

CSE 4125: Distributed Database Systems.

Chapter – 1: Part C

Distributed Databases: An overview

Outline

- DDBMS.

- Accesses to DDB.

DDBMS

- ❑ Two Categories: Commercially available and advanced research prototypes.
- ❑ Distributed Database Management System.
 - Extends the capabilities of DBMS by supporting communication between DBMSs.
 - DBMSs are installed at different sites (local DBMS).
- ❑ Supports creation and maintenance of DDB.

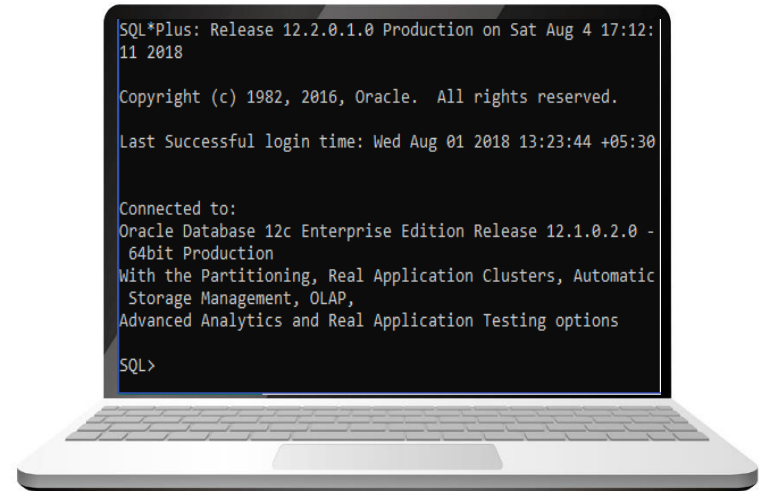
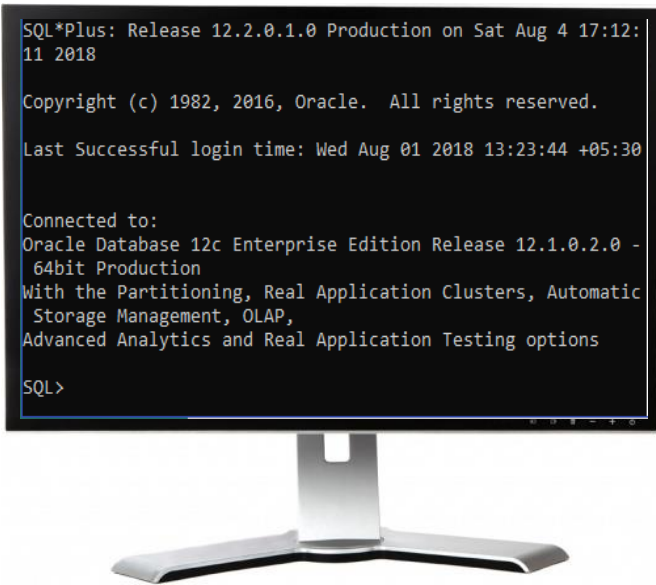
Types of DDBMS

❑ Homogeneous:

- DDBMS with same DBMS at each site.
- Ex. Oracle Database at every site.

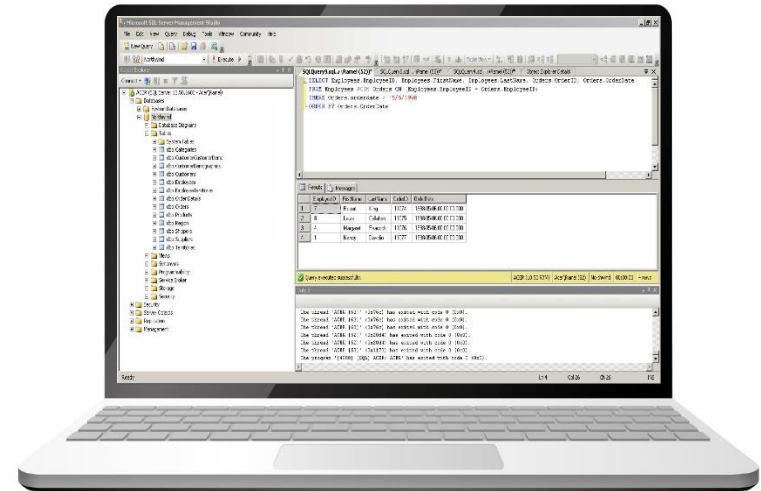
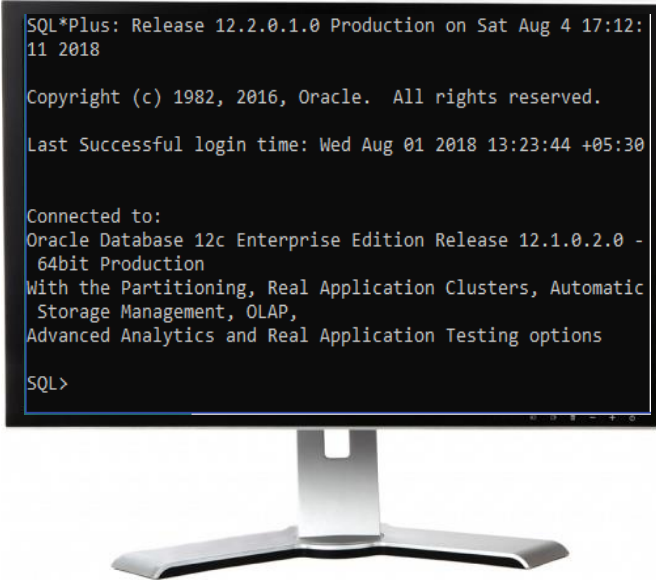
❑ Heterogeneous:

