ANNALS OF THE HISTORY OF COMPUTING

Werner Buchholz 24 Edge Hill Road Wappingers Falls, NY 12590

April 20, 1989

1

Robert W. Bemer 2 Moon Mountain Trail Phoenix, AZ 85023

Dear Bob:

Jan Lee sent me the photograph of that "strange machine from Schenectady," and I can't let this opportunity go by without saying hello.

Do you have some answers to his questions about that picture? We really need to know whatever is known about it, or else we ought to be able to say that little or nothing is. What information do you have?

I am also wondering about the barely recognizable name plate with a GE logo on it. I can't make out whether it says constructed by, or contributed, or what. Since I doubt that GE would make a gift to such a "guest house" and put its name on it, it probably means that it was either made by GE or contributed to some other organization first. The appearance is more that of a piece of telephone equipment, perhaps an array of call timers. But I am just guessing.

Is there anybody in particular who should be named as the source, or are you it?

How have you been? I am slowly, very slowly, retiring from my IBM job. As you might tell from the address above and on the envelope, I am keeping one leg in each camp for now.

With best wishes,

Ulene

Werner Buchholz, Editor Comments, Queries, and Debates



VIRGINIA TECH

Annals of the History of Computing

Blacksburg VA 24061-0119 (703) 961-5780

March 21, 1989

Robert W. Bemer 2 Moon Mountain Trail Phoenix AZ 85023

Dear Bob:

RE: Strange Machine from Schenectady

Many thanks for the piece about the interrelationships between PC's and mainframes. It is interesting since we have developed some software here at Tech so that staff can use the same editors on both our mainframes and the stand-alones.

Regarding the photograph which you sent. By copy of this letter I am forwarding it on to Werner Buchholz to use (possibly) in Comments, Queries and Debate. It might be very well be suited to a piece in the next issue (11/3 due June 1989). However I have two major questions about the photograph: (1) Was it really found in a whore-house, and (2) was it the photograph or the machine which was found? Then of course we need to identify Jim Priest. In essence I am turning it over to Werner to handle in his department. It may be very interesting to just ask the question "does anyone know what this is and what it did?"

Sincerely,

John A. N. Lee Editor-in-Chief

JANL: janl

Encl: Issue 9/3-4

January 15, 1981

M. Dora Hekimi Secretary General ECMA 115 rue de Rhone Geneva 1204 Switzerland

Dear Dora.

Willi Bohn's document TC1/80/19 is an important input, and I concur with the philosophy. The preemption of graphic characters by programming languages is indeed a threat to other usages, as well as a contributor to confusion. This is why I have opposed the 8-bit set of X3L2. We are much more in need of, say database controls (e.g., start of an address, end of an address) and additional characters for languages. The bibliographic delimiters proposed by Kohl in TC46/4/1 are good examples of alternate usage.

Although you will surely hear fromally from ANSI, E3L2, and E3H1, I take the liberty to forward as soon as possible (in support of Bohn) the enclosed documents:

X3L2/80-182 X3H1/80-97 X3J6/80-64

This document shows the metarepresentation method for some of the contentious characters, including the ones mentioned by Bohn. Moreover, the method is easily extendable to other characters that may be required by programming languages in the future.

The method is unambiguous. Local convenience may be to interchange by test processing methods. For example, a provencial using ASCII could indeed use the left bracket in a programming language. But before interchange, it would be required to replace all left brackets with the diagraph % (. Provincial compilers/interpreters could be trained to recognize both forms interchangeably. The diagraph representation % (could be interchanged without prior transformation. Thus, we have target diagraphs that can represent additional programming language characters without confusion in interchange.

I am of the opinion that this diagraph correspondence would well be the subject of an ISO Standard in some correspondence to the SI Substitutions for limited charactar sets.

Cordially.

R.W. Bemer



HONEYWELL INFORMATION SYSTEMS INC., P.O. BOX 6000, PHOENIX, ARIZONA 85005, TELEPHONE 602/866-6000

DANIEL D. McCRACKEN 7 SHERWOOD AVE OSSINING, NEW YORK 10562

914-941-2100 - OFFICE

August 1, 1980

Mr. Robert W. Bemer 2 Moon Mountain Trail Phoenix, AZ 85023

Dear Bob:

I hope you will not mind if I impose on you with a couple copy of my latest writing for your consideration.

Enclosed is a draft of an article for a special issue of Computerworld that will appear in September, dealing with applications software development methodology. Please understand that I am not claiming these methods apply to every application--only that they apply to enough to make a very significant impact on some of our problems in the field.

According to my records I sent you a copy of my book on NOMAD some time ago. If this is not true and you'd like to have a copy, drop me a note.

If you find any of this of special interest, let me know and I'll tell you more! And it would be good to see you again, and compare notes on mutual interests.

Sincerely yours,

Daniel D. McCracken

DDM:css

Date: June 25, 1980

cc: Joann Tupa, B20

Subject: SECURITY AND TELEPHONE BOOK

To: B. J. Dunn

From:	R. W. Ber	ner	
Organization:	Software	Systems	Engineering
HED:	AZ05		
MS:	C-93		
HVN:	357-2569	1	

Today I noticed the guard at the South Gate struggling through the telephone book for a visitor, while several employees were entering. It struck me immediately that the North and South Gates should be furnished with microfiche viewers, because:

- The hardcopy book is reprinted very seldom, and is thus often in error, particularly with the wholesale moves to the trailers.
- The fiche edition is the wonder of the data processing world. It is updated every Friday, and every Monday we get a new edition.
- The fiche edition is much easier to search, and far faster, too. Thus less of a guard's time will be required away from monitoring those entering and leaving.
- 4. The guard told me that the hardcopy also missed many new entries, and he has to call Information anyway. All in all, large delays and diversion from other duties.

I recommend that the North and South Gate be supplied with microfiche viewers, and that Joann Tupa add those locations to her mailing list. I can tell you that I wouldn't use any other form of the phone book now. Viewers, if you cannot find some surplused, are about \$150 each. \$300 would seem to be justified for improving your security.

Make it \$450, and your reception area will tell the world and our customers that Honeywell Information Systems is up-to-date in Office Automation.

Wamm

R. W. Bemer

/rh

28109 :AAA IT12 0013 OCT 05 79 12:03 10/05/79 TELEGRAM

R. BEMER PHOENIX - ARIZONA AZØ5

SUBJECT - POSSIBLE CONTRIBUTION TO AV ITALIAN MAGAZINE ON OFFICE AUTOMATION

10/5-C61

DEAR BOB

a - 16 14

I AM GLAD TO WRITE YOU FOLLOWING PROPOSAL.

NEXT YEAR THE JUNE ISSUE OF AUTOMAZIONE E STRUMENTAZIONE /WHICH IS THE SCIENTIFIC MAGAZINE OF ANIPLA THE ITALIAN NATIONAL ASSOCIATION FOR AUTOMATION/ WILL BE DEDICATED TO OFFICE AUTOMATION.

PROFESSOR DEGLI ANTONI /MILAN UNIVERSITY/ SUGGESTED THAT YOU COULD BE THE PROPER INDIVIDUAL TO PREPARE A CONTRIBUTION IN ONE OF THE FOLLOWING SUBJECTS -

- STANDARDIZATION WORK BY X3J6 ANSI
- SURVEY OF TEXT-EDITING /STATUS-OF-THE-ART/
- ELECTRONIC MAIL
- OFFICE AUTOMATION

OR ANYTHING ELSE INTERESTING THAT YOU COULD PROPOSE IN THE OFFICE AUTOMATION AREA.

PLEASE TELL ME IF YOU LIKE TO ACCEPT /YOUR ANSWER IS URGENTLY NEEDED/ -OF COURSE YOUR PAPER WOULD BE PUBLISHED IN ENGLISH. PLEASE ALSO SEND TO ME YOUR EXACT ADRESS AND I WILL PUT THE RESPONSIBLE PEOPLE OF THE EDITING OF THE ISSUE IN DIRECT CONTACT WITH YOU. IN ADDITION IF POSSIBLE IF YOU MAIL TO ME TWO COPIES OF THE MOST SIGNIFICANT OF YOUR PAPERS THIS WOULD BE APPRECIATED. WITH MY BEST REGARDS

1535GMT/0C



Date: October 8, 1979

cc: K. E. Norland

To: E. R. Vance

From: R. W. Bemer

Location: DVCP - C61

Subject: SOFTWARE TIMING

Courtesy of M. Ronayne of Hoffman-LaRoche, I was able to log onto their system and run a demonstration he had prepared to compare four methods of file I/O. This was done during normal loading. Results for a quite large file were:

DISK TO CURRENT FILE	KEY I/O	FILE I/O	TOTAL I/O	PROC. TIME (sec.)
old cpy conv	0 24 0 48	448 669 1004 336	448 693 1004 384	1.45 1.78 24.96 1.40
CURRENT FILE TO DISK				
resave cpy conv	56 24 0	669 669 1004	725 693 1004 284	1.78 1.79 24.95

A rational person might conclude:

- If our systems use a lot of file transfer, particularly on benchmarks, we'd be better off to use <u>copy</u>. Unfortunately we don't have it. It's a B4 B-program by U. Waterloo.
- Something is amiss with the <u>conv</u> subsystem, despite its user facilities.
- If we had <u>copy</u>, why not make <u>conv</u> call it when no conversion is required?

R. W. Bemer Computer Systems Cons. Analyst

/mc

Date: 1979 July 13

To: K. Norland

From: R. W. Bemer

Location:

Subject: GCOS IV ARCHITECTURAL COHERENCY

The request (for me to examine this area) indicates that the architecture is not visible, in contrast to roadmaps and PERT charts. Making it visible is a simple but tedious task that must be undertaken. I cannot paint the details, but I can set up the mural, and number it to be filled in.

As a trivial example, consider the interaction of the file system, the access system, and compilers, regarding the maximum number of characters permitted for file names:

System	Max	Number	of	Char.
COBOL		32		
PL/I		31		
Mag Tape Std		17		
File		12		
Create		12		
01d		8		
Save		8		
Remove		8		
Release		12		

Now that this is visible, anyone in right mind would say "Isn't that stupid, and a great inconvenience to users? Certainly it must be a simple thing to correct". And he would, if in charge, order it to be done.

So our architectural mural is simply a list of major software entities and their components, with headings in the other direction for a multitude of attributes and relationships. We may not get them all the first time. . but we'll keep adding.

An example of a heading would be "call mechanism". It was evident in the July 12 review of the multisegment rules that the ALTRETURN mechanism of PLG is inconsistent and not as general as others, including Multics. We may as well kill it RIGHT NOW, in favor of the "CALL XXX, IF CONDITION THEN ..." If we didn't put this difference on our chart, the problem could get lost after the meeting.



HONEYWELL INTEROFFICE CORRESPONDENCE

K. Norland GCOS IV ARCHITECTURAL COHERENCY Page 2

Another simple example -- BREAK. In GCOS III a break from a terminal causes control to revert to God knows how far back into the operating system. The optional modes should be settable by the user, as "IF BREAK THEN ... "Options might be:

- o Go back to the last labeled execution point.
- o Permit me to change my input variables
- o Start to trace.
- o Etc., almost anything.

What I need now is some database of all of the software components in existence or planned. I don't know where to get it, but it must exist for cannibalization. I would then lay out the axes so our chart may be computerized -components as headings, features and characteristics vertically. Like:

ITEM	COBOL	FORTRAN	BASIC	DMIV	ITP	etc.
COS III vers total size max residen COS IV versio	ion t size on					
total size max resident opsyst-dependent File type A File type B	t size ndent code (yes or no (yes or no	;}				

Common code generators

...

. . .

G

G

It will be big. It will be complicated. But everyone will be able to see visually the common data in the identical format. The "NO" and "DON'T CARE" conditions can be signed off. It's the PERMANENT design record for the architecture. It may even be susceptible to mechanical analysis for consistency.

Bama

R. W. Bemer

/mtd

A Proposal for

THE GREAT OFFICE AUTOMATION PROGRAMMING CONTEST -- 1980

Each year a number of POKER players of conviction gather in Las Vegas, Nevada, to determine the best player of the game. Each player uses an entry fee (\$10,000) to bet and play. Play continues until one player has won all. When this occurs, the winner is acclaimed the ACE of poker players.

Applied to the computing business, this suggests that we might find a similar top programmer. But what cards shall they play with?

COBOL, FORTRAN, PL/I, BASIC, what?

There is precedent. In 1979, at the NCC, the finals of the Mouse Maze Contest were held. This evidences a strong competitive spirit in the computer field. What act can follow it? I suggest the

Great Office Automation Programming Contest

How will it work? The essential, of course, is competitive play. The theme, of course, is Office Automation, that vague prognosis for the 1980's, upon which much corporate investment is now being gambled [1].

Let us postulate a draft set of rules:

- The contest shall be open to a certain number of programmers with confidence in their capabilities to program for Office Automation.
- That confidence shall be supported by an entry fee of, say, \$1000.
- 3. As in auto racing and other competitive sports, a sponsor may put up the entry fee. An employer, for example. Sponsorship must be overtly associated with the contestant.
- The contest shall consist of programming a predetermined number of applications expected to be useful in Office Automation.
- A selected group of experts shall be chosen to specify the total set of applications, and to judge the contest.
- On the day prior to the contest, a subset of these applications shall be chosen by random drawing to be the official applications for the contest.

- The contestants shall have at their disposal a standalone computer of any capacity, or a remote computer via timesharing terminal.
- The contestants shall have at their disposal the compilers, interpreters, etc. for their chosen application program language, <u>plus</u> the customary development facilities and libraries for that language on their own computer.
- Contestants may use only hardcopy terminals. Their operating system must log the elapsed time used for development and test.
- Each contestant shall have a judge-monitor. Substitutes may be provided for possible offshift work.
- 11. If the number of contestants exceeds the number that the judges may monitor efficiently, the judges are empowered to select at random the necessary number of contestants to scratch and refund the entry fees. Alternatively, preliminary trials may be used to reduce the field, with little or no entry fee.
- 12. Each contestant is given the selected set of applications at the beginning of the contest. A 1-hour period is allowed for querying the panel of judges for resolution of any ambiguities and/or confusion.
- 13. Success is defined as getting the specified applications to run correctly. Benchmark times are not applicable, for this is a programming contest, not a hardware contest. It's assumed that test runs for checkout will not constitute a significant time element.
- 14. The contest shall be based only upon a time measurement equal to (total computer time + 1/3 elapsed time). The contest shall be won by the entrant with the lowest time value.
- 15. The judges shall have sufficient time to determine correctness. The judges are empowered to change input data to prove correctness. These runs do not count in time totals.
- 16. The prize money consists of the total of entry fees less X% for operating costs. It shall be awarded in two ways, to be chosen by the sponsors:
 - The programmer with the lowest time value shall be awarded the total prize money.
 - The time values for all contestants shall be totaled. Each finisher is given a share of the prize money inversely proportional to their times (see sample at end).
 ??

17. The winner shall be acclaimed to the press, with the statistics, and noting the application language of choice. The total statistics shall be published, for the possible guidance of people in the Office Automation field.

REFERENCES

 Artemus Ward(?) -- "The gambling known as business looks with great disfavor upon the business known as gambling".

SAMPLE CALCULATION (Item 16, option 2)

If there are 3 entrants, with time values of 2, 8, and 20 respectively, then the winner should get 10 times as much as the 3rd place and 4 times as much as the second. The amount for the worst time is W, computed as:

(20*W/2+20*W/8+20*W/20)=30

In this case the returns are \$22.22, \$5.55, and \$2.22.

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CM 270W (11-77) Front

1979 May 9

Richard Berryman 600 New Hampshire Avenue NW Washington, DC 20037

Dear Mr Berryman:

This is a summary of points made to you in a recent phone conversation:

 At the ANSI X3 meeting in San Diego (of 1978 February 07) I sat next to the IBM member, Caryl Thorn, who had by then resigned from X3T9. I asked if the I/O Interface Interpretation Committee was still in existence, and he admitted that it was.

The significance to this small exchange is that the IBM 360 interface, now essentially the Federal Standard, is not subject to rigorous and unambiguous specification. It was known to me that ever since 1964 an IBM committee has been required to exist to interpret and/or modify the I/O interface. Apparently it has been in operation for some 14 years.

This could signify that many of the benefits that the US Government expects from using this standard may, in fact, not materialize because its various suppliers could think they were conforming to the standard, and yet the total systems as assembled would not work.

The following is an analysis and consulting firm in the computer industry:

> INPUT 2180 Sand Hill Road Suite 320 Menlo Park, CA 94025 415-854-3422

Their clients include IBM, Bank of America, Bankers Trust, Chase Manhattan, GE, Control Data, McDonnell-Douglas,

Richard Berryman

United Airlines, Univac, etc. Robert Colten, their Director of Research, did not disagree with me that IBM's reason for building a fibre optics manufacturing facility was <u>not</u> to supply other companies, but rather to use in their own intrasystems communications, i.e., I/O interface. He said that his information implied a wideband fibre optic interface on the 4330 lines, carrying multiple bytes in parallel as well as pictures (graphics). This is as opposite from the US Governmentselected interface as it could possibly be.

2

I have tried to verify this with Robert Fertig of A.C.T. (works for C. Lecht), but he says he has no advance notice, and that such information is customarily released only upon first shipment. True. And in this case IBM has no wish for prior divulgence.

- 3. I have always had good contact with the Institute of Computer Science and Technology, at the National Bureau of Standards. It has been my impression that the effort to adopt the current interface was a <u>ploy</u> to force IBM to divulge prematurely its <u>new</u> interface. Forlorn hope, of course. IBM is too big to force that way, even if the action were desirable. In this case it isn't desirable. Suppose the 4330 interface can be kept quiet until the Government is in too deep. Now all its suppliers are committed to the outmoded interface of 15 years ago. How can they change to supply the IBM 4330 market and still serve the Government, given limited resources?
- A person who has taken strong personal opposition to the Government I/O interface is:

Ernest C Baynard 412 North St. Asaph Street Alexandria, VA 22309 703-683-2383

Richard Berryman

1979 May 9

He (Baynard) was Executive Director for the Government Operations Subcommittee at the time PL 89-306 was approved (the so-called Brook's Bill). You can be quite sure that much of the bill was his creation. He has since argued to his successor, Bill Jones, that Congressman Brooks should not support the I/O interface. He has outlined his reasoning to me, and I believe that it is sound, as well as different from the customary arguments.

3

If the matter ever comes up in a court case, he would make an excellent witness.

Sincerely,

3 mm

Ken Norland requested me to call Berryman for Ken Norland requested me to call Berryman for any info I had about Thornton and Baruch. He any inro 1 had about infornton and Baruch. He did not know that Jim Burrows has Ruth's old

He asked me to put down some parts of our

This is for your approval/change before sending

RW Bemer

discussion. This is it.

Memorandum from R. W. BEMER

Irma Wyman:

job.

pak

Date: 1979 April 18

To: J. Aeberhard, MA39-461

From: R. Bemer

Location: AZ05-C61

Subject:

I confess to not knowing what Metrication '79 is.

Re the American National Metric Council Conference, I showed the conversion/learning program for two days, with two 7200 terminals. Reaction was very good. Carl Beck, a member of the US Metric Board, took a TEX manual and writeup, studying it for 3 hours on the evening of the first day. He came back with a man from DoD, and asked if I could make a separate trip to Washington to help the USMB with their conversions and database problems. Last I knew, the Board's secretary took my telephone number and address.

The program itself is written in TEX, which is a full programming language like many others, except that it possesses exceptional string-handling ability and subsumes a text editor and a local file. One thinks of it as processing a form -- find the first line with "subtotal" in it, go three lines beyond that, and replace the word "Company" with "Honeywell Information Systems".

The program asks what you wish to convert, and does it. It will cycle with the asking until one wishes to stop, which is caused by not replying. It is driven by a table that contains a great many units and their conversion factors. Exhibit A lists most of those units. Exhibit B shows a number of sample entries and replies from the program. I've encircled some of the more outlandish.

If you don't know the metric prefixes, enter them:

Term is? peta peta means 10 to the power 15

If you don't know the units, enter them:

Term is? tesla output = T quantity of magnetic flux density

Page 2 1979 April 18 J. Aeberhard If you want to convert a customary term to the metric system: Term is? foot output = 0.305 m quantity of length If you wondered if "m" stood for "metre" Term is? metre (yes it does) output = mquantity of length If you want to convert a metric value to a customary value: Term is? inches per .375 metres = 14.764 If you wish to convert a specific old value: Term is? steres per cord = 3.625 If you wish to know how the units of the old system related: Term is? teaspoons per tablespoon = 3 Term is? firkins per hogghead = 5.829 Term is? skeins per spindle (in the yarn business) =126 Term is? sections per township = 36 (and all sorts of other relationships that I personally never understood) For some inputs you will get surprising answers: Term is? BTU No data on "BTU" Reason = (there are many) Retry

That's because there are many different BTU's, and the program cannot read your mind as to which you meant.

J. Aeberhard

Page 3

1979 April 18

Some are useful for learning:

Term is? lightyears per year 0.3 Gm/s (0.3 gigametres, or 300 megametres, per second is therefore the speed of light)

Term is? milliliters/liter "liter", if you please = 1000

Term is? ohms/mho - Has no meaning in the SI Term is? seconds per century

=3153600008

Moreover, you can sit at a terminal all by yourself to do this learning. No embarrassment, no teachers, -- nothing but the time to play and experiment and put it all together.

The working program (Exhibit C) is only four pages long. No way could any other programming language approach this brevity. I even doubt if it would be <u>possible</u> to do this in any other language.

It also reads spelled-out numbers. The program for that is on the back side of Exhibit A.

W Benec/p

RWWBemeremer

/cau



Date: 1979 March 1

To: R. R. Douglas

From: R. W. Bemer

Location: Phoenix, C-61

Subject: So-called "Frenchization" Process -- Level 66

Much activity and many memos exist about the language requirements of French law, and apparently a great number of people are concerned. HISMO is in the act, as are IBO, Software, and all aspects of Engineering. The approaches are obviously disjoint and narrow in scope. Here are some suggestions to correct the situation.

We must consider the declining ratio of hardware to software costs, which prompts reevaluation of pricing for items that we supply. IBM and others are paying more attention to software pricing. This has implications for our international business, and our relations with CII-HB.

It is so customary to pay for added value that many taxation systems are based upon that principle. In manufacture of hardware, added value comes from making copies of a design. Presumably we have legal and contractual arrangements with CII-HB whereby they get some share of the added value from hardware manufacture.

In software manufacture the added value cannot come from replication. It must come from design value.

Our revenue-sharing arrangements with CII-HB may not yet be perfected with respect to future software manufacture. Would we wish to continue to supply only the English-speaking market, permitting them to modify software and documentation for resale to the non-English market? Gaining revenue from that process?

A reasonably safe procedure is for USISG to set a policy that, from some date onward (and retroactively in certain instances), all software shall be produced in a form independent of natural language. Not just French, but others. They'd love us in Sweden if the startup asked "What language does your operator prefer?" Contrary to folklore and suspicion, this is very easy and inexpensive to do. In all probability, the very controls required will lessen software production costs. E.g., force common message pools, reduce message storage requirements, homogenize, etc. The method is simple. Input and output conversation is encoded by numbers that stand for words and/or phrases. When beginning to operate, the system dips into a stored table, pulling out the numbers and the corresponding words and phrases in the selected language.

Under certain controlled conditions, International Harvester has done this transliteration for years. The attachment shows that the process is already computerized and feasible. Of course, it does not apply to compiler verbs, nor does it exclude the possibility to select English regardless of country.

Ribamar



1979 January 31

Prof. Dr. F.L. Bauer Institut für Informatik Technischen Universität Munchen 8000 München 2 Arcisstrasse 21 GERMANY

Dear Fritz:

Enclosed is a copy of the paper submitted to Prof. Lehman. I have no reason to doubt the referees to whom he will assign it, but a most curious thing happened last year. A paper I had submitted to the Intl Conference on Large Data Bases was rejected (perhaps not too curious a circumstance). The problem was that it outlined a text processing (scanning) approach to databases, and they all had blinders on that would admit only pointer type databases. In fact, some of their comments were clearly ridiculous.

My present concern is that I believe this paper to contain a very powerful (although simple) technique. I wish to present it at your conference because I believe that is where the most likelihood of comprehension and adoption can occur. I do consider it to be as important as any work I have ever done, including the ISO Code.

My question to you is--would you undertake to read it as a kind of unofficial referee? I trust you to grasp the significance of the method. If the referees are half as able there will be no problem, of course.

Perhaps I should have mentioned its particular applicability to making software multilingual. I have enclosed an example which could amuse you.

Cordially,

Bob

R. W. Bemer

Date: 1979 January 25

cc: LW (Roy) Beers DC Rupley

To: WA Shelly From: RW Bemer

Location: C61

JAN 2 6 1979 L. W. (ROY) BEERS

Subject: SPECIALIZED MICROPROCESSORS

I hear rumblings (Blair, Brookman) that BASIC runs faster on the computers from Radio Shack, et al, than it does on the L66. This spawns some questions:

FILE

- 1. How much faster? Maybe 6 times?
- If ADP still has a hard time keeping up with Zilog, Motorola, and Intel--why not put a chip or two in the ADP CPU for this special purpose? Suppose the two versions of the BASIC language aren't precisely identical. Patch the micro program or do a source conversion via TEX.
- If we did this, could we glean any advantage from not maintaining our software version?
- 4. If it worked, how about putting in a PASCAL chip (Western Digital?), knowing as we do that PASCAL is headed for ANSI, and will be required fare for any supplier to provide not so long from now? Wouldn't this preclude the huge cost of writing a PASCAL software package?

RuBenalp

RW Bemer



1979 January 24

To: L. W. Beers From: R. W. Bemer Subj: ADP Console via SSF Ref: Campbell's Jan 18 recommendation

The ADP Issues Committee (?), meeting Jan 23, thought Campbell's recommendation insufficient for reason of showing only technical feasibility -- not human factors -- not cost factors. I don't see it that way. Here are some reasons to go with the ADP console off the SSF, to see if other cost factors can be raised against them:

 An estimated 90% of L6 time is available. Some of this can be used to form up different types of message groups, edit for display, create analog diagrams for display, keep statistic, monitor efficiencies, for new uses, etc.

Advantages

- Human factors for operators greatly improved without subtracting CPU time in ADP, and so reducing total throughput and capacity.
- Such displays can be made reasonably common for all four ADP operating systems, as needed. With common software. If done within each operating system, commonality is lost, and software cost goes up.
- o Console software can be built cheaper with the L6 factory (Multics).
- The problem of operating in natural languages other than in English can be solved in the L6 for all four systems. Each would ship it numbered components, and messages would be fabricated in the chosen operating language.
- 2. We now have only one console, not two.

Advantages

- o Save the cost of one console.
- o Operator lost motion minimized (\$ benefit)
- Operator confusion minimized (\$ benefit because the keyboards and console operating methods were different).

Disadvantages

- o Extra 64K of store required in L6. But that is about a tradeoff with the saved console.
- 3. We have to get used to working with L6, for reasons of network architecture and distributed processing. If additional costs appear for this method, writeoffs against training costs are possible.

136h

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PHOENIX OPERATIONS - HONEYWELL INFORMATION SYSTEMS

COPY: BREBOUR TON K. BREBOURTON P. Stoughton

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JAN 1 5 1979

L. W. (ROY) BEERS

DATE	1979	January

PHONE 8-357-2569

L. W. (Roy) Beers TO

FROM R. W. Bemer

COMPONENT Systems Engineering & Architecture

11

Comments on "USISG Procedure for the Protection of Software" by K. Barbour, SUBJECT dated December 27, 1978 FILE

> The copyright process is a legal procedure. Law is expressed in two forms -original law and case law. This proposed procedure is in original form only. It needs an addition in the form of examples of case law. Some are given here; many more could be postulated.

1. The copyright notice is to be placed in both source and object code for a program, and upon the medium used for its transfer. (A, page 2)

Check which of the following are programs, thus requiring their own notice:

- o A called subroutine
- o A matrix table embedding an algorithm implicitly
- o A software module
- o A software module group
- o An operating system
- o A FORTRAN compiler
- o A database processing program used by two object programs, one created from COBOL source, the other from FORTRAN source
- 2. The copyright notice in object program is visible when listed using:
 - o ASCII print routines
 - o EBCDIC print routines
 - o BCD print routines
 - o Store dump routines
 - o All of these
- 3. Upon encountering a copyright notice in an object program, the CPU will:
 - o Ignore it, because it recognizes that it is not executable
 - o Stop dead, because it is not executable
 - o Cause a fault to the operating system, which will then ...
 - o Jump around it, because all of our compilers and other software are built this way

- Subject: Comments on "USISG Procedure for the Protection of Software" by K. Barbour, dated December 27, 1978 (continued)
- 4. If a source program, or group of source programs, is resequenced, the copyright notices will:
 - o Appear where they used to be, because they also have line numbers
 - Appear where they used to be, because they contain the name of the program that is copyrighted
 - o Move somewhere else in the program
- 5. The responsibility of determining what is, and what isn't, a program -and then inserting the required copyright notice -- belongs to:
 - o The creating programmer
 - o His manager
 - o The software integration group
 - o The software test group
 - o The distribution center
- 6. The relationship of medium to source/object program is defined by:
 - o A unique number appearing in both program and media label
 - o A listing that goes along with the medium
 - It doesn't make any difference, because card decks and magnetic tapes can be put in different boxes and canisters, and therefore the boxes and canisters can be manufactured with the copyright notice preprinted.
- 7. Copyright protection is obtained by:
 - o Marking something with a copyright
 - Taking legal action against some entity that uses your marked product without permission
 - o Depositing the copyrighted product with the Library of Congress
- 8. In a new software release, the copyrightable part is:
 - o All of it
 - o The part that differs from the previous release
 - If the answer is the first one:
 - The customer can't use the previous release any more, because it is copyrighted. He must buy and install the new release.
 - o HIS will waive copyright to the previous release in his case

Subject: Comments on "USISG Procedure for the Protection of Software" by K. Barbour, dated December 27, 1978 (continued)

If the answer is the second one, the distinction is made by:

- All parts are in identifiable modules; the new ones are marked "copyright", the old ones marked "no copyright"
- o One copyright notice contains additional details.
- 9. In a software product jointly produced, the copyrightable part is:
 - o All of it to HIS
 - Those parts following an HIS copyright notice, until a non-HIS copyright notice follows (e.g., COPYRIGHT CONTROL DATA CORPORATION ..)
- When hardware provides automatic refusal to execute copyright programs, a customer who inadvertently does this is:
 - Stopped cold. Restart or start-up will not work until the HIS representative is called.
 - Notified that he has attempted to run a forbidden program of a certain name.
 - Notified that he has attempted to run a forbidden program, but the system can't say which one because the copyright notices don't carry a program name.
 - Is not notified. Transfer is made to the next legal program, and wrong answers result.
- 111 A copyrighted program must be re-copyrighted if more than:
 - o 0.1%
 - 0 0.5 %
 - 0 1%
 - 0 2 %
 - 0 57%
 - o 10 %
 - o 20 %
 - o 50 %

of the instructions are changed from the original.

- 12. The tracking system must
 - o Differentiate between versions of copyrighted software
 - Recall a previous version each times a sufficient number of patches (see example 11) are made in his version
 - Bill the customer, because this is the only formal record that HIS maintains of what customer has what.

