Top IT executives from Molina Healthcare, Rock-Tenn Company, and ITT Educational Services on:

Centralized vs. Distributed Computing: How to Decide

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The question of whether a particular computing function should be centralized or handled locally regularly confronts the IT department of every company with more than one site. The decision may sound easy for particular processes, but there are always tradeoffs. Centralized systems enable more standardization, control, and efficiency, yet they require costly infrastructure, and failures can paralyze the entire operation. Distributed systems, on the other hand, can be more easily customized to fit a local environment’s particular needs, but they can be difficult to standardize across the company and more costly to manage and upgrade. Moreover, the decision must also address the operational needs of the company’s business model as well as Web-based options. This ExecBlueprint addresses these and many other issues IT leaders regularly confront when evaluating their centralized/distributed mix. The three authors discuss how they manage the mix at their company, communicate with stakeholders, and perform cost/benefit analyses.
About the Authors

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Rick Click is vice president of IT and CIO for Molina Healthcare Inc. He is responsible for the company’s technical compliance and growth, overseeing electronic infrastructure, applications, and security, as well as client services.

Mr. Click is a certified Six Sigma Plus “Black Belt” who has more than 15 years of experience in electronic data interchange and international mergers and acquisitions. He is also certified in the Change Acceleration Process. Prior to joining Molina, he was the global technology leader for eBay and former CIO of Honeywell International’s commercial avionics division.

In addition, Mr. Click has authored several books within the areas of outsourcing and supply chain re-engineering.

Larry S. Shutzberg has served as vice president and CIO for Rock-Tenn Company since 1986. Rock Tenn Company is a $2.5 billion Norcross, Georgia-headquartered manufacturer of packaging products, merchandising displays, and both virgin and recycled paperboard. The company operates more than 90 manufacturing facilities throughout the United States, Canada, Mexico, and Chile.

As vice president and CIO, Mr. Shutzberg is responsible for business systems, telecommunications, and related technology infrastructure throughout the company.

Before joining Rock-Tenn Company, he spent four years as a senior management consultant for Accenture (formerly Anderson Consulting). A certified public accountant, Mr. Shutzberg served as an internal auditor with Coopers & Lybrand prior to Accenture.

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Martin Van Buren has served at ITT Educational Services Inc. as vice president of IT since January of 2004. The company is a leading provider of technology-oriented post-secondary degree programs. As of March of 2006, the company operated 84 ITT Technical Institutes in 32 states, which provided mostly career-focused degree programs in fields involving technology to more than 43,000 students.

From April of 2000 to December of 2003, Mr. Van Buren served as a senior manager in Deloitte & Touche’s solutions group, where he led several large-scale supply chain implementations that heavily leveraged IT. Prior to that, he served as a division manager for Symix, a middle market enterprise resource planning software development company, from August of 1999 to March of 2000. In addition, Mr. Van Buren served as a manager in Ernst & Young’s consulting practice from February of 1995 to July of 1999.

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Management Involvement
When deciding whether our IT resources are going to be centralized or distributed, I first gather all of the functional vice presidents to go through the business life cycle. For example, in our business, there are five fundamental processes that occur: we receive claims, then pre-process, process, pay, and audit them. There are many functions that represent those five areas, such as call centers. Every process that supports one of those fundamental processes can be outlined; we can further detail whether the function is centralized or decentralized and if it is affected by demographics or time.

Balancing Centralized and Decentralized Computing
Finding a balance between centralized and decentralized computing really depends on the business model. Different business models basically determine whether a centralized or decentralized environment is more appropriate. If you have a manufacturing company or a company that runs portfolio management with different product lines, a decentralized environment makes sense because, obviously, they are each very dependent upon different business life cycles. However, if you have a large conglomerate — like GE, with GE medical, GE manufacturing, and GE loans — then, obviously, a centralized approach would work best. For a company like ours where 85 percent of what we offer is primarily one service (even though service offerings are in different states and are run as independent plants), running a centralized office makes much more sense because we can leverage the back-office function across the enterprise.

Configuration Review
We review our configuration every year. For example, if we were going to make an acquisition, we would examine the best practices of the company we were purchasing. There may be a centralized corporate office that processes transactions, yet reporting may be centralized in another location. The annual configuration review should be performed cross-functionally, not just by IT.

