



Linux/390 User Experience



Rich Smrcina
Grede Foundries, Inc.
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What is it?

- A complete Linux implementation
- IBM's re-entry into Open Source
 - Thinking has somewhat come around
 - VM/370 was distributed with source
 - Customer modifications added important function
- Kernel patches provided by IBM
 - including SMP support
- ASCII based
 - except for console driver

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What it is not...

- AIX/370/ESA
- Open Edition
 - Available for MVS and VM
 - Several open source packages ported to OE/VM
 - Redbook available
- Unix Systems Services (USS)
 - New name for OE/MVS

Why now?

- Major investment in Linux technology
- Linux support announced on all server platforms
- Benefits...
 - e-business
 - Server Consolidation
 - Big name software packages available
 - Baan
 - SAP
 - DB2
 - Domino

Installation

- G2 processor or higher
 - 9672-x2, MP2k, MP3k, P/390, R/390, IS
 - Uses relative instructions
- Native, LPAR or under VM (at least 2.2)
- ECKD DASD (3380/3390)/FBA DASD
 - ~400 cyl depending upon packages installed and other data
- 64MB main storage
- HMC or Virtual Machine console (3215)
- Network via LCS driver (OSA/3172 or equivalent), CTCA or IUCV

Installation

- Three files for download
 - Kernel (VM RDR or Tape)
 - Ramdisk file system
 - Large or Small disk file system
- A 'parm' file is also required
 - Tells Linux where its 'root' is
 - Defines disk devices
- The kernel, parm and ramdisk are PUNched to the CMS RDR or Tape
- RDR or Tape is IPLed to start Linux

Installation

- During first IPL Linux asks about the network
- After a successful IPL the file system can be built
- Large or small file system can be FTPed to Linux
- Tailor networking files and silo for automatic startup
- IPL from disk to boot Linux

Boot messages...

```
Linux version 2.2.14 (root@linux390.marist.edu) (gcc version 2.95.2 19991024 (release)) #1 SMP Sun Feb 20 06:20:12 EST 2000
Command line is: root=/dev/dasda1 noinitrd dasd=192,193,200 iucv=L390B

We are running under VM
This machine has no IEEE fpu
Initial ramdisk at: 0x00800000 (8388608 bytes)
Detected device 0009 on subchannel 0000 - PIM = 80, PAM = 80, POM = FF
Detected device 000C on subchannel 0001 - PIM = 80, PAM = 80, POM = FF
.....
Calibrating delay loop... 44.75 BogoMIPS
Memory: 54604k/65536k available (1052k kernel code, 4k reserved, 1684k data, 0k
init)
Dentry hash table entries: 8192 (order 4, 64k)
Buffer cache hash table entries: 65536 (order 6, 256k)
Page cache hash table entries: 16384 (order 4, 64k)
POSIX conformance testing by UNIFIX
Detected 1 CPU's
Boot cpu address 0
cpu 0 phys_idx=0 vers=FF ident=050282 machine=2003 unused=0000
.....
VFS: Mounted root (ext2 filesystem) readonly.
Freeing unused kernel memory: 0k freed
Starting lcs module
lcs: tr0 configured as follows read subchannel=7 write subchannel=8
hw_address=40:00:00:09:00:01 rel_adapter_no=0
```

Porting: First a comment...

- 'Porting' is such a strong term
 - Implies modification of the source to make a package work on a platform that it was not intended to run on
- Open source products on USS or OE is a port
- Linux/390 fully source compatible with Linux/Intel
 - as such, few packages actually need modification

Porting: Decisions, decisions...

- First order of business – an editor
 - Editing configuration files necessary
 - Plenty of editing packages available
 - Did not want to learn vi, emacs or ed
 - Needed something familiar
- The first port was THE
 - The Hessling Editor (Mark Hessling)
 - Has an Xedit compatibility mode
 - Perfect!



