

RPC Broker 1.1

TCP/IP Supplement:

Patch XWB*1.1*35

Patch XWB*1.1*44



Patch XWB*1.1*35 Original: January 2005

Patch XWB*1.1*44 Updated: December 2005

Revised: August 2022

Department of Veterans Affairs (VA)

Office of Information and Technology (OIT)

Development, Security, and Operations (DSO)

Revision History

Document Revisions

Date	Description	Author
08/23/2022	Updates: <ul style="list-style-type: none"> Updated document to follow current documentation standards and style guidelines. Updates all styles and formatting. Verified document is Section 508 conformant. No changes to the overall content structure (e.g., multiple M environments), since that was the system design at the time of the original patch release. 	Vista Infrastructure Shared Services (VISS) Development Team
11/30/2005	Patch XWB*1.1*44: Updated the XWB_SERVER_START.COM file in Figure 4 , replacing the pipe command with individual commands to avoid a MAX SUB-PROCESS LIMIT.	RPC Broker Development Team
03/31/2005	Updates: <ul style="list-style-type: none"> Changed user (UAF) and directory names to VISTATCPSVC. Updated the XWB_SERVICE_START.COM to include \$ csession examples in the Caché section for Test and Production accounts and for Production Data Centers. 	RPC Broker Development Team
03/29/2005	Change the following: <ul style="list-style-type: none"> UAF entry from VISTATCPSVC to BROKER. Directory from VISTATCPSVC to RPCSERVER. 	RPC Broker Development Team
03/25/2005	Included a " _UAF> /batch - " command line in the example showing the creation of the VMS User in Figure 2 .	RPC Broker Development Team
03/10/2005	Edited the command lines beginning with CCONTROL to CSESSION in " Figure 4 " to prevent the spawning of a sub-session.	RPC Broker Development Team
01/2005	Initial <i>RPC Broker 1.1 Patch XWB*1.1*35: TCP/IP Supplement</i> document.	RPC Broker Development Team

Patch Revisions

For the current patch history related to this software, see the National Patch Module (NPM) on FORUM.

Table of Contents

Revision History	ii
List of Figures.....	v
List of Tables.....	v
Orientation.....	vi
1 Introduction	1
1.1. Managing TCP/IP Services	1
1.2. RPC Broker Service	1
2 Multi-Threaded Service for Caché on NT	3
2.1 Setting Up a Multi-Threaded Service.....	3
2.2 Starting and Stopping the Listening Service.....	3
3 TCPIP (UCX) Multi-Threaded Service on OpenVMS.....	4
3.1 Set Up OpenVMS User Account.....	5
3.2 Set Up Home Directory for the RPC Broker Handler Account	9
3.3 Create a DCL Login Command Procedure for the RPC Broker Handler ..	9
3.4 Set Up and Enable the TCPIP Service	13
3.4.1 Create a TCP/IP Service.....	14
3.5 Access Control List (ACL) Issues.....	16
3.6 How to Control the Number of Log Files Created by TCPIP.....	17
3.7 Starting and Stopping the Service.....	18
3.8 Starting and Stopping the Service Cluster-Wide.....	18
4 Migration Considerations	19
4.1 DSM/VMS to Caché/VMS.....	19
4.1.1 Disable Any RPC BROKER Service(s)	19
4.2 Caché/NT to Caché/VMS.....	19
5 Glossary.....	20
6 Index.....	22

List of Figures

Figure 1: Copy XMINET (TCP/IP MailMan) Account to a New Account with an Unused UIC	6
Figure 2: Create an OpenVMS User from Scratch	7
Figure 3: Verify the Settings for the New BROKER Account.....	8
Figure 4: Sample DCL Command Procedure.....	11
Figure 5: Set Up the VAH9200 TCPIP Service	14
Figure 6: Enable and Set Boot Status for the RPC BROKER TCPIP Service	15
Figure 7: Access Control List (ACL) for BROKER.....	17
Figure 8: Start and Stop the TCPIP Service.....	18
Figure 9: Start and Stop the TCPIP Service Cluster-Wide	18

List of Tables



Table 1: Documentation Symbol Descriptions.....	vi
Table 2: Terms and Definitions	20

Orientation

This is the Veterans Health Information Systems and Technology Architecture (VistA) Remote Procedure Call (RPC) Broker Transmission Control Protocol/Internet Protocol (TCP/IP) Supplement exported with Patch XWB*1.1*35. This supplement uses several methods to highlight different aspects of the material:

- Various symbols are used throughout the documentation to alert the reader to special information. [Table 1](#) gives a description of each of these symbols:

Table 1: Documentation Symbol Descriptions

Symbol	Description
	NOTE / REF: Used to inform the reader of general information including references to additional reading material.
	CAUTION / RECOMMENDATION / DISCLAIMER: Used to caution the reader to take special notice of critical information.

- Descriptive text is presented in a proportional font (as represented by this font).
- Conventions for displaying TEST data in this document are as follows:
 - The first three digits (prefix) of any Social Security Numbers (SSN) begin with either “000” or “666.”
 - Patient and user names are formatted as follows:
 - [Application Name]PATIENT,[N]
 - [Application Name]USER,[N]

Where “[*Application Name*]” is defined in the Approved Application Abbreviations document and “[*N*]” represents the first name as a number spelled out and incremented with each new entry.

For example, in RPC Broker (XWB) test patient names would be documented as follows:

XWBPATIENT,ONE; XWBPATIENT,TWO; XWBPATIENT,14, etc.

For example, in RPC Broker (XWB) test user names would be documented as follows:

XWBUSER,ONE; XWBUSER,TWO; XWBUSER,14, etc.

- “Snapshots” of computer online displays (i.e., screen captures/dialogues) and computer source code is shown in a *non*-proportional font and may be enclosed within a box.

- User's responses to online prompts are in **boldface** and highlighted in yellow (e.g., **<Enter>**).
- Emphasis within a dialogue box is in **boldface** and highlighted in blue (e.g., **STANDARD LISTENER: RUNNING**).
- Some software code reserved/key words are in **boldface** with alternate color font.
- References to "<Enter>" within these snapshots indicate that the user should press the <Enter> key on the keyboard. Other special keys are represented within < > angle brackets. For example, pressing the **PF1** key can be represented as pressing <PF1>.
- Author's comments are displayed in italics or as "callout" boxes.



NOTE: Callout boxes refer to labels or descriptions usually enclosed within a box, which point to specific areas of a displayed image.

