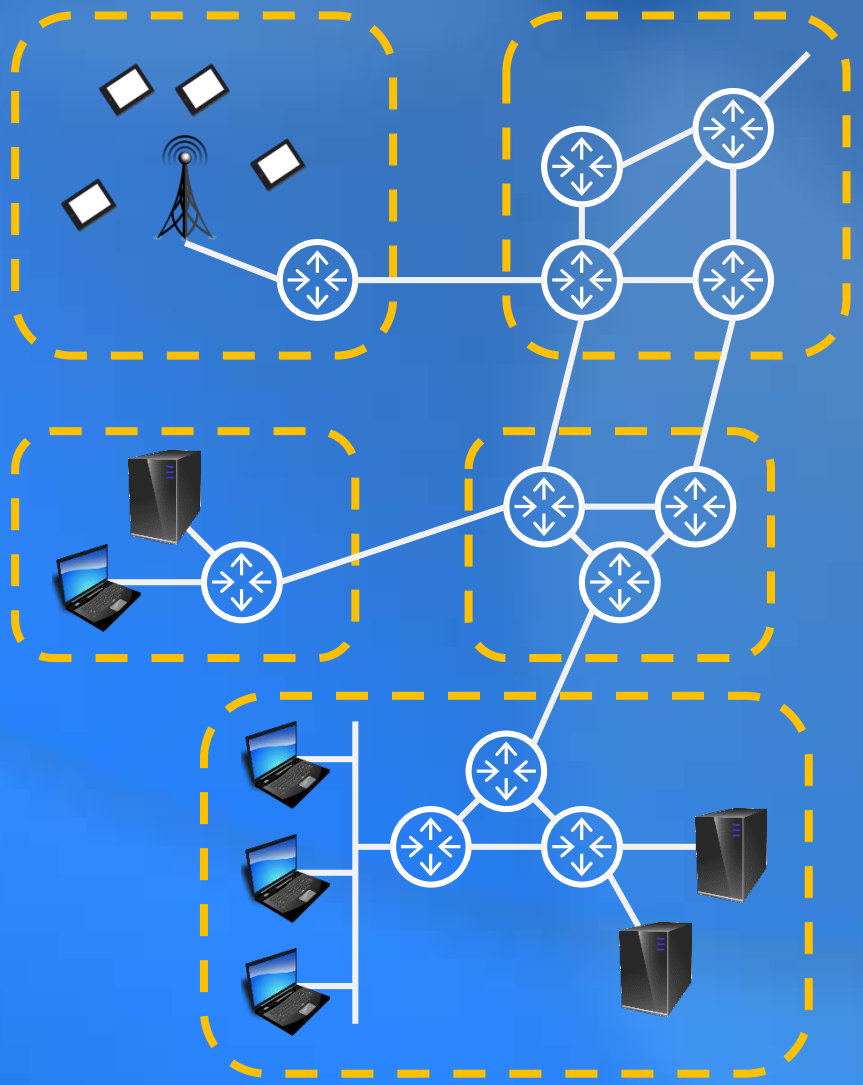
Layering

Networks are complex!



Networks consist of many parts

- hosts
- applications
- routers
- links of various media
- protocols
- hardware
- software

How can we organize the network?

