2° cycle degree programme (lm) in Telecommunications Engineering
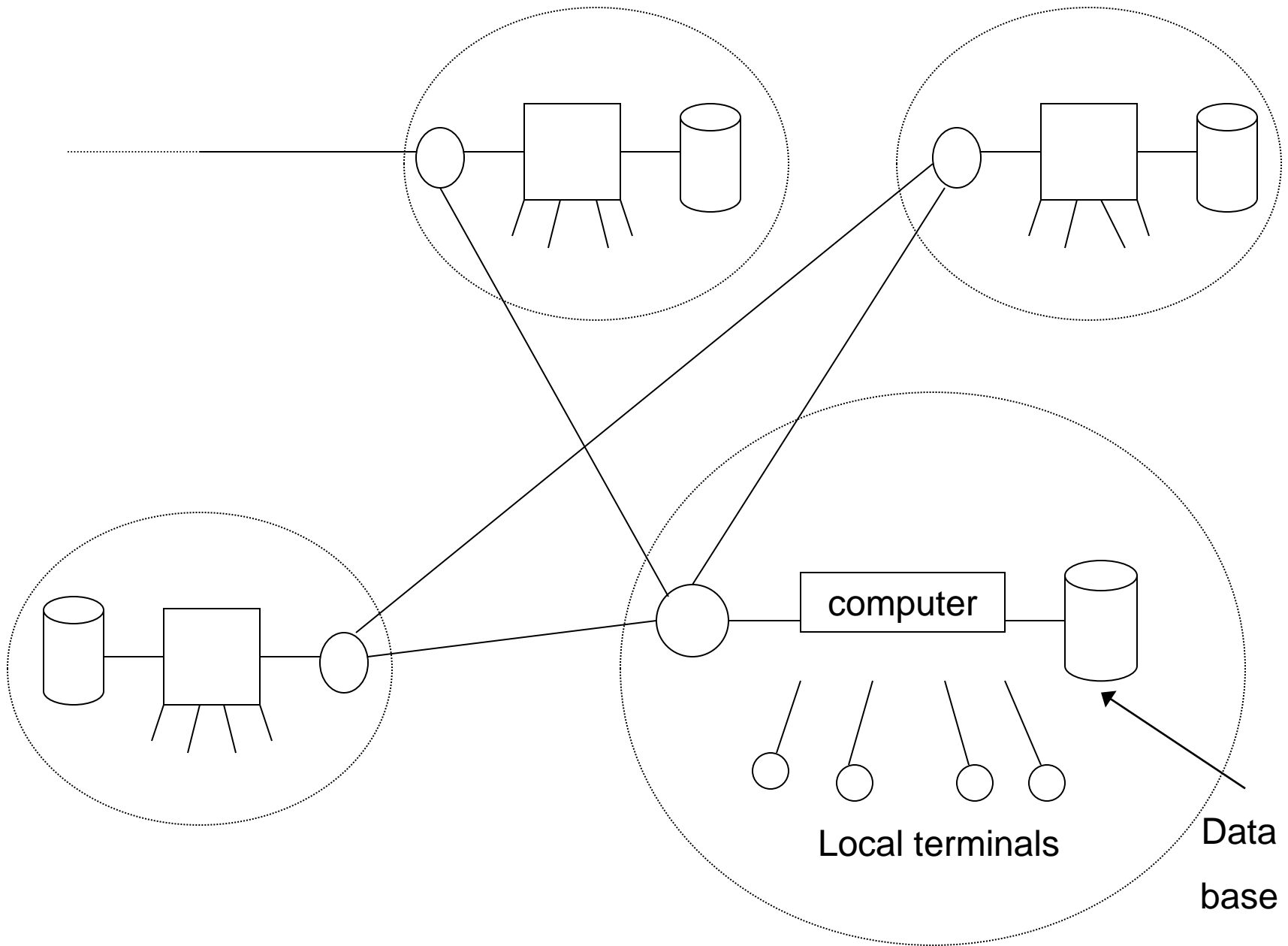
Principles Models and Applications
for Distributed Systems

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Learning outcomes

Knowledge related to the technologies needed for management and usage of computer networks and distributed systems

computer

Local terminals

Data base

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word wide web (www)

- In the past years the www had a very large success basically for two reasons:

  - Simplicity
  - Ubiquity

- For a service provider is simple to contact a great number of users.

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- For a user is simple to access a service everywhere it is located.

- However, www is strongly oriented to **the interaction among users and systems.**

Interaction among distributed computing applications

- The evolution of the internet and web utilization made necessary the demand **of interactions among applications** in different scenarios:

  – A program of business management must be able to integrate the local informations with those made available on Internet by suppliers, banks or public administrations.

  – An application used by estate agents must access real time informations caming from wordwide finantial markets.

  – The library managent system can look for a book either in the local catalog or in those of a larger library management system (University, local goverment,…)

Web limitations

- The web model is not suitable to the management of the interactions among applications.

- It is based on a very simple model:

    - the user, using a browser, sends a URL to a server.
    - the web server returns a HTML page that is graphically displayed by the browser.

- In a interaction between two applications this scheme presents two critical aspects:
    – The URL are a very simple tool in order to express complex and articulated requests.
    – HTML is a language basically used to describe how documents may be displayed.

Course contents

1.Basic elements of the hardware and software architecture of a network node.

- Operating system objectives and functions.
- Process description and control
- Process management: scheduling, resources and protection
- Process classification: independent/cooperating, share memory
message passing
communication/competition/ interference
- threads (multithreading).

2. **Network communication: methods and tools**

- Overview
- Distributed and heterogenous systems
- Client/server and peer-to-peer models.
- Cloud computing
- Sockets
- RPC and RMI
- web services technology
-XML language

3. Network security
- attacks to network security
- criptography and network security
- encryption :classical and modern techniques
-digital signature and authentication protocols
- electronic mail security
- web security

Recommended reading

. Ancilotti, Boari, Ciampolini, Lipari: "Sistemi operativi", McGraw-Hill, seconda edizione, 2008.
. Kurose, Ross: "Computer networs and Internet", McGraw-Hill 2004.
. Douglas Comer : " Computer networs and Internet", Addison-Wesley,2000.
. Ancilotti, Boari: " Programmazione concorrente e distribuita", McGraw-Hill, 2007.
. Pfleeger, Pfleeger: " Security in Computing"Prentice Hall, 2004

Teaching methods

· class and lab lessons

Assessment methods

· oral proof concerning the arguments examined in the course.

Office hours

. Tuesday, 15-17

Network node

- Hardware : server. CPU, main memory, mass memory , I/O devices

- Software: base software, application software

- Base software: compiler, interpreter , editor, **operating system**, **protocols**