

# Chapter 1 Introduction



# 1.1 History of Internet

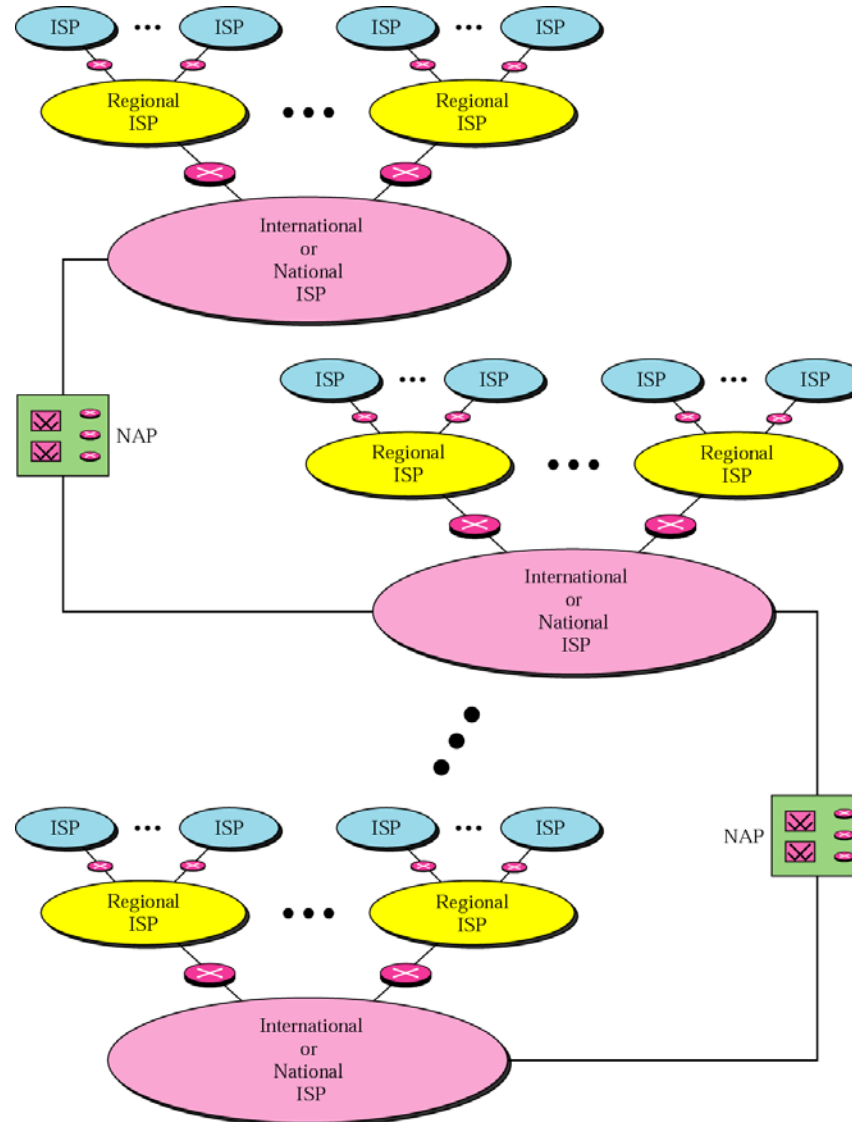
- Internet (not internet)
- ARPANET (Advanced Research Projects Agency: ARPA) – mid-1960s
  - ◆ Advanced Research Projects Agency (ARPA) in the DOD : presented ideas of ARPANET, 1967
  - ◆ Reality : 1969 (UCLA, UCSB, SRI, U of Utah)
- Birth of Internet : in 1972
  - ◆ Vint Cerf and Bob Kahn : Internetting Project
- TCP/IP : A paper by Cerf and Kahn in 1973
  - ◆ In 1983, TCP/IP became to official protocol for the ARPANET
- MILNET : in 1983
- CSNET, NSFNET, ANSNET, ...

