Protocol Architectures Examples

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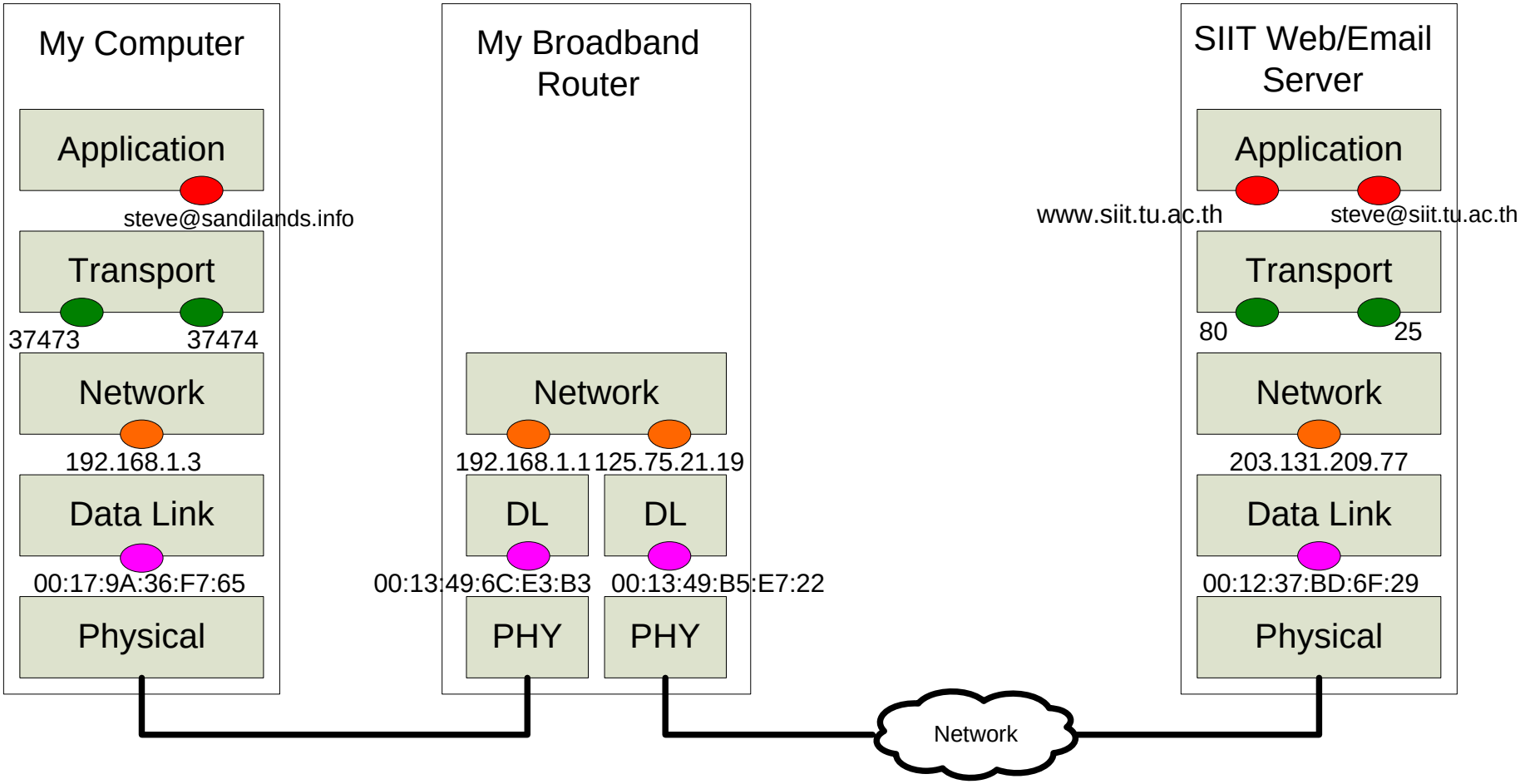
Addressing Example

Assume web browser and email client on My Computer communicating with web and email server at SIIT



Data and Layers

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message

segments

packets/datagrams

frames

bits 0110001010110101000111 10

Application

Application protocol adds a header and sends data as message (may break into multiple messages)

Transport

Transport protocol breaks into segments, adding header to each, and sends each segment

Network

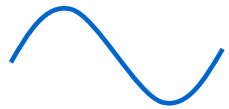
Network protocol adds header to each segment and sends datagram

Data Link

Data link protocol adds header and trailer to each datagram and sends frame

Physical

Physical protocol adds header and sends bits over physical medium (e.g. as waveform)



Implementing Layers

User Processes
- implement application protocol in each application (along with GUI and other functionality)

Application layer

Operating System
- implements TCP/IP set of protocols in software

Router Operating System
- Implements IP in software and hardware

Transport layer

Network layer

Network Interface Card (NIC)
- implemented in hardware and software (driver in OS)
- separate devices or individual chips

Data Link layer

Physical layer