

Coming Home to the Internet

“I was born in the summer of my 27th year....coming home to a place I'd never been before”sang John Denver in *Rocky Mountain High*

In the early years of my teaching, **I used to call the authors of the RFCs....'Internet Ancients'**...as I equated their foundational contributions similar to Archimedes, Plato and Des Cartes.....

When I became part of the Internet community in my 47th year, I found a home and new family...and also, **in meeting those Internet Ancients, I found I was older than almost all of them!**

Coming Home to the Internet

I graduated HS in 1968... joined the US ARMY upon receiving my draft notice....spent 1 year state-side and determined to be a Dentist while in Vung Tau, Viet Nam

I enrolled in Southern Illinois University in Pre-Med, but, transferred to University of Florida and received a degree in Agronomy, then worked for 5 Years as a Soil Conservationist with the USDA, **helping farmers use technology to solve erosion problems**

I quit the USDA, got an MBA, using **an Apple IIe, Visicalc and WordPerfect** and my first job in industry was Mgr. of End User Computing Services....**helping business use Info. Technology to solve their business problems**

Coming Home to the Internet

I joined Washington University in 1990 in their **CIMCenter providing training for engineers. CIMLab was connected to the Internet**

I developed an undergraduate course Networking Small Systems in 1990 and taught both undergrad and grad programs for the next 20 years

I also taught as part of the **Center for the Application of Information Technology...a training consortium for large businesses in the region** (founded 1973 as Center for the Study of Data Processing)

I retired from WU in 2011 and now represent **The Center for Workforce and Organizational Development at St. Louis University** where I teach certification content for both CompTIA Security+ and (ISC)² CISSP

Coming Home to the Internet

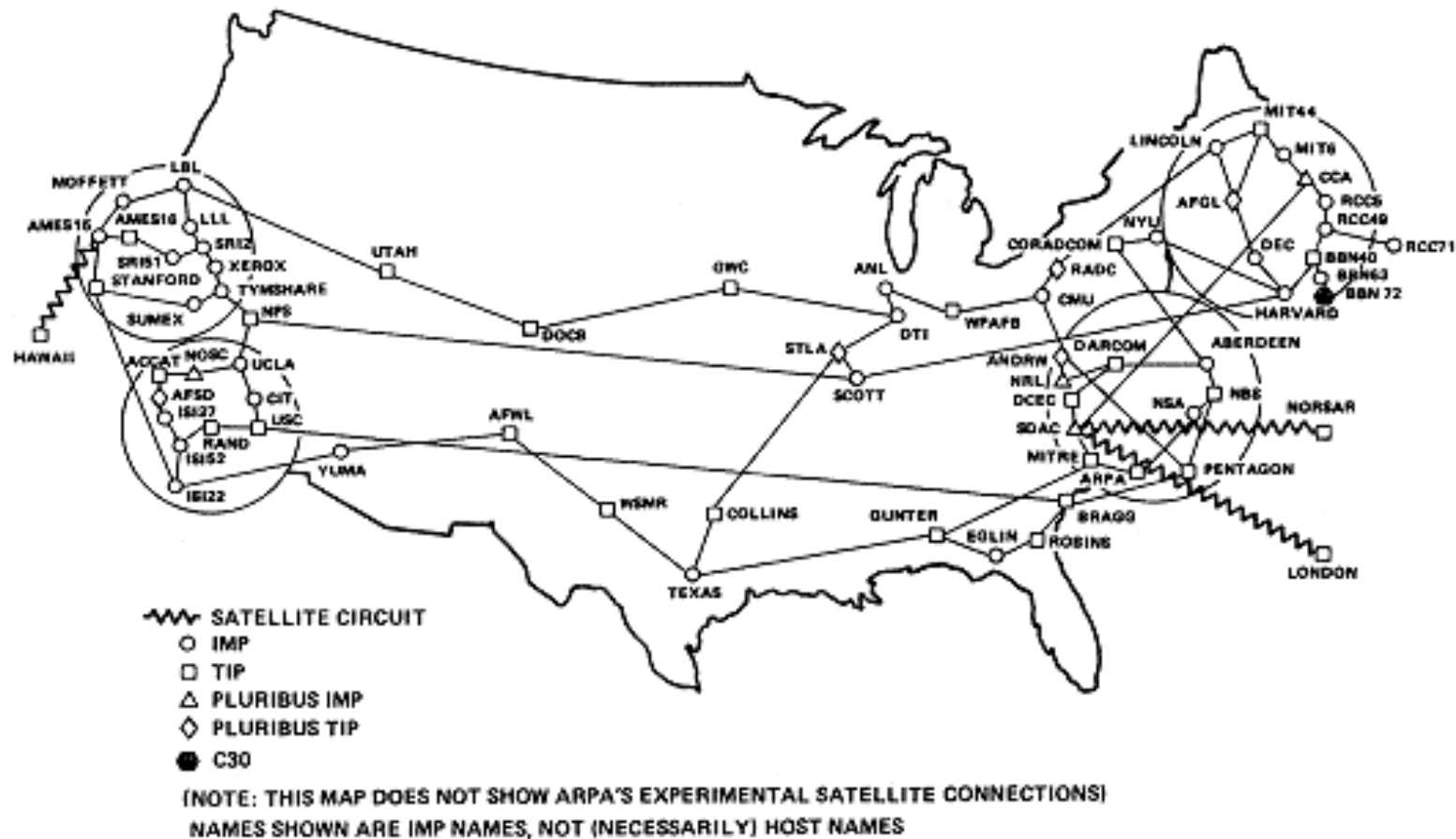
Washington University in St. Louis was part of the NSF Internet in 1990

