

## Setting up a Year 2000 S/390 Test System

With the year 2000 approaching fast, it is critical that you begin the testing phase of your Year 2000 project soon. Testing is projected to be over 50% of your overall project. Because of the possible complexity and interactions between system components, IBM is providing the following guidance on testing.

By their very nature, Year 2000 exposures are time-sensitive and time-driven. Basic Year 2000 testing requires that you set the system date and time to a point where Year 2000 exposures can be detected, then removed.

Any of the S/390® operating systems with a clock set to a future date can be run in any one of the following ways:

- PR/SM(1) LPAR
- as a VM guest
- on a dedicated machine

This is also true for images in LPARs, guests on VM, or when running a native OS/390™ or MVS™ system.(2)

Each LPAR or VM guest has its own logical clock which is separate and distinct from the clocks of all other LPARs or guests running on the same physical machine. A future date in one LPAR will not affect the date set in another LPAR. Any program, application, or system running in the image uses the same future date. The date is set at IPL time or very early in the IPL process and is no different than the date running on the physical hardware.

The environment you choose will depend on your available resources and skills, and system availability or constraints.

1 Processor Resource/Systems Manager

2 Non-IBM systems that have features similar to PR/SM might not function in the same way as an IBM PR/SM LPAR.

## **Things to Remember when Planning a Year 2000 Test**

Several important points should be always be kept in mind when planning your Year 2000 Test.

Be extremely careful before resetting the system timer. Some system resources and functions are time-sensitive and may be activated or de-activated when you reset the system clock. Such effects can occur when you either set the system clock forward or backward. Without careful planning, you could cause the loss of these system resources and/or functions, some of which might prove very difficult and time-consuming to recover.

The most vulnerable resources/functions subject to expiration include:

- user IDs
- passwords
- data files and databases
- authorization/protection
- licences/services
- network access
- automation functions (as well as unexpected activation)
- backup copies of datasets
- migrated copies of data sets

Security products (such as RACF) and other date-dependent functions require particular attention. Setting the system clock ahead can cause immediate loss of system programmer or end-user access and data expiration.

In the case of RACF, it is recommended that a user with system SPECIAL authority be the first to log on to the Year 2000 test system and then specify SETROPTS NOINACTIVE. This will prevent RACF from revoking users due to inactivity. Users' passwords will expire -- this is something that cannot be prevented. And finally, all testing must occur using a copy of the RACF database -- not the real database.

## Testing in a Sysplex

One of the challenges of Sysplex Year 2000 (Y2K) testing is the need to continue to run a production Sysplex while testing is being performed. This page discusses the Time of Day (TOD) clock issues and describes what is possible. At a glance, the page is divided into four parts.

### 1. A production Multi-System Sysplex

Step one is to have an understanding of Sysplex requirements and limitations. For example, there cannot be more than one Sysplex Timer Network on any processor or Sysplex.

### 2. Using SIMETRID to create a Sysplex

SIMETRID has existed since Sysplex was first introduced in September of 1990. SIMETRID is a parameter in the CLOCKxx member of SYS1.PARMLIB that allows multiple simulated Sysplex Timer Networks to be created.

### 3. Year 2000 Sysplex Test Datesource (9672 G3, G4, G5, Multiprise 2000, Application StarterPak)

Year 2000 Sysplex Test Datesource is a function that was introduced to address Year 2000 testing challenges for Sysplex clients. This page will discuss its capabilities and limitations.

### 4. Enhanced Parallel Sysplex Clock Function (9672 G5 only)

The Enhanced Parallel Sysplex Clock Function was introduced in announcement letter 198-115 on, May 7, 1998. It enables clients to run different Sysplexes on the same hardware platform with each Sysplex using a different TOD Clock value. This capability enables Sysplex Year 2000 testing over multiple processors.

Let's first discuss how a production Sysplex is normally implemented. Within the context of this document, a Sysplex uses multiple Central Processing Complexes (CPCs) therefore a 9037 Sysplex Timer is required to ensure that the TOD clocks on all machines are synchronized.

### 1. A production Multi-System Sysplex

A System Complex (Sysplex) is a set of hardware and software that allows OS/390 systems to communicate and cooperate with each other to process customer work. The sysplex provides parallel processing and improved data sharing for certain kinds of work. To coordinate the TOD clocks for OS/390 systems that run on separate processors or CPCs in the sysplex, a Sysplex Timer must be used.

The operating system is customized to either use or not use the Sysplex Timer. This choice is made via the ETRMODE parameter found in the CLOCKxx member of SYS1.PARMLIB. All

images attached to the same Sysplex Timer network and have specified ETRMODE YES, will have their TOD clocks set, synchronized and kept synchronized.

Other CLOCKxx parameters can allow images not participating in the Sysplex to have the operator prompted at Initial Program Load (IPL) time to set their logical TOD clock value to something different than the Sysplex Timer. In this way non-Sysplex images can perform Y2K testing.

## 2. Using SIMETRID to create a Sysplex

SIMETRID in the CLOCKxx member of PARMLIB specifies a simulated Sysplex Timer and allows for the creation of a Sysplex between multiple OS/390 images if they are running under LPAR or as VM Guests on the same CPC.

This works fine when you want to create a Sysplex that has the same date and time as the physical TOD clock of the machine, but not when you need to create an additional Sysplex for Y2K testing. In our example, the additional test Sysplex would have the same date and time as the production Sysplex.

## 3. Year 2000 Sysplex Test Datesource (9672 G3, G4, G5, Multiprise)

The Year 2000 Sysplex Test Datesource capability allows the definition of multiple logical partitions within a CPC to have a synchronized time and date other than that of the production systems(s). This eliminates the need to dedicate an entire CPC to year 2000 testing of a multi-member parallel sysplex. This testing capability is available on S/390 Parallel Enterprise Servers, Generation 3, Generation 4, Generation 5, Multiprise 2000 and the Application StarterPak.

When using the Sysplex Test Datesource function, again the test Sysplex will use the SIMETRID parameter in the CLOCKxx member. The test Sysplex "Group" is identified by settings made through the CPC's Support Element or Single Object Operations via the Hardware Management Console (HMC). The operator specifies a date and time to which the test group will be synchronized and which logical partitions belong to the test group.

This feature may be used for Y2K Sysplex testing when all test images are running on the same CPC. An operational 9037 is not required, but one may be connected. Other images on the same CPC (and other CPCs with a 9037) could run a production Sysplex with the current date simultaneously with the Y2K test Sysplex.

NOTE: Only one test group is allowed at a time. Datesource requires EC Driver 98 or higher. Also, see APAR OW28604.

#### 4. Enhanced Parallel Sysplex Clock Function (9672 G5 only)

With the announcement of the 9672 G5 family of processors, there is a new capability called the Enhanced Parallel Sysplex Clock Function. There are several new TOD clock related items that this announcement introduced, but for this page we will continue the discussion on Y2K Sysplex testing.

In some ways this new function is like the Datasource feature, but better. A client may have more than one Sysplex running across multiple CPC's, and each Sysplex could have a different date and time. In addition, a CPC may have up to 15 sysplex groups.

Implementation is somewhat different than Datasource. Still assuming that we have multiple LPAR'ed CPCs, each member of each Sysplex must attach to a Sysplex Timer and the CLOCKxx member must specify ETRMODE YES. SIMETRID may not be specified if the sysplex images are participating across multiple CPC's.

The Support Element again is used to set up the environment. Instead of specifying a specific date and time for the group(s), the operator will enter a specific "offset" for each group. The offset specifies a value (plus or minus) from that of the 9037 value being transmitted. The offset is entered by +/- days, hours, and minutes. To set up a test

Sysplex for December 31, 1999, you need to calculate how many days until then. Lets say it's now June 11, 1998. There are now 567 days until 12/31/99. The operator would enter + 567\_days, xx\_hours, xx\_minutes (xx\_pick a suitable value). The URL <http://tycho.usno.navy.mil/cgi-bin/countdown.pl> can be used to help you calculate the days until the year 2000.

This function also has other uses besides Year 2000 testing. It obviously allows other Sysplexes to have different TOD dates and times, but this capability can be put to use in another way. For example, some IBM clients still have not converted their TOD clocks from local time to GMT time. This is encouraged when migrating to a Sysplex since it can make daylight savings time changes easier to implement without an outage in most cases. With this new 9672 G5 function, clients could have a multi-system Sysplex using true GMT time and another Sysplex on the same CPC's in a group using a Logical TOD set to local time. In this case the operator would enter an offset that coincides with their local time zone, for example New York (- 0\_days, 05\_hours, 00\_minutes). Notice that there is a minus 05 hours offset entered. If the 9037 were transmitting UTC/GMT time, then this "local time" offset must reside 5 hours West of GMT. This could be very useful for an installation that has recently merged with another company. If the other company still used local time set in their TOD clock, both Sysplexes could coexist simultaneously on the same hardware.

NOTE: A Datasource group and several Enhanced Parallel Sysplex Clock Function groups may coexist on the same processor, but the same LPAR image cannot be in both simultaneously. Up to 15 Enhanced Parallel Sysplex Clock Function Groups may coexist simultaneously.