L. W. (Roy) Beers

-

- Subject: Comments on "USISG Procedure for the Protection of Software" by K. Barbour, dated December 27, 1978 (continued)
- 13. The customer is permitted three copies of a program, for back-up. When he does an initialize re-edit:
 - o It's a violation because there are now 4 copies
 - It's a violation because the copy moved from one medium (disk pack) to another
 - o He must destroy one of the other copies and notify HIS
 - o It's OK, but that pack must be used only on one CPU

Bob

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PHOENIX OPERATIONS - HONEYWELL INFORMATION SYSTEMS

DATE 1978 December 12

12 PHONE 2569

MAIL ZONE C61

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Marketing Requirements Committee

R. W. Bemer

COMPONENT

SUBJECT Keyboard Layout

TO

FROM

At the microcomputer exhibition/conference in Dallas, I saw three separate systems (video screens) that had the Right and Left Cursor placed outboard of the space bar. This is what I had suggested to you previously.

I talked to both vendors and users of these keyboards and systems. Everyone found the arrangement convenient and useful. It makes sense to existing typists on conventional equipment. The Up Cursor gets paired with the index key, which is left where it usually is.

I intend to keep watch on the way this practice grows.

R. W. Bemer

RWB: jn



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FILE

 DATE
 1978 October 09
 PHONE 866-2569
 MAIL ZONE
 C61
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 E W Hughes

 TO
 L. W. Beers
 Bb B. J. J. W. Bemer
 Bb B. J. J. W. Bemer
 Bb B. J. J. W. Bemer
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 E W Hughes

 COMPONENT
 Systems Engineering
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 E W Hughes
 FROM
 R. W. Bemer

 SUBJECT
 Microprocessors
 See Note
 OCT 11 1978

 Honeywell should have an intense interest in microprocessors for at
 Honeywell should have an intense interest in microprocessors for at

Honeywell should have an intense interest in microprocessors for at least three reasons:

- Direct usage in Honeywell products (this already occurs in the Controls side, and an internal conference on their usage is scheduled).
- o Incorporation in computing systems, particularly of the class produced by LISD.
- o General networking, and intercommunication between processors of varying capacities and usage.

Because conversion, emulation, simulation, etc. are costly, Honeywell should have an interest in minimizing variation between microprocessors (and their usage) and the computers it produces (and the way they are used). Dan McCracken has been concerned for at least three years about the low interconnectivity between the microprocessor community and the established community of larger-scale users. He says that re-invention leads to different invention, not all of which is good.

I have now done six articles for Interface Age magazine. It's 60,000 circulation is second only to Byte Magazine in the microprocessor field, but I consider Interface Age to be the premier publication (Byte appears headed for financial difficulties with circulation audit). These articles appear to be well accepted. Publicity for Honeywell is entirely favorable.

Interface Age has asked me to do more articles for them, on a wider variety of topics. The vehicle for this would be a listing on the masthead as a contributing editor (just that -- no stated affiliation).

The bulk of my contributions would be about standards. I have so much existing material and longevity in this area that the work involved would be trivial. In a preliminary discussion with Ted Hughes, he appeared impressed with the argument that there would be no conflict of interest, and to the contrary a definite plus for Honeywell's interests.

CF 25 (5-71)

L.W. Beers

-2-

1978 October 09

As a specific example, consider the benefit to Honeywell if BASIC or APL as used in Minneapolis on a Zilog microprocessor were to be close to or identical to BASIC and APL as used on L66 and L68.

This memo requests your technical approval for such an arrangement; it may then be forwarded for legal clearances as required. Submissions would not be monthly, so no deadline pressures would exist. Individual contributions would go through the normal clearance procedure, as always.

R. W. Bemer

jh

TP./. I AM going to give Approval for Bob Bemer's involvement as contributing editor on this subject. I want Bob's Attention directed toward miceoprocessors (particularly in hight of their obvious relation to the total end-user-tacility ISSUE). FORMAL ARTICLE publication has the additional attribute of pacing Bob's Address of status, direction And use of

MILROPROCESSORS



INTERFACE AGE

MICROCOMPUTING FOR SMALL BUSINESS AND HOME

August 21, 1978

R.W. Bemer Honeywell Information Systems P.O. Box 6000 Phoenix, AZ - 85005

Dear Mr. Bemer:

INTERFACE AGE Magazine grants permission to reproduce in full from the requested articles.

"Inside ASCII" Three-part Article

"Introduction to the TEX Language" Three-part Article

Cordually,

Mike

Mike Antich Publication Director

MA/dj

P.S. I would be grateful if you would send me a copy of these reprints when they are completed and printed. Thank you.

1978 August 15

Data Hekimi Secretary General E C M A 114 Rue du Rhone 1204 Geneva, SWITZERIAND

Dear Dara:

This is to inform you that the series of three articles on ASCII is being adjoined to form a single piece that will be the first article in

"The Best of Interface Age"

This is to thank you for the amount of work and time you spent in comments and annotation, and to tell you that most of them will appear in the revised edition.

RW Bemer

pak

To: R. W. Bemer Harry B. Tunis, Managing Editor From: "Metrication Aids Education -- and Vice Versa" Subject:

Under the copyright law effective in January 1978, you hold the copyright to your creative works for your lifetime and fifty years thereafter. In publishing the material listed above, the National Council of Teachers of Mathematics (NCTM) would like to receive all copyrights from you, including for example, the rights to

- a. use this material in NCTM publications:
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In requesting these rights, we hope to alleviate your need to keep records of the use of this material, and at the same time to expedite responses to requests for the appropriate uses of your material.

It is understood that any reproduction of the above material will be clearly identified as your work, and that you will retain the right to use it freely, provided you have indicated the original source of publication and notified us.

If this disposition of your material is satisfactory, please sign below and return this form for our records.

Thank you very much.

KUSAMUL 1971-06-29 2 MOON MIN TRAIL 85023 Signature: Address: 1978-06-29

Date:

HONEYWELL INTEROFFICE CORRESPONDENCE

PHOENIX OPERATIONS - HONEYWELL INFORMATION SYSTEMS

	HVN 8-357	
	June 12, 1978 PHONE 2569 MAIL ZONE C63	$\frac{\text{COPIES}}{\text{Your}} 780530 \text{ list } +$
TO	T. J. McNamara	CW Bachman
		RW Bemer
FROM	R. W. Bemer, Phoenix	II Boris
	and the second	PJ Derby
COMPONENT	Advanced Systems Engineering	EJ Dieterich
SUBJECT	Scope and Program of Work X3L5	RH Hill
	Scope and Hogram of Horn House	ER Vance
	The proposed modification for the Scope and I	Program of Work

The proposed modification for the Scope and Program of Work for X3L5 is unacceptable. It should be rejected by X3. These are the reasons:

- Media labeling standards exist -- in ISO, ECMA, and ANSI. They specify that all labels and other identification shall be recorded in the ISO Code (ASCII).
- The means to use codes other than the ISO Code are also standardized. This is done via Escape Sequences registered by AFNOR, on behalf of the ISO. At least 19 graphic sets and 3 control sets are now registered.
- 3. These Escape Sequences are operable for inline data flow. They change meaning dynamically. It is thus improper to use them, or any other indicator, in labels. It is proper to use them in the first data record, or in the data immediately following communications protocols.

To say it concisely, the identification of Non-ISO coded character sets must occur in data itself - not in labels or communication protocols.

 The work of SPARC DISY has no effect upon the work of X3L5 in the matter of coded character sets.

To Brandt's memo specifically, the EBCDIC and Fieldata codes are not registered with AFNOR. Nor do I believe that they are likely to be registered. Especially so for EBCDIC, because IBM would have to relinquish control of it.

IBM should be reminded that the interchange standards are in the public domain. They may adopt the formats and protocols, substituting EBCDIC or any other code for the ISO Code. <u>BUT</u> such files and messages will not be ANStandard:

06

R. W. Bemer

RWB/b

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T	English	B77	R	Morrison	C61			
т	Enstein	B124	B	Nardelli	C78			
ŵ	Estfan	C63	P	Nash	T60			
G	Fadok	T60	R	Nathan	B59			
N	Feldman	B42	н	Nolde	B126			
Δ	Fermison	K00	K	Norland	B83			
M	Fileon	T60	R	Nowicki	T60			
T	Freioli	T60	C	O'Boyle	T60			
C	French	B83	C	Oleon	479			
R	Frink	C20	M	Olson	C81			
D	Coinos	T60	D	Paco	R50			
C	Callibor	P/9	F	Palac	199			
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R	Ireland	B124	P	Scola	B124			


To: Distribution

1978 June 07

From: RWBemer

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Report -- History of Programming Languages Conference

This meeting, on June 01-03, was attended by 350 people. In a sense it was a sequel to the hardware history conference in Los Alamos, two years ago, where the secret British codebreaking computer of World War II was exposed. This meeting wasn't quite that exciting, but almost.

Virtually all of the creators and assistant creators were there. Languages discussed included ALGOL, APL, APT, BASIC, COBOL, FORTRAN, GPSS, JOSS, JOVIAL, LISP, PL/I, SIMULA, and SNOBOL. Having a terminal in my hotel room. I called the program "gannotator/profile" to analyze my relational database on System "X", for these names as descriptors. The result is given in Appendix A. This was posted on the bulletin board, and attendees asked for help in updating it. Some 20 changes were given. People with specific interest in how this was done may list "gannotator/profile" on System "X". It is 33 lines of TEX code.

Capt. Grace Hopper keynoted the meeting. It was recorded on cassette, and also (in entirety) on videotape -- courtesy of a grant from the National Science Foundation. In general there was not too much disagreement on historical verity.

The relational database was used in another way. On Thursday night I added the descriptor "HOPL" for all attendees already in the database, and ran the program "who", to give telephone numbers and mailing addresses for these people. On Friday morning I verified this, or obtained corrections and updates. The new output is in Appendix B. One might agree that it shows a substantial and influential segment of the computer industry in attendance.

Not being able to resist showing such opinion-making people some history in the making -- namely, on the TEX language --I had some manuals rushed in and gave some demonstrations. Appendix C gives the names of some of these people. "M" means they received a manual, and "D" that they had a demonstration.

The general reaction was "My God, where did this come from?" and being much impressed with the power and ease. I conclude that HIS has not done a proper sales job on TEX. I'd like to ask all of our salesmen "Don't you wish you could have been an IBM salesman when only IBM had FORTRAN? Then why aren't you doing the right job when only Honeywell has TEX?" Appendix A -- All "language", by Specific Language

1=history 2=ALGOL 3=APL 4=APT 5=BASIC 6=COBOL 7=FORTRAN 8=GPSS 9=JOSS 10=JOVIAL 11=LISP 12=PL/I 13=SIMULA 14=SNOBOL

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Profile for -lang-

Backus, John W.	1			7			
Baird, George N.				6			
Bandat, K.		2					
Bauer, Fritz L.	1	2					
Berghuis, J.		2					
Besse, Jean				6			
Betscha, Robert				6			
Bourgain, J.				6		12	
Bratman, Harvey					10		
Brinch-Hansen, Per		2					
Brittenham, W. Robert							
Bromberg, Howard				6			
Brooker, R. A.							
Brooks, Jr., Frederick P.	1		3			12	
Chasles, Francoise				6			
Cheatham, Jr., Thomas E.							
Clippinger, Dick				6			
Cox, Jim						12	
Dahl, Ole-Johan						13	
Dijkstra, Edsger W.	1	S					
Dorn, Phillip H.							
Dostert, Leon							
Engel, Frank				7			
Ershov, Andrei P.		S					
Evans, Orren Y.							
Falkoff, Adin D.			3				
Feurzeig, Wallace							
Floyd, Robert W.							
Frampton, Lois				7		12	
Franciotti, Rex G.		2				141	
Freiburghaus, R.						12	
Galler, Bernard A.							
Garvine Paul							

Garwick, Jan Gatt, Lou Gentleman, Morven Genuys, Francois Giammo, Caral Goldfinger, Roy Gordon, Barry Gorn, Saul Green, Julien Grems, Mandy Griswold, Ralph Hagerty, Pat Halpern, Mark Halstead, Maurice Hanford, Kenneth Heising, William P. Hemmes, David Hill, I. David Hoare, C. Anthony R. Holberton, F. E. (Betty) Holt, Tolly Hopkins, Marty Hopper, Grace Murray Hori, Shia Iverson, Ken Jones, Jack Kemeny, John G. Kerr, Robin King, Gilbert Kiviat, Phillip Knuth, Donald L. Kurtz, Thomas E. Leavenworth, Burt Ledin, George Lee, J. A. N. Lucas, Peter Marcotty, Michael McCarthy, John McClelland, William F. McClure, Robert M. McIlroy, M. Douglas Merner, Jack N. Mittman, Benjamin Mooers, Calvin C. Morrissey, John H. Naur, Peter Nygaard, Kristen Organick, Elliott I. Pease, Billie Perlis, Alan J. Phillips, Charles A. Polonsky, Ivan Rosin, Robert F. Ross, Douglas T.

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Salle, Francois Samelson, Klaus Ŧ Sammet, Jean E. Sayre, David Schwartz, Jules I. Seegmüller, G. Shapiro, Bob Sharp, Ian P. Shaw, John Clifford Sheridan, Peter Sibley, Edgard H. Smith, Albert Eugene Smith, Chester 1 2 2 1 2 Steel, Tom van der Poel, Willem van Wijngaarden, Adriaan Wegstein, Joseph H. 11 Wells, Mark B. Wilkes, Maurice V. Woodger, Michael Yngve, Victor

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Appendix B -- Known Attendees

Prof. Paul W. Abrahams Computer Science Dept. New York Univ. Courant Institute 251 Mercer St. New York, NY 10012

James M. Adams, Jr. Dir. of Operations ACM 1133 Avenue of the Americas New York, NY 10036

Paul Armer Executive Secretary Charles Babbage Institute 701 Welch Road - Suite 224 Palo Alto, CA 94304

Dr. John W. Backus IBM Res. Lab. K-01/28/2 Monterey & Cottle Roads Sunnyvale, CA 95193

Charles Baker addr

Prof. Dr. F. L. Bauer Institut für Informatik Technischen Universität München 8000 München 2 Arcisstrasse 21 GERMANY

Dr. Joseph Blum Assoc. Prof. Dept. Math., Stat. & Comp. Sci. The American University Washington, DC 20016

Erwin Book Systems Development Corp. 2500 Colorado Avenue Santa Monica, CA 90406

Harvey Bratman System Development Corp. 2500 Colorado Blvd. Santa Monica, CA 90406

Per Brinch-Hansen Univ. Southern California Los Angeles, CA Prof. Frederick P. Brooks, Jr. Dept. of Computer Science Univ. of North Carolina New West Hall Chapel Hill, NC 27514

Walter M. Carlson IBM Corporation P.O. Box 66 Los Gatos, CA 95030

Thomas E. Cheatham, Jr. Aiken Computation Lab. Harvard University Cambridge, MA D2138

James L. Cox Architecture Mgr.-OPD Boulder IBM Corp. PO Box 1900 Boulder, CO 80302

Ole-Johan Dahl Prof. of Informatics Univ. of Oslo Oslo NORWAY

Adin D. Falkoff IBM Corporation

Dr. Aaron Finerman Dept. of Computer Science State Univ. of NY Stony Brook, NY 11790

Dr. Daniel P. Friedman Dept. of Computer Science Indiana University Bloomington, IN 47401

Prof. B. A. Galler Assoc. Dean, Long-Range Planning College of Lit., Sci., and the Art Univ. of Michigan Ann Arbor, MI 48109

Mrs. Caral A. Giammo Chief - Test & Evaluation Branch CCTC/C431 1860 Wiehle Avenue Reston, VA 22090 Geoffrey Gordon IBM Corporation 205 E 42nd St. New York, NY 10028

Patrick E. Hagerty Univac Div. of Sperry Rand addr

Frances Elizabeth Holberton Inst. for Computer Science & Tech. NBS Washington, DC 20234

Capt. Dr. Grace Murray Hopper Navy Prog. Lang. Group Pentagon 50840 Washington, DC 20350

Dr. Kenneth E. Iverson IBM Corporation T. J. Watson Research Center P.O. Box 218 Yorktown Hts., NY 10598

Dr. Thomas A. Keenan National Science Foundation 1800 G Street NW Washington, DC 20550

Prof. William B. Kehl Dir., Center for Info. Services Univ. of Calif. at Los Angeles Los Angeles, CA 90024

Dr. Thomas Kurtz Dartmouth College Hanover, NH 03755

Don Leavitt Software Editor Computerworld Newton, MA ?

Dr. J. A. N. Lee Virginia Polytechnic Institute McBryde Hall Blackburn, VA 24061

Robert Linnenkohl, CDP Consultant, Data Systems Interactive Systems Assoc. 535 S Gramercy Place Los Angeles, CA 90020 Rex Malik addr

Michael Marcotty Computer Science Dept. GM Research Labs Warren, MI 48090

James Matheny Computer Sciences Corp. Information Network Div. 650 N Sepulveda Blvd. El Segundo, CA 90245

Dr. John McCarthy addr

Dr. Robert M. McClure Consultant 14332 Maclay Court Saratoga, CA 95070

Daniel D. McCracken 4 Inningwood Road Ossining, NY 10562

Roger L. Mills TRW Systems 1 Space Park 90-2200 Redondo Beach, CA 90278

Hamilton R. Morse Functional Automation, Inc. 118 Northeastern Blvd. Nashua, NH 03060

Dr. Peter Naur Datalogisk Institut Sigurdsgade 41 2200 Kobenhavn N DENMARK

Roy Nutt Vice Pres., Computer Sciences Corp 650 N. Sepulveda Blvd. El Segundo, CA 90245

Kristen Nygaard Norwegian Computing Center Forskningsvn. 18 Oslo-3 NORWAY Billie J. Pease U. S. Geological Survey Reston, VA 22092

Prof. Alan J. Perlis Dept. of Computer Science Rm 264 Jorgenson Hall CalTech Pasadena, CA 91125

Dr. Robert W. Rector, Exec. Dir. AFIPS 210 Summit Avenue Montvale, NJ 07645

Dr. Saul Rosen Computing Center Purdue University West Lafayette, IN 47907

Dr. Robert F. Rosin Technical Staff Bell Laboratories Holmdel, NJ 07733

Douglas T. Ross, Chmn. SofTech, Inc. 46D Totten Pond Road Waltham, MA 02154

Jean E. Sammet IBM Corporation 545 Technology Square Cambridge, MA 02139

Jules I. Schwartz King Resources 12011 San Vicente Blvd. Los Angeles, CA 90049

Prof. Earl J. Schweppe Chmn., Computer Science Dept. University of Kansas Lawrence, KS 66044

Peter B. Sheridan IBM 40 Rue du Rhone 1211 Geneva 11 SWITZERLAND Thomas B. Steel, Jr. AT&T addr

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Prof. Peter Wegner Div. of Applied Mathematics Brown University Providence, RI 02912

Dr. Joseph Wegstein Inst. for Computer Science & Tech. National Bureau of Standards Gaithersburg, MD 20760

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David S. Wise Assoc. Prof. Dept. of Computer Science Indiana University Bloomington, IN 47401

Appendix C -- Manuals & Demos

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MD	Carlson, Walter M.	(former ACM President)
MD	Cheatham, Jr., Thomas	E.
MD	Friedman, Daniel	
MD	Giammo, Caral	(user-WWMCCS)
M	Hopper, Grace Murray	(US Navy-COBOL)
M	Kurtz, Thomas E.	(user-Dartmouth-BASIC)
M	Lee, J. A. N.	
D	Leavitt, Don	(reporter-Computerworld)
MD	Linnenkohl, Bob	
M	Malik, Rex	(reporter-UK)
M	McClure, Robert M.	(ex Palyn Assoc.)
MD	McCracken, Daniel D.	(well-known author)
D	Morse, Dit	
M	Naur, Peter	
MD	Pease, Billie	(user-US Geol. Survey)
M	Perlis, Alan J.	(former ACM President)
M	Rosen, Saul	
M	Rosin, Robert F.	
D	Schweppe, Earl	(user-Univ. Kansas)
M	Tropp, Hank	
MD	Wegner, Peter	(consultant-DOD lang. study)
MD	Wise, David	

BEERSF

Report -- IR Systems

We have had several contacts recently with sales efforts to state governments. All revolve about supplying capability similar to IBM's ATMS and STAIRS systems. That is, package systems for text creation, storage, retrieval, and photocomposed display.

Some work has been done for proposals to Massachusetts and Maine. Bill Simmons of Industry Marketing has supplied a RFP from the State of Alaska, plus two documents for evaluation:

- o MISTRAL, for Level 64.
- o STATUS 2, for Level 66.

MISTRAL is reportedly at V2 (batch) level, with V3 (TSS) expected in the Fall. STATUS-2 was reported to have originated in Copenhagen, while the document is labeled from the UK Atomic Energy Research Establishment at Harwell. Clamons had seen the latter document during negotiations with Tenneco.

On May 26 I called London and talked to Steve Nelson, who gave this information on STATUS-2:

- It is operational only on IBM 370 at Harwell. A Level 66 version is in partial stages of completion, but not enough for any agreement with HIS. The CPH source is unconfirmed.
- o It is written in Fortran, and would have to be rewritten to become operational. A very low estimate of 3 man-months for this, estimating a position of 3/4 of the way up the learning curve. (I wonder if Alick Glennie had anything to do with this?)
- It is also operational on five or six different minicomputers, probably due to the Fortran transportability, but not on Level 6.
- It is said to be ideal for a turnkey minicomputer, but it is also noted that the marketing experts required must be well-versed in Information Retrieval.
- o The cost was said to be high, but on the phone I couldn't understand if it was 16,000 pounds or dollars, or if that was per user. In any case, negotiations would be required. The UK has not done so because their market alone is not sufficient to move the project.
- o On the STAIRS-type side, STATUS-2 is said to be powerful, simple, and flexible. There must be some reason that the AERE, a longtime and experienced IBM user, would design and build it rather than use STAIRS! It is good for general databases and concordances from any type of input data. It has text compaction for storage, synonyms, ranging, etc.
- The ATMS side is said to be more machine-specific and less developed.

MAY 31 1910

L. W. (ROY) BEERS

2 COPY ME



Speculations

It seems that HIS sales is finally becoming convinced of the need for such capability. A long overdue realization, because IBM has been making a big market here for some years. The question is what must we do to catch up and provide this capability to our sales force?

For one thing, we do not have to define the product. That's clear enough. See the Alaskan RFP, the work of Dave Durant in SEA, the manuals, etc.

For another, we have most of the components at hand. It's a matter of linking and packaging -- putting into production status the experimental work already done on a small scale.

The expertise to integrate it all lies within Advanced Systems Engineering in Phoenix. Marketing Applications has some experience (e.g., Gerry Despain and Concordance). LISD Software Engineering has little to none; even our software manual system is crude in comparison to what is needed here.

Plan

- If undertaken, the project should be done/directed by Advanced Systems Engineering. The ponderosity of the established Software Engineering system is unaffordable.
- 2. A preliminary study is needed. Bemer or Keys or Clamons should go to the UK, meet with Nelson, lay out proposals, schedules, and feasibility. This includes direct contact with Harwell people and exercising the system on the 370. Assuming that the AERE has a Level 66 (because that much of STATUS-2 is written), TEX should be installed there and taught to their people.
- Based on this, Marketing should authorize funding and agree to schedules. Moreover, it must be a least a US-UK agreement.

Postscript

Don't forget -- Dr. Charles Goldfarb of IBM said publicly that "Compared to TEX, ATMS and STAIRS are a kludge".

TEX won't do it all, but it can help to link and build it fast and cheaper.

R. W. Bemer 1978-05-26



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HONEYWELL INTEROFFICE CORRESPONDENCE

PHOENIX OPERATIONS - HONEYWELL INFORMATION SYSTEMS

DATE 1978 May 24

PHONE 8-357-2569 MAIL ZONE C61

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R Lahm C Weber

TO MB Geiger

FROM RW Bemer

COMPONENT Advanced Systems Engineering

SUBJECT IMPROVING THE TELEPHONE DIRECTORY DATABASE

Development of electronic mail capability for HIS in Phoenix will commence from the existing telephone directory database. A modification is about to occur in the affiliation column. While we are about it, it's a good time to make other modifications.

It would be useful to add, but not publish, the employee number and cost center to the entries. This would give these additional byproducts:

- Correct individual sublistings by cost center, for the use of the secretaries serving those groups.
- o Better accuracy for the directory. Presently, the employee fills out a card on his change, with the name of his group (as the employee interprets it!) If just the cost center is given, the computer can match for the name to use.
- Reduced storage requirements. One file for the name to cost center relationship, one for the directory with cost center only. The directory file is created in full only when it is to be displayed.

Could you have a method prepared whereby a tape containing "employeenumber-costcenter-name" can be extracted from the payroll datafile and loaded to a timesharing file on System X or N?

We know that this would not give all persons listed in the directory. But we can work on an exception basis for now, and pick up the balance later when we have demonstrated feasibility. We have to handle name mismatches separately anyway.

We also need, one time only, a tape containing "costcentercostcentername". If not too large, this could be hand entered again.

pak

NATIONAL COUNCIL OF **Teachers of Mathematics**



1906 Association Drive, Reston, Virginia 22091 (703) 620-9840

19 April 1978

Mr. R. W. Bemer Honeywell Information Systems P. O. Box 6000 Phoenix, AZ 85005

Dear Mr. Bemer:

The Board of Directors of the National Council of Teachers of Mathematics has adopted a policy to permit the publishing of material using the liter or litre spellings. Please let us know if this change will permit you to have us proceed with the publication of your material "Metrication Aids Education -- and Vice Versa."

Thank you for your interest in the MATHEMATICS TEACHER.

Sincerely yours

Harry /B. Tunis Managing Editor The MATHEMATICS TEACHER

HBT:bbc



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DATE 1978 April 17

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EH Clamons

P Skelly

TO TJ McNamara

FROM RW Bemer

COMPONENT Advanced Systems Engineering

SUBJECT ANSI Standard for Additional Controls

In the course of writing a series of magazine articles on ASCII, I have endeavored to compact and organize the subject standard-to improve understandability for the readership, and to reduce the printed page requirements drastically. A parallel might be drawn to the long-sought tutorial on the PL/I standard.

To my dismay, I find that this work has turned up serious logical flaws in the standard. A programming language standard with this many ambiguities would certainly never pass scrutiny. I am extremely concerned, both for Honeywell and the entire indistry, because this standard will be the basis of the super-intelligent terminals of the future.

Two categories of flaws are:

- 1. In 25 of the 97 functions described, a parameter value of zero is defined as equivalent to a parameter value of one! As we know from the COMPUTED GOTOs of programming language, a computer process must be rigorous. This ambiguity means that the video screen cannot be controlled unambiguously by a computer program!
- The connection between file, screen, and cursor (Active Position) is undefined. But one or more types of such connections must be defined to permit the present function definitions to exist (See Attachment for example).

I propose that HIS take all possible actions to forestall ANSI approval of this standard, and to get it rewritten in acceptable form. My input will be an excellent basis for the latter.

There is an ISO TC97/SC2 meeting May 24-26 in London. This meeting should still be held, despite French desire for postponement. It should however be structured with adjoint technical sessions, where the substance of a technically correct compromise can be worked out. Precedent exists.

RW Bemer

pak

Honeywell

1978 April 17

TO: D. Hekimi, Secretary General, ECMA C. Card, Chairman, ANSI X3L2

FROM: RW Bemer

SUBJECT: Document X3.64

Gentlemen:

In the course of writing a series of magazine articles about the ISO Code and related matters, I have had to attempt to compact the material on Additional Controls. I started first from ANSI BSR X3.64.

Because this important work lays the foundations for the really intelligent terminals of the future, we must remember that there is a very close coupling with the subject of programming languages. Language interpreters and compilers will be used to build forms on such terminals, fill them, move them as message mail, control photocomposition, etc. I believe that this interaction demands as much rigor and freedom from ambiguity as we expect from the specifications of the programming languages.

Unfortunately, I find many ambiguities in X3.64. In 25 of the 97 functional descriptions, a parameter value of <u>zero</u> is specified to act the same as a parameter value of <u>one</u>. You are both completely conversant with programming languages, and realize that a Computed Go To (which such cursor and scroll movements are) cannot be multivalued.

The relationships between the display window, files, and pointers are in less satisfactory shape. The number of "undefined" convinces me that more chaos could occur acting under the authority of such a standard, rather than less. If indeed there are multiple ways of describing these relationships, then the functional action for each such way must be avowed, not avoided. An attachment to this letter may illustrate this statement more clearly, in addition to the material of section 4.5.

Then there are such traps as Set Mode and Reset Mode (which I now believe mean Mode On and Mode Off), and the differences between cursors (which go up, down, forward, and backward) and scrolling (which goes up and down also, but left and right).

Honeywell

D. Hekimi/C. Card

1978 April 17

My work, which should be available within a week, should derive much coherency from its compacted form. Although I do not suggest that the standard itself should be written in this compact form, certainly it is an alternate view that could be used to give a further test to what could become the International Standard.

2

I apologize for my personal inattention to these important documents before now. Eric Clamons has kept me very busy with the TEX language, but I do not ask you to accept this as an excuse.

It is therefore with some embarrassment, but with <u>much</u> conviction, that I suggest that the documents on this topic be subjected to a further technical refinement before submission to TC97. It may be that such an experts meeting could be held in conjunction with the SC2 meeting in London, without harm to the treating of other important matters before that committee. I shall of course be willing to submit my own findings and suggestions, as a possibly fresher view of an outsider who simulated implementation of the standard as other uninitiates would.

Cordially yours,

RW Bemer

pak

cc: RM Brown, CBEMA



ATTACHMENT

We will make three models of the file-screen-cursor relationship. Our construction materials are:

- o A large piece of paper with written lines on it (the file).
- o A wooden frame of domension less than the paper in both directions (the screen).
- o A number of beads with holes in them (cursors).
- o A number of wires/tracks to move the beads on (rows and columns).

Model 1

Wires are strung in the frame to represent rows and columns. Beads slide along them. We say "Cursor forward 3". The bead on our active line moves right 3 columns. We say "Cursor forward 278". The bead hits the frame and can move no further right.

Model 2

The wires are strung so that all row wires are continuous from the right of the frame with their succeeding row wires on the left of the frame (wraparound). Now the bead is at the rightmost position within the frame. We say "Cursor right 3", and the bead shows up at the left on the next line (row).

Question 1: "On what column is the bead?"

- Question 2: "Are the column wires similarly connected, so that when a bead is at the bottom of the frame, a "Cursor Down n" will bring it to the top of the frame in the next column to the right?"
- Question 3: "If not, what is the logical difference between up and down cursor movement and left and right cursor movement, when the file is in both directions longer or wider than the window frame?"

Model 3

There are no wires in the window frame. But there are tracks on the paper for the beads to travel. The frame is held or suspended a short distance above the paper. We observe that a certain bead is at the far right, in the rightmost position that we can view. We say "Cursor forward 3", and bead moves along the track outside our field of vision. But then we say "Scroll Right 4", which moves the window frame so as to enable us to once more see the bead.

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DATE 1978 April 5

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RE Cain

AL Longanecker

10 LA Kinneberg C75

FROM RW Bemer

COMPONENT Advanced Systems Engineering

SUBJECT REQUEST FOR SOFTWARE DESIGN MODIFICATION-HUMAN INTERFACE

> A most important aspect for customer satisfaction is that the software be forgiving. If a user makes a mistake, a retry should be permitted without punitive chastisement.

As an example, yesterday I typed:

/orgchart/2print

because a 2print is usually done by typing:

texlib/h/2print

However, I had forgotten that the 2print in the orgchart catalog is actually a TEX program that does a lot of things automatically and then calls a 2print. So I should have typed:

call /orgchart/2print

But because I did not, the system returned:

COMMAND UNKNOWN

(67) CMDL ???

and I was kicked up to system level. My variables were lost, and I had to get a fresh copy of TEX and do the work over.

