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PIDplus™ Enterprise Matcher V 2.0
Installation & Getting Started Guide-Linux
Draft v. 1.1

PIDplus

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PIDplus™ Enterprise Matcher V2.0
Installation & Getting Started Guide
Version 1.0

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SECTION 1 | Introduction

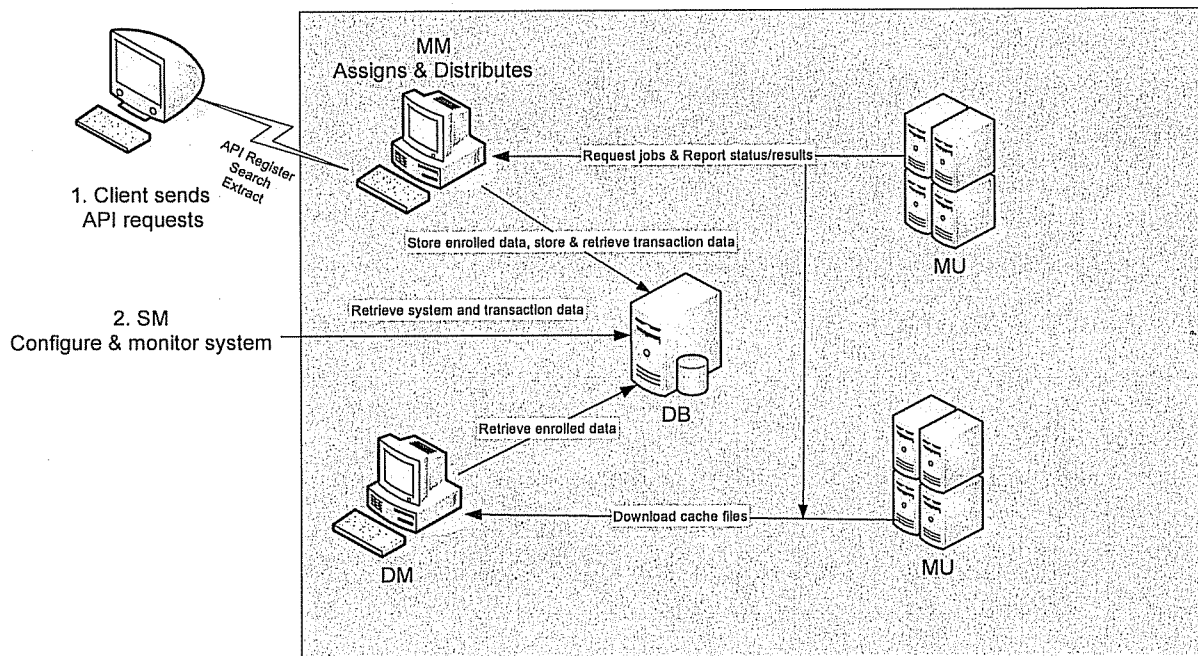
PID*plus*TM is an advanced biometrics matching engine providing grid-based biometrics matching using NEC's fingerprint matching technology to provide fast, accurate, and reliable matching for large fingerprint databases. PID*plus*TM provides a document-style Web Services API allowing integrators, solution providers, and device manufacturers to incorporate NEC's biometrics matching technology into their identification applications.

1.1 System Overview

PID*plus*TM consists of several server components designed to facilitate client requests, manage matching grid resources and data, and perform parallel job processing. This document details all the pre-requisites and steps required to install the server components which make up PID*plus*TM in a Windows operating environment:


- Database – provides persistent storage for enrolled and transaction data.
- Match Manager (MM) – responds to client requests via the Web Services API; and monitors and manages the matching grid
- Data Manager (DM) – creates and updates cache files of enrolled data and makes them available to the MUs.
- System Manager (SM) – provides a user interface to configure and monitor PID*plus*TM.
- Match Unit (MU) – matches grid servers which process image extraction and matching jobs.


The following diagram provides a simplistic view on how PID*plus*TM interacts.




1.2 Documentation Conventions

Please refer to the following icons and conventions used in this document.

: Indicates a time approximation.

: Indicates a reference point.

: Indicates a reference point requiring caution.

