The Penguins Have Landed - Changes and Improvements with Linux on Z at Shelter Insurance
Shelter Insurance

- Midwest - 13 states
- Property and Casualty
- Life
- Reinsurance
- Other holdings
What’s in a Name?
Or maybe…

• Herding z Penguins
• Hording the Penguins
• Penguin Roundup
• Who’s your Penguin?
• Penguins o’ Plenty
• Spanking the Penguins
• Penguins R Us
The Penguins Have Landed

- Why Penguins (Linux)
- Nesting the Penguins
- Feeding the Penguins
- Protecting the Penguins
- Working the Penguins
- Hatching new Penguins
- Penguin Tales
Why Penguins
Why Penguins…

• Linux on System z
  – Ten year old technology
  – Linux virtual servers under z/VM or in an LPAR

• Virtualization
  – More with less
  – Extreme Virtualization
...Why Penguins...

- Software Licensing
  - IBM Processor Value Units (PVU)
  - Per “core”
  - Distributed servers
    - Many servers
    - Many cores
  - System z servers
    - Few physical servers, cores
    - Many servers per core
- Power and cooling
…Why Penguins

• Really cool DR Model
  – Recover entire system
  – IPL Hypervisor (z/VM)
  – Customize environment
  – IPL Servers
  – Faster Recovery Time

Objective
…Why Penguins

• Architectural
  – Application closer to data
  – Applications closer to each other
  – Positioning for SOA
Nesting the Penguins
Nesting the Penguins

• System z Hardware
  – z/OS & z/VM support
  – Linux support
• Networking
• Virtualization
  – z/VM Hypervisor
  – CPU
  – DASD
  – Memory
z/VM Hypervisor

- Evolved from IBM’s VM/370
- Forty years of evolution
- Other uses
  - Virtualize IBM Virtual Storage Extended (VSE)
  - PROFS / OfficeVision (email of 1980s and 1990s)
  - Application development
  - Run-time environment
  - Predecessor to PR/SM

built on IBM Virtualization Technology

Fill in your USERID and PASSWORD and press ENTER
(Your password will not appear when you type it)
USERID ===> 
PASSWORD ===> 
COMMAND ===> 

RUNNING
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MVS Images in LPARs

PROD

IMS
DB2
CICS
MQ

z10 Processor

HiperSocket

zVM Image in LPAR

VSWITCH

GP
GP
GP
GP
ICF
zIIP

IFL
IFL
IFL

88 GB Memory

Disk
Tape
Net
Feeding the Penguins
Feeding the Penguins…

- SLES 11 Linux for System z
  - Build **Template (Gold)** servers
    - DASD Sized by application type
      - Six Gigabyte – basic
      - Thirteen gigabyte – Modest Application
      - Twenty-seven Gigabyte – Larger Application
  - Clone and grow
    - Six or 20 gigabyte increments
…Feeding the Penguins…

- **Cloning**
  - **SYSTEM FILE** – list of unique attributes of the system – gateway, subnet mask, etc.
  - **SERVER FILE** – list of servers and unique attributes
  - Copy virtual disks of base server to new server
  - Provision a new virtual server in five to ten minutes
SERVER FILE

<table>
<thead>
<tr>
<th>NAME</th>
<th>IP-unique-information</th>
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<tbody>
<tr>
<td>xxx1</td>
<td></td>
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<tr>
<td>ABC1</td>
<td></td>
</tr>
<tr>
<td>SYS2</td>
<td></td>
</tr>
<tr>
<td>MMMn</td>
<td></td>
</tr>
<tr>
<td>etc</td>
<td></td>
</tr>
</tbody>
</table>

DR Unique Values

1) Manually Edit File

Build MY INFO

Copy to Linux

Linux

File System

/etc

Configuration files

MY INFO file on EACH server

z/VM

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Protecting the Penguins
Protecting the Penguins

- Monitoring
  - z/VM Hypervisor
  - Linux Servers
- Alerts
- Storage Management
- Penguin Security
Monitoring…

• You need a tool
  – You have numerous options

• Choose carefully
  – You do not get what you do not pay for
  – Reconcile the difference between virtual and real
How full is my bucket?

Real Bucket
Actual Available CPU
35% used

Virtual Buckets
Perceived Used CPU
Alerts…

• We need to know when
  – Server is down
  – Server is looping
  – File system is almost full
  – System storage is almost full
  – System is too busy
  – Other bad stuff
Generating an Alert

1. VM/Linux Monitor
   Detect the “out-of-bounds” condition

2. Fix if possible

3. SNMP

4. Enterprise Framework
   Generate Alert

5. Incident and Notification

6. Automate
Penguin Storage

- **z/OS Management**
  - All existing processes
  - Allocating and Managing DASD volumes
  - Backup
  - Restore
  - Recovery

- **z/VM Management**
  - Assign DASD volumes to servers
  - Monitor

- **Linux management**
  - Logical Volume Manager (LVM)
  - Dynamically enlarge server application storage
Penguin Security

- **z/VM Security**
  - RACF for VM
  - Independent database
  - Admin use only
  - Logon to 3270 (green screen)