PROPOSAL

What a user wants to do, if a mistake is made inadvertently, is remain on the same platform of usage, not have everything explode in his face. This is particularly ture for the newer and inexperienced users that we are trying to sell computers to.

TSS should be modified so that error messages are issued without altering the current subsystem level.



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_____ CW Dix

_____ RW Bemer

COMPONENT Advanced Systems Engineering

SUBJECT AUTOMATED TYPESETTING PROJECT

EH Clamons JF Couleur TJ Kiley

We have a problem. Our typesetting for the organization chart (which Jerritts loves), telephone book, manuals, specifications, slides, etc., is threatened by the obsolescence of the program we wrote in 1970.

We have a solution. A local typesetter, a former GE product planner, can access our Level 66 systems directly to typeset text we prepare for him. This operation will take some development and machine time in his shop. He estimates informally:

Interface Definition and Programming - \$400 Testing and Production @ \$1.75/sheet - \$600 TOTAL - \$1.000

Purchasing can negotiate terms when the program is approved. TEX can handle conversion to his format. He too uses ASCII for his text. The work involved is trivial.

This undertaking will benefit us, not only in helping us secondsource our current work, but also to demonstrate to customers that indeed we can use a Level 66 machine to obtain high quality text output.

The turnaround time for typeset matter will be 3 - 8 hours depending on the quantity and urgency of our work. Copy will be ordered from the terminal and delivered to the guard desk.

Supportive details and considerations on next page.

CW Dix

2

1978 January 25

1. MARKETING OPPORTUNITIES

The program, if successful, will give marketing an opportunity to fill the many requests we've had to demonstrate a typesetting capability. We may be able to use Level 6 computers in place of the presently used mini.

2. SECURITY

A special USERID will be set up to isolate the typeset house from the rest of the users. Only "read" permission will be issued. Files to be typeset will have limited permissions to this USERID.

3. PRESENT PROBLEMS

The program is obsolete and cannot be modified. It uses I language and the source code is indecipherable. The Level 66 system has much improved since then, still we can't take advantage of it.

We are dependent on a single vendor whose financial status is shaky. His equipment is becoming obsolete. If he survives and updates his typesetting equipment, we'll not be able to use our programs.

We have a high administrative overhead involving nonroutine procedure by system operators, tape library, property passes, etc. We usually handcarry the tapes to the shop and have to return to pick up the finished work. This wastes two hours of somebody's time.

4. TIMING

We hope to demonstrate around February 15 in conjunction with the week long internal meeting on the subject of ULTRATEXT, PUBSYS, Documentation, etc.

5. ACTION

Approve the expenditure outlined in this memo (page 1).

RW Bemer

pak

Honeywell

1978 January 11

Dan Smith American National Standards Institute 1430 Broadway New York, NY 10018

Dear Dan:

I showed a database of 97/5 documents at the meeting in The Hague. You will recall that several attendees wanted copies and found them useful.

Attached is an update of the document register - in sequence, classified, and by contributing member. There are some questions that only Marie and Frances can answer, because they have all originals. I would appreciate having the enclosures marked up and returned, to update and correct the database.

I intend to at least show it then to Olle Sturen and Bob Brown as examples of what can be done. And if you agree, it could be assigned a 97/5 document number and distributed generally. I will supply originals, or even the copies if you wish.

If you can find the time, I would appreciate a hard copy (i.e., letter) of your comments about my chairmanship of the meeting. Always helps to justify the expenses for the next meeting.

Cordially,

RW Bemer

pak



To: C. W. Dix From: R. W. Bemer 1977-08-31

Subj: ROBOT (your letter to Manzer)

Re Bartek's activities on ROBOT, certain questions should be asked before making a business decision. Perhaps all can be answered "yes", but prudence says ask them anyway!

<u>Question 1:</u> Does HIS wish to supply "natural language" query systems of the ROBOT class for its computer systems?

a) All such work is being done under the banner of AI (Artificial Intelligence), a field now populated by many former principals in the fiasco of computerized language translation. The choice is between:

Computer A -- "What do you want me to do?"

Computer B -- "Tell me what choice you make among the things that I know how (am programmed) to do, which are these ... "

Computer A is obviously the AI machine, and the large and continuing body of work in this field raises a serious question of whether any of these systems have come to commercial viability. Imagine saying "LIST ALL PRETTY LITTLE GIRLS SCHOOLS"!

Computer B is (equally) obviously my own preference for viability. An example of such a prompting system is the very successful Mark IV of Informatics.

- b) Will customers stand for allocating 10K of memory for each inquiry?
- c) The effect upon the marketing of our other products in this area should be considered. Will 6000/66 customers drop MDQS? Or will they demand ROBOT for that machine as well as Multics?

Question 2: If so, is ROBOT the language to choose?

There are only a few references to ROBOT in the computer Literature. In the 1977 February issue of the ACM SIGART Newsletter (page 39), L. R. Harris of Dartmouth mentioned a sample of 200 responses to queries via ROBOT. He said "78% of the questions received acceptable responses", but that it was a "biased sample ... (wouldn't include the last sentences of users who hung up in disgust)". Bartek indicates the figure to be 90% now, and still improvable. Excellent progress in 6 months. However, it is uncertain how ROBOT compares in this respect to other natural language query systems, a sampling of which is given in Appendix A. Note that some of these work via APL or PASCAL, rather than PL/I. Also, one of them (JIMMY3) runs on a 66/60 at the University of Kansas.

Question 3: Is the supplier dependable?

The principal reference I could find was the paper by Bob Landau, Proceedings 1976 COMPCON, Sep 7-10 -- "ROBOT: the highest level human/machine interface language processor for online interactive information retrieval". I raise these questions:

- a) Landau was then with Science Information Association of Kensington, MD, which is now the home base of the Artificial Intelligence Corporation, purveyor of ROBOT. Who are the principals in the corporation? What is its financial position, as a prospective supplier to HIS?
- b) Why is this paper word-for-word identical with "The standards implications of the developing interrelationships between on-line bibliographic retrieval, manipulation and micrographics data display", in "Management of Data Elements in Information Processing", from the 1975 October 23-24 NBS Symposium?
- c) Why, after reading the papers that Landau gave me at that time, would I have discarded them?
- d) Why are there no Landau papers, nor references to Landau papers, in ACM and SIGART publications?
- e) Why is Dr. Larry Harris, the quoter of the 78% figure, in the position of chief scientist for Artificial Intelligence Corporation, while also of Dartmouth College (I may be wrong here -- Bartek says it's a university)?

REFERENCES

- Fife, Rankin, Fong, Walker, Marron, "A technical index of interactive information systems", NBS Tech. Note 819, 1974 March.
- T.H.Martin, "A feature analysis of interactive retrieval systems", SU-COMM-ICR-74-1, 1974 September.
- Marron, Fong, Fife, "A mechanized information services catalog", NBS Tech. Note 814, 1974 February.
- 4. ACM SIGART Newsletters (various), 1974-1977.

Appendix A - SOME NATURAL LANGUAGE SYSTEMS FOR ARBITRARY DATABASE ENQUIRY *DIALOG Lockheed *Data/Central Mead Technology Labs. *ELMHILL 2 Syst. Dev. Corp. *ORBIT III *RAMIS Mathematica, Inc. *RECON ? Library of Congress (used by the Congress) *SCORPIO *STAIRS IBM TYMSHARE ***TYMFACT** U. Leeds (APL) APRIL ATN? U. Illinois (Martha Williams) EASIS Battelle First Data Corp. DMARS DML CSC DS3 Syst. Dev. Corp. ELI Yale U. ENFORM Engineering Numerics Corp. FLEXIMIS GE ISD GIM TRW Systems U. Oklahoma GIPSY HAM-RPN U. Hamburg HANSA U. Hamburg ILL MBLE Res. Lab - Brussels IMARS Interactive Sciences Corp. IMS IBM IMS-8 Univac INQUIRE Infodata Systems, Inc. Response Technology, Inc. INSYTE JIMMY3 U. Kansas (66/60) Xerox Research KRL LEADERMART Lehigh U. LIFER Stanford Res. Inst. LUNAR U. Brit. Columbia MARS VI CDC MARSHA SUNY Buffalo ("daughter of ELIZA") MASTER CONTROL Lawrence Livermore Labs MICROTEXT MITRE Corp. MINIDATA United Computing Systems MIRADS NASA Marshall MUSE Meta Language Products OLIVER On-Line Computing Systems PEDAGLOT Rutgers U. PHLIQA1 Phillips, Netherlands PIRETS U. Pittsburgh PLANES U. Illinois PLISP Stanford U. (mod. TENEX, SAIL - ALGOL) QUERY IBM (Thompson) QUERY UPDATE CDC RENDESVOUS IBM (Codd) IBM (Plath) REQUEST (see NOTE 2) RESEDA



RIQS	Northwestern U.
SEQUEL	(Chamberlain - ACM74 SIGFIDET Workshop)
SGL	Syst. Dev. Corp. (CODASYL DBTG & relational)
SHOEBOX	MITRE Corp.
SMART	Cornell U. (Salton)
SNP	U. Hamburg
SPIRES II	Stanford U.
SYSTEM 2000	MRI Systems Corp.
TELOS	U. Wisconsin (Pascal-based)
TENEX	?
TICON	Advanced Computer Systems, Inc.
UNIDATA	United Computing Systems
WITS	U. Witwatersrand, S. Africa
?	IBM (Heidorn)
?	IBM (Miller)
?	ISIRAN Inst. (in Farsi)
?	McDermott, MIT AI Lab

- NOTE 1: Commercial systems in public use via timesharing are indicated by an asterisk. The preponderance of noncommercial systems might indicate that such natural-language query methods may still be in the research stage.
- NOTE 2: RESEDA is from the Centre National de le Recherche Scientifique Equipe de Recherche sur l'Humanisme Francais des XIVe et XVe siecles.

4

ATTACHMENT - DETAILS

1. CAPS LOCK DOES NOT CREATE A TELETYPE-COMPATIBLE MODE

With caps lock on, the character set consists of uppercase alphabet, 10 digits, and 11 special characters, which are:

· , -+;@[]/\^

Unavailable from the existing keyboard are these 10 above the digits:

! " # \$ % & ' () =

and these 11 others:

_*:<>?~{}|`

The nontrivial consequence is that a programmer, without jumping in and out of the caps lock mode:

- o Cannot write FORTRAN, BASIC, COBOL programs, etc.
- o Cannot write JCL.
- o Cannot edit.
- 0 ?

Solution 1: Apply caps lock only to the alphabetic keys. All of the above problems are eliminated.

Solution 2: Reverse the caps lock effect upon the 10 digit keys, thus picking up their special characters. Use the numeric cluster for the digits. However, this still leaves some problems with programming languages and editing. See the official character sets required for the standard programming languages.

2. THE KEYBOARD IS NONSTANDARD AND DIFFICULT FOR TYPISTS

Pairing of specials is good, but the selection of which shall be in which case is important. In this keyboard, the programmer must work the shift key quite often to program or edit. Attachment

The keyboard is not only nonstandard, but of a design unfamiliar to our current users. Here are the usage symptoms:

- o The BREAK key is just above the RETURN. This is sure to cause problems and frustrations.
- Almost invariably the left shift key is just to the left of the letter Z. Interposing the @ key poses a difficult adjustment for the user, particularly if he uses other terminals interchangeably.
- There are no rollover interlocks, which yields many extra characters except at most deliberate speed.
- Accent acute and accent grave have the same display rendering (vertical). This may make it difficult to sell in Europe. This should be a trivial fix.
- o The customary control assignments seem to have been made. CNTL X is line delete, CNTL I is horizontal tab. Is there any reason these should not be indicated on the keytops?

3. THE BUFFER MAY NOT MATCH THE SCREEN DISPLAY

I logged on and entered

USER-ID? myuserid ...

At this point I remembered that the software will strip trailing blanks, so the cursor was moved left 3 places and 3 blanks were typed. The screen said

myuserid

But the line transmitted was actually

myuserid ... \$\$\$



Naturally it was rejected. The next time I did the same, but after moving the cursor left 3 places the erase-to-endof-line was used. This didn't help. The buffer still contained

myuserid ...

OTHER COMMENTS

- o The password replaces the mask characters, which is bad for security. But most video terminals do the same, so I have no fix, except to see what IBM does for this.
- There appears to be a logic problem with hitting erase-eopeol with the shift key depressed. The entire display twitches up and down. Perhaps it was only on this one terminal.
- Shifting back to line mode from page mode disconnected me from the computer. Perhaps it should.
- Power-on is awkward in the back. One must memorize the location. Not good for cramped quarters.



HONEYWELL INTEROFFICE CORRESPONDENCE

PHOENIX OPERATIONS - HONEYWELL INFORMATION SYSTEMS

DATE 19// February 10 PHONE 35/-2569 MAIL ZON	NE CO1
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TO KH Buechs/JT Dunn

FROM RW Bemer

COMPONENT Advanced Systems Engineering

SUBJECT ACS AND HYPHENATION

This is to bring (perhaps once again) to your attention a serious deficiency in the ACS, one that surfaced during composition of the first 6000 manuals. Simply--the hyphenation routine is unusable. The 6000 manuals had to be run with the hyphenation turned off.

Some examples (correct hyphenating places are shown by dots in the righthand version):

direc-tly	di.rect.ly
frequen-tly	frequent.ly
subsequen-tly	sub.sequent.ly
quic-kly	quick.ly
app-roach	<pre>ap.proach</pre>
co-pying	copy.ing
cand-idate	can.di.date
inc-lude	in.clude
malf-unction	mal.func.tion
nonc-ritical	non.crit.i.cal
pers-onnel	per.son.nel
sati-sfy	sat.is.fy
sequenti-ally	sequen.tially
uni-que	u.nique (even this is bad)
SY-SOUT OPNS-UTIL	(All caps meanssystems-reserved words which cannot be hyphenated at all!)

Also noticed were dropped characters and words ("within the function" showed up as "withion"), and justification failures resulting in line ending before or after the column righthand limit.

I am stating the problem to you as quickly as possible, for I do not know how long it will take OmniText to make a fix.

W Berner/p

RW Bemer

1.79

pak

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EH Clamons

GK Vercauteren

A.I Nance

FOR C. WALKER DIX

PREFACE

Barring some patent monopoly, the profit of a corporation in a competitive climate is going to depend strongly upon the productivity of its employees. Honeywell Information Systems has not performed optimally in this regard. For example:

- 1. The ratio of technical staff to sales volume is one of the highest in the computer industry.
- 2. Slow sales of the Level 64 system remind us again that the success of a machine line depends critically upon the availability of a suitable set of quality software delivered on schedule. And this adequate software production is not necessarily ensured by the existence of schedules, by promises, by organization or reorganization, by the software design, by the software factory (as it exists), ot by adding to the number of programmers on each project.

We pay much attention to improving the manufacture of hardware in our factories, possibly because the processes are so visible and measurable. Similar attention should be given to tightening up the design process.

In the design-manufacture-marketing-upkeep process there is a subprocess that consists of the <u>development</u>, <u>transfer</u>, and <u>preservation</u> of knowledge. This knowledge itself, documentation, together with the means and tools for using and manipulating it, is critical to productivity.

In the last two months, starting from the paper-saving assignment, I have seen a variety of productivity needs for which I can supply some very good answers. Attached is a first proposal for an assignment especially directed to increasing HIS engineering productivity throughout NAO. PROPOSAL

To develop, improve, install, and promote operational methods to:

- 1. Substantially aid productivity of hardware design engineers.
- 2. Improve programmer productivity by 2:1.
- Make contributions to Field Engineering productivity that will derive from the Engineering improvements.

The methods are to be applicable throughout CEO. Some of the components of this task are:

 Provide an integrated flowchart of documentation components as they move from source (product specifications, design memos, etc.) to sinks (factory, programmers, field engineers, customers, salespeople, etc.)

Augment or modify the present system so that as much documentation as possible is machine-processable. This is not only for publication (with reduced paper and other costs), but also for convenient allocation to sink documents, for accuracy, for elimination of duplication, for improving the match to level of hardware and software change.

- Increase programmer productivity in the fabrication of software via a suitable combination of devices, tools, and training methods. Included are:
 - Redesign of the programmer work station, emphasizing online test, faster turnaround, better diagnostic methods, COM and manuals on fiche.
 - b. Reorganization and condensation of the programming manuals for less wasted time in understanding the system under which software is being constructed. (Needless to say, this will also be welcomed by customers, with whom the cyclical lookup characteristics are a very sore point).
 - c. Courses and demonstrations of optimum diagnostic methods for testing and proving the source programs. (This will also be beneficial for the security requirements).
 - d. Indoctrination in the use of construction tools for the actual creation of source programs.

Addenda

Also to be available for occasional assistance; e.g., Dick Ruth has asked for my help in January for a new formulation of the 6XXX.

As much emphasis is to be given to text editing and other tools, protection of HIS knowhpw can be obtained via my being invited to chair the new ANSI standardization work on text processing and publishing languages.

Field Engineering, in Phoenix at least, is very pleased with the concepts outlined here, for their own purposes.

RBung

HONEYWELL INTEROFFICE CORRESPONDENCE

PHOENIX OPERATIONS - HONEYWELL INFORMATION SYSTEMS

	12 December 1974 рном	<u>1E</u> 993-2761	MAIL ZONE A-20	COPIES
<u>TO</u>	R. W. Bemer			
FROM	R. V. Kloster			
COMPONENT	E&CR/M&ER			
SUBJECT	APPOINTMENT NOTE			

Tomorrow, 13 December 1974, an appointment has been made for you to meet with Mr. Bernard Beck, Executive Vice President of The Kleinbeck Group - Suite 1504 of the Del Webb Townehouse, at 9:00 a.m. (telephone 264-9085).

Please allow most of the morning for your initial appointment with The Kleinbeck Group.

Talk with you soon.

R. V. Kloster, Manager Management & Employee Relations

cadu



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PROSPECTS - INDEPENDENT

Most actions have been planned with this in mind for eventuality. Have as big a contact list and reputation as any.

- ACT Reaffirmed Charlie's offer on Aug 14 (he's back on Sep 3).
 \$25K a year rate to do writing and some consulting; writing to be at my discretion, right here in PHX. Some meetings could be handled. Purpose is promotional, and to give cushion against finding another position or venture. No duration is required. However, no other consulting at same time. Could only set up future contracts.
- 2. CBEMA. Depends on whether they pick up the Journal. Plan given to Henriques. Trying to get together. Call Monday. However, other CBEMA consulting available, and could run concurrently. Example, the wasted \$1200 contract to summarize the privacy studies (writing again). All there very friendly.
- CIA (Computer Industry Association). Has backing of millionaire Dan McGurk; Norm Ream working for standards.
- 4. OtherxBarerNorent NBS. RUth Davis and Bill Andrus. Many projects and contracts, although some still done by joint company efforts, like terminal protocol. Also the suggested vocabulary repository for NBS (and perhaps AFIPS).
- 5. ADLittle. Ted Withington has my resume. They can use an expert on Word Processing as subconsultant.
- ACM. Joe Cunningham could use for Long Range publications planning.
- AFIPS ditto. Very friendly with Glaser (Pres) and Restor (Exec Dir). Did Security manual for them, very pleased. Have contracts, like security, in \$40K neighborhood.
- Datamation. Wants to improve publication methods. Kirkley was to investigate ours. In well with all staff.
- GE. Despite internal staff, may use outsiders, particularly because of my employement there. Burlingame, BEthesda, Feeney.
- Honeywell 6000 customers. Can show how to go from Rext Editor to photocomp, even though HIS does not provide. Ford, GM, others.
- Auerbach. No time to talk to Ike yet, but always got on well, was consulted when he started the Digest.
- 12. IBM. Univac. DEC. Xerox.
- Aschauer. Datagraphics if improve financially. Data Products. Other gogernment.

PROSPECTS - PERMANENT POSITIONS

PHOENIX

 HIS - Slight. Company is in very bad financial bind, stock depressed, new line not selling well. Spangle determined to cut, however wildly

Dix reportedly has no position (from Bremer, I haven't talked to him yet, as Stroup suggests I do). I thought I had a split lined up with Henderson, to do operating cost reduction by our methods, but in talking about it to Searles (Henderson's assistant) he suggested that this should be put to Mario Santrizos, who was going into this. That kills, it, for his boss is Dan Callanan, the chief enemy of the Journal for many years.

Jacobson in Marketing. Under pressure to cut his own staff, and would have to make very strong case.

2. DEC. Digital Equipment Corporation. The major manufacturer of minicomputers, with 33,000 customers already. They are about only IBM competititor in solvency, because they carved out a market share that IBM does not invade so far. Kenneth Olsen is president; Greg Williams speaks very highly of hmm and suggests that DEC could use a journal of our quality. There are other possibilities. PHX is OK because they have one plant in BHX now and have taken option on land N of Tbird on Black Canyon for another.

NEW YORK

- Straight publishers. Alan Caplan, editor of Modern Data, told Petersen I could walk down the streets with the HCJ under my arm and get any job. Bremer says Electronics (McGraw Hill) needs an editor. Greg suggests methods might appeal to Normal Cousins, or to Piel of Scientific American.
- Publishing methods. Barnett works for one, Peg Fischer for Bowker of Xerox.
- IBM White Plains or Armonk. Is going to hit this area hard. Contatcs throguh Carlson, a Haddad, etc.

OTHER

- 1. IBM in N Carolina, Word Processing . Evans and Jarema.
- 2. Xerox in Los Angeles. Ditto.
- 3. Tentative CDC position in Minneapolis.

FINANCE

Have letter from Bayer re salary OK thru end of 74. Bremer, in conversation of Aug 14, said find a job over the next 2 months, working at home. OK if job did not start until December.

On top of this, HIS must, upon layoff, provide.

Vacation	coming		12	d	ays
Week per	service	year -	9	.5	weeks
Returned	pension	money			
Returned	savings	and stock==			

MARY ALLAC . P.D.

1973 National Computer Conference & Exposition

June 4-8 New York Coliseum

Mr. Robert W. Bemer Chairman

Methods & Applications Program c/o Honeywell Information Systems P.O. Box 6000 Phoenix, Arizona 85005

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WILDE)

GAEYHomo camporer - OLIESMANKY, Pros
DEC (Digital Equipment Corporation)

Reputedly offices in Eaton Square and a mfg. plant in PHX already. Check Ed Delph after Labor Day to see if he provided the area north of HIS plant (option?) Find out when Kenneth Olsen (Pres.) comes to PHX next.

Major manufacturer of minicomputers, 33 000 customers already. About the only IBM competitotr that is in solvency, because they carved out a market share that IBM has not invaded so far.

Possibilities - (1) Text processing and common language. They are the leader in photocomposition (doesn't Radke use one? Check him on what it is and his programs. Should be able to sell common language and set extensions via ISO TC46. Another added possibility is to get the work done here in PHX. See what Radke already has; Jerry Harris could house a computer and do programming.

(2) A journal if CBEMA does not take up. Could send that proposal. Might cost only \$5 pr \$6 per customer even for a freebie! Greg Williams suggested, and thinks highly of Olsen. Gordon Bell is a sharpie, so they probably have management well suited to my taste.

In Aug 27 call, John Weil said I should stick with "alphanumeric processing" because I have an important role to play, being the most knowledgeable and visionary in this area. Olsen is chairman of the MIT visitng committee, and Weil serves on it. Weil would be happy to recommend me to Olsen.

WRITE A PROSPECTUS IN ANTICIPATION

STAINLESS STEEL . memo from PRODUCTS 2980 N. SAN FERNANDO BLVD. ARCHIE LESTER BURBANK, CALIF. . VICTORIA 9-3283 Cear Be ARCHIE D. LESTER DATA PROCESSING MANAGER Engineering . Manufacturing Pleased to -Laboratory Testing about you and to learn ga are doing so well -I, too, am still going stong - In case you don't remember, When you were at Marquardt, I had the tab Dept next to you. Nice to see your smiling face! finderely, Leter

993-2569

B-106

1974 July 15

J. B. STROUP

R. W. Bemer

ATP - Phx.

ORGANIZATION CHART

We are photocomposing the total organization chart for Jack Searles, for the August 1 issue. It will take 3 pages, back to back, instead of the current 1.5" notebook.

To validate the entries, we of course used the concordance. The attached excerpts made me think what a handy structuring tool this would make for Clancy Spangle. There are, for instance, 3 Directors of Financial Planning & Analysis - 2 Directors and 4 Managers of Business Analysis.

Sort of puts the whole thing in condensed perspective.

n

Attachments



1974 May 16 993-2569 B106 J. Couleur W. T. BAYER R. W. Bemer ASTO - Phoenix

NEEDED INTELLIGENCE

n

The part number for the Signetics 9 x 64 bipolar RAM is:

82509

Perhaps we should have some HIS people with access to 370s look discreptibily inside and see if they find any of these parts? Or check a maintenance manual?

1974 May 14

993-2569

B106

JOHN COULEUR

R. W. Bemer

ASTO - Phoenix

STRINGS AT THE OHIO COLLEGE LIBRARY CENTER

I visited Dr. Fred Kilgour on April 30. His operation is a winner. I entered "BUT,PIG", depressed the send and display buttons, and got:

Butler, Ellis Parker Pigs is Pigs (Publisher) 1937

This was followed by a list of the libraries that housed a copy, plus all of the other bibliographic details. Things like this should cause a journal producer to think twice about how many library subscriptions he is going to get, depending upon the relative cost of subscription vs. borrowing.

Specifically, they are going to double the number of terminals, to about 400. This demands a second Xerox Sigma 5. They find this a fairly good machine for their usage; however, they have given Xerox a suggested list of additional instructions that they feel would improve the string handling, which is the very foundation for success of their system. This list is attached for your inspection and comparison with what your architecture already offers. It should be considered input from qualified experts.

They are also planning for a third computer. A H.I.S. rep is reported to be calling on them. As I do not know his name, a copy of this memo goes to the Columbus, OH, branch office. In this connection, a Paul Melanson of the Boston office (?) was in my office on April 29. He mentioned that he was going to see Cliff Sink of Photon re a proposed special run of 500 minicomputers for Framingham.

- a) Copy of this goes to Melanson, for the string handling instruction information.
- b) The Columbus office may contact Melanson, in case any of his work can lead to an offering to the OCLC.

n

Attachments

W.T. Bayer Columbus, OH, Branch (P. Melanson, Boston M/s 905 -

Durlington, MA

Buddy, can you spare a byte?

That's a dirty tape for you. It'll put the bite on your computer every time. Dirty tape causes data dropouts. And drop-outs cost you money. Bum deal.

RCA Computer Tape helps computers lead more productive lives.

RENFR

It's a special formulation that starts cleaner. Every inch of every reel is tested and certified in the cleanest of white room conditions. (We believe statistical testing is begging the question.) And it stays cleaner, longer. So? Fewer drop-outs, more efficient computing.

Show your computer what the good, clean life is all about. Write RCA Magnetic Products, 201 East 50th Street, New York, New York 10022.

The first step is clean tape. Ours.



Check 49 on reader service card

In the computer market, as in many other areas, the unrelenting pressures of competition have led to a continuing emphasis on the introduction of new products and product lines. The Univac 1100 Series is a refreshing exception to this trend.



The development of the series, which is the subject of this article, is an instructive example of how a well-designed computer product line, eight years after its introduction, can still command a notable respect in the computer market and maintain a sound basis for further development.

Development of the 1100 Series

dates back to the delivery of the first Univac 1107 in 1962. In terms of the state-of-the-art at that time, the 1107 represented quite a large, powerful, and advanced machine, with extensive multiprograming, multiprocessing, and data communications capabilities. It had a core store of up to 65,536 36-bit words with a cycle time of 4 μ sec for a one-word access. Two 1107s could be used together in a multiprocessor configuration, but they ran completely independently.

When the 1108 was introduced in 1965, the 1107 was essentially superseded. About forty 1107s remain in the field, however, and are still actively supported by Univac. The 1108 represents a considerable advance over the 1107, offering 30 additional instructions and over five times the internal speed at prices below the original 1107 prices. Other improvements in the 1108 compared with the 1107 include:

- Expanded core memory capacity—up to 262,144 36bit words
- Significantly faster core memory and internal processing speeds—basic cycle time is 0.75 μsec
- Double-precision fixed point and floating-point arithmetic facilities
- Greatly improved memory protection and addressing techniques
- Provision for i/o controller units that can access memory independently of the central processor(s)
- Capability for up to five central processors and i/o controllers to share a common core memory
- Provisions for up to eight independent core memory modules

In March 1969, Univac announced the 1106, a less powerful version of the 1108. The 1106 has a main memory cycle time of 1.5 µsec and correspondingly slower instruction execution times; otherwise, the only significant difference between the 1108 and the 1106 is the lack of multiprocessor capabilities and i/o controllers on the 1106. Univac has stated that continuing enhancements of the 1100 Series, including the introduction of larger processors, can be expected in the future.

Recent successes of the 1100 Series have been due partly to the existence of the sophisticated EXEC 8 Operating System, developed for the 1108 and now available for the 1106. EXEC 8 offers extensive realtime, There is still plenty of life ahead for the Univac 1100 Series, which has been systematically enhanced since its original introduction in 1962. This survey of the current state of the series is based on material appearing in AUERBACH Standard EDP Reports, an analytical reference service published by AUERBACH Info, Inc., of Philadelphia.



46 / DATA PROCESSING MAGAZINE . APRIL 1970

Univac's 1100 Series – A Basis For Continuing Enhancements

By PETER J. L. WALLIS Editor, Auerbach Standard EDP Reports Auerbach Info, Inc.



auerbach

demand (i.e., timesharing), and batch processing capabilities in both single- and multiple-processor configurations and includes such facilities as the maintenance of an on-line index of tape and disk files stored off-line.

Advanced Concepts

Another factor contributing to the continued success of the 1100 Series is the advanced concept of the original 1107 and 1108 designs, such as the configuing of main memory in independently accessible banks and the duplication of device controllers for increased, "fail-safe" reliability in a realtime environment.

Univac's lively and imaginative approach to product improvement has also been part of the story. A recent instance is the announcement of the "Unitized Memory" devices for the 1100 Series. These units contain a core memory with a single access port and function either as an alternative to the drum storage used by the operating system on the 1108 (providing an enhanced 1108 at an increased cost) or as an alternative main memory for the 1106 (providing an 1106 of lower performance and cost compared with the standard 1106, which uses expensive multimodule memory to give the maximum internal simultaneity).

Other recent introductions have included the improved Uniservo 12.16 Tape Units, the 8414 Disk Subsystem (a replaceable disk device compatible with the IBM 2314 Disk Pack Drive), and the Univac Array Processor (UAP). The UAP is an autonomous arithmetic unit which performs matrix arithmetic independently of the central processor; it is addressed as if it were an i/o device, and affords some relief for 1108 installations that are overloading the arithmetic capabilities of the system.

Last January, Univac announced the 1108 Shared Processing System, which is a configuration of two 1108 processors in which one of the processors handles all functions connected with i/o, freeing the other for processing. When no i/o processing is required, the Input/Output Processor can perform some of the processing to give the maximum utilization of the system; Univac states that the Shared Processing System provides roughly two thirds more processing power than a single-processor 1108 system.

Core Memory

Core memory can consist of up to 262,144 word locations in increments of 65,536 words. Each 36-bit word location can hold one instruction, one singleprecision floating-point data item, from one to six fixed-point data fields, four 8-bit bytes (quarter-words), or six alphanumeric characters. Core memory for the 1106 and 1108 contains one parity bit per half-word.

