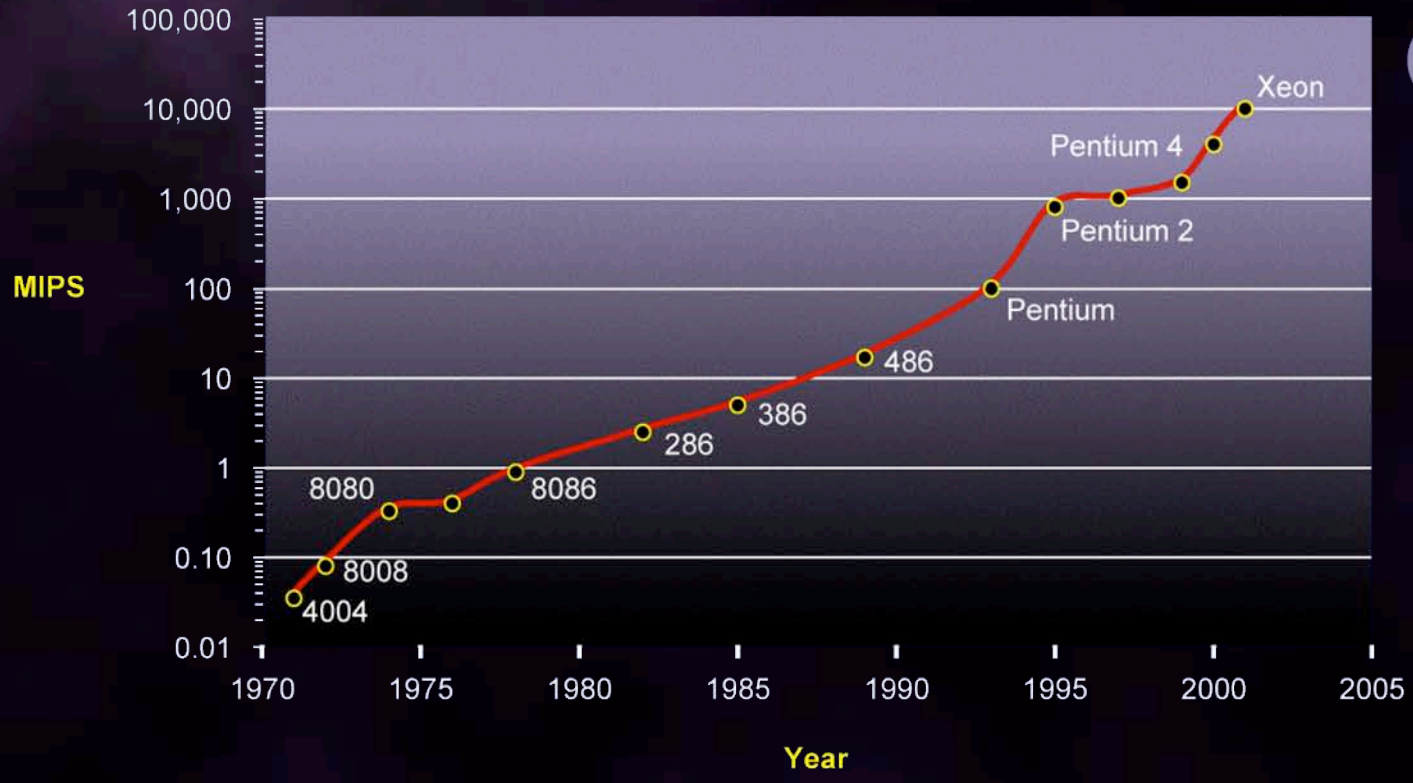
Processor Performance (MIPS)



