



# Information Technologies Best-Kept Secret



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# Session Objectives - Evangelist

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Help the mainframe community and educators to:

- Raise student awareness
- Fill mainframe class seats to
- Address mainframe skill shortage

E-mail me for a powerpoint version of this presentation.

# Session Objectives

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To understand:

- What is this technology?
- Why is it important to Businesses?
- Who uses it?
- What can I gain from studying this technology?



# Current Environment

85 Million

Global unfilled jobs

4.3 Million

in US Tech Market\*

2030

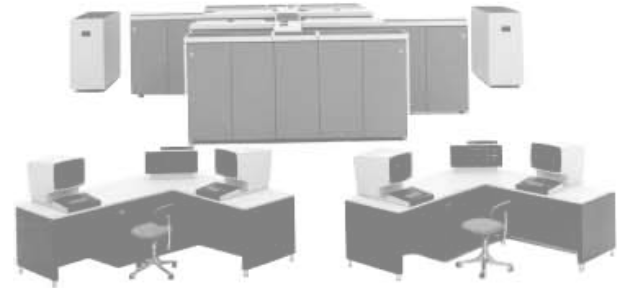
*\* Future of Work; Global Talent Crunch*



# Size Matters



# Technology continues to evolve



**IBM Z**



# What do all computers have in common?

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# What is a mainframe?

IT's Best Kept Secret!

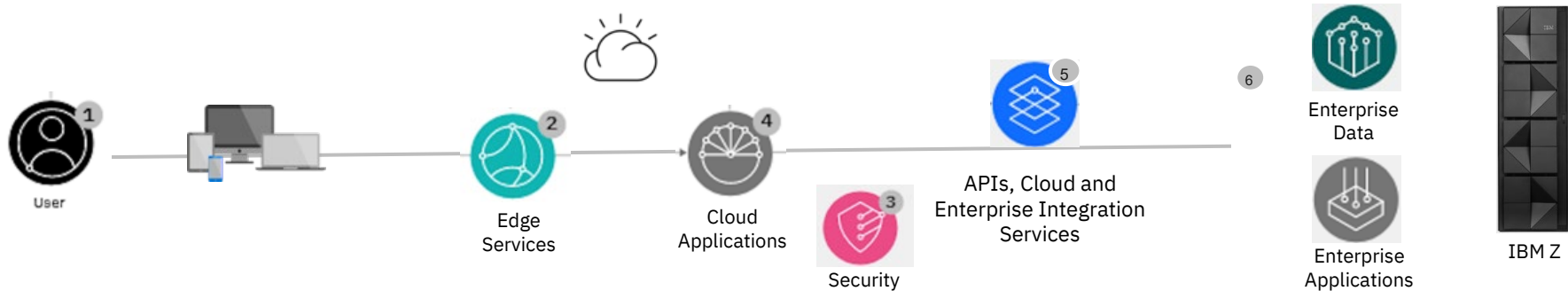




### Public Network

### Cloud Provider Network

### Enterprise Network





# World's leading businesses run on the mainframe



45

of the top 50  
worldwide banks

Mainframes process

**30 billion** business transactions per day



8

out of 10 of the world's  
largest insurers

Mainframes enable

**\$6 trillion** in card payments annually



7

of the top 10  
US retailers

**80 percent** of the world's corporate data  
resides or originates on mainframes



4

out of 5 of the world's  
largest airlines

**91 percent** of CIOs said new customer-  
facing apps are accessing the mainframe

# Growing IBM Z & LinuxONE Open-Source Software Ecosystem

## Linux Distributions & Virtualization



## Linux Community Versions



## Networking & Monitoring



More: [hub.docker.com](https://hub.docker.com)

