
Parallel and Distributed Software Systems

(Parallele en gedistribueerde software systemen)

Universiteit Gent

Faculteit Ingenieurswetenschappen en Architectuur

1ste master computerwetenschappen

2de master elektrotechniek : ICT

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Course Objectives

1. Learn and thoroughly understand concepts regarding the different aspects of the design and implementation of distributed software.
2. A state-of-the-art overview of parallel and cloud computing systems, design of parallel algorithms, software engineering specifically for these applications, and management of high performance and cloud-based systems.

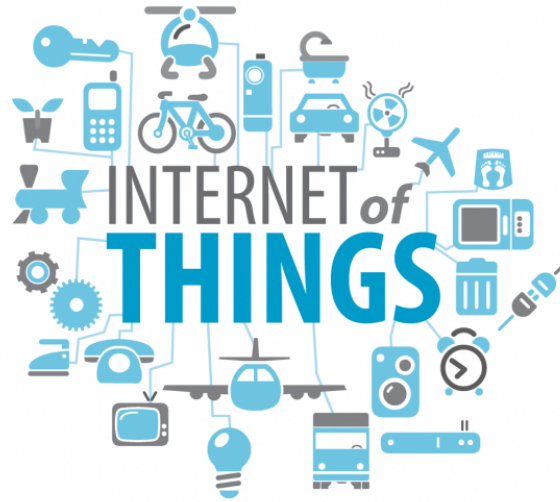
Remarks:

- 1) The emphasis is on the software side and on the different programming models.
- 2) Hardware/architecture aspects are covered in other courses and are only used to the extent necessary to understand the impact on the software performance.

