Operation Manual

Way4 Maintenance

03.52.30

28/10/2020

Contents

This document contains information for Way4 maintenance.

This document is intended for bank or processing center employees who are responsible for the operation of Way4.

When working with this document, it is recommended to use the following resources from the OpenWay documentation series:

- "Way4™ PA-DSS Implementation Guide".
- "Running Processes in Parallel".
- "DB Manager Manual" or "Way4Manager Manual".
- "Way4Tools".

The following notation is used in the document:

- Field labels in screen forms are shown in *italics.*
- Key combinations are shown in angular brackets, for example, <Ctrl>+<F3>.
- Names of screen form buttons and tabs are shown in square brackets, for example, [Approve].
- Sequences for selecting user menu items or context menu items are shown using arrows as follows: "Issuing → Contracts Input & Update".
- Sequences for selecting system menu items are shown using arrows as follows: Database => Change password.
- Variables that differ for each local instance, such as directory and file names, as well as file paths are shown in angular brackets, as in <OWS_HOME>.

Warnings and information are marked as follows:

Warnings about potentially hazardous situations or actions.

Messages with information about important features, additional options, or the best use of certain system functions.

1 Node setup

By default, when an instance of the Way4 database is created, two records are registered with the parameters of the main and backup nodes (menu item "OpenWay → Full → Configuration Setup → Main Tables → System Instances – Simple"). For the main node, all fields are filled in. For the backup node, the fields *Global Name* and *Schema Name* are not filled in.

> ⚠ The backup node is reserved for OpenWay. Do not unnecessarily change the *Id suffix* values for the main and backup nodes.
> Change to *Id suffix* for the main and backup nodes may affect system performance.

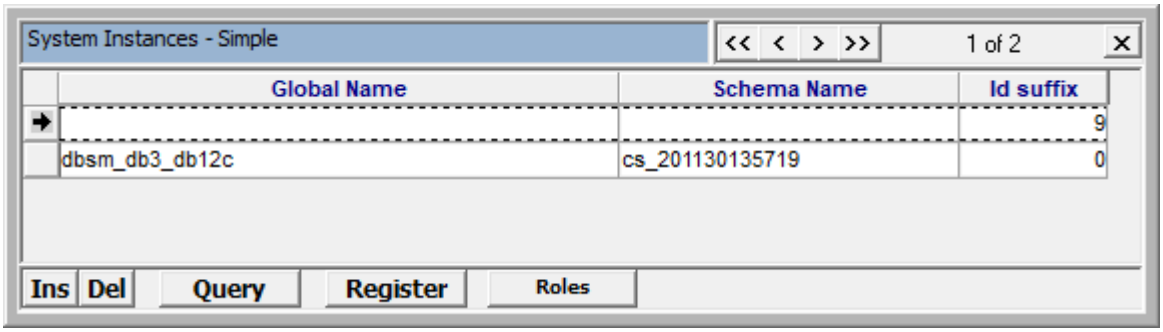


Fig. Node setup

In the *Global Name* field, specify the global name of the database. The full domain name must be specified. The global name of the database must be unique for each node.

In the *Schema Name* field, specify the schema owner's name.

> ⚠ If the global name of the database changes, the value in the *Global Name* field must be changed for the node.
> To fill in *Global Name* and *Schema Name*, lower case must be used.

In the *ID suffix* field, set the digit that will be used when generating the ids of records on each node.

To register a node's settings, click the [Register] button. On registration, a check is made that the value set in the *Id suffix* field +1 does not exceed the value set in the MAX_SYS_INSTANCES parameter (see the description of the parameter in the document "WAY4™ Global Parameters").

When the *Id suffix* field value for any node is changed, the sequence on this node must be rebuilt using the synchseq.sql script:

```
<OWS_HOME>\db\ssp4.bat connect=<OWS_OWNER>/<OWS_PASSWORD>@<Host>:<Port>:<SID>
log=<LogFilePath> <OWS_HOME>\db\scripts\oracle\tools\synchseq.sql
```

Before synchronizing sequences, all activity must be stopped on this node. When executing the script, the correctness of node settings is checked.

