Non Half Hourly Data Aggregation (NHHDA) Installation Guide

Version Number 17.2

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Non Half Hourly Data Aggregation (NHHDA) Installation Guide

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1 Introduction

This document is the Installation Guide for the NHHDA application software developed for ELEXON.

Software Version

This version of the Installation Guide is applicable to the installation of release 11.3.0 of the NHHDA application software.

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1.1 Purpose

The aim of the guide is to provide instructions for installing NHHDA software. This installation is divided into the Database Server Installation and the Application Server Installation. A section is also included describing the procedure for building the NHHDA source code.

It should be noted that a number of prerequisites are required before installation, such as the POSIX-compliant Operating System and Oracle database software.

This guide assumes that the reader has a good working knowledge of the Operating System and Oracle.

The installation sequence should be followed as described in this document. The build of the source code cannot be carried out until the installation procedure is complete since the build procedure requires the tables and users which are created during installation.

1.2 Scope

The scope of this document is the installation of the NHHDA application software.

1.3 Structure of Document

The remainder of this document consists of the following sections:

- Section 2 describes how to set up a new installation of the NHHDA software;
- Section 3 describes how to build the NHHDA software from the source code;
- Section 4 outlines what is provided for upgrades of the NHHDA application software;
- Appendix A lists the Oracle database table spaces;
- Appendix B gives guidance on building on other platforms;
- Appendix C contains an example database creation script;
- Appendix D gives details of the original pre-1998 Logica Performance Test environment;
- Appendix E lists commands to collect database statistics;
- Appendix F gives instructions for associating a file extension to the printpro application on a Windows PC.
- Appendix G gives the list of OFM patches to be applied.

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- Appendix H provides the list of OS patches to be applied on Solaris and Windows Servers.
- Appendix I provides the list of DB patches to be applied on Solaris server.

1.4 Amendment History

Issue	Details
0.901	First draft issued to Client
0.902	Addresses agreed highest priority exceptions of Pool APP comments dated 10/7/97
0.903	Addresses remainder of Pool Sev 1 and Sev 2 comments on V901, and internal Logica comments raised when v0.902 was used to complete a test installation.
0.904	Addresses defect report 873 and further comments.
0.990	Addresses outstanding comments
1.000	Authorised version
1.001	OR 2229, OR 2277, OR 2282, OR 2366 OR 2369 (LCR082/CR492) OR2358 OR2410
1.100	OR1834 - The standing data audit reports produced should map onto the database actions in order to match the database action OR2222 & OR2278 - The installation guide description of set up for deletion of report files from the local machine is incorrect. Also incorporates updates to Oracle version and section 2.3.1. Pool defects 1347, 1363 & 1473
1.500	Changed to incorporate internal review comments. Draft issue for external review consistent with release R1.2
2.000	Address Pool review comments and update to be consistent with release 1.3. Authorised version
2.001	OR2391 Client installation now uses InstallShield PMR0132/OR2729 Information on the configuration of temporary files added.
2.002	Incorporating changes from TA2000 development The changes are detailed in the following SIRs: (Package 1) LCRs 21/3 (SIR R419), 106 (SIR R576), 114 (SIR R654) and divergence document 001ldr30.doc. (Package 2/MDD) LCRs 94/2 (SIR R529), 103/2 (SIR R709), 105 (SIR R391), 107 (SIR R692), 109 (SIR R715), 110 (SIR R716), 112 (SIR R575), 116 (SIR R991), 124/2 (SIR R295), 127/2 (SIR 1528) and divergence document 002ldr50.doc.
2.990	Incorporating internal review comments

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Issue	Details
2.991	Incorporating Pool comments.
3.000	Incorporating Pool review comments consistent with release 4.0.0/5.0.0 Authorised Version
3.001	OR2955 - Alteration of the UNIX version number.
3.990	Removed references to release 4 functionality Issued to Pool for review.
4.000	Authorised Version.
4.001	Incorporating LCR170/2 - Upgrade to Oracle 8i and Oracle Forms 6. Incorporating OR3005.
4.990	Issued to Pool for review.
5.000	Authorised version.
5.001	Update for Oracle 8.1.7 upgrade.
5.990	Incorporating Logica Internal OR 5.1.3111 Issued to Pool for review.
5.991	Incorporating 1 minor correction to OR 5.1.3111 change.
5.992	Incorporating Pool review comments:- OR3118 - Updating the copyright notice
5.993	OR3120 – Updating the Oracle version number.
5.994	Change to Office 2000
5.995	Changes relating to ELEXON superseding the Electricity Pool
6.000	Amended month on cover to May 2000 and made definitive
6.001	Incorporating LCR185 – Upgrade to UNIX 5.1A
6.002	Updated for NHHDA 7.3.0
6.990	Version for ELEXON review
6.991	Incorporating ELEXON review comments
7.000	Authorised version
7.001	Updated template
7.990	Version for ELEXON review
7.991	Updated for ELEXON review
8.000	Authorised version
8.001	Update for Oracle 9i upgrade. Document Template updated
8.990	Version for ELEXON review
9.000	Authorised version
9.001	LCRA218/4 NHHDA BETTA Changes
9.990	Version for ELEXON review
9.991	Applied ELEXON review comments
9.992	Updated for OR3438 – amend instructions for creating

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Issue	Details
	NHHDA users.
10.000	Authorised version
11.000	Updated document references
11.001	Amendments started for Nov. 04 release (CP1001, CP1006, CP1016 & CP1052). Issued to ELEXON for review.
11.002	Additional amendments to client software installation process. Issued to ELEXON for review.
12.000	Authorised version.
12.001	Updated to include comments in 3.1.1 November 04 Release Errata7P9.0.doc
12.002	Amendments started for Feb-06 release (CP933, CP1047, CP965 & CP1089).
12.003	Implemented review comments.
12.990	Version for ELEXON review.
12.991	Included OR3566 (defect F0000948/4)
13.000	Authorised version.
13.001	Draft for internal review for Nov.06 release, including Oracle upgrade to 10g 2-tier & 3-tier architecture
13.002	Incorporated the internal Review comments from UK team.
13.003	Includes OR3633 and OR3634 (HD050270).
13.990	Version for ELEXON review, incorporating internal review comments.
13.991	Incorporating ELEXON review comments plus help desk calls HD061732, HD061678, HD061773
13.992	Updated section 3. Updated section 2.3 in line with configuration files delivered, and to reflect that unix web forms are delivered with the database server software. Updated section 2.2.2.2 to show unix_web_forms in delivered directory structure. Added Appendix F. Includes further update for HD061773.
13.993	Incorporating ELEXON review comments. Released as part of interim release of NHHDA documents.
13.994	Draft for 7.1090 (L8.0.3)
13.995	Incorporating internal review comments
13.996	Incorporating further internal review comments
14.000	Authorised version
14.900	Updated for Feb 08 release : CP1187 (Solaris Port) and Internal OR3689 (corrections to v14.000)
14.990	Incorporating internal review comments; version for ELEXON review
14.991	Changes after witnessed upgrade of EAC/AA at start of PPT, plus ELEXON review comments
15.000	Authorised version

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Issue	Details
15.900	Updated for Feb 09 release : P222, CP1205, CP1206 & CP1207
15.990	Incorporating internal review comments; version for ELEXON review
15.991	Incorporating ELEXON review comments and further internal review comments, after the document had been used in the witnessed upgrade prior to Feb 09 PPT
15.992	Incorporating further ELEXON review comments
16.000	Authorised version
16.010	Updated document classification
17.0	CP1383 - Updated for Tech Upgrade (Oracle DB upgrade from 10.2.0.3 to 11.2.0.3 and OAS upgrade from 10.1.2.2 to 11.1.1.6)
17.1	CP1436 -Updated for Tech Upgrade (Windows OS from 2003 to 2012 and OFM upgrade from 11.1.1.6.0 to 11.1.2.2.0)
17.2	P305 – Updated for November 15 Release

1.5 Summary of Changes

Changes as indicated in the amendment history.

1.6 Changes Forecast

Agreed Change Requests will be incorporated.

1.7 References

Mnemonic	Information	Details
[IVT]	Title: Version No: Author: Date:	NHHDA Installation Verification Tests 14.0 Cognizant 27 June 2013
[NOPSGDE]	Title: VersionNo: Author: Date:	NHHDA Operations Guide. 17.0 Cognizant 27 June 2013
[NSMGDE]	Title: VersionNo: Author: Date:	NHHDA System Management Guide. 18.0 Cognizant 27 June 2013
[NTSPEC]	Title: VersionNo: Author: Date:	NHHDA Physical Design Technical Specification. 20.0 Cognizant 27 June 2013
[OFMING]	Title: Author: Date:	Oracle Fusion Middleware Installation Guide for Oracle Portal, Forms, Reports andDiscoverer11g Release 1 (11.1.1) Oracle Corporation 27 Jun 2013

1.8 Abbreviations

AA	Annualised Advance
AFYC	Average Fraction of Yearly Consumption

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BETTA	British Electricity Transmission and Trading Arrangement
DC	Data Collector
EAC	Estimation of Annual Consumption
GSP	Grid Supply Point
MDD	Market Domain Data
NHHDA	Non Half Hourly Data Aggregation
PRS	PES Registration Service (now called SMRA)
SMRA	Supplier Meter Registration Agent
SPM	Supplier Purchase Matrix
SSC	Standard Settlement Configuration

1.9 Intellectual Property Rights and Copyright

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2 A New Installation of the Application Software

2.1 Installation Prerequisites

This section details the hardware and layered software platform required to install the software.

The media supplied comprises the following elements:

- Object (and Source) CD or tape - includes application executables and installation scripts for the Database Serverand Solaris version of the Application Server, and if the user has the source licence, also contains source for both the Database Server and the Application Server applications;
- Windows Application Server Setup CD - suitable for installing on Windows 2012 Server, containing runtime forms application, and Application server configuration files.

The format of the tape and the directory listings of the tapes or CDs are detailed in the release notes accompanying the media.

Alternatively the contents of the CDs may be downloaded from an FTP site.

The Server is assumed to be a Sun computer, with the SPARC chip-set, running the Solaris 5.10 POSIX-compliant Operating System. In order to install this software, it is assumed that the Oracle installation has been completed on the target server by the recipient organisation.

2.1.1 Hardware Prerequisites

The NHHDA system comprises a POSIX server and a number of PC clients connected over a local area network, plus possibly an application server. Both 3-Tier and 2-Tier physical configurations are supported. An overview of the physical architecture for 3-Tier and 2-Tier is given in Figure 1 and Figure 1A respectively.

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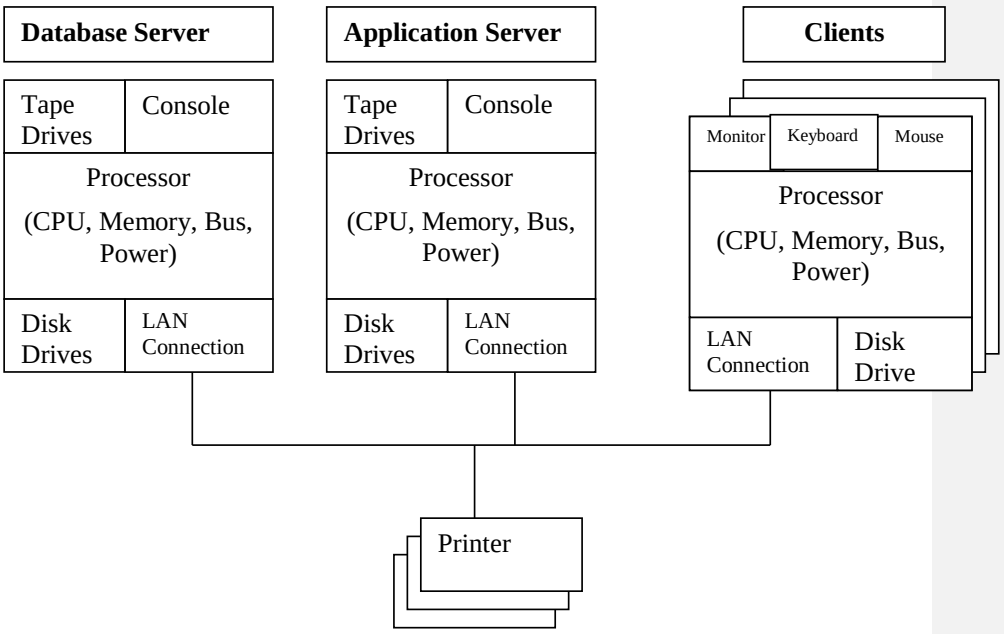

Figure 1: NHHDA 3-Tier Physical Architecture

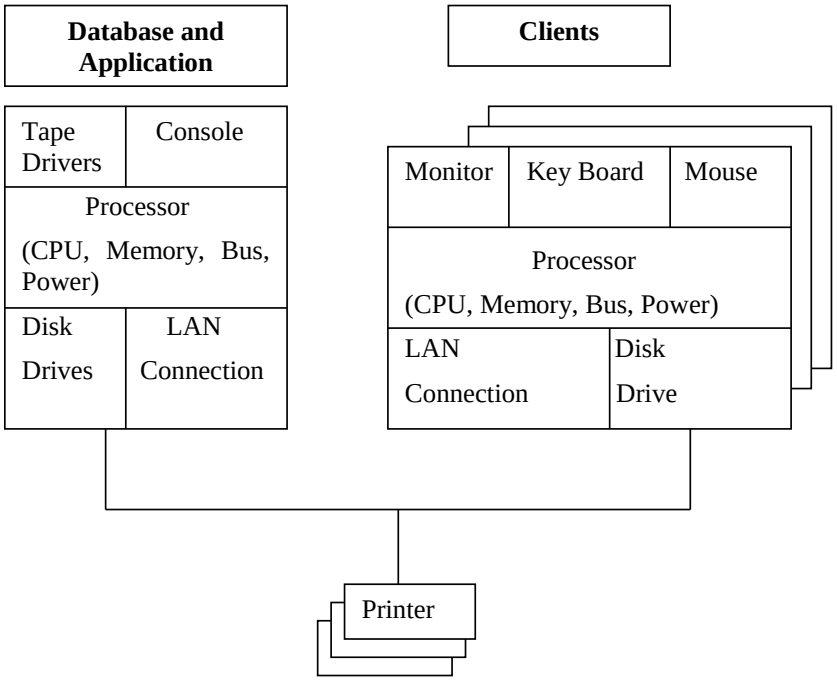

Figure 1A: NHHDA 2-Tier Physical Architecture

The following comprises a list of the hardware required for NHHDA 3-Tier and 2-Tier Application:

Server:

- POSIX-compliant server.

