OS/390 Parallel Sysplex Testing Using VM/ESA

at

Nationwide

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Services Co., LLC

Session Topics

- Our Environment

- Background

- Why Virtual Coupling

- Support Provided

- Restrictions

Session Topics (cont'd)

- Our Use
- Setup
- Start-up
- Notices
- Summary

Our Environment

Hardware

- ES/9672-X47 with 2 VM, 1 OS/390 and 1 Coupling Facility LPAR
  - » One VM has 2 VM and 1-3 OS/390 test Operating System guests
- ES/9672-R56 with 2 OS/390 LPARs and 1 Coupling Facility LPAR
- HDS Skyline 627 with 2 OS/390 LPARs

Our Environment

Software

- VM/ESA 2.4.0

  We first used Virtual Coupling Facility during VM/ESA 2.3.0 ESP.

- VM:Manager (VM:Secure, VM:Tape, etc.) and VM:Webserver

- RSCS, PVM, VTAM, TCP/IP

- RTM, Omegamon, VMPRF, ESAMON and ESAMAP in test

- OV/VM, ISPF, COBOL, FOCUS and *many* more

Our Environment

- **Software OS/390**
  - OS/390 2.8, JES3 (2 JESplexes)
  - RACF, VTAM, TCP/IP
  - CA-MII
  - IMS, CICS, VSAM, DB2
  - ISPF, COBOL, FOCUS and *many* more

Background

- **Stand-alone MVS testing**
  - Weekends, nights, **few** opportunities
  - Low success rate for changes
  - Long delays between upgrades
- **Results: many outages**

Solution

- **Test as VM guest**
  - Any time - during normal hours
  - Flexible number of MVS images
  - No real hardware required
- **Results:**
  - Very high success rate for changes with fewer outages (generally 1 or 2 planned IPL's each month).

New Problem

- OS/390 arrives
- IBM introduces PSLC pricing
  - then changes the rules
- Forced to implement Parallel Sysplex to maintain our $oftware co$t $aving$
- No support in VM for PS technologies
- Testing under VM in jeopardy

New Problem

- Presented case to IBM in the form of a SHARE requirement

- IBM provides Virtual Coupling

Why Virtual Coupling?

- **Testing Environment Cost Savings (hardware)**
  - LINKs
  - Console and CU
  - Memory
  - CHPIDs and DASD paths
- **Multiple Sysplexes require multiple sets of hardware - VM permits unlimited copies**

Why Virtual Coupling?

■ **Manageability**

- – Running LPARs and real CF require access to processor console

- – Flexible device sharing

- – Virtual devices

- – Debugging facilities

- – Easier configuration changes

Support Provided

- **VM/ESA provides**
  - Virtual Coupling Facilities
  - Virtual Coupling Links (Message Paths)
  - Virtual TOD Clock Synchronization
- **Not Required**
  - Real Coupling Facilities
  - Real Coupling Links
  - Real Sysplex Timer

Restrictions

- **Required Hardware**
  - S/390 Parallel Enterprise Server (G3 or higher)
  - S/390 Multiprise

- **VM/ESA does *not* support**
  - Real Coupling Facilities
  - Real Coupling Links
  - Sysplex Timer

Our Use

Needed Sysplex for MVS upgrade testing

- JES3 at OS/390 R1.1 requires basic sysplex

- Parallel Sysplex pricing

  » 3 logical data centers share 3 processors

  » 3 JESplexes and SMSplexes

  » Create 1 GRSplex with LOGREC

  • Two disks shared by all systems with a unique esoteric.

Configuration

- ## OS/390 guests
  - Initially 2 guests in same SMS/JESplex
  - Later a third guest in it's own SMS/JESplex

- ## 2 Virtual Coupling Facilities

- ## Virtual 3088 paths for signaling

- ## Be careful with multiple SMSplexes in a single Parallel Sysplex

Setup

- **VM Directory**
  - OS/390 guests
    - » OPTION CFUSER TODENABLE
    - » SPECIAL vdev MSGP cf-guest-id
    - » SPECIAL vdev CTCA mvs-guest-id
  - Virtual Coupling Facilities
    - » OPTION CFVM TODENABLE
    - » *No* IPL statement

Setup

- ## OS/390

  - CLOCKnn member of SYS1.PARMLIB

    » ETRMODE YES

    » SIMETRID 00

  - IXCMIAPU job for coupling data sets

    » Key parameters:

    - TYPE(SIMDEV)
    - MFG(IBM)
    - PLANT(EN)
    - SEQUENCE(0000000CFCC1)
    - PARTITION(0)

Start-up

- Logon or Autolog secondary user for the Coupling Facility Virtual Machines - CFCONSOL
  - Note: This will require some type of program running
- Autolog Coupling Facility Virtual Machines
  - XAUTOLOG CFCC1, XAUTOLOG CFCC2…
- Logon or Autolog the Coupled guests

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CFVM Initialization messages