The standard core memory for the 1106 and 1108 is arranged in independently accessible modules of 32,768 words, but an alternative, cheaper main memory for the 1106, the 1106 Unitized Storage, provides one memory access for each 131,072-word module with a consequent degradation of performance. Subject to some restrictions, it is possible to mix multimodule and unitized main memory on the same 1106 processor.

The basic core store cycle time for a 36-bit word access is $1.5 \ \mu$ sec for the 1106 and 0.75 $\ \mu$ sec for the 1108. The central processor is arranged so that the effective execution times for instructions are nearly halved if instructions and data are stored in independent memory modules, and all the language processors in the standard software are arranged to take advantage of this fact. The arrangement of main memory in independent 32,768-word banks also enhances the efficiency of multiprocessor (1108-II) configurations.

Control Registers

The 1100 Series processors each have a specialpurpose fast memory of 128 36-bit word locations. On the 1107, this is a thin-film memory, but on the 1106 and 1108 the memory consists of ic registers, with cycle times of 166 sec on the 1106 and 125 sec on the 1108. In the 1106 and 1108, 40 of these 128 locations are reserved for use by supervisory routines; these reserved locations include a separate complete set of index registers, arithmetic registers, and control registers, as well as the i/o access control registers.

CHARACTERISTIC	FH-432	FH-1782	FASTRAND II	FASTRAND III	8414
Type of storage	Fixed-head drum	Fixed-head drum	Moving-head drum	Moving-head drum	Replaceable disk unit
Average Access Time, msec	4.25	17	92	92	112.5
Peak Transfer Rate, words/sec	240,000	240,000	24,625	38,438	34,721
Maximum Storage per Subsystem, 36-bit words	2,097,152	16,777,216	176,160,768	264,241,152	28,672,000
Maximum Units per Subsystem	8*	8°	8	8	8
Number I/O Channels per Subsystem	1 or 2	1 or 2	1 or 2	1 or 2	1 or 2
			and the second		

Table I. Univac 1100 Series Auxiliary Storage Units

* Up to 8 FH-432 and FH-1782 drum units, in any combination, can be connected to the same controller.

The 48 locations available to the user's program include 15 index registers, 16 arithmetic registers, and 4 control registers, the remaining 17 locations can be used by the programer for intermediate storage. In both the reserved and user's area of control memory, four locations can be used as either index registers or arithmetic registers, permitting some unusual and powerful address modification operations.

Central Processors

The Univac 1106 and 1108 Central Processors can perform fixed-point and floating-point arithmetic on one-word or two-word binary operands (although double-precision fixed-point arithmetic is limited to addition and subtraction).

The 16 arithmetic registers, 15 index registers, a versatile repertoire of seven-part instructions, recursive indirect addressing, and a partial word transfer facility permit efficient processing of most scientific and commercial applications, although commercial processing is somewhat less efficient because there are no automatic facilities for editing, decimal arithmetic, and radix conversions.

Although the 1100 Series uses a one-address instruction format, a limited two-address capability is pro-

Table II. Univac 1100 Series Input/Output Subsystems

SUBSYSTEM	I/O CHANNELS PER SUBSYSTEM	MAXIMUM DEVICES PER SUBSYSTEM	PEAK SPEED
Uniservo VIC Magnetic Tape	1 or 2	16	34,200 cps
Uniservo VIIIC Magnetic Tape	1 or 2	16	96,000 cps
Uniservo 12 Magnetic Tape	1 or 2	16	Up to 68,320 cps
Uniservo 16 Magnetic Tape	1 or 2	16	Up to 192,000 cps
Punched Card	1	1 reader; 1 punch	read 900 cpm; punch 300 cpm
Printer	1	4	1600 lpm
Punched Paper Tape	1	1 reader; 1 punch	read 1000 cps punch 240 cps
Communication Controller (multiline)	1	4 multiplexors, each serving up to 32 half- or full- duplex lines	4800 bps per line; 51,000 cps total
Communication Controller (single-line)	1	1	40.800 bps
Uniscope 300 Visual Communica- tion Terminal	1	24 (16-line) 48 (8-line)	400 cps
Uniscope 100 Visual Communica- tion Terminal	1	31	400 cps

vided since most instructions can specify the use of any one of the 16 arithmetic registers. The partialword load and store instructions can transfer any half, third, quarter, or sixth of a word to or from the least significant bit positions of any arithmetic register. A wide variety of logical, shift, search, and block transfer operations can be performed.

The execution time of the shift instructions is independent of the number of places shifted due to the provision of a hardware "shift matrix." All instructions can be indexed, and each index register can be automatically incremented or decremented each time it is referenced concurrent with instruction execution. Multilevel indirect addressing is possible and indexing can be performed at each level.

A program interrupt facility causes a transfer of control to one of 42 dynamically reassignable core memory locations upon completion of an i/o operation, upon detection of a processor or i/o error, or upon countdown to zero of the real-time clock (whose centents are decremented every 200 µsec). A programable day clock that can interrupt the executive system is also provided. The interrupt facility permits full utilization of the central processor and all peripheral devices under the control of an integrated operating system that handles multiprogramed operations.

Peripheral Equipment

Four different magnetic drum units are available for use in 1100 Series systems. Two, the FH-432 and FH-1782, are rapid-access, word-addressable units designed to facilitate the rapid exchange of programs or routines between core storage and drum storage. One FH-432 Drum Subsystem or equivalent with at least 786,000 words of storage is required for use of the standard EXEC 8 Operating System.

The Fastrand II and Fastrand III storage units are sector-addressable drums which are also used with several other Univac computer systems. Fastrand employs movable access mechanisms to provide somewhat slower access to much larger quantities of data than the head-per-track FH-432 and FH-1782 drums. The Fastrand II and Fastrand III Drum Storage Units are the same except that the Fastrand III units have 1½ times the packing density of the Fastrand II units, with consequent increases in storage capacity and peak data transfer rate.

Changeable random access storage is provided by the 8414 Disk Storage Subsystem, which records data on the 20 inner surfaces of a replaceable stack of 11 disks. The 8414 Disk Storage Subsystem is compatible with the IBM 2314 disk unit, which has become a virtual industry standard. The 8414 is also compatible with Fastrand.

Table I summarizes the auxiliary storage devices available for the 1100 Series; besides the devices shown, an auxiliary core storage unit, the 1108 Unitized Channel Storage, is available for the 1108 as a very fast and expensive alternative to the FH-432



auerbach

Drum Storage Unit. The Unitized Channel Storage is word-addressable and, unlike a drum unit, can have its transfers interrupted without risking a loss in efficiency.

The i/o subsystems for the 1100 Series are summarized in Table II. Besides those shown, there are a number of systems originally used with the 1107 but no longer available. The 1107 peripheral devices in this category for which provisions are made in the standard 1108 software include the FH-880 Magnetic Drums and the Uniservo IIA, IIIA, IIIC, and IVC Magnetic Tape Handlers.

All the magnetic tape units for the 1100 Series are IBM-compatible; the earlier Uniservo VIC and VIIC units have been effectively superseded by the recent introduction of the Uniservo 12/16 Magnetic Tape Handlers, which offer a wider range of capabilities including phase-encoded recording. Both 7- and 9-track units are available.

Simultaneous Operations

The 1100 Series processors incorporate powerful features for simultaneous operations. Besides overlapped central processor operations resulting from the multimodule arrangement of main memory, each i/o channel functions independently, subject only to the peak data rate of the central processor and of each channel (or i/o controller in the case of the 1108).

Each channel can handle a maximum of 440,000 transfers per second on the 1108 or 333,000 transfers per second on the 1106. Most data transfers consist of one 36-bit word for each main memory access, but some of the slower peripheral subsystems, such as the paper tape and communications subsystems, access main memory once for each character transferred.

Software

Two main operating systems are available for the 1100 Series—EXEC II and EXEC 8. EXEC II, a development for the 1107 Operating System, offers limited multiprograming, while EXEC 8 is a more ambitious system developed for the 1108 but also available for the 1106. The majority of 1100 Series installations are using EXEC 8, but EXEC II is still used and actively supported by Univac. EXEC II can be used in installations where the main memory is 65,536 or 131,072 words or where an early user of EXEC II has never converted to EXEC 8. Recent enhancements to both systems include the addition of handlers for the 8414 Disk Storage Subsystem and Uniservo 12/16 Magnetic Tape Subsystems as well as indexed sequential file access.

EXEC 8

The main operating system for the 1100 Series is EXEC 8, which provides extensive multiprograming software support for systems with at least 131,072 words of main memory and for multiprocessor (1108 II) installations. The EXEC 8 Executive System is a comprehensive group of routines designed to control all activities of an 1100 Series computer system, including job scheduling, hardware allocation environment, library facilities, i/o control, file control, automatic writing of checkpoints, and segmentation.

EXEC 8 recognizes three types or levels of processing: real-time, demand, and batch. Real-time processing is characterized by the need for a computer response that is quick enough to achieve a desired goal. Real-time processing is normally, but not exclusively, associated with data communications or process con-*Continued on page* 52







Run rings around your data processing forms.

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auerbach

Continued from page 50

trol applications where delay in obtaining computer time could result in lost data or process malfunctions.

Demand processing is typified by the need for "conversation" between the computer and the user; i.e., the user will specify the execution of certain tasks depending on the results of previously initiated tasks. Batch processing is the normal execution of independent tasks (programs) or groups of tasks that are not highly time-dependent; limits can, however, be placed on the times at which a given batch job is to be run. The order of priority for scheduling and execution, in descending order, is real-time, demand, and batch.

The principal orientation of EXEC 8 is toward maximizing the throughput of batch operations while providing facilities for handling useful amounts of realtime and demand processing. The type of processing is specified in the control statements initiating a run, and sometimes within each task of a run; i.e., the type of processing can vary for each task within a run.

Program areas are protected from the actions of another program (except for i o operations) by hardware provisions under control of the Executive. They are protected from i/o operations of other programs through a combination of hardware and software checks.

The EXEC 8 Executive System can be utilized on any 1100 Series configuration incorporating at least 131,-072 words of main memory and 786,000 words of FH-432 Magnetic Drum Storage or equivalent. The Executive System contains provisions for handling any 1108 configuration that includes up to three central processors and two i/o controllers. The minimum resident core storage requirement is at least 20,000 words, depending on the particular machine configuration.

The following major items in the 1100 Series software support package also operate under control of the EXEC 8:

• 1100 Series Assembler—a symbolic assembly system that is virtually identical to SLEUTH II for the 1107, with additional instruction mnemonics.

 1100 Series COBOL—a compiler for programs written in coBOL-61. Language facilities include those of Required cOBOL-61, except for a few minor deficiencies, and many COBOL-61 electives, including the COMPUTE verb and the extended version of the SORT verb.

• 1100 Series FORTRAN—a compiler for programs written in a language that Univac calls "FORTRAN V." The language facilities which represent significant extensions of FORTRAN v as implemented for the 1107, include provisions to facilitate the writing and deletion of debug statements, and to assign types implicitly according to the first letters of variable names.

The 1100 FORTRAN V language includes, as proper subsets, all the language facilities of 1107 FORTRAN IV, IBM 7090/7094 FORTRAN IV, and the USASI FORTRAN language. FORTRAN II SOURCE programs can be accommodated through use of the LIFT translator; LIFT converts the source-language statements into 1107 FOR-TRAN v statements, which can then be compiled by the 1100 Series FORTRAN v compiler.

There are two distinct versions of the FORTRAN V compiler, a fast efficient compiler for batch programs, and an interactive, "conversational mode" compiler for servicing users who desire statement-by-statement program execution at remote terminals.

- · BASIC
- ALGOL

 1100 Series sort/MERGE—a generalized subroutine used in conjunction with a series of parameter lists to produce sort programs. The complete program specifications can be entered via the control stream or can be incorporated into a larger program. Fastrand magnetic drum storage can be utilized to speed sorting.

Application packages available include: Linear Programing, PERT COST, APT III (for computer-assisted programing of numerically controlled machine tools), BEEF (an extensive series of subroutines developed by Westinghouse Electric Corporation's Baltimore Defense and Space Center to enhance FORTRAN's capabilities as a scientific processing language), MATH-PACK routines, STATPACK routines, several generalpurpose system simulators (GPSS II and SIMULA), a biomedical support package (BIOMED), an analog simulator (MIMIC), and a powerful matrix manipulation package (BEMAT).

A recent addition is the Functional Mathematical Programing System (FMPS), an extensive collection of mathematical programing routines that is being released in stages up to mid-1970. The full FMPS facilities include the use of a FORTRAN-like control language, an extensive collection of mathematical programing and matrix manipulation routines, and report writing capabilities.

Here to Stay

It is a tribute to the original designers of the 1100 Series that its continuing enhancement has kept it a formidable competitor in the large-scale scientific computer market. If Univac maintains its original and imaginative attitude to further enhancements, the 1100 Series will remain competitive for many more years.

For a reprint of this article, check 36 on reader service card

SUBJECTS IN PREPARATION

Articles presently being developed for future presentation.

> THE IC 4000 DATA COLLECTION SYSTEMS TEXT PROCESSING NOVA OCR FONTS

The subjects and schedules listed are tentative and may be changed as circumstances warrant.

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239

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 . . . TEL. AREA 602-941-2900

1970 July 15

Ms. Sally Yeates Sedelow University of North Carolina Chapel Hill, North Carolina

Dear Sally:

There used to be a saying that "Last week I couldn't even spell "programmer" and this week I are one". I find a peculiar switch on this, being a programmer already. After reading your article in "Surveys" I find I am a humanist!

I did a music-playing program for the IBM 705 in 1957 July. I used solfeggio notation (2 alpha) followed by the duration in 32nds, i.e., a quarter note was 08. This was to allow replaying in any key; it would also run at various tempos (quarter notes per minute was the scale, and we ran Entry of the Gladiators at 1000--whew!)

For compiling simplicity (it was interpretive) I did not assume carryovers from the previous note. The octave was 0 for the initial, plus and minus N for up and down. In Figure 6 I assume that the quote and comma are up and down arrows, effectively.

I have two notes to make on the balance of the paper:

- 1. Page 101, lines 5 and 6, I don't see the need for a shift character. The ISO code has two cases of letter, with separate representations on cards, tape, disc and internal code.
- Page 102, starting ten lines from the bottom of the left column, the 705
 was such a computer for variable length. In the same sentence, it requires
 more than sorting to order. One must first sort (for "kind") and then
 merge. So-called "sort" programs are actually ordering programs.

DO

R. W. Bemer



HONEYWELL INTEROFFICE CORRESPONDENCE

ENTER MAIL STATION NUMBER AFTER EACH NAME

- DATE 197] March 3
- TO R. P. Henderson, J. W. Weil

cc: J. B. Stroup

- FROM R. W. Bemer
- DIVISION Advanced Systems and Technology
- SUBJECT AFIPS Systems Certification Workshop (1971 February 27, 28)

This meeting, one of some significance, took a curious path to conclusions. At first there was much support for certification, particularly for systems which were funded publicly or those privately funded which had involuntary effect upon the public. But Chairman Patrick, with much consulting experience, insisted that the process must move back into design review. He cited:

- The single radio antenna of the Los Angeles Police Department which, if destroyed, would put the whole force out of commission.
- The single frequency radios of the LAPD patrol cars, and the blindness of refusing to phase into selectable frequencies. In the Watts riot they had to call cars from outlying areas. A San Fernando valley car and a local car were at opposite ends of a block and could have made a concerted effort, except that they could communicate only through the control center, which was oversaturated.
- The company with the backup files in locked rooms, the grandfather files in vaults, and the great grandfather files inside a mountain except that there was only one copy of the operating procedures, which was in the machine room.

I was Patrick's chief supporter, saying that certification was like lopping off myriad brances, while the roots - bad system design - went unchecked. Most of the systems we were discussing were large, and the elapsed time means virtual impossibility of correction if certification were done at the end only. I suggested that there were certain elements fundamental to system analysis, and that the important ones were fairly simple to lay down and carried the most weight (Pareto's law). I suggested AFIPS sponsored handbooks or checklists. This was grasped as a first alternative to the sticky questions of certification:

Where would the certification teams come from?

HONEYWELL INTEROFFICE CORRESPONDENCE

-2-

• Where would their authority derive? From law? From licensing? From professional sanction? (In this case certainly not from AFIPS, which is somewhat a shadow society.)

- What systems would be certified? (Not the May Company's billing procedure, it was agreed, for it was a voluntary arrangement. However, I put forth what I think is a valid Honeywell position, that if good design practice was publicly available, then such a private company would probably want to utilize it as a basis for at least its own internal certification procedure to ensure better protection against both legal action and customer alienation.)
- Who would certify the certifiers?

The tentative conclusions for Phase I activities go like this:

Certification is a methology to achieve information systems that function properly and have a low probability of damage to society (individually and collectively).

It involves:

- 1) A standard glossary
- 2) Published preferred practice by system type
- 3) Define a mechanism to verify a system against that practice
- 4) A way to maintain the preferred practice books to currentcy
- 5) Vigorous training and education programs to promote good practice
- 6) A grievance procedure to provide feedback and learning
- 7) Compilation and investigation of horror stories microfiche?

Bob Patrick will summarize and distribute this to the attendees (who were as in the previous list, except for Bob Barton). If everyone agrees reasonably well, it will go to the AFIPS governing body for action. I should be able to make this first copy available internally to you.

It was reported that the impetus for people certification has died down in California, politicians being what they are, and the November election having gone much better (it was mostly a people system problem, see attached page of notes, if you wish).

I assume that if we put emphasis on quantizing and measurability in Step 3 above, the result will be very much as outlined in Bob Henderson's letter of Feb. 8. In addition, it would be very presumptive to certify someone's system without telling him the basis for the certification so he could design to conform.

R. W. Bemer

1971 January 13

Mr. R.F. Shepherd Computing Centre Chelsea College University of London London, England

Dear Mr. Shepherd:

Having just received the Supplement in The Computer Bulletin of 1970 November, I read the notice on your algorithm project with more than usual interest. I reviewed for Computing Reviews an article by Traub and Gentlemen on the Bell Labs project mentioned in the release. This is an area that in my opinion has received far too little attention relative to its importance.

This letter is a request for a copy of your program of work. One concern I have is that the workhorse mathematical library routines, square root, transcendental functions, etc., are not explicitly mentioned. Another is that some measurement criteria should be established to show operation times relative to some basic measure of machine speed; this is to answer such questions as "For the proportion of store consumed, is this subroutine/ algorithm as relatively efficient as those for other equipments?"

Lest these basic functions be thought trivial compared to the solution of linear algebraic systems, consider the high proportion of sin/cos usage in computers assigned to air traffic control. The equipment that the U.S. Federal Aviation Authority is readying for 1973 usage runs out of computational power at less than one-third of the design capacity. Why? Is it partly because computation of square root and sin/cos is done by table lookup?

I am also concerned with a fault in many papers on so-called "optimal" approximations, where the effort is spent on making the approximation optimal for the original range, rather than using the faster logical operations to transform the range for approximation, evaluate, and retransform the result. Even the distinguished mathematician Erven Kogbelliantz was amazed to find that one of my routines for the IBM 705 ran twice as fast as his optimal routine. He did not know that arithmetic operations for that machine took variable execution times dependent upon the proportion of zeros in the operands; I did.

The work you are about to perform has other aspects of interest. The U.S. National Bureau of Standards was at one time charged with evaluation of the effectiveness of numerical computation, looking toward standards of

Mr. R.F. Shepherd

performance rather than of compliance. They may yet do so, and your work might be very suitable input. However, a third and overriding standards consideration is emerging, that of certification. "Does this computational process produce correct answers, so that it may be certified as a component of computer systems directly connected to human welfare and safety?"

-2-

My own interest in your work is strong. I worked with Hastings at the RAND Corporation and apparently developed polynomial telescoping independently of and concurrently with Lanczos. Being also a member of the BCS, perhaps I might be allowed to give some suggestions and leads.

R. W. Bemer

RWB:eh

cc: John W. Weil, Honeywell Information Systems, Inc. William E. Andrus, Jr., National Bureau of Standards Alex d'Agapeyeff, CAP

DPMA



Conference Seventy

The Data Processing Management Association is to hold its first public conference in London, on 26 and 27 November. The chairman will be Mr Eric Moonman, former MP and member of Parliamentary Sub-Committee D which conducted a searching examination into the computer industry in this country.

The theme of the conference is The relationship of data processing to its environment.

The speakers will include Joe Jacob, National Council for Civil Liberties; Ray Grantham, General Secretary, Clerical and Administrative Workers' Union; Tom Ward, Littlewoods Mail Order Stores; Enid Mumford, Manchester Business School; John Humphries, The National Computing Centre; Tom Scharf, Gilb, Oslo.

The theme was chosen in preference to a more strictly technical one because the organisers believe that human relations is the most fundamental issue facing senior data processing staff in the seventies.

The topics will contain much of interest to executives not directly involved in data processing. Computer people will find themselves several times confronted by spokesmen for the 'non-computer' world, ranging from the NCCL to a personnel director who will discuss his view of their personal futures.

Algorithm project

The Science Research Council have awarded a two-year grant, valued at £13,400 to Chelsea College, University of London, for research into optimal computer algorithms for applications in numerical mathematics.

The project is to be directed by Mr R. F. Shepherd, head of the Computing Centre at Chelsea College, and will involve two research fellows and a research programmer.

Primarily, the object of the research is to establish applications and performance criteria, compare and evaluate existing subroutines/procedures and synthesise the most effective algorithm over a wide range of standard applications, eg differential equations, quadratures, linear algebraic systems. The computer literature has for years abounded with algorithms in various languages, and, beyond the limited scope of the Handbook of automatic computation series published in Numerische Mathematik, little systematic comparative analysis has been carried out. The rather wide range of quality in 'standard' algorithms available in computing centres has led, for example, to the similar project at Bell Telephone Laboratories, New Jersey, under Dr J. Traub, which has already established valuable reports on linear equations and differential equations.

A secondary aim of the Chelsea project is the extension of the established Numerical Mathematics procedure Library, in ALGOL 60. Each algorithm will be thoroughly tested over a range of example problems, on machines of widely different word length, and a documentation file built up. It is expected that versions will be established in FORTRAN IV, ALGOL 60 and, later, ALGOL 68. The ALGOL 68 component of the library is thought to be the first systematic attempt to produce a comprehensive group of applications procedures in that language.

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The Computer Bulletin Supplement

Conferences/Staff Recruitment/Stop Press News/Diary Dates/Vol.13 No.11 November 1970

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Orders should be sent to: The Publications Department, The British Computer Society, 29 Portland Place, London W1.

The remittance must accompany every order, as the Society does not operate an invoicing system for its publications.

Medical Computing Progress and Problems January 1969. **£5** from better bookshops. In case of difficulty in obtaining a copy write to the publishers, Chatto and Windus Limited, **42** William IV Street WC2.

Management Information Systems Seminar

Tuesday, 17th November, 1970 at 2.30 p.m.

Cairn Hotel, Harrogate

Leeds and District Branch are holding a special half day seminar. Two papers will be presented:

Developmental Aspects of MIS in the USA A. R. Gale, ICL (formerly RCA) USA

Management Information in ICL D. Firnberg, ICL Fee £3 members

Enquiries to:

The Conference Department, The British Computer Society, 29 Portland Place, and London W1. B. C. Welch c/o ICL ICL House, Leeds 1.

£5 non members

BCS Library – Rehousing

The BCS library is now housed in the new City University Library, adjacent to the old building. It occupies space on Level 8, approached by lift to Level 7 and one flight of stairs. The new building can be reached from Spencer Street or Northampton Square. All members of the Society welcome. The address for correspondence remains unchanged: The British Computer Society Library, c/o The City University, St John Street, London EC1. The telephone number also remains unchanged: 01-253 1961.

The library is fully staffed from 9 am to 5 pm Monday to Friday. All enquiries should be made during these hours. Visitors requiring assistance should arrive before 5 pm, though the library will remain open for reference during the University Library hours, 9 am to 9 pm Monday to Thursday and 9 am to 8 pm on Friday.





THE ASSISTANT SECRETARY OF COMMERCE WASHINGTON, D.C. 20230

SEP 1 0 1970

Mr. R. W. Bemer General Electric Co. 13430 N. Black Canyon Highway Phoenix, Arizona 85029

Dear Mr. Bemer:

Thank you for your response to my letter to the editor in DATAMATION. You deplore that the funds we requested from Congress are too narrowly limited to certification of mathematical functions. You may recall Christopher Shaw's "Forum" article that prompted my letter to DATAMATION. Shaw was addressing himself only to that problem and the budget request by the Applied Mathematics Division at NBS precisely answered that question.

The Center for Computer Sciences and Technology at NBS is very much interested in compiler performance and contributes through its Office of Information Processing Standards to the validation of COBOL, for example. This is certainly in line with what you suggest, although I agree that this is certainly not enough. But my answer to Shaw's article did not imply that we were only concerned with incorrect answers for mathematical functions and that we ignore wrong answers due to compiler error, systems malfunctions, incompatibility of data bases or inadequate documentation. Unfortunately, however, the answers to these latter problems are much harder to come by than to the former.

I should be glad to hear from you how you might go about attacking some of these problems at the level of sophistication suggested by your review article on Gentleman and Traub's Bell Laboratories numerical mathematics program library project.

Sincerely,

Trilin





1970 August 3

Mr. David Silverman c/o Electronic News Problematic Recreations #544 7 East 12th New York, NY 10003

Dear Mr. Silverman:

What do you mean "unique"? Here are at least two.

1	2	3	4	5	6	7	8	9		1	2	3	4	5	6	7	8	9
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R. W. Bemer

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Information Systems Equipment Division

M2

MAIL ZONE -

SUBJECT .

Networking and Future Computer Business

DATE_ 1970 May 19

TO:	J.	F.	Burlingame
	J.		Music
	т.	Α.	Vanderslice

FROM: R. W. Bemer

The System 3 demonstration at the SJCC indicated that IBM had communications capability planned from design inception. The working software on the central computer indicated that it was started a year to a year and a half ago.

This is further confirmation of the thrust of IBMs marketing for the next decade. Marketing and service may both be under the jurisdiction of a corporate entity other than the Service Bureau Corporation. Reasons:

- SBC has been selling primarily people services, with machine usage 1. somewhat incidental.
- 2. Ed Donegan left SBC to go to RCA because his understanding that SBC would be assigned the networking business was never honored. The Data Processing Division won out.
- 3. IBM would have not taken this course if their employee N. deB Katzenbach had not thought it possible to sustain legally.

The time to ride the wave is when IBM does. The 55 and 58 are the obvious answer to System 3 that is marketable now.

For some period to come, the remote stations (System 3/58) will not be interchangeable with the central machine (360/655). They must be matched by a software system. This is due to lack of hardware and software standards.

It follows that a parc of 58s creates a parc of 600 series, even if we run them ourselves.

Riberny

po

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DIAL COMM 81422 2569	DATE 1970 April 30	MAU ZONE	M2	1	(O) SHEEPE
DIAL COMM 8 433		MALL LUNE .		Ad	vanced Developm d Resources Plann
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ADDRESS .			COPIES		
			G.	в.	Holloway
SUBJECT • WWMCCS			D.	0.	Knight

TO: J. F. Burlingame T. A. Vanderslice

STRICTLY CONFIDENTIAL

FROM: R. W. Bemer

(April 29!)

(intermation

ent

I have an authoritative summary of the present status of WWMCCSA Much of the information is well-known, but this memo should not be disclosed as an entity, to protect the source.

The situation is reported to have changed recently. The bid was very nearly ready to fly, and Packard was said to agree to approval despite the GAO. How it actually got restalled is not clear to me, but there is some politicking within DOD that is said to be somewhat unsavory. Agency politics. Despite Gardiner Tucker's position, previous employer (IBM Director of Research) and cleanout of some DDR&E personnel concerned with the compatibility question--he is said to be in a clear but anomalous position on this one.

There are three main hangups:

- 1. The GAO study will take at least another 6 months.
- The general freeze on procurements (to recap known information--WWMCCS is a source selection and not a procurement--the several procurements components must be justified individually by each command, and no one knows what the totality would really be).
- 3. The Navy was supposed to support and provide staff for the "Joint Technical Support Agency", the main operational advisory group (to the Joint Chiefs). However, Navy chose not to put the money in the budget. Without this agency the whole thing returns to being like a normal GSA sourcing (Abersfeller is back again as Commissioner of the Federal Supply Service).

Brooks' office is not an important factor at this time. Although Brooks has criticized, he and his staff are opposed to the stalling, whether or not they would like to see three winners.





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The situation was likened to being between the devil and the deep blue sea. If conversion costs are put in (Bob Patrick, Datamation), IBM wins. If not, IBM could lose. Patrick is said to not understand that the thinking remains that IBM as a sole source is politically difficult to accept.

My impressions on compatibility problems are apparently sound. I believe that if any delay is premised on waiting until the 4th generation, or better technical knowledge on data structure and transferability, the investment will not permit conversion even at that time. Thus DOD cannot gain by stalling on multiple source selection. The technical people concerned in this in an advisory capacity felt that if they attempted compatibility in this buy they would get it in the next. If they did not try they would never get it. (See attachment.)

Conclusion of my source

Situation is in an indefinite stall. Even under the default condition of no decision there might not be many sole sources to IBM (1 to 10 more on a buy basis?). It may go to individual procurement. SAC is reported to be prepared to go on an individual basis, and would then multisource.

If one were to offer \$1 million worth of useful advice to a contender, it would be this--don't maintain intensive activity--just keep an eye open and restaff if necessary--it may wait until the 4th generation.

FOOTNOTE

The above typed from a conversation of last night. Apparently G.E. has been following his advice to a T, and now we are in the restaff mode.

ABennen

po



ATTACHMENT - DATA AND PROGRAM TRANSFERABILITY

I believe that the required compatibility for multisource selection in WWMCCS is feasible within the life cycle of the present proposed buy. A strongly-guided and phased effort will be mandatory. I endorse Don Knight's suggestion that supplier (manufacturer) cooperation is a more likely source of this guidance than is control by a Government agency set up for this purpose. The reasons for supporting the multisource feasibility are:

- COBOL has been standardized quite well. An American National Standard exists, which has been adopted by the Department of Defense in procurement procedures. The Navy has made compliance tests available to anyone for more than a year and a half. IBM has produced ANSI COBOL processors; GE is quite close to doing so for the 600.
- There have been countless examples of effective conversion of programs from one machine to another via closely related COBOL source language. The ANSI standard and the Navy test make this easier and more probable, with less difficulty.
- 3. Although the realm of data structures is less understood and rationalized than that of programming languages, reasonable standards may be expected in 3-4 years. Proper cautions and constraints allow us to work well within our present knowledge. Conversions from present file structures will be mandatory (and possibly back again), but this may be somewhat mechanized as we did with source program conversion (e.g., FORTRAN II to FORTRAN IV, IBM 360 COBOL to 600 COBOL).
- 4. Recent work at the media level has increased compatibility between EBCDIC code and ASCII. There are direct and unambiguous mappings via punched card, magnetic tape and disc representations. The present 600 internal code is not constrained, for it maps into a 1-for-1 subset of ASCII.
- IBM has recently produced a document for X3 on full physical and logical interchangeability. This has relevance to IBM's capacity to solve this type of problem.
- Our own work of last year on Program Transferability has demonstrated that the problem is technically solvable, even if we did not fund all of the necessary work.

ABuman

1970 April 30

NOTE: The above arguments support the possibility of multisourcing of total systems, if this ideal situation is the only way for GE to get the business and profit. However, there is no question but that our preferable and easier options are to be single source for total system, or to be single source for processor and software.



