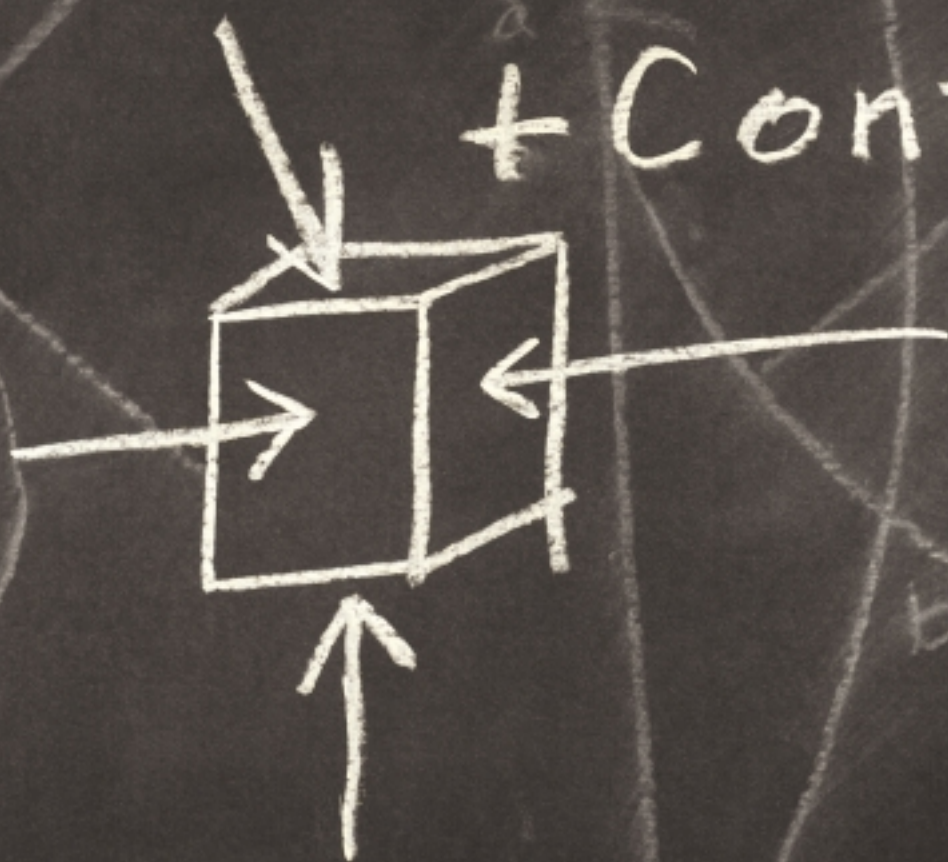


Netcentric =

Client/Server

+ Reach

+ Content



The next computing wave: Gift or Pandora's box?

By Mark V. Goodyear and Richard A. Chang

Netcentric computing links technological capability and strategic opportunity, helping to open today's new markets and provide the flexibility to meet tomorrow's business challenges. It can also add complexity and risk to information systems. Because of the significant impact it can have on topline growth, netcentric computing should be on the agenda of every senior planning executive.

You have been given a box. Inside the box, you are told, is something that will do great things for your business. It will enable true electronic commerce capabilities. It will link your customers, suppliers, employees and other business partners to your information systems, and thus to your entire business—anywhere in the world. It will maximize the flow of information inside your organization, allowing your people to share data and knowledge, to collaborate more effectively. It will, in fact, redefine your industry and create new markets. And it has the potential to drive topline growth for your organization.

So what is the catch? This breakthrough will also bring some challenges. It will require you to think about your business, your customers and your workforce in new ways. It will add some complexities and risks to your information systems environment that will have to be carefully managed. It will break down

some traditional walls in your organization, and some of your people may be threatened by it. It will add some expense that will have to be judged against a potential large return on investment.

Open the box. Inside, as hundreds of companies around the world have already discovered, is a technology called netcentric computing, a gift that will seem both familiar and new. You will recognize pieces of it: your client/server system, your legacy applications, your network. Yet, taken as a whole, it represents a new kind of technology infrastructure for your organization that links, perhaps for the first time, technology capability with new business opportunity. When you read or hear today (and who can ignore it?) of companies opening up new markets, engaging in eCommerce, delighting their customers with unprecedented levels of services or streamlining their internal processes by encouraging the sharing of infor-

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mation and data, that's netcentric computing in action.

