CHAPTER 12: DISTRIBUTED DATABASE MANAGEMENT SYSTEMS

1. A distributed database management system (DDBMS) governs the storage and processing of logically related dataover interconnected computer systems.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.554

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: The Evolution of Distributed Database

Management System

1. Distributed data access was needed to support geographically dispersed business units.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.555

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: The Evolution of Distributed Database

Management System

1. Rapid ad hoc data became unnecessary in the quick-response decision-making environment.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.555

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: The Evolution of Distributed Database

Management System

1. The Internet is the repository for distributed data.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.555

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: The Evolution of Distributed Database

Management System

1. Current distributed database management system (DDBMS) are subject to some problems, such as the complexity of management and control
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.556

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Advantages and Disadvantages

1. Distributed processing shares a database's logical processing among two or more physically independent sites thatare connected through a network.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.556

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. One of the advantages of a distributed database management system (DDBMS) is that the data is located near thesite with the least demand.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. One of the advantages of a distributed database management system (DDBMS) is growth facilitation.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. One of the advantages of a distributed database management system (DDBMS) is security.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. Distributed processing does not require a distributed database, and a distributed database does not require distributedprocessing.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.558

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. In order to manage distributed data, copies or parts of the database processing functions must be distributed to alldata storage sites.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.558

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. A database management system (DBMS) must have validation, transformation, and mapping functions, as well asother functions, in order to be classified as distributed.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.559

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Characteristics of Distributed Database

Management Systems

1. A fully distributed database management system (DBMS) must perform all the functions of a centralized DBMS,and it must handle all necessary functions imposed by the distribution of data and processing.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.559

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Characteristics of Distributed Database

Management Systems

1. The transaction processor (TP) is the software component found in each computer that requests data.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.560

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Components

1. A distributed database management system (DDBMS) must be communications-media-dependent.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.560

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Components

1. A transaction processor (TP) is the software component residing on each computer that stores and retrieves datalocated at the site.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.560

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Components

1. In the single-site processing, single-site data (SPSD) scenario, all processing must be done on the end user's side ofthe system.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.561

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Levels of Data and Process Distribution

1. Performance transparency ensures that the system finds the most cost-effective path to access remote data.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.565

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Transparency Features

1. The level of transparency supported by the distributed database management system remains the same for allsystems.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.565

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distribution Transparency

1. Distribution transparency is supported by a distributed data dictionary.
   1. True
   2. False

*ANSWER:* True

PTS: 1 DIF: Difficulty: Easy REF: p.567

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distribution Transparency

1. Distributed database systems do not require complex mechanisms to manage transactions and ensure the database'sconsistency and integrity.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.568

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Transaction Transparency

1. A remote transaction, composed of several requests, may access data at multiple sites.
   1. True
   2. False

*ANSWER:* False

PTS: 1 DIF: Difficulty: Easy REF: p.568

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Transaction Transparency

1. A centralized database management is subject to a problem such as\_\_\_\_\_\_\_\_\_\_\_\_
   1. a growing number of remote locations b. maintaining and operating small database systems

c. dependence on multiple sites d. organizational flexibility of the database

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.556

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: The Evolution of Distributed Database

Management Systems

1. A disadvantage of a distributed database management system (DDBMS) is that:
   1. it is slower in terms of data access. b. adding new sites affects other sites' operations.

c. it is processor dependent. d. there are lack of standards.

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. A distributed database is composed of several parts known as database .
   1. sections b. fragments

c. partitions d. parts

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. Distributed processing does not require:
   1. database processing functions to be distributed to all data storagesites.
   2. an existing distributed database.
   3. a network of interconnected components.
   4. multiple sites to share processingchores.

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.558

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. A database management system needs to prepare the data for presentation to the end user or to anapplication program.
   1. security b. concurrency control

c. formatting d. I/O interface

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.559

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Characteristics of Distributed Database

Management Systems

1. The processor is the software component found in each computer that requests data. It receives andprocesses the application's data requests.
   1. database b. transaction

c. data d. network

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.560

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Components

1. In theory, a(n) can be an independent centralized database management system with proper interfaces tosupport remote access from other independent database management systems in the network.
   1. transaction processor b. application processor

c. transaction manager d. data processor

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.561

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Components

1. Under the scenario, all record- and file-locking activities are performed at the end-user location.
   1. single-site processing, single-site data
   2. multiple-site processing, single-site data
   3. single-site processing, multiple-site data
   4. multiple-site processing, multiple-site data

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.562-563

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Levels of Data and Process Distribution

1. \_\_\_\_\_ distributed database management system (DDBMS) integrate multiple instances of the same DBMS over anetwork.
   1. Homogeneous b. Heterogeneous

c. Fully heterogeneous d. Combination

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.563

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Levels of Data and Process Distribution

1. A distributed database system will support different database management systems (DBMS) that may evensupport different models running under different computer systems.
   1. fully heterogeneous b. fully homogeneous

c. homogeneous d. heterogeneous

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.563

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Levels of Data and Process Distribution

1. A DDBMS is subject to which of the following restrictions?
   1. Multiple instances of the same database should be integratedover a network.
   2. All database processing must be done at a single site.
   3. Rapid ad hoc data access is not possible.
   4. Remote data access is provided on aread-only basis.