Documentation Navigation

This document uses Microsoft® Word's built-in navigation for internal hyperlinks. To add **Back** and **Forward** navigation buttons to your toolbar, do the following:

1. Right-click anywhere on the customizable Toolbar in Word (not the Ribbon section).
2. Select **Customize Quick Access Toolbar** from the secondary menu.
3. Select the drop-down arrow in the "Choose commands from:" box.
4. Select **All Commands** from the displayed list.
5. Scroll through the command list in the left column until you see the **Back** command (circle with arrow pointing left).
6. Select/Highlight the **Back** command and select **Add** to add it to your customized toolbar.
7. Scroll through the command list in the left column until you see the **Forward** command (circle with arrow pointing right).
8. Select/Highlight the **Forward** command and select **Add** to add it to the customized toolbar.
9. Select **OK**.

You can now use these **Back** and **Forward** command buttons in the Toolbar to navigate back and forth in the Word document when selecting hyperlinks within the document.



NOTE: This is a one-time setup and is automatically available in any other Word document once you install it on the Toolbar.

How to Obtain Technical Information Online

Exported VistA M Server-based software file, routine, and global documentation can be generated using Kernel, MailMan, and VA FileMan utilities.



NOTE: Methods of obtaining specific technical information online is indicated where applicable under the appropriate section.

REF: For further information, see the *RPC Broker Technical Manual*.

Help at Prompts

VistA M Server-based software provides online help and commonly used system default prompts. Users are encouraged to enter question marks at any response prompt. At the end of the help display, you are immediately returned to the point from which you started. This is an easy way to learn about any aspect of VistA M Server-based software.

Obtaining Data Dictionary Listings

Technical information about VistA M Server-based files and the fields in files is stored in data dictionaries (DD). You can use the **List File Attributes** [DILIST] option on the **Data Dictionary Utilities** [DI DDU] menu in VA FileMan to print formatted data dictionaries.



REF: For details about obtaining data dictionaries and about the formats available, see the “List File Attributes” chapter in the “File Management” section of the *VA FileMan Advanced User Manual*.

Assumptions

This manual is written with the assumption that the reader is familiar with the following:

- VistA computing environment:
 - Kernel—VistA M Server software
 - Remote Procedure Call (RPC) Broker—VistA Client/Server software
 - VA FileMan data structures and terminology—VistA M Server software
- Microsoft® Windows environment
- M programming language
- **Open Virtual Memory System (OpenVMS)**
- M operating systems:
 - **Caché** on NT
 - **Caché** on **OpenVMS**

- **Digital Standard MUMPS (DSM) for OpenVMS**
- **GT.M on Linux or GT.M on OpenVMS**

References

Readers who wish to learn more about RPC Broker should consult the following:

- Patch XWB*1.1*35 and XWB*1.1*44 Patch Descriptions (PDs) located in the National Patch Module on FORUM—Includes Installation Instructions.
- RPC Broker Release Notes
- RPC Broker Deployment, Installation, Back-Out, and Rollback Guide (DIBRG)
- RPC Broker Systems Management Guide
- RPC Broker Technical Manual
- RPC Broker User Guide
- *RPC Broker Developer's Guide*—This document provides an overview of development with the RPC Broker.
- RPC Broker VA Intranet website.

This site provides announcements, additional information (e.g., Frequently Asked Questions [FAQs], advisories), documentation links, archives of older documentation and software downloads.

VistA documentation is made available online in Microsoft® Word format and in Adobe Acrobat Portable Document Format (PDF). The PDF documents *must* be read using the Adobe Acrobat Reader, which is freely distributed by Adobe Systems Incorporated at: <http://www.adobe.com/>

VistA documentation can be downloaded from the VA Software Document Library (VDL) Website: <http://www.va.gov/vdl/>

The RPC Broker documentation is located on the VDL at:
<https://www.va.gov/vdl/application.asp?appid=23>

VistA documentation and software can also be downloaded from the Product Support (PS) Anonymous Directories.

1 Introduction

A Service Request (RPC Broker—Firewall Issue, service request #20021001) was made for an enhancement to the RPC Broker that will allow local sites the ability to control the range of ports used in connecting to joint and/or contracting facilities. As a security measure, participating sites or joint facilities (i.e., Department of Defense [DoD] and universities) have firewalls set up to prevent intrusion. Lack of access to clinics outside the firewall is preventing session connections from thin clients to Computerized Patient Record System (CPRS). With the use of the Remote Procedure Call (RPC) Broker, which enables clients to communicate and exchange data over the network, sites could minimize security risks by controlling the range of available ports that would be open for connection.

In response to this request to operate with firewalls and other network security measures, the RPC Broker is eliminating the callback portion of the system. The Broker was changed to work more like other Transmission Control Protocol/Internet Protocol (TCP/IP) programs. This is the RPC Broker TCP/IP Supplement. It outlines the details of the work involved in setting up and managing RPC Broker TCP/IP services for all currently supported M operating systems.

This documentation is intended for use in conjunction with RPC Broker Patch XWB*1.1*35. Patch XWB*1.1*35 sets the groundwork for the next Broker Patch XWB*1.1*36, which implements a new Broker Developer Kit (BDK). This will allow Vista developer's access to this new RPC Broker server side TCP/IP service through the Broker client. Existing RPC Broker applications will work with this new server-side code, which will eventually replace the current Broker listener, **XWBTCPPL**.

The intended audience for this documentation is Vista developers and VA facility system administrators.

1.1. Managing TCP/IP Services

The RPC Broker uses a TCP/IP service to "listen" on a particular port for incoming TCP/IP connections from other systems. Listeners are necessary whenever RPC Broker Clients need to initiate a connection to the Vista system over TCP/IP.

1.2. RPC Broker Service

TCPIP service is only available for the **OpenVMS** operating systems:

- **Caché on OpenVMS.**



REF: For more information, see the "[TCPIP \(UCX\) Multi-Threaded Service on OpenVMS](#)" section.

- **DSM for OpenVMS.**



REF: For more information, see the "[TCPIP \(UCX\) Multi-Threaded Service on OpenVMS](#)" section.

- **GT.M on OpenVMS.**



REF: For more information, see the "[TCPIP \(UCX\) Multi-Threaded Service on OpenVMS](#)" section.

- **GT.M on Linux.**



NOTE: No documentation is available for GT.M on Linux at this time.

2 Multi-Threaded Service for Caché on NT

The Windows NT operating system (OS) does *not* provide an equivalent service to OpenVMS TCPIP service. Kernel Patch XU*8*78, released in April of 1998, provides a way to provide a multi-threaded service for TCP/IP messaging for Caché on NT systems.

2.1 Setting Up a Multi-Threaded Service

To set up a multi-threaded service, do the following:

1. Define an entry for it in the RPC BROKER SITE PARAMETERS (#8994.1) file.
2. Set or change the value of the TYPE OF LISTENER (#.5) field to "New Style" in File #8994.1.
3. Use the TaskMan **Schedule/Unschedule Options** [XUTM SCHEDULE] option to verify that XWB LISTENER STARTER is scheduled. You are then presented with the “**Edit Option Schedule**” ScreenMan form. Enter the value "STARTUP" in the SPECIAL QUEUEING field.

