# SNS COLLEGE OF TECHNOLOGY

**Coimbatore-35**
**An Autonomous Institution**

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## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
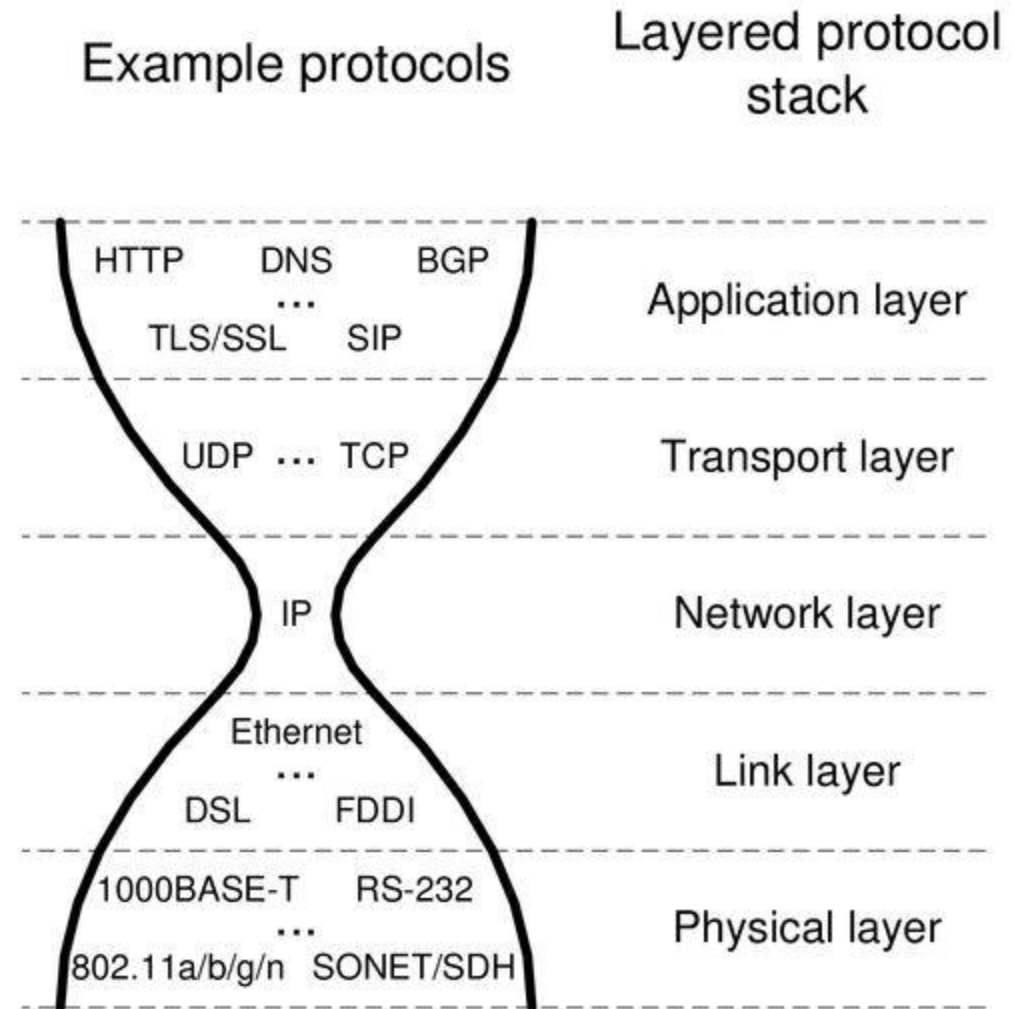
## 19ECT301- COMMUNICATION NETWORKS

### III YEAR/ V SEMESTER

### UNIT V  MULTILAYERING NETWORK

TOPIC 4–Next Generation Internet Architectures

# Current Internet architecture

- Hourglass architecture
  - Common network layer
- Architecture has led to very successful system
- What are potential problems and limitations?