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.564

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Levels of Data and Process Distribution

1. transparency allows a physically dispersed database to be managed as though it were centralized.
   1. Distribution b. Transaction

c. Failure d. Performance

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.565

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distribution Transparency

1. transparency allows data to be updated simultaneously at several network sites.
   1. Transaction b. Distribution

c. Failure d. Performance

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.565

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Transparency Features

1. transparency allows the system to operate as if it were a centralized database management system.
   1. Heterogeneity b. Distribution

c. Performance d. Failure

*ANSWER:*

PTS: 1 DIF: Difficulty: Easy REF: p.565

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Transparency Features

1. transparency is the highest level of transparency. The end user or programmer does not need to know that adatabase is partitioned.
   1. Performance b. Fragmentation

c. Location d. Local mapping

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.565

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distribution Transparency

1. transparency exists when the end user or programmer must specify the database fragment names but doesnot need to specify where these fragments are located.
   1. Transaction b. Location

c. Local mapping d. Fragmentation

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.565

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distribution Transparency

1. A contains the description of the entire database as seen by the database administrator.
   1. distributed global dictionary b. distributed data dictionary

c. distributed global schema d. distributed data schema

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.567

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distribution Transparency

1. A lets a single SQL statement access the data that are to be processed by a single remote databaseprocessor.
   1. remote request b. remote transaction

c. distributed request d. distributed transaction

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.568

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Transaction Transparency

1. A distributed can reference several different local or remote data processing sites.
   1. request b. site

c. data location d. transaction

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.569

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Transaction Transparency

1. A request lets a single SQL statement reference data located at several different local or remote DP sites.
   1. distributed b. transaction

c. fragmented d. remote

*ANSWER:* a

PTS: 1 DIF: Difficulty: Easy REF: p.570

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Transaction Transparency

1. The guarantees that if a portion of a transaction operation cannot be committed, all changes made at theother sites participating in the transaction will be undone to maintain a consistent database state.
   1. DO-UNDO-REDO protocol b. two-phase commit protocol (2PC)

c. coordinator protocol d. write-ahead protocol

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.571

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Transaction Transparency

1. The objective of optimization is to minimize the total cost associated with the execution of a request.
   1. data b. remote

c. transaction d. query

*ANSWER:* d

PTS: 1 DIF: Difficulty: Easy REF: p.574

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Performance and Failure Transparency

1. is the delay imposed by the amount of time required for a data packet to make a round trip from point A topoint B.
   1. Data distribution b. Replica transparency

c. Network latency d. Network partitioning

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.574

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Performance and Failure Transparency

1. fragmentation allows a user to break a single object into two or more segments, or fragments.
   1. Horizontal b. Vertical

c. Data d. Request

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.575

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Design

1. fragmentation refers to the division of a relation into subsets of tuples.
   1. Vertical b. Horizontal

c. Data d. Mixed

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.575

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Design

1. fragmentation refers to the division of a relation into attribute subsets.
   1. Data b. Horizontal

c. Vertical d. Mixed

*ANSWER:* c

PTS: 1 DIF: Difficulty: Easy REF: p.575

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Design

1. The rule requires that all copies of data fragments be identical.
   1. shared fragment b. mutual consistency

c. horizontal fragmentation d. replication

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.578

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Design

1. A(n) database stores each database fragment at a single site.
   1. partially replicated b. unreplicated

c. fully replicated d. partitioned

*ANSWER:* b

PTS: 1 DIF: Difficulty: Easy REF: p.580

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Design

1. In a basic distributed processing environment, the distributed processing system shares the database chores amongthree sites connected through a .

*ANSWER:* communications network

PTS: 1 DIF: Difficulty: Easy REF: p.556

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Advantages and Disadvantages

1. One of the advantages of a distributed database management system (DDBMS) is operating cost.

*ANSWER:* reduced

lower

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. A user-friendly is one advantage of a distributed database management system (DDBMS).

*ANSWER:* interface

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. One of the advantages of a distributed database management system (DDBMS) is less danger of a single- failure.

