

CA Spool™

Best Practices Guide

Version 12.0



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CA Technologies Product References

This document references the following CA products:

- CA Deliver™ (CA Deliver)
- CA Chorus™ Software Manager (CA CSM)
- CA Output Management Web Viewer (CA OM Web Viewer)
- CA View® (CA View)
- CA XCOM™ Data Transport® (CA XCOM Data Transport)

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*, 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

The following documentation updates have been made since the last release of this documentation:

- Updated [Enhanced MAS Support](#) (see page 25) to include procedures to prevent nuisance error messages that may be issued under certain circumstances.

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Chapter 1: Introduction

The guide introduces 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.

Chapter 2: Your Product Installation and Configuration Best Practices

This section contains the following topics:

[Implement a Proactive Preventive Maintenance Strategy](#) (see page 11)

Implement a Proactive Preventive Maintenance Strategy

CA Technologies formerly delivered product maintenance using Service Packs. We have replaced this model with [CA Recommended Service \(CA RS\) for z/OS](#), which provides more flexibility and granular application intervals. CA RS is patterned after the IBM preventive maintenance model, Recommended Service Upgrade (RSU). With CA RS, you can install preventive maintenance for most CA Technologies z/OS-based products in a consistent way on a schedule that you select (for example, monthly, quarterly, annually).

CA Technologies periodically releases Service Updates. A Service Update is a product installation file and all PTFs preapplied up to the last CA RS level.

We recommend that you develop and implement a proactive preventive maintenance strategy whereby you regularly apply maintenance. You could follow the same schedule that you use to apply IBM maintenance, or you could implement a schedule for CA Technologies products only.

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.

Our mainframe maintenance philosophy is predicated upon granting you the flexibility to maintain your sites and systems consistent with industry best practices and site-specific requirements. Our philosophy focuses on two maintenance types. Understanding each type can help you maintain your systems in the most efficient manner.

Note: This philosophy applies to the [CA Chorus Software Manager Enabled Products](#). For legacy products, contact CA Support for maintenance details.

Corrective Maintenance

Helps you address a specific and immediate issue. This type of maintenance is necessary after you encounter a problem. We may provide a test APAR when a new problem is uncovered, and a confirmed PTF when the problem has 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

Lets you bring your system up to a more current level. Doing so helps you avoid problems that others have reported. This maintenance may also contain compatibility fixes for hardware and software. You may have experienced the issues that each PTF addresses. CA RS provides a way to identify all published maintenance that has been successfully integration-tested. This maintenance has been tested with other CA Technologies products, current z/OS releases, and IBM subsystems, such as CICS and DB2. CA RS levels are published monthly that include PTFs, HIPERs and PRPs (PE-resolving PTFs). Before you download, apply, and test a new CA RS level, we recommend that you accept the previous CA RS level.

You can initiate a maintenance installation activity at any time. You can then install the current CA RS level of maintenance (recommended) or an earlier level. Additionally, you can install maintenance to support a new hardware device, software upgrade, or function using the [FIXCAT](#) method.

For all maintenance, *before* you initiate any maintenance action, obtain the current SMP/E HOLDDATA.

Important! [CA Chorus™ Software Manager \(CA CSM\)](#) - formerly known as CA Mainframe Software Manager™ (CA MSM) - is an intuitive web-based tool that can automate and simplify many CA Technologies product installation and maintenance activities. We strongly recommend that you use CA CSM to maintain your CA Technologies z/OS-based products.

More Information:

To apply preventive maintenance using CA CSM or from CA Support Online on <http://ca.com/support>, see the *Installation Guide* for your product and the CA CSM online help.

Chapter 3: Installation Best Practices

These topics provide best practices for implementing Mainframe 2.0 strategies and installing CA Spool.

This section contains the following topics:

[Installation](#) (see page 13)

[Keep Current on CA Common Services](#) (see page 14)

[Install in a Test Environment](#) (see page 14)

[Use a Common CA High Level Qualifier Symbolic](#) (see page 15)

[Web Interface](#) (see page 15)

Installation

Use CA MSM to acquire, install, and maintain your product.

Business Value:

CA MSM provides a common way to manage mainframe products. CA MSM provides a web interface, which works with Electronic Software Delivery (ESD) and standardized installation and management of mainframe products. You can use it to download and install CA Spool.

CA MSM lets you download product and maintenance releases over the Internet directly to your system from the CA Support website. After you use CA MSM to download your product or maintenance, you use the same interface to install the downloaded software packages using SMP/E.

