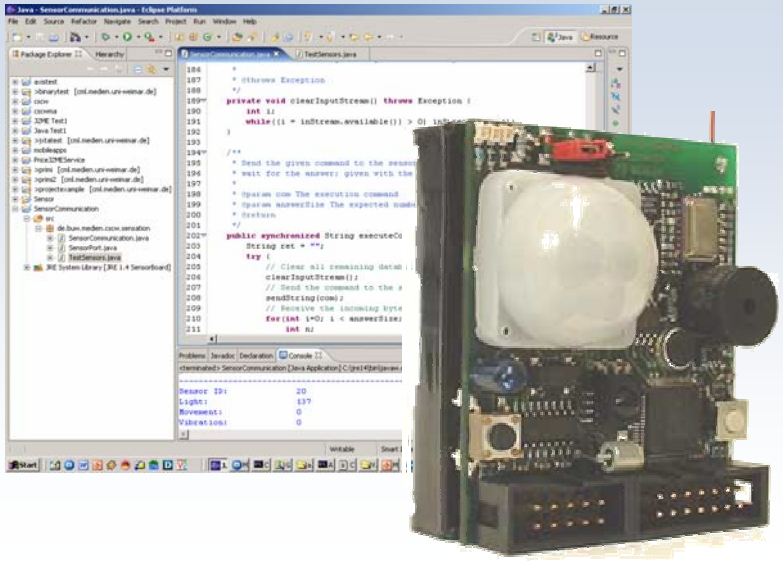
Bauhaus University Weimar



Research, Technology:
ESB, Sensor Interface, Classes

Project Sens-ation

