Worldwide Response Center

HP 3000 APPLICATION NOTE #80

Looking Behind The Scenes Of Resource Sharing

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December 01, 1990
Document P/N #5960-4633

RESPONSE CENTER APPLICATION NOTES

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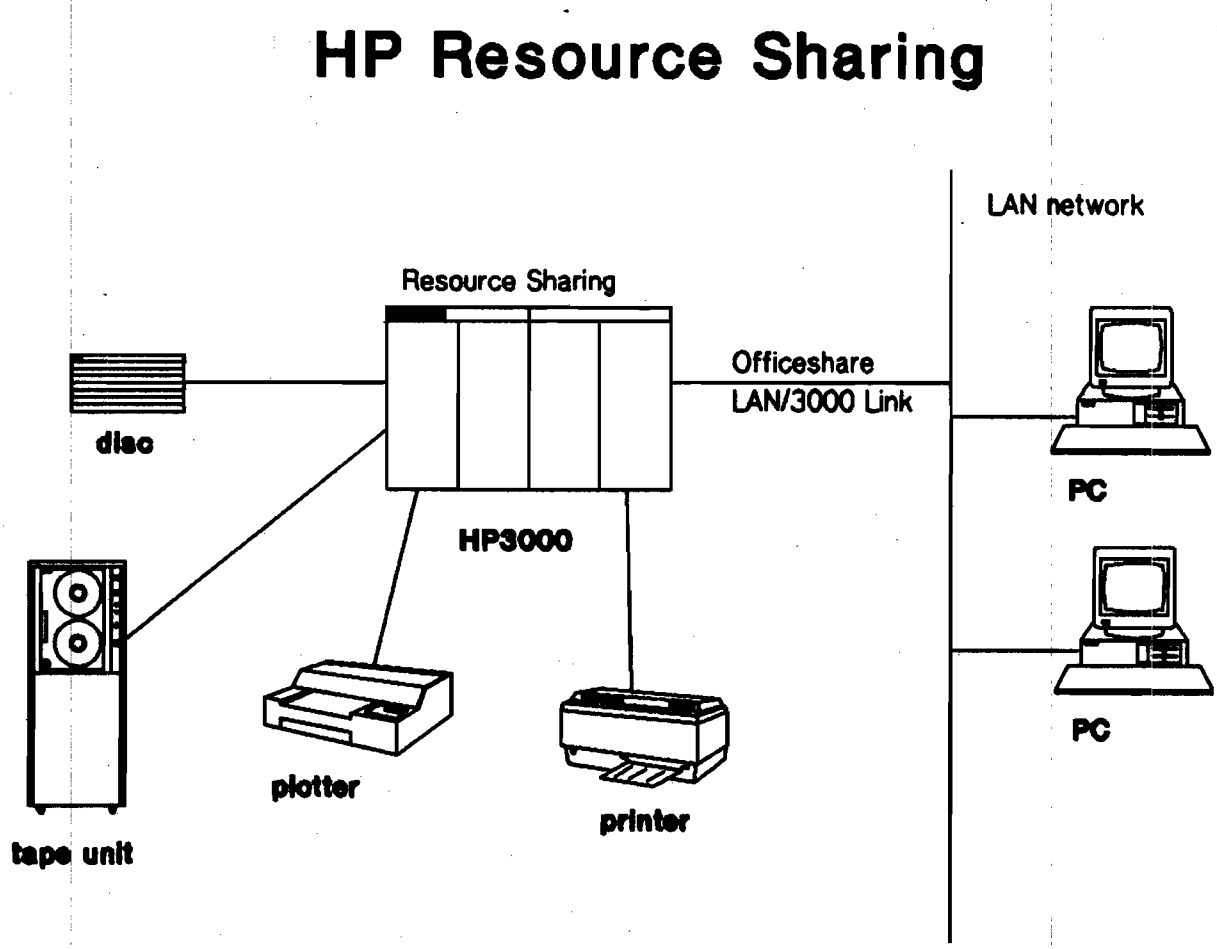
Looking Behind the Scenes of Resource Sharing

Introduction



Resource Sharing is an HP 3000 software that allows PC users within a LAN network to use disc space and printers of an HP 3000. This means, on the one hand, that PC applications and data can be stored on one or more HP 3000 systems. On the other hand, several PC users may simultaneously use the different printers and plotters that are connected to an HP 3000.

This Application Note describes the processes that are initiated by the HP 3000 and the PC to set up a connection to a shared disc or a shared printer to allow disc and printer accesses.

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1. SETTING UP A CONNECTION

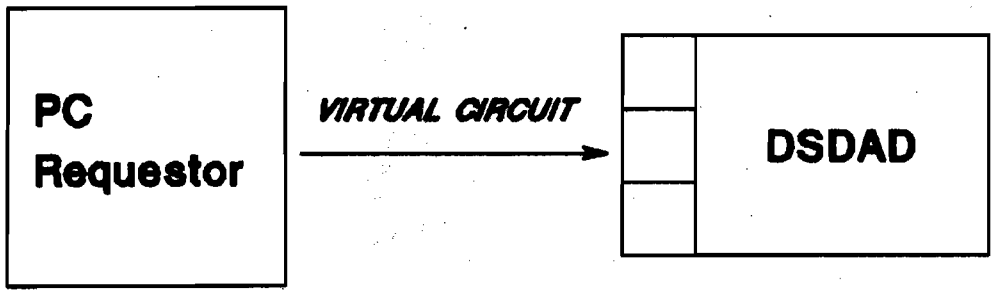
1.1 Setting Up the Virtual Circuit

The process communication between PC and HP 3000 is based on the LAN network plus network software, which is Officeshare for the PC and LAN Link/3000 for the HP 3000. A precondition for the communication between PC and HP 3000 is that - on PC level - the network is loaded and - on HP 3000 level - the network transport system and the network services are started. The network services are started with the command NSCONTROL START. The "father" of these services is a process called DSDAD which handles and monitors their process activities. These are not only restricted to Resource Sharing, but also include Cooperative Services, Information Access, virtual terminal access via AdvanceLink and AdvanceMail etc. The configuration file DADCONF.NET.SYS tells DSDAD which services are available, as soon as DSDAD is started. NSCONTROL STATUS shows the HP 3000 user, which services are available (PDSERVER for Resource Sharing, HDSPNS for Information Acces via LAN, VTSERVER for virtual terminal sessions etc.).

