BGP scaling revisited

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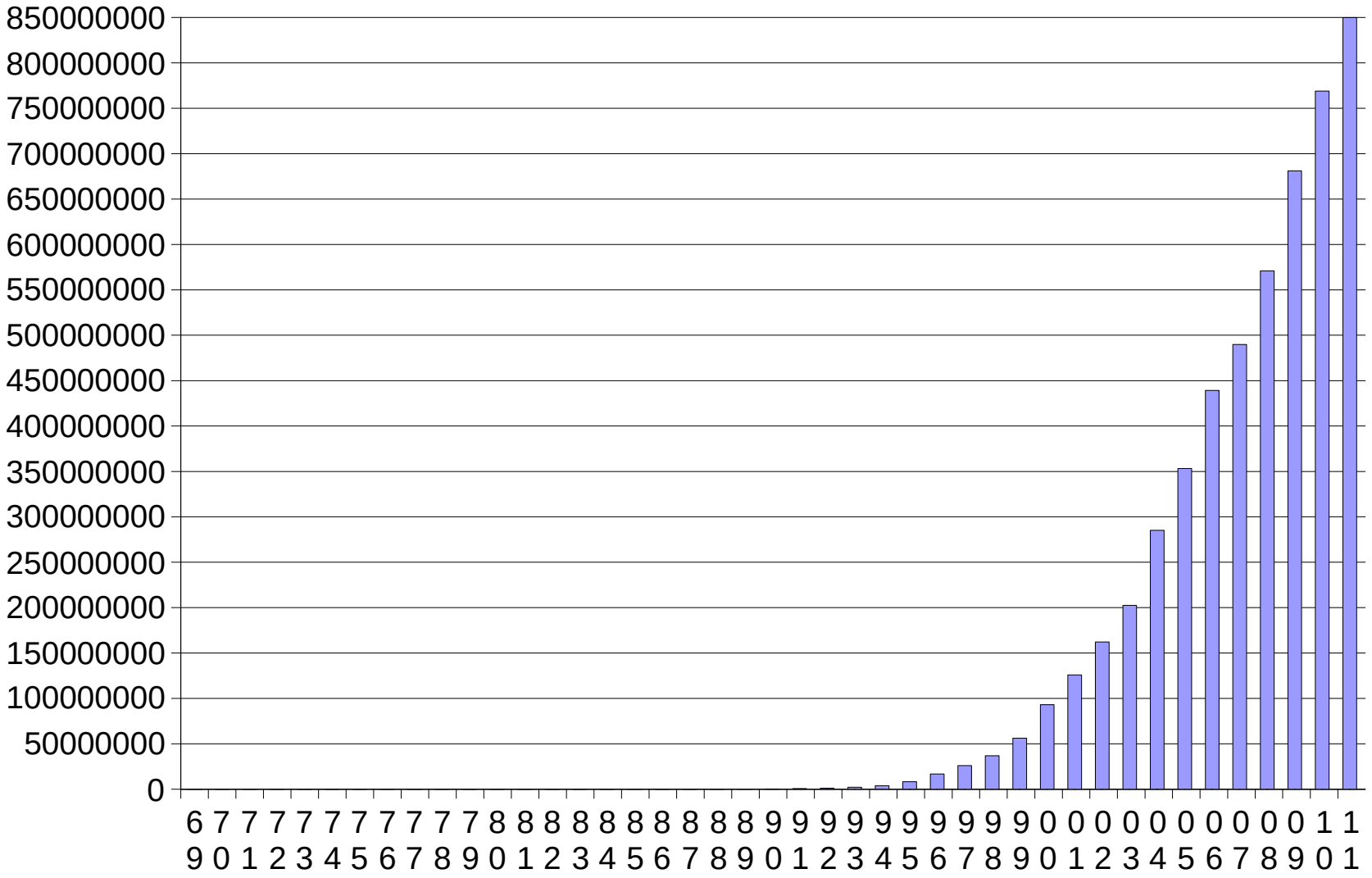
What's the BGP question again?

- Are there any interesting long-term relationships between the size of the globally addressable Internet and the size of the BGP4 system?

What data do we have?

