CS 6/75995
Internet-based

Applications & Systems
Design, 2001

Kent State University

Department of Computer Science

<u>LECTURE-2</u>
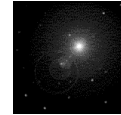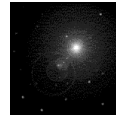

Class Mechanics

- Web Access:
  - iad01f/cache

- Group Formation
  - Next class we will form groups of 2
  - group work/ individual report.
  - 2 phases + optional creative enhancement
  - In class group demonstration

- Class attendance will be important.

- Personal information.
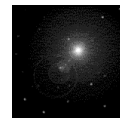
Today's Topic

Internet Real-state

Who manages Internet & Its Organization.

Visit to some high tech. sites

A Map of Internet Real-state

CyberMap Landmarks 03 Dec 1994
Copyright (c) 1994 John Bercester (bercest@gt.edu)

Searcher or Index   Subject Tree
Gateway or Link   Root List

The Matrix
The Internet

Web space
gopher://host:79/0user
Finger space
Fingerinfo
CERN List
CERN VL
Yahoo
Galaxy
Lycos, Crawler
CUI Catalog
Gopher space
gopher
MN
Jewels
Veronica
mailto
agora@w3.org
news
Email space
PAML
Fidonet
UUCP
BITNET
Usenet
newsgroups
WAIS space
wais
dir. of servers
WAISGate
Telnet space
telnet
telnet.w3.org
Hytelnet
FTP space
Monster list
Usenet FAQs
Archie
Commercial Online Services

World Wide Networks

Net Relationships
Copyright © 1995 John December (december@rpi.edu); 19 Feb 95

Link or Gateway
Network

Online cyberspace   Offline cyberspace

Other Nets
PANs LANs MANs RANs GANs   TeleTel

The Matrix   Usenet traffic   UUCP
Email space

Private Nets   Internet
WAIS space   Gopher space
Finger space   MUᵡ, IRC space
FidoNet   Telnet space   Web space
FTP space

BITNET   America Online Delphi Prodigy
Commercial Services   GEnie
Network MCI   Compuserve
IBM GlobeNet
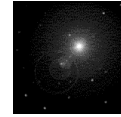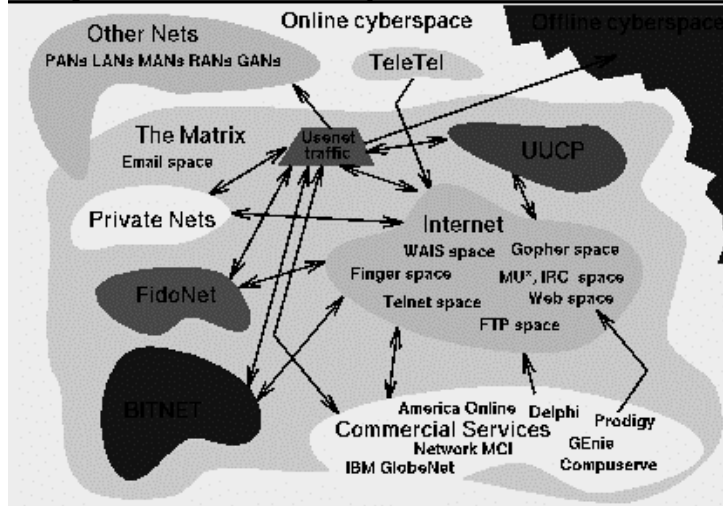
LECT-1, S-45
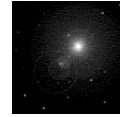IAD2001F, javed@kent.edu
Javed I. Khan@2000

Who Manages Internet?

46

There is no single body which
manages the Internet.

It runs through a host of independent or loosely
coupled coordinating organizations.

The organizations below play a major role in the
organization, management and development of it:

- Internet Society (IS)
- Internet Architecture Board (IAB)
- Internet Engineering Task Force (IETF)
- Internet Assigned Number Authority (IANA)
- ICANN
- Internet Network Information Center (InterNIC)
- W3C

Internet Society (IS)

A nonprofit, non-governmental professional-
membership organization of individuals and
organizations interested in the development of
Internet. More specifically, this is the legal umbrella
for other coordinating bodies (such as IAB, IANA)
for global cooperation and coordination for the
Internet and its internetworking technologies and
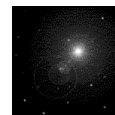applications.
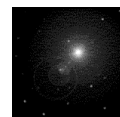
Internet Architecture Board (IAB)

IAB is a technical advisory group of the Internet Society. Its responsibilities include oversight of IETF, editorship of the RFC document series, administration of Internet assigned numbers, and liaison of the Internet Society in liaison relationships with other organizations concerned with standards.
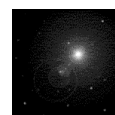
Internet Engineering Task Force (IETF)

Body to address and resolve technical and operational problems on the Internet and to develop Internet standards and protocols.

The membership of IETF is international and completely voluntary. Members consist of network designers, operators, vendors, researchers and other interested individuals.
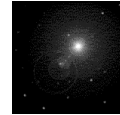
Internet Assigned Numbers Authority (IANA):

Chartered by the ISOC and the Federal Networking Council and operates out of the University of Southern California, is the central coordinator for the assignment IP addresses and manages the Root Domain Name Service.
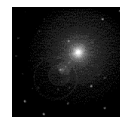
Internet Corporation for Assigned Names and Numbers (ICANN):

To oversee policy for determining, addition, deletion, allocation and management of generic top level domain names (EDU, COM, NET, ORG, GOV, MIL, INT, and ISO-3166 country codes).

