Perceptive Content Database

Installation and Setup Guide

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Lexmark™ Enterprise Software

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Perceptive Content Database prerequisites

This document assumes that you are installing the Perceptive Content Database for the first time or that you are not running earlier versions of Perceptive Content Database.

Before you install, verify that your system meets the requirements in the *Product Technical Specifications*. Then, verify your product compatibility outside of Perceptive Content, such as the compatibility between the service pack level of the operating system and the version for your specific relational database management system (RDBMS).

Prior to installation, we recommend reading the *Perceptive Content Best Practices Guide* for the system you are installing.

Verify Microsoft SQL Server instance prerequisites

1. In **SQL Server Management Studio**, in the **Object Explorer** pane, right-click your server and then click **Properties**.

   Note Typically, your server is the first item listed in the tree.

2. In the **Server Properties** dialog box, under **Select a Page**, click **Security**.
3. Under **Server authentication**, select **SQL Server and Windows Authentication Mode**, and click **OK**.
4. If prompted, click **Yes** to restart the server.

   Important: Restarting the server shuts down and starts up all databases on this instance.

5. In **SQL Server Configuration Manager**, ensure the TCP/IP Protocol is enabled for the IP address and port you intend to use for your configuration.

   For more information on configuring your instance of SQL Server and INOW database for optimal performance, refer to the *Perceptive Content Best Practices Guide for Microsoft SQL Server***.**

   For more information on configuring encrypted communication using SSL between the database and Perceptive Content Server, refer to the *Perceptive Content Server Installation and Setup Guide***.**

Create a Microsoft SQL Server INOW database

Follow the procedures in the following sections in order to create the INOW database.

Connect to your SQL Server

1. Log in to the **SQL Server computer** with a user ID that has local administrator rights, click the **Start** button, point to **Programs**, point to your Microsoft SQL Server version, and then click **SQL Server Management Studio**.
2. In the **Connect to Server** dialog box, enter the information in the **Server Type**, **Server Name**, and **Authentication** fields. Click **Connect**.

   Continue with the following procedures as needed for your environment.

Establish collation methods for a Unicode environment

If you are installing and implementing a version of Perceptive Content using Unicode, you must set the correct collation property for your environment.

The collation you choose determines the sort order of data that defines the sequence in which characters sort, and the way characters are evaluated in comparison operations.

To create the Perceptive Content Database in a Unicode environment and set SQL Server database collation, complete the following steps.

Important Perceptive Content works with case-insensitive collations. When setting the collation property, choose a collation with `CI` in the attribute.

1. Open the Perceptive Content Database SunflowerSS_Unicode.sql creation script.
2. In SQL Server Management Studio, display a list of all of the supported collations on your system by executing the following SQL query.

   ```
   SELECT * FROM fn_helpcollations() WHERE name LIKE '%CI%'
   ```

3. At the beginning of the DDL script, locate the following collation property:

   ```
   COLLATE REPLACE_WITH_VALID_COLLATION_NAME
   ```

4. Change the collation property to the appropriate language from the list that you displayed in step 2. For example, to set the collation to be generic for western European languages, change the property to the following:

   ```
   SQL_Latin1_General_CP1_CI_AS
   ```

Create the INOW database

Use the following instructions to create the INOW database using Microsoft SQL Server 2008 R2 or 2012.

Important Verify the data directory for Microsoft SQL before creating the database. This is the directory where the database files appear after you execute the following SQL file. If you do not want the location of the INOW database files in the default data directory, use the appropriate location(s) for each of the three file names. The SunflowerSS.sql or SunflowerSS_Unicode.sql files are included in the downloaded Perceptive Content Server files.

Depending on the environment type you are creating, SunflowerSS.sql in the steps below can refer to SunflowerSS.sql or SunflowerSS_Unicode.sql.

1. In SQL Server Management Studio, in the **Object Explorer**, select the **master** database.

   Note The master database is typically found under the **System Databases** folder.

2. On the **File** menu, select **Open** and then select **File**
3. In the **Open File** dialog box, navigate to the location that contains the **SunflowerSS.sql** file, select the SQL file, and then click **Open**.

   If you are prompted to connect to the database, enter credentials for a user that has the sysadmin server role, and select **Connect** to make the connection.

4. If you are using more than one drive, in the **SunflowerSS.sql** file, update the drive in the three paths located on the **Create Database** and the **Alter Database** lines.

   You must change the path after 'FileName = N' to the full path (drive, directory, and filename with extension) for all three files. The Primary filegroup = INOW_Data mdf, the Secondary filegroup = INOW_Index.ndf, and the Log file = INOW_Log.ldf

   Note The directories you specify must already exist.