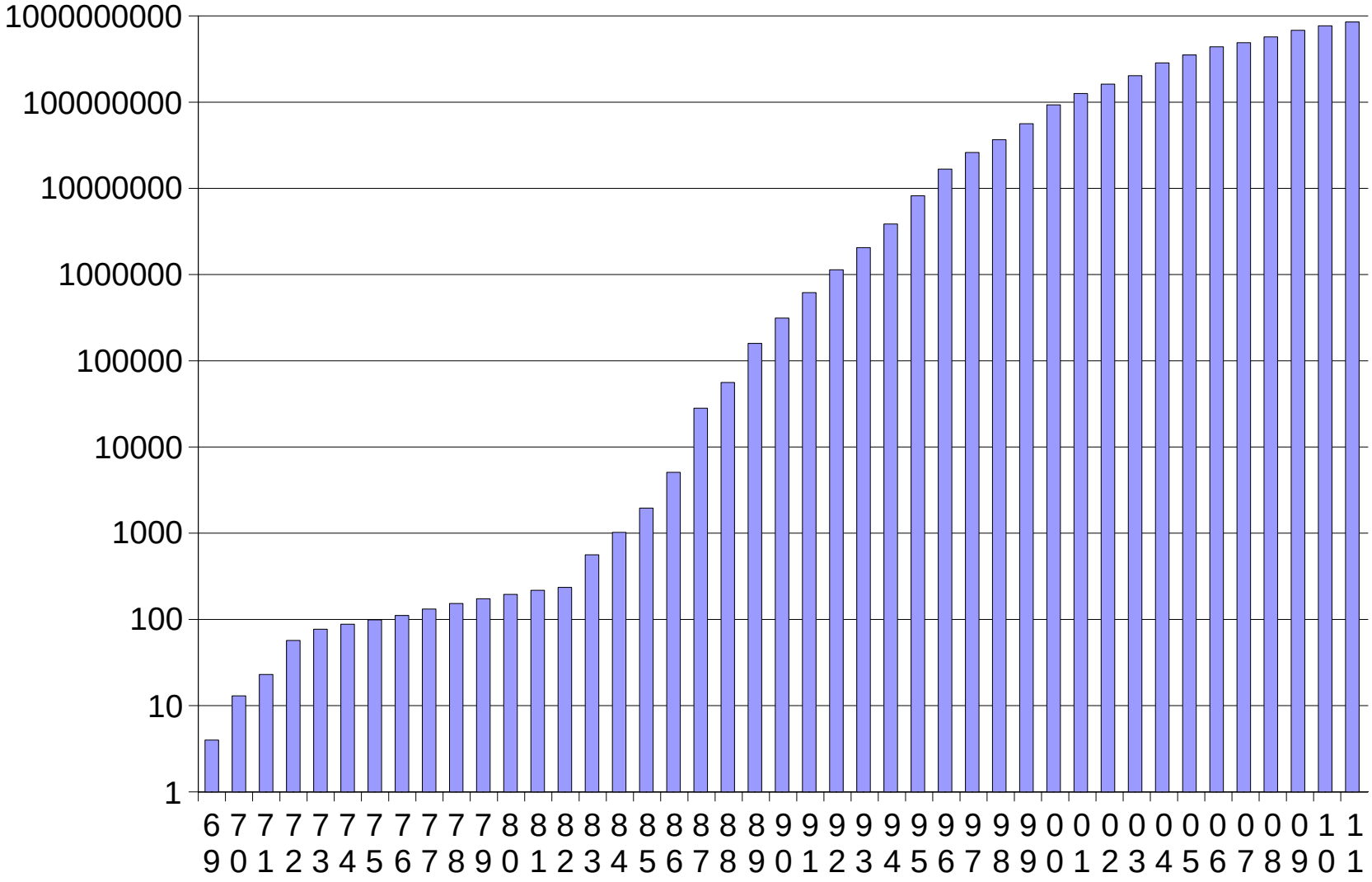
- We have BGP4 data back to 1994 and active AS data back to 1997 (thanks potaroo.net)
- We have domain count data back to 1994 (thanks ISC.org)
  - the domain count is a reasonable lower bound on the number of directly accessible IPv4 interfaces with global addresses
  - if you don’t agree with this assertion please talk to ISC about it ;-)
  - (for earlier years we have actual host counts)

