CIS*3260 Assignment 1

Email System Design

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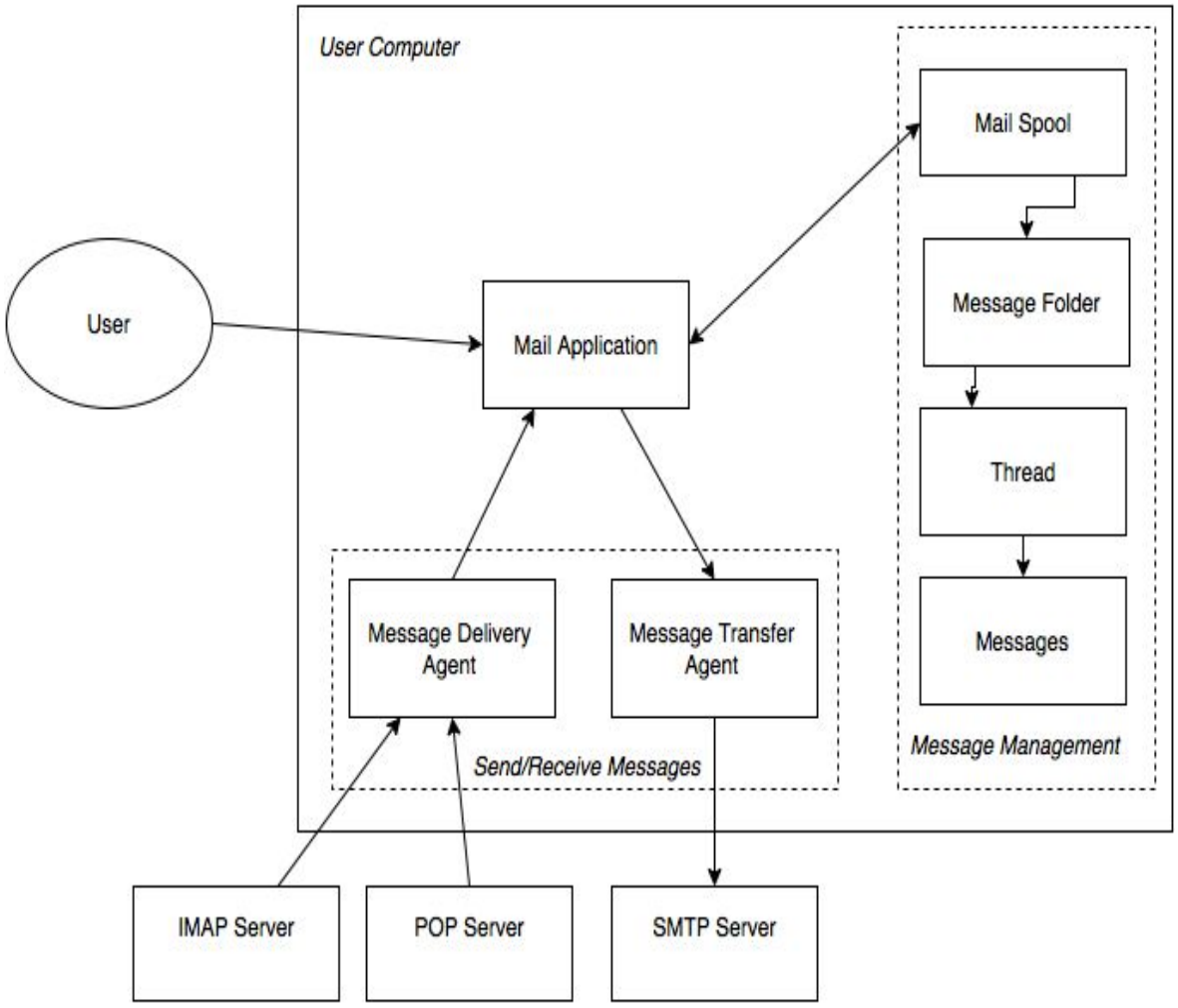
