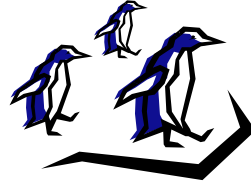


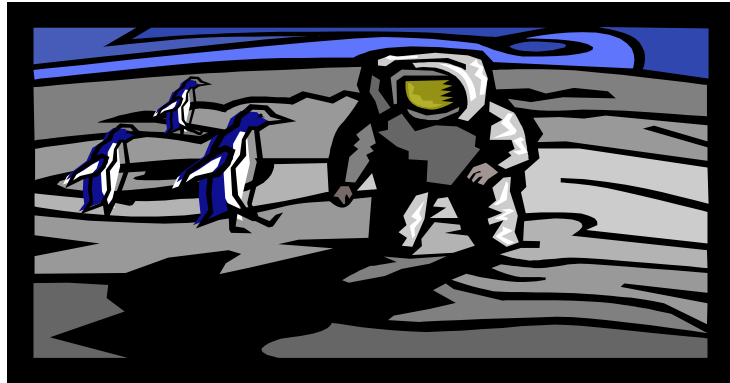
The Penguins Have Landed



Getting Started with Linux on System z
Mike Giglio
Shelter Mutual Insurance Company



What's in a Name?



Complete your sessions evaluation online at SHARE.org/SanFranciscoEval



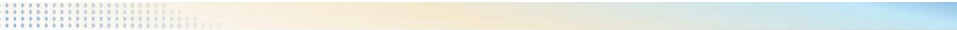
Or maybe...

- Herding z Penguins
- Hording the Penguins
- Who's your Penguin?
- Occupy the Penguins
- Spanking the Penguins
- Penguin Spring
- Angry Penguins
- Here Comes Penguin Boo Boo



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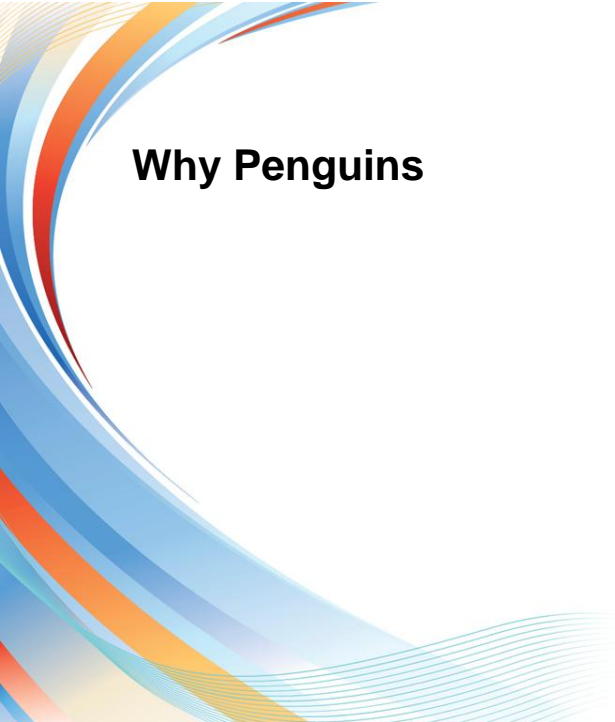


The Penguins Have Landed

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



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Why Penguins



Why Penguins...

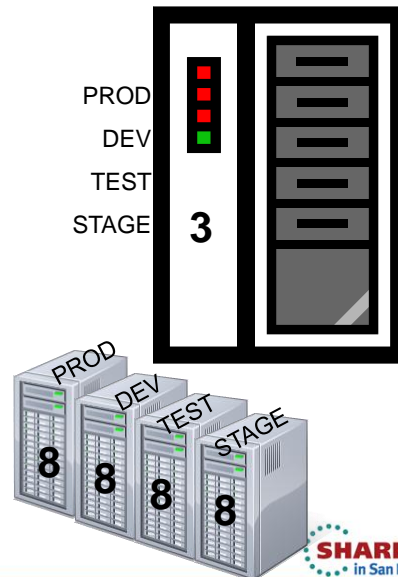
- Linux on System z
 - Ten+ year old technology
 - Linux virtual servers under z/VM or in an LPAR
- Virtualization
 - More with less
 - Extreme Virtualization



Complete your sessions evaluation online at SHARE.org/SanFranciscoEval

...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



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...Why Penguins

- Really cool Disaster Recovery (DR) Model
 - Recover entire system
 - IPL Hypervisor (z/VM)
 - Customize environment
 - IPL Servers
 - Faster RTO