2 Statistics collection methods

This section provides recommendations for collecting Oracle statistics for Way4.

> ⚠ All suggested recommendations should be tested on a test system before being executed on a production system.

Recommendations for the frequency of collecting statistics (after each of the following events):

- After upgrade to a new version of the Way4 Cards component.
- After batch deletion of obsolete data (Housekeeping);
- Every four months.

The statistics collection process requires a lot of database resources and time. Therefore, it is recommended to collect statistics on a copy of the production system and then transfer them to the production system.

The statistics collection process is split into three phases:

1. Preparation of an up-to-date copy of the production system (there are various ways to perform this step).
2. Statistics collection.
3. Transferring statistics from the test database to the production database.

2.1 Statistics collection

A standard script is used for collecting statistics, <OWS_HOME>/db/scripts/oracle/tools/gatherstats.ssp, that allows statistics to be collected for all tables, or for a specific list.

Script parameters:

- TableList – list of tables (values are separated by a space or comma). By default, all the scheme's tables.
- DaysToIgnore – allows tables for which statistics have already been collected in the last DaysToIgnore to be excluded from statistics collection. The default value is 3 days. To gather statistics for the entire volume of data, specify "0".
- EstimatePercent – the default value is "100".
- IsCascade – gather statistics for indexes. The default value is "true" (statistics are gathered for indexes).
- Degree – parallelism degree for gathering statistics. The default value is null (no parallelism).
- UserName – by default, this is the current user.

> ⓘ OpenWay recommends the use of the default values.

Examples of the script's use are shown below.

Collection of statistics for all tables and their indexes. If statistics for a table were collected less than three days ago, the table is skipped during collection of statistics:

```
<OWS_HOME>\db\ssp.bat connect=<OWS_OWNER>/<OWS_OWNER_PASSWORD>@<HOST>:<PORT>:<SID>
<OWS_HOME>\db\scripts\oracle\tools\gatherstats.ssp
```

Collection of statistics for the DOC table and its indexes regardless of the date on which statistics were last collected. Statistics are collected in two parallel threads:

```
<OWS_HOME>\db\ssp.bat connect=<OWS_OWNER>/<OWS_OWNER_PASSWORD>@<HOST>:<PORT>:<SID
<OWS_HOME>\db\scripts\oracle\tools\gatherstats.ssp doc "0" "" "" 2
```

When collecting statistics for all tables, note that the ITEM_TMP and GL_TRANSFER tables are not empty. After collecting statistics, it is recommended to run the document posting procedure and while it is running, to collect statistics again for these tables.

Example of re-collecting statistics for two tables:

```
<OWS_HOME>\db\ssp.bat connect=<OWS_OWNER>/<OWS_OWNER_PASSWORD>@<HOST>:<PORT>:<SID>
<OWS_HOME>\db\scripts\oracle\tools\gatherstats.ssp "ITEM_TMP,GL_TRANSFER_TMP"
```

2.2 Transferring statistics from a test database to the production database

To transfer statistics from a test database to the production database, do as follows:

- In the test database, create an export table and load the collected statistics into it (scripts are run by the <OWS_OWNER> schema owner):

```
begin
    DBMS_STATS.create_stat_table(ownname => user , stattab =>'STATTAB');
    DBMS_STATS.export_schema_stats(ownname => user, stattab =>'STATTAB',statown =>
user);
end;
```

- Export the STATTAB table (table with saved statistics) using the Oracle exp utility:

```
exp <OWS_OWNER>/<OWS_OWNER_PASSWORD>@<TNS> tables=stattab file=stattab.dmp
```

- In the production database, create a backup copy of existing statistics:

```
begin
    DBMS_STATS.create_stat_table(ownname => user , stattab =>'STATTAB_BAK');
    DBMS_STATS.export_schema_stats(ownname => user,stattab =>'STATTAB_BAK',statown
=> user);
end;
```

- Import the DMP to the production system. The STATTAB table with data from the test system should appear in the production system.

```
imp <OWS_OWNER>/<OWS_OWNER_PASSWORD>@<TNS> file=stattab.dmp
```

