

Adabas Cluster Services

Installation

Version 8.1.3

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This document applies to Adabas Cluster Services Version 8.1.3.

Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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Table of Contents

Installation	v
1 Conventions	1
2 Required Environment	3
Parallel Sysplex System	4
Coupling Facility	4
XCF and XES services	5
Performance Recommendations	5
3 Prerequisite Software Installations	7
Adabas	8
Entire Net-Work	8
Adabas Cluster Services Router	8
4 What to Install	9
Entire Net-Work Limited (WDXvrs) Library	10
Adabas Limited (WALvrs) Libraries	10
Using an Existing Entire Net-Work System	10
Using the XCF Line Driver with an Existing Entire Net-Work	11
Order the STEPLIB Concatenation	11
5 Overview of the Installation Procedure	13
Unload the Installation Libraries to Disk	14
APF-Authorize All Load Libraries	16
Install the WALvrs Libraries, if Needed	17
Modify COUPLExx and the CFRM Policy	17
Customize the Entire Net-Work Startup	19
Apply Entire Net-Work Maintenance	22
Start Entire Net-Work	22
Create a Startup Procedure for ADACOM	23
Create a Startup Procedure for Each Cluster Nucleus	24
Modifying the z/OS Common Storage (CSA) Key	26
Starting Adabas Cluster Services	29
Index	31

Installation

This documentation describes the installation process for Adabas Cluster Services.

It is important to review the entire installation procedure before starting the physical installation.

Depending on which components you actually install, it may be useful to group certain installation activities together, even though they may not be in the same installation section in this section. For example, if you are installing the Entire Net-Work XCF line driver, modifications to the CFRM policy for both the line driver and for parallel sysplex cache and lock structures can be made in a single step rather than in two separate steps.

Refer to *Adabas Cluster Services Release Notes* for specific information about late changes to this section.

Using System Maintenance Aid

If you use Software AG's System Maintenance Aid (SMA), refer to the *System Maintenance Aid* documentation for information about the installation process.

The installation procedures described in this section correspond to the jobs that SMA creates to install the product.

If you do not use SMA, you can modify and use the sample JCL provided to unload the Adabas Cluster Services and Entire Net-Work libraries from the installation tape.

The Adabas Cluster Services Installation documentation is organized in the following topics:

[Required Environment](#)

[Prerequisite Software Installations](#)

[What to Install](#)

[Overview of the Installation Procedure](#)

1 Conventions

Notation *vrs* or *vr*: When used in this documentation, the notation *vrs* or *vr* stands for the relevant version, release, and system maintenance level numbers. For further information on product versions, see *version* in the *Glossary*.

2 Required Environment

- Parallel Sysplex System 4
- Coupling Facility 4
- XCF and XES services 5
- Performance Recommendations 5

Adabas Cluster Services requires a parallel sysplex environment.



Note: Fujitsu Technology Systems' HIPLEX is not supported.

This chapter covers the following topics:

Parallel Sysplex System

One or more z/OS operating system images defined as members of a parallel sysplex are required that are:

- connected with an IBM Sysplex Timer™, and
- connected to a coupling facility, and
- running z/OS or z/OS.e (any version supported by IBM)

* Support for z/OS.e is currently restricted to client programs executing in batch or under TSO or Com-plete.

Coupling Facility

The coupling facility configuration must have sufficient resources to support the cache and lock structures used by Adabas Cluster Services. You can duplex these structures, if at least two coupling facilities are available. Adabas Cluster Services can coexist without restriction with other coupling facility users such as GRS Star.

Each Adabas Cluster Services database uses one cache structure and one lock structure. For each, you must define all of the following in the coupling facility resource management (CFRM) policy:

- the name of the structure (NAME)
- the structure size (SIZE or INITSIZE)
- the preference list of one or more coupling facilities where the structure should be allocated (PREFLIST).

You can also allow duplexing (DUPLEX) or dynamic reallocation (ALLOWREALLOCATE) of either structure.

XCF and XES services

Adabas Cluster Services uses parallel sysplex XCF (Cross-System Coupling Facility) services for intracluster communication and XES (Cross-System Extended Services) for intracluster data sharing. Entire Net-Work may also use XCF services. XCF and XES must be available and functioning at all times for Adabas Cluster Services to operate smoothly.

Performance Recommendations

The inherent necessity to synchronize and share data across system boundaries makes it a challenge for Adabas Cluster Services to perform as well or better than the base Adabas, especially when measured by CPU consumption. Adabas Cluster Services performance is best when the following recommendations are applied:

- The coupling facility processors (CFCPs) should be at least as fast as the central processors running Adabas Cluster Services and they should have sufficient capacity to avoid delays in the execution of coupling facility requests.
- The coupling facility link speed should match the coupling facility processor speed.
- The buffer efficiency in a cluster nucleus when functioning as a non-cluster nucleus should be equal to or greater than 50.
- The buffer pool size (LBP) used for a cluster nucleus should not be lower than when the nucleus is functioning as a non-cluster nucleus.
- The rate of throwbacks due to ISN contention should not be greater than two percent (2%).
- The size of the cache and lock structures specified in the coupling facility resource management (CFRM) policy should be appropriate. For more information, read *Optimizing Lock and Cache Structures in the Coupling Facility*, in *Adabas Cluster Services Operations*.