- **Active Directory (AD)**
  - Integrate Linux servers into existing AD environment
  - Group structure
    - Developer
    - Server Admin
    - System Admin
Samba / Active Directory Integration

Domain Controllers

Validate access to resources

Linux File System

SAMBA server

/opt
EAR/JAR
Logs
Code
Config

Read
Write

WAS Admin
Developer
Linux Admin
Working the Penguins
Working the Penguins…

- WebSphere Application Server (WAS)
  - Home grown applications
  - Vendor applications

- Provisioning
  - Environments / number of servers
  - Size – depending upon application
  - Clone and Deploy servers
  - Install / verify / implement applications
Penguin Jobs…

• “Shelter Search”
  – WAS 6.1 application
  – Locally Developed
  – Insured / Agent search
  – Multiple environments
  – Previously multiple Wintel servers
  – Moved all environments to Linux 2010
### Agent Search Results

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Address</th>
<th>Phone Number</th>
<th>Agent Number</th>
<th>Status</th>
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<tr>
<td>ALLISON, NANCY</td>
<td>Agent</td>
<td>1729 W BROADWAY STE E, COLUMBIA, MO 65233</td>
<td>573-445-1749</td>
<td>24-D327-40</td>
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<tr>
<td>ASSIGNED RMS</td>
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<tr>
<td>CHICK WILSON</td>
<td>Agent</td>
<td>1710 W WORLEY STE B, COLUMBIA, MO 65233</td>
<td>573-445-8626</td>
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<td>CLINT MILLER INS AGCY LLC</td>
<td>Agent</td>
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<td>573-445-7776</td>
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<td>RICHARDS LUTCH, RAUL</td>
<td>Agent</td>
<td>1312-1-0 OR SW SUITE 201, COLUMBIA, MO 65233</td>
<td>573-445-0661</td>
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<td>ROMAN WOMENINS INS AGCY INC</td>
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<td>SHELTER LIFE INC</td>
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<td>Active</td>
</tr>
</tbody>
</table>
Data Flow
Penguin Jobs...

- Insurance Verification System
  - WAS 7 application
  - Internally Developed
  - Law enforcement verification
  - Nevada June, 2011
  - Oklahoma ‘soon’
Hatching New Penguins
Hatching new Penguins

• More workload moving to Linux on z
  – WAS
    • New applications
    • Move existing apps from Intel platform
• IBM recommendations
  – Best fit
  – Good fit
New Penguin Jobs

• Billing System
  – Vendor application
  – WebSphere
  – Communications Framework
  – 1Q 2012?
New Penguin Jobs

• Common Services (CSA)
  – WebSphere
  – Customer Access
  – eCommerce
  – 4Q 2011?

• SOA Enablement
  – WebSphere Registry and Repository
  – WebSphere Enterprise Service Bus
  – ?20??
Best Fit Application Workloads*

- WebSphere MQ Series
- DB2 Connect
- CICS Transaction Gateway, IMS Connect for Java
- WebSphere and JAVA applications development
- WebSphere - Application Server (WAS), Portal
- Domino / Lotus Notes
- Network Infrastructure: FTP, NFS, DNS etc.,
- Applications requiring top end disaster recovery model
- Virtualization and Security Services
- InfoSphere/Cognos

*Bill Reeder – IBM Linux for System z Sales and Strategy
Good Fit Application Workloads*

- DB2 (LUW)
- Apache **web serving**
- SAMBA
- TIM/TAM (LDAP Services)
- TSM

*Bill Reeder – IBM Linux for System z Sales and Strategy*
Actual Software Stack

- **z/VM – IBM**
  - Virtualization
  - System management
  - RACF, DIRM
- **SLES – Novell**
- **zVPS – Velocity**
  - Monitor
  - Alerts
- **Tivoli Omegamon – IBM**
  - Enterprise Framework
- **Service Desk – CA**
  - Problem and Incident
  - Notification
- **FDR on z/OS**
  - Backup, restore, recover
Knowing that The Penguins Landed

- Annual Dept. Meeting
  - accomplishments
- ‘We did it!’
  - Linux on z
- Another team listed the accomplishment
  - Not our team
  - WAS Admins
    - They deserved it
Penguin Tales
“Ok, that worked but…”

• Backup / restore
  – DR problems
  – Need a VM solution

• Linux gold
  – More use of LVM
  – Do not include WAS

• WebSphere
  – Horizontal scaling
  – Shared binaries
    • XIP

• LPARs
  – Need development

• Migration Processes
  – VM
  – Linux
  – WebSphere
  – Application
What we have learned (so far)

- **Nothing** is as easy as it sounds
- There is no substitute for **smart, hard** work
- **Experience** is all about knowing what **shortcuts to avoid**
- Don’t underestimate **cultural challenges**
- Do you homework – **never stop learning**
- Start with the **infrastructure**
- **People - Processes - Tools**
The Penguins Have Landed

✔ Why Penguins (Linux)
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Anything Else?

Complex
Counter-Cultural
Opportunity to Learn
Journey – Not a Destination

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“Whenever you find yourself on the side of the majority, it is time to pause and reflect.”

Mark Twain
Cheers!

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