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Advanced Systems Division

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SUBJECT . National Computer Year, ACM 70

TO: J. Burlingame T. Vanderslice

FROM: R. W. Bemer

This is a brief status summary:

1. The Coordinating Committee for the proposed National Computer Year met at the National Academy of Sciences on April 23. Over 40 organizations were represented. In just three hours the general concept was approved and a seven man committee set to polish up the goals, prepare a precis of activities, and develop funding and staff requirements. First meeting of this group is May 4 in Atlantic City, and it must report back within two months.

The members of this committee are from:

American Institute of Aeronautics and Astronautics American Institute of Certified Public Accountants Association of Educational Data Systems National League of Cities New York Stock Exchange Simulation Councils and one other, forgotten

so it is a representative group. The important thing is that ACM is now relieved of the single responsibility, as advertised, and a nationwide group now carries on.

- 2. Among the major backers at this meeting were the American Medical Association and the Engineers Joint Council.
- 3. The major editorial of this month's Computer Decisions is on the National Computer Year. Very good press.

- I have a nice reply from Mrs. Virginia Knauer, backing the work fully. I had proposed several ways for computers to aid consumers.
- 5. ACM 70 proceeds on the independent but associated course. I am inviting Earl Warren as keynoter. Earth Resources is inviting Secretary Hickel. They have the best lineup of any of the sectors, and this is nice because the chairman is Tom Brewer from GE in PHL, working for Otto Klima.
- Datamation for August 15 is featuring the ACM 70 for the whole issue. I have an introductory piece, Brewer has a big feature on Earth Resources, and the other sectors are in cameo.
- Attached is a listing of our document register. If you wish, and have time to look at them, I can furnish copies of any that you may select.

ABanny

po

Attachment

COORDINATING COMMITTEE FOR NATIONAL COMPUTER YEAR AFFIRMATIVE APRIL 23RD REPLIES

American Bankers Association American Crystallographic Association . American Institute of Aero/Astro. , American Institute of Certified Publ. Accts. American Institute of Planners American Machine Tool Distributors Assn. · American Mathematical Society (& AAAS) SECTION A · American Medical Assn. American Petroleum Institute · American Public Works Assn. American Society for Cybernetics American Society for Information Science American Society of Photogrammetry Dr. Atef A. Elassal Association for Computational Linguistics · Association of American Railroads · Association of Educational Data Systems CUNA International, Inc. · Engineers Joint Council · Highway Research Board/Natl. Research Council International Ass'n. of Chiefs of Police · Investment, Bankers Association of America . Law Libraries Association · Music Library Association . National Council of Teachers of Mathematics National Defense Transportation Association

* National League of Cities

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- · National Science Foundation
- National Society of Controllers/Financial Officers of Savings Institutions
- · New York Stock Exchange
- · Simulation Councils, Inc.
- · Society for Advancement of Management
- · Society for Information Displays
- · Society of Logistics Engineers
- U.S. Geological Survey, Topographic Division
- U.S. Savings & Loan League.
- International Science Foundation
- . Society of Automotive Engineers
- Association for Computing Machinery
- CUNA, International (?)
- · National Academy of Science

Operations Research Society of America

American Federation of Information Processing Anthony Ralston Societies

Association of American Geographers

REPRESENTATIVE John R. Pasta Clyde Hampton John J. Alexander, Jr. John McLeod Dr. Chester Guthrie Carl Machover, President James L. Carpenter, Jr. C. William Beetschen Charles Borsom E. Haidemenakis Munn, Locktor L, Walter Carlson

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C. William Beetschen

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1970 April 17

T. L. Gerber c/o Lee Revens ACM 1133 Avenue of the Americas New York, NY 10017

Dear Mr. Gerber:

I noted that your address, as appended to Review 18,577, is given as White Plains, NY. This, and the next to the last paragraph of your review, leads me to the suspicion that you may work for the IBM Corporation. If this is true, I can understand why you would think that there is no terminology usage in the world other than that of IBM.

204

When Dr. Hopper chose the term "jump" (probably prior to IBM activities), she was undoubtedly aware that when one comes to a branch the taking of either path finds one equidistant from the branch. In stored-program computers of the classical type, however, the instruction locations are addressed consecutively; taking one path finds one at a location with an address distance of one--taking the other path finds one at an address distance of anything except one. I will agree that "branch" was suitable for the CPC.

As for "memory", this only reflects the ignorance of the early IBM designers in not knowing that memory is a nonphysical organization of data. By way of example--a baby is born with lo of storage but little memory.

I recommend to you a study of the IFIP Vocabulary of Information Processing. Perhaps after you read this your next review will say "I have not sought for trivial mistakes". In the computer business numerical values have errors, hardware has faults, and we people make mistakes.

R. W. Bemer

po

cc: Dr. Grace Murray Hopper Lee Revens A. R. Wilde





Computing Reviews Review Journal of the Association for Computing Machinery

1133 AVENUE OF THE AMERICAS NEW YORK, NEW YORK 10036 212 265-6300

April 23, 1970

ERIC A. WEISS, Editor-In-Chief

LEE REVENS, Executive Editor

Reply to: Sun Oil Company 1608 Walnut St. Phila., Pa. 19103

Mr. R. W. Bemer General Electric Company 13430 North Black Canyon Highway Phoenix, Arizona 85029

Dear Bob:

May I send a copy of your instructive letter of April 17th to the authors of the book reviewed in Review 18,577?

Very truly yours,

Eric A. Weiss

EAW:oms

cc: Lee Revens





GENERAL 🎯 ELECTRIC

DIAL COMM 8-2002 452-2569 DATE 1970 April 16 MAIL ZONE M2

(376) intermediate syntame	
Advanced Development and Resources Planning Division	

DEPT.

ADDRESS .

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Your February Report, the SUBJECT . last item

> J. W. Weil TO:

FROM: R. W. Bemer

I would like some validation of the reliability factor of this rumor. One of my reliable IBM sources says that this sort of thing has been reverberating internally, but he ascribes it to a speech given by Watts Humphrey at the SHARE meeting in Miami a year ago. Watts told them that the next operating system might cost them \$3 billion if we did not shape up our software production methods. This is akin to the extrapolation of \$1.25 billion that I made in the paper on "Manageable Software Engineering", for the identical purpose -- focusing on the needs for better software production methods. It is reported that Watts unfortunately did not emphasize this aspect quite right and it was taken out of context, both within IBM and without.

You may wish to bring this caution to the attention of those on your distribution list. I must say, however, that your heart is in the right place and I appreciate another voice cautioning of the true magnitude of software efforts.

po

A-14-A



DIAL COMM . 8*273- 4

273. 4510

DATE. April 1, 1970



ADDRESS 7735 Old Georgetown Road Bethesda, Maryland 20014 COPIESO

SUBJECT

Mr. R.W. Bemer, Manager Systems & Software Engineering Integration Engineering & Manufacturing Integration Operation 13430 No. Black Canyon Hwy. Phoenix Arizona 85029

Dear Mr. Bemer,

On March 11 your paper "Manageable Software Engineering" appeared on my desk. There was no cover letter, but I assumed you sent it to me. I wish to thank you for the paper; It is a very excellent presentation of some of the most important observations one can make pertaining to development of software. Having been in the commercial software development end of the business for a couple of years in the old IPC's, I can wholeheartedly agree with many of your points.

Best regards,

pre M. Chisternen.

Børge M. Christensen, Manager International Information Services Operation

P.S. Did you send a copy to Ralph Loftin?



GENERAL 🍪 ELECTRIC

DIAL COMM •8*223-1031 DATE • March 30, 1970



DEPT. • Group Patent Operation

ADDRESS[®] Bridgeport, Conn.

SUBJECT

Mr. Robert W. Bemer, Manager Systems & Software Eng. Integration PHOENIX

Dear Bob:

I very much appreciated receipt of your article entitled "Manageable Software Engineering".

As long as we have someone with your breadth and experience, as reflected in that article, associated with our software creation, there could certainly be no ground for serious concern for our future.

I was somewhat surprised at the relatively crude technique of start-stop computer operation we had to employ to get the use frequency of certain instructions on loops.

The multics improvement factors were especially impressive.

Very truly yours,

COPIES

George V. Eltgroth Patent Counsel Information Systems Group

mrg

GENERAL 6 ELECTRIC

COMPANY

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 . . . TEL. AREA 602-941-2900

1970 March 31

Mr. C. H. Culpepper ADP Systems Officer Office of Telecommunications Management Executive Office of the President Washington, DC 20504

Dear Mr. Culpepper:

In your March 17 letter you asked for comments I might have on the Teleprocessing Report. I believe I have one or two usable suggestions.

 The statements on growth, starting on page 10, make me edgy, particularly as it is stated on page 12 that the projections "seem to be unrealistically high".

The 1951 to 1966 growth rate of 25% compounded is a somewhat dangerous and oversimplified figure. One may note that:

- 44,500 at the end of 1966 implies 1570 machines at the end of 1951, the year when the first one was stated to be introduced. This quantity was not achieved until 1957.
- Among the census takers are Diebold, Computers and Automation, and Business Automation. Diebold shows (in the attachment) an increase of 220% for the three-year period of 1961 to 1964, which is substantially more than 25% compounded. Furthermore, there seems to be very little compounding in that period.
- Business Automation gives comparable figures periodically. I looked at 64 July and 65 February, for a 7-month period. Large computers increased at 12% yearly for that period, medium at 33%, and small at 18%. Overall it was 28%.
- Business Automation of 70 March, page 14, says the population is now estimated at 70,000, and growth expected to drop from 30% to between 15 and 18% yearly.




GENERAL 🕼 ELECTRIC

• The BEMA count of 44,500, when projected to the 70,000 from Business Automation, gives a 15% growth figure. This would take it out to 78,400 for 1970 and 158,800 for 1975. These projections are more consistent with that of the National Academy of Sciences.

Concluding this point, there are three considerations which could be taken into account:

- a. A less simplified method of projection might give the Report more authority and less vulnerability in this area.
- b. Total processing power might be a measurement more valid than a pure count of computers per se. System 3 is not to be compared to the Model 85 in volume of connectability and usage of communications lines.
- c. Caution should be taken in projecting the proportion of online usage in 1975. Much of the present inventory will still be in use then, but not all of it is capable of or suitable to online usage. E.g., 10,000 1401's.
- 2. Two amplifications could be made about the diverse viewpoints which start on page 16:
 - a. A distinction would be useful between the saturation of line facilities vs. switching facilities. Sending data in bursts at high speed concern the line facilities, and would apply mainly to
 - · Load-balancing from one storage site to another
 - Raw data for later reduction, as from a sensor satellite
 - From a store-and-forward concentrator

In such cases only a few of the major trunks are used. Home delivery still requires switching facilities and tieing up of the local lines, with no possibility of interspersal for other usage during that time. If the second viewpoint were completely valid, what went wrong in Las Vegas during the Joint Computer Conference?

b. For projection it will be useful to consider the distinction between people-generated data and computer-generated data. Our top line rates are now 460K bps for picturephone, and ATT is projecting transmission at 5M bps.

GENERAL 3 ELECTRIC

If half of a working population of 60 million people in the U.S.A. were to work 8 hours a day keystroking messages or data for the other half (and in the present state of training 15 words per minute would seem to be the best achievable = 12 bits per second), then we wouldn't need more than 800 picturephone lines at the most. As a practical matter perhaps 50 would suffice.

3

On the other hand, some data bases are projected to 40 billion characters, or 320 billion bits. Moving one of these on picturephone lines would take 200 hours. On our existing Telpak type it would take almost 2000 hours. It is conceivable that for security reasons large portions of such data bases would need to be transmitted simultaneously to several receivers for integration with local processing.

System organization devices and usage can always be used to minimize the amount of data moved (for example, on change basis only), but I agree with your report that sufficient doubt has been raised.

I offer my hopes that the Office of Telecommunications Policy, when established, will move quickly to do more than just allocate frequencies.

Roberna

R. W. Bemer

po

cc: J. F. Cunningham, Bureau of the Budget



Volume X, Number 3, July 5, 1965

JD & A Semi-Annual Industry Review

THIS IS THE 10TH ANNIVERSARY of the Computer Census, and the 16th published in the Automatic Data Processing Newsletter since the initial survey of 1956. The number of General Purpose Digital computers installed in the United States has grown from 810 to 25,413 during that period. This dramatic growth is illustrated by the graph below.

Small computers represent the fastest growing segment of the computer market. The reductions in price over the last decade, as well as increased

capacity and improvements in software, have made smaller data processing systems extremely attractive to an ever broadening base of users. Also, small computers are increasingly being used as support to large scale systems.

X

Small computers, which were 75% of the total in 1956, now account for 89% of total installations. Medium computers have gone from 9% of the total to 7%, while large computers, which accounted for 16% of installations in 1956, represent 4% today. The number of small computers installed has increased almost forty-fold since 1956, while the total number of computers has increased slightly more than thirty times over the same period.



AUTOMATIC DATA PROCESSING VEVISIENTS.

New York, N. Y. 10021

DUTE

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To: R.M.Bloch J.F.Burlingame P.W.Sage

J.F.Music A.W.Robinson T.A.Vanderslice E.R.White G.F.Woodward D.C.Berkey G.A.Oliver G.T.Soldner J.W.Weil

I hasten to bring to your attention some remarkable handwriting on the wall for the computer industry. This is the public admission, by B, O. Evans (no IBM spokesman is more official), of previous speculation that IBM's major thrust will now be transaction-dominated networking for the smaller user. They consider this the unsaturated part of the market thus System 3. (R.W.Bemer)

Semiconductor No. 1; Rival Device, Just a Memory

By JOHN RHEA and RON SCHNEIDERMAN

NEW YORK.—Two top electronics executives agreed semiconductors would represent two-thirds of a \$3 billion computer memory market by 1980 during their appearance at last week's IEEE keynot session, "The Emerging '70s."

Dr. C. Lester Hogan, president of Fairchild Camera &

Instrument Corp., said that semiconductors' share of the memory market would grow from \$16 million out of \$700 million this year to the \$2 billion level by the end of the decade.

ECTRONIC NEWS, MONDAY, MARCH 30, 1970

the end of the decade. Bob O. Evans, president, of IBM's Systems Development division, later agreed, adding that it "may be more than that."

it "may be more than that." Both speakers stressed the dynamic outlook for the computer business in the coming decade—Dr. Hogan from the viewpoint of a "components revolution" that will make it possible and Mr. Evans on the basis of spectacular growth in the demand for data processing services.

The computer industry passed the \$10 billion level before the end of the decade of the 1960s and should reach \$20 billion by the middle of this decade, according to Mr. Evans. From that point it could take off to the \$40 billion figure by the end of the decade. "Who knows?" he said.

Factors.

The specific factors pushing up computer usage relate to economic growth, according to the IBM executive. The Gross National Product should reach a trillion dollars by 1971 and move up to \$1.5 trillion by 1977, he explained, while expenditures for services rise from \$275 billion to \$425 billion over the same period.

The extra dollars available for such services as data processing plus the new technological capabilities to bring these services to smaller users add up to the optimism Mr. Evans projected.

•

Dr. Hogan said the necessary technologies will be MSI and LSI, "which offer a path through the wilderness that faces us," and opto-electronic displays that will ease the manmachine interface problem during the 1970s.

He predicted bipolar random access memories operating at speeds of half a microsecond and priced at half a cent per bit by 1980. He also forecast a coming together of MOS and bipolar technologies as the former increases in speed and the latter in complexity.

In complexity. Increasing complexity is going to bring with it corresponding testing problems, Dr. Hogan added, A 256-bit bipolar random access memory now in production has components occupying 95 per cent of its 12,000-squaremil surface. He cited an R&D version in which 200 chips are bonded to a 4×5 -inch aluminum substrate and asked, "How do you test when there are 4000 components on a chip?"

Noting that improvements in component technology have outstripped the computer industry's ability to use them, Mr. Evans looked for more emphasis on applications. In particular, new terminals permitting remote, online use contribute toward a trend away from batch processing.

Users.

This, in turn, will contribute to an increase in non-professional users, i.e., those outside the computer profession. There are 140,-000 establishments in the United States employing 50 or more persons, he noted, and these will be the primary targets for the computer industry in the decade ahead. "The market definitely is not saturated." he declared.

Mr. Evans did look for an easing of the industry's growth rate during the decade, however, from 16 per cent a year for domestic hardware sales during the first half to 3 per cent annually in the second half.

The product mix will change, too. Unit record equipment will begin to fade along with magnetic tape while minicomputers and computer-to-computer communications markets increase. Communications capability, now available on a fourth of computer systems, will be on twothirds of them by mid-decade, he said.

The central processing unit will continue to decline in terms of percentage of total system cost, he predicted, and the availability of the new generation of semiconductors may make it possible to design the entire processor within the memory. He singled out as the most important technology semiconductor memories operating in the "few 10s of nanoseconds range."

Assessment.

Another panelist, Rep. Emilio Q. Daddarlo of Connecticut, chairman of the House Science Research and Development Subcommittee, said he was about to introduce a bill in Congress calling for the creation of an Office of Technology Assessment (OTA), as an arm of the Congress.

Under the office's structure, policy matters would be handled by a 13-member Technology Assessment Board which would be composed of two senators, two representatives, the Comptroller General of the United States, the head of the Legislative Reference Service of the Library of Congress, and seven members from the public. Members from the public sector would be appointed by the President and would be named from a variety of backgrounds.

Representative Daddario said the board would elect its own chairman from among the public members,

To handle policy and daily operations, an OTA director would also be appointed by the board for a 6-year term with protocol rank equal to that of a Deputyor Under-Secretary of a Department.

The OTA proposal also calls for financing and administrative services by the General Accounting Office, with reimbursement from funds appropriated to the board.

OTA would not itself operate any laboratories or test facilities but would function to identify existing or probable impacts of technology. "The results of any assessment

"The results of any assessment would simply be an added informational input to aid in the legislative process. It would in no way supplant the hearing procedure or the adversary proceeding, nor would it come in terms of fixed recommendations to the Congress."

Direct Dialing.

Dr. Julius P. Molnar, executive vice-president, Bell Telephone Laboratories, predicted that by 1980 direct dialing to most Western countries from the United States will be reality. A direct dialing system was set up earlier this month between New York and London, he said.

With the rapidly increasing voice and data traffic, the potential for cable and microwave transmission systems is greater than ever before, he added.

Dr. Molnar said he didn't think that Picturephone, with its 1-MHz picture capability, would lend liself to home entertainment applications. "It's not as good as the 4-MHz TV picture and leaves something to be desired" as an entertainment medium. "Cable TV may provide a better solution, but that remains to be seen," he said.

Questioned about the social implications of Picturephone, Dr., Molnar said: "We don't think Picturephone will be bad for soclety...we imagine the bookles will find some use for it, however."

EXECUTIVE OFFICE OF THE PRESIDENT BUREAU OF THE BUDGET WASHINGTON, D.C. 20503

January 23, 1970

190A

Mr. R. W. Bemer General Electric Company 13430 North Black Canyon Highway Phoenix, Arizona 85029

Dear Bob:

The questions raised in your letter of January 9, triggered by the letter from Mr. O. Beltrami of General Electric Information Systems Italia, deal with what I think are two basic problems, both of which are fundamentally problems that the individual application or program can speak to but which are much more difficult on a broad basis such as the Government as a whole. For example, standard benchmarks are used by agencies in evaluating proposals and they are standard within the framework of a particular acquisition.

In measuring performance, because of the fact that applications are more common within an agency than they are across the range of Governmental activities, performance criteria and costing are done within the framework of a particular agency program. For example, the Internal Revenue Service has performance indicators and benchmarks for each of their data entry activities. Likewise, the Air Force for its base supply program has performance criteria for ranges of items stocked and activity versus computer time and costs; the management staff use these for analysis purposes.

The general thrust of the Charlottesville Report, and an objective we have had for some time, is to find ways to raise this to the universe of the Federal Government across heterogeneous programs which raises problems for which we do not as yet have solutions.

It is my personal opinion that SCERT and other measuring techniques respond adequately to the program environment, but to respond to a heterogeneous environment involves definition of the characteristics of that environment. We are hoping.

R. W. BEMER

Sincerely,

Joseph F. Cunningham

Chief, ADP Management Staff

GENERAL 66 ELECTRIC

COMPANY



190A

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 ... AREA CODE 602, 941-2900

1970 January 9

14125

Mr. J. F. Cunningham Chief, ADP Management Branch Bureau of the Budget Room 9235 17th and H streets, NW New Executive Office Bldg. Washington, DC 20503

Dear Joe:

Attached is a letter from the competent and thoughtful General Manager of GE Information Systems Italia. The problem is that I am stumped for an answer. As you are the most likely oracle, is there an answer? Can the industry have it?

Sincerely,

R. W. Bemer

2

po



GENERAL ELECTRIC INFORMATION SYSTEMS ITALIA.

Società per azioni Sede sociale in Caluso (Torino) capitale L. 10.962.000.000 int. vers.

3.2.2

01 Direzione Generale: via G. B. Pirelli, 32 - Milano telefono 6257

Milan, November 6, 1969/sp

Mr. R.W. Bemer Manager Systems and Software **Engineering Integration** General Electric Co. 1285 Boston Avenue Bridgeport, Conn. 06602





M. Bellisario c.c.: J. De Sabata

Dear Bob,

I received your report of October 17 on the conference on the Selection and Procurement of Computer Systems by the Federal Government.

6

I found the subject very interesting particularly where it indicates the need for the Federal Government of defining "Quantitative Performance Measurements".

As a matter of fact, the definition of standard benchmarks is a very critical and sensitive point and I think that we should get involved as much as possible in any activity undertaken by the U.S. Government in this field. I think it should be extremely useful for all operating components if you could sum marize the status of the opinions of the Federal Government with respect to existing performance measurements (SCERT, Auerbach benchmarks etc.) and with respect to possible new measurement tools.

In the meantime, I remain,

Yours truly.

1970 January 12

Dr. John R. Platt Associate Director, Mental Health Research Institute The University of Michigan Ann Arbor, Michigan

Dear Dr. Platt:

Your article in the 1969 November 28 issue of Science has led me to your book, The Step to Man, and now to you. This by-product confirms your picture of access to knowledge and, perhaps more importantly, to the producers or enunciators of the knowledge. Many of my interests are akin to yours, and in this better organized world I surely would have known of you before now.

The attached material was sent to Dr. DuBridge and is the proposal for a national computer year. I think you will find it interesting. With or without Presidential proclamation, the program will go on. Although not stated in this material, the work has been synchronized with a UN study.

My purpose in sending you this material is to solicit your suggestions on how this project might serve to aid in the crisis problem you outlined in the Science paper. Other suggestions would be welcome. Perhaps you could suggest other people who would have interest.

Sincerely,

R. W. Bemer

po

cc: G. P. Williams, GE

Attachment

TRE FOR COMPUTING AND AUTOMATION

DIRECTOR S. GILL, M.A., Ph.D. PROFESSOR OF COMPUTING SCIENCE

48, Prince's Gardens,

IMPERIAL COLLEGE ROYAL SCHOOL OF MINES BUILDING PRINCEXCONSORE ROADXX LONDON S.W.7, ENGLAND. **TELEPHONE 01-589 5111**

SG/jmh

10th December, 1969.

Mr. R.W. Bemer, G.E.C., 13430 N.Black Canyon Hwy., Phoenix, Arizona 85029, U.S.A.

Dear Bob,

I really am extremely grateful to you for so promptly sending me the information that I needed for my talk. As soon as I get some reprints I will send you one.

I was also interested in the correspondence about the National Computer Year. I will look forward to hearing whether President Nixon goes along with you.

Yours sincerely,

S.Gill



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COMPANY



13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 ... AREA CODE 602, 941-2900

1969 August 14

Mr. Alexander C. Grove BEMA/DPG 235 East 42 Street New York, N.Y. 10016

Dear Alex:

I object to the implications in your letter of 1969 June 6 to the USASC X3 International Representatives, in the wording:

"The USA Member Body of ISO/TC97 and of its Subgroups are instructed to support Draft Proposals and Draft Recommendations containing measurements only if they include English along with SI measurements."

To me this wording implies that if a document does not contain English measurements, the U.S.A. representatives are instructed to vote against it.

This would be improper because, as you point out, the inclusion of measurement in both systems is already a policy with ISO and IEC. The <u>proper</u> action by USA representatives is not to vote against, but rather to call the attention of the body to the policy, and have these dimensions incorporated as an editorial change.

Sincerely,

Smin

R. W. Bemer

po

cc: M. F. Killian C. A. Phillips

USASC X3 International Representatives



USA Standards Committee Correspondence

Address reply to:

Alexander C. Grove BEMA/DPG 235 East 42nd Street New York, New York 10017

1969 June 6

TO: USASC X3 International Representatives

SUBJECT: English Units in ISO Documents

Gentlemen:

Upon examination of ISO and IEC documents we sometimes note that either the metric or English units are omitted where certain quantitative measurements are indicated.

It is the policy of both IEC and ISO to include both systems of units in all Working Papers, Draft Proposals, Draft Recommendations and Recommendations.

Therefore, the USASC X3 International Advisory Committee has unanimously voted to inform all International Representatives that:

> "The USA Member Body of ISO/TC97 and of its Subgroups are instructed to support Draft Proposals and Draft Recommendations containing measurements only if they include English along with SI measurements."

USA delegations and USASC X3 groups reviewing such documents shall note any deviation from this policy and shall inform the relevant ISO Secretariat thereof. You are urged to bring this matter to the attention of your USASC X3 group.

Sincerely, Alexander d

Secretary USA Standards Committee X3

ACG:rch

cc: M. F. Killian, USASI C. A. Phillips, Chairman, USASC X3

United States of America Standards Institute • 10 East 40th Street • New York, N. Y. 10016

GENERAL (ELECTRIC

DIAL COMM 8*433 2569 DATE 1969 July 31 MAIL ZONE M2

COPIES .

E. H. Clamons

L. B. Cowles

Advanced Development and Resources Planning Division

143

Engineering and Manufacturing Integration Operation

ADDRESS .

DEPT.

USASI CLDG SUBJECT .

> W. J. Connolly TO:

FROM: R. W. Bemer

The CLDC is not exactly an enemy. You may recall that IBM has tried to force PL/I upon everyone, and for a while it was moving toward standardization. This CLDG was my idea. It does two things:

- 1. It takes the label of standard away from PL/I and admits that it needs further development.
- Whether or not the members are aware of it yet, PL/I is not a com-2. posite language. X3 agreed unanimously on my proposal for this name, but it was not until my talk "Straightening Out Programming Languages" at the CODASYL meeting in May that I divulged what a composite language is. You will notice that the proposal for scope and program of work must be prepared and approved by X3. This is where we bite them.

I consider the formation of this group a holding action until we can get the Government support resulting from my negotiations at the office of Congressman Brooks, advanced to the Secretary of Commerce, as I discussed with you in New York.

I do not think they are ahead of us because the prime requirement is for data structures and languages, and certainly the GE work (such as IDS) is ahead of them.

Robernin

po

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COMPANY

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 ... AREA CODE 602, 941-2900



130

1969 June 30

Donald Peyton, Managing Director U.S.A. Standards Institute 10 East 40th Street New York, New York 10016

Sir:

On May 7 Miss Hird-Jones of G.E. Information Systems Ltd., the United Kingdom subsidiary of the General Electric Company, ordered (for my X3 work) a copy of . British Standard 4421:1969, "A Digital Input/Output Interface for Data Collection Systems". Had she ordered it for herself it would have cost the normal price from the British Standards Institution, which is 10 shillings (\$1.20). To avoid a double mailing she asked the BSI to send it directly to me in Phoenix, Arizona. However, handwritten on the face of her order was "Send to USASI".

I am in receipt of your invoice for \$3.25, composed of a sales price of \$2.50 and a handling charge of \$.75. On the face of your invoice it says "...we are the Sales Agent for BS Standards in the USA".

I submit to you these arguments:

- The USA Standards Institute may have a monopolistic agreement with the British Standards Institution.
- 2) This agreement should be voided; if not, the practice should be called to the attention of the U.S. Government Department of Justice.
- 3) In pricing the standards of other countries exorbitantly high, you are inhibiting the access of U.S. industry to foreign competitive knowledge.
- 4) In pricing the standards of other countries exorbitantly high, you are inhibiting the development of U.S.A. Standards, which is the very reason for the existence of your organization.
- 5) If the U.S. Government must pay the same prices as you charge me, you are discriminating against the body which is most active in desiring a U.S.A. standard for computer I/O interfaces.
- 6) As the employee of an international company, despite my permanent residence in the U.S.A., I am entitled to receive documents at the same cost as do other employees of this same company. I can understand a mailing charge; I do not understand a price differential from the U.S. member of the International Standards Organization.

R.W. Bemer Member, USASI X3

cc: C.A. Phillips, BEMA Glen Poorte, RCA, Chairman X3.9, I/O Interfaces H.R.J. Grosch, NBS A. Taylor, Computerworld

/mh

GENERAL (6) ELECTRIC

COMPANY

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 ... AREA CODE 602, 941-2900

Advanced Development and Resources Planning

129

1969 June 26

DISTRIBUTION RECORD COPY

Dr. A. G. Oettinger, Chairman Computer Science & Engineering Board National Academy of Sciences c/o Harvard Computing Laboratory Cambridge, Mass. 02138

Dear Tony:

In reading of your activities, I noted the establishment of a National' Programs Committee. I presume that you might reexamine the concept of the National Software Institute. If you do, you will find a major justification and a program of work outlined in my talk, "Straightening Out Programming Languages", given at the 10th Anniversary of CODASYL.

If you would like to distribute this to members of the Computer Science and Engineering Board, I am enclosing 16 copies for your convenience.

Sincerely,

R. W. Bemer

po

cc: H.R.J. Grosch T. B. Steel, Jr.





Business Equipment Manufacturers Association 235 East 42nd Street, New York, N.Y. 10017 - 687-5969

1969 March 10

ATTACHMENT D Page 1 of 4

Report on National Academy of Sciences

eme

For background material, there is attached a copy of the press release issued at the time the Board was established (Computer Science and Engineering Board).

Since the first meeting on 1969 April 18, the Board has met regularly once each month for a total of ten meetings. During this time the Board has added three members - Glen Culler, Director of the Computer Center, University of California at Santa Barbara; David Evans, Director of Computer Science, University of Utah; and J. C. R. Licklider, Director of Project MAC at MIT - for a total of 15. In terms of area of activity, the Board now has operating a special panel which examines computer equipment and technology in relation to exports and regular panels working in the Data Base area, the National Programs area and in the general Education area.

The National Programs Panel is surveying various government and private sector activities as a part of examining board alternatives that could be considered as ways and means of assisting in the orderly growth of the computer science field. In the Education area, the panel is working on a two-week summer conference that would concentrate on analyzing manpower requirements both in terms of industry's operating needs and in terms of requirements for teaching resources at the college and graduate levels. They have not yet been funded for this but are hopeful. 1969 June 10

The Editor The Computer Journal 23 Dorset Square London, NW1 ENGLAND

Dear Sir:

I support MM. Larmouth and Whitby-Strevens in their contention (1969 May issue) that the term "processor" is valid for software. As further examples: 125

- Firmware which is an item of hardware that is obviously software.
- My paper "Checklist of Intelligence for Programming Systems", CACM, 1959 March (attached). This indicates that this usage was common enough a decade before the question has been raised anew.

Sincerely,

R. W. Bemer

po

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COMPANY

Advanced Development and Resources Planning Division 12.4

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 ... AREA CODE 602, 941-2900

1969 June 6

Mr. T. B. Steel, Jr. System Development Corp. 2500 Colorado Avenue Santa Monica, Calif. 90406

Dear Tom:

With your hat on as chairman of X3 SPARC, please read the attached, which had a better reception at CODASYL than I really expected.