## **Dataset, Catalog and Volume Considerations**

It is essential to completely isolate the data used in the Year 2000 test environment. In addition to the normal desire to avoid mixing the application data on the test system with production data, Year 2000 testing also requires isolation of system data, such as couple datasets, JES2 spool and checkpoint, and catalogs. Because the current date may be placed in DSCB entries, VVDS entries, and catalog entries when datasets are referenced, the mixture of time periods could cause programming to make unexpected decisions.

These important dates include creation date, expiration date, and last reference date. When creating datasets for the Year 2000 system by copying production datasets, these datasets will have same dates as creation date and expiration date as they did on the production system. Care must be exercised to make sure that an automatic storage management process, such as DFSMSHsm space management, does not decide to expire datasets because the expiration date has passed. For example, if you normally keep datasets for one year, and you move these data sets on May 1, 1998, the expiration dates will all be May 1, 1999 or earlier. When you set the date to December 31, 1999, these datasets will be candidates for expiration. Care must be taken to make sure that data is not expired before it has a chance to be used.

If a current date system accesses a dataset on the Year 2000 test system, it may find that the date values don't make sense when considering the normal chronology of dataset creation, reference, and expiration. Unexpected results may occur when trying to determine what to do when a dataset has a creation date in the future as this is a situation which should never occur; there may not even be any code to detect the situation.

This data isolation must occur at several different levels:

### **Dataset**

Copies of data sets used to test Year 2000 changes will need to be created. In addition to copying production or normal test data, these also will need to data "aged" to dates nearer that being set on the Year 2000 system so that short term actions based upon dates will occur.

### **Catalog**

Because date information is kept as part of the catalog, it is essential that separate catalogs exist for the Year 2000 environment and for current date environments. Catalog entries are updated when data is accessed as well as when data is created and/or updated. It would not make sense for a catalog to indicate, for example, that the last reference to a dataset occurred before it was created.

### **Volume**

Although ICF catalogs no longer restrict data on a volume basis, it is necessary to make sure that all data on a volume is accessed only by systems with the current date or by the Year 2000 test system. Information in the VTOC and other volume-level data also contains dates and could cause problems if the relationship between dates was not correct.

The above comments are relevant whether the datasets reside on DASD or on tape. And, since tape datasets may also be catalogued within a Tape Control DataSet (TCDS), it is also necessary to make sure that this doesn't have datasets from both the current date and the Year 2000 test system.

## Control Units

When using a single control unit to contain volumes with data from both the current date system and the Year 2000 test system, you need to consider if this is acceptable. There is no knowledge of the system date transmitted to the control unit itself so that is not where the problem may be encountered. Rather, the concern is over how errors are reported and how associated data is stored. There are two types of error presentation that needs to be considered--SIM (System Informational Message) and logrec.

A SIM is presented at the operator's console to let the operations staff know that a problem has occurred, what level of problem it is, and what device or control unit is involved. For a unique situation, a SIM is presented when the problem occurs and then twice more at 8-hour intervals if the problem is not cleared.

For a DASD controller, the SIM is presented to all attached systems if the latest microcode updates have been installed. Otherwise, DASD controllers behave just like tape controllers and the SIM is presented to one system. Since it is up to the controller to determine which address to use to present the SIM, there is no way to make sure that it goes to the system that has the same time as the device having the error. This means that the operations staff needs to know what devices are in use by another system so that they can make sure that everyone affected by a problem is notified.

Logrec data is the data created when various system problems occur. Each system has an error recording data set and writes relevant records to that dataset. Periodically, that data is formatted by a program called EREP (Environmental Error Record Editing and Printing Program) so that it can be made available for observation. This will be done to get more information about a SIM or to determine system health as part of the normal maintenance practice. At this time, the data is printed based on the date in the system where the program is running. It may also attempt to combine information collected by multiple systems sharing control units and devices so that errors seen by the different systems may be collected together.

As long as all systems have their clocks synchronized, no special considerations are needed when examining the output from EREP. But if one of the systems is being used for Year 2000 testing, it necessarily will have a different time. Therefore, you need to be sure to create the EREP reports on a system using the time when the reports were created. When the logrec data is collected for future processing, the timestamp in each record is converted to the actual time by looking at the system time (GMT) and adding the offset to the local time of the processing system. To consolidate all activities on a specific control unit, whether tape or DASD, you need to know the time difference between the current date system and the Year 2000 test system so that you know what activities are actually happening at the same time.



## **Allocating/Sharing Tape Drives between Systems**

The concern when allocating tape drives is to make sure that only one system attempts to use a drive. This is no different than the situation in any multi-system environment. If you are using a non-IBM product, such as MIM, you need to check with the provider to determine if there are any implications when using the same control mechanisms between a system running with current time and a system with the clock set ahead for Year 2000 testing.

## **IBM Tape Library Data Servers**

This section only applies to IBM Libraries. If your tape library is not manufactured by IBM, please contact the manufacturer for any considerations.

The IBM Tape Library Data Servers and Virtual Tape Servers can interface with multiple systems where the systems are running at different times. The internal time within the library is handled by the Tape Library Controller so there is no passing of timestamps between the systems. As long as the time of the Tape Library Controller is not changed, communication will proceed correctly.

## Timestamps in Tape Labels

Timestamps in tape labels are based on that of the operating systems. Therefore, it will be necessary to partition the tape library to make sure that the present date system does not encounter a tape with a creation date in the future.

Dates contained on both IBM Standard label tapes and ANSI labeled tapes include a creation date and an expiration date. These are represented as a 6-byte field in the format cyyddd, where:

c	century (3) (blank=19; 0=20; 1=21; etc.)
yy	year (00-99)
ddd	day (001-366)

The century byte indicates the first two digits of the year so that a value of blank indicates values in the range 1900-1999 and a value of 0 represents 2000-2099.

Since the default for undefined fields within the tape label has been that they contain blank, tapes written before January 1, 2000 will automatically be interpreted as having a correct 4-digit year value. Code which only enters a 5-digit date field cannot be considered as Year 2000-ready.

## **Creating Data for the Test System**

In order to begin testing, there must be a separate collection of data created for the test system. This may be done using any of the common methods of copying data: full volume dumps, dataset dump/restore, dataset copy and so on.

The RAMAC Virtual Array DASD provides an excellent tool for copying datasets. Use of this product reduces the amount of duplicate data needed as only the changed data is duplicated. As with other volume usage, the data should only be online to either the current system environment or the Year 2000 test environment but not both. Once the volume containing these datasets has been accessed by the Year 2000 test system, the volume should never be put online to the present date system.

## Keeping the Results of Testing

When you have completed testing, you still cannot just store the data on the present date system. You need to take into account how the data will be used and the catalog information about the dataset cannot contain future dates. Past practices have been to store the data on tapes. Therefore, the following refers to tape, although it may also apply to datasets on DASD. It must be remembered that the purpose of Year 2000 testing is not to test what happens with time-machines.

There are two reasons to keep data from a Year 2000 test environment:

- To be able to rerun the tests without creating new data
- To be able to show auditors the results of the test

Once the data has been stored on tape, the most important consideration of such a tape is to make sure that its expiration date value is set so that it will be recognized as a never-expire value by both the current date system and the Year 2000 test system. This should mean that it will also not expire when the current date is beyond December 31, 1999. This will need to take into account any tape management system being used.

Additional special considerations exist with keeping testcase results when the system time does not show when the testcase was run.

A mechanism is needed to show that the tape with a creation date of 2000.59 contains the results from a test run on 1997.335. You need to consider how each file on the tape will be used at a later time. Any data that will be restored as a DASD file needs to be examined based on the program used to dump and restore the information.

These programs often store information about the dataset (such as the creation date from the catalog) as well as the dataset contents. For example, if DFDSS or DFSMSdss creates a dump dataset and it is restored with the same name as when it was dumped, the creation date of the new dataset is taken from the catalog information stored on the tape so this dataset could have a future date depending on when it is restored.

Before you enter a tape with a future date in the label, you need to consider the operation of the tape library and of any tape management system. If using a non-IBM tape library, there may or may not be a problem with entering the tape into the system. And, depending on how the tape management system manages dates, there may or may not be a problem with the creation date in the tape label.

## Device Isolation

There are a number of ways to isolate devices, from the weakest way to the strongest:

1. Have the devices online but just don't use them. This is dangerous since it still requires control over space allocations.
2. Have the devices placed offline by MVS. This is still weak since they can be brought online.
3. Have the devices defined offline to MVS in HCD. This is also weak since they can be brought online.
4. Define the device to the hardware (channel subsystem) but not to MVS

DO NOT do this, because if a device goes hot and sends in many interrupts, it can affect the performance of the channel subsystem and MVS will not be aware of this situation. There have been cases where thousands of I/O status presentations were made for one device each second for hours; no one was aware of this and the performance of the CPC dropped to less than 20%.

