# ARIN Transfer Policy
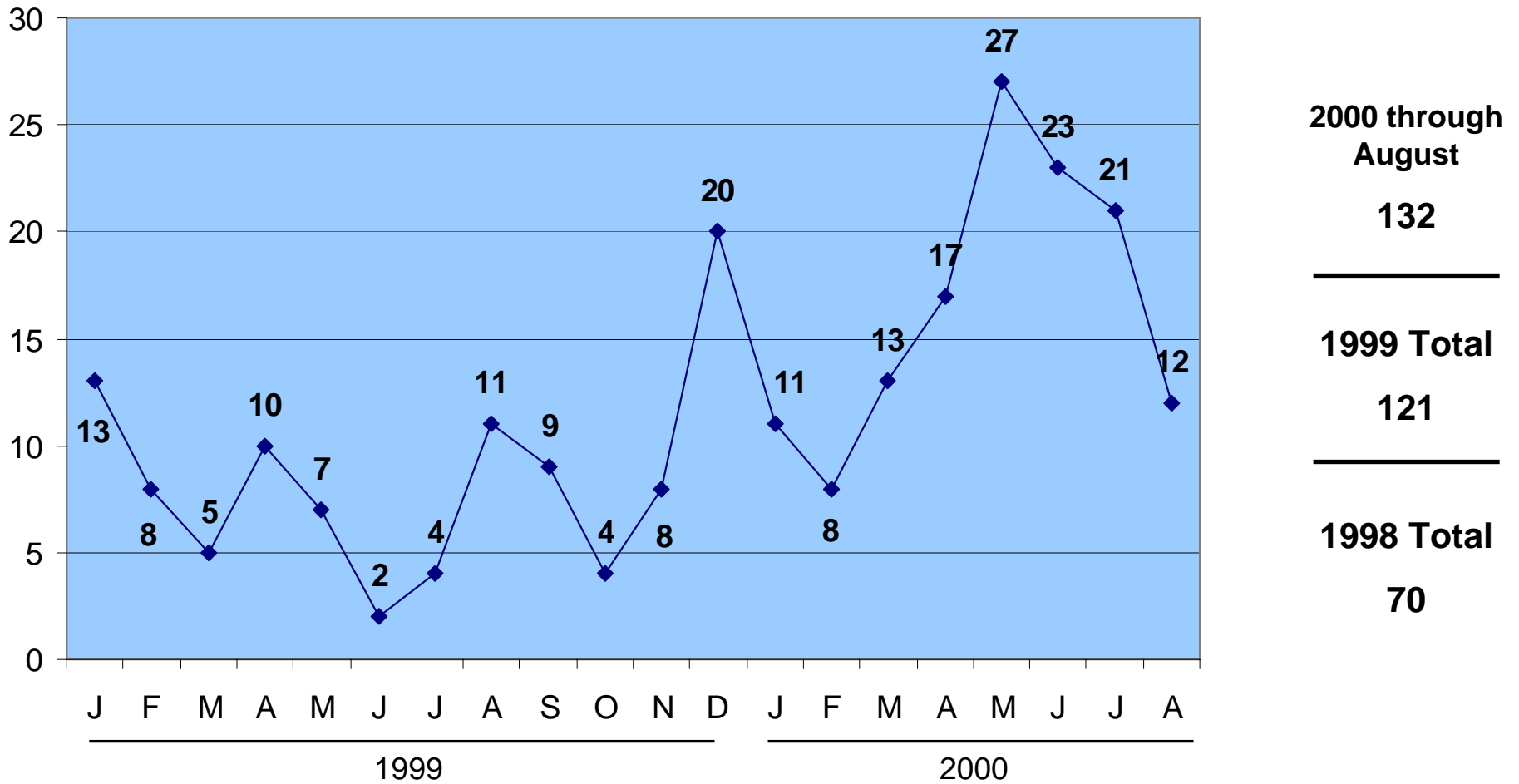
To transfer IPs or ASNs, the new entity must:

a. Demonstrate it acquired the assets that justified the former entity's allocation.

b. Show justification, including:

1) An authenticated copy of the instrument(s) effecting the transfer such as:

- Bill of sale, certificate of merger, contract, deed, court decree

2) A detailed statement depicting utilization at time of acquisition

c. Provide additional information if requested by ARIN

See http://www.arin.net/regserv/transfer.html
for more information.

# Registration Transfers Completed



2000 through August

**132**

———————

1999 Total

**121**

———————

1998 Total

**70**

- Concern that our transfer policy may discourage organizations from making a request

- Should subscribers that have a "history" with ARIN (and have already provided justification in the past) not have to provide utilization information until they submit a request for additional IP address space?

