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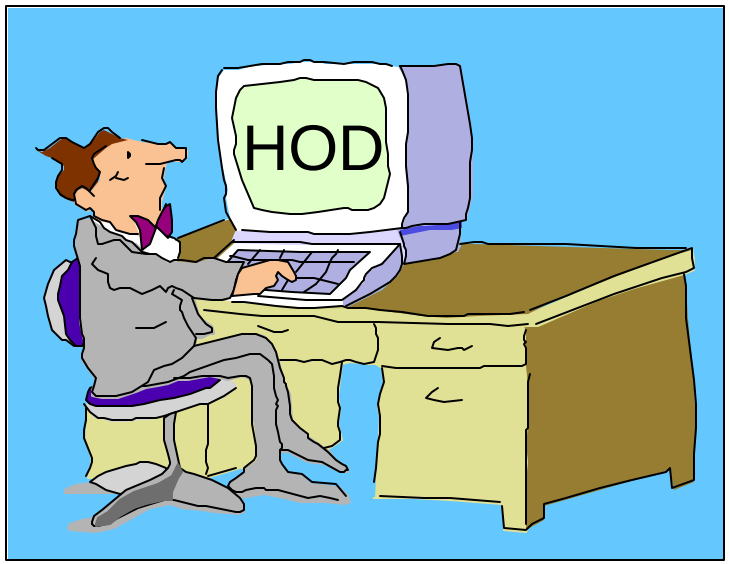
IBM Host On-Demand V4 for OS/390 Overview and Implementation Issues



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Agenda

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  - Product Packaging
  - Version Functions
- OS/390 Host On-Demand Installation
  - SMP/E Installation
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Agenda

- OS/390 Screen Customizer & Lightweight Directory Access Protocol (LDAP) Server
  - Screen Customizer
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Abstract

Title: IBM Host On-Demand V4 for OS/390 Overview and Implementation Issues

Presenter: Linda Harrison supports OS/390 Host On-Demand in IBM Advanced Technical Support.

Audience: OS/390 Host On-Demand Installers and Administrators

Abstract: Host On-Demand's browser-based access is the simplest way ever for users to reach critical host data because the user is not required to load or configure any software. Host On-Demand is a Java enabled Web based terminal emulation software supporting TN3270(E), TN5250, VT100, and VT220 terminals as well as 3827 and 5250 print emulation. For users, Host On-Demand helps eliminate the confusing host and port names as all of the configuration is easily provided by the Administrator. From a web browser, users just click on a hyperlink that launches a session with the host. In addition to the usual web access, any number of sessions can be launched with multiple hosts at the same time. Since Host On-Demand installs on a server, maintenance, distribution, and upgrades are simplified. In the case of OS/390 Host On-Demand, the server that Host On-Demand installs onto is the OS/390 system, where most of today's enterprise mission-critical information still resides.

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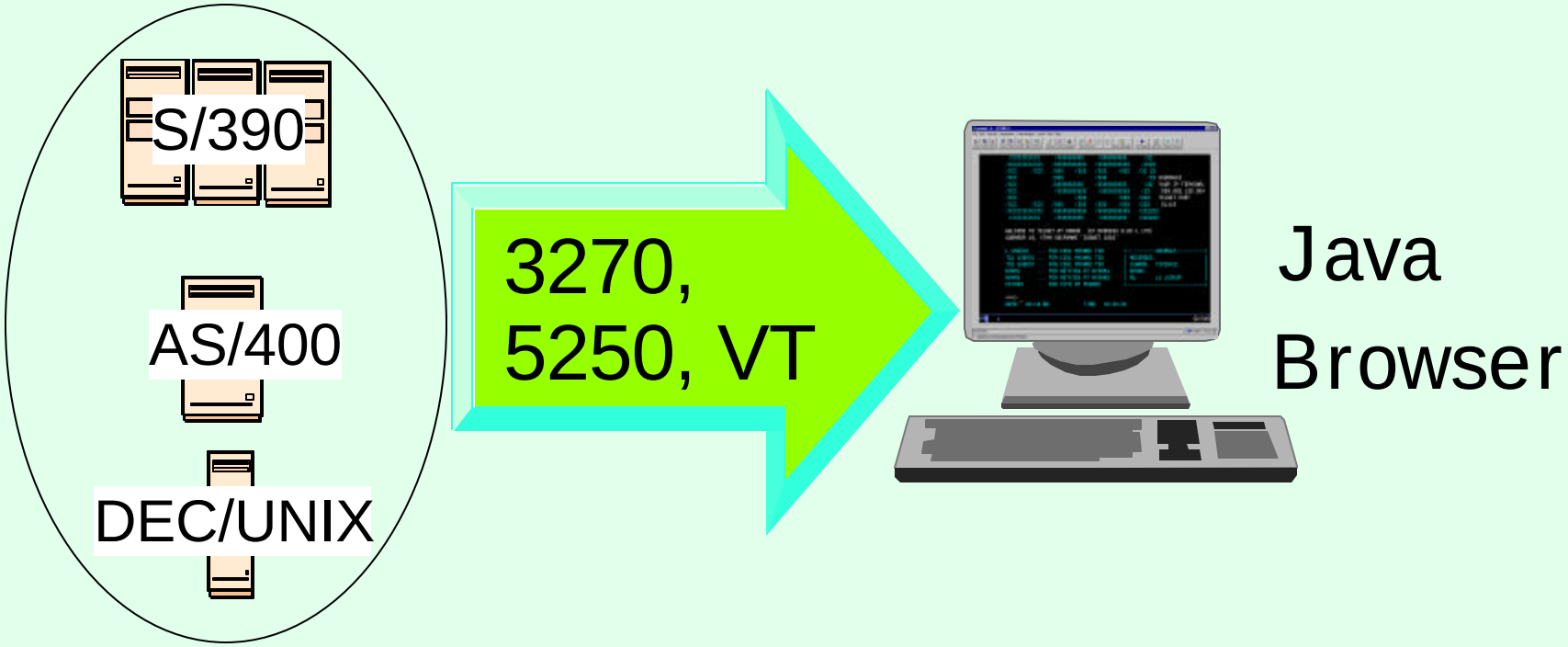
OS/390 Host On-Demand Overview

Terminal Emulation



Web-to-Host Terminal Emulation Solution

- Extends host application reach to new users
- Reduces I/T costs through centralized installation and administration
- Supports client and server platforms of choice
- Requires no middle-tier runtime server
- Enables rapid host integration in new e-business applications

