



OPEN  
**MAINFRAME**  
PROJECT

# Mainframes: The Next 60 Years

## In the Beginning

On April 7, 1964, IBM announced the introduction of its newest computer system, the System/360, and the technology world was forever changed. Not only did it offer the fastest compute speed in the world, the platform also allowed users to upgrade their systems while using their existing tools and applications. The System/360 — widely considered to be the first mainframe computer — was the most successful platform ever developed. Sixty years later, its DNA is in the world's fastest and most powerful computers driving every major industry. In a technology world defined by chasing the newest and shiniest object, this track record is unparalleled.

## The Next 60 Years

Imagining the next 60 years of computing is like writing science fiction. In the year 2084, it is not an exaggeration to say that the entire world will be online. Augmented reality, smart spaces, true AI, virtual worlds, and other technologies that are now in their infancy are going to be key elements of the human experience 60 years from now. We may even see things like consciousness uploads and nanotechnology.

As the integrated world uses more data, computing tasks will become exponentially more complex and intensive. The sheer demand for processing power will be immense, and no matter how advanced computer applications become in the years and decades ahead, only one platform has the power, resilience, and adaptability to create our sci-fi future: **the mainframe.**

## Keeping up with Demand

The amount of data we create every day is increasing at least [22% annually](#), and computing performance increased [a trillion times](#) between 1956 and 2015. That's a trillion with nine zeros. Mainframes have always been the platform driving this growth, and they will only be more necessary as humanity produces more data and demands faster performance.

The current volume of data is only a drop in the bucket compared to what we will generate as we invent new uses for computing over the next 60 years. Mainframes got us to the moon, and today power our finance, defense, and creative industries. Our computing power exceeds our ability to generate data thanks to the muscle and speed that only mainframes offer.



We're all walking around with our phones and watches expecting instant gratification. I want to look at my bank account or do a transaction right now, walking down the street. That can't happen unless you have the processing power and reliability you only get with the mainframe. That's only going to get more true.

**Donna Hudi**  
Chief Marketing Officer  
Phoenix Software International



## Big Iron: 2084

Mainframes are only going to get smaller, faster, and more efficient over time. These systems will not only power AI and the cloud, they will also integrate and leverage these technologies to continue driving the evolution of the most powerful computing platforms in the world.

Mainframes will also become easier to use and more accessible as new projects make it possible to use any coding language when working with these platforms. You won't need to be a mainframer to be a mainframer.

One thing we know for sure is that mainframes will still be the best choice for business and technology leaders. According to a 2023 [BMC poll](#), 92% of respondents consider mainframes indispensable for their future business operations.

## Moore's Law

In 1965, Intel cofounder Gordon Moore predicted that computing power (specifically, the number of transistors in a circuit) would double every two years. His claim has more or less proven to be accurate, and processors are only getting more powerful. The next major innovations in processing power will allow mainframes to continue boosting processing power to new heights.



Addressing mainframe skills extends beyond education and training. There are many new technologies that IBM has introduced to reduce the amount of specialized skills required. First, we are simplifying hardware and software processes to operate and maintain the systems. Second, IBM is continuing to adopt open and industry standards. And third, we are infusing AI and automation everywhere to remove manual work.

### Meredith Stowell

VP, Ecosystem, IBM Z and LinuxONE  
IBM



In 30 years, I predict the mainframe will be even smaller and even more agile and even faster than what it is today. There's never been a better time to be on a mainframe in the history of the technology.

### Leonard Santalucia

CTO Mainframe  
Vicom Infinity, A Converge Company  
Chair of the Open Mainframe Project Governing Board



There is an amazing, amazing career in mainframes, and it's about those people that have a passion for technology, have a passion for business, have a passion for doing important heavy lifting and good work in the world.