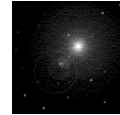Global Internet Assigned Numbers Authority

Americas and sub-Saharan Africa:
The American Registry for Internet Numbers (ARIN)

Europe and North Africa:
Reseais IP Europeens (RIPE) (http://www.ripe.net)

Asia and Australia:
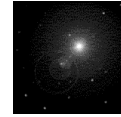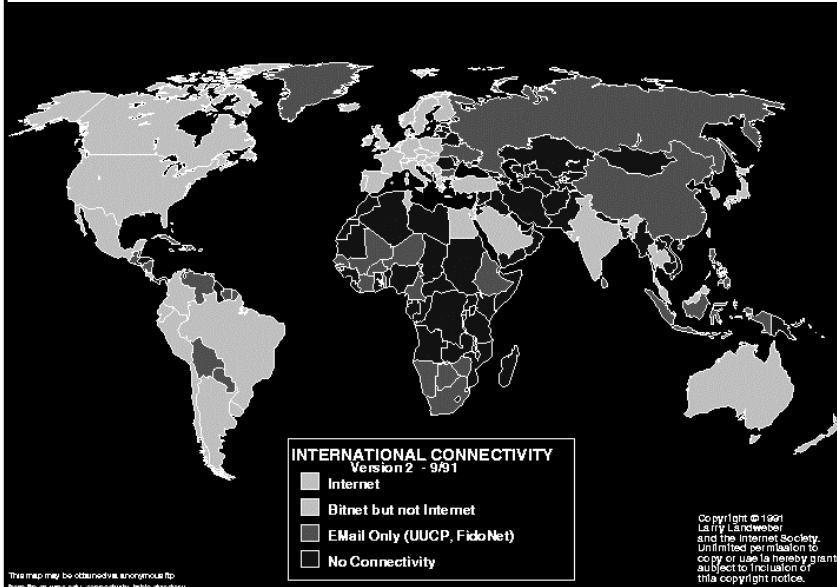Asian-Pacific Network Information Center (APNIC)
(http://www.apnic.net)

Global Village

World Connectivity in 1991

INTERNET BASED
SYSTEMS DESIGN

INTERNATIONAL CONNECTIVITY
Version 2 - 9/91
- Internet
- Bitnet but not Internet
- EMail Only (UUCP, FidoNet)
- No Connectivity

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Larry Landweber
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This map may be obtained via anonymous ftp
from ftp.cs.wisc.edu, connectivity_table directory

World Connectivity in 1995

INTERNET BASED
SYSTEMS DESIGN

INTERNATIONAL CONNECTIVITY
Version 13 - 2/15/95
- Internet
- Bitnet but not Internet
- EMail Only (UUCP, FidoNet)
- No Connectivity

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from ftp.cs.wisc.edu, connectivity_table directory

World Connectivity 1997

INTERNATIONAL CONNECTIVITY
Version 16 - 6/15/97
- Internet
- Bitnet but not Internet
- EMail Only (UUCP, FidoNet)
- No Connectivity

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This map may be obtained via anonymous ftp
from ftp.cs.wisc.edu /connectivity_table directory

Global Village

As of January 1998, 205 countries had at least one connection to the Internet. By July this had grown to 212. Only 11 new countries joined the Internet in 1997. This is a diminished Internet spread rate, but it occurs for the simple reason that there aren't many new countries to join.
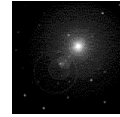
Matrix Inc.
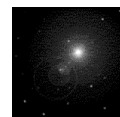
Global Village

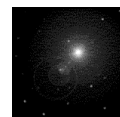|	
World Total	407.1 million
Africa	3.11 million
Asia/Pacific	104.88 million
Europe	113.14 million
Middle east	2.4 million
Canada and USA	167.12 million.
Latin America	16.45 million.

November 2000
source: Nua Internet Surveys http//www.nua.ie

Global Village

By late 1999 the number of non-English speakers online has surpassed the number of English speakers online worldwide and will grow to two-thirds of the online word by 2005.
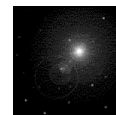
Global Reach Inc.

Internationalization
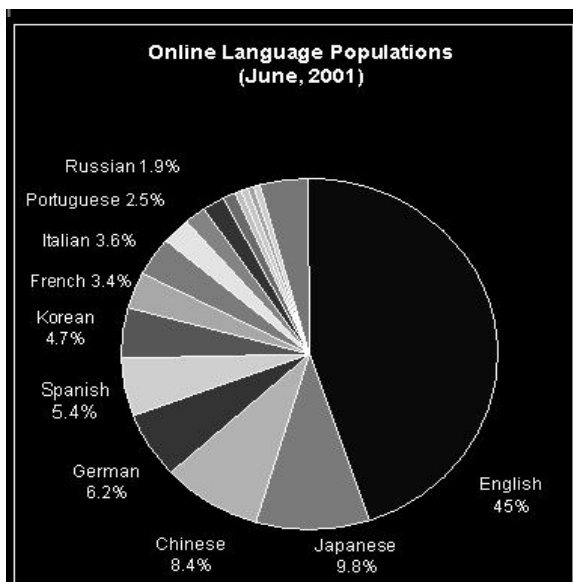
Online Language Populations (June, 2001)