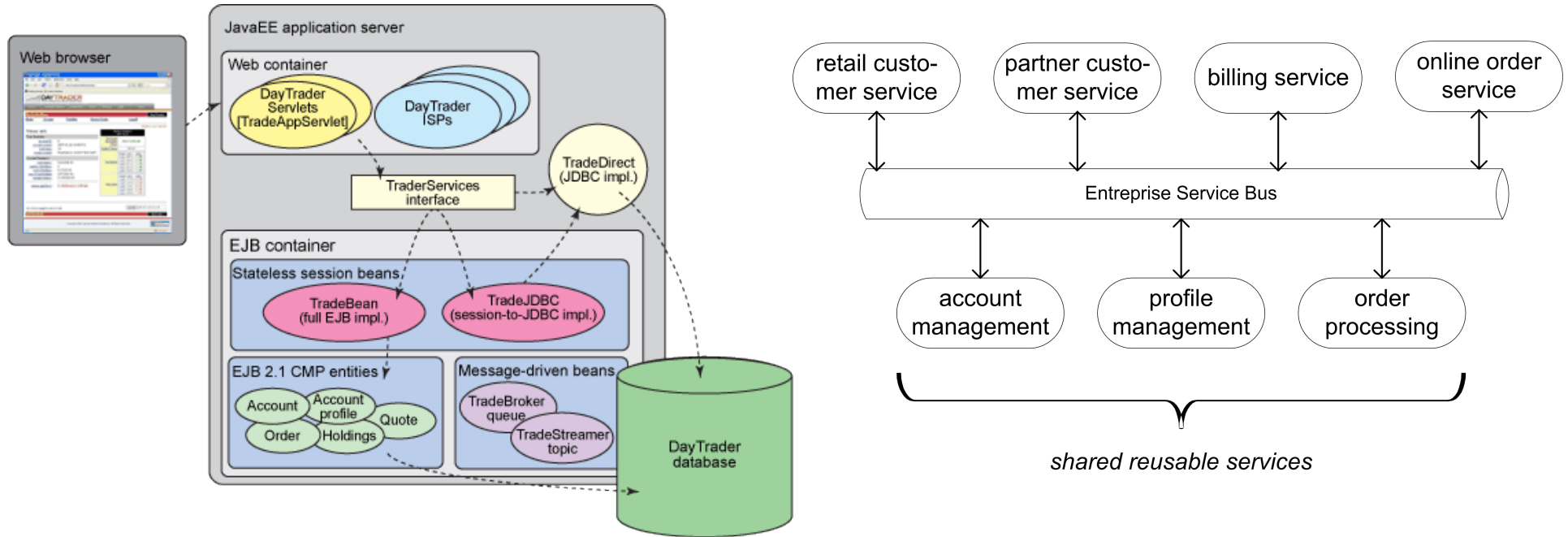
Distributed Software

Communication between software components on different machines

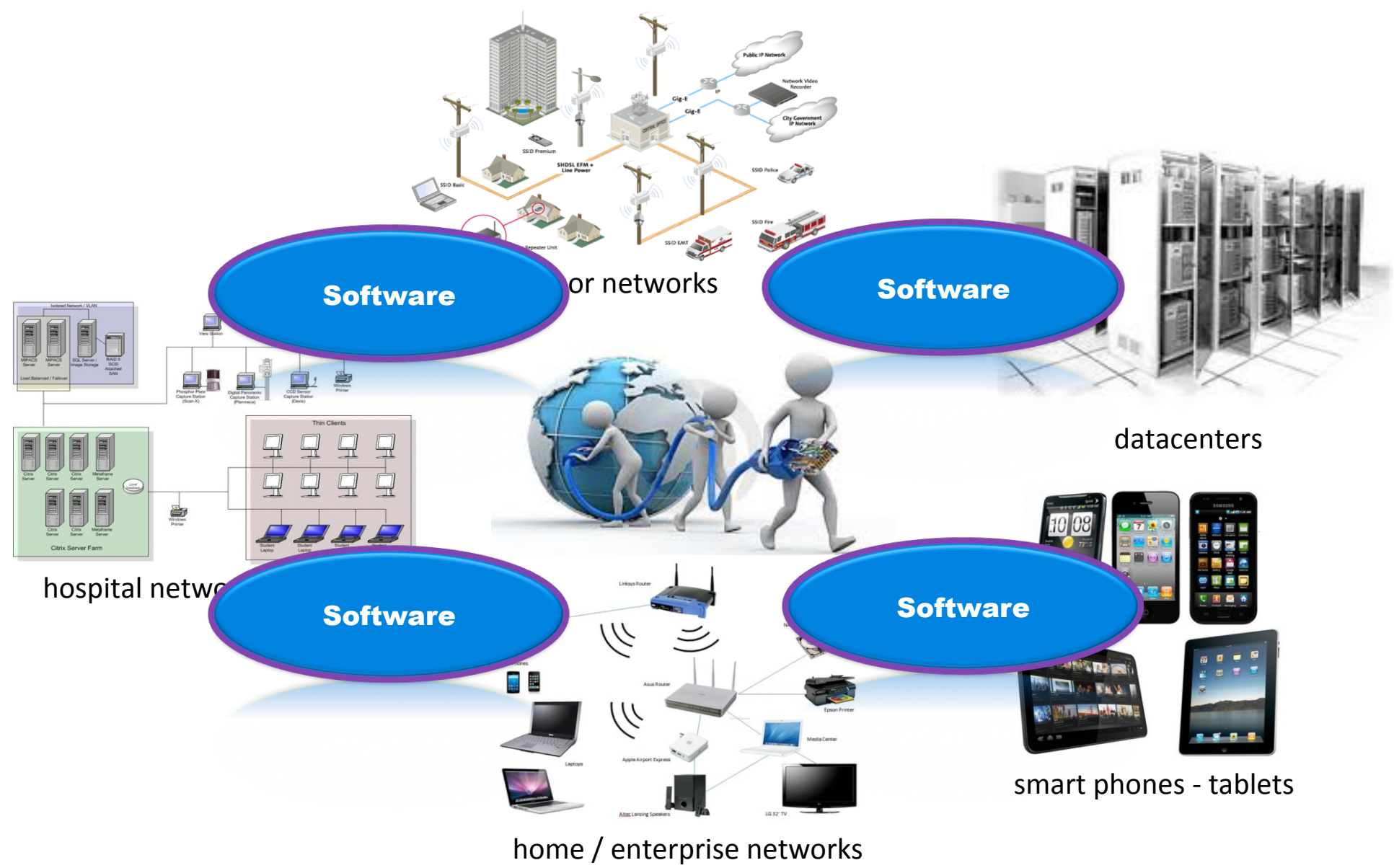
1. to enable resource sharing
2. to improve scalability
3. to provide fault tolerance