### Greg Lotko

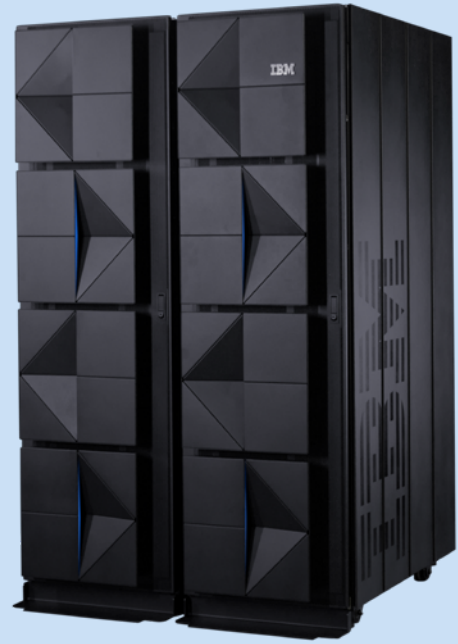
SVP and General Manager  
Broadcom Mainframe Software Division



## Why Mainframes will Power the Future

Mainframes are arguably the most important computers ever created, and they continue to provide the backbone of all computing. The platform's reliability, security, and ability to handle massive amounts of data make it indispensable to any organization's mission to incorporate emerging innovations.

This unparalleled utility has made mainframes the foundation of just about every major computing milestone, and will continue to secure their place at the heart of new advancements. As mainframes become easier to use, new generations will leverage the adaptability and power only available on this amazing platform.



## Adaptability

Mainframes have a reputation for power and performance, but their incredible versatility is what makes them essential. You can do anything with a mainframe, including finance, security, rendering, and design. Anything you can think of doing on a computer, a mainframe can do faster, smarter, and better. Every new idea like the cloud or AI can only be enhanced when run on a mainframe, making the platform ideal for purpose-built operations.

## Power

The bottom line is that computing will only require more and more processing power every year. The architecture of a mainframe allows them to handle a huge volume of tasks all at once, much faster and more securely than on any other platform.

Mainframes will only become increasingly powerful and secure over time, making them the only choice for processing growing volumes of data and powering more demanding technologies.



## Software Development for All

More and more companies that want to stay ahead of the curve are opening their own software development shops. The following industries (and others) will need mainframes to build their bespoke software solutions:

- |  |   |
|--|---|
|  Airlines           |  Government      |
|  Automotive         |  Health Care     |
|  Energy             |  Motion Pictures |
|  Financial Services |  Retail Banking  |



## Security

Increased computing power makes mainframes more secure than any other platform. In addition, their simplified architecture lacks vulnerable entry points for hackers and malware, making them the most securable platform available. That's why organizations that use mainframes boast much higher security.

### Top companies that use mainframes

Source: [ibmmainframes.com](http://ibmmainframes.com)

**AIRFRANCE**

**BANK OF AMERICA**

*charles* SCHWAB

 **PEPSICO**

**FedEx**

**IBM**

 **Kawasaki**

**Marriott**  
HOTELS · RESORTS · SUITES

**The New York Times**

**RITE  
AID**

 **THOMSON REUTERS**

 **general motors**

**VISA**

**Walmart**

## COBOL

Introduced in 1959 to support business and financial tasks, COBOL is a user-friendly language based around using English words as commands. The following key features have made COBOL a major asset to the mainframe:

- Used across major enterprises such as financial services, banking, insurance, healthcare, automotive, shipping, and more
- Easy readability makes COBOL a great way to communicate with any computer
- Seamless integration with modern systems
- COBOL programs run on different platforms so programmers can develop applications without worrying about compatibility
- Adaptability has helped COBOL last and merge with modern APIs and cloud applications



Industry needs to bring new folks who have no tech background to the mainframe. Most colleges are teaching the platform, so companies have to turn non-techies into mainframers. Some of us have been doing that for 20 years.

**Cameron Seay**

Mainframe Thought Leader/Adjunct Professor  
East Carolina University



The mainframe created remarkable opportunities for customers to invent the future. Rather than having to focus on rewriting the past, they could innovate, look forward, and expand what the platform was doing for them.

**John Kaplan**

Head of Brand, Content and Communications  
Broadcom Mainframe Software



The mainframe is secure, reliable, scalable, and capable of processing vast amounts of data. It's an active, integrated, and essential part of modern enterprise IT, and not going anywhere anytime soon.