## Cloud & Container Services

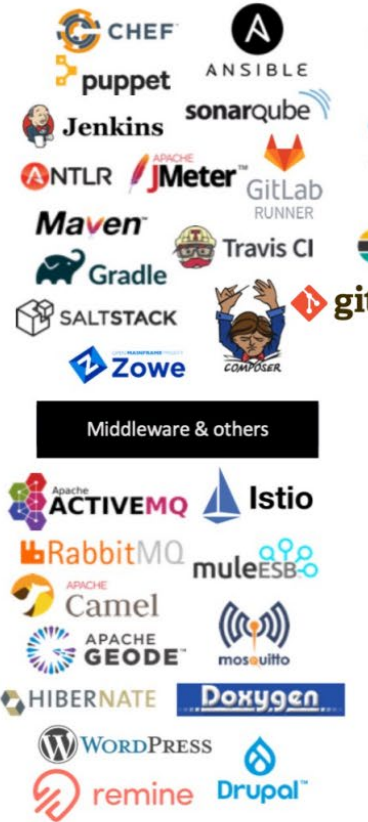


[www.ibm.com/community/z/open-source-software/](https://www.ibm.com/community/z/open-source-software/)

## Languages & Runtimes



## DevOps/Automation



## Big Data, Observability, Analytics



## Databases & Storage





# What happens in one second?