- If the name of the user who imported statistics differs from that of the user who exported statistics, set the corresponding parameters:

```
imp <OWS_OWNER>/<OWS_OWNER_PASSWORD>@<TNS> file=stattab.dmp fromuser=<export_user>
touser=<import_user>
update stats set c5 = '<import_user>' where c5='<export_user>';
```

- Apply the statistics in the production system:

```
begin
    DBMS_STATS.IMPORT_schema_stats(ownname => user,stattab => 'STATTAB',statown =>
user);
end
```

Statistics for specific tables can be transferred. To do so, instead of the export_schema_stats procedure, use the export_table_stats procedure:

```
--test
begin
    DBMS_STATS.create_stat_table(ownname => user , stattab =>'STATTAB_STAT');
    DBMS_STATS.export_table_stats(ownname => user,stattab =>'STATTAB_STAT',statown
=> user,tabname => 'STAT_CONTRACT_GR');
    DBMS_STATS.export_table_stats(ownname => user,stattab =>'STATTAB_STAT',statown
=> user,tabname => 'STAT_CONTRACT_ACT');
end;
exp <OWS_OWNER>/<OWS_OWNER_PASSWORD>@<TNS> tables=stattab_stat file=stattab_stat.dmp

--prod
imp <OWS_OWNER>/<OWS_OWNER_PASSWORD>@<TNS> file=stattab_stat.dmp
begin
    DBMS_STATS.IMPORT_table_stats(ownname => user,stattab => 'STATTAB_STAT',statown
=> user,tabname => 'STAT_CONTRACT_GR');
    DBMS_STATS.IMPORT_table_stats(ownname => user,stattab => 'STATTAB_STAT',statown
=> user,tabname => 'STAT_CONTRACT_ACT');
end;
```

3 Tracing

Tracing is used to diagnose Oracle database performance problems. When tracing is enabled, trace files (Oracle Traces) are generated which contain detailed information about execution of SQL statements by server processes.

> In the examples below, to collect trace information that contains not only wait events but binds as well, use the procedure stnd.start_sql_trace_bind instead of the procedure stnd.start_sql_trace.

Wait events are used to evaluate system performance and are included in trace files by default.

Binds are used to get information about which data was used as input parameters during execution of SQL or PL/SQL. For access to binds, it is necessary to get the unprocessed trace file.

Collection of traces with binds (stnd.start_sql_trace_bind) slightly increases the load on the system. Therefore, usually trace files are collected with wait events only (stnd.start_sql_trace).

> Trace files with binds may contain sensitive data (card numbers and other) in open form. Therefore storing and transferring these files is contrary to PA-DSS requirements (see the document "Way4™ PA-DSS Implementation Guide").

3.1 DB Manager and Way4 Manager client applications

To enable tracing in the DB Manager and Way4 Manager applications, run the menu item "Full → DB Administrator Utilities → System Utilities → Enable SQL Trace".

Traces will be gathered only for wait events without binds. Tracing is only enabled for the current session and for all processes which are running in the current session.

Next, it is necessary to run a test scenario (model an error).

To disable tracing, run the menu item "Full → DB Administrator Utilities → System Utilities → Disable SQL Trace".

To collect traces with binds, use the procedures:

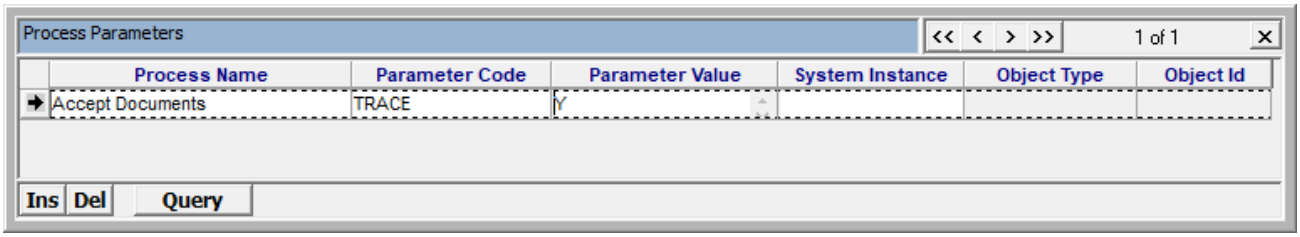
```
stnd.start_sql_trace_bind;
stnd.stop_sql_trace;
```

3.2 Way4 processes

To get a trace file for a Way4 process, use the "TRACE" process parameter.

