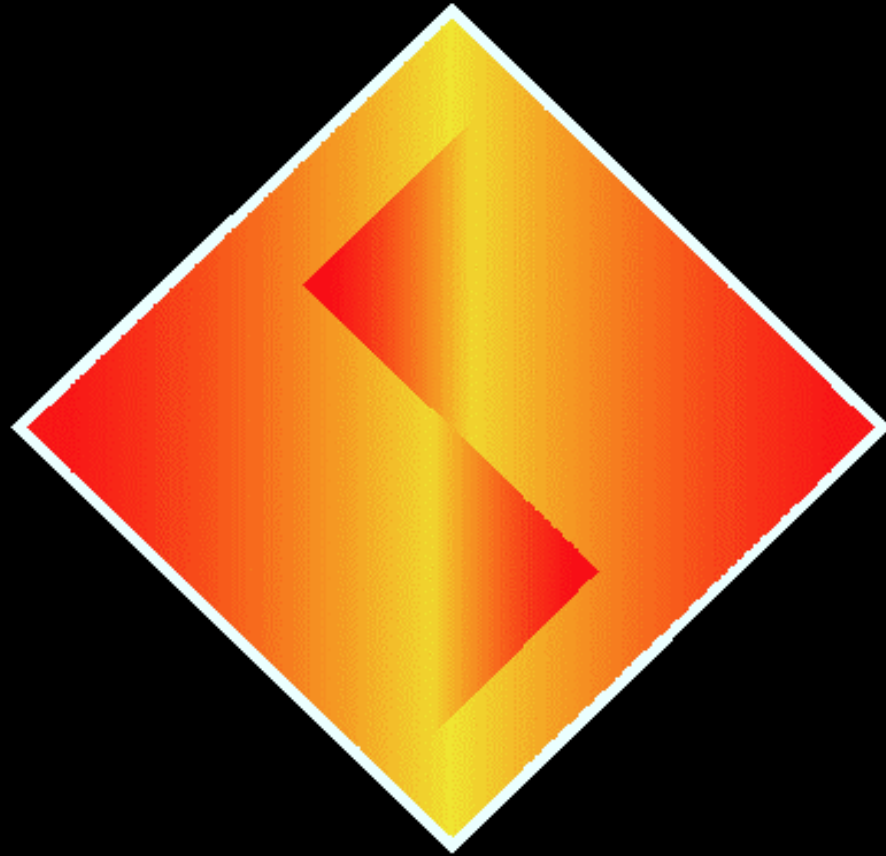


SONY



**COMPUTER
ENTERTAINMENT**



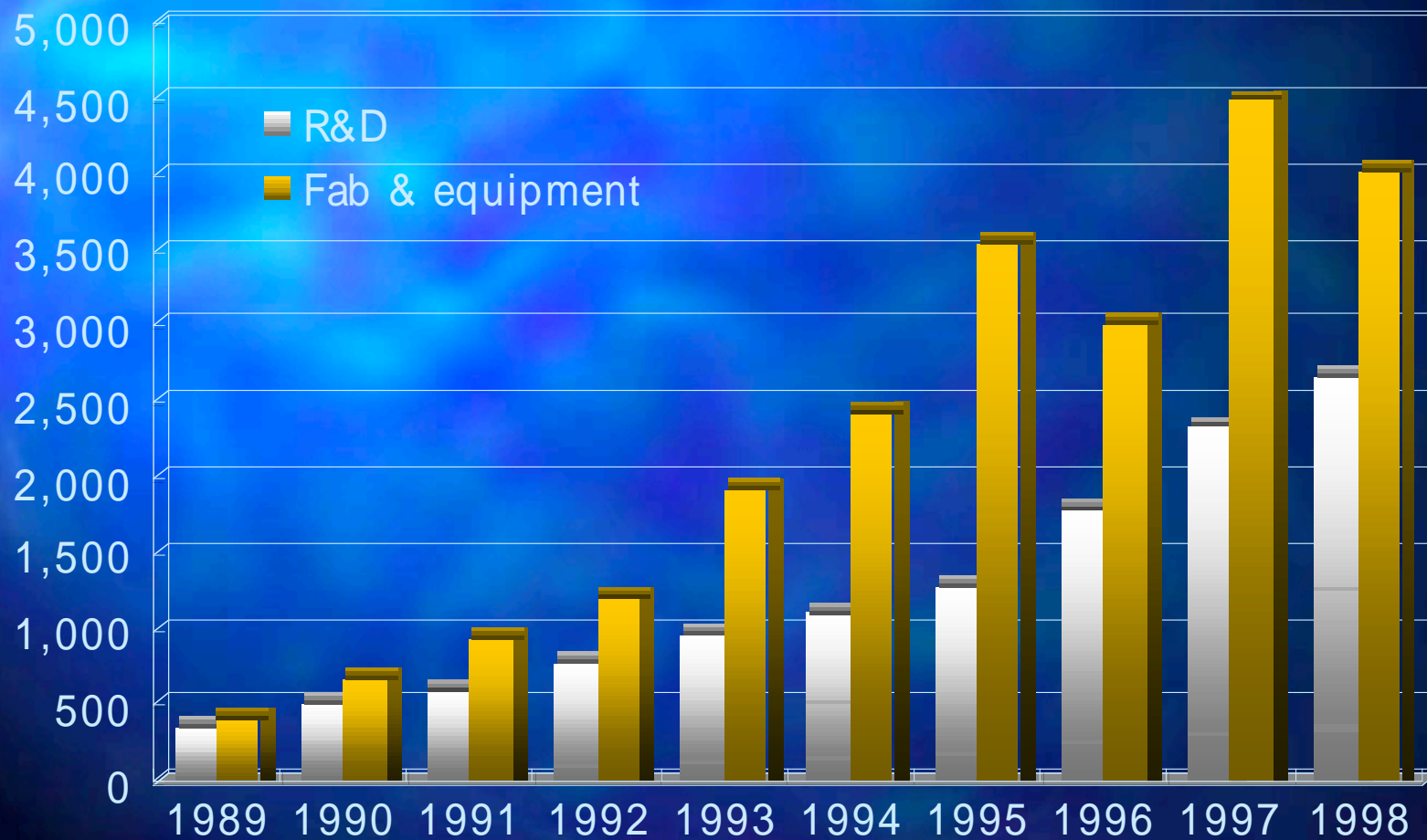
New Millennium for Computer Entertainment

Ken Kutaragi
President and CEO
SONY Computer Entertainment

Intel's Investment



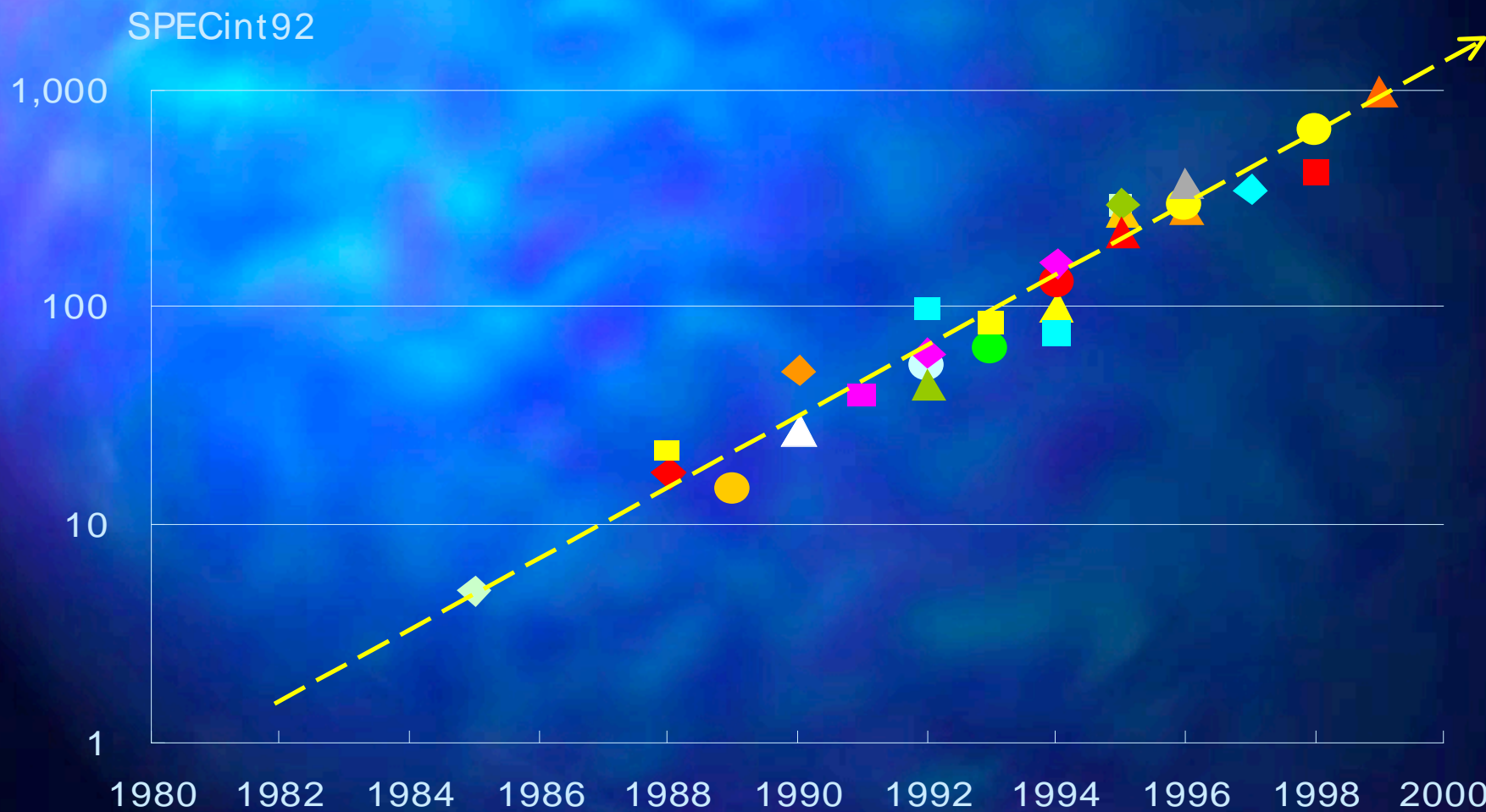
(Dollars in millions)