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1,200  
Instagram  
Posts



10,000  
Tweets



98,000  
Videos



106,000  
Searches



**1,157,407**  
CICS Transactions  
on a Mainframe

# A real-world example

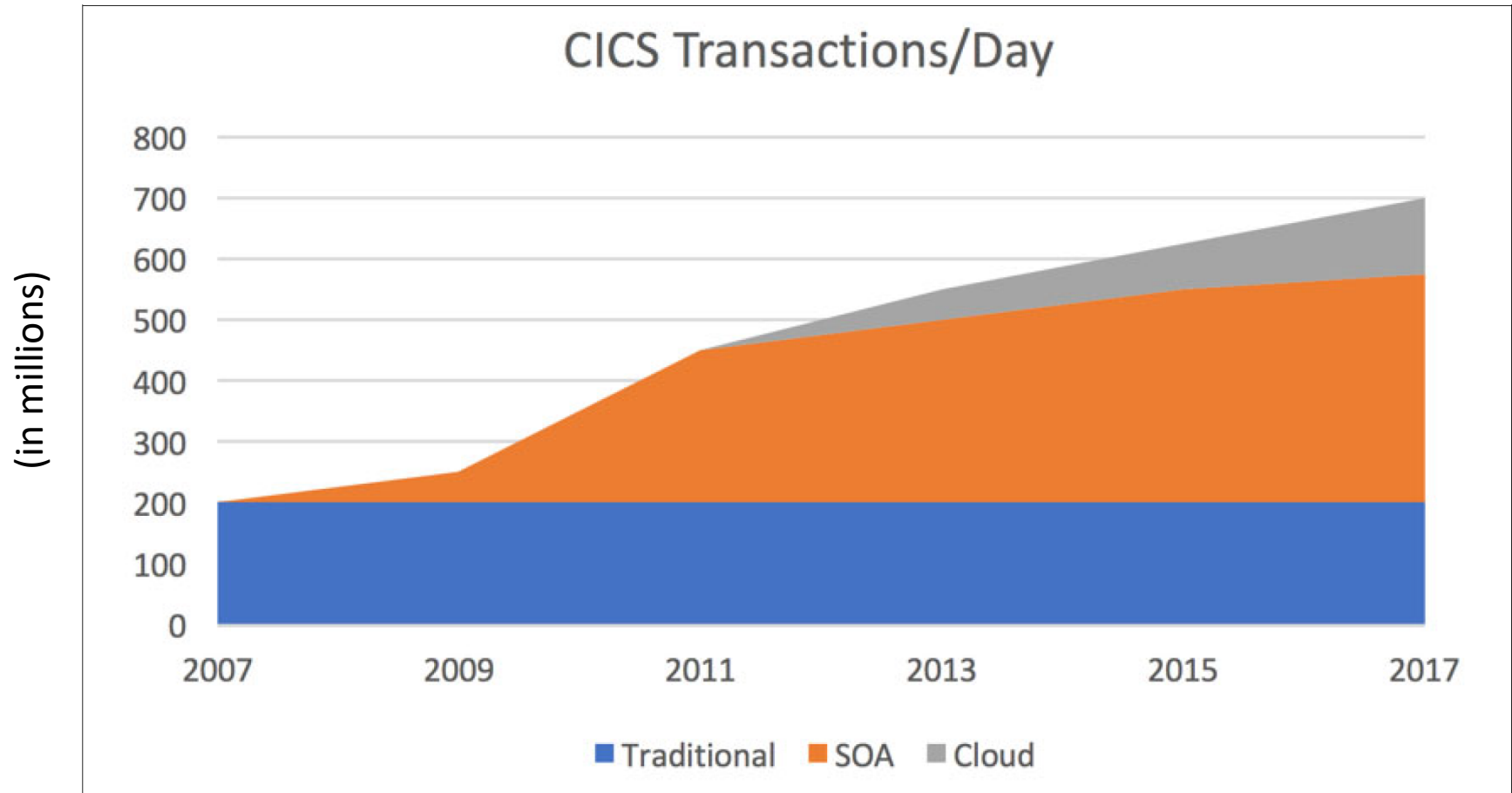
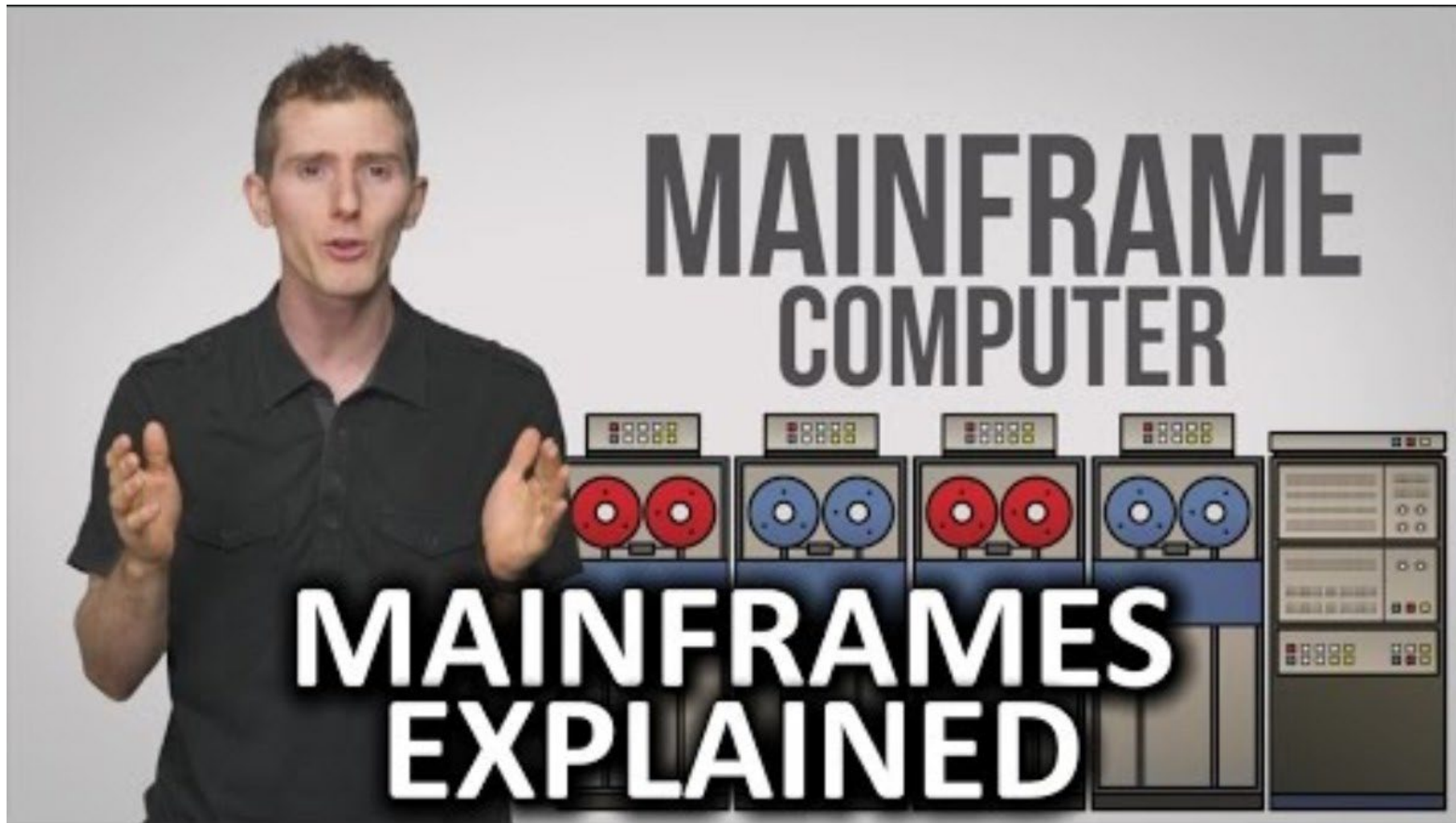


