

flexibility in the data center. By separating software from the hardware on which it runs, virtualization can make the data center far more flexible and agile in five ways:

- It lets you treat multiple hardware devices, like servers or storage systems, as one device. Conversely, it allows you to separate individual physical servers into multiple virtual ones, making it easier to scale storage and applications up or down upon demand.

- It permits you to use cheaper, generic hardware and aggregate it into virtually unified systems that are more cost-effective.

- Virtualization makes it easier to handle equipment failure because you can move a virtual environment to other available hardware quickly.

- By treating hardware resources as one pool, virtualization lets you use that equipment more efficiently, so you need less equipment.

- Outside the production environment, virtualization makes it easier to set up, change and tear down test environments.

Clothing retailer Coldwater Creek Inc. is using virtualization to reduce its number of physical servers, leading CIO Michael Carper to predict that he will be able to “extend the life of the data center by five years.”

At Corrections Corporation of America (CCA), which runs about 60 prisons, virtualization not only helps reduce hardware needs, it also speeds provisioning of new servers. “It takes just hours to bring in additional capacity, not days,” says CIO Brad Wood.

Although server virtualization technology is advancing rapidly, there has been less progress on the storage side, notes Schreck. That’s because traditional large-systems vendors, such as EMC Corp. and Hitachi Data Systems Corp., don’t want to see storage become commoditized, says John Webster, senior analyst at Data Mobility Group LLC. But other vendors, such as Symantec Corp. and Kazeon Systems Inc., now offer software for heterogeneous environments that can virtualize generic storage systems and interact with proprietary systems.

## Virtualization: Challenges

Virtualization technology is fairly new. Consequently, not all applica-



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“The skill sets change dramatically. . . . We have fewer, more highly talented people.”

MICHAEL CARPER, CIO, COLDWATER CREEK INC.

tions can work in a virtualized environment, cautions Kris Dominick, president of data center consulting at Data Dimensions Inc. “You need to start with a feasibility assessment,” he says. Today, virtualization also requires a restart to change the environment, so it won’t work to redistribute computing and storage resources automatically on the fly.

An irony of the virtualized data center is that your staffing costs could increase even as your staffing levels decrease, says Wood. It takes more skill and experience to work in a virtualized environment than in a traditional one. As server and storage capacity is optimized, your buffer is diminished to handle fail-overs and unexpected loads. Furthermore, you have to know what resources are in use by which applications and understand which resources are now shared, since any failures or workload rebalancing can affect multiple systems simultaneously.

“You need a highly skilled, highly paid staff to manage this more complex environment,” Wood says. “You can’t have just the generalist anymore.” The *Computerworld*/CIO survey bears this out: 44% of respondents say they expect to need a more highly skilled staff to run a virtualized data center.

The adoption of virtualization also raises political issues for CIOs. In a virtualized data center, business units may no longer have servers with their names inscribed on them. “Virtualization gets a lot of resistance [from business departments] because it’s shared services. People don’t play well in the sandbox together,” IDC’s Bailey notes. “A lot of people like to own their infrastructure.”

Even within the IT department, virtualization can sometimes bruise egos, says Schreck. “Virtualization cuts across ownership boundaries,” he says, leading each group to compete for resources and campaign for its own