5. To execute the query batch file, on the **Query** menu, select **Execute**. The execution is finished when the completion message appears at the bottom of the **Query** window.

Set up SQL Server to use Secure Sockets Layer (SSL) security

SSL security uses cryptography and symmetric encryption to provide communication security at the transport layer for data sent over a network for application-specific protocols such as HTML and SMTP.

To use SSL security, you must import a certificate from a third party Certificate Authority, bind the certificate to a port number, and configure the certificate. Use the following steps to set up SSL security.

1. Click **Start**, and then click **Run**.
2. In the **Run** dialog box, type **cmd** and then click **OK**.
   1. In the **Command Prompt** window, run **mmc.exe**.
   2. To add the certificates snap-in for the local machine, click **File** > **Add/Remove snap-in** > **Certificates**.
   3. Select **Computer account**, and then click **Finish** and **OK**.
3. In the tree view, navigate to **Certificates** > **Personal** and right-click **Certificates**.
   1. Select **All Tasks** > **Import**
   2. In the **Certificate Import Wizard** dialog, browse to the **PFX** file and click **Next**.
   3. To import the key, enter the password, select the options you want, and click **Next**.

      To secure your PFX file somewhere other than on the production machines where it is used, do not select **Mark this key as exportable**.
   4. When prompted, specify where the certificates are stored, and select **Personal**.
   5. Click **Finish**.
4. Navigate to the file location of the imported certificate. In the **Actions** pane, under the certificate name, click **More actions**, then **All tasks**, and then **Manage private keys**.

   Add the instance name that the SQL Server instance is running as, and then give the user full control.
5. Open **ODBC Datasource Administrator**.
   1. On the **DSN** tab, select **Datasource**, and then click **Configure**.
   2. On the **Security** tab, change the encryption method from **none** to **SSL**.
   3. To verify the connection, click **Test Connection**.

6. Close **ODBC Datasource Administrator**.
   - For **Windows Vista and higher**, use the **Netsh.exe** tool, as shown in the following example.

     ```
     netsh http add sslcert ipport=0.0.0.0:8000
     certhash=0000000000003ed9cd0c315bbb6dc1c08da5e6 appid={00112233-4455-6677-8899-
     AABBCCDDEEFF}
     ```

     The certhash parameter specifies the thumbprint of the certificate, and the ipport parameter specifies the IP address and port and functions just like the -i switch of the Httpcfg.exe tool described. The appid parameter is a GUID that identifies the owning application.
7. Restart the **SQL Server instance**.

Create an Oracle INOW database

To create an Oracle 11.2.0.4 or 12.1.x database, we recommend that you adhere to the best practices set for the creation and configuration of the INOW database with regard to storage at your location. This configuration supports the use of Exadata or a pluggable database (PDB), in a multi-tenant configuration. If your company does not have best practices defined, refer to the *Using Perceptive Content with an Oracle Database Best Practices Guide*.

Additional database components

No additional database components are required for the Perceptive Content Database; however, if you intend to use SSL or Oracle Net native encryption for data encryption and integrity you must purchase and install the Advanced Security option.

Create the INOW database

Depending on the version of Oracle you are using, there may be additional configuration options that are not found in this guide. Please refer to the best practices for your organization.

1. Using the **Oracle Database Configuration Assistant** (DBCA), create a new database by selecting the **Custom Database** template, click **Next** and name it according to the naming conventions for your organization. For example, INOW.
2. On the **Management Options** page, follow the best practices set by your company for configuring Enterprise Manager and Automatic Maintenance Tasks.
3. On the **Database Credentials** page, follow the best practices set by your company.
4. On the **Storage Options** page, choose the appropriate storage type for your database files and then click **Next**.

   Note Ensure the storage is striped and mirrored. We recommend that you use Oracle ASM for managing database storage. Also, place datafiles, redo logs, and archived logs on separate disks to distribute I/O. For more information, refer to the I/O Configuration and Design section of the *Oracle Database Performance Tuning Guide*.
5. On the **Recovery Configuration** page, choose the appropriate recovery options. For production environments, we recommend enabling flashback recovery and archive mode.
6. On the **Database Content** page, clear each of the additional components.

   Note The Enterprise Manager Repository option can remain selected if you intend to use it.

7. On the **Initialization Parameters** page, on the **Memory** tab, use the following recommended settings as a starting point to configure the Perceptive Content Database memory.

   Notes The settings should not exceed your server capacity, as paging may occur. If paging occurs, we recommend adding memory to the server or reducing Oracle memory settings.