Russian 1.9%
Portuguese 2.5%
Italian 3.6%
French 3.4%
Korean 4.7%
Spanish 5.4%
German 6.2%
Chinese 8.4%
Japanese 9.8%
English 45%

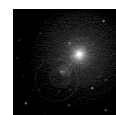**Think of this chart as a city of 100 M people:the city of those online who do not access the Internet in English. It is a city where 20% are Japanese, 14% are German, 12% Hispanic, etc.**
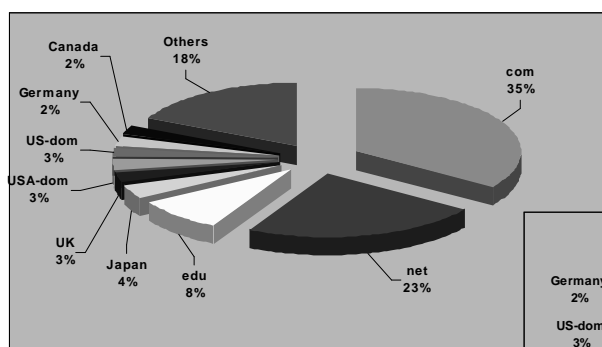

Where the Internet hosts are by domain

Jan 2000

Canada 2%
Others 18%
Germany 2%
US-dom 3%
USA-dom 3%
UK 3%
Japan 4%
edu 8%
com 35%
net 23%

Jan 2001

mil 2%
Others 18%
Germany 2%
US-dom 3%
UK 2%
Canada 2%
Japan 4%
edu 6%
com 34%
net 28%
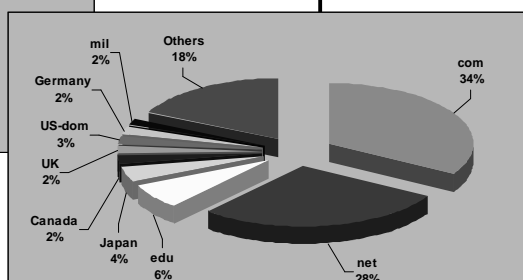
Hosts: Large Three-Letter Domains

Legend:
- com
- net
- edu
- mil
- org
- gov

Y-axis: 40,000,000 / 35,000,000 / 30,000,000 / 25,000,000 / 20,000,000 / 15,000,000 / 10,000,000 / 5,000,000 / 0

X-axis: Jan-96, Jan-97, Jan-98, Jan-99, Jan-00, Jan-01
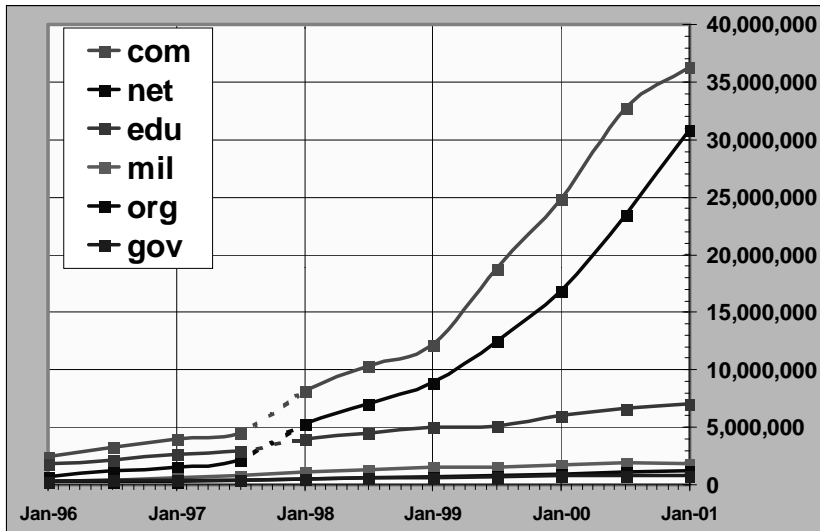
INTERNET BASED
SYSTEMS DESIGN

Hosts: Small 3 & 4 Letter Domains

Legend:
- arpa
- int

Y-axis: 200,000 / 150,000 / 100,000 / 50,000 / 0

X-axis: Jan-96, Jan-97, Jan-98, Jan-99, Jan-00, Jan-01

INTERNET BASED
SYSTEMS DESIGN

Hosts: Two-letter Domains >1 000 000

Legend: Japan, Canada, UK, USA-dom, Germany, Italy, Australia, Netherlands, France, Taiwan

Y-axis: 0 – 5,000,000 (500,000 increments)
X-axis: Jan-96, Jan-97, Jan-98, Jan-99, Jan-00, Jan-01
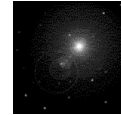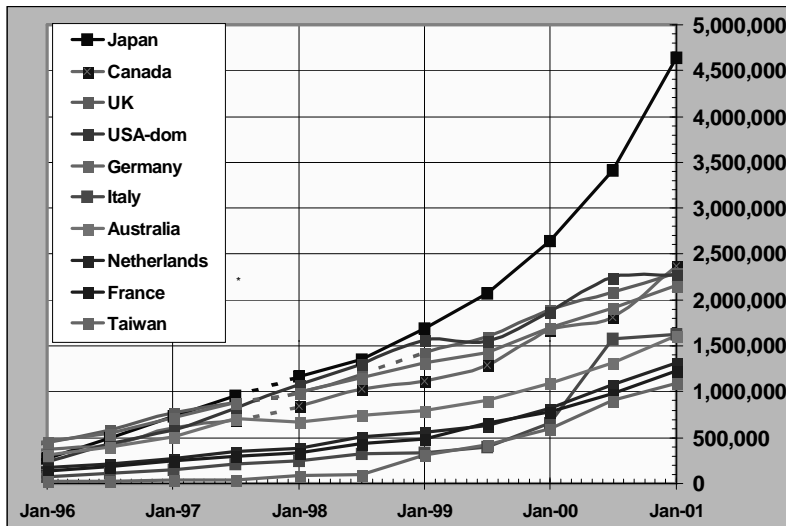
INTERNET BASED
SYSTEMS DESIGN