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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 (e-mail of 1980s and 1990s)
 - Application development
 - Run-time environment
 - Predecessor to PR/SM

```

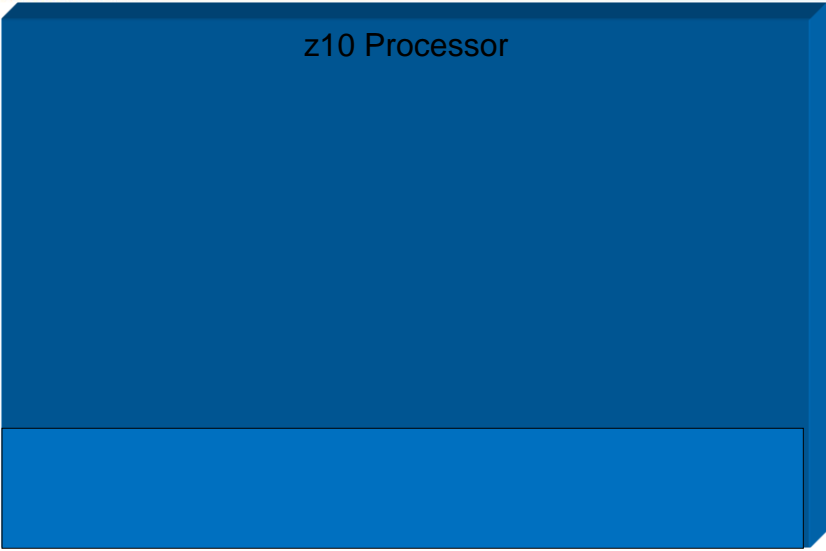
z/VM ONLINE

      / VV      VVV MM      MM
     /  VV      VVV  MMM  MMM
    /   VV      VVV  MMM  MMM
   /    VV      VVV  MM  MM  MM
  /     VV      VVV  MM  MM  MM
 /      VVVVV  MM  M  MM
/       VVV   MM  MM  MM
ZZZZZZ /      V   MM  MM

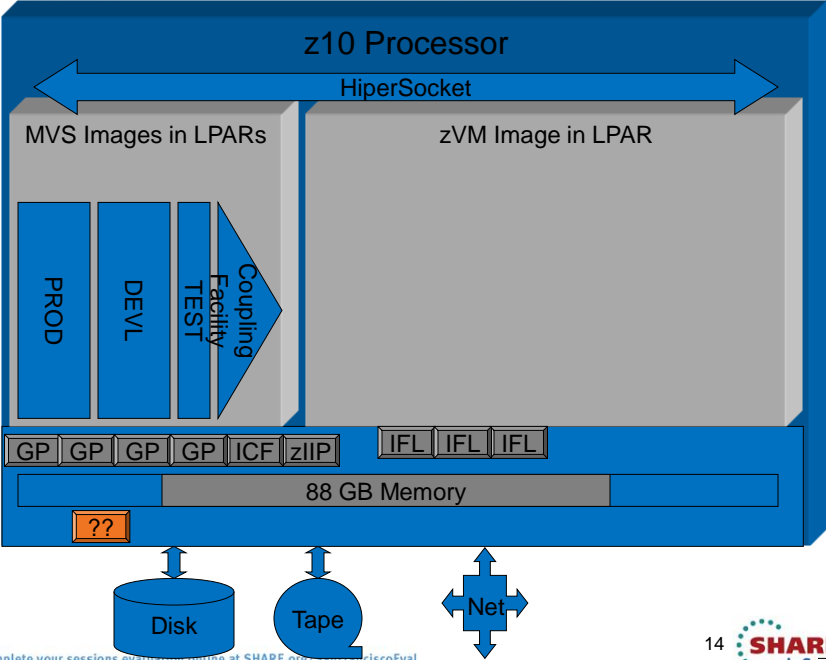
      built on IBM Virtualization Technology

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

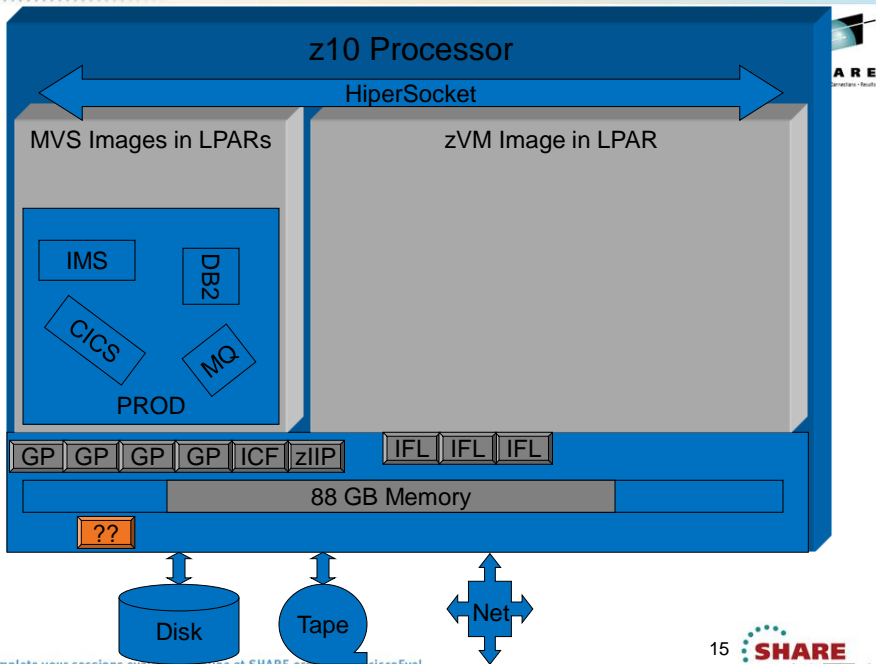
RUNNING
  
