Migrating to the z/VM Virtual Switch
Session 9132

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Topics

- Routing vs. Bridging
- What’s a switch?
- VLAN-unaware migration
- VLAN-aware migration
Review: Guest LAN vs. Virtual Switch

- Virtual router is required
- Different subnet
- External router awareness
- Guest-managed failover

- No virtual router
- Same subnet
- Transparent bridge
- CP-managed failover
A routed Guest LAN

Virtual router to connect Guest LAN to Ethernet
Often VM TCP/IP
z/VM

Subnet B
Router
OSA
Subnet A
Switch
A bridged Guest LAN using VSWITCH

Subnet B

No virtual router required
Built-in transparent bridge

z/VM

OSA

Subnet B

Switch
What’s a switch?

- A box that creates a LAN
- It can be remotely configured
  - E.g. Turn ports on and off
- Contains a built-in router
Switch functions

- Enable and disable a port
- Set port type: trunk or access
- Assign port to one or more VLANs
- Set port speed: 10 / 100 / 1000 / Auto
- Set port duplex mode: Simplex / Duplex / Auto
- Define an internal router
- Define SNAP (sniffer) ports
A routed Guest LAN

10.0.1 / 24

Default gateway for Guest LAN hosts

Router

20.17.19.85

web

10.0.1.254

web

OSA

20.17.19.254

Default gateway for VSWITCH hosts

Switch

20.17.19 / 24

z/VM
z/VM Virtual Switch – VLAN unaware

Virtual QDIO adapter

LAN Bridge

Same LAN segment and subnet
Current Configuration
Current Cisco 6509 Switch Configuration

- OSA is plugged into **port 7 of slot 2**
- Port is defined as an **access** port
  - VLAN **un**aware host
- Port is currently assigned to **VLAN 201**
  - While in ENABLE mode:
    - `#set vlan 201 name vlan201 mtu 1500`
    - `#set vlan 201 2/7`
  - While in CONFIG mode:
    - `#interface vlan 201`
    - `#ip address 20.17.19.254 255.255.255.0`
CP – SYSTEM CONFIG

DEFINE LAN WEBNET TYPE QDIO RESTRICTED
MODIFY LAN WEBNET GRANT LINUX001
MODIFY LAN WEBNET GRANT LINUX002
MODIFY LAN WEBNET GRANT LINUX003
MODIFY LAN WEBNET GRANT LINUX004
MODIFY LAN WEBNET GRANT TCPIP
VM TCP/IP directory

USER TCPIP XXXXXXXX 32M 128M ABG

* Guest LAN
  NICDEF E00 TYPE QDIO LAN SYSTEM WEBNET

* OSA
  DEDICATE C200 C200
  DEDICATE C201 C201
  DEDICATE C202 C202

:
VM TCP/IP Profile

; Syntax is z/VM 5.2
; eth0 is the external OSA
   DEVICE ETH0 OSD C200
   LINK ETH0 QDIOETHERNET ETH0 MTU 1500

; eth1 is Guest LAN
   DEVICE ETH1 OSD E00
   LINK ETH1 QDIOETHERNET ETH1 MTU 1500

HOME
   20.17.19.85/24 ETH0
   10.0.1.254/24 ETH1

GATEWAY
   defaultnet 20.17.19.254 ETH0 0
Linux directory entry

USER LINUX002 XXXXXXXXX 128M 2048M G
:
* Guest LAN
  NICDEF C204 TYPE QDIO LAN SYSTEM WEBNET
:
Linux configuration - network

- ifconfig eth0 10.0.1.5 mask 255.255.255.0 mtu 1500
- route add default gw 10.0.1.254
New Configuration #1
Methodology #1

- Create a new VLAN in the Cisco switch to carry the subnet being moved
- Associate the OSA with the new VLAN
- Add a new router to the switch
- Delete the router from z/VM
- Connect the VSWITCH
Cisco Catalyst 6509 (running CatOS)

- **While in ENABLE mode:**
  - `#set vlan 202 name webnet mtu 1500`
  - `#set vlan 202 2/7`

- **While in CONFIG mode:**
  - `#interface vlan 202`
  - `#ip address 10.0.1.254 255.255.255.0`

- **If you do not have a router function in your switch**
  - **add another interface on your router**
  - **plug it into another port**
  - **add the new port to vlan 202**
CP – SYSTEM CONFIG

* from Guest LAN...