Additional Considerations:

After you install the product, use the *CA Spool Installation Guide* to set it up. CA MSM can continue to help you maintain your product.

More Information:

For more information about CA MSM, see the *CA Mainframe Software Manager Guide*. For more information about product setup, see the *CA Spool Installation Guide*.

Keep Current on CA Common Services

Be sure you have installed the most current release of CA Common Services.

Business Value:

The latest release of CA Common Services contains the most current infrastructure updates, allowing you to successfully use the latest features, and preventing potential errors that can occur from using out-of-date services.

Note: CA Common Services Release 11 SP8 is required to take advantage of the Health Checker feature.

More Information:

For more information about CA Common Services, see the *CA Spool Installation Guide*.

Install in a Test Environment

Use a test system to perform your installation and initial evaluations of the product.

Business Value:

Evaluating the product in a test environment lets you detect any possible problems before you roll out the product to a production system. This practice will help ensure a seamless transition to the new release.

Additional Considerations:

New releases of CA Spool can be installed in different SMP/E zones or data sets to allow a new release to run on a test system while the old release continues to run on production systems.

More Information:

Be sure to review the Upgrade Considerations section and the "Migrating Considerations" chapter in the *CA Spool Installation Guide* prior to upgrading CA Spool.

Use a Common CA High Level Qualifier Symbolic

Use one common high-level qualifier when installing more than one of CA's Mainframe Enterprise Report Management (ERM) products. We recommend that all products share the '**CAI**' symbolic.

Business Value:

By installing and maintaining a single version of a CA common high-level qualifier, you reduce your maintenance effort, save disk space, and eliminate the possibility of executing symbolic utilities that may not be up-to-date with the latest maintenance.

Web Interface

Use the CA Spool Web Interface to access CA Spool.

Business Value:

- End users without mainframe knowledge or expertise can access content in CA Spool in a more user-friendly environment. While the CA Spool menu system can be accessed by a number of mainframe applications, the Web Interface offers a familiar environment while providing all of the functionality accessible through mainframe online interfaces.

More Information:

The CA Spool web interface runs as a native CGI gateway program under the z/OS HTTP server. For more information about the installation and required parameter tailoring, see the Web Interface Installation section of the "Customization" chapter of the *CA Spool Customization Guide*.

Chapter 4: Configuration Best Practices

This chapter presents the best practices to properly configure CA Spool for optimal performance. The following sections describe sample initialization parameters and provide best practices for post- and pre-JES processing.

This section contains the following topics:

- [CA Spool JCL Procedure STEPLIB](#) (see page 17)
- [Network Groups](#) (see page 18)
- [Checkpoint Data Set Configuration](#) (see page 19)
- [Spool Data Set Configuration](#) (see page 20)
- [Initial TCP/IP Printer Node Definition](#) (see page 21)
- [Use the INFO Field to Determine the Status of the Print Connection](#) (see page 23)
- [Virtual Printer Definitions](#) (see page 24)
- [Enhanced MAS Support](#) (see page 25)
- [Common NJE Node Name](#) (see page 27)
- [Coupling Facility](#) (see page 28)
- [AFP Transformer Performance](#) (see page 29)
- [SYSOUT Input Interface Selection](#) (see page 30)
- [CA Spool Health Checker](#) (see page 32)
- [Interfaces and Integration Points](#) (see page 33)

CA Spool JCL Procedure STEPLIB

Reduce the EXCP (Execute Channel Program) counts by placing the CEE.SCEERUN library as the first STEPLIB in your CA Spool JCL procedure as follows:

```
//STEPLIB DD DISP=SHR,DSN=CEE.SCEERUN
//          DD DISP=SHR,DSN=CAI.SPOOL.CBQ4LOAD
```

Business Value:

Reducing the EXCP counts simplifies the search for IBM Linkage Environment load modules for TCP/IP printing.

Additional Considerations:

- If you are modifying your old CA Spool JCL procedure to run with CA Spool Version 12.0, be sure to add the CEE.SCEERUN library as the first STEPLIB.

Network Groups

Group your printers into network groups to improve efficiency, security, and system performance. To assign a printer node to a network group, use the GROUP parameter on the NODE statement.

Business Value:

The group concept used in CA Spool has a major impact on system performance and system security. It is a best practice because groups are more efficient: shared, related printers are in logical groups; display of relevant files is easier based on groups; security is more efficient since access to resources is granted at a group level; and system performance is improved because printers and files are chained in groups. The use of network groups dramatically reduces the CPU overhead in big CA Spool systems with many printers and files.