```



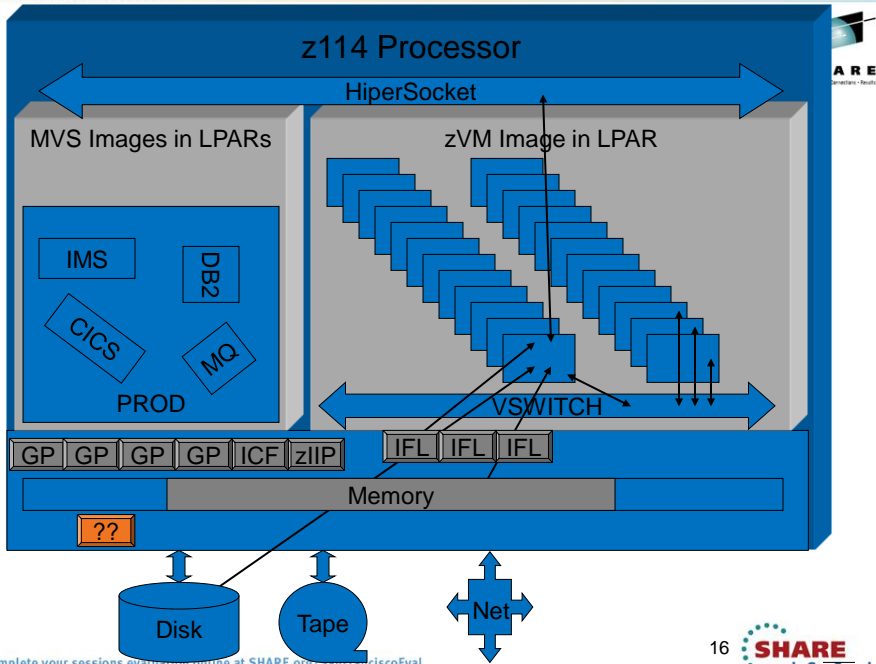
Complete your sessions evaluation online at SHARE.org/SanFranciscoEval



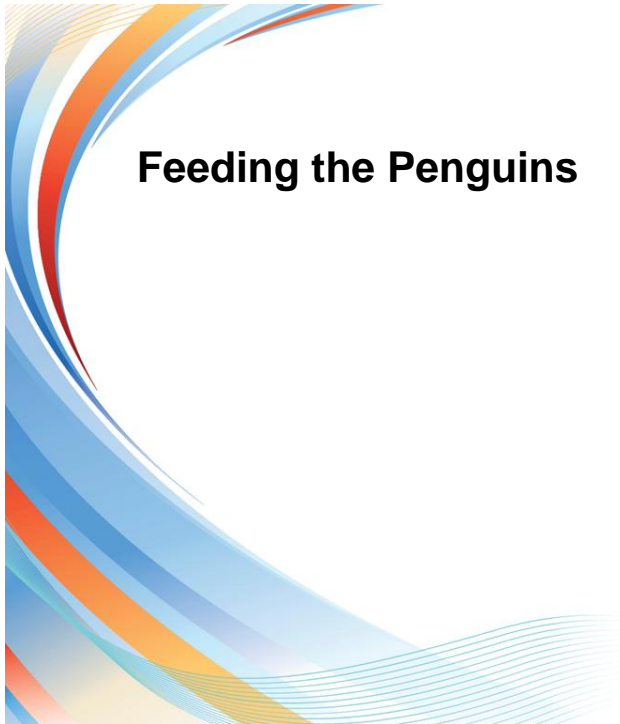
Complete your sessions evaluation online at SHARE.org/SanFranciscoEval



Complete your sessions evaluation online at SHARE.org/SanFranciscoEval



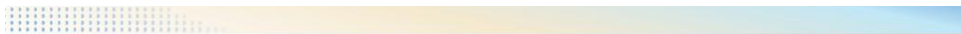
Complete your sessions evaluation online at SHARE.org/SanFranciscoEval



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Feeding the Penguins

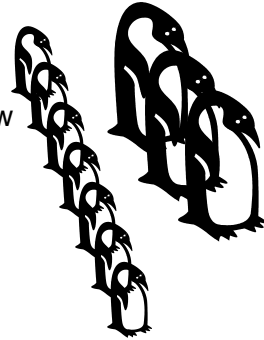


Feeding the Penguins...