*ANSWER:* point

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. One of the advantages of a distributed database management system (DDBMS) is processor .

*ANSWER:* independence

PTS: 1 DIF: Difficulty: Easy REF: p.557

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Processing and Distributed Databases

1. management ensures that data move from one consistent state to another.

*ANSWER:* Transaction

PTS: 1 DIF: Difficulty: Easy REF: p.559

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Characteristics of Distributed Database

Management Systems

1. In a distributed database management system (DDBMS), occurs to determine the data location of local andremote fragments.

*ANSWER:* mapping

PTS: 1 DIF: Difficulty: Easy REF: p.559

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Characteristics of Distributed Database

Management Systems

1. In a distributed database management system (DDBMS), query is used to find the best access strategy.

*ANSWER:* optimization

PTS: 1 DIF: Difficulty: Easy REF: p.559

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Characteristics of Distributed Database

Management Systems

1. In a distributed database management system (DDBMS), control is used to manage simultaneous dataaccess and ensure data consistency across database fragments.

*ANSWER:* concurrency

PTS: 1 DIF: Difficulty: Easy REF: p.559

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Characteristics of Distributed Database

Management Systems

1. A transaction processor is also known as the processor.

*ANSWER:* application

PTS: 1 DIF: Difficulty: Easy REF: p.560

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Components

1. The distributed database system must be of the computer hardware system.

*ANSWER:* independent

PTS: 1 DIF: Difficulty: Easy REF: p.560

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: DDBMS Components

1. The scenario is typical of most mainframe and midrange UNIX/LINUX server database managementsystems (DBMS)

*ANSWER:* single-site processing, single-site data

SPSD

single-site processing, single-site data (SPSD)

PTS: 1 DIF: Difficulty: Easy REF: p.561-562

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Levels of Data and Process Distribution

1. Typically, the scenario requires a network file server running conventional applications that are accessedthrough a network.

*ANSWER:* multiple-site processing, single-site data

MPSD

multiple-site processing, single-site data (MPSD)

PTS: 1 DIF: Difficulty: Easy REF: p.562

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Levels of Data and Process Distribution

1. The fragment condition indicates that no row has a duplicate, regardless of the fragment in which it islocated.

*ANSWER:* unique

PTS: 1 DIF: Difficulty: Easy REF: p.566

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distribution Transparency

1. The database description, known as the distributed schema, is the common database schema used by localtransaction processors (TPs) to translate user requests into subqueries that will be processed by different dataprocessors (DPs).

*ANSWER:* global

PTS: 1 DIF: Difficulty: Easy REF: p.567-568

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distribution Transparency

1. The protocol is used by a DP to roll transactions back and forward with the help of the system's transactionlog entries.

*ANSWER:* DO-UNDO-REDO

DO UNDO REDO

do-undo-redo

doundo redo

PTS: 1 DIF: Difficulty: Easy REF: p.572

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Transaction Transparency

1. The forces the log entry to be written to permanent storage before the actual operation takes place.

*ANSWER:* write-ahead protocol

PTS: 1 DIF: Difficulty: Easy REF: p.572

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Transaction Transparency

1. describes the process of deciding where to locate data

*ANSWER:* Data allocation

PTS: 1 DIF: Difficulty: Easy REF: p.580

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Distributed Database Design

1. A fully distributed database management system must perform all of the functions of a centralized databasemanagement system (DBMS). What are these functions?

*ANSWER:* 1. Receive the request of an application or end user.

2. Validate, analyze, and decompose the request. The request might include mathematical and logicaloperations such as the following: Select all customers with a balance greater than $1,000. The requestmight require data from only a single table, or it might require access to several tables.

3. Map the request’s logical­to­physical data components.

1. Decompose the request into several disk I/O operations.
2. Search for, locate, read, and validate the data.
3. Ensure database consistency, security, and integrity.
4. Validate the data for the conditions, if any, specified by the request.
5. Present the selected data in the required format.

PTS: 1 DIF: Difficulty: Moderate REF: p.559

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

KEY: Bloom’s: Comprehension TOP: Characteristics of Distributed Database

Management Systems

1. Explain the difference between homogeneous and heterogeneous distributed database management systems(DDBMS).

*ANSWER:* Homogeneous DDBMSs integrate multiple instances of the same DBMS over a network—for example,multiple instances of Oracle 11g running on different platforms. In contrast, heterogeneous DDBMSsintegrate different types of DBMSs over a network, but all support the same data model. A fullyheterogeneous DDBMS will support different DBMSs, each one supporting a different data model,running under different computer systems.