The Hessling Editor

- Runs on several platforms
 - Windows, OS/2, AIX, Linux
- Has an Xedit compatibility mode
- Like Xedit can interface with REXX
 - Many Rexx's supported:
Regina, Object Rexx, OS/2 Rexx

Regina (REXX for Linux)

- The next package to port was Regina
- REXX is a very familiar scripting language
- Works with THE
 - Just like REXX works with XEdit

Apache

- Open source Web server
- Most popular on the internet
 - 60% of all web sites surveyed run some form of Apache
- Quite literally A PAtCHy Server
 - Based on existing code and patch files to NCSA
- Compiled directly from source distribution

Samba

- Implements SMB protocol on Linux
- Used to allow a Linux machine to participate as a network server or client
 - Looks like another Windows NT server
 - File Server
 - Print Server
 - Authentication and Authorization
- Available on many Unix-like platforms
 - Linux, AIX, VM/ESA, OS/390 and others

Samba...

- File shares are defined, much as in Windows
- Typically by user or functional area
- Users are given access to shares
- Linux connected printers are similarly defined
- All resources available to a user can be seen from Windows Explorer
 - And the explorer functionality works normally

Others....

- BIND (Berkeley Internet Name Domain)
 - a DNS server
 - A process (or machine) that translates names to IP addresses
 - eg: `www.ibm.com=204.146.80.99`
- INND (InterNet News Daemon)
 - Manage discussion groups
 - Subscription based
 - Clients available with modern browsers
- Sendmail

Others...

- Perl
 - Popular UNIX scripting language
 - Required for INN and other packages
- MySQL
 - Relational database
- Php
 - HTML scripting language
 - Interfaces with relational database (like MySQL) for dynamic content
- IMAP

The porting process...

- Bringing software to Linux/390 is not so much an exercise in porting as it is rebuilding (or recompiling) from the source
- The typical build process involves:
 - Finding a source distribution
 - FTPing it to your Linux virtual machine
 - Untarring it
 - Examining any installation or building notes
 - Fixing two config files for the build process
 - Run the 'configure' script
 - Builds a configuration files specific to the platform and what it finds on your system
 - Run 'make' – grab a coffee
 - Run 'make install' – place executables in their proper