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Application Server:

See [OFMING] for the Application Server running on Windows or Sun Solaris.

Client:

- Any that runs an Operating System and Browser supported by Oracle Application Server.

Note: Use any Browser and Operating System in Client system, which is supported by the Oracle Application Server. Refer to the below link. http://www.oracle.com/technology/software/products/ias/files/fusion_requirements.htm.

2.1.2 Software Prerequisites

The NHHDA system server runs an Oracle 11.2.0.3 database with bespoke software written in C and SQL.

For the physical 3-Tier application, the Application Server runs Oracle Forms 11G version 11.1.2.2.0 on Microsoft Windows 2012 Server as well as Oracle Net Services to enable client - server communication.

For the physical 2-Tier application, the Application server runs Oracle Forms 11G version 11.1.1.6.0on a Sun SolarisUNIX Server, with the SPARC chip-set.

The following patches should be applied to the OFM, for both Windows and Solaris:14373988, 14003476, and14736139.Details of these patches are given in Appendix G.

An overview of the software architecture for 3-Tier and 2-Tier is given in Figure 2 and Figure 2A respectively (on next 2 pages):

The information about the Solaris and DB patches are provided in the Appendix H and Appendix I

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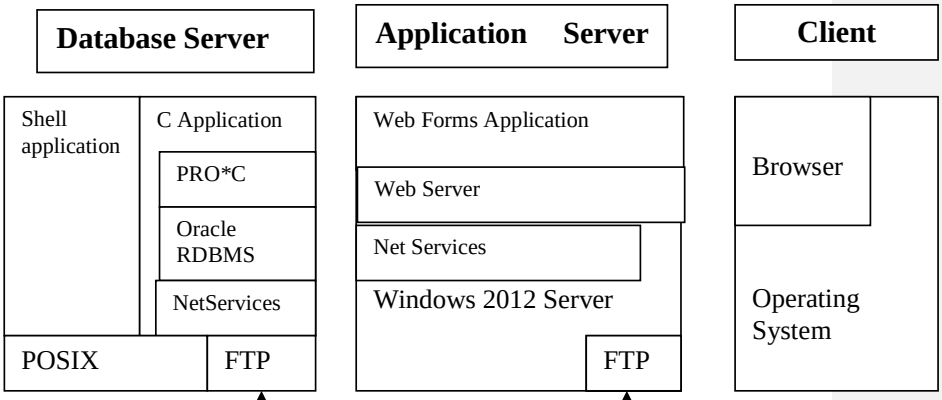

Figure 2: NHHDA 3-Tier Software Architecture

The following table shows the software products used to support the NHHDA 3-Tier application software.

Software Component	Host	Version
Operating System	Database Server	Compliant with POSIX standard 1003.1-1990 and POSIX 1003.1b-1993 (C language real time extension). Compliance with POSIX standard 1003.2-1992 for shell scripts. (C compiler compliant with ANSI X3.159-1989)
Windows 2012 Server	Application Server	Service Pack 1
Oracle Server (includes PL/SQL and Oracle Net Services)	DatabaseServer	11.2.0.3
Oracle Net Services	Application Server	11.1.0.7.0
Pro*C runtime	DatabaseServer	11.2.0.3 *Runtime deployment is included in original Oracle/Developer license for development*
Oracle Forms runtime	Application Server	11.1.2.2.0plus patches listed in Appendix G. *Runtime deployment is included in original Oracle/Developer license for development*
File Transfer Software	Server	FTP receive and send

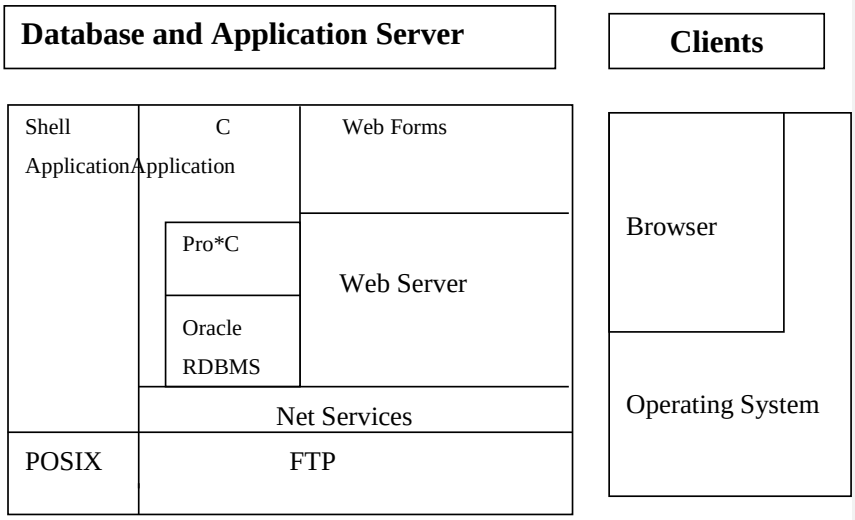

Figure 2A: NHHDA 2-Tier Software Architecture

The following table shows the software products used to support the NHHDA 2-Tier application software.

Software Component	Host	Version
Operating System	Database and Application Server	Compliant with POSIX standard 1003.1-1990 and POSIX 1003.1b-1993 (C language real time extension). Compliance with POSIX standard 1003.2-1992 for shell scripts. (C compiler compliant with ANSI X3.159-1989)
Oracle Server (includes PL/SQL)	Database Server Application Server	11.2.0.3 11.1.1.6.0plus patches listed in Appendix G
Oracle Net Services	Database Server and Application Server	11.1.0.7.0
Pro*C runtime	Database and Application Server	11.2.0.3*Runtime deployment is included in original Oracle/Developer license for development*
Oracle Application Server Forms and Report Services	Database and Application Server	11.1.1.6.0plus patches listed in Appendix G *Runtime deployment is included in original Oracle/Developer license for development*

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2.2 Installation Steps for the Server machine

2.2.1 Overview

The Server should have the hardware configuration described in section 2.1.1. It should have all the prerequisite software installed, described in section 2.1.2.

Additionally, it is necessary to configure the existing products. This configuration is detailed in subsequent sections.

A system manager with 'root' privileges is required to set up the following user. Note that the user must be created as a member of the new unix group:

- Set up an Operating System user account, batch. This user will run the background processes for the NHHDA system. The user owns the NHHDA executables and the NHHDA directory structure. This user will access the Oracle Database that NHHDA is installed on via a default login (O/S authenticated). This is the only default login on the NHHDA system. It is not necessary to call the user batch but this user will be referred to as the batch O/S user in this document. The length of the username should be no more than 8 characters.

It is not necessary to set up the Oracle account for the above O/S user as this is created and configured automatically by the installation script.

2.2.2 Operating System Configuration

This section describes the steps that need to be carried out with respect to the Operating System.

2.2.2.1 Environmental Variables

The batch O/S user should have standard Oracle environment variables set in its login script. These are:

- ORACLE_HOME
- ORACLE_SID
- PATH including $ORACLE_HOME/bin
- LD_LIBRARY_PATH including $ORACLE_HOME/lib

2.2.2.2 Directory Structure

A directory structure is created on installation. The names of these subdirectories under the file directory match the values held in the NHHDA database in the cdb_file_directory table.

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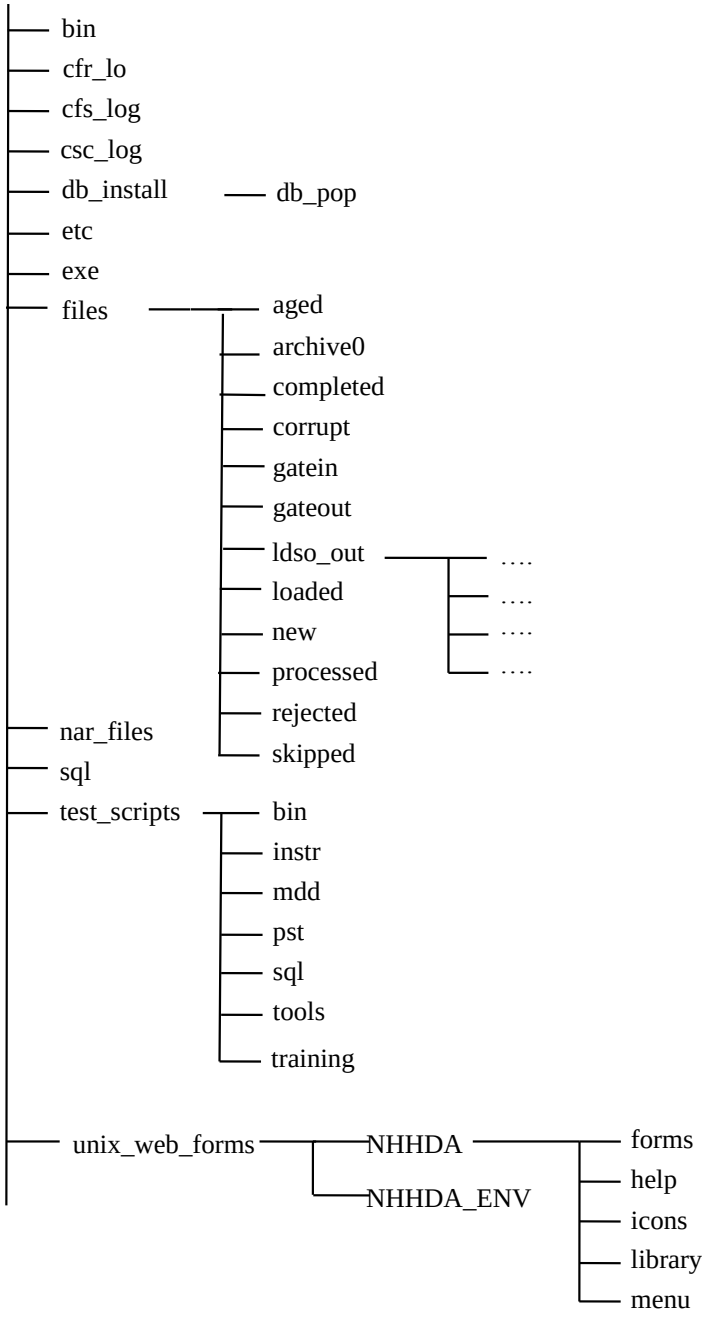

Figure 3: NHHDA Directory Structure

Note that any incoming files that arrive in the gatein directory need to have their permissions set by the file originator so that they are writeable by the NHHDA 'batch' user.

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2.2.3 Installation media

The server software will be downloaded from an FTP Site or else installed from a CD or magnetic tape. The server software consists of the Pro*C executable, installation scripts, and the Solaris version of the web forms.

2.2.4 Software Installation

The installation should be performed by the batch O/S user, using the Korn shell. It is not necessary to set the umask. Extract the contents of the tape or CD to the home directory of the batch O/S user. There should be only one file extracted, nhhda_setup_solaris_solaris_x (where x is the version of the software). This file is a self extracting executable which should be run to create the NHHDA directory structure and executable files. This routine will carry out the installation in a subdirectory of the batch O/S user's home directory, referred to in this document as the 'runtime' directory. The runtime directory must be created before the nhhda_setup_solaris routine is run. It is suggested that the name of the directory is related to the version number of the NHHDA software to allow different version of the software to co-exist on the same machine for testing etc.

Reset the runtime directory, Oracle home directory and Oracle instance as necessary when prompted.

If the runtime directory is named NHHDA_V1, then the executables will be in NHHDA_V1/bin.