Additional Considerations:

Full distributed user control is implemented through the concept of network groups. The grouping of printers into network groups is completely controlled by software, and the groups are not necessarily related to the physical location of the hardware. Similarly, no restrictions are imposed on hardware types.

Each printer node defined to CA Spool is assigned a network group number by the CA Spool administrator. The node definitions and the spool files directed to any of these printers form the logical entity of a network group.

The division of network nodes into network groups provides decentralization and security. In the network group, users are:

- Unaware of the other parts of the network
- Independent of the system operator
- In complete control of their own printers and print files

Users cannot see or access files and devices in another network group; they can, however, route their own files to destinations defined in other network groups.

When a user wants to display printers, the network group printer chain is used; it is not necessary to scan all printers in the system. In the same way, when a user wants to display files, the network group file-chain is used instead of scanning all files in the system.

Checkpoint Data Set Configuration

Allocate enough space to allow the checkpoint data set to accommodate significant growth and assign the checkpoint data set to a low-impact volume that is separate from the spool data sets.

Business Value:

Having a large checkpoint data set on a low-impact volume will prevent the considerable operational issues involved in resizing a full checkpoint file and moving it to different volumes.

Additional Considerations:

CA Spool needs one checkpoint data set and one or more spool data sets. The checkpoint data set and spool data sets must be permanently allocated as part of the installation process.

Optionally, a secondary checkpoint data set may be defined, which will then be used as a duplex copy of the primary checkpoint data set. This data set is used for manual recovery in case the primary checkpoint data set becomes unusable.

Note: In general, we do not recommend that you use a duplex checkpoint data set as it causes the checkpoint elapse times to double and because physical disk crashes are extremely unlikely.

The checkpoint data set must be allocated in cylinders, and in one extent. CA Spool uses only the first extent of the data set for checkpoint, and any additional extensions are ignored.

The checkpoint data set size requirement is mostly dependent on:

- The NUMFQES (number of file queue elements) parameter
Note that NUMFQES is really dependent on the length of time that files are kept before purging and the number of files created during that time cycle.
- The size of the spool data set configuration.

For example: If you keep files for two days and you create 50K files per day, a minimum value of NUMFQES=150000 is suggested to allow for growth and temporary workload increases.

Because spool data sets might be added "on the fly" using the REINIT command, we recommend that you allocate some extra checkpoint data set space to allow the spool data set configuration to grow.

More Information:

See the topic Checkpoint Data Set Size Calculation section in the "Storage Estimates" appendix in the *CA Spool Customization Guide* for the formula to use when calculating the size of the checkpoint data set.

Spool Data Set Configuration

Configure the spool data set structure according to your projected processing needs and anticipated workload so that CA Spool can run at an optimal performance level. It is generally best to have fewer, larger spool data sets because the spool data sets must be allocated in cylinders, and in one extent. CA Spool uses only the first extent of these data sets for spool space; any additional extents are ignored.

For maximum efficiency, we recommend the following:

- BUFSIZE=27998
- SPOOLCMP=NO
- XEQBUFS=double the average amount of open spool files

Business Value:

Larger data sets improve the efficiency of CA Spool. When a large spool buffer pool is specified the I/O activity on the spool data sets is reduced thereby keeping the CA Spool service times at a minimum.

Additional Considerations:

Setting BUFSIZE=27998 reduces the I/O on the spool data sets since a maximum of eight blocks per track is used. Use this value unless your spool files are less than a few hundred records. This allows for 2 physical blocks/records per 3390 track.

Unless you are concerned about spool data set usage, keep the default SPOOLCMP=NO. If YES is specified, all spool files with a record length less than 251 bytes are compressed in the spool data sets.

Specify XEQBUFS=200 or higher; the CA Spool transformer interface will have files open for both input and output while the transform is taking place so if you expect to have 100 open spool files, you should double that amount.

Note that CA Spool can support up to 255 spool data sets which can be added to a running CA Spool system.

More Information:

For more information about configuring spool data sets, see the "Initialization" chapter in the *CA Spool Customization Guide*.

Initial TCP/IP Printer Node Definition

When starting CA Spool for the first time, use the procedure suggested in Additional Considerations and define just one initial TCP/IP printer node.

Business Value:

Focusing on basic TCP/IP printer node initialization parameters and connectivity will simplify a first-time installation and result in a faster implementation of CA Spool. This practice eliminates many errors and optimizes performance for one printer node and may prevent the need to make modifications on several node definitions at a later time.

