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**Non Half Hourly Data Aggregation(NHHDA) Installation Guide**

**Version Number 18.3**

Non Half Hourly Data Aggregation(NHHDA) Installation Guide

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# 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 12.0.0 of the NHHDA application software.

## 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.

## Scope

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

## Structure of Document

The remainder of this document consists of the following sections:

1. Section 2 describes how to set up a new installation of the NHHDA software;
2. Section 3 describes how to build the NHHDA software from the source code;
3. Section 4 outlines what is provided for upgrades of the NHHDA application software;
4. Appendix A lists the Oracle database table spaces;
5. Appendix B gives guidance on building on other platforms;
6. Appendix C contains an example database creation script;
7. Appendix D gives details of the CGI Performance Test environment;
8. Appendix E lists commands to collect database statistics;
9. Appendix F gives instructions for associating a file extension to the printpro application on a Windows PC.
10. Appendix G gives the list of OFM patches to be applied.
11. Appendix H provides the list of OS patches to be applied on Solaris and Windows Servers.
12. Appendix I provides the list of DB patches to be applied on Solaris server.

## 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 2366OR 2369 (LCR082/CR492)OR2358OR2410 |
| 1.100 | OR1834 - The standing data audit reports produced should map onto the database actions in order to match the database actionOR2222 & 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 InstallShieldPMR0132/OR2729 Information on the configuration of temporary files added. |
| 2.002 | Incorporating changes from TA2000 developmentThe 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 |
| 2.991 | Incorporating Pool comments. |
| 3.000 | Incorporating Pool review commentsconsistent with release 4.0.0/5.0.0Authorised Version |
| 3.001 | OR2955 - Alteration of the UNIX version number. |
| 3.990 | Removed references to release 4 functionalityIssued 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 5.1.3111Issued 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 | LCRA218/4NHHDA BETTA Changes |
| 9.990 | Version for ELEXON review |
| 9.991 | Applied ELEXON review comments |
| 9.992 | Updated for OR3438 – amend instructions for creating 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 |
| 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 |
| 18.0 | Clean version - Nov 2015 Release |
| 18.1 | Tech upgrade - Oracle 12c /Solaris 11 |
| 18.2 | Updated for Tech Upgrade –Oracle 12c/Solaris 11.3 |
| 18.3 | Updated after Initial Review |

## Summary of Changes

Changes as indicated in the amendment history.

## Changes Forecast

Agreed Change Requests will be incorporated.

## References

| Mnemonic | Information | Details |
| --- | --- | --- |
| [IVT] | Title:Version No:Author:Date: | NHHDA Installation Verification Tests14.0Cognizant27 June 2013 |
| [NOPSGDE] | Title:VersionNo:Author:Date: | NHHDA Operations Guide. 20.0CGI26 October 2017 |
| [NSMGDE] | Title:VersionNo:Author:Date: | NHHDA System Management Guide.20.0CGI26 October 2017 |
| [NTSPEC] | Title:VersionNo:Author:Date: | NHHDA Physical Design Technical Specification. 23.0CGI26 October 2017  |
| [OFMING] | Title:Author:Date: | Fusion Middleware Installing Oracle Forms And Reports 12C (12.2.1.2)Oracle Corporation 22 February 2017 |

## Abbreviations

AA Annualised Advance

AFYC Average Fraction of Yearly Consumption

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

## Intellectual Property Rights and Copyright

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# A New Installation of the Application Software

## Installation Prerequisites

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

The media supplied comprises the following elements:

1. Object (and Source) CD or tape - includes application executables and installation scripts for the Database Server and 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;
2. 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 5.11 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.

### 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.

Tape Drives

Console

Processor

(CPU, Memory, Bus, Power)

Disk Drives

LAN Connection

Tape Drives

Console

Processor

(CPU, Memory, Bus, Power)

Disk Drives

LAN Connection

**Database Server**

Application Server

**Clients**

Monitor

Keyboard

Mouse

LAN Connection

Disk Drive

Printer

Processor

(CPU, Memory, Bus, Power)

Figure 1: NHHDA 3-Tier Physical Architecture

**Database and Application Server**Server

Tape Console Drivers

Processor

(CPU, Memory, Bus, Power)

Disk LAN

Drives Connection

**Clients**

Monitor Key Board Mouse

Processor

(CPU, Memory, Bus, Power)

LAN Disk

Connection Drive

Printer

**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:**

1. POSIX-compliant server.

**Application Server:**

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

**Client:**

1. 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>.