Domain count history

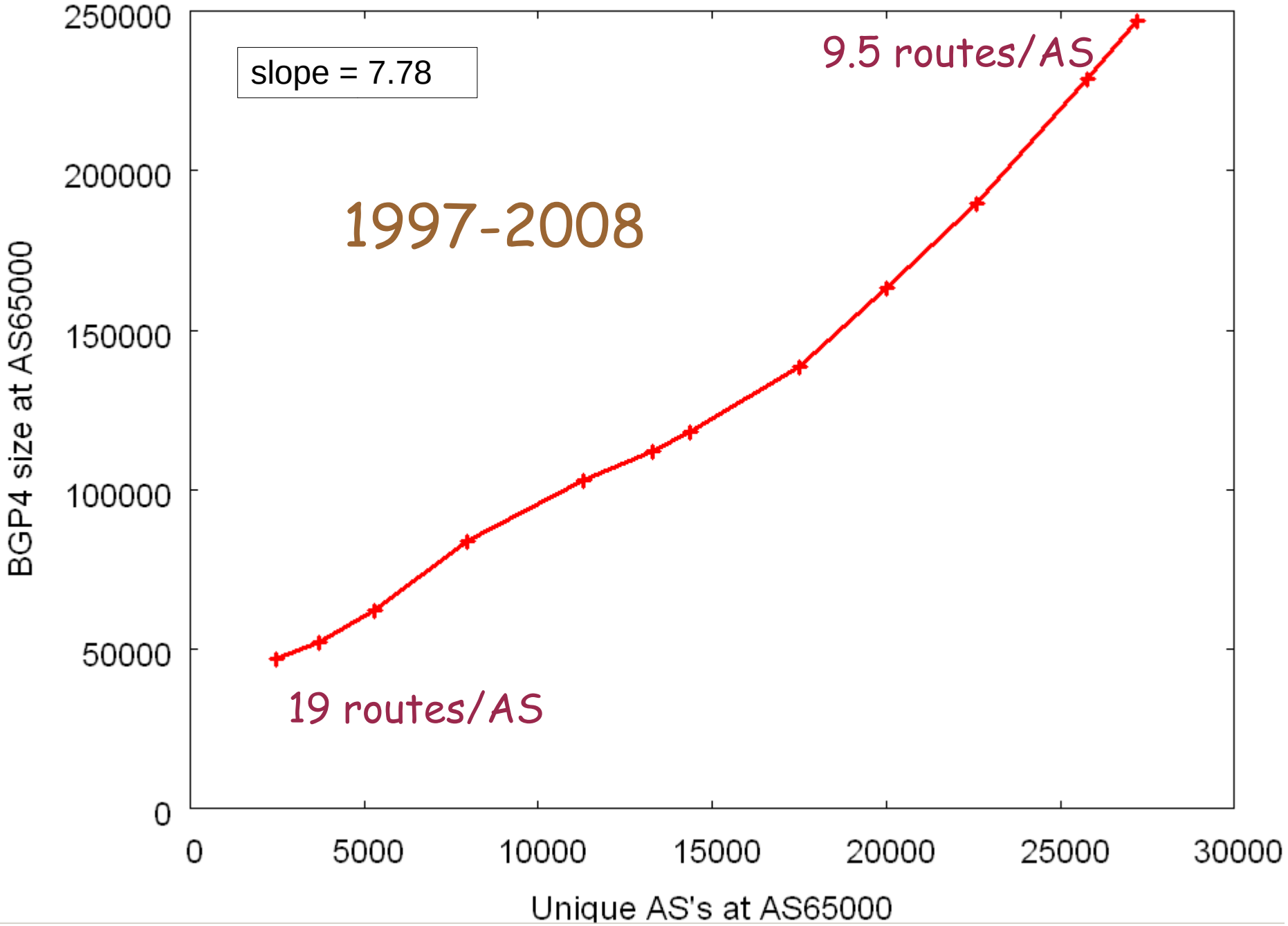