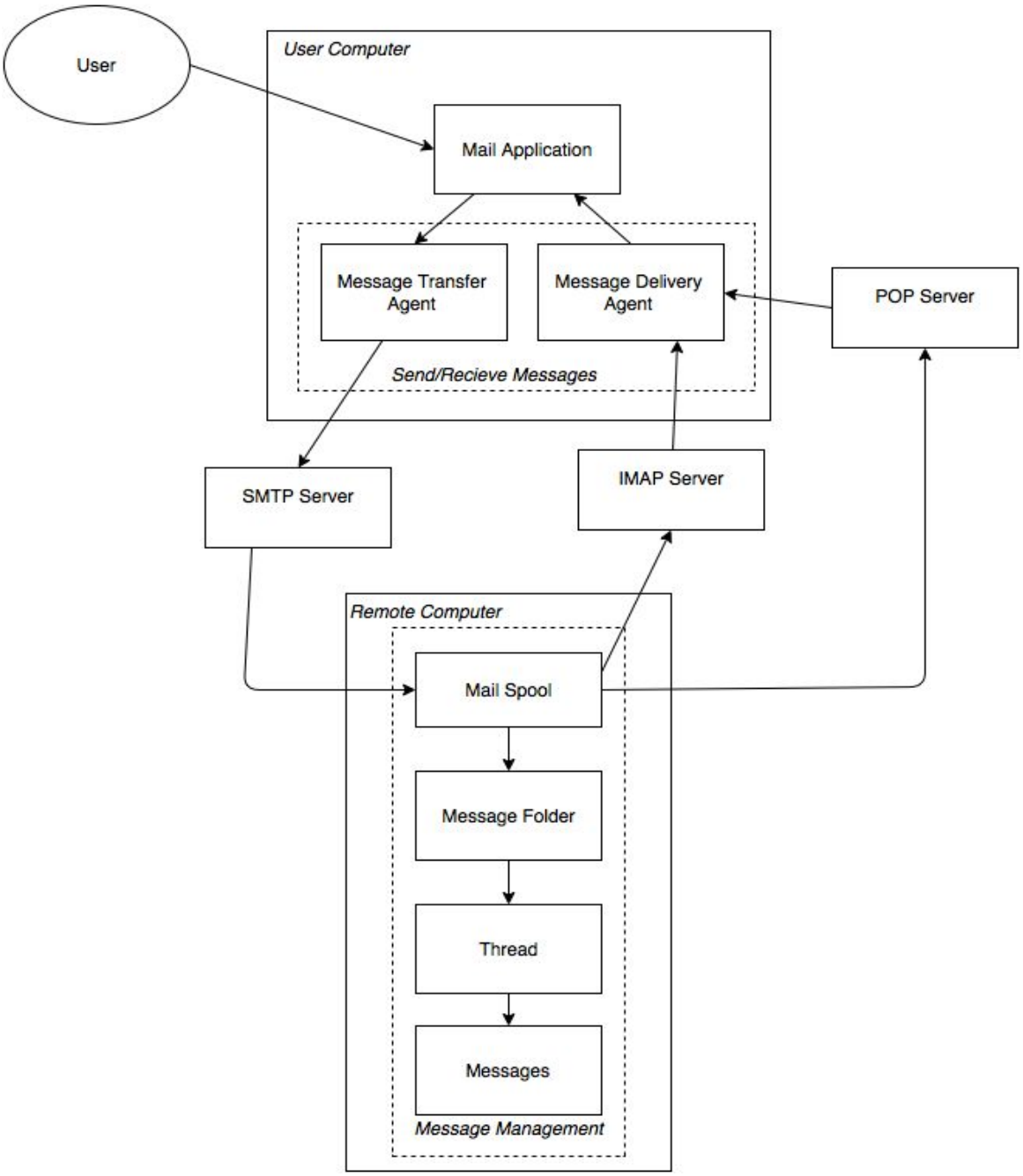
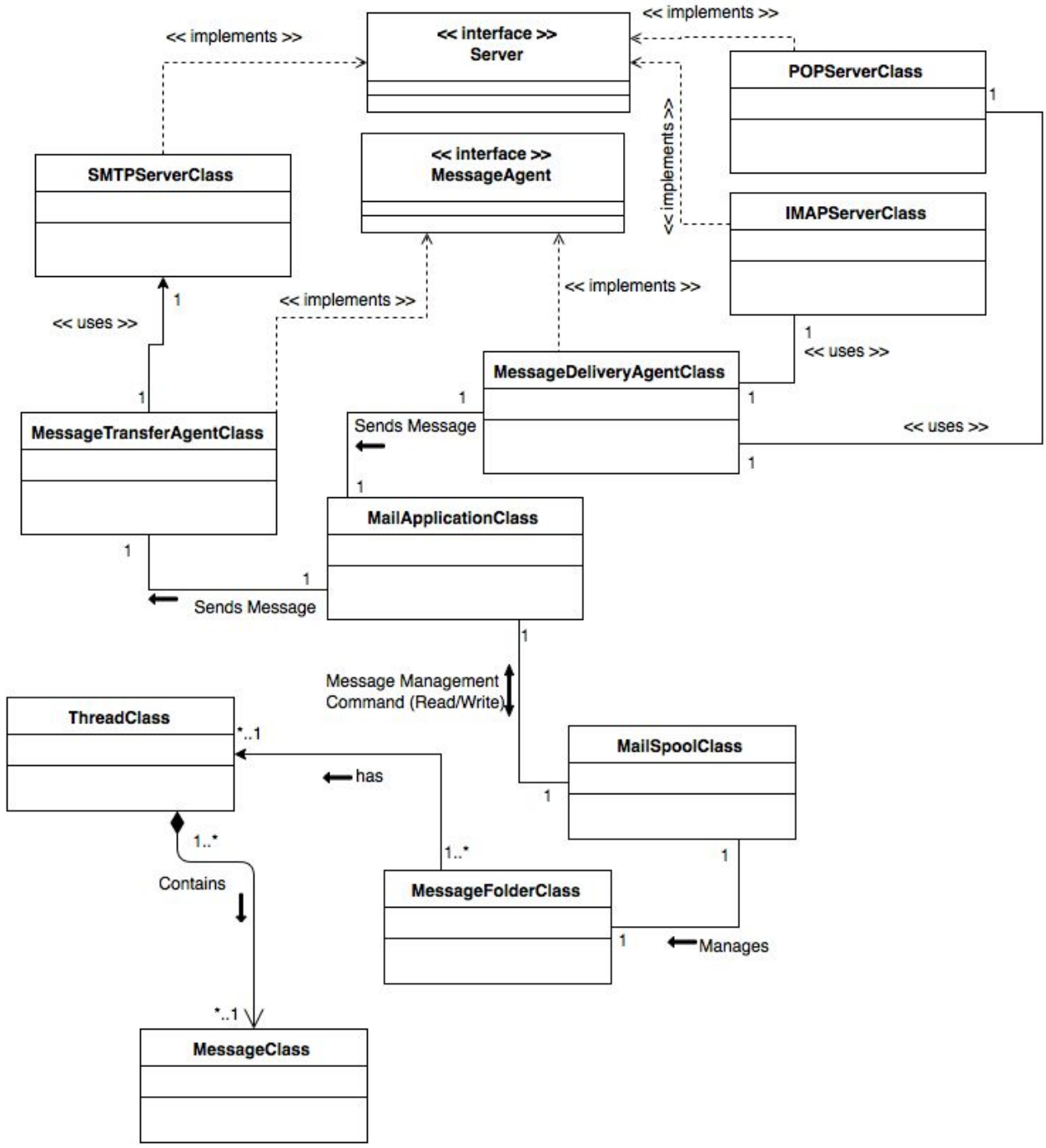
Q1. Architecture Diagram #1: Mail spool on same machine as Mail Application



