DPM 4.0.0 USER GUIDE

Summary

1 Introduction

Database **P**ark **M**anager (**DPM**) is a WEB tool for managing a database park composed of :

- **PostgreSQL, MySQL, Oracle, SQL Server, SAP (ASE** and **IQ)** running on **UNIX** or **WINDOWS**

1. DPM Features

DPM covers the features below:

1. **Monitoring** :
   - Collection and historization, visualization of important indicators
   - Collection can work for DB installed under VM/os-cluster/Container/Cloud (AWS or Azure)
   - Collection can be done remotely from the website or by running scripts on DB machines

2. **Exploitation** :
   - Portable exploitation-scripts (ksh or powerhsell) that can work with any type of DB installation (BACKUP/STAT/REORG/etc)
   - Scripts can work for DB installed under VM/os-cluster/Cloud
   - The scripts can be deployed by the website or installed manually on DB machines (or on a dedicated host for a DB on Cloud because its DB host is not accessible)

3. **Troubleshooting** :
   - Real-time DB activity-reporting to identify the root-cause for various issues

4. **And more** :
   - Tool to migrate an existing DB park to DPM
   - Capacity-planning, DB-refresh, SQL scripts delivery, etc

2. DPM Architecture

DPM is designed with the architecture below :

- The website is developed with Visual-Studio Express 2015 in C#
- The website works under "**IIS**" (Internet Information Service: a module to activate in **Windows**)
- The website stores the data in a SQL Server database (**Edition Express** can do the job)
- The website accesses UNIX machines via **SSH** and WINDOWS machines via **UNC** (to transfer metric collections or do script deployments)
- Website users are Windows users (**Active-Directory** or **Workgroup**)
- The website can work with **HTTPS** (a parameter to activate in IIS)

3. Prerequisites

Prerequisite	Value
Supported-OS	WINDOWS 10 (or higher) or WINDOWS-SERVER 2016 (or higher)
WINDOWS user	1 WINDOWS-account with the "Administrator" privilege
Disk space	1GB (35MB for the tool, 900MB for LOG files)
Memory	A server with minimum 6GB RAM (8GB or 16GB RAM is better)
IIS	IIS (**I**nternet **I**nformation **S**erver) is a module to activate
SQL Server	A database in SQL Server 2005 or higher with **Latin1_General_CI_AS** collation ("**SQL-Server 2014 Express-edition**" may be OK : max-size for each datafile is 10GB)
DBMS clients	DBMS clients for PostgreSQL, MySQL, Oracle, SQL-Server, SAP (required for **Monitoring** and **Troubleshooting**)

2 Installation

2.1 Installation for prerequisites

2.1.1 Activation of IIS

Here we take a **WINDOWS-Server 2019** as an example :

"Panel Control" → "Programs and Features" → "Turn Windows features on or off" :

1. Check "**Web Server (IIS)**" with following option:
   - Web Server (please select all items in each group !):
     - Application Development Features
     - Common HTTP Features
     - Health and Diagnostics
     - Performance Features
     - Security
   - Management Tools :
     - IIS Management Console
     - IIS Management Services
2. Click "**Ok**" button

2.1.2 Creating a SQL Server 2014 database (Express Edition)

1. Download from "**https://www.microsoft.com/en-US/download/details.aspx?id=42299**"
   (file "Express 64BIT\SQLEXPR_x64_ENU.exe") ➔ **c:\temp**

2. Installation (double-click "SQLEXPR_x64_ENU.exe"). During installation, choose default values except :
   - In windows "**SQL Server Installation Center**" :
     Choose "**Installation**" and "**New SQL Server stand-alone installation or add features to an existing** …"
   - In windows "**Feature Selection**":
     Specify "**Installation root directory**" to a directory (eg: "**c:\dpm_webdb**")

3. Setting listening port :
   Start-menu → Microsoft SQL Server 2014 →> SQL Server 2014 Configuration Manager :
   - "SQL Server Network Configuration" → "Protocols for SQLEXPRESS" →
     "**TCP/IP**" (double-click) → Tab **"IP ddresses"** → In section "**IPAll**", set "**TCP port**" to "**1433**"
   - "**SQL Server Services**" → **SQL Server (SQLEXPRESS)** → **Restart** (right-click)

4. Creating a database (eg: **db_dpm**) and a login (eg: **dpm**) in SQL-Server :
   - Connect to SQL Server (in a **DOS** console):
     sqlcmd -S .\SQLEXPRESS

   - Creating a database and a login (under **sqlcmd**):

```
CREATE DATABASE [db_dpm]
      CONTAINMENT = NONE
      ON  PRIMARY ( NAME = N'db_dpm', FILENAME =
            N'c:\dpm_webdb\MSSQL12.SQLEXPRESS\MSSQL\DATA\db_dpm.mdf',
            SIZE = 600MB , MAXSIZE = UNLIMITED, FILEGROWTH = 1024KB)
      LOG ON ( NAME = N'db_dpm_log', FILENAME =
            N'c:\dpm_webdb\MSSQL12.SQLEXPRESS\MSSQL\DATA\db_dpm_log.ldf',
            SIZE = 400MB , MAXSIZE = 2048GB , FILEGROWTH = 10%)
            COLLATE Latin_General_CI_AS
GO
CREATE LOGIN [dpm] WITH PASSWORD = 'password',
      DEFAULT_DATABASE=[db_dpm], DEFAULT_LANGUAGE=[us_english]
GO
ALTER SERVER ROLE [sysadmin] ADD MEMBER [dpm]
GO
```

2.1.3 Installing DBMS clients

1. PostgreSQL client **10** (to get **psql** command) :
   - Download from "**http://get.enterprisedb.com/postgresql/postgresql-10.11-1-windows-x64-binaries.zip**" (there is not package for **PostgreSQL client**, but you could install **PostgreSQL server**)

2. MySQL client **8** (to get **mysql** command) :
   - Download from "**https://dev.mysql.com/downloads/file/?id=490395**" (there is not really package for **MySQL client**, you could install MySQL server)

3. ORACLE client **12c** (to get **sqlplus** command) :
   - Download from "**https://www.oracle.com/database/technologies/oracle12c-windows-downloads.html**" → **winx64_12201_client.zip** **64-bit** (If instant-client, please up-date **PATH** variable)

4. SQL Server client **2014** (to get **sqlcmd** command) :
   - Download from "**https://www.microsoft.com/en-US/download/details.aspx?id=42299**" (there is not package for **SQL Server client**, you could install **SQL Server**)

5. Syabse ASE client **16** (to get **isql** command) :
   - Download from SAP website

Note

For each DBMS client, after installation, please put its "bin" sub-directory in «PATH» environment variable !