Choosing a Strategy
Choosing a centralized or decentralized computing strategy is a relatively easy decision. For example, if 85 percent of all your functions are the same, and if everybody is going to be paid the same, it makes sense to centralize the payroll function. If everybody is going to be run by the same policies, HR can be centralized because you can get as much done with 10 people across an enterprise with one point of contact for each location as you can with four people in each of the locations. Currently, our IT resources are distributed: 90 percent centralized and 10 percent decentralized. We are hoping to convert that to an 85/15 percent split, because we are opening more locations.

Supply and demand of qualified individuals, as well as the availability of a network to allow for communication and centralization, are the types of considerations companies must make before choosing a computing strategy.

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at the costs of full-time employees and the availability of those employees. There are not a lot of computer programmers in Idaho, for instance; on the other hand, a company does not necessarily want to jump into the middle of Silicon Valley and compete for programmers. Thus, supply and demand of qualified individuals, as well as the availability of a network to allow for communication and centralization, are the types of considerations companies must make before choosing a computing strategy.

Benefits of Centralized Resources

Initially, each operation in eight states had its own reporting function. This was very difficult to maintain and resulted in 1,000 reports across the organization, making standardization incredibly difficult. In order to centralize processes and leverage resources, it is important to maintain standardization. So, we consolidated all 1,000 reports down to just eight and built a centralized reporting repository that allowed us to house all of the reports in a central location. Our labor needs were reduced accordingly: instead of four report writers for each state, we found that one in each state that understood the needs of the business was now sufficient.

However, centralization can be expensive. The infrastructure has to be strong, standards must be met, and there needs to be constant integration of new acquisitions and processes. It is a very painful process, but once it is accomplished, administrative costs drop considerably because everything can be managed from one location; there isn’t a need for experts in every location, communication is easier, and problems can be resolved quickly.

Benefits of Decentralized Resources

A decentralized approach, however, has been really beneficial to our helpdesk. From the helpdesk perspective, we have to keep feet on the ground in every state. There must be people available to go to different machines, install, fix, and run wire. It does not make sense to run a centralized helpdesk and have to hire consultants to work in every state when we can simply be decentralized and have our own staff fix the problems. For small offices or small businesses within a large conglomerate, decentralization makes sense because there is no reason to centralize tier-three or tier-four companies. Decentralization also offers advantages for small “mom and pop” shops, allowing them the autonomy to do their jobs.

Expert Advice

If 80 percent of our functions are done in a centralized environment, we will perform a cost/benefit analysis to determine if we would be better served moving to a decentralized environment. We will try to determine the cost of the move from a hardware perspective, an MTE perspective, and from the perspective of the cost of changing the process to run in a new location. Many times, the bottom line is that we can either absorb additional costs due to the centralized location or pay for the difference of decentralizing.
IT Leadership Decisions

IT leadership typically governs the decision about whether to centralize computing operations, but not without collaborating with the business leaders. Business drivers should ultimately make this decision. It really involves understanding what the recommendations are and why, and agreeing or disagreeing. If a business is run centrally, the computing model is typically more centralized. If it is run in a distributed fashion, almost invariably the computing model is distributed, with some exceptions. Some functions are still central, and some are by design distributed.

In the next 12 months, however, I expect browser-based applications will drive more applications toward centralization, even if the business model is distributed. I think enterprise resource planning will also help drive more centralization. However, custom solutions and best-of-breed are examples of where a distributed model may continue to work best. The factors that most greatly influence my decision are business risk, restart recovery, and whether the information needs to be centralized. If so, does it need to be centralized in real time or just historically?

The greatest challenges we have encountered with distributed computing are the higher cost of management, aggregation of historical information, and more difficult and costly rollout of new enhancements.

Factors in Determining a Centralized or Distributed Computing Strategy

Cost savings is important, but not as much as minimizing business risk. The importance of security is a foregone conclusion. Organizational needs are the most important; what does the organization really need? Performance is also very important. Regarding the effectiveness of centralized versus distributed, we seek out feedback from division management and executive management, and we listen carefully to their comments. We take those into account for future planning. If they like it, that’s great. If they don’t like it, we listen to why and change accordingly.

Examples of Centralized and Distributed Solutions

For example, when an application needs centralized information, centralized computing resources make sense. A good example is credit management. The idea that you need to have all information relating to managing your credit in one place necessitates a centralized...
computing system. We’re able to manage credit in an effective manner so some locations are not shipping to bankrupt companies that other locations know about.