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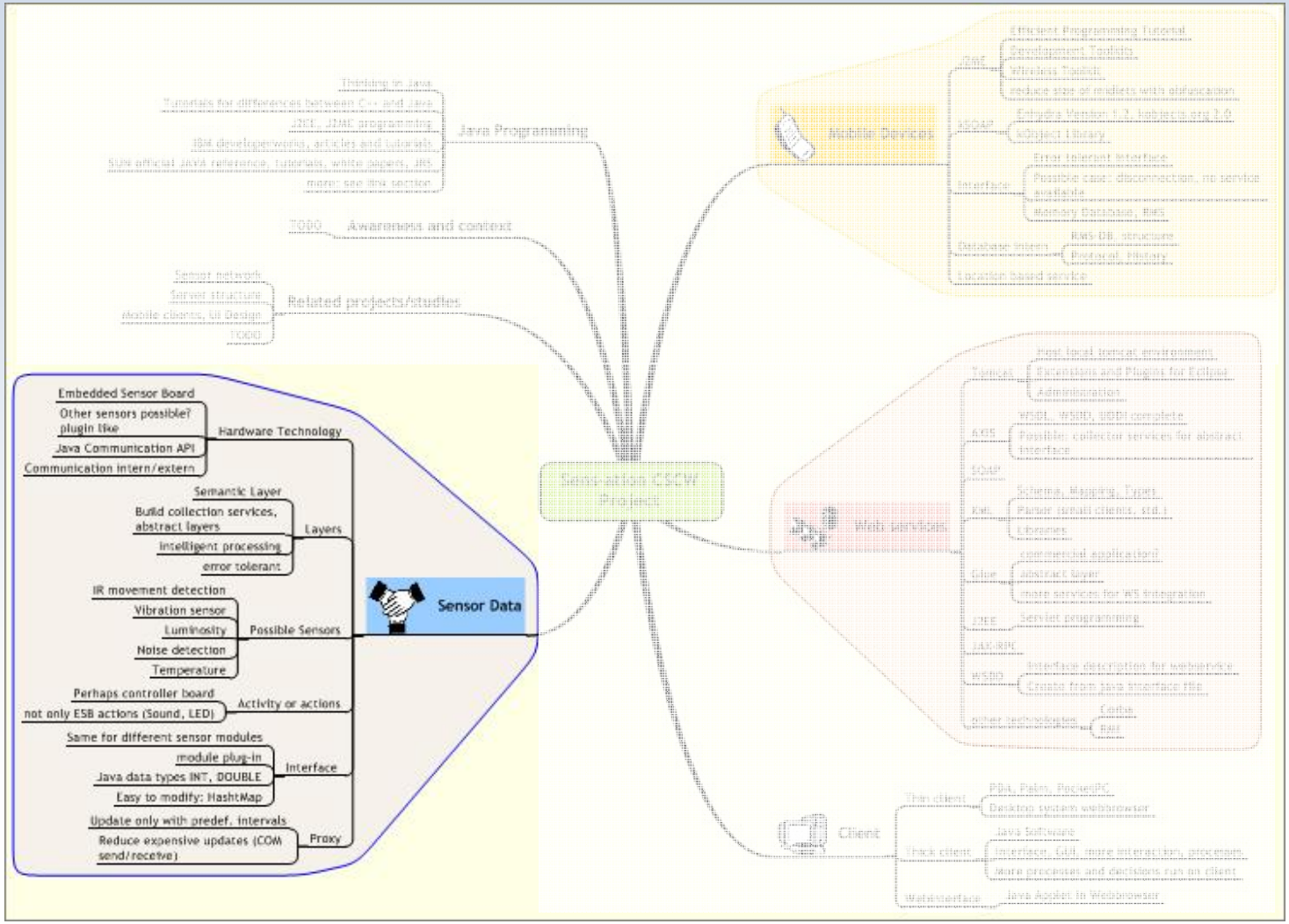
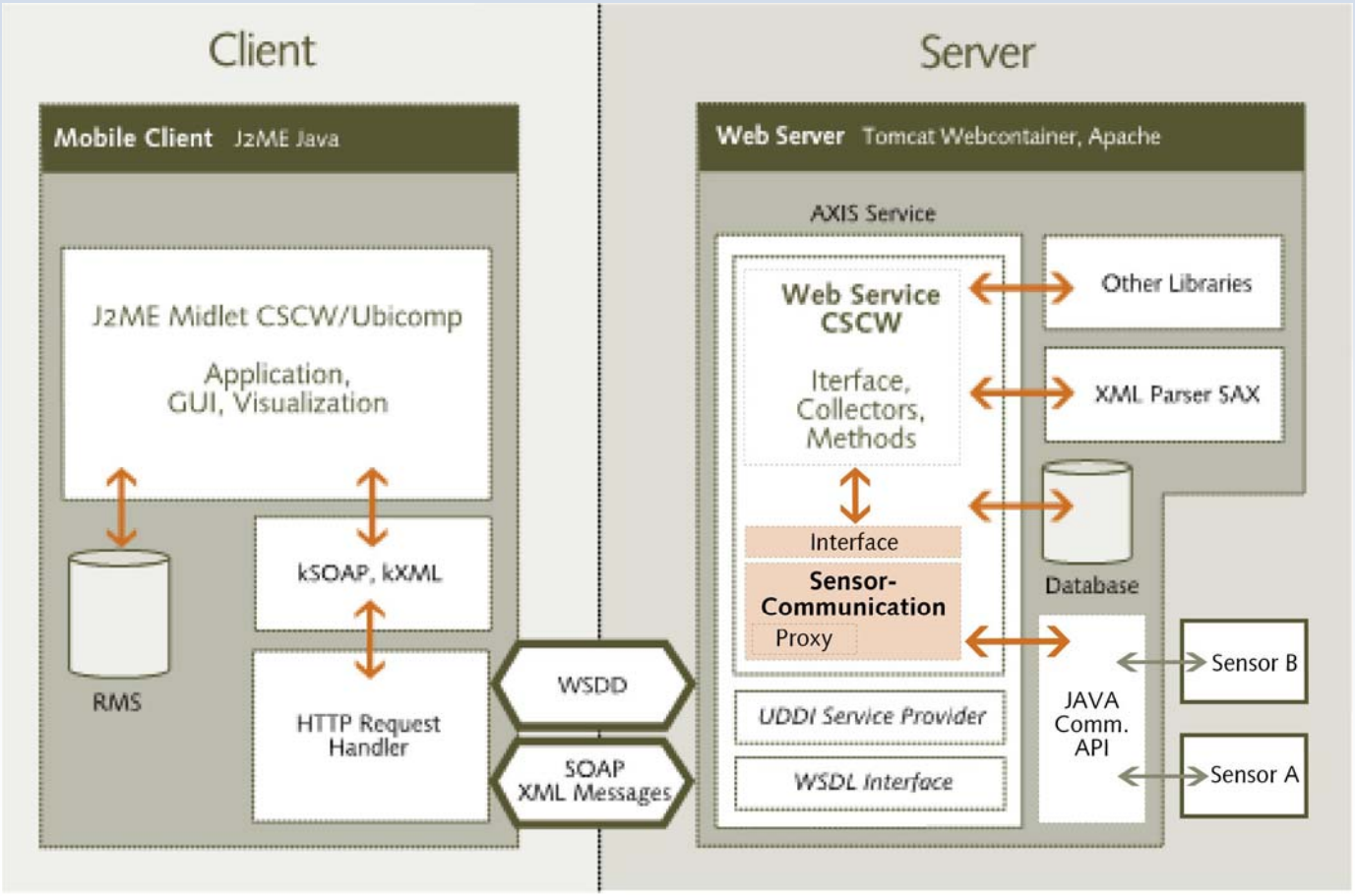
Outline

