DHCP Client and Server using Java

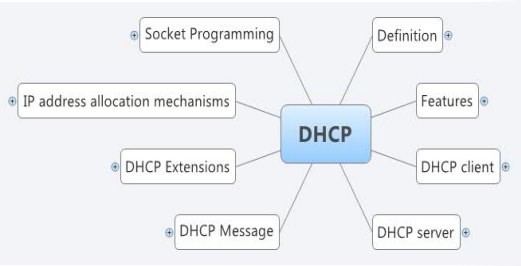
Assignment 2
Computer Networks (2015-2016)

General Goals

- Understand the basics of distributed programming
- Learn socket programming
- Develop the skill to design and implement a network protocol
- Get hands-on experience

2

Assignment Overview



3

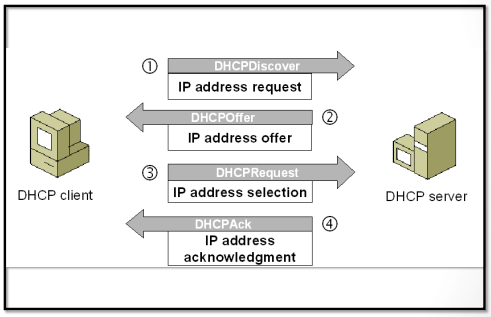
DHCP – Dynamic Host Configuration Protocol

Assignment Overview

- Part I
  - Implementation of UDP Server and Client
  - Using Java
  - Use DatagramSocket, DatagramPacket and MulticastSocket
- Part II
  - Extension of Part I
  - Implementation of DHCP Client
  - Implementation of DHCP Server

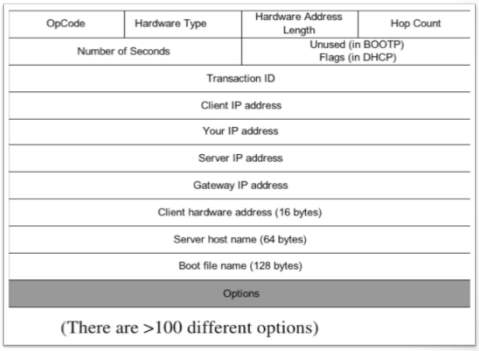
4

DHCP Transactions



5

DHCP Message Format



6

DHCP Transactions

- DHCPDISCOVER
  - Client requests address
- DHCPOFFER
  - Server responds with an offer
- DHCPREQUEST
  - Client accepts the offer, and may request additional information
- DHCPACK
  - Server leases the address
- DHCPNAK
  - Server rejects the request
- DHCPRELEASE
  - Client releases the address

7

Design Choices

- Configuration details of DHCP server
- Address maintenance in DHCP server
- Lease management
- Error handling in client and server
- ….

8

Testing

- DHCP Client
  - Test server will be provided
- DHCP Server
  - Test using your client

9

General Guidelines

- Use DatagramSocket, DatagramPacket and MulticastSocket
  - For other packages: consult with the supervisor!
- Document your code
  - Checked during the evaluation
- You should know the protocol specifications
  - Explain the design and implementation details
  - Design choices
  - .....

10

Practical Information

Weeks	Dates	Purpose
First Week	29-02-2016 to 04-03-2016	Coding
Second Week	07-03-2016 to 11-03-2016	Coding
Third Week	14-03-2016 to 18-03-2016	Coding*
Fourth Week	21-03-2016 to 25-03-2016	Evaluation

* - Self-study week

11

Practical Information

- Work alone or groups of two
  - Email the group details to (gowrisankar.ramachandran@cs.kuleuven.be)
  - Include names and student numbers
  - Subject: **CN:Assignment2**
  - No later than 06-03-2016
- Both the students in group should be prepared to do the demonstration

12

Practical Information

- You have three weeks to complete the assignment
- Grading will be based on your performance in the demonstration
- The fourth session is only meant for grading and you will be marked in your assigned session
- Use the computers in the lab

13

Grading Specifications – Client

Mark	Expected Functionality
Below 4 (D)	Not functional or sufficiently demonstrated.
4-5 (C)	Works partially.
5-7 (B)	Works correctly and all design choices are motivated.
8 (A)	As (B) with elegant and documented code.

14

Grading Specifications - Server

Mark	Expected Functionality
Below 5 (D)	Not functional or sufficiently demonstrated.
5-9 (C)	All transactions are working, but with leasing problems.
9-11 (B)	As above, without leasing problems and good design choices.
12 (A)	As (B) with elegant and documented code.

15

References

- Dynamic Host Configuration Protocol (RFC 2131).
  - https://www.ietf.org/rfc/rfc2131.txt
- DHCP Options and BOOTP vendor extensions (RFC 2132).
  - https://www.ietf.org/rfc/rfc2132.txt
- Bootstrap protocol (RFC 951).
  - https://tools.ietf.org/html/rfc951
- Host configuration protocols.
  - http://www.tcpipguide.com/free/t_HostConfigurationandTCPIPHostConfigurationProtocol.htm

16

If you have questions, contact:

gowrisankar.ramachandran@cs.kuleuven.be

17