

Mainframes in Today's World

Perspectives from a Young Mainframer

Presenter: Christian McArthur



Who is Christian McArthur?

- Graduate of Texas State University-San Marcos
- Graduate student at Texas A&M University.
- Two time finalist of IBM's "Master the Mainframe" contest
 - 2006: 5th overall out of 1,085 students
 - 2007: 4th overall out of 1,750 students
 - 2008: In progress.

Who is Christian McArthur?

- Visited IBM's mainframe campus, March 2007
- Attended career fair at zExpo, October 2007
- Student Representative at System z10 product launch, February 2008
- Visited IBM's mainframe campus, March 2008
- Taught one-day mini-course on Mainframe Basics at Texas State, May 2008.
- Panel Speaker at SHARE, August 2008

Who Uses Mainframes Today?

- All of the top 25 world banks.
- 23 of the top 25 U.S. retailers.
- 95% of US Fortune 500 companies.
- 71% of Global Fortune 500 companies.
- 9 of the top 10 global life & health insurance companies.

Source: IBM

Old Technology or New Tech?

“Well I know that they are outdated lol.....”

- Texas State student answering the question, “What do you know about mainframes” when registering for my mainframe course.

System z10 Architecture

- CPU: 64-bit, 4.4GHz quad-core. Support for up to 64 CPUs.
- Specialty 'engines' for JAVA, Linux & DB2.
- Memory: Minimum 4GB (BC) or 16GB (EC). Supports up to 1.5TB (EC).
- OSs: z/OS, z/VM, Linux for System z.
 - Up to 60 OSs running simultaneously on “bare metal.”
 - 500-1,000+ OSs running simultaneously via z/VM.

Virtualization & Server Sprawl

Three Choices to Run Workload



Intel Servers



**Intel Servers
with VMWare**



**System z10
z/VM, Linux, IFL's**

350 Intel Servers

2.8 GHz each

700 cores

2,464,650 rated capacity

Low Utilization

45 Larger Intel Servers

3.2 GHz each

360 cores

1,263,555 rated capacity

Better Utilization

1 System z10

24 IFL's 4.4 GHz

24 cores

14,238 MIPS

High Utilization

Nationwide Insurance

- Used two System z9 mainframes for virtualization.
 - 450 servers between two mainframes.
 - One production systems, other development & test.
 - Second machine used as fail-over.
- Mainframe runs their website, internal employee portal, additional services, 100,000+ daily users.
- Savings: \$15 million over 3 years predicted.

Parallel Sysplex

- Multiple mainframes working in unison.
 - Up to 32 physical machines linked together.
 - Machines can be up to 1000km apart.
 - System images & workloads can be shared.
 - Load balancing.
 - Data replication.
 - Disaster recovery.

COBOL

Gartner Group report 1997:

- 80% of world's businesses run COBOL.
- 200 Billion lines of COBOL code in existence.
- 5 Billion lines new code added annually.

Much of this is still true today.

Programming

- Programming Languages (z/OS):
 - COBOL
 - Assembler (HLASM)
 - PL/I
 - JCL
 - Rexx
 - C
 - JAVA

Linux on System z

- Official Linux distributions available:
 - Red Hat Enterprise Linux
 - Novell SuSE
- Porting applications from x86 to System z relatively easy for well written code.
- Changes that may be needed:
 - 32bit vs 64bit (especially pointers)
 - Big endian vs Little endian
 - Recompile

What Are Mainframes Good At?

- Virtualization.
- I/O Intensive activities
 - Network communications
 - Disk Access
- Transaction Processing
 - Databases
- Redundancy
 - Two of everything on a mainframe.

The Future of Mainframing

- Mainframe workforce is, generally, an aging workforce close to retirement.

	November 2008		May 2008	
	Monster	Dice	Monster	Dice
Mainframe	1414	1506	2491	2491
COBOL	507	714	1175	778
System z	189	256	272	495
z/OS	134	240	422	202

“Master the Mainframe” Contest

- Held every Fall.
- Any college or high school student is eligible.
- Part 1: “Breaking the Ice”
 - Introduction to the mainframe.
 - Log in, navigate screens, edit files, run scripts.
- Part 2: “Practical Experience”
 - Operations & Administration
- Part 3: “Real-world Challenge”
 - Programming

Resources

- Wikipedia (System z10, System z, mainframes)
- IBM
 - <http://www.ibm.com/university/scholars/contest/>
 - <http://www-03.ibm.com/systems/z/hardware/>
 - <http://www.redbooks.ibm.com/portals/systemz>
- zNextGen (Community for new and emerging System z professionals)
 - www.znextgen.org
- Mainframe Blog:
 - <http://mainframe.typepad.com/blog/>

Resources

- Facebook
 - [Systemz Mainframe](#) (Profile)
 - [IBM System z on Campus](#) (Group)
- YouTube
 - [IBM Mainframe Come Together](#)
 - [IBM Rolls Out New Mainframe](#)
 - [Mainframe: The Art of the Sale](#)

Take Home Message

- Find something you are passionate about and focus on it.
- Make contacts with people in industry (in and out of your primary area of interest). Talk to them about what they do and what technologies they take advantage of.

The Future Runs on System z

..... and Your Future Begins Today