# Internet Today

- **1969.** Four-node ARPANET established.
- **1970.** ARPA hosts implement NCP.
- **1973.** Development of TCP/IP suite begins.
- **1977.** An internet tested using TCP/IP.
- **1978.** UNIX distributed to academic sites.
- **1983.** TCP/IP becomes the official protocol
- **1983.** MILNET was born, **1986.** NSFNET established.
- **1990.** ARPANET replaced by NSFNET
- **1991.** **WWW by CERN**
- **1995.** NSFNET became a research network.
- **1995.** **ISPs** started
- **2005.** UCC
- **2006.** Twitter
- **2006.** Future Internet



# Internet Today (cont'd)



## 1.2 Protocols and Standard

### □ Communication in computer networks

~ occurs between entities in different systems

### □ Entity

~ is anything capable of sending or receiving information

### □ Protocol

~ is a set of rules that govern data communication

# Protocol & Standards (cont'd)

## □ Principle Elements

### ◆ Syntax

**~ refers to the structure or format of the data, meaning the order in which they are presented.**

### ◆ Semantics

**~ refers to the meaning of each section of bits.**

### ◆ Timing

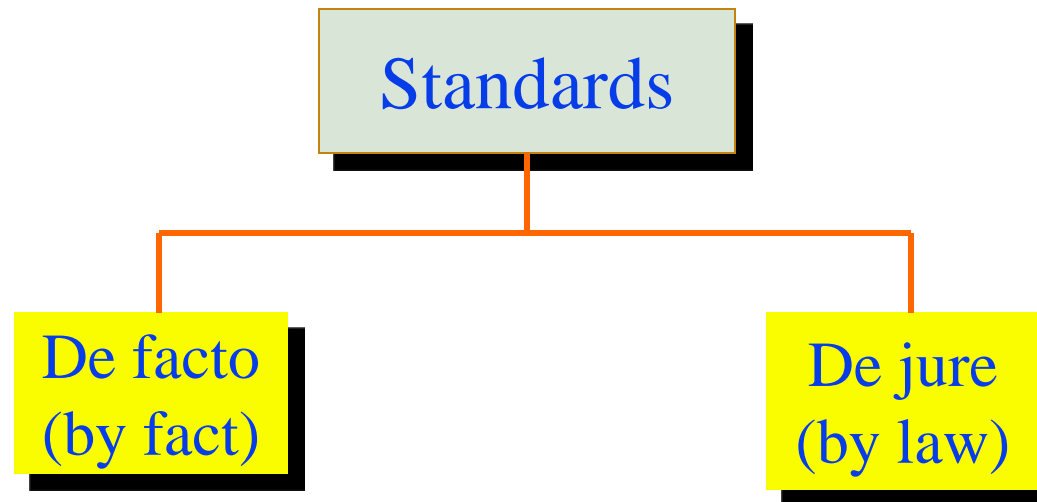
**~ refers to two characteristics (when data should be sent and how fast it can be sent)**



# Standards

## □ Standards

- ~ are essential in creating and maintaining an open and competitive market for equipment manufactures and in guaranteeing national and international interoperability of data and communications technology and processes.



# 1.3 Standards Organizations

## □ Standard Creation Committees

- ◆ ISO (The International Standard Organization)

- ~ created in 1947

- ~ voluntary organization

- ~ is an organization dedicated to worldwide agreement on international standards in a variety of fields (scientific, technological, economic activity)





# Standards Organizations (cont'd)

- ◆ **ITU-T(International Telecommunications Union - Telecommunications Standards Sector)**
  - ~ is an international standards organization related to the United Nations that develops standards for telecommunications.
  - Two popular standards developed by ITU-T are the V series (data transmission over phone lines) and the X series (transmission over public digital networks)



# Standards Organizations (cont'd)

- ◆ ANSI (American National Standard Institute)
  - ~ **is a nonprofit organization and is the U.S. voting representative to be both the ISO and the ITU-T**
- ◆ IEEE (Institute of Electrical and Electronic Engineers)
  - ~ **is the largest national professional group involved in developing standards for computing, communication, electrical engineering, and electronics)**
- ◆ EIA (Electronic Industries Association)
  - ~ **is an association of electronics manufactures in the United States. (EIA-232-D, EIA-530 standards)**



# Standards Organizations (cont'd)

## □ Forums

- ~ consist of representatives from corporation that test, evaluate and standardize new technologies.
- Frame Relay Forum
- ATM Forum and ATM consortium

## □ Regulatory agencies

- ◆ FCC (Federal Communications Commission)
- ◆ MIC (Ministry of Communication)