Distributed Software



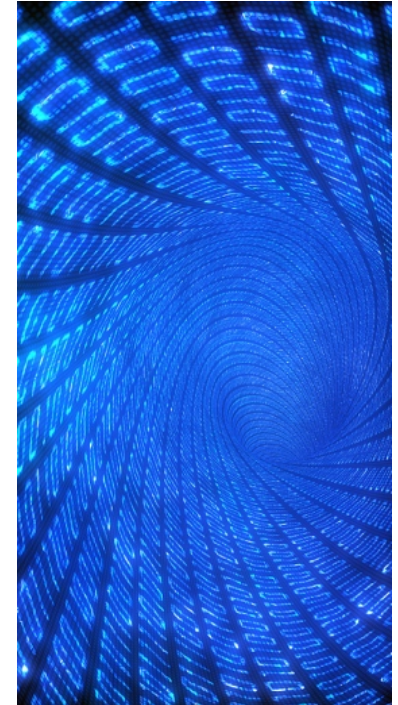
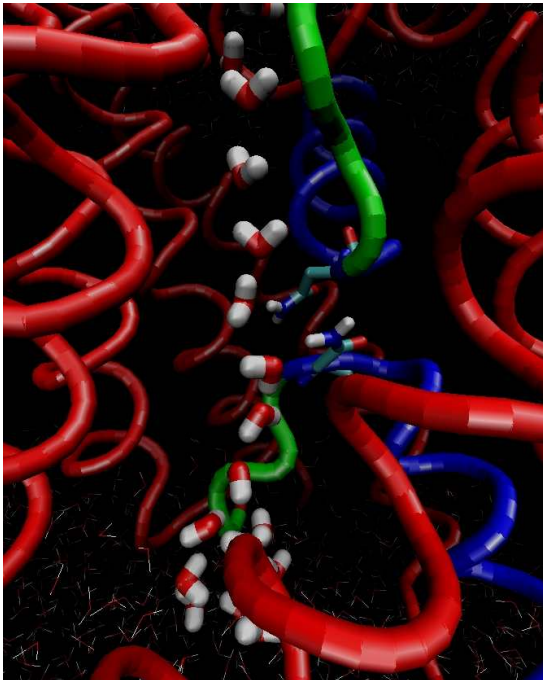
Distributed Software



Parallel Software

Optimize algorithms by spreading over different threads, cores and machines:

1. to improve algorithm execution times
2. avoid bottlenecks in the algorithm execution



When ? Where ? Who ? What ?

- **Lectures**

Tuesday, 10.00 – 12.45, Hoveniersberg, Aud. VII (Vaerenbergh)

Tuesday, 14.30 – 17.15, Plateau, Aud. D0.21A

- **Lab sessions**

Tuesday, Zuiderpoort (3rd floor)

Lab 1 : Enterprise Applications (November 18)

group A: 10.00 AM – 13.00 PM

group B: 14.00 PM – 17.00 PM

Lab 2 : Resource Allocation (December 2)

group A: 10.00 AM – 13.00 PM

group B: 14.00 PM – 17.00 PM

- **Who ?**

- Lecturers: Filip De Turck, Jan Fostier

- Exercises/lab sessions: Femke De Backere

- **Course material**

- Syllabus : will be distributed by VTK

- Minerva: slides, code examples, exercise info, etc.

Grading

• Practicals (2 lab sessions + 3 exercises)	20 %
• Home work assignments	5 %
• Exam (written)	75%
• closed book, theory (syllabus)	(1/3)
• open book, exercise (on algorithms)	(2/3)

NOTE:

- **NO 2ND CHANCE FOR LAB SESSIONS/HOMEWORK
IN 2ND EXAM PERIOD**

Lab sessions

- **Topics**

- session 1 : Enterprise Applications
- session 2 : Resource Allocation

- **The concept**

- **MANDATORY**, marks are given
- in groups of 2 persons
- each session has 3 parts :
 - part 1 : preparatory (@home)
tutorial on Minerva (1 week before session)
 - part 2 : in-lab working under supervision
 - part 3 : hand in your report, at the end of the lab session

Questions

- before/during/after course lesson or lab session
- minerva forum
- email: pds@intec.ugent.be

Timing - Calendar

	10:00-12:45	14:30-17:15
Di 23 sept	Introduction	
Di 30 sept	Modern Processors + HWA1	
Di 7 okt	Middleware	MPI
Di 14 okt	MPI + HWA2	Timing + Coordination
Do 23 okt	Exercise 1 MPI	
Di 28 okt	Coordination + P2P + HWA3	Multithreading
Di 4 nov	Cloud computing	Exercise 2 Multithreading
Di 11 nov	<i>Holiday</i>	
Di 18 nov	Lab 1 Enterprise Applications	Lab 1 Enterprise Applications
Di 25 nov	MapReduce + HWA4	Resource Allocation
Di 2 dec	Lab 2 Resource Allocation	Lab 2 Resource Allocation
Di 9 dec	GPU	
Di 16 dec	<i>Extra slot</i>	

Also on Minerva