In the "Process Parameters" form (menu item "Full → Configuration Setup → Main Tables → Process Parameters") create a record with the following values:

- In the *Process Name* field, set the name of the process. The name of the process can be viewed in the process log ("Process Log" form). For more information, see the document "DB Manager Manual" or "Way4 Manager Manual".
- In the *Parameter Code* field, select "TRACE".
- In the *Parameter Value* field, set "Y" (collect traces with wait events) or "BIND" (collect traces with wait events and binds).



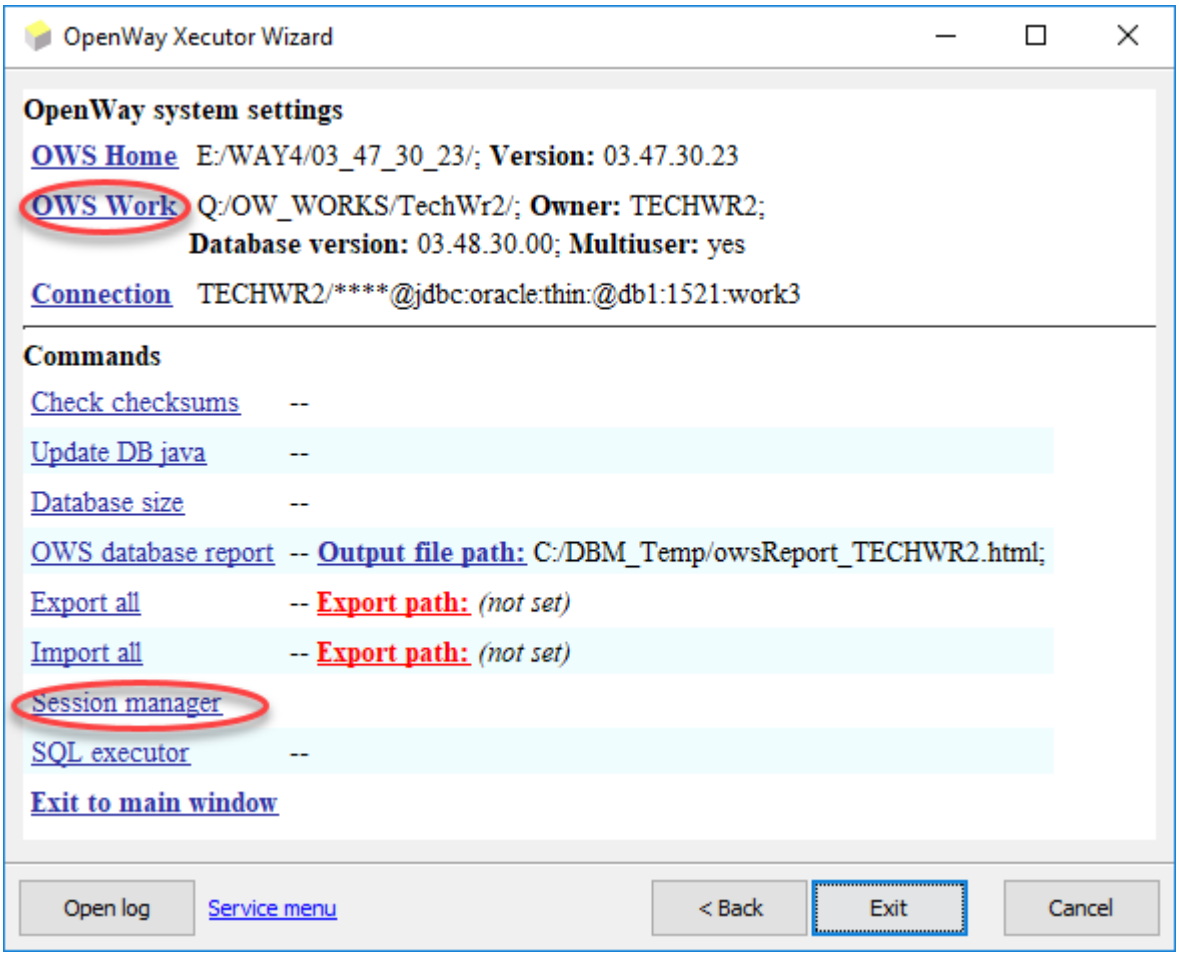
Enabling tracing for a Way4 process

For more information about process parameters, see the document "Running Processes in Parallel".

3.3 Sessions

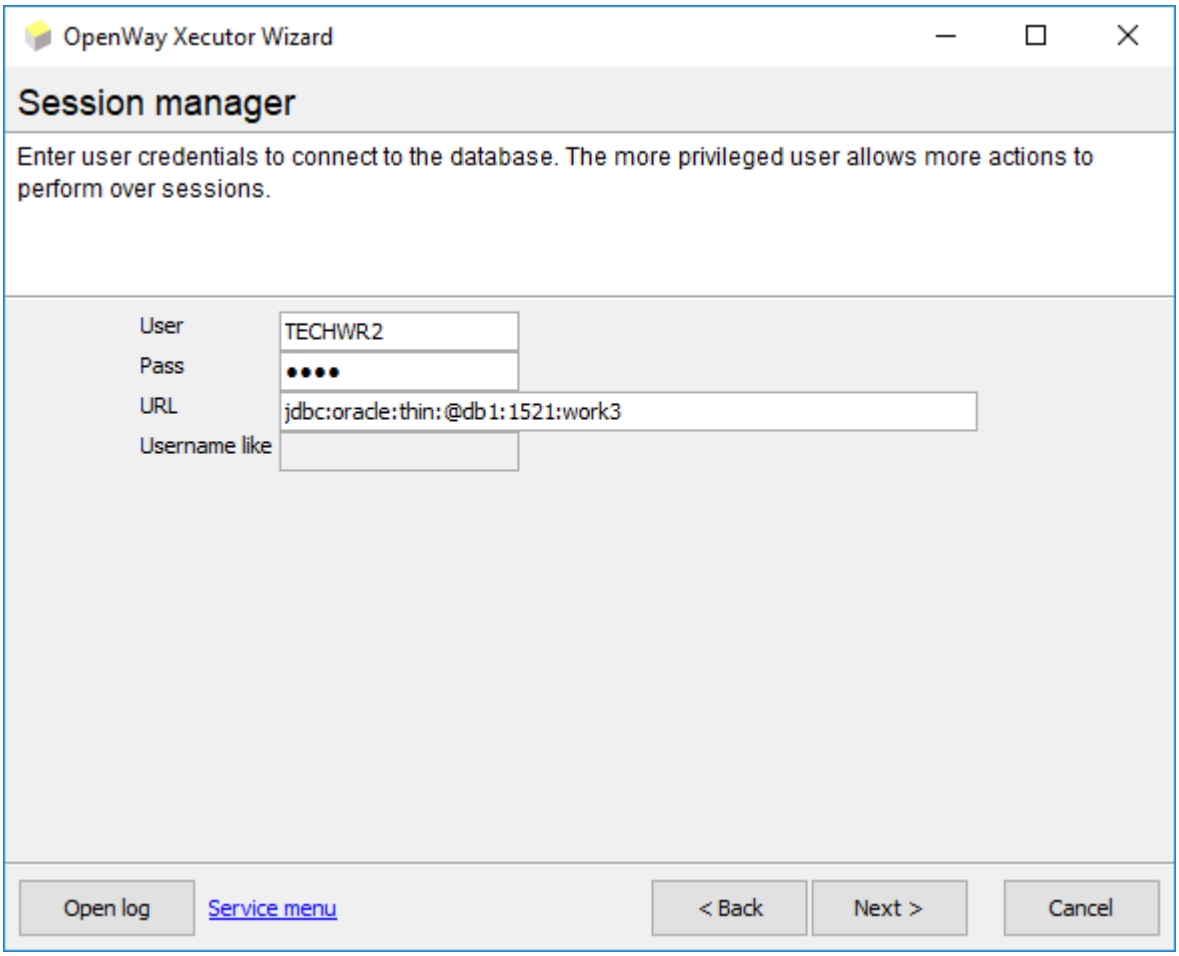
To enable tracing for an arbitrary session, run the Way4Tools utility (<OW_HOME>\install\WAY4Tools.bat) on the workstation.

