

CS 348: Computer Networks

- Intro (2); 24th July 2012

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Revisit problem from last class

- There are two companies A and B, located in cities about 200 km apart.
- The CEO of company A wants to send a document, of about 100 pages, to the CEO of company B.
- What is your opinion on how can this be done, given the following constraints:

Constraints

- There is no email, no fax, no phone, no post office - no form of modern communication whatsoever.
- The only means of communication are some messenger boys.
- The messenger boys are very weak. Each can carry only 10 pages at a time!
- The messenger boys are very fickle. They may decide to quit without notice, at any time, even in the middle of carrying some pages!

Problem-Solving: ABCDE Process

A) Assume a simple, favourable case of given scenario

- State your assumptions clearly (and later relax them)

B) Brainstorm for possible solutions

- Evaluate pros and cons of each wrt given scenario constraints

C) Choose one solution that satisfies the given constraints

- Avoid attempts for premature optimization
- Avoid including “additional features” that are not asked for

D) Do the detailing of the chosen solution

- Do not go back to brainstorming for evaluating other ideas

E) Examine correctness and completeness

- Carry out 'What-if' scenarios on various boundary conditions and see if your solution needs to be modified

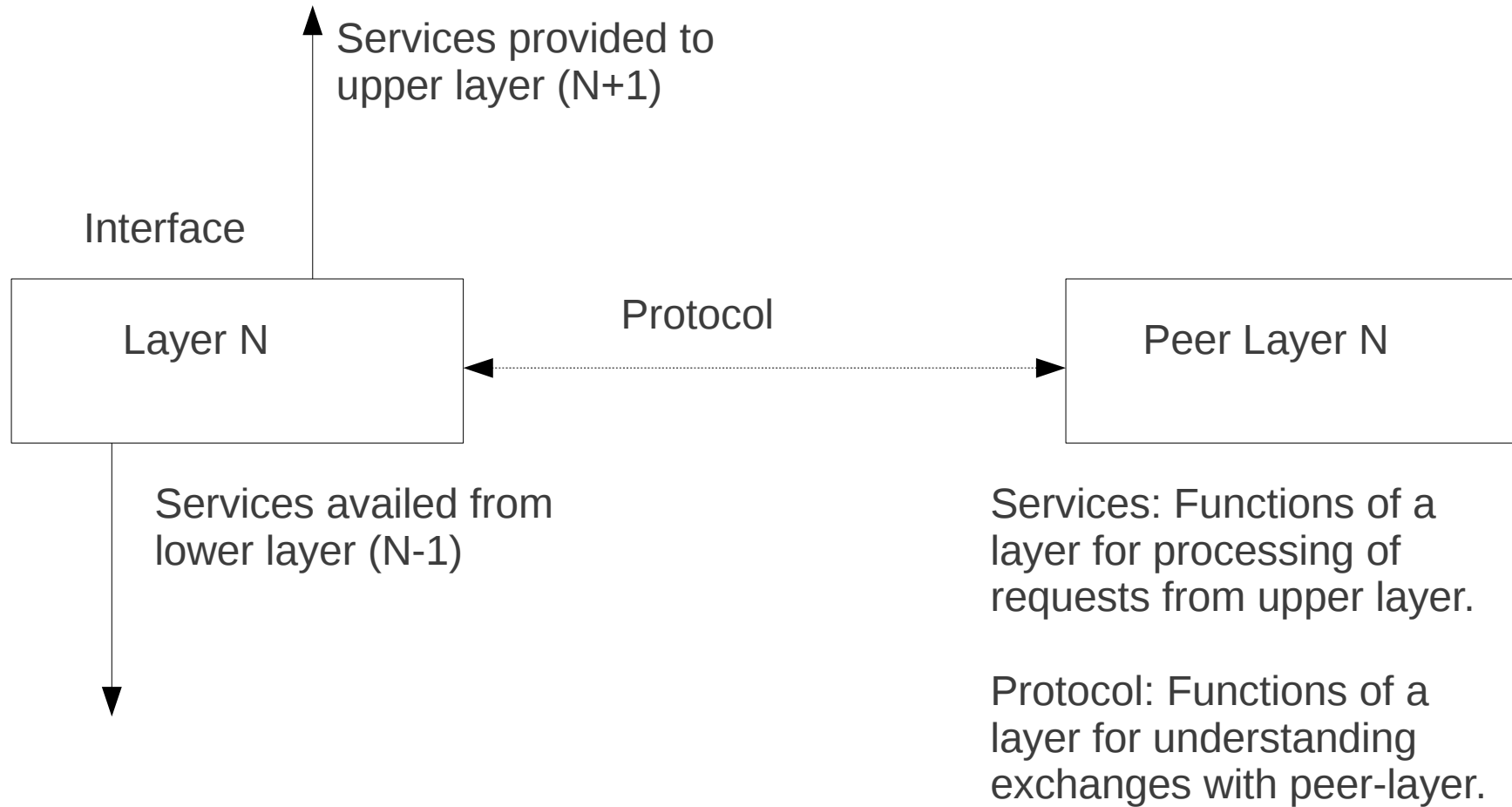
Key points for the CEO example

- Need for secretary and dispatch sections.
- Need to specify actions of each entity clearly.
 - CEO gives **data** - document (D) and name (CEO-B) to secretary, along with **control** – send this by tomorrow.
 - Secretary looks up name and finds address, packetizes, inserts sequence numbers, maintains acknowledgement.
- Specify the actions for each entity, starting with CEO-A, till the document reaches CEO-B.

Analogy with Networks

- Notion of layers, protocols and interfaces.
 - CEO corresponds to application layer.
 - Secretary corresponds to TCP.
 - Dispatch corresponds to IP.
- Concerns and functions at each layer are different.
 - Need to be clearly specified for the abstraction to work!
- Notions of reliable versus best-effort service.
- DNS and other topics touched upon.

Layers, Interfaces and Protocols



TCP overview

- Key features for sender side (TCP):
 - Maintain application data in a buffer, Do packetization, Insert sequence numbers, Send to network layer, Start re-transmission timer and wait for ACK.
 - If timeout before ACK, re-transmit packet.
 - IF ACK before timeout, delete packet from buffer.
- Key features for receiver side (TCP):
 - Send ACK for received pkts, Discard duplicates, Maintain received pkts in a buffer, Do re-assembly of data, Send to upper layer.

Animation

- Here are some links to animation applets:
 - http://highered.mcgraw.hill.com/sites/0072967722/student_view0/animations.html#
 - <http://www.cs.stir.ac.uk/~kjt/software/comms/jasper.html>
- Here is a link to a 13-minute animation video:
 - <http://video.google.com/videoplay?docid=5019530929128132102#>