N-Partner

# 如何設定
# Oracle 資料庫審核記錄

V009

2021/07/07

## 版權聲明



## 商標

# 目錄

# 前言

本文件描述 N-Reporter 使用者在 Linux / AIX 如何啟用資料庫審核，並使用 Rsyslog 或 Syslogd 方式設定 Oracle DataBase Audit Logs。

在 Windows 如何使用 Open Source 工具 NXLog 方式設定 Oracle audit 事件記錄。

NXLog 工具將 Oracle audit 事件記錄轉成 syslog，再傳送到 N-Reporter 做正規化、稽核與分析。

Oracle Security Guide: https://docs.oracle.com/en/database/oracle/oracle-database/19/dbseg/introduction-to-auditing.html#GUID-94381464-53A3-421B-8F13-BD171C867405

Oracle Audit Syslog Level: https://docs.oracle.com/en/database/oracle/oracle-database/19/refrn/AUDIT_SYSLOG_LEVEL.html#GUID-EBBAD1D4-A4F8-49A4-9C4E-7CF6A085CB53

註：本文件僅做為如何將日誌吐出的設定參考，建議您仍應聯繫設備或是軟體原廠尋求日誌輸出方式之協助。

# 1. Red Hat

## 1.1 Red Hat 6

### 1.1.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

(3) 顯示審計參數

```
SQL> show parameter audit
```

(4) 顯示資料庫審計

```
SQL> show parameter audit_trail
```

(6) 顯示審計等級

```
SQL> show parameter audit_syslog_level
```

(7) 顯示 sysdba 特權用戶審計

```
SQL> show parameter audit_sys_operations
```

(8) 修改審計記錄到作業系統

```
SQL> alter system set audit_trail='OS' scope=spfile;
```

(9) 啟用 sysdba 特權用戶審計

```
SQL> alter system set audit_sys_operations=true scope=spfile;
```

(10) 修改審計記錄 facility: local0 info 訊息

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;
```

(11) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate
```

(12) 啟動 Oracle 資料庫服務

```
SQL> startup
```

(13) 顯示審計參數

```
SQL> show parameter audit
```

(14) 離開 Oracle 資料庫

```
SQL> exit
```

### 1.1.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# service rsyslog restart && service rsyslog status
```

## 1.2 Red Hat 7

### 1.2.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

(3) 顯示審計參數

```
SQL> show parameter audit
```

(4) 顯示資料庫審計

```
SQL> show parameter audit_trail
```

(6) 顯示審計等級

```
SQL> show parameter audit_syslog_level
```

(7) 顯示 sysdba 特權用戶審計

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(8) 修改審計記錄到作業系統

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```
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```

(12) 啟動 Oracle 資料庫服務

```
SQL> startup
```

(13) 顯示審計參數

```
SQL> show parameter audit
```

(14) 離開 Oracle 資料庫

```
SQL> exit
```

### 1.2.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# systemctl restart rsyslog && systemctl status rsyslog
```

## 1.3 Red Hat 8

### 1.3.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

(3) 顯示審計參數

```
SQL> show parameter audit
```

(4) 顯示資料庫審計

```
SQL> show parameter audit_trail
```

(6) 顯示審計等級

```
SQL> show parameter audit_syslog_level
```

(7) 顯示 sysdba 特權用戶審計

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SQL> show parameter audit_sys_operations
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(8) 修改審計記錄到作業系統

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(9) 啟用 sysdba 特權用戶審計

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SQL> alter system set audit_sys_operations=true scope=spfile;
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```

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```
SQL> shutdown immediate
```

(12) 啟動 Oracle 資料庫服務

```
SQL> startup
```

(13) 顯示審計參數

```
SQL> show parameter audit
```

(14) 離開 Oracle 資料庫

```
SQL> exit
```

### 1.3.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# systemctl restart rsyslog && systemctl status rsyslog
```

# 2. Oracle Linux

## 2.1 Oracle Linux 6

### 2.1.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

(3) 顯示審計參數

```
SQL> show parameter audit
```

(4) 顯示資料庫審計

```
SQL> show parameter audit_trail
```

(6) 顯示審計等級

```
SQL> show parameter audit_syslog_level
```

(7) 顯示 sysdba 特權用戶審計

```
SQL> show parameter audit_sys_operations
```

(8) 修改審計記錄到作業系統

```
SQL> alter system set audit_trail='OS' scope=spfile;
```

(9) 啟用 sysdba 特權用戶審計

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SQL> alter system set audit_sys_operations=true scope=spfile;
```

(10) 修改審計記錄 facility: local0 info 訊息

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;
```

(11) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate
```

(12) 啟動 Oracle 資料庫服務

```
SQL> startup
```

(13) 顯示審計參數

```
SQL> show parameter audit
```

(14) 離開 Oracle 資料庫

```
SQL> exit
```

### 2.1.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# service rsyslog restart && service rsyslog status
```

## 2.2 Oracle Linux 7

### 2.2.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

```
[oracle@oracle ~]$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Fri Jun 11 17:25:41 2021
Version 19.3.0.0.0

Copyright (c) 1982, 2019, Oracle.  All rights reserved.


Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.3.0.0.0

SQL>
```

(3) 顯示審計參數

```
SQL> show parameter audit
```

```
SQL> show parameter audit

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_file_dest                      string      /opt/oracle/admin/ORCLCDB/adum
                                                 p
audit_sys_operations                 boolean     TRUE
audit_syslog_level                   string
audit_trail                          string      DB
unified_audit_common_systemlog       string
unified_audit_sga_queue_size         integer     1048576
unified_audit_systemlog              string
SQL>
```

(4) 顯示資料庫審計

```
SQL> show parameter audit_trail
```

```
SQL> show parameter audit_trail

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_trail                          string      DB
SQL>
```

(5) 修改審計記錄到作業系統

```
SQL> alter system set audit_trail='OS' scope=spfile;
```

```
SQL> alter system set audit_trail='OS' scope=spfile;

System altered.

SQL>
```

(6) 顯示審計等級

```
SQL> show parameter audit_syslog_level
```

```
SQL> show parameter audit_syslog_level

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_syslog_level                   string
SQL>
```

(7) 修改審計記錄 facility: local0 info 訊息

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;
```

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;

System altered.

SQL>
```

(8) 顯示 sysdba 特權用戶審計

```
SQL> show parameter audit_sys_operations
```

```
SQL> show parameter audit_sys_operations

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_sys_operations                 boolean     TRUE
SQL>
```

(9) 啟用 sysdba 特權用戶審計

```
SQL> alter system set audit_sys_operations=true scope=spfile;
```

```
SQL> alter system set audit_sys_operations=true scope=spfile;

System altered.

SQL>
```

(10) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate
```

```
SQL> shutdown immediate
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL>
```

(11) 啟動 Oracle 資料庫服務

```
SQL> startup
```

```
SQL> startup
ORACLE instance started.

