

MOBILE COMPUTING ARCHITECTURE— AN OVERVIEW

Lesson 05 Client–Server Computing

TWO NETWORK BASED COMPUTING ARCHITECTURES

- Distributed Peer-to-Peer
- Client-Server

DISTRIBUTED PEER-TO-PEER

- Designed each node distributed computing node of the system, each node on the network similar resources and the various nodes can depend on each other for resources

CLIENT SERVER

- Designed such that a node is either a client or a server
- Client node has much less resources than server
- Client nodes depend on server resources

CLIENT-SERVER ARCHITECTURE IN MOBILE ENVIRONMENT

- A client requests the server for data, messages or response
- The client can either access the data records at the server as response or
- Caches the records through broadcasts or distribution from the server

CLIENT-SERVER COMPUTING

- An N -tier architecture ($N = 1, 2, \dots$)
- On the same computing system (not on a network), then the number of tiers, $N = 1$
- When the client and the server are on different computing systems on the network, then $N = 2$

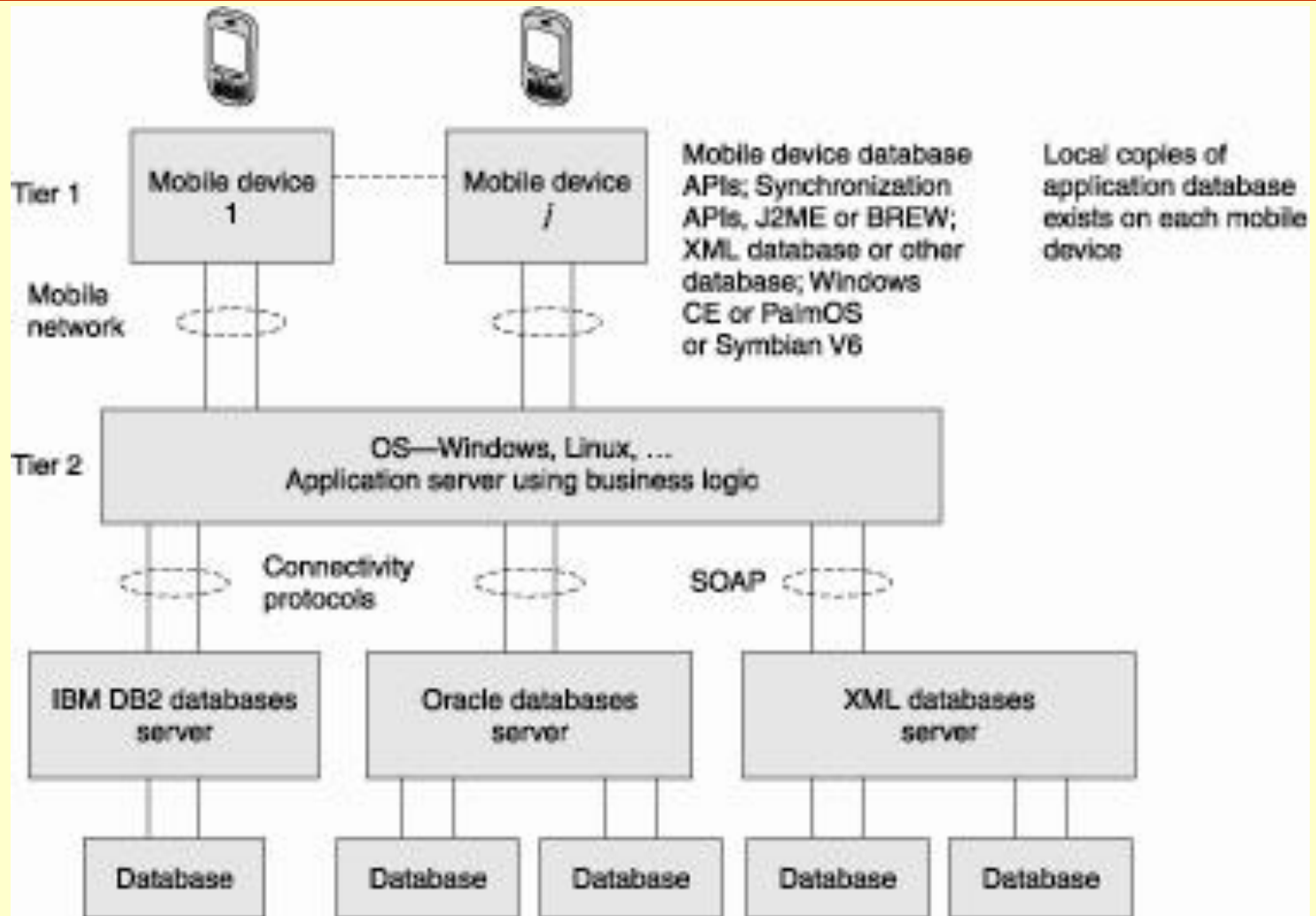
SERVER NETWORKS OR CONNECTING TO OTHER COMPUTING SYSTEMS

- Connecting to other systems provide additional resources to the server for the client
- Then $N > 2$
- $N > 1$ means that the client device at tier 1 connects to the server at tier 2 which, in turn, may connect to other tiers, 3, 4, and so on

APPLICATION SERVER IN TWO-TIER CLIENT–SERVER COMPUTING

- Local copies 1 to j of database hoarding at the mobile devices) on client request
- Synchronization API enables running of the application independently on the devices without the need for a run-time retrieval

