CA MICS® Resource Management

Best Practices Guide

Release 12.9

CA Technologies Product References

This documentation set references the following CA products:

- CA Common Services for z/OS
- CA SMF Director®
- CA Service Desk
- CA Chorus™ Software Manager (CA CMS)

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

Providing Feedback About Product Documentation

If you have comments or questions about CA Technologies product documentation, you can send a message to techpubs@ca.com.

To provide feedback about CA Technologies product documentation, complete our short customer survey which is available on the CA Support website at http://ca.com/docs.

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*, contact 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.

Documentation Changes

- Contents was re-organized into different chapters for easier reading.

Contents

Chapter 1: Introduction

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

The intended audience of this guide is systems programmers and administrators who install, maintain, deploy, and configure your product.

This section contains the following topics:

Installation

Download product and maintenance releases using Electronic Software Delivery (ESD)

Business Value:

ESD lets you download product and maintenance releases over the Internet directly to your system from the CA Support website. When you order the product, you receive the authorizations and instructions to access, download, and prepare the installation files without the need for a physical tape.

Additional Considerations:

CA MICS does not use CA Chorus™ Software Manager (CA CSM) for product installation and maintenance.

More Information:

See the *Pax Enhanced ESD User Guide* available when you order the product.

Implement a Proactive Preventive Maintenance Strategy

CA Technologies delivers an annual Service Pack containing the complete set of software updates required to upgrade a CA MICS installation to the next release. You should apply the product updates provided by the annual Service Pack and regularly review CA Support Online for PTFs applicable to the CA MICS products installed at your site.

Business Value:

Keeping your products current with maintenance helps your team remain productive and minimize errors while safely protecting your systems. If you do not install preventive maintenance regularly, you risk encountering known problems for which we have published and tested fixes.

The CA MICS maintenance philosophy is designed to give you the ability to maintain your CA MICS installation with the flexibility required to meet your site-specific requirements. The CA MICS PTFs you will find at the CA Support site fall into three primary categories. In all cases, the CA MICS Workstation Facility (MWF) keeps track of maintenance you have applied, and identifies any co-requisite or pre-requisite PTFs required by the PTF you want to download and apply.

Corrective Maintenance

Helps you address a specific and immediate issue. This type of maintenance is necessary after you encounter a problem. CA Technologies may provide a test PTF if a new problem is uncovered, or a confirmed PTF if the problem has already been resolved. Your primary goal is to return your system to the same functional state that it was before you experienced the issue. This type of maintenance is applied on an as-needed basis.

Preventive Maintenance

Helps you proactively avoid future problems by keeping your CA MICS installation current. These are PTFs that CA Technologies has created and made public. You may or may not have experienced the issues that each PTF addresses.

New Technology Support

Allows CA MICS products to operate correctly when you have upgraded an operating system, subsystem, or software product that impacts CA MICS processing. CA Technologies may provide a test PTF if you are testing the upgrade prior to general availability or a confirmed PTF if we have already certified the CA MICS product for the specific operating system, subsystem, or software release.

More Information:

See the System Modification Guide, Chapter 3, Maintenance Policies and Procedures.

Chapter 2: Planning

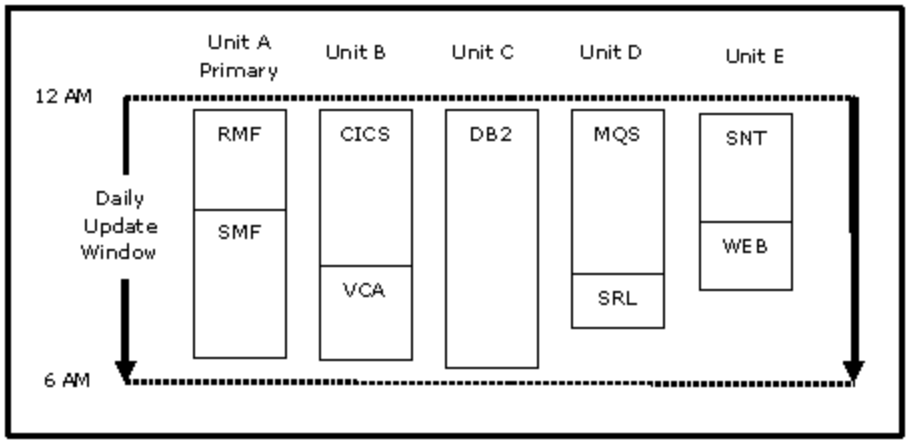
This section contains the following topics:

Create a Balanced Complex

Design a balanced CA MICS complex where the data integration components assigned to each operational unit can complete daily raw data processing and database update within a convenient daily update window, as shown in the following figure.

Business Value:

Ensures that the updated database is available for reporting and analysis at the start of normal business hours every day.



Additional Considerations:

- The daily update processing for each operational unit runs in parallel, and up to 36 units can be deployed to complete processing within the appropriate daily update window.
- Automated report generation and web publishing must wait for each unit to complete daily update processing.

Configure Raw Data for Optimal Value

Understand the characteristics and configuration options used by the subsystems to generate the raw data that is subsequently read by the data integration components of CA MICS. Note that default options used by the subsystems to configure raw data must often be changed to provide raw data content and granularity suitable for input into CA MICS.

Business Value:

Maximizes the usefulness and value of the information stored in the CA MICS database.