For every service a so-called socket is created, which is assigned a unique number, called the well known address. In a figurative sense, you may compare such a socket to a telephone with several extensions, whose telephone number is recorded in a list. For every well known address DSDAD asks, whether "somebody" wants to use the corresponding service. In analogy to the telephone system this means that DSDAD checks, whether one of its telephones rings. From the programmatic point of view, DSDAD performs an IPC RECEIVE CONNECT (IPCRECVN) for every well known address and waits either for an IPC CONNECT or an IPC DESTINATION from another node, such as a PC for example.

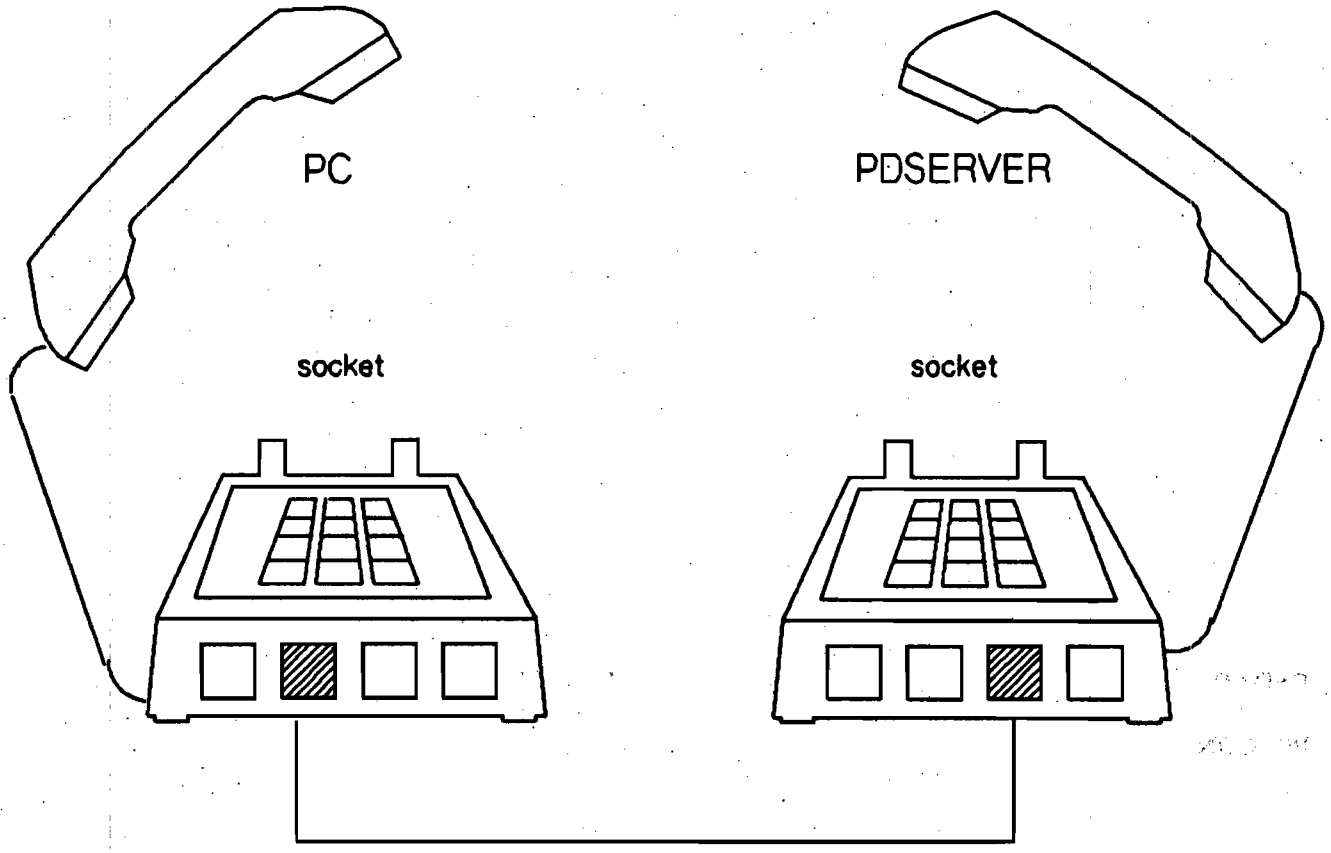
ResShr - Process Flow

Setting up the VIRTUAL CIRCUIT



A connection request from a PC to an HP 3000 may be performed manually or automatically. If shared devices are configured in the AutousesMenu of the PC OfficeShare, the connection is set up automatically, as soon as the network is started. The connection may also be set up manually using the USE command (use device: \\servername\shortname).