You may use the cache and lock structure size calculators provided for Adabas Cluster Services in Adabas Online System to estimate adequate structure sizes. For more information about these calculators, read *Estimating Sizes for the Cache Structure in a Cluster Environment* and *Estimating Sizes for the Lock Structure in a Cluster Environment*, in *Adabas Cluster Services Operations*.

Performance measurements of Adabas Cluster Services in a test environment may yield inconclusive results if these recommendations are not followed.

3 Prerequisite Software Installations

- Adabas 8
- Entire Net-Work 8
- Adabas Cluster Services Router 8

The following Software AG products must be installed on the parallel sysplex before proceeding with the installation of Adabas Cluster Services.

This chapter covers the following topics:

Adabas

Adabas Cluster Services must run with a compatible version of Adabas.

The appropriate version of Adabas must be installed and operational on your systems before you install Adabas Cluster Services.

- Use the ADADEF utility to define a new Adabas database.
- Use the ADACNV utility to convert an existing database from an earlier version. Protection logs (PLOGs) and Work data sets may or may not need to be reformatted, depending on how the ADACNV utility is run. For more information, refer to your *Adabas Utilities Manual* documentation.

To install Adabas on z/OS systems, see the *Adabas z/OS Installation Guide* documentation.

Entire Net-Work

Entire Net-Work for mainframes is required for communication between users and non-local Adabas Cluster Services nuclei. The essential Entire Net-Work components, including the XCF line driver, are part of the Adabas Cluster Services package.

Entire Net-Work must be installed on each operating system image in the parallel sysplex where either Adabas cluster nuclei or users are located. Each system with Entire Net-Work installed becomes a *node* in the network. Each node's adjacent links to other nodes are defined by name and driver type.

Adabas Cluster Services Router

Adabas Cluster Services requires a compatible version of the Adabas router (ADASVC), which contains the Adabas Cluster Services component SVCCLU. The router must be installed on each operating system image in the parallel sysplex where either Adabas cluster nuclei or users are located.

4 What to Install

- Entire Net-Work Limited (WDXvrs) Library 10
- Adabas Limited (WALvrs) Libraries 10
- Using an Existing Entire Net-Work System 10
- Using the XCF Line Driver with an Existing Entire Net-Work 11
- Order the STEPLIB Concatenation 11

Adabas Cluster Services requires Entire Net-Work to provide communication across operating system images between users (including utilities and Adabas Online System) and the nuclei in the Adabas cluster as well as among ADACOM jobs. Communication among the cluster nuclei is performed via XCF.



Note: ADACOM and several Adabas cluster nuclei could run within a single operating system image without Entire Net-Work, but there could then be no application programs for that database in any other image.

This chapter covers the following topics:

Entire Net-Work Limited (WDXvrs) Library

If you are *not* currently running Entire Net-Work, you must install the Entire Net-Work limited (WDXvrs) library supplied on the Adabas Cluster Services installation tape. This library includes Entire Net-Work's XCF line driver (also known as the *Entire Net-Work XCF Option*).

Adabas Limited (WALvrs) Libraries

The Adabas limited (WALvrs) libraries provide the Adabas components necessary to support the Entire Net-Work connection on a node that participates in an Adabas sysplex cluster (that is, has cluster users) but does not have Adabas installed.

Using an Existing Entire Net-Work System

If you are currently running Entire Net-Work, you can use your existing system as long as the following conditions are met:

- An Entire Net-Work node is running on each operating system image that will also be running a cluster nucleus and/or ADACOM.
- The Entire Net-Work nodes supporting the cluster nuclei are all interconnected using one of the currently supported Entire Net-Work line drivers: XCF, VTAM, CTC, or TCP/IP.
- The Entire Net-Work nodes use the same SVCCLU linked with the ADASVC that is used for the Adabas Cluster Services components they support.

If these conditions are not met, you cannot use your existing Entire Net-Work configuration. You must then use the Entire Net-Work limited library supplied on the Adabas Cluster Services installation tape.

Using the XCF Line Driver with an Existing Entire Net-Work

You may incorporate the XCF line driver (also known as the *Entire Net-Work XCF Option*) into your existing Entire Net-Work configuration. The XCF line driver provides performance comparable to the CTC line driver.

When using the XCF line driver, the physical connection mechanism between Entire Net-Work nodes is transparent to Entire Net-Work. The connections may be over CTC links, XCF links, or both.

The connection mechanism/methods are defined by the system programmer using the COUPLE_{xx} SYS1.PARMLIB member and the coupling facility resource management (CFRM) policy.

Order the STEPLIB Concatenation

If you are installing the XCF line driver into an existing set of Entire Net-Work nodes, Software AG recommends that you concatenate the Entire Net-Work limited libraries from the Adabas Cluster Services tape in front of the existing Entire Net-Work library in the STEPLIB sequence.

Concatenate the Adabas Cluster Services library ahead of the Adabas load library.

5

Overview of the Installation Procedure

▪ Unload the Installation Libraries to Disk	14
▪ APF-Authorize All Load Libraries	16
▪ Install the WALvrs Libraries, if Needed	17
▪ Modify COUPLExx and the CFRM Policy	17
▪ Customize the Entire Net-Work Startup	19
▪ Apply Entire Net-Work Maintenance	22
▪ Start Entire Net-Work	22
▪ Create a Startup Procedure for ADACOM	23
▪ Create a Startup Procedure for Each Cluster Nucleus	24
▪ Modifying the z/OS Common Storage (CSA) Key	26
▪ Starting Adabas Cluster Services	29

This section provides information about installing Adabas Cluster Services in the operating system environment.