Intel 1998 annual report

1999 Sony Computer Entertainment, Inc. (C) All rights reserved

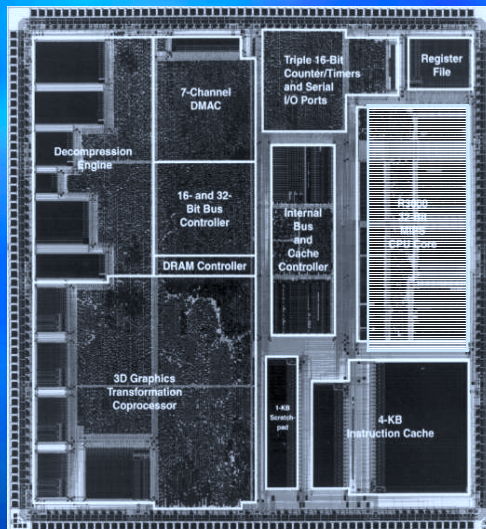
PC Processor Performance



Keep Shrinking

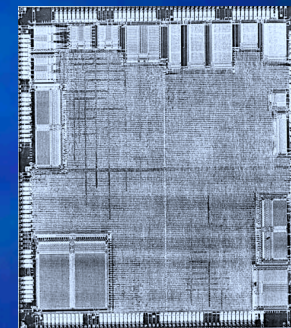


'94



128 mm²
1M transistors
3- Al, 0.6um

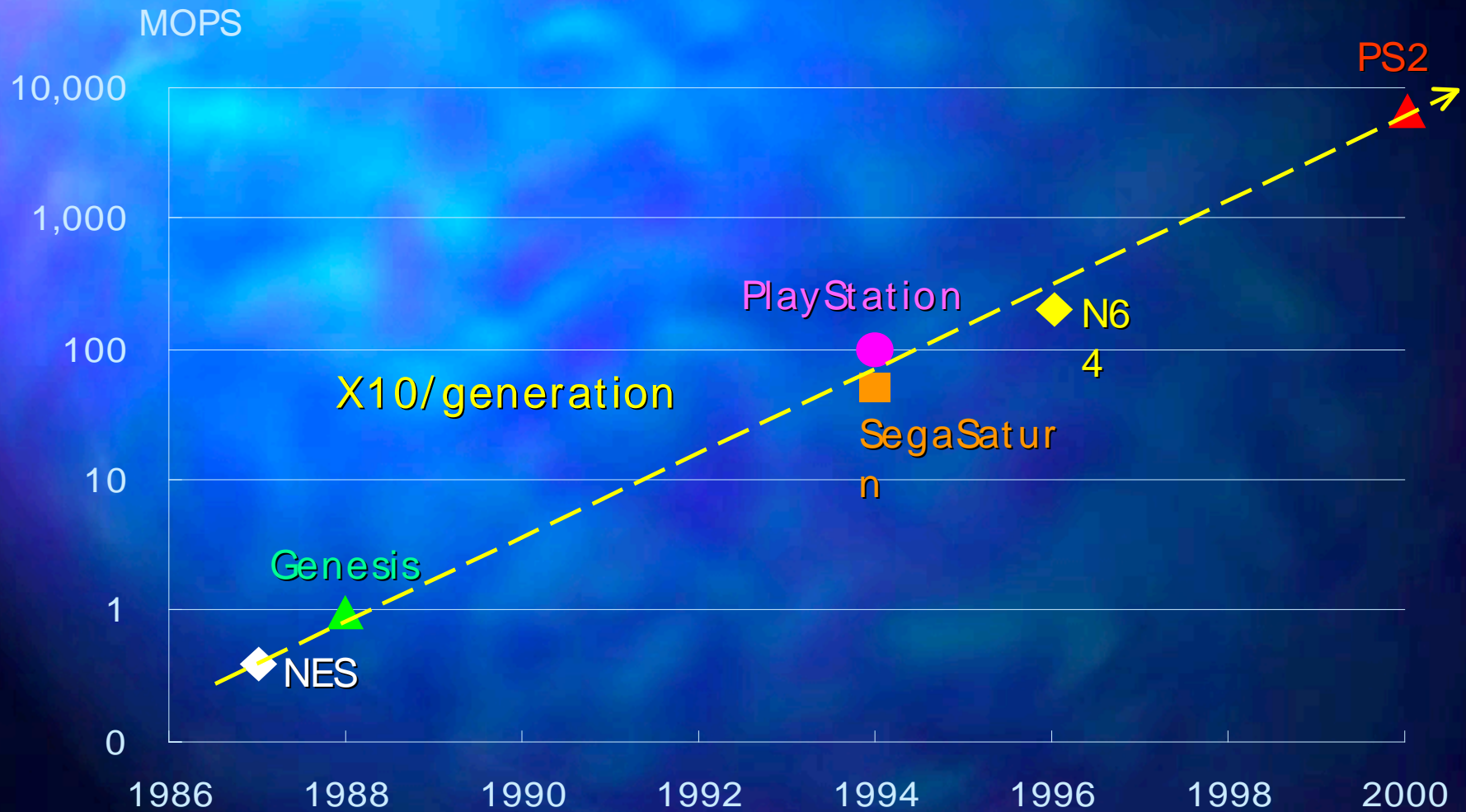
'98



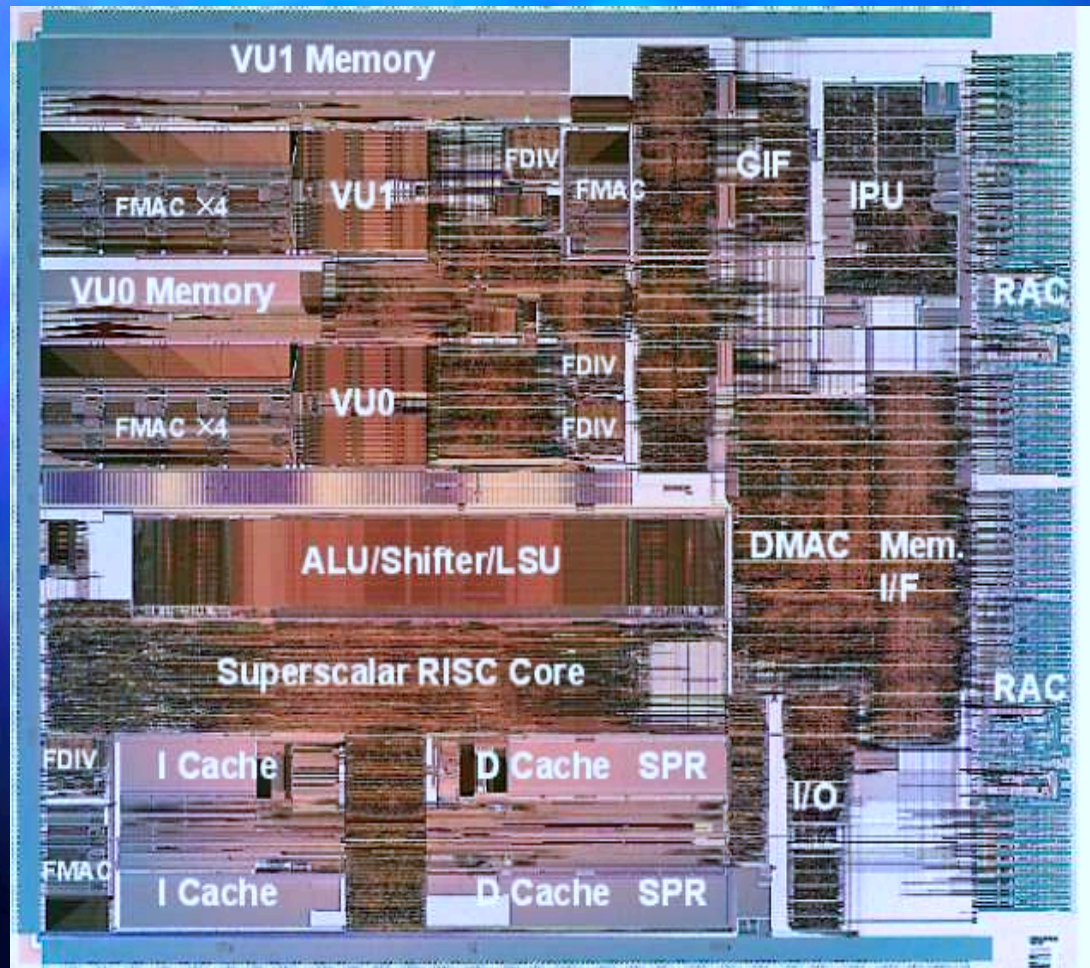
→
5th. Gen.