PTS: 1 DIF: Difficulty: Moderate REF: p.563

NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom’s: Knowledge TOP: Levels of Data and Process Distribution

1. Describe performance transparency and heterogeneity transparency.

*ANSWER:* Performance transparency allows the system to perform as if it were a centralized DBMS. The systemwill not suffer any performance degradation due to its use on a network or because of the network’splatform differences. Performance transparency also ensures that the system will find the most cost-effective path to access remote data. The system should be able to “scale out” in a transparent manner,or increase performance capacity by adding more transaction or data-processing nodes, withoutaffecting the overall performance of the system.

PTS: 1 DIF: Difficulty: Moderate REF: p.565

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

KEY: Bloom’s: Comprehension TOP: Distributed Database Transparency Features

1. What is transaction transparency? What are some of the basic concepts that one should know to understand howtransactions are managed in a distributed database management system (DDBMS)?

*ANSWER:* Transaction transparency is a DDBMS property that ensures database transactions will maintain thedistributed database’s integrity and consistency. It should be remembered that a DDBMS databasetransaction can update data stored in many different computers connected in a network. Transactiontransparency ensures that the transaction will be completed only when all database sites involved in thetransaction complete their part of the transaction.

Distributed database systems require complex mechanisms to manage transactions and ensure thedatabase’s consistency and integrity. To understand how the transactions are managed, the basicconcepts governing remote requests, remote transactions, distributed transactions, and distributedrequests should be known.

PTS: 1 DIF: Difficulty: Moderate REF: p.568

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

KEY: Bloom’s: Comprehension TOP: Transaction Transparency

1. Explain the three types of operations defined by the DO-UNDO-REDO protocol.

*ANSWER:* 1. DO performs the operation and records the “before” and “after” values in the transaction log.

1. UNDO reverses an operation, using the log entries written by the DO portion of the sequence.
2. REDO redoes an operation, using the log entries written by the DO portion of the sequence.

PTS: 1 DIF: Difficulty: Moderate REF: p.572

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

KEY: Bloom’s: Comprehension TOP: Transaction Transparency

1. Discuss the CAP Theorem and the three desirable properties it mentions.

*ANSWER:* According to Dr. Eric Brewer, there are three commonly desirable properties in any highly distributed data system – consistency, availability, and partition tolerance. However, it is impossible for a system to provide all three at the same time.

*Consistency* takes a bigger role in a distributed database. All nodes should see the same data at the same time which means the replicas should be immediately undated. This involves dealing with latency and network partitioning delays.

*Availability*is a paramount requirement of all web-centric organizations. No received request should ever be lost and requests should always be filled by the system.

*Partition tolerance* means the system continues to operate even in the event of a node failure and will fail only if all nodes fail.

PTS: 1 DIF: Difficulty: Moderate REF: p.581

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

KEY: Bloom’s: Comprehension TOP: The CAP Theorem

1. Describe any five of the 12 commandments formulated by C. J. Date for distributed databases.

*ANSWER:* With the rise of relational databases, most vendors implemented their own versions of distributeddatabases, generally highlighting their respective product’s strengths. To make comparisons easier, C. J.Date formulated 12 “commandments” or basic principles of distributed databases. Although no currentDDBMS conforms to all of them, they constitute a useful target. Students may choose any five of thefollowing 12 commandments and describe them:

Rule 1: Local-site independence.

Each local site can act as an independent, autonomous, centralized DBMS. Each site is responsible forsecurity, concurrency control, backup, and recovery.

Rule 2: Central-site independence.

No site in the network relies on a central site or any other site. All sites have the same capabilities.

Rule 3: Failure independence.

The system is not affected by node failures. The system is in continuous operation even in the case of anode failure or an expansion of the network.

Rule 4: Location transparency.

The user does not need to know the location of data to retrieve those data.

Rule 5: Fragmentation transparency.

Data fragmentation is transparent to the user, who sees only one logical database. The user does notneed to know the name of the database fragments to retrieve them.

Rule 6: Replication transparency.

The user sees only one logical database. The DDBMS transparently selects the database fragment toaccess. To the user, the DDBMS manages all fragments transparently.

Rule 7: Distributed query processing.

A distributed query may be executed at several different data processor sites. Query optimization isperformed transparently by the DDBMS.

Rule 8: Distributed transaction processing.

A transaction may update data at several different sites, and the transaction is executed transparently.

Rule 9: Hardware independence.

The system must run on any hardware platform.

Rule 10: Operating system independence.

The system must run on any operating system platform.

Rule 11: Network independence.

The system must run on any network platform.

Rule 12: Database independence.

The system must support any vendor’s database product.

PTS: 1 DIF: Difficulty: Moderate REF: p.583

NAT: BUSPROG: Analytic STATE: DISC: Information Technology

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Distributed Databases