

Answers to Practice Questions for Exam 1 (Internet Basics)

Answer 1-Internet:

The ordered list of goals is

1. multiplexed utilization of existing networks
2. survivability in the face of failure
3. support multiple types of communications services
4. accommodate a variety of network types
5. permit distributed management of resources
6. cost effective
7. low effort to attach a host
8. account for resources

Number 8 has not been fully met. Arguably, number 6 has not been fully met, either; the point is “arguable,” because some of the services that are not cost effective now weren’t envisioned when this list of goals was drawn up.

Answer 2-internet:

1. Itself (to use as source address)
2. A DNS server (to map the names of destinations to their IP addresses)
3. A default router (through which to reach other machines, including the DNS server)

Answer 3-Internet:

$i = 2$

Answer 4-Internet:

- a) From bottom to top: the physical layer, the IP layer, the transport layer, and the application layer
- b) Innovation and entrepreneurship can take place on any layer. If an improvement or a new technology is introduced on layer L , it can be deployed directly if it does not require a change to the layer directly below L and allows L to continue to provide the necessary functionality to the layer directly above L . There is no need for a lengthy, painful redesign of the entire network as there often is in a network with a more centralized, monolithic architecture.

Answer 5-Internet:

Paraphrasing Saltzer, Reed, and Clark: Whenever a function (such as error correction, encryption, or duplicate-message detection) can be completely and correctly implemented only with the knowledge and help of an application running on the points of the network, providing that function as a feature of the communication system itself is not possible.

Moving “intelligence to the endpoints” can work for users’ security and privacy or against it. On the one hand, if sensitive data are processed primarily at the endpoints (rather than “in the network”), then users retain more control over their data and, potentially, more privacy and security. On the other hand, adversaries are highly motivated to hack into endpoints that store and process large amounts of sensitive data.