## 1.4 Internet Standards

### □ Internet standard

- ◆ is a thoroughly tested specification that is useful to and adhered by those who work with the Internet

### □ A specification begins as an Internet draft

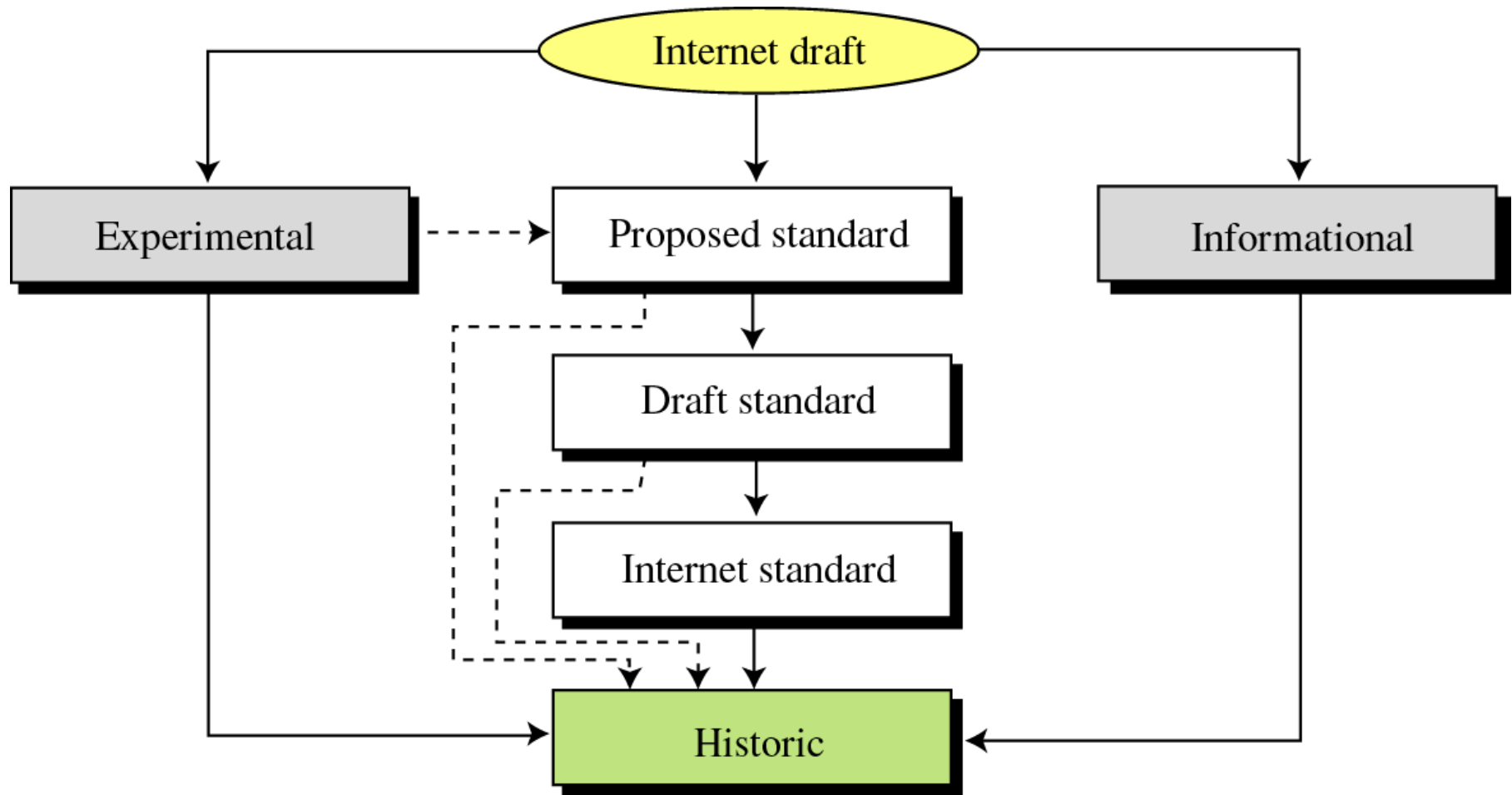
- ◆ Working document with no official status and six-month lifetime

### □ RFC (Request for Comment)

- ◆ Recommendation from Internet authorities



# Maturity Levels



# Maturity Levels (cont'd)

## □ Proposed Standard

- ◆ Is a specification that is stable, well understood, and of sufficient interest to the Internet community.