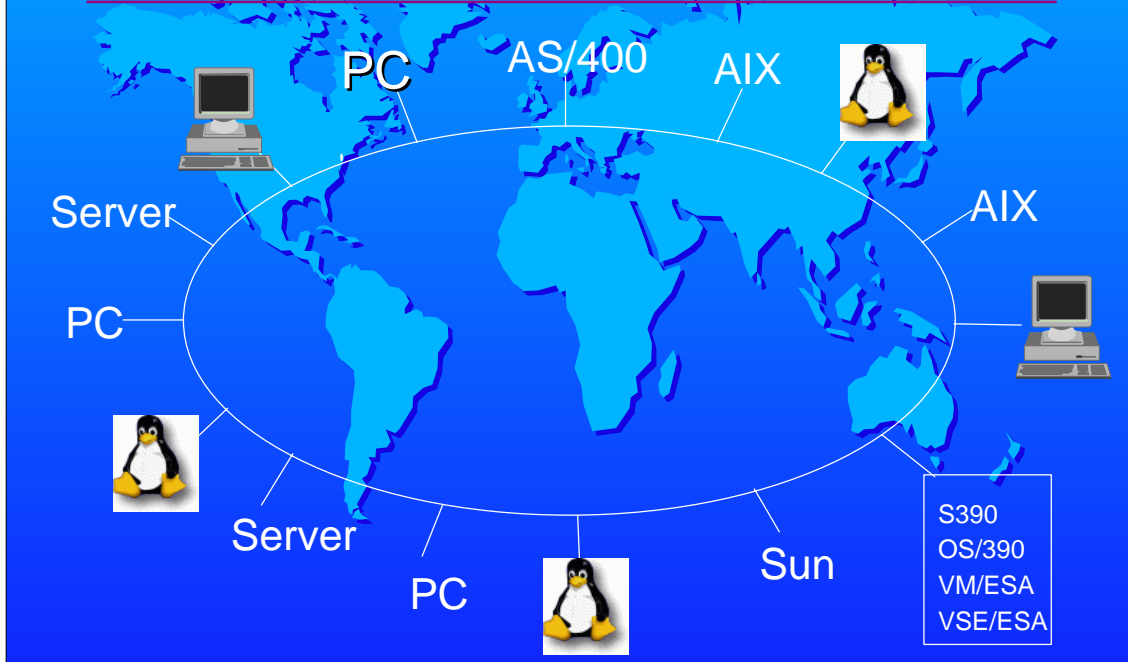
Connectivity

- Linux fully participates in a TCP/IP network
- SNA is available
 - requires kernel patching
- Link Level
 - CTCA, IUCV, LCS
- Application Level
 - FTP, LPR, HTTP, NFS, Telnet, Sockets
- X Windows applications are supported

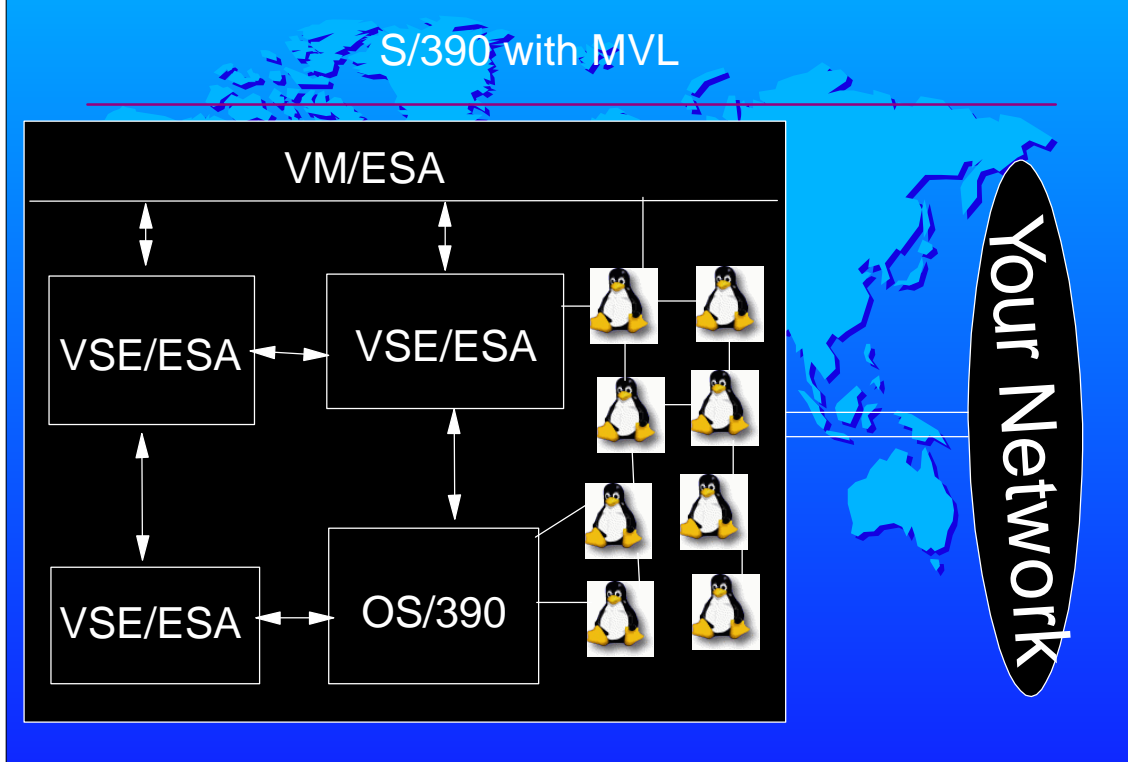
Connectivity...

- Any to any...
 - VM to Linux, VSE to Linux, OS/390 to Linux and Linux to Linux
 - Over a network
 - CTCA or IUCV
 - Very high speed 200-500MB/sec
- Ping times
 - Linux to VSE 12 ms
 - Linux to VM 11ms
 - Linux to UNIX 8ms

What does all of this connectivity mean?



What shape can the network take now?



Demo

- THE
- Regina
- Apache
 - Admin Tools
- Samba
 - SWAT
- NFS

Acknowledgements

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