Hosts: Two-letter Domains 500k-1 000k

Legend: Brazil, Finland, Sweden, Spain, Mexico, Norway, Austria

Y-axis: 0 – 1,000,000 (100,000 increments)
X-axis: Jan-96, Jan-97, Jan-98, Jan-99, Jan-00, Jan-01
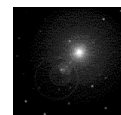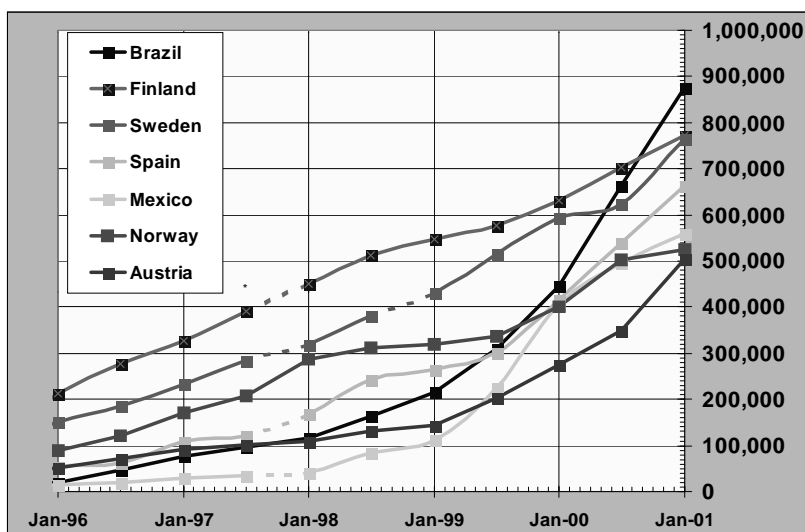
INTERNET BASED
SYSTEMS DESIGN

Hosts: Two-letter Domains 250k-500k

INTERNET BASED
SYSTEMS DESIGN

- Switzerland
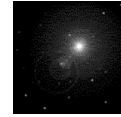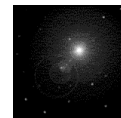- Denmark
- Belgium
- Korea
- Poland
- New Zealand
- Russian Fed. (RU)
- Argentina

Probably due to network outage

500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0

Jan-96　Jan-97　Jan-98　Jan-99　Jan-00　Jan-01
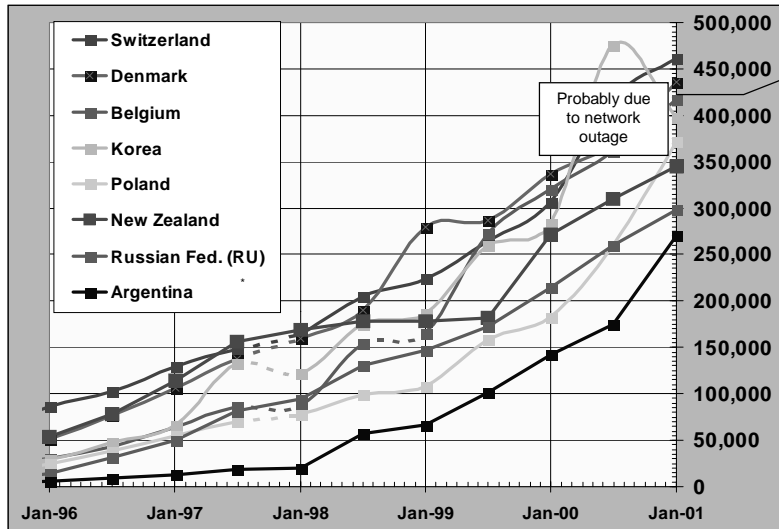
Hosts: Two-letter Domains 100 000-250 000

INTERNET BASED
SYSTEMS DESIGN

- Hong Kong
- South Africa
- Israel
- Portugal
- Singapore
- Hungary
- Czech
- Greece
- Turkey

250,000
200,000
150,000
100,000
50,000
0

Jan-96　Jan-97　Jan-98　Jan-99　Jan-00　Jan-01

14
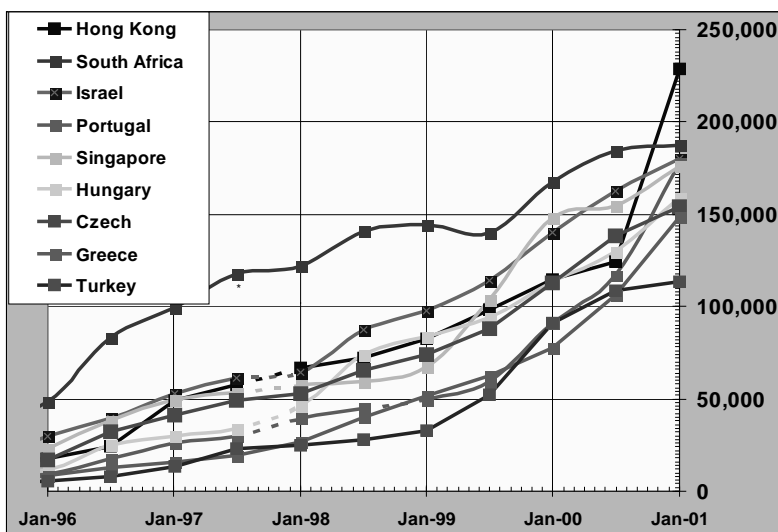
Hosts: Two-letter Domains 50 000-100 000

