ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

inf Informatik
Computer Science

Assignment 2 Aftermath

Distributed Systems HS 2010
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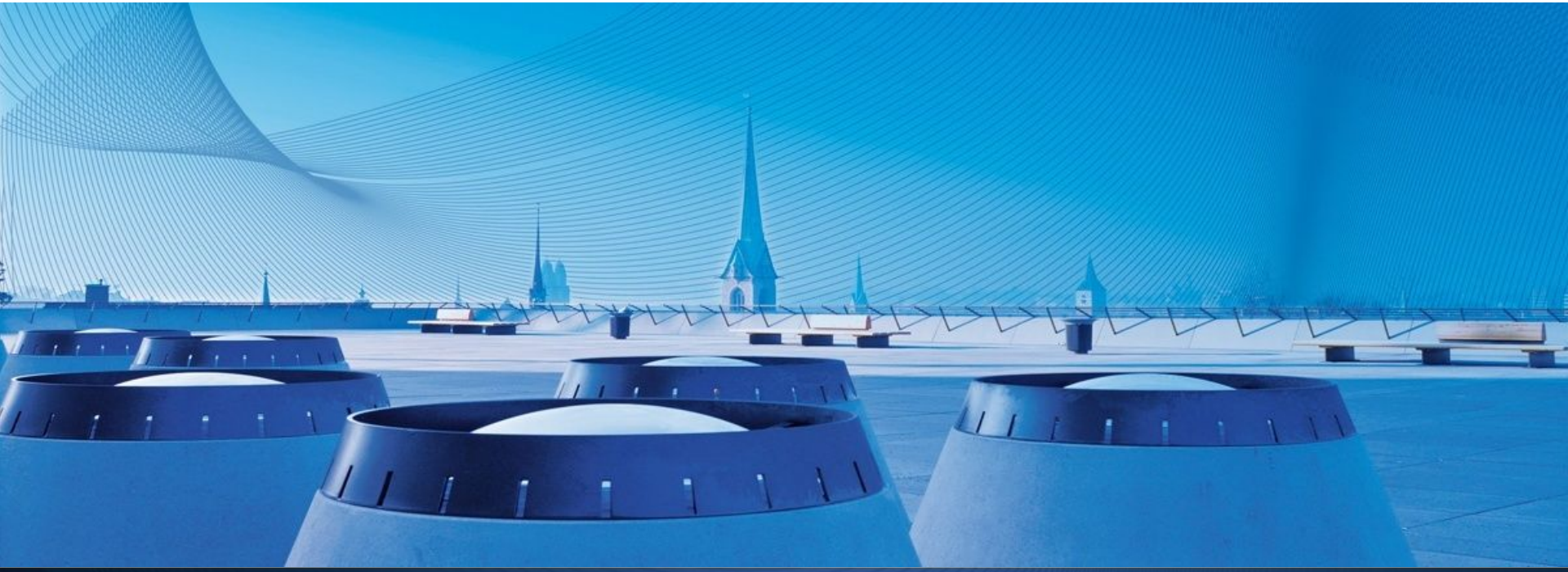


Today's Menu

- Results Assignment 2
- Hints (REST vs. WS-*)
- Submission Considerations + Example Solution
- Briefly: Sockets

Results

- Average grade of **5.33**
- Reports much improved
- Grade 6.0: some nice enhancements

REST and WS-*

- Summarize REST:
  - Every resource is identified with a unique `URI`
  - Uniform Interface (e.g., HTTP verbs `GET, POST, PUT, DELETE,..`)
  - Multiple representations or resources: (specified by setting the `Accept` header
  - Stateless communication

Take-Home Point: REST

- REST defines a number of **constraints**. Thus, when selecting a RESTful architectural style, you **constrain your application** to:
  - Using only the uniform interface (e.g., only HTTP verbs)
  - Keeping no client context on the server
  - Adopting a Resource-Oriented Architecture with URIs
  - ...

REST and WS-*

- Summarize WS-*:
  - Uses HTTP as transport protocol (as opposed to application-level)
  - Describes the service through an WSDL file
  - Messages are exchanged in SOAP format, and encapsulated in an XML envelope

REST and WS-*

- Advantages of REST vs. WS-*:
  - **Lightweight**
  - Human readable, easy debugging
  - Widely available tools, e.g. Web browser, HTTP libraries
- Advantages of WS-* vs. REST:
  - Agreed format between client and server: WSDL as strict specification
  - (Usually simple to consume -> M2M)
  - **Strong typing**

REST and WS-*

- Which one to use?
  - **It depends** on the specific application to be deployed...
  - Is my application **Resource-Oriented** or **Service-Oriented**?
  - Decide whether it **pays off** to map your application to a ROA:

    Yes Using REST could be beneficial...