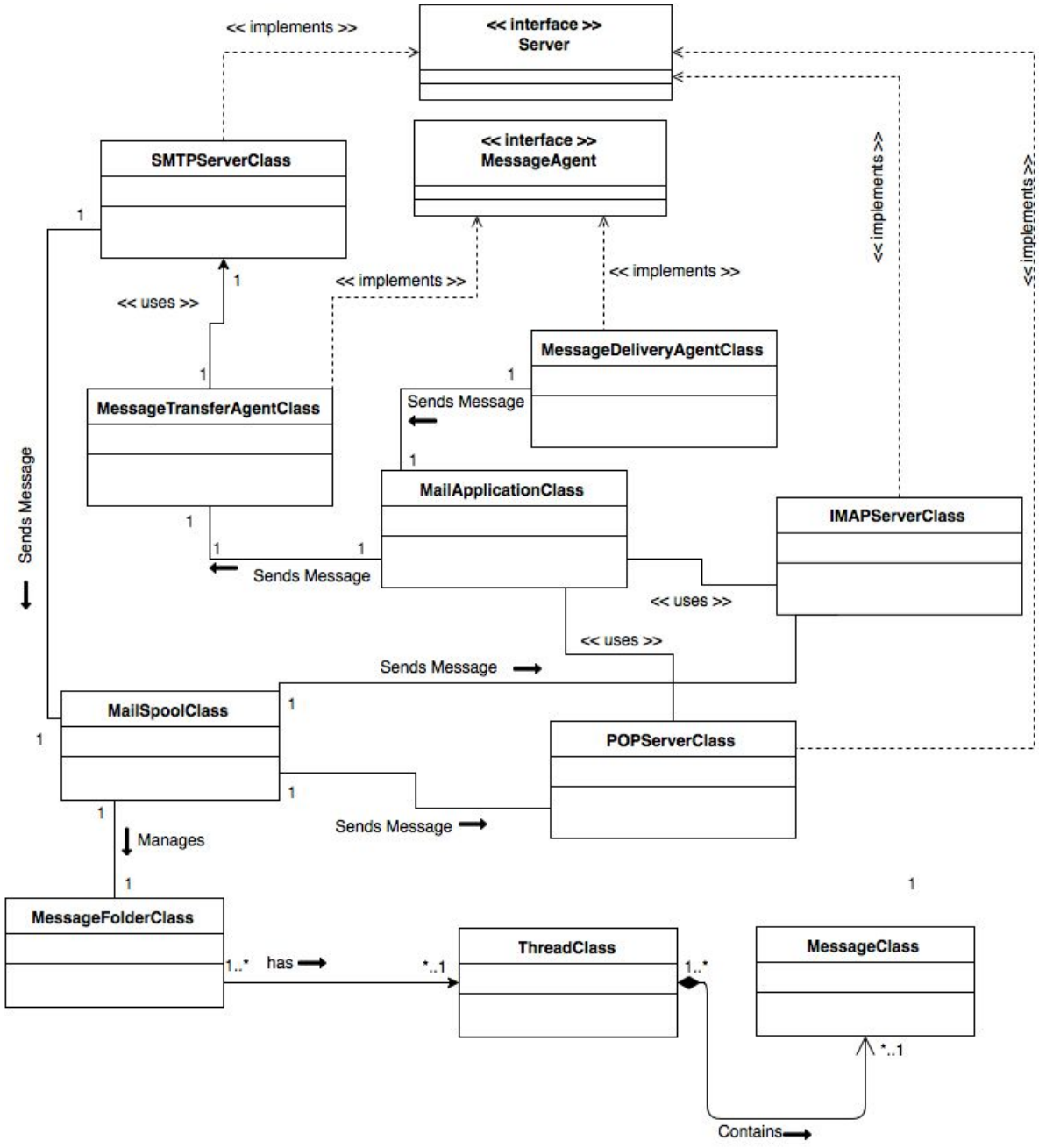
Architecture Diagram #2: Mail spool and Mail Application are on different machines