Going with a distributed solution often makes sense when dealing with applications that interface with plant floor equipment and/or process information. They typically do not need to be centralized, and they tend to function better in the field close to where the system is used. Not only do you get better performance, but when there are telecommunications issues or any kind of recovery or downtime, the plant is often not affected.

Because we set up our systems the way we think it should be done, we find it difficult to quantify the effect on our organization. We don’t do ROI on what problems might have happened if we didn’t do it a certain way. When one location experiences downtime, we know the critical applications at 90 other locations are not down at the same time. For this reason, decentralization of some functions is inherently beneficial.

Challenges of Distributed and Centralized Computing
The greatest challenges we have encountered with distributed computing are the higher cost of management, aggregation of historical information, and more difficult and costly rollout of new enhancements. However, we like the minimized business risk, and we like the performance characteristics, so we actually choose to have those challenges. We are willing to pay for them.

The greatest challenges with centralized computing arise from situations when you need distributed information, but you desire centralized management and visibility. In some cases, we need distributed information, but unfortunately a centralized server in another city is not available. It stops people in their tracks. We deal with that challenge by using distributed computing where practical.
Primary Responsibility
The vice president of IT and the COO have the primary responsibility for deciding whether IT resources will be centralized or distributed. We have 85 schools, and each school has one IT person.

The reason we keep things centralized is so we can control our data, which is one of our most precious and valuable assets.

We manage the distributed versus non-distributed discussion. The more hardware applications we put out there, the more we have to do, so there is a balancing act. The operations department, which runs the schools, is a stakeholder as much as our department. We are the main players in the process, and we have discussions from time to time about paradigm shifts, but won’t be making any major changes in our mix anytime soon. They will be more subtle.

Balancing Distributed and Centralized
We try to engage business owners. We have a change management philosophy in everything we do. We ask for lists of cost, effort, and requirements, and we look at many kinds of dashboards. The network service infrastructure dashboard, for instance, looks at response time, latency time, and uptimes. We also evaluate whether we have acceptable service level agreements for the business.

In addition, we ask for feedback from school directors, district managers, executives on the operation side, and the business. We analyze data, cost per performance, and cost per bandwidth to get the input we need to make a decision. These

Distribute or Centralize?
Essential Steps in IT’s Decision-Making Process

- Engage and ask for feedback from business owners and other users.
- Ask for lists of cost, effort, and requirements.
- Look at many kinds of dashboards such as response time, latency time, and uptimes.
- Evaluate whether acceptable service level agreements for the business are in place.
- Analyze data, cost per performance, and cost per bandwidth.
factors all lead into how to deploy the technologies.

**Key Factors**

When deciding whether to implement different strategies, we take several factors into consideration. Performance can be broken down into response time, bandwidth, uptime, and the ability to deliver software services and network access.

Cost, security, and maintenance are other important factors. Meaning response time is a big component for us. Cost can be broken down into a couple of different categories; price compared to performance is critical to any service we want to provide.

**Beneficial Decisions**

Sometimes, the decision to use centralized computing resources is particularly beneficial to our team. We made a decision to put hardware in each school rather than manage data through virtualization. By allowing hardware to live in a distributed environment, we were able to quickly implement a wireless network within 45 days across 85 sites, because the infrastructure was there.

On the flip side, the reason we keep things centralized is so we can control our data, which is one of our most precious and valuable assets. Remote infrastructure is easier to manage remotely. However, applications and associated data are better managed centrally so the integrity of the data is not compromised and it can easily integrate with other departments’ needs. If we keep applications central, we will be able to implement applications much more quickly, because there is less integration required in the centralized model.

**Challenges**

The greatest challenge in dealing with distributed computing is getting results. When managing a distributed asset, we have to maintain visibility and control to get the benefit of the investment. Also, staying within standards is critical to the overall success of the company, and it is harder to enforce standards when the assets are distributed.

The more a unit needs to customize, the harder it is to have visibility and control. It is difficult, for instance, to maintain control centrally while allowing a local school to have enough flexibility to deliver the process that makes the most sense for them. Because we don’t teach the same curriculum at every school, flexibility is key.