A socket is now created on the PC (that is, a telephone is installed). The PC sends a connection request - an IPC CONNECT - to the corresponding well known address. The server name contained in the IPC CONNECT determines the system that shall be accessed and the well known address selects the corresponding network service. IPC CONNECT requests correspond to the dialing of a telephone number without waiting for an answer.



virtual circuit

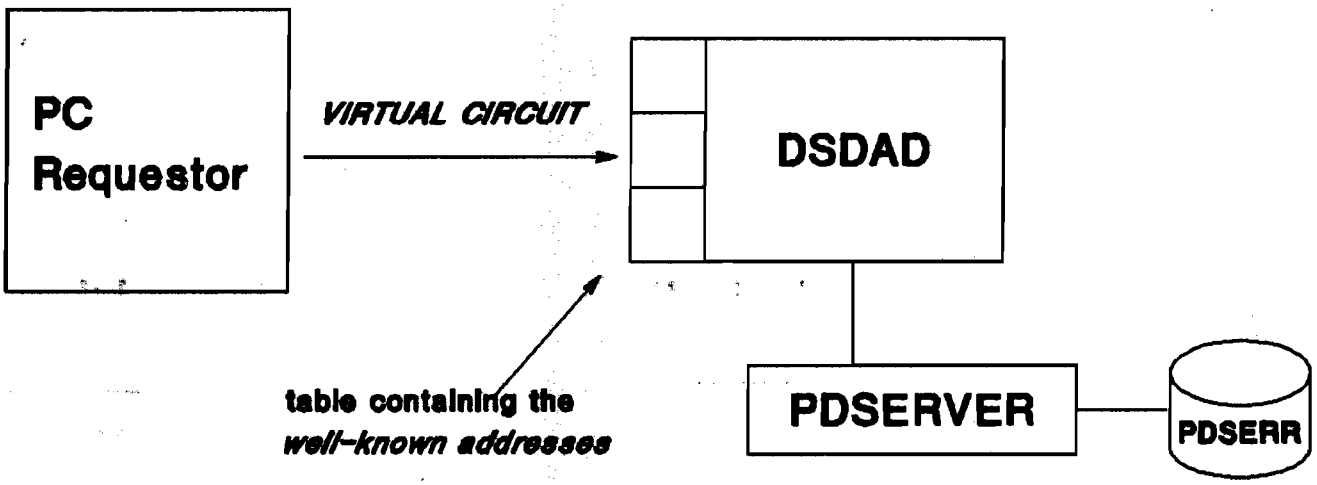
1.2 Creating the PDSERVER Process

On the host level, DSDAD is informed that a network service is requested. As explained above, DSDAD waits in his environment, until one of the "telephones" ring. Now a "telephone rings". DSDAD picks up the phone, so to speak, and accepts the "call". From the programmatic point of view this means that the IPC RECEIVE request is complete. The so-called virtual circuit is set up.

In contrast to the process-to-process communication via special information files, where various processes exchange data, or in contrast to the process communication via PTOP intrinsics, where only a unilateral control is possible, a virtual circuit is based upon a dedicated connection which is exclusively available to the processes that set up the connection. This prevents data from getting lost, becoming corrupt or being influenced in another way.

ResShr - Process flow

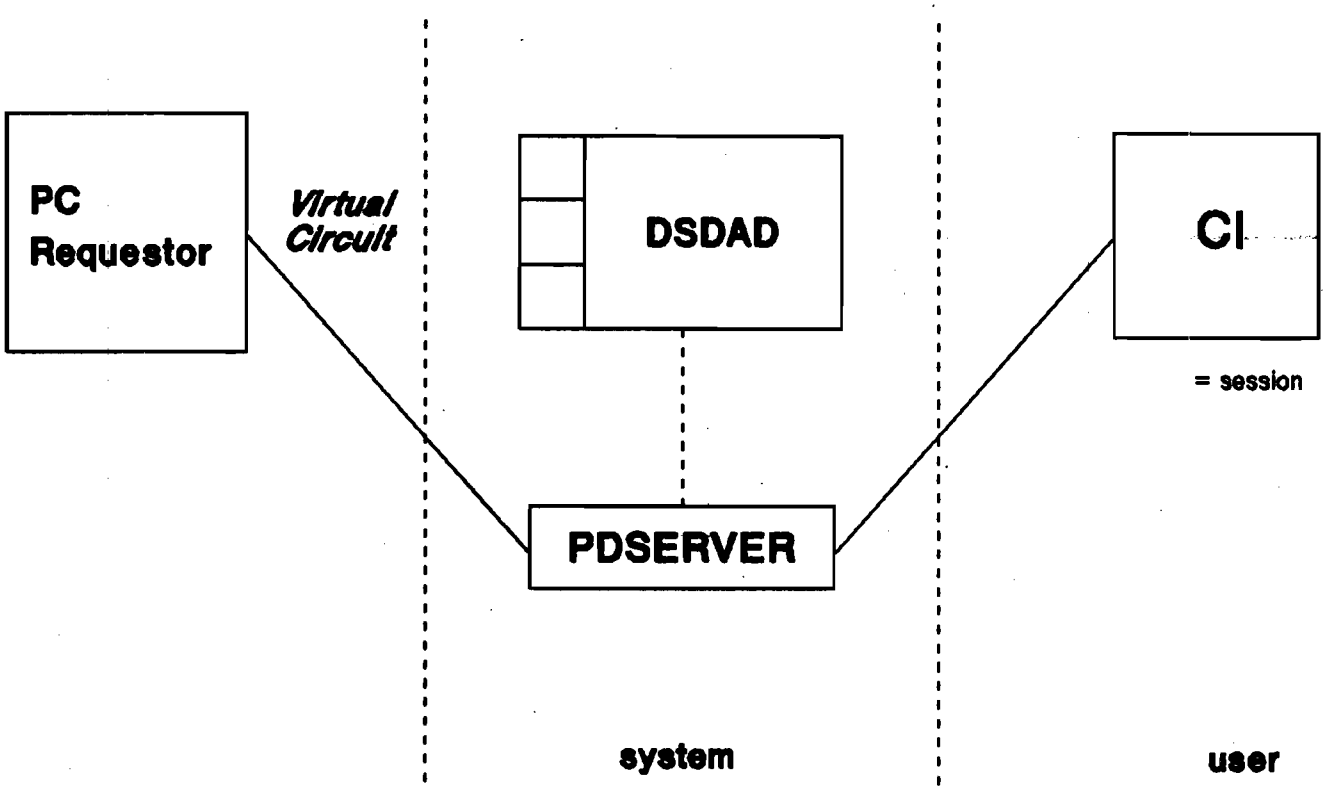
Creating the PDSERVER process



DSDAD looks in the table of well known addresses, to see which service is requested by the PC. DSDAD identifies his "interlocutor" on the phone, as it were, and detects that a process called PDSERVER (PDS) for Resource Sharing must be created. PDSERVER is created and activated.

