Sharing the Wealth Using Vlans on Vswitch

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Denver Share
Session 9163
Objectives

- Definition of virtual lan
- Purpose of vlan
- Hipersocket, vswitch and vlan in z/VM
- Linux virtual machine support
- Configuration and usage examples
What are vlans

- Virtual lans
- Group stations by function regardless of switch location.
  - Daisy chaining switches
- Limit size of broadcast domain by organizing functionally.
- Proprietary methods and IEEE standard 802.1Q
- Software controls
Simplified vlan mechanics

- Frame contains two extra bytes with vlan number referred to as the vlan tag.
- Stations that use **trunk** connections on switch include vlan tag in transmission.
  - VLAN aware host can also send untagged frames. Such frames are assigned the default port VLAN ID. Be careful! May not get delivered where you intended.
- Stations that use **access** connections the switch strips off the tag then delivers.
  - Presence of VLAN tag renders packet "invalid" to a non-VLAN-aware host.
Trunked switches with two vlans

VLAN 11
172.21.88/24

VLAN 34
172.21.88/24

172.21.88.1

172.21.88.11

172.21.34.1

172.21.88.11

VLAN 11
172.21.88/24

VLAN 34
172.21.34/24

172.21.88.22

172.21.34.11

172.21.34.121

172.21.88.222

VLAN 11
172.21.88/24

VLAN 34
172.21.34/24

VLAN 34
172.21.34/24

VLAN 11
172.21.88/24

VLAN 11
172.21.88/24

172.21.88.1

VLAN 34
172.21.34/24

172.21.34.1

172.21.34.11

172.21.34.121

172.21.88.222

VLAN 11
172.21.88/24
Broadcast domain using vlans overcomes geography
Vlans and z/VM

• Multiple vlans on top of same network
  – Use on hipersocket to connect lpars
• Each vlan assigned to unique network
  1 Disconnected vswitch to collect SNMP and monitor data
  2 Mapping successfully to physical switches via OSA QDIO connectivity

All are useful and work great!
Sysprog Predicament

- Multiple Ipars need to be connected from the service zone Ipar, but the other Ipars cannot see each other.
- Connection needed for systems programming needs: ftp, rscs, and telnet, remote dirmaint.

**Solution:** hipersocket network with vlan

*Each Ipar with a unique vlan number*
Conceptual View: Permitted connections

Service Zone

oracle  was  portal  open  test
Hipersocket Hardware

<table>
<thead>
<tr>
<th>IQD CHPID x’BF’</th>
</tr>
</thead>
<tbody>
<tr>
<td>service</td>
</tr>
</tbody>
</table>

SHARE Denver Session 9163
Hipersocket hardware: triplets

IQD CHPID ‘BF’

BF18-BF1A TCP/IP1
BF1B-BF1D LINUXAA
BF00-BF02 TCP/IP
BF00-BF02 TCP/IP
BF44-BF46 TCP/IP
BF00-BF02 TCP/IP
BF29-BF2B TCP/IP

service
oracle
was
portal
open
test
Hipersocket network: IP addresses and vlan assignment

192.168.150/24

- .1 TCPIP1 VLAN ANY
- .3 TCPIP VLAN 11
- .4 TCPIP VLAN 44
- .10 TCPIP VLAN 66
- .6 TCPIP VLAN 88
- .252 TCPIP VLAN 99
- .234 LINUXAA VLAN 99

service
oracle
was
portal
open
test
Vlan on hipersocket networks

192.168.150/24

.service

TCPIP1
VLAN ANY

.LINUXAA
VLAN 99

.oracle

TCPIP
VLAN 11

192.168.150/24

.service

TCPIP1
VLAN ANY

.LINUXAA
VLAN 99

192.168.150/24

.service

TCPIP1
VLAN ANY

.LINUXAA
VLAN 99

.was
Vlan on hipersocket network three

192.168.150/24

.1
TCPIP1
VLAN ANY

.234
LINUXAA
VLAN 99

service

.10
TCPIP
VLAN 66

portal

192.168.150/24

.1
TCPIP1
VLAN ANY

.234
LINUXAA
VLAN 99

service

192.168.150/24

.6
TCPIP
VLAN 88

open
Hipersocket network: IP addresses

192.168.150/24

- .1
  - TCPIP1
  - VLAN ANY

- .234
  - LINUXAA
  - VLAN 99

- .252
  - TCPIP
  - VLAN 99

- test
Will show …

- Configuration
  - CP
  - TCPIP
- Dynamically adding Linux virtual machine with a vlan device at ip address 192.168.150.234
- queries
### Hipersocket CP Configuration