5. Do not have the production devices defined to the Year 2000 hardware image and do not have the Year 2000 devices defined to the production images at the hardware level (channel subsystem level). [ HCD I/O Device Explicit Function ]

It is very safe not to define the device to the hardware providing you are still accessing other devices on the same CU from this CPC that you have defined the CU address range correctly to HCD.

The only way that you can then get to this device is by doing a dynamic I/O reconfiguration change.

For this case, it is OK to have the devices defined to MVS since MVS will never be able to get them online while they are not defined to the hardware.

This is the best practical way of operating for Year 2000 testing.

If the device goes hot for this definition case, there will be an IOS163 message. An IOS163 message is a quality message , not a quantity message (there is only one of them per device). As a normal practice customers should react to them.

6. Do not have any physical/logical connectivity to the production devices from the Year 2000 hardware image and do not have any physical/logical connectivity from the Year 2000 devices from the production image.

This may sound OK, but in an ESCON world it is very hard to do if all the devices are in the same physical location.

## HCD I/O Device Explicit Function

The HCD I/O device explicit function allows devices that are defined to a CU that was defined on shared ESCON channel paths, to have a device candidate list of partitions.

This may be very useful for some year 2000 installations that are sharing a DASD control unit, but want some of the devices to be accessible only from production, development and test partitions and some of the devices only accessible from a year 2000 partition.

There may be some configurations where the standard definition method will cause the customer to try and specify no candidate partitions for an I/O devices.

However, HCD requires as least one partition to be specified in a device candidate list.

A standard definition method would be to define a DASD CU and define the attachment of the CU to both processors, and then try and control access to the devices on this CU by use of the explicit device candidate list (list of partitions).

For a Year 2000 definition case you will need to define two CUs instead of only one CU, one CU (CU101) that has paths defined as attached to one processor (CPC1) and the other CU (CU102) defined as attached to the other processor (CPC2).

For the description that follows, assume:

There are two processors both in LPAR mode, with 2 partitions on processor 1 (CPC1) and 2 partitions on processor 2 (CPC2).

The partitions are:

CPC1 = LP1 = PRODUCTION (PROD)

CPC1 = LP2 = TEST (TEST)

CPC2 = LP1 = DEVELOPMENT (DEV)

CPC2 = LP2 = Year 2000 (Y2K)

There is one DASD CU with 64 DASD devices.

Devices 100 to 11F (thats 32 devices) are required to be accessed from PROD, TEST and DEV, MVS partitions.

Devices 120 to 13F (thats 32 devices) are required to be accessed from the Y2K, MVS partition.

So the customer will have to:

define the processor CPC1 in the normal way

define the LPARs for processor CPC1 the same as the normal way LP1 for PROD and LP2 for TEST

define the CHPIDs on processor CPC1 the same as the normal way the DASD ESCON CHPIDs will be defined as shared the DASD ESCON CHPIDs will have LP1 and LP2 in the access list

define the processor CPC2 in the normal way

define the LPARs for processor CPC2 the same as the normal way LP1 for DEV and LP2 for Y2K

define the CHPIDs on processor CPC2 the same as the normal way

the DASD ESCON CHPIDs will be defined as shared)

the DASD ESCON CHPIDs will have LP1 in the access list

define a DASD Control Unit (CU number 101 for example, unit address quantity = 64) and only connect to CHPIDs on CPC1

define a DASD Control Unit (CU number 102 for example, unit address quantity = 64) and only connect to CHPIDs on CPC2

define the production/development DASD devices (100,32) and connect:

all of these devices (100,32, starting at unit address 00) to both CU 101 and CU 102

no explicit function is required for CPC1 for devices 100,32 therefore they are accessible from CPC1-LP1 (PROD - production) and from CPC1-LP2 (TEST)

for CPC2 use the explicit function 'yes' to provide access to devices 100,32, only to CPC2-LP1 (DEV - development)

define the Year 2000 DASD devices (120,32) and connect:

all of these devices (120,32, starting at unit address 20) to only CU 102

for CPC1 use the explicit function 'yes' to provide access to 120,32 only to CPC2-LP2 (Y2K)

no action required for CPC1-LP1/LP2 for these devices, as these devices (120,32) were not defined as being connected to CU 102



## Communications Products

Correct use of communication products can ease the burden imposed by the inability to "share" DASD at the dataset level between a Year 2000 test environment and development/production systems. Here are some basics you should know:

"Interconnected" VTAMs never "interchange" any dates.

"Interconnected" NCPs never "interchange" any dates.

There are no "communication products" (except noted below) which "interchange" dates.

### VTAM and NCP

The only "interchanging" of dates occurs between VTAM and NCP when VTAM activates or takes ownership of the NCP. VTAM will pass the date to RACF for session-level LU-LU verification to validate that the user's password has not expired. However, there is no external exposure.

If a 37xx is shared between the Year 2000 test environment and other development/production systems, it must be defined as a FID2 to the VTAM on the Year 2000 test environment. In the VTAMs on the development/production systems, of course, it would have to be defined as a FID4 so that at least one VTAM could activate it (and so the other system could take ownership if the first system failed).

Therefore, configure and define VTAM for their Year 2000 test environment exactly like any other system. The rules are exactly the same. The recommendation is to connect the VTAM on the Year 2000 test environment to at least one other VTAM via a CTC. You could also dedicate a 37xx to the VTAM on the Year 2000 test environment or share one with your development/production systems. However, if you share it, the 37xx must be defined as a FID2 connection to the VTAM on the Year 2000 test environment to prevent it from ever activating or taking ownership of it. In this way, the 37xx's internal clock can never be reset by a date from the Year 2000 test environment.

If you do any of the above, there is no danger of a date from the Year 2000 test environment "leaking" out into any other systems. It also allows your development programmers/testers to logon to applications running on your Year 2000 test environment.

Just to reiterate, for an NCP that is shared between a Year 2000 test system with a future date and a development/production system with the current date, its internal clock will be set to the date of the host running the VTAM that LAST executed an "activate" or "take ownership" of the NCP. If one of these was performed by the VTAM on the Year 2000 test system with a future date, it would result in several "cosmetic" problems, including:

1. Trace records on the development/production systems would have timestamps from the Year 2000 test system. Because this could make it more difficult to sequence events occurring within VTAM and NCP, it could complicate diagnosing problems for these products.

2. Some products, such as NTuneMON, would display the future date from the Year 2000 test system as the current date in the NCP.

Some users consider these to be no more than "cosmetic" annoyances. However, many others have requested methods to guarantee that dates from the Y2K test system do not "leak out". The ONLY way of guaranteeing this is to define the connection to a "shared" NCP as a FID2 to the VTAM on the Year 2000 test system.

There are, of course, other methods that could be used to avoid the problem even when the NCP is defined as a FID4 connection. However, none of these will guarantee that the NCP's internal clock will not be reset. You would be at the mercy of your operators and operational procedures.

At this point, you have to decide whether the above "cosmetic" problems are serious enough for you to redefine a shared NCP as a FID2 connection or leave it as a FID4. Remember, we are only talking about sharing an NCP. If you do not connect an NCP or dedicate an NCP to the VTAM on your Y2K test system, the whole issue is moot.

### Sharing PUs and LUs

You should not encounter any problems sharing PUs and LUs defined under lines of the NCP between the VTAMs of the Year 2000 test system and development/production systems. In other words, you should not encounter any problems doing those things that you can do today.

Internally, within VTAM/NCP, however, your sessions will no longer be cross-domain, but rather, peer-to-peer. However, you should not have any resources defined under the LINE statement in your NCP-gen for the VTAM on your Year 2000 test system. If you do, you will not be able to define the NCP as a FID2 connection to the VTAM on your Year 2000 test system.

To reiterate, you should not have any NCP definitions to VTAM on your Year 2000 test system. You should only define a local SNA major node in the VTAMLST on your Year 2000 test system.

“Sharing” PUs and LUs in this context means establishing a session to an LU defined under PU under LINE of NCP from the Year 2000 VTAM, and then closing the session and immediately establishing a session from the same LU to a non-Year 2000 VTAM.

In VTAM/NCP terminology, "sharing" PUs and LUs usually refers to backup/recovery procedures, and what VTAM can “activate” the resources. If the NCP is defined as a FID4, then that VTAM can “activate” any PUs and LUs of the NCP. However, when the NCP is defined as a FID2, that VTAM cannot “activate” any of the PUs and LUs of the NCP. However, this has nothing to do with whether or not a resource can establish a session to an application running on either the Year 2000 test system or development/production systems.

Regarding a "shared" NCP, this refers to a 37xx that was defined to BOTH the VTAM on the Year 2000 test system whose TOD is set in the future, and at least one other VTAM on a development/production system whose TOD is set to the current date-time.

This has nothing to do with "sharing" a terminal/application. Regardless of whether you have defined the NCP as a FID2 or FID4 to the VTAM on the Year 2000 test system, a terminal (or application) could establish a session with an application running on the Year 2000 test system, close that session and then establish a session with an application running on the development/production system.