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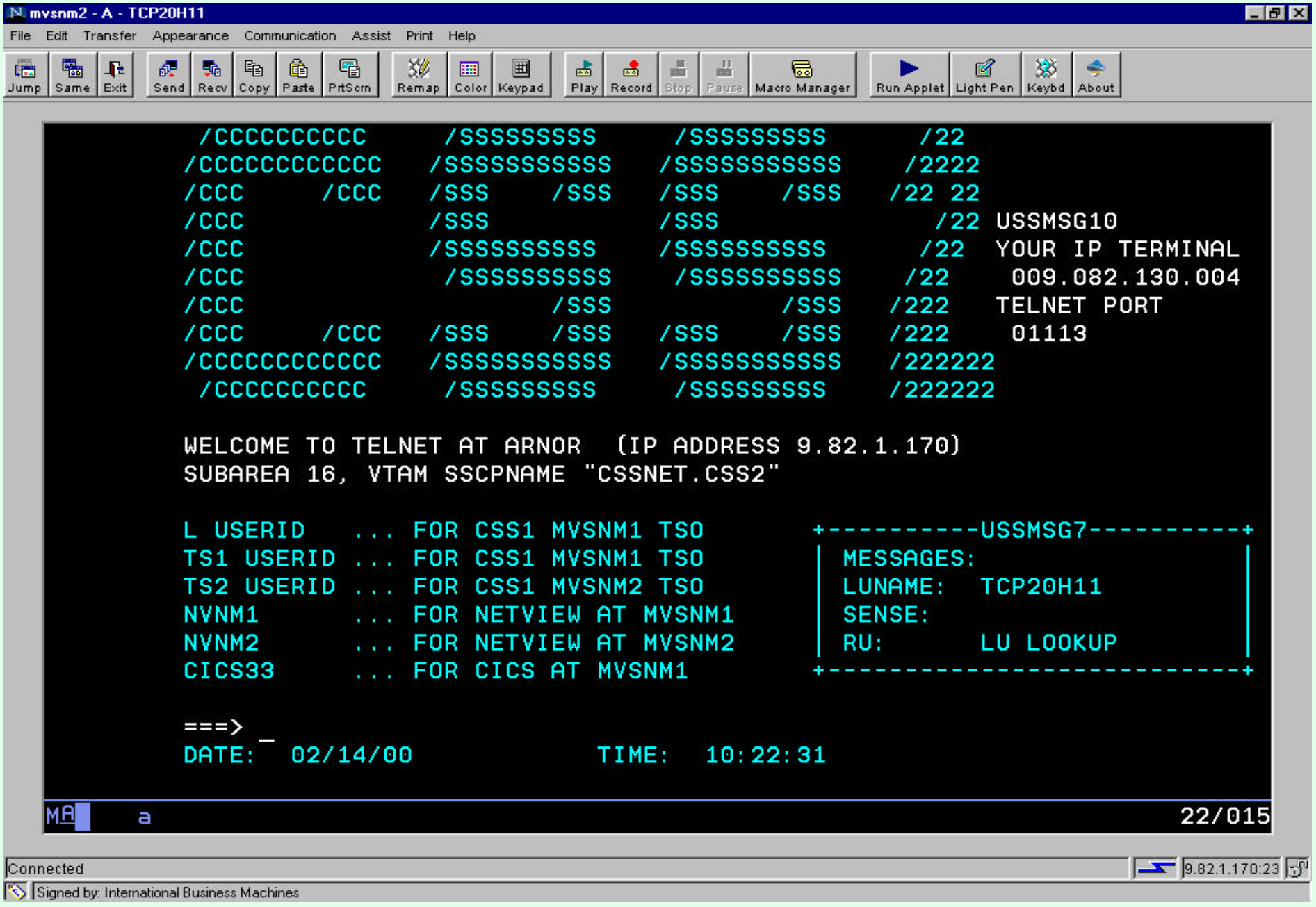
Access Green Screen



Host Integration Product Positioning

Personal Communications is IBM's answer for host emulation

- Designed for customers with a wide variety of network protocols who need a powerful access product
  - Tailored to client's operating system for high performance
  - Enhanced desktop interfaces
  - Rich set of APIs and reusable component for customized applications
  - Registered user pricing model

Host On-Demand is IBM's answer for Web-based host emulation

- Especially designed for intranet or extranet access
- Provides central management solution for client software
  - Requires Java enabled browser
  - Users connect for extended periods of time
  - Fast response times are important to maximize productivity
  - Users are comfortable with traditional host green screens
  - Full function emulation
  - Rich set of APIs and reusable components for customized applications
  - Concurrent user pricing model

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Host On-Demand TN3270 Session

1. User connects Web Browser to Web Server (TCP/IP Port 80).

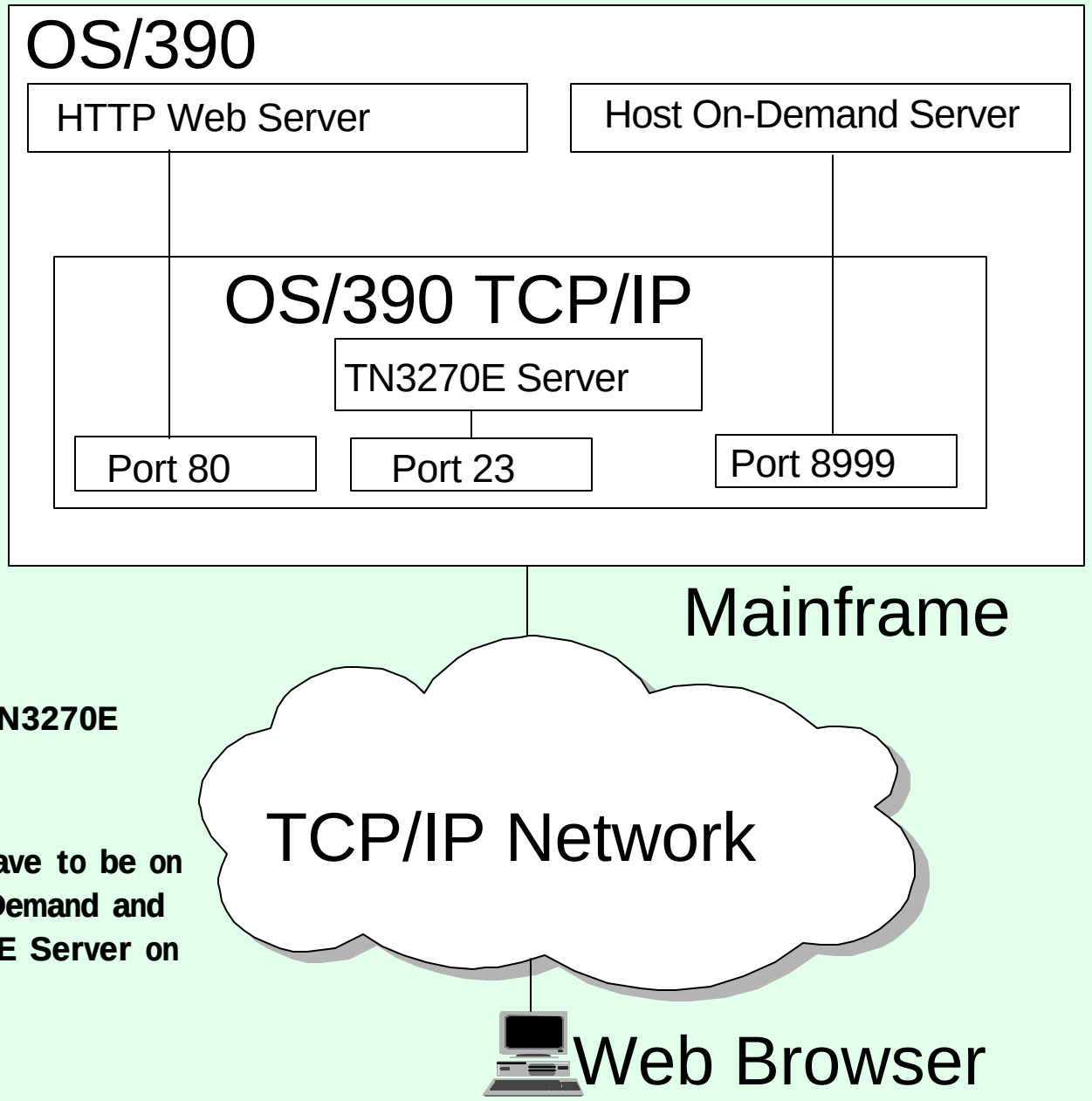
2. User selects Host On-Demand and logs on.