2.2 New installation of DPM

Note

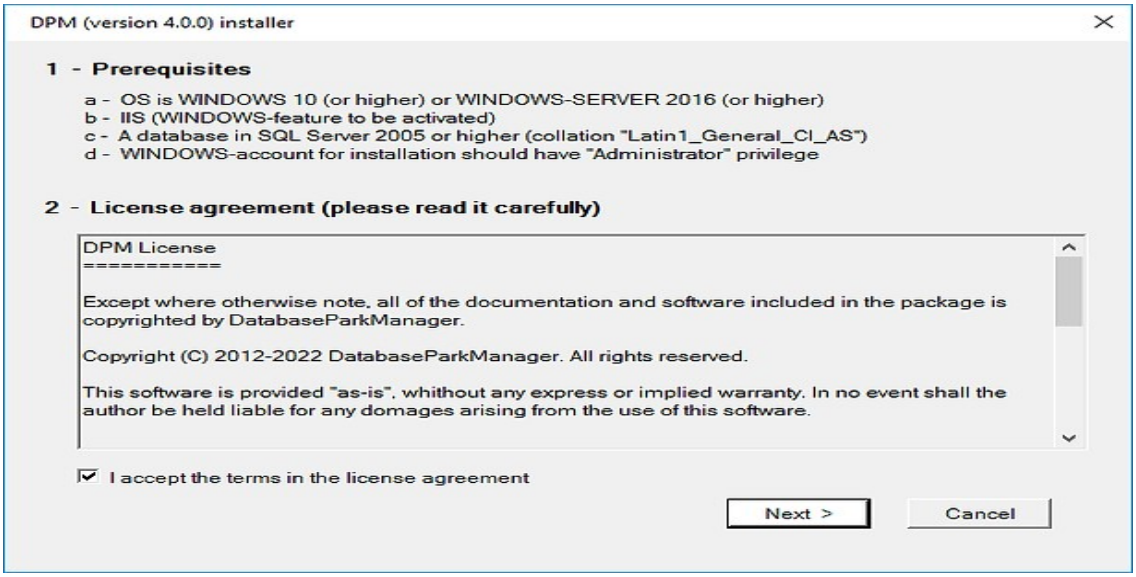
If you encounter problems while executing a script in POWERSHELL, it may be a privilege problem. In this case, we can set the correct privilege as follows (launch powershell under DOS) :

```
Set-ExecutionPolicy RemoteSigned
```

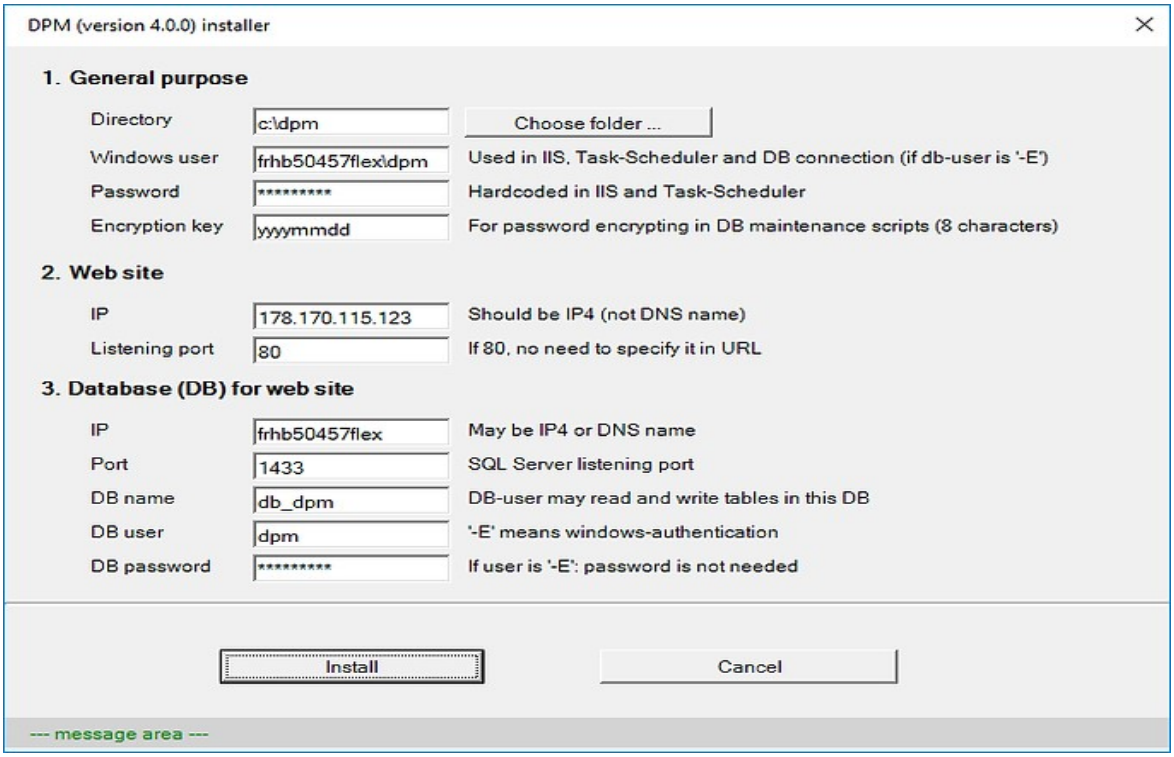
- Download the package to the DPM machine in a temporary directory :
  C:\tmep\dpm-4.0.0.zip

- Unzip the package :
  This will extract the sources to **c:\temp\dpm**

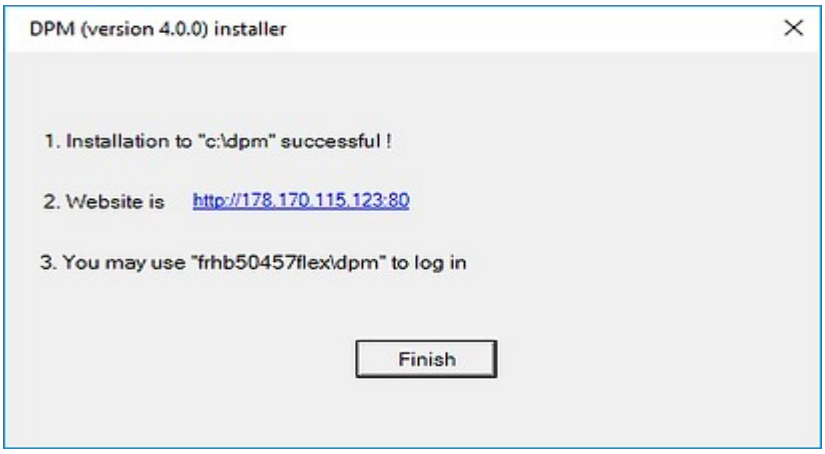
- Lancer «**c:\temp\dpm\install.cmd**» avec le privilege **Administrators** (right-click → Run as Administrators)



Click « **Next** » :



Enter the information for the **website** and the **database**, and then click "**Install**"



If all goes well, the **website** is installed.

After installation, installation information is stored in :