Additional Considerations:

- Many data sources create interval records. You can usually specify the interval duration that controls how frequently interval records are produced. To maximize the usefulness of the CA MICS database, specify an interval duration of 10 to 30 minutes (or shorter) rather than the default interval duration, which, for CICS and CICS Transaction Gateway interval records for example, is three hours.
- Most subsystems let you specify a synchronization value to control the end-of-interval time. For example, the z/OS SMF subsystem supports a global SYNCVAL parameter for SMF records. We recommend that you specify 59 for all raw data sources that support interval record synchronization, rather than the default synchronization value of 00. A synch value of 00 does not provide accurate information because the HOUR that a record belongs to is determined by the End Time Stamp of the interval record. A 30-minute interval that ends at 10:00:00 represents activity from 09:30:00 to 10:00:00. CA MICS would assign this activity to HOUR 10 although the activity actually belongs to HOUR 9. Using a synch value of 59 and an interval duration of 15 minutes would produce interval records at the following interval end times: hh:14:00, hh:29:00, hh:44:00, and hh:59:00.

More Information:

Review chapters 5 (Files) and 6 (Data Sources) in each data integration component guide as you configure each subsystem to make sure it generates the raw data sources required to produce the CA MICS files you need.

Optimize Raw Data Collection

Minimize the number of times each data record is processed—from the time it is created until the time it is input into CA MICS.

Business Value:

Optimizes the use of I/O and CPU resources.

Additional Considerations:

- Before configuring and activating data integration components in your CA MICS complex, determine the raw data sources required by each component, and begin the process of automating the collection of raw data as a parallel task to component activation.
- Many CA MICS components use IBM System Management Facility (SMF) records as raw input. A variety of z/OS subsystems and workloads write SMF data records to z/OS system-managed log files. These SMF log files are dumped periodically, using the IBM SMF dump utility or a vendor product such as CA SMF Director.
- During the SMF dump process, virtually all data centers write SMF records to audit tapes for historical archive. Then, at a later time, many data centers reread the entire archive to extract the SMF records required for application processing. But the most efficient way to create both the historical archive and individual SMF data files for post-dump processing by applications like CA MICS is to read each SMF record once, and write it two or more times:
  - One write operation is to the historical archive.
  - If the particular SMF record is also required for post-dump processing, the second write is directed to a separate split file for that purpose.
- CA SMF Director can be used to optimize the collection and preparation of raw SMF data for many CA MICS data integration components.

More Information:

For more information, see "Automate SMF Data Processing" below and Chapter 6, Data Sources, in each component guide.

Automate SMF Data Processing

Use CA SMF Director to create multiple split files during SMF dump processing.

Business Value:

Minimizes the processor I/O and CPU time required to prepare SMF data for CA MICS. CA SMF Director provides the same data splitting feature as the native IBM SMF dump utility, but has the additional benefit of interfacing directly with the CA MICS components that process SMF data. CA SMF Director keeps track of which split files have already been processed by CA MICS and which are ready to process.

Another benefit provided by the interface with CA SMF Director is that you do not need to externalize the raw SMF data set file names in the DAILY update job's JCL. Instead, the JCL points to the CA SMF Director split file index, and the appropriate split files are dynamically allocated during execution. This minimizes administrator tasks associated with the specification and management of SMF data sets input by the CA MICS daily update routines.

More Information:

For more information, see Section 4.10, Integration with CA SMF Director, in the *Planning, Installation, Operation, and Maintenance Guide* and Chapter 7, Parameters, in each component guide.

Chapter 3: Implementation

This section contains the following topics:

Activate One Operational Unit

Start by installing just the CA MICS platform (BAS) and the SMF and RMF components. Designate this unit on the JCLDEF DATABASE statement as the primary unit.

Business Value:

Minimizes the time and effort required to start getting value from CA MICS. Lets you generate useful reports within a few days.

Additional Considerations:

- Both the SMF (Batch and Operations Analyzer) and RMF (Hardware and SCP Analyzer) components are included in all CA MICS licenses.
- Both the SMF and RMF components use IBM System Management Facility (SMF) records as raw input.
- Together the SMF and RMF components create over 80 database files containing valuable z/OS processor, system, hardware, system infrastructure, workload manager, and address space workload data.
- Begin the process of automating the collection of the SMF records these two components use as raw input.

- Create additional units and activate the remaining components in your CA MICS software license after you are familiar with CA MICS concepts, configuration options, and operation.

More Information:

For more information, see Section 3.8.1.2, Define the Database Complex, Section 3.8.1.3, Define and Generate Products, and Section 3.8.1.4, Generate the New Database Units, in the *Planning, Installation, Operation, and Maintenance Guide* and "Optimize Raw Data Collection" above in this guide.

Set the Unit Up for Cost Accounting

If your CA MICS software license includes the CA MICS Accounting and Chargeback Option, include ACT on the JCLDEF COMPONENTS statement in your first unit.

Business Value:

Saves time by avoiding the regeneration of the unit later, which would be required if you do not add ACT to the initial unit definition.

Additional Considerations:

- The Batch and Operations files are eligible for cost accounting.
- Add an ACCOUNTING INACTIVE parameter to the unit EXECDEF statement. This will dynamically prevent your daily update routine from invoking accounting and chargeback until the ACT component is fully generated. Later, after you become familiar with the chargeback metrics in the Batch and Operations component database files, you can define your accounting rates and journal files, and generate the ACT component. You can then change the EXECDEF statement to ACCOUNTING ACTIVE.

More Information:

For more information, see Section 3.8.1.2, Define the Database Complex, Section 3.8.1.3, Define and Generate Products, and Section 3.8.1.4, Generate the New Database Units, in the *Planning, Installation, Operation, and Maintenance Guide* and the *Accounting and Chargeback Option User Guide.*

Use Customized Documentation

Use the online documentation available at your site through ISPF, HTML, or both to view and print documentation that reflects your database tailoring choices.

Business Value:

Ensures that the documentation you use:

- Is synchronized with the maintenance level of each CA MICS component at your site.
- Reflects your database tailoring choices in the dynamically updated sections of the component guides.
- Contains descriptions of each component's data elements.