The PATH environment variable of the batch O/S user must be altered to include the full file specification of this bin directory.

If any obsolete files, which were delivered in previous releases but are not included in the current release, are found, such files will be deleted when the nhhda_setup_solaris_x file is run.

2.2.4.1 File Permissions

The batch O/S user owns the executables and NHHDA directory structureand only the batch user and the Oracle user need to access them. The Oracle user needs read-only access to several directories, as discussed in section 2.2.5.8. By putting the batch user and the Oracle user in a group with no other users, it is ensured that no other user can access these files.

2.2.5 Oracle Database Configuration

2.2.5.1 Introduction

The installation and configuration of the target Oracle database for installation of NHHDA is specific to the system being installed. Therefore no scripts are provided to perform this stage although a list of required tablespaces and initialisation parameters is provided in Appendix A. Also, examples of the database creation script, cr_nhhda.sql, and Oracle parameter file are delivered in the sql directory. In the rest of this section it is assumed the database has already been created on the target machine.

Note that in NHHDA Release 8, the following two lines were added to the example cr_nhhda.sql file to support new functionality:

@$ORACLE_HOME/rdbms/admin/dbmspool

create or replace public synonym dbms_shared_pool for sys.dbms_shared_pool;

2.2.5.2 Installing the NHHDA Database Objects

This initial step should be performed as the Oracle O/S user. Change directory to the db_install directory created under the runtime directory. Run the create_users_and_grant_roles script. This script will create the NHHDA schema owner and NHHDA batch users in the Oracle database.

When running the create_users_and_grant_roles script, it should be noted that it is necessary to ensure that the database and schema have been created before installing or upgrading a new version of NHHDA.Additionally, when prompted for the batch user, do not let this default to the current user as this will be the Oracle user. The Oracle user should never be used to run NHHDA executables

To run the script, enter the command:

create_users_and_grant_roles

The script prompts for the following information:

- the Oracle username and Oracle password of the nhhda schema owner. The defaults are nhhda and nhhda. Other values may be specified; in this case you will need to specify them when building the source code (step 3.3.4). The length of the username should be no more than 8 characters.
- the Oracle username of the batch user. This must be the same as the unix username of the batch O/S user.

This next step should be performed as the batch O/S user. Change directory to the db_install directory created under the runtime directory. Run the ndb_db_install script. This script will create all database objects needed to run NHHDA.

This script also populates the tables with the pre-defined data necessary for the system to run, except for those tables discussed in the next section.

To run the script, enter the command:

ndb_db_install

The script prompts for the following information:

- confirmation that a backup has been taken of the system.
- the Oracle SID of the NHHDA database
- if the user knows the password of the Oracle system user.
- the password of the Oracle system user (if the previous answer was yes).
- the Oracle username and Oracle password of the nhhda schema owner. The defaults are nhhda and nhhda. Other values may be specified; in this case you will need to specify them when building

the source code (step 3.3.4). The length of the username should be no more than 8 characters.

- if the user wishes to recreate the database. If the user does not wish to recreate an empty database, the script checks whether an upgrade is possible and if so, will offer the option to upgrade or to (re)install the database.
- the Oracle username of the batch user. This must be the same as the unix username of the batch O/S user.
- the full pathname of the runtime directory created in section 2.2.4.

It should be noted that if the Oracle System user password is not known then *ndb_db_install* cannot perform the following checks/updates:

- That there are no other NHHDA schemas in this database instance;
- That the batch user and schema owner have all the correct privileges;
- That the database has no invalid objects owned by the System user;
- That the 'os_authent_prefix' database parameter is correct;
- That the 'utl_file_dir' database parameter is not null
- Updating/checking of the public synonyms used by the application.

The script creates a file called install.log, containing detailed messages produced by the installation/upgrade process.

On completion of the script, check the log file produced for errors e.g. failures in creating tables due to the tablespaces being too small. If this is a reinstallation, ignore any errors caused by users and roles being already present.

After running the script, it is recommended that the database is shutdown and restarted. If this is not done before the application is started, it is possible that gaps in sequence numbers will occur, until the database is shutdown and restarted for the first time.

2.2.5.3 Tables Needing Manual Population or Update

The following data is not included in the automatic installation and must be provided before the system is run:

- ndb_nar_file_location - this table holds the location of the temporary files produced during a data aggregation run. There is one entry for each database partition. The population of this table does not take place automatically as part of the installation and must be done manually. An example population script, nar_file_loc.sql, is provided in the sql directory. It should be run connected as the nhhda schema owner. The directories referred to in the ndb_nar_file_location table must exist on the server.If the Installation Verification Tests [IVT] are to be run on this instance, then ensure that the contents of the file db_install/db_pop/nflc.ctl.customised matches the intended population of the ndb_nar_file_location table, because this file is used to re-populate the table during the IVT.

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- cdb_export_configuration- the following fields should be specified to identify where outgoing files will be placed on the gateway server:

  market role

  participant_id

  gateway

  directory

  Refer to the system management guide for an explanation of these fields.

- cdb_system_parameter - the following system parameters are not included in the Maintain System Parameters form but need to be configured for each NHHDA system using sql. In each case, set the value column to the appropriate value for the organisation running the system.

param_type	param_type2	description
SYS	PID	system participant id
SYS	ORG	system organisation name

- cfs_send - this shell script installed in runtime/bin should be amended as follows:

  ftp username

  ftp password

  In addition, other parts of this script can be amended. Note that organisations with a 'licence to use' licence may also amend this script.

  Warning: if you wish to configure the system so that files are taken from an 'out box' rather than having cfs_send copy directly to the gateway, then modify cfs_send to copy the files to your out box directory and have your external software take (and delete) files from there. Never delete files from within the NHHDA file store (except as part of an archive operation).

2.2.5.4 Other Configurable Data

The following pre-defined data is provided via the installation scripts but may be configured via SQL once the installation is complete (not including data which is maintained via NHHDA forms):

cdb_error_messages - the text of each error message

cdb_file_directory and cdb_default_directory - these two tables together map file types to physical directories depending on the status of the file. WARNING: the NHHDA installation creates a directory structure which matches the information in these tables. If this information is changed, then the physical directory structure must be changed too, and any files already present must be moved. Also, if the archive directories are changed, the value in cdb_ref_values (domain_code='ARCD') must be changed to match - this value gives the base part of the archive directory names without the numerical suffix used to put each archive in a separate directory. If the directories and cdb_file_directory are modified, you should ensure that the

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nhhda 'batch' user has write permission to any new directories. If the contents of cdb_default_directory are modified, you should ensure that there is an entry for each valid combination of file type and status, (where a particular combination of file type and status is not found by the application software, files of that type will be stored in a directory identified by the combination of file type and status of 'Default').

The default configuration creates an archive directory called archive0. If the path in cdb_ref_values is set to, say, /archive/arc then archive will create and use directories /archive/arc0, /archive/arc1 etc.

There are two system parameters connected to the NDP system (which comprises the EAC Data to Distributor Report) which may be changed following the installation:

param_type	param_type2	Description
NDP	ADI	NDP archive directory id
NDP	PDL	Previous days request limit

- NDP archive directory id

  When the NDP process completes successfully all the EAC Data to Distributor reports generated are marked as archived and will reference this directory id. Changing this parameter would also require the creation of new record in the cdb_file_directory table. The following example changes the directory id to be 16:

  UPDATE cdb_system_parameter SET value = '16'
  WHERE param_type = 'NDP' AND param_type2 = 'ADI';

  INSERT INTO cdb_file_directory (directory_id, path, source_directory, archive_media)
  VALUES (16, NULL, 'N', 'ldso_out_arch');

- Previous days request limit

  The value is used by the EAC data to Distributors Report form to validate the date for a report request. The following example changes the value to be 10:

  UPDATE cdb_system_parameter SET value = '10'
  WHERE param_type = 'NDP' AND param_type2 = 'PDL';

For additional information about these system parameters refer to Section 7 of [NSMGDE].

2.2.5.5 Users and Roles

The nhhda and batch Oracle users and all necessary roles are set up by the ndb_db_install script. All other Oracle users should be created manually and should be granted the role BASIC which will give them the basic privileges

to connect to the Oracle database. The length of each username should be no more than 8 characters.

Each user will also have to be assigned to one or more roles to give them access to the NHHDA functions that they require. These roles are:

- AUDITOR
- DATA_AGG_ADMIN
- EXCEPTION_ADMIN
- SYSTEM_OPERATOR
- MKT_DMN_DATA_ADMIN
- SUP_MKT_DMN_DATA_ADMIN
- SYSTEM_MANAGER

2.2.5.6 Profile

The create_users_and_grant_roles script also calls the nhhda_profile.sql script. This creates an Oracle profile named 'prof_nhhda' with the following attributes:

```
PASSWORD_LIFE_TIME      90
PASSWORD_GRACE_TIME     5
PASSWORD_REUSE_TIME     UNLIMITED
PASSWORD_REUSE_MAX      10
FAILED_LOGIN_ATTEMPTS   4
PASSWORD_LOCK_TIME      UNLIMITED
SESSIONS_PER_USER       5
```

This script can be customised to define different attributes. Refer to Oracle documentation for an explanation of these attributes.

The profile is assigned to any users created by the User Management screen in the NHHDA client.

2.2.5.7 The Oracle Parameter File

The instance name is assumed to be 'nhhda', hence the example parameter file provided in directory sql is:

```
init_nhhda.ora.
```

The following non-standard parameters are set up in the init_nhhda.ora file:

utl_file_dir – should be set to * to give access to any directory to which the Oracle user has the appropriate Operating System permissions. For an alternative approach to setting utl_file_dir, see section 2.2.5.8.

resource_limit – should be set to TRUE to enable the resource attributes such as SESSIONS_PER_USER of PROF_NHHDA profile to take affect.

diagnostic_dest = /opt/app/oracle

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The following non-standard parameters are commented out in the init_nhhda.ora file as these parameters are deprecated from 11g Release of Oracle Database.

Core_dump_dest(replaced by diagnostic_dest)

Background_dump_dest(replaced by diagnostic_dest)

User_dump_dest(replaced by diagnostic_dest)

audit_file_dest(replaced by diagnostic_dest)

remote_os_authent (deprecated)

2.2.5.8 Alternative setting of utl_file_dir parameter

Setting utl_file_dir to * in init_nhhda.ora is the simplest approach for specifying which directories Oracle may access, and this is adopted in the example file delivered. An alternative is to include multiple utl_file_dir lines, listing the individual directories that Oracle needs to access for the NHHDA application. The bulk of this list of directories can be obtained from the NHHDA database using this SQL:

select path from cdb_file_directory

where directory_id in (2,3,4,5,6,7,8,9,11);

Also there must be an entry for the csc_log directory which must be specified relative to the bin directory e.g. "/users/nhhda/runtime/../csc_log" – this is the full path of the runtime directory followed by the value obtained by this SQL:

select value from cdb_system_parameter

where param_type='CSC' and param_type2='LOG';

This is the complete list of directories that Oracle accesses in a new installation, but each time that archiving is run, an additional utl_file_dir line must be added for the new archive directory if the archive files are to be viewed via the front end – see [NSMGDE].

The Oracle UNIX user must have read and excecute permission to access this list of directories.

2.2.5.9 Directory for the EAC to Distributors Report

The location where the EAC To Distributors reports will be stored is defined in the cdb_ref_values table – at the end of the installation this value is set to the filesdirectory within the NHHDA "runtime" directory, and as a result the reports will be produced under files/ldso_out.

Consider whether to change this value. Users with appropriate authority will be required to manually access the sub-directories under this directory in order to create the CDs to send to the distributors, so this directory needs to be one that can be read by these users and written to by the NHHDA application. To change this directory to e.g. /app/nhhda/ldso_reports, run the following SQL statement from SQL*Plus:

update cdb_ref_values set value_from = '/app/nhhda/ldso_reports'

where domain_code='NDPD';

This will result in the reports being created under /app/nhhda/ldso_reports/ldso_out.. The new directory does not need to be manually created, as it will be automatically created when the report is next run.

2.2.5.10 Network Files

After configuring the NHHDA Oracle database it is necessary to set up Oracle Net Services to allow connections from Oracle Formsby editing the `$ORACLE_HOME/network/admin/tnsnames.ora file`

Also edit the file:

`$ORACLE_HOME/network/admin/sqlnet.ora`

Add the line:

bequeath_detach=yes

2.2.5.11 Forms Menu Security

In order to enable Menu Security features for NHHDA forms the following script must be run (unless this is included in the database creation script):

Change directory to the db_install directory created under the runtime directory. Connect to the database using the system oracle account. Type:

sqlplus system/<password>

Run the script:

@frmsec

2.2.6 Configuring Temporary Files

During an aggregation run the UNIX kernel requires a number of temporary files to be open. The number that this should be set to can be calculated from the following formula:

Each NAR CI process will have the following:

For each run

1 exception file

1 audit file (if audit turned on)

10 intermediate files

The number of NAR CI processes will be determined by the NAR CI queue width.

So, for a q width of 4 and 4 runs you will have

4 * 12 = 48 files open for writing per process, 192 in all

NB: There will also be files opened by Oracle.

