distinctive shift in the technologies that are currently grouped together under the heading of IT. The first move was from the enterprise data centre number cruncher to more flexible programmable mainframes. Then came department computing with application centric mini computers and finally the last technology wave driven by a mixture of PCs and networks brought information technology to the desktop. The Internet has extended the internal network to such a degree that it is possible to say that any enterprise, computer, sensing device, and therefore even person, can now be assumed to be connected. Web technologies mean they can be communicated with. The networked PC can be said to have changed working patterns. As Web services, or simply services as they are increasingly described, become widespread then whole new working patterns will emerge.

Networked PCs led to “matrix” organizational structures, to business process re-organization and even to enterprise resource planning. So what will the adoption of Service-Oriented Architecture in organizing the structure of resources and the orchestration of services to optimize the delivery of an appropriate process bring? The simple answer is that nobody knows for sure. There is no doubt that it will lead to true innovation in both business and technology. There are enough examples already to prove this! It is interesting that the best known all seem to provide a level of external integration between buyers and suppliers that has been impossible with past technology.

Innovation is, by definition, disruptive change. This means the change and the benefit have to be identified positively by a person or persons that have no stake in preserving the current status. People managing the existing layers, even in the new form of the other four “i” layers, will be tasked with optimization of the current situations. Innovation must have a separate home that will analyze all inputs regardless of how they fit to the current and put forward to the governance board new original propositions for disruptive change that have strong business cases attached.

Governance

With the technology changes and new business uses come new challenges for governance, often already considered the weakest link in existing supply of IT to the enterprise by MIS. Much effort has already been put into defining the overall objectives that should provide high level guidance and form expectations, with the IT Governance Institute defining four principles. These four principles were developed by consultation with their 7,000 members and were in response to the changing conditions following 9/11. Interestingly, even at a time when cost management was the single most important requirement, stress was still laid more evenly across the needs to develop competitive and innovative capabilities.

1. IT is aligned with the business strategy, or in other words, IT delivers the functionality, and services, in line with the organization's needs so the organization can do what it wants to do.
2. IT, and new technologies, enables the organization to do new things never possible before.
3. IT related services, and functionality, are delivered at the maximum economical value, or in the most efficient manner. In other words, resources are used responsibly.
4. All risks relating to IT are known, and managed, and IT resources are secured.

These four principles place the emphasis on IT as a force for innovation, and change, with more flexibility in how to manage its delivery than the assumption of a single application-centric model. A summary of what the Institute says would be a model that reflects not only a move to Service-Oriented Architecture delivering services, but also the shift to using more external capabilities such as outsourcing, offshoring, business process outsourcing, applications management and others. All of these new capabilities are much more likely to be provided externally, and perhaps internally, by transactional charging than via financing by capital purchase as in the past.

The shift from big single function monolithic applications, to small shared services orchestrated by Service-Oriented Architecture is under way. With it comes an optimum process for each requirement that supports a more dynamic business model able to cope with frequent changes. There is an opportunity to use transactional charging where appropriate to continue to drive down costs in certain mature business activities, as well as restoring business differentiation through market driven activities in other areas. Overall, the shift does much to answer the four key requirements that business and MIS should be focused around. Even so, pro-active management action is needed to create a design and build the necessary governance model for success

Appendix

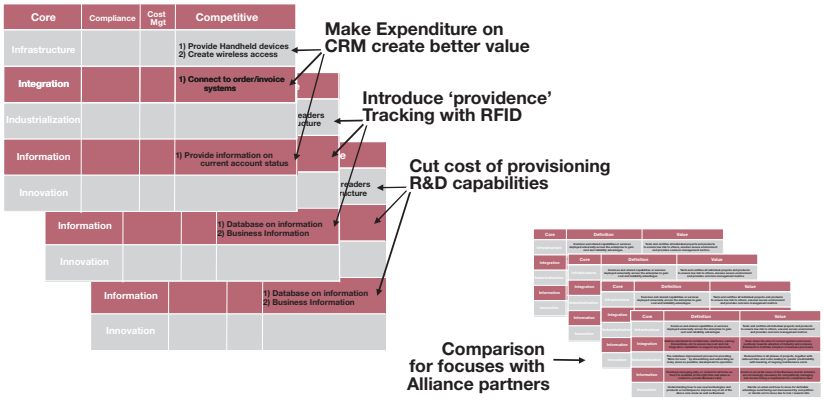
5i by 3c Matrix: A view of possible technology trends and impacts