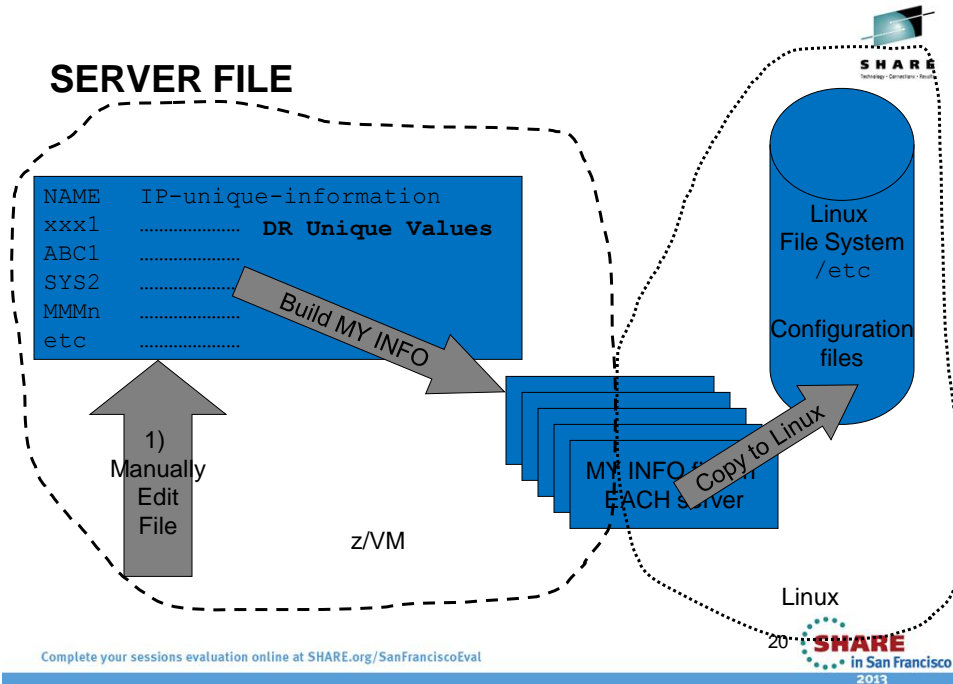
- SLES 11 Linux for System z
 - Build **Template** servers
 - Sized by application type
 - Six Gigabyte – basic
 - Thirteen gigabyte – Modest Application
 - Twenty-seven Gigabyte – Larger Application
 - Clone and grow
 - Six or 20 gigabyte increments

...Feeding the Penguins...

- Cloning
 - SERVER FILE – list of servers and unique attributes
 - Copy virtual disks of template server to new server
 - Configure with unique values - name, IP addresses, etc
 - Provision a new virtual server in five to ten minutes

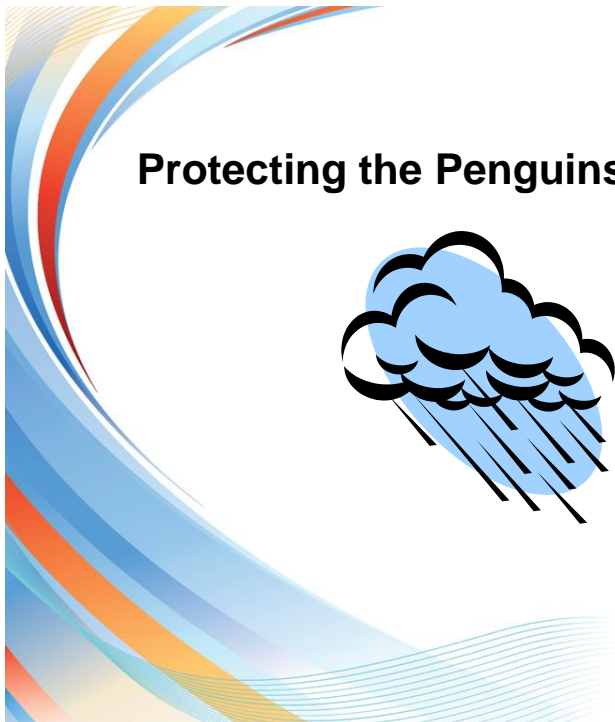
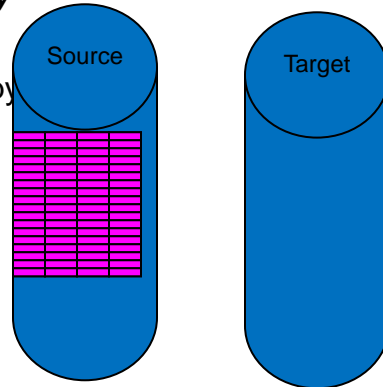