In this way, terminals can always be "shared" between applications running on either the Year 2000 test system or applications running on the development/production systems. They will, of course, be "owned" by only one side -- and not the VTAM on the Year 2000 test system because the NCP is defined as a FID2 connection (cannot "activate" or "take ownership").

To clarify one more point, if you are using LEN (instead of APPN) for the FID2 connection, then SLU-initiated sessions are not allowed. This means that the terminal LU will not be allowed to initiate the session (which is what you want to do).

### Sharing Switched Major Nodes

Sharing switched major nodes that rely on definitions in the NCP the same way between VTAMs should work the same, except that:

1. the VTAM on your Year 2000 test system cannot "activate" or "take ownership" of the NCP
2. the activation procedures on your VTAMs will be slightly different
3. internally, sessions are peer-to-peer instead of cross-domain

Remember that sessions can be established to any/all VTAMs for LUs defined in the switched major node. However, the switched major node must only be defined/activated on the VTAMs running on the development/production systems. The VTAM on the Year 2000 test system will not be able to "activate" these (or any other NCP resources) when the NCP is defined as a FID2 to the VTAM on the Year 2000 test system.

### **NTuneMON**

NTuneMON may be used to monitor NCPs as today. Of course, the date-time of the Year 2000 Test System will be displayed for any NCP which was last 'Activated' by the VTAM on that system.

### **TCP/IP and Associated Functions**

TCP/IP and its various functions may also be used to transfer programs and data either direction between your other systems and your Year 2000 test environment without the 'contamination' fear that goes with other methods (including tapes).

However, you will need the following circumvention to FTP LOADLIBs until a fix can be provided in a later release of TCP/IP. Create a dataset with identical characteristics on the receiving MVS system using ISPF/PDF or by issuing the following FTP commands:

```
LOCSITE
LKMDIR
or
SITE
MKDIR
```

Then, issue the following FTP commands:

```
EBCDIC
MODE B
MGET dsname(*) or MPUT dsname(*)
```

The dataset on the receiving system is now useable for everything except a LOADLIB. To make a LOADLIB useable, it is necessary to invoke IEBCOPY or ISPF/PDF and do either an "in-place compress" or a "copy" to another dataset with identical characteristics. This will "circumvent" a problem which leaves the programs in a "non-executable" state.

## **NETWORKING PRODUCTS**

Provided all of the IBM hardware, which will include any Licensed Internal Code, and, when necessary, any separately orderable software products are both Year 2000-ready, all IBM Networking Products may be connected to a Year 2000 Test System with the following restrictions:

### **NCP & TCP/IP**

Any IBM Networking Product may be directly connected to any NCP and/or TCP/IP on any Development/Production and/or Year 2000 Test System without any restrictions.

### **VTAM**

Any IBM Networking Product may be directly connected to any VTAMs whose host's clocks are synchronized. At this time, it is suggested that any IBM Networking Product not be directly connected to a VTAM on a Development/Production System and a VTAM on a Year 2000 Test System at the same time.

All IBM Networking Products that are Year 2000-ready properly handle all date fields. Some application protocols do send two-digit years but these are only used for informational messages destined for the end-user and are not used for processing. However, simultaneously connecting a

network to both Development/Production Systems and to a Year 2000 Test System whose clocks are out-of-synchronization may result in some security products denying access for some users to some resources. This does not result in any date contamination and the problem will rectify itself when the Network is no longer simultaneously connected to both Development/Production Systems and a Year 2000 Test System.

## NCP DEFINITION ADDITIONS/CHANGES

An existing NCP which is currently "shared" between a Development & Production System may also be FID2 connected to the Y2K Test System by making the following additions/changes to the existing NCP Definitions (which are usually in VTAMLST):

```

./ ADD NAME=Y2KNCP LIST=ALL
Y2KNCP TITLE 'CHANNEL ATTACHED NCP "shared" WITH Y2K Test System'
*****
*
* NAME: Y2KNCP
*
* USE: NCP definition deck with FID2 connection to Y2K System
*
* NOTES: Use for the following APPN configuration
*
* +-----+ +-----+ +-----+
* * * * * * * * *
* * DEVSSCP *===CA1===* *===CA3===* Y2KSSCP *
* * * (FID4) * * (FID2) * *
* +-----+ * * +-----+
* * Y2KNCP *
* +-----+ * *
* * * * *
* * PRDSSCP *===CA2===* *
* * * (FID4) * *
* +-----+ +-----+
*
* OWNER: Y2K Technical Support Center
* Y2KTSC@US.IBM.COM
*
* DATE: 04/25/98
*
* CHANGES: 04/25/98 - New
*
*****
*
*
*=> Following Lines for Development System SSCP (FID4)
*
DEVSSCP PCCU AUTODMP=NO, X
AUTOIPL=NO, X
AUTOSYN=YES, X
BACKUP=YES, X
CHANCON=COND, X
CUADDR=91C, 3745-A62 CA 1 X
DUMPDS=VTAMDUMP, X
INITEST=NO, X
MAXDATA=4096, X
OWNER=DEVSSCP, X
SUBAREA=1, X
VFYLM=YES
*
*
*=> Following Lines for Production System SSCP (FID4)
*
PRDSSCP PCCU AUTODMP=NO, X
AUTOIPL=NO, X
AUTOSYN=YES, X
BACKUP=YES, X

```

```

CHANCON=COND, X
CUADDR=81C, 3745-A62 CA 2 X
DUMPDS=VTAMDUMP, X
INITEST=NO, X
MAXDATA=4096, X
OWNER=PRDSSCP, X
SUBAREA=2, X
VFYLM=YES X

```

\*

\*-----

\*

\* B U I L D D E F I N I T I O N S

\*

\*-----

\*

```

Y2KNCP BUILD ADDSESS=10, LEN: # SESSIONS BESIDES RESSCB X
AUXADDR=100, LEN: ADDRESS REPIURED BY ALL LUS X
BACKUP=5, X
BFRS=76, X
BRANCH=8000, X
DR3270=YES, DYNAMIC RECONFIGURATION SUPPORTED X
DSABLTO=25, DATA-SET-READY TIME OUT (SECONDS) X
ENABLTO=25, MODEM ENABLED TIME OUT (SECONDS) X
LOADLIB=NCPLOAD, X
MAXSESS=100, LEN: MAX SESS FOR IND. LU X
MAXSSCP=8, X
MAXSUBA=255, PRE-ENA NETWORK SIZE X
MODEL=3745, X
NAMTAB=30, LEN: NETWORK NAME TABLE X
NETID=NETA, X
NEWNAME=Y2KNCP, X
NUMHSAS=4, NUMBER OF HOST SUBAREAS X
OLT=YES, ONLINE TERMINAL TEST X
SLOWDOWN=12, BUFFER SLOWDOWN THRESHOLD X
SUBAREA=3, X
TRACE=(YES,20), ADDRESS TRACE OPTION IN CORE TABLE X
TYPGEN=NCP, X
USGTIER=5, 3745 ONLY X
VERSION=V7R6, X
VRPOOL=75 X

```

\*

\*-----

\*

\* V T A M S Y S T E M C O N T R O L S

\*

\*-----

\*

```

SYSCNTRL OPTIONS=(BACKUP, X
BHSASSC, MODIFY BLOCK HANDLER SET X
DVSINIT, X
ENDCALL, PHYSICAL DISCONNECT (SW ONLY) X
LNSTAT, X
MODE, CHANGE LINE SPEED X
NAKLIM, CHANGE NEG POLL RESP LIMIT X
RCNTRL, REQUEST CONTROL MODE RESET X
RCOND, RESET CONDITIONAL X
RECMD, RESET AT END OF COMMAND X
RIMM, RESET IMMEDIATE X
SESINIT, X

```

SESSION,	CHANGE SESSION LIMIT	X
SSPAUSE,	CHANGE SERVICE-SEEKING PAUS	X
STORDSP,	DISPLAY CONTROLLER STORAGE	X
XMTLMT)	CHANGE DEVICE TRANSMISSION LIMIT	

\*

-----

\*

\* D Y N A M I C R E C O N F I G U R A T I O N P O O L S

\*

-----

\*

PUDRPOOL NUMBER=100

\*

LUDRPOOL NUMTYP1=100,NUMTYP2=100,NUMILU=100

\*

-----

\*

\* H O S T D E F I N I T I O N S

\*

-----

\*

\*

\*=> Following Lines for Development System SSCP (FID4)

\*

DEVSSCP	HOST	BFRPAD=0,	VTAM PAD REQUIREMENT	X
		DELAY=0,	NCP DELAY BEFORE ATTN ISSUED	X
		INBFRS=6,	NUMBER OF CONTROLLER BUFFERS	X
		MAXBFRU=16,	MINIMUM HOST BUFFER ALLOCATION	X
		SUBAREA=1,	HOST SUBAREA NUMBER	X
		TIMEOUT=NONE,	RAS & ANS CHANNEL TIMEOUT	X
		UNITSZ=256	SIZE OF DATA PORTION OF HOST BUFFER	

\*

\*

\*=> Following Lines for Production System SSCP (FID4)

