Linux and z/OS Playing Nicely Together: Two Are Better Than One

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Notes:
Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user’s job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.
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Agenda

- This is not a product pitch!
- Linux can compliment existing z/OS workloads
- Some examples
Software Firewall

- Linux software firewalls can protect z/OS systems without using CP MIPS
- Virtual nature allows flexibility
- Exploits HiperSockets for secure connections to z/OS
- Passively benefits from CUoD to meet demand
- Stonegate product features:
  - HA Failover
  - Single console for managing complicated rule sets on multiple systems
Software Firewall

- Usually based on iptables
  - Included as part of all modern Linux distributions (Kernel 2.4 or greater)
- Stateful or Stateless Packet Filter
- Also support Network Address Translation, Network Address Port Translation
  - Enables transparent proxies
- Project home page at http://www.netfilter.org/
Software Firewall
Security Scanner

- Secure point to initiate security scans of network
  - Both Host systems and Distributed systems
- Answers the question “What is actually running on my systems, and where?”
- Can make use of off-peak MIPS
- Can be automated and controlled from z/OS using ssh
- Assists with regulatory compliance
- Nessus, NMAP
Security Scanner

- Searches IP address ranges for active systems
- Passively or Actively scans open ports on active systems
- Can optionally fingerprint applications running and look for known vulnerabilities
  - This can sometimes disrupt service
- http://www.insecure.org/nmap/
- http://www.nessus.org/
Authorization and SSO in a DMZ

- Linux in a DMZ can perform Authorization and SSO before transactions reach z/OS
- Insulates z/OS from unauthenticated requests
- Lowers risk for z/OS applications
- Tivoli WebSeal and Tivoli Access Manager
Authorization and SSO in a DMZ

- Kerberos and LDAP on Linux can also provide Authorization and Authentication
  - Not full SSO, however
- Kerberos provides Authentication
  - Is this who they say it is?
  - http://web.mit.edu/kerberos/
- LDAP provides Authorization
  - Are they allowed to run this application?
- If LDAP is running on z/OS it can use RACF for its data store
  - RACF as the central repository of identity for the enterprise
  - Distributed systems with centralized user authentication audit logs
Authorization and SSO in a DMZ

Diagram:
- WebSeal
- Apache
- TAM Plugin
- OSA
- Linux TAM IFLs
- Kerberized Application
- Linux Kerberos IFLs
- z/OS LDAP CPs
- z9
- RACF
System Monitoring Tools

- z/OS system monitor tools running on Linux on zSeries
- Proximity to z/OS allows better monitoring
- Monitor tool should have similar RAS to systems it monitors
- Does not expose monitor data streams between z/OS and tool if HiperSockets are used
- Various Tivoli/Candle products
Network Monitoring Tools

- Monitor the network inside the z/Series system and outside
- Can also monitor network services (ftp, http, etc)
- Sends alerts when things go awry
  - Email, SNMP, SMS text message, pager
- Nagios
  - http://www.nagios.org/
- Hobbit
  - http://hobbitmon.sourceforge.net/
Network Monitoring Tools

• Periodically connect to service
• Logs connect response time
• Keeps history for performance analysis
• Nagios will also guess what is causing a network outage
  • Requires manually defined network topology
  • Can indicate whether a down link is causing problems downstream
• Web Interface with color coded system and service states
Network Monitoring Tools