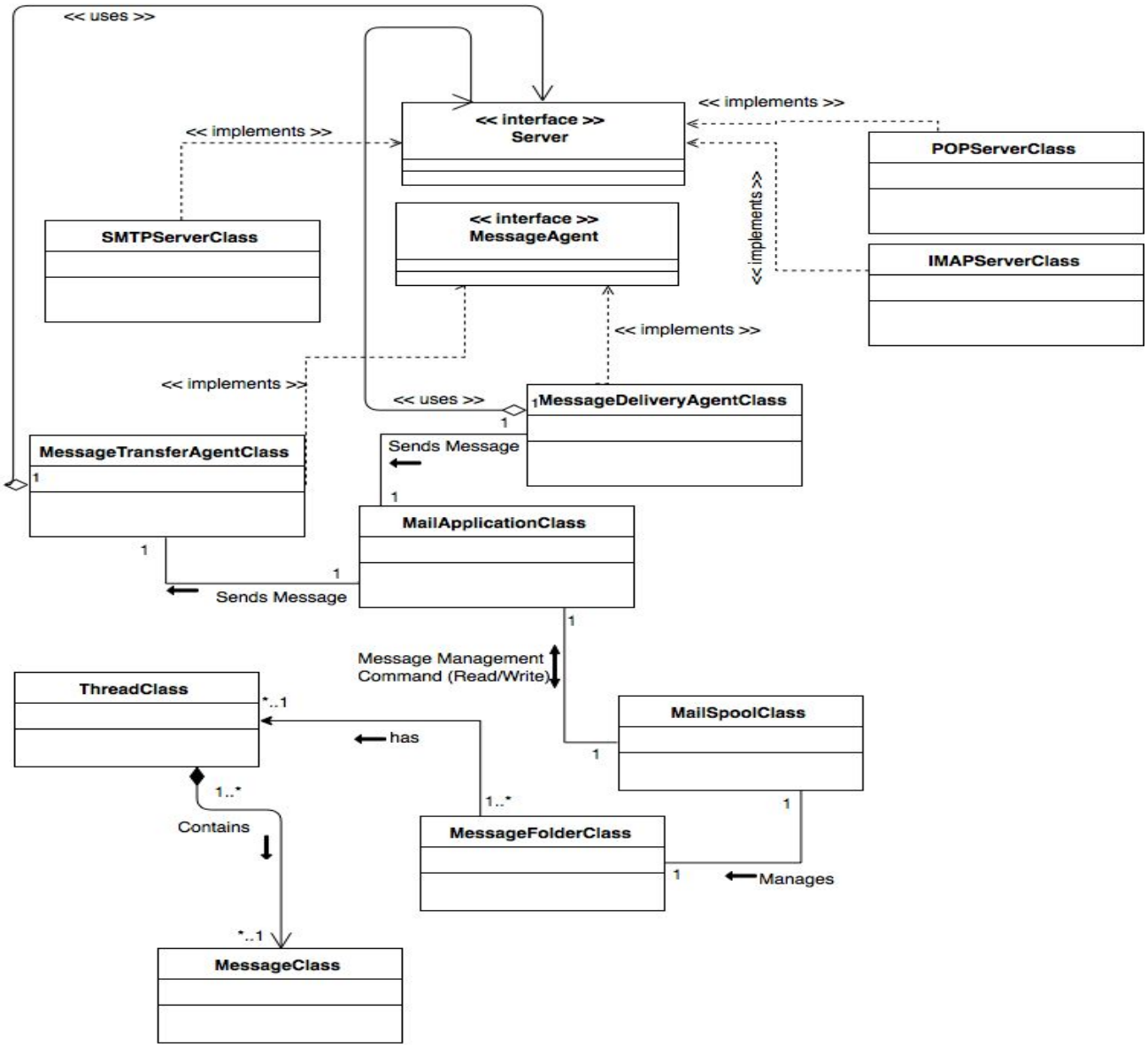
Class Diagram #1: Mail spool on same machine as Mail Application