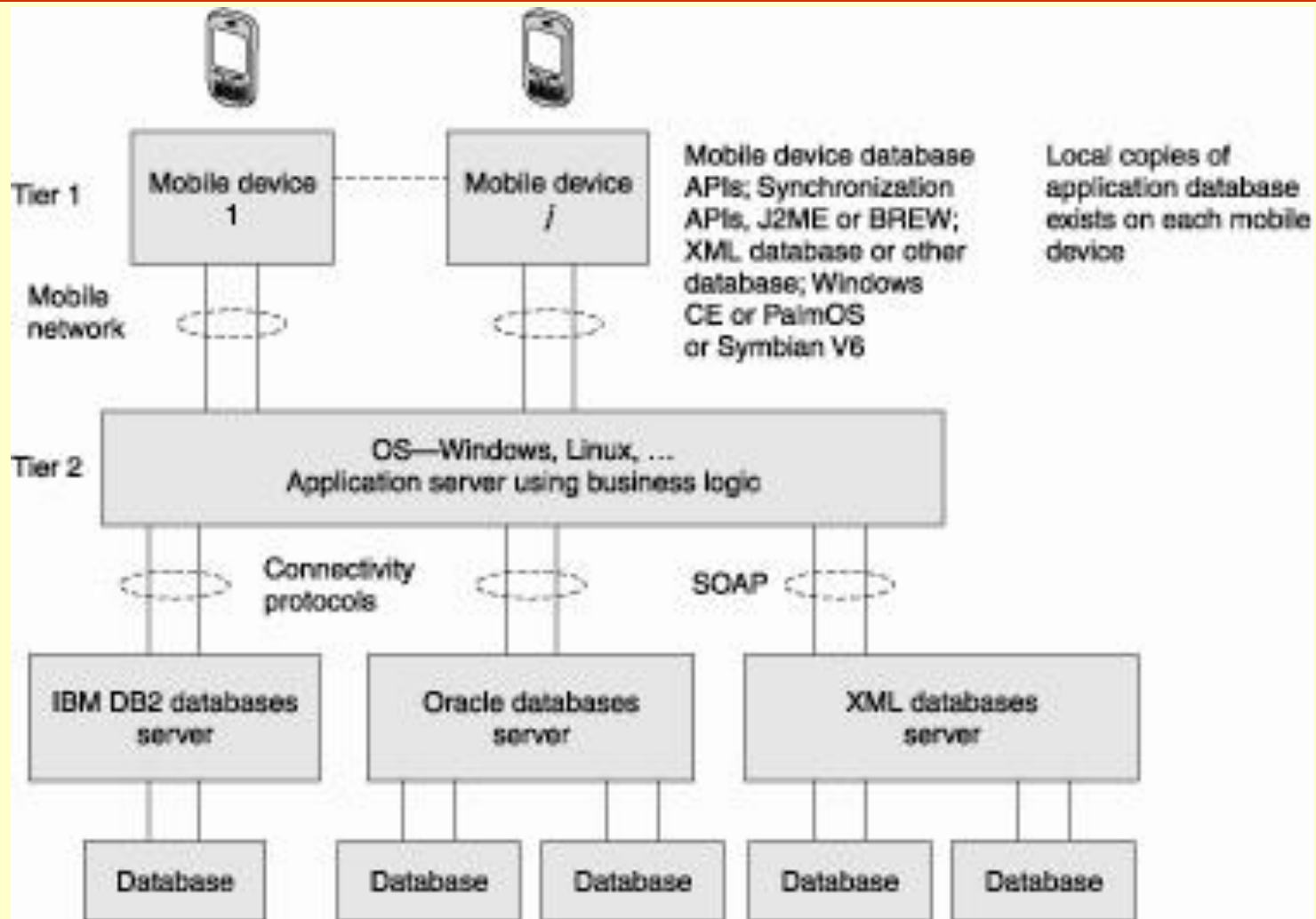
TWO-TIER CLIENT-SERVER ARCHITECTURE



APIs AND SYNCHRONIZATION API

- Various APIs synchronization with each other
- Synchronization— means that when copies at the server-end modifies, the cached copies accordingly modified
- The APIs designed independent of hardware and software platforms as far as possible as different devices may have different platforms