Additional Considerations:

CA MICS component guides downloaded from CA Support Online in PDF format reflect a generic database configuration and do not contain Appendix B, the Data Dictionary.

More Information:

For more information, see the *Document Access Guide*.

Allocate Exclusive Libraries

Allocate a separate set of SAS system libraries exclusively for the use of CA MICS. Adopt a SAS system library data set naming convention that eliminates the requirement to regenerate CA MICS JCL when migrating from one SAS release to another.

Business Value:

Maintaining a separate set of SAS system libraries guarantees a stable CA MICS environment where you can coordinate and schedule the application of compatible maintenance levels of both CA MICS and your statistical analysis software (SAS). Using the strategy described in the documentation referenced below will simplify the process and reduce the time to move to a new release of SAS.

More Information:

For more information, see Sections 3.8.1.2 and 5.4.2 in the, *Planning, Installation, Operation, and Maintenance Guide.*

Accept Default Parameter Options

When defining both complex-level parameters and unit-level parameters, accept default parameter option settings where provided.

Business Value:

Provides quick implementation of the primary CA MICS unit. The context and effect of each parameter option will be clearer after your unit is operational. You can then modify settings if the database content or component behavior does not meet your reporting or analysis requirements.

Additional Considerations:

- Accepting the default settings of ESSENTIAL ONLY and DERIVED COMP will minimize the space requirements for your CA MICS database.
- Use the CPLXSID member to specify the SYSID values of the z/OS LPARs that generate the raw data used by various CA MICS components. This saves you from having to repeatedly specify the same SYSID values in every unit with components that process SMF data.
- For the BAS unit-level parameter members SYSID, ZONE, and SITE, use the setting that forces the unit definitions to defer to the complex-level settings.

More Information:

For more information, see Section 2.3.1.8, Complex Option Definition, in the *Planning, Installation, Operation, and Maintenance Guide* and Chapter 7, Parameters, in each component guide.

Accept Default Component Generation Options

Generate the components using default generation options.

Business Value:

Saves time, minimizes mistakes, and gets your primary CA MICS unit up and running quickly.

Additional Considerations:

- Each CA MICS component creates database files whose content and characteristics are defined in the generation statement definition member, cccGENIN, where ccc is the three-character component identifier.
- The effect of each generation option will be clearer after your unit is operational and can be easily changed if not meeting requirements.

More Information:

For more information, see Section 3.4.2, Component Definition Statements, in the *Planning, Installation, Operation, and Maintenance Guide*. Chapter 7 in the SMF and RMF component guides presents the component generation options for SMFGENIN and RMFGENIN.

Define Account Codes

Define account codes that impose your company's organization and business structure on the CA MICS database, for example, DIVISION, LOCATION, and DEPARTMENT.

Business Value:

Provides resource utilization reporting at each account code level.

Additional Considerations:

- The CA MICS database files in the DAYS and higher timespans are grouped by account codes, in addition to the normal file summarization keys.
- Account codes are supported for component database files where organization ownership can be identified. Most SMF component files support database account codes; none of the RMF component files do.
- While the primary use of account codes is to impose organization structure on the database, account codes can also be used to provide any other summarization level important to your reporting needs.
- Since account codes are used as summarization keys when building the DAYS and higher timespan views, choose account codes that will collapse DETAIL timespan records into summarized records.
- Avoid defining account codes that tend to have unique values in each DETAIL timespan record since this would prevent any significant summarization, and result in DAYS and higher timespan views that are no different from DETAIL views.

More Information:

- For more information, see Section 2.3.1.7, Database Complex Account Code Parameters and Section 3.8.1.3, Define and Generate Products, checklist step 8 in the *Planning, Installation, Operation, and Maintenance Guide*.
- For more information, see the *Accounting and Chargeback Option User Guide* and Sections 7.1 and 7.2, in the *Batch and Operations Analyzer Guide*.

Define All Account Codes

Define all nine account codes now even though fewer may satisfy your immediate needs.

Business Value:

Lets you integrate and report on both historical and current files if you begin using additional account codes later. If they were not previously defined, you would need to recreate and retrofit historical files each time you define a new account code.

Additional Considerations:

Define unused account codes with a length of 1 byte as shown in the distributed account code definition member (ACCOUNT).

More Information:

- For more information, see Section 2.3.1.7, Database Complex Account Code Parameters, in the *Planning, Installation, Operation, and Maintenance Guide*.
- For more information, see the *Accounting and Chargeback Option User Guide* and Sections 7.1 and 7.2, in the *Batch and Operations Analyzer Guide*.

Code Account Routines

When coding the routines that assign values to account codes, use efficient coding techniques and assign default values to each code to protect against situations where the rightful value cannot be determined.

Business Value:

The use of efficient coding techniques minimizes the impact your account routine has on the performance of the daily update routine. Assigning a default value to each account code prior to invoking the assignment code prevents unexpected or invalid values.

Additional Considerations:

- Using a SAS FORMAT to perform account code assignments, for example determining the department associated with a user ID, is an efficient look-up technique.
- A variety of data elements in each raw or DETAIL level record can be used to determine organizational ownership.
- Tracking the number of records where default account codes were initially assigned, over time, is a useful way to measure progress in efforts to improve the effectiveness of your account routines. The goal is to replace the default values with meaningful values.
- The SMF component invokes two account routines: one for standard z/OS workloads (ACCTRTE) and one for APPC/MVS transaction records (APPCRTE).

More Information:

- For more information, see Section 2.3.1.7, Database Complex Account Code Parameters, in the *Planning, Installation, Operation, and Maintenance Guide*.
- For more information, see the *Accounting and Chargeback Option User Guide* and Chapter 7, Parameters, in the *Batch and Operations Analyzer Guide*.

