z/OS 3.1 IBM Education Assistant

Solution Name: z/OSMF Structure Sizing Support APIs

Solution Element(s): z/OS

July 2023

Agenda

- Trademarks
- Objectives
- Overview
- Usage & Invocation
- Interactions & Dependencies
- Upgrade & Coexistence Considerations
- Installation & Configuration
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Trademarks

- See url http://www.ibm.com/legal/copytrade.shtml for a list of trademarks.
- Additional Trademarks: None

Objectives

- Provide a very brief overview of concepts related to sizing coupling facility (CF) structures.
- Describe z/OSMF dependency on z/OS APIs for incorporating the functions of CFSizer and the Sizer utility
- Describe updates to z/OS APIs

Overview

- Who (Audience)
  - System programmers and capacity planners implementing CFRM policies that reflect structure sizes and placement
- What (Solution)
  - Enhance sysplex APIs that provide information about structure attributes and calculate structure sizes to support z/OSMF structure sizing and policy editor functions
- Wow (Benefit / Value, Need Addressed)
  - z/OSMF users will be able to:
    - Size structures for new or changing workloads for specific CFLevels
    - Resize existing structures for CF upgrades, even before a CF at the new level is installed

Structure Sizing Basics

- A CF structure's size is determined by:
  - Fixed attributes (has data or not, has a lock table or not, has adjunct areas or not, etc.)
  - Object counts (number of lists or directory entries, number of data elements, etc.)
  - CF internal storage
- Size varies with CFLevel - typically increases as CFLevel increases
- A CF structure is properly sized when:
  - It's big enough to support the application workload without impeding performance or exhausting the allocated supply of required structure objects
  - It's not so big that it wastes CF storage or causes capacity planning issues
- Customers must estimate structure sizes in advance to construct a CFRM policy

Structure Sizing Tools

- CFSizer
  - Web-based (https://www.ibm.com/support/pages/cfsizer)
  - Estimate structure size for new or changed workload
  - One web page per structure-owning application (XCF Signaling, IMS, Db2, etc.)
  - For each structure type, input workload characteristics
  - Estimates required structure object counts based on input workload characteristics and structure models
  - Uses IXLCSP API to compute initial and maximum structure size recommendations
  - Issues
    - Can only size at the CFLevel installed on the IBM CF that fields the request
    - Hard to collect the inputs and no way to save them
    - Manual input of results to CFRM policy

Structure Sizing Tools (cont'd)

- Sizer utility
  - Batch or started task, download from CFSizer website Alternate Sizing Techniques page (https://www.ibm.com/support/pages/cfsizer-alternate-sizing-techniques)
  - Use when satisfied with existing structure sizes, upgrading a CF, and need to estimate sizes of existing structures to preserve capacity in new CF
  - Obtains existing structure attributes and counts using IXLMG API
  - Uses IXLCSP API to compute sizes for new CF
  - Issues
    - Must have CF at desired level installed
    - Manual input of results to CFRM policy

IXLCSP Enhancements

- SERVICE(COMPUTE)
  - Encompasses existing structure computation function
  - Today, must specify CFNAME to select an installed CF to perform computation
  - Now emulating one or more CFLevels in software, starting with current and adding over time
  - Can now specify CFLEVEL keyword instead of CFNAME
    - If requested CFLevel exists in configuration, drives request to live CF and CF performs calculation as today
    - If requested CFLevel is available in emulation, performs calculation in z/OS software
    - If neither live nor emulated support available, request fails with return / reason code 8 / xxx08BE and provides list of supported CFLevels in answer area IXLYCSPA
- SERVICE(QUERY)
  - New support to return the set of CFLevels for which calculation is supported
  - Answer area IXLYCSPA defines new mapping CSPA_CFLevelInfo
    - Number of supported CFLevels
    - For each each entry, provides the CFLevel and whether it is supported by a live CF, software emulation, or both

IXLMG Enhancements

- New CHAINTYPE keyword
  - Specify how answer area (IXLYAMDA) entries are chained
    - Pointer (default, existing behavior) – chain fields in entries are pointers containing virtual address of related / next entry
    - Offset – chain fields contain offset from start of answer area identified by DataArea keyword
  - Offset allows routines performing IXLMG on behalf of another requestor to transfer output from one buffer into another without adjusting pointer contents

Usage & Invocation

- IXLCSP structure computation API

```
IXLCSP [SERVICE=COMPUTE
        [,CFNAME=xcfname
        [,CFLEVEL=xcflevel
        [,TYPE=CACHE
         ...
        [,TYPE=LIST
          ...
        [,TYPE=LOCK
           ...]
       [SERVICE=QUERY]
        ,ANSAREA=xansarea
          ,ANSLEN=xanslen
        ...
```

Usage & Invocation (cont'd)

- IXLCSP answer area (IXLYCSPA)

```
CSPA_CFLEVELINFO DSECT
CSPA_CFLEVELCOUNT DS F   Number of valid entries in
                         CSPA_CFLevelArray
CSPA_CFLEVELARRAY DS CL8 Array of CFLEVEL information
         ORG   CSPA_CFLEVELARRAY
CSPA_CFLEVELVALUE DS F   CFLEVEL value
CSPA_CFLEVELFLAGS DS B   CFLEVEL flags
*  Bit definitions:
CSPA_CFLEVELCONNECTED EQU X'80' On => A CF with this CFLEVEL is        *
                         connected to the system initiating the IXLCSP *
                         request. In processing a sizing request       *
                         specifying this CFLEVEL, the system may       *
                         select any connected CF that supports it.
CSPA_CFLEVELEMULATED EQU X'40' On => The system has support for        *
                         emulating this CFLEVEL in software.
         DS    CL3       Reserved
```

Usage & Invocation (cont'd)

- IXLMG measurement gathering API

```
IXLMG    DATAAREA=xdataarea
        ,DATALEN=xdatalen
       [,CHAINTYPE={POINTER|OFFSET}]
        ,...
```

Interactions & Dependencies

- Software Dependencies
  - None
- Hardware Dependencies
  - None
- Exploiters
  - z/OSMF Sysplex Management application

Upgrade & Coexistence Considerations

- To exploit this solution, all systems in the Plex must be at the new z/OS level: No
- All changes are compatible

Installation & Configuration

- There are no installation or configuration concerns
- Support to be rolled down to z/OS V2R5 via APARs OA63685 and OA64664. Support for emulated CFLevels will be delivered in both z/OS 3.1 and V2R5 by APAR OA64662.

Summary

- IXLCSP API enhanced to support CFLevel emulation, request sizing by CFLevel vs. CF name, and to provide a query service reporting on supported CFLevels
- IXLMG API enhanced to support chaining of output data area entries by offset as well as pointer
- All changes are compatible
- Changes will be rolled down to z/OS V2R5

Appendix

- Publications
  - z/OS MVS Sysplex Services Guide
  - z/OS MVS Sysplex Services Reference
- Websites
  - CFSizer landing page: https://www.ibm.com/support/pages/cfsizer
  - CFSizer alternate sizing techniques page (Sizer utility download): https://www.ibm.com/support/pages/cfsizer-alternate-sizing-techniques