Figure 1-1 Walmart CICS transaction per day growth

CICS: Customer Information Control Systems

# What is a mainframe?

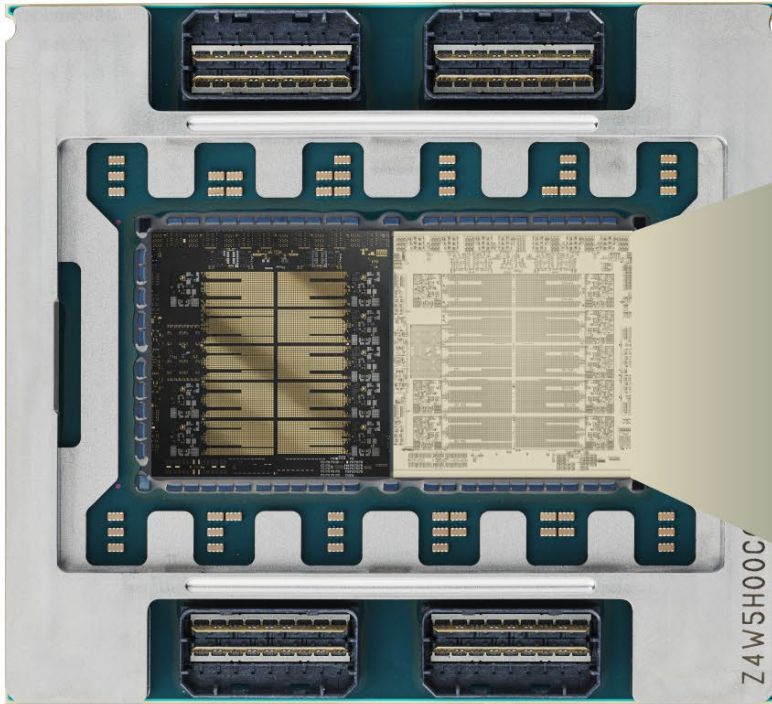


<https://www.youtube.com/watch?v=ximv-PwAKnc&t=11s>

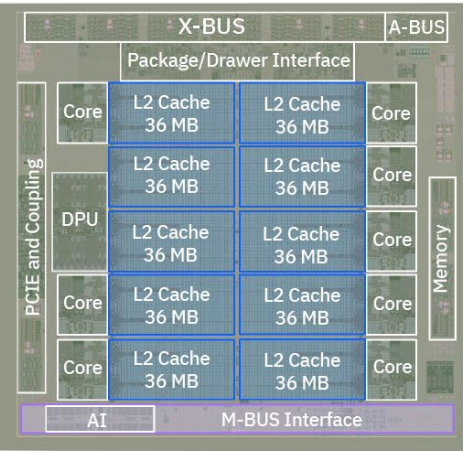
<https://www.ibm.com/it-infrastructure/z/education/what-is-a-mainframe>

# IBM z17: More at the core

*Advanced AI where it matters most*



**IBM Telum II Processor**



## Processor specifications:

- 5nm technology, 5.5 GHz
- 24.1 miles of wire
- 43 billion transistors
- 565 mm<sup>2</sup>

## 8 cores each with:

- 20% area reduction
- 15% power reduction
- 40% more cache
- 7.5x AI throughput

## Innovations:

- **NEW** On chip-Data Processing Unit (DPU): Increased I/O performance with 90% reduction in power for I/O management, RAS, reduced latency
- Second generation AI Accelerator for high-speed inferencing and tuning

