Cray-1

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Background

- Seymour Cray worked on the CDC 8600, a successor of the CDC 6600
- He left CDC and started Cray Research
- After 4 years of development, the 80 MHz Cray-1 was announced in 1975
  - NCAR paid $8.86 million for serial number 3
- The Cray-1 was very successful, selling over 80 units for $5-8M each
- Later succeeded by the Cray X-MP and Cray-2
Internals of the Cray-1

- B and T registers in memory hierarchy
- The Cray-1 was the first Cray design to use Integrated Circuits (ICs)
- 64-bit system
- C-shape to maximize performance
- The Cooling System was meticulously worked on:
  - Copper sheets between each two circuit boards
  - Freon liquid in the stainless pipes
  - New welding techniques to seal the tubing
<table>
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<tr>
<th>STAR</th>
<th>Cray</th>
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<tbody>
<tr>
<td>Vector machine -&gt; less fetches and decodes</td>
<td>Relied on registers</td>
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<td>Memory to Memory, only memory accesses for arrays are set-up</td>
<td>Repeated operation on already-read elements</td>
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<td>Variable length of vectors</td>
<td>Registers are expensive so fixed number</td>
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<tr>
<td>Very long pipelines</td>
<td>Separation of pipelines</td>
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