## □ Draft Standard

- ◆ Proposed is elevated to draft standard status after at least two successful independent and interoperable implementations
- ◆ With modification, normally becomes an Internet standard

## □ Internet Standard

- ◆ A draft standard reaches Internet standard status after demonstrations of successful Implementation



# Maturity Levels (cont'd)

## □ Historic RFCs

- ◆ Superseded by later specifications or never passed the necessary maturity levels to become an Internet standard

## □ Experimental RFCs

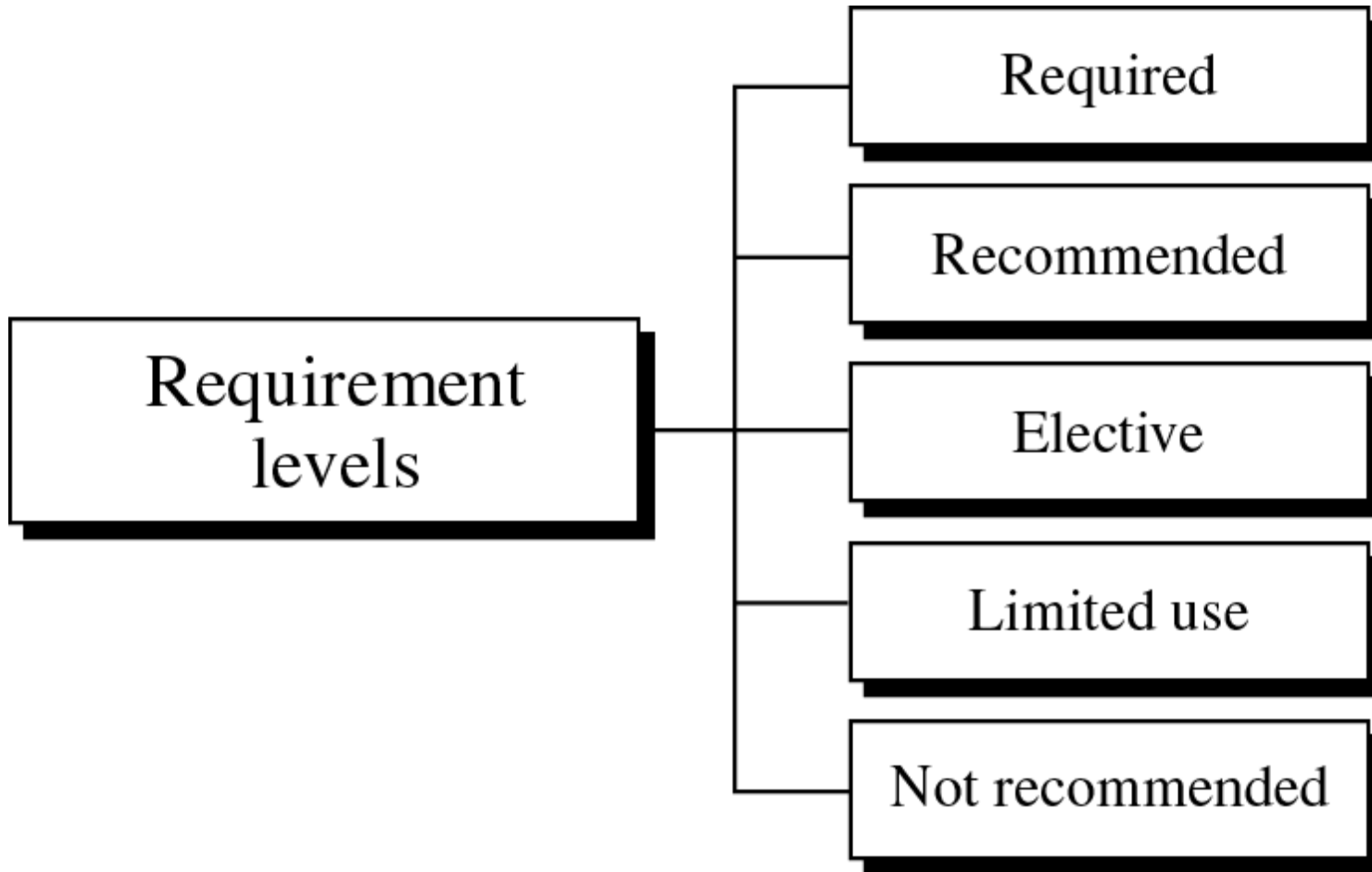
- ◆ Not implemented in any functional Internet service