### Software Prerequisites

The NHHDA system server runs an Oracle 12.2.0.1 database with bespoke software written in C and SQL.

For the physical 3-Tier application, the Application Server runs Oracle Forms 12C version 12.2.1.2 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 12C version 12.2.1.2on a Sun Solaris UNIX Server, with the SPARC chip-set.

For information on the patches applied to the OFM, for both Windows and Solaris refer 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

Windows 2012 Server

**Database Server**

Shell application

C Application

PRO\*C

Oracle RDBMS

NetServices

POSIX

FTP

**Application Server**

Web Forms Application

Web Server

Net Services

FTP

**Client**

Operating System

Browser

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 | Oracle Solaris on SPARC (64-bit) Version 5.11 and patched to 11.3.21.5.0 (Branch: 0.175.3.21.0.5.0 ). 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 | 12.2.0.1  |
| Oracle Net Services | Application Server | 12.2.0.1 |
| Pro\*C runtime | DatabaseServer | 12.2.0.1*Runtime deployment is included in original Oracle/Developer license for development* |
| Oracle Forms runtime | Application Server | 12.2.1.20plus patches listed in Appendix G.*Runtime deployment is included in original Oracle/Developer license for development* |
| File Transfer Software  | Server | FTP receive and send |

Database and Application Server

Clients

Shell C Web Forms

Application Application

 FORMS Web Server

 Net Services

POSIX FTP

Pro\*C

Oracle

RDBMS

Operating System

Browser

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 | Oracle Solaris on SPARC (64-bit) Version 5.11 and patched to 11.3.21.5.0 (Branch: 0.175.3.21.0.5.0 ). 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 ServerApplication Server | 12.2.0.112.2.1.2.0plus patches listed in Appendix G |
| Oracle Net Services | Database Serverand Application Server | 12.2.0.1 |
| Pro\*C runtime | Database and Application Server | 12.2.0.1*Runtime deployment is included in original Oracle/Developer license for development* |
| Oracle Application Server Forms and Report Services | Database and Application Server | 12.2.1.2.0plus patches listed in Appendix G*Runtime deployment is included in original Oracle/Developer license for development* |

## Installation Steps for the Server machine

### 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:

1. 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.

### Operating System Configuration

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

#### Environmental Variables

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

1. ORACLE\_HOME
2. ORACLE\_SID
3. PATH including $ORACLE\_HOME/bin
4. LD\_LIBRARY\_PATH including $ORACLE\_HOME/lib

#### 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.



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.

### 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.

### 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.

#### File Permissions

The batch O/S user owns the executables and NHHDA directory structure and 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.

### Oracle Database Configuration

#### 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;*

#### 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:

1. 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.
2. 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:

1. confirmation that a backup has been taken of the system.
2. the Oracle SID of the NHHDA database
3. if the user knows the password of the Oracle system user.
4. the password of the Oracle system user (if the previous answer was yes).
5. 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.
6. 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.
7. the Oracle username of the batch user. This must be the same as the unix username of the batch O/S user.
8. 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:

1. That there are no other NHHDA schemas in this database instance;
2. That the batch user and schema owner have all the correct privileges;
3. That the database has no invalid objects owned by the System user;
4. That the ‘os\_authent\_prefix’ database parameter is correct;
5. That the ‘utl\_file\_dir’ database parameter is not null
6. 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.

#### 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:

1. 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.
2. 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.

1. 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 |

1. 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).

#### 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 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 |

1. 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');*

1. 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].

#### 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:

1. AUDITOR
2. DATA\_AGG\_ADMIN
3. EXCEPTION\_ADMIN
4. SYSTEM\_OPERATOR
5. MKT\_DMN\_DATA\_ADMIN
6. SUP\_MKT\_DMN\_DATA\_ADMIN
7. SYSTEM\_MANAGER

#### 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.

#### 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**

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 )**

#### 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.

#### 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.

#### 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

#### 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*

### 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.

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

### 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.

### 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\Middleware
* <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: D:\oracle\Middleware\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\_12.2.1\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\_12.2.1\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\_12.2.1\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\_12.2.1\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\_12.2.1\config directory, add the lines below to the end of that file.