\*

PRDSSCP	HOST	BFRPAD=0,	VTAM PAD REQUIREMENT	X
		DELAY=0,	NCP DELAY BEFORE ATTN ISSUED	X
		INBFRS=6,	NUMBER OF CONTROLLER BUFFERS	X
		MAXBFRU=16,	MINIMUM HOST BUFFER ALLOCATION	X
		SUBAREA=2,	HOST SUBAREA NUMBER	X
		TIMEOUT=NONE,	RAS & ANS CHANNEL TIMEOUT	X
		UNITSZ=256	SIZE OF DATA PORTION OF HOST BUFFER	

\*

-----

\*

\* P A T H D E F I N I T I O N S

\*

-----

\*

\*

\*=> Following Lines for Development System SSCP (FID4)

\*

PATH	DESTSA=1,	X
	ER0=(1,1),	X
	VR0=0	

\*

\*=> Following Lines for Production System SSCP (FID4)

\*

PATH	DESTSA=2,	X
------	-----------	---



```

                ER0=(2,1),
                VR0=0
X
*-----*
*
*   C H A N N E L   L I N K   D E F I N I T I O N S
*
*-----*
*
G3ACA      GROUP CA=TYPE7,
                CASDL=420,
                DELAY=0.2,
                LNCTL=CA,
                NCPA=ACTIVE,
                TIMEOUT=180.0
X
X
X
X
X
*
*=> Following Lines for Development System SSCP (FID4)
*
DEVACA1  LINE  ADDRESS=P1
DEVACA1  PU    PUTYPE=5           FID4 Connection
*
*=> Following Lines for Production System SSCP (FID4)
*
PRDACA2  LINE  ADDRESS=P2
PRDACA2  PU    PUTYPE=5           FID4 Connection
*
*=> Following Lines for Y2K Test System (FID2)
*
Y2KACA3  LINE  ADDRESS=P3
Y2KACA3  PU    ANS=CONT,
                PUTYPE=2,           FID2 Connection
                CONNTYPE=APPN,     If not APPN, change to CONNTYPE=LEN
                CPCP=YES           If not APPN, omit this line
X
X
X
*
*-----*
*
*   E N D   O F   G E N
*
*-----*
*
                GENEND
./ ENDUP
You can now re-gen your NCP.

```

## YEAR 2000 TEST SYSTEM VTAMLST ADDITION

Before you can use NCP on your "Year 2000 Test System", you must also add a "local SNA major node to the "Year 2000 Test System's VTAMLST" such as:

```

./ ADD NAME=Y2KLSMN LIST=ALL
Y2KLSMN VBUILD TYPE=LOCAL
Y2KA81DP PU    PUTYPE=2,           FID2 CONNECTION
                CUADDR=81D,
                ISTATUS=INACTIVE,
                XID=YES,
                VPACING=0,
                SSCPFM=USSSCS,
                MAXBFRTU=15,
                CONNTYPE=APPN,     IF NOT APPN, CHANGE TO CONNTYPE=LEN
X
X
X
X
X
X
X
X

```

```
                CPCP=YES                IF NOT APPN, OMIT THIS LINE                X
./  ENDUP
```

The PUTYPE=2 defines the connection as a FID2 connection rather than the usual PUTYPE=5 which would define it as a FID4 connection. If you are not using APPN, then change the CONNTYPE=APPN to CONNTYPE=LEN (or leave it off) and also leave off CPCP=YES in both the NCP Definition and Y2KLSMN VTAMLST.

However, you should be aware that with LEN connections, all sessions must be PLU-initiated and you either have to pre-define your CDRSCs or specify DYNLU=YES on the PU statement in both the NCP and local SNA definitions.

## ACTIVATION PROCEDURE

The usual procedure that you would have used to activate the connection if the channel adapter was a PUTYPE=5 (FID4) would have been something like:

1. Development/Production VTAM:       V NET,ACT, ID=Y2KNCP
2. Year 2000 Test System VTAM:       V NET,ACT, ID=Y2KNCP
3. Development/Production VTAM:       V NET,ACT, ID=cdrmname\_of\_y2k\_vtam   OR  
   Year 2000 Test System VTAM:       V NET,ACT, ID=cdrmname\_of\_dev/prod\_vtam

The new procedure that you would now use to activate the connection when the channel adapter is defined as PUTYPE=2 (FID2) would be something like:

1. Development/Production VTAM:       V NET,ACT, ID=Y2KNCP
2. Year 2000 Test System VTAM:       V NET,ACT, ID=Y2KLSMN

There is no CDRM activation for FID2. It is a peer-to-peer connection.

## Informational APAR

The following text of an informational APAR reflects NCP Products readiness status as of September 1998. This information is provided here for your convenience. The current Year 2000 readiness status of IBM products is found in the IBM Year 2000 Product Readiness Database at <http://www.yr2k.raleigh.ibm.com>. IBM recommends periodic checks of the Product Readiness Database to verify that previous Year 2000 remediation is still up to date.

### Document ID E402730

TITLE: NCP PRODUCTS YEAR 2000 READY. YR2000 Y2K YEAR2000  
F - -II09701--INFO-PA-LIB--DD-DOC

REPORTED RELEASE R001

#### ERROR DESCRIPTION:

THIS INFORMATIONAL APAR HAS BEEN WRITTEN TO DOCUMENT YEAR 2000 READINESS FOR ALL OF THE NCP PRODUCTS (NCP, SSP, NTUNEMON, EP, NRF, NTO, NPSI, NSF, XI, ALCI, NEF AND NSI).

PRODUCT DESIGN HAS REVIEWED THE CODE FOR THE ABOVE LISTED PRODUCT SET AND HAS DETERMINED THEY ARE YEAR 2000 READY. ALL RELEASES OF THE NCP PRODUCT SET ARE COVERED BY THIS DISCLOSURE.

NOTE: NCP V4R3.1, V5R4, VERSION 6 (ALL RELEASES) AND/OR VERSION 7 (ALL RELEASES) USERS SHOULD REFERENCE NCP APARS IR34194(V4R3.1), IR34196(V5R4), IR34197(V6) OR IR34198(V7) RESPECTIVELY. THESE APARS ADDRESS A PROBLEM WITH LEAP YEAR WHEN RUNNING WITH NPM.

### NCP PRODUCT SET - YEAR 2000 ANALYSIS OVERVIEW

AN ANALYSIS OF THE NCP PRODUCT SET (ALCI, EP, NCP, NEF, NPSI, NRF, NSF, NSI, NTO, NTUNEMON, NTUNENCP, SSP, XI) WAS DONE TO DETERMINE WHERE THESE PRODUCTS USE THE DATE TO ASCERTAIN IF THERE WOULD BE ANY PROBLEMS ENCOUNTERED IN THE TRANSITION FROM 1999 TO THE YEAR 2000. THE ANALYSIS INCLUDED A REVIEW OF THE NCP PRODUCT SET PUBLICATIONS TO HELP IDENTIFY POTENTIAL AREAS OF FOCUS FOLLOWED BY A DESK REVIEW OF SELECTED PORTIONS OF THE EXECUTABLE CODE. FINALLY, UNIT AND SYSTEM VERIFICATION TESTS WERE EXECUTED TO VALIDATE THE DESK ANALYSIS. SOME OF THE SPECIFIC DATES THAT WERE CONSIDERED DURING THE INVESTIGATION WERE:

- 02/28/1999-03/01/1999	VERIFY THAT 1999 IS NOT A LEAP YEAR
- 09/09/1999	"HIGHEST" ALL 9'S DATE
- 09/10/1999	DAY AFTER "HIGHEST"
- 12/30/1999	LAST WORKING DAY OF 1999
- 12/31/1999-01/01/2000	ROLLOVER FROM THE LAST DAY OF 1999 TO 2000
- 02/28/2000-02/29/2000	VERIFY THAT 2000 IS A LEAP YEAR
- 02/29/2000-03/01/2000	VERIFY THAT 02/30/2000 IS AN INVALID DATE
- 12/31/2000	FIRST YEAR END OF MILLENNIUM
- 01/01/2001	CORRECT ROLLOVER - FIRST DAY OF 2001
- 02/28/2001-03/01/2001	VERIFY THAT 2001 IS NOT A LEAP YEAR AND THAT 02/29/2001 IS AN INVALID DATE

THE INVESTIGATION DETERMINED THE EXISTING NCP PRODUCT SET TO BE YEAR 2000 READY. THESE PRODUCTS DO USE A TWO-DIGIT YEAR FORMAT BUT, IN THE CONTEXT OF THIS SET OF PRODUCTS, THE TWO-DIGIT YEAR FORMAT IS UNAMBIGUOUS AND MEETS THE

YEAR 2000 READY GUIDELINES. THE NEWEST VERSIONS OF THESE PRODUCTS (BEGINNING WITH NCP V7R7, SSP V4R7, NTUNEMON V2R5) HAVE BEEN ENHANCED TO USE A FOUR-DIGIT YEAR FORMAT WHERE PRACTICAL TO DO SO WITHOUT CAUSING MIGRATION PROBLEMS.