Example protocols

Layered protocol stack

| Example protocols | Layered protocol stack |
|---|---|
| HTTP    DNS    BGP<br>...<br>TLS/SSL    SIP | Application layer |
| UDP ... TCP | Transport layer |
| IP | Network layer |
| Ethernet<br>...<br>DSL    FDDI | Link layer |
| 1000BASE-T    RS-232<br>...<br>802.11a/b/g/n    SONET/SDH | Physical layer |

# Changes in Internet

- New requirements
  - Security
  - Robustness
  - Performance guarantees
  - Etc.

- Different ways of communicating in network
  - New networking paradigms
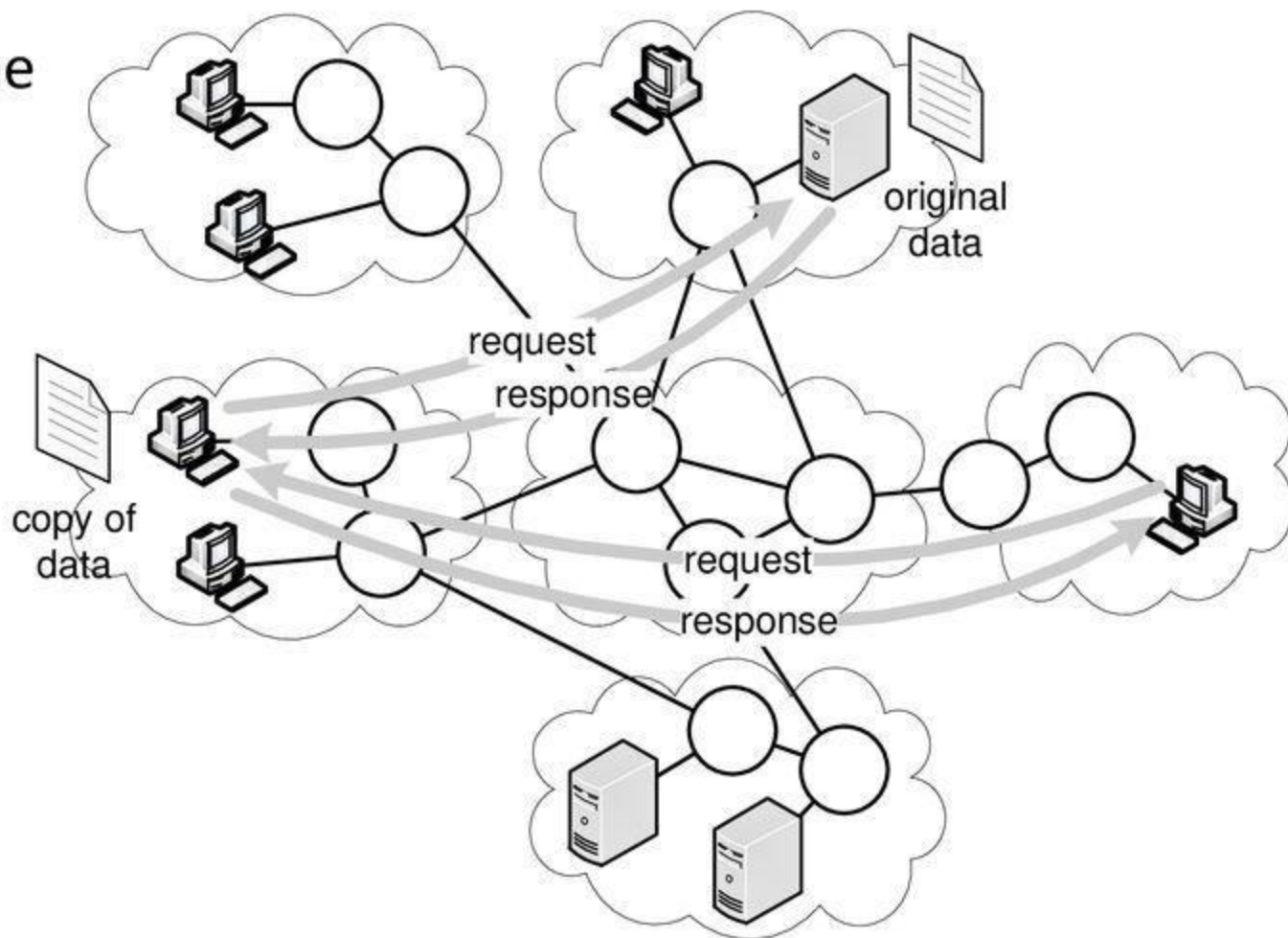
# Client-server communication
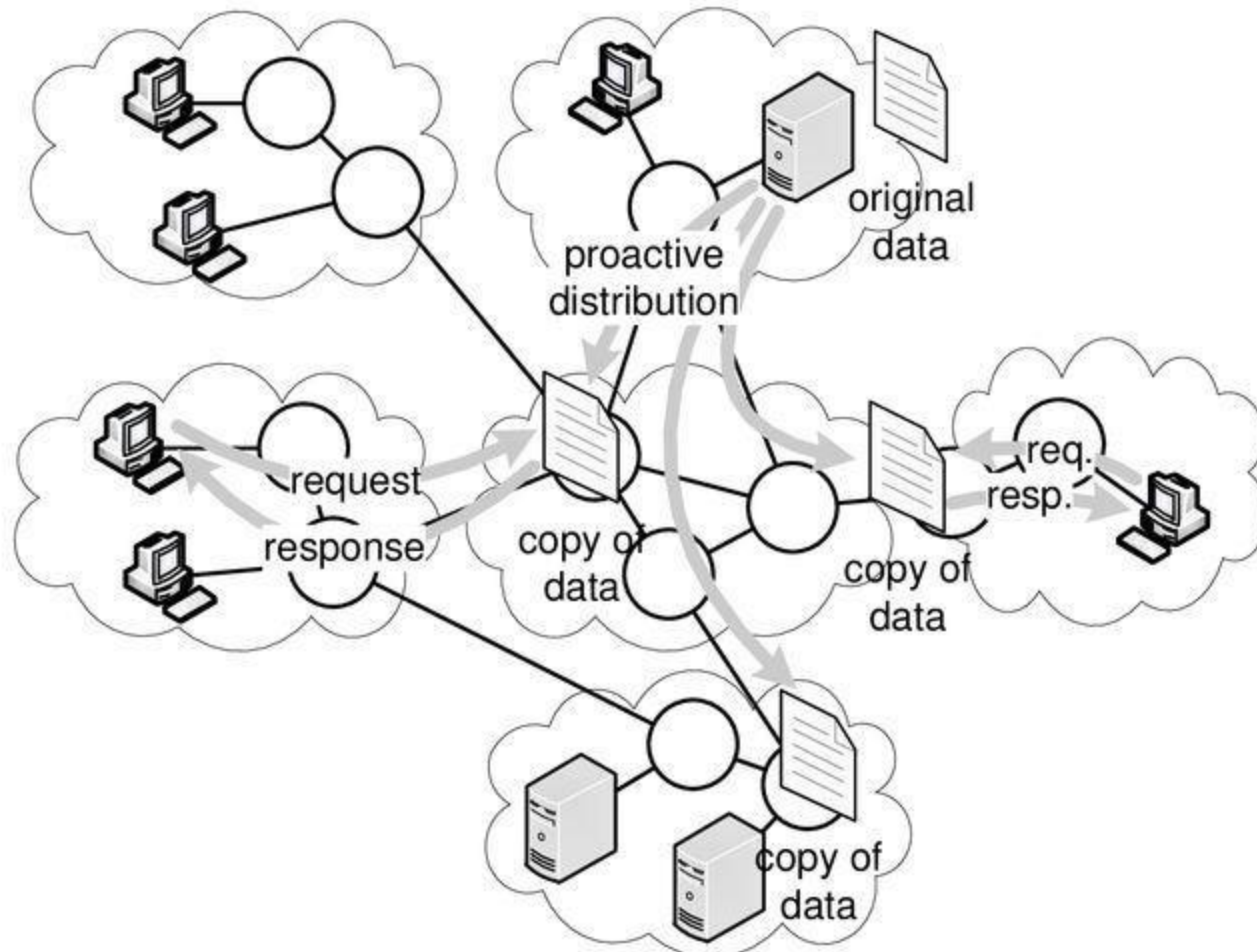
- Classic view of networking
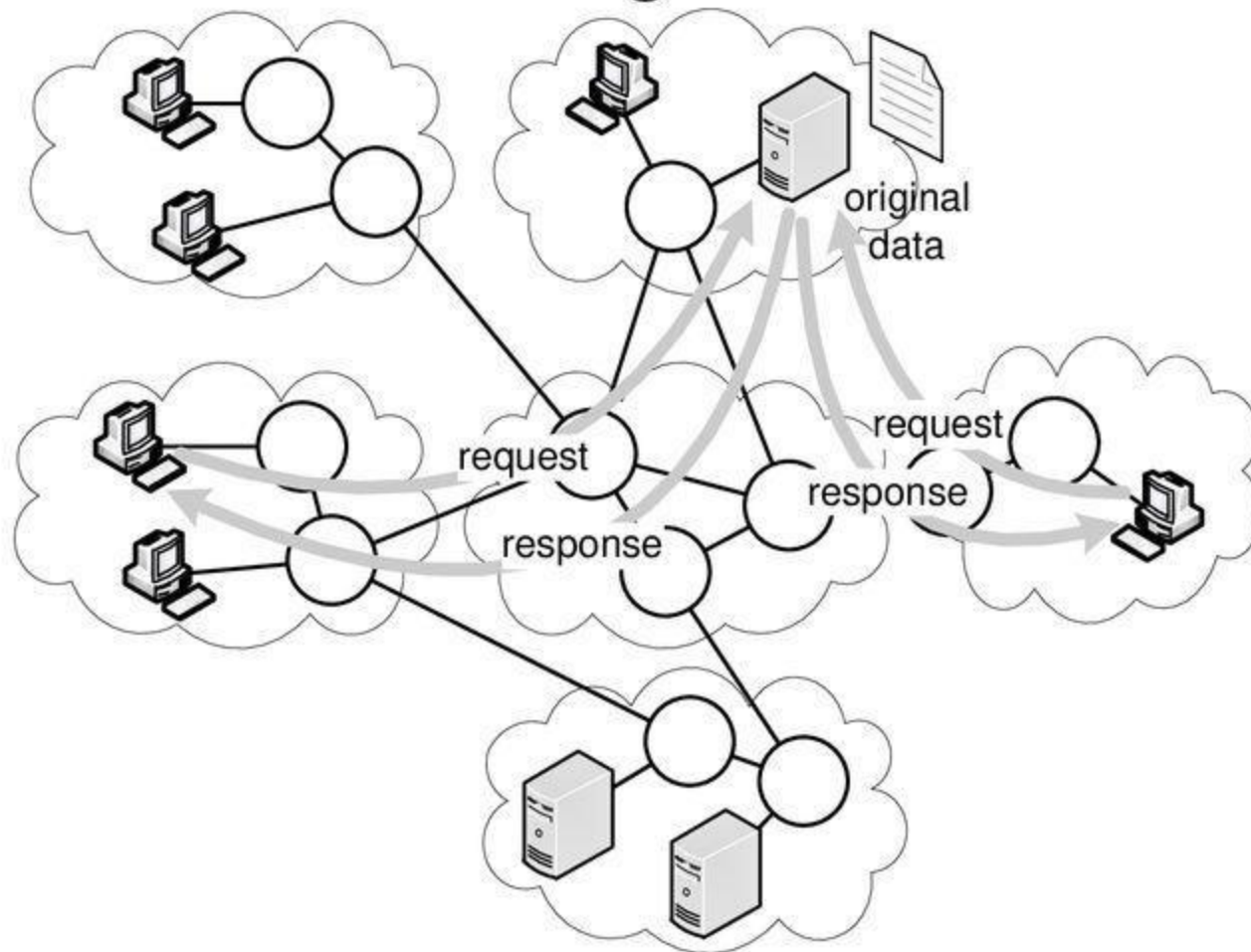
# Peer-to-peer communication