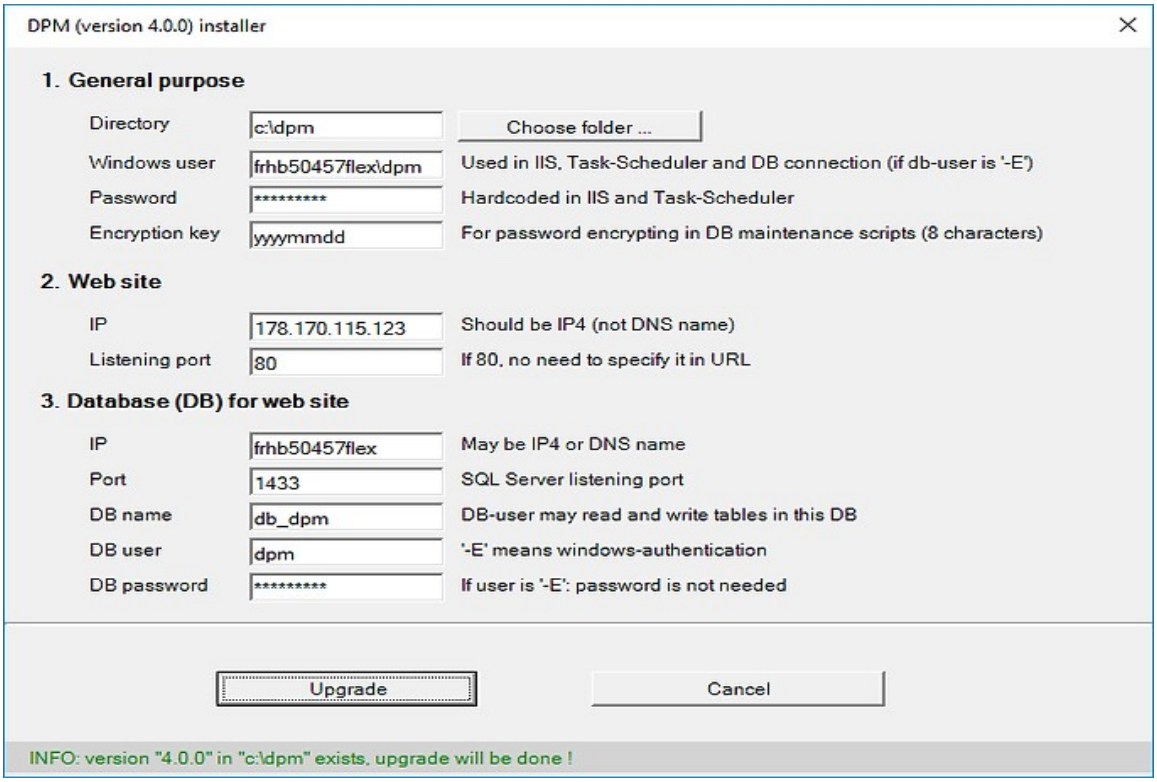
- **`<installation_dir>\conf\dpm.conf`**

2.3 Upgrade of DPM

- Download the package to the DPM machine in a temporary directory :
  C:\tmep\dpm-4.0.0.zip

- Unzip the package :
  This will extract the sources to **c:\temp\dpm**

- Lancer «**c:\temp\dpm\install.cmd**» avec le privilege **Administrators** (right-click → Run as Administrators)



Installer detects automatically existing DPM, upgrade will be done by clicking "**Upgrade**"

2.4 Uninstallation

Go to "**Control Panel**" → Choose "**Programs and Features**" :

- Uninstalling the "**DPM 4.0.0**" component

3 Using DPM

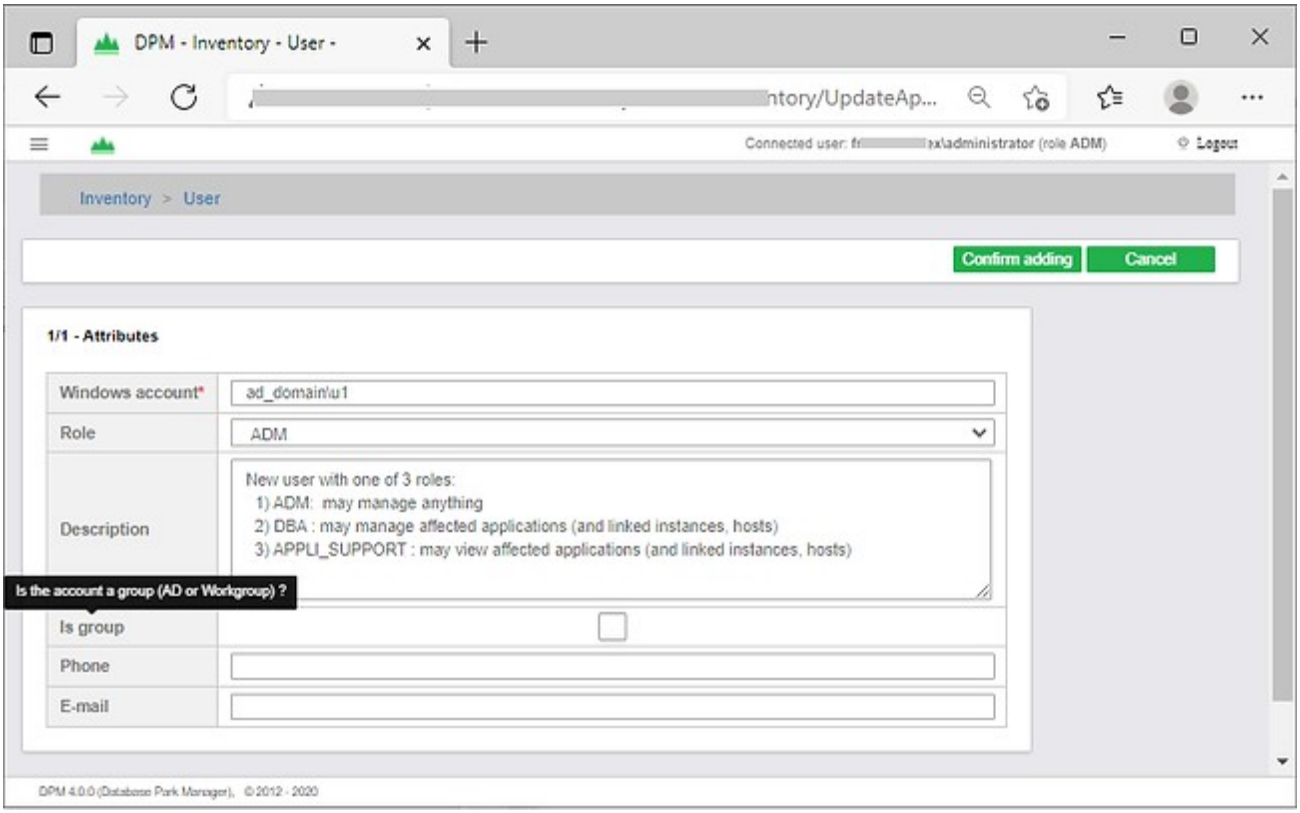
3.1 Creating a new user

After installing **DPM** (a **website**), you can connect to the website. To do this, launch a web-browser (**Chrome 30, FireFox 52, Opera 73.0.3, IE 11**, etc.) and enter the URL of the website.

In the login page, enter the WINDOWS account (Active-Directory or Workgroup) given during installation and its password. Once the connection is made, we come to the home page, here we see all the DPM modules (**Inventory, Supervision, Capacity-planning, DB-refresh, SQL-delivery**, etc.)

The first task is to create a new user. To do this, you can click on the "**User**" tab (in "**Inventory**" module), and then click on the "**Add new user**" button and enter the information necessary to create the user. Once the user has been created, you can disconnect and reconnect with the new user.

Note: as shown in the figure, you may move the cursor over label "**Is group**" to get help message about the attribute !