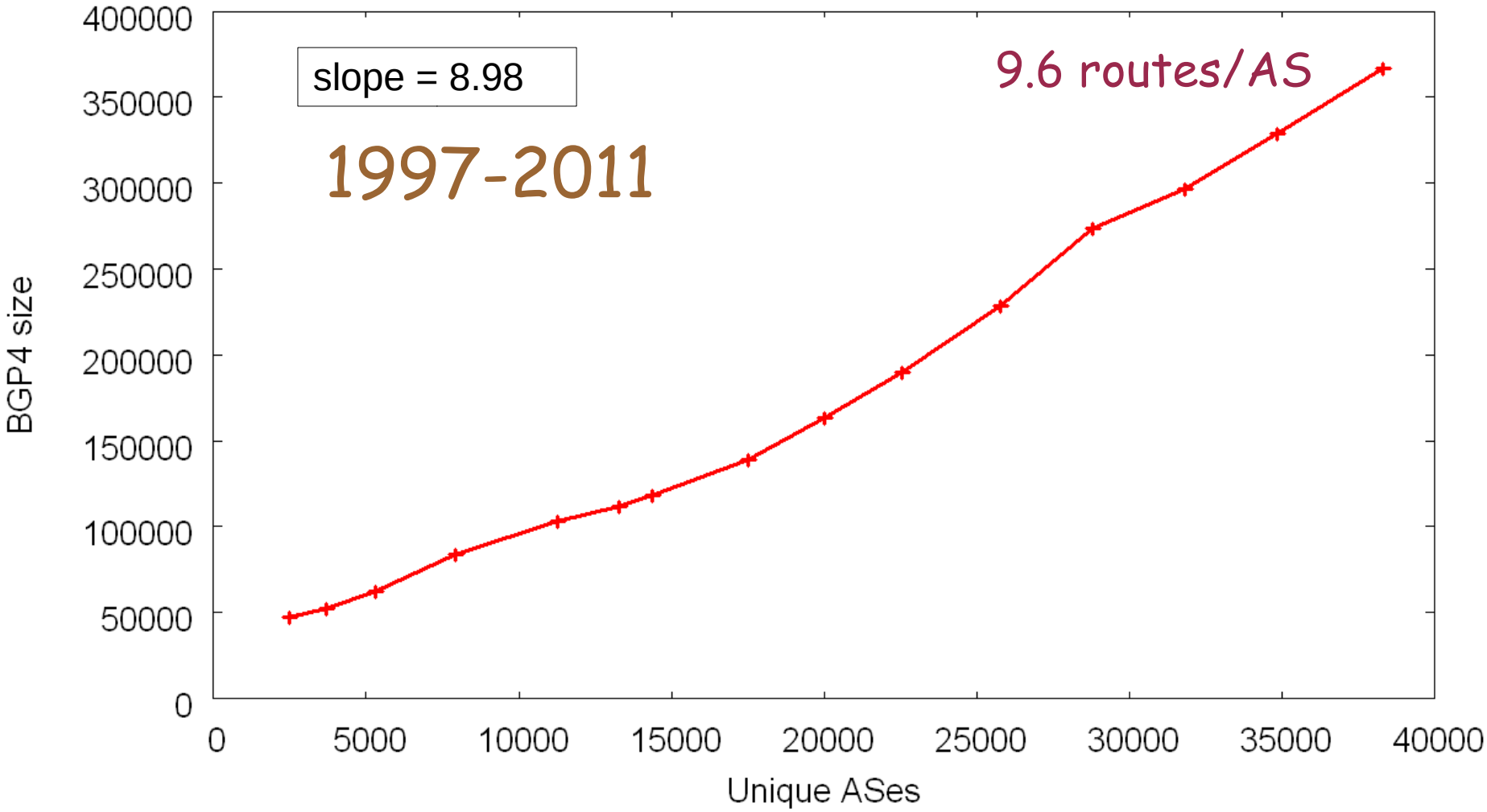
Data from http://www.isc.org/

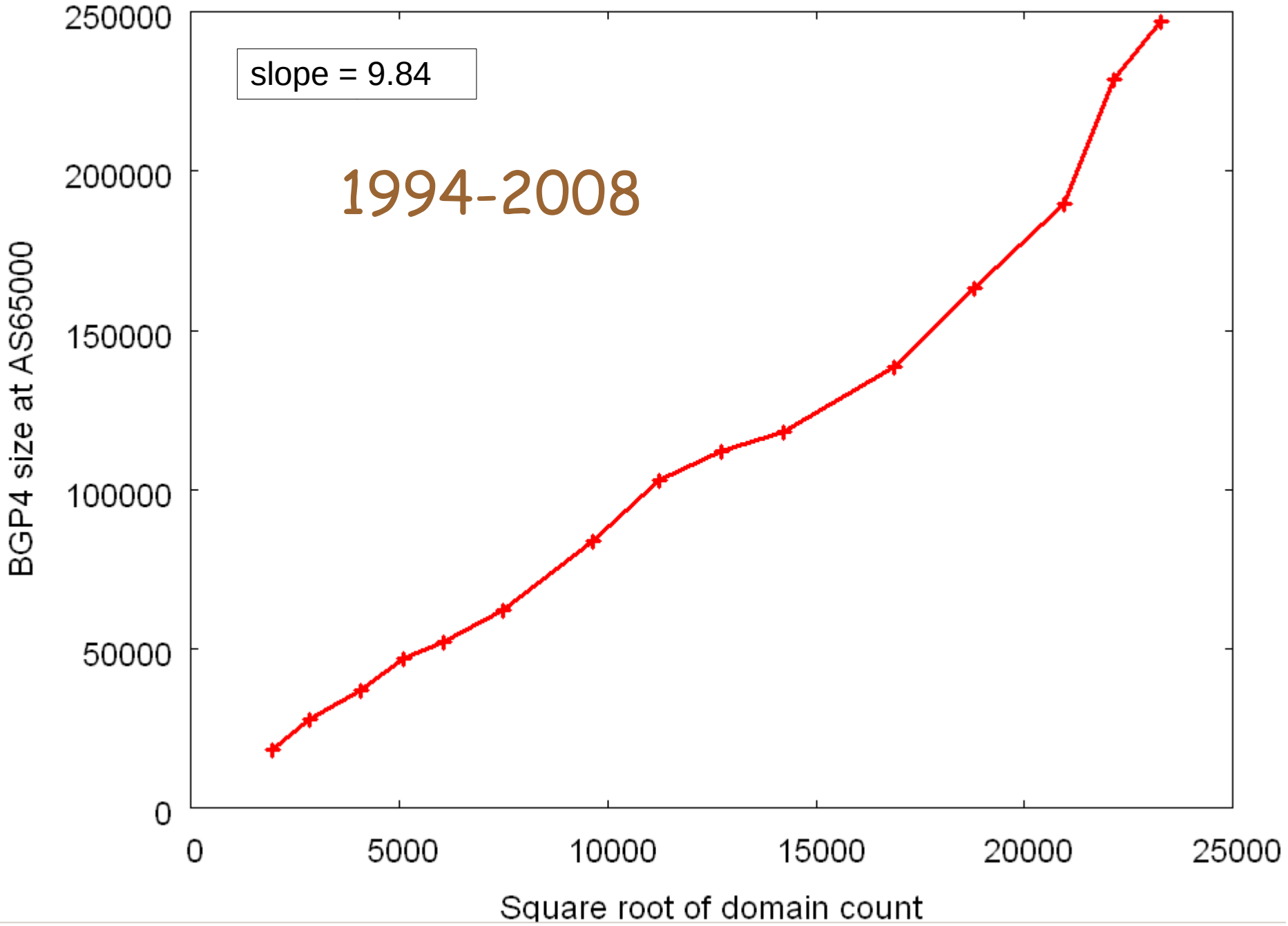
Domain count history knitted onto host count history (log scale)