46 mm²
850K transistors
2- Al, 0.35um

Game Processor Performance



Emotion Engine



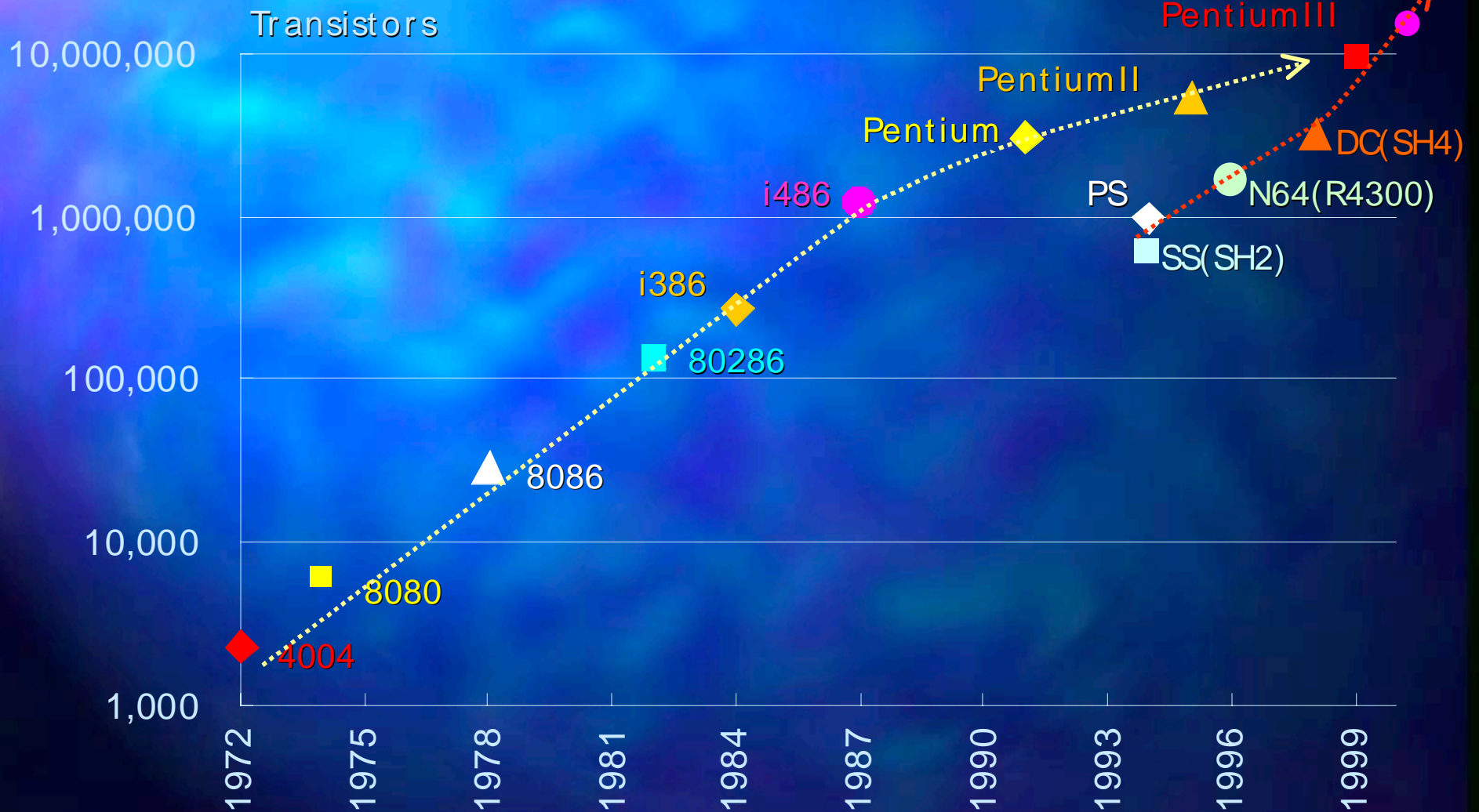
128bit CPU
3.2GB/sec. Bandwidth

6.2GFLOPS
Vector Units and FPU

17.0Å 14.1mm
10.5 million transistors

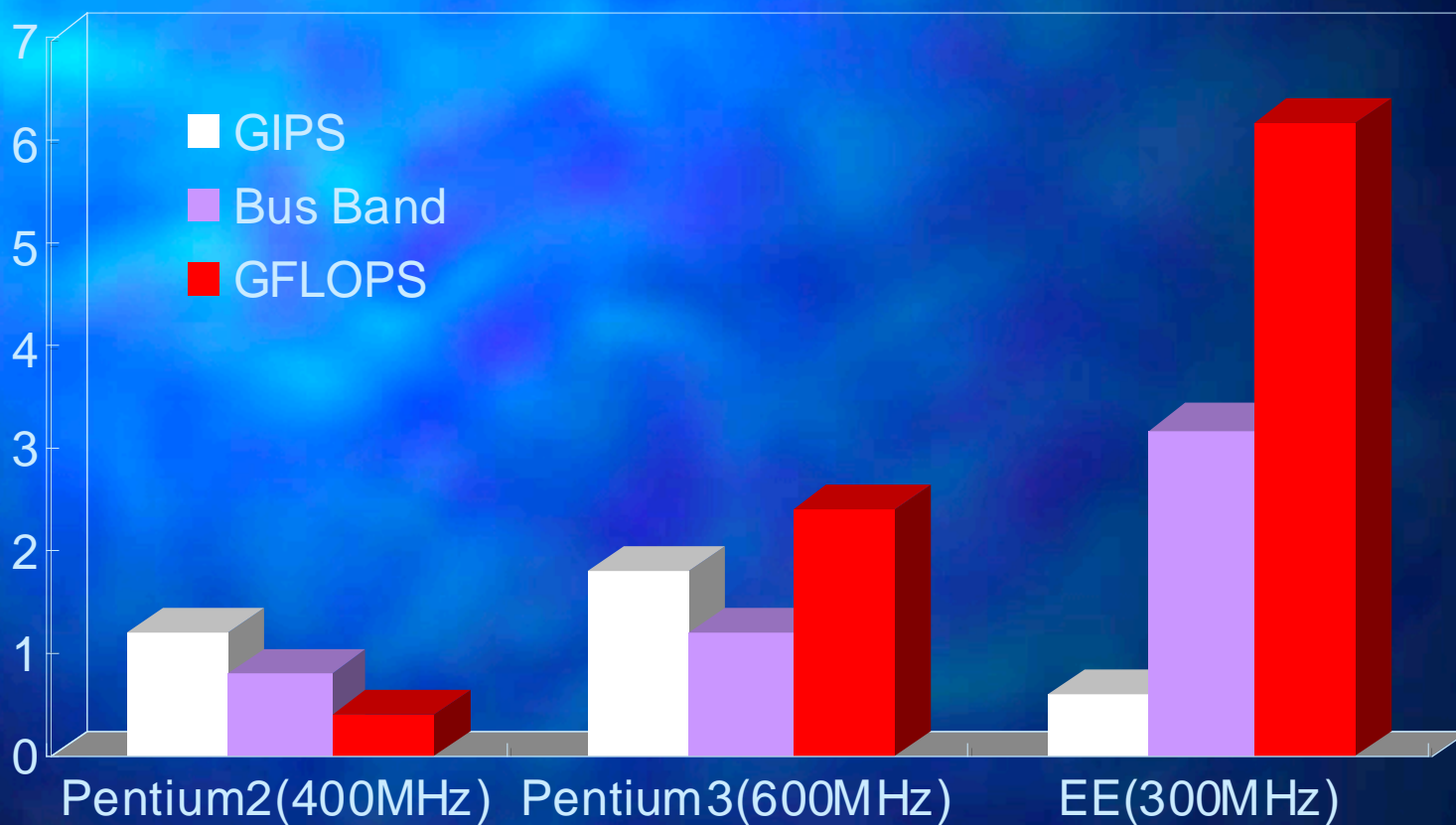
0.25um (gate: 0.18um)
15W @ 1.8V
4 metal layers
540 pin PBGA