- Chapter 7, Parameters, in each component guide identifies data elements that are frequently used for account code setting.

Estimate Unit Database Space and Runtime Requirements

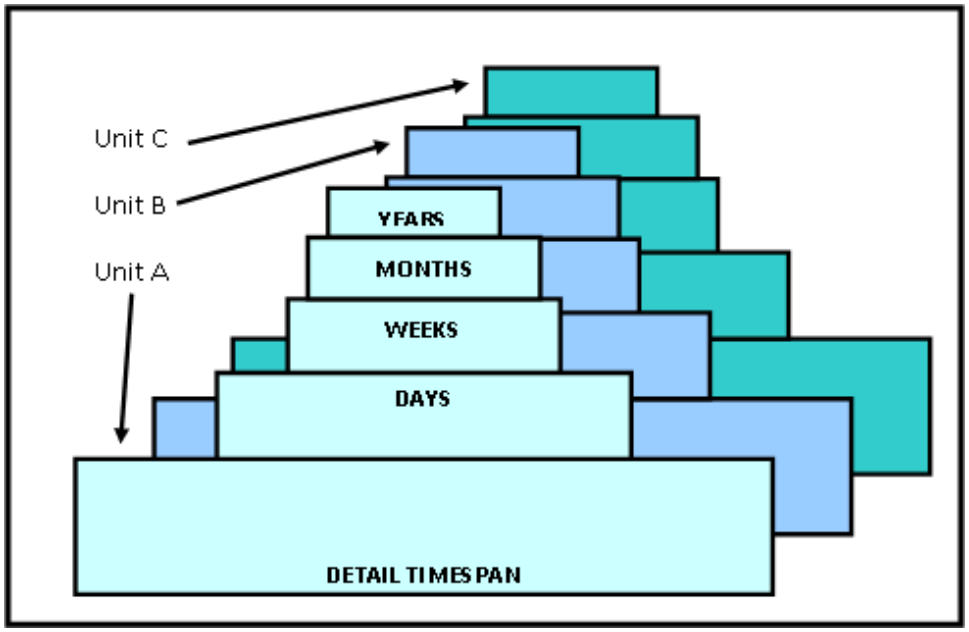
Execute the DBSIZE job during unit creation to determine how long the daily update will take and how much DASD space to allocate for each timespan of a unit-level database.

Business Value:

The DBSIZE job simulates a daily update run. It validates your unit-level JCL specifications, reveals the approximate runtime required for the daily update, and projects the space required for each database timespan.

Additional Considerations:

- To ensure accurate runtime values and database space estimates it is important to use raw input data that represents a typical day.
- Each CA MICS unit-level database supports five timespans: DETAIL, DAYS, WEEKS, MONTHS, and YEARS. Each timespan is allocated as one or more z/OS data sets.
- Each timespan contains component-generated files at different levels of summarization. The DETAIL timespan contains the most granular level of data and requires the most DASD space. In general, less DASD space is required by each successive timespan.



More Information:

For more information, see Section 3.8.1.4, Generate the New Database Units, checklist step 21, “Estimate Database Space” in the *Planning, Installation, Operation, and Maintenance Guide*.

Verify the Successful Implementation of the Unit

Carefully review the logs produced by your first daily update job. Also execute SMFCHECK and RMFCHECK to validate database metric content.

Business Value:

Confirms that the unit is working as expected before proceeding to production.

Additional Considerations:

- Review message BAS00331I in the MICSLOG output DD for each component step to verify that raw data was processed from all expected systems.
- When reviewing the SMFCHECK job output, pay special attention to the account code data elements to confirm that your account routines are populating account codes as you expected.
- If an ABEND occurs, the SASLOG output DD can provide additional diagnostic information in the event of a problem such as an out-of-space error when sorting or writing to a work or database file.
- The CA MICS Workstation Facility Operations and Tracking feature provides a HISTORY command that shows the time boundaries of data processed by each system by component for each unit in the complex.

More Information:

For more information, see Section 3.8.1.3, Define and Generate Products, Section 3.8.1.4, Generate the New Database Units, and Section 4.3.5, Database Update Audit Trail (ADMIHL), in the *Planning, Installation, Operation, and Maintenance Guide*.

Automate the Operational Jobs

Use a job scheduling facility, such as CA 7 Workload Automation, to automate the scheduling and submission of the DAILY job and other operational jobs. Be sure that the BACKUP job is scheduled, this will minimize recovery time if ever required.

Business Value:

Ensures that the right jobs run every day at the appropriate time.

Automate Report Generation and Publication

Use CA MICS facilities to automate the regular production and publication of reports.

Business Value:

Reports are published on time on a regular schedule without operator or administrator intervention and provide end-users with the information they need at the start of normal business hours.

Additional Considerations:

- When CA MICS operational units complete daily processing, the database is available for production reporting and on-demand analysis. If update processing is done at night, reports are ready when managers and end-users arrive in the morning. On-demand analysis can be produced at any time.
- Choose AUTOSUBMIT YES in the unit PARMS JCLDEF member to make reports run as external batch jobs rather than as part of the daily update run. This helps to minimize the run time of the daily update job and makes the updated database available as soon as possible.
- CA MICS provides hundreds of ready-to-run queries, fully documented with report samples.
- The SMF component reports provide information about z/OS operational configuration, event, and address space activity.
- The RMF component reports are similar to the IBM RMF post-processing reports, which provide information about your mainframe hardware, operating system, and workload manager service and report classes. The CA MICS RMF reports provide additional value because they can report on more summarized views of the data using the WEEKS and higher timespans.
- CA MICS Query & Reporting (Q&R) lets managers and end-users generate reports that graphically display key performance indicators for workloads and subsystems critical to your organization.

More Information:

For more information, see Chapter 3, Reports, in each component guide.