Ireland
Chile
China
Malaysia
Thailand
Uruguay

Probably due to network outage
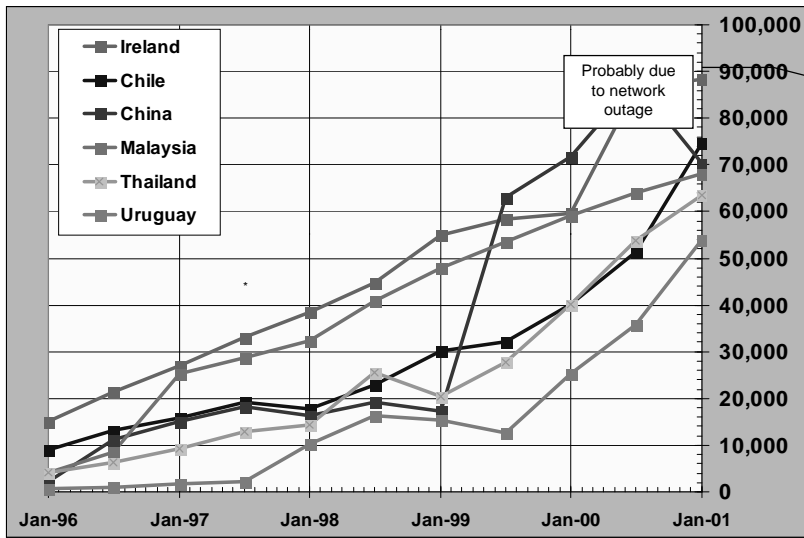
INTERNET BASED
SYSTEMS DESIGN

Hosts: Two-letter Domains 25 000-50 000

Colombia
Iceland
Romania
Estonia
Ukraine
Slovakia
India
United Arab Emirates
Indonesia

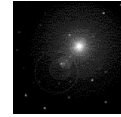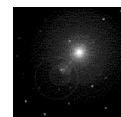INTERNET BASED
SYSTEMS DESIGN

Hosts: Two-letter Domains 15 000-25 000

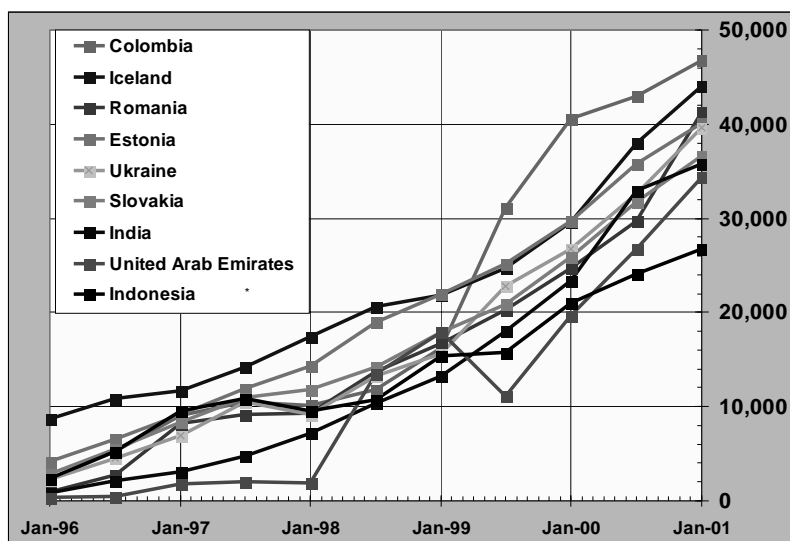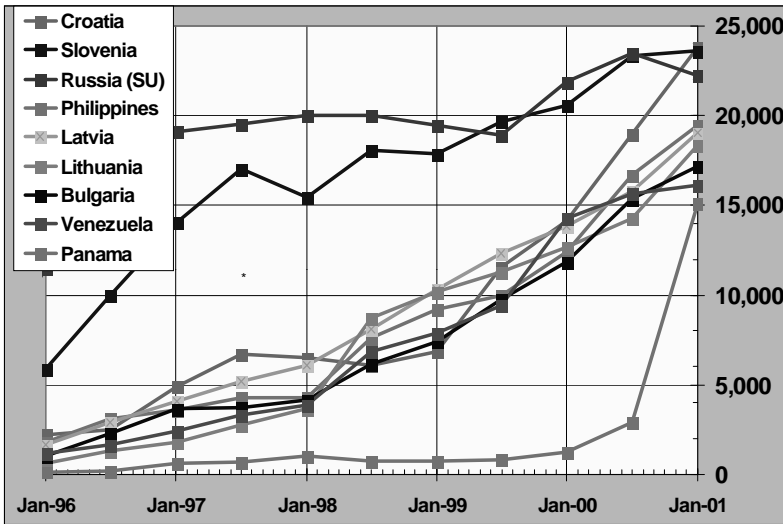Legend: Croatia, Slovenia, Russia (SU), Philippines, Latvia, Lithuania, Bulgaria, Venezuela, Panama
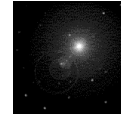
INTERNET BASED
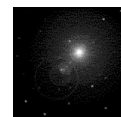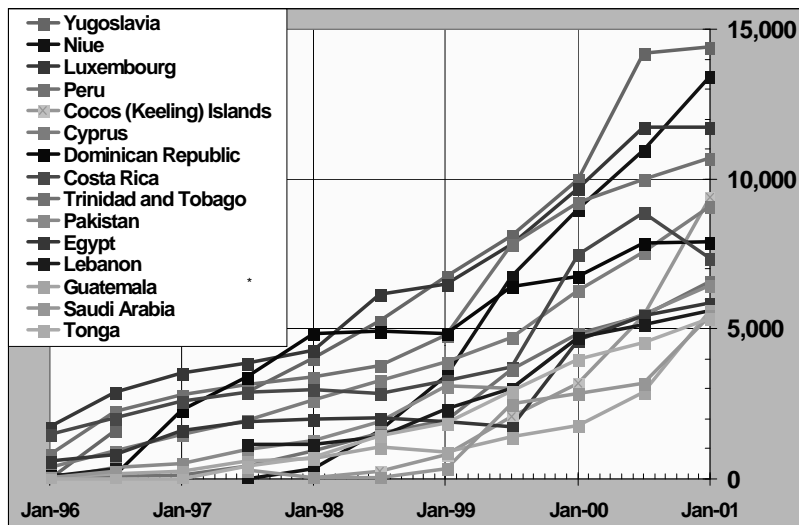SYSTEMS DESIGN