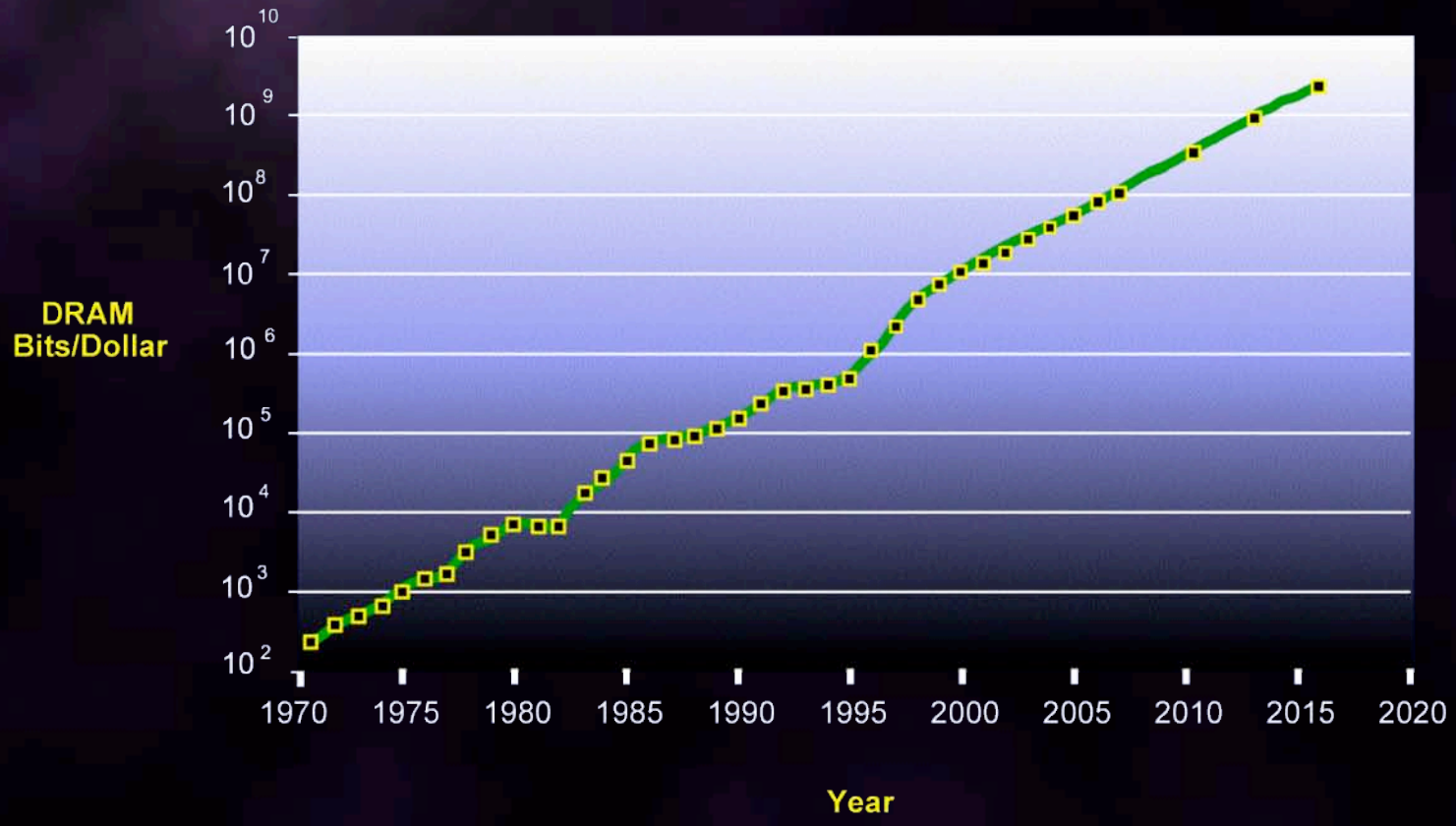
Logarithmic Plot

Data from: Intel

Doubling time: 1.8 years

Dynamic RAM Memory

Bits per Dollar at Production

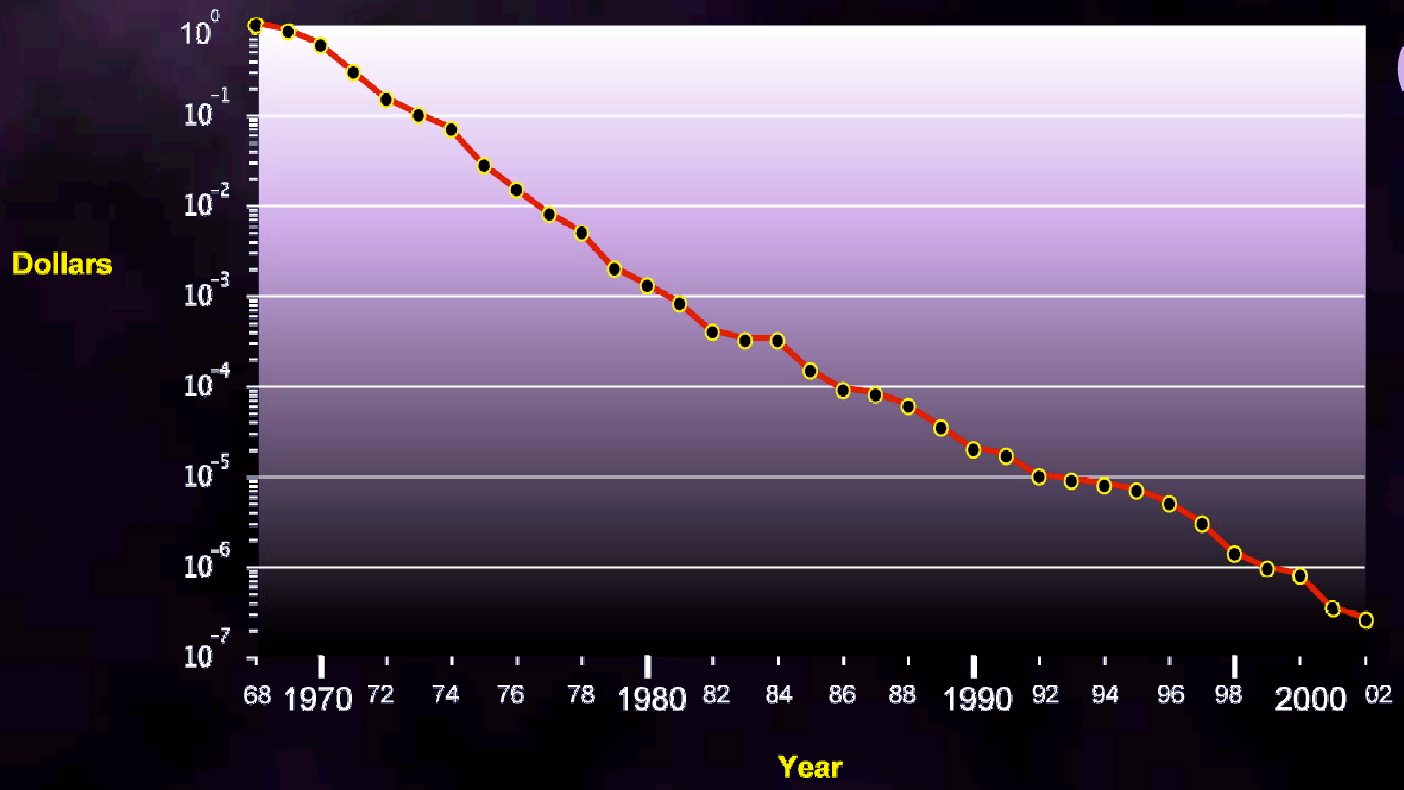


Logarithmic Plot

Data from: SEMATECH ITRS Roadmap

Doubling time: 1.5 years