Total System Global Area 2.0200E+10 bytes
Fixed Size                  9145232 bytes
Variable Size            2483027968 bytes
Database Buffers         1.7650E+10 bytes
Redo Buffers               57962496 bytes
Database mounted.
Database opened.
SQL>
```

(12) 顯示審計參數

```
SQL> show parameter audit
```

```
SQL> show parameter audit

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_file_dest                      string      /opt/oracle/admin/ORCLCDB/adum
                                                 p
audit_sys_operations                 boolean     TRUE
audit_syslog_level                   string      LOCAL0.INFO
audit_trail                          string      OS
unified_audit_common_systemlog       string
unified_audit_sga_queue_size         integer     1048576
unified_audit_systemlog              string
SQL>
```

(13) 離開 Oracle 資料庫

```
SQL> exit
```

```
SQL> exit
Disconnected from Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.3.0.0.0
[oracle@oracle ~]$
```

### 2.2.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# systemctl restart rsyslog && systemctl status rsyslog
```

## 2.3 Oracle Linux 8

### 2.3.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

(3) 顯示審計參數

```
SQL> show parameter audit
```

(4) 顯示資料庫審計

```
SQL> show parameter audit_trail
```

(6) 顯示審計等級

```
SQL> show parameter audit_syslog_level
```

(7) 顯示 sysdba 特權用戶審計

```
SQL> show parameter audit_sys_operations
```

(8) 修改審計記錄到作業系統

```
SQL> alter system set audit_trail='OS' scope=spfile;
```

(9) 啟用 sysdba 特權用戶審計

```
SQL> alter system set audit_sys_operations=true scope=spfile;
```

(10) 修改審計記錄 facility: local0 info 訊息

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;
```

(11) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate
```

(12) 啟動 Oracle 資料庫服務

```
SQL> startup
```

(13) 顯示審計參數

```
SQL> show parameter audit
```

(14) 離開 Oracle 資料庫

```
SQL> exit
```

### 2.3.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# systemctl restart rsyslog && systemctl status rsyslog
```

# 3. SUSE Linux

## 3.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

(3) 顯示審計參數

```
SQL> show parameter audit
```

(4) 顯示資料庫審計

```
SQL> show parameter audit_trail
```

(6) 顯示審計等級

```
SQL> show parameter audit_syslog_level
```

(7) 顯示 sysdba 特權用戶審計

```
SQL> show parameter audit_sys_operations
```

(8) 修改審計記錄到作業系統

```
SQL> alter system set audit_trail='OS' scope=spfile;
```

(9) 啟用 sysdba 特權用戶審計

```
SQL> alter system set audit_sys_operations=true scope=spfile;
```

(10) 修改審計記錄 facility: local0 info 訊息

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;
```

(11) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate
```

(12) 啟動 Oracle 資料庫服務

```
SQL> startup
```

(13) 顯示審計參數

```
SQL> show parameter audit
```

(14) 離開 Oracle 資料庫

```
SQL> exit
```

## 3.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# systemctl restart rsyslog && systemctl status rsyslog
```

# 4. AIX

## 4.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

(3) 顯示審計參數

```
SQL> show parameter audit;
```

(4) 顯示資料庫審計

```
SQL> show parameter audit_trail;
```

(6) 顯示審計等級

```
SQL> show parameter audit_syslog_level;
```

(7) 顯示 sysdba 特權用戶審計

```
SQL> show parameter audit_sys_operations;
```

(8) 修改審計記錄到作業系統

```
SQL> alter system set audit_trail='OS' scope=spfile;
```

(9) 啟用 sysdba 特權用戶審計

```
SQL> alter system set audit_sys_operations=true scope=spfile;
```

(10) 修改審計記錄 facility: local0 info 訊息

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;
```

(11) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate;
```

(12) 啟動 Oracle 資料庫服務

```
SQL> startup;
```

(13) 顯示審計參數

```
SQL> show parameter audit;
```

(14) 離開 Oracle 資料庫

```
SQL> exit;
```

## 4.2 設定 Syslogd

(1) 編輯 syslog 設定檔

```
# vi /etc/syslog.conf
```

(2) 將 Oracle log 轉發到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 停止 syslogd 服務和啟動 syslogd 服務

```
# stopsrc -s syslogd && startsrc -s syslogd
```

(4) 確認 syslogd 服務情形

```
# ps -ef | grep syslogd
```

# 5. Windows

## 5.1 NXLog

### 5.1.1 NXLog 安裝

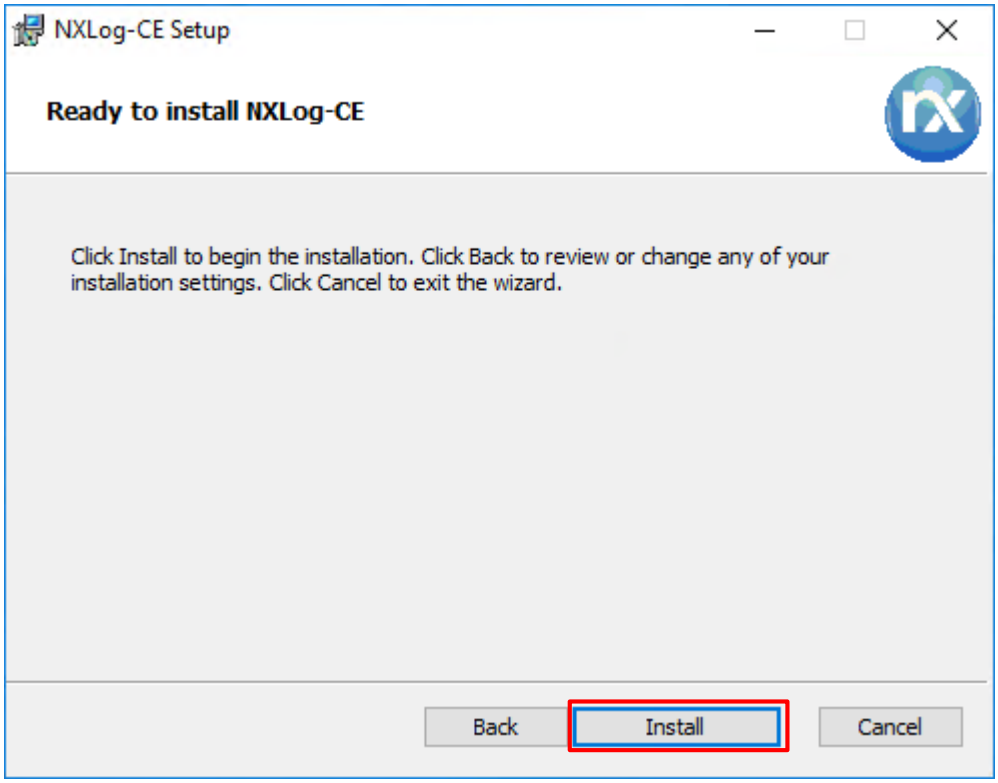
(1) 下載 NXLog

前往網址 https://nxlog.co/products/nxlog-community-edition/download

下載網址最新版 nxlog-ce-x.x.xxxx.msi，範例: nxlog-ce-2.10.2150.msi


(2) 安裝 NXLog

點擊 [nxlog-ce-2.10.2150.msi] -> 按 [Install] 到 [Finish]

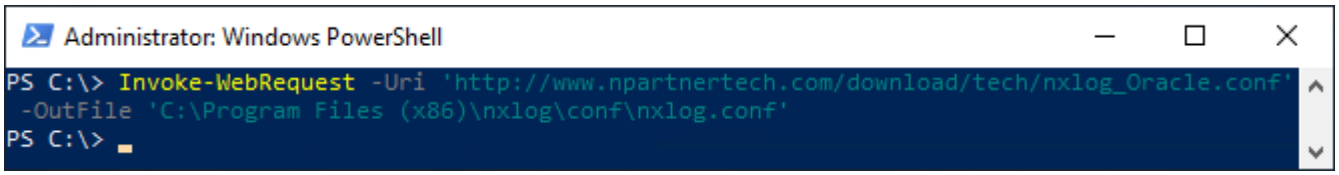


### 5.1.2 NXLog 設定檔下載

(1) 開啟 [Windows PowerShell]


(2) 下載 nxlog_Oracle.conf 並覆蓋 NXLog 設定檔。

```
PS C:\> Invoke-WebRequest -Uri 'http://www.npartnertech.com/download/tech/nxlog_Oracle.conf' -OutFile
'C:\Program Files (x86)\nxlog\conf\nxlog.conf'
```