2.2 Starting and Stopping the Listening Service

To start and stop the listening service, do the following:

- **START SERVICE**—To start a service outside of scheduling it through TaskMan, enter the following through programmer mode:

DO RESTART^XWBTC

Or

JOB ZISTCP^XWBTCM1(port#)

- **STOP SERVICE**—To stop the listener, enter the following through programmer mode:

DO STOPALL^XWBTC

3 TCPIP (UCX) Multi-Threaded Service on OpenVMS

Multi-threaded listeners are implemented using **OpenVMS's TCPIP** (aka **Digital TCPIP** services for **OpenVMS**, formerly known as **UCX**). The **TCPIP** service uses a cluster-wide database. The **TCPIP** multi-threaded service on **OpenVMS** permits multiple **TCPIP** clients to connect and run as concurrent processes up to the limits established by the system. **TCPIP** listens on a particular port and launches the specified RPC Broker handler process for each client connection.



The following names, found in a typical RPC Broker Handler process, are referenced throughout this chapter:

- **BROKER—OpenVMS** account name for TCPIP RPC Broker handler.
- **[RPCSERVER]**—Name of home directory.
- **XWBSERVER_START.COM**—Name of template DCL command procedure.

For the TCPIP RPC Broker handler process, you need to create the following:

- **OpenVMS** account.



REF: For more information, see the "[Set Up OpenVMS User Account](#)" section.

- Home directory.



REF: For more information, see the "[Set Up Home Directory for the RPC Broker Handler Account](#)" section.

- Digital Command Language (DCL) login command procedure.



REF: For more information, see the "[Create a DCL Login Command Procedure for the RPC Broker Handler](#)" section.

3.1 Set Up OpenVMS User Account

The easiest way to configure an **OpenVMS** account for the RPC Broker handler is to use a current account, like VA MailMan or Health Level Seven (HL7), and adjust its parameters. The other way is to create a new **OpenVMS** account for the RPC Broker handler. The following steps illustrate how to do this:

1. Determine an unused UIC:

Determine an unused User Identification Code (UIC). This is selected from the same UIC group as other **DSM** or **Caché** for **OpenVMS** accounts, depending on which version of **M** you are using.

2. Create a **BROKER** account with the unused UIC:

Use the **OpenVMS** Authorize Utility to create a **BROKER** account with the unused UIC.



CAUTION: You *must* be running from a system administrator account to set up an OpenVMS user account.



CAUTION: Since the TCPIP is node-specific, make sure you set up the TCPIP service for each node on which you want the service to run.

The following two examples illustrate different ways to set up an **OpenVMS** User account to execute the RPC service COM file:

- a. Copy your existing **XMINET** (TCP/IP MailMan) account to a new account with an unused UIC. [Figure 1](#) contains the recommended settings and assumes you already have an **XMINET** account on **OpenVMS**.

Figure 1: Copy XMINET (TCP/IP MailMan) Account to a New Account with an Unused UIC

This example assumes that UIC [51,45] is an unused UIC. Substitute an unused UIC on your system. Set the owner according to your system policy. Please note that [51,45] is used as an example, only.

```
$ MCR AUTHORIZE
UAF> COPY XMINET
BROKER/UIC=[51,45]/DEVICE=USER$/DIRECTORY=RPCSERVER
%UAF-I-COPMSG, user record copied
%UAF-W-DEFPWD, copied or renamed records must receive new
password
%UAF-I-RDBADDSMSGU, identifier BROKER value [000051,000045] added
to rights database
UAF>
```

- b. Create the new **BROKER** VMS account. [Figure 2](#) illustrates how to create an **OpenVMS** User account from scratch with the recommended settings. You *must* adhere to minimum account quota recommendations from the AXP/VMS Technical Support Team.



REF: For more information on recommended account quotas, see the [AXP/VMS Technical Support Team](#) website.

Figure 2: Create an OpenVMS User from Scratch

This example assumes that UIC [51,45] is an unused UIC. Substitute an unused UIC on your system. Set the owner according to your system policy. Please note that [51,45] is used as an example, only.

```
$ MC AUTHORIZE
UAF> ADD BROKER /UIC=[51,45]/OWNER="<<cache>or<DSM>" -
_UAF> /DEVICE=USER$/DIRECTORY=[RPCSERVER] -
_UAF> /NOACCESS/NETWORK/FLAGS=(DISCTLY,RESTRICTED,NODISUSER) -
_UAF> /PRIV=(NETMBX,TMPMBX) -
_UAF> /batch -
_UAF> /DEF=(NETMBX,TMPMBX)/LGICMD=NL:
%UAF-I-ADDMSG, user record successfully added
%UAF-I-RDBADDMSGU, identifier BROKER value [000051,000045] added
to rights database
UAF>
```

3. Verify Account Settings:

Verify the settings for your new **BROKER** account or the account you are going to use. Now you want to see what the parameters look like. [Figure 3](#) contains the settings for your new **BROKER** account. Verify that your settings are the same as they appear in [Figure 3](#); or if they are different, verify that the impact of the different settings is acceptable for your system.



REF: The example in [Figure 3](#) assumes that you have just completed the steps illustrated in either [Figure 1](#) or [Figure 2](#).

Figure 3: Verify the Settings for the New BROKER Account

```
$ MCR AUTHORIZE
UAF> SHOW BROKER
```

This example assumes that UIC [51,45] is an unused UIC. Substitute an unused UIC on your system. Set the owner according to your system policy. Please note that [51,45] is used as an example, only.

```
Username: BROKER                                Owner: (DSM or Cache)
Account:                                         UIC: [51,45] ([BROKER])
CLI:      DCL                                    Tables: DCLTABLES
Default:  USER$:[RPCSERVER]
LGICMD:   NL:
Flags:    DisCtly Restricted
Primary days:  Mon Tue Wed Thu Fri
Secondary days:                               Sat Sun
Primary      000000000001111111112222  Secondary
000000000001111111112222
Day Hours 012345678901234567890123  Day Hours
012345678901234567890123
Network:  ##### Full access #####            ##### Full access #####
Batch:    ##### Full access #####            ##### Full access #####
Local:    ----- No access -----            ----- No access -----
Dialup:   ----- No access -----            ----- No access -----
Remote:   ----- No access -----            ----- No access -----
Expiration: (none)      Pwdminimum: 6      Login Fails: 0
Pwdlifetime: 90 00:00  Pwdchange: (pre-expired)
Last Login: (none) (interactive), (none) (non-interactive)
Maxjobs:    0  Fillm: 600  Byt1m: 200000
Maxacctjobs: 0  Shrfillm: 0  Pbyt1m: 0
Maxdetach:  0  B101m: 600  JTquota: 8192
Prclm:      2  D101m: 2048  WSdef: 2048
Prio:       4  AST1m: 4096  WSquo: 4096
Queprio:    0  TQElm: 50  WSextent: 65535
CPU:        (none)  Enqlm: 4096  Pgflquo: 200000
Authorized Privileges:
  NETMBX      TMPMBX
Default Privileges:
  NETMBX      TMPMBX

UAF> EXIT
```

```
%UAF-I-DONEMSG, system authorization file modified
%UAF-I-RDBDONEMSG, rights database modified
```



CAUTION: As a security precaution, make sure that the DisCtly and Restricted flags are set.