## □ Informational RFCs

- ◆ Containing general, historical, or tutorial information related to the Internet



# Requirement Levels





# Requirement Levels (cont'd)

## □ Required protocols (RFCs)

- ◆ Must be implemented by all Internet systems to achieve minimum conformance
- ◆ For example, IP and ICMP

## □ Recommended protocols

- ◆ Not required for minimum conformance; it is recommended because of its usefulness
- ◆ For example, FTP and Telnet

## □ Elective protocols

- ◆ Not required and not recommended; but a system can use it to its own benefit.

## □ Limited Use protocols

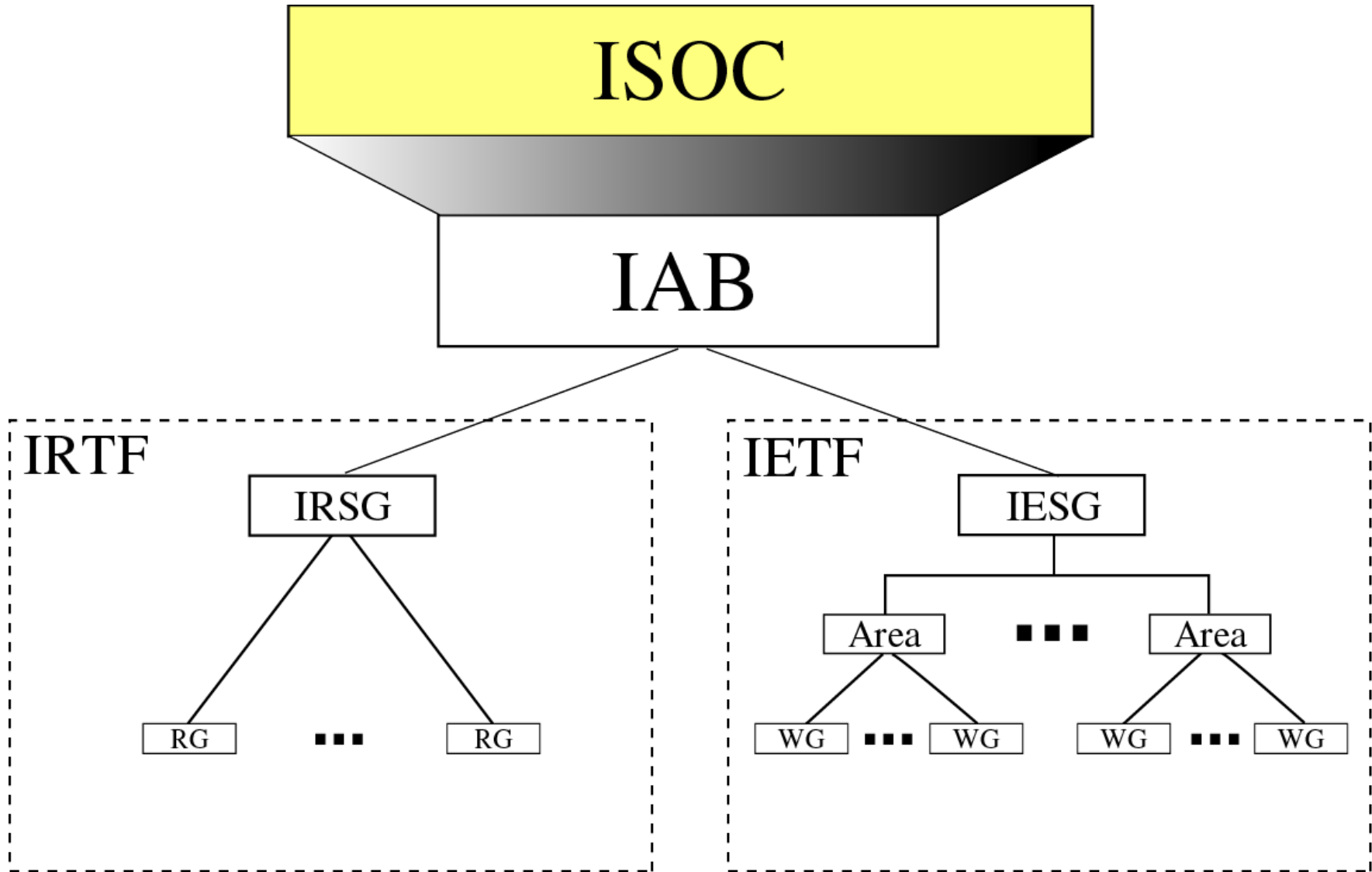
- ◆ Used only in limited situations; most of the experimental RFCs fall under this category