### 5.1.3 NXLog 設定檔

```
## Please set the ROOT to the folder your nxlog was installed into, otherwise it will not start.
define NCloud 192.168.8.184
define ROOT     C:\Program Files (x86)\nxlog

Moduledir %ROOT%\modules
CacheDir    %ROOT%\data
Pidfile     %ROOT%\data\nxlog.pid
SpoolDir    %ROOT%\data
LogFile     %ROOT%\data\nxlog.log

Moduledir %ROOT%\modules
CacheDir    %ROOT%\data
Pidfile     %ROOT%\data\nxlog.pid
SpoolDir    %ROOT%\data

## Load the modules needed by the outputs
<Extension syslog>
   Module       xm_syslog
</Extension>

## For Oracle event log file use the following:
<Input in_eventlog>
   Module            im_msvistalog
   ReadFromLast TRUE
   SavePos          TRUE
   Query        <QueryList> \
                    <Query Id="0"> \
                        <Select Path="Application">*[System[(Provider[@Name='Oracle.orcl'])]]</Select> \
                    </Query> \
                </QueryList>
</Input>

<Output out_eventlog>
   Module om_udp
   Host     %NCloud%
   Port     514
   Exec $Message = string($SourceName) + ": " + string($EventID) + ": " + $Message;
   Exec if ($EventType == 'ERROR' or $EventType == 'AUDIT_FAILURE') { $SyslogSeverityValue = 3; } \
            else if ($EventType == 'WARNING')    { $SyslogSeverityValue = 4; } \
            else if ($EventType == 'INFO' or $EventType == 'AUDIT_SUCCESS')    { $SyslogSeverityValue = 5; }
   Exec to_syslog_bsd();
</Output>

<Route eventlog>
   Path    in_eventlog => out_eventlog
</Route>
```

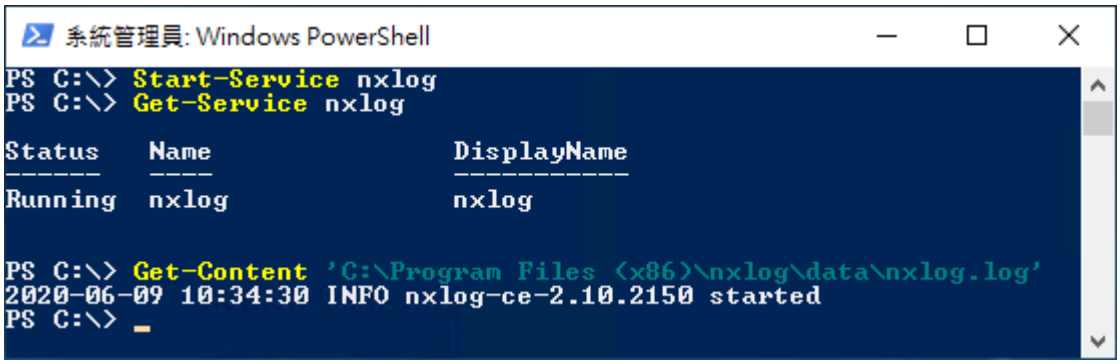
藍色文字部位請輸入 N-Reporter 系統 IP address 和 Oracle 執行個體名稱

### 5.1.4 NXLog 啟動服務

(1) 開啟 [Windows PowerShell]


(2) 啟動 NXLog 服務，檢查 NXLog 服務和確認 NXLog 沒有錯誤訊息

```
PS C:\> Start-Service nxlog
PS C:\> Get-Service nxlog
PS C:\> Get-Content 'C:\Program Files (x86)\nxlog\data\nxlog.log'
```

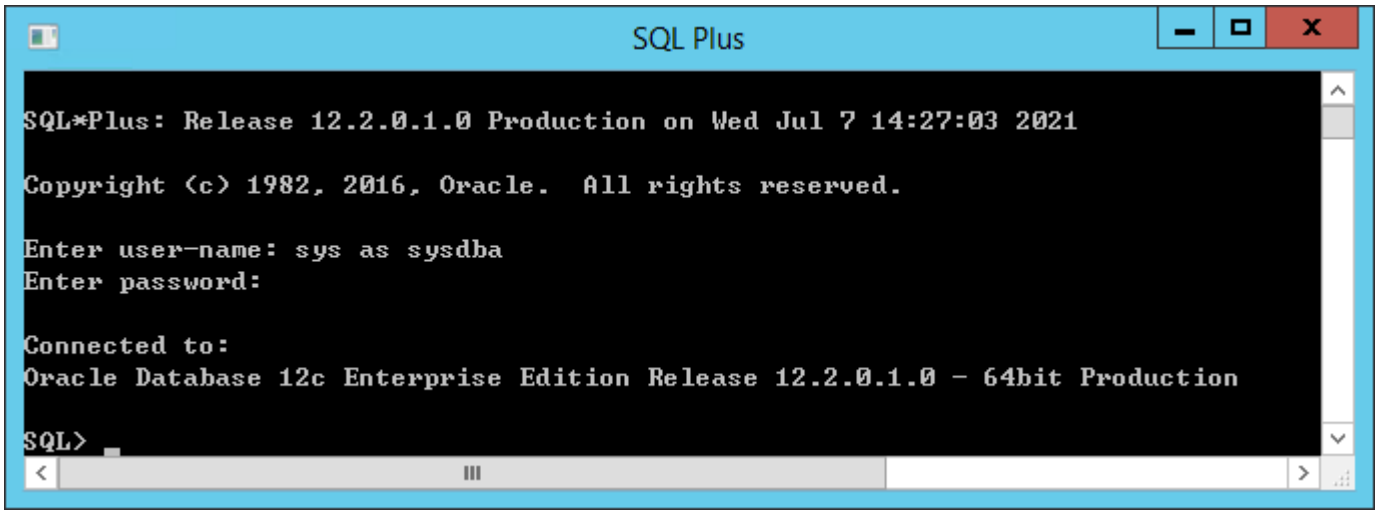


## 5.2 Oracle Database

### 5.2.1 Oracle 12c Audit 設定

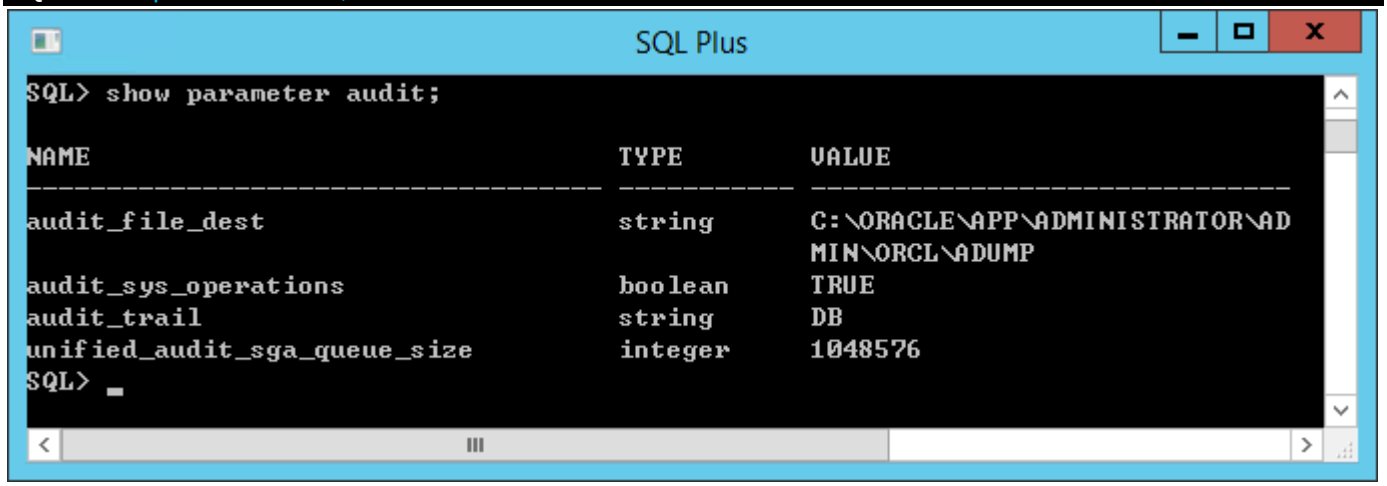
(1) 開啟 [SQL Plus]


