Where is My Coupling Facility?

The paper is being written to provide clear and concise instructions on how to address the sysplex support team's most common callout. Where is My Coupling Facility?

Problem Description

The first system to IPL in a sysplex in GRS STAR mode is unable to allocate the ISGLOCK structure because no coupling facility (CF) is accessible. The circumstances where the problem is mostly to occur are IPLing a z/OS system at a disaster recovery (DR) site or IPLing a z/OS system following a CF upgrade.

The following messages will appear on the z/OS NIP console.

```
ISG338W GRS INITIALIZATION ERROR. UNABLE TO ALLOCATE GRS LOCK
STRUCTURE (ISGLOCK).
IXLCONN FAILED WITH RC=0000000C, RSN=00000C08.
COUPLING FACILITY CF01 RSN=0000000E.

IXC220W XCF IS UNABLE TO CONTINUE: WAIT STATE CODE: 0A3 REASON
CODE: 0BC,  EXTERNAL CALLER REQUESTED WAIT STATE TO BE LOADED
```

Path to Resolution

If there is no CF available at the site then the GRS STAR environment cannot be initialized. A CF is required for allocation of the ISGLOCK structure . To successfully IPL the system in a GRS RING specify GRS=TRYJOIN and leverage XCF signaling or ensure GRS CTCs are properly configured. To successfully IPL a single system which does not need to serialize access to resources with other systems, GRS=NONE may be specified. Once the system(s) are IPLed, other applications may struggle if they are configured to leverage CF structures. Thus, additional modifications may be necessary.

If there is a CF available at the site, then the CF must be physically connected to the z/OS image and logically defined in the ACTIVE CFRM policy. Historically, the CF not being defined correctly in the CFRM policy is the root of the problem. The swiftest way to determine the state of the CF is to IPL one and only one z/OS image in a single image GRS RING by specifying GRS=TRYJOIN at IPL. IEASYSxx may be modified to declare TRYJOIN or override PARMLIB setting when prompted with MSG IEA101A during IPL.

Once the z/OS system is IPLed, issue D CF. Next, verify physical connectivity to the CF. MSGIXL150I will indicate the serial number of the CF to which the z/OS image has physical connectivity. The paths to the coupling facility must be ONLINE physically and logically.

```
IXL150I  09.41.25  DISPLAY CF
COUPLING FACILITY 002817.IBM.02.00000000E1ZZ
                  PARTITION: 09  CPCID: 00
                  CONTROL UNIT ID: FFB4
… lines omitted…
SENDER PATH      PHYSICAL            LOGICAL      CHANNEL TYPE
  05 / 0518       ONLINE             ONLINE        CFP
  06 / 05A1       ONLINE             ONLINE        CFP
  24 / 0713       ONLINE             ONLINE        CIB
  26 / 070D       ONLINE             ONLINE        CIB
… lines omitted…
```

If there is no CF connected to the z/OS system
> (a) Verify the links are physically connected, aka, cables are plugged in properly
> (b) Verify the CF image is active
> (c) Verify the CF is defined as a CF in the IODF
> (d) Validate the coupling link configuration in the IODF
> (e) Validate the CTNid for the CPC on which the CF resides matches the CTNid for the CPC on which the z/OS image resides

If the paths are offline logically, vary the paths online. If the paths are offline physically, configure the paths online. MSGIXL157I will be issued as paths the CF become operational.

After the physical connectivity has been validated, ensure the coupling facility is logically and correctly declared in the active CFRM policy. Issue D XCF,CF. Verify the serial number which appears in the D CF MSGIXL150I output matches the information in the D XCF,CF MSGIXC361I. Cut and paste works wonderfully to confirm the serial numbers match.

```
IXC361I  09.40.17  DISPLAY XCF
CFNAME     COUPLING FACILITY                SITE
CF1        002817.IBM.02.00000000F4QQ       SITE2
           PARTITION: 10   CPCID: 00
CF2        002817.IBM.02.00000007FDTT       SITE1
           PARTITION: 36   CPCID: 00
CF3        002817.IBM.02.00000000E1ZZ       SITE1
           PARTITION: 09   CPCID: 00
```

If the CF is physically connected and correctly defined in the active CFRM policy message MSGIXC517I will be issued to indicate the z/OS system can use the coupling facility.

If the CF is physically connected but is not correctly defined in the CFRM policy MSGIXC517I will not be issued. To define the CF, a new policy can be defined in the CFRM CDS and then activated using

```
SETXCF START,POLICY,TYPE=CFRM,POLNAME=polname
```

Alternatively, the currently active policy can be updated.

Hints & Tips

The most common errors when updating the CFRM policy:

      (a) Trying to IPL at the DR Site using a copied or mirrored CFRM CDS from the primary site with definitions to the CFs at the primary site and no definitions for the CFs at the DR Site

      (b) Typo in the serial number
          i. Typing O "oh" instead of 0 "zero"
          ii. Typing an l "lower case L" instead of 1 "one"
          iii. Missing a significant 0 "zero"

      (c) The CFRM CDS is only formatted for 2 CFs and this would be the third
      (d) Declaring the "in-use" CFRM CDS in the IXCMIAPU job. IXCMIAPU will fail. Do not declare the CFRM CDS in the IXCMIAPU job when updating the CFRM CDS being actively used by the sysplex.
      (e) Correct serial number, but with an incorrect partition number
      (f) Updating or creating a CFRM policy in the current CFRM CDS but did not issue the SETXCF command to make the new or updated policy the active policy
      (g) CF definitions updated correctly, PREFLIST for ISGLOCK does not contain the available CF

For completeness, if the ISGLOCK structure size has not been updated over several CFCC upgrades, or this is a new STAR configuration, it is possible to receive the ISG338W due to the INITSIZE / SIZE of the ISGLOCK being too small. The resolution to this scenario is to run CFSizer and update the ISGLOCK structure definition. Similarly, if the size of storage allocated to the CF is insufficient to allow the ISGLOCK structure to be allocated the ISG338W will be issued.

If mirrored or copied CDSes are used, please review the most common high impact pitfalls shared in Hot Topics Issue 24 p 69, "Mirror, mirror on the wall, should couple datasets be mirrored at all?"

Completing the IPL(s)

Once the IXC517I is issued, the connected z/OS system(s) may use the CF. If the system was IPLed using TRYJOIN, it is possible to migrate to GRS STAR using SETGRS MODE=STAR and continue to bring up applications. If IEASYSxx was changed to GRS=TRYJOIN or GRS=NONE, set it back to GRS=STAR. If GRS=NONE mode was used, or if leveraging automation is desired, re-IPL the z/OS system. After the first system is up in the GRS STAR environment the other systems in the sysplex may be IPLed.

IBM **strongly recommends** reviewing existing procedures and updating them as appropriate.

Additional references:
WP10905 Best Practices Upgrading a Coupling Facility Version 2
z/OS V1R13.0 MVS Planning: Global Resource Serialization
z/OS V1R13.0 MVS Setting Up a Sysplex
z/OS V1R13.0 MVS System Codes
z/OS V1R13.0 MVS System Messages, Vol 9 (IGF-IWM)