- DDBMS with at least two different DBMSs.
- Ex. MS SQL Server, Oracle at different sites.



❑ Homogeneous:

- **Similar software** (identical DBMS or DBMS from the same vendor)
- Each site is aware of all other sites and co-operates with other sites to process user requests.

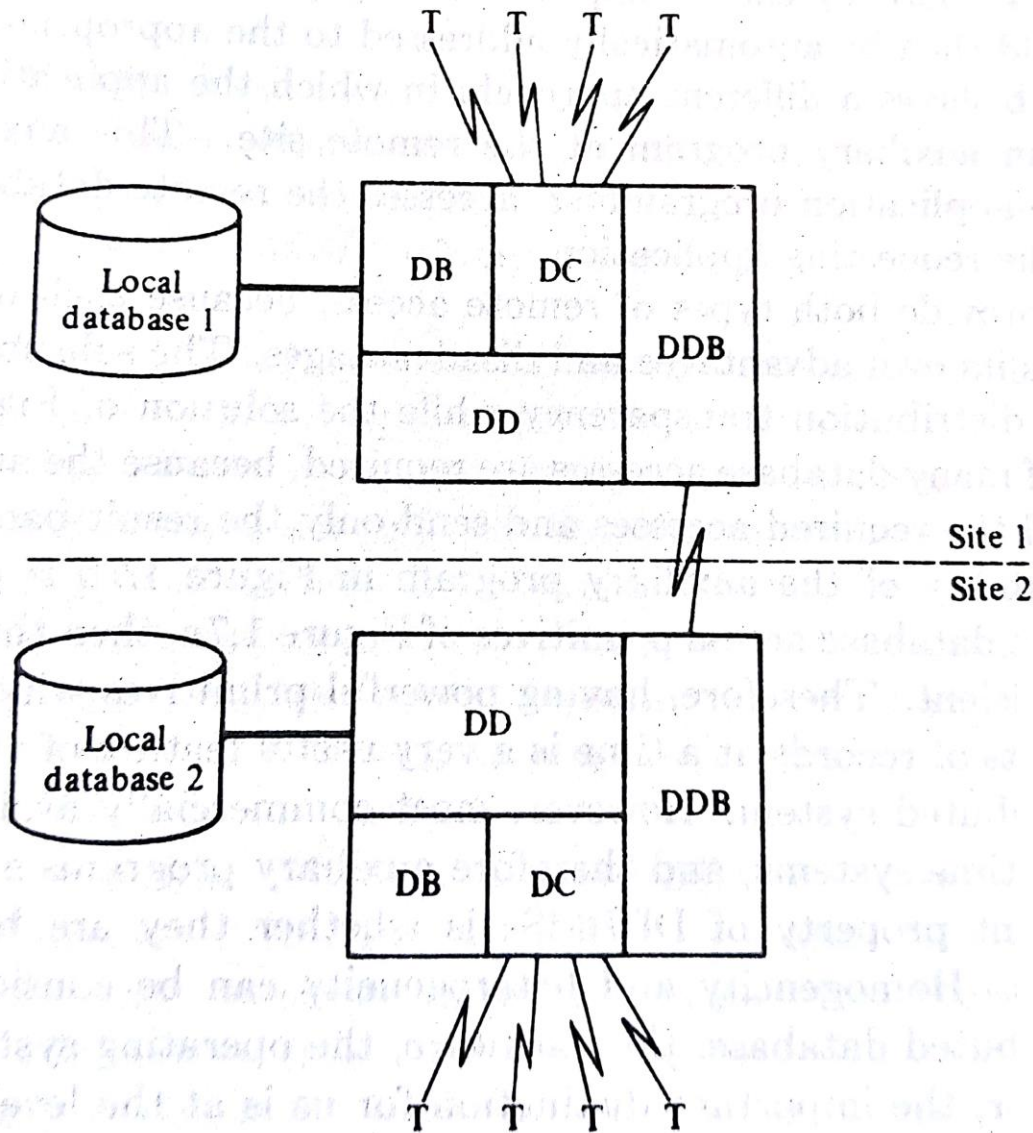


❑ Heterogeneous:

- Different sites use dissimilar schemas, software and a variety of DBMSs
- Query and transaction processing is complex