Note:

Indicates a specific example of command input

Indicates a displayed message or file contents

1.3 Documentation References

Document	Source
Oracle Database Quick Installation Guide (Document No. B32285-01).	http://www.oracle.com
JDK Software Installation	http://java.sun.com
RedHat Linux 5.0 Installation Documentation	https://www.redhat.com/docs

SECTION 2 | Hardware and Software Requirements

This section contains hardware and software requirements regardless of the type of configuration selected for installing PID*plus*TM.

2.1 Hardware Requirements

This section contains the hardware and system requirements for the database and PID*plus*TM application.

2.1.1 Minimum Database Hardware Requirements


The following are the minimum hardware requirements for the database.

32-bit (x86)

- x86 compatible CPU
- 1 GB RAM
- 10 GB available disk space (e.g. 3.5 GB for the Oracle software + 1.5 GB for the database + 3 GB for OEL5 + 2 GB swap*Space varies.)

64-bit (x86_64)

- x86_64 compatible CPU
- 1 GB RAM
- 10.5 GB available disk space (e.g. 4 GB for the Oracle software + 1.5 GB for the database + 3 GB for OEL5 + 2 GB swap *Space varies.)

 The available disk size varies dependent upon the total size of the system.

2.2 Software Requirements

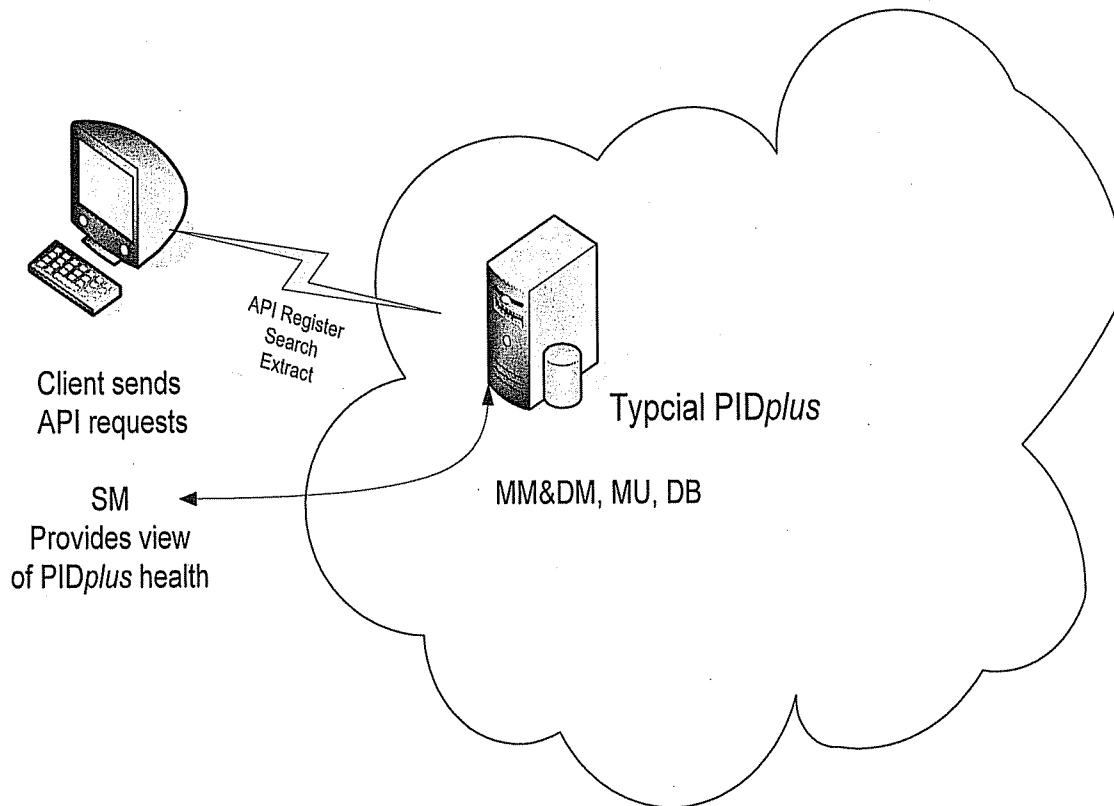
OS:	Windows 2003 R2 x64 SP2 (Standard or Enterprise Edition)
Note: Below software will be included in package and can also be download from the Internet.	
Oracle DB	Oracle Database 11g Release (http://download.oracle.com)
Java Components:	Java2 Platform Standard Edition Development Kit 5.0 ver. 1.5.0.15 (http://java.sun.com/javase/downloads)
Oracle Components:	Oracle Client 10.2.0.1.0 (http://download.oracle.com/otn/nt/oracle10g/10201/102010_win64_x64_client.zip)

SECTION 3 | **PID*plus*TM Configurations**

This section presents a typical single-server and a multiple-server PID*plus*TM configuration.