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**Expert Advice**

Two-thirds of our labor is out in the field. Our hardware distribution is 50/50, and our software is 95 percent centralized. I expect these percentages to change over the next couple of years. I think the hardware and software mixes will stay the same, but the labor mix will shift slightly. Our big shift will be in the way we leverage and manage technical resources in the field.
Ideas to Build Upon & Action Points

I. How Does a Company Choose the Right Computing Model?

The appropriate balance between centralized and distributed computing generally depends on your company’s business model, and the question will have to be revisited periodically as company needs change and technologies evolve. Major factors that will influence your choice include:

- Size of company: It makes more sense for large conglomerates to centralize than mid- or small-sized companies.
- The company’s number of product lines: More lines can often be better served with a decentralized system, fewer lines with a centralized system.
- The number of departments performing the same function across sites, such as HR or payroll: Centralization of that function can reduce staff overhead and promote efficiency.
- The amount of information that is shared across sites, such as credit data on customers: Centralization of this information can increase control and security.
- The number of operations that need to be performed locally, such as helpdesk or plant floor applications: Distributed solutions generally function better, because they have been customized to the environment.

II. The Bottom Line

While costs must always be considered, they should never be the sole basis for deciding whether to centralize or distribute a particular computing function. The first bottom line most companies must address in their IT function is, in fact, security — a feature that can prove all too costly to downplay or ignore. When attempting to assess the other financial implications of different computing models, consider:

- Analyzing cost per performance and per bandwidth where appropriate
- Performing cost/benefit analyses after making changes that include the costs of hardware, MTE, and system relocation

III. Must-Have Approaches Toward Making Informed Decisions

Like most, your company probably has a mix of centralized and distributed computing systems, which will need to be reviewed and adjusted periodically to ensure that present and future needs are met. Such a review and planning process should entail:

-Detailing whether all functions are centralized or decentralized and if they are affected by demographics or time
- Assessing performance (response time, bandwidth, uptime, and ability to deliver software services and network access), cost, security, and maintenance of present systems
- Evaluating how present processes support standardization across sites and whether acceptable service level agreements are in place
- Determining which locations have the necessary infrastructure or resources for centralized processing (Headquarters is not always the answer.)
- Researching the costs and availability of labor in different locations

IV. The Golden Rules for Working with Your Stakeholders

At most companies, IT leadership typically governs computing decisions, but not without collaborating with other business leaders who depend on your system capabilities, such as operations. Best practices for communicating with your colleagues on technology issues include:

- Asking them to trace their computing needs through their various business cycles
- Listening carefully to feedback and comments from division and executive management
- Engaging them in discussions about their costs, effort, and requirements
- Making sure IT first understands the rationale behind their recommendations before deciding to agree or disagree

V. Essential Take-Aways

Every computing solution will offer a distinct set of rewards and challenges for both your IT staff and the company as a whole. Rewards of centralized systems can include greater efficiency and ability to implement new applications more quickly.

Rewards of distributed systems can include greater adaptability and less vulnerability to system failures.

Before deciding to institute changes, IT must be prepared to weigh these factors as well as address the following common challenges:

- With centralized systems, you have a higher risk of losing more data — and time — should failures occur.
- Distributed computing can be associated with higher costs for management, aggregation of historical information, and rollouts of new enhancements.
- IT must take extra steps to maintain control of the data and processes, and enforce industry standards in distributed environments.
- The more a unit needs to customize, the more difficult it will be for IT to exert visibility and control over the data.
10 Key Questions and Discussion Points

1. In your company, who has primary responsibility for deciding whether IT resources will be centralized or distributed? How are business leaders from across the organization involved?

2. In the next 12 months, how do you expect your company’s balance of centralized versus distributed computing to change? What is driving these changes?

3. How often do you conduct a review to determine if the current configuration of centralized versus distributed computing is meeting organizational needs? Is only the IT organization involved in these reviews, or do you utilize a cross-functional approach?

4. What percentage of your IT resources is distributed? Do you expect this percentage to increase over the next 12 months?

5. What percentage of your IT resources is centralized? Do you expect this percentage to increase over the next 12 months?

6. When considering whether to implement a centralized versus distributed computing strategy, which factors are most important? Cost savings? Security? Organizational needs? Other?

7. What parties are asked for feedback regarding the effectiveness of centralized versus distributed computing? How is their feedback incorporated into future decision making?

8. Could you give an example of when a decision to utilize centralized computing resources proved especially beneficial to the company? What was the effect on the company? How did you calculate ROI for this initiative?

9. Could you give an example of when a decision to utilize distributed computing resources proved especially beneficial to the company? What was the effect on the company? How did you calculate ROI for this initiative?

10. What kind of benchmarks do you use to determine whether your company’s balance of centralized versus distributed computing is meeting organizational needs? How is progress measured? How often?