Additional Considerations:

Additional printer options and parameters can be specified later, based on the evaluation of business requirements at your site.

The following is a sample of TCP/IP printer definitions, followed by best practices for defining new TCP/IP printers.

```
DEFNODE TCPIP,TCPIP,GROUP=1,SEP=0,ACQUIRE=WORK,
        RELEASE=NOWORK,CLASS=A,TCPDRIV=LPR
NODE PRT1,TCPIP,TCPHOST=111.22.333.4    Direct Network Attached <<<<
NODE PRT2,TCPIP,TCPHOST=111.22.333.5,   Server Attached          <<<<
        TCPVRT=prtrqueue
```

To define a TCP/IP printer

1. Use node parameter TCPDRIV=LPR until you can get a good bind to the printer or print server. The T option will create a TCPTRACE file in CA Spool queued to the same printer you are testing with.

Note: Node parameter TCPVRT should not be specified when using the LPR print driver. It will default to port 515 to receive all line print requests from CA Spool.
2. Verify that the printer is network or server attached.
3. If the printer is server attached, insure that the correct case sensitive printer queue name is defined on the server.
4. Use the printer queue name as the value of the TCPVRT node parameter. Note that the LPR command can be used to verify that the TCP/IP printers are connected correctly in your network.

The following is an example of the LPR command as executed from the ISPF Command Shell screen in TSO:

```
lpr 'esf120.cbq4parm(caiqparm)' h 111.22.333.4 p XLPR
```

Note: If the LPR command does not work, that same printer will not work in CA Spool.

5. Insure that the correct IP address for this printer or print server is specified on the node parameter TCPHOST.

Note: The DNS name defined for the IP address can be specified in the nameserver if you want to use name resolution.

The TCP/IP printer is defined.

When working with the TCP/IP print drivers, be aware of the following:

- Once the printer is working from CA Spool, you can change the print driver to other values depending on the support the printer is configured with.
- If your printer is configured to handle Direct Socket connections, you can use node parameter TCPDRIV=DSO and TCPPOINT=9100, which will not use the LPR protocol.
- If your printer is configured to handle PCL, it needs to be at level PCL4 or higher; you can use node parameter TCPDRIV=PCL5.
- If your printer is configured to handle PCL, you can use node parameter TCPDRIV=PCL or PCL4.
- If your printer is configured to handle full bi-directional communication, you can use node parameter TCPDRIV=PCL5.

Use the INFO Field to Determine the Status of the Print Connection

Review the INFO field after attempting to make a print connection. A blank INFO field is the result of a good print connection; any value other than blank in this field is a "no bind" situation and should be researched based on the contents of the INFO field.

Business Value:

You can immediately determine if there is a no-bind condition for a printer and the information provided by the status codes will help you quickly define and resolve the no-bind situation.

Additional Considerations:

The status codes are specified in the order the function occurs: If the printer does not bind, there will be a 0003 in the INFO field of the printer display panel until a "times out" occurs; the INFO field will then show a 0067. The status codes provide information that will assist in diagnosing the problem.

More Information:

These INFO field status codes are found in the *CA Spool Systems Guide* in the "Menu System" chapter, in the topic Printer Display Panel.

Virtual Printer Definitions

Use the Virtual Printer interface to collect data sent by a TP-monitor (like CICS or IMS) to a VTAM-attached printer and store the collected data as a CA Spool file. This file can then be printed on any printer regardless of how it is attached (TCP/IP, PSF, or VTAM).

Business Value:

Virtual printer definitions save time and are less error prone than the process of manually changing application programs or modifying TP-monitor definitions. It is a best practice to let CA Spool take over the responsibility for the physical printing.

Additional Considerations:

Use the following samples as a starting point in your definitions for CICS, IMS, and IDMS virtual printer interfaces.

- The following is a sample of a CICS virtual printer definition:

```
DEFNODE TCPVCIC, TCPIP, GROUP=1, SEP=0, ACQUIRE=WORK,  
        RELEASE=NOWORK, CLASS=A, TCPDRIV=LPRET,  
        VPSFILE=BRACKET, VPSERROR=PASS, VPSOPT=6  
NODE PRTV1, TCPVCIC, TCPHOST=111.22.333.4, VPS=PRTV1
```

Be aware of the following:

- The CICS application printer PRTV1 needs to be defined to both CICS and VTAM.
- VPSOPT=6 is used if TCPIP NODE name and VPS= has the same name.

