Developing for the Modern Mainframe

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(I talk to techies, I don’t know how to sell you a mainframe 🤦‍♂️)

Debian / Ubuntu  OpenStack  Apache Mesos  Linux on Z
What is a mainframe?

IBM System 360 (s/360), 1964

IBM z15, 2019
What is a mainframe?

*Depends on who you ask.*

Traditionally runs z/OS, but increasingly Linux too.

Data, data, data.

Batch processing!

Enterprise-grade hardware and external storage.

Virtualization? Solved!

Networking? Solved!
What is a mainframe?
Storage - DS8900F

The highest end model, the IBM DS8950F Model 996 has nearly 5.9 PB (5,898 TB) maximum physical capacity.
So, what runs on it?

**z/OS**

z/OS, a widely used mainframe operating system, is designed to offer a stable, secure, and continuously available environment for applications running on the mainframe.

**z/VM**

As a control program, z/Virtual Machine (z/VM) is a hypervisor because it runs other operating systems in the virtual machines it creates.

**z/VSE**

z/Virtual Storage Extended (z/VSE) is popular with users of smaller mainframe computers. Some of these customers eventually migrate to z/OS when they grow beyond the capabilities of z/VSE.

**z/TPF**

The z/Transaction Processing Facility (z/TPF) operating system is a special-purpose system that is used by companies with very high transaction volume, such as credit card companies and airline reservation systems.

**Linux for System z**

Several (non-IBM) Linux distributions can be used on a mainframe.

Modern mainframes run Linux!

...and they have for 20 years
LinuxONE

2019, LinuxONE III (z15 with IFLs)
Already have software?

Build it for the mainframe!
The IBM LinuxONE Community Cloud provides a no charge, self-provisioned SUSE or Red Hat virtual machine on an IBM LinuxONE Enterprise Server (s390x architecture) to develop, test, and run your apps.

https://developer.ibm.com/linuxone
Self-Service s390x: Ubuntu PPAs

See: https://princessleia.com/journal/2019/06/building-a-ppa-for-s390x/
Self-Service s390x: openSUSE Build Service

Source: https://build.opensuse.org/
Working with z/OS
Expected Programming on z/OS

The most widely used computer languages supported by z/OS:

- Assembler
- COBOL
- PL/I
- C/C++
- Java
- CLIST
- REXX™
More programming on z/OS

To this list, we can add the use of **shell script** and **Perl** in the z/OS UNIX System Services environment.


Traditional interaction: ISPF

(Interactive System Productivity Facility)

Menu Utilities Compilers Options Status Help

Option ==> []

0 Settings  Terminal and user parameters
1 View  Display source data or listings
2 Edit  Create or change source data
3 Utilities  Perform utility functions
4 Foreground  Interactive language processing
5 Batch  Submit job for language processing
6 Command  Enter TSO or Workstation commands
7 Dialog Test  Perform dialog testing
8 LM Facility  Library administrator functions
9 IBM Products  IBM program development products
10 SCLM  SM Configuration Library Manager
11 Workplace  ISPF Object-Action Workplace

----- Other Functions ----------

SD SDSF  View output
U Unix  Unix Shell Prompt
UF Unix Files  Unix Services
DB DSE  DB2 Interactive functions
DM D2ADM  DB2 Administration
F File Manager  File Manager for z/OS
IS ISPF  Disk Storage Management
SN SMHELP  Software Installation and Management
IP IPCS  Debug System Dumps and Traces
HC HCM  System Device Management
FD FM/DB2  File Manager/DB2
FJ FM/IMS  File Manager/IMS

Enter X to Terminate using log/list defaults

F1=Help  F2=Split  F3=Exit  F7=Backward  F8=Forward  F9=Swap
F6=Actions  F12=Cancel

TCP0044b  004-014
Modern interaction: Zowe Web Desktop

- Desktop-like environment, in your web browser
- Includes a 3270 terminal
- Provides GUI-based explorers for files and datasets with ways to manipulate data
Modern interaction: Zowe CLI

Modern command line tool

- Execute zowe commands from standard MacOS/Linux terminal
- Includes core commands for interacting with mainframe-specific needs (TSO, batch processing)
- Extendable for your specific needs, or those of vendors who wish to offer support for their tooling

Can build IDE extensions, a Visual Studio Code extension already exists.

Automation and scripting, including CI/CD pipelines!

Example usage, Using the Zowe CLI to edit a data set:

Modern interaction: Zowe API

API gateway that can abstract out the various number of services running on the mainframe that you may wish to interact with: job services, dataset services, and more.

Open source and vendor products are now leveraging the API for new products that interact with the mainframe.
Open Mainframe Resources

Open Mainframe Project projects:  
https://www.openmainframeproject.org/projects

Zowe website: https://www.zowe.org/

Zowe Overview (November 2018):  
https://www.youtube.com/watch?v=NX20ZMRoTtk

Zowe Webinar (22 February 2019):  
https://www.youtube.com/watch?v=XixEltbRmds
Questions?

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