The installation procedure must be repeated for *each* operating system image (that is, LPAR) that will participate in the system.

Important: Before proceeding with the installation, ensure that the prerequisite environment has been established. Review the earlier sections of this documentation for detailed information.

The procedure corresponds to the jobs that SMA creates to install the product. If you do not use SMA, you can modify and use the sample JCL described in [Unload the Installation Libraries to Disk](#) to unload the libraries from the installation tape.

This chapter covers the following topics:

Unload the Installation Libraries to Disk

Sample JCL is provided in the base Adabas source library and in the Entire Net-Work source library. This JCL can be modified and used to unload the Adabas Cluster Services libraries and, optionally, the Entire Net-Work libraries from the installation tape.

The Adabas Cluster Services installation tape is a standard label tape. Refer to the *Report of Tape Creation* that accompanies the tape for the volume serial number, density, media type, data set names, and data set sequence numbers.

The tape contains the installation data sets, a data set required by SMA, and one or more data sets containing maintenance fixes. Refer to the *Adabas Cluster Services Release Notes* for information about recommended fixes.

Allocate DASD

The ALS load library for Adabas Cluster Services requires one cylinder.

If you need to install them, the minimum 3390 disk space requirements for the Adabas limited (WAL) load library is one cylinder; the WAL source library requires two cylinders.

The WDX limited load library for Entire Net-Work requires four cylinders; the WCP source library for Entire Net-Work requires four cylinders.

Copy the Contents of the Tape to Disk

To copy the Adabas Cluster Services data sets and (optionally) the limited Entire Net-Work libraries from the installation tape, use JCL similar to the following:

```
//COPY      JOB . . . .
//*
//*      Adabas Cluster Services Load Library
//*
//CPY1      EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//DDIN      DD DSN=ALSvrs.LOAD,DISP=OLD,UNIT=cart,
//           VOL=(,RETAIN,SER=volser),LABEL=n
//DDOUT     DD DSN=ADAALS.Vvrs.LOAD,DISP=(NEW,CATLG,DELETE),
//           UNIT=xxxxx,VOL=SER=vvvvvv,SPACE=(CYL,(cc,,b1))
//SYSIN     DD *
COPY INDD=DDIN,OUTDD=DDOUT
/*
/*
/*      Entire Net-Work Limited Load Library
/*
//CPY2      EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//DDIN      DD DSN=WDXvrs.LOAD,DISP=OLD,UNIT=cart,
//           VOL=(,RETAIN,SER=volser),LABEL=n
//DDOUT     DD DSN=WDXALS.Vvrs.LOAD,DISP=(NEW,CATLG,DELETE),
//           UNIT=xxxxx,VOL=SER=vvvvvv,SPACE=(CYL,(cc,,b1))
//SYSIN     DD *
COPY INDD=DDIN,OUTDD=DDOUT
/*
/*
/*      Entire Net-Work Samples
/*
//CPY3      EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//DDIN      DD DSN=WCPvrs.SRCE,DISP=OLD,UNIT=cart,
//           VOL=(,RETAIN,SER=volser),LABEL=n
//DDOUT     DD DSN=WCPALS.Vvrs.SRCE,DISP=(NEW,CATLG,DELETE),
//           UNIT=xxxxx,VOL=SER=vvvvvv,SPACE=(CYL,(cc,,b1))
//SYSIN     DD *
COPY INDD=DDIN,OUTDD=DDOUT
/*
```

where:

<i>bl</i>	number of directory blocks for this library
<i>cart</i>	tape device type
<i>cc</i>	number of cylinders for this library
<i>vrs</i>	product version, revision, and system maintenance (SM) level
<i>volser</i>	volume serial number for the installation tape
<i>n</i>	position of the data set on the installation tape
ALS	product code for Adabas Cluster Services
WCP	product code for the Entire Net-Work source library
WDX	product code for Entire Net-Work limited load library
<i>vvvvvv</i>	volume serial number of the disk used for the specified library
<i>xxxxx</i>	DASD device type

Copy the Adabas Limited (WALvrs) Libraries, If Required

Entire Net-Work requires some Adabas modules. For systems where Adabas is not installed, these modules are supplied on the installation tape in the Adabas limited libraries (WAL*vrs*). See the *Report of Tape Creation* for specific information regarding these limited libraries.

Software AG recommends that you concatenate the Adabas limited (WAL) libraries with the Entire Net-Work (WDX) load library first in the sequence.

APF-Authorize All Load Libraries

Ensure that Adabas Cluster Services runs authorized.

To run authorized, the Adabas Cluster Services, Adabas, and limited Entire Net-Work load libraries and all other load libraries in the STEPLIB concatenation must be APF-authorized.

Ensure that all load libraries referenced in the STEPLIB concatenation for your Entire Net-Work, ADACOM, and Adabas cluster nuclei startup procedures are defined to the operating system as authorized libraries. If this is not done, the Entire Net-Work, ADACOM, or the Adabas cluster nuclei will not initialize and may abnormally terminate, usually with an ABENDS047 or ABENDS306.

Either copy the base Adabas modules and the Adabas Cluster Services modules to an existing APF-authorized library or APF-authorize the Adabas Cluster Services library that was unloaded from the installation tape and the Adabas load library unloaded from the base Adabas installation tape.

Install the WALvrs Libraries, if Needed

The Adabas router (ADASVC), which contains the SVCCLU component used by Adabas Cluster Services, can and should also be used for Entire Net-Work. It must be installed on any node where Entire Net-Work is to be run, even if no servers are running on that node. Use the WAL vrs libraries for such nodes.

