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

- 1964: 30, 40, 50, 60, 62, 70
- 1965: 20, 25
- 1966: 44
- 1967: 65, 75
- 1968: 67
- 1969: 85, 91, 95
- 1970: Focused on small business

- Baby scientific machine (FPRs)
- DAT
- cache
- S/370
<table>
<thead>
<tr>
<th>IBM 2314, 1965</th>
<th>From Dell, 2006</th>
<th>Improvement ratio</th>
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</thead>
<tbody>
<tr>
<td>233MB</td>
<td>500GB</td>
<td>2000</td>
</tr>
<tr>
<td>$256,000 (x6!)</td>
<td>$300</td>
<td>5000</td>
</tr>
<tr>
<td>60 msec latency</td>
<td>10 msec latency</td>
<td>6</td>
</tr>
<tr>
<td>.312 MB/sec xfer</td>
<td>375 MB/sec xfer</td>
<td>1000</td>
</tr>
<tr>
<td>$1099/MB (x6!)</td>
<td>$0.0006/MB</td>
<td>10,000,000</td>
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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