Average Transistor Price

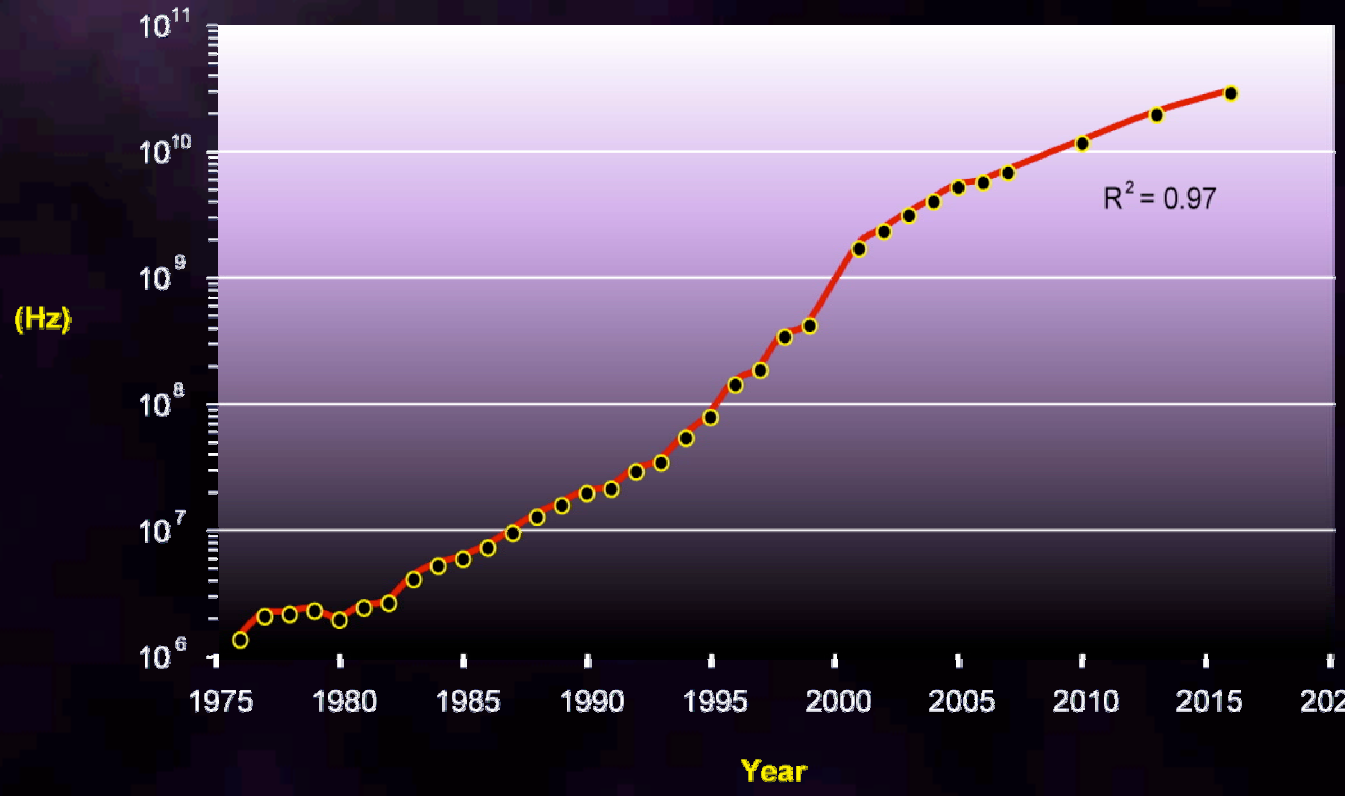


Logarithmic Plot

Data from: Dataquest/Intel

Halving time: 1.6 years

Microprocessor Clock Speed

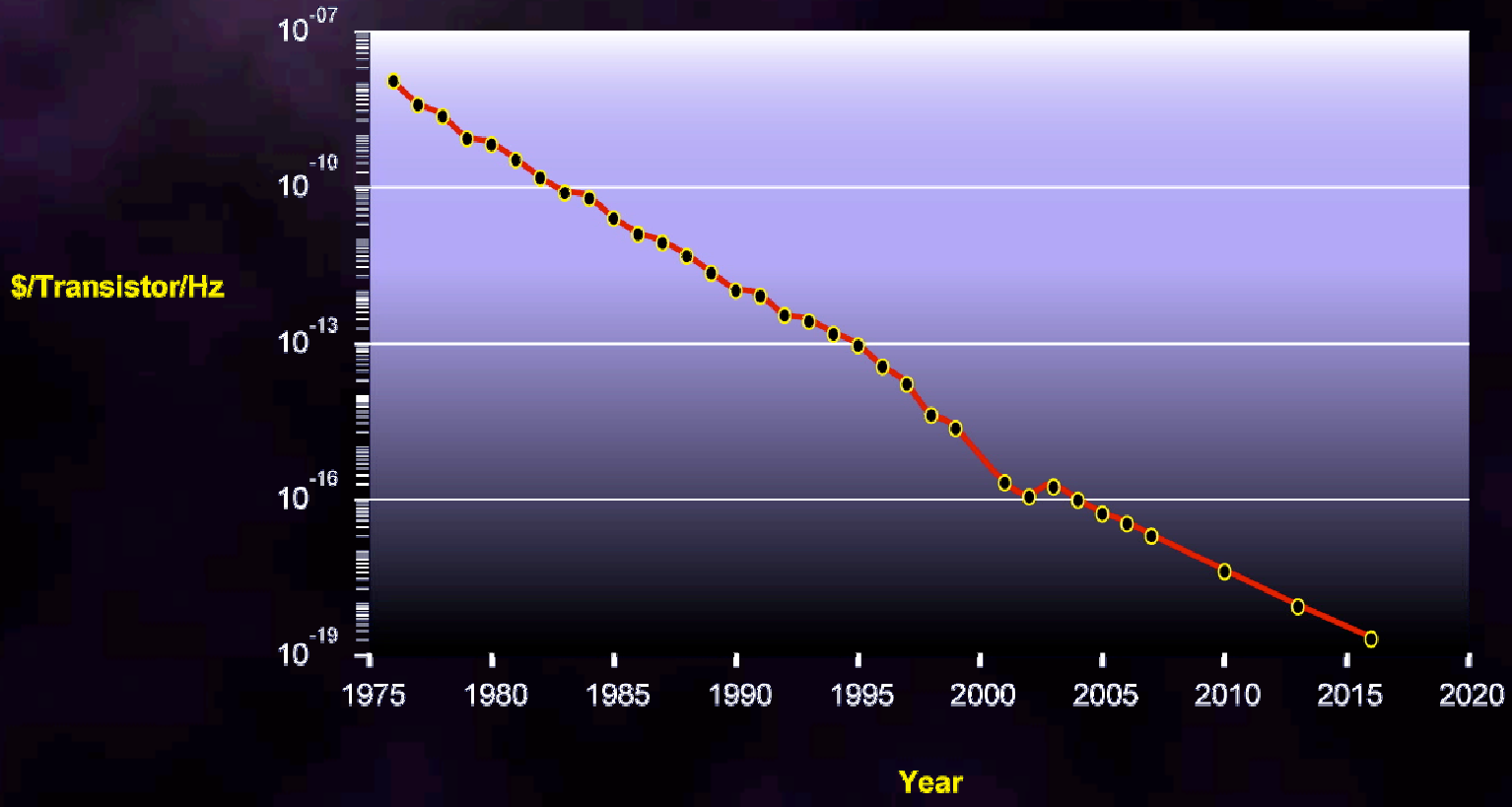


Logarithmic Plot

Data from: Berndt et al., ITRS