3.2 Set Up Home Directory for the RPC Broker Handler Account

You need to create a home directory for the RPC Broker handler account. This directory will house the DCL command procedures, which are executed whenever a client connects. Make sure that the owner of the directory is the **BROKER** account.

For example, to create a home directory named **[RPCSERVER]** with ownership of **BROKER**:

```
$ CREATE/DIR USER$: [RPCSERVER] /OWNER=BROKER
```

3.3 Create a DCL Login Command Procedure for the RPC Broker Handler

Create a DCL command procedure in the home directory for the handler account. Make sure the command procedure file is owned by the RPC Broker handler account.

Copy the sample COM file: **XWBSEVER_START.COM**, from any Vista anonymous directory. Create a local copy to edit, you will need one file for each TCP/IP service (port). All nodes of the cluster share the same COM file.



NOTE: Make sure that you do *not* have a current **XWBSEVER_START.COM** file being used by the M2M Broker Service. **XWBSEVER_START.COM** is a template file. Make a copy to edit for each service you setup. You want to give the service a name that helps make the link with the account and port that it uses.

```
$COPY XWBSEVER_START.COM VAH9200.COM
```

Edit your local copy of the COM file as follows:

1. Adjust the command line (environment, UCI, and volume set) to match your system. In the command line section of the COM file for each vendor, there are parameters in the angle brackets (< >) that need to be replaced with the correct values for your site. Example, for **DSM**, copy the following sample line, keeping in mind to replace the **<dsmmgr>**, **<vah>**, and **<rou>** with the correct values for your site:

```
"DSM/ENV=<dsmmgr>/UCI=<vah>/VOL=<rou>/data="'dev'" DSM^XWBTCPM"
```



REF: For the specific changes that need to be made for **Caché** or **GT.M**, see [Figure 4](#).

2. If you are running **DSM** and access control is enabled, ensure that the **BROKER** account has access to this UCI, volume set, and routine.

You can run the same **TCPIP** service processes on multiple nodes. This depends on your sites configuration and needs. For instance, the impersonator VMS feature allows for the possibility of all nodes in the cluster to become the surrogate, permitting the listening process to continue uninterrupted if one node stops. This requires that the **RPC BROKER TCPIP** service be enabled on all nodes in the cluster. For this reason, it is *recommended* that you enable the **RPC BROKER TCPIP** service on most or all of the nodes in the cluster.



REF: For more information on **DSM** and access control, see the "[Access Control List \(ACL\) Issues](#)" section.

Figure 4: Sample DCL Command Procedure

```
$!XWBSESERVER_start.COM - for incoming tcp connect requests
$! Revision History:
$! Patch XWB*1.1*35
$! Add code to get remote IP address.
$!-----
$ set noon          !Don't stop
$ set noverify      !change as needed
$! set verify       !change as needed
$ say :== write sys$output
$! Purge at end
$ set prot=(s:rwed,o:rwed,g:rwe,w:rwe)/default
$!
$ dev=f$trnlrm("sys$net") !This is our MBX device
$ NODE=F$EDIT(F$GETSYI("SCSNODE"),"COLLAPSE,TRIM") !Node Name
$!
$ say "Opening " + dev !This can be viewed in the log file
$!
$! With TCPIP Services for OpenVMS 5.3 ECO #2 or higher,
$!     the below section can be removed.
$!
$! Check status of the BG device before going to Vista
$ cnt=0
$ CHECK:
$ stat=f$getdvi("'dev'", "STS")
$ if cnt .eq. 100
$ then
$ say "Could not open 'dev' - exiting"
$ goto EXIT
$ else
$     if stat .ne. 16
$     then
$         cnt=cnt+1
$         say "Stat: 'stat' Cnt:'cnt' Dev: 'dev' not ready!"
$         wait 00:00:01 !Wait one second to assure connection
$         goto CHECK
$     else
$     endif
$ endif
$! End of TCPIP Services for OpenVMS 5.3 ECO #2 or higher, removal
$!
$!-----
$ bg == f$extract(1,f$locate(":",dev)-1,dev)
$ pid = f$getjpi("", "PID")
$ assign /user pipe1_'pid'.tmp sys$output
$ TCPIP SHOW DEVICE 'bg'
$ search pipe1_'pid'.tmp 'bg' /output=pipe2_'pid'.tmp
$ open/error=err_exit/end=err_exit host pipe2_'pid'.tmp
$ read host line
$ close host
$ delete /noconfirm /nolog pipe1_'pid'.tmp;*,pipe2_'pid'.tmp;*
$ port = f$edit(f$extract(24,5,line),"TRIM")
$ ip = f$edit(f$extract(55,15,line),"TRIM")
$!
$ define Vista$IP "'ip'"
$!-----
```

```

$ say "'dev' from host 'ip' is now ready for use."
$!-----
$! **Be sure the command line(s) in the COMMAND LINE SECTION
$! **below is correct for your system and if access control is
enabled,
$! **that this account has access to this uci,vol & routine.
$!
$!-----
$! COMMAND LINE SECTION:
$! =====
$! anything in <x> needs to be replaced including the <> with local
data
$!-----

```

DSM

```

$! for DSM
$! dsm/env=<dsmmgr>/uci=<vah>/vol=<rou>/data="'dev'" DSM^XWBTCPM
$!-----