Link Routines

Adabas client application programs need an Adabas link routine module suitable for the environment in which they run. For example, batch programs should be linked with ADAUSER, which loads current versions of ADALNK and supporting modules from the Adabas load library. TP environments usually require specialized link routine modules that may require an additional license.

Software AG recommends that link routines have the same version level as Adabas in a sysplex cluster environment.

Modify COUPLE xx and the CFRM Policy

Make any needed additions and modifications to the COUPLE xx SYS1.PARMLIB member and the sysplex CFRM policy. See the *Performance and Tuning* documentation for sizing recommendations.

For XCF Groups

A separate XCF group is activated for each

- Adabas sysplex cluster;
- Entire Net-Work instance using an XCF line driver; and
- active lock structure; each Adabas cluster uses one lock structure.

Ensure that the COUPLE xx data sets are formatted with sufficient capacity for the necessary XCF groups.

No changes to the COUPLE xx member are required. If values are not specified, the system defaults are used. However, rather than use the default values for CLASS, GROUP, and STRUCTURE, Software AG recommends that you add specific values to the COUPLE xx member in SYS1.PARMLIB for use by the Entire Net-Work XCF line driver, as follows:

1. Add a CLASSDEF statement with CLASS(ENTIRE) and GROUP(NETWORK) specified.

2. Add a PATHIN statement with STRNAME(IXC_NETWORK) specified.
3. Add a PATHOUT statement with STRNAME(IXC_NETWORK) and CLASS(ENTIRE) specified.

A sample section from the COUPLE_{xx} member in SYS1.PARMLIB is as follows:

```
COUPLE SYSPLEX(USRSPLX1)
    PCOUPLE(SYS1.SYSPLEX.USRSPLX1.CDS01)
    ACOUPLE(SYS1.SYSPLEX.USRSPLX1.CDS02)
    INTERVAL(120)
CLASSDEF
    CLASS(ENTIRE)
    CLASSLEN(8192)
        GROUP(NETWORK)
    MAXMSG(4096)
LOCALMSG
    MAXMSG(4096)
    CLASS(ENTIRE)
PATHIN STRNAME(IXC_DEFAULT ,IXC_NETWORK)
PATHOUT STRNAME(IXC_DEFAULT)
PATHOUT STRNAME(IXC_NETWORK) CLASS(ENTIRE)
```

For List, Cache, and Lock Structures

To define the optional list structure for Entire Net-Work and the required cache and lock structures for each ADABAS nucleus cluster, you will need to run a job similar to the following to update the CFRM administrative policy data in the COUPLE data set:

```
//STEP20 EXEC PGM=IXCMIAPU
//SYSPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//SYSIN DD *
    DATA TYPE(CFRM) REPORT(YES)
    DEFINE POLICY NAME(POLICY1) REPLACE(YES)
    CF NAME(CF)
        TYPE(009674)
        MFG(IBM)
        PLANT(02)
        SEQUENCE (000000040101)
        PARTITION(1)
        CPCID(00)
        DUMPSPACE(2000)
        .
        .
    STRUCTURE NAME(IXC_DEFAULT)
        SIZE(1000)
        PREFLIST(CF)
    STRUCTURE NAME(ADA_CACHE1)
        SIZE(48000)
        PREFLIST(CF)
        .
```



```

      .
      STRUCTURE NAME(ADA_LOCK1)
      SIZE(16000)
      PREFLIST(CF)
      .
      .
      STRUCTURE NAME(IXC_NETWORK)
      SIZE(10000)
      PREFLIST(CF)
      .
      .

```

The CACHE structure must be large enough to retain

- all changed blocks between buffer flushes; and
- directory elements for all blocks in all buffer pools.

For information on cache structure sizes, read *Optimizing Lock and Cache Structures in the Coupling Facility*, in *Adabas Cluster Services Operations*.

Adabas Cluster Services supports rebuild processes and duplexing rebuild processes for the cache and lock structures that it uses. These processes are managed by the operating system. See the following IBM documentation for additional information:

- MVS Setting Up a Sysplex
- MVS Programming: Sysplex Services Guide
- MVS System Commands (the SETXCF operator command)

Customize the Entire Net-Work Startup

Modify the Startup Procedure

Customize the Entire Net-Work startup procedure and copy it to a valid system procedure library.