Doubling time: 2.7 years

Microprocessor Cost Per Transistor Cycle

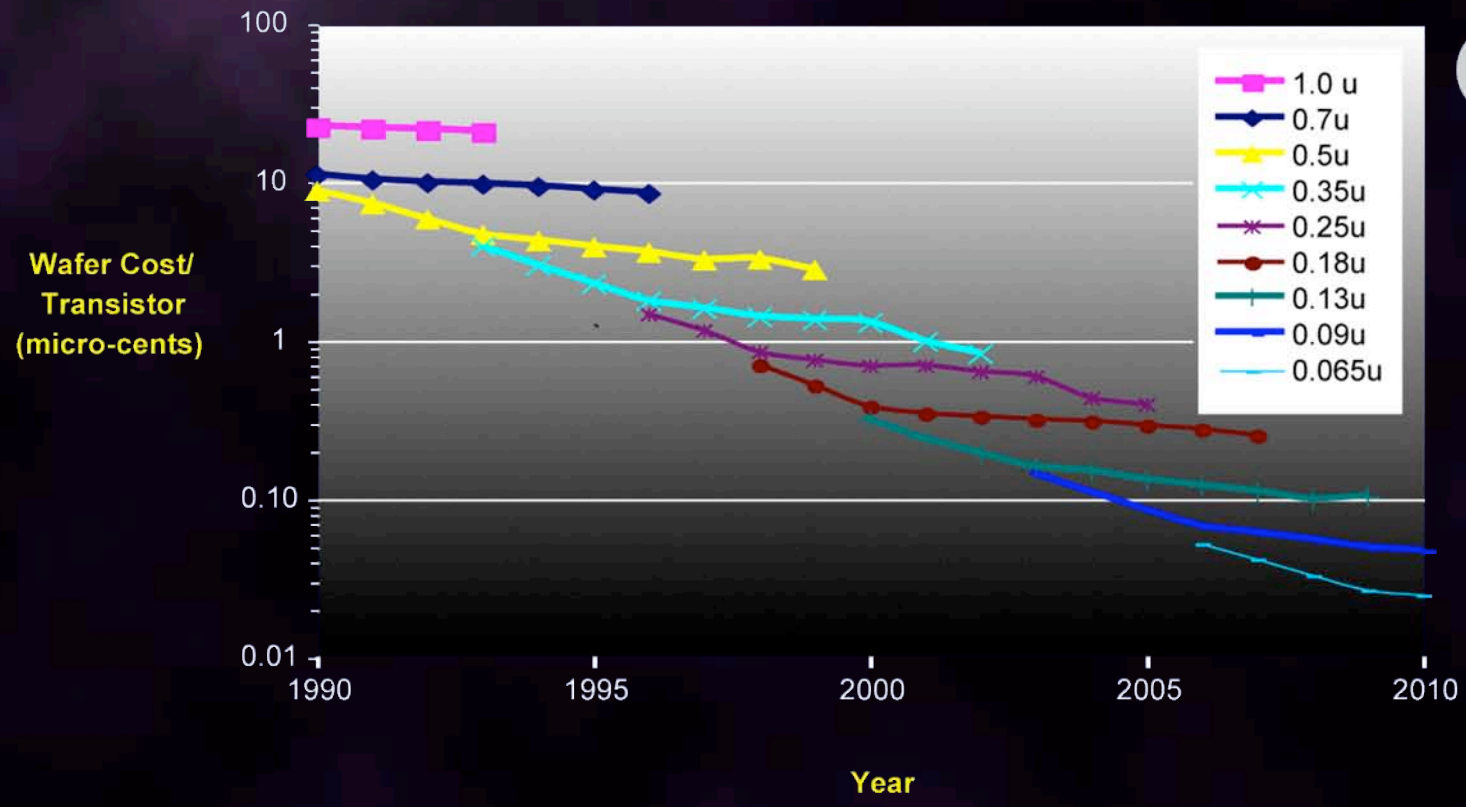


Logarithmic Plot

Data from: Berndt et al., SEMATCH ITRS Roadmap

Halving time: 1.1 years

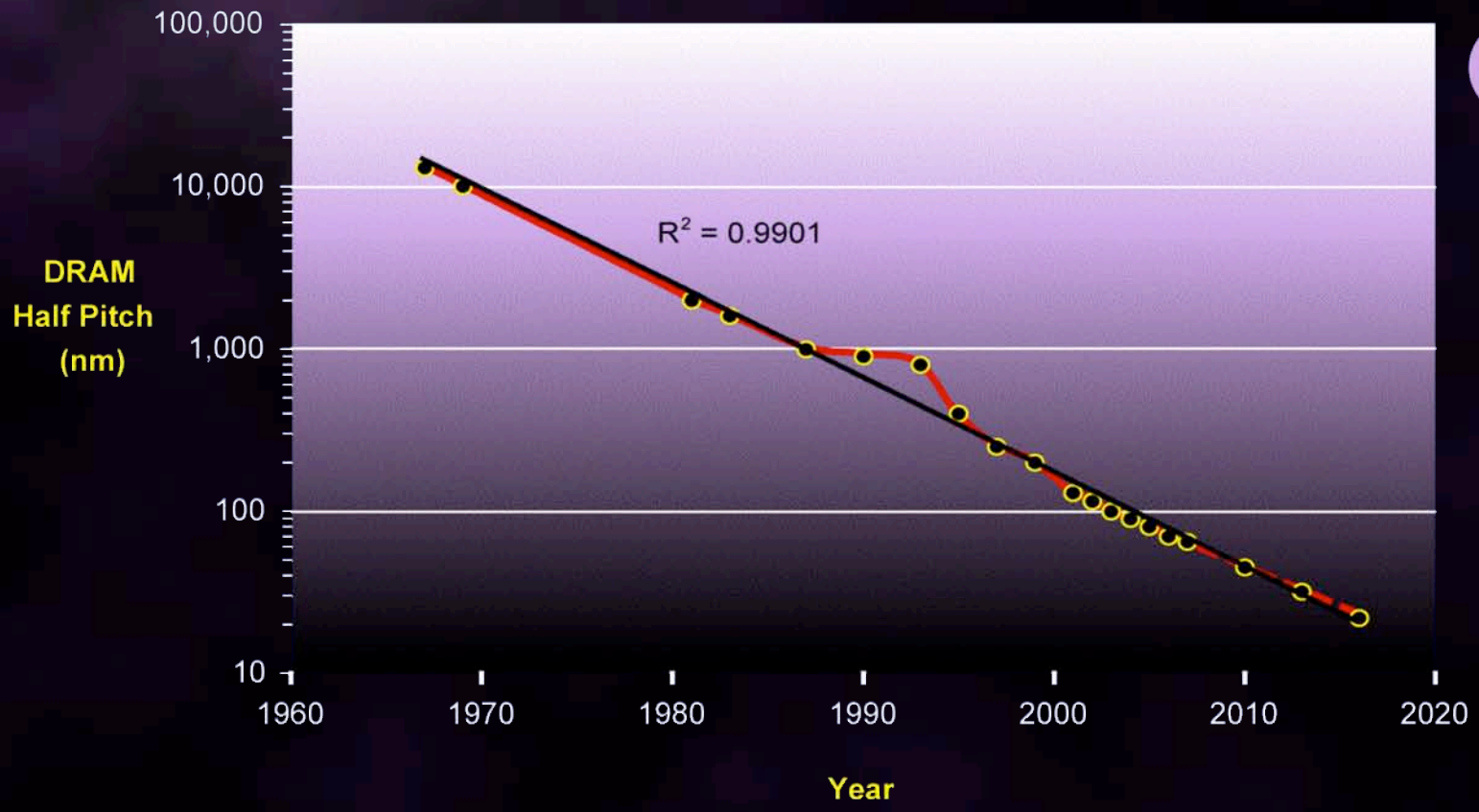
Transistor Manufacturing Costs Falling



