



z/OS® V1R10

GRS latch contention display enhancement

@business on demand software

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Table of contents

- Session objectives
- GRS background
- Overview
- Usage and invocation
- Interactions and dependencies
- Migration and coexistence considerations
- Installation
- Session summary

Session objectives

- You should understand the change to the D GRS,C,LATCH output and how it benefits your installation.

Background: GRS – ENQ and latch services



- APIs: ENQ,DEQ,Reserve,ISGENQ,GQSCAN, ISGQUERY
- Resource Identity: QNAME, RNAME, SCOPE
- Scope: JOB STEP,SYSTEM, GRS Complex
- Shared/Exclusive ownership
- Authorized/Unauthorized
- Widely used
- Reasonable performance
- Installation controls – RNLs and Exits

Latch Sets

1	
2	
x	

- APIs: Create, Obtain, Release and Purge
- Resource Identity: latch#
- Scope: single system
- Shared /Exclusive ownership
- Authorized only
- Widely used by systems/subsystems
- Very fast
- No installation controls

This is just a background foil since many people do not realize that GRS provides two sets of critical system serialization services. When GRS services are not working well you know it - something usually fails or poor performance.

- The GRS ENQ services provide the ability to serialize an abstract resource within the scope of a JOB STEP, SYSTEM or multi-system complex (GRS Complex). The GRS complex is usually equal to the sysplex. Using the HW reserve function, DASD volumes can be shared between different systems that are not in the same GRS complex or even the same operating system. For example, between z/VM,..., and z/OS. Enq/Reserve services can be used by authorized or unauthorized users. Almost every component, subsystem, and many applications use ENQ in some shape or form.

- The GRS latch services provide a high speed serialization service for authorized callers only. It uses user provided storage to manage a lock table that is indexed by a user defined lock number. GRS latch is also widely used. Very big users are USS, Logger, RRS, MVS, and so on. GRS latch non-contention path is on the order of tens of instructions while ENQ is on the order of a thousand for a local (single system) ENQ. GRS latch requires more recovery type coding on behalf of the resource manager cleanup at task or address space termination.

Overview

- **Problem statement / need addressed:**
 - ▶ GRS latches are used by many components
 - ▶ Latch contention/deadlock can cause outages or bad performance
 - ▶ The current D GRS,C,Latch output does not provide critical information needed to diagnose and take action on a latch contention problem:
 - The holding/waiting units of work (TCB/SRB-WEB) within an ASID are not displayed
 - The amount of time that the latch is in contention is not displayed
 - Not having this makes it impossible to determine if a latch was in contention continuously between intervals. For example, it has gone in and out of contention but every time you look the same players were in contention.
- **Solution:**
 - ▶ Provide the unit of work information and elapsed hold/wait times.
 - ▶ Roll the function back to R8 and R9 in APAR OA24658.
- **Benefit:**
 - ▶ The elapsed time allows you to determine if the latch is moving which can prevent false alarms/actions.
 - ▶ The unit of work information provides better PD and allows you to possibly take more specific action against the unit of work rather than the entire address space.

This line item is adding a unit of work address and the latch request/hold elapsed time to the D GRS,Contention,Latch output. This solves a long term PD (problem determination) issue related to which units of work within an ASID are affected and if displayed contention is for new or old instances of contention. It is currently impossible to determine:

- The difference between long term contention and new instances of the short term contention. For example, every time you look the same players are in contention but you don't know if something is moving or not. Some latches can be in frequent contention.
- What unit of work is holding onto the latch and which ones are affected by the contention. In some instances (L2 direction), it might be useful to "abend" the holder's task rather than cancel the address space in emergency situations.

Overview

- The WORKUNIT, TCB (Y/N) and ELAPSED TIME columns were added to the display:

```

- S1 d grs,l,c
ISG343I 11.14.59 GRS STATUS          FRAME 1   F   E   SYS=S1
LATCH SET NAME:  LAR25SET1
CREATOR JOBNAME: GRJLAR25  CREATOR ASID: 0029
LATCH NUMBER:    0
REQUESTOR  ASID  EXC/SHR  OWN/WAIT  WORKUNIT  TCB  ELAPSED TIME
GRJLAR25   0029  EXCLUSIVE OWN      006E6CF0  Y   00:00:40
GRJLAR25   0029  SHARED   WAIT     006E6B58  Y   00:00:28
LATCH NUMBER:    1

```

- Using the new display output ([line item 1027](#)), the customer can:
 - Prevent false latch contention actions/alarms
 - Take action against the holding unit of work
- Value:
 - You can do the right thing

The elapsed time shows how much time has elapsed between the time the request entered this state and the issuance of the display in hh:mm:ss.ddd format. Note that no rounding is done. Also, if the elapsed time is greater than 24 hours, the following text will be displayed: -over 24 hrs.

Usage and invocation

- The support is invoked by:
 - ▶ D GRS,C or D GRS,C,Latch
- Note that GRS is providing a generic service and has no idea what the latches are being used for by the owning component. As such, you should refer to the MVS Diagnosis: Reference manual and component specific documentation for additional information on what specific latch contention could mean and what steps should be taken for different circumstances.

The MVS Diagnosis: Reference manual has additional information on how latches are used by exploiters and the proper procedures for each component. The following section is an example: “2.10.6 Understanding UNIX System Services latch contention”.

Interactions and dependencies

- Hardware dependencies
 - ▶ None
- Software dependencies
 - ▶ Check your automation
- Exploiters
 - ▶ Automation, systems programmers, and so on.

Migration and coexistence considerations

- Check automation for any issues

Installation

- Prerequisites for installation
 - ▶ Check/update automation
 - ▶ Check/update operator procedures
- Installation publication references
 - ▶ SA22-7627-16 z/OS V1R10 MVS System Commands
 - ▶ GA22-7588-09 z/OS V1R9.0 MVS Diagnosis: Reference

Session summary

- Enjoy the better latch contention display output

Note: If you are not using D GRS,ANALYZE,ENQ for ENQs then you should take a look at it because it is better than D GRS,C for analyzing ENQ contention.

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