Seminar Computer Networks

*Interactive Teaching - an experiment*

Development Crash Course

Bernhard Wiegel and Joao Carneiro, Institute OMI, November 15th, 2011
Content

– System design review
– Apple development workflow
  • Apple developer membership
  • Subversion server access

– XCode development / tips & tricks
– Sample client / server as a template for implementation
Architecture

– Client on mobile devices (tablets, smartphones)

– Server

Diagram showing the client-server architecture with GUI, Client Function, Network Comm, Server Function, Network Comm, DB Interface, and DB.
Communication Architecture

- Layer 7 - Application protocol, Service Discovery / Advertisement protocol
- Layer 6 - Encryption, Authentication
- Layer 5 - Sessions overcome changes in underlying layers
- Layer 3 & 4 - TCP / IP protocol family
- Layer 1 & 2 - e.g. Wireless LAN 802.11 protocol
Module tasks (presented by groups)

- Session and Identity management
- Encryption
- Authentication
- Application protocol
- Service discovery
- Service advertisement

- Security model
Software structure of communication architecture

```plaintext
Server
- session
- definesession()

Application
- session
- definesession()

TCP connection
- socket
- hasData() : bool

TCP wait
- listen() : socket

Authentication
+ authenticate(loginname : str, password : str)

Session
- token : string
- user : int = 0
+ sessions : dict

Encryption
- clientKey
- myPublicKey
- myPrivateKey
- handleHandshake() : int

APP

Block
- up : Block
- down : Block
- upData : array
- downData : array
- notifyUp()
- getData() : array
- pushData(data : array)
- end()
+ __init__ (down : Block) : Block

 Ethernet
```
Module interfaces

– Protocol classes derived from Block

```plaintext
class Block:
    - up : Block
    - down : Block
    - upData : array
    - downData : array
    - notifyUp()
    - getData() : array
    - pushData(data : array)
    - end()
    + __init__(down : Block) : Block
```

– AUTH class

```plaintext
class Authentication:
    + authenticate(username : str, password : str)
```

– Session class

```plaintext
class Session:
    - token : string
    - user : int = 0
    + sessions : dict
```
Apple development workflow

– Signup with the apple development center to join our development group
  • You should have received an invitation email last tuesday - please complete the signup
  • As result your AppleID connected to our team dev program
– Sign your iOS Apps
  • iOS provisioning portal at developer.apple.com (in Member Center)
  • Create your personal certificate and upload it
  • We will create a Provisioning Profile using your certificates
  • Download and install the Provisioning Profile on your development Mac
– Run a developed App on the iPad
Access and commit code using Subversion

- Each team has an account on our Subversion server
  - Login: sem_tXX
    XX is your team number, e.g. Team 4 -> sem_t04
  - Password:
    please note ...
- Server repository path:
  - iLclient
    https://134.60.30.80/svn/ilearning/iLclient/
  - iLserver
    https://134.60.30.80/svn/ilearning/iLserver/

- Setup of repositories in Xcode
  - Xcode 4 has some bugs using Subversion repositories
  - In case connection fails in Xcode
    Terminal utility:
    svn info --username sem_tXX https://134.60.30.80/svn/ilearning/iLclient/
  - Accept certificates for our server permanently
XCode and iOS development - Tips & Tricks

...
Sample Client - Server

iPad Client

Application
Presentation
Session
TCP
IPv4
Data Link
PHY

(echo) Server

Application
Presentation
Session
TCP
IPv4
Data Link
PHY
Sample Client - Server

iPad Client

Application
Presentation
Session
TCP
IPv4

Data Link
PHY

(echo) Server

Application
Presentation
Session
TCP
IPv4

Data Link
PHY

Campus Network
Sample Client - Server

iPad Client

Application
Presentation
Session
TCP
IPv4
Data Link
PHY

Campus Network

(echo) Server

Application
Presentation
Session
TCP
IPv4
Data Link
PHY
Sample Client - Server

iPad Client

Data

Application

Presentation

Session

TCP

IPv4

Data Link

PHY

(echo) Server

Application

Presentation

Session

TCP

IPv4

Data Link

PHY

Campus Network
Sample Client - Server

iPad Client

(IPv4) TCP

Data Link

PHY

Application

Presentation

Session

TCP

IPv4

Data

(echo) Server

Application

Presentation

Session

TCP

IPv4

Data

IP

TCP

Data

Data Link

PHY

Campus Network

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Sample Client - Server

iPad Client

- Data
- Application
- Presentation
- Session
- TCP
- IPv4
- Data Link
- PHY

Campus Network

(enter) Server

- Data
- Application
- Presentation
- Session
- TCP
- IPv4
- Data Link
- PHY
Sample Client - Server

iPad Client

- Data
- Application
- Presentation
- Session
- TCP
- IPv4
- Data Link
- PHY

Campus Network

(echo) Server

- Data + Echo
- Application
- Presentation
- Session
- TCP
- IPv4
- Data Link
- PHY

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Sample Client - Server

iPad Client

Data

Data + Echo

Application

Presentation

Session

TCP

IPv4

Data Link

PHY

( echo) Server

Data + Echo

Application

Presentation

Session

TCP

IPv4

Data Link

PHY

Campus Network

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Contact information

Information on the web
- Group assignments
- Presentation dates
- Presentation templates for Open-Office and PowerPoint
- Templates and tutorial for implementation part
- Lecture material
- Web:  www.uni-ulm.de/in/omi

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