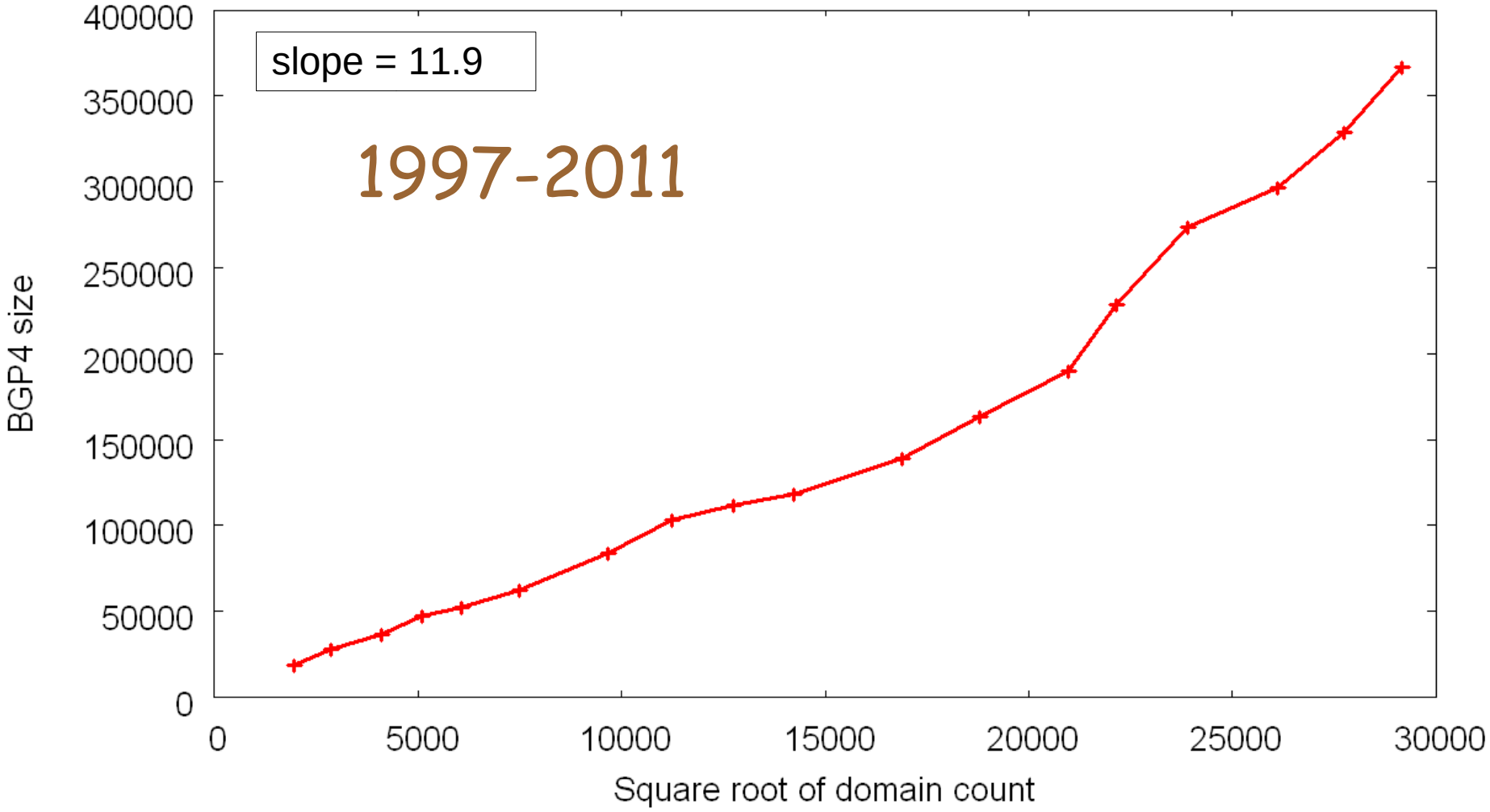


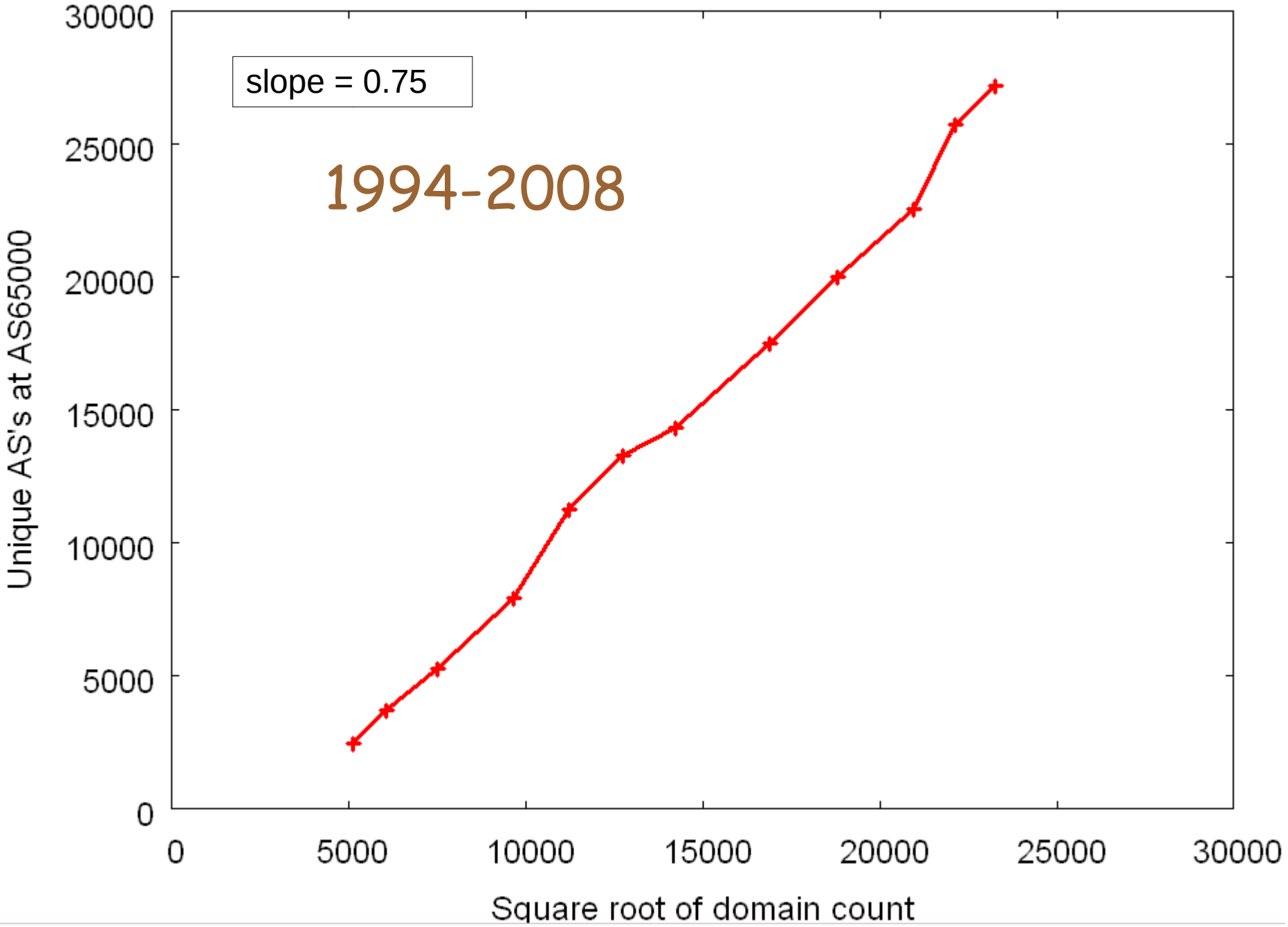
Data from http://www.isc.org/ and other sources