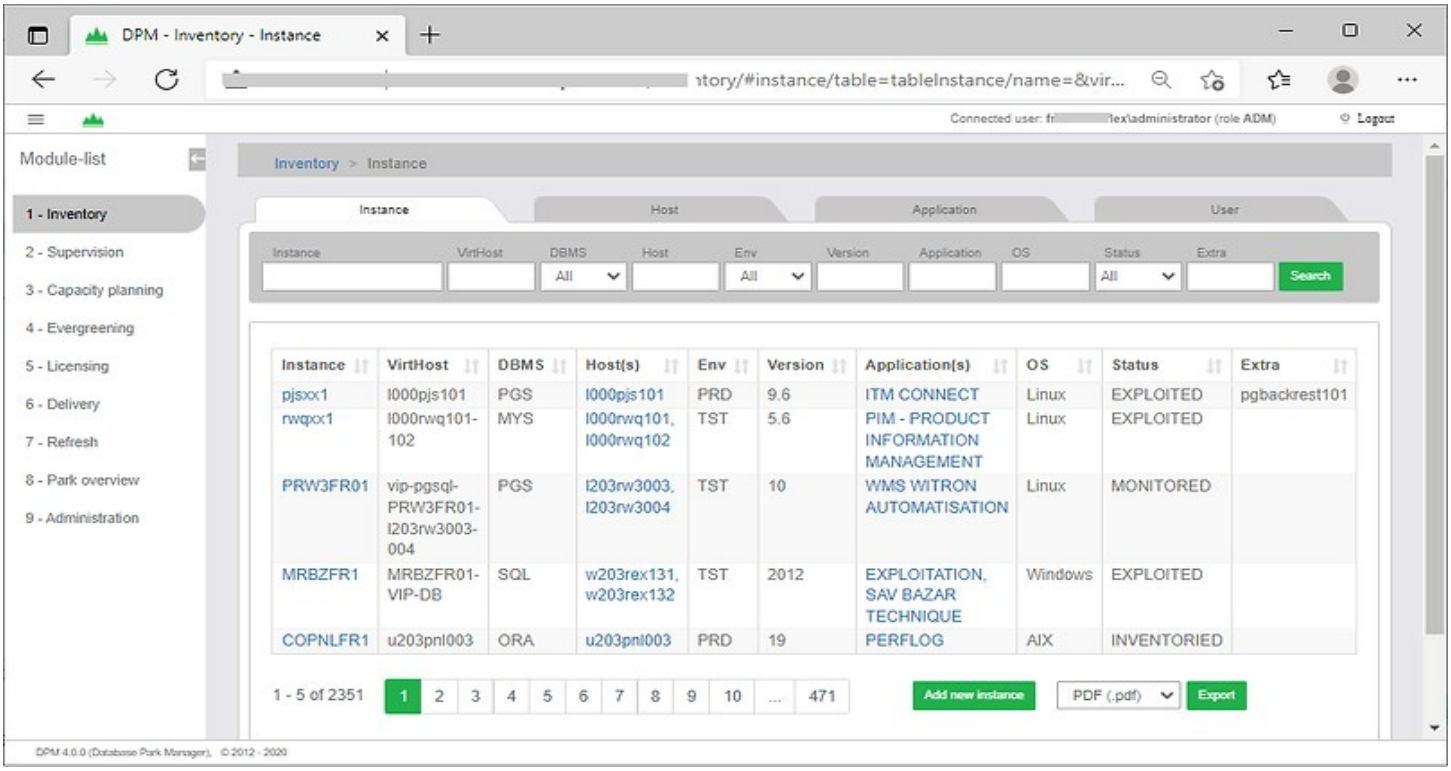
3.2 «**Inventory**» module

In this module, we manage 4 types of objects: :

- **Application** ➔ Functional application (ex: ACCOUNTING, TRADE, etc)
- **Instance** ➔ Database environment (ex: PostgreSQL instance, MySQL, Oracle, etc)
- **Host** ➔ Device with an OS (ex: a standalone machine, VM, node of a cluster-OS)
- **User** ➔ DPM Users (linked to a WINDOWS account)

The relationships between these objects are as follows :

- An application can use several instances (and an instance can be used by several applications)
- An instance can be hosted on one host or several hosts (in case of cluster-OS)
- A host can host one or more instances



3.2.1 Create instance, host, application

You can create a new object (application, instance, host) as follows (in the "**Inventory**" module) :

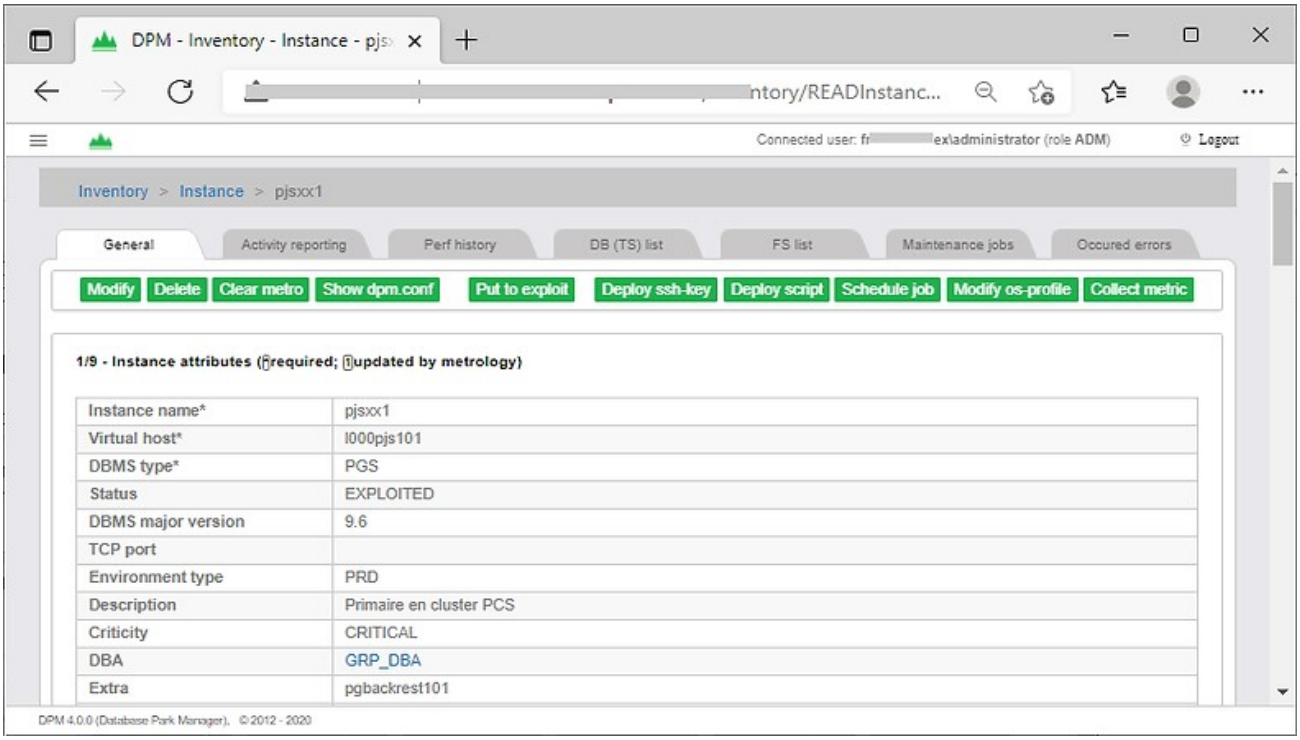
- Create an application : in the "**Application**" tab → click "**Add new application**"
- Create an instance : in the "**Instance**" tab → click "**Add new instance**"
- Create a host : in the "**Host**" tab → click "**Add new host**"
- Create a user : in the "**User**" tab → click "**Add new user**"