2.3 Installation Steps for the Application Server

A number of prerequisite products must be set up on the Application Server. These are discussed in section 2.1.2. Additionally, the Database Server installation should be carried out before the Application Server Installation

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The installation of Oracle Fusion Middleware(OFM) Forms and Report Services is discussed in [OFMING] (Windows or Solaris).

2.3.1 Installation media

The Application Server software will be downloaded from an FTP Site or installed from CD. All the NHHDA files needed for the server installation are included.

2.3.2 Steps to install the 3-Tier Application from the CD

NHHDA Directory:

Instructions for creating the NHHDA directory, and copying all the files from the CD to the NHHDA directory.

Files/Directories	Description
NHHDA	Create the NHHDA directory in the root directory of the drive where Oracle Application Server is installed (or you may choose another directory name but the instructions assume the directory is named NHHDA). For example, if the OFM is installed in D drive, the NHHDA directory should be created under the D drive like D:\NHHDA. If multiple environments are required for different test system, create multiple directories like NHHDA1, NHHDA2 etc.,
Forms	Copy the NHHDA\Forms directory with its contents from the CD to the NHHDA directory.
Library	Copy the NHHDA\Library directory with its contents from the CD to the NHHDA directory.
Icons	Copy the NHHDA\Icons directory with its contents from the CD to the NHHDA directory.
Menu	Copy the NHHDA\Menu directory with its contents from the CD to the NHHDA directory.
Help	Copy the NHHDA\Help directory with its contents from the CD to the NHHDA directory.

NHHDA Env Directory:

Instructions for copying the NHHDA ENV directory files from the CD to beneath the <ORACLE_HOME> directory, where <ORACLE_HOME> represents the Oracle Home directory where Oracle Application Server is installed.

In the below examples, the directory structure has the below notations.

- <MW_HOME> denotes the Middleware Home directory. For example: D:\oracle\Middleware11gR1
- <DOMAIN_NAME> denotes the domain name created during the OFM configuration. For example: ELXON

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- <ORACLE_INSTANCE> denotes the Oracle instance directory of the OFM. For example: D:\oracle\Middleware11gR1\asinst_1

Files/Directories	Description
nhhda.env	Copy the NHHDA ENV\nhhda.env file from the CD to the <MW_HOME>\user_projects\domains\<DOMAIN_NAME>\config\fmwconfig\servers\WLS_FORMS\applications\formsapp_11.1.1\config directory on the application server. If multiple environments are required for different test systems, create multiple copies of this file e.g. named nhhda1.env, nhhda2.env
nhhdaRegistry.dat	Copy the NHHDA ENV\nhhdaRegistry.dat file from the CD to the <MW_HOME>\user_projects\domains\<DOMAIN_NAME>\config\fmwconfig\servers\WLS_FORMS\applications\formsapp_11.1.1\config\forms\registry\oracle\forms\registry directory
formsweb.cfg	• If the formsweb.cfg file does not exist in the <MW_HOME>\user_projects\domains\<DOMAIN_NAME>\config\fmwconfig\servers\WLS_FORMS\applications\formsapp_11.1.1\config directory: Copy the NHHDA ENV\formsweb.cfg file from the CD to the <MW_HOME>\user_projects\domains\<DOMAIN_NAME>\config\fmwconfig\servers\WLS_FORMS\applications\formsapp_11.1.1\config directory on the application server. • If the formsweb.cfg file exists in the <MW_HOME>\user_projects\domains\<DOMAIN_NAME>\config\fmwconfig\servers\WLS_FORMS\applications\formsapp_11.1.1\config directory, add the lines below to the end of that file. [nhhda] lookandfeel=Generic colorScheme=Gray background=nhhda envFile=nhhda.env form=nhhda.fmx width=1000 height=700 separateFrame=TRUE ImageBase=codeBase serverApp=nhhdaRegistry

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	(omit the separateFrame=TRUE line if you do want the forms application to run on a separate browser window) If multiple environments are required, create multiple sections containing these lines, named e.g. [nhhda1] [nhhda2] etc – one for each .env file.
forms.conf	• If the forms.conf file does not exist in the <ORACLE_INSTANCE>\config\OHS\ohs1\moduleconf directory: Copy the NHHDA ENV\forms.conf file from the CD to the<ORACLE_INSTANCE>\config\OHS\ohs1\moduleconf directory on the application server. • If the forms.conf file exists in the <ORACLE_INSTANCE>\config\OHS\ohs1\moduleconf directory, add the lines below to the end of that file. # BEGIN NHHDA1 CONFIG RewriteRule ^/forms/nhhda1_help/(..*) /nhhda1_help/$1 [PT] AliasMatch ^/nhhda1_help/(..*) "D:\nhhda1\Help\$1" WLExcludePathOrMimeType /forms/nhhda1_help RewriteRule ^/forms/nhhda1_reports/(..*) /nhhda1_reports/$1 [PT] AliasMatch ^/nhhda1_reports/(..*) "D:\nhhda1\Reports\$1" WLExcludePathOrMimeType /forms/nhhda1_reports # END NHHDA CONFIG • If multiple environments are configured, these lines should be updated by suffixing the environment number as given below. # BEGIN NHHDA1 CONFIG RewriteRule ^/forms/nhhda1_help/(..*) /nhhda1_help/$1 [PT] AliasMatch ^/nhhda1_help/(..*) "D:\nhhda1\Help\$1" WLExcludePathOrMimeType /forms/nhhda1_help RewriteRule ^/forms/nhhda1_reports/(..*) /nhhda1_reports/$1 [PT] AliasMatch ^/nhhda1_reports/(..*) "D:\nhhda1\Reports\$1" WLExcludePathOrMimeType /forms/nhhda1_reports # END NHHDA1 CONFIG
plan.xml	• This file can be found under the directory <DOMAIN_HOME>\deploymentplans\formsapp\11.1.1 • This file maps the relative path given in the files forms.conf and nhhda.env • Under <variable-definition> add below entry: In the below entry, ensure that the <value> tag is mapped to the directory where NHHDA directory is created.

	<variable> <name>vd-d:\</name> <value>d:\</value> </variable> • Under <module-descriptor external="false"> add below entry: In the below entry, ensure that the url-pattern is set to the directory where the help and reports directories were created. <variable-assignment> <name>vd-d:\</name> <xpath>/weblogic-web-app/virtual-directory-mapping/[url-pattern="nhhda/reports/*"]/local-path</xpath> </variable-assignment> <variable-assignment> <name>vd-d:\</name> <xpath>/weblogic-web-app/virtual-directory-mapping/[url-pattern="nhhda/help/*"]/local-path</xpath> </variable-assignment> Note: The above changes are mapping the reports and help directories correctly. The values given in the <value> tag and url-pattern should jointly form the help and reports directories.

svaicons Directory:

Instructions for creating the svaicons directory and copy .gif files.

Files/Directories	Description
svaicons	Create the directory svaicons in the <ORACLE_HOME>\forms\java directory.
nhhda.gif	Copy the NHHDA\Icons\nhhda.gif file to the <ORACLE_HOME>\forms\java directory.
Icons	Copy all the files (including nhhda.gif) from the NHHDA\Icons directory to the <ORACLE_HOME>\forms\java\svaicons directory.

fmrweb.res File:

Instructions for maintaining the key mappings same as forms 6i.

fmrweb.res	Renamethe <ORACLE_INSTANCE>\config\FormsComponent\forms\fmrweb.res fileto<ORACLE_INSTANCE>\config\FormsComponent\forms\fmrweb_orig.res, and then copy <ORACLE_INSTANCE>\config\FormsComponent\forms\fmrpcweb.res to<ORACLE_INSTANCE>\config\FormsComponent\forms\fmrweb.res.

forms.conf File:

Instructions for customising the contents of file <forms.conf >.

Keyword	Description
/forms/html/	Change the default directory D:\oracle\Middleware11gR1\asinst_1 to reflect the correct oracle home of OFM.

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/forms/nhhda_help	Change the default directory D:\ NHHDA\Help to specify the correct location of NHHDA help files.
/forms/nhhda_reports	Change the default directory D:\nhhda_reports to specify the location where NHHDA report files are stored.
WebLogicHost	Change the default Web logic Host CTSINTBMVELX3.cts.com to specify the host where the web logic server is hosted.
WebLogicPort	Change the default web logic post number 9007 to the correct web logic port number which would have been chosen during the OFM installation.

NHHDA Reports Directory:

Instructions for creating the nhhda_reports directory which is used tostore NHHDA report files, generated from the NHHDA application.

Files/Directories	Description
reports	Create the reports folder as specified in the /forms/nhhda_reports alias in the forms.conf file to store the reports generated from the application. If different folders are required for different environments, create sub-folders e.g. with the same names as the environments, nhhda1, nhhda2 etc

formsweb.cfg File:

Instructions for customising the contents of file <formsweb.cfg>.

Keyword	Description
Global Change	Replace all occurrences of D:\oracle\Middleware11gR1\Forms11g with the correct Oracle Home if exists.

nhhda.env File:

Instructions for customising the contents of file <nhhda.env>. If there are multiple environments, then each of the multiple .env files may be customised with different values.

Keyword	Description
ORACLE_HOME	Change the default directory D:\oracle\Middleware11gR1\Forms11g to reflect the correct oracle home of OFM.
ORACLE_INSTANCE	Change the default directory D:\oracle\Middleware11gR1\asinst_1 to reflect

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	the correct oracle instance of OFM.
FORMS_PATH	Change the default directory D:\oracle\Middleware11gR1\Forms11g\ to reflect the correct oracle home of OFM. Also if the NHHDA folder was not created on D: or it was given a different name, then replace all the occurrences of D:\ NHHDA.
CLASSPATH	Change the default directory D:\oracle\Middleware11gR1\Forms11g to reflect the correct oracle home of OFM.
PATH	Change the default directory D:\oracle\Middleware11gR1\Forms11g to reflect the correct oracle home of OFM. Also if the NHHDA folder was not created on D: or it was given a different name, then replace all the occurrences of D:\ NHHDA.
FORMS	Change the default directory D:\oracle\Middleware11gR1\Forms11g to reflect the correct oracle home of OFM.
FORMS_RESTRICT_ ENTER_QUERY	By default this parameter is set to TRUE. When it is set to TRUE, Oracle Forms limits the types of query criteria that can be entered when in Enter-Query mode. In general, it disallows the use of: • conjunctions (AND, OR) • keywords which modify parts of the SELECT statement outside of the WHERE clause (ORDER BY), • All functions, including SQL functions (LENGTH, TO_CHAR, LPAD, SUBSTR). Also, the Query/Where window is unavailable when set to TRUE. If the users need the freedom to enter these types of criteria, add a line to the nhhda.env file, setting the parameter to FALSE.
EP98NREPPATH	This should not be changed from /forms/nhhda_reports which is an alias defined in the forms.conf file. The only valid change is to define the variable as a sub-folder within this alias e.g. /forms/nhhda_reports/nhhda1/. if multiple environments are configured, it should be updated by suffixing the environment number

	(as defined in the forms.conf file) e.g., /forms/nhhda1_reports/
EP98NTEMP	Change to specify the reports path. It must match the /forms/nhhda_reports alias match entry in the forms.conf file, e.g. D:\nhhda\reports. If EP98NREPPATH is defined for multiple environment, then the same sub-folder name must be added to this variable as given in the forms.conf file, e.g. D:\nhhda1\reports\
EP98NHELP	Change to specify the Help files path. It must match the /forms/nhhda_help alias match entry in the forms.conf file.
host_address	Change the host_address entry to reflect the Host address of OFM.
EP98NFILEEXT	Change the default value .nhh to specify the extension to be used for displayed NHHDA Reports. (The advantage of using an extension such as .nhh which is unique to NHHDA is thatthere is complete freedom to configure how this extension is opened on the clients.)
EP98SPORTPRTEXT	Change the default value .por to specify the extension to be used for NHHDA Reports which are printed portrait. (The advantage of using an extension such as .por which is unique to NHHDA is that there is complete freedom to configure how this extension is opened on the clients.)
EP98SLANDPRTEXT	Change the default value .lnd to specify the extension to be used for NHHDA Reports which are printed landscape. (The advantage of using an extension such as .lnd which is unique to NHHDA is that there is complete freedom to configure how this extension is opened on the clients.)
EP98PRINTW	Do not change the default value of 132 – this is used to control whether reports are printed portrait or landscape.
EP98NVERS	Do not change this line.

-N.B. Restart Oracle Application Server after modifying all configuration files.

2.3.3 Steps to install the 2-Tier Application from the CD

The UNIX web forms software is delivered as part of the database server software bundle. Once section 2.2.4 Software Installation has been run, the web forms files will be found in the unix_web_forms directory under the runtime directory.

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NHHDA Directory:

The instructions in the table below are for creating the NHHDA directory, and copying all the files from the unix_web_formsdirectory within the NHHDA installation (created in section 2.2.4) to a new directory namedNHHDA. Note that it is possible to leave the files in the location where they are delivered – in which case, omit the instructions in this table and then the directory referred to as /oradata/sva/NHHDA in subsequent sections is the unix_web_forms/NHHDA directory. Ensure that the oracle user has read and execute permissions on the files under this directory.

