

## CSE 588 Notes

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### Design Challenges for building the next generation Internet

1. How many hosts should the Internet be able to support (currently the Internet is supporting about 110 million hosts)

The number of Internet hosts is increasing at a factor of 2 every year. 20 bil microprocessors were manufactured last year but very few have IP addresses. The Internet should be able to support users for 20 years. The ideal number of hosts should be between 1bil and 1 tril.

2. How many different organizations do I need to consider? How much coordination is required? How will they compete for resources?

Considering the total number of companies and the number of people, the Internet should be able to handle a very large number of organizations; between 100mil and 1bil.

3. How many companies are going to be implementing the protocols?

There are currently at least 1000 different implementations. Considering the total number of switches, network routers, firewalls and Internet compatible devices, the number of companies implementing protocols could be a order of 100 or 1000.

4. What applications should the Internet support?

Anything that anyone can think of.

5. What kind of networks should be supported?

All.

6. What are the other design challenges?

- Invulnerable to attack/ Security/ Privacy
- Reliability
- Performance
- Graceful degradation
- Availability, no single points of failure/ concentration
- Priorities
- Upgradability
- Accountability
- Scalability, no degradation

- High/ Low Bandwidth
- Congestion monitoring. Error reporting/ checking
- Manageability. Cost of ownership – How expensive is it for an ISP to operate.
- QOS/ Realtime
- Authentication
- Resource allocation/ Resource assignment policy
- Compatibility/ Interoperability
- Discovery/ Naming
- Filtering
- Scalable searching

### **Priorities of an Internet design engineer**

Candidates for high priority considerations:

1. Robustness/ no single point of failure
2. Scalability
3. Application correctness
4. Security/ Privacy
5. Extensibility/ flexibility/ heterogeneity
6. Responsiveness
7. Cost effectiveness
8. Interoperable/ Deployable.

### **Conclusions**

Internet was more successful than ISO because Internet was easily interoperable. Interoperability is clearly more important than reliability. The top three priorities of an Internet design engineer (by popular vote) are:

1. Interoperability
2. Robustness
3. Scalability