CA Datacom® CICS Services

Best Practices Guide

Version 14.02

CA Technologies Product References

This document references the following CA products:

- CA Datacom® CICS Services
- CA Datacom®/DB
- CA Chorus™ Software Manager™ (CA CSM)

Contact CA Technologies

Contact CA Support

For your convenience, CA Technologies provides one site where you can access the information that you need for your Home Office, Small Business, and Enterprise CA Technologies products. At http://ca.com/support, you can access the following resources:

- Online and telephone contact information for technical assistance and customer services
- Information about user communities and forums
- Product and documentation downloads
- CA Support policies and guidelines
- Other helpful resources appropriate for your product

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Best Practices Guide Process

These best practices are based on customer experience reported through interviews with development, technical support, and technical services. Therefore, many of these best practices are a collaborative effort stemming from customer feedback.

To continue to build on this process, we encourage you to share common themes of product use that might benefit other users. Please consider sharing your best practices with us.

To share your best *practices, c*ontact us at techpubs@ca.com and preface your email subject line with "Best Practices for product name" so that we can easily identify and categorize them.

Contents

Chapter 1: Introduction

This section contains the following topics:

Purpose of this Guide

The guide provides a brief introduction to the CA Technologies mainframe management strategy and features, and describes the best practices for installing and configuring CA Datacom CICS Services.

Audience

The intended audience for this guide is systems programmers and administrators who install, configure, deploy, and maintain CA Datacom CICS Services.

Mainframe 2.0 Overview

Mainframe 2.0 is our strategy for providing leadership in the mainframe operating environment. We intend to lead the mainframe marketplace for customer experience, Out-Tasking solutions, and solution innovation. After listening to customer needs and requirements to keep the mainframe operating environment viable and cost-effective, we are providing new tools to simplify usage and to energize this operating environment for years to come.

CA Mainframe Software Manager™ (CA Mainframe Software Manager) is an important step in realizing the Mainframe 2.0 strategy. CA Mainframe Software Manager simplifies and standardizes the delivery, installation, and maintenance of mainframe products on z/OS systems. CA Mainframe Software Manager has a web-based interface with a modern look and feel for managing those solutions. As products adopt Mainframe 2.0 features and CA Mainframe Software Manager services, you can acquire, install, and manage your software in a common way.

We follow the IBM z/OS packaging standards using SMP/E, with some additional CA Technologies qualities of service added, to make installation simple and consistent. Additionally, through the synchronization of product releases and the use of common test environments, we will declare a yearly mainframe software stack that includes many new releases with enhanced functionality. This stack is certified for interoperability across the CA Technologies mainframe product portfolio and the base IBM z/OS product stack.

Mainframe 2.0 Features

Mainframe 2.0 has the following main features:

CA Mainframe Software Manager (CA MSM)

Delivers simplified acquisition, installation, and deployment capabilities using a common z/OS-based web application delivered through a browser-based UI. CA MSM includes the following services:

Product Acquisition Service (PAS)

Facilitates the acquisition of our mainframe products and services, including product base installation packages and program temporary fixes (PTFs). This service integrates the inventory of products available on your system with CA Support, providing a seamless environment for managing and downloading software and fixes onto your system.

Software Installation Service (SIS)

Facilitates the installation and maintenance of our mainframe products in the software inventory of the driving system. This service enables you to browse and manage the software inventory using a web interface, and automates tasks for products that use SMP/E to manage installation. You can browse downloaded software packages, and browse and manage one or more consolidated software inventories (CSIs) on the driving system.

Software Deployment Service (SDS)

Facilitates the deployment of CA Technologies mainframe products from the software inventory of the driving system. This service enables you to deploy installed products that are policy-driven with a set of appropriate transport mechanisms across a known topology. The enterprise system topology can include shared DASD environments, networked environments, and z/OS systems. Policies represent a combination of metadata input and user-supplied input. Metadata input identifies the component parts of a product. User-supplied input identifies the deployment criteria, such as where it goes and what it is named.

Software Configuration Service (SCS)

Facilitates the mainframe products configuration from the software inventory of the driving system to the targeted z/OS mainframe operating system. SCS guides you through the configuration creation process, and through the manual steps to implement the configuration. In addition, SCS includes an address space communications service running on each targeted z/OS system.

