Chapter 4.16
Continuous Database Availability

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ABSTRACT

In today's business environment, it is usual that data relevant to business is stored on different hardware, inside different databases, different data warehouses, inside as well as outside of the organization. Accuracy, quality, timeliness, and especially availability of such distributed data make crucial role in the process of business managing. Now, one of the biggest challenges is to ensure continuous availability of that data, even in critical and disaster situations. This chapter gives a short overview of the most used solutions for database availability that have become industry standards and gives examples of implementation of these standards by, in this moment, three main database vendors: Oracle (Oracle 11g), IBM (DB2 Version 9.5) and Microsoft (SQL Server 2008).

INTRODUCTION

The main characteristics of today's business, mostly owing to Internet and web technologies, are globalization and continuous availability (24/7/365). Although information technology (IT) is the one of the main driving forces in enabling such a business, ensuring continuous business availability is still one the biggest challenge for IT itself.

This chapter presents necessity of enabling continuous database availability and different approaches used in ensuring this. Today's huge amount of different variety of data stored in voluminous databases and data warehouses has to be readily accessible by Internet and sophisticated communications network. Gathering customer data, vendor information, minute financial measurements, product data, retail sell-through data and manufacturing metrics become one of the most important organization goals. The final result is

that organization had to accumulate terabytes of data on increasingly large storage systems, with the main purpose to enable users who by different software applications use that data in order to improve their business activities and resolve potential business problems.

During last four decades, with great thanks to rapid development of IT, business decision making has become more complex than ever. Today, organizations no longer rely primarily on local or regional sources for inputs, work force to complete production or consumers to purchase their products. This means that decision makers must be aware of trends, activities, customs and regulations around the world and therefore must have easy access to considerably more information and from considerably more sources. At the same time, development of IT, especially related to communications and Internet has enabled 24/7/365 access to digitally stored data. Data relevant to business are stored on different hardware, inside different databases, different data warehouses, inside as well as outside of organization (public databases, web pages, Internet and so on). Accuracy, quality, timeliness and especially availability of such distributed data make crucial role in the process of business managing. Now, one of the biggest challenges is to ensure continuous (24/7/365) access to that data, even in critical and disastrous situations.

With the growing understanding of how incredibly valuable organization data is, there is a new focus on protecting and accessing data. As organizations received hard-earned lessons on what can happen when data is destroyed, damaged, or unavailable, more focus has been placed on protecting mission-critical information than on simply accumulating it. As data volumes continue to grow, organizations are dealing with larger and larger databases. Forrester estimates that 80% of the enterprises supporting terabyte-size databases in production will encounter tremendous challenges in backup and recovery (Otey & Otey, 2005). Large database backups require a scalable

solution that includes appropriate hardware infrastructure. As enterprises deploy new applications, including applications related to Web services and content management, they are poised to support databases that run well into hundreds of terabytes. Therefore, backup and recovery administration challenges will come in phases, with enterprises pushing for higher thresholds and vendors trying to deliver scalable database backup solutions.

For mission-critical applications, the database and servers that support full 24/7/365 database availability need to be available during the times that users require those data. The requirements for achieving the necessary levels of availability in the enterprise today extend far beyond the simple data protection provided by traditional backup and restore technologies. Creating a high-availability environment for business continuity is a complex undertaking because it touches so many different areas in the organization. It is also influenced by many factors, including technological challenges and capabilities as well as human and organizational factors that extend beyond the realm of pure technology into operations. This chapter is focused on only one, but extremely important, part of the availability story – database availability. The aim of the chapter is to explain different approaches and solutions that IT community developed and used in order to protect data and enable its continuous availability. Among standard approaches there are those using high availability (HA) devices with redundant systems, backing up data regularly to tape and data duplication techniques. There are also some more sophisticated methods, including remote mirroring and remote copy (data vaulting), hot (near-line) backup, Data Lifecycle Management (DLM), Information Lifecycle Management (ILM) and so on.

BACKGROUND

Shifting business models, driven by increased customer expectations for 24/7/365 access to

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