Activate Cost Accounting

If your CA MICS license includes the CA MICS Accounting and Chargeback Option, implement data center cost accounting after successfully running several daily update cycles of the primary unit.

Business Value:

Enhances the value of the CA MICS database by assigning monetary values to resource usage.

Additional Considerations:

- To activate cost accounting, you must determine resource consumption patterns, set rates, and activate journal files.
- You must run a minimum of several daily updates to collect sufficient database information to reliably extrapolate monthly or annual resource usage. When compared to known resource costs, rates can be developed to either recover costs or generate a profit.
- After the ACT component is fully generated, change each unit's EXECDEF statement parameter from ACCOUNTING INACTIVE to ACCOUNTING ACTIVE.

More Information:

For more information, see the *Accounting and Chargeback Option User Guide* and Section 3.8.1.2, Define the Database Complex, Section 3.8.1.3, Define and Generate Products, and Section 3.8.1.4, Generate the New Database Units, in the *Planning, Installation, Operation, and Maintenance Guide*.

Complete the Installation by Deploying Additional Components

After your primary unit is up and running in production and you have automated reporting on SMF and RMF component data, gradually deploy the additional components included in your CA MICS license using the same techniques and processes used for the primary unit.

Business Value:

Maximizes your investment in additional CA MICS components and applications by putting them to use.

Additional Considerations:

- Additional components can be installed in new units or added to your primary unit.
- When you add components to an existing unit, both the unit database size and the time required to complete the DAILY update job will increase.

More Information:

For more information, see Section 3.8.2, Adding a Product to an Existing Database Unit, in the *Planning, Installation, Operation, and Maintenance Guide*.

Monitor Your Operational Units

Use the CA MICS workstation facility (MWF) Operations Status and Tracking Facility to monitor the health and status of your units.

Business Value:

Provides an easy way to verify that each operational unit in your CA MICS complex successfully processed the expected raw data and completed all steps and processes associated with DAILY, WEEKLY, and MONTHLY updates.

More Information:

For more information, see Section 4.1.8, in the *Planning, Installation, Operation, and Maintenance Guide*.

Leverage CA Service Desk Alerts

Use the CA MICS/CA Service Desk interfaces to pass information from CA MICS to CA Service Desk to automate response actions.

Business Value:

CA Service Desk can automatically notify departments or key individuals if problems occur during daily update processing, or if user-specified conditions occur within CA MICS applications.

Additional Considerations:

- Application-level alerts can be passed to CA Service Desk by the CA MICS Accounting and Chargeback Option when specified budget limits are exceeded.
- Application-level alerts can be passed to CA Service Desk by the CA MICS Capacity Planning Option when current metric values indicate that a previously generated forecast may no longer be accurate.

Chapter 4: Configuration

CA MICS provides many configuration options that allow you to tailor the product to best meet your specific performance and data analysis requirements. A number of the configuration options described below address the performance challenge of processing very large raw data volumes in an acceptable time window. Others address the DASD space requirements these large data volumes can consume, both in temporary work space and the CA MICS database. Some configuration choices can benefit every site, such as inactivating database files that are not relevant for your analysis and reporting requirements. Many of the CA MICS configuration choices, however, must be made based on the specific requirements and environmental considerations at your site.

This section contains the following topics:

Reevaluate Your System

Periodically compare your CA MICS database configuration with the business and performance requirements at your site, and modify your configuration if necessary to meet current objectives.

Business Value:

Maximizes the value gained from your CA MICS investment and ensures optimal performance.

Additional Considerations:

- It is critical for those responsible for CA MICS administration to maintain awareness of evolving business paradigms, shifting workload priorities, and technology changes at your site.
- CA MICS continuously introduces new database files and metrics. Files and metrics that were once irrelevant at your site may become critical as your company evolves. Conversely, previously important files may lose relevance.
- Account code structures and content that previously reflected your organizational structure may require updates as your company changes over time.
- The SYSID (unit-level) and CPLXSID (complex-level) PARMS library members contain user-specified fields such as the one used to populate data element CPUMODEL, allowing you to provide a name for the central processing complex (CPC). When a CPC upgrade occurs, make sure these fields are updated as well.
- The ZONE (unit-level) and CPLXZONE (complex-level) PARMS library members define summarization parameters that yield separate summarized database records for time periods important to you. For example, you can specify that the hours 8 AM through 5 PM on weekdays constitute a Prime Shift Zone. Holidays can also be identified and assigned to a specific ZONE, but the date that holidays occur can change from year to year—so it is important to maintain these members and periodically update them.

Use Incremental Update

Configure components to perform partial database updates periodically throughout the day. For example, if a DB2 region generates 60 million transaction records daily, the DB2 component in a unit can be configured to process the raw data incrementally at 8:00 AM, 2:00 PM, and midnight. Assuming a consistent transaction arrival rate, each update only has to process 20 million records.

Business Value:

Addresses the situation where a large volume raw data source cannot be processed as a whole within an acceptable daily update window. Also supports inter-day reporting.

Additional Considerations:

- Incremental update is activated for a specific component within a particular unit. A unit containing multiple components can use this option for none, one, some, or all components within the unit.
- Overall processing time is increased but spread over the day. The final daily update run completes in less time than if it had to process the complete set of raw data itself.
- An additional incremental update database must be allocated to contain the partially processed data until the final daily update completes.

- Raw data collections must be scheduled to provide input files for the incremental updates.
- Reporting on incremental databases should be controlled by the CA MICS administrator to make sure the database is not tied up when the next incremental update is ready to run.

More Information:

For more information, see Section 4.3.12.6, Incremental Update Considerations, in the *Planning, Installation, Operation, and Maintenance Guide*.