3. Host On-Demand downloads Applet to user (via TCP/IP Port 8999).

4. User selects host session.

5. Host session is established to TN3270E Server (TCP/IP Port 23).

Note: TN3270E Server does not have to be on the same OS/390 as the Host On-Demand and Web Server; it can be any TN3270E Server on the TCP/IP Network.



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OS/390 Host On-Demand V4.0x Installation:

Product Packaging

Product Packaging

- OS/390 Host On-Demand (5648-C54) V4.0x Features

FMID	Description	Medium	Feature Number
HHOE40F (V4.01+ only)	TDES US/CAN English (168-bit encryption*)	9/6250 tape	6732
		3480 cart	6733
		4mm cart	6738
HHOE40S	DES US/CAN English (128-bit encryption*)	9/6250 tape	5439
		3480 cart	5440
		4mm cart	5441
HHOE40W	Int. English (40-bit encryption)	9/6250 tape	5443
		3480 cart	5444
		4mm cart	5445

* Subject to Export Regulation

Software Requirements

- Minimum OS/390 Software Requirements

Program Number	Product Name and Minimum VRM/Service Level	Install Requirement
5647-A01	OS/390 Version 2 Release 5	Yes
5655-A46	Java for OS/390 V1.1.6 with APAR OW38252 (see http://www.s390.ibm.com/java)	No
5697-D43	Domino Go Webserver for OS/390 V5R0M0	No

- Notes:
  - The OS/390 Communications Server TCP/IP Services and Unix Systems Services, both included with OS/390, are required by all FMIDs of IBM Host On-Demand V4.0x for OS/390 at run time.
  - A PTF representing Corrective Service Diskette (CSD) 1 for Host On-Demand V4.01 has been incorporated into the product tape for FMID HHOE40F. A separate PTF tape representing CSD 1 is available for FMIDs HHOE40S (APAR OW40500 PTF UW62175) and HHOE40W (APAR OW40501 PTF UW62622).

Software Requirements (cont.)

- CSD 1 tape was created as a NO LABEL tape with blocksize of 12960.
- After unloading CSD 1 or 2 PTF tape the shell script hod40ptf.sh must be run to un-tar the PTF to replace the changed files.
- A PTF tape representing CSD 2 is available for FMIDs HHOE40F (APAR OW41854 PTF UW64905), HHOE40S (APAR OW41853 PTF UW64945), and HHOE40W (APAR OW41852 PTF UW65002).
- HOD V4.0 base code must be installed before an SMP/E install of CSD 2 but CSD 1 is not required. CSD 2 contains all of the updates from CSD 1 as well.

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OS/390 Host On-Demand Function

HOD on OS/390

- OS/390 version 2 release 4, 5, 6, and 7 all came with HOD V1.
- HOD V3 Entry is available via the web at URL:

  http://www.ibm.com/software/enetwork/hostondemand/downloads
- Announcement Letters for each version of HOD:

  HOD V2 Announcement Letter 298-064

  HOD V3 Announcement Letter 298-331

  HOD V4 Announcement Letter 298-204
- Compared to HOD V1, HOD V3 Entry offers the following additional features:

  TN5250 & VT 52/100/220 support

  Copy / Cut / Paste

  Persistent Browser Caching

  Print Screen

  National Language Support

  Eurocurrency Support

HOD V3 Entry

- Compared to HOD V3, HOD V3 Entry lacks:
  - Host connectivity through non-IBM TN gateways. (HOD V3 Entry is restricted to being used with the IBM Communications Server that it was installed upon.)
  - 10 concurrent sessions (HOD V3 Entry only offers 2)
  - Color Mapping
  - Run Applet
  - Macro Record / Play
  - Graphical User Interface
  - User & Group Configuration
  - Thin Client Option
  - File Transfer (IND$FILE & Database On-Demand)
  - Host Print
  - Host Access Class Libraries
  - Java Beans
  - TN3270E support (LU Pools & NVT)
  - SSL Encryption

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HOD Function

Function	HOD V1	HOD V2	HOD V3	HOD V3 Entry	HOD V4
Emulation Types					
TN3270	Yes	Yes	Yes	Yes	Yes
TN5250		Yes	Yes	Yes	Yes
VT 52/100/220		Yes	Yes	Yes	Yes
No. of Sessions	2	Unlimited (10)	Unlimited (10)	2	Unlimited
User Interface					
Graphical Toolbar	Yes	Yes	Yes	Yes	Yes
Keypad	Yes	Yes	Yes	Yes	Yes
Auto Font Sizing	Yes	Yes	Yes	Yes	Yes
Keyboard Mapping	Yes	Yes	Yes	Yes	Yes
Color Mapping			Yes		Yes
Copy / Cut / Paste		Yes	Yes	Yes	Yes
Run Applet		Yes	Yes		Yes
Macro Record / Play			Yes		Yes
ResQ!Net/LE (Default GUI)			Yes		Yes*
ResQ1Net Customizable GUI			Yes (separate)		Yes* (separate)

HOD Function (cont.)

Function	HOD V1	HOD V2	HOD V3	HOD V3 Entry	HOD V4
Configuration					
Guest (Default Config.)	Yes	Yes	Yes	Yes	Yes
Individual User Config.		Yes	Yes		Yes
User Group Config.			Yes		Yes
Persistent Browser Caching		Yes	Yes	Yes	Yes
Flexibility of Applet Size			Yes		Yes
LDAP Support					Yes
File Transfer					
File Transfer (IND$FILE)		Yes	Yes		Yes
Database On-Demand (OS/400)			Yes		Yes
Print Support					
Convenience (Screen) Print		Yes	Yes	Yes	Yes
Host Print			Yes		Yes

HOD Function (cont.)

Function	HOD V1	HOD V2	HOD V3	HOD V3 Entry	HOD V4
Programming Support					
Host Access Class Library		Yes	Yes		Yes
Beans for Java			Yes		Yes
Host Access ActiveX Controls					Yes
Class Library (HACL)					Yes
Networking Support					
TN3270E LU Pool Support		Yes	Yes		Yes
TN3270E NVT Support			Yes		Yes
Choice of TN Server/Location		Yes	Yes		Yes
SSL Encryption & Server Auth		Yes	Yes		Yes
SSL Client Authentication					Yes
RAS (Tracing)	Yes	Yes	Yes	Yes	Yes

HOD Function (cont.)

Function	HOD V1	HOD V2	HOD V3	HOD V3 Entry	HOD V4
Internationalization					
NLS (SBCS & DBCS)	US English	Yes	Yes	Yes	Yes
NLS (BiDi)			Yes	Yes	Yes
Eurocurrency Support			Yes	Yes	Yes
Improvements					
AS/400 5250 Host Print, etc.					Yes

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OS/390 Host On-Demand V4
SMP/E Installation

SMP/E Installation

- Two methods of Host On-Demand installation are available:
  - SMP/E with mainframe media
  - non-SMP/E with CD ROM
- SMP/E is the traditional method of installation/removal of all software and maintenance on OS/390:
  - RAS Support
  - Auditable
  - Preferred method of installation of Host On-Demand

SMP/E Installation (cont.)