   Depending on the configuration of the operating system, you may receive a performance boost by using huge pages for Oracle memory allocation. For more information on this, refer to the appropriate version-specific operating system and Oracle documentation.

   Use automatic shared memory management (ASMM), rather than automatic memory management (AMM).

Parameter	% of Recommended Memory	Example Value
SGA_MAX_SIZE	70% of free memory	8192M
SGA_TARGET	*Same value as SGA_MAX_SIZE	8192M
PGA_AGGREGATE_TARGET	1536M	
SHARED_POOL_SIZE	1024M	
LARGE_POOL_SIZE	128M **Note** If you are using large RMAN backup buffers, this value may need to be larger.	
DB_CACHE_SIZE	0 **Note** You can provide a specific value, for example, 6144M (6G) or set the value to 0, which allows Oracle to set the value automatically.	

   After load testing with a sufficient representation of peak activity, review the AWR reports to determine the various advisory statistics recommended as the optimal settings for each individual component of memory.

8. On the **Initialization Parameters** page, on the **Character Sets** tab, specify **WE8MSWIN1252** as the default character set for the INOW database.

   Notes The National Character Set (AL16UTF16) can remain as the default value.

   Unicode sets are currently not supported for Perceptive Content using an Oracle database. If you require a Unicode implementation, we recommend that you consider using SQL Server or PostgreSQL.

9. On the **Initialization Parameters** page, click **All Initialization Parameters**.

10. In the **All Initialization Parameters** dialog, click **Show Advanced Parameters**.

    Note The value for each of the parameters in the dialog must match the values listed below.

Parameter	Value
QUERY_REWRITE_ENABLE	TRUE
QUERY_REWRITE_INTEGRITY	TRUSTED
CURSOR_SHARING	EXACT
NLS_DATE_FORMAT	RRRR-MM-DD
NLS_TIME_FORMAT	HH24:MI:SS.FF
NLS_TIMESTAMP_FORMAT	RRRR-MM-DD HH24:MI:SS.FF
NLS_COMP	LINGUISTIC
NLS_SORT	BINARY_CI
OPTIMIZER_MODE	ALL_ROWS
OPTIMIZER_INDEX_COST_ADJ	1

11. Click **Close** and then click **Next**.
12. Click **Next** and continue to the **Creation Options** page.
13. Select the **Create Database** and the **Save as a Database Template** options.
14. Click **Finish**.

    Result A summary of the database parameters appears.

15. Click **OK** to create the database. This may take some time, depending on your system.

    Result When the database is complete, a summary appears with database log and connection information.

16. Click **OK**

About the INUSER account

The INUSER database user is the user that owns all of the Perceptive Content database objects. This is the same user the Perceptive Content uses to connect to the INOW database. The SunflowerORA.sql script attempts to create the INUSER account if it does not exist when; and if, the default (DATA) and index (INDX) tablespaces already exist. Alternatively, you can manually create the INUSER account. To create the INUSER database user account manually, complete one of the following methods.

Create the INUSER database user using SQL*Plus

You can create the INUSER database user using SQL*Plus or any other tool that allows you to execute SQL against the INOW database. Ensure that the INUSER account has the following minimum privileges. You can grant additional privileges to INUSER as needed. To create the INUSER database user using SQL*Plus, complete the following step.

Run the following commands:

```
create user INUSER identified by imagenow
default tablespace DATA
account unlock;

grant create session, resource, select any dictionary to inuser;

alter user inuser quota unlimited on DATA;
alter user inuser quota unlimited on INDX;
```

Create the database objects

1. Connect to the INOW database as SYS or another user that contains the Database Administrator role.
2. Execute the SunflowerORA.sql script.

   This script attempts to create the DATA and the INDX tablespaces, the INUSER and INEMUSER users, and all the tables, indexes, and constraints.

Create a PostgreSQL INOW database

Locating the PostgreSQL configuration files

By default the pg_hba.conf and postgresql.conf files are located in the data directory of the database cluster ($PGDATA).

To find the files, complete any of the following actions.

Command	Scope
show hba_file; show config_file; select name, setting from pg_settings where category = 'File Locations';	Connected to the database with the postgres role
$ psql -U postgres -d postgres -c "show hba_file" $ psql -U postgres -d postgres -c "show config_file"	Execute the command from the OS command line
Go to Tools then Server Configuration to view and change settings	pgAdmin III (Native GUI interface)

Configure PostgreSQL to allow remote connections

1. In the ph_hba.conf file, add a line for each server that will connect to the INOW database.

   Notes To restrict the establishment of connections, we recommend using a specific IP address. Although not recommended for security reasons, you have the ability to use “all” to allow connections from all servers.