Class Diagram #2: Mail spool and Mail Application on different machines



Q2. i) I would use a strategy pattern to group the functionality of all the servers together into one class, since the functions are going to be almost all the same, except for the send/receive functions that are server specific (as in, SMTP sends, POP/IMAP receive). The strategy pattern will allow the functions that need to be different to be changed, and will keep the similar ones across all the servers. Now that the strategy pattern is implemented, you can see that the MessageDeliveryAgentClass and MessageTransferAgentClass have a relationship with the interface, not the server directly.



ii) The second pattern used is the Adapter pattern. I had already used it in the original design. It is the MessageDeliveryAgentClass and the MessageTransferAgentClass. They both implement the MessageAgent interface, and act as adapters for the MailApplicationClass to use the interface, but in different contexts. One delivers messages to the MailApplicationClass, (MessageDeliveryAgentClass) while the other, MessageTransferAgentClass, sends messages out of the MailApplicationClass.

Q3.

Between the Mail Application and the SMTP server: Multi-tier client-server architecture because a high volume of information (emails) are going to be processed by the server, as well as the server will have thousands of clients.

Between SMTP servers (MX and MTA applications/components): Master-slave architecture because the applications need to coordinate and communicate extensively with each other

Between the MX and MDA: Peer-to Peer architecture because they are exchanging the information (messages) locally

Between the Mail Application and POP server: Multi-tier client-server architecture because a high volume of information (emails) are going to be processed by the server, as well as the server will have thousands of clients.

Between the Mail Application and IMAP server: Multi-tier client-server architecture because a high volume of information (emails) are going to be processed by the server, as well as the server will have thousands of clients.

Between the Mail Application and Message Folder: Peer-to Peer architecture because they are exchanging the information (messages) locally