- Nodes act as clients and servers
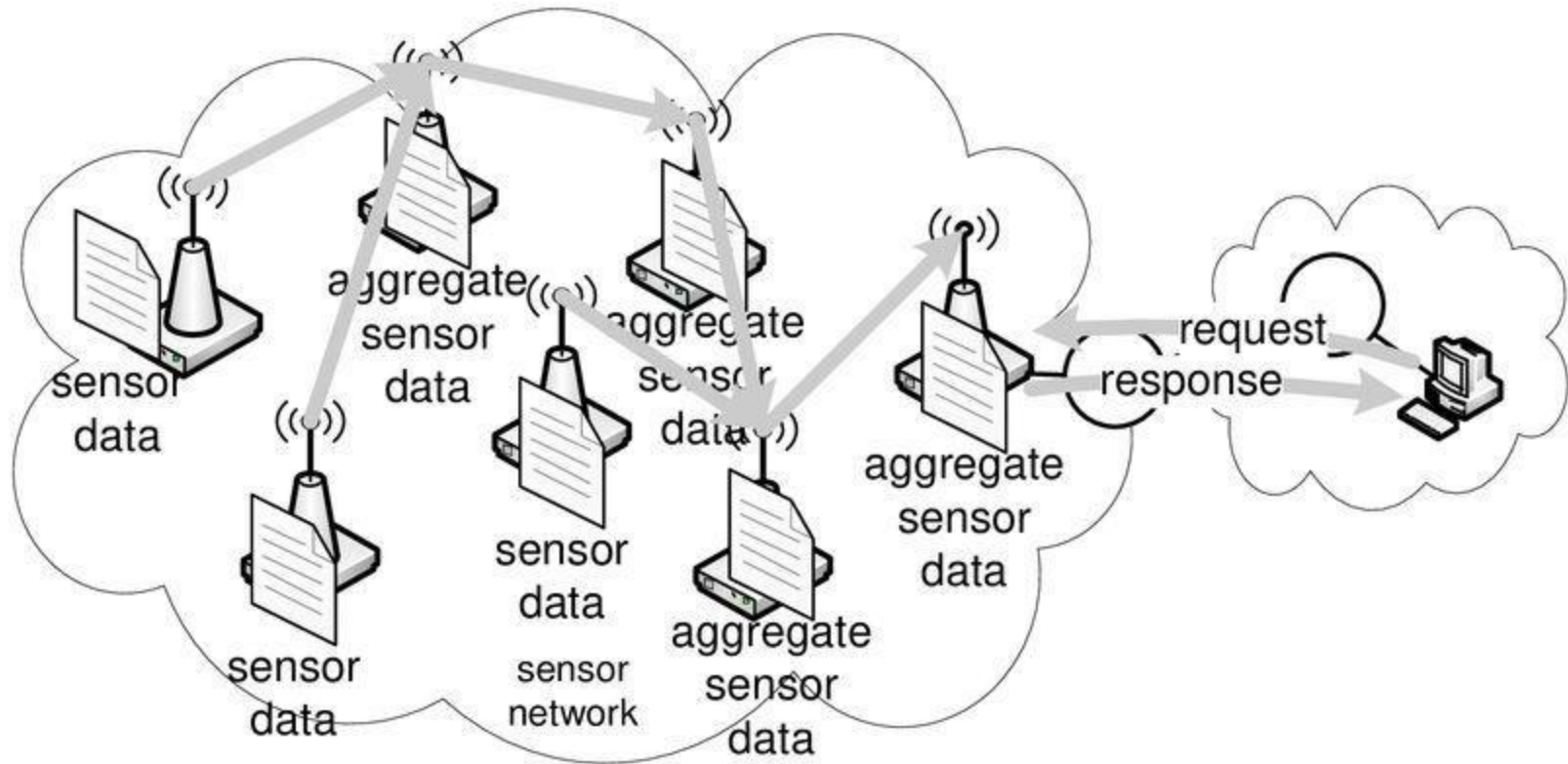  - Where is the main challenge?