Note that this format can also be used for an IDMS virtual printer definition.

For an IMS virtual printer definition, simply change the VPSFILE parameter from BRACKET to CHAIN.

- The following is a sample of an IMS virtual printer definition:

```
DEFNODE TCPVIMS, TCPIP, GROUP=1, SEP=0, ACQUIRE=WORK,  
        RELEASE=NOWORK, CLASS=A, TCPDRIV=LPRET,  
        VPSFILE=CHAIN, VPSERROR=PASS, VPSOPT=6  
NODE PRTV2, TCPVIMS, TCPHOST=111.22.333.4, VPS=PRTV2
```

Be aware of the following:

- The IMS application printer PRTV2 needs to be defined to both IMS and VTAM.
- VPSOPT=6 is used if TCPIP NODE name and VPS= has the same name.

Enhanced MAS Support

Consider using an EMAS complex to run CA Spool in a parallel sysplex while allowing users who are communicating with multiple systems to view real-time printer status.

EMAS support enables one CA Spool system to handle all printer sessions by receiving commands from the other systems through an NJE connection. The primary system runs the commands and replies to the originating system to present to the user. In this way, the user always sees the real status of the printer in the network owning system.

Business Value:

In a MAS/EMAS complex, the CA Spool systems logically share a common CA Spool file queue. If one system in the configuration fails, the others can continue processing from the common queue because all systems are functionally the same. Only the work in process on the failed system is interrupted.

An EMAS environment has the added benefit of providing central control of all printer sessions in each Spool system while communicating accurate printer status information to the end users of each system.

Additional Considerations:

To implement EMAS, there are some conditions which must be observed:

- The printer definitions must be identical on all systems.
- Each system must have an NJE connection to all other systems in the EMAS configuration.
- Each *Snn* parameter definition must specify the NJE name of the corresponding EMAS member.
- The users must be defined to the security system in the network owning CA Spool system.

Be aware of the following:

- The first CA Spool system started becomes the network owner. If this system is shut down or its network is drained, the lowest numbered active EMAS member becomes by default the network owner.
- The NETOWNER parameter on the SNET, PNET, and TNET commands is used to explicitly select the system, which must take over the role as the network owner.
- NJE connections are configured so all the EMAS network owners try to start these NJE connections.

For best performance, we recommend that you use the supplied default MAS/EMAS initialization parameters:

```
MINDORM=0      (0 SEC.)  MIN TIME BETWEEN ACCESS TO QUEUES
MAXDORM=200    (2 SEC.)  MAX TIME BETWEEN ACCESS TO QUEUES
MINHOLD=1      (.01 SEC.) MIN TIME QUEUES MUST BE CONTROLLED
MAXHOLD=10     (.1 SEC.)  MAX TIME QUEUES MUST BE CONTROLLED
SYNCTOL=300    (5 MIN.)  SYNCHRONIZATION TIME INTERVAL
WARNTIM=1000   (10 SEC.)  WARNING TIME FOR DENIED REQUESTS.
```

Prevent Nuisance Error Messages

In an EMAS complex, specifying ISTATUS=TIMENETO in the NJE initialization parameter for an NJE node can result in nuisance messages if the following conditions exist:

- The NJE node is not a member of the EMAS.
- That node or the EMAS members use VTAM generic resources.

If both conditions exist, to prevent nuisance messages, set ISTATUS=TIMENETO on only one side of the NJE link, as shown in the following example. In this example, two EMAS complexes are connected through an NJE link. Both complexes use VTAM links and VTAM generic resources.

EMAS1 Parameters

```
APPLID=ESF1
NJENAME=ESF1
NJEOPT=3
NJEOPT=9
NJE ESF1SPL1,ISTATUS=TIMENETO
NJE ESF1SPL2,ISTATUS=TIMENETO
NJE ESF1SPL2,ISTATUS=TIMENETO
NJE ESF2,ISTATUS=TIMENETO
PSWRECE=++++%PWSSEND=pwval
e
S1 SID=SPL1,NJENAME=ESF1SPL1
S2 SID=SPL2,NJENAME=ESF1SPL2
```

EMAS2 Parameters

```
APPLID=ESF2
NJENAME=ESF2
NJEOPT=3
NJEOPT=9
NJE ESF2SPL3,ISTATUS=ACTIVE
NJE ESF2SPL4,ISTATUS=ACTIVE
NJE ESF2SPL4,ISTATUS=ACTIVE
NJE ESF1,ISTATUS=INACTIVE
PSWRECV=++++%PWSSEND=pwval
ue
S1 SID=SPL3,NJENAME=ESF2SPL3
S2 SID=SPL4,NJENAME=ESF2SPL4
```

In this example, the Network owner region of the EMAS1 complex initiates the session between EMAS1 and a member of EMAS2. However, if you reverse the ISTATUS values, the network owner region of the EMAS2 complex initiates the session between EMAS2 and a member of EMAS1.