```

Caché

```

$! for Cache
$! Edit only one of the three 'csession' lines below.
$!
$ assign 'f$trnlnm("SYS$NET")' SYS$NET
$!
$! #1 -- For Test Accounts
$! if the configname is not the same as the node name, usually a
test
$! account, edit/use the 'csession' line below
$! Remove the comment character '!' from the beginning of the line.
$! Replace <PREFIX>, including the <>, with the proper Test account
$! prefix.
$! Usually this is T or TST
$! Replace <namespace>, including the <> with the correct namespace.
$! Usually the namespace is TST for a Test account.
$!
$! an Example -- $ csession "T'NODE'" "-U" "TST" "CACHEVMS^XWBTCPM"
$!
$! csession "<PREFIX>'NODE'" "-U" "<namespace>" "CACHEVMS^XWBTCPM"
$!
$! #2 -- For most Production Accounts.
$! OR if your configname is the same as your node name, usually a
non-data
$! center production site, edit/use the 'cesssion' line below.
$! Remove the comment character '!' from the beginning of the line.
$! Replace <namespace>, including the <> with the correct namespace,
$! Usually the namespace is "VAH" for production.
$!
$! an Example -- $ csession "'NODE'" "-U" "VAH" "CACHEVMS^XWBTCPM"
$!
$! csession "'NODE'" "-U" "<namespace>" "CACHEVMS^XWBTCPM"
$!
$! #3 -- for Data-Center Production Accounts

```

```

$! OR, for a production Data Center site, edit/use the 'csession'
line below.
$! Remove the comment character '! ' from the beginning of the line.
$! Replace <NSP>, including the <>, with the proper site prefix.
$! Replace <namespace>, including the <> with the correct namespace.
$! Usually the namespace is the same as the value used for NSP.
$!
$! an Example -- $ csession "BRX'"NODE'" "-U" "BRX"
"CACHEVMS^XWBTCPM"
$!
$! csession "<NSP>'NODE'" "-U" "<namespace>" "CACHEVMS^XWBTCPM"
$!$!-----

```

GT.M

```

$! for GT.M
$! assign 'f$trnlrm("SYS$NET")' SYS$NET
$! Depending on how your command files are set up, you may need to
$! run the GT.M profile file.
$! @<user$:[gtmmgr]>gtmprofile.com
$! forfoo="$" + f$parse("user$:[gtmmgr.r]ZFOO.exe")
$! forfoo GTMUCX^XWBTCPM("'"dev'"")
$!
$!
$ exit:
$ purge/keep=100 sys$login:*.log !Purge log files only
$ logout/brief

```

3.4 Set Up and Enable the TCPIP Service

After you have done the following:

- Created the RPC Broker account.
- Created the **TCPIP** service to listen for connections.
- Launched the RPC Broker handler.

Do the following three steps:

1. Select the **OpenVMS** nodes upon which to run the service.

Designate the nodes on which you want to run the resulting M jobs to handle incoming RPC Broker connections. You will need to set up the **TCPIP** service on each node that you want the service to run.

2. Select the port upon which the new service should listen.

This will be the port you are currently using for the Broker listener.

3. Specify the user account and command file name (see the "[Set Up OpenVMS User Account](#)" section) invoked when a connection is received.

3.4.1 Create a TCP/IP Service



CAUTION: Prior to setting up the TCP/IP service in Production, it is *recommended* that you create a test TCP/IP service that uses a different port to listen on, which sends connections into an M Test account. This test TCP/IP service can use the same OpenVMS account and directory that the Production TCP/IP uses. However, it is *recommended* that you create a different DCL command file (e.g., TST9900.COM) for the UCI and port for the Test account.

The steps to set up a TCP/IP service for the RPC Broker are listed as follows:

1. Set up the RPC BROKER TCP/IP service.

Since the TCP/IP service database is cluster-wide, sign onto one node in the Production cluster and create the service.



CAUTION: The LIMIT *must* be set high enough to allow access for all your CPRS and other RPC Broker users that you want to run on that node.



NOTE: You will need to provide unique names on each node for each account, because all files will be located in a common directory. Each RPC service on a node *must* have a unique name. The TCPIP service is named **VAH9200** for the purposes of this documentation only.

Figure 5: Set Up the VAH9200 TCPIP Service

```
$ TCPIP
TCPIP> SET SERVICE VAH9200/USER=BROKER/PROC=VAH9200/PORT=9200-
TCPIP> /PROTOCOL=TCP/REJECT=MESSAGE="#Signon Limit Reached#" -
TCPIP> /LOG=ADDRESS/LIMIT=500/FILE=VAH9200.COM

TCPIP> SHO SERVICE VAH9200/FULL

Service: VAH9200

Port:          9200      State:      Disabled
0.0.0.0        Protocol:  TCP          Address:

User_name: BROKER      Process:
VAH9200
```