I asked John Haanstra's advice on how to get a larger audience and initiate positive work. He suggested that you are the proper person to move it. Thus this letter.

This is a very large and general systems problem, and nothing in the X3 structure has this much scope, although Data Descriptive Languages and X3.4 work are components. John's suggestion as a possible method to start would be to convene an ad hoc group in some suitably hallowed spot like Aspen for a two- or three-day planning session on technical and political strategy. The attendees should represent (at the highest level) such groups as CODASYL, ACM, X3, the Federal Government, and perhaps a User Group or two such as SHARE, because the backing of IBM and SHARE would certainly facilitate this work. You may think of other schemes.

I do not know what conclusions we might reach, but it's obvious that this is the type of work that the often suggested National Software Institute would have undertaken. Perhaps we could simulate such an institute for a discrete period of time by full-time assignment of industrial and university personnel. Perhaps this could not be supported without outside funds, and we could consider possible sources.

We will also want to decide the question of auspices. Some options are:

1. CODASYL

My final sentence shows CODASYL as a possibility. Indeed the word COBOL does not appear in the CODASYL constitution. (It appears five places in the self-generated by-laws of the Programming Language Committee.) However, they would have to go back to the fulltime assignment precedent set in the original COBOL work. Of course this is a project of much greater magnitude.



GENERAL (ELECTRIC

2. X3 - Composite Language Development Committee

The title is proper, but:

a. They may think they were chartered to further PL/I rather than the real composite language I had in mind (my motives are much clearer now, are they not?)

2

b. X3 has no full-time working precedent.

3. NBS

The Center for Computer Sciences and Technology has provision for a type of fellowship, but no money. I suppose this was to anticipate a Software Institute. It could be worked here, but we would have to get firm backing and commitments for full-time assignments.

I am sending a copy of this to Ernest Baynard to show that we are trying to move on a matter of extreme importance. At present no one else will be advised, including the press. That will be your responsibility, when and if you take action in this matter.

Sincerely yours,

R. W. Bemer

po

cc: E. Baynard J. W. Haanstra



GENERAL 🍪 ELECTRIC

COMPANY



105

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 ... AREA CODE 602, 941-2900

1969 May 1

Mr. A. C. Grove Director of Standards BEMA 235 East 42 Street New York, New York

Dear Alex:

On 1968 November 19 GE voted NO on the proposed revision to X3.12-1966. (Copy attached for reference.)

On 1969 March 27 I received a reply to these points from Mr. Weik (copy attached).

GE, having studied this reply, maintains its negative ballot, commenting:

- We are pleased that it is intended to show the changes in the future. However:
 - a. The method is insufficient because there is no guarantee that the person who looks up "character set", for example, will always refer to the change page to see if that term was included as a changed term;
 - b. It is more important to know the changes from the existing standard, not from the proposed revisions.
- Since Mr. Weik thinks this point was well taken, it cannot be used as a basic substantiation for the negative ballot.
- 3. In previous letters to you I have stated
 - a. That GE is an international company and cannot afford to serve conflicting standards in the basic areas of information processing
 - b. That our future voting will consider the existence of ECMA concurrence or, failing this, technical justification of a differing position.

GENERAL C ELECTRIC

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Let us now take a specific example, actually the very first term I looked at randomly! I find three definitions for <u>digit</u>.

a. Document TC97/SC1/(Secretariat-44) 101 gives the definition as

"040 10 DIGIT NUMERIC CHARACTER

A character that represents an integer.

Example: One of the characters 0 to 9."

b. The IFIP/ICC Vocabulary has the definition

'D6	DIGIT	A single character that represents			
	Numeric character	an integer. That is, in decimal			
		notation, one of the characters U			
D7		to 9 (the DECIMAL DIGITS).			

Note: "Seven" and "VII" are symbols but not digits."

c. Document X3.5/75 defines digit as

"digit

- A symbol that represents one of the non-negative integers smaller than the radix, for example, in decimal notation, a digit is one of the characters from 0 to 9. Synonymous with numeric character.
- (2) See <u>binary digit</u>, <u>check digit</u>, <u>equivalent binary digits</u>, sign digits, significant digit."

NOTE: Definition 2 is not a definition.

Since Webster's definition for "symbol" allows the representations "seven" and "VII", the USA proposal is in conflict with the international work.



GENERAL (ELECTRIC

CONCLUSION

We feel that it is arguable and justifiable to have a USA Vocabulary which differs from other vocabularies on the basis of language used, spelling, and national usage. GE could tolerate the existence of such a vocabulary.

We do not think that it is arguable and justifiable to have a USA <u>Standard</u> Vocabulary which differs for these reasons, in light of our expressed principle that an international company can serve only one standard.

Bama

R. W. Bemer

po

Attachments

cc: Members of X3
M. H. Weik, Chairman X3.5
D. Hekimi, ECMA

bcc: W. R. Lonergan, RCA

L. B. Cowles L. Durand H. H. Green L. G. Lauri D. B. Schneider 1968 November 19

Mr. Alexander C. Grove Director of Standards BENA/DPG 235 East 42 Street New York, New York 10017

Dear Alex:

General Electric votes <u>NO</u> on the proposed revision to X3.12-1966, USA Standard Vocabulary for Information Processing, for these reasons:

- The document does not indicate which of the definitions have been either added, removed, or modified.
- Quite apart from our opinion of the technical quality of the definitions, we object to a revision of a copyrighted document which requires such extensive use (and therefore repurchase at considerable cost) without appreciable consideration of the new terms inevitably appearing in a period of more than two years.
- 3. We have serious doubts on the advisability of having a "<u>standard</u>" vocabulary in force, particularly when it conflicts with the approved vocabulary for the Information Systems Group of General Electric, which is the IFIP/ICC Vocabulary. As an international manufacturer we must use an internationally accepted vocabulary.

Sincerely yours,

R. W. Bemer

cc: D. Hekimi, ECMA



19



USA

USA Standards Committee Correspondence

Address reply to: Martin H. Weik, Jr. U.S. Army Research Office 3045 Columbia Pike Arlington, Virginia 22204

> 1969 March 27 File: X3.5/98

Mr. Robert W. Bemer General Electric Company 13430 North Black Canyon Highway Phoenix, Arizona 85029

Dear Bob:

I have been asked by the Secretary of USASC X3 to prepare a direct reply to the letter attached to your negative Letter Ballot X3/157 accompanying Document X3.5/75 (proposed revised USA Standard Vocabulary for Information Processing).

In regard to your Point 1, Subcommittee X3.5 did consider the present USA Standard X3.12-1966 to be insufficiently comprehensive and too obsolete to create a meaningful document that showed additions, deletions, and changes. Assuming the proposed revision is approved, it is our intention to prepare future supplements as you suggest. The recommended changes to Document X3.5/75, resulting from comments received during the balloting phase, are being handled as terms added, removed, and modified, using the mechanism you have recommended. A copy of the proposed changes is at Inclosure 1. Thus, this is the manner in which we intend to show changes in the future.

Your Point 2 is well taken. Three years will have elapsed since the publication of X3.12-1966 by the time the new Standard is approved, assuming it is approved. It will now be handy to prepare compatible supplements, as you suggest, and allow USASI to decide when to print cumulative Vocabularies. Such an arrangement will allow us to maintain consistency with national and international standards, as well as incorporate new concepts as they develop.

Regarding your Point 3, as you know, ISO TC97/SCl is using the IFIP/ICC Vocabulary as a "primary reference document" in connection with preparation of draft international recommendations. We in X3.5 are closely following the ISO effort, making modifications and additions, as appropriate, in accordance with draft ISO recommendations, to maintain the utmost consistency between the USA Standard Vocabulary drafts and the draft ISO Recommendations. The results of these two major efforts in vocabulary affairs, ISO and USASI, can be used to advantage by international manufacturers.

Although you did not recommend specific immediate changes to the existing proposed revised USASVIP, your constructive criticism was most welcome. We in X3.5 certainly appreciate the interest you have expressed in vocabulary matters.



United States of America Standards Institute • 10 East 40th Street • New York, N. Y. 10016

Mr. Bemer General Electric Company

In view of these considerations and the changes in Document X3.5/75 (prUSASVIP) shown in Inclosure 1, request the General Electric Company reconsider its negative ballot in favor of the affirmative and in favor of improved communication resulting from mutually accepted Standards.

Sincerely yours,

MARTIN H. WEIK, JR.

Chairman USA Standards Subcommittee X3.5

1969 March 27

File: X3.5/98

1 Incl a/s





1969 April 21

Professor M. Duggan University of New Hampshire Durham, New Hampshire

Dear Mike:

I realize I am starting to play a most interesting game, which is seeing how far I am into a review before the Duggan signature is decidable. In the April issue, #16492 - was 10 lines out of 92; #16521 - was 11 lines out of 47. I think I have bettered this in the past, but have not kept records. 98

Sincerely yours,

R. W. Bemer

po



1969 April 18

Mr. Alan Taylor Editor-in-Chief Computerworld 60 Austin Street Newton, Mass. 02160

Dear Alan:

Just reading the May ACM, I found two indications of the remarkable influence of Computerworld, even the Letters to the Editor column.

95

- Gotlieb has an editorial on content restructuring the ACM publications. Could my letter of filing the Communications in 20 minutes have been some input?
- 2. The last two paragraphs of Galler's letter stated that the membership growth has not kept pace with the computing profession. Could it just possibly be he found out from my chart?

Sincerely,

R. W. Bemer

po

PS: Obviously this is not a printable letter.

GENERAL C ELECTRIC

DIAL COMM 8*433_3409

Advanced Development and Resources Planning Division

MAIL ZONE _M2

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DEPT.• Engineering and Manufacturing Integration Operation

DATE 1969 April 3

ADDRESS .

- SUBJECT Some Philosophy on Achieving Program Transferability
 - TO: R. Glaser L. Stanton R. More R. Stevens J. Richter
 - Data/program transferability is required between different, but co-existing, systems.
 - The primary requirement is for explicit and unambiguous recognition of data/programs with respect to type and original system used. Thus data/programs must be self-identifying.
 - 3. To achieve this explicit and unambiguous recognition it will be allowed to demand modification of user usage, i.e., add to the source program or its data or environment division.

In other words, most existing programs assume <u>implicitly</u> that they are to run on a certain machine, under a certain operating system, using certain data and data structure. These facts must be made explicit.

- It will be allowed to indicate to the user that a particular practice is good, difficult, or proscribed.
- The user may be required to conform to certain norms if transferability is desired. The option shall exist to deny processing in case of non-conformity.
- The requirement for transferability is not required until the <u>second</u> attempt to do so. A failure on the first attempt requires unambiguous explanation of the reasons for failure.
- Such explanation may even be the maximum contribution to transferability.
- 8. It will be desirable to remove limitations such as card-reader input rate when going to execution, because source programs will now contain more information and alternatives which will be used only selectively. In particular, there is nothing especially difficult in including object code routines in the source program, one each for each different computer for which the program is expected to run. The identification division (or some test routine for system identification) identifies the particular routine to be loaded for usage, the other versions being ignored.

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R. W. Bemer

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GENERAL C ELECTRIC

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DIAL COMM 8.433 3409

DATE 1969 March 26

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Engineering and Manufacturing Integration Operation

ADDRESS .

DEPT.

SUBJECT · COMPETITIVE INTELLIGENCE REPORT - SOFTWARE

TO: Distribution

On March 20-21 I attended (courtesy of NATO) a planning session for a Second Conference on Software Engineering, to be held in Rome on October 27-31. I gathered the following information, which is of some importance:

- IBM plans a U.S.A. Conference on Software Engineering this summer, with an emphasis on system efficiency and performance. They had tentative plans for the same in Europe last summer, but the First NATO Conference at Garmisch (1968 October 7-11) seemed to have preempted this.
- Attention! In the Garmisch discussions of Automating Software Production, Opler of IBM (now deceased) stated:

"IBM is also developing such a system. The cost is enormous, and a vast amount of hardware is needed."

We now learn that the work is being done at Boulder, Colorado, under Bob Ruthrauff, who is invited to speak of it in October, if he is allowed. Quotes are "fantastically large", "a long way along", "almost nobody is talking about it".

We suspect that Alan Scherr, in charge of OS??? production, is not yet using this system.

No other manufacturers are heard to be developing online software production systems.

3. I received no indication that IBM's 4th generation equipment would deviate substantially in instruction repertoire. So far I have no evidence that Beitzel's leak of possible incompatibility means anything more than "look out, users, if we should bring out a CPU with the ISO character code (USASCII), and you have built dependencies upon EBCDIC into your programs. After all, we did too!"

GENERAL DELECTRIC

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4. It is reported that everywhere the APL system (based upon Iverson notation) has been installed (and heavily exercised) it is a resounding success, to the considerable embarrassment of PL/I. Thus, it is definitely true that there is a factional tug-of-war within IBM, between these two systems.

2

- TSS/360 is now running at Version 4.0, but 0300 A.M. seems to be the best time to demonstrate. One suspects that a large number of users is not yet feasible.
- 6. Chris Strachey of the U.K. has gone back to serious software work at Oxford. He is reported to have constructed a good compiler for a (nontrivial) programming language in two days! Next week, the operating system. For one, I will not discount the plausibility of this tour de force. These developments should be watched carefully.
- 7. Lowrey (IBM) will be invited to the NATO Conference as having done the most advanced work in object code optimization. The strange thing is that he is now disenchanted with the relative profit to be achieved in this manner, as opposed to other avenues.

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R. W. Bemer

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· 1969 March 26

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DIVISION DES AFFAIRES SCIENTIFIQUES SCIENTIFIC AFFAIRS DIVISION

11th February, 1969

SA.6-5-17.138/AJ

Dear Mr. Bemer,

At its meeting last week the NATO Science Committee decided to sponsor a conference on Techniques in Software Engineering to take place in the vicinity of Rome from 27th to 31st October this year.

Professor P. Ercoli, Istituto Nazionale per le Applicazioni del Calcolo, Rome, will be chairman of the conference, and Professor Bauer, Munich, who chaired last year's conference on Software Engineering, has agreed to participate in the scientific planning, and act as co-chairman of the meeting.

The Science Committee would greatly appreciate your participation in this conference and your collaboration in its planning. In the hope that you will be able to accept this participation I have pleasure in inviting you to a first planning meeting at the <u>NATO Headquarters</u> in Brussels on 20th and 21st March.

Some thought has already been given to a possible programme for the conference. The idea of holding it originated in the course of the Science Committee's work with plans for increased international collaboration in the software side of computer science, and was furthermore developed in informal discussions at last year's conference. Recently a small group met to consider these ideas in detail. In the opinion of the group a conference could be centred on the topics mentioned in the enclosed paper.

Mr. R. Bemer, GE Information Systems Group, 13430 Black Canyon Highway, C-85, Phoenix, Arizona 85029, USA. Mr. R. Bemer

Such a new conference will not duplicate last year's meeting. It is the intention this time to concentrate the discussion on scientific and technical aspects of software engineering. Structuring of problems and programs, methods of mechanization of software production and methods of documentation at various stages of software development would be the central subjects. The usefulness of these techniques towards the achievement of increased reliability of software, greater availability and portability of the produced software, etc. would be examined.

Experience has shown the type of conference initiated by the Science Committee two years ago to be very successful, and it is proposed to organize the present conference on the same pattern, that is a one-week meeting of 50 to 60 participants, possibly divided into three or four working groups. Again it is recommended that working material be submitted before the conference and the proceedings published immediately after it.

I enclose a list of those invited to the planning meeting on 20th and 21st March. The purpose of this meeting will be to select participants for the conference, set up its scientific programme and decide in more detail on the form the conference will take, whether the work would best be covered in a few working groups, if working material or more formal research papers should be requested, etc.

I very much hope that these ideas, even at the present preliminary stage, will be of interest to you, and that you will be able to participate in such a conference.

The NATO Headquarters where the planning meeting will be held is situated on the autoroute to the airport, the extension of Boulevard Léopold III. The meeting will start at 10.00 a.m. on Thursday, 20th March.

Your travel expenses at the level of tourist class air fare and/or first class train will, if you wish, be reimbursed by NATO, and you may request an advance by completing and returning the enclosed form. We shall be pleased to reserve a room at the Hotel Metropole if you wish.

Yours sincerely,

29 aunt-

H. Arnth-Jensen Head, Pure Science Bureau

(Dictated by Dr. Arnth-Jensen and signed in his absence.)

CONFERENCE ON TECHNIQUES IN SOFTWARE ENGINEERING

1.

Purpose of the Conference

In October 1968 the Science Committee sponsored a highly successful conference on Software Engineering, held in Garmisch, Germany. This conference assembled around 60 leading experts in the field of software and gave them opportunity to discuss the vital problems involved in creating software. The discussions were centred around three main topics, these being: Design of Software, Production of Software and Maintenance of Software. During the discussions the participants mainly emphasised problems which had been solved and which were under investigation, and the merits of the various techniques applied were evaluated. However, provision was also made in the schedule for presentations and discussions on methods for developing software which were then, and still are, only at the experimental stage, but which promise to provide techniques which could be used in the future to overcome many of the problems in present software development. Amongst such techniques discussed at the meeting in Garmisch were methods for mass-produced software components and mechanized software production.

It is felt that it might be useful to arrange a new conference to explore these ideas and related items further. This conference should have as a goal the exchange of ideas on how software engineering can be established on a more rational basis. It is interesting to note that many problems treated at the Garmisch conference were managerial in character, and there is no doubt that a future conference devoted solely to management problems in connection with software development would be very worthwhile. The immature techniques of today create management problems which are indeed very serious, but rather than try to provide a solution for them as such it is felt that they should be considered as technical questions before progress can be made.

2. Subjects to be covered

There seem to be three areas in techniques of software engineering which might contribute to alleviating and even circumventing some of the present difficulties of software development, whether these difficulties are of a technical or managerial nature. These new techniques, which should be discussed at a conference, fall in the following fields:

- 1. Structuring of problems and programs.
- 2. Methods of mechanization of software production.
- Methods of documentation at various stages of software development.

-4-

- re 1: Methods to structure the initial problem as well as the software designed to solve it in such a way that the result is a clear partitioning into subproblems and logical components which can be treated separately and which have clearly defined interfaces. Techniques for structuring the initial problem not only at the design stage, but through the whole development of the software which will solve the problem.
- re 2: Techniques for parameterizing programs and the use of generators in order to produce software components or whole programs. New techniques of a more general nature than, for example, the use of compilers.
- re 3: Techniques for creation of that particular documentation of software which is most useful in a given purpose. By clearly defining that purpose, the amount of work necessary to create documentation can be diminished, e.g. through mechanization of documentation.

Discussions of these techniques would centre on their usefulness to achieve the following goals:

- 1. Reliability. Quality Control.
- 2. Adequacy of solution to problem.
- 3. Availability, with regard to area of possible applications.
- 4. Portability to different instrumentations.
- 5. Ease of maintenance.
- 6. Information to the user.
- 7. Ease of implementation.

Persons invited to planning meeting in Brussels, 20th and 21st March, 1969

Prof.Dr. F.L. Bauer, Mathematisches Institut der Technischen Hochschule, D-8 München 2, Arcisstrasse 21, Germany.

Mr. R. Bemer, GE Information Systems Group, 13430 Black Canyon Highway, C-85, Phoenix, Arizona 85029, USA.

Prof.Dr. E.W. Dijkstra, Department of Mathematics, Technological University, Postbox 513, Eindhoven, The Netherlands.

Professor P. Ercoli, Istituto Nazionale per le Applicazioni del Calcolo, Piazzale delle Scienze 7, I-00185 Rome, Italy.

Professor J. Feldman, Stanford University, Stanford, California 94305, USA. Mr. K.E. Iverson, Thomas J. Watson Research Center, P.O. Box 218, Yorktown Heights, New York 10598, USA.

Dr. P. Lucas, IBM Laboratory, Parkring 10, Vienna 4, Austria.

Dr. M.D. McIlroy, Bell Telephone Laboratories Inc., Murray Hill, New Jersey 07971, USA.

Mr. A. Opler, Thomas J. Watson Research Center, P.O. Box 218, Yorktewn Heights, New York 10598, USA.

Mr. B. Randell, Thomas J. Watson Research Center, P.O. Box 218, Yorktown Heights, New York 10598, USA.

Mr. D.T. Ross, Electronic Systems Laboratory, M.I.T., Room 527, 545 Technology Square, Cambridge, Mass. 02139, USA.


1969 February 17

M2

Engineering and Manufacturing Integration Operation

DATANET 300 Review

3409

M. Pierre Boucheron, Consultant Design Analysis Engineering Services

With respect to II.B.1, all I can do is quote Charlie Lecht to you:

"To believe that two computer programs that are ninety percent identical are necessarily ten percent different is to hold a very limited view of what a program is."

No further comment.

R. W. Bemer

bcc: L. B. Cowles

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GENERAL CB ELECTRIC

DIAL COMM 8	433 3409 DATE 1969 February 7 MAIL 200	r M2
DEPT	Engineering and Manufacturing Integration Operation	Advanced Development and Resources Planning Division
ADDRESS .		COPIES
SUBJECT •	COBOL Extensions for Communications Processing	C. Bachman R. Barton A. L. Ellison G. B. Krekeler
TO:	P. B. Hall	J. C. Richter R. F. Stevens S. B. Williams
FROM:	R. W. Bemer	

Concerning the document "First Report of the Communications Task Group to the CODASYL Programming Language Committee on the COBOL Extensions to Handle Communications Processing", 1968 January 20, which you say is to be presented formally at the February 25 - 28 meeting of the Programming Language Subcommittee:

- 1. Having coined the name CODASYL, I reemphasize the "Data Systems Languages":
 - a. Data Systems Languages comprise more than Programming Languages (examples: languages for operating systems, job control, report generators, network-oriented languages, etc.).
 - b. Programming Languages comprise more than COBOL.
- 2. CODASYL has in the past worked upon the Information Algebra. The mistake now is that several areas are under study in the Programming Language Committee which properly belong in the Systems Committee. At least they are general to any operating environment in which data is processed.

These include report writers, segmentation, data storage and retrieval, random processing, and the communications processing which is the subject here. These elements are at a higher level than programming languages, which are themselves but a collection of tools from which we may make a selection.

3. Therefore the General Electric position is that every effort must be made to formally recognize this correct structure. All such elements which are presently fleshed out in the COBOL pattern must be reduced to the metastructure, which should then be carefully validated for soundness by existing syntactic and semantic techniques. A further check may be applied by refleshing the elements in the FORTRAN or PL/I forms, for example.







GENERAL DE ELECTRIC

P. B. Hall

As demonstrated in our formal position to NBS regarding segmentation as an improper component of COBOL (due to the origin of COBOL in a uniprogramming world), General Electric opposes the inclusion of these elements in the COBOL language at any stage.

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4. I suggest the following tactic:

Let us say we could have given this same argument when these studies were initiated. We knew from our superior operating system experience that this was a necessity, but realized that the evidence and experience of other usage groups were insufficient at that time to prove the point.

So we bided time, and now we have several valuable proposals that required a lot of development work and ingenuity in finding the necessary primitives. It was necessary experience, and the fact that they are cast in the COBOL form is only a small part of the work. Very little is lost enlarging the scope and generalizing these functions. We really appreciate their work.

R. W. Bemer

po

1969 January 30

Mr. M. Stuart Lynn Editor-in-Chief Communications of the ACM IBM Scientific Center 6900 Fannin Street Houston, Texas 77025

Dear Mr. Lynn:

I have just read and filed my January issue of Communications of the ACM. Elapsed time--20 minutes! Ten minutes for the Washington Commentary, ten minutes for the balance. If I were Mr. Titus I would go for wider circulation and more money. He should syndicate and go in all the DP journals. This leads me to ask serious question #1. Should it have been the Communications, and not the Journal, that was made optional to the ACM membership? (See note)

I had a policy statement for the Techniques Section of the CACM, which is guoted from the 1958 January issue:

"It is preferable that the techniques contributed be factual and in successful usage, rather than speculative or theoretical. One of the major criteria for acceptance and the question one should answer before submitting any material is--'Can the reader use this tomorrow?'"

In light of this I look at the January issue of CACM and ask myself "What is here that the working programmer can use?" I do not find much. I don't ask that professionalism be discarded to cater to the lowest class of coder who writes poor programs; I just ask that the full range be served, not just the high end or specialized groups.

So I ask serious question #2. Can't you editors (e.g., Datamation, Computerworld) get together and effect a better distribution of your services and responsibilities? I don't like to see a technical article of worth denied to CACM, and I cannot see what CACM is doing with general news and Journal articles. I would like to see the Department Editors of CACM get to work and conscientiously control the contributions for maximum effectiveness.



Mr. M. Stuart Lynn

Demand references, demand reorganization, demand qualities for sustained reader interest. Demand separation of fact from theory. Demand separation and identification of elements which are useful to all computers from those peculiar to only one. The Editor of Datamation has to do this to keep his job. Why shouldn't the CACM editors have to do likewise?

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NOTE: To support this, imagine you are me, with these specific reactions to the content of the January issue:

Computers in Group Theory: A Survey - This should have been in JACM. It probably would have been if the readership had not been cut by the option of subscription.

Object Code Optimization - Pretty good for specialized class of people, compiler builders. Might be better in a SIG publication.

Polynomial Resultants - I had some interest.

Education - OK, except I question the adjective "appropriate" for PL/I; I would prefer an ALGOL 68 PhD.

Algorithms - Appropriate, and I cannot complain, except that they didn't seem to solve commercial problems.

Directed Random Generation of Sentences - Perhaps, but not a burning question to me. I know programmers who do it all the time, as they speak.

Some Criteria for Timesharing System Performance - I thought it peculiar that there was only one reference. Sorry, I'm suspicious of papers for this reason. It is in the Standards Section, but what is the connection? The criteria are given on page 52, unnumbered (although they are numbered in the preceding text) and without meaningful and concise definition. I don't see any standard proposed, either for adherence of comparison.

Washington Commentary - Now here is something important and useful, as I have already noted.

ACM News - OK and proper, not much other way to get it.

Products - It's old hat when I read it here. I get it from Computerworld, Electronic News, Datamation and a dozen others.

Calendar - How incomplete can you get?

Any portion of this letter may be reprinted.

R. W. Bemer

po

cc: Editor, Datamation Magazine Editor, Computerworld

GENERAL C ELECTRIC

DEPT .

ADDRESS .

DIAL COMM 8.433 ____ DATE January 20. 1969 MAIL ZONE



Equipment Division

COPIES. L. B. Cowles J. Katzen S. B. Williams

SUBJECT. Division-Wide Data and File Systems

Reference: Your January 17, 1969 memorandum

Mr. R. W. Bemer Engineering and Manufacturing Integration Operation

29VJ67 786T

HOAN- VIQ and

ante Gange

Bob, while much that you say makes sense, I cannot accept it as a final conclusion.

There are many ways to organize, and whatever way is picked, then, strong coordination will be necessary across other dimensions of the problem.

We cannot walk away on a Group or Division-wide basis from the problem of coordinating the data management subject. MALE LACK PLACE

I would appreciate it if you would meet with me to go over this matter and develop a plan whereby we can accomplish this necessary coordination.

John Haan

kcs

LIST ELEMENTS IN PROCESS (i.e. PILE STRUCTURE IN FACTORY FIND ELEMENTS COURSYL ised Am PLAN, EVOLVING. 6055 ins parsibili 20 Sound Ind Lusty e TRUNAL , CNUST SED FORT & STARS MTG - GENLSTALTURE \$ HON TO PREVET BEING A TIRADE AGOINST 8 STANDARD I ZATUN ? MORDERS CONSEQUENCE ~2 FOR THO TO SET UP. ARENOMTS (BOB STEVENS) "SINGLE ROAD MAN KASS, MER. "SENSIBLE DISCIPLINES" DEPINE OBJECTIVE WET BEJECTIVE ASSESS ROSTTION STAP HOW TO GET THERE GET AN OUTLINE - ? TOBE SOLVED, CONF. PLANNING GROUP. WARK SESSIONS 1 WF. DETECT f (DATA DIN - MACHINE) CONCLUDING SESSION, CONF PRESENT (RECOGNITION) ~ WICKEPBURG, ~ IST WE MAY



In reference to your recommendation to organize a Division or Group council on "Data and File Systems", I concur. EMIO has the responsibility for planning and implementing Group standards; specifically, Mr. R. W. Bemer is EMIO's representative in this area. I would like to recommend that you consider the applicability of a Group standards council to follow up on your proposal on an official basis. Of course, if the activity is limited to technical seminars, it may not be applicable.

In any event, Mr. A. L. Ellison is the ADPO representative to participate in any future activity.

Advanced Development Project Office

/bp



4967

1968 Nov. 18

C85

EMIO

Instructions Per Hour

D. C. Klick A. R. Maloney

TO: J. C. Richter

FROM: R. W. Bemer

From Mr. Sebring I obtained a figure of 550,000 man-hours in the production of 400 software over a 4 1/2 year period. From Mr. Klick I obtained a figure of 574,000 instructions as the total number under the various operating systems. With an arbitrary figure of 80,000 man-hours for BGE, this gave me a figure of .94 instructions per hour which I spotted on my chart.

This was better than UNIVAC 1107 at .5, and IBM OS 360 at .2. \$10 per man-hour gives us very accurate figures in these last two cases and would give a figure of \$6,100,000 for the 400.

This figure is for 4 1/2 years and as such does not seem consistent with the 1968 budget proposed (for 400 alone) of \$3.9 million.

If your budget figures were reasonable, it must follow that 400 production was nowhere near this given rate. This would make a substantial difference in our estimate for APL. Could you reconcile this discrepancy?

po

GENERAL 🛞 ELECTRIC

COMPANY

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 ... TEL. AREA 602-941-2900

ISED

1968 November 14

Dr. H. R. J. Grosch, Director Center for Computer Sciences and Technology National Bureau of Standards Gaithersburg, Maryland

Dear Herb:

General Electric has only two comments, technical in nature, to make concerning the Draft Memorandum "Application of Federal ADP Code and Media Standards".

 We think the document does not treat adequately of existing equipment which has been oriented to 6-bit codes but is nevertheless capable of handling ASCII with respect to encoding and media. Only updating from "six-bit-oriented codes and media" is mentioned in the document, and this is not at all the same matter.

There is also a specific mention (page 12, paragraph b) of subsets of ASCII. The 6-bit subset b7 \neq b6 is a very valuable one because it contains all of the graphics permitted in FORTRAN and COBOL source language programs. This is also true for the language PL/I, if this were in the distant future to become a USASI or Federal Standard language. Indeed, it may be a considerable period of time, if ever, before graphics other than those found in this 6-bit subset would be allowed in these standard languages.

Dr. H. R. J. Grosch

1. Continued

The document allows existing equipment to be kept intact for the sake of economy. We think that existing software, both system and application, should also be allowed to be kept intact for economy. We know this is an important factor in Federal Government thinking, seen in Congressman Brooks' letter to the Bureau of the Budget, 1967 December 5, requesting swift completion of the Federal Government software inventory, for re-use.

2

General Electric performs daily transformations of COBOL and FORTRAN source programs between this 6-bit subset of ASCII and another 6-bit set in which existing software is written, which existing software recognizes as the source program for COBOL and FORTRAN compilers, and which <u>contains the same graphics as the</u> <u>6-bit subset of ASCII</u>, so that the transformation is fully determinate on a one for one basis!

The above does not in any way impinge upon the ability to read or write either source language or data in ASCII form on the standard 9-track magnetic tape and the standard 8-track paper tape. Nor does it deny the ordering of such files according to the ASCII collating sequence.