## □ Not Recommended

- ◆ Inappropriate for general use; normally a historic (obsolete) RFC may fall under this category



# 1.5 Internet Administration



# 1.5 Internet Administration (cont'd)

## □ Internet Society (ISOC)

- ◆ An international, nonprofit organization formed in 1992

## □ Internet Architecture Board (IAB)

- ◆ Technical advisor to the ISOC
- ◆ Liaison between the Internet other standards organizations and forums
- ◆ Oversee the continuing development of the TCP/IP Protocol Suites

## □ Internet Engineering Task Force (IETF)

- ◆ A forum of working groups managed by the Internet Engineering Steering Group (IESG)
- ◆ Eight Areas
  - Applications Area
  - General Area
  - Internet Area
  - Operations and Management Area
  - Routing Area
  - Security Area
  - Transport Area
  - User Services Area



## 1.5 Internet Administration (cont'd)

### □ Internet Research Task Force (IRTF)

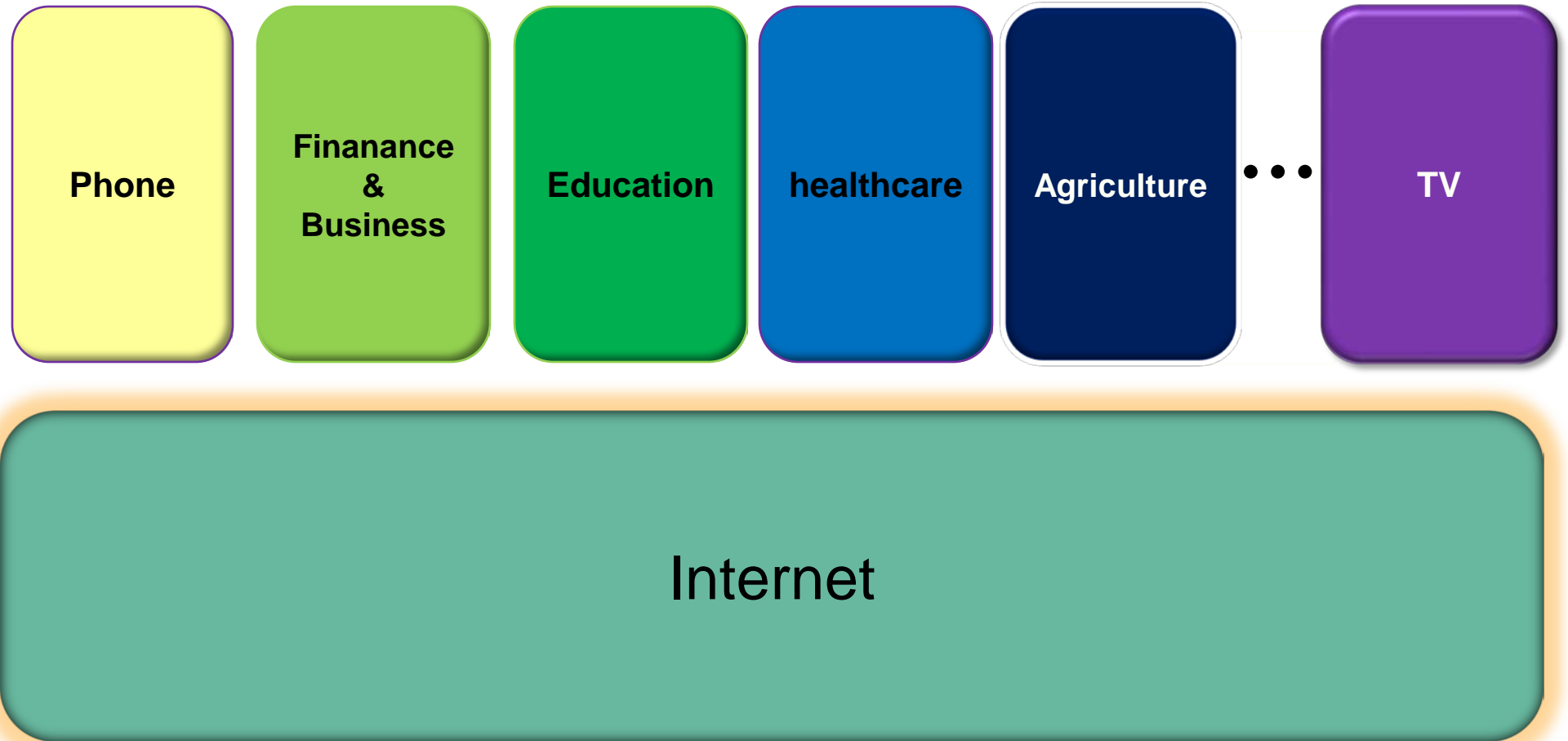
- ◆ A forum of working groups managed by the Internet Research Steering Group (IRSG)
- ◆ Focusing on long-term research topics