Total Transistors

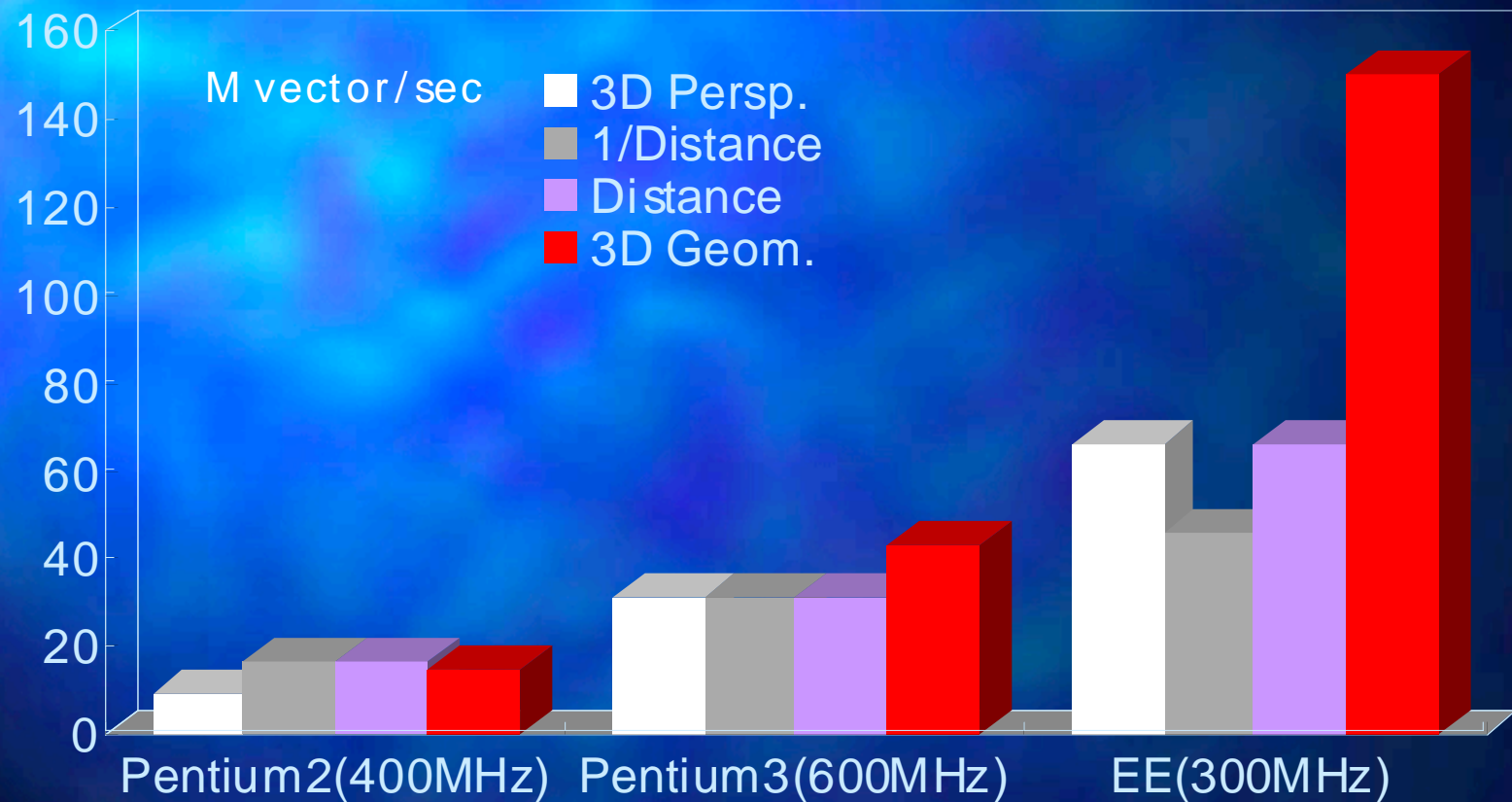




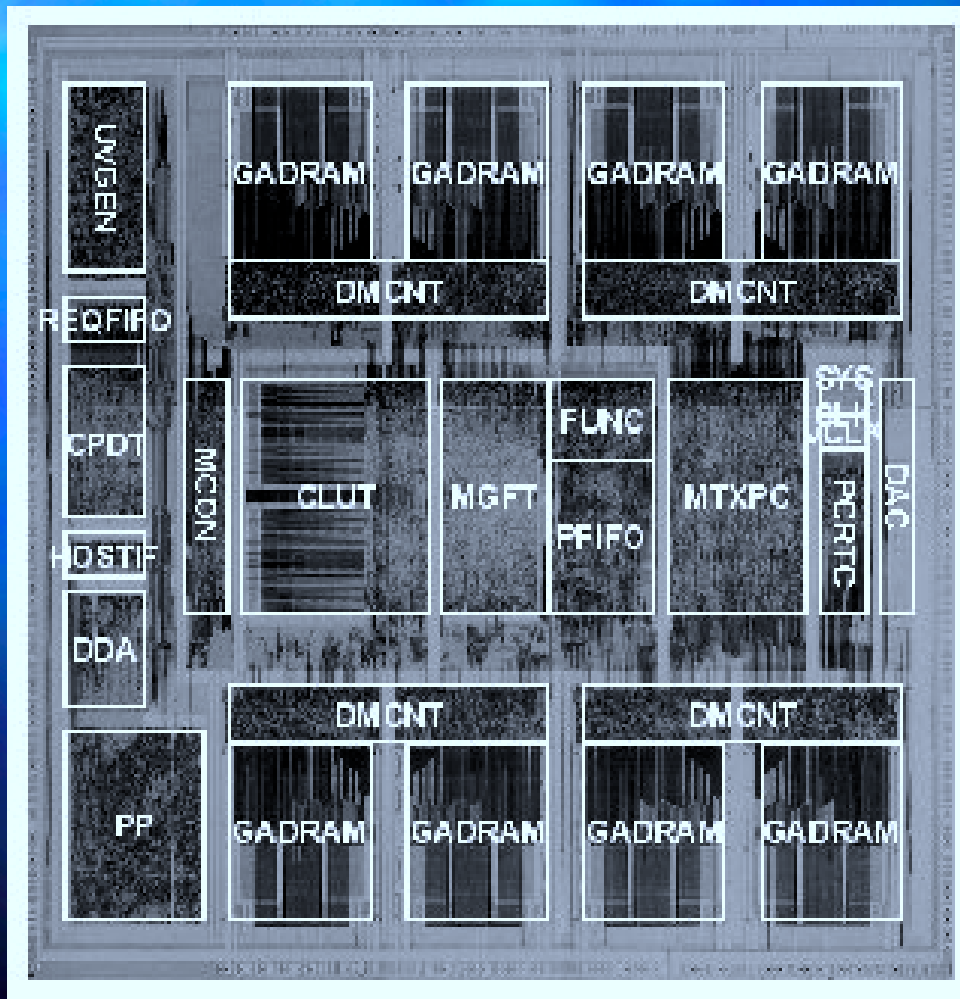
Peak Performance



Floating Point Vector Calculations



Graphics Synthesizer



75 Million polygon/sec.

2,560 bit/width eDRAM

279 mm²

42.7 million transistors

0.25um (0.25um/gate)

10W @1.8V

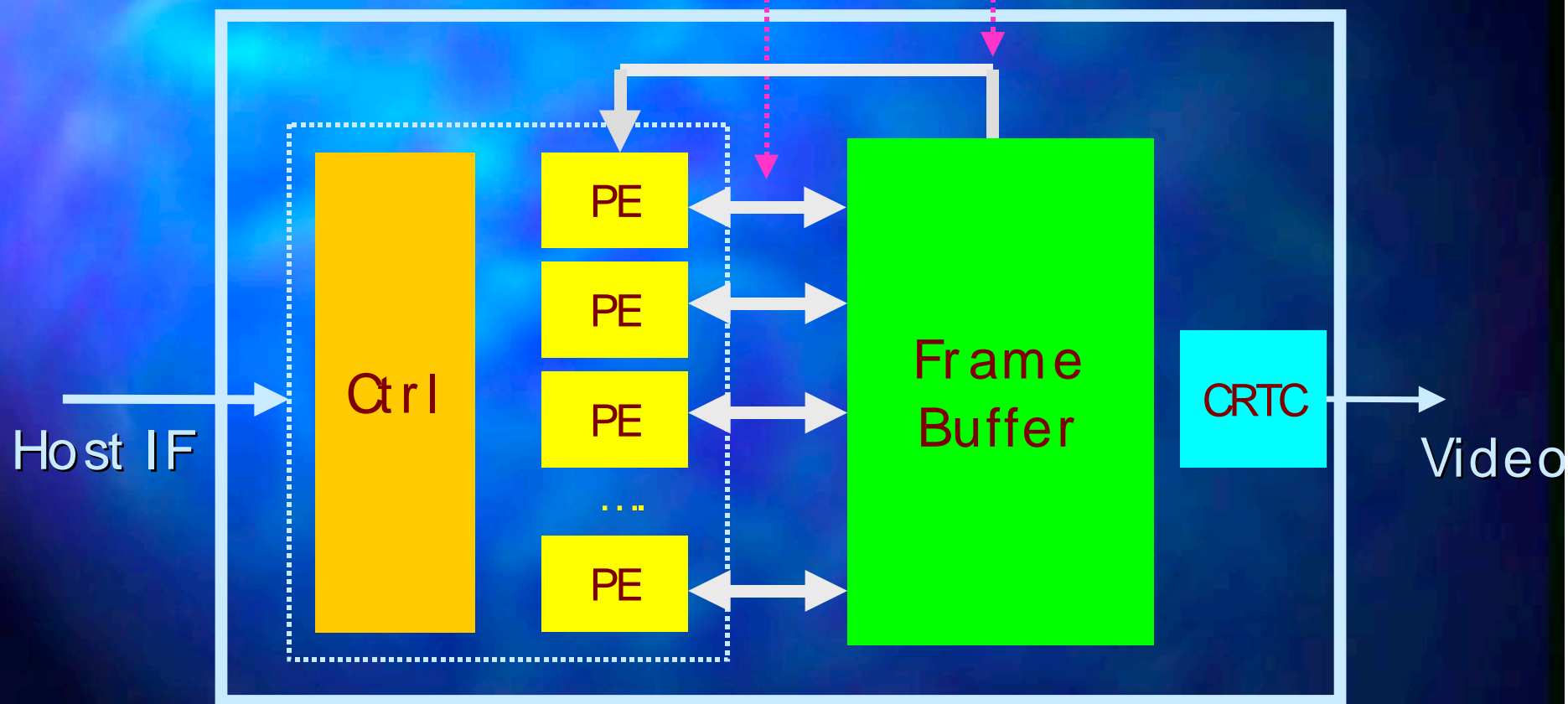
5 metal layers

384 pin BGA



Massive bit-width

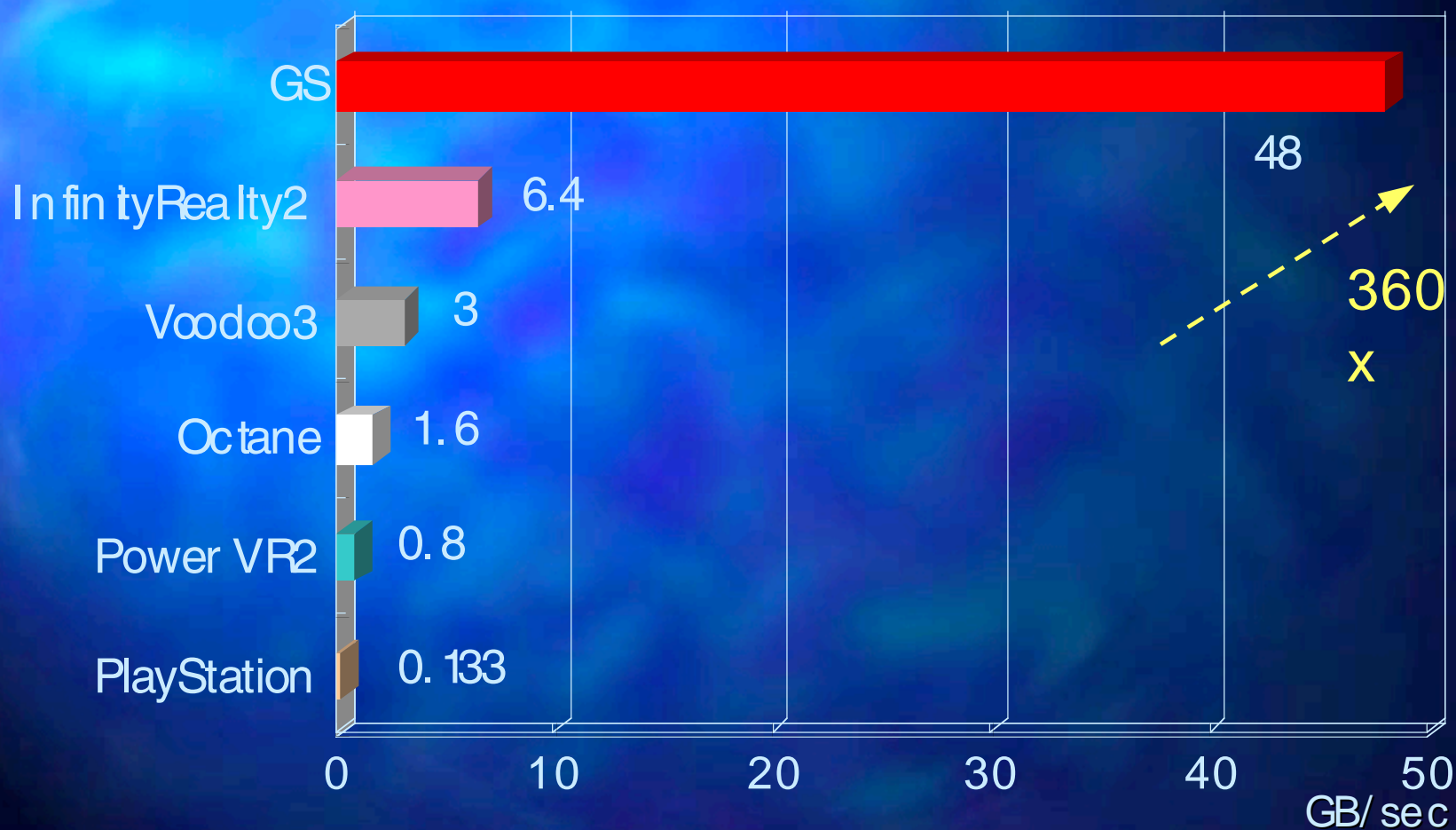
$$2048\text{bit} + 512\text{bit} = 2560\text{bit}$$