Deploy Components Across Multiple Units

If a unit containing multiple components cannot complete daily update processing within the daily update window, add a unit to the complex and move one or more of the components to the new unit.

Business Value:

Lets you process large volumes of data within the required daily update window by processing multiple units at the same time. Also reduces the amount of space required for each unit database.

Additional Considerations:

- CA MICS supports up to 36 operational units in a complex.
- A unit that historically completed daily update processing within the daily update window can start missing this objective due to gradual or sudden raw data volume increases due to workload changes at your site caused by business changes such as mergers, acquisitions, or new applications.

More Information:

For more information, see Section 4.2.2.4, Parallel Database Update Processing, in the *Planning, Installation, Operation, and Maintenance Guide*.

Split Individual Component Data across Multiple Units

When the large data volume of a subsystem like DB2 or CICS is generated by several regions, you can direct the raw data from different regions to separate CA MICS units.

Business Value:

The DAILY update jobs for each unit execute in parallel, allowing processing of large volumes of data to complete within the update window. Also reduces the DASD space required for each unit database and the amount of DASD work space required by the component step in each unit's DAILY update job.

Additional Considerations:

- You must install multiple instances of the appropriate CA MICS component in two or more units.
- As an example, if you have three large DB2 regions, each generating 20 million transaction records daily and the CA MICS DB2 component is installed in a single unit, the DAILY update DB2 component step would need to process all 60 million transaction records within the daily update window. By installing the DB2 component into three different CA MICS units and creating a separate raw data file for each DB2 region, the three unit DB2 component steps can each process 20 million records in parallel.

More Information:

For more information, see Chapter 4, Operation, in the *Planning, Installation, Operation, and Maintenance Guide*.

Minimize the Number of Work Files

The multiple-work-file feature allows you to increase the number of temporary work files used by each component step.

Business Value:

Multiple work files require smaller primary and secondary allocations. This solves the problem of not having enough contiguous space available for the primary and secondary space allocations of a single work file.

Additional Considerations:

- By default, most component steps in a DAILY update job use a single temporary work file to handle interim data storage and sorting. If the raw data volume is high, the large primary and secondary file allocations required for a single work file may not be consistently available in your DASD work-volume pool.
- Overall I/O, CPU time, and elapsed time increases with the number of work files used. If you can allocate the DASD space required by one work file for each component step in the DAILY update job, avoid the use of multiple work files.

- With SAS Version 8.0 and earlier releases, there were reliability and usability issues associated with allocating individual work files that spanned DASD volumes. Beginning with Version 9, multi-volume SAS work files can be employed successfully. If multiple work files were historically used at your site because the temporary work space requirements exceeded the capacity of a single DASD volume, you should re-evaluate. Daily update performance is better if the multiple work file feature is not used.
- If you must use multiple work files, use the minimum number possible to meet your processing requirements. While this feature can solve the problem of obtaining large allocation blocks, the cost is increased I/O, CPU, and elapsed time expended during the merging and manipulation of the separate work files. The additional time required increases with the number of work files used.

More Information:

For more information, see Chapter 7, Parameters, in each component guide.

Turn Off Unused Files

Review the numerous database files created by each CA MICS component. If the information provided by a file is not needed by your site, turn it off using the file control statements in the component definition member (cccGENIN).

Business Value:

Eliminates the time and processing resources required by the daily update to process the raw data, create and sort temporary work files, and create the DETAIL and summarized database cycles for nonessential files. Also frees up space in the CA MICS database and eliminates the time and resources required by other file management processes.

Additional Considerations:

- Different companies have different reporting and analysis needs. The default file activation settings delivered by CA MICS are not likely to be ideal for all environments.
- Keep in mind that files that are not needed now may be needed in the future so you should periodically evaluate their usefulness.
- Use the CA MICS health check utility to remove existing file instances from the database after files are turned off.

More Information:

For more information, see Section 4.4.4.5, Database Health Check Utility, in the *Planning, Installation, Operation, and Maintenance Guide*.

Split the Database

If you have problems allocating the DASD space required for a particular unit's database timespans in single z/OS data sets (the default), you can allocate two or more physical data sets that logically behave as one.

Business Value:

Solves the problem where the space required to allocate a database timespan as a single z/OS data set is unwieldy or unavailable.

Additional Considerations:

- If you have multiple components in a unit, you can direct the files from each component to a different data set.
- If the unit contains a single component and the component has multiple information areas, you can direct the files from each information area to different data sets.
- Additional DASD data sets must be managed, but there is no performance degradation associated with database splitting.
- Fewer customers need to use this database-split feature after SAS Version 9's improved reliability for SAS data sets that span DASD volumes.

More Information:

For more information, see Section 3.8.5, Split an Existing Database Unit, in the *Planning, Installation, Operation, and Maintenance Guide*.

Start with ESSENTIAL ONLY

Use the ESSENTIAL ONLY setting initially to globally deactivate metrics (data elements) that are not essential.

Business Value:

The CA MICS database is more manageable because it uses less space. The operational performance of the daily updates is better because interim work files are smaller, and processing fewer metrics consumes less I/O and CPU time.

Additional Considerations:

- Each record in every CA MICS database file contains a number of data elements. Each data element is designated as essential or non-essential.

- The ESSENTIAL option can be specified at the complex-level and overridden at the component and individual file levels. ESSENTIAL ALL globally activates the non-essential data elements. File tailoring lets you turn individual data elements on or off.
- The CA MICS Workstation Facility (MWF) provides an Administrator Facility utility (option 5.4.3 from the MWF primary menu) that generates a report showing the current ESSENTIAL setting for each component file.
- In the cccGENIN component database definition members, each file data element name is preceded by NAME or NAMX. NAME means essential, NAMX means non-essential. If you use ESSENTIAL ONLY but want to activate a few data elements classified as non-essential, you can change NAMX to NAME.