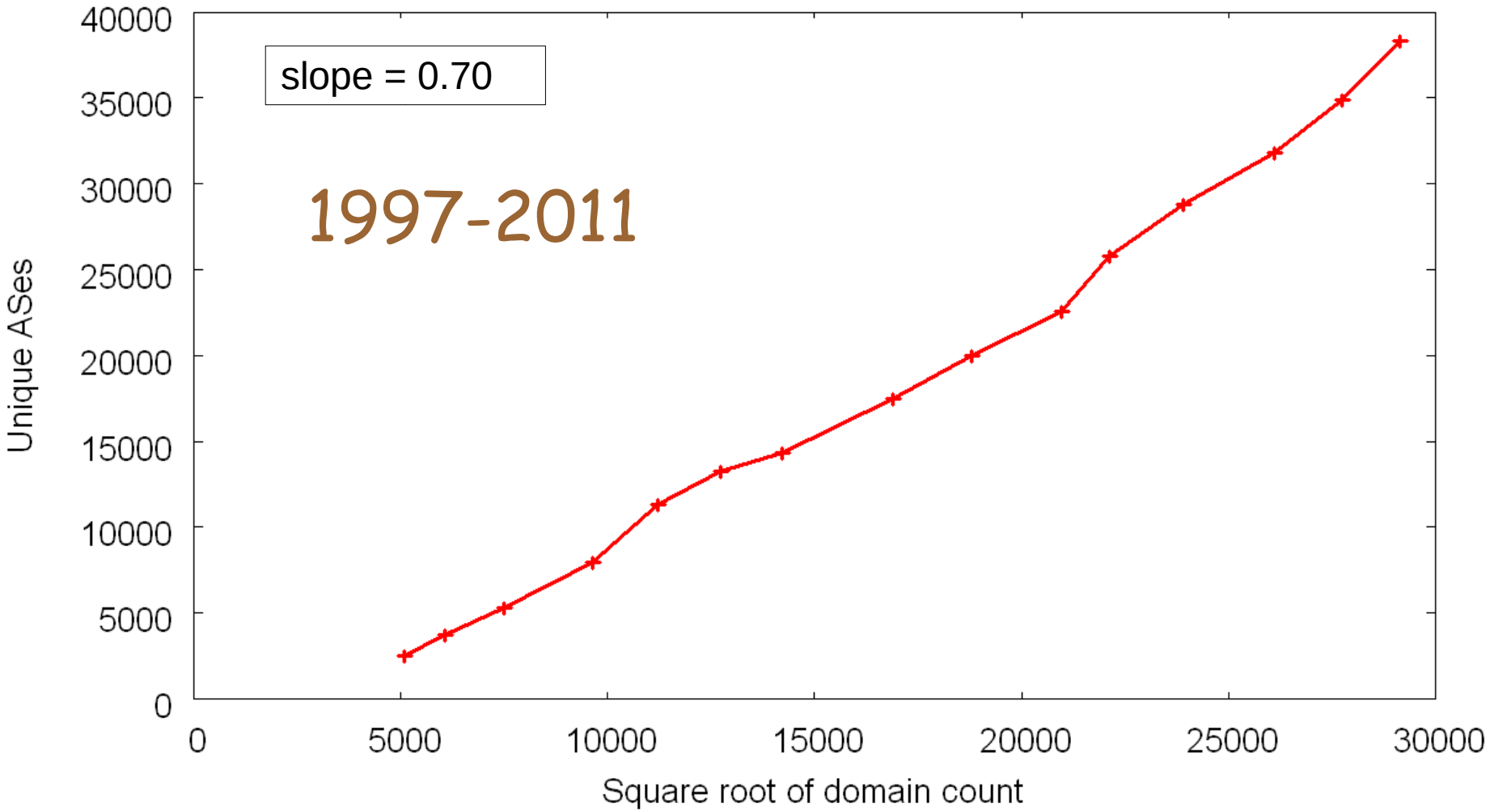

slope = 7.78
9.5 routes/AS
1997-2008
19 routes/AS
BGP4 size at AS65000
Unique AS's at AS65000
250000
200000
150000
100000
50000
0
0
5000
10000
15000
20000
25000
30000


slope = 8.98
1997-2011
9.6 routes/AS
BGP4 size
Unique ASes
400000
350000
300000
250000
200000
150000
100000
50000
0
0
5000
10000
15000
20000
25000
30000
35000
40000


slope = 9.84
1994-2008
BGP4 size at AS65000
Square root of domain count
250000
200000
150000
100000
50000
0
0
5000
10000
15000
20000
25000


slope = 11.9
1997-2011
BGP4 size
400000
350000
300000
250000
200000
150000
100000
50000
0
0
5000
10000
15000
20000
25000
30000
Square root of domain count


slope = 0.75
1994-2008
Unique AS's at AS65000
Square root of domain count
0
5000
10000
15000
20000
25000
30000


slope = 0.70
1997-2011
Unique ASes
Square root of domain count
0
5000
10000
15000
20000
25000
30000
35000
40000

What do we learn?

- BGP4 as a whole is scaling something like the square root of the total size of the addressable Internet.
- This is a Good Thing.
  - It could have been so much worse.
- But it only holds true as long as operational policy and habits don’t change.
  - Complacency is not in order.