THE FOLLOWING SECTIONS PROVIDE PRODUCT SPECIFIC INFORMATION REGARDING THE USE OF THE DATE.

### NCP

THE OWNING SSCP (E.G. VTAM) PASSES NCP THE DATE AND TIME WHEN THE SSCP ACTIVATES THE NCP. THE DATE AND TIME ARE GIVEN TO NCP IN A SET CONTROL VECTOR (SETCV) REQUEST UNIT THAT CONTAINS THE DATE-TIME (X'01') CONTROL VECTOR (CV01). THE FORMAT OF THE CV01 IS:

- BYTE 0 = KEY: X'01'
- BYTES 1-12 = DATE, IN EBCDIC: MM/DD/YY.DDD
  - MM = MONTH
  - DD = DAY OF MONTH
  - YY = YEAR (IT IS IMPORTANT TO NOTE THAT NCP ONLY RECEIVES THE YEAR IN A TWO-DIGIT FORMAT.)
  - DDD = NTH DAY OF THE YEAR (1-366)
- BYTES 13-20 = TIME, IN EBCDIC: HH.MM.SS
  - HH = HOURS
  - MM = MINUTES
  - SS = SECONDS

THE DATE AND TIME PASSED BY THE SSCP ARE KEPT IN NCP'S TIME AND DATE (TND) CONTROL BLOCK. ONCE THE DATE AND TIME ARE SENT BY THE SSCP, NCP MAINTAINS THE DATE AND TIME BASED UPON THE 3745 100MS INTERVAL TIMER. WHILE KEEPING THE TIME AND DATE, NCP LOGIC CONSIDERS:

- SECONDS IN A MINUTE
- MINUTES IN AN HOUR
- HOURS IN A DAY
- DAYS IN A MONTH (FEBRUARY OF A LEAP YEAR HAS 29 DAYS)
- MONTHS IN A YEAR

FOR AUDIT PURPOSES, MONITORING THE TND CAN BE USEFUL FOR EVALUATING NCP'S TIME AND DATE MANAGEMENT. THE TND CONTAINS THE NCP MAINTAINED DATE AND TIME AND THE NUMBER OF DAYS IN EACH MONTH OF THE CURRENT YEAR. FOR EXAMPLE, AT MIDNIGHT ON DECEMBER 31, 1999 NCP'S DATE WILL ROLL OVER TO 01/01/00.001 (MM/DD/YY.DDD FROM THE TND). NCP DOES NOT RECOGNIZE THAT 2000 IS A LEAP YEAR SO, AT MIDNIGHT ON FEBRUARY 28, 2000, NCP'S DATE WILL ROLL OVER TO 02/29/00.060.

THE NCP MAINTAINED DATE AND TIME IS NOT USED BY THE 3745/3746 MODEL 900/MOSSE. CONVERSELY, NCP DOES NOT USE THE 3745/3746 MODEL 900/MOSSE MAINTAINED DATE AND TIME.

NCP'S USE OF THE TIME AND DATE IS LIMITED TO TIME-STAMPING CERTAIN EVENTS SUCH AS NPM SESSION ACCOUNTING DATA AND SLOW-DOWN FIRST FAILURE DATA CAPTURE INFORMATION. NCP DOES NOT PERFORM DATE ORIENTED MANIPULATIONS SUCH AS SORT-BY-DATE OPERATIONS AND AGE CALCULATIONS WHERE THE USE OF A TWO-DIGIT YEAR FORMAT COULD BE PROBLEMATIC IN A YEAR 2000 CONTEXT.

THE EXISTING VERSIONS OF NCP KEEP THE YEAR IN A TWO-DIGIT FORMAT AND, WHILE THE TWO-DIGIT YEAR FORMAT IS UNAMBIGUOUS AND MUST BE RETAINED FOR ARCHITECTURAL REASONS (E.G. CV01 AND NPM SESSION ACCOUNTING DATA), THE NEWEST

VERSIONS OF NCP (BEGINNING WITH V7R7) WILL ALSO MAINTAIN THE YEAR IN A FOUR-DIGIT YEAR FORMAT. THIS NEW FOUR-DIGIT YEAR WILL BE MAINTAINED BY NCP IN A NEW FIELD WITHIN THE TND.

### SSP

ALL OF THE SSP PRODUCTS (E.G. NDF, ACF/TAP) TIME-STAMP THEIR REPORTS AND, WHILE THE TWO-DIGIT YEAR FORMAT IS UNAMBIGUOUS, THE NEWEST VERSIONS OF THESE PRODUCTS (SSP V4R7) WILL USE A FOUR-DIGIT YEAR FORMAT WHERE PRACTICAL.

ACF/TAP IS THE ONLY SSP PRODUCT THAT MAKES FUNCTIONAL USE OF THE DATE AND TIME. THE GTF RAW TRACE DATA RECORDS INCLUDE A TIME STAMP THAT IS BASED ON THE NUMBER OF MICROSECONDS ELAPSED SINCE 1900. THE EXISTING VERSIONS OF ACF/TAP CONVERT THE HOST TIME STAMP TO A DATE WITH A TWO-DIGIT YEAR FORMAT (E.G. D(11.06.97)). THE SDATE AND EDATE ACF/TAP CONTROL PARAMETERS THEN ALLOW THE USER TO SPECIFY THE DATES, IN A TWO-DIGIT YEAR FORMAT, FOR WHICH TRACE RECORDS SHOULD BE PROCESSED. AS DOCUMENTED IN THE NCP, SSP, EP TRACE ANALYSIS HANDBOOK, THIS TWO-DIGIT YEAR PROCESSING COULD PRODUCE UNDESIRABLE RESULTS IN THE FUTURE, FOR TRACE DATA THAT INCLUDES TRACE RECORDS THAT SPAN FROM 1999 TO 2000 BECAUSE ACF/TAP WOULD CONSIDER THE TRACE RECORDS PRODUCED IN 2000 TO BE OLDER THAN THE TRACE RECORDS PRODUCED IN 1999. THE SITUATION IS SIMPLY REMEDIED BY RUNNING ACF/TAP TWICE WHERE THE PRE-2000 ENTRIES ARE SELECTED IN THE FIRST PASS AND THE 2000+ ENTRIES ARE SELECTED IN THE 2ND PASS. WHILE THIS TWO-PASS PROCESSING IS ACCEPTABLE FOR EXISTING VERSIONS OF ACF/TAP, THE NEWEST VERSIONS OF ACF/TAP (BEGINNING WITH SSP V4R7) IMPROVE THE USABILITY OF THIS FUNCTION BY USING A FOUR-DIGIT YEAR FORMAT FOR TRACE RECORD SELECTION.

### NTUNEMON

NTUNEMON DOES NOT PERFORM DATE ORIENTED MANIPULATIONS SUCH AS SORT-BY-DATE OPERATIONS BUT NTUNEMON DOES PROVIDE TIME-STAMPS ON SOME OF ITS PANELS. EXISTING VERSIONS OF NTUNEMON USE A TWO-DIGIT YEAR IN THE TIME STAMPS AND, WHILE THE TWO-DIGIT YEAR FORMAT IS UNAMBIGUOUS, THE NEWEST VERSIONS OF NTUNEMON (V2R5) WILL USE A FOUR-DIGIT YEAR FORMAT WHERE PRACTICAL.

### COMMENTS:

THIS APAR IS BEING CLOSED FOR RETENTION.

### CIRCUMVENTION:

REPINNED RP97/03/25 ADDED YR2000 KEYWORD. EB  
REPINNED RP97/05/01 CHANGED COMPLIANCE TO READY AND ADDED REFERENCE TO LEAP YEAR APARS. EB  
REPINNED ANSWR RP98/03/16 ADDED VERSION TO APAR #S. EB  
REPINNED ANSWR RP98/04/08 ADDED KWS Y2K YEAR2000 VSS  
REPINNED ANSWR RP98/09/30 ADDED ANALYSIS OVERVIEW. EB  
98/09/30,RALEIGH

## RACF

The factors of importance for using RACF on a Year 2000 test system involve user password expiration and user revocation for inactivity.

The assumption is that a copy is made of your RACF database to use on your Year 2000 test system. Under no circumstances should you use your production database on the Year 2000 system during testing; separation will prevent contamination of your production database with future dates.

The steps for RACF testing are outlined here:

1. Make a copy of the database using IRRUT200.
2. Security administrators typically have user passwords expire, with an expiration interval ranging from 1 to 254 days. If a copy of a "today" database is made and used on a system IPLed with a Year 2000 date, then RACF will consider the users' passwords expired, and users will have to change their passwords when logging on.

This probably is of minor consequence. Users do typically change their passwords at the interval chosen by the security administrator or more often (if desired by the user). However, the administrator can avoid the password expiration by choosing any one of the following options, listed in preferred order (a. strongly preferred):

- a). After copying the database, have a user with SPECIAL logon and run a clist to set all users to having no password interval. Then the users' passwords won't expire when they try to logon. A simple RACF command can do this:

```
SEARCH CLASS(USER) NOMASK CLIST('PASSWORD USER(' , ') NOINTERVAL')  
CLIST
```

followed by

```
EXEC EXEC.RACF.CLIST LIST
```

Note that the SPECIAL user will probably have to change his/her password during that initial logon.