Files/Directories	**Description**
NHHDA	Create the /oradata/sva/NHHDA directory on the unix server where Oracle Application Server is installed (or you may choose another directory name but the instructions assume the directory is named /oradata/sva/NHHDA). If multiple environments are required for different test system, create multiple directories like NHHDA1, NHHDA2 etc.,
forms	Copy the NHHDA\forms directory with its contents from unix_web_forms to /oradata/sva/NHHDA directory.
icons	Copy the NHHDA\icons directory with its contents from unix_web_forms to oradatw/sva/NHHDA directory.
library	Copy the NHHDA\library directory with its contents from unix_web_forms to /oradata/sva/NHHDA directory.
menu	Copy the NHHDA\menu directory with its contents from unix_web_forms to /oradata/sva/NHHDA directory.
help	Copy the NHHDA\help directory with its contents from unix_web_forms to /oradata/sva/NHHDA directory.

NHHDA_Env Directory :

Instructions for copying the NHHDA_ENV directory files from the unix_web_forms directory to beneath the $ORACLE_HOME directory, where $ORACLE_HOME is the Oracle Home directory where Oracle Application Server is installed. This section cannot be omitted.

In the below example, the directory structure has the below notations.

- <MW_HOME> denotes the Middleware Home directory. For example: /app/oracle/Middleware11gR1
- <DOMAIN_NAME> denotes the domain name created during the OFM configuration. For example: ELXON
- <ORACLE_INSTANCE> denotes the Oracle instance directory of the OFM. For example: /app/oracle/Middleware11gR1/asinst_1

Files/Directories	Description
nhhda.env	Copy the NHHDA_ENV/nhhda.env file from unix_web_forms to the <MW_HOME>/user_projects/domains/<DOMAIN_NAME>/config/fmwconfig/servers/WLS_FORMS/applications/formsapp_11.1.1/config directory on the application server. If multiple environments are required for different test systems, create multiple copies of this file e.g. named nhhda1.env, nhhda2.env.
nhhdaRegistry.dat	Copy the NHHDA_ENV/nhhdaRegistry.dat file from unix_web_forms to the <MW_HOME>/user_projects/domains/<DOMAIN_NAME>/config/fmwconfig/servers/WLS_FORMS/applications/formsapp_11.1.1/config/forms/registry/oracle/forms/registry directory
formsweb.cfg	• Set the ORACLE_HOME variable to point to the OFM home directory. • If the formsweb.cfg file does not exists in <MW_HOME>/user_projects/domains/<DOMAIN_NAME>/config/fmwconfig/servers/WLS_FORMS/applications/formsapp_11.1.1/config directory: Copy the NHHDA_ENV/formsweb.cfg file from unix_web_forms to the <MW_HOME>/user_projects/domains/<DOMAIN_NAME>/config/fmwconfig/servers/WLS_FORMS/applications/formsapp_11.1.1/config directory on the application server. • If the formsweb.cfg file exists in the <MW_HOME>/user_projects/domains/<DOMAIN_NAME>/config/fmwconfig/servers/WLS_FORMS/applications/formsapp_11.1.1/config directory, add the lines below to the end of that file. [nhhda] lookandfeel=Generic colorScheme=Gray background= nhhda envFile= nhhda.env form= nhhda.fmx width=1000 height=700 separateFrame=TRUE ImageBase=codeBase serverApp= nhhdaRegistry (omit the separateFrame=TRUE line if you do want the forms application to run on a separate browser window) If multiple environments are required, create multiple sections containing these lines, named e.g. [nhhda1] [nhhda2] etc – one for each .env file and change the respective .env file name assigned in the parameter **envFile** given above.

forms.conf	• If the forms.conf file does not exist in the <ORACLE_INSTANCE>/config/OHS/ohs1/moduleconf directory: Copy the NHHDA_ENV/forms.conf file from unix_web_forms to the <ORACLE_INSTANCE>/config/OHS/ohs1/moduleconf directory on the application server. • If the forms.conf file exists in the <ORACLE_INSTANCE>/config/OHS/ohs1/moduleconf add the lines below to the end of that file. # BEGIN NHHDA CONFIG RewriteRule ^/forms/nhhda_help/(..*) /nhhda_help/$1 [PT] AliasMatch ^/nhhda_help/(..*) "/oradata/sva/NHHDA/help/$1" WLExcludePathOrMimeType /forms/nhhda_help RewriteRule ^/forms/nhhda_reports/(..*) /nhhda_reports/$1 [PT] AliasMatch ^/nhhda_reports/(..*) "/oradata/sva/NHHDA/reports/$1" WLExcludePathOrMimeType /forms/nhhda_reports # END NHHDA CONFIG • If multiple environments are configured, these lines should be updated by suffixing the environment number as given below. # BEGIN NHHDA1 CONFIG RewriteRule ^/forms/nhhda1_help/(..*) /nhhda1_help/$1 [PT] AliasMatch ^/nhhda1_help/(..*) "/oradata/sva/NHHDA1/help/$1" WLExcludePathOrMimeType /forms/nhhda1_help RewriteRule ^/forms/nhhda1_reports/(..*) /nhhda1_reports/$1 [PT] AliasMatch ^/nhhda1_reports/(..*) "/oradata/sva/NHHDA1/reports/$1" WLExcludePathOrMimeType /forms/nhhda1_reports # END NHHDA1 CONFIG
plan.xml	• This file can be found under the directory <DOMAIN_HOME>/deploymentplans/formsapp/11.1.1 • This file maps the relative path given in the files forms.conf and nhhda.env. • Under <variable-definition> add below entry: In the below entry, ensure that the <value> tag is mapped to the directory where NHHDA directory is created. <variable> <name>vd-/oradata/sva</name> <value>/oradata/sva</value> </variable> • Under <module-descriptor external="false"> add below entry: In the below entry, ensure that the url-pattern is set to the directory where the help and reports directories were created. <variable-assignment> <name>vd-/oradata/sva</name> <xpath>/weblogic-web-app/virtual-directory-mapping/[url-pattern="NHHDA/reports/*"]/local-path</xpath> </variable-assignment>

	<variable-assignment> <name>vd-/oradata/sva</name> <xpath>/weblogic-web-app/virtual-directory-mapping/[url-pattern="NHHDA/help/*"]/local-path</xpath> </variable-assignment> • Note: The above changes are mapping the reports and help directories correctly. The value given in the <value> tag and url-pattern should form the help and reports directories.

svaicons Directory:

Instructions for creating the svaicons directory and copy .gif files.

Files/Directories	Description
svaicons	Create the directory svaicons in the $ORACLE_ HOME/forms/java directory
nhhda.gif	Copy the NHHDA\Icons\nhhda.gif file from unix_web_forms\Iconsto the $ORACLE_HOME/forms/java directory.
Icons	Copy all the files (including nhhda.gif) from the NHHDA/Icons directory to the $ORACLE_HOME/forms/java/svaicons directory.

fmrweb.res File:

Instructions for maintaining the key mappings same as forms 6i.

Files/Directories	Description
fmrweb.res	Rename the <$ORACLE_INSTANCE>/config/FormsComponent/forms/admin/resource/US/fmrweb.res fileto<$ORACLE_INSTANCE>/config/FormsComponent/forms/admin/resource/US/fmrweb_orig.res, and then copy<$ORACLE_INSTANCE>/config/FormsComponent/forms/admin/resource/US/fmrpcweb.res to <$ORACLE_INSTANCE>/config/FormsComponent/forms/admin/resource/US/fmrweb.res.

forms.conf File:

Instructions for customising the contents of file <forms.conf>.

Keyword	Description
/forms/html	Change the default ORACLE_HOME /app/oracle/Middleware/asinst_1/ to the correct Oracle Home Directory of OFM.
/forms/nhhda_help	Change the default directory "/oradata/sva/NHHDA/help" to specify the location of NHHDA help files.
/forms/nhhda_reports	Change the default directory "/oradata/sva/NHHDA/reports" to specify the

	location of NHHDA report files.
WebLogicHost	Change the default Web logic Host CTSINTBMVELX3.cts.com to specify the host where the web logic server is hosted.
WebLogicPort	Change the default web logic post number 9007 to the correct web logic port number which would have been chosen during the OFM installation.

NHHDA Reports Directory :

Instructions for creating the reports directory, which is used to store NHHDA report files generated from the NHHDA application.

Files/Directories	Description
reports	Create the reports folder as specified in the /forms/nhhda_reports alias in the forms.conf file to store the reports generated from the application. Ensure that the oracle user can write to this directory. If different folders are required for different environments, create the reports folder uner the respective NHHDA folder created. e.g. Create the folder reports under NHHDA1, NHHDA2 and NHHDA3 etc.

Formsweb.cfg File :

Instructions for customising the contents of file<formsweb.cfg>

Keyword	Description
Global Change	Replace all occurrences of D:\oracle\Middleware11gR1\Forms11gwith the correct Oracle Home if exists

nhhda.env File :

Instructions for customising the contents of file<nhhda.env>. If there are multiple environments, then each of the multiple .env files may be customised with different values.

Keyword	Description
ORACLE_HOME	Change the default directory /app/oracle/Middleware/Forms11g to reflect the correct oracle home of OFM.
ORACLE_INSTANCE	Change the default directory /app/oracle/Middleware/asinst_1 to reflect the correct oracle home of OFM
TNS_ADMIN	Change the default directory /app/oracle/Middleware/asinst_1/config to reflect the correct TNS admin directory of OFM.
FORMS_PATH	Change the default directory /app/oracle/Middleware/Forms11g to reflect the correct

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	oracle home of OFM. Also if the NHHDA folder was not created under /oradata/sva or not named NHHDA then replace all occurrences of /oradata/sva/NHHDA.
CLASSPATH	Change all the occurrence of the default directory /app/oracle/Middleware/Forms11g to reflect the correct oracle home of OFM.
PATH	Change all the occurrence of the default directory /app/oracle/Middleware/Forms11g to reflect the correct oracle home of OFM. Also if the NHHDA folder was not created under /oradata/sva or not named NHHDA then replace all occurrences of /oradata/sva/NHHDA.
LD_LIBRARY_PATH	Change the default directory /app/oracle/Middleware/Forms11g to reflect the correct oracle home of OFM. Change the default directory /tmp/OraInstall2006-12-05_09-28-55AM/jre/1.4.2/ to reflect the correct jre home. Also if the NHHDA folder was not created under /oradata/sva or not name NHHDA then replace all occurrences of /oradata/sva/NHHDA.
FORMS_RESTRICT_ENTER_QUERY	By default this parameter is set to TRUE. When it is set to TRUE, Oracle Forms limits the types of query criteria that can be entered when in Enter-Query mode. In general, it disallows the use of: • conjunctions (AND, OR) • keywords which modify parts of the SELECT statement outside of the WHERE clause (ORDER BY), • All functions, including SQL functions (LENGTH, TO_CHAR, LPAD, SUBSTR). Also, the Query/Where window is unavailable when set to TRUE. If the users need the freedom to enter these types of criteria, add a line to the nhhda.env file, setting the parameter to FALSE.
EP98NREPPATH	This should not be changed from /forms/nhhda_reports/ which is an alias defined in the forms.conf file. If multiple environments are configured, then it should be updated by suffixing the environment number (as defined in the forms.conf) e.g., /forms/nhhda1_reports/

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EP98NTEMP	Change to specify the reports path. It must match the /forms/nhhda_reports alias match entry in the forms.conf file e.g.. /oradata/sva/NHHDA/reports If EP98NREPPATH is defined for multiple environments, then it should be changed to match with the alias entry in the forms.conf file. e.g. /oradata/sva/NHHDA1/reports.
EP98NHELP	Change to specify the help files path. It must match the /forms/nhhda_help alias match entry in the forms.conf file.
host_address	Change the host_address entry to reflect the Host address of OFM.
EP98NFILEEXT	Change the default value .nhh to specify the extension to be used for NHHDA Reports. (The advantage of using an extension such as .nhh which is unique to NHHDA is that there is complete freedom to configure how this extension is opened on the clients.)
EP98SPORTPRTEXT	Change the default value .por to specify the extension to be used for NHHDA Reports which are printed portrait. (The advantage of using an extension such as .por which is unique to NHHDA is that there is complete freedom to configure how this extension is opened on the clients.)
EP98SLANDPRTEXT	Change the default value .lnd to specify the extension to be used for NHHDA Reports which are printed landscape. (The advantage of using an extension such as .lnd which is unique to NHHDA is that there is complete freedom to configure how this extension is opened on the clients.)
EP98PRINTW	Do not change the default value of 132 – this is used to control whether reports are printed portrait or landscape.
EP98NVERS	Do not change this line.

N.B. Restart Oracle Application Server after modifying all configuration files.

2.3.4 Oracle Net Services Configuration

Use Oracle Net Services Easy Configuration to set up the Database Alias to point at the server machine. (The server host name, Oracle instance name and the port number are needed for this step.)