**query osa**

<table>
<thead>
<tr>
<th>OSA</th>
<th>Device Type</th>
<th>CHPID</th>
<th>IQD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BF18</td>
<td>Hipersocket</td>
<td>BF</td>
<td>IQD</td>
</tr>
<tr>
<td>BF19</td>
<td>Hipersocket</td>
<td>BF</td>
<td>IQD</td>
</tr>
<tr>
<td>BF1A</td>
<td>Hipersocket</td>
<td>BF</td>
<td>IQD</td>
</tr>
</tbody>
</table>

**query cplevel**

```
z/VM Version 5 Release 3.0, service level 0802 (64-bit)
```
TCPIPI Configuration: SYSTEM DTCPARMS

:NICK.TCPIPI :TYPE.SERVER :CLASS.STACK :ATTACH.BF18-BF1A

netstat level
VM TCP/IP Netstat Level 530
IBM 2094; z/VM Version 5 Release 3.0, service level 0802 (64-bit), VM TCP/IP Level 530; RSU 0802 running TCPIP MODULE E2 dated 09/27/08 at 00:26
TCPIP1 Configuration: TCPIP1 TCPIP

: DEVICE HIPER1 HIPERS BF18
LINK HIPER QDIOIP HIPER1 NOFWD MTU 0 VLAN ANY

HOME
192.168.150.1 255.255.255.0 HIPER

GATEWAY
DEFAULTNET 192.168.150.1 HIPER 4000

START HIPER1

TCPMAINT 198

Packets from/to any vlan on the hipersocket device
TCPIP1 Console log

08:04:04 DTCOSD080I HIPERS initializing:
08:04:04 DTCPRI385I Device HIPER1:
08:04:04 DTCPRI386I Type: HIPERS, Status: Not started
08:04:04 DTCPRI387I Envelope queue size: 0
08:04:04 DTCPRI388I Address: BF18

08:04:05 DTCQDI001I QDIO device HIPER1 device number BF1A:
08:04:05 DTCQDI007I Enabled for QDIO data transfers
08:04:05 DTCOSD238I ToOsd: IPv4 multicast support enabled for HIPER1
08:04:05 DTCOSD246I HIPERS device HIPER1: Assigned IPv4 address 192.168.150.1
TCP/IP1 Queries of the Dynamic Nature

ifconfig hiper

HIPER    inet addr: 192.168.150.1 mask: 255.255.255.0
         UP BROADCAST MULTICAST MTU: 4000
         vdev: BF18 rdev: BF18 type: HIPERS
         ipv6: DISABLED
         cpu: 0 forwarding: DISABLED
         RX bytes: 2441368403 TX bytes: 501172660

From TCPMAINT
netstat home
VM TCP/IP Netstat Level 530

IPv4 Home address entries:

<table>
<thead>
<tr>
<th>Address</th>
<th>Subnet Mask</th>
<th>Link</th>
<th>VSWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.150.1</td>
<td>255.255.255.0</td>
<td>HIPER</td>
<td>&lt;none&gt;</td>
</tr>
</tbody>
</table>

IPv6 Home address entries: None

Ready; T=0.01/0.01 17:29:23
| Device HIPER1 | Type: HIPERS | Status: Ready |
| Queue size: 0 | CPU: 0       | Address: BF18  |
| IPv4 Router Type: NonRouter | Arp Query Support: No |

| Link HIPER | Type: QDIOIP | Net number: 0 |
| BytesIn: 2441369810 | BytesOut: 501176551 |
| Forwarding: Disabled | MTU: 4000 | IPv6: Disabled |
| Maximum Frame Size: 24576 |
| Broadcast Capability: Yes |
| Multicast Capability: Yes |

<table>
<thead>
<tr>
<th>Group</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>224.0.0.1</td>
<td>1</td>
</tr>
</tbody>
</table>