Step	Description	Supplied Jobstream
1	Unload sample JCL from Product Tape and customize to conform to user standards.	See section 6.1.4 of Program Directory
2	Perform SMP/E RECEIVE from Product Tape.	HOMRECVE
3	Allocate SMP/E Target and Distribution libraries.	HOMALLOC
4	Create SMP/E DDDEF entries. Note: If Host On-Demand is being installed on a Target system which is different then the Driver system there is an additional jobstep required in this step (see section 6.1.8 of the Program Directory).	HOMDDDEF
5	Allocate the HFS. Note: This V4.0 jobstream provides for an initial allocation of 460 cylinders of 3390 disk space. Experience indicates that a more appropriate value is approximately 900 cylinders for Host On-Demand V4.0, approximately 1200 cylinders for V4.01, and approximately 1500 cylinders for V4.02. Note: See also step 6.	HOMHFS

SMP/E Installation (cont.)

Step	Description	Supplied Jobstream
6	Copy Host On-Demand V2 or V3 HFS contents to V4 HFS. Note: This step is only applicable if you are migrating from an earlier release of Host On-Demand. It will unload the existing HFS, allocate a new HFS (expanded for V4) and reload the contents of the old HFS. Note: This V4.0 jobstream suffers from the same dasd shortfall as does the HOMHFS jobstream in step 5 and needs to be adjusted accordingly. Note: Run step 5 or step 6 but not both, depending on the situation (ie. initial install vs. migration).	HOMCOPY
7	Logon to Unix Systems Services. Create HFS mountpoint (/usr/lpp/HOD) and mount Host On-Demand HFS created in either step 5 or step 6 above. Note: The permission bits for the mountpoint must be set to (7,5,5). To be able to execute a file, all permissions of "higher" level directories must have execute authority turned on to allow a search of the directory for a subdirectory. So to execute hod40mvs.sh all the directories, /usr, /usr/lpp, and /usr/lpp/HOD must have permission bits ending in 1, 3, 5, or 7.	n/a

SMP/E Installation (cont.)

Step	Description	Supplied Jobstream
8	Perform SMP/E APPLY CHECK followed by APPLY.	HOMAPPLY
9	Perform SMP/E ACCEPT CHECK followed by ACCEPT. Note: This step is optional at this point and may be performed later if desired.	HOMACCPT
10	Delete Host On-Demand V2 DDDEFs (if applicable).	HOMDDCLN
11	Logon to Unix Systems Services, cd to /usr/lpp/HOD and run the **hod40mvs.sh** shell script. Note: If migrating from a previous version of HOD backup any modifications which the user has made in either /usr/lib/HOD/ondemand/lib or /usr/lpp/HOD/ondemand/HOD and remove these directories (ie. rm -Fr /usr/lpp/HOD/ondemand/lib). The instructions in the V4.0 Program Directory indicate that this removal is automatic but this comment is incorrect. Failure to remove these directories may result in HFS space problems during install and cause the hod40mvs.sh script to fail.	n/a

SMP/E Installation (cont.)

Step	Description	Supplied Jobstream
11 (cont.)	Note: The comments in the V4.0 Program Directory indicates that migration of the user definitions contained in the /usr/lpp/HOD/ondemand/private directory is automatic. This is incorrect. The act of changing the default directory structure from /usr/lpp/HOD/ondemand to /usr/lpp/HOD/hostondemand between versions is not properly accounted for in the hod40mvs.sh script. If upgrading from a previous version therefore the user will need to manually copy their definitions following successful completion of the hod40mvs.sh script. ie. Enter the following command all on one line: **cp /usr/lpp/HOD/ondemand/private/*.* /usr/lpp/HOD/hostondemand/private/*.***	n/a
12	Update Web Server "pass" rules and verify/update resource mapping (ie. "addtype") directives. Note: Reference to updating the "addtype" parameters in httpd.conf was added to the Program Directory for V4.01	see section 6.2.2 in Program Directory

SMP/E Installation (cont.)

Step	Description	Supplied Jobstream
13	Start Host On-Demand. Note: Please see section 6.2.3 in the Program Directory. The HOMSERVR started from a RACF userid with root authority in OS/390 Unix Systems Services. Section 6.2.3 indicates the necessary commands to provide this authorization. Note: HOMSERVR indirectly executes a shell script (ServiceManager.sh) located in the Host On-Demand HFS. If the mountpoint for the Host On-Demand HFS is not /usr/lpp/HOD (the default) then an update is required to the PARM passed on the HOMSERVR proc's EXEC statement. Note: The ServiceManager.sh script will generally require updates to either the CLASSPATH and/or PATH variables depending on the manner in which Java has been installed. The script is commented to indicate the required changes.	HOMSERVR
14	Following installation the tar files in the /usr/lpp/HOD directory are no longer of use and can be backed up and deleted to free up HFS space if desired.	n/a

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OS/390 Host On-Demand V4
Non-SMP/E Installation

Non-SMP/E Installation

- Alternative approach to SMP/E install
  - Utilizes the readily available Host On-Demand product CD
  - Does not require a program tape
- As noted previously, SMP/E is the preferred method of installation of Host On-Demand

Non-SMP/E Installation (cont.)

Non-SMP/E Installation Steps

1. Allocate a target Host On-Demand HFS as described previously under SMP/E installation.
2. Logon to Unix System Services. Define a mountpoint (ie. /usr/lpp/HOD), set the permission bits to (7,5,5), and mount the target Host On-Demand HFS.
3. Insert the Host On-Demand CD into the CD ROM drive of an available Windows 95, 98, or NT workstation.
4. Exit from the automatic install process if it initializes and view the CD with Windows Explorer. The \tar directory on the CD will contain (among others) the following files:

   HOD40MVS.SH

   HOD40MVSCD.TAR.Z

   HOD40SRV.TAR.Z

   HOD40WWW.TAR.Z

Non-SMP/E Installation (cont.)

5. FTP to the target OS/390 Host On-Demand system and put the four previously noted files into the Host On-Demand HFS mounted at /usr/lpp/HOD.

   Note: Filenames on the CD are in upper case. The FTP put commands must allow for this and the resulting filenames on OS/390 must be in lower case:

   put HOD40MVS.SH hod40mvs.sh

   Note: HOD40MVS.SH represents the install shell script and must be transferred in ASCII which will allow it to be translated to EBCDIC on receipt by the OS/390 FTP server. The remaining three tar files must be transferred in BINARY mode.