- Forego collection of utilization information if legal documentation is okay

Should the ARIN registration transfer guidelines be modified?

# Hosters, ISPs, and the IPv4 Shortage

*Can't we all just get along?*

# Our Intentions

- Summarize technology and business issues raised on the ARIN policy mailing list

- Attempt to clarify the situation and draw attention to the most misunderstood issues

- Assist ARIN and its members in defining legitimate exceptions to the existing policy

- De-fuse building tensions by provoking creative solutions to the IPv4 shortage

# Our Sources

- ARIN Public Policy mailing list
- ARIN Discussion mailing list
- NANOG mailing list
- ARIN policies

*Please, don't shoot the messengers!*

# Common Mythconception #1

- Web hosters are ravenously gobbling up the ARIN IPv4 space!
  - Verio (a large web hoster): hosts around 500,000 web sites (worst case: 500,000 IPs)
  - @Home (a mid-tier ISP): has over 2 million subscribers (allocation: 2.3 million IPs)
  - By ARIN policy, fast growing ISPs that use /14s in 3 months can get /13s now!
- Web hosters cause relatively small impact!

# Common Mythconception #2

- ARIN is reasonable about IP justification, so the policy will not cause undue hardship.
  - Policies are aggressively enforced by ISPs, IDCs, managed co-location providers, etc.
  - ARIN themselves is usually not involved in allocation requests from small web hosters
  - Exceptions are poorly defined, leaving the upstream provider rigidly in control

- Vague policy impedes small web hosters!

Quadrix Solutions, Inc.

# Summary of Issues

- HTTP 1.0 browsers
- Web hosting is NOT merely HTTP
  - FTP
  - POP3/IMAP
  - Telnet
- Search Engine incompatibility
- Microsoft FrontPage server extensions
- Filtering/Blocking software

# Summary of Issues (cont.)

- SSL protocol issues
- Bandwidth measurement/throttling
- Business-support systems which are IP-based (automated billing, etc.)
- Complex/Secure virtual hosting services
  - Performance and reliability of shared servers
  - Increased impact of DOS attacks and bugs
  - Shared hosting environment security

# Possible Alternatives

- IPv6, the REAL solution
  - Too distant, need more timely solution?
  - Should ARIN aggressively pursue?

- Protocol changes (ala HTTP 1.1)

- IPv4 reclamation
  - Already some positive results
  - Should ARIN pursue/audit "pioneers"?
  - Where's the authority to reclaim?

# Possible Alternatives (cont.)

- NAT for ISPs
  - More secure, better control, possible revenue
- DNS Extensions
  - Domain administrator defines ports that services run on within network
- Super-duper Ultra-Creative Hitherto-unheard-of Grand Master Solution
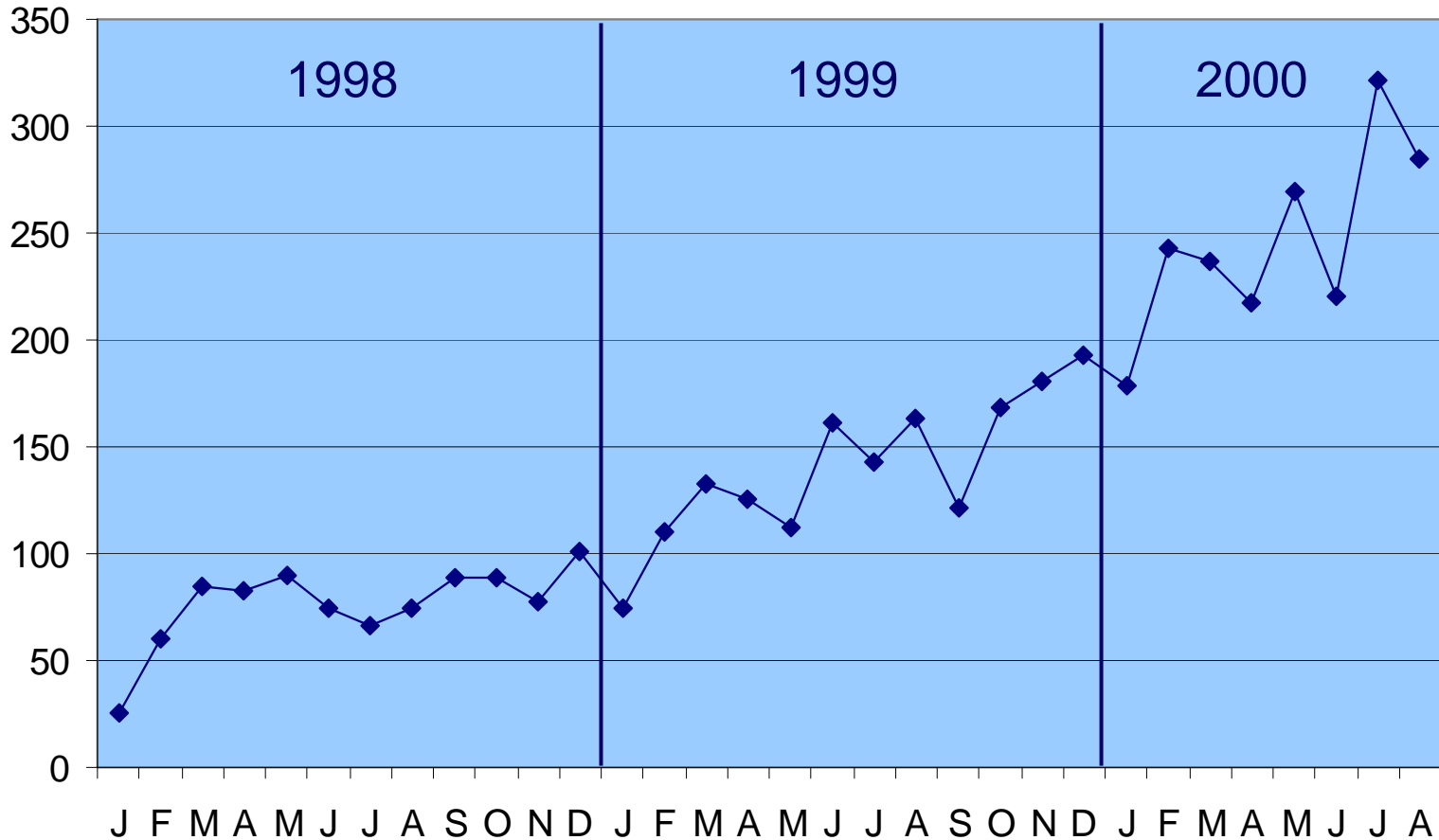  - Anybody?