- Need to translate different data models of different local DBMSs.

Components of DDBMS

- ❑ Database management component (DB).
- ❑ Data communication component (DC).
- ❑ Data dictionary (DD).
- ❑ Distributed database component (DDB).



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SQL>
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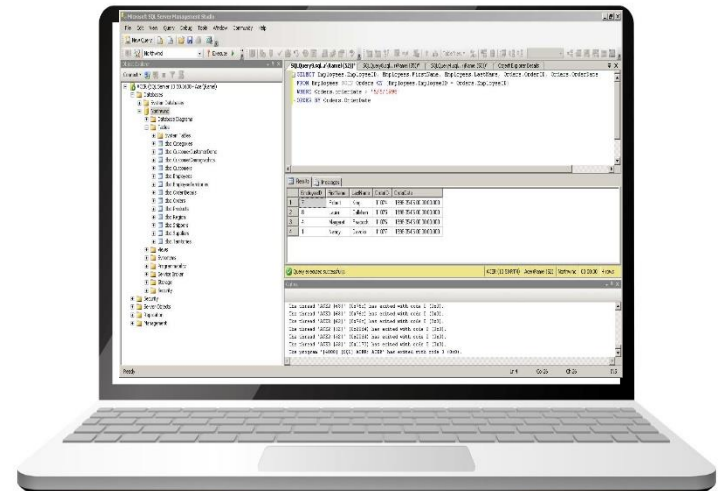


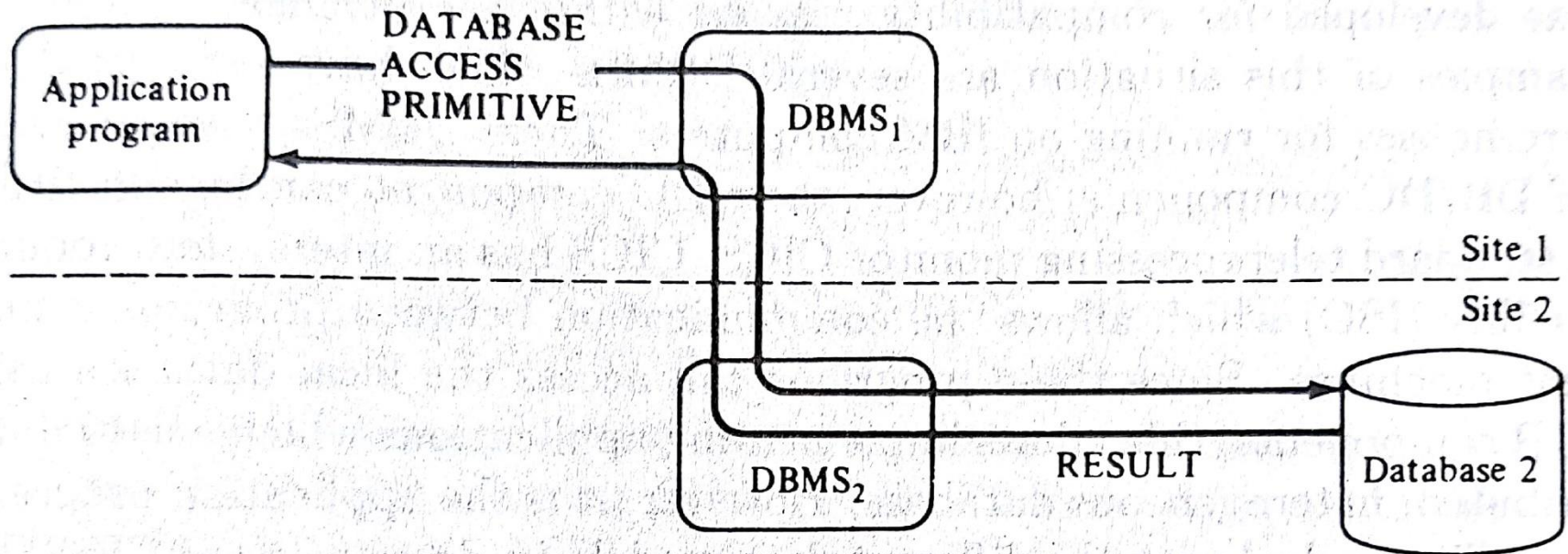
Figure 1.6 Components of a commercial DDBMS