The following example execution job can be used to start Entire Net-Work in a z/OS environment. More JCL may be needed, depending on the node configuration (types of line drivers, number of links, and so on). All load libraries in the STEPLIB concatenation must be APF-authorized.

```

//NETWORK JOB . . . .
//*-----*
//*          ENTIRE NET-WORK Vv.r.s STARTUP          *
//*-----*
//XCFNET01 EXEC PGM=ADARUN,REGION=4M,TIME=1440 <--- see Note 1
//STEPLIB DD DISP=SHR,DSN=NETWRK.Vvrs.LOAD
//          DD DISP=SHR,DSN=ADAALS.Vvrs.LOAD
//          DD DISP=SHR,DSN=ADABAS.Vvrs.LOAD <--- see Note 2
//DDPRINT DD SYSOUT=* <--- see Note 3
//NETPRNT DD DISP=SHR,DSN=WDXvrs.NETPRNT <--- see Note 4
//MPMDUMP DD SYSOUT=* <--- see Note 5
//SYSUDUMP DD SYSOUT=*
//DDCARD DD * <--- see Note 6
*-----*
*          SAMPLE ADARUN CARDS FOR ENTIRE NET-WORK          *
*          *
*-----*
ADARUN PROG=NETWRK
ADARUN TARGETID=65490 /* MUST BE UNIQUE WITHIN SYSTEM */
ADARUN SVC=209 /* SUPPLY ADABAS SVC NUMBER */
ADARUN NAB=16,LU=65535,NC=20
ADARUN FORCE=N
*
//DDKARTE DD * <--- see Note 7
*-----*
*          SAMPLE ENTIRE NET-WORK NODE STATEMENT          *
*-----*
NODE XCFNET01 BUFFERS=(32K,16K,512K,0), -
              CQTIMER=60, -
              LOG=NO, -
              MAXPATH=10, -
              NTRACE=1000, -
              REPLYTIM=60, -
              TIMER=20
*-----*
*          SAMPLE ENTIRE NET-WORK LINE DRIVER DEFINITION          *
*-----*
DRIVER XCFD GROUP=NETWORK, -
           ACCEPTUI=Y, -
           TRACESIZ=256K
*

```



Notes:

1. The region size required varies with the number and type of links, as well as other operating parameters.
2. The STEPLIB should always designate the most current Adabas load library unless you have been specifically instructed otherwise by Software AG. Adabas Cluster Services requires the version of Adabas that underlies it or the corresponding Adabas limited library (WALvrs) provided on the Adabas Cluster Services installation tape.

3. All Entire Net-Work print output is written to DDPRINT.
4. All diagnostic information from tracing, logging, and ABENDs is written to the NETPRNT file if it is open (otherwise it is written to the DDPRINT file). NETPRNT can be allocated to a large data set that can be copied when closed. The data set should be created with the DCB attributes RECFM=FBA and LRECL=121. To do this, allocate the file SHR. This causes the data set to be erased at the time the file is opened. Be aware that the diagnostic information is very large and will fill a data set quickly. When this happens, the file is closed and all additional output is sent to DDPRINT. This diagnostic information is created by Entire Net-Work and does not include the operating system dump information written to SYSUDUMP.
5. If MPMDUMP is defined, a snap dump is produced during any abnormal termination. In most error situations, the MPMDUMP dump may contain more pertinent information than the SYSUDUMP dump.
6. DDCARD contains the ADARUN control statements defining the interregion communication parameters for Entire Net-Work. Some ADARUN parameters are the same as for Adabas; others are similar, but are designed specifically for Entire Net-Work. Read *Entire Net-Work (NETWRK) Initialization Parameters*, in *Adabas Cluster Services Reference*, for information about coding ADARUN statements for Entire Net-Work.
7. DDKARTE contains Entire Net-Work parameter statements describing the local environment and the network connections for this node. Read *Entire Net-Work Parameter Statements*, in *Adabas Cluster Services Reference*.

Specify the Entire Net-Work Control Statements

As shown in the job example in section [Modify the Startup Procedure](#), there are four types of Entire Net-Work control statements:

- ADARUN control statements define the interregion communication environment.
- NODE statements define the node's name and operating characteristics. Read *XCF NODE Statement*, in *Adabas Cluster Services Reference*.
- DRIVER statements define the line driver type(s) to be loaded. Add one or more DRIVER statements that specify your requirements for this Entire Net-Work node. At least one DRIVER statement is required. For the XCF line driver, read *XCF DRIVER Statement*, in *Adabas Cluster Services Reference*.
- LINK statements define the links to other nodes and are currently not required. Optionally, add one or more LINK statements. For the XCF line driver, read *XCF LINK Statement*, in *Adabas Cluster Services Reference*.

Customize the Entire Net-Work ADARUN and NODE statement parameters.

Add the XCF DRIVER statement that specifies your requirements to the Entire Net-Work parameter data set. Optionally, add one or more XCF LINK statements to describe Entire Net-Work partner nodes.

Apply Entire Net-Work Maintenance

Apply corrective maintenance.

Refer to the *Report of Tape Creation* to determine whether any files containing corrective maintenance (i.e., data sets named *pppvrs.ZAPS*) are supplied on the installation tape. If so, restore the data sets using IEBCOPY, and then follow the corrective maintenance instructions in the \$READMVS member.

Start Entire Net-Work

When execution JCL, including the ADARUN and Entire Net-Work parameter statements, is created for each node and all access method-specific definitions and installation steps are completed, Entire Net-Work can be started.

Start Entire Net-Work on multiple nodes and establish connectivity with the partner nodes.

The execution job or procedure for Entire Net-Work must be started on each of the participating nodes. Once started, Entire Net-Work determines the interregion communications environment on its node, connects to neighboring nodes through the defined links, and exchanges all relevant information with the other nodes during the "handshaking" process following link connection.

While the Entire Net-Work tasks are active and connected, user programs on any node can access all active targets on any other node, regardless of the targets' locations.

Run verification tests. For example:

- Test your applications running across Entire Net-Work. Run one application at a time and verify the results.
- Run a load test through the network (that is, multiple users on each node accessing data on the partner node).

If a link fails or cannot be connected properly, Entire Net-Work searches for possible alternate routes to complete the call. Once a disconnected link becomes available again, it is automatically considered for traffic.

Entire Net-Work can also be installed as a started task; no special considerations apply.

Entire Net-Work uses cross-memory services similar to Adabas in z/OS systems. As a result, the operating system may terminate the ASCB/initiator when Entire Net-Work terminates operation unless the system is configured with reusable address spaces. This is normal and is not an error.