More Information:

For more information, see Section 2.3.1.8, Complex Option Definition, in the *Planning, Installation, Operation, and Maintenance Guide*.

Start with DERIVED COMP

Use the DERIVED COMP setting initially so that derived elements are not stored in the database.

Business Value:

The database is more manageable because it uses less space. The operational performance of the daily updates is better because code to compute derived data elements is not invoked during file creation.

Additional Considerations:

- Most CA MICS database files contain ”derived” data elements, elements that are computed from other data elements in the file. For example, data element SECPSPIN (Page-Ins per Second – Total) is computed by dividing SECTOPIN (Page-Ins Total) by DURATION (Recording Interval Time).
- Derived data elements are easily computed, as needed, during reporting or on-demand analysis, but you must invoke the appropriate CA MICS file macro to derive them. CA MICS reporting facilities (that is, MICF and Q&R) automatically compute derived elements.
- The global option, DERIVED, controls the presence or absence of derived data elements in the database files. It can be specified at the complex-level, and overridden at the component and individual file levels.
- The CA MICS Workstation Facility (MWF) provides an Administrator Facility utility (option 5.4.3 from the MWF primary menu) that generates a report showing the current DERIVED setting for each component file.

More Information:

For more information, see Section 2.3.1.8, Complex Option Definition, in the *Planning, Installation, Operation, and Maintenance Guide*.

Compress SAS Data Sets

SAS supports optional data compression when files are written to DASD, but, with CA MICS, you can compress files in the CA MICS database on a file-by-file basis.

Business Value:

Compression minimizes the CA MICS database size.

Additional Considerations:

- Not all files show the same degree of compression. Use the CA MICS Workstation Facility (MWF) Administrator Facility utility (option 5.4.1 from the MWF primary menu) to identify good compression candidates.
- Additional CPU time is required to perform file compression when the file is originally written and decompressed when the file is retrieved for reporting or on-demand analysis. Determine whether the database space savings are worth the increased CPU time used to perform compression and decompression.

More Information:

For more information, see Section 2.3.2.6, Compression, in the *Planning, Installation, Operation, and Maintenance Guide*.

Reorganize Unit Databases

During normal operation, new file cycles are added to your online DASD databases (DETAIL, DAYS, and so on) and old file cycles are removed. Over time this leads to SAS database fragmentation. Defragment the database by backing it up and restoring it to either a newly allocated dataset or to the previously allocated dataset after a SAS PROC DATASETS KILL has deleted all of the files.

Business Value:

Reduces database space required by reclaiming fragmentation holes and improves performance by eliminating multiple SAS extents for individual files.

Additional Considerations:

- DETAIL and DAYS time span files are written and aged off daily. These database time spans become fragmented faster than the WEEKS, MONTHS, or YEARS time spans.

More Information:

For more information, see Section 2.3.2.6, Compression, in the *Planning, Installation, Operation, and Maintenance Guide*.

Store DETAIL Files on Tape

For components with high volume database files, allocate enough DASD space to accommodate only a single cycle in the DETAIL timespan, and store older cycles on tape.

Business Value:

Minimizes space required by the DETAIL timespan for a unit database. Permits fast retrieval, analysis, and reporting on current data, while analysis of older data is available on tape if required.

Additional Considerations:

- The largest timespan in the database is the DETAIL timespan. You can use the DETAIL tape option to activate 10-20 generations of a high volume database file on tape.
- It takes longer to retrieve DETAIL data from tape.
- Q&R and MICF are not explicitly aware of information on the DETAIL tapes.

More Information:

For more information, see the *Planning, Installation, Operation, and Maintenance Guide*.

Reduce File Cycles

If you have more file cycles activated than needed, reduce the cycle value to meet your requirements.

Business Value:

Frees up database space.

Additional Considerations:

- History and audit archive facilities are available. They use tape for long-term file storage.
- Administrative and analyst time is needed to determine the appropriate amount of file history required to meet reporting and analysis needs.

More Information:

For more information, see Section 4.3.13.1, The CA MICS Audit Archive Tape, in the *Planning, Installation, Operation, and Maintenance Guide*.

Use Internal Step Restart

Activate internal step restart for CA MICS components that process large volumes of raw data.

Business Value:

Minimizes recovery time in case of an abend.

Additional Considerations:

- With internal step restart, each component's daily database update step has strategically placed checkpoints that are invoked when significant data processing milestones have been reached. If an abend occurs and internal step restart is active, the update step will restart at the last checkpoint.
- For most components, the first phase is the longest and most resource-consuming because it converts the raw data into work files. If the raw data input and initial processing has completed, it is inefficient to reprocess.
- A small amount of processing time is needed to take processing checkpoints but it is minimal.

More Information:

For more information, see Section 4.3.12.5, Internal Step Restart Considerations, in the *Planning, Installation, Operation, and Maintenance Guide*.

Replace Your Reports with CA MICS Reports

Replace existing data-center reports that have been generated by proprietary code that processes raw data with reports generated by CA MICS.

Business Value:

Avoids redundant processing of raw data and redundant processed data repositories that waste valuable processing resources and data storage.

Additional Considerations:

- CA MICS provides out-of-the-box reports to monitor system resources and workloads. The CA MICS reports match the look and feel of most IBM RMF-generated reports, but provide additional summarization views and do not require reprocessing of raw data.
- Proprietary user reports that provide information about specific subsystems or workloads often require the processing of high volume raw data sources such as DB2 transaction data. A similar report developed using one or more CA MICS database files eliminates the expensive reprocessing of raw data and maximizes the value you extract from CA MICS.

More Information:

For more information, see Chapter 3, Reports, in each component guide, the *Standard Reports Guide*, and the *Planning*, *Installation*, *Operation*, *and Maintenance Guide*.