2.3.5 Installation Steps for Clients

2.3.5.1 Associating the File Extension used for viewing files.

As described in sections 2.3.2 and 2.3.3, the NHHDA report file name extension can be set to any name in the environment file nhhda.env of theOracle Application Server using EP98NFILEEXT. (For example EP98NFILEEXT= .nhh). If this extension is associated with an application

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e.g. Wordpad on the Clients, then the file will be displayed using that application; if there is no association for that extension, then the file will be displayed in a new browser window.

If the client is a Windows PC, associations must be made with the "Use DDE" checkbox ticked for the Open action for the file type.

An advantage of using the browser to display the file is that it is then not possible for the user to accidentally change the contents of the local copy of the file as it is displayed.

2.3.5.2 Associating the File Extensions used for printing files.

The nhhda.env file also contains two variables EP98SLANDPRTEXT andEP98SPORTPRTEXT which specify the extensions for files which are to be printed landscape and printed portrait. There must be association for these file extensions set up in the same way, if the print button is to be used. If the Client is a Windows PC, then they may be associated to the programs printpro.exe and portrait.exe (which must be installed first, see next section).

Appendix F contains further details of how to associate an extension on a Windows PC. The example described is the association of the .lnd extension to the printpro program.

2.3.5.3 The printpro and portrait print programs.

For Windows PC clients, the example print executables printpro.exe and portrait.exe may be used for printing files landscape and portrait.

Note that the executables portrait.exe and printpro.exe do not form part of the warranted NHHDA system. They are provided as examples of programs which print portrait and landscape reports.

These example executables are delivered with the Windows Application Server in the folder PC Print. They should be copied from there into a folder on the PC (or on a network file server) and this folder must be referenced when the file association is carried out.

2.3.5.4 Pop-up Blockers.

Any pop-up blocker running on the client must be disabled, or else it will not be possible to use the view reports function.

2.3.5.5 Proxy Servers

The web browser on the Client must be configured so that it does not use a proxy server when accessing the Application Server. (e.g. for Internet Explorer this is done in the Communications tab of the Internet Options dialog box). This is to ensure that if a new report file is generated with the same name as an older report file, then the new one will always be downloaded; this scenario will not occur in normal live operation but could do in a Disaster Recovery situation or on test instances where database restores or imports are carried out.

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2.4 Start the NHHDA System

2.4.1 Starting the Database Server processes

The NHHDA system start script can now be run, logged on as the batch O/S user. This is called:

`nhhda_start` - starts all NHHDA background tasks

2.4.2 Accessing the Front End

From an Internet Explorer window, type in the URL

http://<hostaddr>:<port_no>/forms/frmservlet?config=nhhda

- where <hostaddr> should be substituted with the address of the server – same as the value of the <hostaddr> variable in nhhda.env
- where <port_no> is the web logic port number which would have been chosen during the OFM installation – same as the value of the <WebLogicPort> variable in forms.conf
- assuming the env file is named nhhda.env

2.5 Installation Notes

Since both ORACLE and the NHHDA application software are installed relative to a home directory which is a system environment variable, no assumptions have been made regarding the directory structure prior to such an installation. Indeed, the system manager can decide where in the system to install both these items of software.

2.6 Database Statistics

Oracle database statistics must be collected in order for the performance of the applications to be optimal. This must be done for the first time before the NHHDA application is started.

The commands run by Cognizant for the database used for performance testing are listed in Appendix E.

Note in particular the commands to record histogram statistics on the NDB_MS_EXCEPTIONS partitioned tables – the inclusion of these gives a significant performance gain to the Check Data Collector Data process.

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3 Building the Source Code

3.1 Introduction

The NHHDA source code can only be built by users who are licensed to use and develop the code.

3.2 Build Prerequisites

The build of the source code can only be carried out once the entire installation procedure has been completed (see Section 2).

3.3 Build Source Code Procedure

This section details the steps required to build the NHHDA source code.

3.3.1 Introduction

It is recommended that an "NHHDA Owner O/S user is created to perform the source code build. This user should be created in the same O/S group as the batch O/S user created in Section 2.2.1.

The build uses the NHHDA Oracle user created in Step 2.2.5.2. If that user has not given Oracle username "nhhda" and Oracle password "nhhda" then the build must be changed . The procedure to do this is described in Section 3.3.4. The username of the "nhhda owner" O/S does not have to be nhhda.

3.3.2 Build Package Installation

The installation should be performed as the NHHDA O/S user using the Korn shell. It is not necessary to set the umask. Extract the contents of the tape or CD or FTP Site to the home directory of the NHHDA O/S user. The command to do the extract for a tape is specified in the Release Notes. There should be only one file extracted, src_setup_solaris_<*Release_Number*>. This file is a self extracting executable.

3.3.3 Extracting Source Code and Build Files

The build of the source code must be carried out in a directory which is not the $HOME directory. Therefore make a new directory:

cd $HOME

mkdir build

To unpack the source files type:

src_setup_solaris_<Release_Number>

Follow instructions as they are displayed on screen.

The target directory is displayed and should be the 'build' directory.

If this is not correct then to the prompt:

"Do you want to change these settings"

type:

Y<CR>

and specify the path of the 'build' directory:

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/usr01/Users/nhhda/build

otherwise hit the <RETURN> key to continue.

At the prompt:

"Confirm to continue installation with these parameters"

the default is 'Y'.

Hit the <RETURN> key to continue.

Unpacking produces the directory tree structure as described below:

common
common/bin
common/cfr
common/cfs
common/clg
common/cph
common/crp
common/csc
common/fck
common/hdr
common/install
common/lib
common/lib/cfs
common/lib/clg
common/lib/cph
common/lib/csl
common/pc_print
include
nhhdas
nhhdas/include
nhhdas/include/db
nhhdas/nar
nhhdas/nar/include
nhhdas/nar/nar_ad
nhhdas/nar/nar_ci
nhhdas/nar/nar_go
nhhdas/nar/nar_pc
nhhdas/nar/nar_rm
nhhdas/ncd
nhhdas/ncd/ncd_ce
nhhdas/ncd/ncd_go
nhhdas/ncd/ncd_pc
nhhdas/ncd/ncd_rm
nhhdas/ndb
nhhdas/ndb/archive
nhhdas/ndb/backup
nhhdas/ndb/db
nhhdas/ndb/db/db_pop
nhhdas/ndb/db/or_upgrades
nhhdas/ndb/db/release_x (multiple directories containing database scripts)

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nhhdas/ndb/db/test
nhhdas/ndb/db/test/agg
nhhdas/ndb/db/test/cdcd
nhhdas/ndb/db/test/cp1089
nhhdas/ndb/db/test/cp965
nhhdas/ndb/db/test/dast
nhhdas/ndb/db/test/lcr163
nhhdas/ndb/db/test/lcr192
nhhdas/ndb/db/test/lcr192/results
nhhdas/ndb/db/test/lcr203
nhhdas/ndb/db/test/lcr203/results
nhhdas/ndb/db/test/lcr207
nhhdas/ndb/db/test/nld
nhhdas/ndb/db/test/nmi
nhhdas/ndb/db/test/or2961
nhhdas/ndb/db/test/or3124
nhhdas/ndb/db/test/or3125
nhhdas/ndb/db/test/or3139
nhhdas/ndb/db/test/or3152
nhhdas/ndb/db/test/or3161
nhhdas/ndb/db/test/or3162
nhhdas/ndb/db/test/or3167
nhhdas/ndb/db/test/or3171
nhhdas/ndb/db/test/or3173
nhhdas/ndb/db/test/or3175
nhhdas/ndb/db/test/or3176
nhhdas/ndb/db/test/or3203
nhhdas/ndb/db/test/or3208
nhhdas/ndb/db/test/or3293
nhhdas/ndb/db/test/or3397
nhhdas/ndb/db/test/results
nhhdas/ndb/example_db_cre
nhhdas/ndb/maintain
nhhdas/ndp/include/
nhhdas/ndp/ndp_ci/
nhhdas/ndp/ndp_pc/
nhhdas/ndp/ndp_rm/
nhhdas/nfat
nhhdas/nfat/bin
nhhdas/nfat/instr
nhhdas/nfat/mdd
nhhdas/nfat/misc
nhhdas/nfat/pst
nhhdas/nfat/sql
nhhdas/nfr
nhhdas/nhh
nhhdas/nld
nhhdas/nld/include
nhhdas/nld/nld_ctl
nhhdas/nld/nld_fil

nhhdas/nld/nld_mdd
nhhdas/nld/nld_pst
nhhdas/nld/ndd
nhhdas/nmi
nhhdas/nmi/include
nhhdas/nmi/nmi_ctl
nhhdas/nmi/nmi_fil
nhhdas/nmi/nmi_mif
nhhdas/nmi/nmi_pro
nhhdas/nmi/nmi_ret
nhhdas/nmi/nmi_upd
nhhdas/ntraining
nhhdas/setup

nhhdas/web_forms
nhhdas/web_forms/config
nhhdas/web_forms/forms
nhhdas/web_forms/help
nhhdas/web_forms/icons
nhhdas/web_forms/library
nhhdas/web_forms/menu
setup

Figure 4: NHHDA Directory Structure

If the target environment variable is not set then set the target directory for the build directory tree. At the UNIX prompt type:

export TARGET=$HOME/build/sw

Set the PATH environment variable to include the path details of the bin used for the build. Type:

export PATH=$HOME/build/bin:$PATH

3.3.4 Changing the Build Details

To change the build details so that another user can run the build the file:

`build2.c`

must be edited.

Change directory:

cd $HOME/build/sw

Edit the file build2.c in the 'sw' directory. Search for the string "userid". Change the userid value from:

nhhda/nhhda

to:

the oracle username / password of the NHHDA Oracle user.

Also, amend username/password occurrences in:

$HOME/build/sw/nhhdas/ndb/db/dump_db

$HOME/build/sw/check_condev

3.3.5 The Build of the Web Forms

The build directory tree contains the forms source code. The directory web_forms contains source code that was developed using Forms Developer 11gR1 which may be built into forms executables to run on Windows or Solaris.

3.3.5.1 Web Forms for Windows Application Server

The files beneath the web_forms directory must be transferred to a Windows server and built there.

3.3.5.2 Web Forms for Solaris Application Server

The files beneath the web_forms directory are built as part of the build as described in the next section. In order for it to work, edit the following ksh script files:

sw/nhhdas/web_forms/forms/build_forms

sw/nhhdas/web_forms/menu/build_menus

sw/nhhdas/web_forms/library/build_libraries

The following lines in these files need to be changed:

export DISPLAY=158.234.27.31:0.0

export ORACLE_HOME=/app/oracle/Middleware/Forms11g

The value of the DISPLAY environment variable must be changed to the IP address of a device running X-windows. The value of the ORACLE_HOME environment variable must be changed to the Oracle Home under which the forms builder is installed.

3.3.6 Executing the Build

Move to the sw directory and type:

build sw . > output.txt 2>&1

Examine the output.txt file to ensure the build has completed successfully.

Messages of the form:

cp: …: is a directory

may be ignored.

3.3.7 Installing the Build

Move to the build/sw/nhhdas/setup directory and type:

ship

This creates a new nhhda_setup_solaris file in this directory. This can then be moved to the home directory of the batch O/S user and installed as in section 2.2.4.

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4 An Upgrade of the Application Software

Upgrades to delivered software will be handled by supplying:

- amended source;
- replacement object code for changed objects (database server and application server);
- a release note covering the procedure for installing the update;

The upgrade will also include programs or scripts to convert any existing data to the format required post-update (if this differs from the format before the changes). For example, a script to add a new column to a database table, or a program to convert from one format of flat file to a revised format for that file.

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Appendix A NHHDA Oracle Database Tablespaces

Several tablespaces are required on the NHHDA database. There is a set of 'static' tablespaces that exist on all NHHDA installations and then a set of tablespaces that are dependent on the number of partitions on the database. The number of partitions is dependent on the amount of data in the database and the number of processors on the machine. Sizes given below are for a full 10000000 metering system aggregator with all data fields filled.

A.1 Static Tablespaces

The static tablespaces are as follows:

Tablespace	Size (Mb)
SYSTEM	70
RBS (NB spread across disks)	240
USERS_INDEXES	50
TEMP_OBJECTS	200
TEMP (NB spread across disks)	1700
USERS	245
AUDIT7	20
AUDIT6	20
AUDIT5	20
AUDIT4	20
AUDIT3	20
AUDIT2	20
AUDIT1	20
TEMP_OBJECTS_INDEX	200
INSTRUCTIONS	200
INSTRUCTIONS_INDEX	40

A.2 Partition Tablespaces

The default number of partitions is 48 and assuming that there are 8 processors on the target machine this will require 6 groups of partition data. There are two tablespaces per partition (data and indexes):

Tablespace	Size Mb
METER_PARTITION_n	916
METER_PARTINDEX_n	780

where n is numbered 1 to 48. The important thing is to separate the data and indexes and to prevent a conflict between aggregation processes reading from the same disks. In the scenario above there will be at least 16 disks with one set of 8 with data and one set with indexes. Data tablespaces 1,9,17,25,33 and 41 will be on disk 1, 2,10,18,26,34 and 42 will be on disk 2 etc. (space allowing). Aim for 150,000 - 250,000 Metering Systems per partition with the number of partitions a multiple of the number of processors.