### □ Network Information Center (NIC)

- ◆ Is responsible for collecting and distributing information about TCP/IP protocols



# Everything on Internet



# Towards Future Internet

## □ Problems in current Internet

- ◆ Bandwidth
- ◆ Mobility
- ◆ Accessibility
- ◆ Security
- ◆ Cost

## □ Researches

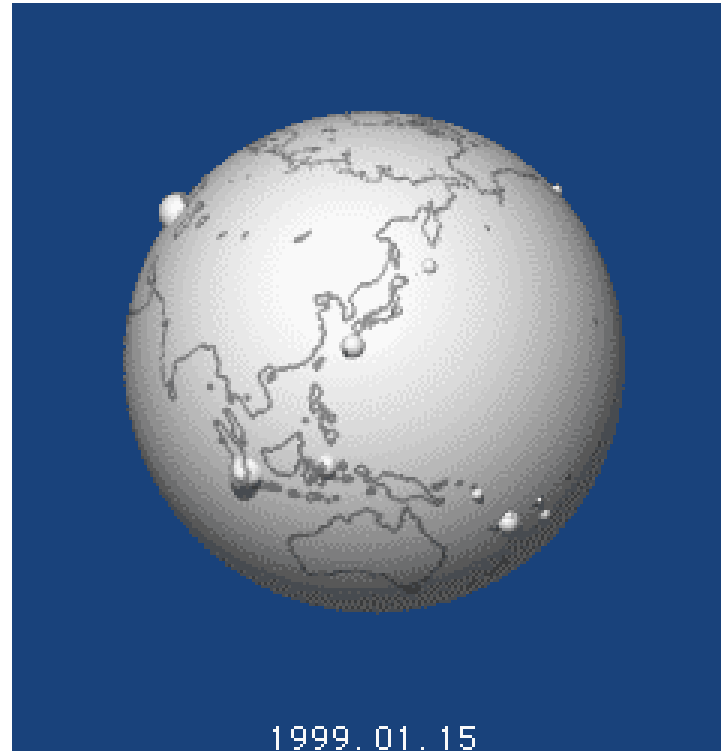
- ◆ USA : FIND, GENI
- ◆ Japan: AKARI
- ◆ EU: FIRE
- ◆ CJK: AsiaFI
- ◆ Korea : FIF



□ What is the vision of Future Internet Services?

Kyung Hee  
University

# Towards Future Internet



<http://www.sensorium.org/breathingearth>



# Summary

- ❑ **The Internet is a collection of hundreds of thousands of separate networks**
- ❑ **What is ISPs?**
- ❑ **Internet Standards: RFCs in IETF**
- ❑ **IRTF for long-term research for Internet**
- ❑ **ICANN : the Internet Corporation for Assigned Names and Numbers is responsible for the management of Internet domain names and addresses**
- ❑ **Future Internet**





# Q and A

