

Emerging Distributed Architectures

Introduction

Unil

HEC

dop i a b

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distributed object programming lab

Roadmap

- Content, structure & approach
- Organization & evaluation
- Technologies used in this course
- Evolution of distributed architectures and their supporting middleware

Content (overview)

emerging distributed architectures
=
multi-tier enterprise architectures
+
ubiquitous mobile networks

Content (detailed)

THURSDAY

8:30 – 10:00

10:15 – 11:00

11:15 – 12:00

Feb 23	introduction + web tier	introduction to lab & project tools
Mar 02	message oriented middleware	introduction to the project
Mar 09	business tier	project work web tier + messaging
Mar 16		
Mar 23	project presentation web + messaging	
Mar 30	persistence tier	project work business + persistence tier
Apr 06	mobile ubiquitous computing	
Apr 13	a swift introduction to mobile clients	
Apr 20	Easter break	
Apr 27	project presentation business + persistence tier	
May 04	context-aware mobile communication	project work mobile context-aware client
May 11	location-based pub/sub implementation	
May 18		
May 25	Ascension (public holiday)	
Jun 01	project presentation location-based pub/sub	

Legend:

Course

Exercise

Evaluation

Organization (general)

- Thursday
 - Lectures : [Internef 237](#) (click to see map)
 - Projects : [Internef 143](#) (click to see map)
- Evaluation :
 - Projects (P_i) - mini-projects, compulsory
 - Final exam (E) - written exam, compulsory

$$\text{if } E \geq 3 : \text{grade} = 0.5 \times \sum_i^n \frac{1}{n} P_i + 0.5 \times E$$

$$\text{if } E < 3 : \text{grade} = E$$

Course Registration

- For organizational reasons, you need to register to this course by following the instructions available at:

<http://doplab.unil.ch/eda-registration>

- Please register by **wednesday 1st March** at the latest!

Further information

- doplab.unil.ch/eda
- arielle.moro@unil.ch
- benoit.garbinato@unil.ch

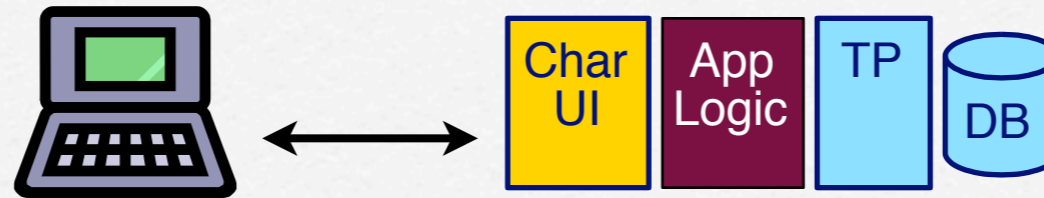
Basic technologies

- The Internet protocol stack
- The Java enterprise programming platform
- The iOS & Swift mobile platform

