Computers In 1964

During the early 1960's there was a noticeable rise in the use and production of computer systems in the United States. The need for computers is a result of rising demands from both the scientific and commercial users. As businesses expand the need for a device to calculate their expenses and costs is urgently needed. In the scientific field the need to come up with fast and accurate calculations was in great demand as well. In 1964 they're where were a lot of very important evolutions and inventions that took place in the computer business. These events can be categorized as following; first there was a rapid growth and a drastic change in the computer industry, second was a noticeable growth in the computer software field, thirdly is the rapid growth in the spread and use of computers in the United States government, and finally the different growth rate in the use of computers internationally.

The first part that was noticed during 1964 is the wide spread and growth of computers. The computers during this year evolved dramatically in both hardware and software. The first major event that was discussed throughout 1964 is the birth of the new IBM 360 on April 7, 1964. Before getting into the IBM 360 its better to discuss the previous period in the computer industry and how computers where made before the IBM 360. In the computer industry computers were made depending on the need and use of it users. There were computers especially built for commercial use, and there were computers that were built specially for research and science uses only, which required the ability of a computer to conduct large calculations (*Williams 400*). This meant that computers couldn't transfer or exchange information if they were built for different purposes. During this era IBM had different divisions that built

specialized computers; the first division was the General Products Division, the Data Systems Division, and the World Trade Laboratories (*Williams 401*). They didn't share any information between these different divisions; they even had rivalries between each other's. Then management came along and decided to produce the first family of machines that had the ability through the use of microcode control the operation of the standard System 360 design. The name 360 was given to these systems to indicate that the new systems could manage all the data processing market whether it was scientific or commercial (*Macdonald 32*). Thomas Watson, Jr. (CEO of IBM at that time) had taken a big risk in undertaking the development of the 360. It was the largest private venture in American history, with $5 billion spent on five new plants and an additional 60,000 employees. This risk had paid handsomely and helped change the way computers are built from that day on (*Williams 405*).

The IBM 360 offered a choice of five processors and 19 combinations of power, speed, and memory (*IBM's New System 51*). A user could operate the same magnetic tape and disk products as another user with a processor 100 times more powerful. The systems vary from $2,700 per month for a basic system all the way up to a high end system that is $115,000 a month, which offers a multiprocessor configuration and processing power of 2.5 million 32 bit word additions per second (*Macdonald 32*). The 360 also offered a dramatic performance gains, thanks to Solid Logic Technology (SLT), which is a half inch ceramic modules containing circuitry far denser, faster and more reliable than earlier transistors. These tiny circuits operate at speeds ranging from 6 nanoseconds to 300 nanoseconds (Macdonald 32).

The 360 comes with the following software FORTON, COBOL, and the (NPL) New Programming Language compilers designed to operate under monitor

control (*Forest 68*). Despite all the success that IBM had with the 360 when it first came out a lot of customers and end users had a lot of doubts about how it will function in the real world (*Forest 69*). As in any new successful technology as soon as people used it they were satisfied with its performance. This caused a chain reaction on major computer companies to come up with their own families of compatible computers (*Williams 405*).

Control Data Corp came out with their supercomputer in 1964. The CDC 6600 supercomputer, designed by Seymour Cray, performed up to 3 million instructions per second at a processing speed three times faster than that of its closest competitor, the IBM Stretch (*New Products 93*). The 6600 retained the distinction of being the fastest computer in the world until surpassed by its successor, the CDC 7600, in 1968. Part of the speed came from the computer's design, which had 10 small computers, known as peripheral processors, and funneling data to a large central processing unit.

In 1964 there was a noticeable trend in producing switching systems for airline companies, giving them the ability to send passengers information to reservation offices all throughout the United States. The first airline company in 1964 to order such technology was Delta Airlines, which installed their Collins switching system (an online teletype message switching system). Before Delta had this system installed they were running a system that handled 80,000 messages and with the new system they can switch 240,000 lines for messaging purposes (*News Briefs 66*).

The next airline to order an online teletype message switching system was Northwest Orient Airlines. The system they requested was a UNIVAC 490, which will replace their older UNIVAC system. The system they had was capable of

producing 3,600 transactions per hour. The new system on the other hand will have the ability to produce more than 30,000 transactions per hour (*News Brief 67*).

IBM also came out with their online transaction processing system, which made its debut in IBM's SABRE reservation system, set up for American Airlines. Using telephone lines, SABRE linked 2,000 terminals in 65 cities to a pair of IBM 7090 computers, delivering data on any flight in less than three seconds (*News Brief 67*).

The next new concept that was mentioned in great deal during this year was time-sharing. In the late spring and early summer of 1964 it became obvious that greater facility in the computing system was required if time-sharing techniques were to move from the state of an interesting pilot experiment into that of a useful prototype for remote access computer systems (*Glaser & Corbato 24*). The present computers that were immediately available could not be adapted readily to meet the difficult set of requirements time-sharing places on any machine. The major reason corporations were using and where going to use time-sharing is because current batch-processing capabilities are a subset of any complete time-sharing system (*Glaser & Corbato 25*). The IBM 7094 pilot computer, which was used time-sharing, was placed at MIT was one of the first computers to start this trend of time-sharing in computers (*Glaser & Corbato 24*). The need for more computers that used time-sharing were in demand since then and throughout 1964 computer companies where using time-sharing.