1. Introduction
2. ESB, SensorCommunication
3. Interface and Class Implementation
4. Example

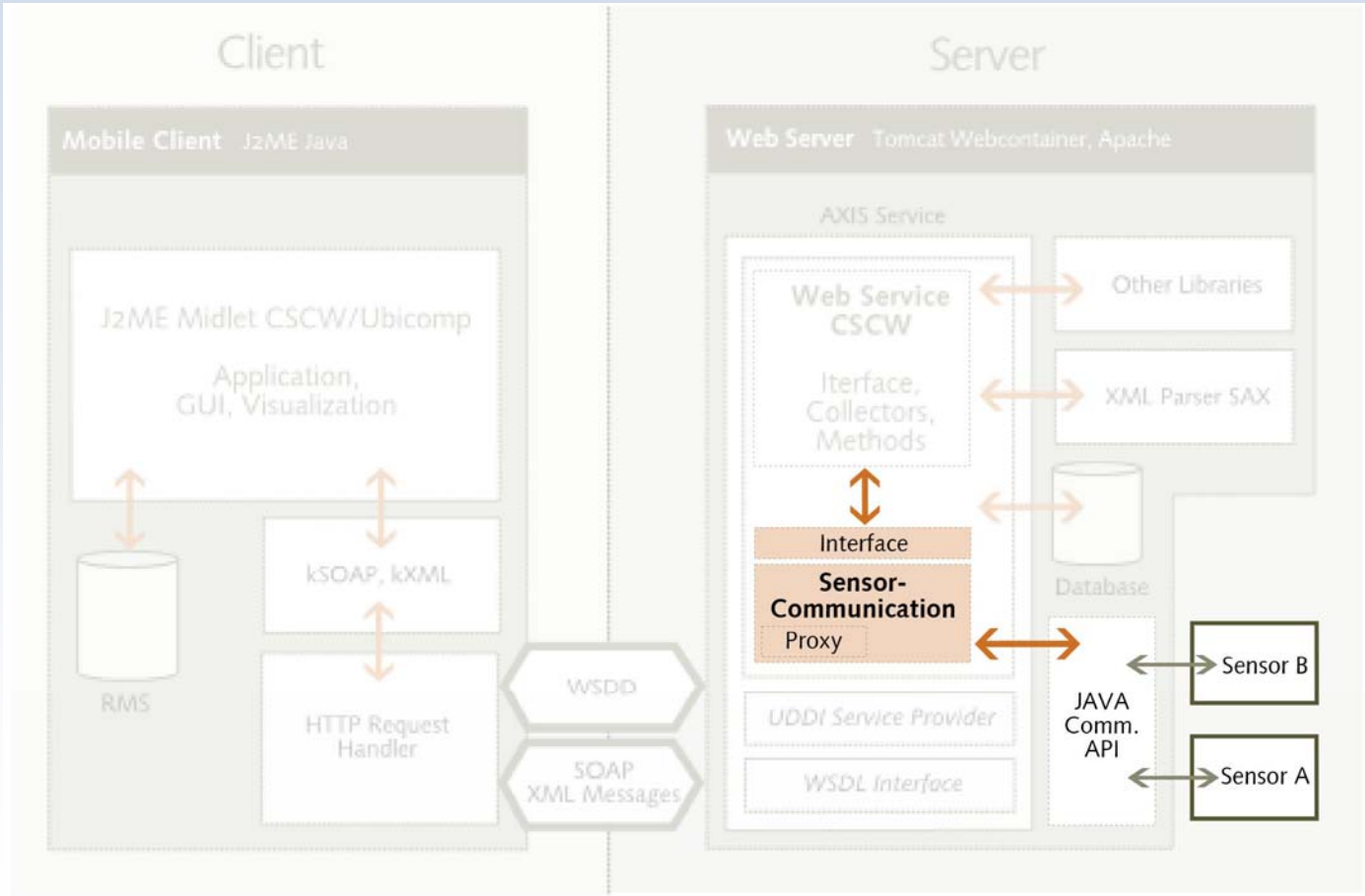
1. Introduction



1. Introduction



1. Introduction



2. ESB, SensorCommunication

- Encapsulation of methods
- Flexible modules (easy addition of new commands)
- Change of the sensor board possible → Java Interface
- Data types: conversion and parsing
- Proxy
  - Local memory (in class members)
  - Different update interval for each of the commands
  - Some values without using proxy (time, movement, etc.)

2. ESB, SensorCommunication

1. Allgemein, Konfiguration, EEPROM		
`rid`	Liefert die ID des Sensors zurück	4 int
`sid [xxxx]`	Setzt die Sensor ID, Wertebereich zwischen 0000 - 9999	
`rcf`	Liefert vollständige Konfiguration zurück	variabel
`RST`	Reset des ESB	
`raf`	Polling Status	2 int

3. Bewegung, Licht, Vibration, Lautstärke		
`rms`	Der aktuelle Wert des IR Bewegungssensors. Der Wert variiert bei Bewegungen vor dem Sensor zwischen 001 und 006; kann aber auch höhere Werte annehmen. Ein paar gemessene Werte: 001 langsame Bewegung, 1m 002 langsame Bewegung, 2m 004 schnelles Winken, 3m 004 schnelles winken, 20cm	3 int
`rls`	Der Zähler des Lichtsensors. Je dunkler das Umgebungslicht desto höher wird dieser Wert. Einige der folgenden Werte habe ich in Tests bestimmt: 000030 Mittags, direkte Sonne 000050 Mittags, Zimmer, indirekt 000075 Abends, beleuchtet mit Taschenlampe 000290 Abends, Zimmer, Beleuchtung direkt 000870 Abends, Zimmer, Beleuchtung indirekt 012900 Dämmerung, dunkler Raum 350000 Völlig Dunkel (Verpackung)	6 int