# AS Number Registrations

| | 1998 | 1999 | 2000 |
|---|---|---|---|
| January | 26 | 74 | 179 |
| February | 60 | 110 | 243 |
| March | 85 | 133 | 237 |
| April | 83 | 126 | 217 |
| May | 90 | 112 | 269 |
| June | 74 | 161 | 220 |
| July | 66 | 143 | 321 |
| August | 74 | 163 | 285 |
| September | 89 | 121 | |
| October | 89 | 168 | |
| November | 78 | 181 | |
| December | 101 | 193 | |
| **Total** | **915** | **1,685** | **1,971** |

Notable Facts

- 1999 was 84% increase over 1998

- 2000 could possibly double 1999

# AS Number Registrations

# AS Number Request Criteria

- ## Unique Routing Policy
  - Must demonstrate that routing policies are different from border gateway peers

- ## Multi-homed Site
  - Must be multi-homed or will immediately become multi-homed, and must describe:
    - Exterior gateway protocol to be used
    - IP network addresses that will make up the AS
    - Technical POC information for each upstream provider/peer, including…
      - Full name
      - Email address

- Almost all AS number requests are for multi-homed sites

- Of these, the majority are from dual homed sites.

# AS Number Delegation Status from the IANA

- 1 - 19455 have been delegated to the RIRs for further assignment

- 19456 - 32767 (13,312 numbers) are listed as held by the IANA

- 32768 - 64511 (31,744 numbers) are listed as reserved by the IANA

For additional information:

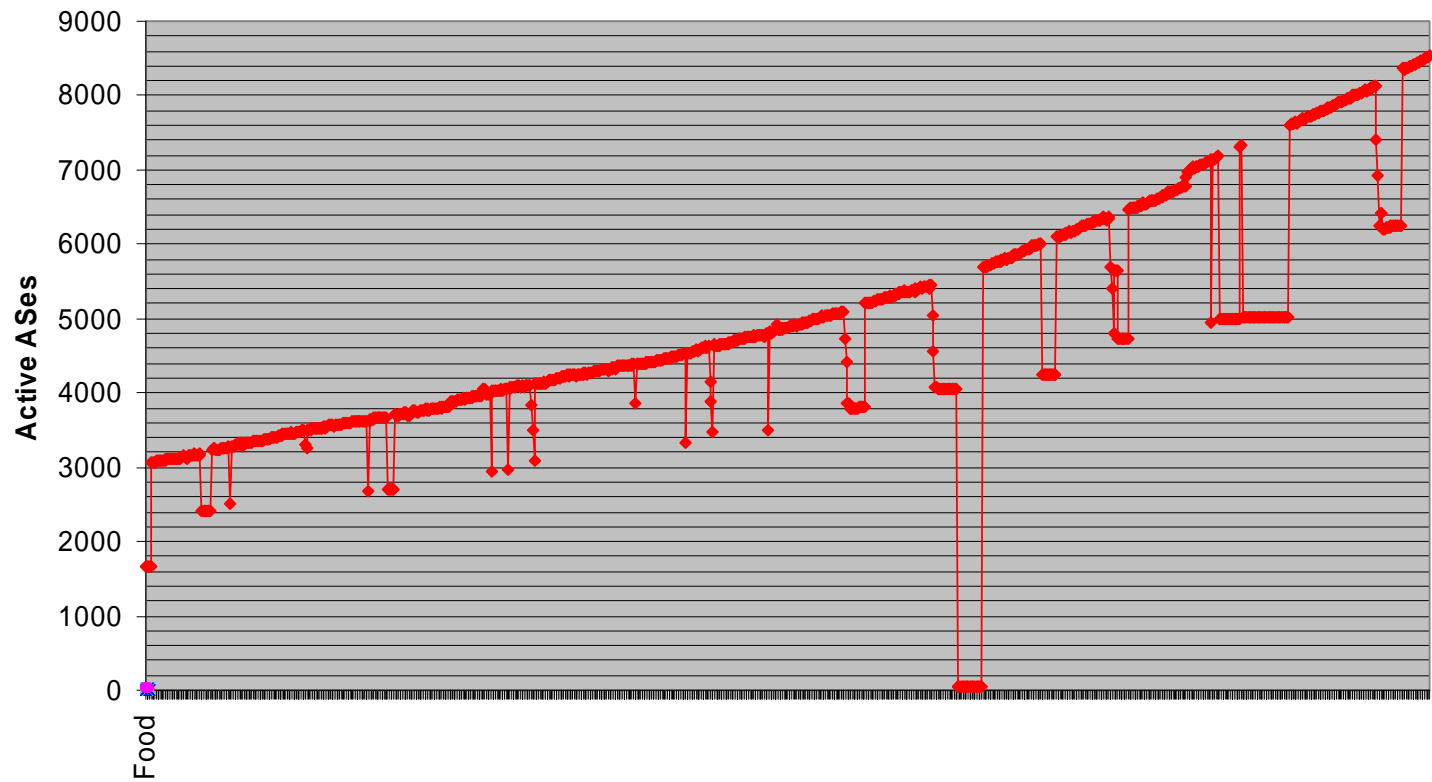http://www.isi.edu/in-notes/iana/assignments/as-numbers

