

The Largest Project in IT History

New England Db2 Users Group Meeting

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The Goal



AGENDA

1. IBM mainframe history overview 1952-2019
2. The Largest Project in IT History: IBM System/360
3. Key Design Principles
4. Key Operational Principles
5. Dedication



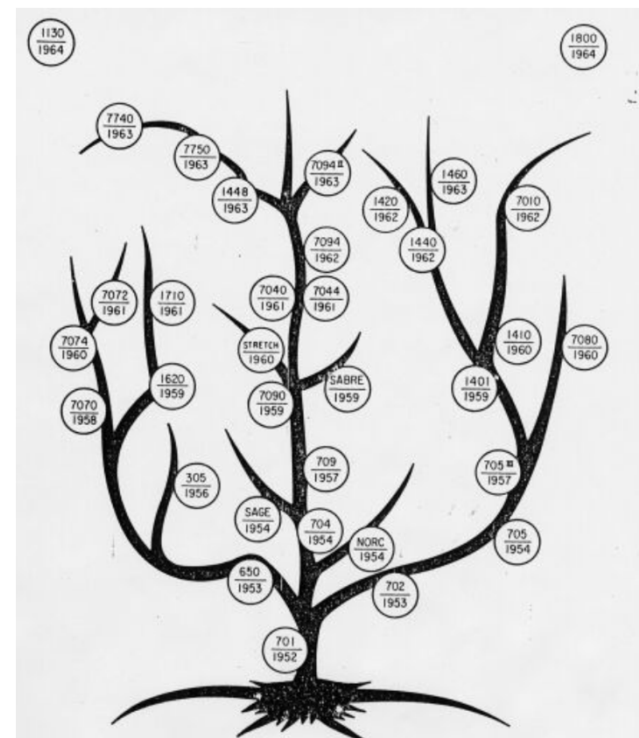
The Mainframe Family tree – 1952 to 1964

- Several mainframe families announced, designed for different applications
- Every family had a different, incompatible architecture
- Within families, moving from one generation to the next was a migration

Common compilers made migration easier:

FORTRAN (1957) 62nd anniversary in 2019

COBOL (1959) 60th anniversary in 2019



The Mainframe Family tree – 1952 to 1964

1st generation

IBM 701 – 1952

IBM 305 RAMAC – 1956



2nd generation

IBM 1401 – 1959

IBM 1440 – 1962

IBM 7094 – 1962



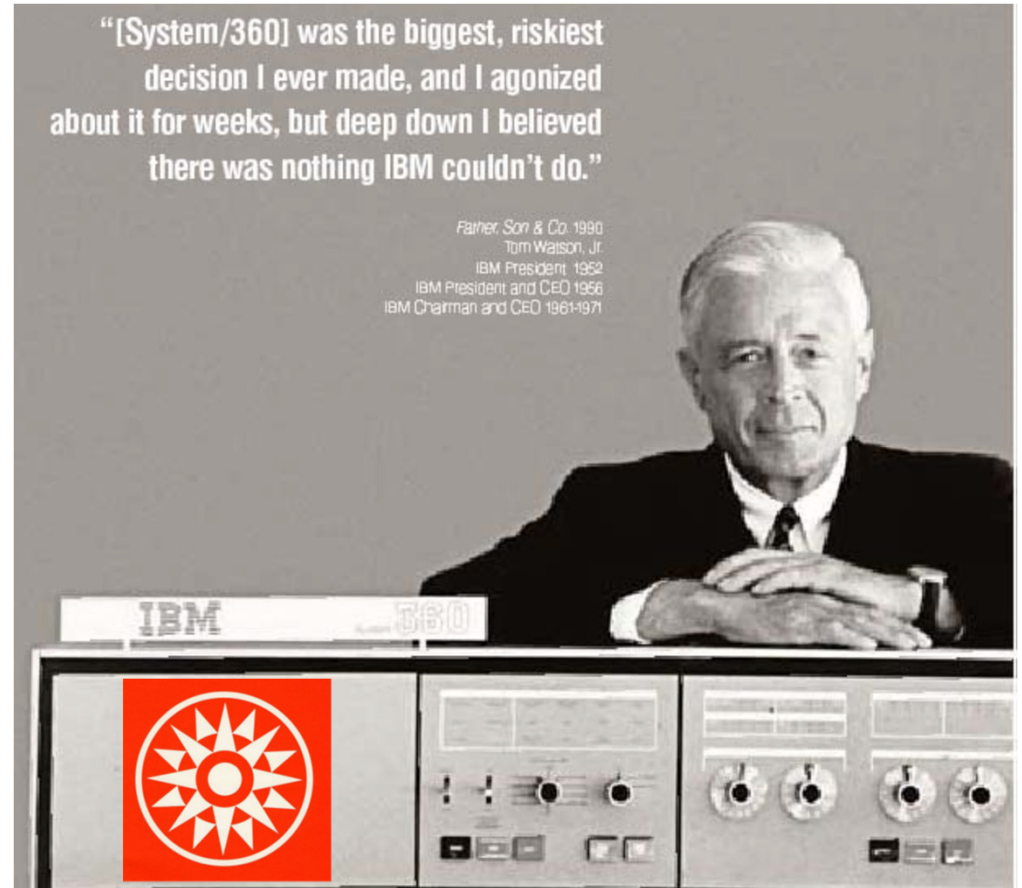
The April 1964 Revolution - System 360

3rd generation

- **IBM decided to implement a wholly new architecture**
- **Specifically designed for data processing**
- **IBM invested \$5B to develop System 360**

announced on April 7, 1964

IBM Revenue in 1964: \$3.23B



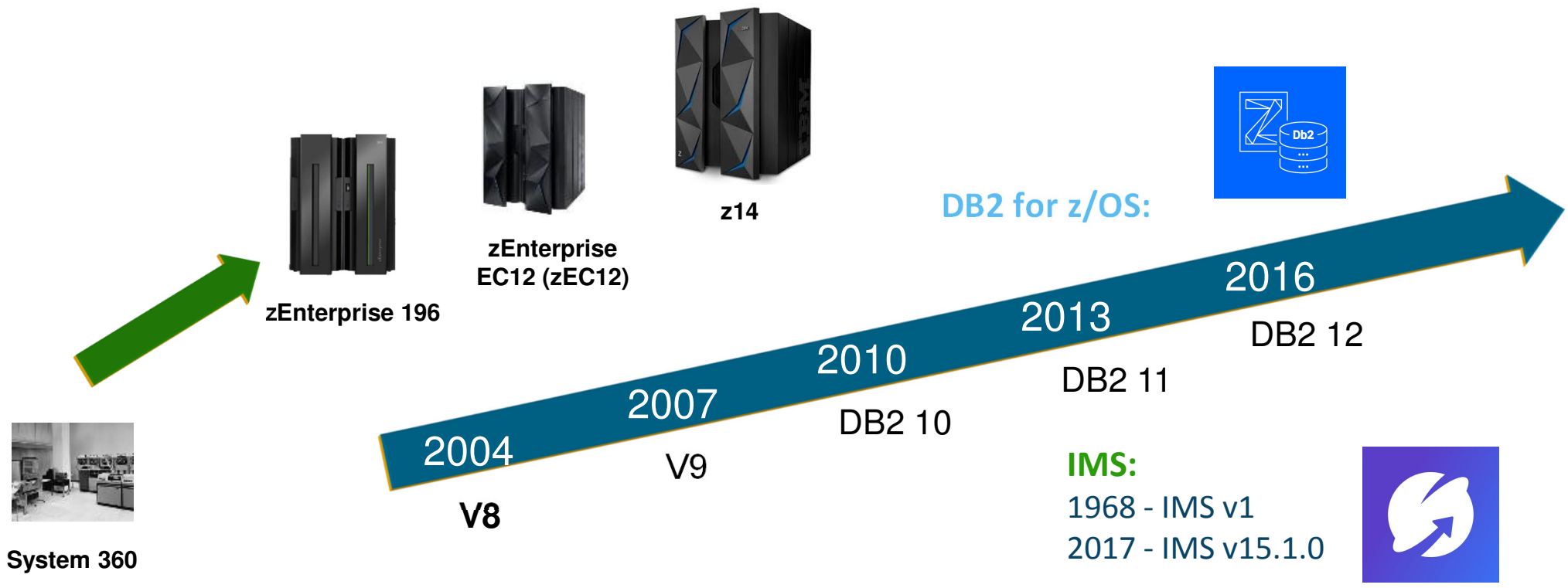
Data Processing Software in Historical Perspective