**Milan Shetti**

President & CEO  
Rocket Software



## Facing New Challenges

Today, more than **70%** of **Fortune 500 companies** use mainframes to power their operations. But to power the next 60 years of computing milestones, mainframes need new waves of skilled operators. Every generation is more tech-savvy than the last, and every year a new class of brilliant engineers, programmers, and innovators begins learning how to create tomorrow's disruptive game-changers.

These incoming professionals need a chance to fall in love with the power and agility of mainframes to carry the platform to new heights. Mainframe operators in their prime or who are leaving professional life must seize this moment to hand off the platform to the next generation.

### How to close the generation gap

- Lead dynamic outreach and education programs
- Offer highly incentivized mainframe careers with best-in-class benefits
- Increase accessibility so programmers can use the mainframe with common languages
- Break down knowledge silos and build a shared knowledge base
- Create opportunities for independent software vendors to innovate and expand on the mainframe's utility

## Leading the Way: the Open Mainframe Project

In 2015, the Linux Foundation launched the [Open Mainframe Project](#) to deploy open source and Linux throughout the mainframe computing community. The Open Mainframe Project boasts members from tech giants, innovative startups, and academic institutions around the world. Its ambassadors are recognized leaders in the field, dedicated to educating the computing world about mainframes.

Here are just a few of the initiatives the Open Mainframe Project has helped to found — and which are already bringing exciting new talent into the world of Big Iron.

- [The Open Mainframe Project's Mentorship Program](#) continues to be one of its most popular projects. Since its launch, the mentorship program has helped more than 100 students gain hands-on learning experience with Linux, open source, and mainframes. Several mentees have continued to contribute to the project communities they mentored with and some have even become mentors or members of the technical steering committees.
- The [COBOL Programming Course](#) is an open source initiative that gives users vital COBOL training materials and hands-on experience with modern mainframe tooling. The course stands out by offering practical experience to learners through hands-on labs on z/OS. By enabling developers to effectively learn COBOL, the program not only helps to ensure that mission-critical applications continue to run smoothly, but also opens up career opportunities in an area where demand for skilled professionals exceeds supply.
- [Mainframe Open Education](#) is a community dedicated to “open sourcing” mainframe learning roadmaps and spreading knowledge of mainframe techniques and best practices. By participating in this project, contributors collaborate on resources and educational materials that result in transferring mainframe skills to the next generation within a trusted platform.
- Launched by IBM and including other major tech players like SHARE, the [Mainframe Skills Council](#) was created to nurture a skilled and sustainable new generation of mainframe professionals that represents today's diverse and dynamic workforce. The Open Mainframe Project will soon join this IBM-led group.

These initiatives, along with new skills training and apprenticeship programs, make it easy for professionals to make their mark on the mainframes that will power their wildest dreams.

### Active projects



### Working Groups



### Incubating Projects



## The Linux Foundation

Linux, the world's most versatile open-source platform, is deeply tied to the mainframe. Linux on IBM Z combines the flexibility of Linux with the advantages of fault-tolerant mainframe hardware that can perform 90,000 I/O operations per second, with a mean time between failures measured in decades. Virtualization allows multiple smaller services to combine onto a single mainframe, offering centralization and cost reduction while enabling specialized servers.



Mainframes have been the dominant computing platform for large organizations for a reason: they have consistently delivered value for users that demand reliability and scalability with almost no downtime. No other technology even comes close.

### Steven Dickens

Vice President and Practice Leader  
The Futurum Group



Leveraging emerging technologies does not mean getting rid of your mainframe. Organizations are rushing to adopt AI, but mainframes will only make AI better. Ripping and replacing infrastructure rarely works and causes massive business disruptions and security risks. Many of the applications that create the data needed for AI models run better on the mainframe. By adopting a hybrid cloud strategy, businesses can combine the security and reliability of mainframe infrastructure with the agility of the cloud to implement AI across a blended, distributed environment.