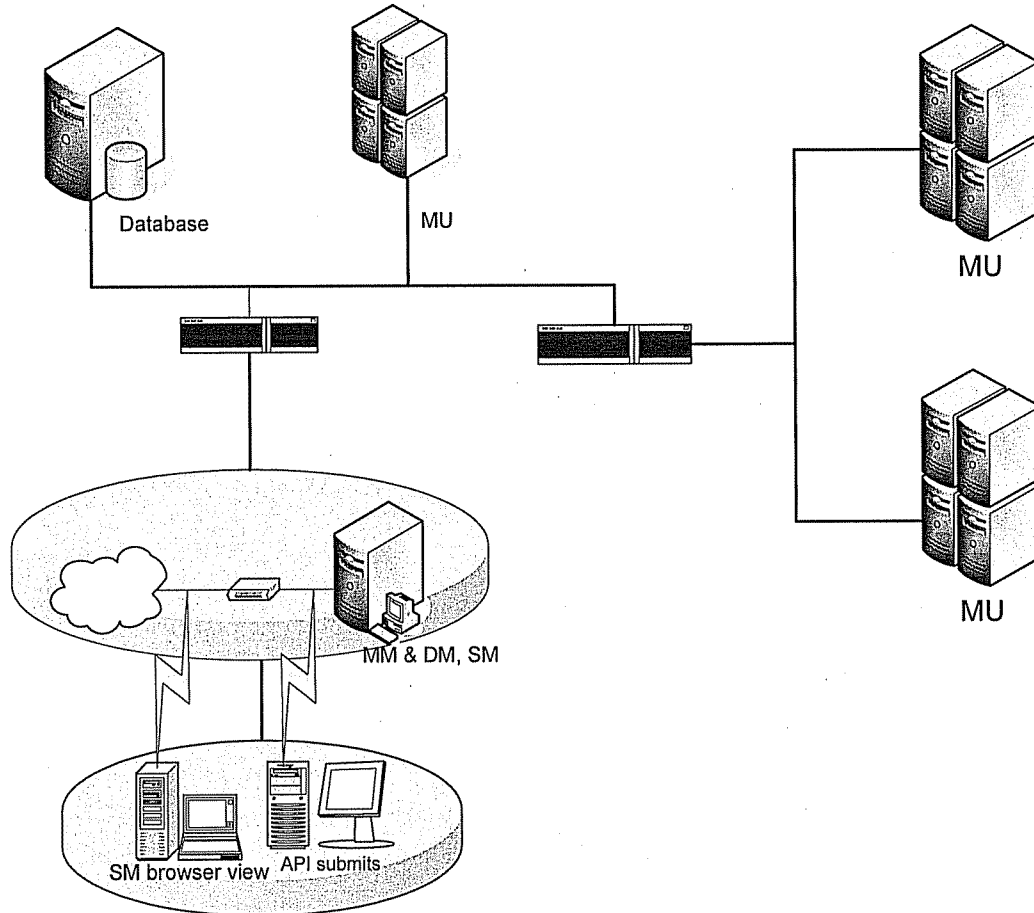
3.1 Typical (Single-Server)

This section presents a typical configuration with the operating system, database, client, and software on the same server and having extra server blades for the MU portions.



3.2 Multiple (up to 5 blades)

This section presents a multiple server configuration with the operating system, database, client, and software distributed across different servers.



SECTION 4 | Database Installation

This section describes general guidelines on the installation and configuration of the database used to install *PIDplus*TM. The following procedure flow catalogs these installations as prerequisites to the software installation.

4.1 Oracle 11g DB Guidelines

The installation of Oracle 11g R1 is a prerequisite to installing *PIDplus*TM.