HCPMFT2817I Load completed from the processor controller.
HCPMFT2817I Now starting message processor CFCC1.
01:09:51 CF0009I Licensed Internal Code - Property of IBM
Coupling facility control code
(C) Copyright IBM Corp 1993,1994,1995,1996,1997
All rights reserved.
US Government Users Restricted Rights -
Use, duplication or disclosure restricted
by GSA ADP Schedule Contract with IBM Corp.
01:09:51 CF0280I CFCC Release 08.00, Service Level 01.05
Built on 02/16/2000 at 09:48:29
Code Load Features:
Facility Operational Level: 8
01:09:51 CF0010I Coupling Facility is active with:
1 CP
0 CF Receiver Channels
118.5 MB of allocatable central storage
0 MB of allocatable expanded storage
01:09:51 CF0102I MODE is POWER SAVE. Current status is VOLATILE.
Power-Save feature is not installed.

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CFVM Console

- **Messages when OS/390 guest connects to CFVM**

  14:13:42 => CON C0 OFF

  14:13:42 CF0149I CHPID C0 OFFLINE.

  14:13:42 => CON C0 ON

  14:13:42 CF0140I CHPID C0 ONLINE, type CFR.

  14:13:42 => CON 80 OFF

  14:13:43 CF0149I CHPID 80 OFFLINE.

  14:13:43 => CON 80 ON

  14:13:43 CF0140I CHPID 80 ONLINE, type CFR.

- **Messages when OS/390 guest disconnects from CFVM**

  15:37:47 => CON 80 OFF

  15:37:47 CF0149I CHPID 80 OFFLINE.

  15:37:47 => CON 80 OFF

  15:37:47 CF0149I CHPID 80 OFFLINE.

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OS/390 JES 3 Syslog

- **OS/390 CF initialization messages**

  IXC306I START PATHIN REQUEST FOR DEVICE 0C52 COMPLETED 030

  SUCCESSFULLY: PARMLIB SPECIFICATION

  IXC306I START PATHOUT REQUEST FOR DEVICE 0C51 COMPLETED 031

  SUCCESSFULLY: PARMLIB SPECIFICATION

  IXC306I START PATHIN REQUEST FOR DEVICE 0C54 COMPLETED 032

  SUCCESSFULLY: PARMLIB SPECIFICATION

  IXC306I START PATHOUT REQUEST FOR DEVICE 0C53 COMPLETED 033

  SUCCESSFULLY: PARMLIB SPECIFICATION

  ⇒ IXC454I SIGNALLING CONNECTIVITY CANNOT BE ESTABLISHED FOR SYSTEMS: THETA

  ⇒ IXC455D REPLY INTERVAL=NNN SECONDS TO RECHECK CONNECTIVITY OR R TO

  ⇒ REINITIALIZE XCF

  ⇒ IEE600I REPLY TO 00 IS;INTERVAL=1

OS/390 JES 3 Syslog

IXC466I INBOUND SIGNAL CONNECTIVITY ESTABLISHED WITH SYSTEM THETA 037
   VIA DEVICE 0C54 WHICH IS CONNECTED TO DEVICE 0CA4

IXC466I OUTBOUND SIGNAL CONNECTIVITY ESTABLISHED WITH SYSTEM THETA 038
   VIA DEVICE 0C53 WHICH IS CONNECTED TO DEVICE 0CA5

IXC418I SYSTEM MTI IS NOW ACTIVE IN SYSPLEX MVSTST

IXC286I COUPLE DATA SET 040

SYS1.MVSTST.CFRM03,

VOLSER SYSPTI, HAS BEEN ADDED AS THE PRIMARY

FOR CFRM ON SYSTEM MTI

IXC286I COUPLE DATA SET 041

SYS1.MVSTST.CFRM04,

VOLSER SYSPTD, HAS BEEN ADDED AS THE ALTERNATE

FOR CFRM ON SYSTEM MTI

IXC286I COUPLE DATA SET 042

SYS1.MVSTST.LOGR01,

VOLSER SYSPTI, HAS BEEN ADDED AS THE PRIMARY

FOR LOGR ON SYSTEM MTI

IXC286I COUPLE DATA SET 043

SYS1.MVSTST.LOGR02,

VOLSER SYSPTD, HAS BEEN ADDED AS THE ALTERNATE

FOR LOGR ON SYSTEM MTI

IXC517I SYSTEM MTI ABLE TO USE 044

    COUPLING FACILITY   SIMDEV.IBM.EN.0000000CFCC1

        PARTITION: 0   CPCID: 00

    NAMED CFCC1

Notices

- XCF initialization delays
- Can't have virtual ESCON CTCs

■ **CF Failure Scenarios we tested**

- Start OS/390 without CFVM logged on
  - » We were able to start the CFVM and connect
- Force one CFVM
  - » We were able to recover after restarting the CFVM
- Run 2 OS/390 guests with a single CFVM.
  - » One OS/390 guest was able to continue running after shutting the other one down and forcing the CFVM to simulate POR of the CEC which runs our production coupling LPAR.

Summary

- Parallel Sysplex testing can be complicated
- VM/ESA provides a flexible environment

Contact Info

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