ResShr - Process flow

Creating the CI main process



PDSERVER, on its part, creates a CI main process, which means that a programmatic logon is performed. The user and account names required for the logon are kept in the configuration file PDCONFIG.PPC.SYS. This file contains configuration data, such as logon, file size, number of active connections per PC etc. PDSERVER uses the PC IP addresses contained in the file NODETBL.PPC.SYS to obtain the name of the PC. During logon this name is used as session name. PDSERVER changes to become the brother process of the CI main process. DSDAD passes his socket on to PDSERVER, so that the visual circuit exists between PC and PDSERVER. However, the connection between DSDAD and PDSERVER is not totally cut and will be maintained on a lower level. It is used by DSDAD to communicate with PDSERVER, such as for example to transmit a close statement to PDSERVER.

There are two reasons for the fact that PDSERVER is adopted by a CI main process. As long as PDSERVER is a son process of DSDAD, it runs as a system process. However, the abortion of a system process may easily result in a system crash. As a process that runs parallel to a session, PDSERVER is much less "dangerous". Besides, being a user process, PDSERVER is governed by the security structure of the accounts, as well as by session terminal and other requirements.

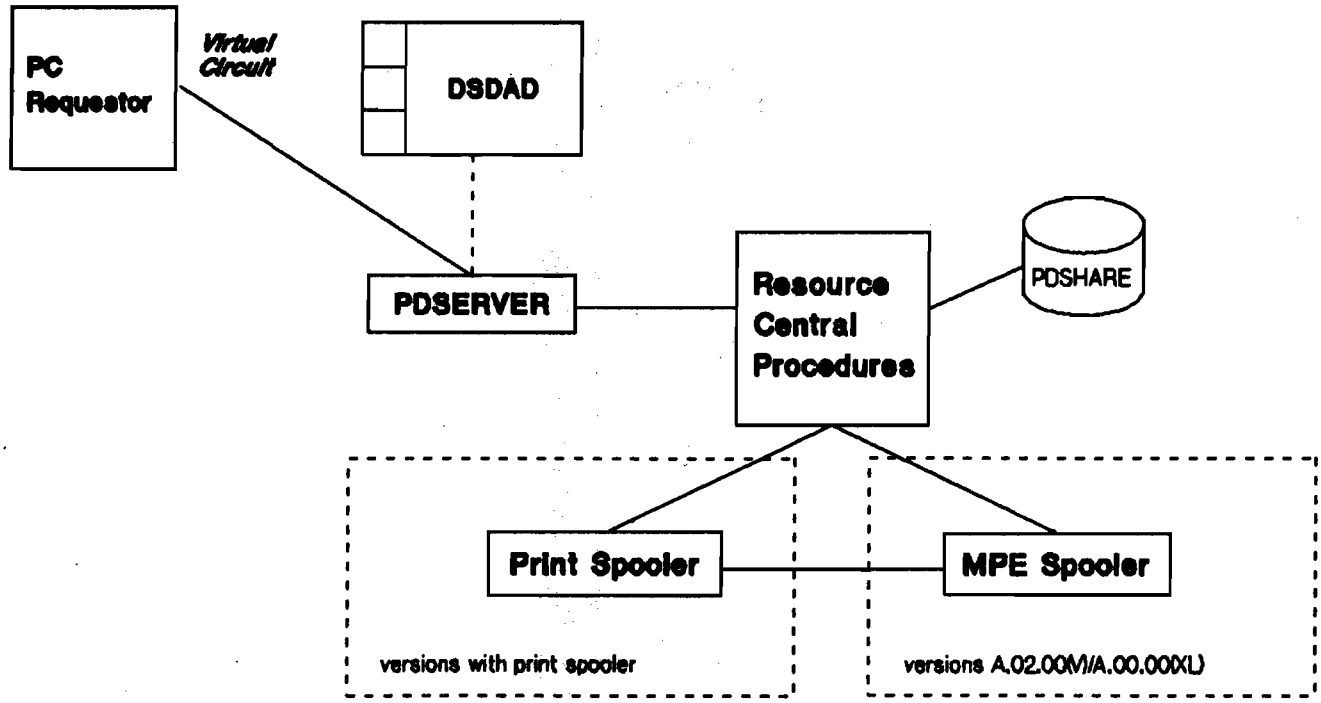
For reasons of absolute security PDSERVER changes from a son process to a brother process of the session. This makes it impossible for PC users to perform HP 3000 MPE commands due to any PC software manipulations.

1.4 Setting Up the Connection

In the meantime, the PC has sent the first "negotiate packet" using IPCSEND. This packet contains a request for version checking and is used among others to determine the maximum packet size for sending and receipt. PDSERVER invokes IPCRECEIVE to receive the packet. The request of the PC is accepted and a "negotiate reply" is returned. It is only now that the PC sends its first connection request.