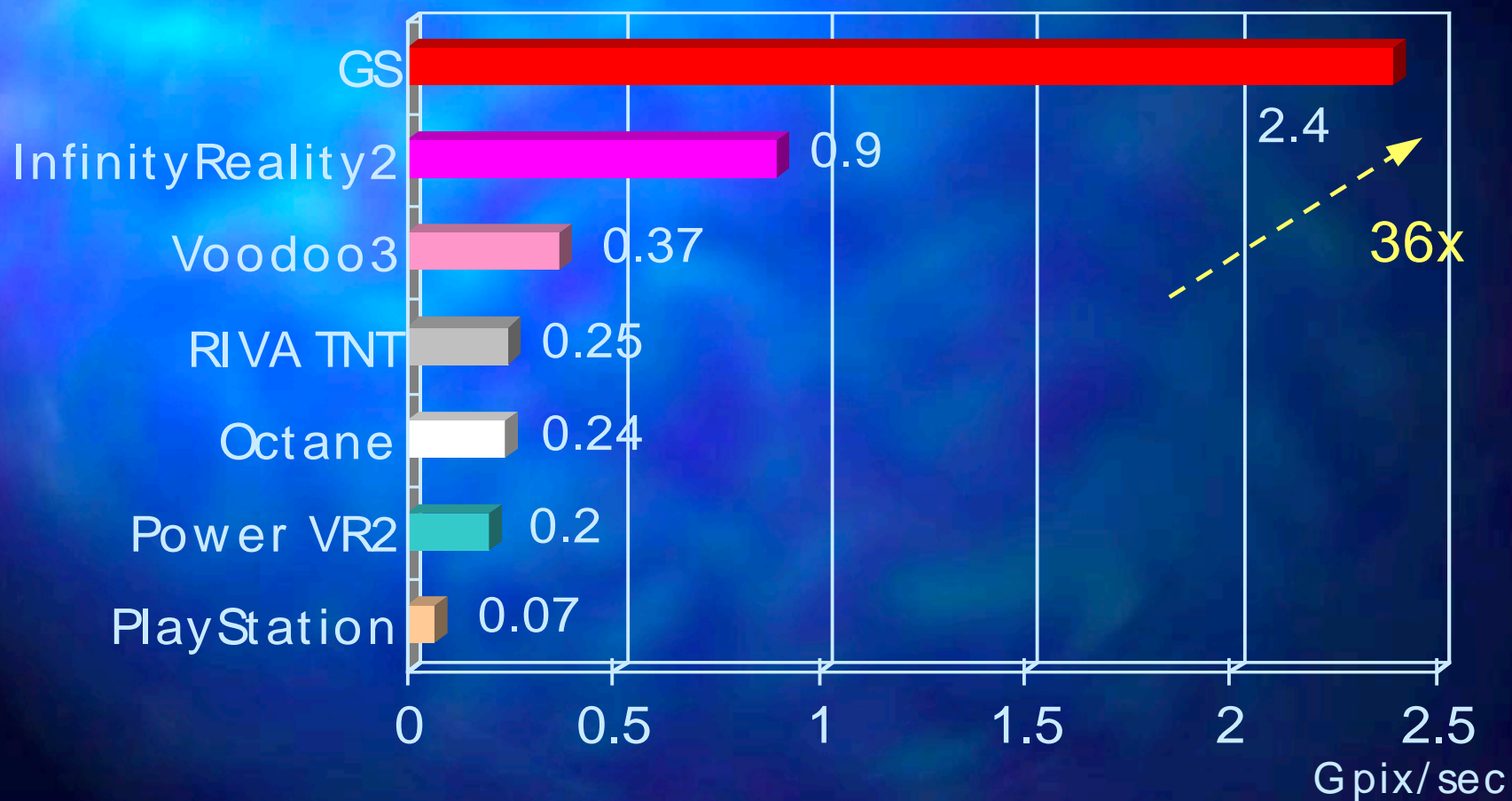
Rendering Engine



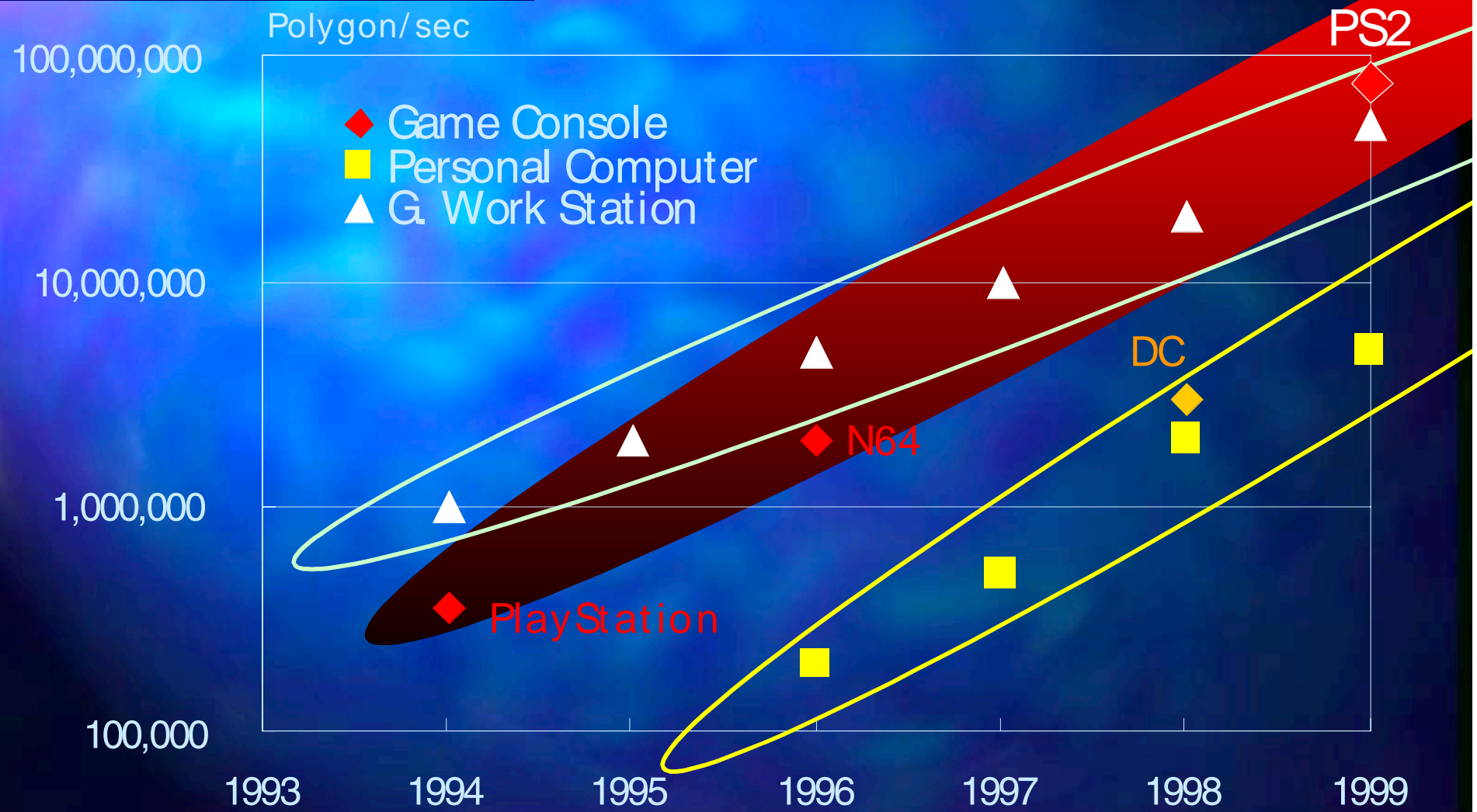
VRAM Bandwidth



Pixel Fill Rate



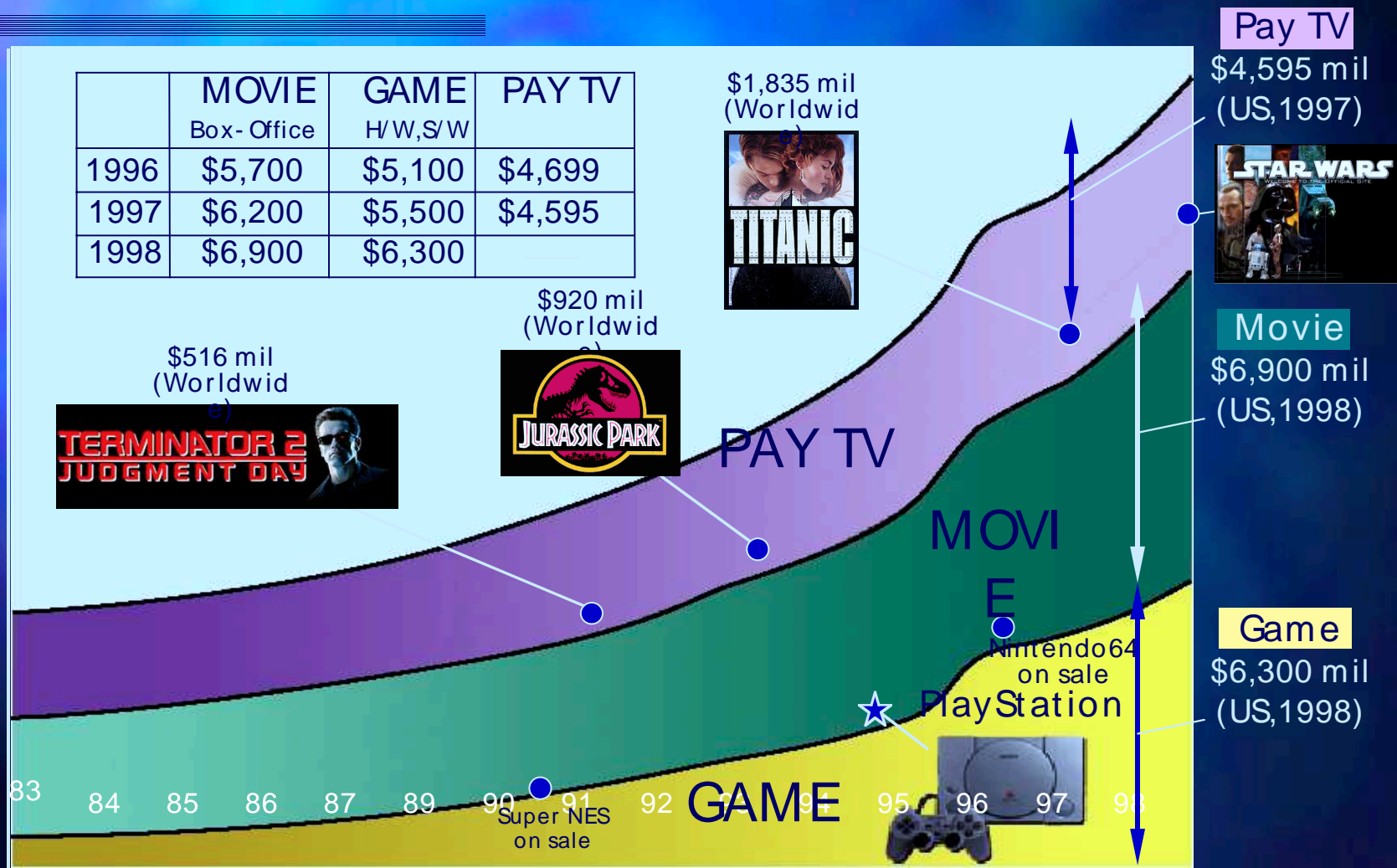
Polygon Rendering Performance





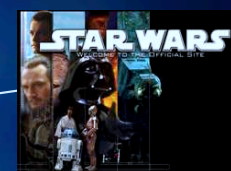
Entertainment Expenses

| | MOVIE Box- Office | GAME H/W,S/W | PAY TV |
|------|----------------------|-----------------|---------|