Netcentric computing asks all of us to think in a different way about the relationship between technology and strategic opportunity. It is not primarily about using technology to solve a problem; nor is it about using technology to do an old job in a more efficient way. Netcentric computing is about new opportunities. This is a significant point, because it means that today's dominant technologies must be on the minds of boardroom executives. The netcentric model is not a silver bullet solution. But because of the significant impact it can have on growing a business, it should not only be a consideration for all major information technology initiatives; netcentric computing needs to be of strategic concern to CEOs, chief financial officers, chief information officers and planning executives.

For several years, business and technology observers have been talking about the major changes being wrought by universal networking capabilities, such as the Internet. Today's technology solutions are what we can call "convergence" solutions: They represent the convergence of computing power, communications capability and content—the information, data or knowledge that forms the "stuff" of the solution. At the heart of the solution, however, is the network—hence, network-centric, or "netcentric," solutions.

What does "netcentric" mean? In its most general sense it refers to an emerging technology architecture and an evolutionary stage of client/server computing. The common architecture of netcentric computing supports access to information through multiple electronic channels (personal and network com-

puters, kiosks, telephones, etc.). This information is made accessible to many more users—not just an organization's workforce but also its customers, suppliers and business partners—through technologies that employ open, commonly accepted standards (Internet, Java, Web browsers and so forth).

In other words, netcentric computing is a common architecture built on open standards that supports many different ways for many different kinds of people to collaborate and to reach many different information sources.

Evolutionary yet radical implementation

Although netcentric computing sounds new, and although some analysts and vendors may want people to believe that it is new, it, in fact, represents an evolution from what we already know about client/server computing. We know that it is evolutionary rather than revolutionary, because a real revolution, with all the change it would bring, would not be accepted by the market as quickly as the netcentric model has been adopted. However, do not mistake "evolutionary change" for "small change." The change is big. Big enough, in fact, that the real difference between client/server and netcentric is that client/server will not enable companies to leap to the next generation of business solutions. Netcentric computing will.

The evolutionary yet radical nature of netcentric solutions can be seen in many of those already implemented. The robust architecture of netcentric computing has the ability to evolve as new channels and functionality become available. For example, NBTel, the telecommunications provider for the Canadian province of New Brunswick, had an existing

customer self-service application, installed in the early 1990s, that enabled customers to conduct transactions and make inquiries by phone. As NBTel moved to enhance this application, netcentric computing allowed the organization to evolve this approach to a richer multimedia environment through interactive channels, including the Internet. Today, NBTel's Interactive Phone Store gives customers access, through their personal computers, to fully interactive service over the organization's broadband and Internet network. Interactive television access is also planned.

Today's netcentric solutions would not be possible if we were still in the era of proprietary architectures and incompatible technologies, software and standards. The common architecture of the netcentric approach solves a number of information technology issues, such as systems interoperability, and provides the benefits of moving to an open computing environment and common standards, linking everything between the desktop and the Internet.

The benefits of this openness can be seen in most netcentric solutions today. Just one example is Commerzbank, the fourth largest bank in Germany. Commerzbank wanted to push the technology envelope in order to reach a younger, more profitable customer base without incurring the costs of a branch delivery system. Its solution: COMLINE, a "virtual" bank subsidiary designed to attract new, high-income customers between the ages of 25 and 50 with a range of direct-banking services never before offered. The new bank needed to provide a unique combination of flexibility, capability and convenience. Only the open architecture of netcentric computing could have allowed COMLINE

to offer such powerful business capabilities to its customers so quickly.

Another way to think about the evolutionary nature of netcentric computing is through the following equation:

Netcentric = Client/Server + Reach + Content

At the heart of the netcentric approach is a fully functional client/server system. However, the new channels and new users of netcentric computing mean that organizations can extend the reach of client/server applications, as well as provide new and more complex forms of content. Outside the enterprise, the reach of netcentric computing allows an organization to link its employees, customers, suppliers, partners and others, irrespective of time, location or device. But reach applies inside the enterprise as well—among its departments and business units, at home and around the world. It enables the sharing of information and allows everyone to tap into the organization's brain power.

One important netcentric initiative extending internal reach has come from communications giant Motorola. As part of a project to reengineer its human resources function, Motorola designed a self-service network, or Enet, to give its employees 24-hour access to basic information, thus freeing its human resources personnel to address higher value-added work. This network is accessible through the organization's intranet, as well as through stand-alone corporate kiosks. It not only provides information on demand but is integrated with the organization's human resources system as well.