Services Supported by These Systems

1. Remote database access by an application program.
2. Some degree of distribution transparency.
3. Support for database administration and control.
4. Some support for concurrency control and recovery of distributed transactions.

Accesses to DDB

Remote access via DBMS primitives. directly write the query



(a) Remote access via DBMS primitives.

- Provides more distribution transparency

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SQL>
```

SELECT * FROM EMP@CHICAGO WHERE EMPNO = 1;

```
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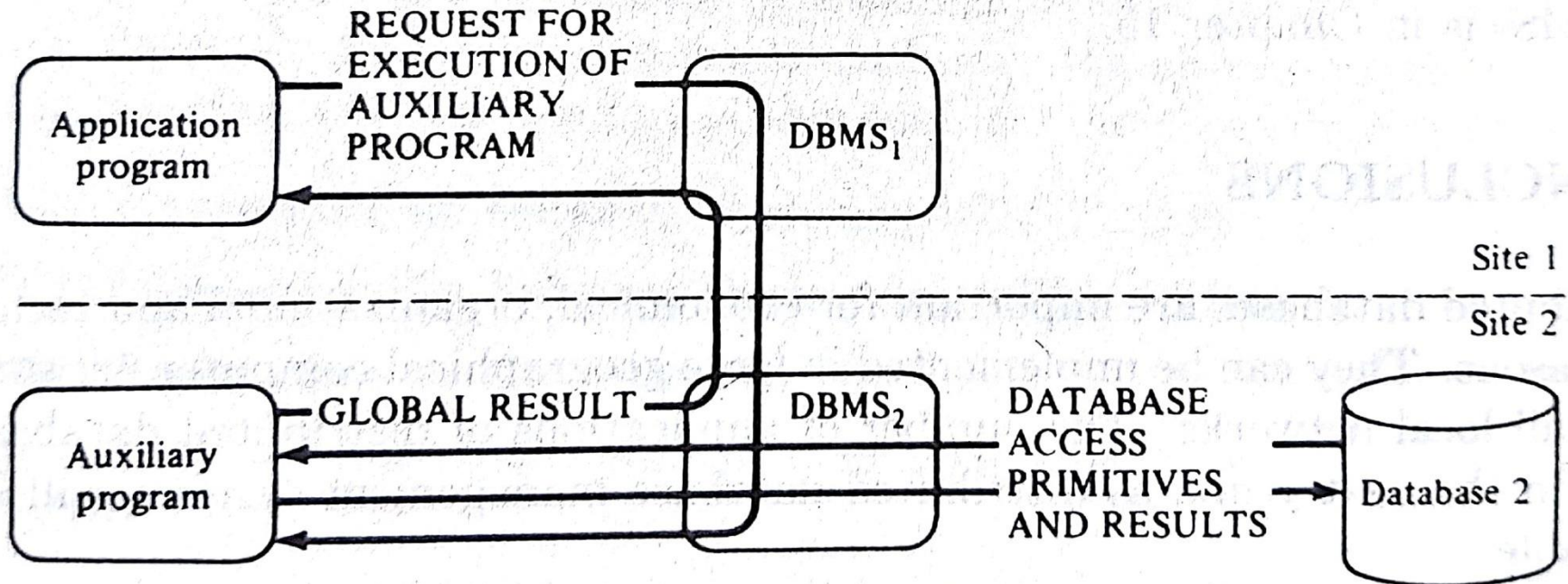
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SQL>
```

Remote access via an auxiliary program.



(b) Remote access via an auxiliary program.

- Can be more efficient if many database accesses are required.

```
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SQL>
```

EXEC DATA@CHICAGO(1);

```
CREATE OR REPLACE PROCEDURE DATA(ID Int IN)
AS

BEGIN
    SELECT * FROM EMP WHERE EMPNO = 1;
END DATA;
```

```
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SQL>
```

Sample question

1. Create your own scenario/ example of a distributed database over a local network (must be different from the ones shown in the class). Explain its necessity. Discuss its features.
2. Discuss the advantage and disadvantages of homogeneous and heterogeneous DDBMS.