SERVER FILE



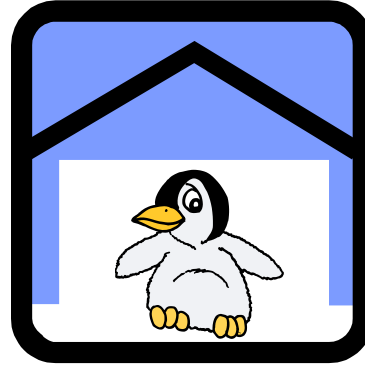
...Feeding the Penguins

- DASD Cloning - *Flash Copy*
 - Define Target disk
 - Issue an OS command to copy one virtual disk to another
 - Disk subsystem
 - Bitmap
 - Completes copy in background
 - OS resumes next step



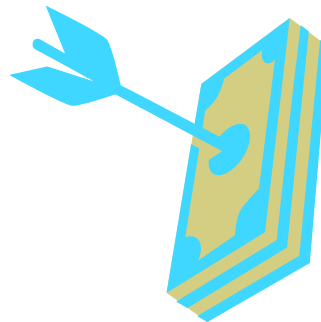
Protecting the Penguins

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

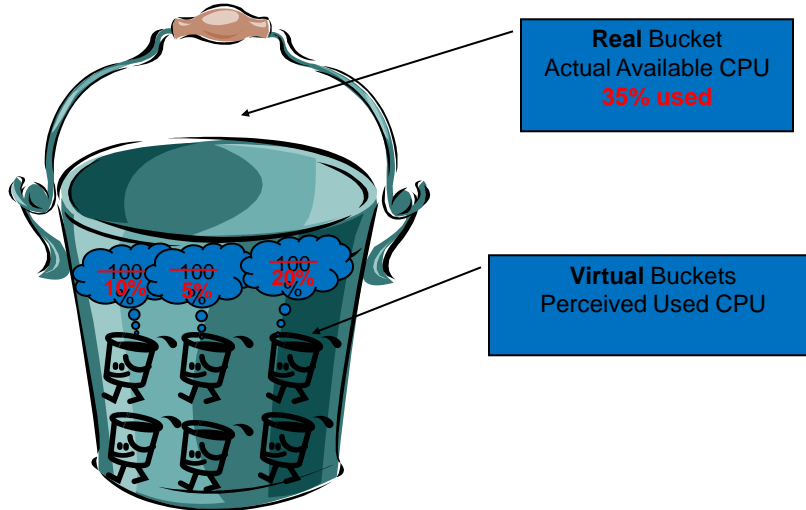


Monitoring...

- 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?



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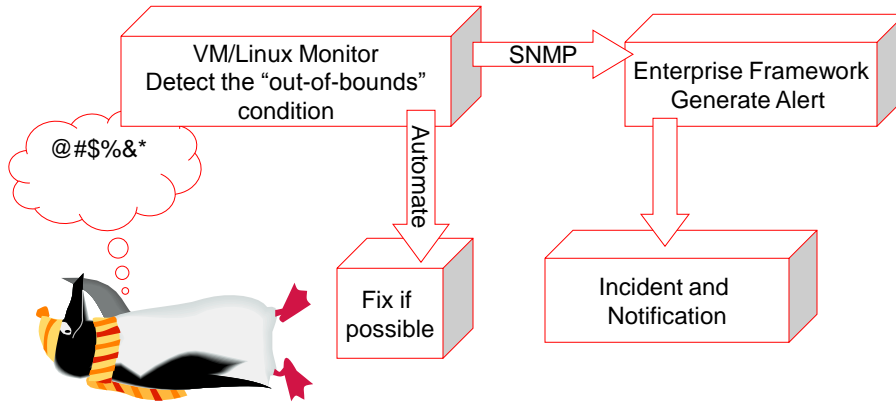
Alerts...