### Milan Shetti

President & CEO  
Rocket Software



The mainframe is legendary, from revolutionizing computing to the profound impact it has had and continues to have on transforming our finance, healthcare, government, and transportation sectors. Its ability to evolve with the times and seamlessly adapt to changing technological landscapes while continuing to drive industry-first innovation ensures it remains future-proof, continuously meeting the diverse needs of our clients and society at large.

### Meredith Stowell

VP, Ecosystem, IBM Z and LinuxONE  
IBM







The average person may not realize it, but we rely on the mainframe everyday to do things we take for granted like withdrawing money from an ATM, using credit cards, or booking airline reservations. The mainframe is behind it all. While today's mainframers understand this, it is increasingly important that we take every opportunity to educate the next generation of IT professionals about the platform and its possibilities. The platform has gotten to where it is today through generations of innovation. Support for modern languages, tool sets, and open source is what's going to take this platform into the next 60 years making it even more powerful while also more attractive to that next generation.

**Donna Hudi**

Chief Marketing Officer  
Phoenix Software International













The future of mainframes will be characterized by continued innovation, integration with emerging technologies, and a focus on addressing the evolving needs of enterprises in an increasingly digital world. While the specific advancements and developments may vary, mainframes will remain a critical foundation for driving business success and innovation for decades to come. Along with this, the mainframe ecosystem comprises a vast network of developers, vendors, and experts who contribute to its ongoing development and support. This vibrant community ensures that mainframes will remain relevant and responsive to evolving industry needs, with access to a wide range of tools, resources, and best practices.

**Mark Wilson**

Technical Director  
Vertali



-  Mainframes are used by **71% of Fortune 500 companies**.
-  Mainframes handle **90%** of all credit card transactions.
-  Mainframes handle **68% of the world's production IT workloads**, yet they account for only 6 percent of IT costs.
-  IBM's z16 can support up to **40 terabytes of memory**.
-  An IBM Z System mainframe **can survive an earthquake** having a magnitude of at least 8.0 on the Richter scale.
-  Each IBM z16 mainframe can handle **19 billion business transactions a day**.
-  Revenue from Z System sales spiked **77% year-over-year** with the 2022 release of the newest IBM mainframe, the z16 system.
-  As of 2020, **92 of the top 100 banks** and **all top 10 insurers** worldwide use IBM mainframes.
-  The median mainframe programmer salary has skyrocketed to \$111,116 according to **ZipRecruiter**.
-  Mainframe market size is estimated to be worth **USD 5.3 billion in 2023** and is forecast to a readjusted size of USD 6.2 billion by 2028 with a CAGR of 2.6%.

## Empowering People and Building Community

If mainframes power innovation, it's only because people power mainframes. The long history of the mainframe has put these amazing platforms at the heart of the longest-running computing communities in the world. As early as the 60s, and including projects like CBT Tape in 1970, mainframes have offered the first open source resources for the tight-knit and welcoming community of mainframe operators.

## Join the Revolution

This vibrant community is the biggest reason for new tech professionals to seek careers in mainframes. Mainframes multiply human potential, and the people who have discovered this amazing power are eager to share it and build upon the work of their fellow innovators. As the community reaches out to new generations, more and more talent will flock to the mainframe experience and begin innovating on this incredible platform.

The power and versatility of mainframes has made them the heart of the open source movement, which will only continue to gain momentum as computing careers become more accessible. By bringing talented young professionals into the mainframe world, the community can only continue to grow and thrive, as this amazing platform powers the future of technology.

## SHARE

SHARE is the oldest computer-user group in the world, and it's where mainframers come together to continually shape the future of the enterprise technology ecosystem. SHARE is an independent volunteer-run information technology association that provides education, professional networking and industry influence, and thousands of mainframe experts are part of this vibrant community.



I am very excited for the future, and always amazed to see how the mainframe continues to evolve and remain the premier data serving and transaction processing platform meeting the needs of our clients today and into tomorrow. History tells us about the future, and the mainframe has a history of constant relevance, reinvention, and innovation. And it's just going to continue.

