4.11: Virtualization- Software That Makes One Computer Act Like Many

Learning Objectives

After studying this section you should be able to do the following:

1. Know what virtualization software is and its impact on cloud computing.
2. Be able to list the benefits to a firm from using virtualization.

The reduced costs and increased power of commodity hardware are not the only contributors to the explosion of cloud computing. The availability of increasingly sophisticated software tools has also had an impact. Perhaps the most important software tool in the cloud computing toolbox is virtualization. Think of virtualization as being a kind of operating system for operating systems. A server running virtualization software can create smaller compartments in memory that each behave as a separate computer with its own operating system and resources. The most sophisticated of these tools also allow firms to combine servers into a huge pool of computing resources that can be allocated as needed (Lyons, 2008).

Virtualization can generate huge savings. Some studies have shown that on average, conventional data centers run at 15 percent or less of their maximum capacity. Data centers using virtualization software have increased utilization to 80 percent or more (Katz, 2009). This increased efficiency means cost savings in hardware, staff, and real estate. Plus it reduces a firm’s IT-based energy consumption, cutting costs, lowering its carbon footprint, and boosting “green cred” (Castro, 2007). Using virtualization, firms can buy and maintain fewer servers, each running at a greater capacity. It can also power down servers until demand increases require them to come online.

While virtualization is a key software building block that makes public cloud computing happen, it can also be used in-house to reduce an organization’s hardware needs, and even to create a firm’s own private cloud of scalable assets. Bechtel, BT, Merrill Lynch, and Morgan Stanley are among the firms with large private clouds enabled by virtualization.
(Brodkin, 2008). Another kind of virtualization, virtual desktops allow a server to run what amounts to a copy of a PC—OS, applications, and all—and simply deliver an image of what’s executing on a PC or other connected device. This allows firms to scale, back up, secure, and upgrade systems far more easily than if they had to maintain each individual PC. One game start-up hopes to remove the high-powered game console hardware attached to your television and instead put the console in the cloud, delivering games to your TV as they execute remotely on superfast server hardware. Virtualization can even live on your desktop. Anyone who’s ever run Windows in a window on Mac OS X is using virtualization software; these tools inhabit a chunk of your Mac’s memory for running Windows and actually fool this foreign OS into thinking that it’s on a PC.

Interest in virtualization has exploded in recent years. VMware, the virtualization software division of storage firm EMC, was the biggest IPO of 2007. But its niche is getting crowded. Microsoft has entered the market, building virtualization into its server offerings. Dell bought a virtualization software firm for $1.54 billion. And there’s even an open source virtualization product called Xen (Castro, 2007).

Key Takeaways

• Virtualization software allows one computing device to function as many. The most sophisticated products also make it easy for organizations to scale computing requirements across several servers.
• Virtualization software can lower a firm’s hardware needs, save energy, and boost scalability.
• Data center virtualization software is at the heart of many so-called private clouds and scalable corporate data centers, as well as the sorts of public efforts described earlier.
• Virtualization also works on the desktop, allowing multiple operating systems (Mac OS X, Linux, Windows) to run simultaneously on the same platform.
• Virtualization software can increase data center utilization to 80 percent or more.
• While virtualization is used to make public cloud computing happen, it can also be used in-house to create a firm’s own private cloud.
• A number of companies, including Microsoft and Dell, have entered the growing virtualization market.

Questions and Exercises

1. List the benefits to a firm from using virtualization.
2. What is the average utilization rate for conventional data centers?
3. List companies that have virtualization-enabled private clouds.
4. Give an example of desktop virtualization.
5. Name three companies that are players in the virtualization software industry.

References