Click the {OWS Work} link and select the <OWS_WORK> directory. Click the {Session manager} link.



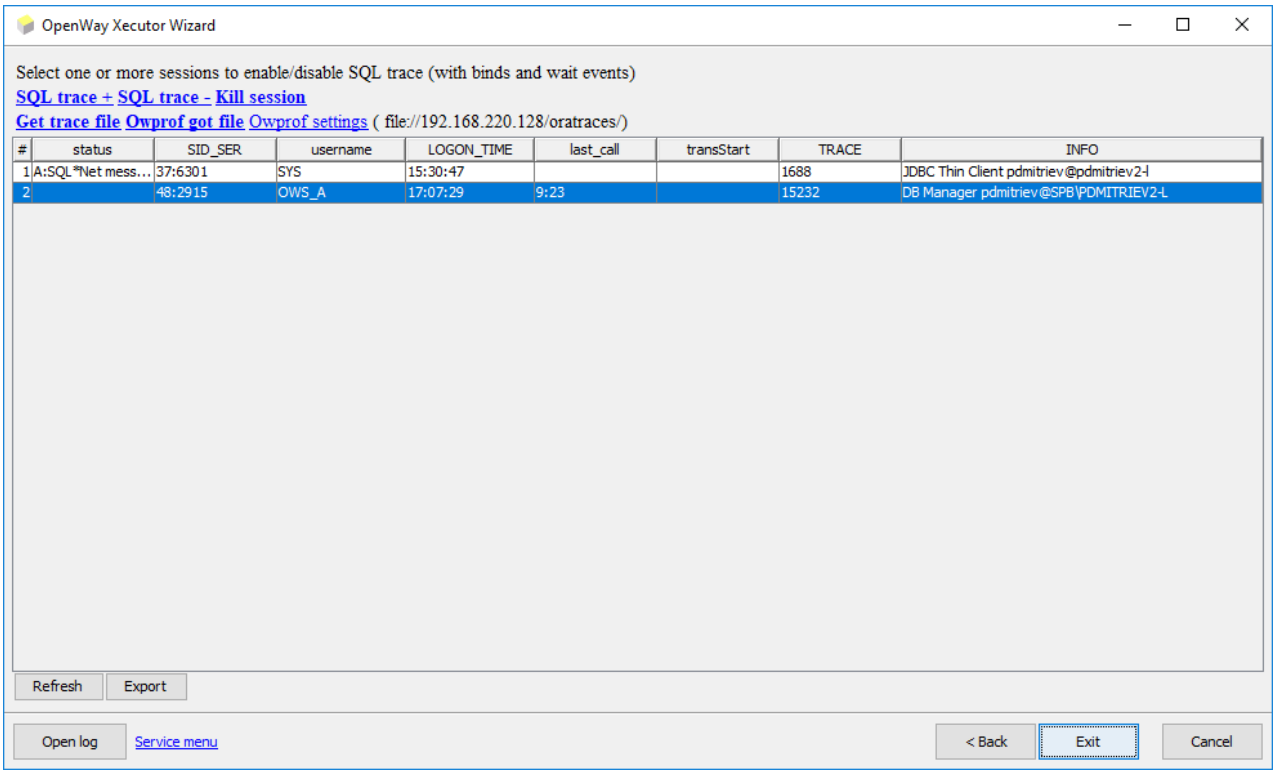
Main window of the Way4Tools utility

Enter database connection parameters. Set <OWS_OWNER> as the user.