NETSTAT DEVLINKS from TCPMAINT
Adding to a Linux critter dynamically

- Attach devices
- Create group devices structure
- Configure interface
SuSE and Linux levels

SuSE SLES 10 Service Pack 2

# cat /proc/version
Linux version 2.6.16.60-0.21-default (geeko@buildhost) (gcc version 4.1.2 20070115 (SUSE Linux))
#1 SMP Tue May 6 12:41:02 UTC 2008

# cat /etc/SuSE*
SUSE Linux Enterprise Server 10 (s390x)
VERSION = 10
PATCHLEVEL = 2
cat: /etc/SuSEconfig: Is a directory
Attach devices

attach bf1b-bf1d LINUXAA
BF1B-BF1D ATTACHED TO LINUXAA

Class B from TCPMAINT

BF1B-BF1D ATTACHED TO LINUXAA
LINUXAA console
Create group devices structure dynamically

In memory file system

From root in LINUXAA

/sys/bus/ccwgroup/drivers/qeth

# echo 0.0.bf1b,0.0.bf1c,0.0.bf1d > group

# cd /sys/bus/ccwgroup/devices/0.0.bf1b
In /sys/bus/ccwgroup/devices/0.0.1bf1
place the devices online

# echo 1 > online

qeth: Device 0.0.bf1b/0.0.bf1c/0.0.bf1d is a HiperSockets card (level: () with link type
HiperSockets.

qeth: set adapter parameters not supported on device 0.0.bf1b.
qeth: Hardware IP fragmentation not supported on hsi0
qeth: VLAN enabled
qeth: Multicast enabled
qeth: IPv6 not supported on hsi0
qeth: Broadcast enabled
qeth: Using SW checksumming on hsi0.
qeth: Outbound TSO not supported on hsi0

From root in LINUXAA
Load the vlan support, configure the physical device, and add the vlan device.

```
# modprobe 8021q

# ifconfig hsi0 0.0.0.0

# vconfig add hsi0 99
Added VLAN with VID == 99 to IF -:hsi0:-
```

From root in LINUXAA

Load the vlan support module

Add vlan device on vlan 99 on the hsi0 interface
Display of vlan device before configuring it

```bash
# ifconfig hsi0.99
hsi0.99   Link encap:Ethernet  HWaddr 00:00:00:00:00:00
          BROADCAST NOARP MULTICAST  MTU:16384  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
```

From root in LINUXAA
Configure vlan device

# ifconfig hsi0.99 192.168.150.234
# ifconfig hsi0.99
hsi0.99  Link encap:Ethernet  HWaddr 00:00:00:00:00:00
        inet addr:192.168.150.234 Bcast:192.168.150.255  Mask:255.255.255.0
        inet6 addr: fe80::200:ff:fe00:0/64 Scope:Link
        UP BROADCAST RUNNING NOARP MULTICAST  MTU:16384  Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:0
        RX bytes:0 (0.0 b)  TX bytes:588 (588.0 b)

From root in LINUXAA
2 pings: #1 on same vlan (works)  
#2 on different vlan (fails as expected)

```
# ping 192.168.150.252 -c 2
PING 192.168.150.252 (192.168.150.252) 56(84) bytes of data.
64 bytes from 192.168.150.252: icmp_seq=1 ttl=60 time=0.175 ms
64 bytes from 192.168.150.252: icmp_seq=2 ttl=60 time=0.178 ms
--- 192.168.150.252 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
rtt min/avg/max/mdev = 0.175/0.176/0.178/0.013 ms

# ping 192.168.150.6 -c 2
PING 192.168.150.6 (192.168.150.6) 56(84) bytes of data.
--- 192.168.150.6 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1007ms
```
Uses for the hipersocket vlan network