Oracle 11g for Windows Documentation can be downloaded at: <http://download.oracle.com/docs>. NEC recommends downloading the Oracle Database Quick Installation Guide (Document No. B32305-02).

4.1.1 Prerequisites of the Oracle 11g DB Installation

1. Minimum Hardware Requirements must be met.
2. Linux and Oracle must be installed for the same architecture, e.g. 32 or 64 bit.
3. All RPMs required for the Oracle 11g DB must be installed, see “Preparing for the Oracle 11g DB Installation”.

4.1.2 Preparing for the Oracle 11g DB installation: ⌚ Approx. 1-1/2 hours

1. Download Oracle 11gR1 for Redhat Linux x86_64 from the Oracle website at: <http://www.oracle.com>. For example, select “linux.x64_11gR1_database.zip”; you need to copy this file into the Oracle home directory and unzip it using the “unzip” command.

If you have an install disk, move to step 2.

Note: You need to create an account to download any software from the Oracle site.



Download times can vary, but expect approximately 20 minutes.

2. Validate the size allocations using the “df -h” command at the root.

```
[root@Linux01 ~]$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda2       58G   14G   42G   25% /
/dev/sda3       70G   6.2G   60G   10% /home1
/dev/sda1       99M   12M   83M   13% /boot
tmpfs           7.9G   1.9G   6.0G   25% /dev/shm
[root@Linux01 ~]$
```



You might need to perform mount and partitioning procedures to match custom specifications.

3. Validate the Kernel package and install missing RPMs.


- a) Validate the package e.g. “Kernel 2.6.18.92.el5 x86_64”.

Validating package commands “uname -rm” or “uname -al”:

```
# uname -rm
2.6.18.92.el5 x86_64
```

- b) Check that each RPM has been installed by checking the core package list for RedHat Linux 5.0 (reference from the Package Requirements section in the “Oracle DB Quick Install Guide”):

```
bitutils-2.17.50.0.6
compat-libstdc++-33-3.2.3
compat-libstdc++-33-3.2.3 (32 bit)
elfutils-libelf-0.125
elfutils-libelf-devel-0.125
gcc-4.1.1
gcc-c++-4.1.1
glibc-2.5-12
glibc-2.5-12 (32 bit)
libaio-0.3.106
libaio-0.3.106 (32 bit)
libaio-0.devel-0.3.106 [This is a common missing rpm]
libgcc-4.1.1
libgcc-4.1.1. (32 bit)
libstdc++-4.1.1
libstdc++-4.1.1 (32 bit)
libstdc++-devel 4.1.1
make -3.8.1
sysstat-7.0.0 [This is a common missing rpm]
```

 Check for “**libXp-10.0-81.el5.i386.rpm**” and install to prevent potential errors during the Oracle Client installation.

Validating RPM command “rpm -qa | grep <package name>”:

```
# rpm -qa | grep bitutils-2.17.50.0.6
```

- c) Replace missing RPMs from the CD and install using the “rpm -hiv” command:

```
# rpm -hiv libaio-devel-0.3.106
```

4. Create required OS groups and user accounts.

- a) First create an “oracle” account and then create “oinstall”, “dba” and “oper” groups. Additionally, ensure a “nobody” account exists.

- Use “groupadd” and “useradd” commands to create the user account and group accounts.

```
# /usr/sbin/useradd oracle
# /usr/sbin/groupadd oinstall
# /usr/sbin/groupadd dba
# /usr/sbin/groupadd oper
```

- Use “usermod” command to modify group membership:

```
# usermod -g oinstall oracle
# usermod -G dba,oper oracle
# id oracle
uid=501(oracle) gid=502(oinstall) groups=502(oinstall),
503(dba)
```

- b) Set the password for the oracle user.

```
# passwd oracle
Changing password for user oracle.
New Password:
Retype new password:
Passwd: all authentication tokens updated successfully.
```

5. Validate Oracle accounts, ownerships, and memberships.

- a) Validate oracle home ownership:

```
[oracle@dblnx ~]$ ls -ld /home/oracle
drwxr-xr-x 4 oracle oinstall 4096 Aug 18 09:44 /home/oracle
[root ~]# chmod -R 775 /home/oracle
[root ~]# chown -R oracle:oinstall /home/oracle
Chmod -R 775 /home/oracle
```