During execution, a number of operator commands may be issued to Entire Net-Work to display or modify the system status. Read *Entire Net-Work Operator Commands*, in *Adabas Cluster Services Reference*.

Create a Startup Procedure for ADACOM

An ADACOM initialization task is provided. This task must execute on each operating system image that has users who access the cluster database but no cluster nuclei; Software AG recommends that you also execute it on each operating system image that has a nucleus that participates in the cluster so that it is available as a command manager. All load libraries in the STEPLIB concatenation of ADACOM must be APF-authorized.

Either a cluster nucleus or the ADACOM program can allocate the nucleus table for monitoring the active nuclei and the user table for monitoring users in the extended CSA (ECSA) above the 16MB line.

The ADACOM task can be set up to manage any number of SVC/DBID sets in a sysplex. Read *ADACOM Initialization Parameters* in *Adabas Cluster Services Reference* for more information about specifying values for ADACOM parameters.

The following is a sample job for running ADACOM:

```
//ADACOM JOB . . . .
//*-----*
/*      Adabas Cluster Services ADACOM Vv.r.s STARTUP      *
//*-----*
//ALSvrs EXEC PGM=ADARUN,REGION=4M,TIME=nnnnn
//STEPLIB DD DISP=SHR,DSN=ADAALS.Vvrs.LOAD
//      DD DISP=SHR,DSN=ADABAS.Vvrs.LOAD
//*
//COMPRINT DD SYSOUT=*
//DDPRINT DD SYSOUT=X
//DDCARD DD *
ADARUN PROGRAM=ADACOM
/*
//DDKARTE DD *
ADACOM SVC=sv1,DBID=dbid1,NU=150
ADACOM SVC=sv1,DBID=dbid2,NU=150,C=N,F=Y
ADACOM SVC=sv2,DBID=dbid1,NU=500
ADACOM SVC=sv2,DBID=dbid3,NU=500
/*
```

The COMPRINT DD statement must be specified when running ADACOM. It defines an output data set for all general messages printed by ADACOM. For each SVC/DBID set specified in the ADACOM task, two subtasks are attached and SYSOUT data sets are dynamically allocated to receive all messages specific to that combination. The DD-name of the SYSOUT data sets are

"P*ss*ddddd" and "D*ss*ddddd", where *ss* represents the last two digits of the SVC number and *ddddd* are the five digits of the DBID.

ADACOM can also be installed as a started task; no special considerations apply.

You may also want to add the ADACOM task's start command to member COMMND_{xx} of SYS1.PARMLIB; this enables the ADACOM task to begin automatically at IPL.

Create a Startup Procedure for Each Cluster Nucleus

1. Customize a startup procedure to execute ADARUN.

For each Adabas cluster nucleus, customize the appropriate startup parameters and execute ADARUN from the Adabas load library.

2. Concatenate the Adabas Cluster Services load library ahead of the Adabas load library in the STEPLIB. All load libraries in the STEPLIB concatenation of the cluster nucleus must be APF-authorized.
3. Allocate and format a Work data set for each nucleus.

All nuclei in an Adabas cluster share a common database resource; i.e., the same ASSO and DATA data sets. Each nucleus in the cluster must have its own Work data set; and all Work data sets within a cluster must have the same size and device type as defined in the general control block (GCB).

Use DISP=SHR on the DD card for the Work data set (DDWORKR1). During an offline or online restart/recovery, a nucleus may access the Work data sets belonging to other nuclei in the cluster.

4. Specify the ADARUN CLUSTER, NUCID, CLUGROUPNAME, CLUCACHENAME, and CLULOCKNAME parameters for each nucleus.

Although each nucleus of an Adabas cluster shares the same database resource (DBID), each nucleus must have a unique NUCID value:

- a single (noncluster) nucleus: NUCID=0 (default)
- a cluster nucleus: NUCID=1-65000

Each cluster has cache and lock structure names that are unique in the sysplex system. ADARUN parameters are used to identify these names to each cluster nucleus.

Use current values for all other ADARUN parameters, then reevaluate the values after monitoring the result. Ensure that each nucleus in the cluster is prepared to handle the entire workload for the common database, if necessary.

5. If protection logs are used, they must be dual or multiple logs and each nucleus must have its own. If one nucleus in the cluster runs with PLOGs, all nuclei in the cluster must run with PLOGs. The ADARUN PLOGRQ parameter must be the same for all nuclei (global parameter).

If user exit 2 or user exit 12 is supplied for one nucleus, the same user exit must be supplied for all nuclei in the cluster. User exit 12 must be used instead of user exit 2 if NCLOG/NPLOG is specified.

6. If command logs are used, each nucleus must have its own. If command logs are to be merged, they must be dual or multiple command logs and each nucleus in the cluster must have the same CLOG definition. CLOGMRG=YES must be specified in the ADARUN parameters to invoke automatic CLOG merging.

The following sample nucleus JCL executes the Adabas ADARUN program to implement session parameters for an Adabas cluster nucleus.