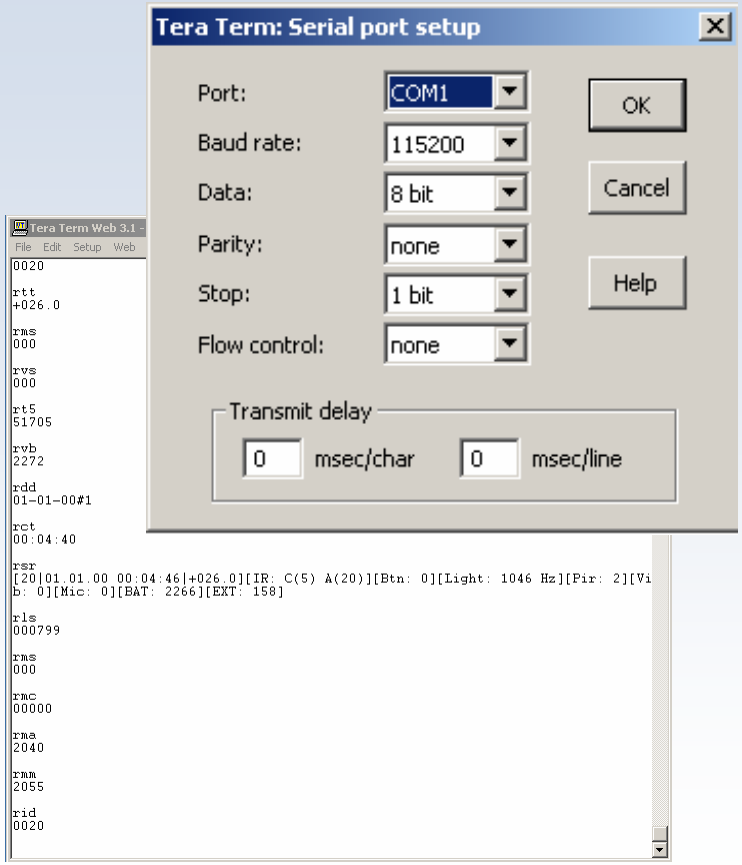
2. ESB, SensorCommunication

Terminal commands: rXX (read), sXX (save)

- **`raf, saf`**: Send and receive data (serial port or wireless)
  → polling: sometimes collision with manual commands
- **`rdd, rct, snt`**: Date and time → Java date object parsing
- **`rtt`**: Temperature, example: `+026.5`
- **`rms, rls, rvs`**

- Document (Handout)
  - Usage of terminal commands and answer sizes
  - Value ranges of the sensors, tests
  - Notes for the commands, class usage and example

3. Interface and Class Implementation



1. Baudrate: 115.200
2. 8 Data bits
3. No parity
4. 1 Stop bit
    1. No flow control
5. Activate local echo
6. Send command with STRG + Enter

3. Interface and Class Implementation

Request	Description	Parameter	Return	Delay
`getID()`	Identification of sensor	-	int	5s
`getTemperature()`	Temperature °C	-	Double (with conv. sign)	5s
`getMovement()`	Movement sensor	-	int	0s
`getLight()`	Light intensity (negative)	-	int	0s
`getCurrentNoise()`	Microphone level	-	int	0s
`getCounterNoise()`	Microphone counter	-	int	0s
`getAverageNoise()`	Average microphone level	-	int	2s
`getDate()`	Clock	-	Date object	10s/0s (Zeit)
`setDate(Date)`	Set integrated clock	Date object	-	-
`getVibration()`	Vibration / tilt sensor	-	int	0s
`getPower()`	Battery check	-	int	0s

4. Example

Software:
SensorCommunication

Ecplise: Sensor Project

Start tool: 

ToDo: Sensors

Finished the next days:

1. Polling mechanism for sensors (receiver)
2. Parser for sensor summary (`rsr, saf`), working with regular expressions (`java.util.regex` or `jakarta regexp`)
3. Class/struct for sensor data collection (instead of single requests)
4. Calibration: microphone, noise detection, tests
5. Permanent data collector

Next step:

- DB structure for saving sensor collections and search algorithm
- Send/receive infrastructure of multiple sensors (`saf, flags`), wireless connections, nodes, protocol

Literature, References

[ESB a]	Documentation ESB, Freie Universität Berlin http://www.inf.fu-berlin.de/inst/ag-tech/scatterweb_net/ESB/sensorboards/doc/html/index.html
[ESB b]	ESB: Communication and Configuration via Terminal http://www.inf.fu-berlin.de/inst/ag-tech/scatterweb_net/ESB/terminal/terminal.htm
[ESB Mon]	Java Implementation of Monitor Module http://www.inf.fu-berlin.de/inst/ag-tech/scatterweb_net/ESB/downloads/Monitor_neu.zip
[ESB Term]	C++ Terminal Documentation terminal.c, terminal.h http://www.inf.fu-berlin.de/inst/ag-tech/scatterweb_net/ESB/sensorboards/doc/html/terminal_8c.html
[Darwin 2001]	Ian Darwin: Java Cookbook, First Edition, June 2001, Chapters 4 – Pattern Matching and Regular Expressions, Chapter 11 – Programming Serial and Parallel Ports
[Jakarta RegExp]	Apache Project: Jakarta Regular Expression Version 1.3 http://jakarta.apache.org/regexp

Thank You

For Your Attention!