TWO-TIER CLIENT-SERVER ARCHITECTURE USING A MULTIMEDIA FILES SERVER



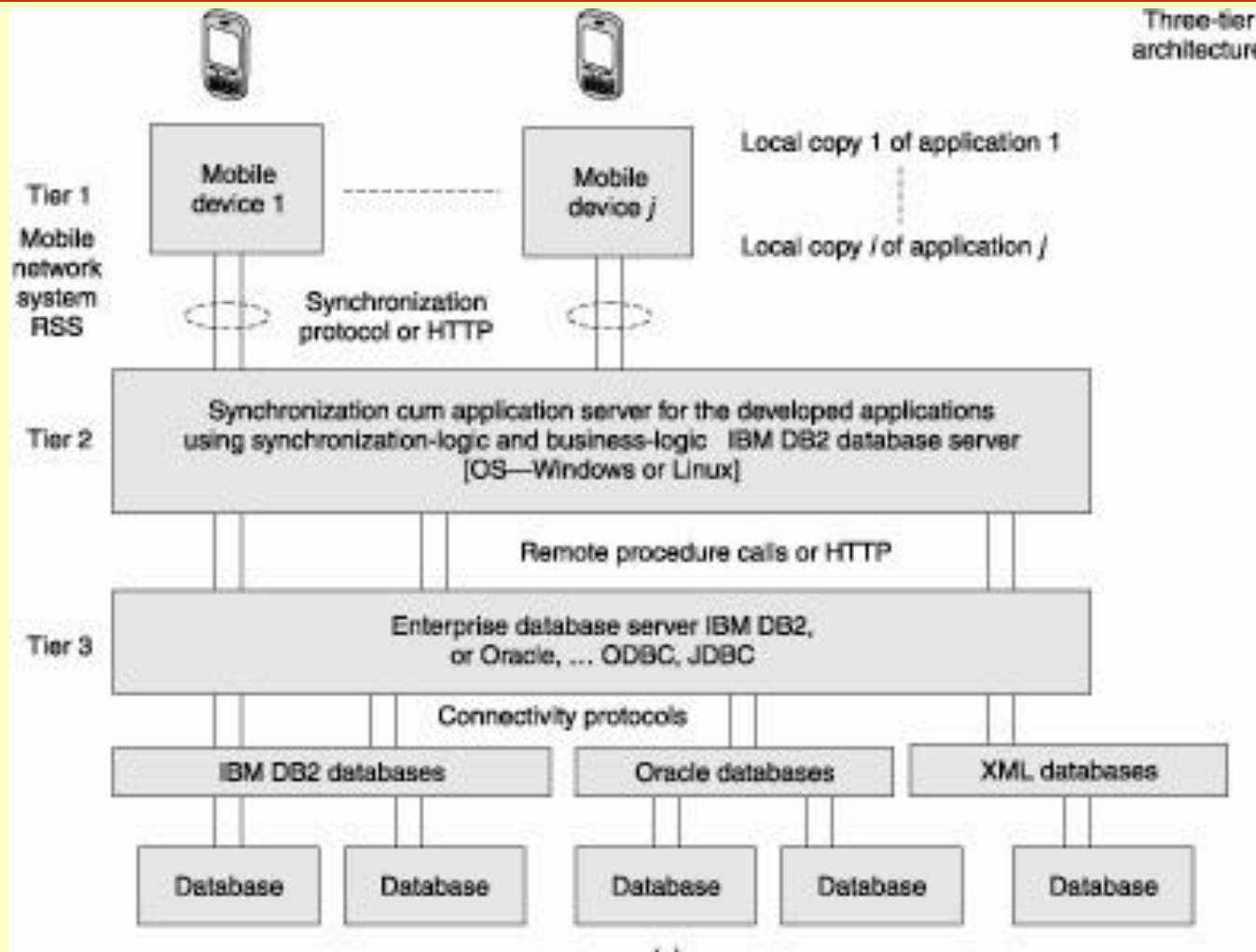
THREE-TIER CLIENT-SERVER ARCHITECTURE

- The application interface, the functional logic, and the database are maintained at three different layers
- The database is associated with the enterprise server tier (tier 3)
- Only local copies of the database exist at mobile devices

THREE-TIER CLIENT–SERVER ARCHITECTURE

- Database at the backend system of an enterprise (company) that holds IBM DB2, Oracle, and other databases
- Server at Tier 2 connects to the enterprise server through a connecting protocol
- Enterprise server connects the complete databases on different platforms, for example, Oracle, XML, and IBM DB2

DATABASE RECORD COPIES OF DATABASE AT THE MOBILE DEVICES USING THREE TIERS



MOBILE DEVICE WITH J2ME OR BREW PLATFORM, AN OS AND DATABASE HAVING LOCAL COPIES



Tier 1

Mobile device APIs,
Synchronization APIs, J2ME,
BREW; DB2e or XML database
or other database APIs and an
OS (Windows CE or PalmOS
or Symbian V6...)

Local copy 1 of application 1



Local copy *j* of application *j*

CONNECTIVITY OF THE SYNCHRONIZATION- CUM-APPLICATION SERVER

- To the enterprise server is by RPC, RMI, JNDI, or IIOP protocols
- In case the application client at tier 1 connects to tier 2 using the Internet, the connectivity using HTTP or HTTPS