Core	Compliance	Cost Management	Competitive
Information	▪ Increasing use of Data Warehouse/Business Intelligence/Data Integration technologies to respond to the reporting requirements of regulation ▪ Trend for real-time, event-driven data (structured and unstructured) enables compliance infractions to be spotted & managed as they happen. DW/BI/Content management/enterprise search will contribute to this trend. ▪ No longer own all the data you need, creating an exposure–Organic Business again. Multiple companies own the data.	▪ Master data enables companies to take a single view of their customers/products, removing duplication & cost associated with storage, maintenance and synchronization errors. ▪ Availability of near-time data allows quick improvements in process (e.g. Wal-Mart data into P&G)	▪ Demand forecasting ▪ Real-time structured and unstructured data used as soon as it is created or changed to drive decisions E.g. Medical imaging, CPG industry. ▪ Scenario Design improving customer interactions
Integration	▪ Crafting compliance as part of the SOA layer–building controls into the layer. Also risk management at SOA layer, for example Basel II.	▪ Platform rationalization around App server platforms ▪ Application rationalization in process ▪ Improving Integration Competency Center (enterprise data models, pivot formats, application and interfaces cartography ▪ Performance measurement as an alternative first step to BP improvements	▪ Information workplace (IW) incorporate role based information from business systems, apps and processes. Delivering voice, documents, BI, real time analytics.
Infrastructure	▪ Organic IT–automation eases compliance burden but more flexibility will create demand for logging Software ▪ Process Methodologies–Frameworks like COSO, ITa frameworks COBIT, IT frameworks COBIT, ITIL and ISO 17799IL and ISO 17799 ▪ Governance and Structure of compliance programs ▪ Compliance and Risk management tools Axentis, Openpage, Paisley, Compliance 360	Organic IT reduces cost by up to 50% ▪ Virtual servers, VMotion technology moving running server to new host ▪ Data Center automation software for provisioning, patching and reconfiguring servers ▪ Virtualized network services (soft wiring, virtual services, programmable interfaces) ▪ Open source ▪ Offshoring ▪ Shared Services provides mechanism for standardization, the driver behind simplification and rationalization of infrastructure	▪ Data Storage–Data storage opportunities at the edge of the network ▪ Digital Business Architecture-extension of enterprise architecture/SOA.
Industrialization	▪ Data Center automation will help to track compliance issues but increased flexibility may add complexity. ILM will be key. ▪ Process methodologies–Factory to ensure consistent delivery ▪ Frameworks like COSO, IT frameworks COBIT, ITIL and ISO 17799 ▪ Governance & Structure of compliance programs ▪ Compliance & Risk management tools Axentis, Openpage, Paisley, Compliance 360 ▪ Centralized control of processes, and increasing process consistency—role of the CPO. E.g. Mitsui chemicals trying SOX across 800 Bus—so give CIO control of all IT budgets and sort into 13 sectors ▪ As business fragment, increased risk, e.g. SOX compliance with partners with partners	Organic IT produces cost reduction up to 50%. Key technologies: ▪ Web services & SOA ▪ Server virtualization VMware for Intel servers, Intel Vanderpool and AMD Pacifica for hardware support ▪ DC automation software ▪ Emerging storage virtualization with Information Life Cycle ▪ Management (ILM) beginning to standardize ▪ virtualization of network based resources: load balancers, SSL accelerators Sun N2000, Inkra Networks ▪ Offshoring/BPO models ▪ Deployment of common business processes across functions and geographies, allowing demand/supply management globally rather than locally and reducing implementation costs ▪ Right-Channeling to reduce customer service costs	▪ Organic IT produces opportunities for revenue growth. ▪ All technologies listed for cost management have potential but key will be web services & SOA. ▪ Organic Business/Digital Business. Centralization also leads companies to create flexibility and adaptability ▪ Improved management focus on competitive factors through BPO of non-core activities ▪ Right-Channeling to improve customer experience ▪ Transformational Outsourcing
Innovation	▪ Decision making based on real time structured and unstructured data	▪ IT 'necessary evil' only 22% of CEO see IT as source of innovation ▪ Symbiotic loyalty–building consumer trust through emotive connections, actively cultivating endorsements, and minimizing costs by knowing when, what, and where to invest in loyalty	▪ Innovation networks ▪ Adaptive Trading Networks (ATNs) Adaptive Trading Networks (ATNs)-Firms anchor their supply chains in interconnected global trading ecosystem with assistance from global trade orchestrators (GTOs)—optimize trade flows across multiple supply networks. ▪ Consumer-focused innovation—consumers play an active role in process redesign, product development strategies, and new channel development.