   Note: When transferring the three tar files all names should be changed to lower case with the exception of the ending "Z" which should be left in upper case:

   put HOD40MVSCD.TAR.Z hod40mvscd.tar.Z

6. Logon to Unix System Services, cd to /usr/lpp/HOD, and run the hod40mvs.sh install shell script with the "eval" option:

   hod40mvs.sh eval

7. Follow the remaining SMP/E steps 11-14.

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OS/390 Host On-Demand Administration

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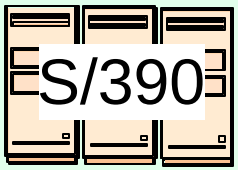
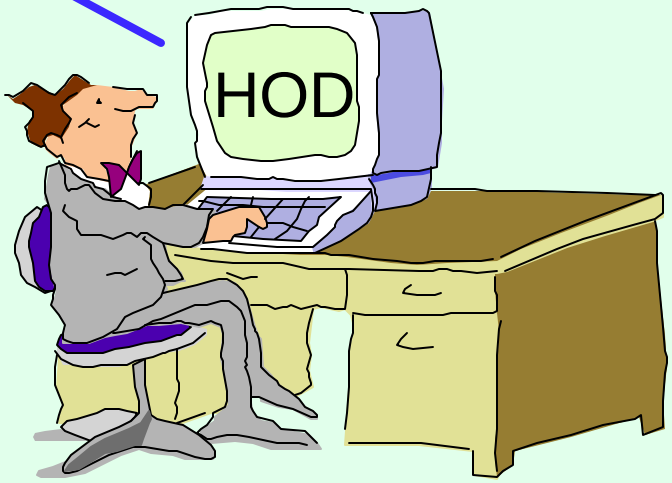
Host On-Demand Administration



Browser to OS/390 HOD Server.

Logon as **admin**.



Create groups (or use default HOD group).

Create sessions for groups.

Create users and assign them to groups.

Create specific sessions for individual users as necessary.

HOD Admin (cont.)

- Essentially the same as for all other Host On-Demand server platforms.
  - Connect to HOD server:

    http://hod_server_name/hod/HODMain.html
  - Select Administration and logon as **admin/password.**
  - Once logged on:

    Create groups

    Create sessions (ie. 3270, 5250, VT100, etc.) for groups

    Create users and assign them to groups

    Create specific sessions for individual users as necessary
- Every user must be a member of at least one group.
  - When NOT using LDAP, a user may be a member of multiple groups in which case they will inherit the sessions associated with all of the groups to which they belong.
  - When using LDAP, a user may only be a member of ONE group.

HOD Admin (cont.)

- Tool for bulk creation of users, group, and sessions:

  http://poggly1.raleigh.ibm.com/dirutil/dirutil.html

- One potential issue exists if users are allowed to define their own sessions or modify inherited sessions.
  - A user who modifies a session inherited from a group level definition now has a local "instance" of that session. This may present a help desk problem since neither the help desk nor the user can differentiate the two sessions should the user subsequently have reason to call in for assistance.

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OS/390 Communications Server
IP Customization
and 3270 Host Print

3270 Printing

- A Host On-Demand 3270 printer session emulates an IBM 3287 printer in either LU Type 1 (SCS) or LU Type 3 mode.
  - The printer LU must be defined in VTAM and TCP/IP.
  - The mainframe application that the user is printing from must be setup to print to the VTAM LU.
  - Please see the Host On-Demand V4 Host Printing Reference

- In some applications a printer is associated with a userid. For this type of application TPC/IP has the capability to "associate" or "map" printer LUs "generically" or "specifically" with user terminal LUs. In addition to the standard TCP/IP customization required for TN3270 telnet, this section describes the GENERIC and SPECIFIC LUMAP capability.

IP Customization

PROFILE TCPIP BEGINVTAM STATEMENT

PORT xxxx -define which telnet port the BEGINVTAM effects

HNGROUP -define group of host names (available in OS/390 V2R7 and above)

IPGROUP -define group of ipaddrs

LUGROUP -define group of LUs

LUMAP -map LU or LUGROUP to host name, HNGROUP, ipaddr, or IPGROUP and optionally associate a printer LU or PRTGROUP

PRTGROUP -define group of printer LUs

PRTMAP -map printer LU or PRTGROUP to host name, HNGROUP, ipaddr, or IPGROUP

HOD Session Customization

Destination Port

TN3270E -required for LU or LU Pool specification

LU or LU Pool

Associated Printer Session

IP Customization (cont.)

PROFILE TCPIP BEGINVTAM STATEMENT

```
PORT 223
HNGROUP HNAMES1 andyh.washington.ibm.com patb.washington.ibm.com ENDHNGROUP
HNGROUP HNAMES2 **.bet.ibm.com ENDHNGROUP
IPGROUP IPNAMES1 255.255.240.0:9.82.0.0 ENDIPGROUP
IPGROUP IPNAMES2 9.82.130.4 9.82.1.161 ENDIPGROUP
IPGROUP IPNAMES3 255.255.224.0:9.82.128.0 ENDIPGROUP
IPGROUP IPNAMES4 9.82.1.2 9.82.1.10 ENDIPGROUP
LUGROUP NONHOD1 TCP20001..TCP20010 ENDLUGROUP
LUGROUP NONHOD2 TCP20011..TCP20020 ENDLUGROUP
LUGROUP HODLUG2 TCP20H01..TCP20H02 ENDLUGROUP
LUGROUP HODLUG3 TCP20H11..TCP20H20 ENDLUGROUP
LUGROUP HODLUG4 TCP20H21..TCP20H22 ENDLUGROUP
PRTGROUP PRTLUS1 TCP20P01..TCP20P10 ENDPRTGROUP
PRTGROUP PRTLUS2 TCP20P11..TCP20P12 ENDPRTGROUP
PRTGROUP PRTLUS4 TCP20P21..TCP20P22 ENDPRTGROUP
```

IP Customization (cont.)

PRTMAP PRTLUS1 IPNAMES1 ===> see section 1 below

LUMAP NONHOD1 HNAMES1 ===> see section 2 below

LUMAP NONHOD2 HNAMES2 ===> see section 3 below

LUMAP HODLUG2 IPNAMES2 SPECIFIC PRTLUS2 ===> see section 4 below

LUMAP HODLUG3 IPNAMES3 ===> see section 5 below

LUMAP HODLUG4 IPNAMES4 GENERIC PRTLUS4 ===> see section 6 below

1. If a printer session is initiated to port 223 from any IP address in the 9.82.0.0 subnet (mask 255.255.240.0), the first available LU will be assigned between TCP20P01 and TCP20P10.
2. If andyh or patb from domain washington.ibm.com telnets into port 223, the first available LU will be assigned between TCP20H01 and TCP20H10.
3. If any host from domain bet.ibm.com or any sub-domain (including tomv.bet.ibm.com and suej.rustbuck.bet.ibm.com) telnets into port 223, the first available LU will be assigned between TCP20H11 and TCP20H20.

IP Customization (cont.)

4. If 9.82.130.4 telnets to port 223 and requests LU TCP20H01, it will be assigned and a printer session with LU TCP20P11 will be initiated and associated with the host session. Likewise if 9.82.1.161 telnets to port 223 and requests LU TCP20H02, it will be assigned and a printer session with LU TCP20P12 will be initiated and associated with the host session.
5. If any IP address in the 9.82.128.0 subnet (mask 255.255.224.0) telnets into port 223, the first available LU will be assigned between TCP20H11 and TCP20H20.
6. If 9.82.1.2 telnets to port 223, the first available LU will be assigned between TCP20H21 and TCP20H22, and a printer session will be initiated and associated with the host session. Likewise if 9.82.1.10 telnets to port 223, the first available LU will be assigned between TCP20H21 and TCP20H22, and a printer session will be initiated and associated with the host session. Where TCP20P21 is the printer LU if the host LU is TCP20H21, and TCP20P22 is the printer LU if the host LU is TCP20H22.

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OS/390 TN3270E
Secure Sockets Layer (SSL)

TN3270E SSL Requirements

- Any one of the following optional OS/390 V2 IP Security Features is required if SSL support is desired.