Web Server → Router → Intranet → OSA

Linux Hobbit / Nagios IFLs

Kerberized Application

Linux Kerberos IFLs

OSA → FW

FW → LDAP RACF z/OS CPs

Proxy Server → NFS Server

Web Server

Network Monitoring Tools

Linux

Kerberos

IFLs

Router

OSA

z9

Intranet

Proxy Server

NFS Server

Linux

Hobbit / Nagios

IFLs

Kerberized Application

Linux

Kerberos

IFLs

FW

LDAP

RACF

z/OS

CPs

Intranet

Proxy Server

NFS Server

Web Server

Network Monitoring Tools

Linux

Kerberos

IFLs

Router

OSA

z9

Intranet

Proxy Server

NFS Server

Web Server

Network Monitoring Tools

Linux

Kerberos

IFLs

Router

OSA

z9

Intranet

Proxy Server

NFS Server

Web Server

Network Monitoring Tools

Linux

Kerberos

IFLs

Router

OSA

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Intranet

Proxy Server

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Network Monitoring Tools

Linux

Kerberos

IFLs

Router

OSA

z9

Intranet

Proxy Server

NFS Server

Web Server
Workload Manager aware

- Current VE release allows z/OS WLM to be monitored along with Linux eWLM workloads
- ARM enabled distributed workloads can be moved to z/Series Linux
- Provides unified view of Applications with both distributed components and z/OS components
- Workloads can then benefit from:
  - Proximity to z/OS data
  - z/Series RAS
Workload Manager aware
DB2 Datasharing Group entry point

- DB2 Connect EE or JDBC type4 drivers can distribute connections across all DB2 systems in a SysPlex
- Provides higher availability than connecting to one DB2 subsystem
- Provides benefit to external distributed platforms as well when they connect through this entry point
- Get handouts from Scott Loveland's HA presentation
  - Session 9276: High Availability for Linux on IBM System z Servers
DB2 Datasharing Group entry point

- DB2 Connect EE provides finer transaction distribution across members than JDBC type4 driver
- JDBC type4 driver requires DB2 Connect EE licence to talk to z/OS anyway
Communications Subsystem

- Linux can enhance z/OS communication with both Open and Legacy systems
- Communications Controller for Linux
  - Replaces the 3745 & family
- Communications Server for Linux
- Open Systems translator for z/OS
Communications Subsystem

- Communications Controller for Linux
  - Consolidate several 3745 units into one CCL image
  - Almost a drop in replacement
  - Supported 3745 features include:
    - Network Control Program
    - Extended Recovery Facility (XRF)
    - X.25 NCP Packet Switching Interface
    - Network Routing Facility
  - Make use of higher speed interconnects (Gigabit Ethernet)
  - For vastly more information:
    - IBM Communication Controller Migration Guide
Communications Subsystem

- Communications Server for Linux
  - Provides SNA support for Linux
  - Moves SNA traffic across IP networks with Enterprise Extender
  - Supports both Host Mediated and APPN networks
  - SNA API support
    - OS/2 SNA apps can be readily ported to Linux
  - TN3270 server
Communications Subsystem

TN3270

Intranet

OSA

Linux Comms Serve

IFLs

SNA

VTAM

z/OS CPs

z9

OSA

Linux Comms Serve

IFLs

SNA

VTAM

z/OS CPs

z9
Communications Subsystem

- Open Systems translator for z/OS
- Provide z/OS access to data that resides on:
  - SAMBA or Windows Shares
  - NFS V4 Servers
  - FCP storage network access
Backup/Recovery access point

- Open and Distributed systems can benefit from z/OS backup and recovery capabilities
- Bacula on Linux on zSeries
  - Clients for almost every UNIX type system
  - Clients for Windows systems also
- Makes use of existing z/OS backup and recovery infrastructure, procedures, offsite vaulting, etc
- http://www.bacula.org/
Backup/Recovery Access Point

• Bacula Server running on Linux on z/Series
• Configured to use files for backup media, not tapes
• Files are stored on z/OS via NFS mount
  • Use a HiperSocket here
• HSM migrates files as needed
• HSM recalls files automatically on restore
• Contact dboyes@sinenomine.net for details
Backup/Recovery Access Point

- Bacula client
  - OSA
  - Linux
    - Bacula server
      - IFLs
    - HiperSocket
  - NFS
  - z/OS CPs
  - HSM
  - z9
Application on Linux uses DB2 on z/OS

- And then there's all the other possible combinations
- Hybrid applications which reside partly on Linux, partly on z/OS
- Any possible combination of:
  - Workload Balancer
  - HTTP server
  - Java App Server
  - Database Server
  - Message Queue
  - LDAP
  - And others...
Application on Linux uses DB2 on z/OS

- But why would you want to bring distributed workloads onto the Mainframe? MIPS are expensive!
- Look again - It's cheaper than the alternatives in many cases
  - IFL Cycles are much cheaper
  - Software licence charges
- Stop by at the friendly SHARE Linux/VM project office!