Electronic Software Delivery (ESD)

Enables you to get our products from an FTP server. We have improved this process so that you no longer need to build a tape to install the product.

Best Practices Management

Integrates with IBM Health Checker for z/OS to verify that deployed software follows our best practices. The health checks continually monitor the system and software to provide feedback on whether the software continues to be configured optimally.

Best Practices Guide

Provides best practices for product installation and configuration.

Active and Heartbeat Event Management through CA OPS/MVS EMA

CA Technologies mainframe products can automatically communicate both active status events and heartbeat events to CA OPS/MVS in a consistent manner. The enabling technology for this feature is through a generic event API call that CA OPS/MVS provides to the other products so that they can communicate events to CA OPS/MVS.

Two versions of this API call are provided to support this initiative:

- An active status event API call that allows other products to generate events for the CA OPS/MVS EMA System State Manager (SSM) component when they are starting, up, stopping, or down.
- A heartbeat API call that allows other CA Technologies products to communicate a normal, warning, or problem overall health status and reasoning to CA OPS/MVS EMA on a regular interval.

After a CA Technologies product begins generating heart beat events for CA OPS/MVS, CA OPS/MVS can also react to the lack of a heart beat event from another CA Technologies product address space, treating this as an indication that there is either a potential problem with the CA Technologies product address space, or there is a larger system-level problem.

SSM is a built-in feature of CA OPS/MVS that uses an internal relational data framework to proactively monitor and manage started tasks, online applications, subsystems, JES initiators, and other z/OS resources including your CA Technologies mainframe products. SSM compares the current state of online systems, hardware devices, and the other resources with their desired state, and then automatically makes the necessary corrections when a resource is not in its desired state. This provides proactive and reactive state management of critical resources. As previously noted, SSM is particularly interested in receiving active status events consistently from all CA Technologies products when they are starting, up, stopping, or down. Without this consistent type of events, SSM must maintain separate rules in CA OPS/MVS for each product unique messages that are associated with starting and stopping.

Note: For additional information about the CA Mainframe 2.0 initiative, see http://ca.com//mainframe2.

Chapter 2: CA Datacom CICS Services Installation and Configuration Best Practices

This section contains the following topics:

Updating Techniques, SYNCPOINT, and Logging

Business Value

To maintain the most efficient and functional transaction processing environment, minimize the length of time your applications hold data with exclusive control (data locks). A transaction (task) that waits on a terminal response from the operator is called a conversational transaction. When waiting for an operator response, if your application locks data other users requesting a read for update of that data must wait until the transaction releases the data. For best overall performance, when writing CICS transactions do not lock the data to update while waiting for a response from an operator.

Additional Considerations

To avoid waiting on the terminal, you can help increase performance by issuing the following commands as late as possible in the processing of the transaction:

- ADDIT, RDU*xx* (one of the read for update commands)
- DELET
- UPDAT

When updating a database in a CICS environment, pseudoconversational mode is the recommended method.

Note: A pseudoconversational transaction is a collection of tasks and transactions that appear to the end user as one task.

To perform a pseudoconversational transaction:

1. Read the target record without locking it.
2. Save the record information in a temporary location.
3. Display the record information to the screen and end the transaction.
4. Obtain the updates to the information upon entry of the new transaction.
5. Reread the target record with a lock.
6. Verify that the locked record information is the same as the original information, and then write the updated information to the locked record.

   If the locked record information differs from the original information, release the record and return to Step 2, if desired.
7. Issue SYNCPOINT or end the transaction.

If a long running conversational transaction is needed, issue frequent SYNCPOINTs after updating records to increase efficiency. Task completion automatically generates a SYNCPOINT. When no ABEND HANDLER exists, a task ABEND generates a SYNCPOINT ROLLBACK.

Use SYNCPOINTs instead of CA Datacom/DB log (LOG*xx*) commands. Whenever possible, avoid using LOG*xx* commands (including COMIT and ROLBK) in a CICS environment.

Using CICS SYNCPOINT

Business Value

Simplified management of CA Datacom CICS Services resources using CICS SYNCPOINT implementation for user log type commands is available.