[nhhda]lookandfeel=GenericcolorScheme=Graybackground=nhhdaenvFile=nhhda.envform=nhhda.fmxwidth=1000height=700separateFrame=TRUEImageBase=codeBaseserverApp=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. |
| 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 CONFIGRewriteRule ^/forms/nhhda1\_help/(..\*) /nhhda1\_help/$1 [PT]AliasMatch ^/nhhda1\_help/(..\*) "D:\nhhda1\Help\$1"WLExcludePathOrMimeType /forms/nhhda1\_helpRewriteRule ^/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 CONFIGRewriteRule ^/forms/nhhda1\_help/(..\*) /nhhda1\_help/$1 [PT]AliasMatch ^/nhhda1\_help/(..\*) "D:\nhhda1\Help\$1"WLExcludePathOrMimeType /forms/nhhda1\_helpRewriteRule ^/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\12.2.1
* 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 or <ORACLE\_HOME>\forms\java 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\Middleware\asinst\_1 to reflect the correct oracle home of OFM. |
| /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 to specify the host where the web logic server is hosted. |
| WebLogicPort | Change the default web logic port number 9001 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. D:\nhhda\_reports or D:\nhhda\reports 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\Middleware\Oracle\_Homewith 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\Middleware\Oracle\_Home to reflect the correct oracle home of OFM.  |
| ORACLE\_INSTANCE | Change the default directory D:\oracle\Middleware\asinst\_1 to reflect the correct oracle instance of OFM. |
| FORMS\_PATH | Change the default directory D:\oracle\Middleware\Oracle\_Home\ 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\Middleware\Oracle\_Home to reflect the correct oracle home of OFM. |
| PATH | Change the default directory D:\oracle\Middleware\Oracle\_Home 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\Middleware\Oracle\_Home 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 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.

### 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.

**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/Middleware
* <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/Middleware/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\_12.2.1/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\_12.2.1/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\_12.2.1/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\_12.2.1/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\_12.2.1/config directory, add the lines below to the end of that file.

[nhhda]lookandfeel=GenericcolorScheme=Graybackground= nhhdaenvFile= nhhda.envform= nhhda.fmxwidth=1000height=700separateFrame=TRUEImageBase=codeBaseserverApp= 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 CONFIGRewriteRule ^/forms/nhhda\_help/(..\*) /nhhda\_help/$1 [PT]AliasMatch ^/nhhda\_help/(..\*) "/oradata/sva/NHHDA/help/$1"WLExcludePathOrMimeType /forms/nhhda\_helpRewriteRule ^/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 CONFIGRewriteRule ^/forms/nhhda1\_help/(..\*) /nhhda1\_help/$1 [PT]AliasMatch ^/nhhda1\_help/(..\*) "/oradata/sva/NHHDA1/help/$1"WLExcludePathOrMimeType /forms/nhhda1\_helpRewriteRule ^/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/12.2.1
* 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 or $ORACLE\_HOME/forms/java/ 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 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\Middleware\Oracle\_Home 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 /app/oracle/Middleware/ Oracle\_Home 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/Oracle\_Home 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. |
| CLASSPATH | Change all the occurrence of the default directory /app/oracle/Middleware/Oracle\_Home to reflect the correct oracle home of OFM. |
| PATH | Change all the occurrence of the default directory /app/oracle/Middleware/Oracle\_Home 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/Oracle\_Home to reflect the correct oracle home of OFM.Change the default directory /tmp/<Timestamp> /jre/<Version Number>/ 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/ |
| 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.

### 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.)

### Installation Steps for Clients

#### 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 the Oracle Application Server using EP98NFILEEXT. (For example EP98NFILEEXT= .nhh). If this extension is associated with an application 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.

#### 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.

#### 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.

#### 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.

#### 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.

## Start the NHHDA System

### 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

### 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

## 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.

## 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 CGI 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.

# Building the Source Code

## Introduction

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

## Build Prerequisites

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

## Build Source Code Procedure

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

### 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.

### 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.

### 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:

 */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)

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*

### 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

### 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.

#### Web Forms for Windows Application Server

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

#### 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=<IP Address>:0.0*

*export ORACLE\_HOME=/app/oracle/Middleware/Oracle Home*

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.

### 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.

### 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.

# An Upgrade of the Application Software

Upgrades to delivered software will be handled by supplying:

1. amended source;
2. replacement object code for changed objects (database server and application server);
3. 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.

###### 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.

###### 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/… |  |
| 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:

1. C include files (“.h” files);
2. Templates for the functions used internally (“.tpi” files);
3. 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:1. the delivered source “include” directory
2. 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:

1. the common library (described earlier),
2. the Oracle shared library (e.g. libclntsh.so),
3. 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.

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

###### Example Scripts

Note that up to date example database creation scripts and Oracle Initialisation Parameter file (init.ora) are delivered with the NHHDA software in the sql directory (files cr\_nhhda.sql, init\_nhhda.ora.)