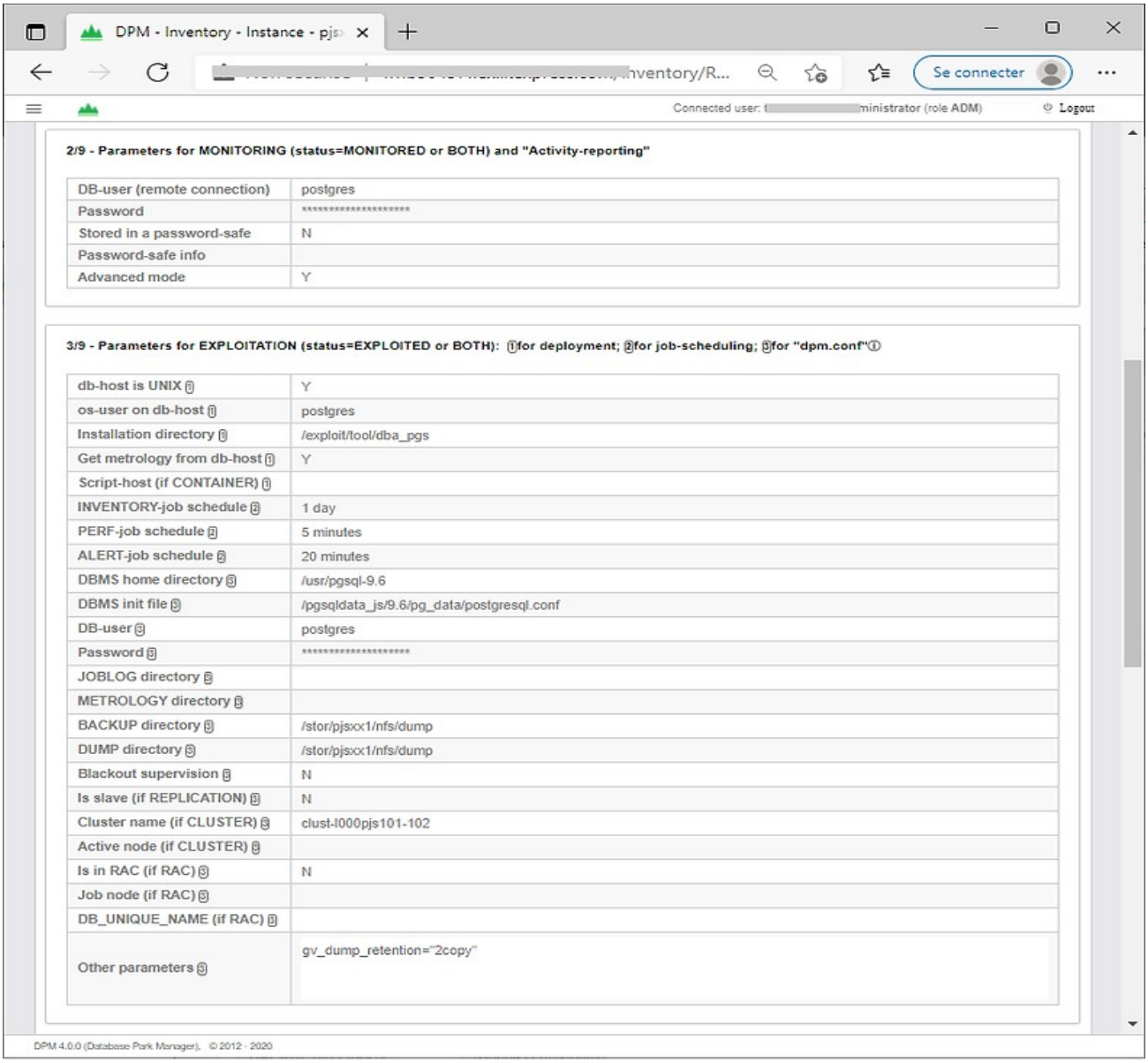
*Note: you may create the objects via batch (see "Migration assistant" in "Administration" page)

3.2.2 Search instance (host, application) and display its detail

To search for one or more instances in home-page, proceed as follows :

- In the "**Instance**" tab: enter the search criteria ("**AND**" relationship is applied if several fields are entered) and then click on the "**Search**"
- Once the instance is found, just click on the name of the instance to see its detail (see the figure below)


DPM - Inventory - Instance - pjs
Connected user: fr exladministrator (role ADM)
Logout
Inventory > Instance > pjsxx1
General
Activity reporting
Perf history
DB (TS) list
FS list
Maintenance jobs
Occured errors
Modify
Delete
Clear metro
Show dpm.conf
Put to exploit
Deploy ssh-key
Deploy script
Schedule job
Modify os-profile
Collect metric
1/9 - Instance attributes (required; updated by metrology)
Instance name* pjsxx1
Virtual host* l000pjs101
DBMS type* PGS
Status EXPLOITED
DBMS major version 9.6
TCP port
Environment type PRD
Description Primaire en cluster PCS
Criticity CRITICAL
DBA GRP_DBA
Extra pgbackrest101
DPM 4.0.0 (Database Park Manager), © 2012 - 2020


DPM - Inventory - Instance - pjs
Se connecter
Connected user: t ministrator (role ADM)
Logout
2/9 - Parameters for MONITORING (status=MONITORED or BOTH) and "Activity-reporting"
DB-user (remote connection) postgres
Password **********
Stored in a password-safe N
Password-safe info
Advanced mode Y
3/9 - Parameters for EXPLOITATION (status=EXPLOITED or BOTH): 1for deployment; 2for job-scheduling; 3for "dpm.conf"
db-host is UNIX 1 Y
os-user on db-host 1 postgres
Installation directory 3 /exploit/tool/dba_pgs
Get metrology from db-host 1 Y
Script-host (if CONTAINER) 1
INVENTORY-job schedule 2 1 day
PERF-job schedule 2 5 minutes
ALERT-job schedule 2 20 minutes
DBMS home directory 3 /usr/pgsql-9.6
DBMS init file 3 /pgsqldata_js/9.6/pg_data/postgresql.conf
DB-user 3 postgres
Password 3 **********
JOBLOG directory 3
METROLOGY directory 3
BACKUP directory 3 /stor/pjsxx1/nfs/dump
DUMP directory 3 /stor/pjsxx1/nfs/dump
Blackout supervision 3 N
Is slave (if REPLICATION) 3 N
Cluster name (if CLUSTER) 3 clust-l000pjs101-102
Active node (if CLUSTER) 3
Is in RAC (if RAC) 3 N
Job node (if RAC) 3
DB_UNIQUE_NAME (if RAC) 3
Other parameters 3 gv_dump_retention="2copy"
DPM 4.0.0 (Database Park Manager), © 2012 - 2020

3.2.3 Modify or delete instance (host, application)

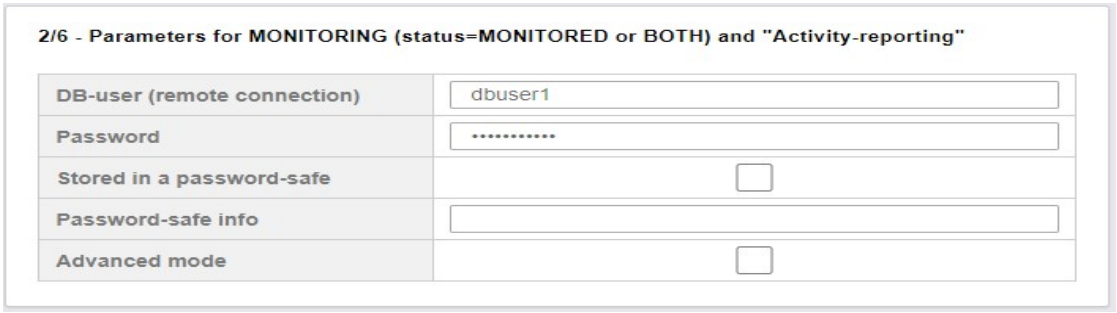
To modify an object, you start by searching for the object and displaying its detail. Then, we click on the "**Modify**" button to make the modification (provided that the user has the privilege on the object). Association relationships between objects (between an application and an instance, between a host and an instance) may be created during object modification.