VTAM determines which member of the target EMAS receives the session request from the network owner that is initiating the session.

Common NJE Node Name

You can simplify NJE network configurations by operating an EMAS complex as one NJE node using a common NJE node name. A common VTAM Generic Resource name must have been previously defined to the EMAS complex so that VTAM sessions to any of the EMAS members are initiated by making a session to the VTAM Generic Resource name.

Business Value:

The management of your CA Spool system will be simplified because other external NJE nodes will only need one NJE connection to the CA Spool EMAS complex.

Additional Considerations:

If a VTAM Generic Resource name is defined and the NJENAME parameter is specified in the EMAS complex, the NJENAME parameter specifies a common NJE node name for the entire EMAS complex. Other external NJE nodes then just need one NJE connection to the EMAS complex. This NJE connection must specify the common NJENAME as the NJE node name and the common VTAM Generic Resource name as APPLID.

The members in an EMAS complex communicate using NJE connections. For these private NJE connections the individual Home Node NJE name and VTAM APPLID are being used.

The following rules decide which of the NJE definitions are considered to be the home node:

- When an EMAS member is started, it determines its member number by finding the *Snn* statement, which matches the specified SID parameter; the default is the actual SMF-provided system ID.
- The NJENAME sub-parameter of the matching *Snn* statement points to the NJE home node for the EMAS member.
- The APPL sub-parameter and NJE nodename of the NJE home node is used as the VTAM APPLID and local NJE node name by the EMAS member.

Coupling Facility

If all the members in a MAS/EMAS complex have access to the same Coupling Facility, we strongly recommend that you use a Coupling Facility Structure for communication.

Business Value:

The Coupling Facility will manage the exchange of all changes to the file queue among the EMAS members. This will help simplify the management of the EMAS configuration and maximize its performance.

Additional Considerations:

The EMAS member with the lowest system number automatically becomes the CKPT owner, which is responsible for writing all changes to the checkpoint data set(s). The other EMAS members are updated through the Coupling Facility, so they have no need to access the checkpoint data set, avoiding the need for RESERVE/RELEASE.

CA Spool supports System-Managed CF Structure Rebuild. If the Coupling Facility is switched to a backup Coupling Facility, the operating system copies the old structure data to the new structure, providing a planned reconfiguration capability.

CA Spool supports System-Managed CF Structure Duplexing, so a backup copy of the CA Spool CF structure is automatically maintained on a secondary coupling facility. In case of failure, the system can automatically switch to the duplex copy of the CF structure and continue running with no disruption or performance degradation.

AFP Transformer Performance

Evaluate the following parameter settings when configuring the AFP transformers to optimize performance:

- X2YY MAXFILES
- CacheSize
- BUFSIZE
- TRANSFRM

Business Value:

The CPU saved by proper use of these tuning parameters can be dramatic when common AFP resources such company logos are used on every page of a file that is being transformed; when large files are transformed, and when large *numbers of files* are transformed at one time.

Additional Considerations:

To obtain optimal AFP Transformer performance and throughput, consider the following changes:

- Set X2YY MAXFILES to between 5 and 10.

Note: A number higher than 10 will not increase throughput, it will just increase virtual storage usage below the 16 Mb-line.
- To allow for concurrent transformations remove TRANSFRM option R which causes a transformation report to be produced for each transformation.
- Use the following example as a model when specifying the AFP transformer parameter CacheSize.

For example, if CacheSize is set at CacheSize=10M, up to 10Mb of AFP resources will be stored in memory to avoid reading the same resource members from the AFP resource libraries again and again. This will dramatically reduce I/O and CPU usage.
- Set BUFSIZE=27998 to reduce I/O and CPU overhead to read transformer input files and write corresponding transformer output files.
- Specify TRANSFRM option B to have multiple PCL, PostScript and PDF commands buffered into output records to reduce CPU usage.

