

**Automatic login and automatic**

**IPL facilities for CP/67**

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## INTRODUCTION

The purpose of this technical note is to describe the modifications and additions to the system CP-67 due to the insertion of the new console function ZOOM and of the automatic IPL facility.

ZOOM is a privileged console function which gives a virtual machine the possibility to login another virtual machine.

The virtual machine logged in by the ZOOM console function runs in disconnected mode; therefore if no automatic way to initiate computation exists, the virtual machine will be logged out by CP-67 after a short period of time.

In order to avoid this immediate logout of the 'zoom-ed' machine and to take advantage of the ZOOM console function two other facilities are required:

- 1) The automatic IPL of a virtual machine's operating system (i.e. CMS) immediately after login.
- 2) The automatic execution of the virtual machine's PROFILE EXEC program after the IPL of CMS.

The first problem was solved by modifying the routines CONSIGN and LOGON in the nucleus of CP-67; the second involved a slight modification to the CMS nucleus.

## ZOOM CONSOLE FUNCTION

The ZOOM console function is only available to users with privilege class A (system control operator) or B (system administrator).

The console function has the following format:

ZOOM            USERID

where the name ZOOM can be shortened to 'Z'.

If the user, whose USERID is specified as a parameter of the ZOOM command, is already logged in the system, the following statements are performed:

- 1) The login procedure is not initiated.
- 2) A message is sent to the console of the virtual machine which issued the ZOOM command.
- 3) This user is left waiting for another console function.

If the login operations cannot terminate correctly because of unexpected conditions (the user not being defined in directory, etc...) the following operations are performed:

- 1) The login procedure is aborted as in standard login.
- 2) a message is sent and
- 3) the user is left waiting for a new console function as in case above.

## UPDATES TO ADD THE CONSOLE FUNCTION ZOOM

These updates concern the modules:

CFSMAIN where the name ZOOM is added in the list of privileged commands.

CFSPRV where the routine ZOOM which manages the new request is inserted.

This routine checks the format of the request, the correctness of its parameter and then, performs the following operations:

- 1) It saves the general purpose register 11 (which contains a pointer to the current user UTABLE) and, by a call to the DISIO routine, notifies the Control Program that it is beginning to work for a new user (the 'zoomed' user).
- 2) It writes a pointer to the zoomed user USERID in register 2 as requested by AUTLOGON and performs a call to this routine.
- 3) Upon return from the AUTLOGON routine it tests register 11 to check if the login procedure has been successfully terminated. In this case the zoomed user is disconnected and a CP request block (CPEXBLOK) is created for this user and stacked by a call to the CPSTACK routine. This block is then used to resume execution of the zoomed user at the starting address of DISPATCH.
- 4) Upon completion of all these operations our routine restores saved register 11 and leaves the virtual machine waiting for a new console function.

Important updates also concern the module LOGON which performs all login operations.

The ZOOM request uses the entry AUTLOGON of this module whose standard use is to initialize automatic login of the system operator machine.

Since a "zoomed" user logs in disconnected mode it is necessary to avoid the writing of any messages that login operations send to user's console.

The update generally avoids writing the messages; we have re-written this routine for "zoomed" users only in the case of messages of login complete.

Finally a series of changes were studied to condense messages in order to make the code of the LOGON module fit within a range that can be covered by one base register only.

Updates to other modules of Control Program (RESIST, SCHEDULE) generally avoid the writing of messages on the user console.

## AUTOMATIC IPL

Automatic IPL facility requires:

- 1) A change in the directory format and an update to the program DIRECT that manages DIRECTORY.  
in the directory the user file directory entry UFDENT has been modified by adding the doubleword UFDIPL which must contain the address or name of the automatically IPLable system.
- 2) Updates to the modules CONSINT and LOGON to allow the Control Program to manage this facility.  
The update of LOGON reserves a 17 double-words area, moves the UFDIPL content in the first double-word of this area, sets registers as requested by COMENTRY and performs a call to this routine.  
COMENTRY is the CFSMAIN entry for a virtual console function and initiates the execution of the IPL console function. Finally the first byte of register 11 is set as an automatic IPL flag.  
The update of CONSINT only resets the first byte of register 11 on return from a call to LOGON performed by this module.

## UPDATES TO CMS ROUTINES

The standard CMS IPL procedure terminates leaving the virtual machine waiting for the first user command; only after this command is issued is the PROFILE EXEC executed.

In the case of automatic IPL we want the PROFILE EXEC to be executed immediately after the IPL completion: in order to do this the routine INIT of CMS nucleus was modified. The update only suppresses the call to the routine that reads from the terminal (WAITRD) in such a way that the PROFILE EXEC is immediately executed.