- 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



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Generating an Alert



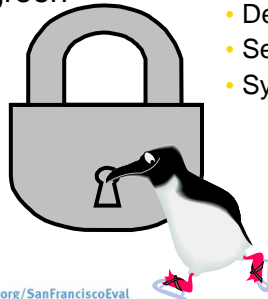
Penguin Storage

- z/OS Management
 - 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

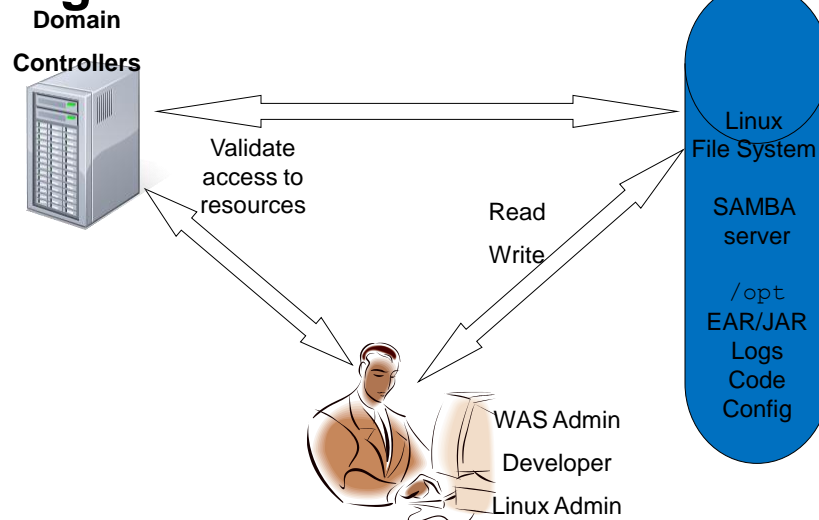


Penguin Security

- 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



Working the Penguins

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Working the Penguins...



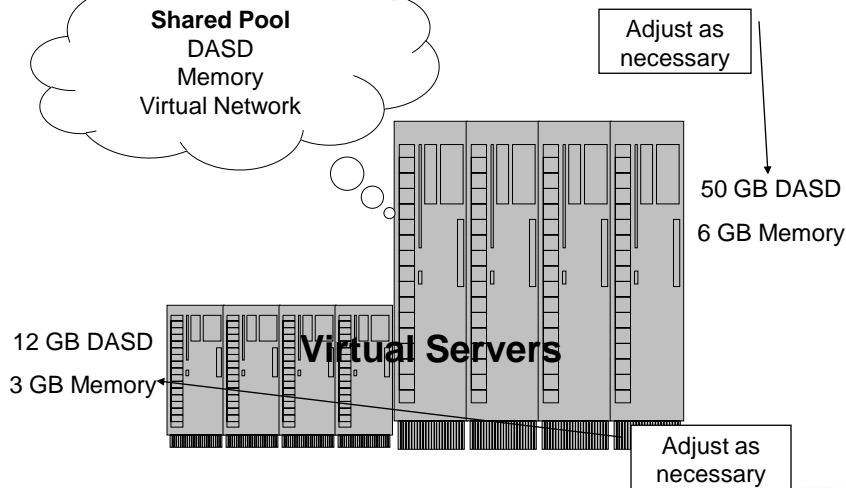
- WebSphere Application Server (WAS)
 - Home grown applications
 - Vendor applications
- Provisioning
 - Environments / number of servers
 - Size – depending upon application
 - Clone and Deploy servers
 - Install / verify / implement applications



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...Working the Penguins

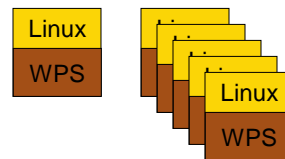


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...Penguin Jobs...

- WebSphere Process Server (WPS)
 - IBM application
 - Work Flow management
 - Now IBM BPM
- Learning experience
 - Install failure – SLES Service Pack
 - Larger servers – more virtual storage (and more...)
 - Numerous environments – WPS cloning

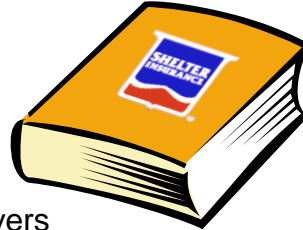


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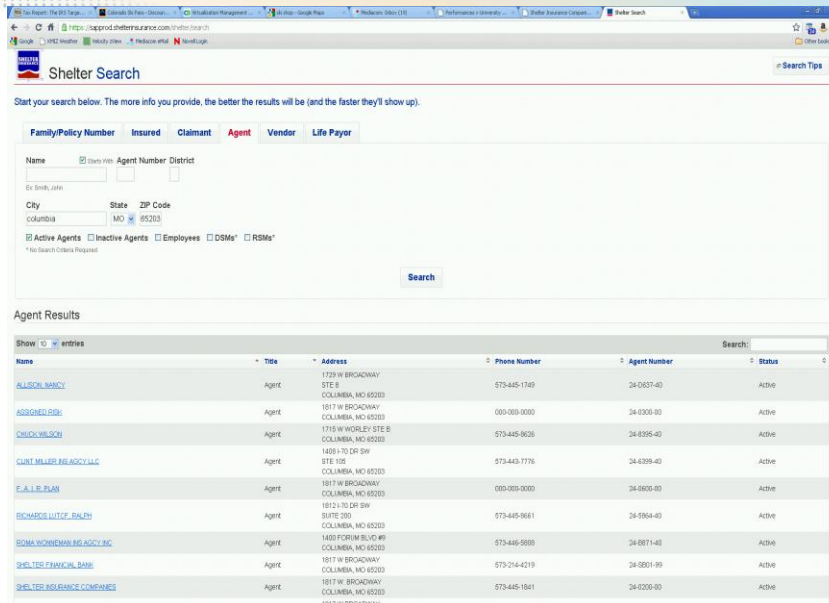
34

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



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Shelter Search

Start your search below. The more info you provide, the better the results will be (and the faster they'll show up).