Encryption Feature	V2R6	V2R7	V2R8	Elements
Base	HTCP350	HTCP370	HTCP380	SSL Authentication
Level 1	JTCP353, JTCP35T	JTCP373	JTCP383	Kerberos Non-DES IP Security CDMF IP Security SSL RC2/RC4
Level 2	JTCP352, JTCP35S, JTCP35L	JTCP372	JTCP382	Kerberos DES IP Security DES/CDMF IP Security SSL 56-bit SNMP CBC 56-bit DES
Level 3	JTCP35K	JTCP37K	JTCP38K	Kerberos DES IP Security Triple DES IP Security SSL Triple DES SNMP CBC 56-bit DES

SSL Support

- SSL support provided by Security Features:

Encryption Feature	SSLv2 Clients	SSLv3 Clients
Base	Not supported	NULL SHA NULL MD5 NULL NULL
Level 1	RC4 Export RC2 Export	RC4 MD5 Export RC2 MD5 Export NULL SHA NULL MD5 NULL NULL
Level 2	RC4 Export RC2 Export	DES SHA RC4 MD5 Export RC2 MD5 Export NULL SHA NULL MD5 NULL NULL
Level 3	Triple DES US DES US RC4 Export RC4 US RC2 Export RC2 US	Triple DES SHA US DES SHA RC4 MD5 Export RC4 SHA US RC4 MD5 US RC2 MD5 Export NULL SHA NULL MD5 NULL NULL

OS/390 TN3270E SSL

- Create Server Public/Private Keys and Certificate Request
  - The MKKF utility that ships as part of the OS/390 V2R6 and V2R7 LDAP server supports a 512-bit key size.
  - To use MKKF with certificate authority (CA) VeriSign, APAR OW39793 is required and a password for the keyringfile has to be 6 to 8 characters.
  - LDAP Security Server Feature JRSL161 (OS/390 V2R6) or JRSL171 (OS/390 V2R7) supports a 1024 key size.
  - GSKKYMAN utility is part of OS/390 V2R8 System Secure Sockets Layer.

SSL Server Authentication

- Use the TELNETPARMS SECUREPORT statement to enable SSL Server Authentication.
- For OS/390 V2R6 and R7, how to create a private key and server certificate in the server's key ring file and a password stash file using MKKF is documented in "OS/390 Communications Server, IP Configuration, SC31-8513", Appendix D.
- For OS/390 V2R8, how to create the server key database using GSKKYMAN is documented in "OS/390 Communications Server, IP Configuration, SC31-8513", Appendix C, and the Redpiece "IBM Host On-Demand 4.0: Enterprise Communications in the Era of Network Computing, SG24-2149-01".
- On OS/390 V2R7 and R8 the TELNETPARMS ENCRYPTION statement specifies a subset of the supported encryption algorithms to use for a port.

Optional SSL Client Authentication

- On OS/390 V2R8 use the TELNETPARMS CLIENTAUTH statement to enable SSL Client Authentication.
- Client certificate validation requires the root certificate for the Certificate Authority (CA) who issued the client certificate.
- For RACF to check that the client has a RACF userid the certificate must be defined to RACF with the RACDCERT command.
- RACF class SERVAUTH may be used to limit access on a port basis.

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OS/390 V2R6 and R7
MKKF Server Certificate

MKKF Server Certificate

Create Certificate with MKKF

1. Go to OMVS on OS/390, change the directory to the directory that you want the key ring to be in, and start MKKF:

   mkkf

2. Create and name the Server Keyring file (n for new):

   n

3. Input the key ring filename or press Enter for the default keyfile.kyr filename.
4. 'Work with keys and certificates':

   w

5. 'Create a key pair and request a certificate':

   c

6. Input the key ring password.
7. Input the password again for verification.
8. Select if the password will expire.

   To have the password expire, enter y and the number of days until it expires.

   To have the password not expire, enter n.

MKKF Server Certificate (cont.)

9. Request a server certificate or a CA certificate:

   s

10. Modify the key and certificate fields:

    m

11. Enter the Key Name label.
12. Select the Key Size.
13. Enter the Server Name; fully-qualified host name of the TN3270E server.

    If you select "Server Authentication" on your HOD session this Server Name must match the host name in the DNS for the IP address of the TN3270E server.

14. Enter the Organization Name.
15. Enter the Organization Unit Name.
16. Enter the Locality/City.
17. Enter the State/Province.
18. Enter the Postal Code.
19. Enter the two digit Country Code:

    US

MKKF Server Certificate (cont.)

20. Create the key pair and certificate request:

    r

21. Enter the certificate request filename.

22. Exit the Key menu:

    x

23. Create a stash file:

    c

24. Exit the Key Ring menu

    x

25. Save the key ring file and exit MKKF:

    y

26. If you are going to purchase a signed certificate from a Well Known Certificate Authority (CA), like VeriSign or Thawte, e-mail the certificate request to the CA and they will return it signed.

27. Start MKKF:

    mkkf

MKKF Server Certificate (cont.)

28. Open the key ring file:

    o

29. Enter the key ring filename from step 3.
30. Enter the password from step 6.
31. Receive the certificate into the key ring:

    r

32. Enter the certificate filename from step 21.
33. If you are receiving a self-signed certificate, confirm that you want to add the certificate to the key ring:

    y

34. If prompted, enter the certificate label for the signed certificate.
35. Exit the Key Ring Menu:

    x

36. Save the key ring file and exit MKKF:

    y

37. Start MKKF:

    mkkf

MKKF Server Certificate (cont.)

38. Open the key ring file:

    o

39. Enter the key ring filename from step 3.
40. Enter the password from step 6.
41. Work with keys and certificates:

    w

42. List the keys:

    l

43. Either select the key you want to make the default key:

    s

    Or display the next key:

    n

44. Make the key the default key in the key ring:

    f

45. Confirm the default key:

    y

MKKF Server Certificate (cont.)

46. Exit the Key Menu:

    x

47. Exit the Key Ring Menu:

    x

48. Save the key ring file and exit MKKF:

    y

49. Set up the environment for IKEYMAN:

    ```
    export PATH=/usr/lpp/internet/bin:$PATH
    export LIBPATH=/usr/lpp/internet/bin:$LIBPATH
    export NLSPATH=/usr/lpp/internet/%L/%N:$NLSPATH
    ```

50. Convert kyr file to kdb format:

    ```
    ikeyman -m -r keyfile.kyr
    ```

    where keyfile is the name of the mkkf key ring file from step 3.

51. Enter password from step 6.

    File keyfile.kdb is created.

52. Start IKEYMAN:

    ikeyman

MKKF Server Certificate (cont.)

53. 'Open key database':

    2

54. Enter the key database name:

    keyfile.kdb

55. Enter password from step 6 again.

56. 'List/Manage keys and certificates':

    1

57. Select the number of the certificate you want to make available to HOD clients.

58. 'Copy the certificate of this key to a file':

    5

59. Select binary file type:

    2

60. Input filename (ie. cert.der).

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OS/390 V2R8
GSKKYMAN Server Certificate

GSKKYMAN Server Certificate

Create Certificate with GSKKYMAN

1. Go to OMVS on OS/390, change the directory to the directory that you want the key ring to be in.

   My directory on my system is /u/harrisl.