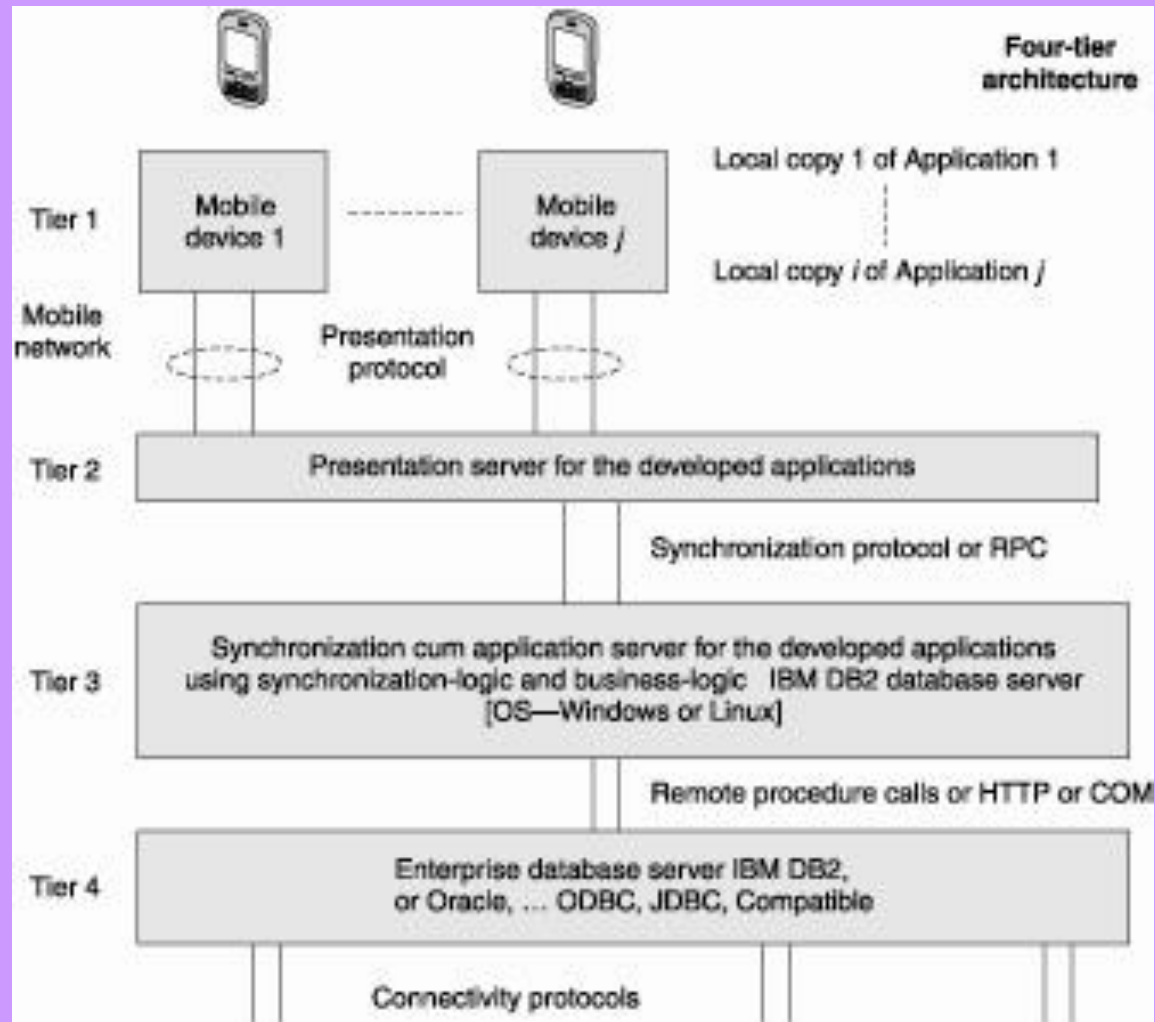
N-TIER CLIENT–SERVER ARCHITECTURE

- When N is greater than 3, then the database is presented at the client through in-between layers
- Four-tier architecture in which a client device connects to a data-presentation server at tier 2
- The presentation server then connects to the application server tier 3

N-TIER CLIENT–SERVER ARCHITECTURE

- The application server can connect to the database using the connectivity protocol and to the multimedia server using Java or XML API at tier 4

4-TIER ARCHITECTURE IN WHICH A CLIENT DEVICE CONNECTS TO A DATA-PRESENTATION SERVER



SUMMARY

- Two methods in Network Architecture for computing
- Peer-to-Peer and Client Server
- 1 Tier in which server and API at the mobile device itself
- Two, three, four or N tier architecture
- Use of presentation, synchronization, enterprise database servers

End of Lesson 05
Client–Server Computing