LECT-1, S-71
IAD2001F, javed@kent.edu
Javed I. Khan@2000

Hosts: Two-letter Domains 5 000-15 000

Legend: Yugoslavia, Niue, Luxembourg, Peru, Cocos (Keeling) Islands, Cyprus, Dominican Republic, Costa Rica, Trinidad and Tobago, Pakistan, Egypt, Lebanon, Guatemala, Saudi Arabia, Tonga
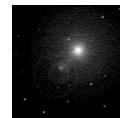
INTERNET BASED
SYSTEMS DESIGN

LECT-1, S-72
IAD2001F, javed@kent.edu
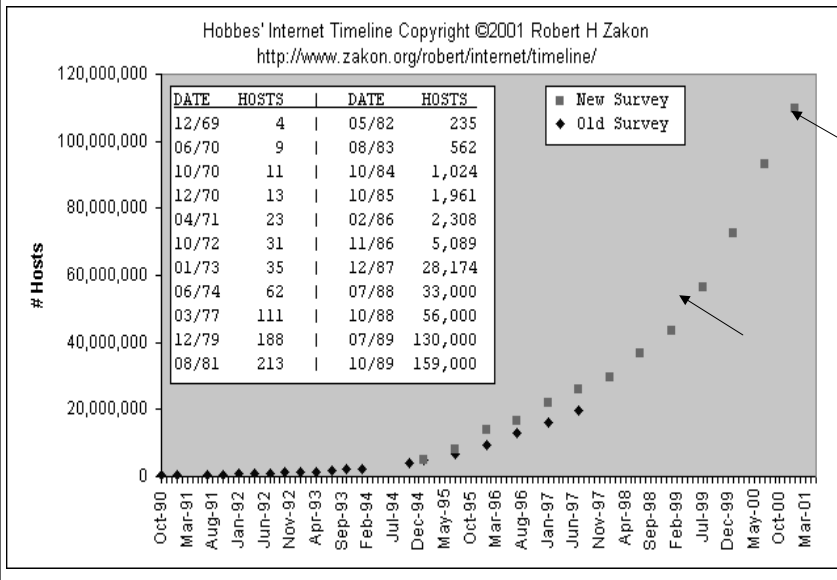Javed I. Khan@2000

Growth Rates

Internet Hosts

- The Domain Survey attempts to discover every host (i.e., uniquely reachable connected computers) on the Internet by doing a complete search of the Domain Name System. The latest results gathered during late Jan 2001 are listed, together with Mark Lottor's work in this area over many years. For more information see RFC 1296; for more data see the archive site at the Internet Software Consortium, http://www.isc.org/ds/

- Beginning with the January 1998 survey, Lottor began using a new method of doing the survey to avoid the increasing blocking of DNS zone transfers. This method of querying the DNS for known IP address is explained at <http://www.isc.org/ds/new-survey.html>. It is not backward compatible with the old results. The old and the new data is juxtaposed in these trends graphs with dotted lines.

- Actual country host counts must be done by attributing the three-letter domain hosts to specific countries and aggregating totals of 2 and 3 letter domain hosts. This has been done by John Quarterman of MIDS since July 1995, and subsequent data is available from him. See http://www.matrix.net/
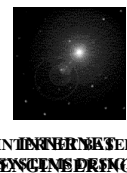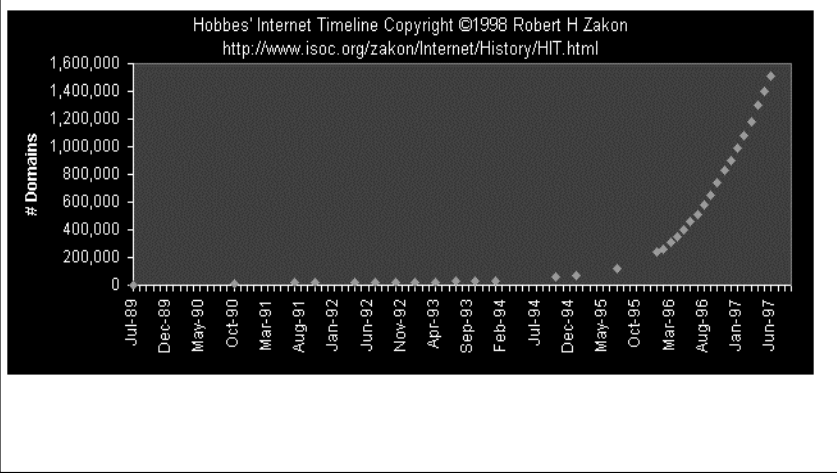
INTERNET BASED SYSTEMS DESIGN