Architecture | Evolution

Mainframe

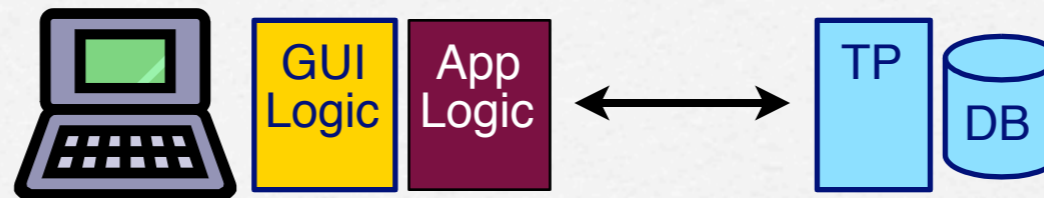
70's



IBM, DEC

Client/Server

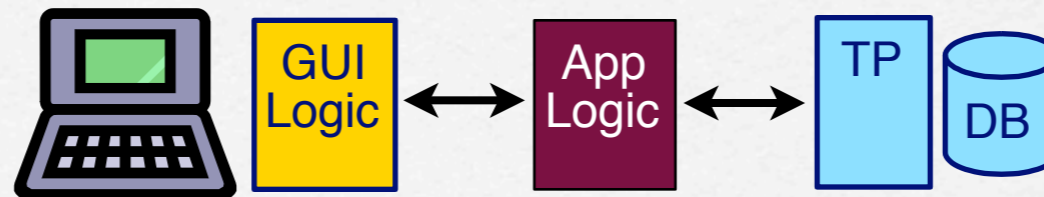
80's



Sun, Appolo

Three-Tier

Early 90's



CORBA

Web-Centric

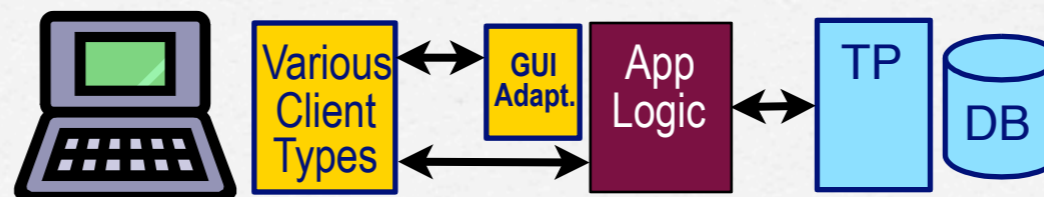
Late 90's



Java, Microsoft

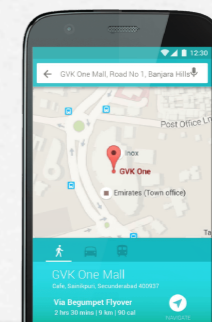
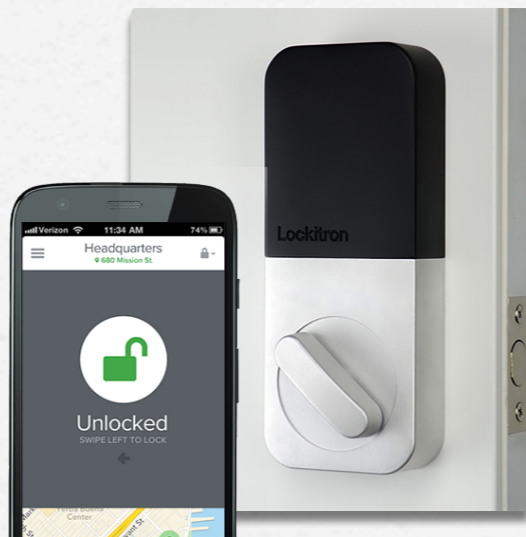
Multi-Tier