- RSCS
- Telnet
- ftp
- Remote DIRMAINT
- Show rscs
RSCS network query from the service zone: all nodes

```
smsg rscs query links connect show defparm name

<table>
<thead>
<tr>
<th>Link</th>
<th>Name</th>
<th>Default Parm Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORACLE</td>
<td>TCPID=TCPIP1 HOST=192.168.150.3</td>
<td></td>
</tr>
<tr>
<td>WAS</td>
<td>TCPID=TCPIP1 HOST=192.168.150.4</td>
<td></td>
</tr>
<tr>
<td>OPEN</td>
<td>TCPID=TCPIP1 HOST=192.168.150.6</td>
<td></td>
</tr>
<tr>
<td>TEST</td>
<td>TCPID=TCPIP1 HOST=192.168.150.252</td>
<td></td>
</tr>
<tr>
<td>PORTAL</td>
<td>TCPID=TCPIP1 HOST=192.168.150.10</td>
<td></td>
</tr>
</tbody>
</table>

5 links found```
RSCS network query from the ORACLE zone: only the service zone

```
sm rscs cmd ORACLE query links connect show defparm name
Ready; T=0.01/0.01 14:26:17
From ORACLE: Link
From ORACLE: Name  Default Parm Text
From ORACLE: SERVICE TCPIP=TCPIP1  HOST=192.168.150.1
From ORACLE: 1 link found
```

Command issued from service zone to RSCS on the ORACLE zone
Usefulness of disconnected vswitch with lan

• Gathering SNMP data for Velocity product.
• All Linux machines produce this data.
  – Linux machines on different zones.
• With a disconnected vswitch vlan membership can be RACF protected.
  – *Cannot be protected in a guest lan*
RACF and vlans

- Vswitch membership protected as well.
  - Base profile
- Vlan membership protected in the `vmlan` resource class.
  - Vlan qualified control.
- Does not do any packet investigation.
- Will not allow communication with vlans that you are not a member of even if you configure in Linux.
```
CLASS   NAME
-----   ----
VMLAN   SYSTEM.PERFMON
:  
ALTER COUNT  CONTROL COUNT  UPDATE COUNT  READ COUNT
-----------  --------------  -------------  ----------
       000000 000000 002197 000000

USER   ACCESS  ACCESS COUNT
----   ------  ------- -----
LINUXAA UPDATE  000975
TCP1PERF UPDATE  000967
GROUPAA UPDATE  000252
GROUPBB UPDATE  000252
:
```

The vswitch itself is a protected resource in a base profile.

Shows racf groups and user profiles in the resource list (vswitch)
```
CLASS    NAME
-----    -----
VMLAN    SYSTEM.perfmon.0048

:  
ALTER COUNT  CONTROL COUNT  UPDATE COUNT  READ COUNT
-----------  -------------  ------------  ----------
000002      000000         000324        000000