System 360	1964
IMS	1968
VSAM	1970s
ADABAS by Software AG	1971
Oracle database by Oracle Corporation	1977
SMF/RMF system data	1980s
DB2 for z/OS	1983
DB2 UDB Linux Unix Windows	1993



Increasing volume of valuable enterprise data

Hardware and Software Modernization



Increasing computing power and functionality

Key Design Principles

- **Backward compatibility**
- **Conceptual Integrity**
- **Communication**
- **Project Organization**
- **Project Documentation**



Cathedral of Our Lady of Reims, France

Years built: 1211–1275

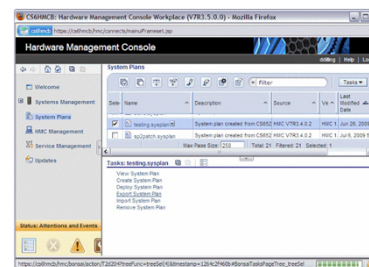
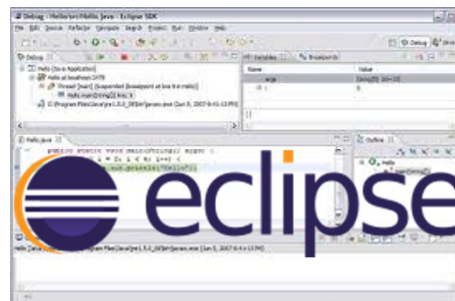
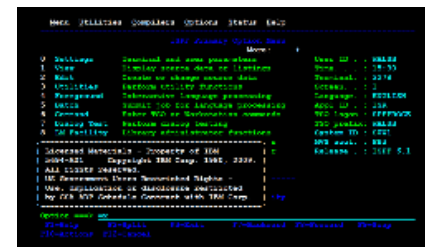
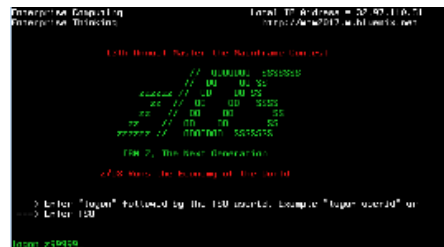


Key Design Principles

- **User Interface Consistency**

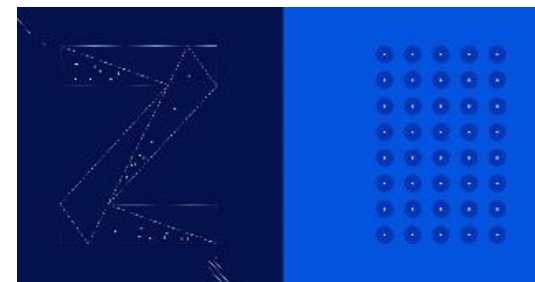
- **Character based:** 3270 TSO ISPF
- **Client based:** Eclipse - open source
- **Web based:**
 - Hardware Management Console HMC
 - ZOWE - open source

- **Evolution & Modernization**



Key Operational Principles

- **Resiliency: 24x7 availability**
- **Security**
- **Scalability**



The New z15: Released on September 12, 2019



IBM z15 one-frame



IBM z15 two-frame



IBM z15 three-frame



IBM z15 four-frame

IBM Mainframe: The System that grows with your needs

Evolution, Modernization, ... SUCCESS!