Since 2000

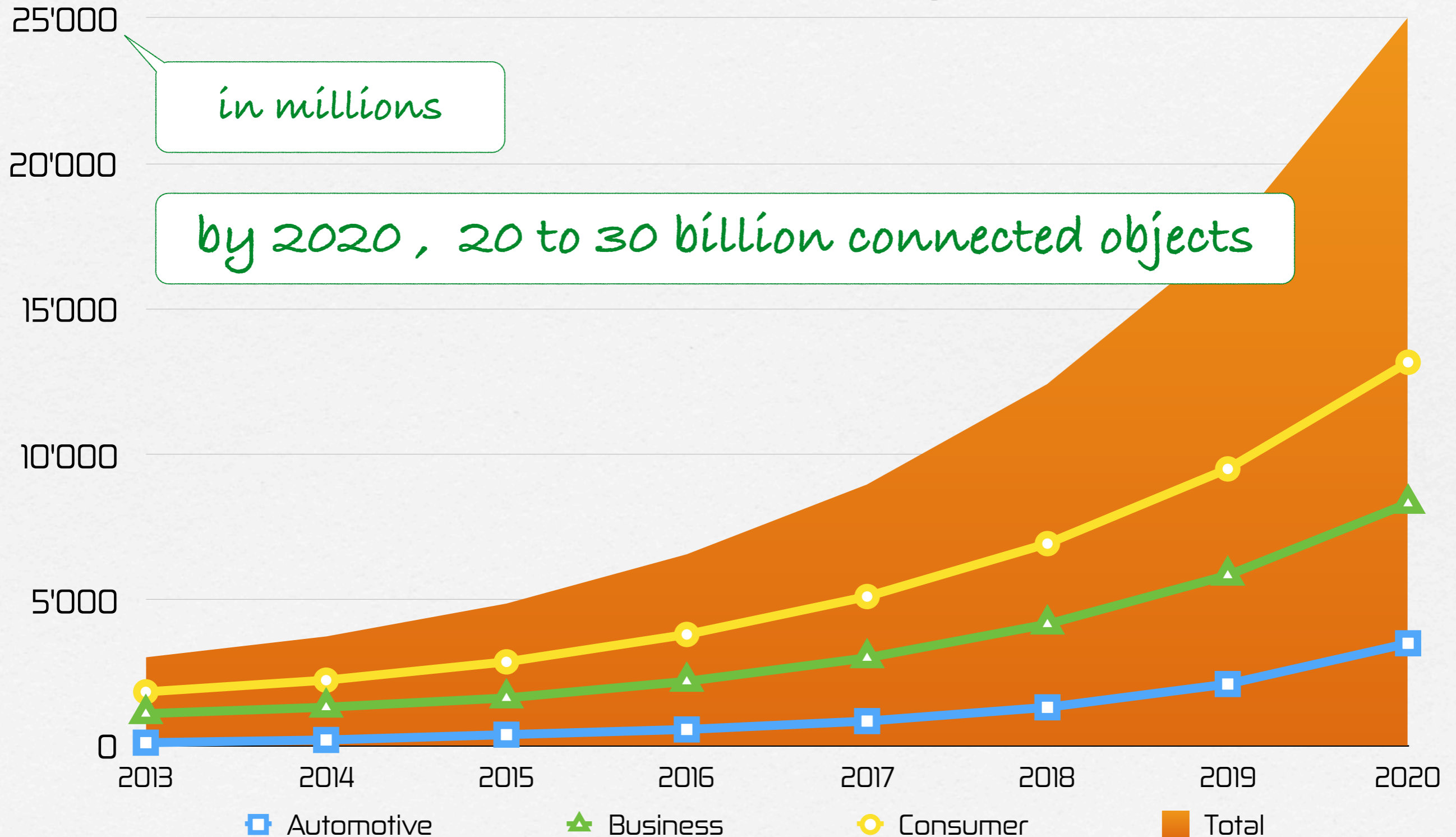


enterprise computing
+
mobility & ubiquity

So what's now? Internet of Things (IoT)



Internet of Things (IoT)



Enterprise computing

- Beside interacting remotely, Distributed Enterprise Applications exhibit several other critical needs:
 - highly available
 - highly reliable
 - highly scalable
 - highly secure
 - Etc.
- Software architects & developers must therefore be experts not only in the application domain, but also in these various orthogonal domains known as system qualities

Enterprise computing (2)

- In addition, with the advent of the web and of mobile communication, enterprise applications must now be able to interact via many devices on many channels
- Conclusion: software engineers must in addition aim at flexible, multi-channel & forward-looking distributed architectures

Application server

- ❑ Software that runs on some middle tier, between:
 - ❑ web-server (thin clients)
 - ❑ databases / legacy applications
- ❑ Support for clustering, load balancing, fail-over, connectivity to legacy systems, transaction processing, business logic, etc...
- ❑ Hosting environment for server-side components

Java Enterprise Services

- A set of standard APIs providing access to existing infrastructure services
- Enterprise Java APIs are platform & vendor neutral
- A business component model based on these APIs, i.e., that can be deployed on:
 - any hardware/operating system
 - any compliant applications server

→ The Java EE platform

Java EE | Overview

- Java EE stands for Java platform, Enterprise Edition
- Java EE is the specification of a distributed multitiered application model for enterprise applications, presented as a coherent set of programming APIs
- Implementations of the Java EE specification are usually proposed in the form of application servers

Enterprise Edition (Java EE)

Standard Edition (Java SE)

~~Micro Edition (Java ME)~~

} The Java platform

Enterprise Java APIs

- Distributed Objects: Java RMI & Java IDL
- Object Directory: JNDI
- Database Access: JPA, JDBC
- Transactions: JTA, JTS
- Web: Servlets, JSP, tag libs
- MOM: Java Message Service, Javamail
- Components Model: EJBs

The big picture...