USER  ACCESS  ACCESS COUNT
----  ------  ----------
LINUXAA UPDATE  000975
TCP1PERF UPDATE  000967
GROUPAA UPDATE  000252
```

Vlan membership is a protected resource! Nice – eh?

Shows racf groups and user profiles in the resource list (vlan).
rac rlist vmlan permit system.perfmon.0048
class(vmlan) id(maint)

rac permit system.perfmon.0048 class(vmlan) id(maint) access(update)

rac rlist vmlan system.perfmon.0048 all
Ready; T=0.01/0.01 14:18:47
CLASS NAME
----- -----
VMLAN SYSTEM.PERFMON.0048 :
USER ACCESS ACCESS COUNT
---- ------ ------ ----- 
LINUXAA UPDATE 000975
TCP1PERF UPDATE 000967
GROUPAA UPDATE 000252
MAINT UPDATE 000000 :

1. Add user profile maint to the vlan resource.

2. MAINT is in the access list
rac rlist vmlan permit
system.perfmon.0048 delete

rac pe system.perfmon.0048 class(vmlan) id(maint) delete

rac rl vmlan system.perfmon.0048 all
Ready; T=0.01/0.01 14:22:02
CLASS   NAME
-----   -----
VMLAN   SYSTEM.PERFMON.0048

USER   ACCESS   ACCESS COUNT
----   ------   ------ ------
LINUXAA UPDATE  000975
TCP1PERF UPDATE  000967
GROUPAA UPDATE  000252

3. Some mechanics – remove maint

4. Maint not in list anymore
Network design for SNMP data collection

Disconnected vswitch supporting multiple vlans

- **TCP1PERF**
  - **VLAN ANY**
  - **ESATCP**
  - **LINUXAA**
  - **VMB**
    - **VM0**
    - **VM2**
    - **VM1**
  - **MAA**
    - **MA0**
    - **MA1**
    - **MA2**

VLAN 34 172.21.99.x

VLAN 48 172.21.48.x
Configuration

- Vswitch defined in SYSTEM CONFIG with vlan
- VM TCP stack configured in the TCP1PERF virtual machine supporting vlan.
  - TCPMAINT 198
- Velocity collection configured in the ESATCP 191.
- Linux configured in /etc/sysconfig/network support vlan.
  - Virtual machine LINUXAA exemplified.
PERFMON Vswitch Defined in SYSTEM CONFIG

Disconnected vswitch supporting multiple vlans

Def Vswitch PERFMON IP Controller * Rdev NONE , VLAN 199 PORTT TRUNK

Vlan bytes Send to stacks in virtual machines

No real devices, disconnected
The TCP1PERF TCPIP configuration profile: DEVICE/LINK combo

Disconnected vswitch supporting multiple vlans

TCP1PERF

ESATCP

DEVICE DEV@48 OSD 0754 NONROUTER
LINK OSA48 QDIOETHERNET DEV@48 MTU 1500 VLAN 48

DEVICE DEV@99 OSD 0745 NONROUTER
LINK OSA99 QDIOETHERNET DEV@99 MTU 1500 VLAN 99
The SYSTEM DTCPARMS configuration profile

Disconnected vswitch supporting multiple vlans

TCP1PERF

: NICK.TCP1PERF : TYPE.SERVER : CLASS.STACK
: VNIC.0700 SYSTEM PERFMON, 0703 SYSTEM PERFMON,
: 0727 SYSTEM PERFMON, 0730 SYSTEM PERFMON, 0733 SYSTEM PERFMON,
0736 SYSTEM PERFMON, 0739 SYSTEM PERFMON, 0742 SYSTEM PERFMON,
0745 SYSTEM PERFMON, 0748 SYSTEM PERFMON, 0751 SYSTEM PERFMON,
0754 SYSTEM PERFMON

TCPMAINT 198
The TCP1PERF TCPIP configuration profile: HOME statements

Disconnected vswitch supporting multiple vlans

TCPMAINT 198

TCP1PERF

ESATCP

HOME
172.21.48.254 255.255.255.0 OSA48
172.21.99.254 255.255.255.0 OSA99
The ESATCP PARM configuration profile for ESATCP

Disconnected vswitch supporting multiple vlans

TCP1PERF

ESATCP

; First set up the VM Environment.
TCPIP = 'TCPIP'
PORT = 161
Nicdefs defined in the directory of
LINUXAA

Disconnected vswitch supporting multiple vlans

LINUXAA

directory

USER LINUXAA CHANGEIT 512M 1024M G
NICDEF EB00 TYPE QDIO DEVICES 3 LAN SYSTEM WHAT...
NICDEF EB04 TYPE QDIO DEVICES 3 LAN SYSTEM EVER...
NICDEF EB08 TYPE QDIO DEVICES 3 LAN SYSTEM PERFMON
Network definition for ifcfg-qeth-bus-ccw-0.0.eb08

Disconnected vswitch supporting multiple vlans

/etc/sysconfig/network

- BOOTPROTO='static'
- BROADCAST=''
- IPADDR='0.0.0.0'
- MTU=''
- NETMASK=''
- NETWORK=''
- REMOTE_IPADDR=''
- STARTMODE='onboot'
- UNIQUE='0bz9.FOqOujDmSR4'
  _nm_name='qeth-bus-ccw-0.0.eb08'
Network definition for ifcfg-vlan99

Disconnected vswitch supporting multiple vlans

LINUXAA

/etc/sysconfig/network

/ifcfg-vlan99

BOOTSPROTO="static"
UNIQUE="interface-vlan"
STARTMODE="onboot"
ETHERDEVICE='eth2'
IPADDR="172.21.99.74"
MTU=""
NETMASK="255.255.0.0"
dmesg Showing the start up messages

Linux version 2.6.16.46-0.12-default (geeko@buildhost) (gcc version 4.1.2 20070115 (prerelease) (SUSE Linux)) #1 SMP Thu May 17 14:00:097
qeth: Device 0.0.eb08/0.0.eb09/0.0.eb0a is a Guest LAN QDIO card (level: V534)
with link type GuestLAN QDIO (portname: suseport)
qeth: Hardware IP fragmentation not supported on eth0
qeth: VLAN enabled
qeth: Multicast enabled
qeth: IPV6 enabled
qeth: Broadcast enabled
qeth: Using SW checksumming on eth0.
qeth: Outbound TSO not supported on eth0
802.1Q VLAN Support v1.8 Ben Greear <greearb@candelatech.com>
All bugs added by David S. Miller <davem@redhat.com>