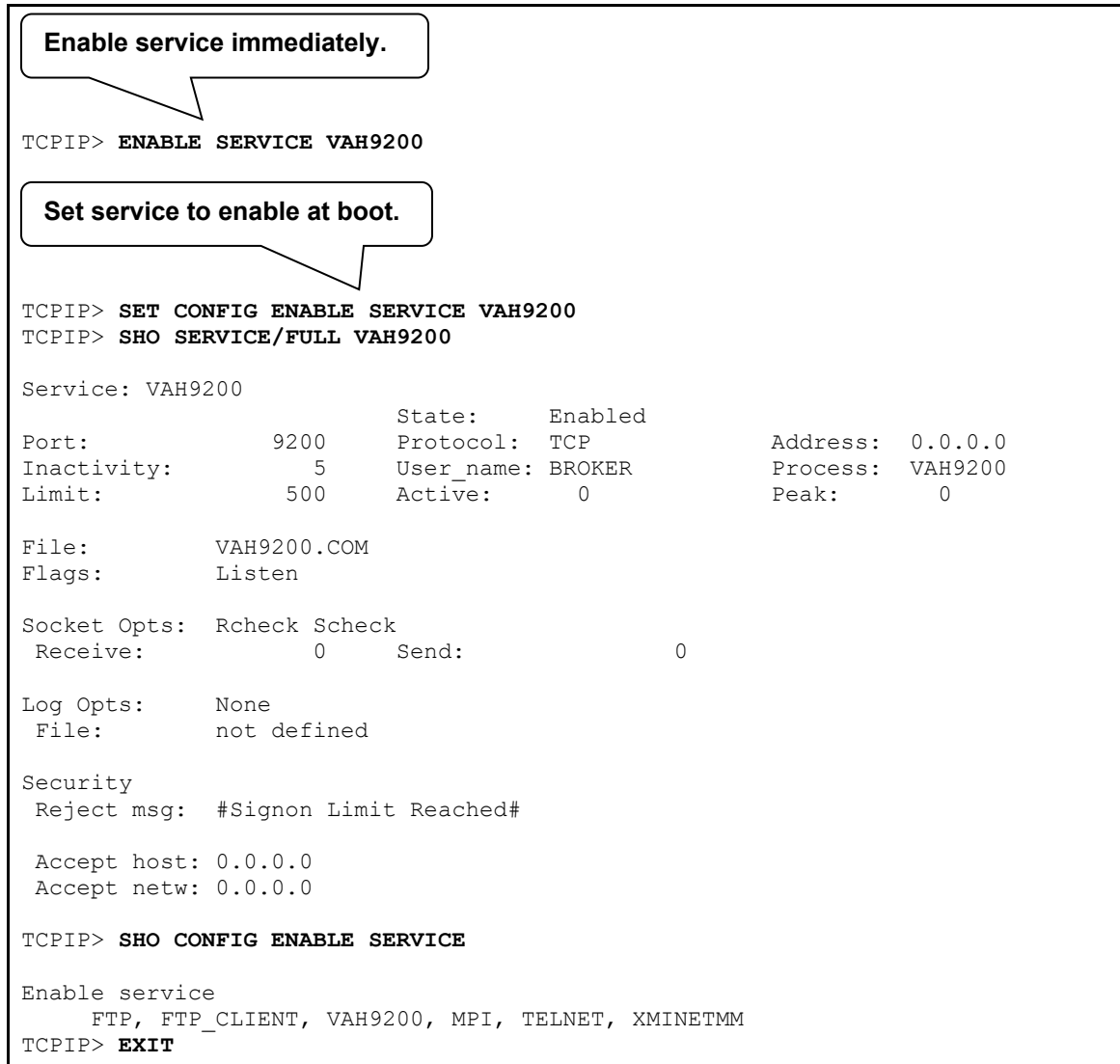


NOTE: Set the port number to match the port number in use by your site.

2. Enable and set boot status for the RPC BROKER TCP/IP service on every node where you need to run the service.

On the same node:

Figure 6: Enable and Set Boot Status for the RPC BROKER TCPIP Service



```
TCPIP> ENABLE SERVICE VAH9200
```

Set service to enable at boot.

```
TCPIP> SET CONFIG ENABLE SERVICE VAH9200
TCPIP> SHO SERVICE/FULL VAH9200
```

Service: VAH9200

Port:	9200	State:	Enabled	
Inactivity:	5	Protocol:	TCP	Address: 0.0.0.0
Limit:	500	User_name:	BROKER	Process: VAH9200
		Active:	0	Peak: 0

File: VAH9200.COM
Flags: Listen

Socket Opts: Rcheck Scheck
Receive: 0 Send: 0

Log Opts: None
File: not defined

Security
Reject msg: #Signon Limit Reached#

Accept host: 0.0.0.0
Accept netw: 0.0.0.0

```
TCPIP> SHO CONFIG ENABLE SERVICE
```

Enable service
FTP, FTP_CLIENT, VAH9200, MPI, TELNET, XMINETMM

```
TCPIP> EXIT
```


3.5 Access Control List (ACL) Issues

Some sites use **DSM**'s ACL feature, which controls access explicitly to each **OpenVMS** account needing to enter that specific **DSM** environment. If your site is using ACL, you should set up the **BROKER** account with PROGRAMMER access, then specify the Volume set and UCI name that the **BROKER** user account has authorization to access. Ensure that the **OpenVMS BROKER** account:

- Prohibits the following logins:
 - Batch
 - Local
 - Dialup
 - Remote
- Allows only Network logins.

[Figure 7](#) is an example of setting this level of access for a **BROKER** account:

Figure 7: Access Control List (ACL) for BROKER

```
$ DSM/ENV=<dsmmgr>/MAN ^ACL

Environment Access Utilities

1. ADD/MODIFY USER (ADD^ACL)
2. DELETE USER (DELETE^ACL)
3. MODIFY ACTIVE AUTHORIZATIONS (^ACLSET)
4. PRINT AUTHORIZED USERS (PRINT^ACL)

Select Option > 1 <Enter> ADD/MODIFY USER

OpenVMS User Name: > BROKER

ACCESS MODE VOL UCI ROUTINE
-----
No access rights for this user.

Access Mode ([M]ANAGER, [P]ROGRAMMER, or [A]PPPLICATION): > P
Volume set name: > ROU
UCI: > VAH
UCI: > <Enter>
Volume set name: > <Enter>
Access Mode ([M]ANAGER, [P]ROGRAMMER, or [A]PPPLICATION): > <Enter>

USER ACCESS MODE VOL UCI ROUTINE
----
BROKER PROGRAMMER ROU VAH

OK to file? <Y> <Enter>

OpenVMS User Name: > <Enter>

OK to activate changes now? <Y> <Enter>

Creating access authorization file: SYS$SYSDEVICE:[DSMMGR]DSM$ACCESS.DAT.
```

3.6 How to Control the Number of Log Files Created by TCPIP

The **TCPIP** service automatically creates log files in the **RPCSERVER** directory named **VAH9200.LOG;xxx** (where "xxx" is a file version number).



NOTE: TCPIP does this, and it *cannot* be prevented.

The **XWBSERVER_START.COM** template file purges extra log files as part of its running. New versions of the log file are created until that file version number reaches the maximum number of **32767**. This can be used to limit the number of log files by explicitly setting the log file to the highest version number (**32767**) on the **VAH9200.LOG** file. This results in the **VAH9200.LOG** file being renamed to **VAH9200.LOG;32767**, and no further versions of this log file are created. If a system manager needs to see the log file contents of new connections, they can rename that file to a lower version, such as **VAH9200.LOG;32760**, and let new log files be created.

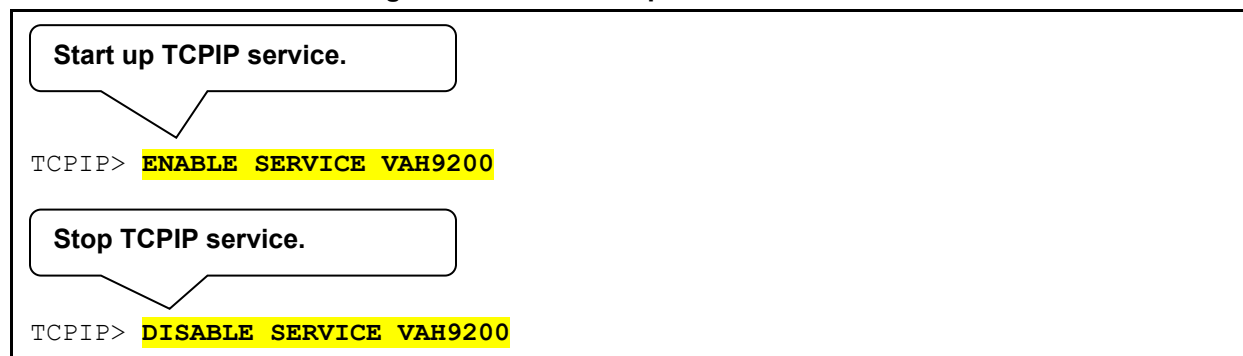


CAUTION: It is *recommended* that you *not* limit the number of versions of the log file until you know that your VAH9200 service is working correctly; keeping the log files can help when diagnosing problems with the service/account.