To delete an object, the process is similar to that of modification. Deleting an object removes all of the object's association relationships with other objects.

3.2.4 Putting an instance in **MONITORING**

When an instance is added in DPM: it is in **MONITORING** mode by default. For an existing instance that is not in "**MONITORING**" mode, we start by searching for the instance and displaying its details. And then, we click on the "**Modify**" button (in the "**General**" tab):

1. Change following attributes (section "**1/6 - Instance attributes**" and **"2/6 - Parameters for MONITORING"**):



Note : you may move the cursor over the label of an attribute to get help message !

2. And then you click "**Confirm modifying**" button to save the parameters (normally, 10 minutes later we may view the performances metrics)

3. To stop the monitoring for an instance :
   In "**General**" tab, you may click "**Modify**" button :
   - Change following attributes in section "**1/6 - Instance attributes**" :
     "Status" (set to "**INVENTORIED**")
   - Then click "**Confirm modifying**" button to save the change
   - From now, the collection of metrics for the instance is stopped !

3.2.5 Putting an instance in **EXPLOITATION**

Putting an instance in "**EXPLOITATION**" mode means :

- to deploy exploitation-scripts to its db-hosts (or script-host for DB on **Cloud**)
- to schedule 3 cyclic-jobs (INVENTORY, PERF, ALERT) to do monitoring locally on db-host
- script-executions generate some metrics (**metrology**) in form of text-file on db-host (eg: BACKUP script will generate **backup-size** and **backup-status** as metrics)
- there is a cyclic-job (DPM_GET_METRO) on website-host which will retrieve the metrology from the db-hosts

To do that, you first search the instance and then display its detail. In "**General**" tab, you may click "**Modify**" button :

1. Change following attributes (section "**1/6 - Instance attributes**" and **"3/6 - Parameters for EXPLOITATION"**):

For all cases (standalone/os-cluster/RAC/Container/Cloud)

- "Status" (set to **EXPLOITED** or **BOTH**)
- "db-host is UNIX"
- "os-user on db-host"
- "Installation directory"
- "Get metro from db-host" (set to **Y**)
- "DBMS home directory"
- "DBMS major version"
- "DBMS init file"
- "TCP port" (if different from the default. Default: **5432** for PostgreSQL, **1521** for Oracle, etc)
- "DB-user"
- "Password"
- And more (eg: "BACKUP directory", "DUMP directory", "JOBLOG directory", etc)

Note : you may move the cursor over the label of an attribute to get help message !

For OS-cluster

- "Cluster name (if CLUSTER)"
- "Active node (if CLUSTER)": node running the instance. The BACKUP or DUMP scripts may be scheduled on each node of cluster, but only the scripts on this node will actually do BACKUP or DUMP (useful if your enterprise-scheduler cannot schedule job on a VIP)

For ORACLE-RAC

- "Cluster name (if CLUSTER)"
- "Is in RAC (if RAC)"
- "DB_UNIQUE_NAME (if RAC)"
- "Job node (if RAC)" : node dedicated to launching scripts. The BACKUP or DUMP scripts may be scheduled on each node of the RAC, but only the scripts on this dedicated node will actually do BACKUP or DUMP

For Container or Cloud

- "Script-host (if CONTAINER)" (set to **dedicated-host** to deploy and run scripts)

2. And then you click "**Confirm modifying**" button to save changes

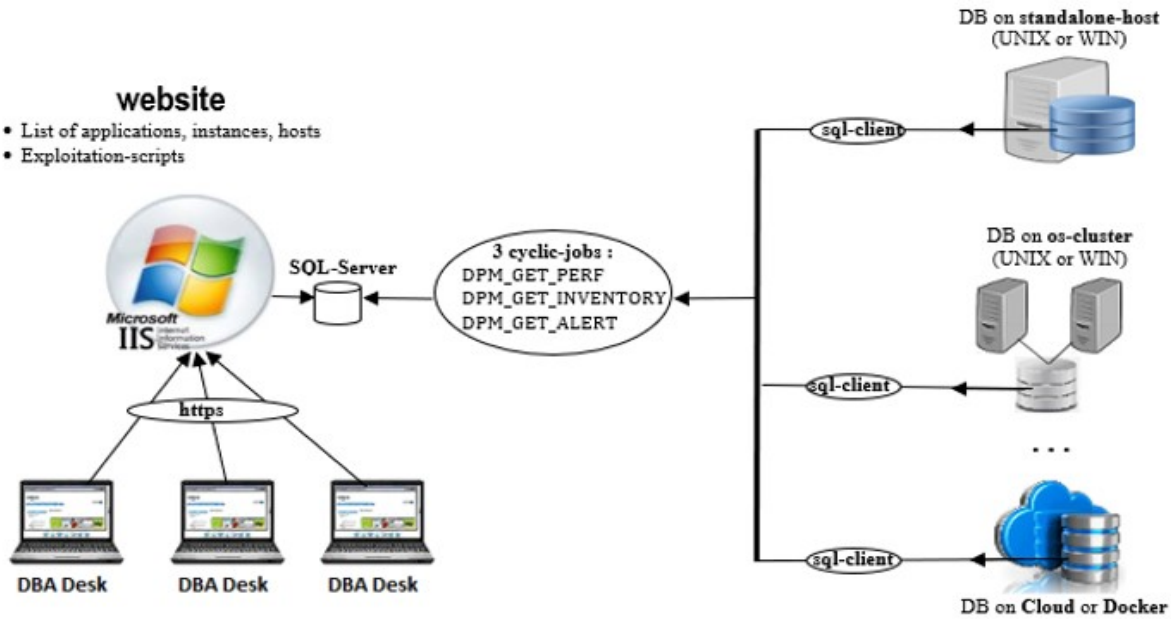
3. Search the instance and display its detail page once again :
   In "**General**" tab, click "**Put to exploit**" button. This button does the operations below:
   - to deploy **SSH** key to UNIX db-hosts (or script-host): password is asked for "**os-user on db-host**"
   - to deploy exploitation-scripts to db-host (ou script-host):
     - this operation updates "**dpm.conf**" too (section "**[GLOBAL]**", section "**[instance_name]**")
     - it's possible to undo the deployment (please see **undo_last_upgrade.sh**)
   - to schedule 3 scripts (INVETORY, PERF, ALERT) on db-host (**crontab** for UNIX and **Task-Scheduler** for Windows) to do monitoring locally on db-hosts
   - to modify os-profiles (eg: **$HOME/.bash_profile**, **$HOME/.bashrc**) for UNIX db-hosts
   - to run INVENTORY and PERF script and transfer **metrology** to website DB (this information allows to create/update the instance and the associated host)

   Note:
   - Each of above operations may be done individually, there is corresponding button for each operation in the webpage (eg: "**Deploy script**" button)
   - Above operations may be doned manually (see section «manual deployment for exploitation scripts»)

4. To stop the exploitation for an instance :
   In "**General**" tab, you may click "**Modify**" button :
   - Change following attributes (in section "**1/6 - Instance attributes**"):
     "**Status**" (set to "**INVENTORIED**")
   - Then click "**Confirm modifying**" button to save the change
   - From now, instance metrology is no longer retrieved to website. But you should remove manually some action done by "**Put to exploit**" on db-host (eg: removing 3 scheduled jobs) !