Externalize WEEKLY and MONTHLY History and Backup Jobs

Remove the HISTW, HISTM and BACKUPM steps from the WEEKLY and MONTHLY jobs.

Business Value:

Reduces the WEEKLY and MONTHLY job duration, freeing up the CA MICS database for reporting as soon as possible.

Additional Considerations:

- These job steps can execute for a long time, and, when included as steps within the WEEKLY and MONTHLY jobs, prevent CA MICS database access until they complete. Removing them lets them execute as separate jobs that do not interfere with CA MICS database access.

More Information:

For more information, see Section 2.3.3.2.1.3, Database Unit Execution Option Definitions, in the *Planning*, *Installation*, *Operation*, *and Maintenance Guide*.

Chapter 5: Customization

This section contains the following topics:

Create Your Own Reports

Create reports and graphs that use the metrics in the CA MICS database to display the information you need to manage your data center.

Business Value:

Maximizes your investment in CA MICS by providing the information you need in the format that is most helpful to your operation.

Additional Considerations:

- The MICS Information Control Facility (MICF) provides tools to create user-defined reports.
- CA MICS Query and Reporting (Q&R) lets managers and end-users generate and graphically display reports at their workstations without having to use CA MICS on the mainframe.

More Information:

For more information, see Chapter 3, Reports, in each component guide.

Customize CA MICS to Meet Your Needs

Use the numerous features, options, and user exits provided by CA MICS to meet the reporting and data analysis requirements at your site. Tailor the database to contain the specific files, metrics, and data volume you need.

Business Value:

Customization maximizes your investment in CA MICS by tailoring it to meet your management and reporting requirements.

Additional Considerations:

- Customization is both supported and encouraged.

- CA MICS delivers source code for the majority of executable modules. Each source module contains a maintenance tracking area at the top of the module. The upper section is updated whenever a CA-delivered PSP product change or PTF modifies the module. The lower section is available for user modification tracking. If you update source modules, use this area to create a permanent record of the changes you make and the reasons you made them.
- Use IEBUPDTE to modify source modules and use the LOCALMOD.CNTL libraries to document your modifications.
- The component daily update routines contain numerous exit points where you can modify and extend database content. Use comments liberally to explain the meaning and purpose of any exit code you write.
- Several CA MICS facilities let you create user-written components that process raw data and generate database files to meet reporting and analysis needs not covered by the CA MICS product family.
- To identify database modifications, use the MWF Administrator Facility Database Modification utility (option 5.4.4 from the MWF primary menu). The utility generates a report showing each database modification made at your site.

More Information:

For more information, see the *System Modification Guide* and Chapter 10, Modifications, in every component guide.

Use a Test Unit

Create a test unit in your CA MICS complex to test and validate modifications.

Business Value:

This lets you work through and verify impact of change and modifications without impacting the operation of your production units.

More Information:

For more information, see the *System Modification Guide* and the *Planning, Installation, Operation, and Maintenance Guide*.

Chapter 6: Maintenance

This section contains the following topics:

Releases, Service Packs, and PTFs

Apply each new release, service pack, and PTF as soon as possible.

Business Value:

Keeping the CA MICS base platform and components technically and functionally current lets you take advantage of enhancements and consolidated maintenance and entitles you to full technical support.

Additional Considerations:

- Regularly scheduled maintenance is delivered as an integrated collection of product changes, referred to as a Product Service Pack (PSP), which you apply to your operational CA MICS complex. Each PSP modifies and updates the base platform and components with minimal impact on your existing configuration and operational parameters.
- CA MICS problems reported by users or discovered internally are posted for customer viewing on CA Support Online. If warranted, a PTF is created and made available for customer download and application.
- The MICS Workstation Facility (MWF) keeps track of the maintenance applied to each product and ensures that prerequisite and corequisite requirements are honored.
- PSPs are available by way of traditional tape, but we recommend that you use ESD PAX to download and install them electronically.

More Information:

For more information, see *How to Use the PSP*.

Consolidate Maintenance

Use the consolidated checklist feature and consolidated unit generation.

Business Value:

These features reduce the overall time, complexity, and job steps required to apply maintenance.

Additional Considerations:

- When applying maintenance, the MWF PSP facilities let you either apply one update at a time or bundle updates using the PSP consolidated checklist feature.
- The consolidated Unit Generation Feature automates unit level product regeneration steps based on the maintenance selected thus simplifying the maintenance process.

More Information:

For more information, see *How to Use the PSP*.

Clone Your Environment

Clone your CA MICS complex environment and apply the maintenance to the cloned complex. Then run the cloned complex in parallel with your production complex to evaluate changes introduced by the PSP.

Business Value:

This protects your production complex from changes until you have analyzed the impact. Once satisfied with the results, you can safely apply the maintenance directly to your production complex.

More Information:

For more information, see Section 5.1, Create an Alternate CA MICS Environment, in the *Planning, Installation, Operation, and Maintenance Guide*.

Avoid Production ABENDs

Periodically review specific CA MICS libraries and data stores to see if they require compression or additional space.

Business Value:

Avoids out-of-space ABENDs during daily updates. They can delay the daily generation of reports and the use of the CA MICS database.

Additional Considerations:

- The sharedprefix.MICS.ISPTLIB data set is updated by the operational jobs. It should be compressed periodically, for example weekly.

- Periodically examine your individual database timespans to make sure they are not using 16 extents. If so, increase the database size.
- If you have implemented web publication of production reporting to a Unix System Services xFS file, periodically check that the xFS file has sufficient free space using the OMVS "zfsadm" command (aggrinfo option).

More Information:

For more information, see Section 5.1, Create an Alternate CA MICS Environment, in the *Planning, Installation, Operation, and Maintenance Guide*.