Logarithmic Plot

Data from: SEMATCH ITRS Roadmap

Dynamic RAM Memory "Half Pitch" Feature Size

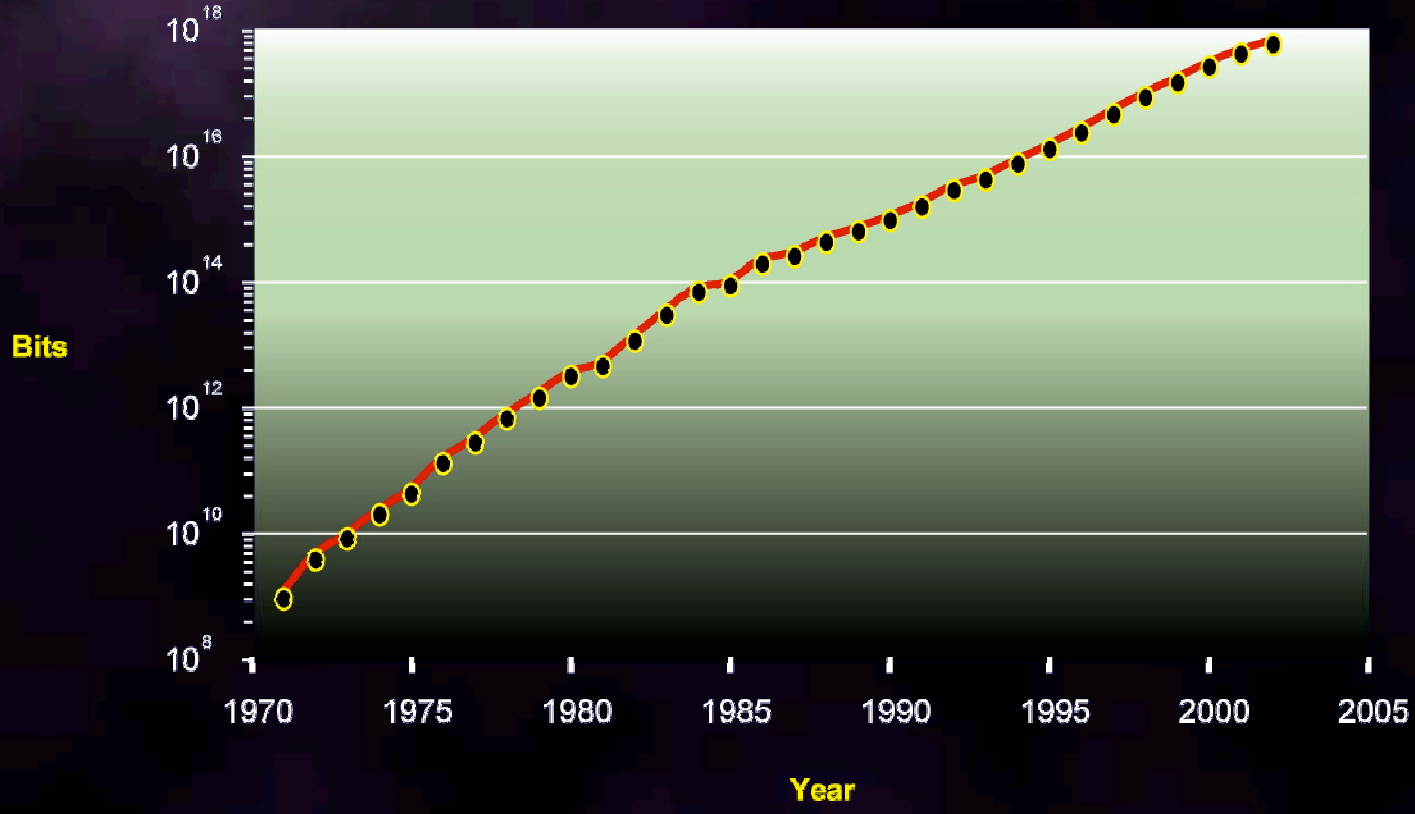


Logarithmic Plot

Data from: Intel, SEMATECH ITRS Roadmap

Halving time: 5.4 years

Total Bits Shipped