Appendix B Building on Other Platforms

B.1 Source Tape

B.1.1 Extracting from the tape

The code required to build the system is packed in file "src_setup_solaris". This is a uuencoded, compressed file containing the "build" directory contents (which has a structure as defined in section 2.2.2.2) plus a shell script to automatically expand the software attached to the front.

Assuming you have created a directory "build" that contains "src_setup_solaris" and this is the current directory, the build tree structure can be extracted manually using the following commands:

```
uudecode src_setup_solaris
uncompress -d src.tar.Z
tar -xf src.tar
```

B.1.2 Source contents

The following file types appear as part of the source:

File Suffix	Description
.sc	Source code containing Oracle statements
.c	C source code
.h	Include files
.tpi	Function prototypes of internal functions
.tpl	Function prototypes of external functions
.bcm	Link files to link objects to executables

B.2 Building the NHHDA software

B.2.1 NHHDA Executables

The following executables need to be built for the NHHDA system:

Executable	Description	Directory	*
	Common processes	common/…	
cfrd	File Receipt Manager	cfr	
cfsd	File Send Manager	cfs	
cscd	Scheduler	csc	
clgd	Logging daemon	clg	*
dump_audit	Unload data from audit database tables	clg	*
crpfmt	Report formatter	crp	
	Aggregation processes	nhhdas/nar/…	
nar_pc.exe	Main Aggregation process	nar_pc	
nar_ci.exe	Calculate increments	nar_ci	
nar_ad.exe	Aggregate data	nar_ad	
nar_go.exe	Generate SPM output	nar_go	
	Check Data Collector processes	nhhdas/ncd/…	

Executable	Description	Directory	*
ncd_pc.exe	Main Check Data Collector process	ncd_pc	
ncd_ce.exe	Calculate exceptions	ncd_ce	
ncd_go.exe	Generate Exception output	ncd_go	
	EAC Data to Distributor report **processes**	nhhdas/ndp/…	
ndp_pc.exe	Main EAC Data to Distributor report process	ndp_pc	
ndp_ci.exe	Retrieve EACs	ndp_ci	
	Other Processes	nhhdas/...	
nmi.exe	Main Instruction Processing process	nhhdas/nmi	
nld.exe	Main Load Data process	nhhda/nld	
nhh_unlock.exe	Unlock database (after backup complete)	nhhdas/nhh	
nhh_submit.exe	Queue a job for processing	nhhdas/nhh	
archive.exe	Main Archive program	ndb/archive	
arc_dbs.exe	Database Archive program	ndb/archive	
	Report processes	nhhdas/nfr/…	*
naf.exe	AFYC report		
dars.exe	Data Aggregation Run Schedule report		
gsp_grp.exe	GSP groups report		
instruc.exe	Instruction report		
msai.exe	Meter System and associated items report		
ms_hist_eac_aa.exe	Metering System History, EAC and AA report		
pro_cls.exe	Profile class and associated items report		
sscai.exe	SSC and associated items reports		
distrib.exe	Distributors and associated items report		
dc_except.exe	Data Collector Data exception log report		
agg_except.exe	Aggregator exception log report		
supplier_pm.exe	Generate SPM file		
rfirept.exe	Refresh Instruction Failure Report		
dc_summ_except.exe	Data Collector Summary Report		

Each executable has a source file in the directory indicated. The source for this has a name based on the executable name but with suffix ".sc".

The source file may have include directives that reference:

- C include files (".h" files);
- Templates for the functions used internally (".tpi" files);
- Templates for the functions used from library code (".tpl" files).

Where a non-standard source file is required or an alternative build is required this is indicated by an asterisk in the last column.

B.2.2 Common Library

The executables described in the previous section make use of the common (library) routines listed below:

Source	Description	Directory (common/lib/…)
cfs_file.sc	File Sender Interface	cfs
clg_log.sc	Logging interface	clg
csl_file.sc	File Handling library	csl
csl_record.sc	Record Handling library	csl
csl_field.c	Field Handling library	csl
csl_misc.sc	Miscellaneous library	csl
cph_daemon_control.c	Daemon process control	cph
cph_process.c	Other process control	cph

Before building the executables, the object code from these sources should be prepared as a shared object library. This library can then be searched for required routines when linking each of executables. The link files, with extension .bcm, can be used to build the shared object library.

B.2.3 Building executables

To build the executables, the following steps are necessary:

1. Compile the template.c and bitfield.c files. These files are used in the compilation of other files.
2. Replace any calculated values in the array sizes in the source (".sc" files).
3. Pass the resulting pre-compiler source through the Oracle pre-compiler to create C source code (".c" files).
4. Generate the ".tpi" and ".tpl" files needed for the compilation.
5. Compile the source using the C compiler to produce object code (".o" files).
6. Create an executable by combining the required code and libraries (".bcm" files can be used to build the executables).
7. The built executables should be moved to the appropriate runtime binaries' directory, e.. $NHHDA/bin.

Each of these stages, and options likely to required, are described in the following sections.

B.2.3.1 Compile template.c and bitfield.c files

Compile template.c and bitfield.c in the $TARGET/setup directory.

Copy the new executables 'template' and 'bitfield' to the $TARGET/bin directory, replacing the existing ones.

B.2.3.2 Removing array size calculations

The Oracle pre-compiler may not be able to cope with array sizes that include a calculated value, e.g.

```
char    my_name[MY_NAME_LEN + 1];
```

Since such declarations are frequently required for "C" character strings, a pre-processor program has been included to replace such occurrences by a single value.

The source of this program is called:

```
rep.c
```

and the executable that created from it takes two arguments:

1. input file name
2. output file name

B.2.3.3 Oracle pre-compiler options

When running the Oracle pre-compiler the following options may be needed:

Flag	Value	Comment
mode	oracle	Code is designed for Oracle
include	See comment	The include path should contain at least: • the delivered source "include" directory • the system 'C' include directory
sqlcheck	semantics	Semantic checks
code	ansi_c	Produce ANSI C compliant code
ireclen	132	Input record length of .sc files
oreclen	132	Output record length of .c files
userid	See comment	User/password for NHHDA database

B.2.3.4 Generate the ".tpi" and ".tpl" files

Run the template utility (built in step 1), as shown below, to create, for example, the files nld.tpi and nld.tpl:

```
template -itpi -xtpl nld_ctl.c
```

B.2.3.5 C Compiler options

The include files search path should be the same as for the Oracle pre-compiler, as described in the previous section.

B.2.3.6 Link options

Unless otherwise stated in the following section, all the source code for each executable needs to be linked with:

- the common library (described earlier),
- the Oracle shared library (e.g. libclntsh.so),
- any C libraries required (e.g. libc.a).

Links required are defined in the link (.bcm) files.

B.2.4 Detailed instructions for specific executables

The following sections describe any deviations from the build mechanism described above.

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B.2.4.7 Logging daemon

This source of this executable has a non-standard name:

```
common/clg/clg_daemon.sc
```

B.2.4.8 Dump Audit

This executable has two source files:

```
common/clg/aud_proc.sc
common/clg/clg_audit.sc
```

The first of these is the main program, the second a function used by that.

B.2.4.9 Reports executables

Each of these executables also requires the reports library object. The source of this is found in:

```
nhhdas/nfr/nfr.sc
```

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Appendix C Example Scripts

Note that up to date example database creation scripts and Oracle Initialisation Parameter file (init.ora) are delivered with the NHHDAsoftware in the sql directory (files cr_nhhda.sql, init_nhhda.ora.)

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Appendix D Performance Test Environment

Appendix D will not be maintained, it is only retained for reference.

This appendix contains details of the hardware configuration used in the Performance Testing of NHHDA at Cognizant's development centre. It also provides the volumes of data for the example scenario used for the testing, the processor queue widths, the Oracle initialisation files, and the sizes of the databases and files used in these scenarios. This appendix also gives timings for the activities performed during testing.

D.1 Configuration

D.1.1 Hardware Configuration

The configuration of the hardware used was as follows:

- SPARC Enterprise T5120 with:
  - 1 Physical CPU with 32 Virtual Processor each of 1165 MHz
  - 8 Gbyte RAM
  - 7 * 136 GB Internal disks
  - 100GB storage disk
  - 1 Disk Controller
- Client PCs connected via telnet
- OS Disk not configured as stripe set. Other internal disk are configured as RAID5 striped data set zpool volume

Disk connectivity was:

- 1 SCSI on which 7 internal Disk connected

D.1.2 Disk Configuration

The disk configuration was as follows:

- 8 METER table tablespaces (METER_PARTITION_1..8) and 8 METER index tablespaces (METER_PARTINDEX_1..8) were located on each disk;
- 750 Mb sort area size;
- asynchronous I/O;
- cost based optimizer with no statistics;
- parallel query turned off (parallel query is not necessary, as NHHDA already runs in parallel).

D.1.3 Partition Placement

- NAR intermediate files on a file system of 100GB
- Following Tablespaces reside on a file system of 100GB
  - USERS
  - USERS_INDEXES

- TEMP_OBJECTS
- TEMP_OBJECTS_INDEX
- SYSTEM
- SYSAUX
- UNDO
- TEMP
- AUDIT1..7

- Redo logs on the above file system

D.1.4 Disk Usage

- Flat file layout, sufficient for tests
  - All output to one multi-volume striped disk set
  - Can be spread differently using:
    - links
    - file type, status combinations (see section 2.2.5.4)

D.2 Example Scenario

The following volumes of data were used in the performance testing:

- 14 GSP groups
- 22 Distributors
- 733 SSCs
- 1176 Measurement Requirements
- 22 PRS agents
- 2 ISR Agents
- 995 LLFs
- 143 Suppliers
- 4,035,370 metering systems
- 27 Data Collectors
- 30 Aggregation Runs per day

D.3 Processor Queue Widths

Queues control the number of jobs of a given type that can run simultaneously. The widths below were used to achieve a balance on the 12 processor machine.

Queue	Width
EXCLUSIVE	1
NAR_CI	2
NAR_AD	20
NAR_GO	20
NCD_CE	2
NCD_GO	2
NMIARR	1

Queue	Width
NMIAPP	4
NMIRET	1
NMIRFR	4
NMIMIF	4
NREPORT	4
CRPFMT	4
NMIRFT	4
NARCDB	2

D.4 Performance Timings

The optimum performance timings are shown below for the main NHHDA tasks:

Job	Time (HH:MM)
Aggregation	00:57
Instruction Processing	00:31
Archive	03:39
Check Data Collector Data	00:31

The parameters used in the tests were as follows:

Aggregation

4,035,370 metering systems.

30 runs.

13 month date range.

Instruction Processing

PRS files, with 399 instructions in each.

DC files, with a total of 166 instructions.

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Appendix E Database Statistics

This appendix lists the commands run by Cognizant to gather statistics on the database before commencing performance testing. Note that these commands are for a database with 16 partitions, and where the greatest number of distinct values for current_supp_id, current_dc_id and dist_participant_id in the NDB_MS_EXCEPTIONS view is less than 50.

```
EXEC DBMS_STATS.gather_schema_stats(ownname=>'NHHDA',

estimate_percent=>100,

method_opt=> 'FOR ALL INDEXED COLUMNS SIZE AUTO', cascade=>true);
EXEC dbms_stats.gather_system_stats;
EXEC dbms_stats.gather_dictionary_stats;


-- Create histogram on columns in the NDB_MS_EXCEPTIONS tables
--
-- This is for a database with 16 partitions, change the limit of the FOR
--  LOOP if you have a different number of partitions
--
--  If the greatest number of distinct values for  current_supp_id,
--  current_dc_id and dist_participant_id in the NDB_MS_EXCEPTIONS
--  view is greater than 50, increase the number in the method_opt
--  parameter value accordingly
--
BEGIN
FOR i in 1..16
LOOP
   dbms_stats.gather_table_stats(ownname          => 'NHHDA',
                                 tabname          => 'NDB_MS_EXCEPTIONS_' ||
LTRIM(TO_CHAR(i,'99')),
                                 estimate_percent => NULL,
                                 method_opt       => 'FOR COLUMNS SIZE 50
current_supp_id, current_dc_id, dist_participant_id');
END LOOP ;
END ;
/
```

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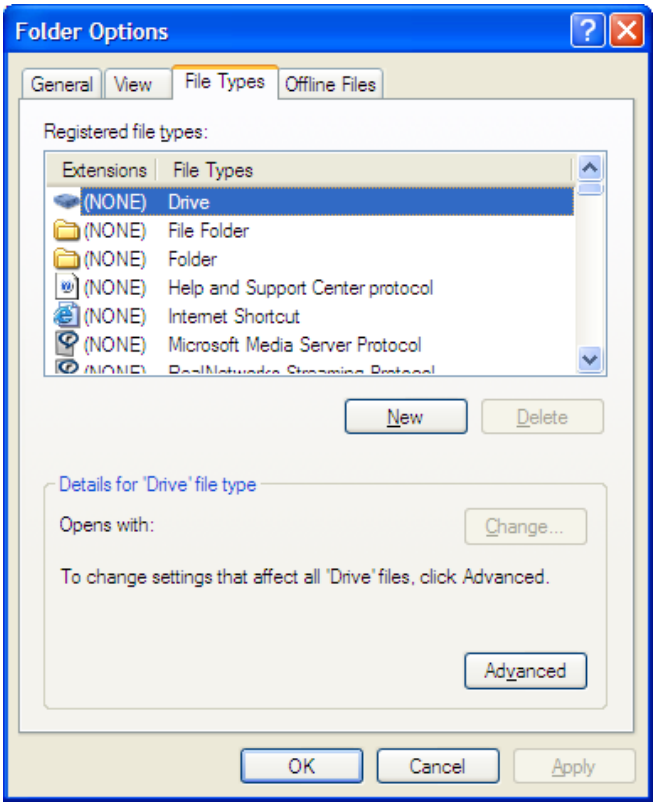
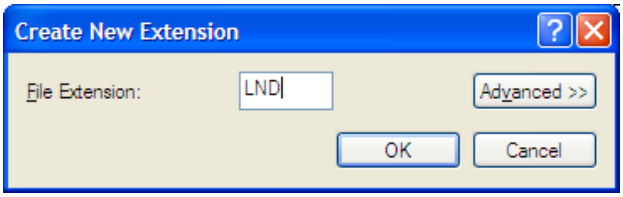
Appendix F Associating a File Extension on a Windows PC

This appendix gives instructions for associating the "LND" extension to the printpro program.