Family/Policy Number Insured Claimant Agent Vendor Life Payor

Name Check Web Agent Number District
 Ex: Smith, John

City State ZIP Code
 Columbia MO 65203

Active Agents Inactive Agents Employees DSM* RSM*

* No Search Criteria Required

Search

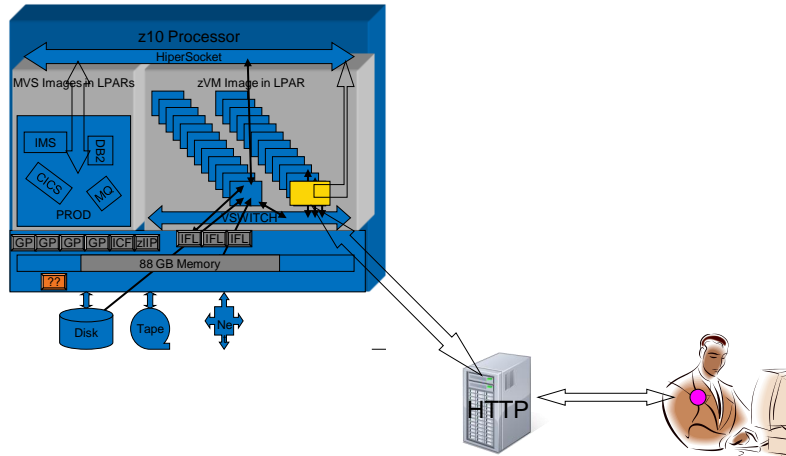
Agent Results

Show entries

Name	Title	Address	Phone Number	Agent Number	Status
ALLISON BAILEY	Agent	1729 W BROADWAY STE 2 COLUMBIA, MO 65203	573-445-1749	24-0037-40	Active
ASSIGNED CSR	Agent	1817 W BROADWAY COLUMBIA, MO 65203	000-000-0000	24-0300-30	Active
CHRISTOPHER WILSON	Agent	1715 W WORLEY STE B COLUMBIA, MO 65203	573-445-9026	24-0395-40	Active
CURT MILLER REAGENCY LLC	Agent	1499 J TO DR SW STE 102 COLUMBIA, MO 65203	573-443-7776	24-0399-40	Active
E.A.L.E. PLAN	Agent	1817 W BROADWAY COLUMBIA, MO 65203	000-000-0000	24-0605-30	Active
RICHARD LUTZ, RALPH	Agent	1812 J TO DR SW SUITE 200 COLUMBIA, MO 65203	573-445-9661	24-0364-40	Active
SONIA WORMEYAN REAGENCY INC	Agent	1408 FORUM BLVD #9 COLUMBIA, MO 65203	573-445-9588	24-0871-40	Active
SHELTER FINANCIAL BANK	Agent	1817 W BROADWAY COLUMBIA, MO 65203	573-214-4219	24-0801-95	Active
SHELTER INSURANCE COMPANIES	Agent	1817 W BROADWAY COLUMBIA, MO 65203	573-445-1541	24-0200-30	Active

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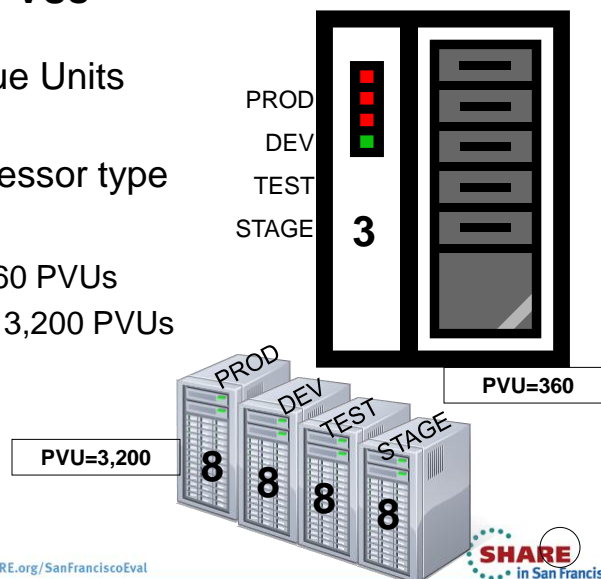
Data Flow



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Penguin Saves PVUs

- Processor Value Units (PVUs)
- Based on processor type
- IBM - WPS
 - \$250,xxx for 360 PVUs
 - \$x,xxx,xxx For 3,200 PVUs



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Hatching New Penguins



Hatching new Penguins

- More workload moving to Linux on z
 - WAS
 - New applications
 - Move from Intel
 - IBM recommendations – other stuff
 - “Best Fit”
 - “Good Fit”



New Penguin Jobs...