ResShr - Process flow

Setting up a connection to shared resources



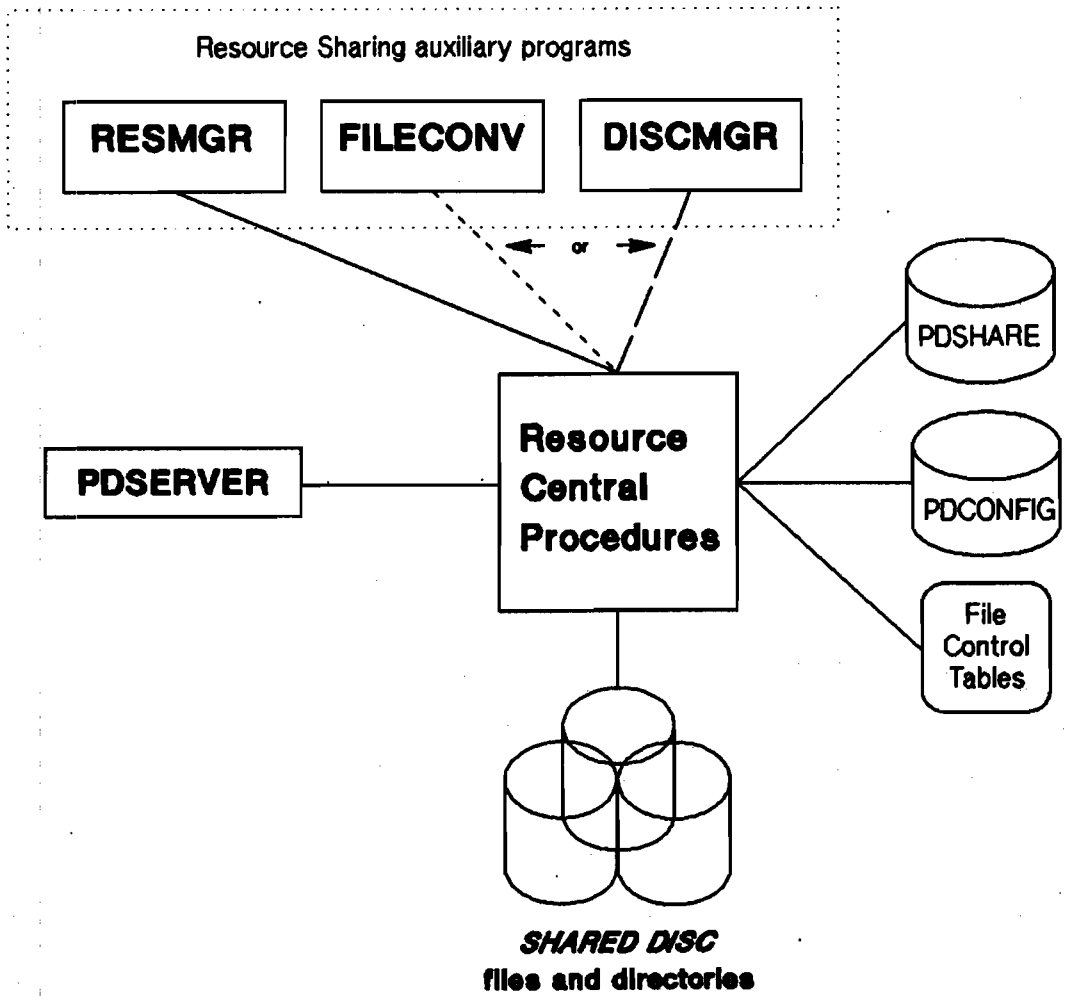
For every connection request a MS Net connection packet is sent via the virtual circuit to the PDSERVER. This packet contains the shortname of the shared disc or shared printer/plotter that is configured in the RESMGR. Now, PDSERVER invokes the Resource Central procedures to process the connection request. The file PDSHARE.PPC.SYS checks, whether the shortname is configured and whether the request refers to a disc or to a printer.

When using Resource Sharing with print spooler (MPE/V ResShr versions preceeding A.02.00), the print request is checked, as to whether it refers to a printer or a plotter connection, whether or not a device class exists that corresponds to the shortname and whether the class contains the requested device. When using newer versions, such as MPE/V ResShr versions starting from A.02.00 and MPE/XL ResShr

versions, both printer and disc requests are matched with the RESMGR configuration in the file PDSHARE.PPC.SYS.

1.5 Disc Requests

What happens when a *shared disc* is accessed?