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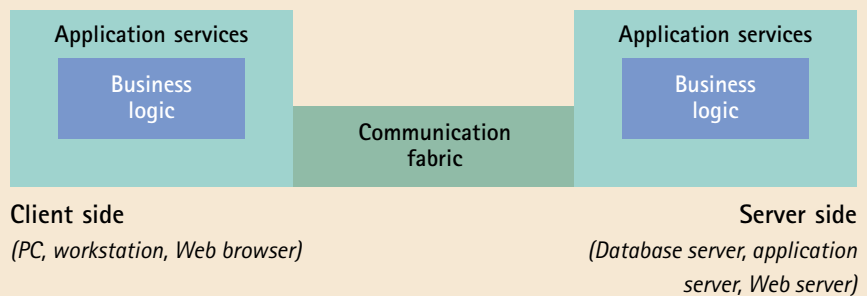
Netcentric Architecture Framework

Netcentric computing is an evolutionary form of client/server computing. The Netcentric Architecture Framework builds upon the knowledge about systems architecture gained during the client/server era. Components or services of the netcentric solution are shown below, both on the client side and the server side of the system; these are joined by the services of the "communication fabric," which links the sides and places intelligent capabilities into the physical network, enabling applications to interact.

The services of the solution are kept distinct from the underlying business logic, and they are deliberately not vendor- or technology-specific. These two critical facts ensure that the solution is flexible, both from a business and a technology point of view.

The services of the framework are logical groupings of system capabilities. They include:

- **Communication services**, which enable an application to interact with other applications wherever they may be physically located
- **Information services**, which manage and control access to electronic data assets
- **Environment services**, which provide miscellaneous application and system-level services
- **Transaction services**, which provide the transaction integrity mechanism for the application
- **Presentation services** (client side), which manage the human-computer interface
- **Web services** (server side), which support the delivery of applications over the Internet, intranet and extranet



SOURCE: ACCENTURE ANALYSIS

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information officers and other executives be doing today to put it in place? Four primary points need to be made.

1. **Netcentric computing is today's enabler of major business capabilities.** For perhaps the first time in the history of computing, people are defining an evolutionary stage in the industry, not just by pointing to a new set of hardware components, but by telling stories about what their business is now capable of doing, and about the value being derived

from netcentric solutions. NBTel's self-service strategy, enabled by such applications as the Interactive Phone Store, resulted in drastically lower costs per transaction: from more than \$11 (Canadian) in 1992 to less than \$5 in 1997, with a further decrease to just more than \$2 projected by the year 2000. Since Commerzbank implemented its virtual banking capability, 4,000 customers per month have signed up for the service; the customer base is expected to be 230,000 within two to three years. Motorola's Enet applica-

tion resulted in a \$2.5 million savings just from the manager self-service human resources network alone.

Real numbers, and real value. But netcentric's full value must be measured by the way in which it enables new strategic thinking. Take, for example, a US-based utility that manages a pool of retail electricity suppliers for all or parts of six states. The utility today handles almost 8 percent of the electric power in the United States. As a result of deregulation, electricity customers were given a choice of electricity provider. This meant that the industry needed to think in new ways about how to schedule and provide service. The utility's business strategy was to operate the first bid-based regional energy market in the United States. The netcentric technology enabler for that business strategy was the first Internet-based retail contract and scheduling application in the United States electric power industry.

The system enables participants to buy and sell energy, schedule bilateral transactions and reserve transmission service; it also provides accounting and billing services for these transactions. The system allows more than 30 retail electricity suppliers to manage their energy services to residents in their area. The utility has since become one of the most liquid and active energy markets in the United States.

2. Netcentric computing is a flexible foundation for the future.

Take almost any industry and compare a list of market leaders in 1999 with the list from 1989. The message will be clear: Companies can no longer depend on a sustained advantage from a single good idea or new way of doing business. Imitators catch up, and others take the innovation even further and pass them by.

The key for our current era is to discover instead an innovative solution in a key competitive area, manage the costs out of the solution and then leap to the next solution when imitators follow.

Netcentric computing enables this need for continuous reinvention. It creates a more resilient architecture that evolves and extends over time. It enables companies to transition their legacy systems into a new environment, extending the usefulness of those systems and the critical business knowledge they contain as they begin to run out of gas. In all, these capabilities provide greater flexibility, enabling companies to rapidly adopt new technology to support innovative marketplace solutions.