| 1996 | \$5,700 | \$5,100 | \$4,699 |
| 1997 | \$6,200 | \$5,500 | \$4,595 |
| 1998 | \$6,900 | \$6,300 | |



Pay TV

\$4,595 mil
(US,1997)



Movie

\$6,900 mil
(US,1998)

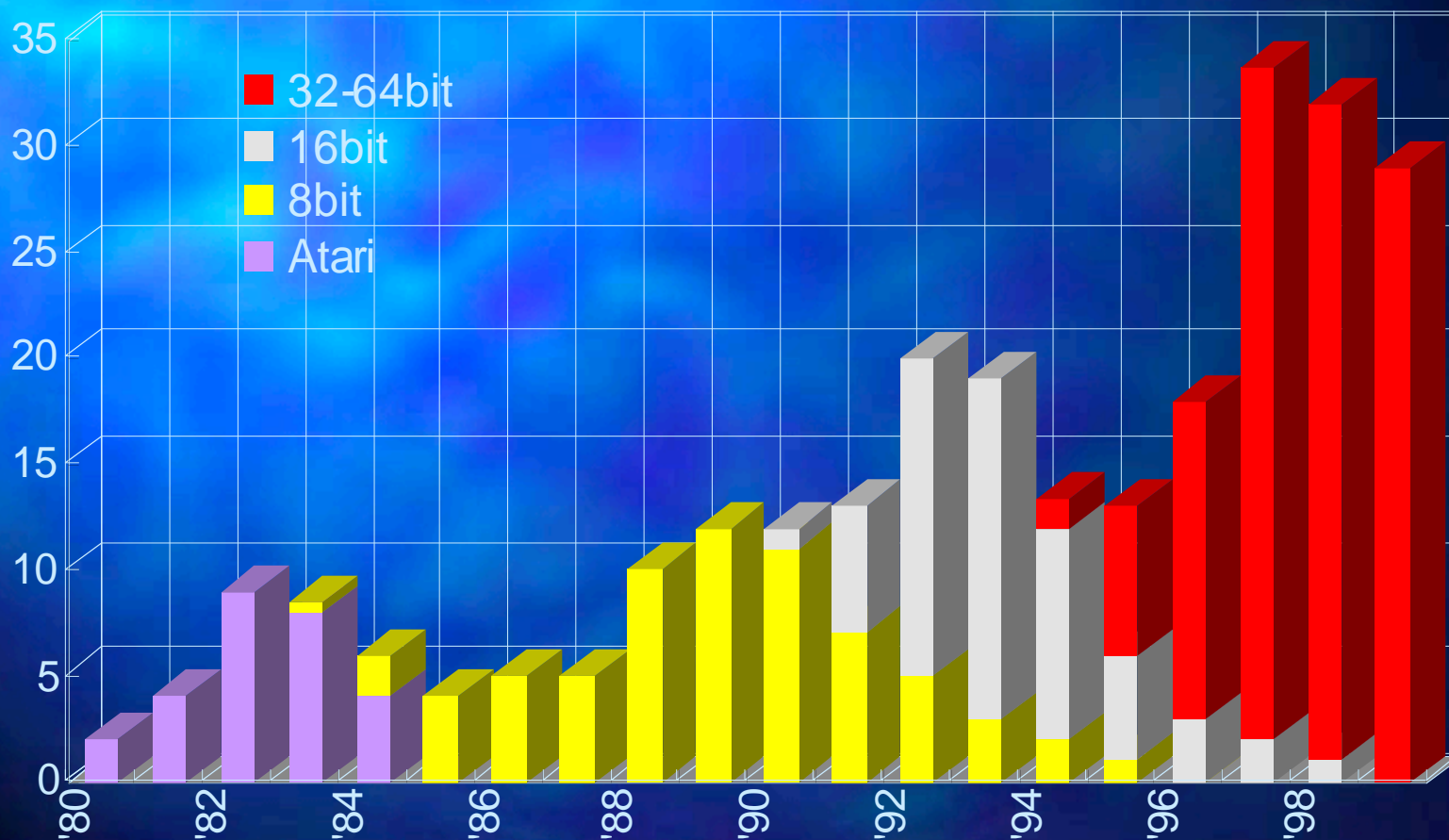
Game

\$6,300 mil
(US,1998)

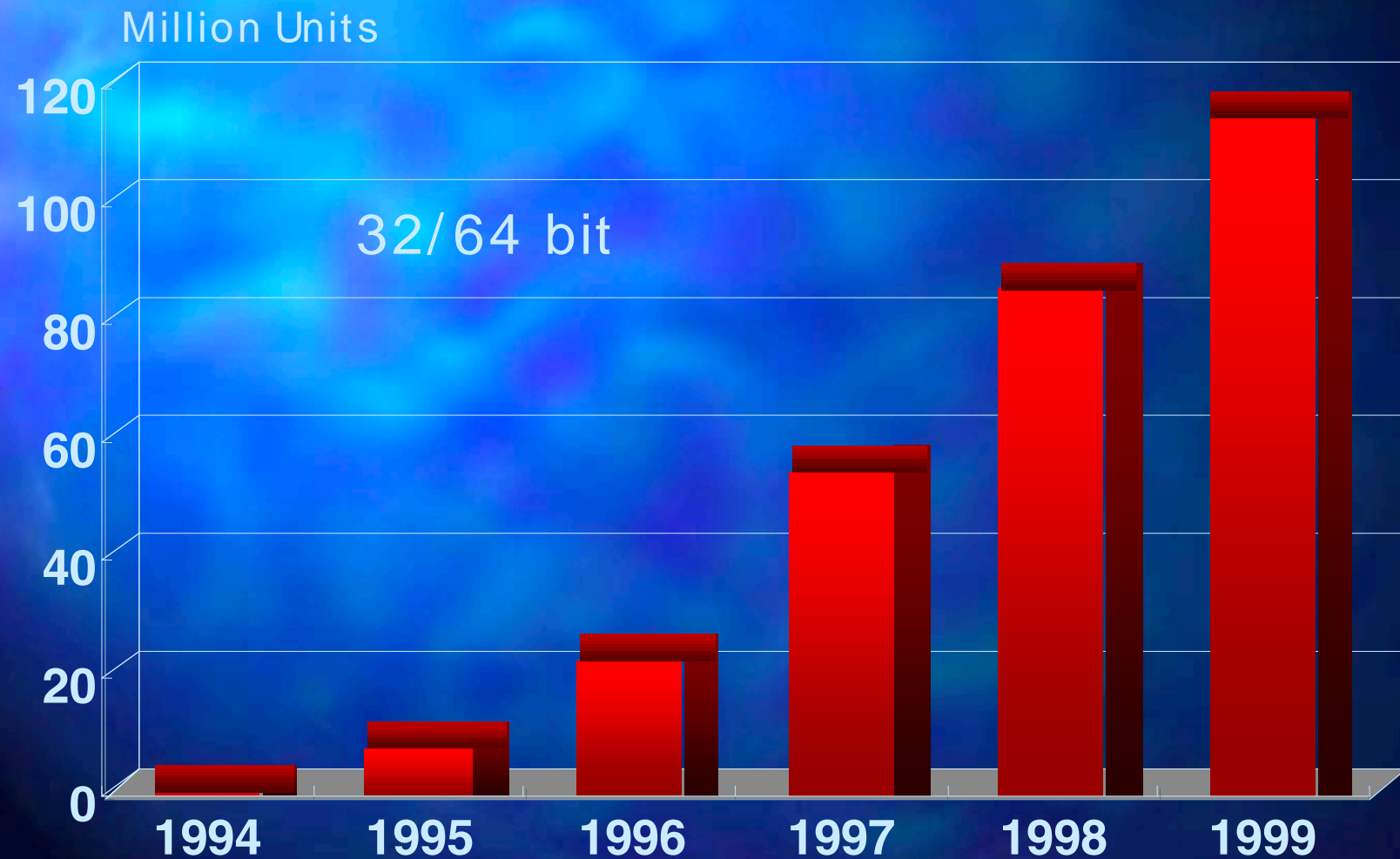


Video Game Hardware

(million units/year, flow)