3.2.6 Instance MONITORING mechanism

1. **Schema for MONITORING**



2. **The 3 cyclic jobs**

The metrics for the instance will be collected remotely by **website** via 3 cyclic-jobs in **Task-Scheduler** on website-host (created during DPM installation):

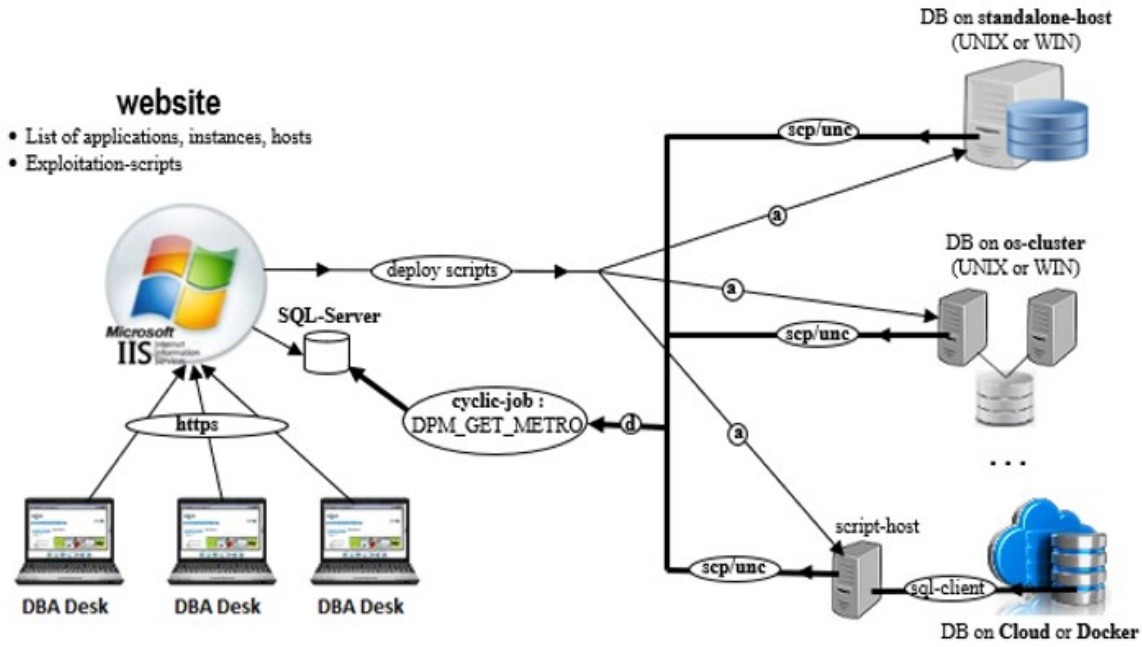
- **DPM_GET_PERF** (hit-ratio, blocked-sessions, transactions, slowest SQL-query-text, etc)
- **DPM_GET_INVENTORY** (instance info, DB volumetry, etc)
- **DPM_GET_ALERT** (alerting about instance status, space usage in DB, etc)

3.2.7 Instance EXPLOITATION mechanism

1. **Schema for EXPLOITATION**

For each instance with status "**EXPLOITED**", the following things are done :

a. The exploitation-scripts are deployed to its db-hosts (or script-host for DB hosted on Cloud)
b. The scripts are executed on db-host (by crontab/Task-Scheduler, by enterprise-scheduler or by DBA manually), these executions generate metric files (**metrology**)
c. Usually, 3 scripts for monitoring are scheduled automatically on db-hosts (or script-host) while script-deployment (or manual script-installation). **So, if an instance whose status is "EXPLOITED", then it is also "MONITORED"** (CPU/RAM/FS info is collected too) **!**
d. The metrology-files are retrieved by a job on website-host (job **DPM_GET_METRO**)



2. **Method for retrieving metrology from db-hosts**

website connects regularly (every 10 minutes) to the db-hosts to retrieve the metrology files via **scp** for UNIX and **UNC** for WINDOWS. Once retrieved, the contents of **metrology** files are integrated into DB of the **website** (webdb).

This process is done by a job in "**Task Scheduler**" ("**DPM_GET_METRO**" created during installation) :
powershell <dpm_dir>\bin\get_metro.ps1

3. **Method to access UNIX db-host**

The **website** uses **SSH** (**ssh** and **scp**) to access UNIX host in order to:
- Deploy DB exploitation-scripts, retrieve metrology files, etc.

There are 2 ways to generating **SSH** keys (2nd should be done just after installing DPM) :
- You can use existing «**<dpm_dir>\conf\pub.ssh**» and «**<dpm_dir>\conf\private.ssh**»
- Or you can generate new keys by running "**<dpm_dir>\ThirdParty\Putty\puttygen.exe**" (and choose "**SSH-2 RSA**" for "**Type of key**"):
  - Save the generated public key in file "**<dpm_dir>\conf\pub.ssh**"
  - Save the generated private key in file "**<dpm_dir>\conf\private.ssh**"

4. **Method to access WINDOWS db-host**

The **website** uses **WinRM** to access remote WINDOWS hosts, and **UNC** to access remote directory. It is sufficient if the AD account exists on the remote host to get **UNC** access. To check if you can access drive **C** of the remote host "**remote_host1**":

dir \\remote_host1\c$

Note : On Windows db-host, you may activate **WinRM** by: **winrm quickconfig**

3.2.8 Manual deployment of exploitation-scripts to UNIX

It may happen that you have to install manually the exploitation-scripts on an isolated host (eg: the db-host is in **DMZ** that **website** doesn't have access). In what follows, you take an instance PostgreSQL as example, the other types DBMS can be managed in a similar way !

Description

- There are in all a dozen scripts in **BASH**; each script covers a functional need (**BACKUP, RESTORE**, **DUMP, IMPORT, STAT**, **REORG, PERF, ALERT, INVENTORY**, etc.)
- Scripts can work with various PostgreSQL versions (**13/12/11/10/9.x**) by setting a config-file (**dpm.conf**)
- Each execution of a script generates a **log file** (timestamped), and the script purges these **log** files with a default retention period of 7 days (configurable)
- Exploitation-scripts can work alone without the implementation of **website**

Prerequisites for running scripts

Prerequisite	Description
Disk space	**1MB** for scripts and **50MB** for log-files per instance
Command UNIX	bc, openssl (to check if openssl is installed: which openssl)

1. Installation (or upgrade) of exploitation-scripts :
   - Transfer scripts (from **<dpm_dir>\dba_script\pgs_unix** or **www.DatabaseParkManager.com**) to db-host (eg: to «**/tmp/pgs_unix**»)
   - Install (or upgrade) the scripts in a directory «eg: **/home/postgres/dba_pgs**»:
     sh /tmp/pgs_unix/install.sh -d /home/postgres/dba_pgs
   - To uninstall an installation, simply delete the directory:
     rm -r /home/postgres/dba_pgs

2. Configuration:
   In «**/home/postgres/dba_pgs/dpm.conf**», the information is divided into 2 parts:

   Part-1 → General settings (applicable for all instances on the db-host**):**

   ```
   [GLOBAL]
     gv_rc_err="12"
     gv_encryption_key="yyyymmdd"
   ```

   Part-2 → Each instance settings (eg: parameter **gv_joblog_retention** is redefined**) :**

   ```
   [INST1]
     gv_dbms_home="/usr/pgsql-9.6"
     gv_dbms_version="9.6"
     gv_config_file="/INST1/data/postgresql.conf"
     gv_backup_dir="/INST1/backup"
     gv_dump_dir="/INST1/backup"
     gv_login="postgres"
     gv_passwd="nq6N3UrfZwWrvXQepOyJ3K4M/zAeJTIpq7dizEmknpQ"
     gv_joblog_retention="21"
   ```