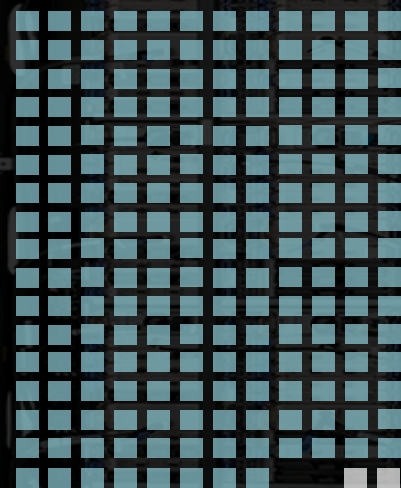
# Integrated system design for the IBM Z and LinuxONE Emperor

Up to 208 cores  
on a CPC

Up to 25 cores for  
offload system  
processing

Plus up to 384  
POWER® cores:  
I/O and Coprocessors

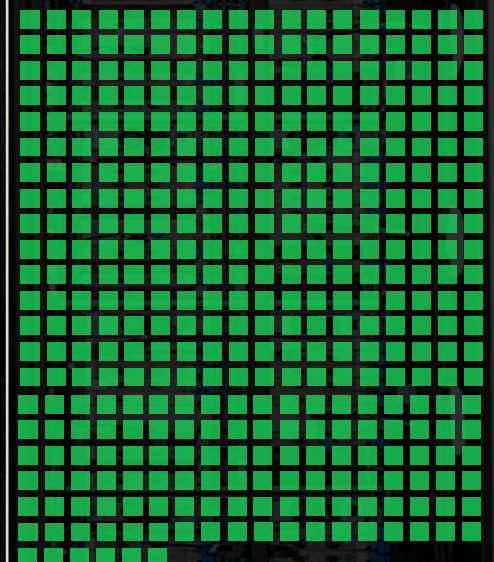
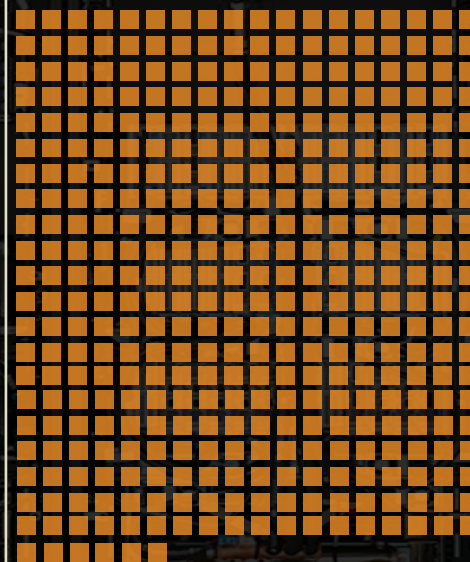
Plus up to 384  
RAS cores



- Share up to 200 processors with up to 85 LPARS
- **2 Spares**
- Configure the processors as CPs, IFLs, zIIPs, or ICFs



25 SAPs  
2 IFP



# Demand for IBM Z and Skills

60%

Mainframe Technology Specialists are over the age of 50

71%

IT Leaders say their mainframe team is understaffed

93%

Say it's moderately or extremely challenging to find mainframe skills

67%

Executives recognize the mainframe's ability to grow and attract new workloads

91%

Companies are expanding their mainframe footprints as a moderate or critical priority



# Consider This!

Without a mainframe...

- Your airplane might not land safely (air traffic control)
- Your ATM would not give you \$\$ (banks all over the world)
- You could not buy something online (transaction processing)
- Trains could not run everywhere (virtual Linux servers)
- Hospitals could not access patient records (Patient Management)
- Your FedEx /UPS package would not ship? (shipping and tracking of shipments)
- The internet would not work

# IT = Information Technology

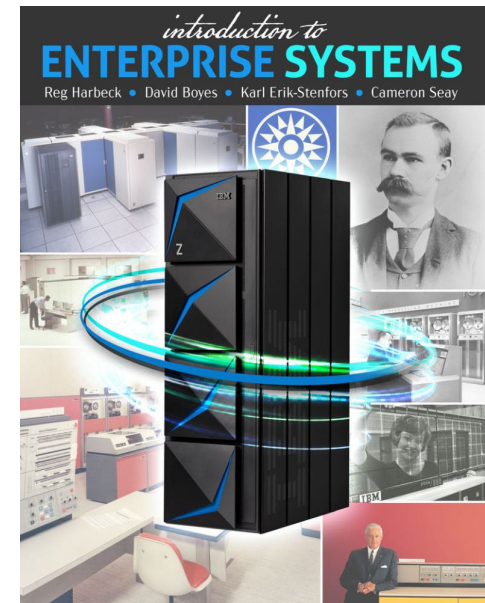
- IT is everywhere in our lives!
- IT depends on Enterprise Systems.
- Mainframes do extreme computing.