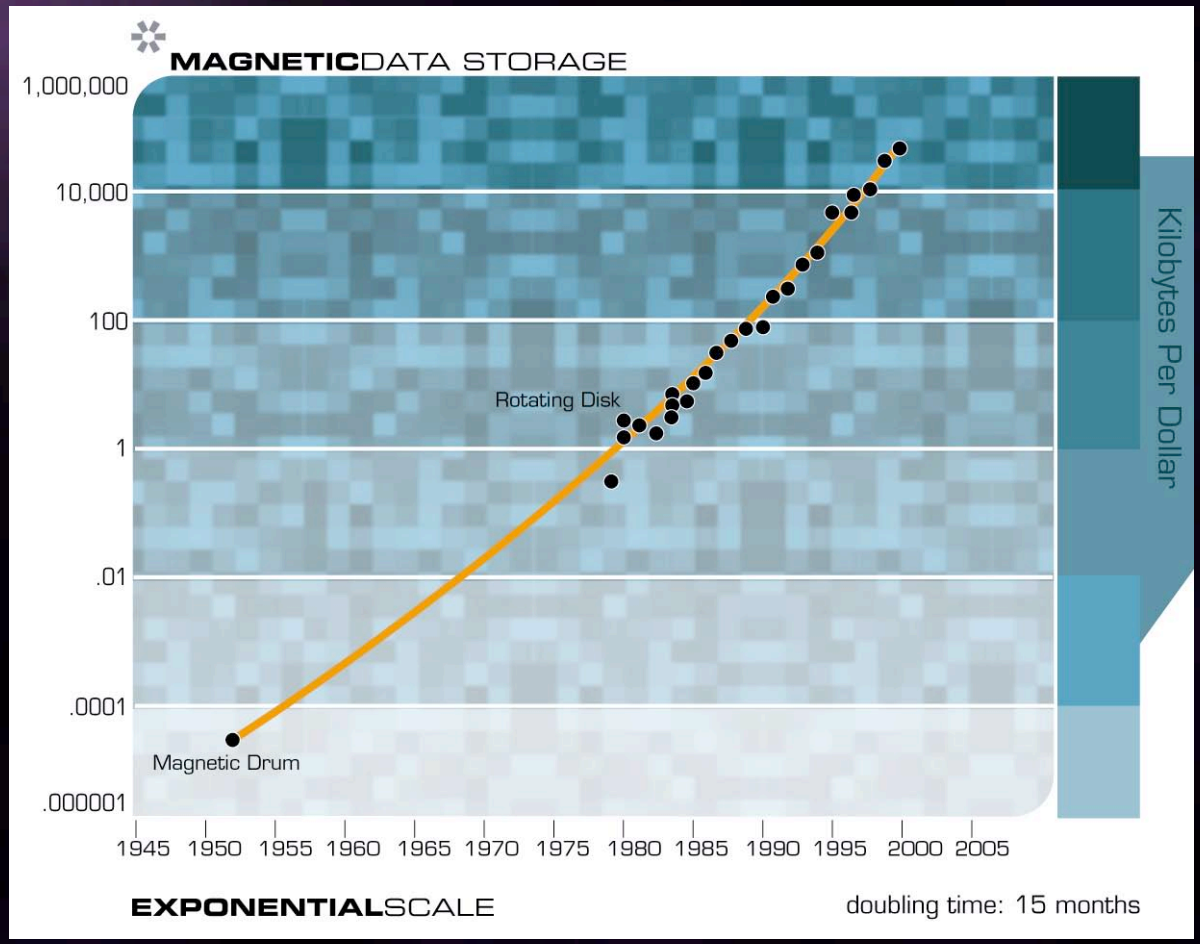
Logarithmic Plot

Data from: In-Stat/MDR

Doubling time: 1.1 years

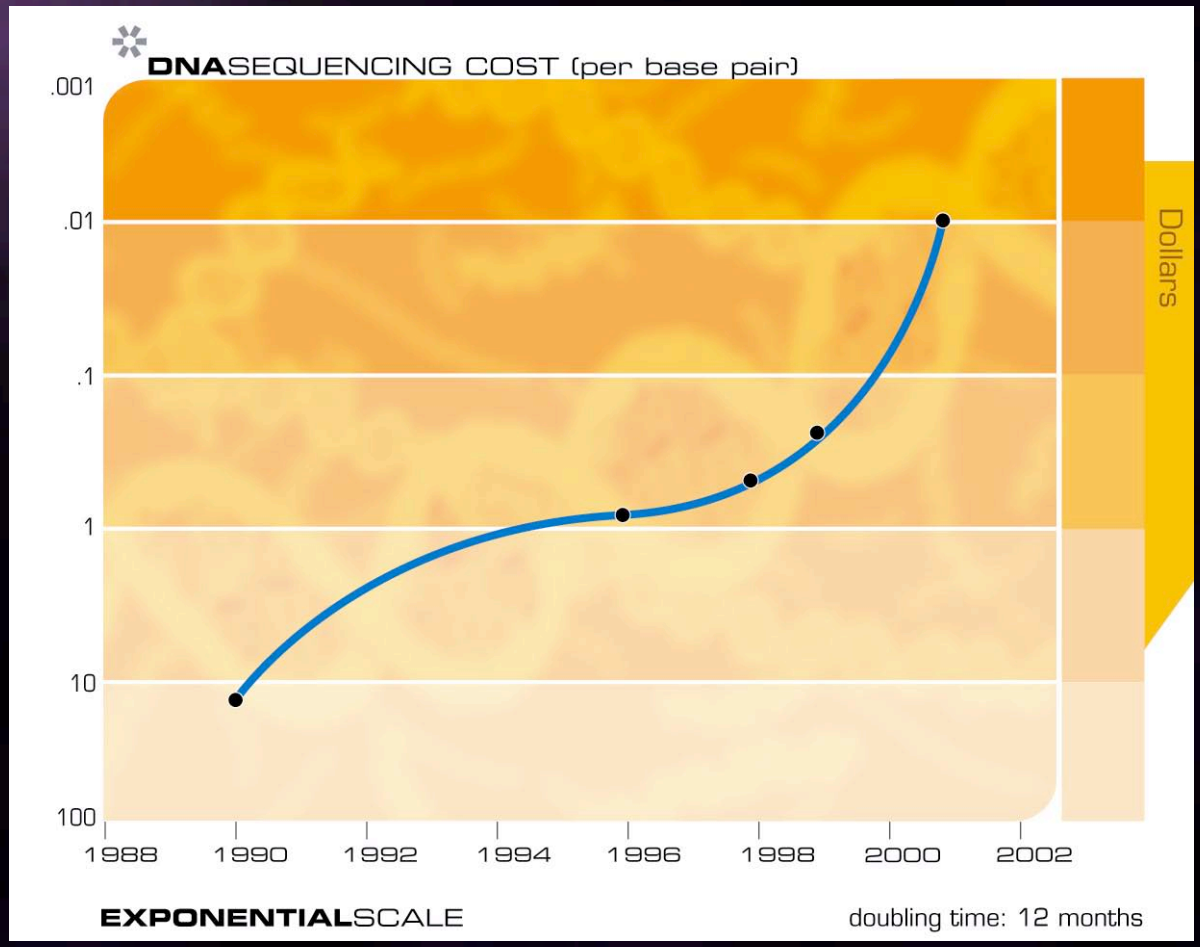
Doubling (or Halving) times

- Dynamic RAM Memory “Half Pitch” Feature Size 5.4 years
- Dynamic RAM Memory (bits per dollar) 1.5 years
- Average Transistor Price 1.6 years
- Microprocessor Cost per Transistor Cycle 1.1 years
- Total Bits Shipped 1.1 years
- Processor Performance in MIPS 1.8 years
- Transistors in Intel Microprocessors 2.0 years
- Microprocessor Clock Speed 2.7 years