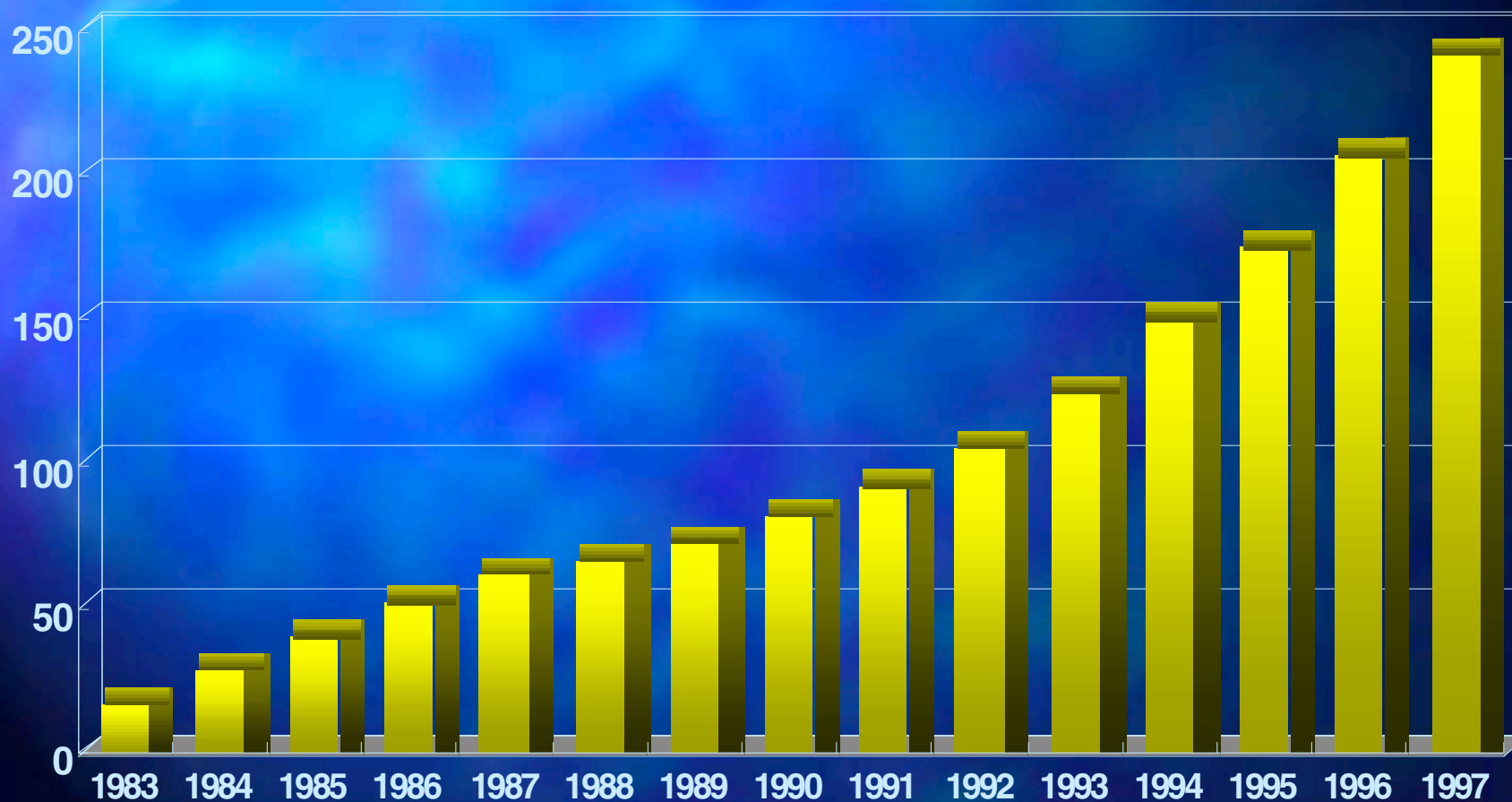
Video Game Installed Base





PC Installed Base

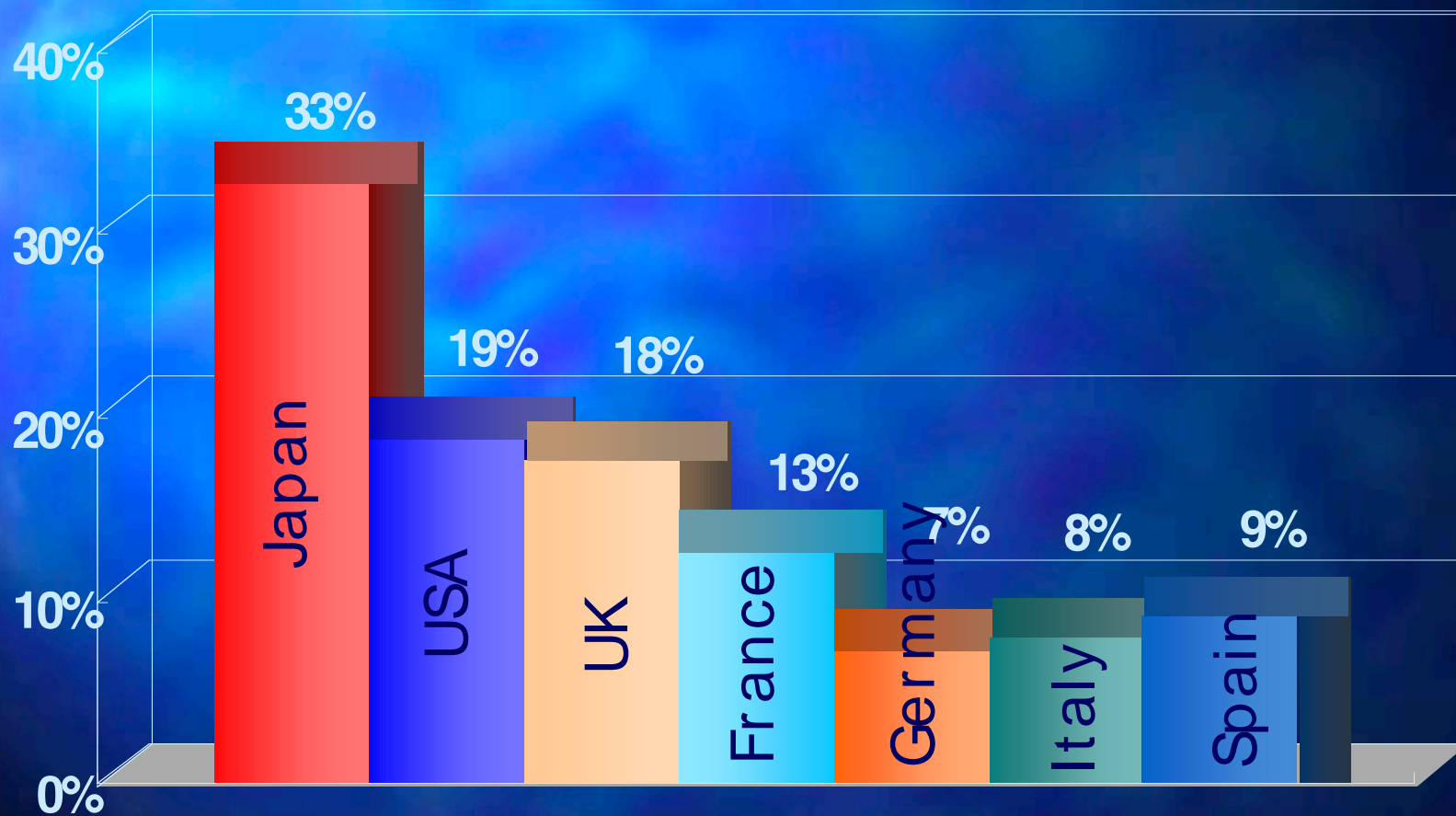
Million Units / World Wide



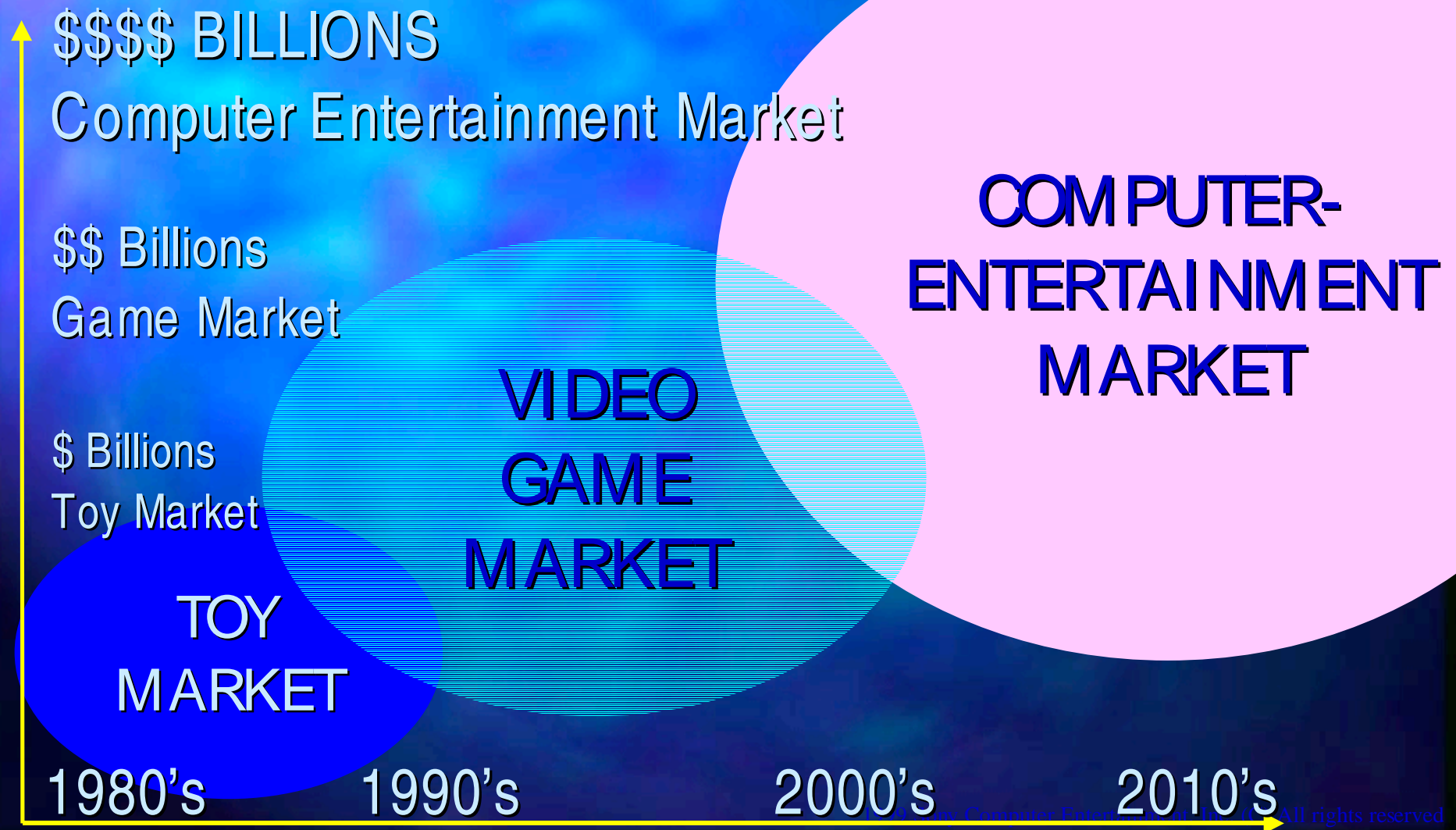
PS in TV Homes



as of Mar.1999



Emergent Market



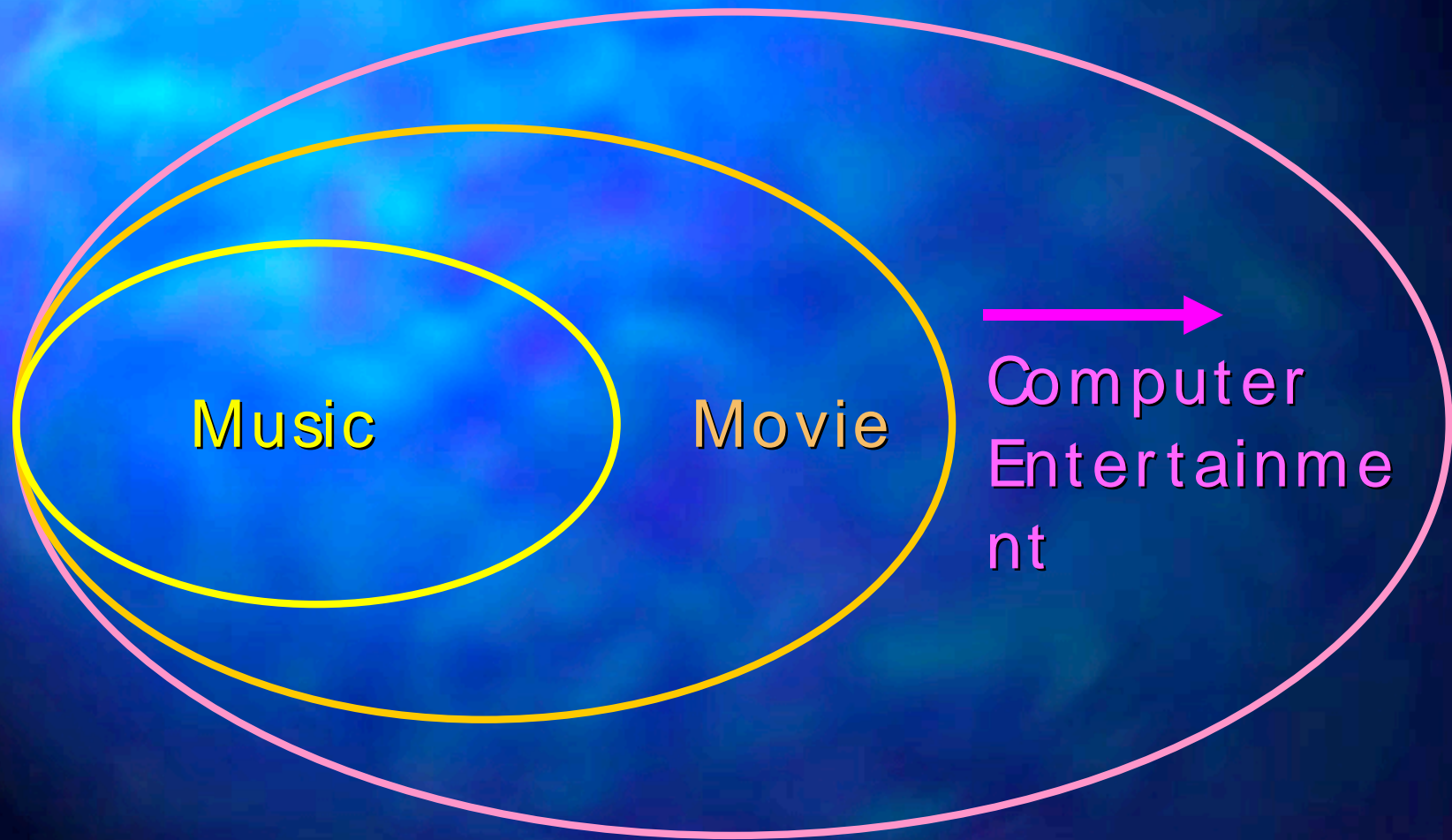
COMPUTER-ENTERTAINMENT MARKET

VIDEO GAME MARKET

TOY MARKET

1980's 1990's 2000's 2010's

Our Vision



Concept



□ 1988

“Sound Synthesis”

□ 1994

“Graphics Synthesis”

□ 2000

“EMOTION SYNTHESIS”