(2) 輸入 user-name: 和 password:



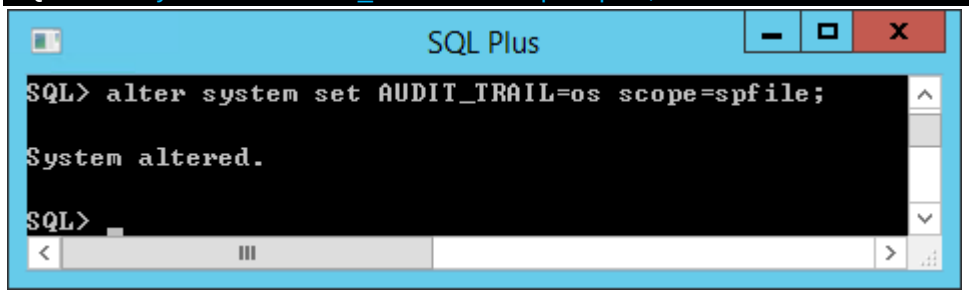

(3) 顯示審計參數

```
SQL> show parameter audit;
```



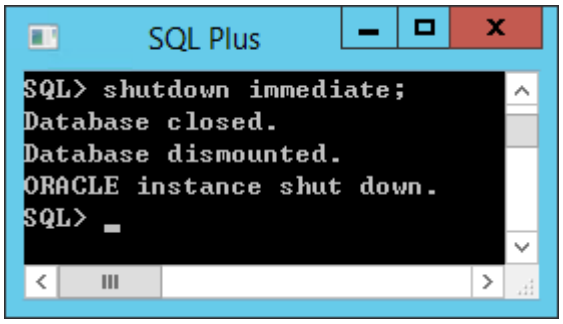
(4) 修改審計記錄到作業系統

```
SQL> alter system set AUDIT_TRAIL=os scope=spfile;
```



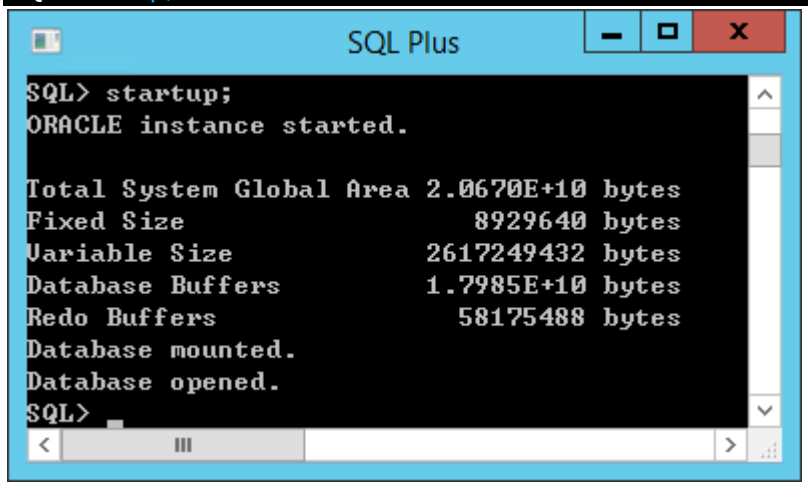

(5) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate;
```



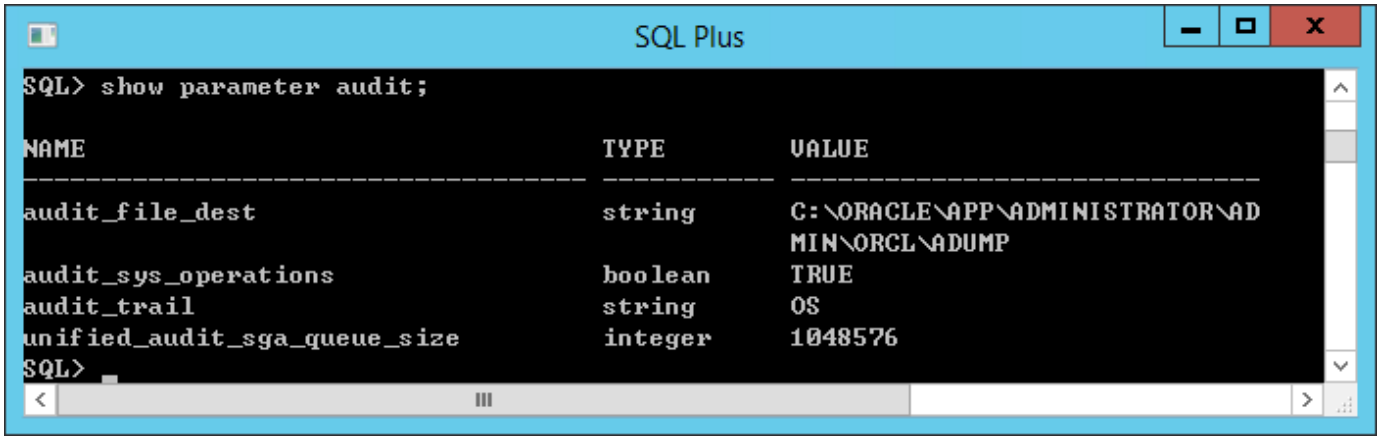

(6) 啟動 Oracle 資料庫服務

```
SQL> startup;
```



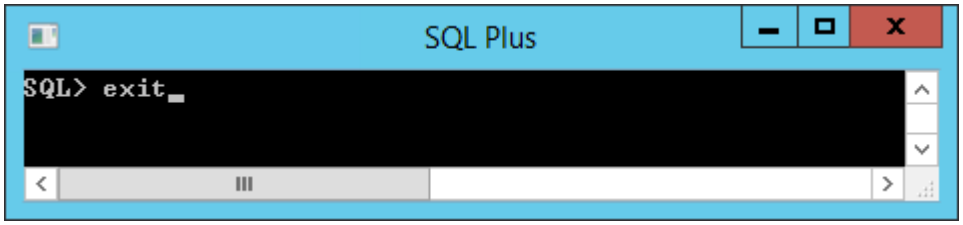
(7) 顯示審計參數

```
SQL> show parameter audit;
```



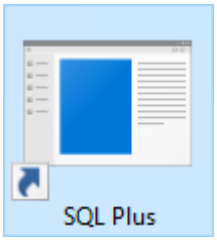

(8) 離開 [SQL Plus]