Growth of Internet Hosts

Hobbes' Internet Timeline Copyright ©2001 Robert H Zakon
http://www.zakon.org/robert/internet/timeline/

DATE	HOSTS		DATE	HOSTS
12/69	4		05/82	235
06/70	9		08/83	562
10/70	11		10/84	1,024
12/70	13		10/85	1,961
04/71	23		02/86	2,308
10/72	31		11/86	5,089
01/73	35		12/87	28,174
06/74	62		07/88	33,000
03/77	111		10/88	56,000
12/79	188		07/89	130,000
08/81	213		10/89	159,000

■ New Survey
♦ Old Survey

Hosts

Growth of Internet Domains

Hobbes' Internet Timeline Copyright ©1998 Robert H Zakon
http://www.isoc.org/zakon/Internet/History/HIT.html

Domains

18

Growth of Internet Networks

Hobbes' Internet Timeline Copyright ©2001 Robert H Zakon
http://www.zakon.org/robert/internet/timeline/

 # Networks (y-axis): 0 – 160,000

x-axis: Jul-89, Dec-89, May-90, Oct-90, Mar-91, Aug-91, Jan-92, Jun-92, Nov-92, Apr-93, Sep-93, Feb-94, Jul-94, Dec-94, May-95, Oct-95, Mar-96, Aug-96, Jan-97, Jun-97
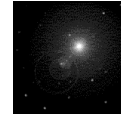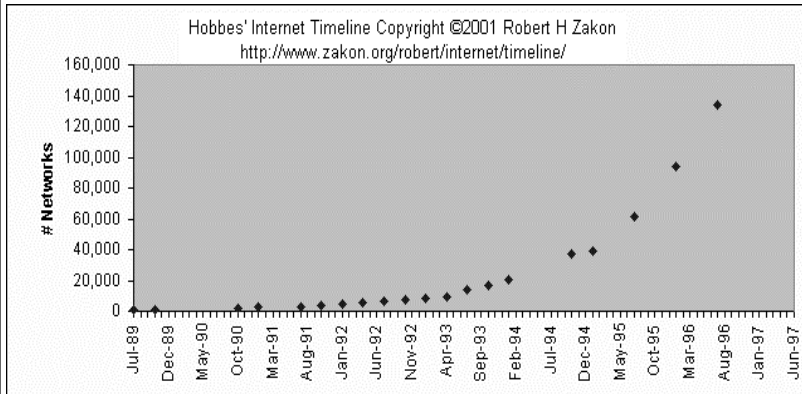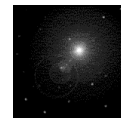
LECT-1, S-77
IAD2001F, javed@kent.edu
Javed I. Khan@2000

Growth of World Wide Networks

Hobbes' Internet Timeline Copyright ©1998 Robert H Zakon
http://www.isoc.org/zakon/Internet/History/HIT.html

 # Countries (y-axis): 0 – 180

x-axis: Jul-91, Nov-91, Mar-92, Jul-92, Nov-92, Mar-93, Jul-93, Nov-93, Mar-94, Jul-94, Nov-94, Mar-95, Jul-95, Nov-95, Mar-96, Jul-96, Nov-96, Mar-97, Jul-97
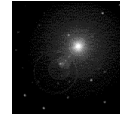
Legend:
- Internet
- BITNET
- UUCP
- FIDONET
- OSI
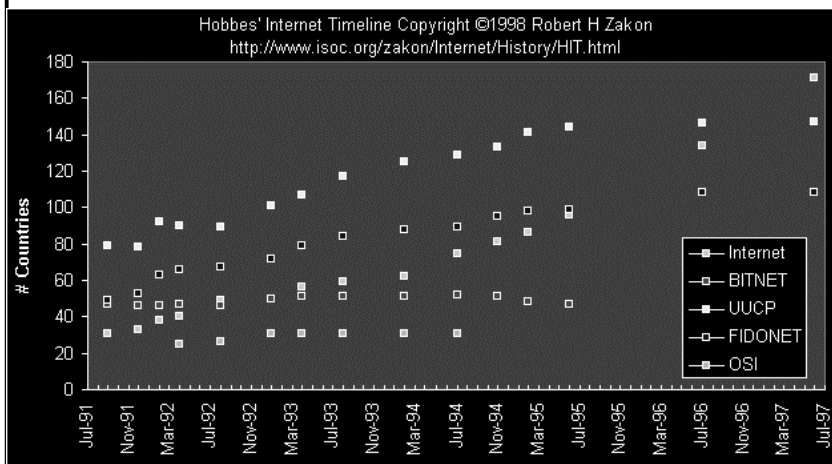
LECT-1, S-78
IAD2001F, javed@kent.edu
Javed I. Khan@2000

