Big Iron on Linux

Running MVS and OpenVMS on your PC

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Overview

- MVS – IBM's flagship mainframe operating system, workhorse of the financial and insurance industries
- OpenVMS – DEC's (now HP) premier operating system for over 20 years, runs on everything from desktops to multi-million dollar servers, very popular in the medical industry
- Tried to summarize the most interesting and pertinent points because there is way too much to cover
- Please ask any questions you have

Dispelling Mainframe Myths

- Mainframes are *not* the same as super computers or high performance computers (HPC)
- Mainframes focus on high reliability, massive I/O, and the ability to support many users and jobs
- Mainframes no longer take up entire rooms, need special electricity arrangements, or water cooling
- Modern mainframes have the footprint of a household refrigerator

Typical Mainframes

- Mainframes are divided into logical partitions (LPARs)
- Each LPAR runs a separate, independent OS instance, can optionally share common data
- Not the same as virtualization
- LPARs and other mainframes can be grouped into clusters called sysplexes (systems complex)
- Up to 32 LPARs can be combined into a sysplex which provides load balancing, redundancy, etc.
- Sysplex performance scales almost linear

MVS

- Stands for Multiple Virtual Storage
- Means there are multiple, separate virtual memories
- Every user and batch job believes they have the entire address space
- MVS has changed names over the years
- Called OS/360 when it was released
- Renamed OS/390 in 1990s to fit with the System/390 line of mainframes
- Renamed again in 2000 as z/OS to coincide with 64-bit ISA known as z/Architecture

Mainframe Terminals

- Users connect to mainframes via a class of devices known as 3270 terminals, colloquially known as “green screens”
- Fundamentally different than Unix/Linux terminals, user input is only sent to the mainframe once the user causes a screen refresh
- Single mainframes have been known to support over 15,000 terminals simultaneously
- Once a standalone device, now almost always emulated with PCs
- c3270 – curses-based 3270 terminal
- x3270 – X11 3270 terminal

MVS Demo

- MVS on Hercules – using RPF and compiling and running a simple COBOL program

Getting Started with MVS

- Hercules – mainframe emulator which emulates the entire spectrum of mainframe architectures and a lot of peripherals (DASD, printers, tape drives, card readers, card punchers, and more)
- MVS Turnkey – a ready-to-run MVS CD, can be installed and run in only a few minutes
- Also provides a sysgen option for those who want to get their hands dirty (not quite like Gentoo)

Cool Stuff about Hercules

- Dynamic hardware reconfiguration (devices can be added or removed while the operating system is running)
- Shadow files, also known as disk differencing
- Emulates almost the entire history of mainframes

Legality

- MVS 3.8j was the last public domain MVS release (free and clear to run on Hercules)
- OS/390 and z/OS can run on Hercules, but are not legally permitted
- Hercules community has done some lobbying to try to convince IBM to release more current versions to no avail (yet)

OpenVMS

- Started by DEC in 1975 along with VAX as the successor to the PDP-11
- VAX was originally meant to be an internal name until a person in marketing said that memorable names were three letters and had an X, thus VAX was chosen
- VMS = Virtual Memory System, later renamed OpenVMS to highlight POSIX compatibility
- VMS was the grand unifying operating system on VAX, PDP-11s had previously had several incompatible operating systems for different industries

OpenVMS (cont.)

- "1,000:1" strategy – the most expensive VMS machine would cost 1,000 times more than the cheapest, but all would run the same operating system
- February 1987 – VAXstation 2000 costs $4,600, VAX 8978 costs $5,240,000
- Runs on three architectures (VAX, Alpha, IA64)
- More familiar to Unix/Linux users than MVS

OpenVMS Clustering

- Pioneered computer clustering (VAXcluster)
- Five 9s uptime (99.999%) ~ 5 mins downtime/year
- Virtual VAXen can even be clustered with real ones
- All machines can be clustered with each other, even across architectures and different OS versions

OpenVMS Demo

- Booting OpenVMS, navigating, DECwindows

Getting Started with OpenVMS

- Read Phil Wherry's guide “Running VAX/VMS Under Linux Using SIMH” carefully and follow the steps
- http://www.wherry.com/gadgets/retrocomputing/vax-simh.html
- HP documentation is also very good

Cool Stuff about SIMH

- It's a simulator suite which emulates over two dozen different machines
- PDP-11, Altair 8800, IBM 7094, IBM System/3, and many more
- Designed to be extensible – new computer simulators are still being added (IBM 7094 just released over the summer)

Legality

- Compaq/HP has allowed hobbyists to run OpenVMS for VAX and Alpha (and as of a few weeks ago, Itanium)
- Need to register for a license (free) which is good for one year and can be renewed

Resources

- Hercules – http://www.hercules-390.org
- MVS Turnkey ISO – http://www.ibiblio.org/jmaynard/turnkey-mvs-3.zip (~490 MB)
- c3270/x3270 – http://x3270.bgp.nu
- SIMH – http://simh.trailing-edge.com
- OpenVMS Hobbyist Program – http://www.openvmshobbyist.com