From Windows Explorer select the Folder Options menu option from the Tools menu, then select the File Types tab:



Click on the New button, and type in LND:



Select OK then select LND from the list of extensions, and click on the Change button, then this box appears:

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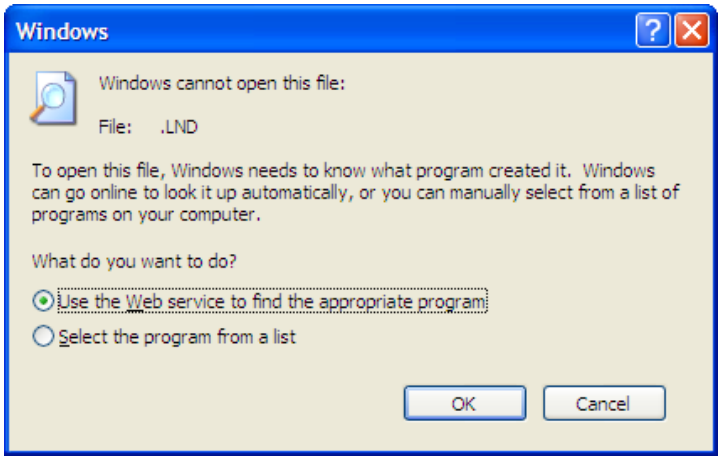
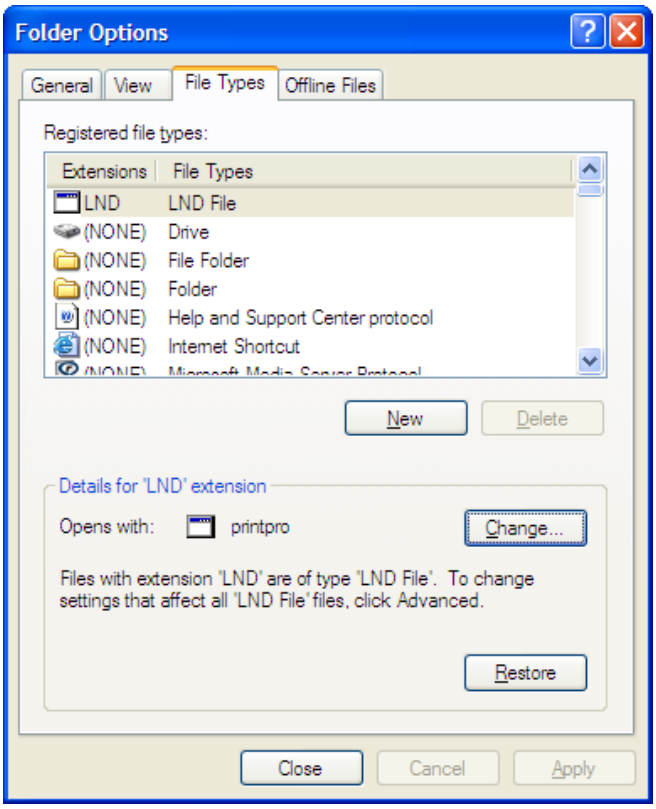


Select the second radio button "Select the program from a list" and click on OK. The "Open With" dialogue box now appears. Click on the Browse button, browse to where printpro.exe is installed, select it, and click on the Open button. The Folder Options dialogue box now shows that the LND extension opens with Printpro:



If the Restore button appears as shown here, click on it, and the Restore button is replaced by the Advanced button:

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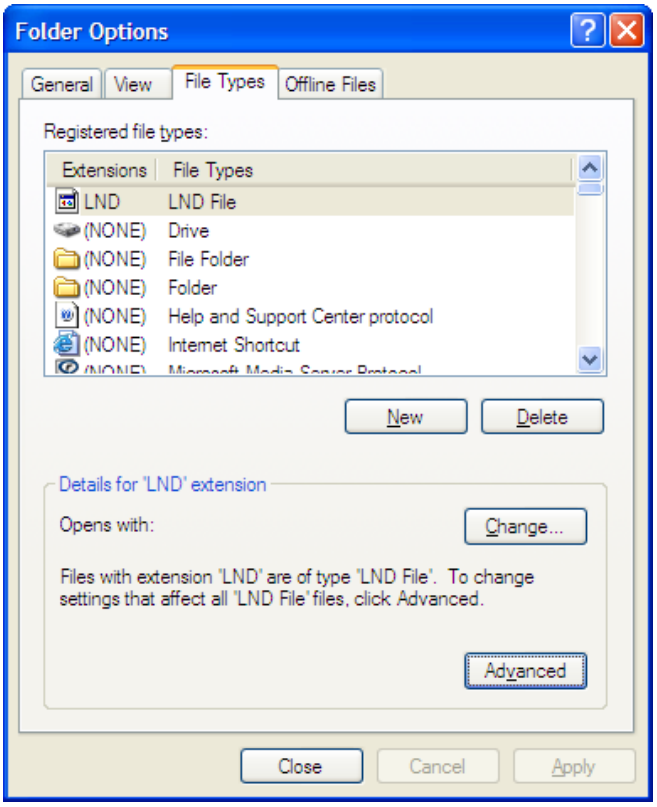
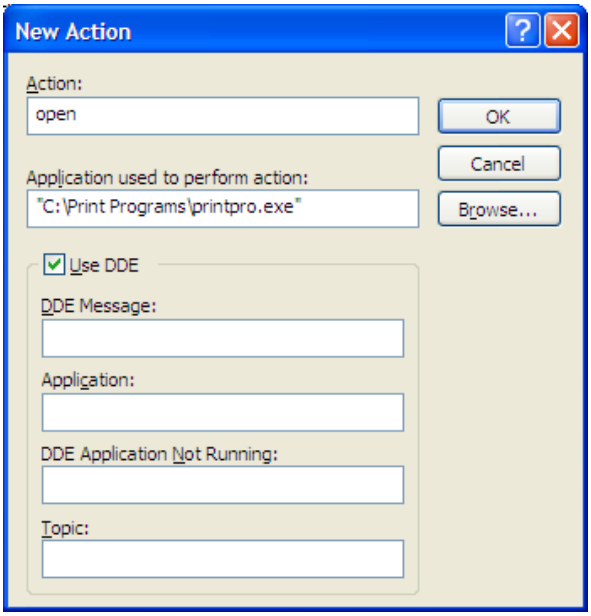


Click on the Advanced button, and the Edit File Type dialog box appears. Click on New .. and the New Action dialog box appears: enter open in the Action field, click on Browse to locate printpro.exe, and select the "Use DDE" checkbox:



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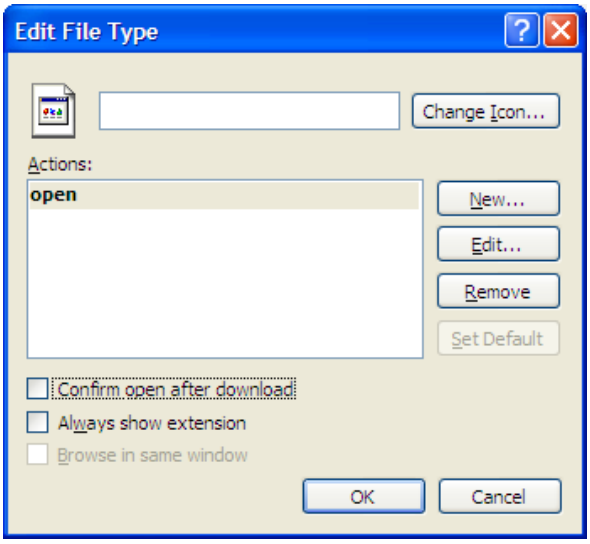
Click on OK. Then ensure that the "Confirm open after download" checkbox is **not** selected on the Edit File Type dialog box:



The file association operation is now complete.

Appendix G Oracle Application Server Patches

The following patches should be applied to the Oracle Application Server installation, on top of 11.1.1.6.0:

Patch	Description	Product	Release	Last Updated
14373988	OFM SPU (Security Patch Update)	Oracle Fusion Middleware	11.1.1.6.0	Oct 2012
14003476	OFM CPU (Critical Patch Update)	Oracle Fusion Middleware	11.1.1.6.0	July 2012
14736139	WLS PSU (Patch Set Update)	Oracle Weblogic Server	10.3.6.0.3	Jan 2013

Note: There are no patches required for OFM version 11.1.2.2.0 which needs to be installed on Windows platform.

Appendix H OS Patches

<table>
<tr><th>OS Name</th><th>Current Version</th><th>Proposed Version</th><th>Notes and Source</th></tr>
<tr><td>Solaris</td><td>Solaris 10 5/09 s10s_u7wos_08 SPARC (64 bit)</td><td>Same as current version but with additional requirements mentioned below
Packages Requirement:
• SUNWarc
• SUNWbtool
• SUNWhea
• SUNWlibC
• SUNWlibm
• SUNWlibms
• SUNWsprot
• SUNWtoo
• SUNWi1of
• SUNWi1cs (ISO8859-1)
• SUNWi15cs (ISO8859-15)
• SUNWxwfnt
• SUNWcsl
• Motif: 2.1.01
• GCC: package 3.4.2 or higher2

Solaris patch requirement:
All the patches mentioned below need to be installed with the below version or above:
120753-06: SunOS 5.10: Microtasking libraries (libmtsk) patch
139574-03: SunOS 5.10
141414-02
141444-09
119963-14: SunOS 5.10: Shared library patch for C++
124861-15: SunOS 5.10 Compiler Common patch for Sun C C++ (optional)
125555-03
139555-08
140796-01
140899-01
141016-01
141414-10
141736-05
127111-02 - The patch is for forms
137111-04 - The patch is for forms

Java Requirement:
1.6.0.29+ - Can install update 29 or higher version.
Shell limits requirement:
<table><tr><th>ell Limit</th><th>Recommended Value</th><th>Existing value</th></tr><tr><td>TIME</td><td>(Unlimited)</td><td>limited</td></tr><tr><td>LE</td><td>(Unlimited)</td><td>limited</td></tr><tr><td>ATA</td><td>nimum value: 1048576</td><td>limited</td></tr></table></td><td>http://www.oracle.com/technetwork/middleware/ias/downloads/fusion-requirements-100147.html

http://docs.oracle.com/cd/E11882_01/install.112/e24346/pre_install.htm</td></tr>
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		TACK	nimum value: 32768	92	
		OFILES	nimum value: 4096	6	
		MEMORY	nimum value: 4194304	limited	

The shell limits for STACK -50000 and NOFILES-65536 needs to be set.

Kernel Parameter settings required:

esource Control	*Min. Value required*	*Existing Value*
project.max-sem-ids	0	8
ocess.max-sem-nsems	6	2
oject.max-shm-memory	94967295	GB
oject.max-shm-ids	0	8

Windows	Windows Server 2012 SP 1 (64 bit)	**Java Requirement:** 1.6.0.29+ - Can install update 29 or higher version.	

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Appendix I DB Patches

Software	Current Version	Proposed Version	Notes and Source
Oracle Database	10.2.0.3	11.2.0.3	Part Number is E24903-01 Downloaded through Oracle Support web site by searching for patch number 10404530. Release notes can also be found through the Oracle Support web site.
Oracle Database PSU (Patch set update)		14727310(January2013)	http://www.oracle.com/technetwork/topics/security/cpujan2013-1515902.html

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Comment Form

Document Title	Non Half Hourly Data Aggregation (NHHDA) Installation Guide
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