- b). Before copying the database, at a time when no other users are using the system, list all user profiles and record their password intervals (or run the RACF database unload program IRRDBU00 and save its output), then use the commands above to reset all users to have no interval on the production database. Then make the database copy. Then using the information previously recorded about the users' password intervals, reset them to their previous values by generating

PASSWORD USER(user\_id) INTERVAL(previous\_interval)

for each user. Automating the production of these commands can be done by writing a program or REXX exec to read the previously saved IRRDBU00 output and building the appropriate commands. IBM does not ship any programs that do this, but a model could be based upon such a program as the DBSYNC sample that IBM makes available on RACF's home page (<http://www.s390.ibm.com/racf>). Or, another IRRDBU00 run could be made and both IRRDBU00 files could be given to DBSYNC to build the commands automatically since the databases should not have any other changes except for the password intervals.

c). A program could be written to run on the Year 2000 system before the users logon. This program (possibly executed as a batch job or STC) could use RACROUTE REQUEST=EXTRACT,TYPE=EXTRACTN in combination with RACROUTE REQUEST=EXTRACT,TYPE=REPLACE to change the date that RACF maintains for all users indicating when they last changed their password, and specify the current date. There are several REQUEST=EXTRACT samples in the RACROUTE documentation, but none that does precisely this function.

This could also be done using the ICHEINTY and ICHEACTN macros in a program.

Both programs would require APF authorization.

d). A RACROUTE REQUEST=VERIFY pre-processing exit (ICHRX01) could be written. When the user specified a password, the exit would examine a user's password date (retrieved via ICHEINTY or RACROUTE REQUEST=EXTRACT,TYPE=EXTRACT) and if non-zero (not X'000000' nor X'00000C' nor X'00000F') and less than X'99365F' it would set it to the current date using ICHEINTY or RACROUTE REQUEST=EXTRACT,TYPE=REPLACE.

3. Security administrators may also choose to have RACF revoke users for inactivity if they haven't used the system in some period of time ranging from 1 to 254 days, but typically perhaps 60-90 days if they choose this option. When the users first logon to the Year 2000 test system, RACF will examine the current date, compute the delta from their last logon, and very likely revoke the users.

This is of major consequence and the administrator will need to address this. The options in preferred order (a. or b. below strongly preferred):

a). Have a SPECIAL user logon first after IPLing the Year 2000 test system. This will result in an operator prompt

ICH304D REPLY Y TO ACTIVATE USER OR N TO REVOKE USERID userid.

to which the operator should reply Y. The SPECIAL user can then specify SETROPTS NOINTERVAL to avoid revoking the other users. The Year 2000 test system will then not detect inactive users, but this is not considered a big exposure.

b). As above (2b) , they could make note of their current inactivity value (as displayed by SETROPTS LIST), then specify SETROPTS NOINACTIVE before making the database copy. Make the copy. Then specify SETR INACTIVE(nm) again with their original inactivity value.

(You may consider this option before option a) in this section. It does not have a very long exposure on the production system (just a few minutes while making the database copy) and avoids some extra work during the first IPL of the Year 2000 system).

As in 2c above, you could write a program to reset the users' last access dates before anyone tries to logon using a Year 2000 value that would not cause revocation.

c). As in 2c above, an ICHRIX01 could be written that would reset the users' last access dates during logon.

Note that any time there are multiple databases, there are other considerations:

If the systems with different databases share DASD, you should ensure that both databases have identical DATASET and GLOBAL DATASET profiles so they don't accidentally allow access to production data from the test system by inappropriate users.

Users may end up with different passwords on both databases, and thus end up confused about which password they should specify when logging on. Users can manually keep their passwords synchronized, but this takes extra work.

You can address both these concerns by setting up RACF remote sharing (RRSF) between the two systems, so that commands issued on one system and passwords changed on one system would automatically propagate to the other system.



## **Hardware Isolation**

Care should also be taken to prevent impacting the clocks in the Hardware Management Console(s) and the Support Elements. Before proceeding, follow these steps to prevent impacting the clocks in the Support Element and the Hardware Management Console(s).

"Enable for Time Synchronization" should be set to "No" in the test CPCs object definition on all HMCs which are not intended to be part of the Year 2000 test. The HMC may still be used for all management and activate tasks to the S/390 Year 2000 test CPC.

"Scheduled Operations" on the CPC Operational Customization task list should be turned "Off" for the duration of the Year 2000 testing.

## Changing the System Date

You can change the system date through the following methods:

### Setting the system timer

Set the system timer on a test system image. However, never share data or data sets between such a test system and any other system unless all clocks are synchronized to that same date. For example, on the following platforms:

#### OS/390 or MVS

### Year 2000 Testing within a Single-System Sysplex Environment

You can set the clock in an MVS image to a future date

Your PARMLIB CLOCKxx member in the test LPAR image should only contain the following:

```
OPERATOR PROMPT  
TIMEZONE W05.00.00
```

This example is based on the U.S. East Coast being 5 hours west of Greenwich.

Remember -- do not include any of the options related to the SYSPLEX timer.

So the operator would reply to the

```
IEA888A [GMT DATE=...,CLOCK=...] LOCAL DATE=...,CLOCK=...
```

message prompt with the following:

```
R00,DATE=yyyy.ddd,CLOCK=hh.mm.ss,GMT
```

If you specified TIMEZONE W05.00.00 then you must add 5 hours to the date/time on the reply. The system will then re-issue the IEA888A message to allow the operator to reset the DATE and TIME if they are not correct or accurate enough. The operator can either reply with a new DATE=yyyy.ddd,CLOCK=hh.mm.ss,GMT or with a 'U' if the values are acceptable for this IEA888A prompt.

For example, at 8:00 a.m. on January 1, 2000 on the U.S. East Coast, the operator would reply to the IEA888A prompt with

```
R00,DATE=2000.001,CLOCK=13.00.00,GMT
```

And remember -- do not set the time of day (TOD) using the Sysplex Timer.

## **Year 2000 Testing within a Multi-System Sysplex Environment**

It must be noted here that testing your system using the following test techniques is seldom required; you need to do this testing only for those applications that you consider truly multisystem (that is, those applications which you cannot test under a single-system sysplex image).

To set up a multi-system Sysplex Year 2000 test environment on bi-polar and CMOS machines (prior to the G3 machines) requires that you dedicate at least an entire physical machine to the test system. The Year 2000 test machine cannot include LPARs which contain members of a different sysplex with a different date. This is because it is not possible to set manually different dates (and times) in the several LPARs which are accurate enough to allow the sysplex to function correctly.

There are two ways you can set a future date for the test sysplex.

### Using a Sysplex Timer

In a sysplex environment, keep the year 2000 test sysplex systems isolated from other systems.

Do not share the sysplex couple data sets with other systems. To ensure that only the year 2000 test system is using the sysplex couple data sets, specify PLEXCFG=MONOPLEX in the IEASYSxx member.

Set the date ahead on a dedicated (to the test sysplex) Sysplex Timer and then IPL your sysplex images. The images, which are part of the Year 2000 test sysplex, can be on a single physical machine or on multiple physical machines, but you cannot include sysplex images on these machines which are not in the Year 2000 test sysplex. Be sure to set the ETR network ID on this Sysplex Timer to a value different from the ETR network ID used by other Sysplexes.

For more information on Sysplex timers as related to Year 2000 testing in an S/390 environment, refer to: *S/390 Time Management* and *IBM 9037 Sysplex Timer (SG24-2070)*.

### Without Using a Sysplex Timer

#### Bi-polar machines

If the sysplex images all reside on a single physical machine, you can set the Process Controller clock to the future date using the SYSDEF frame.

#### CMOS machines

Set the service element clock to the future date using the Service Element Option menu on the hardware master console.

Then Power\_On\_Reset the machine, activate PR/SM, and IPL your sysplex images with CLOCKxx parmlib members which specify SIMETRID=xx.

Note: Be certain that the SIMETRID is different from the ETR network ID used by other Sysplexes.

### **CMOS Machines that Support the Sysplex Test Datasource Facility**

The Sysplex Test Datasource Facility is provided by CMOS machines (G3 and later) at microcode level EC F10640 or higher. In addition, MVS APAR OW28604 is required for releases of MVS and OS/390 through OS/390 Version 2 Release 5.

The Sysplex Test Datasource Facility allows you to set up a multi-system Year 2000 test sysplex where you do not need to dedicate the entire machine to that test sysplex. This facility allows you to:

- define a group of LPARs with the same time and date values
- specify the time and date values for the LPAR group.

As a result, the MVS images in these LPARs can belong to a multi-system sysplex with a date and/or time value which is different from the remaining LPARs on the same physical machine. For more details on how to set up this facility, refer to PR/SM Planning Guide (GA22-7236) and S/390 Time Management and IBM 9037 Sysplex Timer (SG24-2070).