## CONCLUSIONS

The following remarks can be made about the practical use of the ZOOM console function.

- A) The ZOOM console function has been implemented in order to reduce the work of the system operator who previously had to execute repeated IPL's of several machines: for example the virtual machines executing batch jobs and all virtual machines managing connections with remote terminals.  
By using the ZOOM console function the work of the system operator is considerably simplified mainly in the case of both system setup and system restart.
  
- B) The availability of this new facility allowed us to develop a simple method to test system behaviour and performance in particular conditions simulated by means of a series of a virtual machines (executing different jobs) zoomed by a driver machine.  
Thanks to this new facility we are able to test efficiently our modifications to the Control Program routines; these tests are particularly useful in discovering those errors connected with the system overhead since in this way it is possible to simulate, with 5-10 zoomed virtual machines, system overheads comparable to those that 30-40 users can normally produce.



## APPENDIX

A) The new UFDENT format:

UFDID				
UFDPASS				
UFDACCT				
UFDMDEF				
U*1	U*2	X	U*3	UFDTIME
UFDIPL				

where:

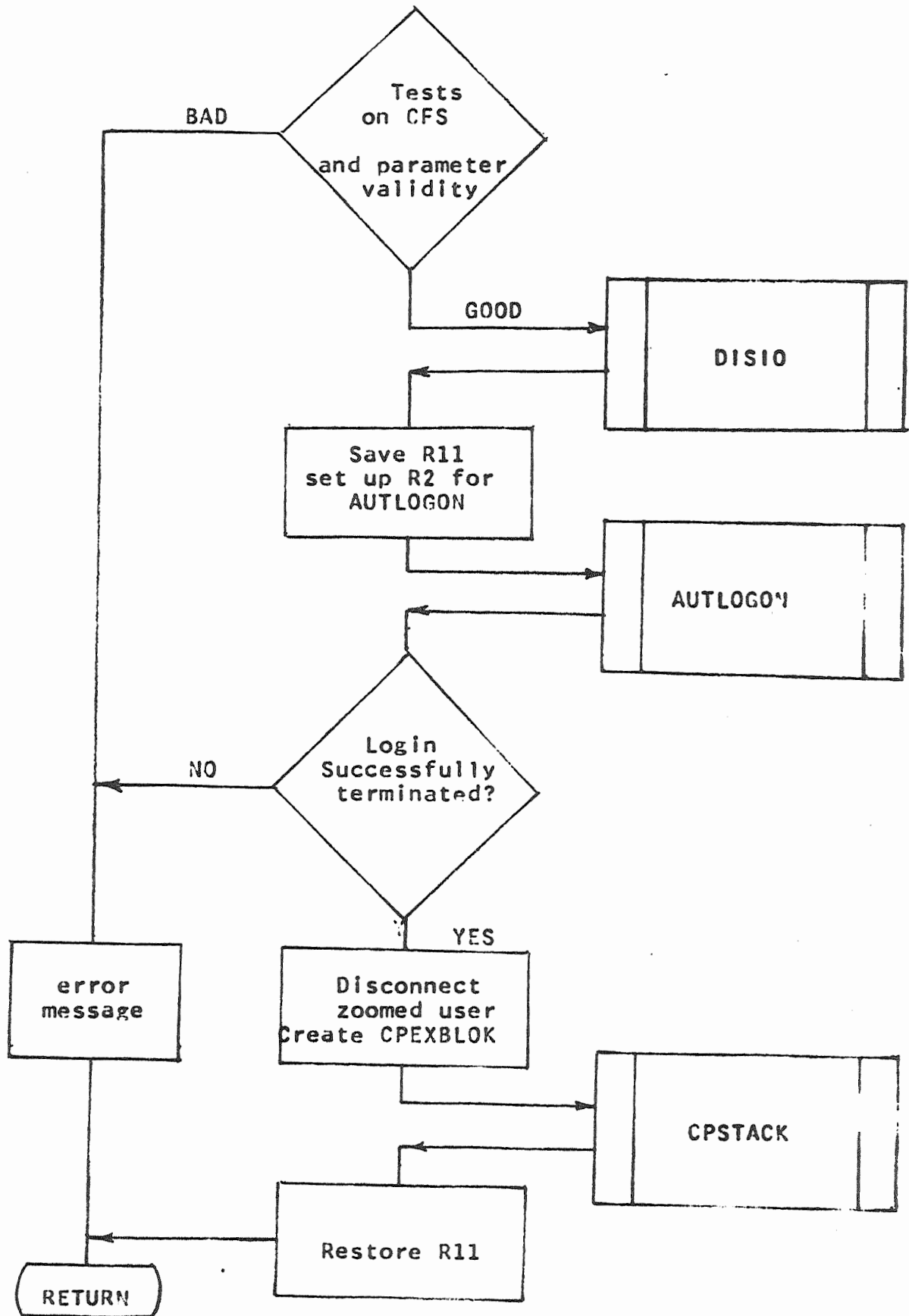
UFDID, UFDPASS, UFDACCT, UFDMDEF, U\*1, U\*2 as in standard UFDENT table.