- b) Validate nobody account exists:

```
[oracle@dblnx ~]$ id nobody
uid=99(nobody) gid=99(nobody) groups=99(nobody)
[oracle@dblnx ~]$
```


- c) Validate Oracle group membership exists:

```
[oracle@dblnx ~]$ groups oracle
oracle : oinstall dba oper
[oracle@dblnx ~]$
```

6. Configure Kernel parameters.

- a) Ensure you are logged in at the root level and edit the “/etc/sysctl.conf” file using the “cat & EOF” command or using “vi”:

```
cat >> /etc/sysctl.conf <<EOF
kernel.shmni = 4096
kernel.sem = 250 32000 100 128
net.ipv4.ip_local_port_range = 1024 65000
net.core.rmem_default = 4194304
net.core.rmem_max = 4194304
net.core.wmem_default = 262144
net.core.wmem_max = 262144
fs.file-max = 6553600
net.ipv4.ip_local_port_range=1024 65000
EOF
[root ~]# /sbin/sysctl -p
```

 Must run “sysctl -p” command to activate the new settings.

- b) Validate using the “sysctl -a | grep“(shm, sem, file-max, ip_local_port_range, rmem_default, rmem_max, wmem_default, wmem_max) commands:

```
[root ~]# /sbin/sysctl -a | grep <xxx>
```

7. Set Shell Limits for the oracle user.

- a) Add the following entries to the “/etc/security/limits.conf” file using the “cat & EOF” command or by using “vi”:

```
cat >> /etc/security/limits.conf <<EOF
oracle soft nproc 2047
oracle hard nproc 16384
oracle soft nofile 1024
oracle hard nofile 65536
EOF
```

- b) Update the “/etc/pam.d/login” file using the “cat & EOF” command or using “vi”:


```
cat >> /etc/pam.d/login <<EOF
session required /lib/security/pam_limits.so
session required pam_limits.so
```

8. Logon as oracle and update the “.bash_profile” file.


Add the following entries using the “vi” command:

```
[oracle@dblnx ~]$ vi .bash_profile

#Add these entries:
ORACLE_BASE=/home/oracle/app; export ORACLE_BASE
ORACLE_HOME=$ORACLE_BASE/product/11.1.0/db_1;export ORACLE_HOME
ORACLE_SID=PID; export ORACLE_SID
ORACLE_TERM=xterm; export ORACLE_TERM
JAVA_HOME=/usr/java/jdk1.5.0_16; export JAVA_HOME
PATH=/usr/sbin:$PATH;export PATH
PATH=$ORACLE_HOME/bin:$JAVA_HOME/bin:$PATH; export PATH
LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib; export LD_LIBRARY_PATH
CLASSPATH=$ORACLE_HOME/JRE:$ORACLE_HOME/jlib:$ORACLE_HOME/rdbms/jlib;
export CLASSPATH
NIST_PACK=/home/bmtmu/nistpack/lib
export PATH=$PATH:$NIST_PACK
[oracle@dblnx ~]$
```


 Use the “O” to get into “Insert” mode, use “ESC” to return to the main mode. To save these additions use the “Shift + :wq!”.

4.1.3 Installing the Oracle 11g DB : Approx. 45 minutes – 1 hour

 Copy Oracle 11gR1 zip file to /home/oracle and modify the ownership to oracle:oinstall prior to extracting the files.

1. Change the directory to the database, use the “unzip” the Oracle installation.

```
[oracle@dblnx ~]$ unzip linux.x64_11gR1_database.zip
```

 Logout from the root session and logon as oracle, otherwise you may encounter display problems.