**Meredith Stowell**

VP, Ecosystem, IBM Z and LinuxONE  
IBM



Emerging workloads need to be as fast, secure, and scalable as possible, plus remain up all the time. There's nothing else that can do it, and nobody's building anything comparable to the mainframe.

**John Mertic**

Executive Director  
Open Mainframe Project



## CBT Tape

An open library of free software distribution, [CBT Tape](#) serves the IBM mainframe Multiple Virtual Storage (MVS), OS/390, and z/OS operating systems. An ever-evolving resource, CBT Tape uses magnetic media to distribute mainframe solutions throughout the world. CBT Tape is part of the Open Mainframe Project, and is key to the dynamic and collaborative mainframe community.

## Zowe

[Zowe](#), an open source software framework for the mainframe that strengthens integration with modern enterprise applications, celebrated its fifth anniversary in 2023. The first integrated and extensible open source framework for z/OS comes with a core set of applications out of the box in combination with the APIs and OS capabilities future applications will depend on. This year, [The Arcati Mainframe 2024 Survey](#), the independent annual guide for users of mainframe systems, found that 85% of respondents said they are or will be using Zowe by the end of the year.

## Galasa

An open source test framework, [Galasa](#) is an agile, reliable, and scalable testing process for multiple technologies and platforms. Galasa centralizes test results and simplifies test planning to enhance DevOps strategies.



Looking ahead, I see great potential a decade and beyond for the Mainframe. Yes, the world will change, markets will change, and the digital nature of all things will become even more pervasive. Simply put, Mainframes will remain an indispensable cornerstone in business and society.

### Greg Lotko

SVP and General Manager  
Broadcom Mainframe Software Division



When I entered the world of mainframes 10 years ago, I was amazed at the sense of community. I thought I had walked into another dimension. I've been in technology for most of my career, but never experienced such a spirit of collaboration like that of this community. They're all friends, they all help each other. Whether you're a customer or competitor, we help each other all the time. We're all proud to be part of that community.

### Donna Hudi

Chief Marketing Officer  
Phoenix Software International, Inc.



This document was prepared by [VerbFactory](#) for the [Open Mainframe Project](#).

### **About the Open Mainframe Project**

The Open Mainframe Project is intended to serve as a focal point for deployment and use of Linux and Open Source in a mainframe computing environment. With a vision of Open Source on the Mainframe as the standard for enterprise class systems and applications, the project's mission is to Build community and adoption of Open Source on the mainframe by eliminating barriers to Open Source adoption on the mainframe, demonstrating value of the mainframe on technical and business levels, and strengthening collaboration points and resources for the community to thrive. Learn more about the project at [www.openmainframeproject.org](http://www.openmainframeproject.org).

### **About The Linux Foundation**

The Linux Foundation is the world's leading home for collaboration on open source software, hardware, standards, and data. Linux Foundation projects are critical to the world's infrastructure including Linux, Kubernetes, Node.js, ONAP, PyTorch, RISC-V, SPDX, OpenChain, and more. The Linux Foundation focuses on leveraging best practices and addressing the needs of contributors, users, and solution providers to create sustainable models for open collaboration. For more information, please visit us at [linuxfoundation.org](http://linuxfoundation.org). The Linux Foundation has registered trademarks and uses trademarks. For a list of trademarks of The Linux Foundation, please see its trademark usage page: [www.linuxfoundation.org/trademark-usage](http://www.linuxfoundation.org/trademark-usage). Linux is a registered trademark of Linus Torvalds.

### **About VerbFactory**

For more than 20 years, VerbFactory has helped mainframe companies articulate their vision and drive visibility by telling compelling stories that resonate with their target audiences. The agency was founded by former technology journalists with a passion for storytelling and a fundamental belief that high-quality content is the catalyst for helping mainframe companies build meaningful connections by transforming their innovations into brand stories that get noticed by the people who matter most. For more information, please visit [www.verbfactory.com](http://www.verbfactory.com).

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For more information about the Open Mainframe Project, or to get involved, please visit [openmainframeproject.org](http://openmainframeproject.org)