This distinction between

- <u>source programs</u>, which require only this 6-bit subset of ASCII, and
- b. <u>data</u>, which requires not only the full ASCII but <u>also</u> binary, floating point, packed numeric, etc.

is one that we feel deserves particular enumeration in the document, as it also demonstrates how the Federal

Dr. H. R. J. Grosch

3

1968 November 14

1. Continued

Government could augment and facilitate transition to the approved standards for its existing inventory of equipment.

We hope that the above information will be of utility for this purpose.

2. Line 4 of page 12 would read better as:

"Under no circumstances, for instance, shall the 128 graphics and controls of ASCII be reassigned to different codes."

Sincerely yours,

John W. Haanstra Vice-President and General Manager

po

cc: E. H. Clamons L. B. Cowles

You may use this letter as you feel necessary.

GENERAL 🛞 ELECTRIC

DIAL COMM 8-433 4967 DATE 1968 NOV. 1 MAIL ZONE C85



Information Systems Equipment Division

DEPT.• Engineering and Manufacturing Integration Operation

ADDRESS .

COPIES

SUBJECT · COMPETITION REPORT

COMPANY CONFIDENTIAL

T0: K. E. Charles
J. T. Coe
L. B. Cowles
C. L. Eaton
J. W. Haanstra
J. S. Smith
J. W. Weil
K. F. Yarbrough

FROM: R. W. Bemer

The following information was picked up while attending the joint SHARE-GUIDE meeting of IBM users, 1968 October 28 - November 1 in Atlantic City:

TSS/360

It is now evident that IBM did not go down to total defeat with the 360/67. Version 2.0 of TSS/360 was demonstrated from four terminals at the meeting. Version 3.0 is now in field test. Specifically:

- The system is supported by between 180 and 200 programmers (more than are presently scheduled for our entire APL software!). It is scheduled to go to version 6.0 by 1969 June.
- So far they have run up to 50 remote terminals concurrently, depending upon loading, of course. The amount of system consumed by overhead also varies, going from 60-80 percent for heavy I/O down to as low as 10 percent, which is comparable to CALL 360.
- 3. The hardware is still the Model 67, although it may be modified. Forty billion bytes of virtual memory are available (the brochure erroneously says four billion, but it is really 40,000,000,000)! This is accomplished via twenty 2314 disc drives, each with eight disc packs.

GENERAL DE ELECTRIC

3. Continued

The user addresses virtual memory by logical address, which is related to physical location by correspondence tables. The storage is relinquished when the user signs off. I did not find out how often garbage collect occurs. Seek time is buried.

- 4. Access to both programs and data sets is shareable. The FORTRAN processor is forced to produce reentrant code.
- 5. There is a debug language for the system which operates dynamically during execution. Patches may be put in and stripped out. As yet object programs may be modified only but not restored automatically to original condition.
- There are four classes of response conditions. Response for these classes vary from 4 to 7.5 seconds. For data processing in the object program the response is variable, of course.
- There is an extensive command language, which works identically for both foreground and background processing, consisting of:

8	Task Management Commands
15	Data Management Commands
6	Character set selection commands
3	Language processing commands
14	Program control commands
2	Command creation commands (This is open-end)
3	Profile Management Commands
17	Text Edit commands
3	Data Editing commands
3	Bulk output commands
2	Message handling commands

8. The system now handles only FORTRAN.

The literature handouts were:

- 1. TSS/360 Terminal Desmonstration
- 2. An Analysis of the TSS/360 Command System II
- 3. Utilization of Virtual Memory in TSS/360
- 4. TSS/360 Quick Guide (a folding pocket size compendium of how to run the system)

2



4

The first three documents have no copyright, and I will supply copies on demand. The last one has, and as I have only three they are sent to MM. Haanstra and Coe.

The SHARE-GUIDE Meeting

I attended by invitation as a member of USASI X3/SAC, but was also able to register as a legal member of SHARE via installation code GS, which stands for the IBM 7094 at TIPO, under Mr. Eaton. The only other GE employee attending was L. L. McCoy, working on the 360-44 at King of Prussia. It is somewhat disturbing to me that the Group does not appear to have a policy to take advantage of intelligence opportunities such as this.

The merger of SHARE and GUIDE was to be voted upon at this joint meeting. As of today I have no information on the outcome. Approximate attendance was 2700, being 2 to 1 in favor of GUIDE.

A copy of the printed program is also available upon request.

RBamen

po

8*223/1871

Oct. 21, 1968

ASTO

Bridgeport

Competitive Intelligence on ECEX-8

- J. Haanstra
- R. Bemer 🗣
- J. Coe
- G. Feeney
- D. Sackman

Memorandum to J. H. Sweeney:

The University of Utah has been one of the prime Univac 1108 installations and has, indeed, been used by Univac as a demonstration of the growing usefulness of the 1108 operating system called EXEC-8. Until perhaps a year ago, all 1108's were running with the EXEC-2 operating system originally developed for the 1107. Prof. David Evans of the University of Utah, head of the Information Sciences Department, has been a working associate of ours, as well as one of the most respected men in the field.

Last Friday in conversations with Prof. Evans, the following information on EXEC-8 was secured.

- 1. The University of Utah, after actively trying to use EXEC-8 for one year, has now given up altogether. Their experience is that after much difficult work, Univac has EXEC-8 to the point where it does multiprogram. However, it still has profound difficulty mixing batch work and demand jobs.
- Performance-wise, the total thruput of EXEC-8 is a factor of 2 poorer than that of EXEC-2.
- 3. On Fortran compilations (the area in which EXEC-2 and the 1108 give us the most severe competitive difficulty), EXEC-8 is three times slower as a result of being unwilling to devote the massive memory to the Fortran compiler as was done in EXEC-2.
- 4. In attempting to help clean up EXEC-8 or to adapt it to the needs of the University of Utah, it was discovered that the operating system is complex and inflexible. Some of its bugs are extremely refractory and have persisted from version to version.
- Accordingly, the University is going back to using their own modified version of EXEC-2.

This is again a clear reminder that no competitive operating system exists which can approach GECOS III (let alone something like a possible GECOS IV to be derived from work at the R&D Center). We must make every effort to exploit this advantage.

JW/11

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COMPANY

13430 NORTH BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85029 . . . TEL. AREA 602-941-2900

1968 September 25

Mr. Alexander C. Grove BEMA 235 East 42nd Street New York City, New York

Dear Alex:

Perhaps you will recall noticing and reading the magnificent explanation of collating sequence in the 68 August 28 issue of Computerworld, entitled:

"Nonstandard Collating Sequence Can Hold COBOL Back"

The letter to the Editor of Datamation, "A Universal Code," page 11 of the September issue, gives additional substance to this problem and indicates that it is being recognized for its true weight.

I request adding an agenda item for the next X3 Meeting on October 24, for discussion of this topic and its implications to the work of X3 and X3.4.

For convenience of members of X3, I have attached a reproduction of this article, and commend it to their earnest study.

R. W. Bemer

RWB:sm

Attachment

cc: Members of USASC X3 A. Taylor, Editor, Computerworld R. Forest, Editor, Datamation D. Hekimi, ECMA

MOUSTON STOS SUBCOUNCIL

RECEIVED BEMA/DPG

SEP 30 1968





Research Nonstandard Collating Peport Can Hold Cobol Back

The relationship between various subjects in the computer field is rarely obvious. Compatibility between file systems turns out to depend upon tape labeling rather than on language problems. The problem of \$0.00 dunning bills may depend upon whether the number 0 is built into the hardware in one or two ways (and if -0 is or is not thought to be greater than +0!). Indeed, many of the items that actually affect data processing applications seem at first glance to have no real relationship to the subject matter. (If you do not believe this, go and listen to a systems programmer explaining the reasons why he cannot do something that seems simple.)

No one denies the importance of Cobol, our only common business language. Cobol is generally a known quantity to anyone in the field. Collating sequences are not as well known, except to programmers. A collating sequence is simply the list of characters which defines whether character A is greater than or less than character B (see box).

ASCII (American Standard Code for Information Interchange) is considerably less well known than either Cobol or collating sequences. It really doesn't seem to affect much of the work around the installation, although perhaps someone has read about it and has talked about the position of upper and lower case characters. But in day to day work it dot perfseem to be important. You can get along without it. It certainly doesn't seem to have any relationship to Cobol, although it may relate to a collating sequence. But the fact that ASCII does define a collating sequence makes up for one of the big deficiencies in the Cobol language - the fact that Cobol does not define a collating sequence. The moment that this particular deficiency is made up, then it makes the compatibility of Cobol programs much more practical than they have ever been in the past.

Cobol Is File Dependent

Currently a Cobol program is tied to a file which is sequenced whichever way the manufacturer of the original hardware decided. If you compile the same program on a different computer, you will get a program which works, but not one which has the file organized in the same order. As a result, you cannot mix the two files. This was not important in the past, but now with the spread of inter-system communications it is becoming more and more important and is a problem which the adoption of ASCII can solve. If a Cobol program uses the ASCII collating sequence in its file organization, then it is probable that up to 80% of the controllable problems involved in having real machine-independent programming will be taken care of in one fell swoop.

Getting the Cobol program to use the ASCII coll₄ding sequence is not easy. It can be done in any of a humber of different ways. For instance, the Cobol program files produced by the forthcoming NCR Century Compiler will most certainly be in ASCII sequence – but this is because the hardware has been set up to work that way. It is the only way that the Century series sets any collating sequence up. In other hardware systems you have a choice of using ASCII or some other collating systems, and very clearly a compiler can take advantage of this if

the designer so wishes, without difficulty. Probably in many hardware systems you have the capability of producing an ASCII collating sequence even if you have to use a software routine to do the comparisons for the sequencing. It may take a bit of time, but it is practical. There are no such systems operational at the moment that we know of, but an analogy does exist in the files used by the time sharine GE Fortran and Basic systems.

A Computerworld Recommendation

ASCII, then, has a relationship to Cobol and, indeed, to the future value of your programming investments of today. Its value has been recognized in the government by a presidential order to agencies to utilize it wherever possible. Its importance does not appear to have percolated into the commercial area, At any rate, it is still difficult to find users or compiler manufacturers who are allowing the use of ASCII's collating sequence in their compilers. Computerworld hopes that this will soon happen because we believe that it is one of the simplest pieces of standardization which can occur quickly and economically and which can very greatly help everyone.

What is a Collating Sequence?

A collating sequence is the list which determines which character comes first when lists are made. In computers we normally use greater/less than comparisons, with the lesser coming first. It is a simple operation for numbers because it is generally understood that two is less than five. It is not bad for letters either, because dictionaries have taught us to start with the letter A and work through to the letter Z, and by analogy with the numbers, this lets us think of A as being less than B and, of course, less than Z. It is not even too complicated to get the relationship between numbers and letters because there are only two ways of doing it. You can either say that all numbers come before letters or, alternatively, come after them. This leads to two possible sequences.

It is not very complex having two different collating sequences. But the real fun comes when you try to put things like commas, exclamation points, and other special symbols into an agreed place. And, as for those nonprinting characters, well, many people feel that the less said about them the better. Historically, where these were placed in the list simply did not matter, and so they were put in no particular order. In fact, they often did not have a genuine place at all! What happened was that after the coding for about 40 basic characters (A-Z, 0-9, . , , +, -) was decided, there were left some 15 code combinations to be allocated as necessary. The allocation was left to the peripheral manufacturer concerned. If he needed another character, he selected a particular unused code combination, and used that. But, there was no need for the code used by the card reader to agree with that used by the printer - and often they didn't.

Now the legacy of this lack of coordination has become important – and now we have in ASCII a commonly defined collating sequence.

Let's use it!

a universal code Sir:

Look Ahead (July, p. 17) mentioned the changing from other codes to ASCH as having slight effect on programs written in higher level languages. If you are thinking of modern systems and complete systems, you should perhaps re-evaluate your statement.

The collate sequence of machines has been ignored in the design of higher level languages; yet if files consist of mixed alphanumeric and special characters, then the sorting of these files and logical processing of them is dependent upon that machine's collating sequence. We don't have to re-program to go to ASCII-we have to re-systemize. We must perhaps re-order or change the control characters within our files and further must re-examine our programs for the insidious one of checking a code and saying, "If a high or low condition exists, then perform some operation." Every "if" statement in a COBOL program should be re-analyzed to make sure that the collating sequence of the machine has not destroyed the current program logic.

I think that the idea of going to a universal code structure is excellent, but not easy-but I suggest an arbitrary structure that interposes special characters before, between and behind the alphabet and the numeric digits is not what we need. Let us not standardize on a system reminiscent of our English based system of weights and measures, but rather let us design a logical system that has some mnemonic value.

T. Y. JOHNSTON Sacramento, California



5



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY 60 Austin Street, Newton, Massachusetts 02160

EDITORIAL DEPARTMENT

Alan Taylor, CDP Editor-in-Chief

September 30, 1968

Mr. R. W. Bemer General Electric Company 13430 North Black Canyon Highway Phoenix, Arizona 85029

Dear Bob:

<u>Computerworld</u> is delighted to give you permission to use the copyright material "Nonstandard Collating Sequence Can Hold COBOL Back," provided that its source and copyright are acknowedged.

Incidentally, we have now pressed IBM into admitting that they are going to release CALL/360 Basic.

Sincerely,

COMPUTERWORLD

Alan Taylor Editor-in-Chief

AT/ec

E.R. WHITE

1968 See \$7

CC. J. W. HAANSTRA, E.R. VANCE, L. B. COWLES

AS OF THIS DATE I HAVE BEEN WASLE TO HEAR A CONSIDERING; FEASIBLE PLAN FOR EMULATING THE 400 ON THE ASL, CONSIDERING; I) FREEDOM OF 400 USERS TO WRITE THEIR OWN I/O 2) DISK PACK [IN COMPATIBILITY OF FORMAT] BETWEEN 400 \$ 482.

I SUGGEST THAT THIS PROBLEM BE CONSIDERED REAL, AND THAT

THE EMULATION BE REMOVED FROM THE PRODUCT PLAN IF IT CANNOT

BE RESOLVED BY 68 OCT 15.

RBuman

SEPTEMBER 6 * FOLLOWING MORDON-VOYCES PRESENTATION ON 100 PLANS FOR DISK FILES.

GENERAL 🛞 ELECTRIC

DIAL COMM 8*433____

DATE September 9, 1968MAIL ZONE -(Dictated but not read)

nE

DEPT..

ADDRESS .

SUBJECT .



In case you don't get it other ways, you'll be very interested in Bob Bemer's report on Call 360. You may want to ask Bob to come to Bethesda for a more complete discussion.

pho W bacastice John W. Haanstra

kcs Att.



COPIES. R. W. Bemer L

1968 September 3

Eng. & Mfg. Integration Operation Adv. Dev. & Resources Planning Division

13430 N. Black Conyon Highway Phoenix, Arizons 85029

Competition Report -CALL 360 Timeshoring System

4967

J. T. Coe L. B. Cowles J. S. Smith J. H. Sweeney

C-85

Mr. J. W. Haanstra General Manager Information Systems Equipment Division

At the ACM Conference I talked with Sherbie Gangwere, Jr., former Phoenix GE employee who was the task leader for CALL 360 while at Computer Applications, Inc. He has since resigned to start his own firm, Advanced Programming, Inc., in Santa Clara, California.

Perhaps many of the Items here are known to GE, but I would like to make sure.

The system is efficient. At the present 95 lines, the overhead is 11%, which includes merging and reordering statements, etc. He says it is "breezing along" at this many lines. He is now doing contract work for IBM to expand the number (his firm also does work for RCA and CDC - IBM is not exclusive, but the bulk.

For comparison, he says "CALL 360 can eat the GE 265 alive1"

The system was well conceived and planned. It is simple, very modular, and easy to diagnose and repair. A module trace is part of that 11% overhead, producing a table for each program (much like GECOS III) where all variable items are registered. As a result, 90% of all molfunctions are caught in a single analysis.

The design was simulated in GPSS, varying loading, response time (which is now very fast), and time slice. This program is now in use for further improvement.

The system was well produced. It took from 67 Jan 1 to March 1 to settle the equipment hookup. The software was in test by 67 Dec 1, and Gangwere says if it had been his responsibility he would have been willing to put it in public service by Jan 1. From this, I assume that it was well shaken out by announcement time.

The disk hardware helps. There are eight 2314 disk files in the system. Gangware says this is the most underrated peripheral there is. Even if there were only four units, all seek times would be buried by overlap.

Mr. J. W. Haanstra

/ds

.5

1968 September 3

The system software is clean. Seeking to overcome the problems of relocation and no interrupt inhibit in the Model 50, they were forced into such a scheme that globals, etc., all fell out naturally. As a result, the system programmer writes without interrupt or conflict restraints.

He is obviously very pleased with the system, and has invited me to go to Santa Clara and use it from a terminal in his office. Would GE be interested in my doing so? With a friend, perhaps?

Now that he is an independent, could GE use his services in any way?

R. W. Bemer

4967

August 1, 1968

H. N. Cantrell J. C. Richter

C-85

CALL 360

Mr. J. W. Haanstra, General Manager Information Systems Equipment Division

A man working for CAI in Palo Alto called me today, and I extracted the following information:

1. The group is run by J. J. Goodposture (from my Univac group).

 The executive was written by people recruited from GE Phoenix last year, as we knew, particularly Sherby Gangwehr. The running overhead is said to be less than 6%.

 The BASIC processor was finished up by Poula Newman, and the average compile speed is 14,000 statements a minute (for the 2 usec 360-50, whereas the 6 usec 265 does 8000, according to Cantrell, so this seems plausible).

4. The PL/I processor was written by CSC, and is very slow.

My informant is now doing FORTRAN, and is shooting at 5000 statements a minute with considerable optimism.

R. W. Bemer

8*423-011

JIM PARHAM FRED LAMLAR

/ds

: L.B.CØWLES

FRØM: K.W.BEMER

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Name R. Hogen R. L.

1968 JUNE 3

I AM IN GENERAL AGREEMENT THAT THE 400 IT/S PLAN RESENTS A VERY SOUND BUSINESS OPPORTUNITY, ONE WHICH IN FACT MUST BE UNDERTAKEN EVEN IF UNDER LESS FAVORABLE CIRCUMSTANCES.

THEREFØRE THE FØLLØWING ITEMS MUST BE CØNSIDERED MERELY AS CAUTIONS ØR AS PLACES WHERE THE PLAN CØULD BE IMPRØVED:

1) IT IS DØUBTFUL WHETHER HARDWARE CØNTINUATIØN CØSTS CØULD DRØP TØ O BY LATE 72, AS THERE WILL BE ENDGAME DEMANDS.

2) THE SØFTWARE SUPPØRT ALLØWANCE ØF CØNSTANT 100K THRU 70-75 DØES NØT ALLØW FØR:

- A) NEW TYPES OF TERMINALS APPEARING IN THE 7 YEAR PERIOD.
- B) A RACE TO PROVIDE MORE AND MORE LINES.
- C) JUST NØRMAL MAINTENANCE (WITH 65-80 265S IN FIELD THERE ARE 7 MSD PRØGRAMMERS SUPPØRTING PLUS ? ISD PERSØNNEL, WHEREAS THIS 100K WØULD BE 4 PRØGRAMMERS MAX) Assume for Machine Time

BECAUSE SØFTWARE IS THE HINGE ITEM IN A TIMESHARING SYSTEM, AND THERE CAN BE AS MUCH AS A 4 TØ 1 DIFFERENTIAL EFFECTIVENESS DUE TØ SØFTWARE, SØFTWARE CØSTS CANNØT DRØP LIKE THIS. THE 265 HAS BEEN AVAILABLE SINCE 64 MARCH, AND JUST LAST MØNTH THERE WAS ØA CØMBINED HARDWARE AND SØFTWARE CHANGE WHICH REDUCED THE BETWEEN-PRØCESS TIME FRØM 220 MILLISEC AVERAGE (726 MAX) TØ A 116 MICRØSEC AVERAGE, A FACTØR ØF 1900 TØ 1 IN A CRUCIAL AREA! THIS SYSTEM WILL HAVE TØ UNDER-GØ CØNSTANT INSTRUMENTATIØN IN THE ENDGAME TØ BE CØMPETITIVE.

- 3) THERE IS NØ STATEMENT IN THE PLAN RE ALTERNATATIVES TØ THE DN-30 CØNTRØLLER. CØULD THE JUST AUTHØRIZED CØMMUNICATIØNS CØNTRØLLER RE-PLACE THE DN-30? WHEN? IF NØT IN PLAN, HØW ARE PRESSURES RESISTED? ØR SHØULD THEY BE RESISTED FØR THE ENDGAME? THIS ØNE WØULD TAKE SØFTWARE MØDIFICATIØNS ØF CØNSIDERABLE MAGNITUDE, BUT HØW ABØUT THE TØSHIBA UNIT WHICH IS A FUNCTIØNAL CØPY ØF THE DN-30 WITH DIFFERENT TIMING?
- 4) I DØ NØT BELIEVE THE LIMITATIØN STATED FØR THE ALLEN BABCØCK SYSTEM "PL/I ØNLY CØNVERSATIØNAL LANGUAGE ØFFERED ... RESTRICTS THEIR SER-VICES TØ THE IBM 360 PRØGRAMMING CØMMUNITY". PL/I IS SUBSETTABLE ENØUGH. IBM IS STRØNGLY BEHIND IT. THUS EVEN THØUGH THESE SYSTEMS ARE AIMED AT "INHØUSE T/S" WE ARE LIKELY TØ FIND THØSE INSTALLATIØNS PØPULATED WITH MANY 360-TRAINED PRØGRAMMERS FRØM THAT VERY MØBILE GRØUP.

5) IN THE CHART ØF "SYSTEMS WHICH MAY BE PURCHASED WITH SØFTWARE BY USER DESIRING TØ SELL TIMESHARING SERVICE", WATCH ØUT FØR THE PØSSIBLE ADDITIØNS. WHAT IF UNIVAC LEASED THE UCC SYSTEM FØR DISTRIBUTIØN, FØR EXAMPLE? CAN IBM BE LIMITED TØ ØNE ENTRYFØR-EVER?

GENERAL 💮 ELECTRIC

Computer Equipment Department Phoenix, Arizona SUBJECT

0

POSSIBLE VENDOR - NEW 400 COBOL

DIAL COMM 8*433____

COPIES:

1968 March 8

H. van Dorsten

Quite by chance, I met Mr. Joe Speroni in the lobby today. He is with, and I think runs,

Computer Control Corporation 20000 W. 12 Mile Road Southfield, Michigan 48075 313-358-3730

Our conversion was brief, but he apparently has about 12 programmers in this software house, plus their own Burroughs 300, which they use primarily to service banks in that area.

Of chief interest is the fact that they have built a COBOL processor for that B-300 which is disc-based, uses it randomly, and is full COBOL 65 except for the Sort verb. He also mentioned data communications verbs, which may be the Honeywell proposal that Yehling has.

Speroni used to work for me at UNIVAC and also did contract work for me. He did the 1107 ALGOL with two others at Case Institute, and modified it for the 1108. He did the software for the two 1108's that SNCF uses entirely for messageswitching. He has also done portions of SIMULA, which is written in a modified ALGOL, so he has experience in writing processors in higher level languages. I think, but will verify, that their COBOL is so constructed.

He is a worker who produces a high grade product in a much shorter time than average. One of his workers is N. Saumets, whom I also know as a very clever programmer. I feel that this would be a good source for a bid on 400 COBOL which might prove to be lower than most, and probably with a faster delivery time, particularly if we can capitalize on his present processor (which is virtually what we want).

He will send me the manuals and technical documentation for this processor shortly, and we can get a better picture of how this would fit in.

RBung

R.W.Bemer





Computer Equipment Department Phoenix, Arizona

SUBJECT

400 COBOL - NEW

IAL	COMM	8*433
AIL	ZONE	

COPIES

1968 March 5

Mr. H. van Dorsten

Proposals for a new COBOL processor for the 400 line have been in evidence for over two years, and killed with regularity. There is still no funding for anything other than maintenance of the present processor, which requires five people full time.

The latest revival of a proposal has been in process for four months, and it will probably take another three to put together the best economic justification for management. Unfortunately this is just an exercise, because there is no <u>question</u> but that a new COBOL processor must be constructed, for these reasons:

1) The present version is a prisoner of its own design, such that the man in charge of maintenance says it is "held together with spit and baling wire". It is far from what will be the USA Standard COBOL, and is impossible to upgrade and change to this position. Yet this standardization will occur this year, even throughout the Federal Government.

 It is far from the state-of-the-art and is non-competitive, in design and in non-use of the disc.

3) The requirement to keep the 400s out sufficiently long for the new line to become established will be jeopardized without such a COBOL, as there is no evidence that PL/I can replace COBOL sufficiently by 1972.

4) A really good COBOL processor would impel our customers to do most of their programming in this language, contrary to present custom. It could be the leverage upon our customers to do their own conversion to the new line via COBOL, for the most part, rather than by emulation of 400 programs running under five different operating systems for the 400, running under the new line operating system. The latter is also complicated extraordinarily by the fact that 400 customers are permitted to use their own I/O routines.

Funding could come from:

GO FOR IMPROVEMENT

1) Additional allocation, which is difficult to achieve in these times.

2) From new line funds, in part, assuming that there will be a COBOL for that line and that the design can be made generally applicable (see Note) for some additional work (e.g., if it took 130% of single line costs in design, 35% of the 400 line design could be accommodated).

CUSTOMER SATISFACTION/PROFITABILITY

GENERAL 🎲 ELECTRIC

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3) From decommitment of 400 software projects which are less urgent or important, or from better efficiency in software production, or from cancellation of hardware projects.

However, because of new management it seems that point (3) will be impossible to solve for another four months, which is time that can never be made up, whereas projects can always be stopped in the future. Therefore I suggest that the new COBOL be authorized for immediate start, with confidence in the new management to convert the necessary funds within that four months. If this is impossible we will have lost no more than 10% of the cost of a COBOL processor, which seems little enough insurance to gain that time.

RBunin

R.W.Bemer

Note: Even if common design is not achievable 100%, this would produce at least:

1) Equivalent language and feature specs for 400 and new line COBOL, and possibly for the 600 as well, in view of the new investigation now being undertaken for USASI COBOL.

2) It would provide an earlier proving for the new line COBOL processor, with just that much more safety in view of COBOL being the next most complex element after the operating system.



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INFORMATION SYSTEMS DIVISION

570 Lexington Ave. New York, N. Y. 10022

SUBJECT

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R. W. Bemer

L. B. Cowles

400 Software and 400/115 Interconnection

February 5, 1968

COPIES:

Mr. Richard E. Roberts General Manager Medium Systems Department PHOENIX

Dear Dick:

The attached provides an interesting approach by Bob Bemer on a way to get a significant improvement on the FORTRAN with discs for the 400. I had written earlier to Gene White on some of the problems on this. (Copy attached).

Dick, I have reasons to believe that a marketing combination using the 115 interconnected to the 400 would be a significant asset in the near term. While there have been some investigations on this, none of them have approached it aggressively with full recognition of the possibilities.

When you get settled down, I think this is a good one to look into and would be glad to discuss it further.

Sincerely John W. Haanstra

JWH: Attachments

> FEB 7 1968 • R. W. BEMER

INFORMATION SYSTEMS DIVISION

GENERAL () ELECTRIC 1285 Boston Avenue Bridgeport, Conn. 05602 27 DE

68 Feb 1

DIAL COMM

cc: JW Haanstra JH Sweeney

Mr. L. B. Cowles OFFICE

While making investigations for the 400-115 connection, certain information came to light which may have a substantial impact on the life of the 400 system, at a negligible cost and minimum disruption of schedules. This study was based on information provided by Van Doersten and Cloughley of Marketing, as well as numerous programming personnel.

Using rough figures of 250 CP4's and 150 CP5's in the field, it becomes advantageous to take the FORTRAN processor from the Timesharing System and use it to replace the FORTRAN processor in the Disc Programming System. The minimum required programming modification is five man months. This will yield a FORTRAN processor for the disc system which runs about 10 times as fast as the present one and at least twice as fast as the 600.

This suffices for CP5 only. CP4's will require hardware modification of about 500 wires in the main frame to install the floating point interface and the repackaging of the floating point door from the CP5.

Two elements of supporting documentation are attached:

- 1) Summary 400 FORTRAN Processors
- 2) Modifying FORTRAN (Timesharing) to be FORTRAN (DPS)

The 400 Product Plan should now be revised to accomplish this. The engineering feasibility and costs may be verified easily. Someone should verify the competitive FORTRAN capability with a view toward a marketing campaign (oriented to the scientific market) based upon the "most FORTRAN per dollar."

R. W. Bemer

RWB:dda att.

SUPPARY - 400 FORTRAN PROCESSORS

Processors	Notes	Compilation rate - statements/pin
FORTRAN - MTPS	2, 4	450 - 500 (with 120KC tapes)
FORTRAN - DAPS	3, 4, 5	100 - 150
FORTRAN - DPS	4, 6, 7 🌧	200 - 250
FORTRAN - TIMESHARING	8,9	2000 - 3000

Note Explanation

- There is also a Basic FORTRAN, card system, of little concern here. It does not seem to be used much by customers.
- 2) Faster because the interface of the processor and assembler is informal and joined together in execution time. Thus it uses a one-phase modified assumbler instead of the normal two-phase assembler.
- Computer Usage Development wrote a POPS-type processor under contract to GE, because DS15 commitments diluted internal resources at contracting time. Cost = \$130K. Scrapped.
- 4) Same basic processor. Design was originally constrained to go through the assembler and the processor was not allowed to use floating point hardware in its operation, as design of such hardware was not yet complete.
- 5) Extraordinarily slow because:
 - a) DAPS has an unbuffered Read Job Stack
 - b) DSU204 used for intermediate store, at 250ms seek time
 - c) Uses page management for intermediate storage
- 6) Also uses page management for intermediate storage, but has buffered Read Job Stack at card level only. Due to run mid February.
- 7) Due to be modified later to MTPS informal interface method to speed up.
- 8) a) Single pass, in core processor!
 - b) Processor utilizes floating point hardware. Any sensible customer would have this anyway, for interpretive f.p. is 10 times slower.
 - c) Top rate of 3000 is estimated for source program and object program in core.
 - d) Does not provide block common.
 - e) Does not provide double precision as the other FORTRAN processor for 400 do, but this is completely superfluous. 48 bits yield over 11 decimal digits.
 - f) Presently without compile listing, but this could be added as a user choice switchable option.
 - g) Processor is 6K, self-sufficient, operating in a 9.5K minimum environment. Would be seriously impaired in performance if reduced to 8K. Will automatically take available store.
- 9) Not available for CP4 hardware processors, presently without f.p. hardware.

HODIFYING FORTRAN (TIMESHARING) TO BE FORTRAN (DPS)

For CP5, this requires floating point hardware, reputed to be on less than 25% of CP5s being built today. However, this does indicate sufficient FORTRAN usage to warrant this modification.

For CP4, will require a high speed channel to connect the DSU160. DPS can then run. Will require a hardware design to add floating point hardware to CP4. Not done heretofore for lack of door space (takes almost a full door). Dick Herter makes a preliminary estimate of feasibility as:

1) Present door could be repackaged individually by cable connection as a special floating point box.

 Floating point interface, same as for CP5, must be provided in present CP4. Requires shuffling, maybe 200-500 wires changed, but not at exorbitant cost.

3) Preferably this should be a cycling retrofit, utilizing our excess CP4s now in storage. (Also check John Gleason, Gene Porter, Bill Sykes)

Modifications

1) Processing 6-bit characters instead of 8.