###### 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 CGI’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:

1. SPARC Enterprise T5120 with:
2. 1 Physical CPU with 32 Virtual Processor each of 1165 MHz
3. 8 Gbyte RAM
4. 7 \* 136 GB Internal disks
5. 100GB storage disk
6. 1 Disk Controller
7. Client PCs connected via telnet
8. OS Disk not configured as stripe set. Other internal disk are configured as RAID5 striped data set zpool volume

Disk connectivity was:

1. 1 SCSI on which 7 internal Disk connected

D.1.2 Disk Configuration

The disk configuration was as follows:

1. 8 METER table tablespaces (METER\_PARTITION\_1..8) and 8 METER index tablespaces (METER\_PARTINDEX\_1..8) were located on each disk;
2. 750 Mb sort area size;
3. asynchronous I/O;
4. cost based optimizer with no statistics;
5. parallel query turned off (parallel query is not necessary, as NHHDA already runs in parallel).

D.1.3 Partition Placement

1. NAR intermediate files on a file system of 100GB
2. Following Tablespaces reside on a file system of 100GB
3. USERS
4. USERS\_INDEXES
5. TEMP\_OBJECTS
6. TEMP\_OBJECTS\_INDEX
7. SYSTEM
8. SYSAUX
9. UNDO
10. TEMP
11. AUDIT1..7
12. Redo logs on the above file system

D.1.4 Disk Usage

1. Flat file layout, sufficient for tests
2. All output to one multi-volume striped disk set
3. Can be spread differently using:
4. links
5. 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:

1. 14 GSP groups
2. 22 Distributors
3. 733 SSCs
4. 1176 Measurement Requirements
5. 22 PRS agents
6. 2 ISR Agents
7. 995 LLFs
8. 143 Suppliers
9. 4,035,370 metering systems
10. 27 Data Collectors
11. 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 |
| 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.

###### Database Statistics

This appendix lists the commands run by CGI 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 ;

/

###### 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:



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:



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:



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.

###### Oracle Application Server Patches

:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Patch** | **Description** | **Product** | **Release** | **Last Updated** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

There are no patches required for OFM version 12.2.1.2 which needs to be installed on Windows or Solaris platform.

###### OS Patches

|  |  |  |  |
| --- | --- | --- | --- |
| OS Name | Current Version | Proposed Version | Notes and Source |
| Solaris | Solaris 10 5/09 s10s\_u7wos\_08 SPARC (64 bit)  |  Oracle Solaris on SPARC (64-bit) Version: 0.5.11 (Oracle Solaris 11.3.21.5.0)**Packages Requirement:*** SUNWmfrun
* SUNWlibC (Already loaded)
* developer/assembler (Already loaded)
* x11-info-clients
* xclock (used to test remote Oracle GUI and X11 forwarding is working.
* x11/library/libxp
* jdk-8

**Solaris patch requirement:****Java Requirement:**1.8.0\_51+ - Can install update 51 or higher version.**Shell limits requirement:**

|  |  |  |
| --- | --- | --- |
|  ***Shell Limit*** | ***Recommended Value*** | ***Existing value*** |
| TIME | -1 (Unlimited) | unlimited |
|  FILE | -1 (Unlimited) | unlimited |
|  DATA | Minimum value: 1048576 | unlimited |
|  STACK | Miminimum value: 32768 | 8192 |
|  NOFILES | Miminimum value: 4096 | 256 |
| V MEMORY | Miminimum value: 4194304 | unlimited |

The shell limits for STACK -50000 and NOFILES-65536 needs to be set.**Kernel Parameter settings required:**

|  |  |  |
| --- | --- | --- |
|  ***Resource Control*** | ***Min. Value required*** | ***Existing Value***  |
| project.max-sem-ids | 100 | 128 |
|  Process.max-sem-nsems | 256 | 512 |
|  project.max-shm-memory | 4294967295 | 8GB |
|  project.max-shm-ids | 100 | 128 |

 |  |
| Windows | Microsoft Windows x64 (64-bit) 2012 Release - FMW 12.2.1.2  | **Java Requirement:**1.8.0\_51+ - Can install update 51 or higher version. |  |

###### DB Patches

|  |  |  |  |
| --- | --- | --- | --- |
| Software | Current Version | Proposed Version | Notes and Source |
| Oracle Database | 11.2.0.3 | 12.2.0.1 |  |
|  |  |  |  |

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