Note that the Adabas Cluster Services library is concatenated ahead of the Adabas library in the STEPLIB.

```
//PLX240N1 JOB . . . .
//*-----*
//*          STARTUP FOR ADABAS CLUSTER NUC #1          *
//*-----*
//NUC240   EXEC PGM=ADARUN,REGION=8M,TIME=nnnnn
//STEPLIB  DD DSN=ADAALS.Vvrs.LOAD,DISP=SHR
//         DD DSN=ADABAS.Vvrs.LOAD,DISP=SHR
//*
//DDASSOR1 DD DSN=MPM240.ASSOR1,DISP=SHR
//DDDATAR1 DD DSN=MPM240.DATAR1,DISP=SHR
//DDWORKR1 DD DSN=MPM240.WORKR1.CLU01,DISP=SHR
//*
//DDPRINT  DD SYSOUT=*
//DDDRUCK  DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//*
//DDCARD   DD *
ADARUN PROG=ADANUC
ADARUN CLUSTER=SYSPLEX          ADABAS CLUSTER SERVICES
ADARUN NUCID=1
           ADABAS CLUSTER NUCLEUS ID
ADARUN CLUGROUPNAME=ADA240      XCF GROUP NAME
ADARUN CLUCACHENAME=ADA240_CACHE  CACHE STRUCTURE NAME
ADARUN CLULOCKNAME=ADA240_LOCK   LOCK STRUCTURE NAME
ADARUN SVC=209                 SVC NUMBER
ADARUN DBID=240                DATABASE ID
ADARUN PLOGRQ=NO                PLOG REQUIRED
ADARUN MODE=MULTI              MULTIUSER MODE
ADARUN LOCAL=NO
.
```

```
./.*
```

Modifying the z/OS Common Storage (CSA) Key

With z/OS version 1.9, the default setting of the ALLOWUSERKEYCSA parameter has been changed to NO, prohibiting the allocation of CSA storage in a non-privileged storage key. In past releases of Adabas Cluster Services and Adabas Parallel Services, its data structures in common storage (PLXCB and subordinate control blocks) were stored in user key storage. Due to the change of the ALLOWUSERKEYCSA default, you must either:

- Change the ALLOWUSERKEYCSA setting in z/OS 1.9 to YES. In this case, you need do nothing more, but you incur the security risk that unauthorized programs might modify storage owned by Adabas Cluster Services and Adabas Parallel Services.
- Accept the ALLOWUSERKEYCSA default setting in z/OS 1.9 (NO), thus eliminating the security risk. If you choose this option, however, you will need to modify your Adabas Cluster Services or Adabas Parallel Services installation and the Adabas Cluster Services, Adabas Parallel Services, and ADACOM startup procedures to use a system key. This section provides information on modifying the Adabas Cluster Services and the startup procedures to use a system key and on the prerequisites for doing so.

This section covers the following topics:

- [Requirements and Recommendations](#)
- [Steps to Modify the CSA Key](#)

Requirements and Recommendations

The following requirements and recommendations apply when modifying the CSA storage key:

- The Adabas version 8 ADASVC is required. This procedure, when used with the Adabas 8 ADASVC, supports Adabas 7 and 8 used with Adabas Cluster Services versions 7.4 and 8, and with Adabas Parallel Services versions 7.4, 7.5 and 8. Older releases of Adabas Cluster Services or Adabas Parallel Services may require that some fixes be applied before attempting this, so be sure to check the Knowledge Center of Software AG's Empower (at <https://empower.softwareag.com>) web site for them.
- APF authorization is required to be assigned a system key. Adabas Parallel Services and Adabas Cluster Services nuclei must run authorized, but utilities and classic nuclei may bypass APF authorization by applying an optional fix to ADASVC. If APF authorization is not in effect and the execution JCL has been modified as described below, the following message will appear during initiation:


```
IEF188I  PROBLEM PROGRAM ATTRIBUTES ASSIGNED
```

Steps to Modify the CSA Key

In general, you can modify the CSA key one system at a time for each database. On each system, you can apply the modifications to each DBID/SVC combination independently. One exception to this is when ADACOM controls more than one DBID/SVC pair. In this case, you must modify all DBID/SVC combinations defined to that ADACOM at the same time. All database member nuclei on the system using that ADASVC or ADACOM must be stopped and restarted.

The modification to the CSA storage key involves the use of program name ADARUNK, which is an alias for ADARUN. When your modifications are complete (see the steps below), your installation and all of the appropriate execution JCL will have been changed to use ADARUNK (PGM=ADARUNK) instead of ADARUN. Once this is done, z/OS will assign a system key to all tasks for the nuclei or ADACOM processes. Although only ADACOM tasks and nuclei associated with Adabas Cluster Services or Adabas Parallel Services obtain CSA storage and are required to perform these modification steps to avoid using a user key, the ADARUNK program can also be used for classic Adabas nuclei and utilities.

► To modify the CSA storage key to a system key:

- 1 Add the following entry for program ADARUNK to an active Program Properties Table description in SYS1.PARMLIB(SCHED_{xx}):

```
PPT PGMNAME(ADARUNK) KEY(4)
```

- 2 Activate the new PPT entry. This will occur automatically at the next IPL, or you can use the z/OS operator command SET SCH(_{xx}) to activate it without an IPL.
- 3 Optionally, create permissions for the FACILITY class resource IEAABD.DMPAKEY to allow SYSUDUMP to include system key storage.

When executing with a system key, SYSUDUMP will not contain the system key storage. The following message will appear:

```
IEA848I DUMP SUPPRESSED - ABDUMP MAY NOT DUMP STORAGE FOR KEY 0-7
```

Since cluster nuclei and ADACOM may obtain large storage objects, we suggest including a //SVCDDUMP DD statement in the execution JCL instead of a //SYSUDUMP DD statement. Otherwise, enable SYSUDUMP for system key tasks by permitting the user to have read access to the IEAABD.DMPAKEY resource in the FACILITY class. For more information, refer to your *z/OS Security Server (RACF) Security Administrator's Guide*.