```
SQL> exit;
```

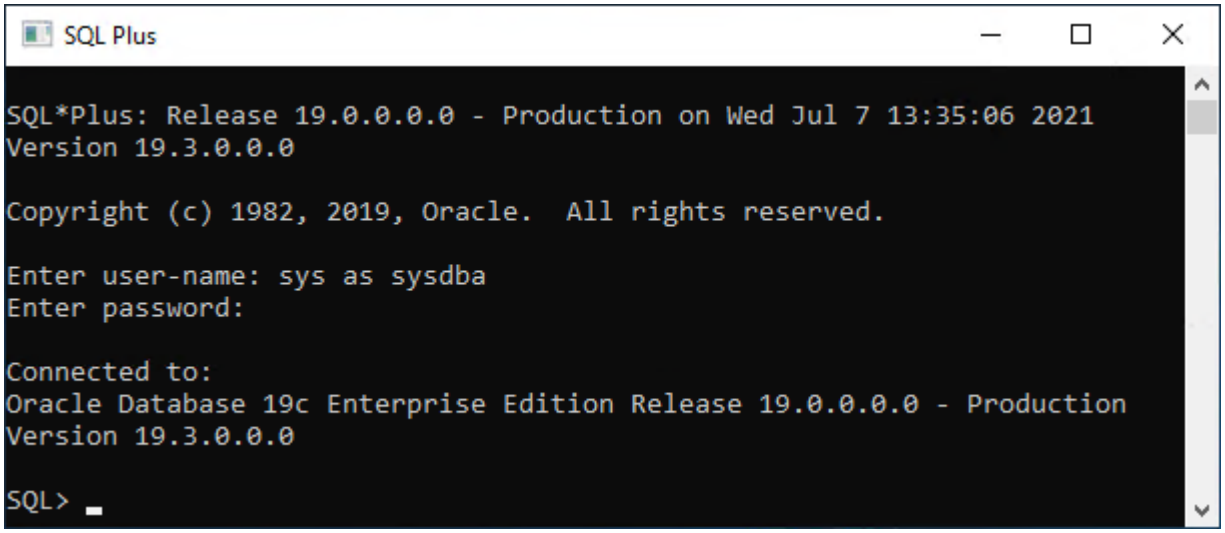


### 5.2.2 Oracle 19c Audit 設定

(1) 開啟 [SQL Plus]

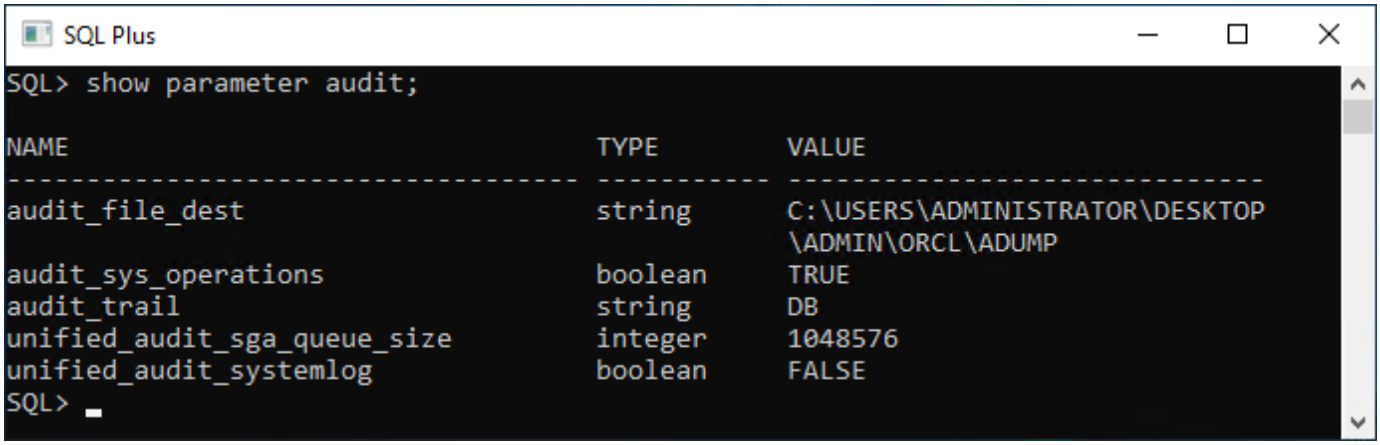



(2) 輸入 user-name: 和 password:



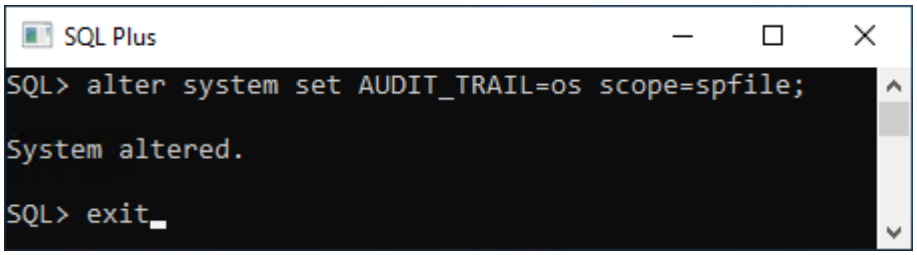

(3) 顯示審計參數

```
SQL> show parameter audit;
```



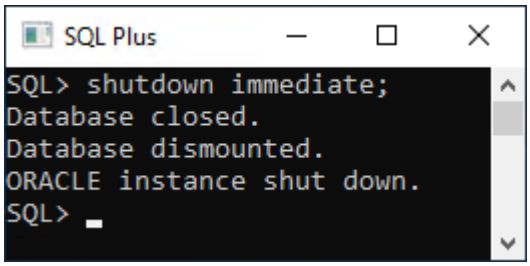
(4) 修改審計記錄到作業系統

```
SQL> alter system set AUDIT_TRAIL=os scope=spfile;
```



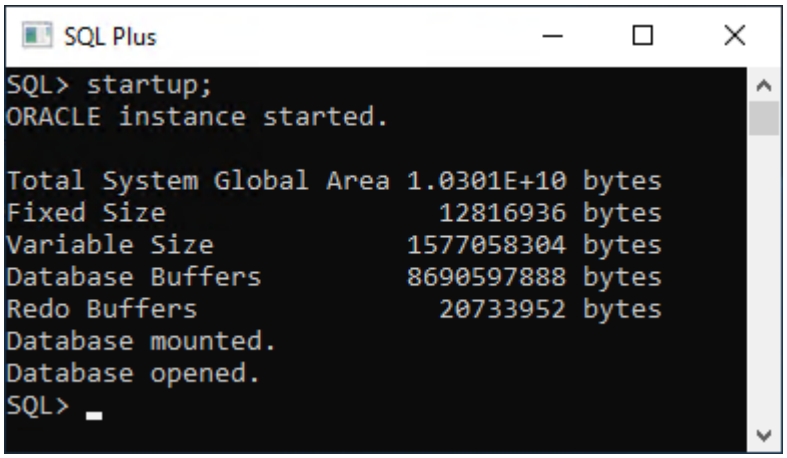

(5) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate;
```