- Insurance Verification System (IVS)
 - Internally Developed WebSphere
 - Law Enforcement can verify status of an insured
 - Nevada now, Oklahoma eventually
 - Production 2Q 2011

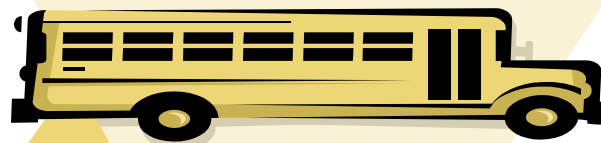


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...New Penguin Jobs

- Common Services (CSA)
 - Home grown service bus
 - WebSphere
 - Customer Access
 - eCommerce
- SOA Enablement
 - WebSphere Registry and Repository (WSRR)
 - WebSphere Enterprise Service Bus (WESB)
 - Prototype environment



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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**
- **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

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Good Fit Application Workloads*

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

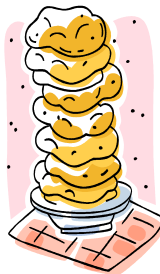


*Bill Reeder – IBM Linux for System z Sales and Strategy

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Actual Software Stack

- z/VM – IBM
 - Virtualization
 - System management
 - RACF, DIRM, RSCS
- SLES – SUSE
 - Linux servers
- zVPS – Velocity
 - Monitor
 - Alerts
- IBM Tivoli Monitoring
 - Enterprise Framework
- Service Desk – CA
 - Problem and Incident
 - Notification
- FDR on z/OS
 - Backup, restore, recover



Penguins Quality of Service Maturity

- VM:Manager tools
 - Backup, Tape
 - Schedule, Operations
 - Move away from z/OS reliance
- TSM Backups
 - DB2 databases
 - IBM BPM
- z/VM 6.2
 - SSI cluster
 - Two production images
 - App split across both
 - Dev image / Test Image
- SUSE Manager
 - Centralize server configuration and maintenance

Knowing Penguins had Landed

- Annual IS meeting
 - Accomplishments for last year
 - Goals for upcoming year(s)
- “**We did it!**”
 - Linux on System z
- Team listed this accomplishment
 - Not our team
 - WAS Admin team
 - Deserved it



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 your homework – **never stop learning**
- Start with the **infrastructure**
- **People - Processes - Tools**



The Penguins Have Landed

- ✓ Why Penguins (Linux)
- ✓ Nesting the Penguins
- ✓ Feeding the Penguins
- ✓ Protecting the Penguins
- ✓ Working the Penguins
- ✓ Hatching new Penguins



Anything Else?
Complex
Counter-Cultural
Opportunity to Learn

Journey – Not a Destination

This is Real



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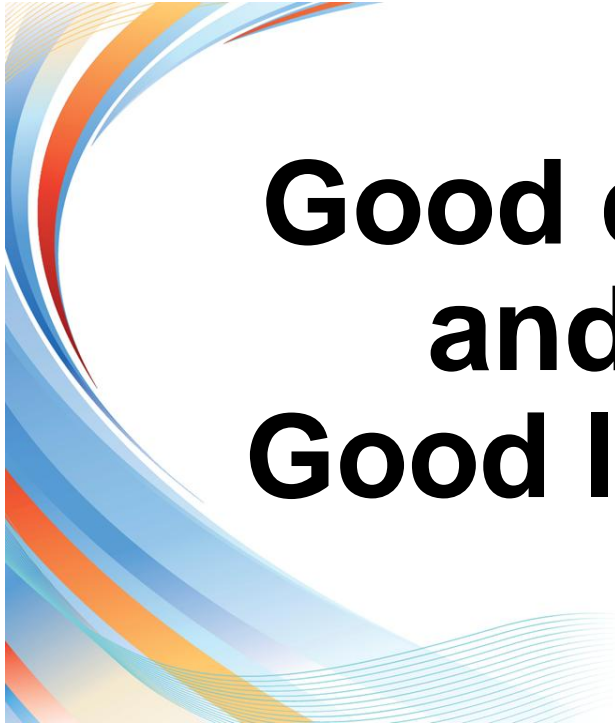


“Everyone is a prisoner of his own experiences. No one can eliminate prejudices - just recognize them.”

Edward R. Murrow

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Good day and Good luck