# Content distribution
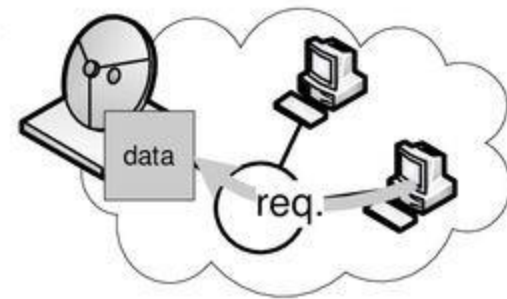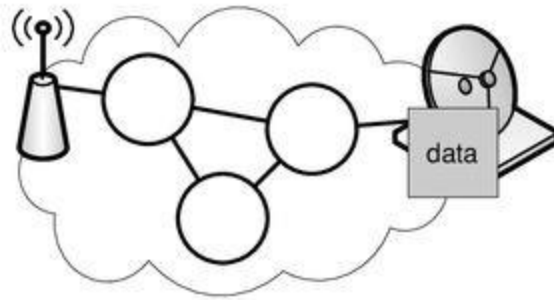
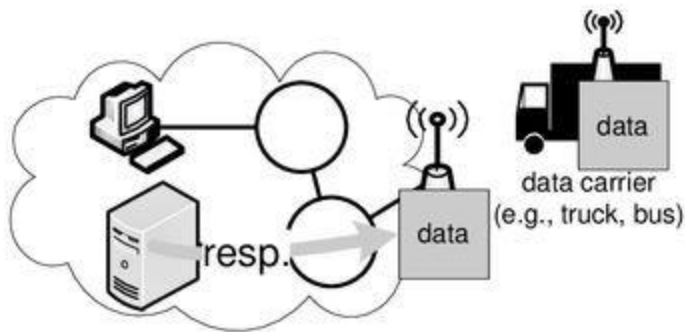- "Pushing" of content towards nodes