The first major company that came up with a system that had time-sharing capabilities in 1964 besides IBM was Digital. They came up with their PDP-6, which had 8-256K (36 bit) words of directly addressable core with an access time of 0.8 usec

(*New Products 95*). It also had a seven-channel priority interrupt system and a repertoire of 363 instructions.

The second major evolution in 1964 was in the computer software area. At the previous time everyone in the computer industry were using FORTRAN, COBOL, and ALGOL (*Halpern 51*). FORTRAN (**FOR**mula **TRAN**slation) was developed for scientific and engineering applications about 1956 by John Backus at the IBM Corp. COBOL (**CO**mmon **B**usiness **O**riented **L**anguage), the first language intended for commercial applications, is still widely used today; it was developed by a committee of computer manufacturers and users under the leadership of Grace Hopper, a U.S. Navy programmer, in 1959. ALGOL (**ALGO**rithmic **L**anguage), developed in Europe about 1958, was used primarily in mathematics and science (*McCracken 31*).

However the major development in 1964 was in the programming language and the development of BASIC (**B**eginner's **A**ll-purpose **S**ymbolic **I**nstruction **C**ode) it was a language developed for students at Dartmouth College who needed better access to computers and a simple, effective language to write computer programs. The first developer, John G. Kemeny, who was the chairman of the Department of Mathematics, and the second developer Professor Thomas Kurtz who created the Dartmouth Time-Sharing System, one of the first time-share computer systems in the United States. They both created BASIC computer language so students could write programs to run on the General Electric GE-225 mainframe. On May 1, 1964, two programs written in BASIC ran simultaneously on the Dartmouth time-shared system. Ten years later, a version of BASIC written by Bill Gates and Paul Allen was included on the Altair, the first personal computer, and after three decades

(*Programming Language* 132). The main characteristics they had for BASIC where as following:

- Easy For Beginners To Use
- A General-Purpose Language
- Allow Advanced Features To Be Added For Experts
- Provide Clear And Friendly Error Messages
- Respond Fast For Small Programs Not Require An Understanding Of Computer Hardware
- Shield The User From The Operating System

The next major noticeable issue that was always mentioned and discussed throughout 1964 was the constant rise and need of the United States government for computers. In January the first of such signs was noticed when the government planned to install approximately 300 to 350 additional computers during the year of 1964 (*Mahoney 26*). This will raise the numbers of computers in the US government from 1,700 to 2,000 computers. The cost of using such computers annually is estimated at $700 million (*Mahoney 26*). This makes the United States government the single largest user of digital computers (*Ward 27*). The Department of Defense is one of the major branches of the government that is in constant demand of computers so it can enhance its military capabilities. The DOD also helps the computer companies by spending millions of dollars annually in doing research to improve computers (*Ward 27*). This in return helps the computer industry improve and develop their commercial aspect of their business as well.

The last issue that was discussed in this year was the fact that the United States wasn't the only country to request and use computers in the world as most people assumed. Australia was one of the countries that requested computers from the United States. To help it in fields such as in gathering census information, in the scientific research, and in industrial research as well (*Kelly 24*). The Australians paid close to 10 million dollars for their system they purchased from Control Data, which consisted of two large CDC 3600's and 10 of CDC 3200's (*Kelly 24*).

The second country that was discussed in 1964 was the growth rate of computers in Japan. Unlike Australia, Japan had a very slow growth rate in the computer field (*Berston & Imada 26*). This slow growth rate had to do with the fact that the Japanese government had a very controlled trade policy, which imposed government restriction on 96% of all import items in 1950. The government later on was moving towards a more liberal unrestricted trade policy that only imposed an 8% restriction on all imported goods in 1964 (*Berston & Imada 26*). This had a major effect on the computer use and growth in Japan, only in 1964 was it trying to start to catch up to countries like the United States after finding itself 10 years behind the new technology advances in the United States (*Berston & Imada 27*).

In conclusion this was a year filled with development and progress in every aspect of the computer world. This year with the development of the IBM 360 and other hardware and software helped in the shaping of today's computer, there for it's very important to list this year as a milestone for a lot of today's inventions.

References

Berston, Joseph C., Ken Imada. “Computing in Japan.” Datamation September. 1964: 26+

Forest, Robert B. “System/360’s Initial Impact.” Datamation May. 1964: 68+

Glaser E. L., F. J. Corbato. “Introduction To Time-Sharing.” Datamation November. 1964: 24+

Halpern, Mark. “Evolution of The Programming System.” Datamation July. 1964: 51+

“IBM’s New System/360.” Datamation April. 1964: 51+

Kelly, Ned. “Computers in Australia.” Datamation September. 1964: 24+

Macdonald, Neil “The IBM System/360.” Computers and Automation May. 1964: 32+

McCracken, Daniel D. “The New Programming Language.” Datamation July. 1964: 31+

Mahoney, Edward J. “Federal EDP.” Datamation January. 1964: 26+

“New Products.” Datamation April. 1964: 95+

“News Briefs.” Datamation August.1964: 65+

“News Briefs.” Datamation July. 1964: 67+

“Programming Language.” The Columbia Encyclopedia. 6th ed. New York: Columbia University Press, 2001.

Ward, James A.” Government Research.” Datamation January. 1964: 27+

Williams, Michael R., A History of Computing Technology. California: IEEE Computer Society Press, 2000