## How can you prepare?

Look for Mainframe Content in Colleges and Universities in either

Computer Science or Business Schools such as:

- Computer Science
- Information Technology
- Computer Information Systems
- Management Information Systems
- Business Information Systems
- Financial Computing
- Enterprise Computing



# A New Learning Experience

## Upskill, reskill and new skill

IBM Z Xplore is a year-round interactive learning platform available for any learner to get hands-on experience across a variety of technologies, to develop valuable skills, and to earn industry recognized badges – with no prior knowledge required!

You will find:

- Hands-on challenges
- Digital badging
- Direct access to IBM Z environments
- Progressive learning paths
- User community discussion boards

Fundamentals + Concepts:

Fundamentals: Learn about data sets and how to use VS Code. Introduction to coding languages such as JCL, Python, USS, and REXX.

Concepts: Increased knowledge on security, uptime and enterprise scalability. Take a deeper look into enterprise systems and RACF.

Advanced: Further your hands-on learning around REXX, COBOL, Linux, SQL1, Partitioned Data Sets, and more.

Extended: Develop skills surrounding TSO/ISPF, Node.js, MQ, VM, Machine Learning, Ansible, and more.



Concepts Badge



All Star Badge



Advanced Badge



Register today: [ibm.biz/ibmz-xplore](https://ibm.biz/ibmz-xplore)

# Earn Mainframe Open Digital Badges and become highly marketable!



**IBM Z Xplore Learning System** - No experience necessary. Earn badges upon successful completion of Part 2 and Part 3 of the learning system.



**z/OS Mainframe Practitioner Certificate** - Earn up to four badges when you complete three self-paced, hands-on, e-learning courses through Coursera.



**Z Community** - Join the community to access even more resources!

***Up to 8 mainframe digital badges at no cost\****

*\*Course access is free for 1 month*

# Where can you get a job working with IBM Z Systems?

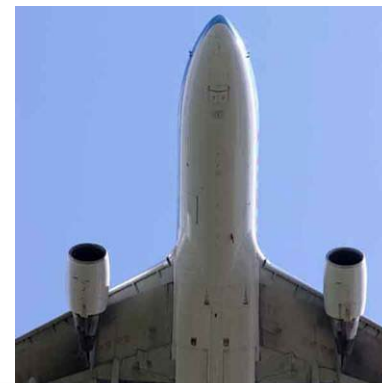
Government



Shipping



Airline



Auto insurance



Banking/finance

Students pursuing careers in technology are focused on five primary things in a potential career.

Enterprise Computing outperforms other IT roles

Base: US online adults, 18+; 414 IT professionals involved in software development, IT support, enterprise architecture, enterprise computing systems administration/development, data science, etc.  
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, September 2019

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## Good salary

● Enterprise computing role ● Other computing role

Trends show starting salaries in mainframe are **~\$8,000** more than in other mixed IT roles



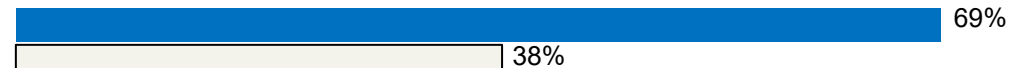
## Good work-life balance

A good work-life balance (% rating 8, 9, or 10 out of 10)



## Ability to make a social impact

Social impact, for example, the ability to contribute to open source, social, or community groups, with your technical skills



## Working on something that aligns with primary interests in technology

Opportunity to work with leading-edge tech



## Job security/role versatility

Nearly **90%** of professionals in enterprise computing careers agree the job market for their skill set is growing, and **75%** believe there is a shortage (i.e., high demand) for their skill.

# Cobol Skills Are In Demand!

## COBOL Remains in High Demand\*

Industries that rely heavily on mainframes also depend on apps written in COBOL, the venerable mainframe programming language.

