

Some Points to Make

Stretch was a Tremendous accomplishment for its time --- for 5 years was ~~the~~ leading project

- a major investment
- deliberately beyond the state of the art by at least a factor of 10 or 20,
- pulled IBM into a leadership role in the industry

o what a fellow is
o no making pricing
o own expense only.

Stretch encountered problems of complexity on all fronts, we were not equipped to solve and did not realize how serious they would be.
= They took time to solve.

Stretch - was done at just the right time - (1) The technology (transistors, cores) was just becoming available -

- (2) - The govt agencies had the flexibility & foresight to order it -
- (3) - IBM was bold enough to try it.

2 or 3 years later the technology would be old hat & cost of approval & the govt would tighten its procurement policies } IBM would be much more conservative,

"Nashon
"Bob's Bow
"ie"

Dennell was a charismatic leader who could extract the best (unrealistic) commitments from everyone. ^{Force of will...} By insisting that the project was doable he overcame ~~the~~ doubts, even though the doubts were almost universal.

Like Columbus & supposed the same date
TV Pearson
I Watson overreacted and cut the price - driving defeat

Eventually, faced with delays and hardware redesign problems beyond his control, he was brought down by the "bean counters."

George Monroe ~~was~~ was head of the 7090 project started as a special 5 machine project for BNEWS - ^{about 6 men} took Stretch memories, circuits, design tools, etc --- did a direct remap of 709 with no improvements --- came out with machine with software already written - 1st del June 1960,
performance = 0.16 x STRETCH ~ (1/6)

o He became darling of the bean-counters, Dennell was the villain, he took over the 7030 project area - May '61 - choked off any future or improvements...

Some Interesting Points

We were all inexperienced in how to scale performance over such a wide range

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- Indexing: based on 704, where indexing was buried in the execution time, we assumed indexing was overlapped or could be done in $\{0.1-0.2 \mu\text{sec}\}$.
- Data paths: transfer of data was considered negligible or one clock time (about $0.1 \mu\text{sec}$)
- Relative speed of operations: ^{Floating} multiply and divide were ~~expected~~ ^{thought} to be about the same speed, ~~roughly~~ ^{roughly} ($\sim 3\times$) than add. actually Fadd + mpy came out about same speed, divide much slower.
- F/pt ops were expected to be much slower than fixed point. actually came out the other way around.

The Math Planning Group met starting Sept 5, 1956
for next year and half?

- Stretch Console had Selectric Typewriter covered it over with a piece of cardboard when visitors came through

Ref: Reference Manual 704-709-7090 Programming Package for 7030
1960 STRAP-1 cross compiler

In retrospect: - bit addressing was a mistake - cost more than it was worth (byte as in 360 was much better)
- single accumulator was a mistake, GPR's better idea
- some special indexing ops - "progressive indexing", "geometric index"

Problems:

- design too complex --- There was no easy way to delete,
- not evolutionary
- software was a big problem treated as if it were a small one.
- different componentry, design -- a research ^{& ad tech} project called a development project,
- Transistors were 20ms not 10ms in circuits.
- additional complexity to compensate

Interesting people to mention:

- Carlbert Hurd
 - Sullivan Campbell
 - Werner Buchholz
 - Genit Blaauw
(Gene Amdahl - wasn't there during START)
 - R. M. Franks
 - Roger B. Jozrus
 - Ed A. Voorhes
 - Dave F. Woods
 - W. Jack ~~W~~ Worlton
earlier Nick Metropolis
replaced by Mark Wells
 - Fred Brooks
 - John Griffith
 - Elaine Boehm
- (LASL Technical Advisory Committee)

Nominal speeds : scientific

701	.009	May '53		
704	.026	'55		
709	.029	'57		
7090	.18	Jun '60		
7030	1.1	May '61	CDC 6600	1.7
7094II	.47	Apr '64		sep '64
Mod 65	.67	Mar '66		
Mod 75	.97	Apr '65		
Mod 75	5.5	Feb '67		
Mod 85	3.4	Sep '69		
Mod 195	9.3	Feb '71		
168	3.95	late '72		
3033	8.0			

note:

$$\frac{7030}{7090} \approx 6.$$