- 4 Examine the Adabas load library to see if an entry exists for ADARUNK. If it does not, create an alias ADARUNK for member ADARUN. You can do this using programs such as

PDSTOOLS or the freeware PDS or use the Linker/Binder to relink ADARUN and create the alias:


```
//LINK EXEC PGM=IEWL,PARM='Map,Let,List(All),Ncal'
//SYSPRINT DD SYSOUT=*
//SYSLMOD DD DSNNAME=<Adabas load library>,DISP=SHR
//SYSLIN DD *
    Include SYSLMOD(ADARUN)
    Order RUNMVS,USRZAP,RUNIND
    Mode AMode(31),RMode(24)
    Setcode AC(1)
    Entry RUNMVS
    Alias ADARUNK
    Name ADARUN(R)
/*
```

- 5 Stop all Adabas Parallel Services and Adabas Cluster Services member nuclei that use the same DBID/SVC pair.
- 6 Any existing user key PLXCB structures for a DBID/SVC combination must be deleted. This happens automatically at the next IPL or if ADASVC is reinstalled using ADASIP.

ADACOM may be used to deallocate the PLXCB without an IPL by specifying NU=0 for every DBID/SVC pair, and then stop and restart ADACOM.

The following sequence of operator commands may also be used to deallocate a PLXCB after stopping all nuclei but before stopping ADACOM:

```
F <ADACOM job>,DBID=<dbid>,SVC=<svc>,ADAEND
F <ADACOM job>,DBID=<dbid>,SVC=<svc>,NU=0
```

- 7 If ADACOM is running and controlling the database, it must be stopped.
 -  **Caution:** If ADACOM is controlling more than one DBID/SVC pair, all pairs must be processed at the same time.
- 8 Modify the startup JCL for each Adabas Parallel Services or Adabas Cluster Services member nucleus and ADACOM to specify program ADARUNK instead of ADARUN. For example, for an Adabas Parallel Services or Adabas Cluster Services nucleus you might specify:

```
//NUC240 EXEC PGM=ADARUNK
```

For an ADACOM startup procedure, you might specify:

```
//ALSvrs EXEC PGM=ADARUNK,REGION=4M,TIME=nnnnn
```

- 9 Modify the JCL for each Adabas Parallel Services or Adabas Cluster Services member nucleus and ADACOM to include a `//SVCDUMP DD DUMMY` statement.
- 10 Restart all ADACOM jobs and Adabas Parallel Services and Adabas Cluster Services nuclei that you stopped in Step 5.
- 11 Repeat steps 5 through 10 for each DBID/SVC pair.



Caution: If ADACOM is controlling more than one DBID/SVC pair, all pairs must be processed at the same time.

Starting Adabas Cluster Services

Software AG recommends the following first start sequence:

1. Start Entire Net-Work on each operating system image that is participating in the Adabas nucleus cluster. Ensure that all nodes required for the cluster are connected.
2. Start the ADACOM initialization task on each operating system image that is participating in the Adabas cluster.
3. Start the Adabas cluster nuclei in any order.

The Adabas cluster is now ready to process user requests.

Rules for subsequent starts of Adabas Cluster Services are described in *Adabas Cluster Services Operations*.

When the Adabas cluster nuclei are active, issue the Entire Net-Work operator command `DISPLAY TARGETS` to ensure that the required targets have been established. For more information, read *DISPLAY - Display Information About a Network Component*, in *Adabas Cluster Services Reference*.

Index

A

- ADACNV utility
 - converting existing databases, 8
- ADACOM
 - example of job control, 23
 - initialization job/task, 23
- ADADEF utility
 - defining a new database, 8
- AMODE (31), 16
- APF authorization, 16

C

- cache structure
 - CLUCACHENAME parameter, 24
 - coupling facility resource management (CFRM) requirements, 4
- CFRM (see coupling facility resource management (CFRM) policy)
- CLUCACHENAME
 - ADARUN parameter, 24
- CLULOCKNAME
 - ADARUN parameter, 24
- CLUSTER
 - ADARUN parameter, 24
- cluster nucleus ID
 - NUCID parameter, 24
- command logs, 25
- control statements, 21
- coupling facility resource management (CFRM) policy
 - Adabas Cluster Services cache structure requirements, 4
 - Adabas Cluster Services lock structure requirements, 4

D

- DT command
 - display target IDs, 29

E

- Entire Net-Work
 - requirement for, 8
 - STEPLIB concatenation, 11
 - using an existing system, 10
 - XCF line driver, 11

I

- installation
 - Adabas Cluster Services, 23
 - sequence, 14

J

- job samples
 - copying tape data sets to disk, 15
 - running ADACOM, 23
 - starting Entire Net-Work, 19

L

- lock structure
 - CLULOCKNAME parameter, 24
 - coupling facility resource management (CFRM) requirements, 4

N

- NUCID
 - ADARUN parameter, 24

P

- PLOG
 - requirement to reformat, 8
- protection logs, 25

R

- run job example
 - z/OS, 19

X

- XCF line driver
 - library concatenation Adabas Cluster Services, 11
 - use with Entire Net-Work and Adabas Cluster Services, 11

Z

- z/OS
 - installation JCL, 15
 - run-time examples, 22