3.7 Starting and Stopping the Service

Because this is a TCPIP service, use TCPIP to enable and disable it, as shown in [Figure 8](#):

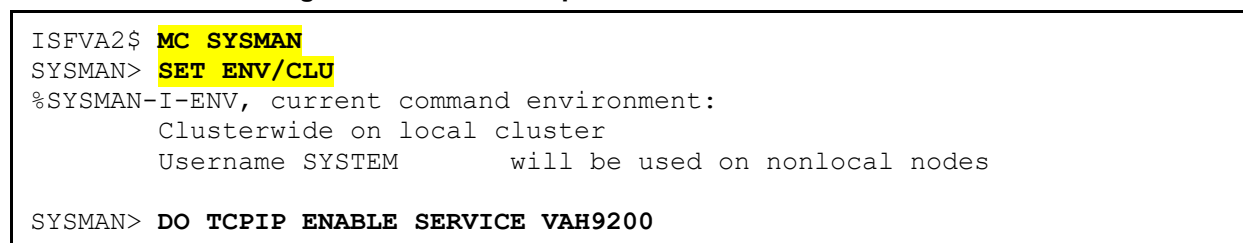
Figure 8: Start and Stop the TCPIP Service



3.8 Starting and Stopping the Service Cluster-Wide

Use the **OpenVMS** command **SYSMAN** to run the **TCPIP** command on each member of the cluster, as shown in [Figure 9](#):

Figure 9: Start and Stop the TCPIP Service Cluster-Wide



4 Migration Considerations

This section addresses issues and considerations involved in moving from the platforms listed below, to **Caché/VMS**:

- Migrating from **DSM/VMS** to **Caché/VMS** as documented in the "[DSM/VMS to Caché/VMS](#)" section.
- Migrating from **Caché/NT** to **Caché/VMS** involves only one step related to the **NT** platform prior to migrating to **Caché/VMS**. This is documented in the "[Caché/NT to Caché/VMS](#)" section.

4.1 DSM/VMS to Caché/VMS

If your site is running **DSM/VMS** and you are migrating to **Caché/VMS**, it is *recommended* that you read these instructions to make the necessary VMS configuration changes.



NOTE: These changes *must only* be done after shutting down **DSM** and prior to migrating to **Caché/VMS**.

4.1.1 Disable Any RPC BROKER Service(s)

To disable RPC BROKER services, do the following:

1. Disable all user access:
Check the existing **BROKER** user and ensure that the User Identification Code (UIC) is correct for **Caché/VMS**.
2. Modify the existing **VAH9200.COM** file to start **Caché** in place of **DSM**.
3. You are now ready to migrate to **Caché**. Perform the necessary steps for migration including any backups, disk conversions, and the shutdown of **DSM**.
4. After the migration is complete and **Caché** is activated for use, remember to enable the RPC BROKER service.

4.2 Caché/NT to Caché/VMS

If your site is running **Caché/NT** and you are migrating to **Caché/VMS**, follow these instructions to remove the multi-threaded service and create the **TCPIP** service:

1. Remove the entry for it in the RPC BROKER SITE PARAMETERS (#8994.1) file.
2. Use TaskMan's **Schedule/Unschedule Options** [XUTM SCHEDULE] option to remove the **XWB LISTENER STARTER** option from the schedule.
3. Follow the instructions documented in the "[TCPIP \(UCX\) Multi-Threaded Service on OpenVMS](#)" section.

5 Glossary

Table 2: Terms and Definitions

Term	Definition
ACL	Access Control List.
DCL	Digital Command Language.
DEPARTMENT OF VETERANS AFFAIRS (VA)	The Department of Veterans Affairs , formerly called the Veterans Administration .
DHCP	Decentralized Hospital Computer Program of the Veterans Health Administration (VHA), Department of Veterans Affairs (VA) is the former name for Veterans Health Information Systems and Technology Architecture (VistA). VistA software, developed by VA, is used to support clinical and administrative functions at VA Medical Centers nationwide. It is written in M and, via the Kernel, runs on all major M implementations regardless of vendor. VistA is composed of packages that undergo a verification process to ensure conformity with namespacing and other VistA standards and conventions.
FIELD	In a record, a specified area used for the value of a data attribute. The data specifications of each VA FileMan field are documented in the file's data dictionary. A field is similar to blanks on forms. It is preceded by words that tell you what information goes in that particular field. The blank, marked by the cursor on your terminal screen, is where you enter the information.
FILE	Set of related records treated as a unit. VA FileMan files maintain a count of the number of entries or records.
FILE MANAGER (VA FILEMAN)	VistA's Database Management System (DBMS). The central component of Kernel that defines the way standard VistA files are structured and manipulated.
KERNEL	Kernel is VistA software that functions as an intermediary between the host operating system and other VistA software applications (e.g., Laboratory, Pharmacy, IFCAP, etc.). Kernel provides a standard and consistent user and programmer interface between software applications and the underlying M implementation.
MENU	List of choices for computing activity. A menu is a type of option designed to identify a series of items (other options) for presentation to the user for selection. When displayed, menu-type options are preceded by the word "Select" and followed by the word "option" as in Select Menu Management option: (the menu's select prompt).
MENU SYSTEM	The overall Menu Manager logic as it functions within the Kernel framework.

Term	Definition
OPTION	An entry in the OPTION file (#19). As an item on a menu, an option provides an opportunity for users to select it, thereby invoking the associated computing activity. Options may also be scheduled to run in the background, non-interactively, by TaskMan.
PROMPT	The computer interacts with the user by issuing questions called prompts, to which the user issues a response.
ROUTINE	Program or a sequence of instructions called by a program that may have some general or frequent use. M routines are groups of program lines, which are saved, loaded, and called as a single unit via a specific name.
RPC Broker Clients	Any Windows application that makes use of the RPC Broker to do the connection with the VistA system.
TCP/IP	Transmission Control Protocol/Internet Protocol
TCPIP	Digital TCPIP services for OpenVMS , this used to be called UCX . TCPIP permits multiple TCPIP clients to connect and run as concurrent processes up to the limits established by the system. TCPIP listens on a particular port and launches the specified RPC Broker handler process for each client connection.
VA FILEMAN	Set of programs used to enter, maintain, access, and manipulate a database management system consisting of files. A software application of online computer routines written in the M language, which can be used as a standalone database system or as a set of application utilities. In either form, such routines can be used to define, enter, edit, and retrieve information from a set of computer stored files.
VistA	Veterans Health Information Systems and Technology Architecture (VistA) of the Veterans Health Administration (VHA), Department of Veterans Affairs (VA). VistA software, developed by the VA, is used to support clinical and administrative functions at VHA sites nationwide. Server-side code is written in M, and, via Kernel, runs on all major M implementations regardless of vendor. VistA is composed of software that undergoes a quality assurance process to ensure conformity with namespacing and other VistA standards and conventions.

