The Largest Project in IT History

New England Db2 Users Group Meeting
Old Sturbridge Village, 1 Old Sturbridge Village Road, Sturbridge, MA 01566, USA

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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

<table>
<thead>
<tr>
<th>Software</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>System 360</td>
<td>1964</td>
</tr>
<tr>
<td>IMS</td>
<td>1968</td>
</tr>
<tr>
<td>VSAM</td>
<td>1970s</td>
</tr>
<tr>
<td>ADABAS by Software AG</td>
<td>1971</td>
</tr>
<tr>
<td>Oracle database by Oracle Corporation</td>
<td>1977</td>
</tr>
<tr>
<td>SMF/RMF system data</td>
<td>1980s</td>
</tr>
<tr>
<td>DB2 for z/OS</td>
<td>1983</td>
</tr>
<tr>
<td>DB2 UDB Linux Unix Windows</td>
<td>1993</td>
</tr>
</tbody>
</table>

*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
  o Character based: 3270 TSO ISPF
  o Client based: Eclipse - open source
  o 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 Mainframe: The System that grows with your needs
Evolution, Modernization, ... SUCCESS!
References & Further Readings

1. Book "The Mythical Man Month"
2. IBM online archives
3. Client and personal experience 😊
1. 71% of Fortune 500 Companies Use Mainframes.

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

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

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.

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](https://www.share.org/p/bl/et/blogaid=339)
6. Mainframes handle 30 billion business transactions each day.
Credit card payments, stock trades, flight reservations, insurance claims, and other business-critical transactions.

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