    No Use WS-*

Resource-Oriented Web Application Example

- Amazon Web Services Simple Storage Service (S3)
  - S3 stores arbitrary objects up to 5 gigabytes in size
  - Objects are organized into buckets (each owned by an account)

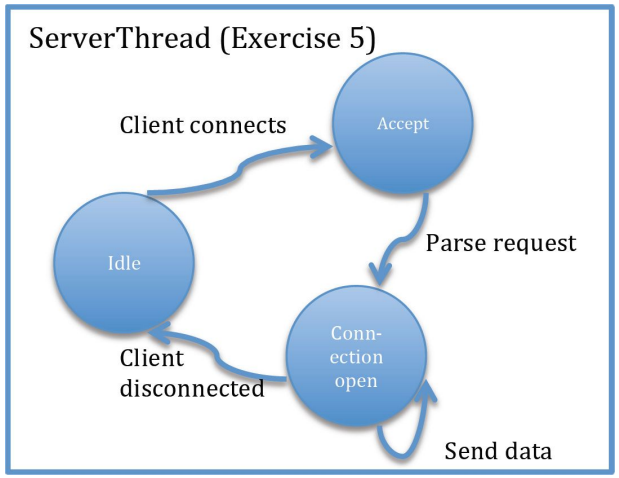
GET http://s3.amazonaws.com/bucket/key	maps smoothly to “Retrieve bucket”
DELETE http://s3.amazonaws.com/bucket/key	maps smoothly to “Delete bucket”
PUT http://s3.amazonaws.com/bucket/key	maps smoothly to “Create new bucket”
POST http://s3.amazonaws.com/bucket/key	maps smoothly to “Modify data in bucket”

Submission Considerations...

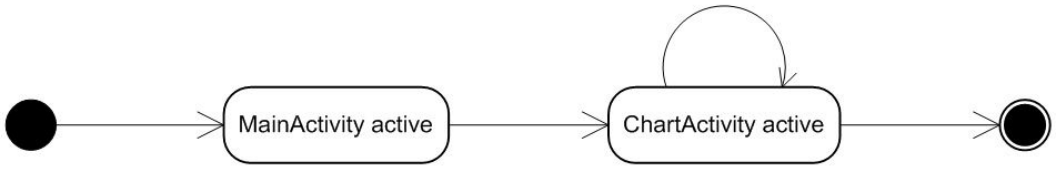
- Make sure your project compiles and runs...
- Include all libraries, use relative paths and not “C:/simons_folder“
- Task 5: Specify the port number used and give an overview of the Web interface of your server
- Make your interfaces useable (button names should be descriptive, progress bars should state the current value and unit)