vlan99: add 33:33:00:00:00:01 mcast address to master interface
vlan99: add 33:33:ff:00:00:2b mcast address to master interface
vlan99: add 01:00:5e:00:00:01 mcast address to master interface

Vlan99 interface will be automatically started by the network script. The script will load the 8021q module required for vlan support.
# Velocity Report Based on SNMP Data

**Screen:** ESAHST1 Customer LPAR1  ESAMON 3.7.0 02/20 15:14-15:15

**1 of 1 Linux HOST Software Analysis Report**  NODE * LIMIT 500  2094 4FFE

<table>
<thead>
<tr>
<th>Time</th>
<th>Node</th>
<th>Name</th>
<th>ID</th>
<th>Type</th>
<th>Status</th>
<th>Total</th>
<th>Interval</th>
<th>Pct</th>
<th>Current</th>
<th>CPU Seconds</th>
<th>Storage(K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:15:00</td>
<td>LINUXAA</td>
<td>java</td>
<td>31551</td>
<td>Applic</td>
<td>ResWait</td>
<td>3292</td>
<td>6.70</td>
<td>11.24</td>
<td>2065422</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>snmpd</td>
<td>18449</td>
<td>Applic</td>
<td>Running</td>
<td>1218</td>
<td>0.08</td>
<td>0.13</td>
<td>7019</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>httpd</td>
<td>3409</td>
<td>Applic</td>
<td>ResWait</td>
<td>127</td>
<td>0.05</td>
<td>0.09</td>
<td>236035</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>pdflush</td>
<td>98</td>
<td>Applic</td>
<td>ResWait</td>
<td>10</td>
<td>0.03</td>
<td>0.04</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>events/0</td>
<td>4</td>
<td>Applic</td>
<td>ResWait</td>
<td>145</td>
<td>0.03</td>
<td>0.04</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Totals</em></td>
<td></td>
<td>Unknown</td>
<td>Unknown</td>
<td>0</td>
<td>6.88</td>
<td>0.23</td>
<td>2736872</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:15:00</td>
<td>LinuxZZ</td>
<td>java</td>
<td>11216</td>
<td>Unknown</td>
<td>ResWait</td>
<td>97</td>
<td>0.16</td>
<td>0.26</td>
<td>475155</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>httpd</td>
<td>7448</td>
<td>Applic</td>
<td>ResWait</td>
<td>62</td>
<td>0.02</td>
<td>0.04</td>
<td>237467</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>httpd</td>
<td>7446</td>
<td>Applic</td>
<td>ResWait</td>
<td>62</td>
<td>0.02</td>
<td>0.04</td>
<td>237507</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>snmpd</td>
<td>2298</td>
<td>Applic</td>
<td>Running</td>
<td>1153</td>
<td>0.02</td>
<td>0.04</td>
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</tr>
</tbody>
</table>
Consolidating to fewer OSAs by using vlans
Consolidating to fewer OSAs by using vlans
Condensed OSAs through vlan usage

- OSA is trunked to physical switch
- Supports multiple vlans in agreement with physical switch configuration
- Showing:
  - Vswitch definition
  - 2 Linuxen on same vswitch with different vlans
  - Isolated
  - Vswitch is defined as layer 2 (vlan works either in layer 2 or 3 …)
• Virtual machines connect to vswitch as trunk
  – *But in some configurations not required (including this one)*
  – *will change … maybe*
  – *Definitions on vswitch describe how the virtual machines connect to vswitch, not how vswitch connects to OSA*
• Virtual machine connecting to vswitch as trunk must deal with tags
• If only supporting one ip address per interface use access connection to vswitch
Shows two vlans on one osa ... can support many more vlans

Other world
Define Vswitch PRODA3A4 Ethernet nogroup Rdev D200 D300 Controller

VSWITCH SYSTEM PRODA3A4 Type: VSWITCH Connected: 8 Maxconn: INFINITE
PERSISTENT RESTRICTED ETHERNET Accounting: ON
VLAN Aware Default VLAN: 0999 Default Porttype: Trunk GVRP: Enabled
Native VLAN: 0999
MAC address: 02-01-0A-00-00-03
State: Ready
IPTimeout: 5 QueueStorage: 8
Isolation Status: OFF
RDEV: D200.P00 VDEV: D200 Controller: DTCVSW2
VSWITCH Connection:
- RX Packets: 38138851 Discarded: 3 Errors: 0
- TX Packets: 37995827 Discarded: 0 Errors: 0
- RX Bytes: 15122277122 TX Bytes: 8681966948
- Device: D202 Unit: 002 Role: DATA vPort: 0001 Index: 0001
- Unicast IP Addresses:
  - 172.27.110.254 MAC: 00-03-BA-5B-24-81 Remote
- RDEV: D300.P00 VDEV: D300 Controller: DTCVSW1 BACKUP
Query vswitch details

Adapter Owner: LINUXA3 NIC: EB00.P00 Name: suseport
Porttype: Trunk
RX Packets: 8096888 Discarded: 0 Errors: 0
TX Packets: 152976 Discarded: 8 Errors: 0
RX Bytes: 7382934749 TX Bytes: 16211529
Device: EB02 Unit: 002 Role: DATA vPort: 0069 Index: 0006
VLAN: 0210
Options: Ethernet Broadcast
Unicast MAC Addresses:
  02-01-0A-00-00-1D IP: 172.27.210.105
Multicast MAC Addresses:
  01-00-5E-00-00-01 IP: 224.0.0.1
  33-33-00-00-00-01 IP: FF02::1
  33-33-FF-00-00-1D IP: FF02::FF00:1D
/etc/sysconfig/network/ifcfg-qeth-bus-ccw-0.0.eb00