Flexibility also becomes the key to how an organization plans for developing future netcentric capabilities. A critical point for companies today is that even if their current business solutions do not involve netcentric computing, it is vital to maintain the flexibility in technical architecture that will permit a move to netcentric computing in the future.

Case in point: Accenture has been working on a systems development project for a large automotive manufacturer. We recently reviewed the technical infrastructure for a centralized system that was to be integrated with local dealer systems. We asked the organization executives, What if, at some point in the future—one or two years from now—the way in which the business is transacted changes? What if, for example, somebody walked into a dealership on a Thursday or Friday, interacted with the system (that is, created a customized car, selected the color, looked at the finance or lease package) but then said, “I want to go away and think about this for the

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weekend.” Then suppose the organization had a 24-hour call center. That same customer could call and, by speaking to a customer-service representative about the details of the package designed at the dealership, talk through the deal on a Sunday afternoon. Right there, the customer could make some adjustments and close the transaction over the phone. Of course, being a 24-hour operation, the call center could be based anywhere in the world.

This would be a new way to buy cars—not dramatically different, perhaps, but it would have a big impact on the technology infrastructure of the business. All of a sudden, the entire context of the transaction from the showroom conversation on Thursday or Friday would have to be made available to a call center three days later, potentially on the other side of the world.

We asked our client if this scenario was within the realm of possibility. It was. Would there be a significant impact on the infrastructure if we did not design and build in that potential capability today? Yes. Netcentric architectures provide the flexibility and resiliency required in such scenarios.

3. Netcentric computing presents new challenges.

Yes, there are new complexities and risks in the netcentric environment. Consider the new kind of complexity involved in building netcentric infrastructures. When we were in the mainframe world, we may have had three or four major infrastructure components: the database, the CPU, a network and some terminals. Two or three suppliers provided all those major components, so choices were limited. Because there were only six to eight combinations of all components and vendors, the complexity

was manageable. When we went to client/server, we went up to five or six infrastructure components: workstation, workgroup server, enterprise server, a database and a couple of networks. Each of these had five to seven possible suppliers. So instead of six to eight combinations, we were looking at up to 40. The size of the problem was bigger, and the nature of the computing solution got more complex.

With netcentric computing, if we add only 20 percent more components and, let us say, 30 percent more providers, we go from some 40 combinations to up to 100. And to make things even more exciting, the components and providers change practically every day. The vendors are more numerous, and the products are younger—the “average version number” is much lower. And, paradoxically, those vendors who are most successful are those whose support resources are most stretched.

4. The new complexity can be managed.

Organizations typically hit a kind of wall as they encounter the host of complexities in a netcentric environment: performance, security, reliability and usability, to name just a few—all with major implications for processes and people. Their frustration will be aggravated by vendors’ claims that netcentric computing is going to be faster, cheaper and easier. How will organizations get over the wall?

This complexity can be managed through the use of a proven architectural approach. Experience from client/server development clearly demonstrated that technology architectures can isolate and manage risk. They permit the development of consistent, reliable and high-quality applications that are also better inte-

grated within and between an organization's business units.

The netcentric architecture framework—again, an evolution from client/server architectures—helps neutralize technology complexity by managing the explosion of new technologies. The framework has been successfully used by hundreds of companies to deliver new business capabilities across a wide range of industries and environments.

The framework accomplishes two major things. First, it helps manage the development of the netcentric solution, serving as a guide and a completeness check, allowing one to assess more easily the types of services and products needed for any specific situation. Second, the framework is a logical representation of the environment in which the business problem will be addressed by the computing solution. It is a tool that allows development teams to break the problem down into component parts and reassemble a solution.

We began with the idea of “opening the box” of netcentric computing. But there is another interpretation of this phrase. To take advantage of the powerful technology infrastructure of netcentric computing and to meet today's challenges and prepare for tomorrow's, companies must open *themselves* up. They must open their own box, and understand themselves as an “extended enterprise.” This has important management implications. To build such an enterprise, business leaders must be willing to break through their traditional boundaries. They must open up their organizations and information systems to include customers, suppliers and partners. They must constantly be thinking of new ways to use their technology to make

richer content available and establish new commercial relations.

From a purely technical point of view, netcentric computing is breaking down the hierarchy of command and control that was implicit in earlier technologies. It is moving intelligence to the edge of the network and flattening the hierarchy, while it creates new strategic opportunities. Today's opportunity, however, is tomorrow's necessity. Innovators in netcentric computing today can redefine their markets and seize the advantage. Tomorrow's imitators will be forced toward these new technologies simply to stay in business. ■



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