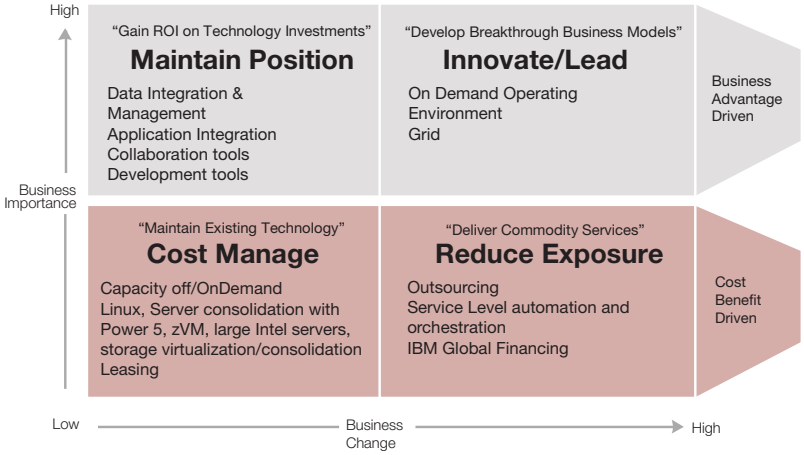
5i by 3c Matrix: Example of Technology Vendor Products

Technology Area	Definition	Value
Innovation	Understanding new technologies, products, and practices, to build propositions on how to improve any technology or business area	The ability to be able to make decisions on the best time to adopt, and in the value of changes, to ensure a persistent rate of improvement in all areas
Information	The form, content, and context, of data management to actively support business decisions and record both business and technology transactions	Current information on key business processes is becoming increasingly important with faster moving markets, and the demands of compliance
Integration	The definition of all standards, naming conventions, practices, and architecture reference models, to support cost effective integration technology aspects	Creates the ability to be 'adaptive', and 'collaborative', in terms of creating business flows internally, and externally, to meet Business requirements quickly
Infrastructure	Provisioning 'shared service' capability to support common IT elements; networks, directories, security, and increasingly MIPs, and storage	Provides low cost flexibility with high reuse of expensive fixed assets, together with high reliability, and the provision of charge/management metrics
Industrialization	The awareness of methods, and practices, even suppliers, that can be used to reduce operational, and maintenance, costs and time	Ensures a market competitive provision of IT by matching, and maintaining, the best, or at least optimal levels, of cost, manning, or time, for operations

5i by 3c Matrix: Example of mapping Competitive Issues in the Life Sciences Sectors



Example of using the above 5i by 3c matrix to position on the decision criteria framework



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