Growth of Web Servers
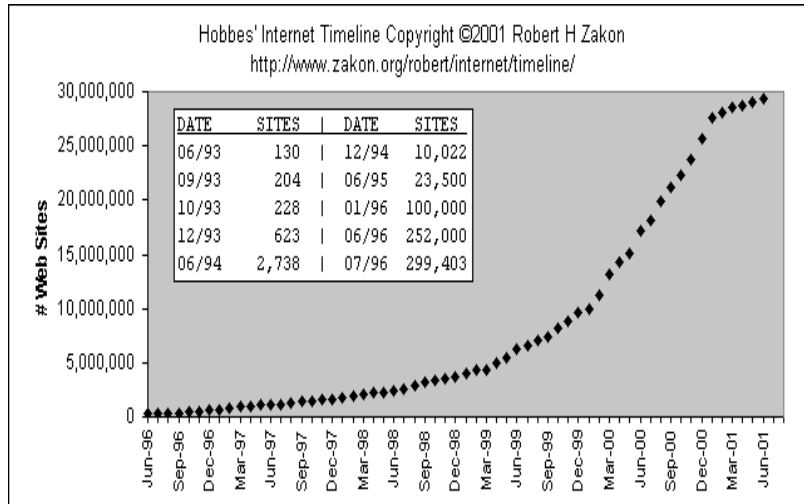
Hobbes' Internet Timeline Copyright ©2001 Robert H Zakon
http://www.zakon.org/robert/internet/timeline/

DATE	SITES		DATE	SITES
06/93	130		12/94	10,022
09/93	204		06/95	23,500
10/93	228		01/96	100,000
12/93	623		06/96	252,000
06/94	2,738		07/96	299,403

How Many Online?

How Many Online Worldwide
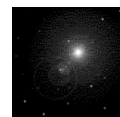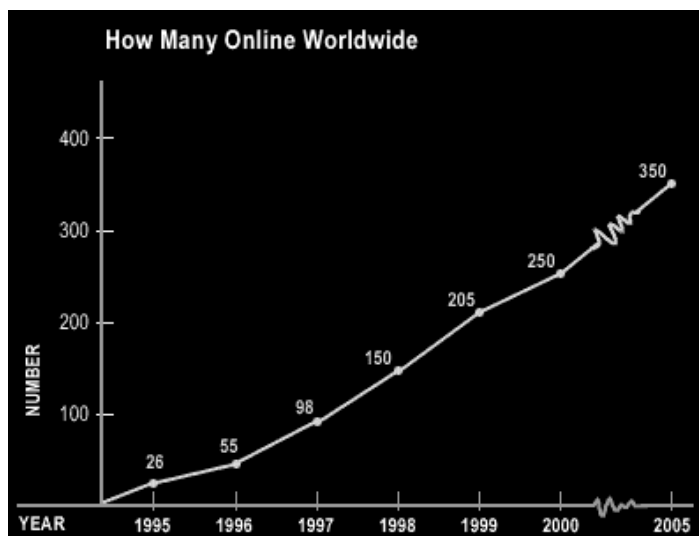
Will growth continue for ever?

Future Growth of Internet Hosts

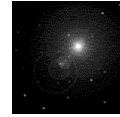**Internet host count - linear scale**

y=number of hosts, x=yy.mm
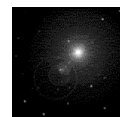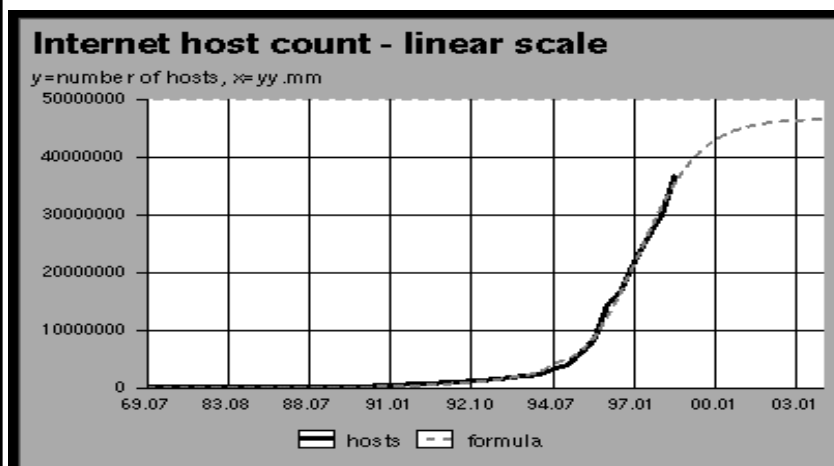
INTERNET BASED
SYSTEMS DESIGN

The results shows that we have already passed the point of fastest growth in host numbers in 1997, the level-off is due at about 47 (51) million hosts in 2002(3)! (Src: Mario's Scenarios, 1999)

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S-Curve

- The creative output of talented persons is similar to the growth curve, be it musical compositions, poems or scientific articles.

- The number of sold units of a certain models or types of industrial products follow S-curves. These products are, among others, computer models, car models, structural wood panels, Gothical cathedrals, particle accelerators, railroad tracks and super tankers.

- There are saturation processes. AIDS has already filled its niche in the USA at 0.95 % of all deaths. The decline of deaths by tuberculosis also follows an S-curve. Air freight transport have reached 90 % of its limit value by 2000.