

CS5700 Fundamentals of Computer Networking

Course Project Meeting Notes

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Phase 1: UDP Implementation using RAW Socket

Week 1 [Oct 22 - Oct 28]

Meeting 1 [Oct 25, 4PM - 6PM]

Agenda: Analyze project objectives and requirements, assign initial roles.

Conclusions: Agreed on weekly meeting schedule and assigned roles. Python development environment setup.

Action Items: Installation of Python development environment. Role assignment

Progress: Development environment set up. Role of each member: Yu for the rawUDPCliient development, focusing on the part of 'send_and_receive". Xilong for the common part of client and server, concentrating on packet parser, IP and UDP header construction and checksum verification, together with UI design. Yiwei for the rawUDPSever development, project documentation and testing strategies, ensuring proper documentation of code and test cases.

Meeting 2 [Oct 28, 3PM - 6PM]

Agenda: Discuss roles and tasks.

Conclusions: Reaffirmed tasks and roles. Assigned initial tasks for RAW socket research, and project documentation initiation.

Action Items: Familiarize RAW sockets.

Progress: Research on RAW sockets completed.

Week 2 [Oct 29 - Nov 4]

Meeting 3 [Oct 31, 2PM - 3PM]

Agenda: Begin coding for rawUDPClient and rawUDPServer. Discuss the architecture of the client-server model using RAW sockets and divide coding tasks.

Conclusions: Division of tasks for IP and UDP header construction, checksum verification, and UDP send and receive using socket.

Action Items: Begin coding respective components.

Progress: Basic IP header, UDP header construction underway, checksum verification completed, tasks of using socket should be done individually and discussed in the next meeting .

Meeting 4 [Nov 3, 10:30AM- 1PM]

Agenda: Testing Phase 1 functionalities in Mininet and handling errors. Review code for Phase 1, prepare for testing in Mininet, and document errors.

Conclusions: Basic communication established. Identified issues with checksums and packet loss.

Action Items: Perform initial testing in Mininet, document errors.

Progress: Communication in a controlled environment established. Issues identified for further debugging.

Week 3 [Nov 5 - Nov 11]

Meeting 5 [Nov 5, 3PM - 6PM]

Agenda: Finalize and test Phase 1.

Conclusions: Phase 1 complete. Identified challenges for Phase 2.

Action Items: Validate file integrity, prepare for Phase 2 implementation.

Progress: Phase 1 completed successfully.

Meeting 6 [Nov 9, 3PM - 6PM]

Agenda: Prepare for Phase 2.

Conclusions: Confirmation of Phase 1 completion and begin planning for Phase 2.

Action Items: Validate file integrity, prepare for Phase 2 implementation.

Progress: Phase 1 completed successfully.

Phase 2: Reliable Data Transfer for UDP

Week 4 [Nov 12 - Nov 18]

Meeting 7 [Nov 13, 3PM - 4:30PM]

Agenda: Discuss and finalize the UDP file sender's design and implementation. Discussion of the UDPFileSender class and its functionalities. Importance of checksum verification in the file transmission process.

Conclusions: Initial version of UDP file sender completed. Implementation of UDP file sender in Python. Identified the components of reliable file transfer..

Action Items: Implement components of reliable file transfer like add ACK, SEQ, retransmission, etc. Begin testing with small text files.

Progress: Basic file sending functionality implemented.

Meeting 8 [Nov 16, 3PM - 4:30PM]

Agenda: Review test results for UDP file sender and discuss error handling strategies in network communication.

Conclusions: Adjustments needed in error handling for lost packets.

Action Items: Refine error handling mechanisms. Test with larger files.

Progress: Enhanced error handling. Successfully tested with small files.

Week 5 [Nov 19 - Nov 25]

Meeting 9 [Nov 20, 3PM - 4:30PM]

Agenda: Discuss and evaluate performance issues and optimize file transmission. Plans for optimizing the file transmission process for better performance, including the introduction of multi-threading to enhance data processing and transmission speed.

Conclusions: Identified the need for multi-threading to improve performance for larger files. Discussed potential challenges and strategies for thread management and synchronization.

Action Items: Implement multi-threading in the file transmission process. Optimize data chunk sizes and transmission logic.

Progress: Minor performance improvements with initial multithreading implementation. Ongoing optimization required.

Meeting 10 [Nov 23, 3PM - 4:30PM]

Agenda: Finalize optimizations for the file transmission process, including multi-threading, and prepare for comprehensive testing under different network scenarios.

Conclusions: Performance optimizations, including multi-threading, are complete.

Action Items: Conduct extensive testing under various network conditions to ensure stability with the new configurations.

Progress: Performance significantly improved with multi-threading.

Week 6 [Nov 26 - Dec 3]

Meeting 11 [Nov 27, 3PM - 4:30PM]

Agenda: Review results from comprehensive testing. Analysis of comprehensive testing results, focusing on the effectiveness of multi-threading. Discussion on final adjustments for enhancing system reliability.

Conclusions: Testing successful with enhanced performance and stability. Multi-threading has contributed significantly to system reliability.

Action Items: Implement final adjustments based on testing feedback. Prepare for Phase 2 demo, ensuring that the multi-threading implementation is highlighted.

Progress: System stable under various conditions with improved throughput. Minor improvements in thread management and packet handling underway.

Meeting 12 [Nov 30, 3PM - 4:30PM]

Agenda: Final review of the project in preparation for the demonstration. Discuss the addition of a user interface to the application. Finalize presentation materials and documentation.

Conclusions: Phase 2 complete and ready for demonstration. Agreed adding a user-friendly interface for the application.

Action Items: Have a user interface design, complemented by a progress bar for real-time feedback on file transfer status. Finalize documentation and presentation materials with a focus on technical improvements and challenges overcome.

Progress: Preparing for presentation. Implemented UI design.

Meeting 13 [Dec 3, 7PM - 8:30PM]

Agenda: Add IPPROTO_RAW and fix new bugs.

Conclusions: Decide the implementation of IPPROTO_RAW, fix the bugs after that.

Action Items: Identify the components of IP header. Edit the parameters of sockets.
Address the "Message too long" error in the server by adjusting MTU settings.

Progress: Completed implementation of IPPROTO_RAW and bugs fixed.