2. Make the Oradata directory and assign membership and permissions:

```
[oracle@dblnx home1]$ mkdir /home1/oradata
[oracle@dblnx ~]$ chown oracle:oinstall /home1/oradata
[root]# chmod -R 775 /home1/oradata
```

3. Run the Installer.

```
[root ~]# xhost +<IP> [Note: you may use the host name as well]
[oracle] $ export DISPLAY=<IP>:0.0 or export DISPLAY=:0.0
[oracle] $ xclock [Note: use xclock to test X display works or not]
[oracle@dblnx ~]$ ./runInstaller
```

4. Select **Advanced Installation** to start the Oracle 11gDB installation.
 - a) Specify the inventory directory e.g. (/home/oracle/app) and the oracle group name e.g. (oinstall).
 - b) Select the **Standard Edition**.
 - c) Enter the **paths** to the Install Location e.g. (/home/oracle/app) and the Software Location e.g. (/home/oracle/app/product/11.1.0/db_1).
 - d) Click **next**, if all prerequisites are successful at the Prerequisite check step. Otherwise, follow the displayed errors, resolve, and rerun.
 - e) Select **Install Software** only.
 - f) Confirm the **privileged operating system groups** e.g. (dba, oper, oinstall).
 - g) Click **Install** at the summary display.
 - h) When the configuration window displays, log onto the root through a terminal session and run the following scripts:

```
[root~]# /home/oracle/app/orainstRoot.sh
Changing permissions of /home/oracle/app to 770.
Changing groupname of /home/oracle/app to oinstall.
The execution of the script is complete

[root~]# /home/oracle/app/product/11.1.0/db_1/root.sh
The following environment variables are set as:
    ORACLE_OWNER= oracle
    ORACLE_HOME= /home/oracle/app/product/11.1.0/db_1
Enter the full pathname of the local bin directory:
[/usr/local/bin]:/usr/local/bin

Creating /etc/oratab file...
Entries will be added to the /etc/oratab file as needed by
Database Configuration Assistant when a database is created
Finished running generic part of root.sh script.
Now product-specific root actions will be performed.
Finished product-specific root actions.
[root~]#
```

5. **Add the listener for your database.**
 - a) Open a new terminal and run the “netca” command and select to add LISTENER service (enter LISTENER as the name), select remaining defaults, return to the open “dbca” session and finish the DB software installation.

6. **Create the “PID” database.**



Logon as oracle to the DB server and run “dbca”.



The bash.profile file needs to have the SID updated to the PID value.

- a) Select **create a database** at the database configuration assistant.
- b) Select **custom** database.
- c) Enter the global **database name** and the **SID** values e.g. (PID and PID respectively).
- d) Select **Configure Enterprise Manager and Configure Database Control for local management** options and select next.
- e) Enter **username** and **passwords** e.g. (sys/sys).
- f) Select **File system** option.
- g) Select use **common location for all database files** and enter path e.g. (/home1/oradata).
- h) Specify **Flash Recovery Area** and accept defaults.
- i) Accept defaults on the Database Components step(Oracle Text, Oracle Ultra Search, and Enterprise Manager Repository).
- j) On the Memory tab, select **Typical** Memory Size and enter **3193** for the value and select the **automatic memory management** option.
- k) On the Sizing tab, enter **400** as the process value.
- l) Select **Keep the enhanced memory 11g default security settings**.
- m) Select **Enable automatic maintenance tasks**.
- n) Select **File Location Variables** on the Database Storage page and validate the locations.
- o) Select **Create Database** option and select Finish.

7. **Validate creation of the tnsname service file.**

Check that the tnsname service file (tnsnames.ora) was created:

`/home/oracle/app/product/11.1.0/db_1/network/admin/tnsnames.ora`

Note: The SGA memory allocation is set to 3GB and the PGA is set to 6GB (always use increments on 1024. Such as; 1024/2048/4096/8192). To check how much swap exists, run “swapon -s” and to see the memory utilization run “free -l”.

8. Perform a connectivity test either by connecting to the database as a system or running a “tnsping” command and a sqlplus command.

```
[oracle@dblnx ~]$ tnsping PID

[oracle@dblnx ~]$ sqlplus / as sysdba
          Shutdown immediate
          Startup
          Quit

[root~]# lsnrctl
Lsnrctl> status
Lsnrctl> service
Lsnrctl> exit
[root]# lsnrctl start (only if the listener was not running)
[root~]# emctl stop dbconsole
[root~]# emctl start dbconsole
```

9. Connect to the Database control at “https://<IP>:1158/em”. Logon as sys with sysdba privileges. Also remember to enable Diagnostics and tuning packs. Select these packs by selecting setup, then management pack access.