2. You can display your environment settings, including STEPLIB:

   env

   I needed to add the C and Crypto library to my STEPLIB:

   export STEPLIB=$STEPLIB:SYS1.CRYPTO.SGSKLOAD:SYS1.CPP.SCLBDLL

3. Start GSKKYMAN:

   gskkyman

4. 'Create new key database':

   1

5. Input a database filename or press Enter for the default key.kdb filename.

   I input nm512.kdb and file ***/u/harrisl/nm512.kdb*** was created.

6. Input a password.

   I input *one0ssl* on my system.

GSKKYMAN Server Certificate (cont.)

7. Input password again for verification.
8. Select if the password will expire.

   I selected *1* so that the password would expire.

   Then I pressed *Enter* to default to a 60 day expiration.
9. Select to work with the database now:

   1
10. If you are going to purchase a signed certificate from a Well Known Certificate Authority (CA), like VeriSign or Thawte, select 3 'Create new key pair and certificate request'.

    If you are going to create a self-signed certificate, select 5 'Create a self-signed certificate'.

    I created a self-signed certificate.
11. Select a version 3 Certificate:

    3
12. Input a certificate label name:

    I input *nmlow* for a certificate label name on my system.

GSKKYMAN Server Certificate (cont.)

13. Select key size.

    I selected *1* for 512 key size.

14. Input 'Common Name'; the fully-qualified host name of the TN3270E server.

    I input *mvsnm2*.

    If you select "Server Authentication" on your HOD session this 'Common Name' must match the hostname in the DNS for the IP address of the TN3270E server.

15. Input the 'Organization'.

    I input *IBM*.

16. Input the 'Organization Unit'.

    I input *nsc*.

17. Input the 'City'.

    I input *GBURG*.

18. Input 'State'.

    I input *MD*.

GSKKYMAN Server Certificate (cont.)

19. Input two digit 'Country'.

    I input *US*.

    Note: If you use USA then you get the following error when you try to save:

    Error: An asn.1 encoding/decoding error occurred.

20. Input number of days for certificate.

    I pressed *ENTER* to default to 365 days.

21. If you are purchasing a signed certificate, send the request to CA and after the request is returned select 4 'Receive a certificate issued for your request'.

22. Set key as the default key in the database:

    1

23. Save the certificate to a file:

    1

24. Save as a binary file:

    2

25. Input a filename or press Enter for the default name of cert.crt.

    I input *clow.crt* and file ***/u/harrisl/clow.crt*** was created.

GSKKYMAN Server Certificate (cont.)

26. Do not exit yet:

    0

27. 'Store encrypted database password':

    11

    I received a message back that password had been stored in ***/u/harrisl/nm512.sth***.

28. Exit GSKKYMAN:

    1

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Make SSL Server Certificate Available to HOD Clients

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HOD SSL Server Certificate

Make the Certificate Available to the HOD Clients

1. Change to the root directory:

   cd /

2. Locate the HOD web-published directory:

   find . -name WellKnown TrustedCAs.class*

   The published directory on my system is the default /usr/lpp/hostondemand/HOD.

3. Copy the binary certificate into the published directory:

   cp /u/harrisl/nmlow.crt /usr/lpp/HOD/hostondemand/HOD/nmlow.crt

   Note: Copy as a binary file and no character conversion.

4. Locate the Host On-Demand server directory:

   find . -name sm.zip*

   The server directory contains the file archives used to run the Service Manager.

   The server directory on my system is /usr/lpp/HOD/hostondemand/lib.

5. Change to the HOD published directory:

   cd /usr/lpp/HOD/hostondemand/HOD

HOD SSL Server Certificate (cont.)

6. Add the certificate to the CustomizedCAs.class file, using the keyrng Java Utility.

   For HOD V3 type the following, all on one line:

   java -classpath .:HOD_SERVER_DIR/sm.zip:$CLASSPATH com.ibm.sslight.tools.keyrng CustomizedCAs add --certificatetype cert.der

   For HOD V4 type the following, all on one line:

   java -classpath .:HOD_SERVER_DIR/sm.zip:$CLASSPATH com.ibm.hodsslight.tools.keyrng CustomizedCAs add --certificatetype cert.der

   where **HOD_SERVER_DIR** is the HOD server directory,

   certificatetype is **ca** if you are adding a CA root certificate

   or **site** if you are adding a site or self-signed certificate,

   and **cert.der** is the name of the file containing the binary certificate.

(continued on next page)

HOD SSL Server Certificate (cont.)

6. (cont.)

Note: **CustomizedCAs** must be capitalized exactly as shown, there is a single hyphen before the classpath parameter, and a double hyphen before the certificate parameter. If the java command is typed in with incorrect syntax you will get the following error:

Unable to initialize Threads: Cannot find class /java/lang/Thread

If no CustomizedCAs.class file exists, keyrng prompts you for a password with which to encrypt the new class-file. However, CustomizedCAs.class must NOT be encrypted, so just ENTER at the password prompt.

I found I needed the following path to the java code:

```
export PATH=$PATH:/usr/lpp/java/J1.1/bin
```

I found this in the ServiceManager.sh script in /usr/lpp/HOD/hostondemand/lib.

I issued the following on my system:

```
java -classpath .:/usr/lpp/HOD/hostondemand/lib/sm.zip:\
/usr/lpp/java/J1.1/lib/classes.zip \
com.ibm.hodsslight.tools.keyrng CustomizedCAs add --site nmlow.crt
```

HOD SSL Server Certificate (cont.)

7. Check to see if the certificate was added.

   For HOD V3 type the following, all on one line:

   java -classpath .:HOD_SERVER_DIR/sm.zip:$CLASSPATH
   com.ibm.sslight.tools.keyrng CustomizedCAs verify

   For HOD V4 type the following, all on one line:

   java -classpath .:HOD_SERVER_DIR/sm.zip:$CLASSPATH
   com.ibm.hodsslight.tools.keyrng CustomizedCAs verify

   This should be followed by something similar to the following:

   ```
   --------Key ring entry:  1 -------------------
   Entry type:  Site Certificate
   Key:  RSA/512 bits
   Subject:  aix-f26.raleigh.ibm.com,ibm,US
   Issuer:  aix-f26.raleigh.ibm.com,ibm,US
   Valid from:  Fri Aug 13 2:21:29 EDT 1999
   Valid to:  Sun Aug 13 12:21:29 EDT 2000
   Finger print:  D7:2D:E9:6B:66:00:54:04:44:DE:02:E4:4E:1C:80:85
   ```

   The last certificate shown should be the one just added.

(continued on the next page)

HOD SSL Server Certificate (cont.)

7. (cont.)

   I issued the following on my system:

   ```
   java -classpath .:/usr/lpp/HOD/hostondemand/ibm/sm.zip: \
   /usr/lpp/java/J1.1/lib/classes.zip \
   com.ibm.hodsslight.tools.keyrng CustomizedCAs verify
   ```

8. Exit OMVS.

9. Create HOD session with "Enable Security (SSL)" selected.

   Note: If you select "Server Authentication (SSL)" on your HOD session the 'Common Name' input when creating the certificate must match the host name in the DNS for the IP address of the TN3270E server.

HOD SSL Server Certificate (cont.)