- Object code is now fixed. Will require 1/0 for batch processing that generates a relocatable program. Time could increase slightly, to write out object program instead of forming in core. Size could go up, but would be compensated by less space for object code.
- 3) If DAPS is decommitted, then FORTRAN object code execution should be able to run as a CMC program. Requires an algorithm change in software and the timer runout (interval timer) in hardware. Relinquishing would be intolerable for the customer to handle by his programming. Estimate - 3 man months. Interval timer available now on CP5 only. Optional, but cheap.

This is a general enhancement to DPS, not just FORTRAN, although DPS does not use memory protect, a decision based upon DPS usage for CP4s. It operates upon the symbiont premise of the 1107, such that both main and CMC programs must be thoroughly checked out. This is a generally potential danger point for DPS.

4) Inserting FORTRAN only (without CMC capability) estimated at 5 man months. This is suitable with general DPS release in 2nd week of April.

5)

Advantages

400 FORTRAN Processors in the speed range of 600 FORTRAN! Present customer equates 435 MTPS FORTRAN with 360-50. 415 and 425 FORTRANS based on TIMESHARING processor should be in this range, too.

MODIFYING FORTRAN (TIMESHARING) TO BE FORTRAN (MTPS)

The same problems apply to the GP4, getting floating point hardware. Other than this, FORTRAN (TIMESHARING) can also be put into MTPS; in fact, it was checked out in that environment.

. GENERAL 🛞 ELECTRIC

Computer Equipment Department Phoenix, Arizona

· Compiling Techniques with Discs

DIAL COMM 8*433-2597 MAIL DROP__________

COPIES: P. A. Abetti E. M. Koeritz L. E. Wengert

copy attend

January 24, 1968

RECEIVED

JAN 29 1968

JOHN W. HAANSTRA

Mr. John W. Haanstra General Manager Advanced Development & Resources Planning Division 570 Lexington Avenue New York, New York 10022

Dear John:

This letter is in response to your letter of December 29, 1967. Your observations and conclusions are fundamentally correct for the 400-Line compilers. The compilers are slower, less competitive, than they need to be or would have been if they were designed for disc operation. As an expediency, in 1965 a decision was made to transfer the 400-Line tape compilers to the disc programming systems. I cannot debate the wisdom of that 1965 decision but, as you pointed out, it provides us with the 1968 dilemma of an inferior competitive position.

The 600-Line, on the other hand, originally designed the compilers for disc operation. The compilers use core memory, the high speed drum, and discs in those areas where random processing will benefit compiler performance.

The problem is also complicated by the fact that GE's only disc in the marketplace is the DSU-204, competitively inferior also. The DSU-160 and 270 will improve our situation but will not provide an ultimate solution. For your information, I have attached the price/performance comparisons with IBM.

In my opinion, the ISG 1968 400-Line software plans are primarily oriented at quantity not quality. As a matter of policy, these plans are unacceptable. The customer commitments, in some cases with considerable financial liability, have dictated an extremely ambitious product calendar. Quality emphasis in 1968 has been limited to functional capability and not performance (speed), e.g. software optimization. The latter is required even if it means a redesign in the case of our compilers.

The 1968 600-Line software plans do provide for transferring the DSU-204 compilers to the DSU-270 and development of a considerably faster FORTRAN compiler. Random processing techniques will be utilized wherever beneficial in the development of this compiler.

GENERAL DELECTRIC

Mr. John W. Haanstra Page 2 January 24, 1968

In summary, we concur with your compiler design philosophy, we implemented this philosophy for 600-Line compiler development in the past and intend to continue in the future, and we recognize that significant performance gains may be realized with the 400 compilers if we redesigned. At the present time, we cannot anticipate undertaking the latter before mid 1968 and possibly not until after the release of DAPS-160.

The 400-Line alternatives are reasonably clear. Decommit software in preference to a product improvement program or provide the software presently scheduled and phase in the product improvements at the earliest possible time. Marketing has taken a position that the current product calendar is mandatory in view of the current 400-Line business plans. My position to date has been to resist further software commitments which would postpone any opportunity to schedule product improvements, i.e. COBOL 65 and extensions to 420 Time Sharing are examples. I anticipate management support in limiting future commitments.

E. R. White Manager - Engineering

/bp Attachments






3770

Compiling Techniques With Discs

E. M. Koeritz L. E. Wengert

December 29, 1967

Mr. Eugene R. White Manager-Engineering Section Computer Equipment Department PHOENIX

Dear Gene:

It has come to my attention that we may have an extremely serious problem resulting from the approach we are taking with respect to the compilers for disc programming systems. As I understand it, we are essentially copying the tape compilers that we have and are not taking advantage of the random access capability in a disc system.

The IBM compilers for the disc operating systems tend to run about three times gaster than similar compilers for tape. The point here is that by taking advantage of the random access capability, one can achieve significantly faster compiling speeds.

As you know, an increasing number of procurements are based on benchmark type comparisons of various manufacturers' equipment. These benchmark comparisons necessarily include the speed of compiling. By not taking advantage of the inherent random access capability in our compilers for disc systems, we stand a chance of being extremely non-competitive in such benchmark comparisons.

I recognize that the approach taken may be expedient in terms of schedule, manpower, or other factors. We should understand, however, that expedients which fail to capitalize on fundamental capabilities and result in a truly inferior competitive position are never justifiable. Mr. Eugene R. White

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I would appreciate it if you could look into this subject and give me your views.

John W. Haanstra

JWH:bbo

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GENERAL DE ELECTRIC

1968 Jan 25

To: E.R.White

From: R.W.Bemer

Subject: Priority Tasks for 400 Software

GENERAL

400 software is in a very poor state of repair with respect to technical documentation, to a degree that it will cost more in new schedule delays and maintenance that it would take to fix the situation. CPM or no CPM, commited software will slip if major repair is not done.

Existing software is of low quality in many instances, not state-of-the-art anymore, and even if the new software is completed as planned the total will not be sufficient to hold 400s in the field.

DOCUMENTATION

- The complete systems block diagrams must be completed. The technical documentation is about two-thirds in people's heads, regardless of how big the stack of papers might seem. Much of this is pure boilerplate to keep typists busy. Actually, what programmer A has in his head about a software item doesn't really match what programmer B has in his head. This guarantees incompatibilities between the various operating systems and such.
- 2) Flowcharts are missing or out-of-date. There is a flowcharter that runs on the 600, making flowcharts from the 600 code itself. 600 programmers find this most useful in diagnosis. This was looked into here and cut from the budget. Wrong! This program should be converted to the same job for 400 programs, again running on the 600.
- Make sure the 400 software takes full advantage of the editing tools provided by Shriver and co.

INSTRUMENTATION

- Fred Smith's report of Dec 5 says that present instrumentation is not suitable, and proposed a further program. Marketing confirmed this week that this is not funded or proceeding.
- 2) Such a complex program is not primary, however. GECOS II was held to 16K residence because it was thought that more throughput could be obtained if slave programs had more room, or if more of them could get in at the same time to operate simultaneously. Not so. After instrumentation, allow-
- ing 32K for GECOS gave more throughput, not less, because GECOS stopped going out to disc for some tool that it didn't have. The same applies to 400 overlays, caused by 6K target maximum for residence. Modify the program and put a cheap counter in the segment driving overlays. Count for each overlaid segment and print. After two days for this one will find perhaps two or three culprits. Put them in residence and enjoy performance improvement.



GENERAL C ELECTRIC

DUPLICATION AND EXCESS

When technical documentation is sufficient to show what is really in the software, study for coalescence in service routines and generalize when possible. Examples:

- Two variable length format routines exist; one where it should be in LRP for general service, another to block and deblock in the job stack routine and system outputter.
- 2) There are 10-20 deblocking routines written by as many people.
- 3) FORTRAN uses its own systems output writer, since the general one is claimed to be too large and inefficient. So set switches in the general case as soon as a FORTRAN task comes through. Reset for others.

Much more duplication will be found. Without documentation how can a programmer know what routine might exist already that he might take advantage of? This not only clutters up the store. It causes more overlays. It causes more maintenance. It causes more internal systems documentation. It costs.

WHAT'S IMPORTANT?

The EPA figures I see do not have values assigned to indicate profit and return to the General Electric Company. Each piece of software cannot be equally important. The volume of customers using specific software and possible sales due to certain software are what counts. Get Marketing to find the real priorities and decommit wherever possible. Better lass low quality software and fewer high quality items that the customer can be induced to use more effectively.. Cloughley suggests decommitting arbitrarily any software to be delivered later than mid-69.

Find what might give the best return in the end game, and in preparation for the new line. I will bet that this could be USA Standard COBOL, completely rewritten for a whizbang processor direct to machine code and using the disc optimumly. The percentage of COBOL users in the present market is not the key. It is the percentage of usage that <u>would be made</u> if a great COBOL were available. It should be table-driven like the 600 one(for maintenance), with a debug package for 'satisfactory customer usage. It might be written in a higher level language for reducing costs, delivery times and maintenance. 'ehling's paper is an excellent guide for this.

RBama





INFORMATION SYSTEMS DIVISION 2000 HOLIDAY DRIVE, CHARLOTTESVILLE, VA. B D I A L C O M M 8*273-6139

COPIES

SUBJECT

November 7, 1967

Mr. Robert W. Bemer, Manager Systems and Software Integration Bldg. 27-DE 1285 Boston Avenue Bridgeport, Connecticut 06602

Dear Bob:

I very much appreciated the receipt of your trip report entitled "USASI X3 Meeting, 1967 October 17" and provide herewith a few words of reaction.

Since the requirements for storage and for processing are different, the different parametric restraints will produce different optimum standards. For the moment, it would appear best to leave machine language level aspects outside the scope of standards.

It seems clear, also, with the steady movement toward large scale integrated circuits that the realities of supply will exert an inexorable pressure culminating in the establishment of internal standards. From my vantage point, I am unable to tell whether this is two years away or ten years away, but these certainly seem to be the outer limits. The question to be decided upon at this time is whether we should be seeking to develop a rationally developed set of internal standards or await their development and imposition on the industry by IBM.

Very truly yours,

G. V. Eltgroth Division Patent Counsel

GVE:vkh

1967 September 7

Mrs. F. E. Holberton Center for Computing Sciences National Bureau of Standards Gaithersburg, Md.

Dear Betty:

Certain elements which were elicited by your comments last week seem desirable to put in writing for standardization work. They are:

- 1. With table and other limits as examples, there are many things in processors which should not be standardized. However, these are considerations which must not be overlooked for compatibility and interchange; therefore, there is a need for a standard list of measurements which must be made. These measurements results may then be required to be contained in the processor and automatically affixed to the source program during processing. When this source program is then moved to another processor, that processor can check this information against its own standard list of measurements. If the capacities and other variables associated with the source program are a total subset or a match to those of the new processor, action can proceed automatically. If not, a warning is provided for each improper characteristic. A substantial number of warnings could lead the programmer into the good practice of segmentation.
- Considering necessary vs. sufficient conditions, each standard should list in the preamble:
 - a. sufficient conditions which are not contained in the standard;
 - b. necessary conditions which are not contained in the standard.

R. W. Bemer

po

ce: P. B. Goodstat, BEMA (for addition to Program of Work) T. B. Steel, Jr., Chairman, X3.4

GMH FLOON CEILING

1967 May 4

Mr. A. G. Oettinger, President Association for Computing Machinery 211 East 42 Street New York 17, New York

Dear Tony:

I indicated to you, at the April 18 meeting of the Standard Committee, that the JUG proposal for a program library catalog was improperly conceived.

There are three basic problems with the proposal:

- 1) Among the programs allowed to be interchanged or catalogued are those specific to a particular machine or system. This is not a proper business for JUG, whereas it is for those user groups organized by machine. It is proper for JUG to catalog programs written in machine-independent languages, although even here there are many dangers. You may look at your sample copy of the catalog dated (strangely) June 1967, page 10, second program. Can IEM users make a profit from a sequence check on card to tape conversion written in SALT for the UNIVAC III?
- 2) The classification scheme is at variance with that of Computing Reviews. If the latter is not detailed enough for their purpose, surely it can be modified in the same framework to include the headings necessary for JUG.
- The catalog entry allows any notation the originator cares to use, but it lacks:
 - a) standard format
 - b) mandatory information
 - c) suggested information

In this connection see the attachment, dated 1965 April 22, which you should already have via the ACM Council. I assume this material was also available to JUG, inasmuch as it was addressed to them also and originated in a JUG ad hoc committee. Further, one of the members, Mr. McQuillin, seems to be chairman of the committee that has made the present proposal. A.G. Oettinger

Now you know as well as I do that it is difficult to exchange a program even among the members of a single machine group. Somehow or other, unless constrained by a standard format, the programmer forgets to note its little idiosyncrasies, its accuracy and precision, the range and format of the input and output, the linkage mechanism and restrictions, testing programs, etc., etc. Mention was made of ACM funding. Let's spend our money carefully and judiciously.

5/4/67

I think you will find that the imposition of documentation standards for programmed functions will have more effect than simply facilitating interchange. The complexity of software systems is still growing and is even now virtually unmanageable. I envision tool programs which can operate upon networks of self-documented functions in such a way as to service the interconnections and interfaces requirements. We must proceed in this way to allow the non-specialist to take advantage of computer utilities. In other words, if everybody writes and documents their programs as a connectable black box, only the connecting process needs to be under the control of the user.

This is why I shudder to see JUG go in a virtually opposite direction.

/cac

bcc: M. Grems

1967 March 28

Mr. J. A. Haddad IEM Corporation Armonk, New York

Dear Jerry:

Please add my congratulations to the many I know have come to you both from within and external to IEM. It must be a source of great personal satisfaction to be elected a corporate officer of a so distinguished a company.

You might like to know that it is a source of satisfaction and pleasure to me, as well. I am happy that this recognition has come to someone I have known for a long time and in friendship. I am pleased that another person from the technical and scientific area has been recognized by IRM in this way. Moreover, I am delighted that your title includes the word "programming", for now I might begin to hope that the 360 software could be brought under control before the very momentum and appetite of this behemoth vitiates the computing industry. It can be fixed, you know.

It would disappoint all who have worked with you, however, if this change were to deprive the USA Standards Institute of your services. You know well that real understanding at the X3 level is possessed by very few of its members, and for you to relinquish your membership to an IEMer with less vision (regardless of how technically competent) would lessen severely the value and effectiveness of X3 and its substructure. Besides, I like a reasonable adversary that one can agree with most of the time.

R. W. Bemer

DAPS REVIEW

1967 March 2

TO: E. R. White

FRCM: R. W. Bemer

A DAPS review was held today from 9-11, resulting in considerable divergence of opinion on the release of DAPS to the field.

-37

C-76

P. Quantz

D. Klick

Mr. Klick, as Production Manager, has a natural desire to meet his schedules as agreed and plans to release DAPS to the Library tomorrow for limited field use, as controlled by the regions.

Marketing representatives are not sure of the urgency for release. They have never furnished performance criteria for Engineering to meet and are generally receptive to restricting distribution to new customers with discs.

A substantial number of the reviewers (including Ellison, Cantrell and myself) felt that the performance of DAPS has not yet been instrumented and measured, and that it possibly has many of the same difficulties as 600 GECOS II. Mr. Heffner of GECOS III project was shocked by some of the timing figures.

Therefore I recommend that you hold up distribution to the Library pending a proposal by Mr. Quantz for a minimum and expeditious performance measurement and evaluation, while the implementation team is still intact. This is your prerogative exclusive of Marketing decision, although I doubt that they will disagree. There seems to be a fortuitous set of conditions here which could lead to our first gold standard product.

C-76

P. A. Quantz

36

1967 March 2

TO: E. R. White

FROM: R. W. Bemer

REFERENCE: My memo to you 67 January 25.

Quoting from the fourth paragraph "perhaps it would be useful to enlarge the Cantrell/Ellison function with some additional top quality programmers ..." Much more instrumentation work needs to be done. Cantrell and Ellison must have assistance in two particular crucial areas, 600 FORTRAN "A" and 400 DAPS. Normal line functions have precluded the furnishing of this assistance and perhaps there may be some uneasiness about assistants for consultants.

It has been rumored that a GECOS II programmer intends to resign in two weeks; however, recent experiences in that project have so interested him in the work of Ellison and Cantrell that it is felt he would be willing to forego resignation if he could work in this area.

Will you please take steps to enable this?

March 25, 1959

ake the information shows and the first of a specified area of data from A to R. MOVE F a specified area of data from A to R. MOVE F a

Memorandum to Mr. J. J. Kemney, Jr.

Subject: Description of Data Processing Functions

RCHANGE (N, A. B.) The N elements of the array A are interchange with the elements of array B.

The attached memorandum is an initial attempt to develop a list of common data processing functions which occur repeatedly in programming. It is my feeling that those functions warrant spacial study from both a programming and machine design standpoint.

The objective of such study should be to find a combined hardways and programming way of handling these functions which is fast, simple and efficient.

If you fool a list of this kind has some value. I would appreciate each person who receives a copy of this memorandum propose additions to it which will make sure that all important Data Processing functions eventually are brought under this sort of special scrutiny.

Differentiation, and suppressing leading zeros pay pattern.

JCMePtizn Attachment John C. MaPherson

elect next page anding, shoet to have, and treating or a

Mr. R. L. Paimer - with attachment Mr. R. L. Harmon Mr. B. L. Sarahan ""

A. D) N elements of array A are purched in a service of cards. B is the name of array into which ins elements will be wend on reloading.

MOVE Take the information stored at A and place it at B. The basic instruction will move one field. MOVE 1 will move a specified area of data from A to B. MOVE 2 will move a specified number of records from A to B.

SET 1 (N, A, B) The N elements of array A are set to the value of B.

SET 2 (N, A, B, C) The N variables A, B, are set to the value of C.

EXCHANGE (N, A, B) The N elements of the array A are interchanged with the elements of array B.

TRANSFER (N, A, B) The N elements of the array B are set to the same values as the N elements of A.

BLANK MEMORY (N, A) The N elements of array A are set to zero.

READ RECORD This operation causes computer to shift its processing to a new record, either by physically moving the record to the working location or modifying the program equivalently. It is intended that all housekeeping to reload input areas, buffer areas, etc. be automatically handled by this operation.

WRITE RECORD This operation parallels the read operation, assigns an output area, places records in output area until group is complete, and writes group of records on tape.

EDIT FOR PRINT Arranges line of data for printing, inserting spaces, punctuation, and suppressing leading zeros per pattern.

PRINT LINE Writes a line, spaces and when a designated number of lines have been printed, transfers control to a location which handles page ending, sheet totals, and heading of the next page.

PRINT HEADINGS Writes heading lines and controls spacing to body of form.

PUNCH (N, A, B) N elements of array A are punched in a series of cards. B is the name of array into which the elements will be read on reloading.



CYCLE TAPES Where two or more tapes are used in sequence for same file, reading or writing is transferred cyclically to tape units in order.

-2-

SELECT Compares control field of successive records against indicator and separates records into two sets -- those that match, and those that do not.

FIND SMALLEST Compares control fields of successive records and holds lower value for next comparison.

FIND LARGEST Compares control fields of successive records and holds higher value for next comparison.

SORT Arranges set of elements or records as specified in ascending order on specified control field.

MERGE Arranges in order two or more sorted sets.

ABSTRACT Moves specified fields from a record to form a shortened record for processing.

REARRANGE Changes order of fields in a record, for instance, brings control fields together in proper order.

SEQUENCE CHECK Tests order of sorted or merged file for ascending sequence, either \measuredangle or \measuredangle , i.e., no duplicate control fields.

DISTRIBUTE Inspects a control field of a record and adds a specified amount field into a memory location designated by the control field, summarizing data without sorting.

TABULATE Accumulates quantities from a sorted file of records for each group of records having an identical value of the control field.

FIND Searches a table for a desired value, either equal to, or just higher than, a given argument.

SUBSTITUTE Finds equivalent in a table and replaces given element with its equivalent.

READ STATEMENT Scans character-by-character for interpretation of symbols and expressions in a statement.

FABRICATE INSTRUCTION (L) Calculate or look-up address, select operation, get other elements and place complete instruction in location L.

FORM VARIABLE INSTRUCTION 6, N, L, A) Initialize instruction address to value 5, and store in instruction at location A. Advance address of instruction by N after each execution until limit L has been reached.

INITIALIZE A (K, V) Place value K in address portion of instruction V.

INCREMENTA (K, V) Increase address in instruction V by K.

DECREMENTA (K, V) Decrease address in instruction V by K.

MOVE & INCR A (A, B, N) Move address from A to B increasing it by value N.

IF (ACC : MEM), GO TO (R) If stated comparison > = < is met, take next instruction from R, otherwise proceed to next in= struction in normal sequence.

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IF (MEM : MEM), GO TO (R)

 $\frac{\text{IF (Mem = 0), GO TO (R)}}{\text{IF (BITSW = 1), GO TO (R) Also = 0}}$

IF (0 = COUNT - 1), GO TO (R)

" (Repeat Control)

...

11

IF (L = COUNT + 1), GO TO (R)

IF (X = K), GO TO (R) If character X is specified character K (letter, digit or zone), take next instruction from R.

IF $(S \leq A \leq L)$, GO TO (R) If the value of A does not lie between limits S and L, branch to R.

UP Return to next higher level of program at the point at which it was left.

DOWN Return to next lower level of program (after up).

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SWITCH NOP (X) SWN sets switch X to normal, i.e., to continue with next instruction.

SWITCH TR (X) SWT sets switch X to transfer control to location specified in address in X. (All switches should be set before initial use as they remain in either N or T status indefinitely.)

SET BIT SW OFF Sets specified bit to 0

SET BIT SW ON Sets specified bit to 1

ALTERNATE SWITCH Switch is successively normal, transferred, normal each time passed.

FIRST TIME ONLY Switch is set to TR first time through, thereafter set to N until reset externally.





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1966 MAR 1

To: H.B. Fancher

From:R.W. Bemer

cc: R.B. Curry

In a telephone conversation yesterday Mr. Curry indicated that I should be prepared to take up duties with the Division on April 1. This would probably be as a software Consultant for the Division, similar to my function for you.

Probably you agree that some aspects of BGE software production are not really carried to completion, and that I cannot say "The job is done - Goodbye.". Outlined here are alternate plans for continuity, which I should like to discuss with you in person:

- Leave unfilled my unusual position here (or in a sense, leave me in it). Havelka can still serve as an on-site Assistant, furnishing schedules, pertinent correspondence and documentation to me for review. (He is also still needed to monitor the 400 Disk only software). I could then spend a substantial amount of time ensuring that existing plans proceed. If you wish, I could then spend 3 or 4 days here every 4-8 weeks reviewing progress with MM. Chain and Boss.
- Cancel my position, giving Product Planning (Vernières) a stronger coordinating function, adding another software man in Product Planning.
- 3) Get a replacement for my position, either from the U.S. or from within. There are some dangers to this alternative. After a lengthy time I am fairly well accepted ; A new man will have to go through the same procedure.
- 4) Form a Software Direction as discussed last summer. Here I am at a loss for a candidate, and cannot really recommend this course of action.

Your possible software management talent is:

- Boss (Pro) competent, successful with his people, professionally known. (con) lacks real drive, has no previous experience in production of a full software system and thus cannot judge urgency and costs.
- 2) Vernières (Pro) very knowledgeable in software planning scheduling and marketing. Thorough, good judgment, has some management experience. (Con) a little young for acceptance by all, particularly coming from IGE. Do not know if he could learn to drive forcefully.
- 3) Pouzin (Pro) E.P., acceptance by many in company, here since 1957, best knowledge of the way they do it nowadays, has actual capability in writing software. Has managed before and can probably push. (Con) he would prefer to do advanced work rather than run production.

1.966 MAR 1

To H.B. Fancher From R.W. Bemer

- McNaught Davis (Pro) good knowledge of field, forceful, presentable. (Con) English, may be vital in a new U.K. organization.
- 5) Pépin de Bonnerive (Pro) comprehensive knowledge of software, E.P., experienced. (Con) tagged with previous software production failure, although he could not have been wholly responsible. Remote personality, opposite of forceful qualities needed for production.

Baman R.W. Bemer



2000 HOLIDAY DRIVE, CHARLOTTESVILLE, VA.

DIAL COMM 8*273-

February 28, 1966 COPIES

SUBJECT

Mr. R. W. Bemer Compagnie Bull General Electric Paris

Dear Bob:

Just a note to say we are working on a solution as to where and what you should come back to do for us, as we have many, many problems and need your capable assistance.

I understand Bob did write you at your house on February 17.

We will let you know as soon as plans crystallize \S_{e} we can work it out with Fancher.

Sincerely,

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L. T. Rader

PHONE TO CURRY , POR 28

DISCUSSED JIS PROPOSAL WITH WENDERE & WETL, WHE WERE FAMILIAR WITH ASER TASK FORCE PROFESAL. IF CURRY'S PROMOSAL NOT ACCOPTOBLE, POSSIBILITIES ADE:

- 1) MEYER WILL PLOSABLY HAVE TO GET IND STWE, MATRIE AS A SOPRIMELAS. RED CONTOR MIGHT TIME ON
- 2) TEMPO Why PRENESSE, "GROSCH TYPE MAGNTOPE".
- 3) SUMMUALO

"Reat for a while soled to be varied"

THINK OF ME AS A UTILITY STAFF MAN

PROPOSED NOT DISCUSSED SINCE. SEE WENGERT, WE W (#DIV. DONOTOS) SELEND TO DENTY TO BIND UP DIVISION STAFF. DON'T WART STWE WITT NOW (WHO?) STILL WHAT DECENTRATED OR DENTRATION EXCENT FOR PRIVES & PRODUCT PLANNING A NO CONTINUING ASSIGNMENTS, JUST FIDE-FIGHTING. GO AS CONSULTED TO WATCH MANEGET WATE LETTER WITH FIRM POSITION ASTMST. DON'T MONTION TO WENGEDT - FIRST YOU HAVE TO ASPECT THERE IS A PROBLEM. I REQUESTED TO REPORT TO KEDRITE (CURPY-"MARKET NO DIFFEDEDNICE"). STILL ASSIST BEE AS PERRESENTATIVE OF CURPY'S IFFICE Dear Dr. Rader;

Enclosed is a copy of a letter sent some time ago to Bob Curry. Having no reply, I am in a serious quandary. As you know, Brainard Fancher insisted upon only a one year contract here, and all of our personal plans were made on that basis. As nothing further was mentioned by December 31, our apartment lease expires March 31. Our furniture is now scheduled to be shipped on March 15, which is just over three weeks from now. The only problem is that we do not know where. Brainard did say last week that he hoped I could stay a while, but this seemed very indeterminate to me and hardly warrants the difficulties of another year's lease in an new apartment.

Apart from the fact that I do not wish to stay in France, my analysis of the total ISD software picture says that I am needed more in the U.S. than here. Software here is going satisfactorily, and minor adjustments could be handled from the U.S. We should be making every effort not to fall into the same software trap that IBM is in, and you know that I am your best resource for doing this.

I would appreciate either a decision or an estimated date for a decision. I am willing to work either temporarily or permanently in Phoenix. or in Charlottesville or New York.

Sincerely,

33 Bd. Commandant Charcot Neuilly-sur-Seine, France 1966 January 25

Mr. R.B.Curry Information Systems Division General Electric Company 2000 Holiday Drive Charlottesville, Virginia

Dear Bob,

While it may be true that a precise definition of my next assignment is not critical until April 1, a prognostication of locale would be very helpful. This is particularly true because the lease expires on our apartment here, and our present tenants in Connecticut wish to have an opportunity to buy the house or else they will move. On our part we cannot make this decision without further information.

There are some personal arguments in favor of a return to the U.S., and I hope there is no objection to my conveying them to you by private letter. They are:

1) One of my chief assets to a computer manufacturer is the ability to scrounge, synthesize and thus have a reasonably good crystal ball facility in my field. While the BGE assignment is interesting, I cannot keep in proper touch with new developments. Datamation and Electronic News cannot replace my many personal contacts. In order for a consultant to have effective output, a periodic renewal of input is vital.

2) My personal position here (and I realize that it is due to the temporary nature of the assignment) is not really in accord with the best management principles. Although I am assigned direct responsibility for production, the budget under which this is performed is not assigned to me but is rather split between three directions, to all of which I report. It is my opinion that this has caused a two months delay in the 140 software because I cannot hire people directly myself, cannot make salary adjustments, cannot move people or alter expenditures without getting approval from these three directions. I do not mind the tediousness of the process - I just don't think we have the time. Naturally each director is reluctant to have me disrupt their own balancing of expenditures, although they (Chargueraud, Teper and Davous) are all most sensible of these problems. The problem lies only within the organization for programming production. You know that I believe that a software production shop must be separately organized. 3) I do not know whether I can afford to live in Paris. The normal GE compensation plan pays one's rent above 15% of the base salary. I think that Fancher has listened to my argument that I did not get as expensive an apartment here as I might have, since my normal expense is for two households, one of which I must maintain in California. Therefore I expressed the hope that consideration would be taken of my actual housing expenses rather than the theoretical GE figure, but I do not know even after nine months what the decision is. I realize that everybody is busy, but it is disconcerting to my wife not to know, particularly as my expense accounts have not been paid or adjusted since February 1965.

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4) My wife's preferences are very strong toward living in the U.S.

There are some good reasons for GE as well. Being available more than three times a year could help you with many technical problems of division management. It is certainly acceptable to me to be based at Charlottesville, and I hope not to have given the opposite impression. Certainly I could continue heing of some use at BGE, but the additional experience gained here should make me more valuable in a coordination position in the U.S. at this time. Actually, there has been no indication that I am being scheduled for further assignment here, as the topic has not come up. Now it is rather late, as I would have to move to another apartment, possibly at my own expense for commission and moving, which I can ill afford.

I am grateful that it is to you that I write this, for you have always been considerate of personal relations.

R.W.Bemer

February 17, 1966

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Dr. L. T. Rader Office

In view of the extraordinary difficulties in which the Computer Operation finds itself with respect to the 600 installations, and the woeful inadequacies of the Operating System and Monitors (GECOS II, GECOS IV, and GERTS), and with other major software such as COBOL, FORTRAN, PERT/COST, as well as others which seemingly are bound to appear, we suggest that Bemer be brought back as soon as possible and attached to the Charlottesville office as a programming consultant. He would work closely with Systems and Processors Section in Phoenix (John Weil), users, particularly the 600 users, and with outside consultants as required, as well as perform lisison function with Information Sciences Laboratory, and work on special projects, such as BASIC.

As you know, Bemer does not desire to continue the one-year contract with Bull, mainly for personal reasons, but also because he does not believe a long-term software program can be headed by other than Bull personnel of French nationality.

However, our recommendation is predicated solely upon what we feel are the dire needs of the current 600 program, which continues not only to have critical hardware problems, such as at Evendale, but massive software difficulty as well, such as at TIPS, where they have confirmed almost complete failures on the software side as to timing, capability, and even recognition of the magnitude of the problem.

R. B. Curry

RBC:ej

February 17, 1966

Mr. B. W. Bemer 33 Bd. Commandant Charcot Neuilly-sur-Seine, France

Dear Bob:

I have your letter of January 25, received when I was in Phoenix for two weeks, now waiting a belated reply. I discussed it with Jim Wilde in Phoenix, who, I'm sure, is quite cognizant of your interest in future assignments.

We have not yet been able to conclude as to where your assignment would be best for yourself and for GE computer operations. We further said unequivocally when this inadvertently arose at a staff meeting (Fancher in attendance) that we would bring Bemer back. In response to Fancher's question, we did indicate that it was a personal matter and developed it no further.

I hope to have some conclusion in the very near future, in which case we will notify you by cable.

Best regards.

Sincerely,

B. Curry