   The address specifies the set of hosts that matches the records. It can be a host name or a combination of an IP address and CIDR mask that contains an integer between 0 and 32, for IPv4; or between 0 and 128, for IPv6 that specifies the number of the significant bits in the mask.

2. After making updates, restart the PostgreSQL service “pg_ctl restart” or call “pg_ctl reload”.

   This signals a SIGHUP to the postmaster and initializes the changes.

   Note You must restart the PostgreSQL service; otherwise, the Perceptive Content Server will not be able to connect to the INOW database.

Configure connection settings

Update hba_file.conf

To find the file logged in as postgres, run the following command.

```
psql -U postgres -d postgres -c "show hba_file"
```

Add all to allow all, otherwise for access that is more restrictive specify a specific database, user and IP address for all connections to the database. For the address field append /32 for IPv4 addresses and /128 for IPv6 addresses.

```
# TYPE                      DATABASE     USER          ADDRESS                     METHOD
# IPv4 local connections:
host                        INOW         inuser        <<inserver ipaddress>>/32 md5
host                        all          all           127.0.0.1/32              md5
```

Update postgresql.conf

To update postgresql.conf, modify the **listener_addresses** and **max_connections** parameters.

Note Changes to this file require a PostgreSQL Server restart

```
#------------------------------------------------------------------------------
# CONNECTIONS AND AUTHENTICATION
#------------------------------------------------------------------------------
# - Connection Settings -
listen_addresses = '*'          # what IP address(es) to listen on;
                                # comma-separated list of addresses;
                                # defaults to 'localhost'; use '*' for all
                                # (change requires restart)
port = 5432                     # (change requires restart)
max_connections = 300           # (change requires restart)
```

Create the Perceptive Content INOW database

To create the Perceptive Content INOW Database, complete the following steps.

Log in to the postgres database as the postgres user, and execute the PostgreSQL version of the full DDL script. For example, SunflowerPG.sql.

Note: You must execute the Full and Incremental DDL scripts for Perceptive Content from the command line using the psql utility. Specific psql commands within the script cannot work with GUI tools, such as pgAdmin III.

```
EXAMPLE CONNECT STRING:

psql -h <IP_ADDRESS or localhost> -d postgres -U postgres -p 5432
```

```
EXAMPLE OF EXECUTING A SCRIPT WITHIN PSQL:

\i C:/DDL/7.1.3/7.1.3.3/ddl/SunflowerPG.sql
\i 'C:/DDL/7.1.3/7.1.3.3/ddl/SunflowerPG.sql'
```

Database access through INEMUSER

In addition to the INUSER database user, you have the option to use the INEMUSER database user. The database setup script creates the INUSER and INEMUSER users. If your system includes applications that need to communicate with Perceptive Content Server, you can use the following database tables to process external messages. INEMUSER user can add, remove, and update records in the database tables without the risk of corrupting information stored in the Perceptive Content database. INEMUSER allows you to connect your external applications to the Perceptive Content database to access the tables. External applications, such as HL7 Interface, should only access the Perceptive Content database only through INEMUSER.

- IN_EXTERN_MSG
- IN_EXTERN_MSG_PROP
- IN_EXTERN_MSG_GROUP
- IN_EXTERN_MSG_SEQ

Order processing of external messages

Messages with the same group process in first-in-first-out (FIFO) order.

To group messages, complete the following steps.

1. In the IN_EXTERN_MSG_GROUP table, insert the EXTERN_MSG_ID and an EXTERN_MSG_GROUP_ID.
2. In the IN_EXTERN_MSG_SEQ table, insert the EXTERN_MSG_ID.

Notes

- The EXTERN_MSG_ID is the same ID you used in the IN_EXTERN_MSG table.
- You can add more than one group to a message by inserting additional records into the IN_EXTERN_MSG_GROUP table.
- The EXTERN_MSG_ID and EXTERN_MSG_GROUP_ID columns have a limit of 64 characters.
- To create a new message, insert a record into the IN_EXTERN_MSG table with a unique value for the EXTERN_MSG_ID column.

Unlock the INEMUSER account

The INEMUSER account is locked by default. You must unlock the account if you intend to utilize it.

To unlock the INEMUSER account, perform one of the following actions according to the RDBMS you are using.

- For SQL Server, execute the following command.

```
alter login inemuser enable;
```

- For Oracle, execute the following command.

```
alter user inemuser account unlock;
```

- For PostgreSQL, execute either of the following commands based on the preferred active date range.

```
alter role inemuser valid until 'YYYY-MM-DD 00:00:00';

alter role inemuser valid until 'infinity';
```

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