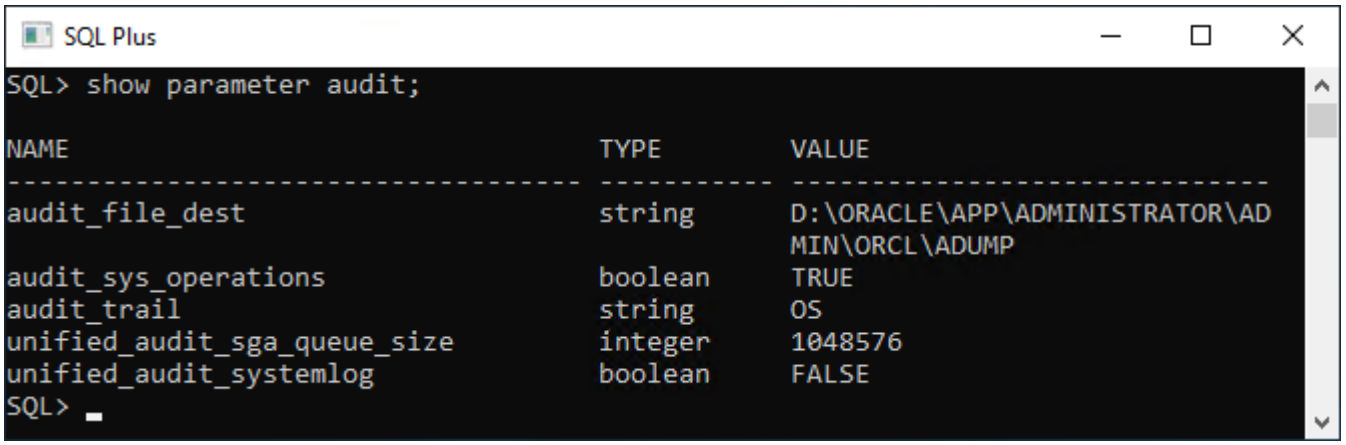

(6) 啟動 Oracle 資料庫服務

```
SQL> startup;
```



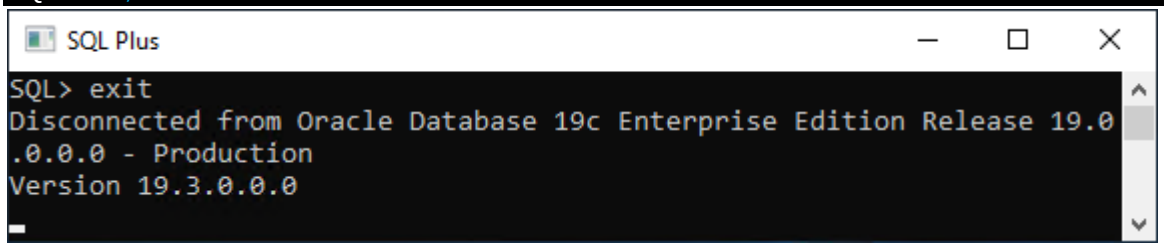
(7) 顯示審計參數

```
SQL> show parameter audit;
```




(8) 離開 [SQL Plus]

```
SQL> exit;
```



# 6. Oracle RAC

作業系統以 Oracle Linux 為範例。

## 6.1 Node 1

### 6.1.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

```
[oracle@oracle-rac1 ~]$ sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Wed Jul 7 10:43:39 2021

Copyright (c) 1982, 2016, Oracle.  All rights reserved.


Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL>
```

(3) 查看當前資料庫的執行個體名稱

```
SQL> SELECT inst_name FROM v$active_instances;
```

```
SQL> SELECT inst_name FROM v$active_instances;

INST_NAME
------------------------------------------------------------------------------
oracle-rac1.localdomain:cdbrac1
oracle-rac2.localdomain:cdbrac2

SQL>
```

(4) 查看 Oracle SID

```
SQL> select instance_name from V$instance;
```

```
SQL> select instance_name from V$instance;

INSTANCE_NAME
----------------
cdbrac1

SQL>
```

(5) 查看 Oracle spfile

```
SQL> show parameter spfile;
```

```
SQL> show parameter spfile;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      +DATA/CDBRAC/PARAMETERFILE/spf
                                                 ile.309.1077273243
SQL>
```

(6) 顯示審計參數

```
SQL> show parameter audit;
```

```
SQL> show parameter audit;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_file_dest                      string      /u01/app/oracle/admin/cdbrac/a
                                                 dump
audit_sys_operations                 boolean     TRUE
audit_syslog_level                   string
audit_trail                          string      DB
unified_audit_sga_queue_size         integer     1048576
SQL>
```

(7) 顯示資料庫審計

```
SQL> show parameter audit_trail;
```

```
SQL> show parameter audit_trail;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_trail                          string      DB
SQL>
```

(8) 修改審計記錄到作業系統

```
SQL> alter system set audit_trail='OS' scope=spfile;
```

```
SQL> alter system set audit_trail='OS' scope=spfile;

System altered.

SQL>
```

(9) 顯示審計等級

```
SQL> show parameter audit_syslog_level;
```

```
SQL> show parameter audit_syslog_level;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_syslog_level                   string
SQL>
```

(10) 修改審計記錄 facility: local0 info 訊息

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;
```

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;

System altered.

SQL>
```

(11) 顯示 sysdba 特權用戶審計

```
SQL> show parameter audit_sys_operations;
```

```
SQL> show parameter audit_sys_operations;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_sys_operations                 boolean     TRUE
SQL>
```

(12) 啟用 sysdba 特權用戶審計

```
SQL> alter system set audit_sys_operations=true scope=spfile;
```

```
SQL> alter system set audit_sys_operations=true scope=spfile;

System altered.

SQL>
```

(13) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate;
```

```
SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL>
```

(14) 啟動 Oracle 資料庫服務

```
SQL> startup;
```

```
SQL> startup;
ORACLE instance started.

Total System Global Area 3707764736 bytes
Fixed Size                  8799320 bytes
Variable Size             905972648 bytes
Database Buffers         2785017856 bytes
Redo Buffers                7974912 bytes
Database mounted.
Database opened.
SQL>
```

(15) 顯示審計參數

```
SQL> show parameter audit;
```

```
SQL> show parameter audit;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_file_dest                      string      /u01/app/oracle/admin/cdbrac/a
                                                 dump
audit_sys_operations                 boolean     TRUE
audit_syslog_level                   string      LOCAL0.INFO
audit_trail                          string      OS
unified_audit_sga_queue_size         integer     1048576
SQL>
```

(16) 離開 Oracle 資料庫

```
SQL> exit;
```

```
SQL> exit;
Disconnected from Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
[oracle@oracle-rac1 ~]$
```

### 6.1.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# systemctl restart rsyslog && systemctl status rsyslog
```

## 6.2 Node 2

### 6.2.1 設定 Oracle Audit

(1) 切換 oracle 帳號

```
# su - oracle
```

(2) 登入 Oracle 資料庫

```
$ sqlplus / as sysdba
```

```
[oracle@oracle-rac2 ~]$ sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Wed Jul 7 11:01:05 2021

Copyright (c) 1982, 2016, Oracle.  All rights reserved.


Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL>
```

(3) 查看當前資料庫的執行個體名稱

```
SQL> SELECT inst_name FROM v$active_instances;
```

```
SQL> SELECT inst_name FROM v$active_instances;

INST_NAME
------------------------------------------------------------------------------
oracle-rac1.localdomain:cdbrac1
oracle-rac2.localdomain:cdbrac2

SQL>
```

(4) 查看 Oracle SID

```
SQL> select instance_name from V$instance;
```

```
SQL> select instance_name from V$instance;

INSTANCE_NAME
----------------
cdbrac2

SQL>
```

(5) 查看 Oracle spfile

```
SQL> show parameter spfile;
```

```
SQL> show parameter spfile;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      +DATA/CDBRAC/PARAMETERFILE/spf
                                                 ile.309.1077273243
SQL>
```

(6) 顯示審計參數

```
SQL> show parameter audit;
```

```
SQL> show parameter audit;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_file_dest                      string      /u01/app/oracle/admin/cdbrac/a
                                                 dump
audit_sys_operations                 boolean     TRUE
audit_syslog_level                   string
audit_trail                          string      DB
unified_audit_sga_queue_size         integer     1048576
SQL>
```

(7) 顯示資料庫審計

```
SQL> show parameter audit_trail;
```

```
SQL> show parameter audit_trail;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_trail                          string      DB
SQL>
```

(8) 修改審計記錄到作業系統

```
SQL> alter system set audit_trail='OS' scope=spfile;
```

```
SQL> alter system set audit_trail='OS' scope=spfile;

System altered.

SQL>
```

(9) 顯示審計等級

```
SQL> show parameter audit_syslog_level;
```

```
SQL> show parameter audit_syslog_level;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_syslog_level                   string
SQL>
```

(10) 修改審計記錄 facility: local0 info 訊息

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;
```

```
SQL> alter system set audit_syslog_level='local0.info' scope=spfile;

System altered.

SQL>
```

(11) 顯示 sysdba 特權用戶審計

```
SQL> show parameter audit_sys_operations;
```

```
SQL> show parameter audit_sys_operations;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_sys_operations                 boolean     TRUE
SQL>
```

(12) 啟用 sysdba 特權用戶審計

```
SQL> alter system set audit_sys_operations=true scope=spfile;
```

```
SQL> alter system set audit_sys_operations=true scope=spfile;

System altered.