Is this increase in AS number registrations a concern to the community and should ARIN policies be changed as a result?
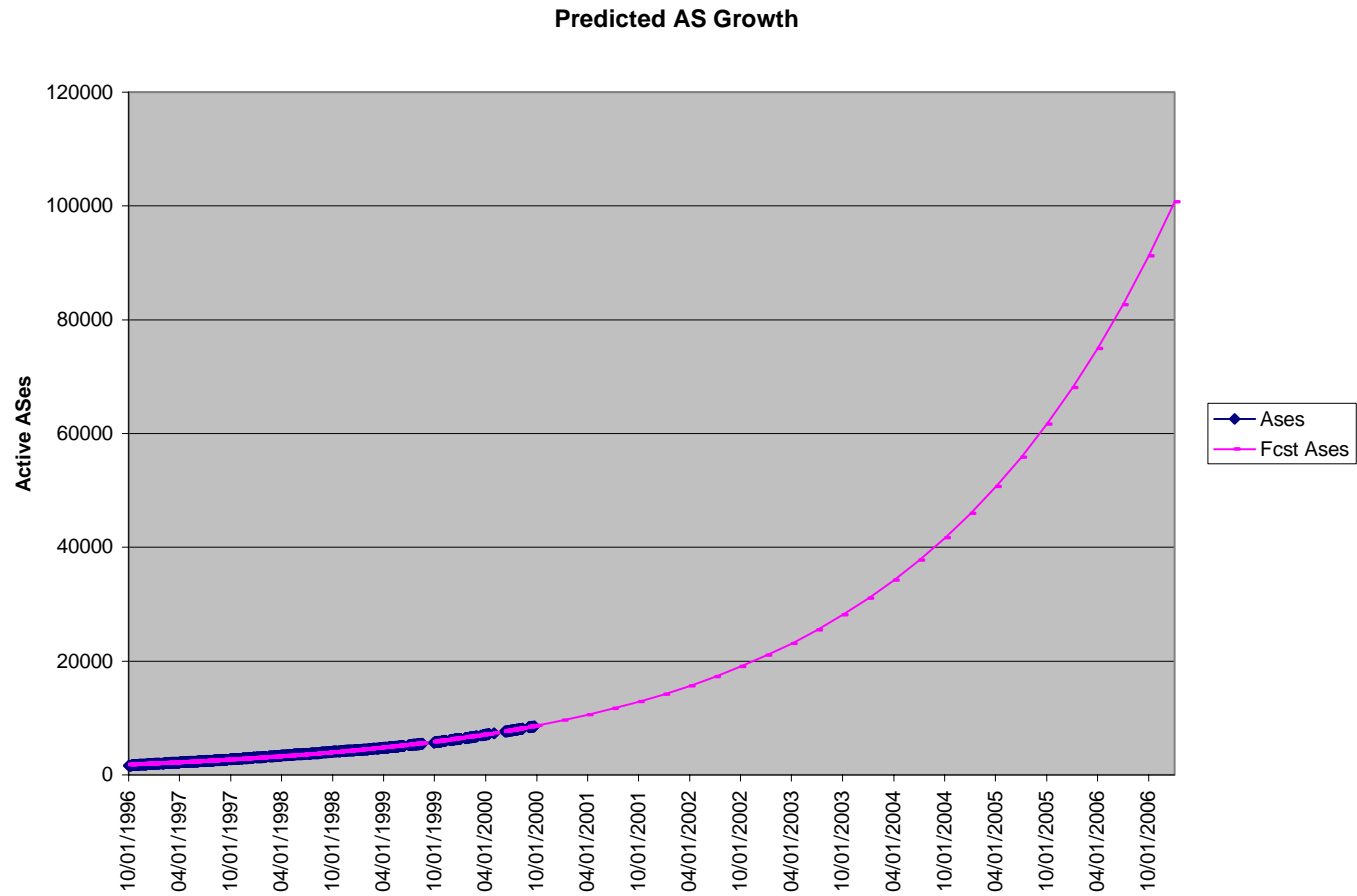
# AS Number Depletion