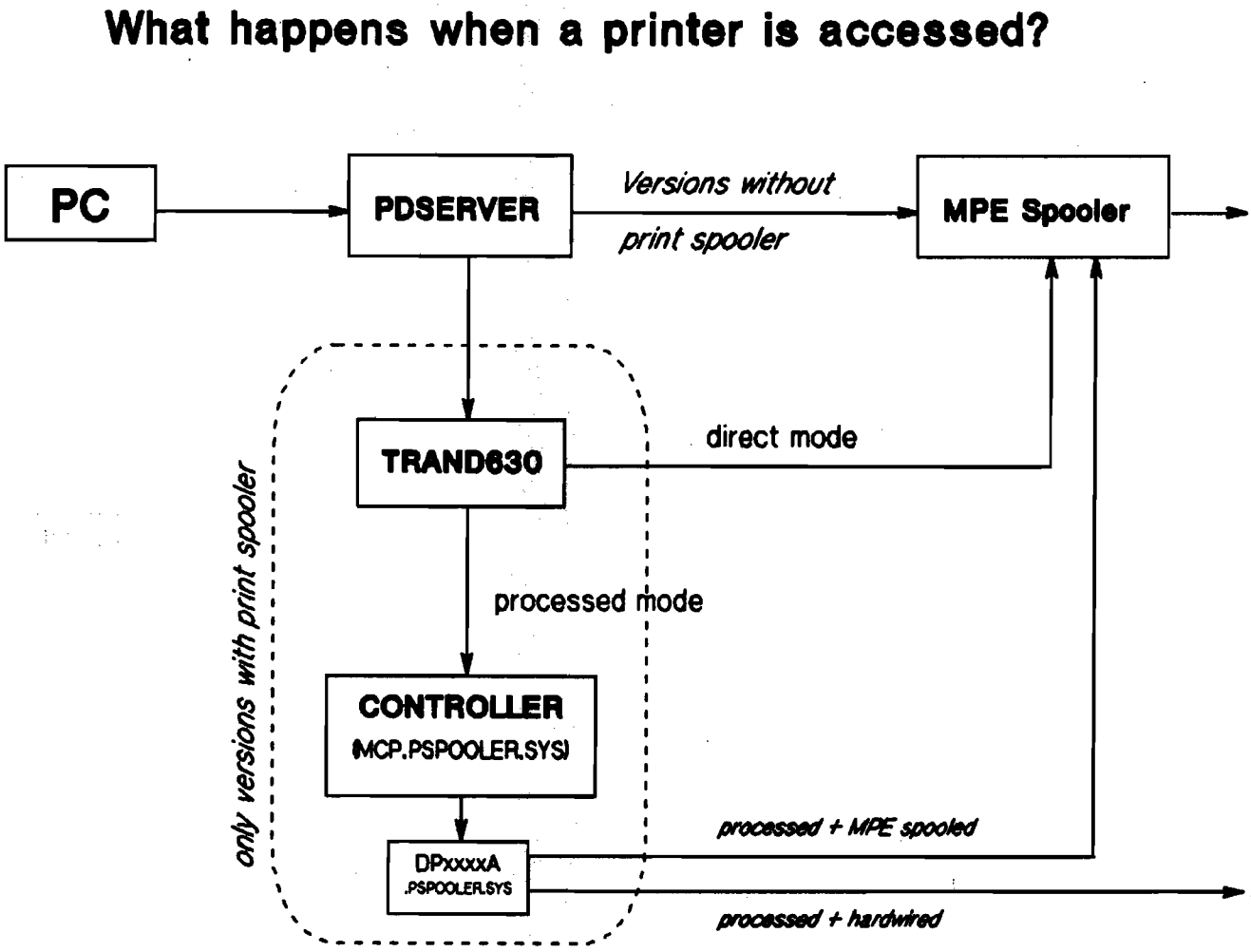


If a disc request is sent, PDSERVER accesses the file PDSHARE.PPC.SYS to obtain the physical path name on the basis of the shortname. PDSERVER checks, whether the path is valid, that is whether the group and the account exist. It also checks, whether the root directory and the subdirectories exist for this path. After that, the connection is assigned a unique ID from the file control table. The size of this table is determined by the CONNECTS parameter in the RESMGR. The CONNECTS parameter determines the number of active connections to drives and devices per PC and is kept in PDCONFIG.PPC.SYS. Every time the PC sends a request to PDSERVER, this ID number will be used as a reference number for the connection.

The server now returns an IPC packet to the PC, containing the connection ID plus status in case of a successful connection. If the connection failed to be set up, PDSERVER "translates" the status message in the corresponding MS-Net error message. However, MS-Net only has a limited set of status and error

messages. Since Resource Sharing is obliged to assign every error one of these messages, the status that can be returned to the PC are also very limited.

1.6 Print Requests



If the PC sends a print request, ResShr versions without print spooler will pass on the file directly to the MPE spooler. When using ResShr versions with print spooler, a process TRAND630 is created. If the printer is configured in 'direct mode' and the printer type supports this mode, the data is transferred to the MPE spooler. If the printer is 'processed', the data must be converted, first. The print format that the HP 3000 expects to be sent by the PC is that of the DIABLO 630 printer. Some of the HP 3000 printers, such as the HP2688, cannot understand this format. TRAND630 converts the PC print format in the so-called PIF format (Page Image Format). The print format will also be converted, if the processed mode is not supported . However, due to the interpretation of the printer escape sequences, for example, the result is unpredictable. Following the conversion, the documents are transferred to a program called DGxxxxA.PSPOOLER.SYS (xxxx = printer type) that translates the PIF files in a device-specific code for the corresponding printer. If the printer is 'processed' and 'MPE spooled', the data is transferred to the MPE spooler. If the printer is 'processed' and 'hardwired', the data is transferred directly to the configured device.

2. Terminating a Connection

Basically, when terminating a connection, the process of initiating the PDSERVER is reversed. PDSERVER becomes the son process of DSDAD and terminates the connection to the CI main process. The CI main process terminates, on its part, which means that the session ends. The virtual circuit to PDSERVER as well as the PDSERVER process are maintained, unless the last connection between PC and HP 3000 is terminated.

If the PC is switched off without having terminated the connection to the HP 3000, the low-level network software will notice that the virtual circuit was terminated. How fast DSDAD informs PDSERVER about the fact that the PC does not answer anymore will be determined by the network configuration (refer to program: NMMGR.PUB.SYS, configuration file: NSCONF.NET.SYS, path: @NETXPORT.GPROT.TCP, connection assurance parameter). The error is transmitted to PDSERVER which tells DSDAD that the work is done and DSDAD terminates PDSERVER.

3. General Task of the PDSERVER

The main task of the server process is to accept the protocol of the requester - in this case the PC - and to translate it in host compatible function calls. PDSERVER invokes the intrinsic modules of the Resource Sharing, that finally execute the requests. Following the execution of a request, the status and - if necessary - the demanded information are returned to the requester.