Important! Take great care to distinguish between user issued log commands and log commands that are issued as a result of SYNCPOINT. Both can generate the same log command, but they may not function the same way. A user issued log command is when an application issues a CA Datacom/DB request with its command being a log command.

Additional Considerations

Take advantage of the following simplifications:

- Synchronization of all resources is ensured.
- All LOG*xx* commands that checkpoint data participate in both the MVS LOGGER (or CICS JOURNAL FILE if z/VSE) and the LXX.
- SYNCPOINT optimization of DB logging commands is allowed.
- The original user log command is preserved on the CA Datacom/DB LXX file.

All updates for application issued SYNCPOINTs and task termination SYNCPOINTs are true for CA Datacom CICS Services r11 and Version 14.0. No difference between r11 and Version 14.0 exists for user-issued or CICS issued SYNCPOINTs.

When an application program issues a CICS SYNCPOINT, all held data resources but not the sets necessarily, are released. Released resources include all resources under exclusive control, and the release of threads making those resources available for batch jobs or other CICS tasks to hold and update. After an application issues a CICS SYNCPOINT, CA Datacom CICS Services participates in SYNCPOINT, and the task completes one unit of work (UOW). Coding a CICS SYNCPOINT commits all updates to all resources or backs them all out including the following:

- VSAM
- DL/I
- BDAM
- DB2
- CA Datacom/DB
- CICS SYNCPOINT ROLLBACK

Important! If you want SYNCPOINT ROLLBACK to back out the updates for a transaction, specify the parameter value DTB=YES in the appropriate TRANSACTION definition. If DTB=NO is specified, SYNCPOINT ROLLBACK is treated as a SYNCPOINT and all the updates are committed.

Whenever possible, use the CICS SYNCPOINT or CICS SYNCPOINT ROLLBACK command for committing updates instead of specifying the following CA Datacom/DB commands:

- COMIT
- LOGCP
- LOGTB
- ROLBK

When modifying legacy programs containing these commands, consider converting the LOG commands to SYNCPOINTs at that same time.

Note: CBS and SQL sets are beyond the scope of this document. They are not obligated to follow any of the rules stated in this document concerning exclusive control. There can be cases where sets remain beyond a SYNCPOINT or task termination or log commands.

Leveraging the IBM OTE to Increase Performance

Business Value

Proper use of the Open Transaction Environment (OTE) allows applications to run faster with higher throughput and better performance.

Additional Considerations

Take advantage of many TCBs available in the OTE in CICS to relieve stress on QR TCB. Allow multiple transactions to run simultaneously to achieve higher throughput and better performance.

To leverage the OTE for increased performance:

- Find out whether your application is threadsafe.
- Find out whether your application makes DB2 or other resource manager calls with DATACOM calls.
- Find out whether you are QR TCB bound or CPU bound.
- Find out whether the application provider has a threadsafe version of the code.
- Find out whether your application runs with EXECKEY of CICS or USER.
- Find out the value of MAXOPNTCBS in the CICS initialization phase and whether you can change the value.

All factors play important roles in increasing performance in OTE. Consider them collectively to maximize performance of the application.

OTE provides many OPEN TCBs (engines) where CICS can run its transactions simultaneously. The goal is to achieve threadsafety on as many applications as possible to take advantage of this feature in CA Datacom CICS Services.

To achieve that goal, CA Datacom CICS Services was written and enhanced to threadsafe standards in Version 14.0 to run in the OTE environment. To take advantage of this new feature, select the option OPENAPI=YES in the DBCVTPR macro. The default is OPENAPI=NO which keeps CA Datacom CICS Services running on QR TCB (Quasi-reentrant) like it was in r11. This selection does not necessarily depend on the application threadsafety and can be selected independently. However, the following selection criteria may help you decide.

The environment that benefits most from this selection is one that allows for the use of many TCBs. It is also architected to minimize TCB switching while running a transaction from the start to end.

Example Scenarios

Select a value of YES for OPENAPI if your environment can be defined as:

1. A threadsafe application running.
2. An application with both DATACOM and non-DATACOM resource manager calls such as DB2 regardless of application threadsafety.
3. A clearly defined *QR or CPU bound* environment regardless of application threadsafety. In this case, the application would keep running on QR but CA Datacom CICS Services would run on L8 TCBs. Monitor the environment and measure performance to help ensure that expected performance improvements have been achieved. Consider changes for application threadsafety if the expected throughput goals have not been achieved.