Yet the fact is that COBOL skills are still in demand. And precisely because younger COBOL programmers are in short supply, businesses that depend on COBOL are willing to pay top dollar for programmers who can provide COBOL expertise.

## Article of Interest

### [COBOL Is Everywhere. Who Will Maintain It?](#)

“220 billion lines of COBOL code in production today that handles \$3 trillion in commerce every single day”

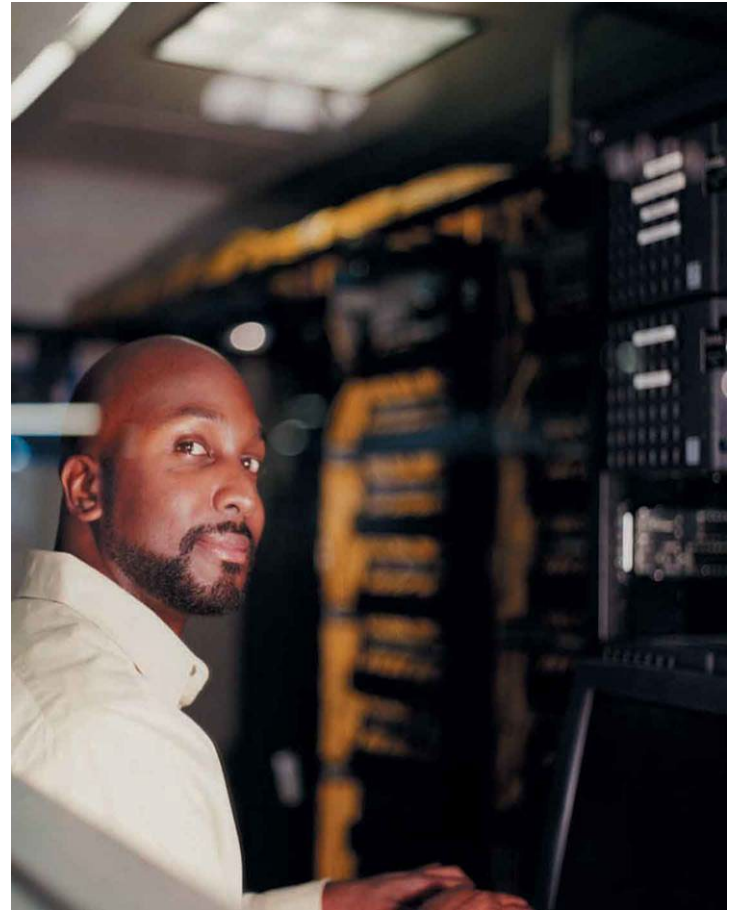
\*Enterprise Systems Media, 5 Things Everyone Should Know About Mainframes, by [Christopher Tozzi](#) on January 2nd



# Recommended skills

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- A desire to learn
- Problem Solving
- Communication skills
- Teaming skills
- Attention to detail
- Computer programming
- Project management skills



# Some Typical Mainframe Roles

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- Application Programmer (Developer)
- Operator
- Performance and/or Capacity Analyst
- Security Administrator
- System Administrators / Programmers
- Network Specialists
- Database Administrators (DBAs)
- Production Control Specialists

# Career Areas

Following is a subset of career areas related to software development;

- OS System programmers
- Security
- Database Administration
- Networking
- System Architect
- **Developer**
- **Function Test**
- **System Test**
- Publication (user documentation)
- **Support**
- Project/Program/Offering Management
- Content Design
- More...

# Some University Choices

The following is a subset of Colleges/Universities that IBM is working with That have a mainframe curriculum and/or teach mainframe topics.

- University of North Texas,
- Northern Illinois University
- West Texas A&M
- University of North Florida
- Eastern Illinois University
- North Carolina A&T
- Eastern Carolina University
- Marist College

# Summary

- IBM Mainframes will be around for a long time
- They are constantly changing with new innovations
- Companies large and small utilize the mainframe
- 60+% of the current workforce are nearing retirement
- Career opportunities will exist for you
- Learn more about IBM's z System for competitive advantage



Thank  
you!

For additional information  
about the IBM z Systems  
Academic Initiative,  
E-mail the IBM z Systems  
Academic Initiative team at:  
[zskills@us.ibm.com](mailto:zskills@us.ibm.com)