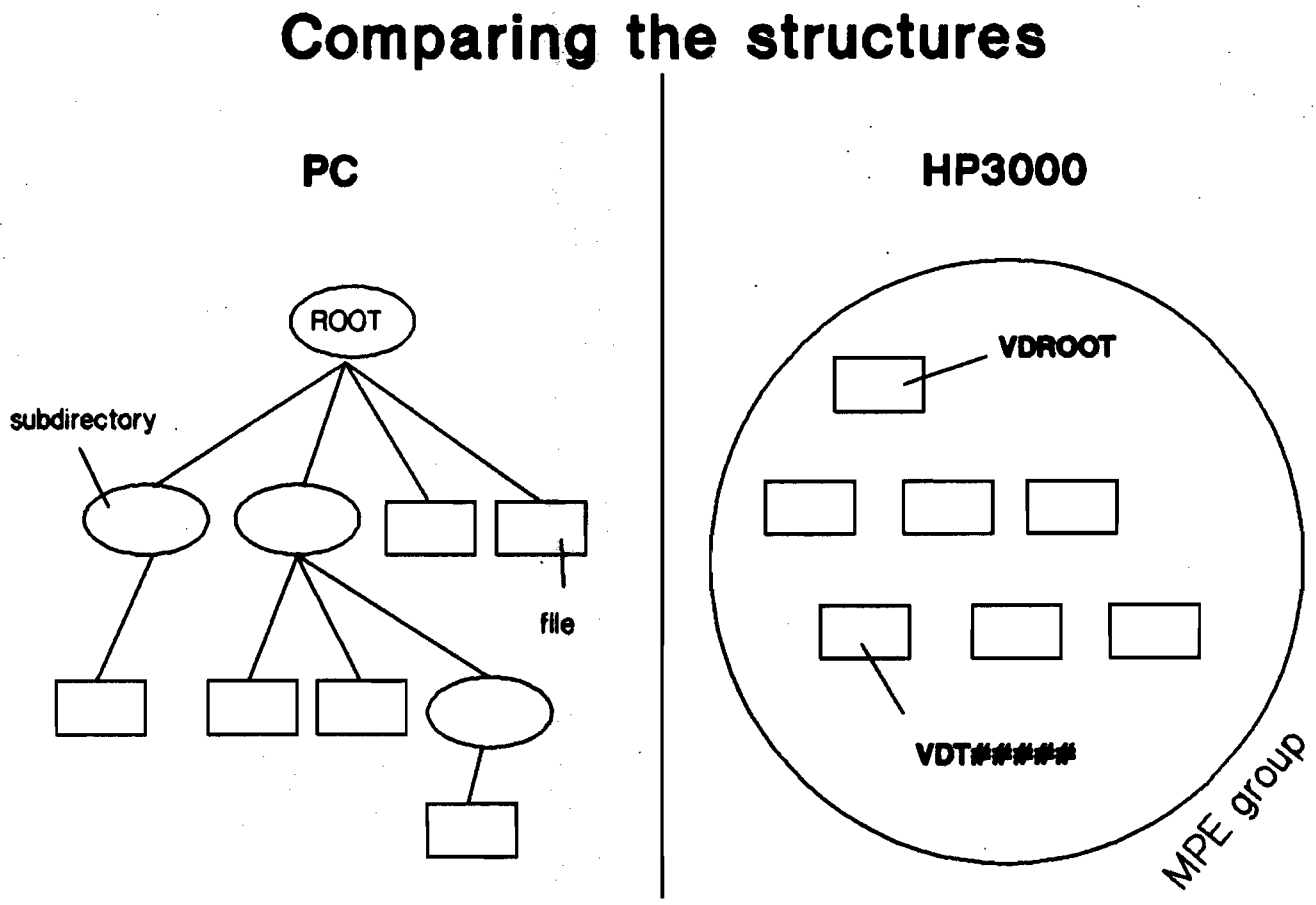
In concrete terms this means that the main task of the PDSERVER is to unpack packets to find out what request they contain, and to invoke the corresponding resource central procedures to manipulate the MPE files that correspond to the DOS files as requested.

4. Example of a Concrete Disc Request

What happens, when a file is created on a shared disc?

A precondition is that a shared disc exists, which means that a shared disc was created and assigned a shortname using the RESMGR program.

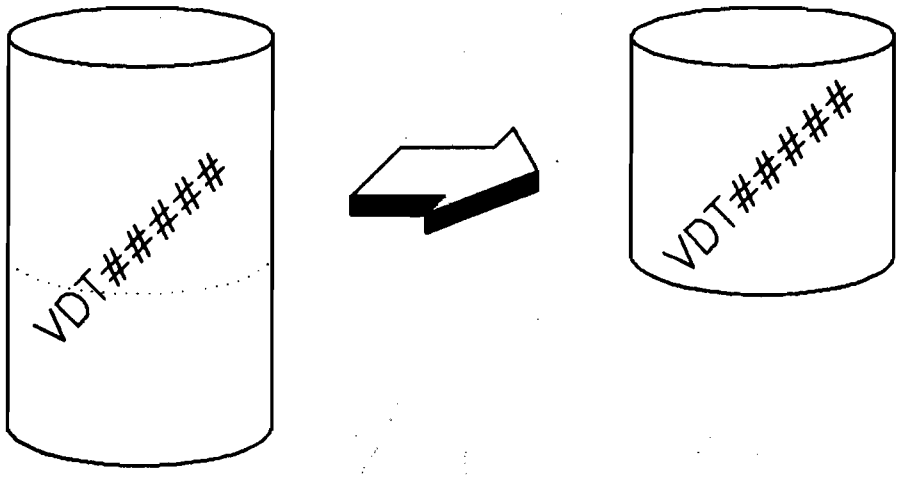
4.1 Comparing the DOS File Structure to the MPE File Structure



When creating a shared disc, an MPE file VDROOT is created in the desired group of the account. This file contains information on all files and directories that are kept on the shared disc and reflects the DOS file structure. The DOS files are represented by the VDT##### files on MPE level.

A new file

on a *shared disc*



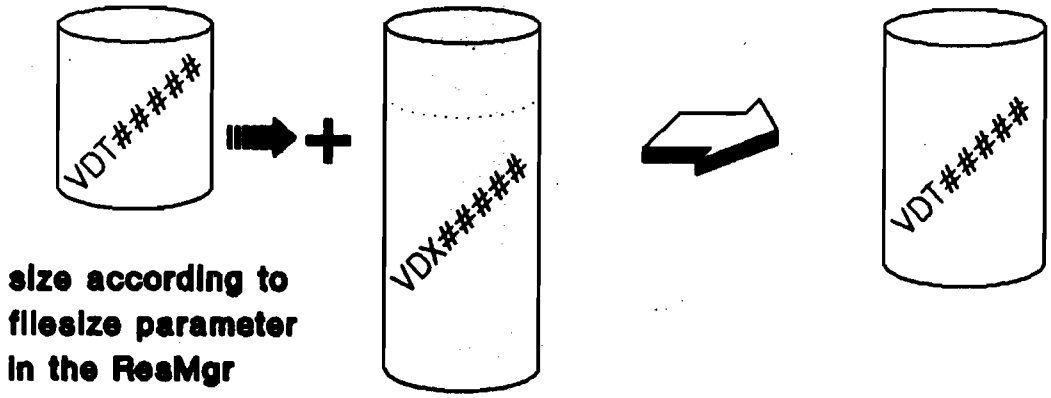
size according to filesize parameter in the ResMgr