Once you have defined the LPARs to be test datasource LPARs, IPL our sysplex images with CLOCKxx parmlib members which specify SIMETRID=xx.

### **VM/ESA**

Systems will IPL correctly with a year of 2000 or later. For VM/ESA Version 1 Releases 2.1 and 2.2, you must apply APAR VM57927. Beginning with VM/ESA Version 2 Release 1, this capability is included in the base VM system.

In order to change the date of your VM/ESA system, reply Yes to the Change TOD clock (Yes-No) prompt during IPL, and change the date and time to the desired date and time. To specify a year of 2000, simply enter 00 as the year (01 for 2001, 02 for 2002, and so forth).

If you change the system date, unless you have applied APAR VM60324 (this APAR is available for Version 1 Release 2.2 and Version 2 Release 1), issue a SHUTDOWN REIPL command immediately after completion of the system IPL as indicated in message HCPITM1161I (this message is displayed only on Version 2 systems). This is required because by the time VM issues

the Change TOD clock (Yes-No) prompt, components of the control program (CP) have already developed sensitivities to the actual value of the TOD (time of day) clock. These sensitivities might cause irregular scheduling and dispatching behavior if the value of the TOD clock is changed by more than several minutes.

For more information on VM/ESA as related to Year 2000 testing, refer to: VM/ESA Year 2000 Migration--A Case Study (SG24-2042)

## VSE/ESA

All VSE/ESA guest systems, running underneath a VM/ESA host system, don't have to make any changes to their VSE/ESA system in case they want to use the same TIME and ZONE values as specified for the VM system. If the appropriate VSE-commands, as described below, are omitted, then VSE will use these VM-TIME and -ZONE values as its defaults and no further actions are required.

In case you want a VSE-specific time setting, different than the VM time setting, you need to make sure that the TODENABLE option has been set in the DIRECTORY entry of your virtual guest system. Without this option, any changes to the TOD (Time-Of-Day) clock as described below will be simply ignored by your VM-system. In addition, you should be aware that all the commands described below will only affect the VSE-system and that the REAL TOD clock, as maintained by the VM-system, remains unaffected by those changes. The TODENABLE option ensures that the VM-system maintains a VIRTUAL TOD CLOCK for the appropriate guest system.

Changing this VIRTUAL TOD CLOCK requires the same commands as described below.

### **Changing the Time**

The system DATE and TIME of an installation and the TOD clock of the machine can be changed by the following IPL command. The SET DATE command would normally have to be contained in the IPL-asiproc and will cause the TOD to be set.

```
SET DATE=MM/DD/YYYY,CLOCK=HH/MM/SS,ZONE=ZONE/HH/MM
```

The operands DATE/CLOCK specify the LOCAL time of the installation. The operand ZONE specifies the time difference between the local time and Greenwich-Mean-Time (GMT). The DATE/CLOCK and ZONE value are used to calculate the GMT-TIME, which will then be STORED INTO THE TOD CLOCK. The Greenwich time zone (00) itself is the geographical reference for all time zones. The time ZONE value itself is kept separately and must be specified at each IPL. Once the TOD has been set, it will be maintained throughout subsequent IPL attempts and will only be changed if another SET DATE/CLOCK command is being recognized. Setting the ZONE, without changing the TOD clock, is accomplished by the command:

SET ZONE=zone/hh/mm

Example:

SET DATE=12/31/1999,CLOCK=23/50/00,ZONE=WEST/05/00

The command above sets the TOD clock to January 1st, 2000, 4:50 o'clock a.m. GMT (11:50 o'clock p.m. local time + 5 hours difference to GMT). The system time ZONE is 5 hours WEST of Greenwich which we may assume is the Eastern Standard Time (EST).

For testing purposes, it might be a good practice to have an INVALID SET DATE command (e.g. SET DATE=somethingInvalid) included in your IPL asiprocs which will cause IPL to issue an error message and prompt the operator to either enter a correct statement, or to have the statement ignored totally.

### **TIME Command**

Another possibility to change the TOD clock is the TIME command. The TIME command, however, is recommended to be used in a TEST environment only and it should be used when no TOD-sensitive environments (like CICS journaling) are running. The advantage of the TIME command is the fact that it doesn't require any changes to the IPL procedures, but again, it should preferably be used right after IPL, when no TOD sensitive subsystems are up. This can easily be achieved by including a // PAUSE statement in the BG-asiprocs(\$JCL..).

TIME DATE=MM/DD/YYYY,CLOCK=HH/MM/SSZONE=ZONE/HH/MM

The operands are exactly as described for the SET DATE command and it functions the same way as described for the IPL command. The only difference is that the TIME can be changed without performing an IPL and that no procedures need be changed to make it become effective immediately.

### **TPF**

Use the ZATIM (alter time) functional message to change the system time-of-day (TOD) clock, change the subsystem local standard time (LST) clock, and synchronize the TOD clock to a Sysplex Timer. Do so as follows:

Issue the ZDTIM functional message to determine the time base before you issue this functional message.

If you issue this functional message when the TPF system is above 1052 state, you must cycle the TPF system to 1052 state to complete the time adjustments.

You can issue this functional message with the TOD parameter only in 1052 state.

In a loosely coupled system, all other active processors must be in 1052 state in order to change the TOD clock without the BP option.

The ZATIM functional message does not adjust time-initiated functions (that is, functions that were started by using the CRETC macro).

### **Intercepting the call to date and time routines**

Intercept the call to date and time routines or system timer services. Change the date and time value returned from the routines/services to a specific value that will cause exposures. For example, on OS/390 or MVS, trap the MVS TIME macro (SVC 11) and the STCKSYNC macro.

### **Notes:**

There are vendor tools available that provide the function of time simulation. For any time simulation tool, the change of time should be on application-level programs and should not affect the system functions and operations. The tool should allow the users to specify the scope of the applications with time change. Once the scope is specified, the change of time should be within that pre-defined scope and transparent to others applications.

When you request full coverage of time references, you must ensure that all forms of time references are intercepted. For example, some date/time service routines use hardware instructions to reference time. Such tools will not intercept the STCK on OS/390 or MVS and control block references.

## **JES Functions**

### **Network Job Entry (NJE)**

JES2 has a feature called the Network Path Manager which can be used to do automatic routing in a JES2 NJE network. The path manager sends connection status records through the network to communicate the status of each connection it manages. These status records all have a timestamp so that the latest status of a connection is always used. This timestamp can cause problems if you are testing a Year 2000 system and have an NJE link to non-Year 2000 system. The future timestamp can cause the NJE link to be refused. The timestamp check is to prevent the very situation you are trying to create. Customers have accidentally set their system clock to a future time and brought up a NJE connection, thus creating path manager status records with a future date. A problem will arise when the bad system clock is corrected and the NJE connection restarted, the time stamp of the new connection is older than the previous status and gets ignored. This prevents the NJE network from working properly until the time erroneously set on the one system passes. To prevent these types of problem JES2 verifies that all timestamps are within an installation defined tolerance of the local clock. If not, the status record/signon is refused. This is controlled by the TIMETOL= parameter on the NJEDEF statement.

So one way to connect a Year 2000 system into the network would be to disable the tolerance checking (set NJEDEF TIMETOL=0). This would allow the Year 2000 node into the network but it would also expose you to problem of a node is accidentally IPLed with a bad system clock. This also would cause problems if you kept resetting the Year 2000 system back to the same day.

A better solution is to not use the path manager functions for this connection. This can be done by defining the NODEs as PATHMGR=NO. When defining the Year 2000 node on any adjacent node (or any JES2 node in your network) ensure that PATHMGR=NO is coded (i.e. NODE(x) NAME=name,PATHMGR=NO ). Also on the Year 2000 node, define all other nodes as PATHMGR=NO. Now when the Year 2000 node signs onto the network, a timestamp will not be assigned to the connection. A side effect of this is that no status records can be sent into the network. Nodes which are not adjacent to the Year 2000 node will not automatically know that there is an NJE connection. To define this connection on non-adjacent nodes, use the JES2 CONNECT statement. See the "JES2 Initialization and Tuning Guide" for more information about using JES2 CONNECT statements.

As a final precaution, you probably do not want the Year 2000 system to be used for NJE store-and-forward operations. To do this, either only connect the Year 2000 system to one other node or define the Year 2000 NODE as ENDNODE=YES on all other nodes in the network.

### **Remote Job Entry (RJE)**

MVS/JES's RJE support only sends dates and times when processing SYSOUT data sets. And, this information is only used for display purposes. There are no exposures using an RJE workstation when the dates on the two systems differ radically.

### **Bulk Data Transfer (BDT)**



There are no exposures using BDT to transfer data sets either direction with a Year 2000 test system.

## **For More Information**

For additional information on Year 2000 testing, refer to:

The Year 2000 and 2-Digit Dates: Guide for Planning and Implementation , GC28-1251

OS/390 Parallel Sysplex Test Report , GC28-1963

VM/ESA Year 2000 Migration--A Case Study, SG24-2042

S/390 Time Management and IBM 9037 Sysplex Timer , SG24-2070