Figures in Reports

- Should not only be there, but also useful....
  - Generic -->

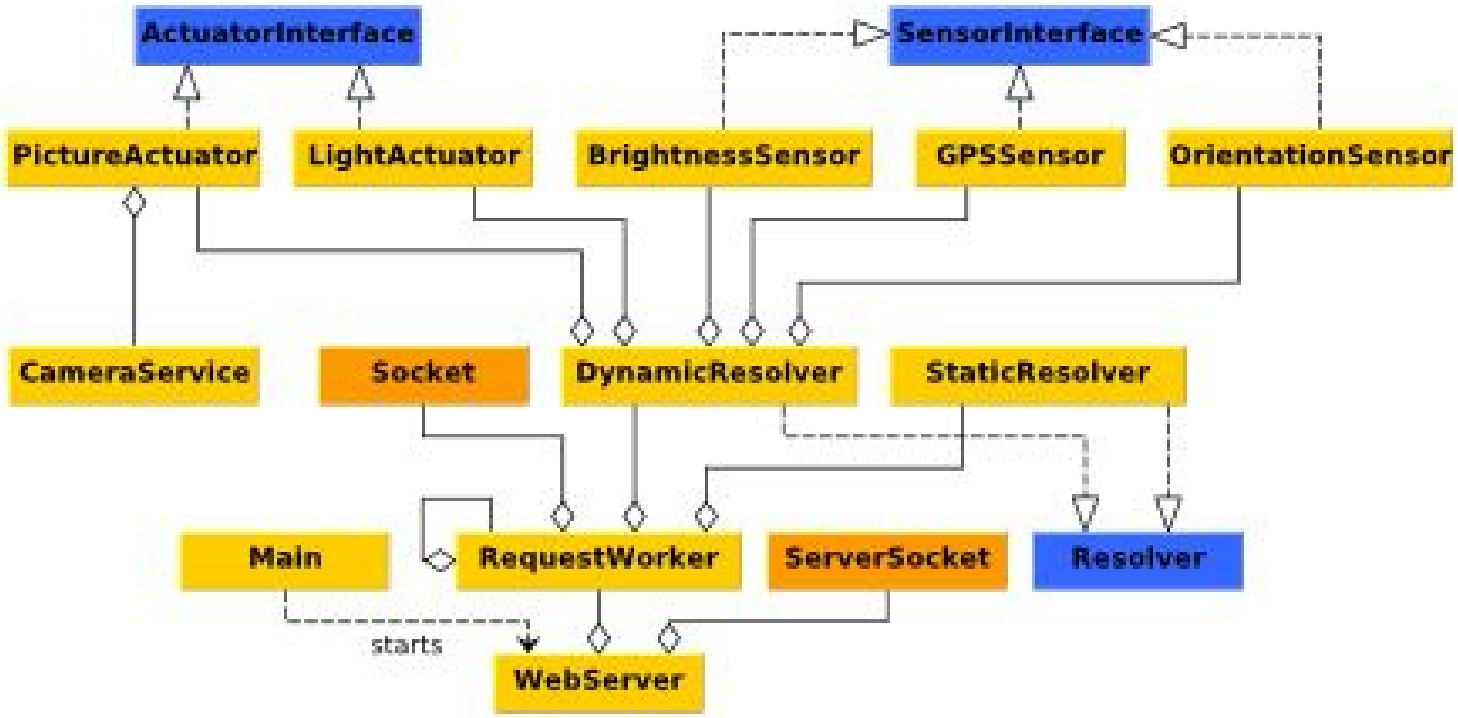


  - Pointless -->



Figures in Reports

- Good... ! And, in this case, very helpful to understand the architecture

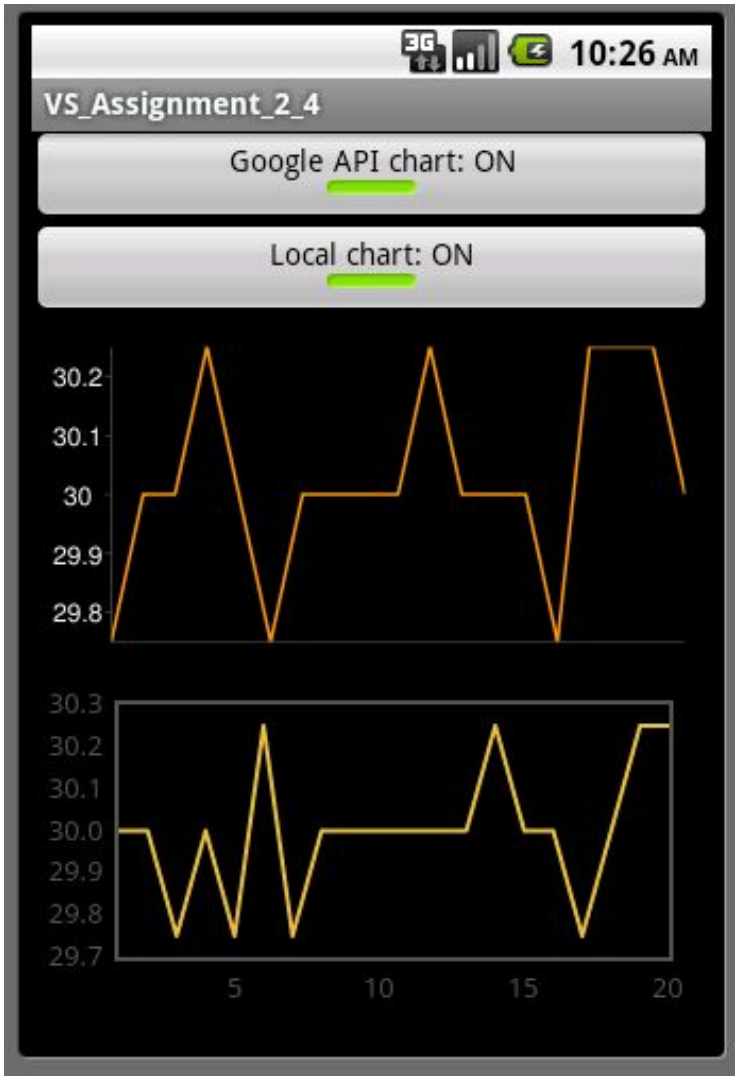


6.0 Grade Example

- All tasks completed
- Excellent reports (+ online ReportComments)
  - Insight into implementation specifics, not general issues
  - Make use of diagrams! They are very useful to convey ideas.
  - Use a professional writing style: imagine showing the report to a business partner.
- Enhancements:
  - Multi-threaded server, SOAP by hand, Visualization by hand
  - Nice UIs, extra sensors and sophisticated functionality

6.0 Grade Example

- Task 4: Cloud visualization
  - Values update automatically
  - Implemented also locally (using a library)



6.0 Grade Example

- Task 5: Web-browser interface
  - Extra sensor/functionality
  - Nice UI

Available Sensors / Actuators

Type	Name	Description
Sensor	Orientation Sensor	Displays the orientation of the phone
Sensor	Brightness Sensor	Displays the brightness
Sensor	GPS Sensor	Displays the current location of the phone
Actuator	Light Actuator	Allows turning the camera light of the phone on and off
Actuator	Picture Actuator	Allows taking pictures with the phone

6.0 Grade Example

- Task 5: Take a picture
  - Uploaded in real time

Page requested at 10:59:13

Server Sockets (TCP)

- Socket definition: Local Addr. + Local Port + Remote Addr. + Remote Port
- Server waits for incoming connections on a specific port
- Server creates **one socket for each client** (“binds a client”)
- These sockets **share the same local socket address**

- Datagram Sockets cannot be “bound” since UDP is connectionless!

Now have fun with the open project!