

# IBM System/360 - 1964



# IBM System/360 overview



- Announced in 1964
- First shipped in 1965
- Six models initially announced (ultimately more than a dozen shipped)
- 40 compatible peripherals
- 100 other devices (e.g., 029 card punch)

# Before System/360

- **Every machine was custom**
  - Basic market target
    - Business, scientific
      - For IBM, the 1401 character-oriented business machine, and the 7090 / 7094 scientific machine
- **Word length**
  - 16 bits, 20 bits, 32 bits, 36 bits, variable
- **Arithmetic**
  - Binary, decimal
- **Operand addressing**
  - 1-address, 2-address, 3-address
- **Registers tended to be special-purpose (accumulator, index, PC)**
- **Operating system**

# System/360 innovations

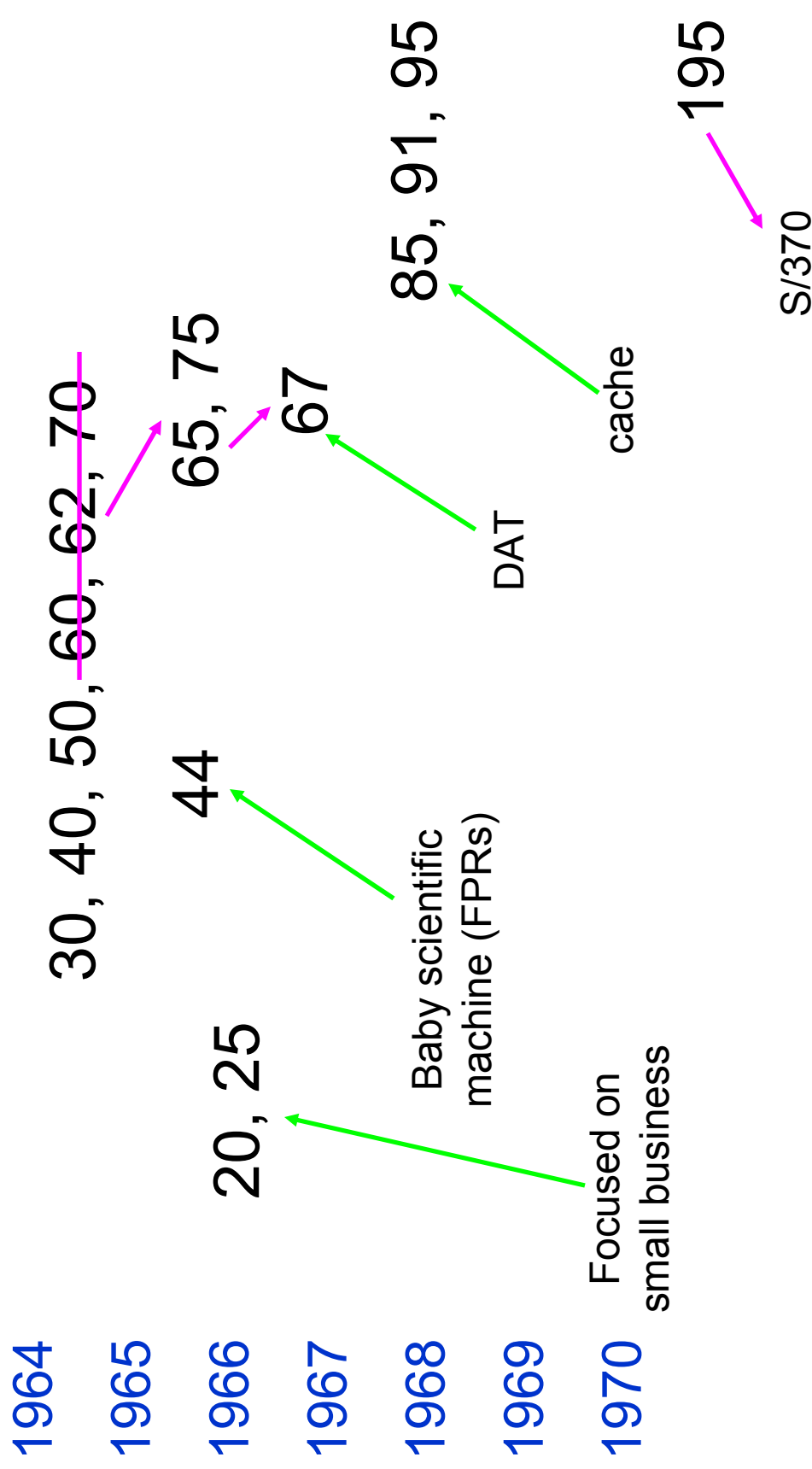
- 8-bit byte
- Byte-addressable memory
- 32-bit words
- 2's complement arithmetic
- Commercial use of microcoded CPUs
- IBM Floating Point Architecture
- EBCDIC character set
- I/O architecture (channels), PSW, SVC
- Many brilliant tradeoffs (e.g., instruction format, halfword alignment, etc.)
- *A family*