SYSOUT Input Interface Selection

Use the appropriate interface when bringing SYSOUT files under CA Spool control. There are four different CA Spool SYSOUT input interfaces to choose from; one or a combination will be the best practice for your site. Use the guidance supplied in the Additional Considerations section to evaluate the impact of each interface and to determine the most productive and advantageous configuration.

Business Value:

CA Spool efficiency is directly related to the type of input interface(s) that you choose to implement. The methods by which CA Spool collects input data have a significant impact on processing speed and system resources.

Additional Considerations:

To gain the most control over when CA Spool processes reports, you can choose to have the SYSOUT written to JES first and then transferred to CA Spool using the NJE interface or the XFER SAPI interface.

If you want to avoid double spooling first in JES and then in CA Spool, you can use the DD SUBSYS interface or the SYSOUT Allocation Intercept interface. This requires CA Spool to be running on the system where the SYSOUT is generated.

The SYSOUT input interfaces, in order of best performance are:

- The DD SUBSYS input interface where you change your JCL to specify DD SUBSYS= instead of DD SYSOUT=.

The allocation request is passed directly to the specified CA Spool subsystem causing the SYSOUT to be written directly into a CA Spool file.

- The SYSOUT Allocation Intercept input interface, which may be considered the automatic version of the DD SUBSYS input interface, because no JCL changes are required.

CA Spool will look at SYSOUT allocation requests and decide if requests should be rerouted to CA Spool.

- The NJE input interface which is event driven.

When an NJE node has a SYSOUT ready it will start sending immediately. Up to seven SYSOUT and seven JOB streams can be sent and received in parallel between two NJE nodes. All SYSOUT attributes are preserved. It is the preferred interface to interconnect CA Spool systems. Using the NJE interface to receive SYSOUT from JES2 or JES3/BDT you either have to change your JCL to specify a DEST equal to the CA Spool NJE node name or with JES2, add DESTID definitions for all printers to route output to the CA Spool NJE node.

- The XFER SAPI interface, which is mostly timer-driven.

Every time the XFERTIME timer expires the SAPI interface wakes up and makes the specified SAPI queries for SYSOUT against JES until there is no more SYSOUT to retrieve.

There are four different ways to use the SAPI interface with increasing CA Spool and JES overhead:

- Transfer SYSOUT with destination equal to the CA Spool subsystem name.

This provides minimal overhead but requires JCL changes.

- Transfer SYSOUT by class.

This provides minimal overhead and requires no JCL changes if all SYSOUT in specific output classes can be picked up by CA Spool.

- Transfer SYSOUT by destination.

This requires no JCL changes but creates extra CA Spool and JES overhead because 1-4 SAPI queries are processed per defined printer every time the XFER timer expires.

With many printers defined this may cause a noticeable CPU overhead.

XFERDEST=YES may help reduce the queries to only JES defined printers and XFERDEST=DEST | WRITER may be used to halve the number of queries. The use of the printer node XFERNODE= BOTH | NODE | ALIAS | OFF may further help fine-tune the number of SAPI queries.

- Transfer SYSOUT by destination using SAPI threads.

This may dramatically reduce the CPU overhead with the expense of about 12K virtual storage per thread in the CA Spool region.

When XFERSAPI=THREADS is used, a thread is established for each request designated by the ESFPARM definitions when the interface is initialized. The JES subsystem will post each thread when a SYSOUT is available that matches the selection criteria established when the thread was initialized. When XFERTIME expires, each thread is checked to determine if any new SYSOUT is available, and if so, a request is made to transfer that SYSOUT.

CA Spool Health Checker

Use the CA Spool Health Checker feature to view and correct conditions that could prevent CA Spool from running properly.

Business Value:

Health Checks provide the ability to optimize system performance by warning of potential configuration problems or inefficiencies.

Additional Considerations:

The following health checks are provided for CA Spool:

SPOOL_SPACE_PCT@jobname

Monitors space in the CA Spool data sets to ensure that sufficient spool space is available to allow for more spool files.

SPOOL_FILE_QUEUE_PCT@jobname

Monitors file queue elements in use, to ensure that sufficient free file queue elements are available to allow for more spool files.

SPOOL_TCP_ACT@jobname

Monitors number of concurrent active TCP/IP subtasks to warn if the maximum of 128 subtasks is being reached.

SPOOL_TRANSFRM_ACT@jobname

Monitors number of concurrent active Transformer subtasks to warn if the maximum number of Transformer subtasks is being reached.

SPOOL_CKPT_ACT@jobname

Warns if the CA Spool system has not updated the checkpoint within the CKPTIME= specified time interval.