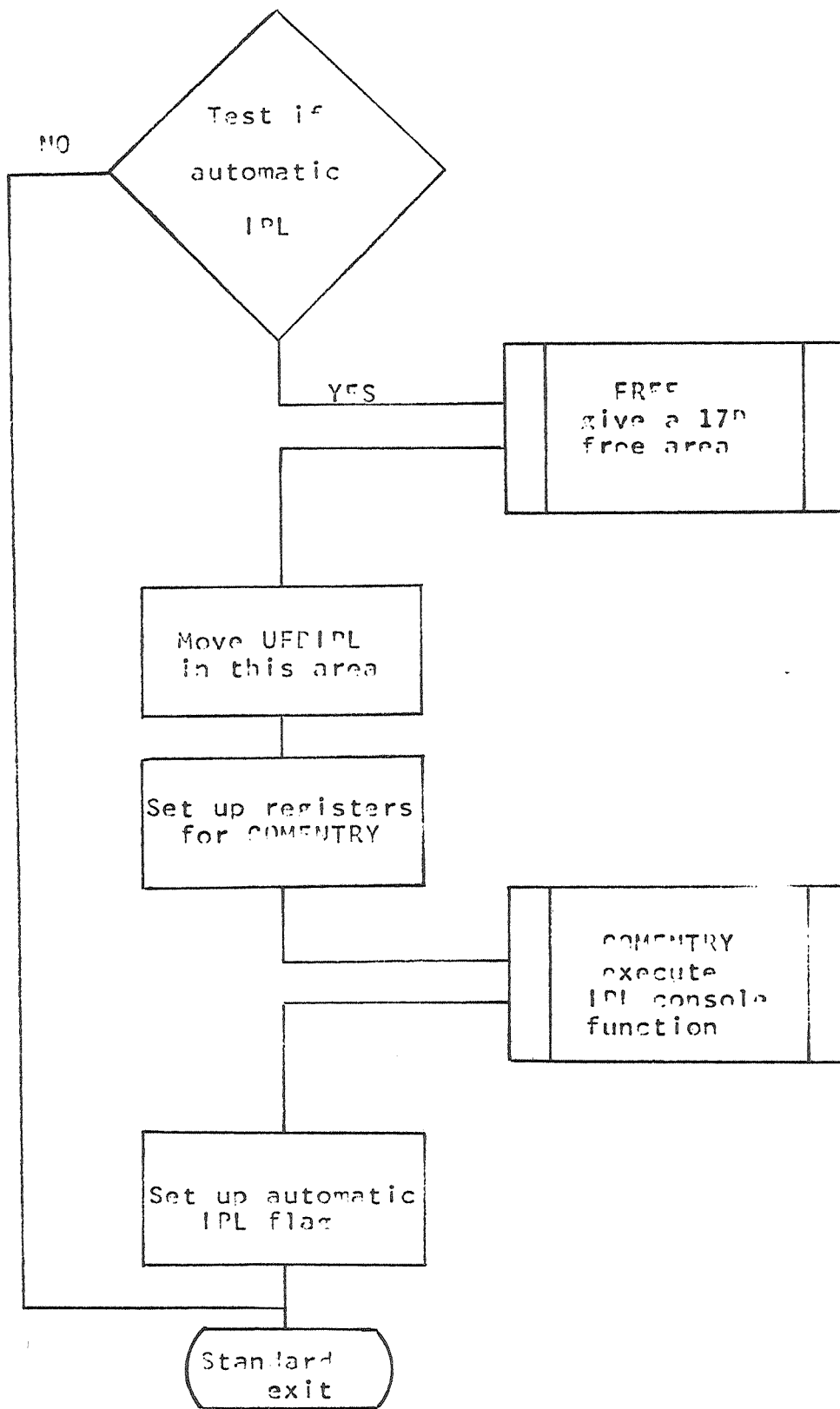
U\*3 - UFDTFLG is a flag to indicate time-limited virtual machines (UFDTFLG = X'80') or nolimit virtual machines (UFDTFLG = X'00').

UFDTIME Time limit (only for time limited users)

UFDIPL contains the address (the name) of the automatic ipable system.

B) OPERATIONS PERFORMED BY ZOOM CFS





C) OPERATIONS PERFORMED BY AUTOMATIC IPL PROCEDURE AFTER COMPLETION OF LOGIN PROCEDURE