DEFINE LAN WEBNET RESTRICTED TYPE QDIO
MODIFY LAN WEBNET GRANT LINUX001
MODIFY LAN WEBNET GRANT LINUX002
MODIFY LAN WEBNET GRANT LINUX003
MODIFY LAN WEBNET GRANT LINUX004
MODIFY LAN WEBNET GRANT TCPIP

* ...to VLAN-unaware VSWITCH

DEFINE VSWITCH WEBNET RDEV C200
MODIFY VSWITCH WEBNET GRANT LINUX001
MODIFY VSWITCH WEBNET GRANT LINUX002
MODIFY VSWITCH WEBNET GRANT LINUX003
MODIFY VSWITCH WEBNET GRANT LINUX004

Note that TCPIP is not in the access list on the VSWITCH
But I want to keep TCP/IP...
A routed Guest LAN

10.0.1 / 24

Router

10.0.1.254

20.17.19.85

TCPIP

z/VM

Default gateway for Guest LAN hosts

OA

20.17.19.85

20.17.19.254

Default gateway for VSWITCH hosts

Switch

20.17.19 / 24
A VLAN-aware switch: An inside look
z/VM Virtual Switch – VLAN aware

Virtual QDIO adapter

IEEE 802.1q transparent bridge
New Configuration #2
Methodology #2

- Use a single OSA port to carry traffic for both VM TCP/IP and the Linux guests
- Use a VLAN-aware VSWITCH
- Add a new router to the switch
- Allow VLAN tags for both subnets to flow on the OSA port
CP – SYSTEM CONFIG

* from a Guest LAN...

DEFINE LAN WEBNET RESTRICTED TYPE QDIO
MODIFY LAN WEBNET GRANT LINUX001
MODIFY LAN WEBNET GRANT LINUX002
MODIFY LAN WEBNET GRANT LINUX003
MODIFY LAN WEBNET GRANT LINUX004
MODIFY LAN WEBNET GRANT TCPIP

* ...to a VLAN-aware VSWITCH

DEFINE VSWITCH WEBNET RDEV C200 VLAN 1
MODIFY VSWITCH WEBNET GRANT LINUX001 VLAN 202
MODIFY VSWITCH WEBNET GRANT LINUX002 VLAN 202
MODIFY VSWITCH WEBNET GRANT LINUX003 VLAN 202
MODIFY VSWITCH WEBNET GRANT LINUX004 VLAN 202
MODIFY VSWITCH WEBNET GRANT TCPIP VLAN 201

The native VLAN id of the switch should match the VLAN specified on DEFINE VSWITCH
Cisco Catalyst 6509 (running CatOS)

- **While in ENABLE mode:**
  
  ```
  #set vlan 202 name webnet mtu 1500  
  #set trunk 2/7 on dot1q 1,201-202
  ```

- **While in CONFIG mode:**
  
  ```
  #interface vlan 202
  #ip address 10.0.1.254 255.255.255.0
  ```

- **If you do not have a router function in your switch**
  - add another interface on your router
  - plug it into another port
  - add the new port to vlan 202
VM TCP/IP directory

USER TCPIP XXXXXXXX 32M 128M ABG

*: Virtual Switch

NICDEF C200 TYPE QDIO LAN SYSTEM WEBNET
VM TCP/IP Profile

; Syntax is z/VM 5.2
; eth0 is the external OSA

DEVICE ETH0 OSD C200
LINK ETH0 QDIOETHERNET ETH0 MTU 1500

HOME
20.17.19.85  255.255.255.0  ETH0

GATEWAY
defaultnet  20.17.19.254  ETH0  0
Conclusion
Summary

- Conversion is relatively easy
- Draw pictures
- There are choices:
  - Separate OSA ports, each assigned to a separate VLAN
  - A single OSA port that trunks multiple VLANs
  - A combination
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