Q&A

References & Further Readings

1. Book "The Mythical Man Month"
2. IBM online archives
3. Client and personal experience 😊

9 Mainframe Statistics That May Surprise You - Syncsort Blog Part I

1. 71% of Fortune 500 Companies Use Mainframes.

Source: <https://www.zdnet.com/article/with-the-world-embracing-cloud-computing-who-needs-mainframes/>

2. Mainframes handle 87% of all credit card transactions.

Source: <https://www.ibm.com/it-infrastructure/z/why-mainframe>

3. Mainframes handle 68 percent of the world's production IT workloads, yet they account for only 6 percent of IT costs.

Source: <https://www.ibm.com/it-infrastructure/z/why-mainframe>

4. IBM's z13 system can support up to 10 TB of memory, z15 up to 40 TB.

That's 10,000 GB: I'd have to clone my 32 GB RAM personal computer 312 times to match that RAM.

Source: <http://www.redbooks.ibm.com/redbooks/pdfs/sg248251.pdf>

5. A z13 mainframe can survive an earthquake having a magnitude of at least 8.0 on the Richter scale.

Source: <https://www.share.org/p/bl/et/blogaid=339>

9 Mainframe Statistics That May Surprise You - Syncsort Blog Part II

6. Mainframes handle 30 billion business transactions each day.

Credit card payments, stock trades, flight reservations, insurance claims, and other business-critical transactions.

Source: <https://www.zdnet.com/article/with-the-world-embracing-cloud-computing-who-needs-mainframes/>

7. z14 success: Revenue from z System sales increased 64 percent in 2017, compared to 2016

Source: <https://www.zdnet.com/article/ibms-q3-gets-boost-from-z-system-mainframe-as-a-service-annual-run-rate-hits-9-4-billion/>

<https://www.zdnet.com/article/ibm-delivers-q2-revenue-growth-ibm-z-leads-hardware-gains/>

8. As of 2017, 92 of the world's top 100 banks continued to use mainframes.

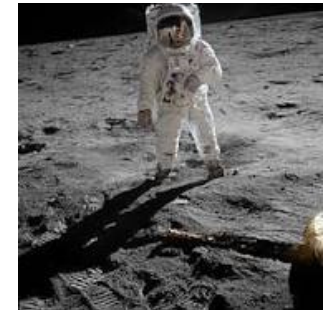
Sure, the cloud is great and x86 servers are cheap. But when you're a bank with millions of transactions to process each day, and ultra-tight security needs, nothing beats the mainframe. [Source](#)

9. The median mainframe programmer salary is about \$73,000 USD, according to PayScale.

That's about \$13,000 higher than the median salary for computer programmers in general, according to the same site. ([Source](#) and [source](#).)

IBM IMS - IBM Information Management System IMS

If we could put a man on the Moon, could we also create a computer program to track the millions of rocket parts it takes?



In 1966, the National Aeronautics and Space Administration (NASA) contractor North American Aviation (later to merge with Rockwell Standard Corporation to become North American Rockwell and eventually Rockwell International) asked IBM that question.

In response, in 1968 IBM launched the world's first commercial database management system, called Information Control System and Data Language/Interface (ICS/DL/I). In 1969, it was renamed Information Management System (IMS).