J. Scott Marcus
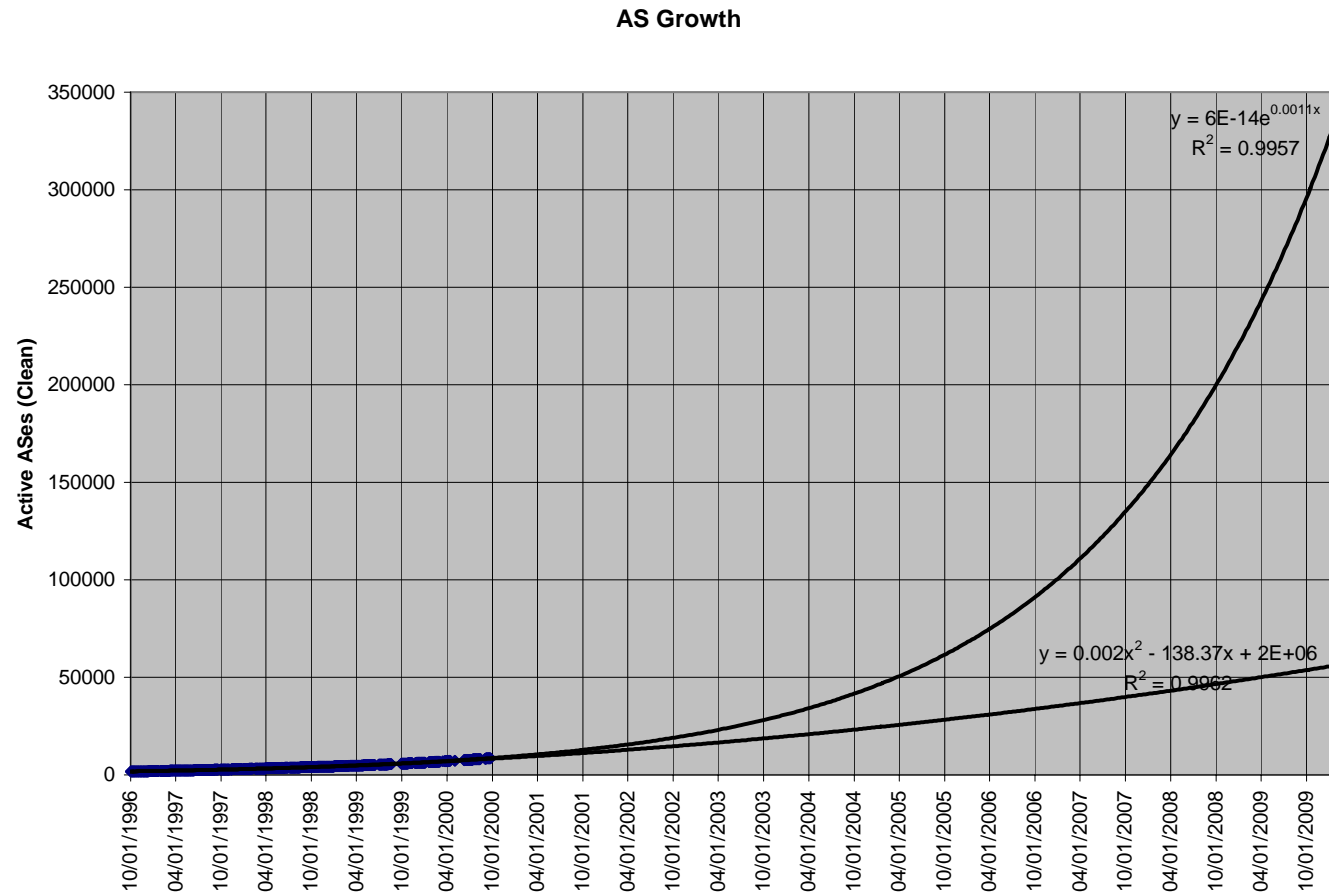
CTO, Genuity, Inc.

# Tony Bates's Data

# Exponential Regression



**Predicted AS Growth**

# Exponential vs Quadratic

**AS Growth**



$y = 6E\text{-}14e^{0.0011x}$
$R^2 = 0.9957$

$y = 0.002x^2 - 138.37x + 2E\text{+}06$
$R^2 = 0.9962$

# Exponential vs Quadratic

**AS Growth**



$y = 6E\text{-}14e^{0.0011x}$
$R^2 = 0.9957$

$y = 0.002x^2 - 138.37x + 2E\text{+}06$
$R^2 = 0.9962$

# Exponential vs Quadratic

**AS Growth**



The chart shows "Active ASes" on the y-axis (0 to 12000) and dates on the x-axis (10/01/1996 to 10/01/2000).

Equations shown on chart:

$$y = 2\text{E-}15e^{0.0012x}$$
$$R^2 = 0.994$$

$$y = 0.0008x^2 - 51.822x + 869376$$
$$R^2 = 0.9994$$

Legend:
- Ases
- Ases
- Poly. (Ases)
- Expon. (Ases)
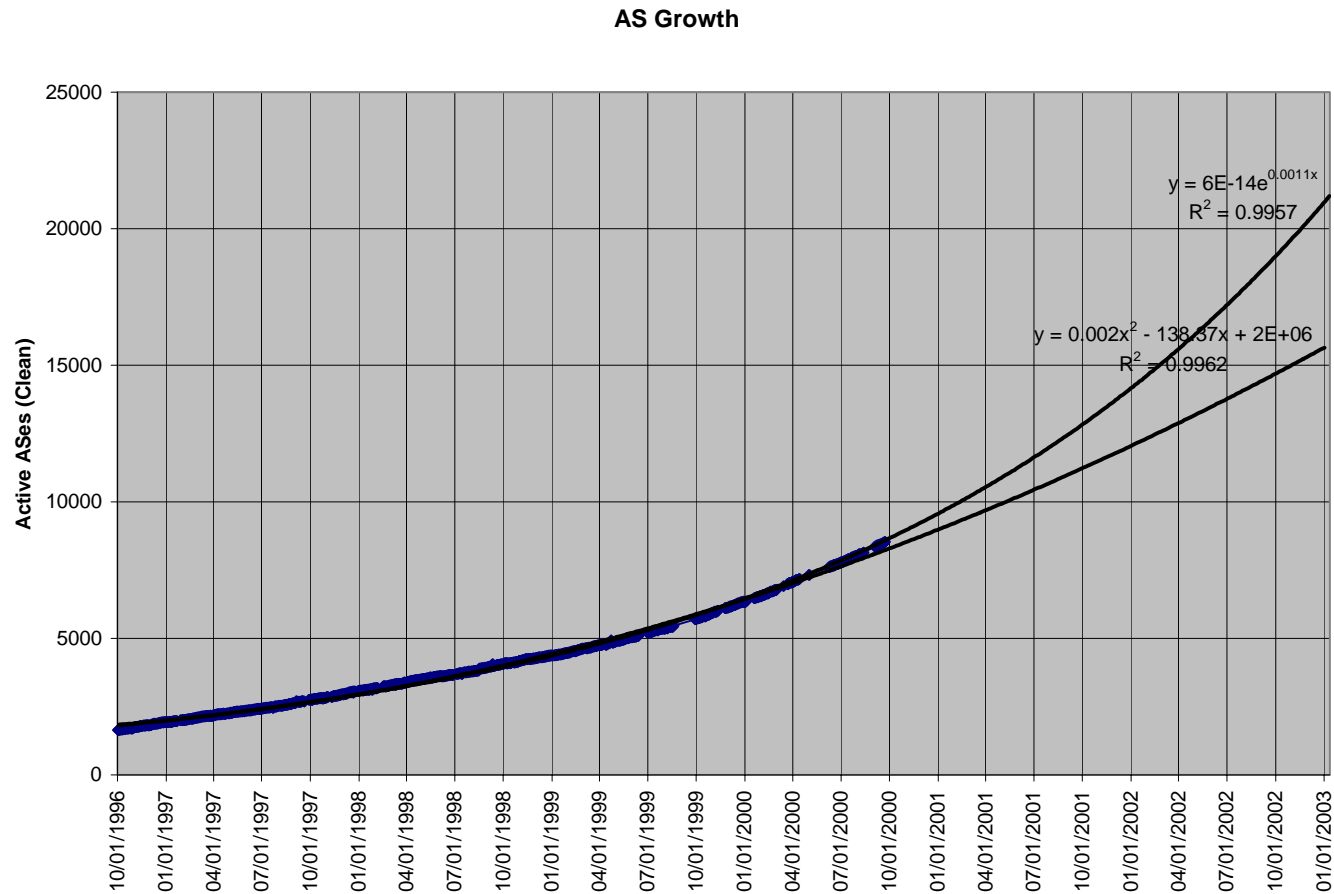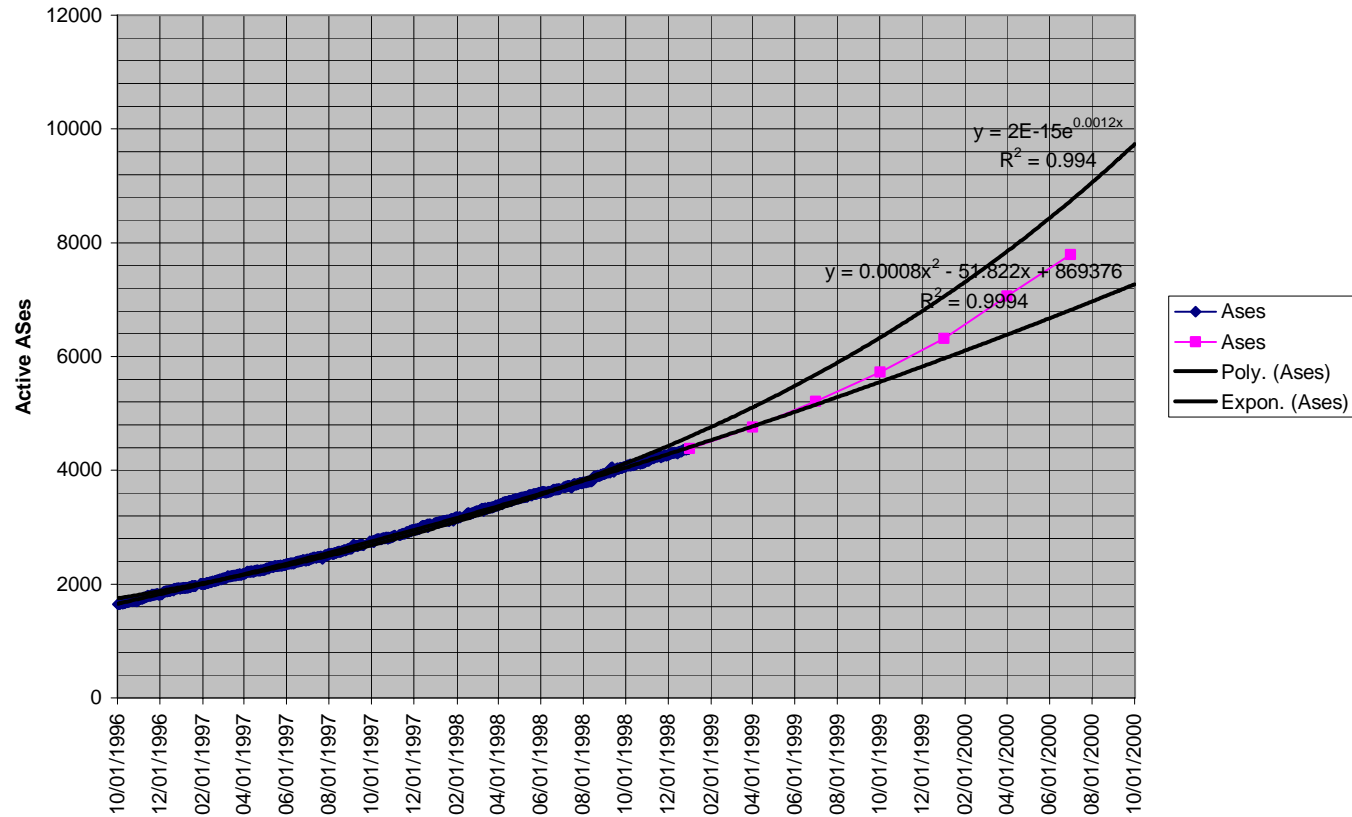
# Apparent Implications