Real-time Media Trend



Era of Media Transformation

- Sprite (2D)
- Polygon (3D)
- Sound Waveform
- Animation Script
- 2D Photo
- Video

4 bit 8 bit 16 bit 32 bit 128 bit

Real-time Media Trend



Era of Media Synthesis →

- Algorithmic generation
- Skeletal Physical Modeling
- Inverse Kinematics
- Physical Dynamics
- Behaviors
- Emotion

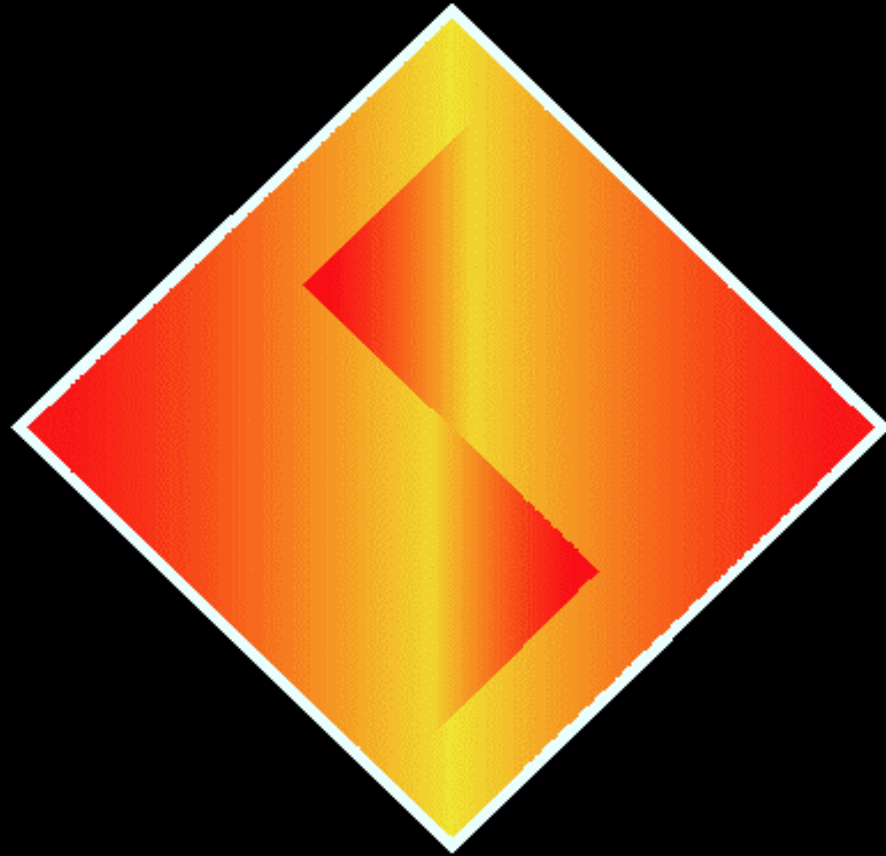
4 bit 8 bit 16 bit 32 bit 128 bit



Next Generation PlayStation

DEMONSTRATION

SONY



**COMPUTER
ENTERTAINMENT**