Entering database connection parameters

Select the session for which tracing must be enabled and click the {SQL Trace +} link.



Enabling tracing for a session

Next, it is necessary to run a test scenario (model an error).

To disable tracing, click the {SQL Trace – } link. For more information about the Way4Tools utility, see the document "Way4Tools".

SQL*Plus can be used to enable tracing for a session. To do so, run the following command as the <OWS_OWNER> or SYS user:

```
begin
sys.dbms_system.set_ev(sid, serial#, 10046, 12, '');
end;
```

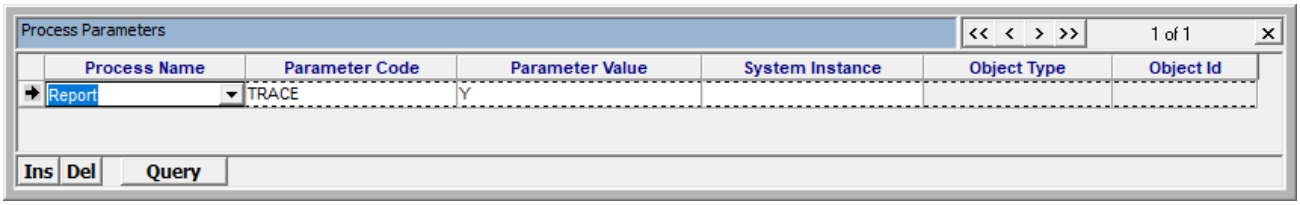
sid and serial# are the identifiers of the session from the v$session view.

To stop tracing, run the following command as the <OWS_OWNER> or SYS user:

```
begin
sys.dbms_system.set_ev(sid, serial#, 10046, 0, '');
end;
```

3.4 Reports (Oracle Reports)

To enable tracing for Oracle Reports, use the "TRACE" process parameter for the "Report" process.



Enabling tracing for Oracle Reports

Next, run the problematic report.

To disable tracing, change the parameter's value to "N".

3.5 Transaction Switch and Access Server applications

Tracing is managed by the application configuration parameter conn.<groupName>.autotrace.traceMode.

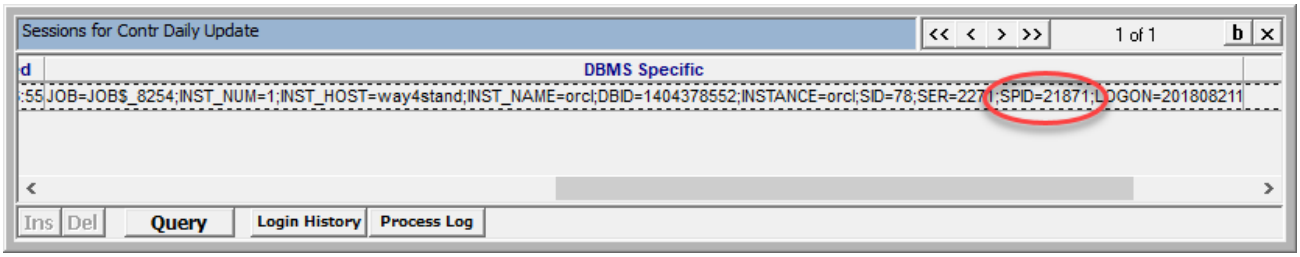
Tracing is enabled on the Oracle database server. Possible values for the parameter conn.<groupName>.autotrace.traceMode:

- off – tracing is disabled
- on/normal – trace with wait events
- all – trace with wait events and binds.

For more information, see the application's documentation.

3.6 Getting and analyzing trace files

A trace file for a Way4 process contains the process' identifier which can be obtained from the "SPID" tag for a Way4 process session record.



Way4 process identifier

The obtained trace files can be analyzed directly. However, it is usually sufficient to analyze a much smaller amount of structured information that can be obtained from a trace file using the standard Oracle utility tkprof.