file size after having accessed the file

Suppose that a file shall be copied from a PC to a shared disc. Using the COPY command, the data is transmitted to the HP 3000. PDSERVER recognizes that a new file shall be created on a shared disc. The new file (VDT#####) is created according to the file size parameter in the RESMGR. If the data quantity that shall be written to the file is inconsistent with the configured file size, the unused disc space is made available as soon as the copy process is terminated, so as to avoid wasting disc space.

A new file

on a *shared disc*



size according to filesize parameter in the ResMgr

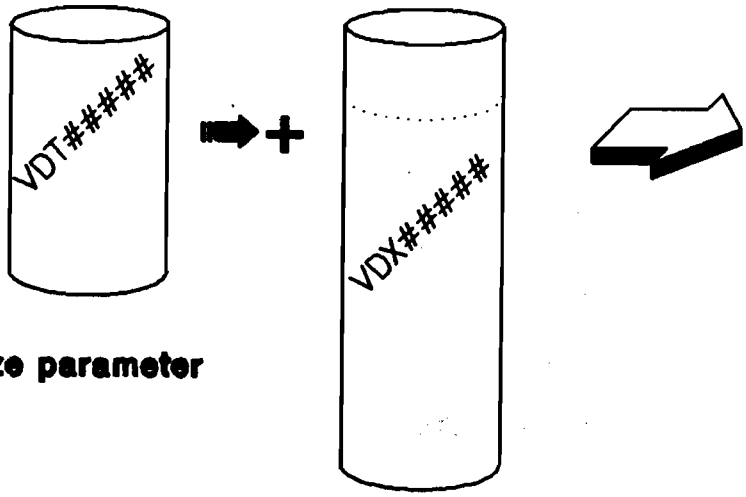
size = 2 x filesize

filesize after having accessed the file

If, however, the EOF of the file is reached during the writing process, that is if the file to be written is larger than the file created on the HP 3000, a second file is created (VDX*#####*, with *#####* being identical with the number in the VDT*#####* file) that is double the size of the configured file size. All further data will be written to this file. As soon as the data is transferred, the two files are merged and the unused disc space is made available. Consequently, a file whose size is three times the configured file size cannot be stored on a shared disc. If the file size is configured at 384 Kbyte, for example, this means that the maximum permissible file size is 1.152 Mbyte. In order to save larger files, the file size for this shared disc must be increased via the FILESIZE parameter in the RESMGR.

An existing file

on a *shared disc*



file > filesize parameter

filesize = 2 x size of the original file

filesize after having accessed the file

There are, however, applications that append data to an existing file. In such a case, PDSERVER creates a second file that is twice the size of the original file, regardless of which file size was configured for the shared disc. Again the files are merged, as soon as the writing process ends, to build a file whose EOF equals to the integer multiple of the 256 k file limit.

5. General Differences Between MPE/V and MPE/XL Resource Sharing Versions

The versions available on XL systems are not provided with a print spooler. All printers and plotters that are supported by the normal system configuration of the HP 3000 can be used. It is no longer necessary to define classes and to assign devices to these classes using the program PSUTIL.PUB.SYS. Just like shared discs, plotters and printers are now exclusively configured in the RESMGR during the share procedure, including logical device specification, output priority, etc.

Also MPE/V ResShr versions starting from A.02.00 no longer have a PSPOOLER.

The FILESIZE parameter is no longer used, as the creation of files on XL systems is performed differently. For example, it is not necessary to create a file of a definite size, to create a second file, as soon as the EOF of the first file is reached and to merge them afterwards.

All MPE files of a shared disc start with VDT. This may lead to a so-called "permanent directory overflow (FSERR 103)" for the corresponding group, so that no further files may be created on the shared

disc. To avoid this problem, a limit of 1,200 files was set for every shared disc of Resource Sharing. This limit no longer exists for XL systems.

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3	5960-2842	Plotter Configuration Guide
4	5960-2843	Printer Configuration Guide - Version 2
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7	5960-2846	COBOL II/3000 Programs: Tracing Illegal Data
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11	5960-2850	System Configuration or System Table Related Errors
12	5960-2851	Pascal 3000 - Using Dynamic Variables
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26	5960-2865	HP 2680A, 2688A Error Trailers
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28	5960-2867	The Startup State Configurator
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30	5960-2869	Disc Cache
31	5960-2870	Calling the CREATEPROCESS Intrinsic
32	5960-2871	Configuring Terminal Buffers
33	5960-2872	Printer Configuration Guide - Version 3
34A	5960-2873	RIN Management (Using COBOLII Examples) (A)
34B	5960-2874	Process Handling (Using COBOLII Examples) (B)
35	5960-2875	HPDESK IV (Script files, FSC, and Installation Considerations)
34C	5960-2876	Extra Data Segments (Using COBOLII Examples) (C)
36	5960-2877	Tips for the DESK IV Administrators
37	5960-2878	AUTOINST: Trouble-free Updates
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47	5960-2900	Customizing Database Data Items & Changing Passwords in JCL Files
48	5959-9215	Printer Configuration - Version 4
49	5959-9227	Configuring DATACOMM Products Into MPE
50	5959-9228	VFC's for Serial Printers

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52	5959-9242	Configuring MRJE
53	5959-9245	Using Special Characters on the 700/9x Series Terminals
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75	5060-3000	XL NRJE Configuration
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