Warns if the CA Spool EMAS/MAS complex member has not been able to get access to the checkpoint within the WARNTIM= specified time interval.

SPOOL_OPT_ENCRYPT@STCname

Warns that CA Spool has detected a setting of SPOOLENC=YES, but encryption hardware is not installed on this machine.

CA Spool can encrypt and decrypt reports without encryption hardware, but emulating encryption hardware is CPU intensive, and it is more efficient to run all archiving and browsing tasks for encrypted databases on a machine that supports hardware encryption.

Evaluating the conditions reported by these health checks helps ensure proper product performance.

Interfaces and Integration Points

Integrate with CA View

Use CA View in conjunction with CA Spool as a report repository where you store and manage all of your documents generated by CA Spool. CA Spool reports can be archived directly to the CA View databases, viewed online, and backed up on storage media. All CA Spool report attributes and resources are retained in the CA View database.

Business Value:

CA View provides an archival and retrieval system that can automate day-to-day report management and minimize time-consuming manual tasks and lower document delivery costs. Viewing reports online and printing fewer reports reduces costs and saves time that might be spent reformatting, tracking, handling and rerunning reports.

Additional Considerations:

CA Spool can interface with CA View in the following ways:

- CA Spool has the ability to write all types of CA Spool print files, including PDF/HTML/RTF wrapped text files, directly to a CA View report database for archiving and viewing.
- CA Spool can pass AFP data post-JES to the CA View Functional Subsystem Interface in order to store fully composed AFP reports in the CA View database.
- The CA LPD interface can be used to process distributed file types that are sent from servers and PCs to be archived to the CA View database.

More Information:

For more information, see the *CA Spool Customization Guide* and *System Guide*.

Interface with CA Deliver for Comprehensive Report Distribution

Use CA Deliver in conjunction with CA Spool for a complete report distribution solution. CA Deliver can logically group reports by pre-defined bundle definitions and will send them to specific recipients or distribution groups. CA Deliver can also archive output directly to CA View and make reports available to only the specified report recipients.

Business Value:

By automating day-to-day document distribution, tracking, and printing, CA Deliver helps you minimize time-consuming manual tasks and reduce document delivery costs. *Together with CA's Enterprise Report Management Solutions, CA Deliver forms a comprehensive solution that allows the automated flow of reports from the mainframe to anywhere in your enterprise.*

Additional Considerations:

Incoming print requests that are directed to JES as dynamically allocated SYSOUT data sets in formats such as EBCDIC, text, AFP, PCL, and binary print files, can be intercepted and processed "on the fly" by CA Deliver pre-spool support.

The CA Spool Email Print Driver can provide CA Deliver with the ability to distribute pages of a report to one or more recipients for online viewing, tracking, or hard copy output.

The Email Notification feature allows recipients to be notified through email that reports are available for viewing with an optional link or attachment to the report. For more information, see the "Setting Up Email and Email Notification" chapter in the *CA Deliver Administrator Guide*.

Interface with CA Output Management Web Viewer

Use CA Output Management (OM) Web Viewer as a single, Web-based point of access to all CA Spool documents stored in CA View. Because of its ability to view reports originating from the mainframe, CA OM Web Viewer enables online web viewing of report types that cannot be viewed from the 3270 panels, such as AFP and PDF reports.

Business Value:

CA OM Web Viewer provides immediate, secure access to enterprise documents, protects your organization's current investment in internet or intranet-accessible hardware and software, and can significantly reduce printing costs.

Additional Considerations:

CA OM Web Viewer is the solution used to view all of the documents that are archived to the CA View database, including reports processed by CA Spool and reports distributed by CA Deliver.

Information about how to configure CA OM Web Viewer with CA View can be found in the *CA Output Management Web Viewer Administrator Guide* and the *CA DRAS Operations Guide*.

Interface to CA XCOM Data Transport Print Driver

Use the CA XCOM Data Transport print driver to automatically send all types of files, including PDF/HTML/RTF wrapped text files, directly to remote CA XCOM Data Transport servers running on various platforms for further processing. Text files can also be converted to PDF/HTML/RTF reports while they are being sent.

Business Value:

The CA XCOM Data Transport print driver can take advantage of this cost-effective data transport solution that supports a wide array of network platforms. CA XCOM Data Transport enables unattended, secure data transfers to remote systems while optimizing the use of network resources through proven methods such as compression and record packing.

More Information:

For more information, see the CA XCOM Print Driver section in the "Customization" chapter of the *CA Spool Customization Guide*.