# Performance range at announcement

- Core memory: 8K bytes -> 8M bytes (x1000)
  - 60x previous largest available
- Cycle time: 1 usec -> 200 nsec (x5)
- Processing speed: x50
  - From 1401 to 2x previous fastest IBM system

(Far greater performance range over time)

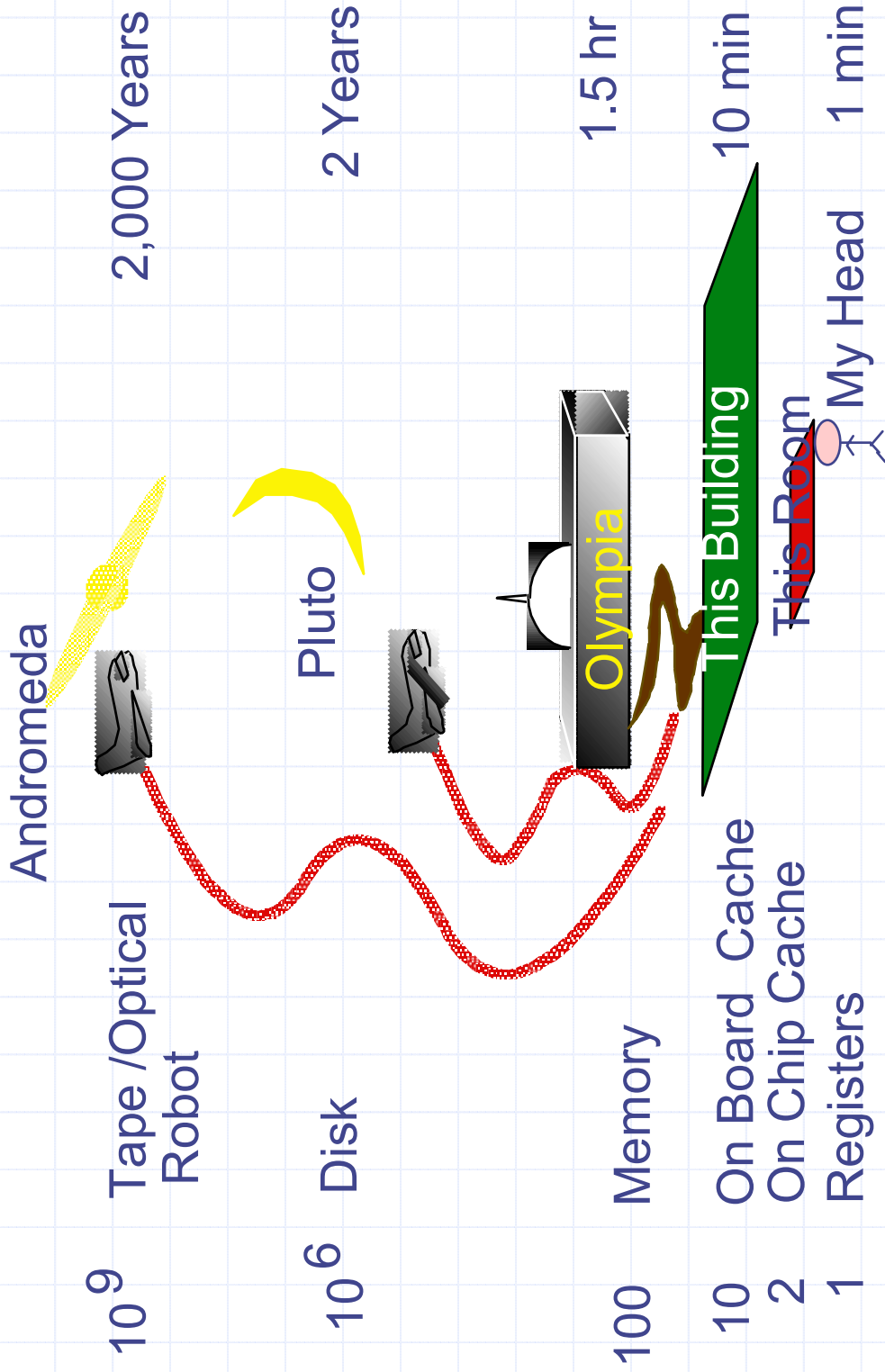
# IBM System/360 family





■ IBM 2314, 1965	■ From Dell, 2006	■ Improvement ratio
■ 233MB	■ 500GB	■ 2000
■ \$256,000 (x6!)	■ \$300	■ 5000
■ 60 msec latency	■ 10 msec latency	■ 6
■ .312 MB/sec xfer	■ 375 MB/sec xfer	■ 1000
■ \$1099/MB (x6!)	■ \$0.0006/MB	■ 10,000,000

# Storage Latency: How Far Away is the Data?





# IBM System/360 people

- Fred Brooks, project manager



- Gene Amdahl, architect



- Gerry Blaauw, architect  
(many aspects incl. Model 67)



- 819 pages of further information ...

*IBM's 360 and Early 370 Systems*

Emerson W. Pugh, Lyle R. Johnson, and John H. Palmer  
MIT Press, 1991