Monitor your environment and make any necessary changes for performance gains.

If choosing the option OPENAPI=YES has minimal or even negative impact on the performance of the system, it would be a good time to take one of the following actions:

- Replace the application with a threadsafe version.
- Run the application with the EXECKEY=CICS option if possible.
- Increase the number of MAXOPNTCBs in the CICS SIT table. With respect to choosing a proper value for MAXOPNTCB, this value must be set to at least the value of the USERS value in the DBCVTPR. The MAXOPNTCB value must also account for the other resource managers that use open TCBs and all the applications that use open TCBs. This is in addition to the number of MAXOPNTCB for the CA Datacom threads.

Note: See the IBM documentation about selecting a value to accommodate the need of your CICS environment for open TCBs and requirements for the CA Datacom/DB threads.

Using SKIPLOAD

Business Value

The SKIPLOAD URT RANGES feature allows CA Datacom CICS Services to shorten startup time by eliminating certain specified URT ranges because they do not exist in the site configuration. Many users want to match DBID numbers with URT numbers. Therefore, the MAXURT can be high. SKIPLOAD reduces the number of attempted loads by telling CA Datacom CICS Services to skip loading certain ranges of URTs for which they have not been created.

Additional Considerations

SKIPLOAD is beneficial if you want to use DBCVTPR DYNPPT=YES with the CICS Program AUTO install using modeling.

By adding new SKIPLOAD macros or multiple macros to the DBCVTPR, you can specify the range or ranges of URTs to skip during startup when all URTs up to the MAXURT value are loaded. More than one can be specified in a DBCVTPR assembly. Place them immediately after the last DBCSID macro. If no DBCSID macros exist, placement is immediately following the DBCVTPR macro in the DBCVTPR assembly.

Important! Allow some extra entries for DQRY dynamic URT generation.

Example Scenario

The following example demonstrates how to reduce the attempted URT loads from 4025 to 162 in a CICS Program auto install environment. The startup time is greatly reduced while saving CICS CSD definition time. SQL was added with the DQRY DQL mode to show how to allow for extra URT entries for DYNAMIC URT generation.

A service bureau has four clients. Each client requires their own MUF and set of DBIDs. The first site is the bureau and uses CA Datacom SQL and DQRY DQL mode and bases 1-30.

- The first client uses DBIDs 21-50 on MUF2
- The second client uses DBIDs 21-40 on MUF3
- The third client uses DBIDs 21-59 on MUF4
- The fourth client uses DBIDs 20-25 on MUF5

The service bureau has 25 SQL tables in the SQL DBID. This bureau is using DBID remapping by 1000 for each additional client. Therefore, client 3 DBIDs in CICS are 3021-3059, which are mapped to 21-59 in MUF 4. DBIDs and URT IDs match. The site would need to leave 25 additional open URT slots for dynamic URTs for DQRY to access those tables in DQL mode. In this case, we assume that the DBIDs and SQL table are fairly stable meaning that new SQL tables and new bases are rare over time.

Results would be as follows:

```
DBCVTPR MAXURT=4025
DBCSID   SIDNAME=DEFAULT,USERS=17,CONNECT=P
DBCSID   SIDNAME=SIDMUF2. USERS=4,CONNECT=D
DBCSID   SIDNAME=SIDMUF3, USERS=9,CONNECT=A
DBCSID   SIDNAME=SIDMUF4, USERS=6,CONNECT=A
SKIPLOAD SKIP_LOAD_FROM=56,SKIP_LOAD_TO=999       * skip over 25 entries for dynamics
SKIPLOAD SKIP_LOAD_FROM=1151,SKIP_LOAD_TO=2019
SKIPLOAD SKIP_LOAD_FROM=2041,SKIP_LOAD_TO=3019
SKIPLOAD SKIP_LOAD_FROM=3060,SKIP_LOAD_TO=4019
```

The number of attempted loads is reduced from 4025 to 162 and saves considerable startup time.

Note: URTs 1000 through 1020 were not skipped because CA products can use them.