SQL>
```

(13) 停止 Oracle 資料庫服務

```
SQL> shutdown immediate;
```

```
SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL>
```

(14) 啟動 Oracle 資料庫服務

```
SQL> startup;
```

```
SQL> startup;
ORACLE instance started.

Total System Global Area 3707764736 bytes
Fixed Size                  8799320 bytes
Variable Size             905972648 bytes
Database Buffers         2785017856 bytes
Redo Buffers                7974912 bytes
Database mounted.
Database opened.
SQL>
```

(15) 顯示審計參數

```
SQL> show parameter audit;
```

```
SQL> show parameter audit;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
audit_file_dest                      string      /u01/app/oracle/admin/cdbrac/a
                                                 dump
audit_sys_operations                 boolean     TRUE
audit_syslog_level                   string      LOCAL0.INFO
audit_trail                          string      OS
unified_audit_sga_queue_size         integer     1048576
SQL>
```

(16) 離開 Oracle 資料庫

```
SQL> exit;
```

```
SQL> exit;
Disconnected from Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
[oracle@oracle-rac2 ~]$
```

### 6.2.2 設定 Rsyslog

(1) 編輯 Rsyslog 設定檔

```
# vi /etc/rsyslog.conf
```

(2) 將 Oracle log 傳送到 N-Reporter

```
# Send Oracle log to N-Reporter
local0.*                                                @192.168.8.184
```

紅色文字部位請輸入 N-Reporter 系統 IP address

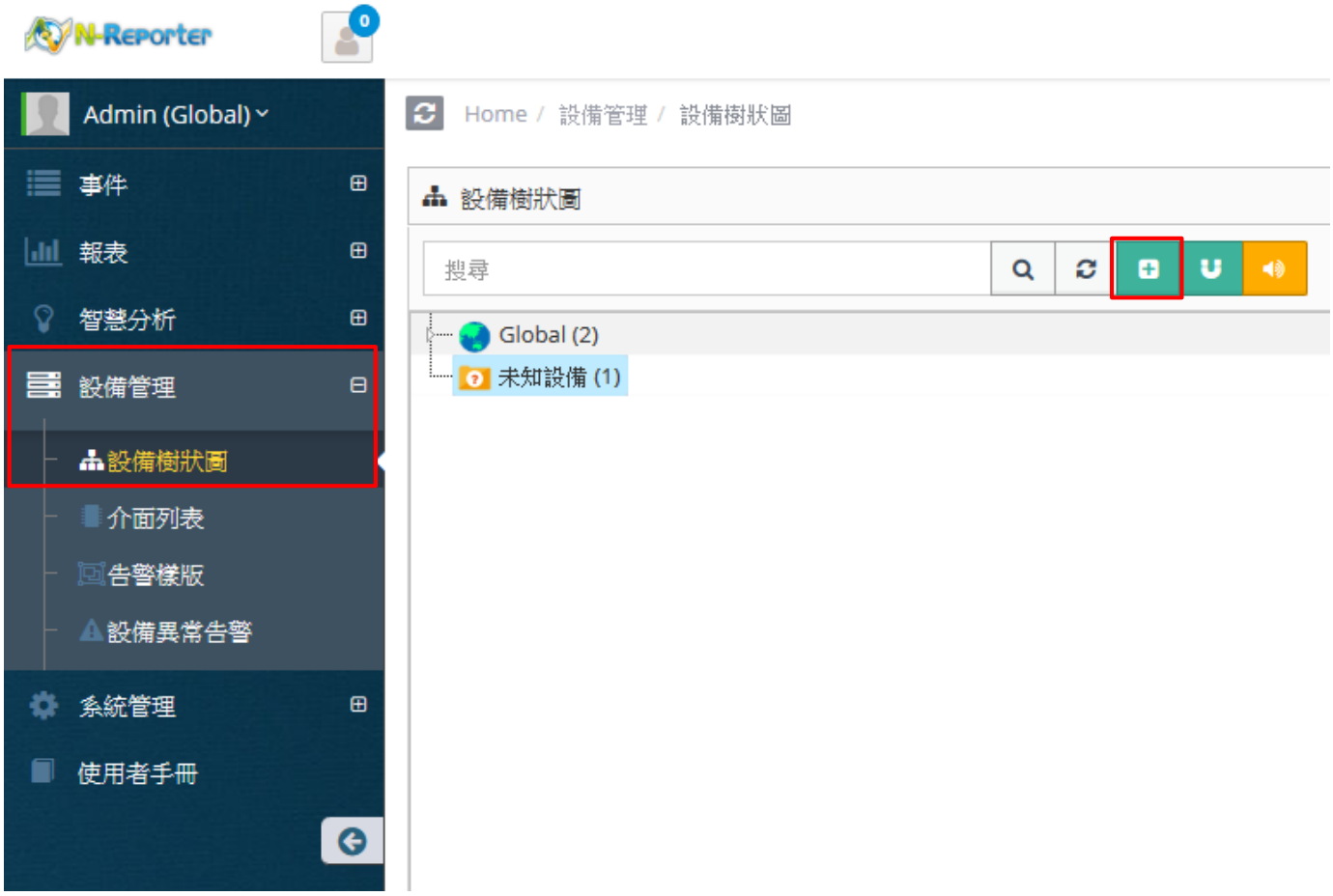
(3) 重啟 Rsyslog 服務和確認 Rsyslog 服務情形