10. On OS/390 TN3270E server create TELNET SECUREPORT statement and BEGINVTAM PORT statement in TCPIP PROFILE:

```
TELNETPARMS
   SECUREPORT 723 KEYRING HFS /u/harrisl/nm412.kdb
   ...
ENDTELNETPARMS
BEGINVTAM
   PORT 723
   ...
ENDVTAM
```

11. Recycle HOD and TCP/IP servers and you're done!

HOD SSL Client Authentication

SSL Client Authentication

- Create Client Certificate
  - Host On-Demand Locally Installed Client has a key-management utility for creating a Client Certificate.
  - Client certificate creation is detailed in the Redpiece "IBM Host On-Demand 4.0: Enterprise Communications in the Era of Network Computing, SG24-2149-01", section "11.2.5 Configuring SSL to Use a Self-Signed Certificate".

    http://www.redbooks.ibm.com

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OS/390 Screen Customizer

Screen Customizer

- ResQ!Net was renamed to IBM Screen Customizer.
- HOD V4.01 supports IBM Screen Customizer 1.0 (ordered separately).
- HOD V4.02 supports IBM Screen Customizer 1.01 (ordered separately).
- Only the Screen Customizer "Client" is supported on OS/390.

Screen Customizer Installation

Screen Customizer Installation Steps

- FTP the mvscli.tar and mvsdoc.tar files from the \tar directory on the Screen Customizer Client CD to the OS/390 Host On-Demand server /usr/lpp/HOD directory. Transfer in BINARY mode.
- On OS/390 change to the HOD *publish* directory (/usr/lpp/HOD/hostondemand/HOD is the default):

  cd /usr/lpp/HOD/hostondemand/HOD

- Untar and install the Client files into the HOD *publish* directory:

  tar -xf /usr/lpp/HOD/mvscli.tar

- Untar and install the documentation files:

  tar -xf /usr/lpp/HOD/mvsdoc.tar

Copy Custom Files

- After installing Screen Customizer Client, copy customized files from a Windows Screen Customizer Administrator to OS/390.

Copy Custom Files Steps

- On OS/390 create five subdirectories in the *publish* directory:

  /usr/lpp/HOD/hostondemand/HOD/custom/1st

  /usr/lpp/HOD/hostondemand/HOD/custom/map

  /usr/lpp/HOD/hostondemand/HOD/custom/ps

  /usr/lpp/HOD/hostondemand/HOD/custom/ref

  /usr/lpp/HOD/hostondemand/HOD/custom/wsp

  Note: Set the permission bits to (7,5,5) for a subdirectories.

- FTP the files of each corresponding subdirectory on the Windows Administrator to the OS/390 host in the *publish* custom directory. Files must be transferred in BINARY.

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OS/390 Lightweight Directory Access Protocol (LDAP) Server

OS/390 LDAP

- Host On-Demand V4.02 supports the OS/390 V2R5, 6, and 7 LDAP Server.

OS/390 LDAP (cont.)

LDAP Directory Configuration

- Verify the LDAP Server.
  - The LDAP Server must be configured as described in the "OS/390 Security Server LDAP Server Administration and Usage Guide, SC24-5861".
  - A suffix must be added and associated with an object class. You can use this suffix as the parent distinguished name (DN) for Host On-Demand or you can use a lower-level object.

    Note: The original schema files shipped with OS/390 LDAP Server create about 100 DB2 tables. The original schema definitions create about 600 tables.

    Before attempting to use these schema files, be sure that DB2 is configured to allow over 600 DB2 tables to be created and used.

    LDAP32K is the tablespace for most of the over 600 created tables.

OS/390 LDAP (cont.)

The SPUFI command for creating this tablespace should look similar to:

```
create large tablespace eeeeeee in ddddddd
numparts 1 bufferpool BP32K

using stogroup sysdeflt priqty 720 secqty 720;
```

where **sysdeflt** is the installation-dependent, systems default stogroup that you obtain from your local DB2 administrator.

- Design the LDAP directory information tree.
  - To build a directory information tree for an entire organization, use the organization object class for the suffix:

```
dn:  o=MyOrganization
objectclass:  organization
o:  MyOrganization
```

  - To build a directory information tree for one division of an organization, use the organizationalUnit object class for the suffix:

```
dn:  ou=MyDivision, o=MyOrganization
objectclass:  organizationalUnit
ou:  MyDivision
```

- To add to the directory information tree in the LDAP directory, use the ldapadd command.

OS/390 LDAP (cont.)

- Add the Host On-Demand schema to the LDAP Directory.
  - From a Unix Systems Services shell command prompt, change to the /etc directory that the LDAP Server is using.
  - Copy the schema files to your current location.

    V2.1.IBM.at
    ods.delta.oc
    V2.1.IBM.oc

    Note: These files are available from IBM.
  - Edit the LDAP directory attribute file, slapd.conf, and append the following line:

    include /etc/V2.1.IBM.at
  - Edit the LDAP directory object class file, slapd.oc.conf, and append the following lines:

    include /etc/ods.delta.oc

    include /etc/V2.1.IBM.oc
  - Restart the LDAP Server.

OS/390 LDAP (cont.)

- The following configuration changes are offered as possible performance enhancements.
  - Add these lines to slapd.conf:

```
index principalPtr eq
index dc eq
index o eq
index name eq
index objectClass eq
index uid eq
```

  - Sizelimit is the number of entries LDAP will return on a search request. Change sizelimit to 5000.

Bibliography

Bibliography

- Program Directory for IBM Host On-Demand for System/390:
  - GI10-3116-03 Version 4.0
  - GI10-3116-04 Version 4.01
  - GI10-3116-05 Version 4.02
- The following three documents are available after installation (where 9.82.1.100 is the IP address of the OS/390 system where HOD is installed) and they are also available on the HOD Library page off of the Host On-Demand Home page:
  - Host On-Demand 4.01 Readme

    http://9.82.1.100/hod/en/doc/readme/readme.html
  - Planning and Installation Guide (also available in pdf as install.pdf)

    http://9.82.1.100/hod/en/doc/install/install.html
  - Host Access Beans for Java

    http://9.82.1.100/hod/en/doc/beans/API_users_guide.html
  - Host Printing Reference

    http://9.82.1.100/hod/en/doc/hostprint/hostprintref.html

Bibliography (cont.)

- OS/390 Communications Server IP Configuration, SC31-8513
- OS/390 Cryptographic Services System Secure Sockets Layer Programming Guide and Reference, SC24-5877
- OS/390 Security Server (RACF) Command Language Reference, SC28-1919
- OS/390 Security Server LDAP Server Administration and Usage Guide, SC24-5861
- The following Redpiece is available at http://www.redbooks.ibm.com:
  - IBM SecureWay Host On-Demand 4.0: Enterprise Communications in the Era of Network Computing, SG24-2149-01
- The following Redbooks are available at http://www.redbooks.ibm.com:
  - IBM SecureWay Host On-Demand: Enterprise Communications in the Era of Network Computing, SG24-2149-00
  - Security in OS/390-based TCP/IP Networks, SG24-5383-00
  - SecureWay Communications Server for OS/390 V2R8 TCP/IP: Guide to Enhancements, SG24-5631-00

Web Sites

Web Sites

- Host On-Demand Product Information site:

  http://www.software.ibm.com/network/hostondemand

  Select Support from the above Home Page to get to the Support Page.

  Select Library from the above Home Page to get to the Library page.

- This presentation is available on web site as presentation PRS162:

  http://www.ibm.com/support/techdocs