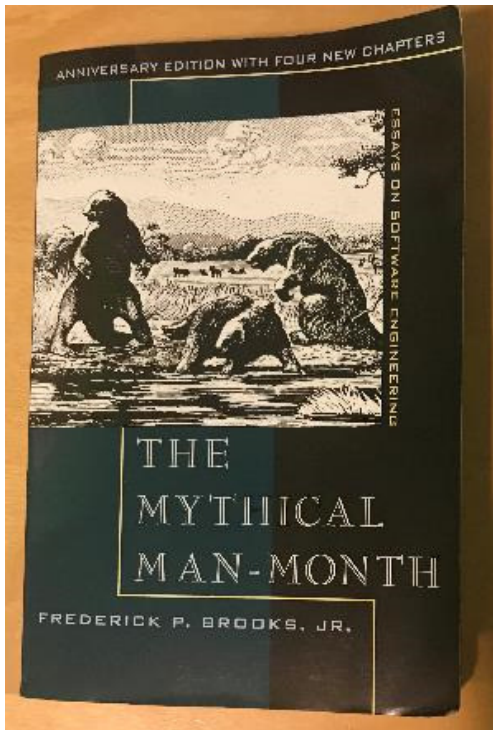
Apollo 11 was the spaceflight that first landed humans on the Moon. Commander Neil Armstrong and lunar module pilot Buzz Aldrin formed the American crew that landed the Apollo Lunar Module Eagle on July 20, 1969, at 20:17 UTC.

SUMMARY

- ✓ 1. IBM mainframe history overview 1952-2019
- ✓ 2. The Largest Project in IT History - System 360
- ✓ 3. Key Design Principles
- ✓ 4. Key Operational Principles
- ✓ 5. Dedication



Dedication



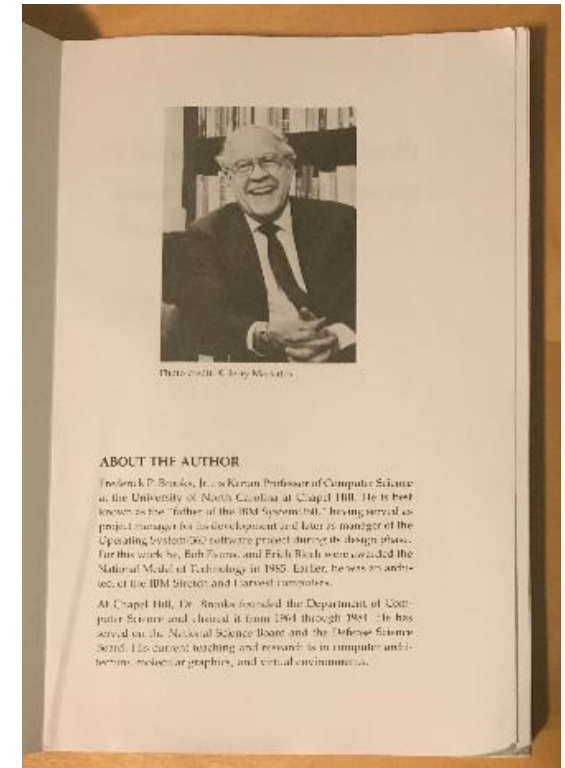
Soli Deo gloria To God alone be glory

Preface to the 20th Anniversary Edition ix

Addison-Wesley's house custom did not permit me to acknowledge in the preface to the 1975 edition the key roles played by their staff. Two persons' contributions should be especially cited: Norman Stanton, then Executive Editor, and Herbert Boes, then Art Director. Boes developed the elegant style, which one reviewer especially cited: "wide margins, [and] imaginative use of typeface and layout." More important, he also made the crucial recommendation that every chapter have an opening picture. (I had only the Tar Pit and Reims Cathedral at the time.) Finding the pictures occasioned an extra year's work for me, but I am eternally grateful for the counsel.

Soli Deo gloria—To God alone be glory.

Chapel Hill, N.C. F. P. B., Jr.
March 1995



Dedication from the fathers of IBM System 30: Fred Brooks, Erich Bloch, Bob Evans, in the book THE MYTHICAL MAN-MONTH.