WU housed WUarchive and distributed the WU-ftp ...written and managed by Chris Myers and Bryan D. O'Connor and was responsible for around 12% of all Internet traffic at that time

WUarchive has been described as: *The gigantic and very popular FTP archive at Washington University at St. Louis (wuarchive) is available as a Web site, providing easy access for those who don't remember how to spell anonymous. Over 65 gigabytes of files in 11 top level directories (with literally hundreds of directories underneath) covering such topics as systems, graphics, documentation, selected Usenet News archives, and educational programs and materials. New is a list of the hundreds of sites wuarchive mirrors. Concentration is on computer related items, however see the public directory for an eclectic selection of files.*

Note: WU spun off the Internet Access services it provided in St. Louis and Chris Myers was a principle of that venture.

ARPANET GEOGRAPHIC MAP, OCTOBER 1980



By 1985 there were 2000 hosts attached to the Internet and by 1990 there were 2000 networks which had grown to 94,000 networks by 1996 per

<http://www.w3.org/2012/08/history-of-the-web/origins.htm>

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Several **large organizations like McDonnell-Douglas (now Boeing) and Monsanto used WU as their access to the Internet** through the Engineering School where I taught and trained

My training duties were largely **to help develop training and executive programs for our CAIT Consortium** members

I worked in a small office on the third floor of Prince Hall (served as a dorm for workers constructing 1904 World's Fair exhibits)

In late 1990 I had an epiphany.....



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In previous days I had been trying to search the Internet and had **discovered a site in the Netherlands** which offered an application which categorized and listed many other sites on the Internet which hosted research.....

That particular morning in 1990... I walked into my office, **checked my voicemail**, logged onto my computer and **checked my email** and then **logged onto a system in Europe** hosted by someone I didn't know which allowed me to find interesting stuff on the Internet....and....

I KNEW then...and said in mind...“the Internet is gonna be a BIG DEAL”

Note: WU received netblock 128.252.0.0/16 June 3, 1987

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“What’s the Internet”was the title of a new CAIT training event

A colleague Joe Haspiel and I created this event and offered it in 1992
I introduced the course asking **“who can tell me what the Internet is”**

Joe taught the then current applications on the Internet....FTP, SMTP
and Telnet of course, but also **Archie, Veronica, Jughead**....three
standard "finding" tools on the Internet... and WAIS database indexing

Of course **Gopher from University of Minnesota**...later enhanced by
Veronica.... was the **“killer app of the Internet”** ...IMO...

**Gopher created a matrix of inter-connected text menus for Internet
content**

Note: Veronica = Very easy rodent-oriented netwide index of
computerized archives

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I taught TCP/IP and how Internet communications works

We discussed **Delphi...the first commercial Internet access service (1992)** and then AOL, Prodigy and CompuServe as dial-up Internet access options

I was invited to visit with Charles Knight and his executive directors at Emerson Corp. discuss the Internet.... An executive declared at the outset of the meeting....**”Of course we will never connect to the Internet as it is too risky, but we want to better understand what it is.....”**

With the emergence of HTTP and then Marc Andreessen’s Mosaic in **1993, Netscape and the WWW became THE world changing technology**

In that timeframe it was **impossible to police the NFS AUP on non-commercial use of the Internet**

Coming Home to the Internet

I was offering a **course called “TCP/IP” in 1992** and it almost never ran
By 1995 I was running this course to a packed room every other week...

I believe **I taught nearly every ATT engineer when they finally “got it”**

Joe Haspiel and I consulted with ATT product managers prior to their roll-out of a commercial ISDN service for Internet access. We told them that it was going to be too little, too late and too expensive.....that proved to be true.

We offered many “executive round-tables” on aspects of the Internet ...like WWW as a business tool, Firewall technology, etc. throughout the mid-90s. I ran a region-wide security roundtable since 2006

Note: Joe Haspiel helped MasterCard Intl. develop their Web presence after I referred him to a job I turned down....he later became very rich

Coming Home to the Internet

Bill Cheswick's "Evening with Berferd" 1992 book on a honeypot and hacking and **"Take Down: The Pursuit and Capture of Kevin Mitnick.."** 1996

These were my first experiences with information security

Of course, famously, **it was discovered that the wu-ftp had a Trojan Horse** and our backbone network director was found to be infected with a root-kit for perhaps as much as a year or more

My research on Usenet News led me to contact the FBI in 1995 where I discovered that the Internet was new to them, at least in the St. Louis field office

Note: Oklahoma City Bombing by Timothy McVeigh happened April 19, 1995

Coming Home to the Internet

My academic interest was in standards and how they impact commercialization and acceptance of IT products.