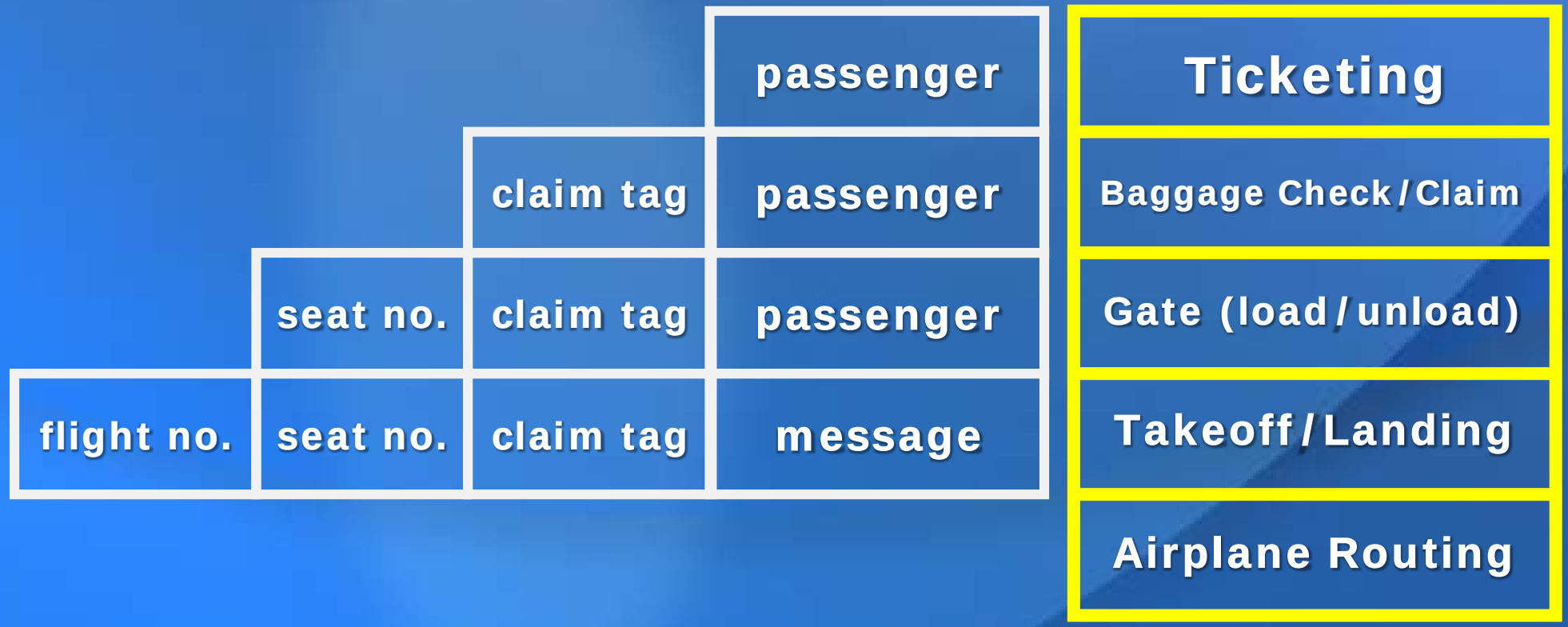
By layering!

Example: Air Travel

- To get from one city to another, passengers must travel down and up through layers.
- Each layer implements a service.
- Higher layers rely on services provided by lower layers
  - Do not need to know implementation details.

Transferring Passengers

Each layer adds information to the passengers with the information needed to do its job.

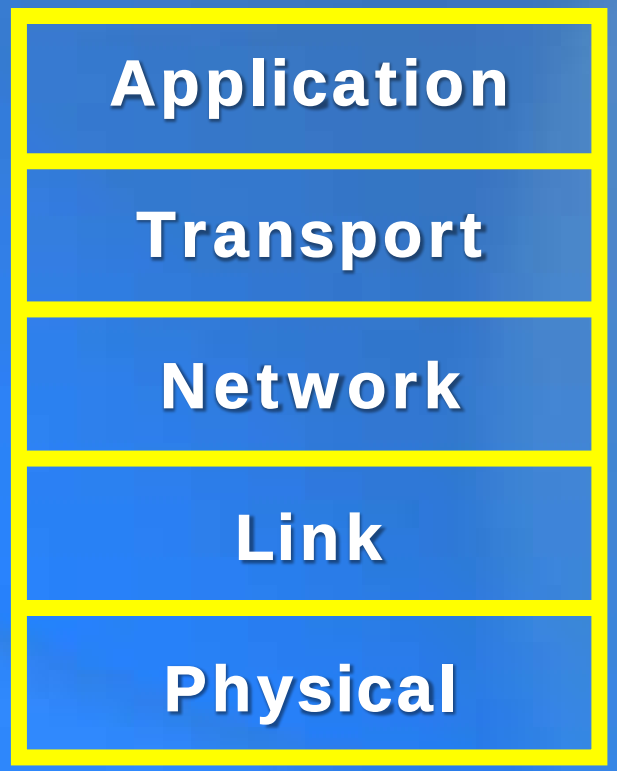


Why layering?

When dealing with a complex system, layering

- Enables identification of different parts and their relationship
- Eases maintenance and updating of the system
  - Changes in the implementation of one layer's services does not affect the rest of the system.
  - Limits the amount of information each layer needs to know about the other.

Internet protocol stack



- Application layer runs applications, e.g. email, web browser, messaging
- Transport layer provides for logical communication between applications
- Network layer delivers packets from source to destination over a network
- Link layer handles data transfer from between adjacent nodes
- Physical layer deals with properties of medium (e.g. wired / wireless)

Transferring Data

Each layer adds header information to the data from upper layers with the information needed to do its job.