- Need verification of analysis.  ("Doc, I'd like a second opinion! ;^)

- Exhaustion of current AS numbers *under current practices* around the end of 2005, assuming exponential growth.

- Need for IETF protocol development.

- Probable need for conservation and/or reclamation.

- Possible opportunities to deploy various hacks (e.g. "AS NAT").

# CLEW

## Community Learning and Education Workgroup

**Community** - Which?

**Learning** - What?

**Education** - Whom?

          - What's the Difference?

**WorkGroup** - Work - What?

          - Group - Whom?

**CLEW is ARIN members helping each other….**

# Community - Which?

- **A group of people with a common characteristic or interest living together within a larger society….**

- **Who are the members of the ARIN community?**
  - **ISPs, Customers, Individuals, Vendors, Governments, Businesses….**
- **What are the common characteristics and interests?**
  - **Conservation of IP Addresses, Influence fair and effective address policy, Financial stake in a prosperous and growing Internet, Peer and business relationships….**
- **What is the larger society?**
  - **The Internet realm, the world, businesses….**

- **Community is about Cooperation and**

# Learning - What?

- **To gain knowledge or understanding of or skill in by study, instruction, or experience ….**

- **What do we need to learn?**
  - **Policy, Procedure, Best Practice, Peers, How to Help, Whom to Help, What we don't know….**

- **Learning is about OUR need to know….**

# Education - Whom? and What's the Difference?

- **The action or process of knowledge transfer….**

- Whom do we need to educate?
  - Other members of the community, Those outside the community, Those with less knowledge than ourselves….

- What is the difference between education and learning?
  - Learning is self directed, Education is other directed…

- **Education is about consensus through understanding….**

# WorkGroup

- **A specific task, duty, function, or assignment often being a part or phase of some larger, activity…. A number of individuals assembled together or having some unifying relationship….**

- What needs to be done?
  - Learning, Education, Consensus, Constituent identification….

- Who needs to be involved?
  - Each of us to identify, Define, Involve, Resolve….

- **Workgroups are about defining and doing work….**

# Defining the Work

- **Identify the inefficiencies and roadblocks?**
  - In practice, in communication, in understanding…

- **How to work?**
  - Set priorities, Divide and allocate tasks, Allocate resources, Establish deadlines, Monitor progress….

- **Use the proper tools?**
  - List server, Usenet, Websites, other?…..

- **Defining the work is about getting organized….**

# Doing the Work

- **Why must it be me? (and not ARIN)**
  - **Because you stand to gain or lose….**
  - **ARIN is you…**
  - **(ARIN offered training and no one came)**

- **But I'm so busy?**
  - **It's not if,… it's when….**

- **Doing is about Motivation and Commitment….**

# Some Topics for Discussion

- AC-BoT Nomination Process
- "Genetic Diversity"
- Timeliness and Deadlines
- Nomination, Biographies
- Credential Presentation
- Self Nomination
- Nomination Committee Members
- Strategy to improve?

# Some Topics for Discussion

- Legacy Address Reclamation
-     Authority
-         Historical, ICANN
-     Rationale
-         We recycle cans don't we?
-     Strategy to improve?

# Some Topics for Discussion

- Identify ARIN

- `http://www.arin.net/arinintro.htm`

- Thanks to Richard Jimmerson

- Internet Authority Hierarchy

- What else can be done

- Improve performance

- Improve image

# Some Topics for Discussion

- Increase Participation
- More members
- 
- More involvement

- How do we reach and motivate?

# Some Topics for Discussion

- Address Conservation
- Rationale
- IPv6
- Doomsday Clock

# Some Topics for Discussion

- Leverage Best Practices
- Renumbering
- NAT and Name-based Web Hosting

- What else?
- 
-