```
BOOTPROTO='static'
BROADCAST=""
IPADDR='0.0.0.0'
MTU=""
NETMASK=""
NETWORK=""
REMOTE_IPADDR=""
STARTMODE='onboot'
UNIQUE='0bz92%RFZc#OmSR4'
nm_name='qeth-bus-ccw-0.0.eb00'
```

**LINUXA4 configuration**

- 172.27.210.105
- VLAN 210
- LINUXA3
/etc/sysconfig/network/ifcfg-vlan210

ETHERDEVICE='eth0'
MTU=''
IPADDR='172.27.210.105'
NETMASK='255.255.254.0'
NETWORK='172.27.210.0'
STARTMODE=onboot
VLAN='YES'

LINUXA3 configuration
/etc/sysconfig/network/ifcfg-qeth-bus-ccw-0.0.eb00

<table>
<thead>
<tr>
<th>Configuration Entry</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOTPROTO</td>
<td>static</td>
</tr>
<tr>
<td>BROADCAST</td>
<td>''</td>
</tr>
<tr>
<td>IPADDR</td>
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</tr>
<tr>
<td>MTU</td>
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<td>NETMASK</td>
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<td>NETWORK</td>
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<td>REMOTE_IPADDR</td>
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<tr>
<td>STARTMODE</td>
<td>onboot</td>
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<tr>
<td>UNIQUE</td>
<td>45%?SDdd%FR_.FOmSR9</td>
</tr>
<tr>
<td>_nm_name</td>
<td>qeth-bus-ccw-0.0.eb00</td>
</tr>
</tbody>
</table>

LINUXA4 configuration

172.27.110.234
VLAN 110
LINUXA4
/etc/sysconfig/network/ifcfg-vlan110

ETHERDEVICE='eth0'
MTU=''
IPADDR='172.27.110.234'
NETMASK='255.255.248.0'
NETWORK='172.27.210.0'
STARTMODE=onboot
VLAN='YES'

LINUXA4 configuration
Summary

• Z/VM, vswitch and vlan
• Different uses and implementations:
  – Hipersocket
  – Disconnected vswitch
  – Connecting over qdio osa devices
Thank you to …

- Alan Altmark
- Dave Jones
- Dominic Coulombe