With the advent of cheap processing and data storage many things became possible and innovation accelerated...

Standards like **NDIS allowed OS-NIC interoperability, CSV for data sharing across proprietary spreadsheets, RAID, SSL vs SHTTP as a secure communications protocol.....** And of course....

TCP/IP and the emergence of IPng.... 1992-----> to Present

Note: Industry de facto standard...over ITU-T standard X.200 or OSI Model (1984) and **nothing is so durable as a well adopted standard**

Coming Home to the Internet

By the beginning of 1992, several proposals appeared for an expanded Internet addressing system and by the end of 1992 the IETF announced a call for white papers.^[8] In September 1993, the IETF created a temporary, ad-hoc *IP Next Generation* (IPng) area to deal specifically with such issues. The new area was led by Allison Mankin and [Scott Bradner](#), and had a directorate with 15 engineers from diverse backgrounds for direction-setting and preliminary document review.^{[4][9]} The working-group members were [J. Allard](#) (Microsoft), [Steve Bellovin](#) (AT&T), Jim Bound (Digital Equipment Corporation), Ross Callon (Wellfleet), [Brian Carpenter](#) (CERN), [Dave Clark](#) (MIT), [John Curran](#) (NEARNET), [Steve Deering](#) (Xerox), Dino Farinacci (Cisco), Paul Francis (NTT), Eric Fleischmann (Boeing), Mark Knopper (Ameritech), Greg Minshall (Novell), Rob Ullmann (Lotus), and [Lixia Zhang](#) (Xerox).^[10]

The Internet Engineering Task Force adopted the IPng model on 25 July 1994, with the formation of several IPng working groups.^[4] By 1996, a series of [RFCs](#) was released defining Internet Protocol version 6 (IPv6), starting with [RFC 1883](#)

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IMHO.....**IPv6 represents a huge design failure**.....of course I am no engineer or scholar in this area....

That **IPv4 and IPv6 are fundamentally incompatible** is astounding

In 1988 IBM introduced the **proprietary MCA bus technology that obsoleted existing ISA expansion cards**....competing industry elements introduced EISA and IBM was effectively finished as a player in the PC industry.....**open architecture and compatibility is king**....

Those involved in the evolution of IPv6 made the **same fundamental error of IBM...believing that features of an emerging technology can be so compelling as to make business discard legacy investments**...

Note: Today...essentially the only significant feature in IPv6 is a larger address space...the failure of IPv6 to flourish was not a big surprise

Coming Home to the Internet

In 1997 ARIN emerged as the newest RIR with a service area of North America, South America, the Caribbean and Sub-Saharan Africa

On January 30, 1998, Ira Magaziner, then the senior adviser to President Clinton for policy development, released a discussion paper, known as the "**green paper**" after the DNS root authority incident. A revised version known as the "white paper" was released on June 5.

This paper proposed a new organization to handle internet resources (that later became ICANN) (Wikipedia)

I saw a **public announcement by the Board of trustees** for the newly created **American Registry for Internet Numbers** in Fall of 1997....

There was a **call for volunteers to serve on the Advisory Council** to the BoT.....and I volunteered by submitting my resume and experience

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Amazingly I was selected and at the initial meeting of the 15 selected members, drew by lots a 2 year term

I was successfully elected in that position by the community at large for successive 3-years in each of the next five **elections...serving a total of 17 years, ending last year**

I have been fortunate to support the emergence of first **LacNIC** (2002) and then **AfriNIC** (2005) to complete the 5 RIR continental systems

Upon retirement from the AC, only John Curran (CEO and former Chair of the BoT) and I were continuously serving members of ARIN

Note: I told Kim Hubbard, first CEO of ARIN to **quit being so 'tight fisted' with IPv4...**to create an emergency that would usher in IPv6 quickly

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I have **watched the 'free pool' of IPv4 addresses dwindle** until (with the exception of AfriNIC) every RIR is exhausted

I have been **involved in crafting policy that tries to minimize disruptions** in a 'seemingly endless' transition to IPv6

Unfortunately....I actually **authored the ARIN Policy 8.3** Transfers Between Specified Recipients within the ARIN Region. I hated and opposed this policy and still do. **It essentially allows IPv4 addresses to be treated as assets to be bought and sold and impedes IPv6 adoption**

I now witness that this transition difficulty in our industry encourages the **ITU to attempt to usurp the 'bottom-up' governance processes** of a hugely successful Internet and the stable ICANN regime of leadership

ARIN and NANOG began hosting joint meetings in the Fall of 2002 in Eugene, OR and I helped bring a full meeting to St. Louis in 2006.

I hope that this collaboration continues and helps address some of the issues that face the Internet and its continuing success as an open and interoperable environment. **Please stay involved and contribute!**

It's nice to have NANOG back in our city again!

Please enjoy your meeting!

And, thank you for inviting me to share my story

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