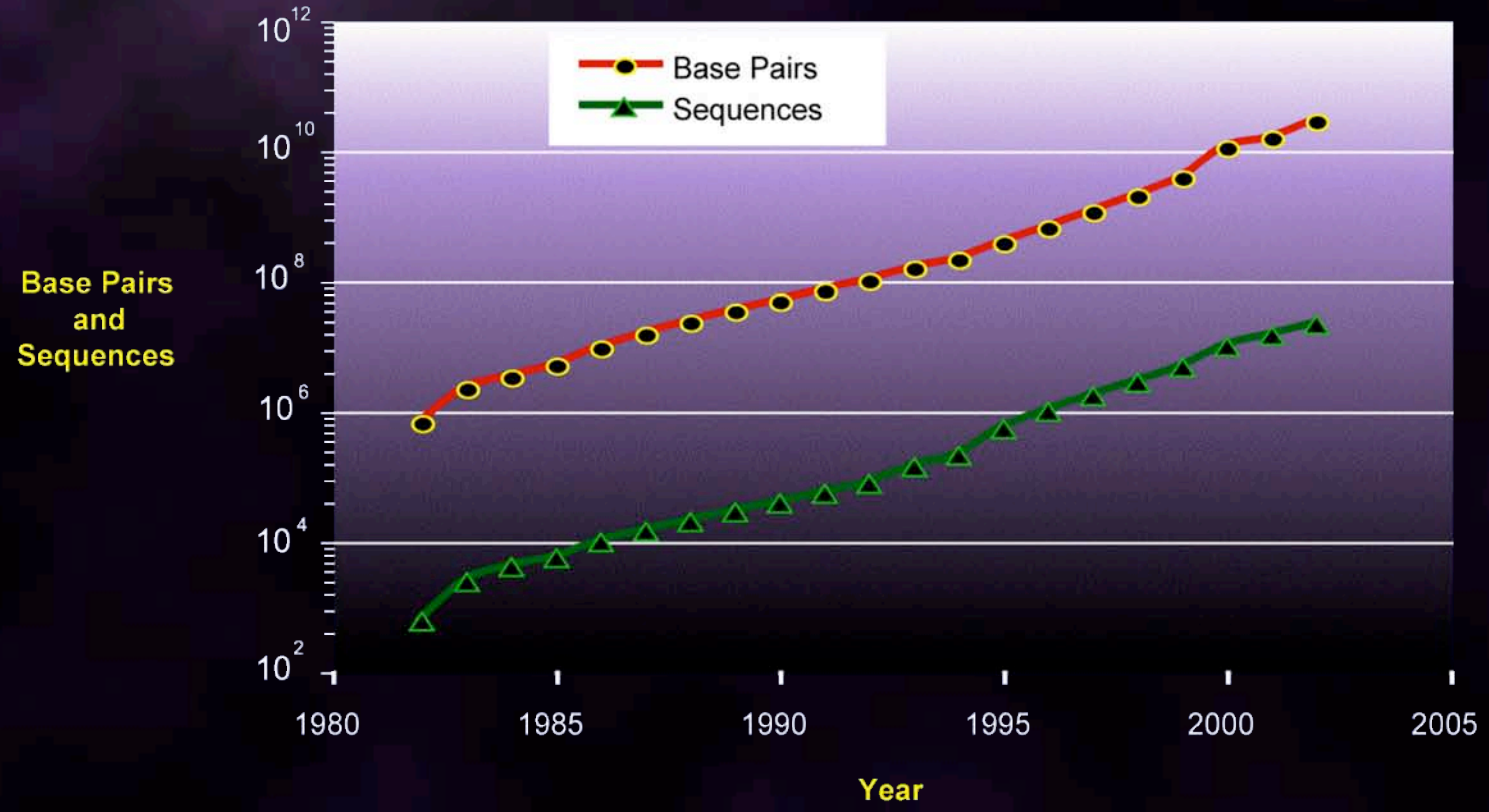

MAGNETICDATA STORAGE
1,000,000
10,000
100
1
.01
.0001
.000001
Rotating Disk
Magnetic Drum
1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005
Kilobytes Per Dollar
EXPONENTIALSCALE
doubling time: 15 months

The Biotechnology revolution:

the intersection of biology with information technology


DNASEQUENCING COST (per base pair)
.001
.01
.1
1
10
100
Dollars
1988
1990
1992
1994
1996
1998
2000
2002
EXPONENTIALSCALE
doubling time: 12 months

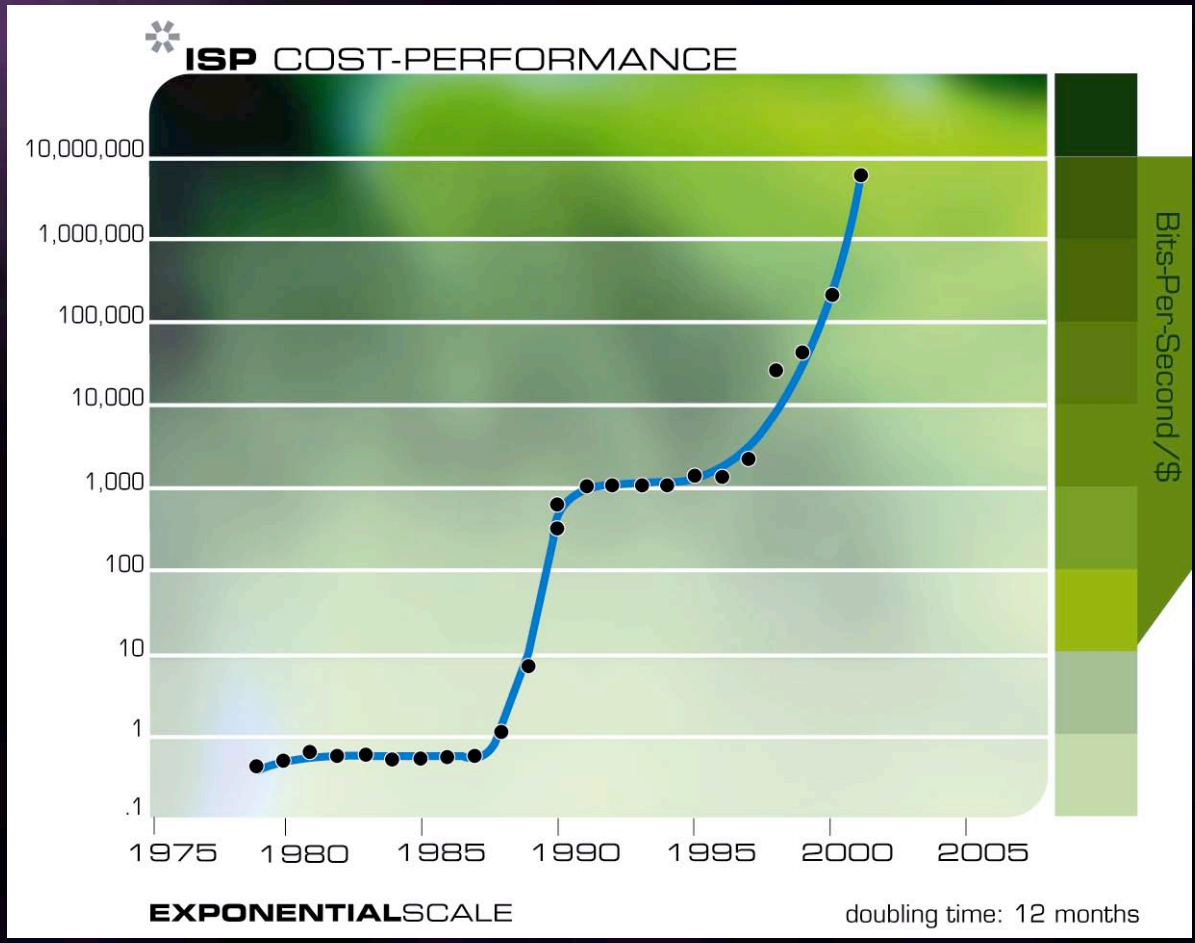
Growth in Genbank DNA Sequence Data



Logarithmic Plot

Data from: GenBank

Every form of communications technology is doubling price-performance, bandwidth, capacity every 12 months


ISP COST-PERFORMANCE
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
.1
1975
1980
1985
1990
1995
2000
2005
Bits-Per-Second/$
EXPONENTIALSCALE
doubling time: 12 months