```
# systemctl restart rsyslog && systemctl status rsyslog
```

# 7. N-Reporter

(1) 新增 Oracle Database 設備

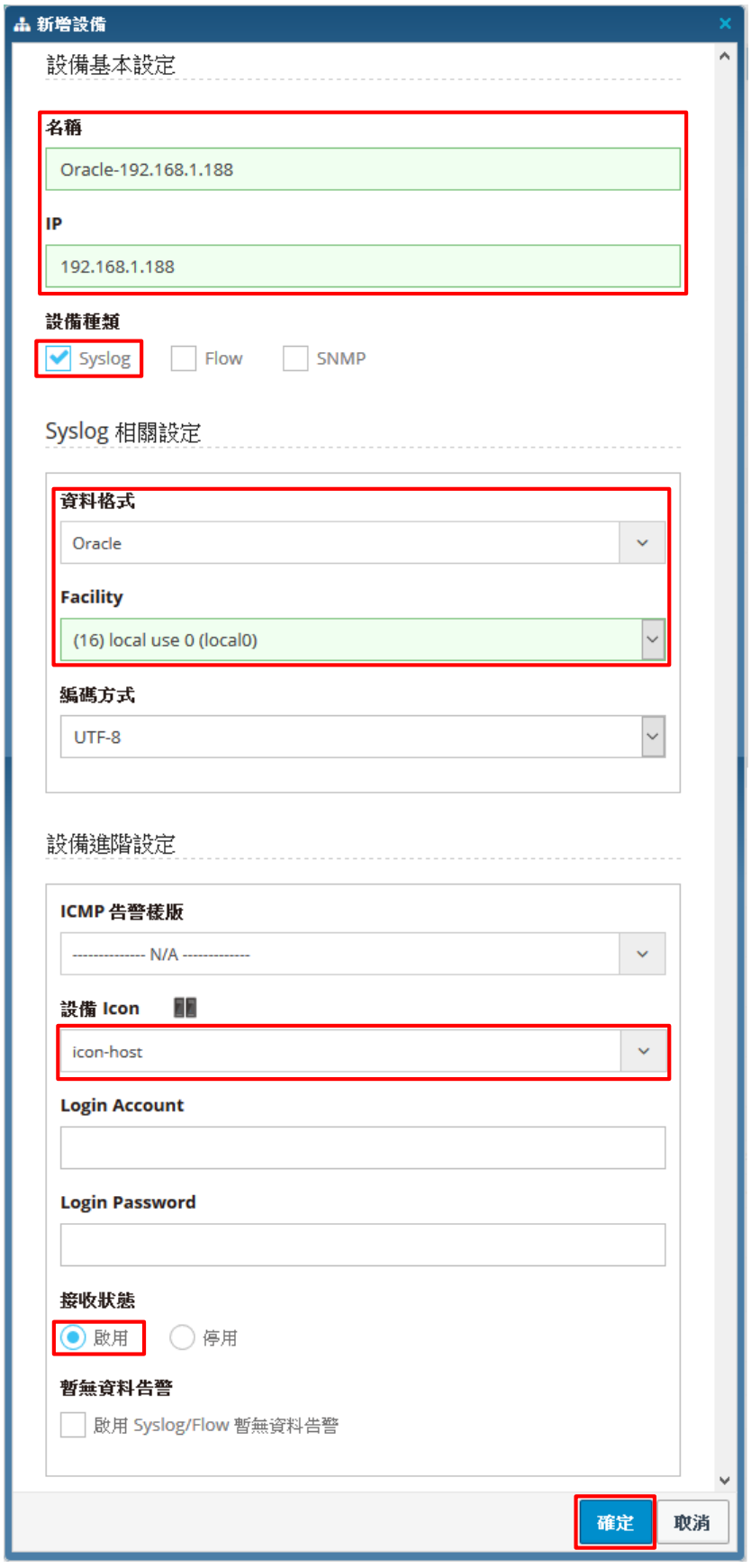
選擇 [設備管理] -> [設備樹狀圖] -> 按下 [新增]



## 7.1 Linux / AIX

(2) 設定 Oracle Database 設備的資料格式

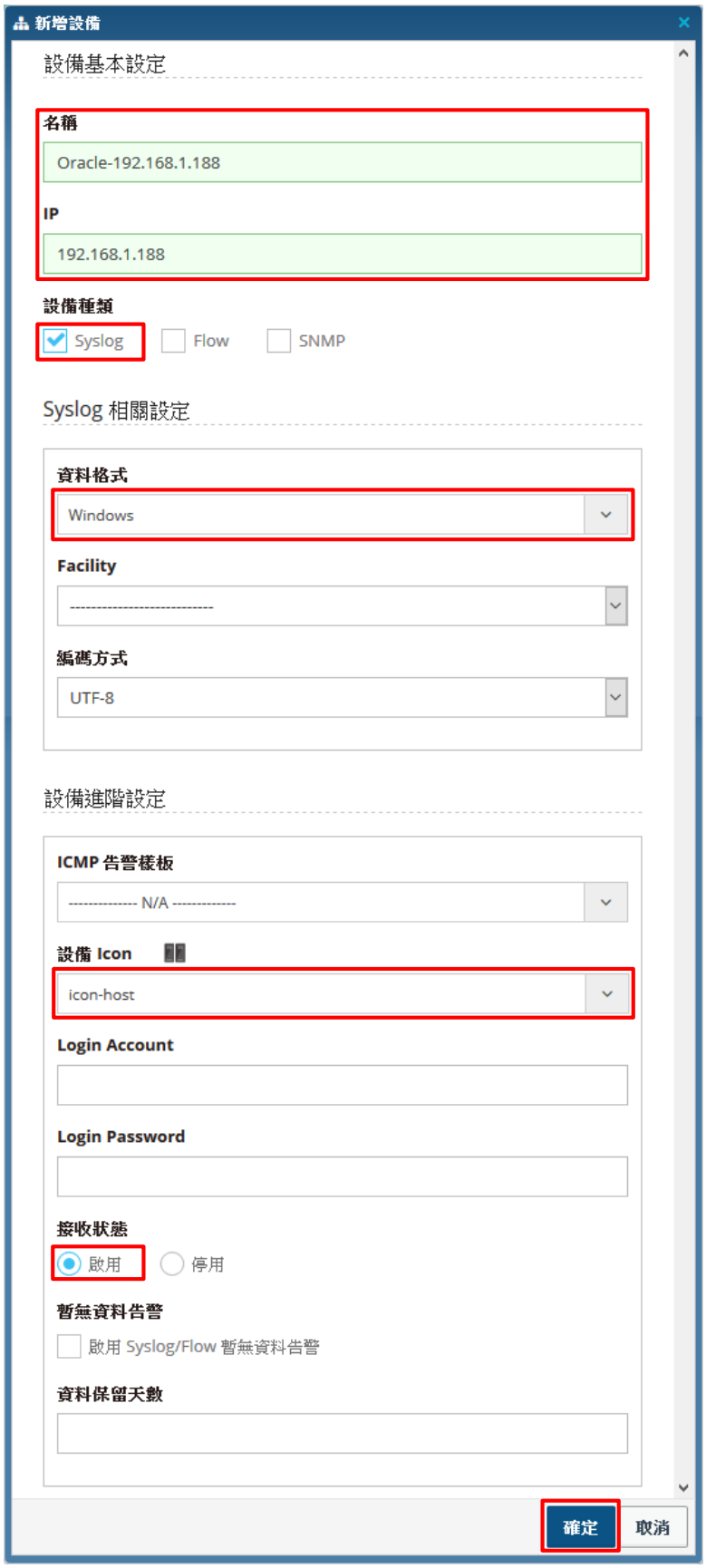
輸入名稱 和 IP -> 勾選設備種類: [Syslog] -> 選擇資料格式: [Oracle] 和 Facility: [(16) local use 0 (local0)] -> 選擇設備 Icon: [icon-host] -> 點選接收狀態: [啟用] -> 按下 [確定]



## 7.2 Windows

(2) 設定 Oracle Database 設備的資料格式

輸入名稱 和 IP -> 勾選設備種類: [Syslog] -> 選擇資料格式: [Windows] -> 選擇設備 Icon: [icon-host] -> 點選接收狀態: [啟用] -> 按下 [確定]



## 8. 問題排除

(1) 查看 Oracle SID

```
SQL> select instance_name from V$instance;
```

```
SQL> select instance_name from V$instance;

INSTANCE_NAME
----------------
ORCLCDB

SQL>
```

(2) 查看 Oracle DB 系統以 pfile 還是 spfile 啟動

```
SQL> SELECT DECODE(value, NULL, 'PFILE', 'SPFILE') "Init File Type" FROM sys.v_$parameter WHERE name = 'spfile';
```

```
SQL> SELECT DECODE(value, NULL, 'PFILE', 'SPFILE') "Init File Type" FROM sys.v_$parameter WHERE name = 'spfile';

Init F
------
SPFILE

SQL>
```

(3) 查看 Oracle spfile

```
SQL> show parameter spfile;
```

```
SQL> show parameter spfile;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      /opt/oracle/product/19c/dbhome
                                                 _1/dbs/spfileORCLCDB.ora

SQL>
```

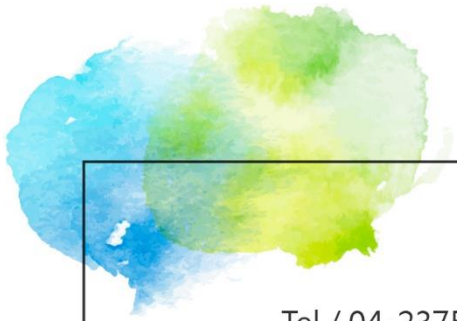
(4) 查看 Oracle pfile

```
SQL> show parameter pfile;
```

```
SQL> show parameter pfile;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      /opt/oracle/product/19c/dbhome
                                                 _1/dbs/spfileORCLCDB.ora

SQL>
```



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