6 Index

A

Access Control List (ACL) Issues	
Allow only Network Logins	15
authorization access	15
PROGRAMMER access	15
setting level of access for	
RPCSERVER account	16
accounts	
MailMan TCP (XMINET)	5
OpenVMS RPC Broker handler	4
RPC BROKER	8
RPC Broker handler	8
RPCSERVER	5
Assumptions	viii
AXP/VMS Technical Support Team	6

B

Broker Patch XWB*1.1*35	1
Broker Patch XWB*1.1*36	1

C

Caché command line	8
Caché on NT, Multi-threaded Service for	
set up service	3
starting and stopping service	3
Callout Boxes	vii
Captive flag	7
COM file	
XWBSEVER_START.COM	4, 8

D

Data Dictionary	
Data Dictionary Utilities Menu	viii
Listings	viii
DCL command procedure	
TCPIP (UCX) Multi-threaded Service	
for Cache on OpenVMS	4
DI DDU Menu	viii
DILIST Option	viii
directories	
DCL command procedure	8

RPC Broker handler account	8
RPCSERVER	8
setup	8
TCPIP (UCX) Multi-threaded Service	
for Cache on OpenVMS	4
directory, home	4, 8
DisCtlY flag	7
Documentation	
Revisions	ii
Symbols	vi
Documentation Navigation	vii
DSM command line	8
DSM's ACL (Access Control List)	
feature	
Allow only Network Logins	15
authorization access	15
PROGRAMMER access	15
setting level of access for	
RPCSERVER account	16

F

field, TYPE OF LISTENER (#.5)	3
Firewall Issue Request #20021001	1
flags	
Captive	7
DisCtlY	7
Restricted	7

G

Glossary	19
----------------	----

H

Help	
At Prompts	viii
Online	viii
Question Marks	viii
History	
Revisions	ii
home directory	4
DCL command procedure	8
RPC Broker handler account	8
RPCSERVER	8

set up.....	4, 8
Home Pages	
Adobe Website	ix
RPC Broker Website.....	ix
VA Software Document Library (VDL)	
Website	ix
RPC Broker	ix
How to	
Obtain Technical Information Online	
.....	viii

I

Introduction	1
--------------------	---

L

List File Attributes Option	viii
log files	16

M

MailMan TCP account (XMINET)	5
Managing TCP/IP Services, Introduction	
.....	1

Menus

Data Dictionary Utilities.....	viii
DI DDU	viii

Migration Considerations

Caché/NT to Caché/VMS	18
disable any RPC BROKER service(s)	
.....	18
disable users	18
DSM/VMS to Caché/VMS.....	18
User Identification Code	18

Multi-threaded Service for Caché on NT RPC BROKER SITE PARAMETERS

file (#8994.1)	3
set up.....	3
SPECIAL QUEUEING STARTUP.....	3
starting and stopping service	3
TaskMan.....	3
TYPE OF LISTENER field (#.5).....	3

N

network security	1
------------------------	---

O

Obtaining

Data Dictionary Listings	viii
Online	

Documentation	viii
Technical Information, How to Obtain	
.....	viii

OpenVMS account

TCPIP (UCX) Multi-threaded Service	
for Cache on OpenVMS	4

OpenVMS Nodes	12
---------------------	----

OpenVMS RPC Broker handler account	
.....	4

OpenVMS User Account, Set Up

Captive flag.....	5
DisCtlY flag.....	5
Restricted flag.....	5
RPCSERVER	6
XMINET	6

Options

Data Dictionary Utilities.....	viii
DI DDU	viii
DILIST	viii
List File Attributes	viii

Orientation.....	vi
------------------	----

P

Product Support (PS)

Anonymous Directories.....	ix
----------------------------	----

PS

Anonymous Directories.....	ix
----------------------------	----

Q

Question Mark Help.....	viii
-------------------------	------

R

Restricted flag	7
-----------------------	---

Revision History

Documentation	ii
---------------------	----

Revision History	ii
------------------------	----

RPC Broker

Website.....	ix
--------------	----

RPC Broker handler account

DCL command procedure.....	8
----------------------------	---

RPC Broker Service	1
--------------------------	---

RPC BROKER SITE PARAMETERS file	
(#8994.1)	

TYPE OF LISTENER field (#.5).....	3
-----------------------------------	---

RPC BROKER TCPIP service	
set up.....	13
RPCSERVER.....	5
RPCSERVER account	16

S

security, network	1
Service Request #20021001	1
Set Up OpenVMS User Account	
Captive flag.....	5
Restricted flag.....	5
RPCSERVER	6
XMINET	6
starting and stopping service	
DO RESTART^XWBTCP.....	3
DO STOPALL^XWBTCP	3
Multi-threaded Service for Caché on	
NT	3
TCPIP (UCX) Multi-threaded Service	
for Cache on OpenVMS	17
Support	
Anonymous Directories.....	ix
Symbols	
Found in the Documentation.....	vi

T

TaskMan	3
TCP/IP Listeners	
TCPIP (UCX) Multi-threaded Service	
for Cache on OpenVMS	4
TCPIP (UCX) Cluster Wide	
starting and stopping service	17
TCPIP (UCX) Multi-threaded Service for	
Cache on OpenVMS	
home directory	8
starting and stopping service	17
TCP/IP Listeners.....	4
TCPIP service	
set up.....	13
set up and enable	12
TCPIP Service	

Multi-threaded for Caché on NT	3
TYPE OF LISTENER field (#.5)	3

U

unique naming conventions	
RPC service.....	13
URLs	
Adobe Website	ix
AXP/VMS Technical Support Team..	6
RPC Broker documentation	4
RPC Broker Website.....	ix
VA Software Document Library (VDL)	
Website	ix
RPC Broker	ix
User Account, Set Up OpenVMS	
Captive flag.....	5
DisCtlY flag.....	5
Restricted flag.....	5
RPCSERVER	6
XMINET	6

V

VA Software Document Library (VDL)	
Website.....	ix
RPC Broker	ix
VAH9200 TCPIP	
log files	16

W

Web sites	
AXP/VMS Technical Support Team..	6
RPC Broker documentation	4
Websites	
Adobe Website	ix
RPC Broker	ix
VA Software Document Library (VDL)	
Website	ix
RPC Broker	ix

X

XWB SERVER_START.COM	4, 8
----------------------------	------