# Information fusion

- ## Sensor network
  - ### Computation inside network (e.g., aggregation)

# Delay-tolerant networks

- Links with very long delay / intermittent availability
  - Satellites
  - Data carriers

# Implications for network architecture

- Diverse demands on network
  - New requirements
  - New communication paradigms
- Architecture needs to support all
  - Possibly conflicting demands
  - How to design one architecture?
- Architecture should support future ideas
  - Expensive to change infrastructure

# Network virtualization

- **Virtualized network**
  - Single physical infrastructure
  - Multiple logical networks
  - Similar to OS virtualization

- **Dynamic instantiation of new networks**
  - Programmable data plane
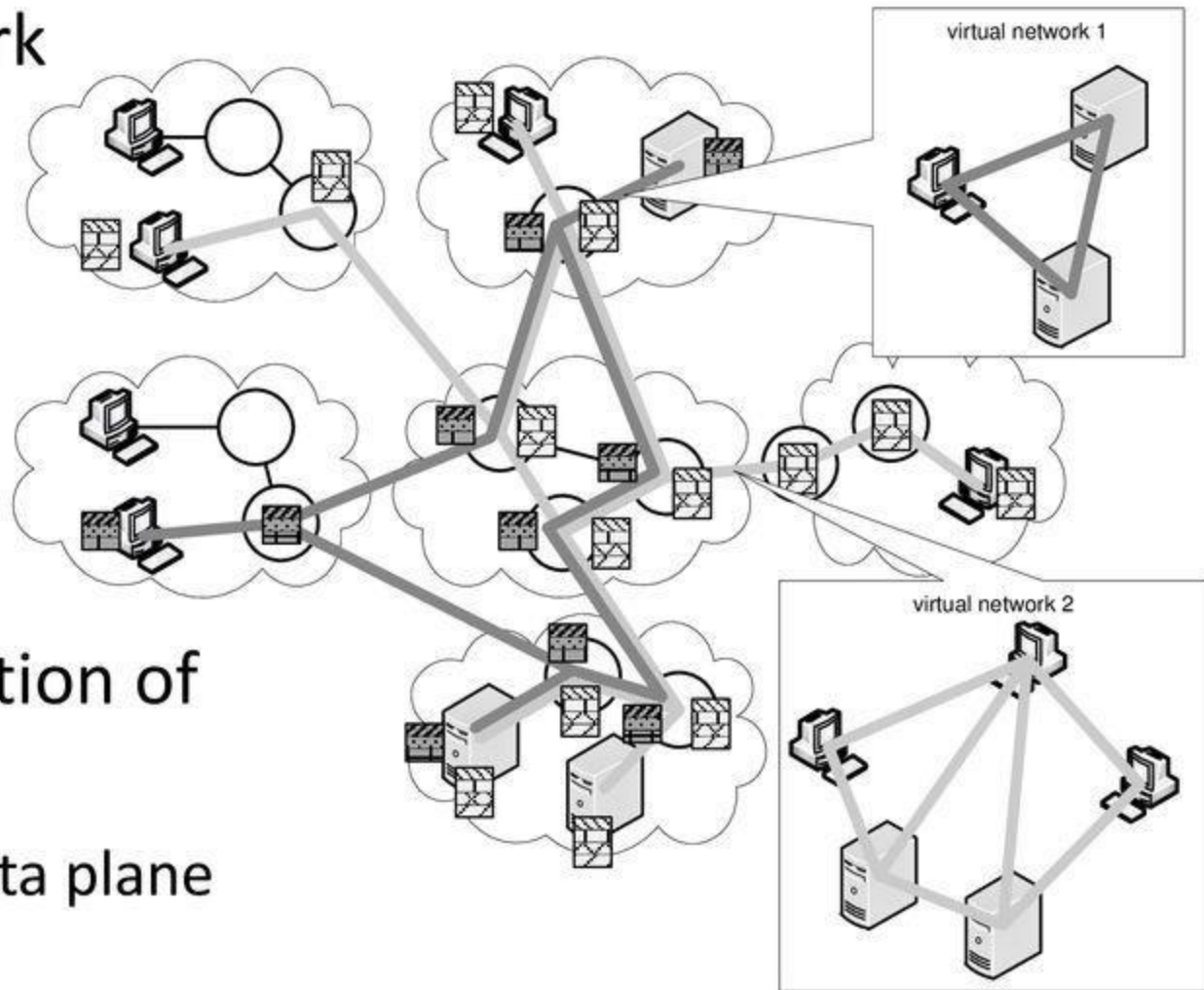
# Network virtualization

- Ongoing research on network virtualization
  - Network node design (isolation, protocol processing, …)
  - Control plane (setup, control, mgnt of virtual networks, …)
  - New protocols for specific virtual network

- Testbed: GENI
  - Large confederation of experimental networks
  - Virtualization at core of GENI to allow experimentation
  - Model for potential future Internet

- Exiting time to be networking researcher!