   * **to encrypt and decrypt password**
     Encrypt → **crypo.sh -s "password"**
     Decrypt → **crypo.sh -d Y -s "encrypted_password"**

3. Examples for script-executions (the syntax for all scripts are similar, please see "**README.txt**" for more info) :
   - to show script syntax and documentation: **pgs_perf.sh -h**
   - to run script en simulation-mode (no real execution): **pgs_perf.sh -i INST1 -simu Y**
   - to run script : **pgs_perf.sh -i INST1**

4. List of exploitation-scripts:

Script	Description
pgs_backup.sh	Physical backup (**pg_basebackup**) of an PostgreSQL instance
pgs_restore.sh	Restoring from the physical backup obtained via pgs_backup.sh
pgs_dump.sh	Logical backup (**pg_dump**) : script may do BACKUP with parallel jobs
pgs_import.sh	Import (**pg_restore**) from a dump done by pgs_dump.sh
pgs_stat.sh	Update statistics for tables in DB
pgs_reorg.sh	Do various VACUUM and REINDEX with parallel jobs
pgs_send2tape.sh	Send backups (physical and dump) to tapes (NetBackup,TSM, hdps, etc.)
pgs_manage.sh	**start/stop/clean/status** an instance
pgs_reboot.sh	Script to stop or restart all instances when rebooting the host
pgs_perf.sh	Collection of performance indicators and the slowest sql-query's text: • Hitratio, CPU usage rate, RAM usage rate • Number of all sessions, number of active sessions • Number of blocked sessions, number of sessions with transaction, Slowest sql-query's text (at collection time)
pgs_inventory.sh	Collecting inventory information (FS, tablespace, INSTANCE)
pgs_alert.sh	Supervision for an instance with a return code (configurable): 0 → **OK**; 1 → **WARNING** ; 2 → **CRITICAL** Monitored info : • Instance status, Errors in DBMS logfile, FS • Blocked session (blocked for a given duration) • Very slow SQL query (duration > 1 day) • Replication issue (from the standby instance) Note: This script can be used by third party monitoring tools (TIVOLI,ZABBIX)

5. Configure **bash (**or **ksh**) to obtain an optimized work environment:

To facilitate the exploitation of DB environments, you can configure the 2 files below:

- For **bash** → **$HOME/.bash_profile** and **$HOME/.bashrc**
- For **ksh** → **$HOME/.profile** and **$HOME/.kshrc**

You proceed as follows (under os-account "**postgres**"):

- Add the line below at the end of the file **$HOME/.bash_profile** :
  export DPM_HOME=/home/postgres/dba_pgs; if [-f $DPM_HOME/os.profile] ; then . $DPM_HOME/os.profile ; fi

- Add the line below at the end of the file **$HOME/.bashrc**:
  if [-f /home/postgres/dba_pgs/os.bashrc]; then . /home/postgres/dba_pgs/os.bashrc; fi

- Disconnect and reconnect from the **PUTTY** console, and you should get the screen below:

```
------------------------------------------------------------------
     1. useful commands:
          si [instance] : to set an instance to work with
          gi            : to get current instance info
          ct            : to connect to current instance
          li            : to list instances on this host

     2. declared instances (in /home/postgres/dba_pgs/dpm.conf):
          INST1
          INST2
 ------------------------------------------------------------------
```

si → to choose an PostgreSQL instance to work :

```
postgres@mach1[]:/home/postgres> si
Available instances:
  1) INST1
  2) INST2
Your choice (ctrl+c to abort): 1
```

gi → to display the information of the chosen instance (current instance) :

```
postgres@mach1[INST1]:/home/postgres> gi
  Instance:        INST1 (status: UP)
  Port:            5432 on mach1
  ...
```

ct → to connect to the current instance with psql :

```
postgres@mach1[INST1]:/home/postgres> ct
  You are under "psql" command connecting to INST1
  postgres>
```

6. To uninstall an installation: simply delete the installation-directory

3.2.9 Manual deployment of exploitation-scripts to WINDOWS

Description

- There are about 10 **powershell** scripts running in various WINDOWS versions; each script covers a functional need (BACKUP, RESTORE, DUMP, IMPORT, STAT, PERF, INVENTORY, ALERT, etc.)
- Scripts can work with different DBMS versions by setting a config-file (**dpm.conf**)
- Each execution of a script generates a log file (timestamped), and the script purges these log files with a default retention period of 7 days (configurable)
- Exploitation-scripts can work alone without the implementation of the website

Prerequisites for running scripts

Prerequisite	Description
Disk space	**1MB** for scripts and **50MB** for log-files per instance
OS	Windows-7 and Windows-Server 2008 or higher
POWERSHELL	POWERSHELL 2.0 (WINDOWS-7, WINDOWS-SERVER 2008 or higher should already be OK)

1. Installation (or upgrade) of exploitation-scripts for PostgreSQL:

- Transfer scripts (from **<dpm_dir>\dba_script\pgs_win** or **www.DatabaseParkManager.com**) to DB host (eg: in "**c:\temp\pgs_win**")
- Install (or upgrade) scripts in "**c:\dba_pgs**" :

  powershell c:\temp\pgs_win\install.ps1 -d c:\dba_pgs

  Note

  If you encounter any problem while running a script in POWERSHELL, it may be a privilege issue.
  In this case, you can set the right privilege as follows (launch **powershell** under DOS):

  Set-ExecutionPolicy RemoteSigned

2. Configuration:

In "**c:\dba_pgs\dpm.conf**", the information is divided into 2 parts :

Part-1 → General settings (applicable for all instances on the db-host):

```
[GLOBAL]
  gv_rc_err="12"
  gv_encryption_key="yyyymmdd"
```

Part-2 → Each instance settings (parameter **gv_joblog_retention** is redefined):

```
[INST1]
  gv_dbms_home="c:\Program Files\PostgreSQL\9.6"
  gv_dbms_version="9.6"
  gv_backup_dir="d:\INST1\backup"
  gv_dump_dir="d:\INST1\backup"
  gv_login="postgres"
  gv_passwd="nq6N3UrfZwWrvXQepOyJ3K4M/zAeJTIpq7dizEmknpQ"
  gv_joblog_retention="21"
```

- **to encrypt and decrypt password:**
  Encryp → powershell crypo.ps1 -s "password"
  Decrypt → powershell crypo.ps1 -d Y -s "encrypted_password"

3. Examples for script-executions (for syntax, please see "**README.txt**" for more info) :
   - to show script syntax and documentation: **powershell pgs_perf.ps1 -h**
   - to run script en simulation-mode (no real execution): **powershell pgs_perf.ps1 -i INST1 -simu Y**
   - to run script : **powershell pgs_perf.ps1 -i INST1**

4. Inventory of exploitation-scripts: see "**List of scripts**" for UNIX above

5. To uninstall an installation: simply delete the installation-directory

3.2.10 Scheduling exploitation-scripts

1. **For a UNIX host**

Once the exploitation-scripts are deployed on the db-host (automatically or manually), they can be scheduled with a dedicated os-account (eg: **schedule_osuser**) using **SUDO** mechanism by adding following line to "**/etc/sudoers**" (os-account for PostgreSQL-installation is **postgres** here):

schedule_osuser ALL=(**postgres**) NOPASSWD: /home/postgres/dba_pgs/pgs_backup.sh

Below is an example of exploitation-job scheduling (under "**schedule_osuser"**) :

Job	Command-line	Schedule
BACKUP full	`sudo -u postgres …/pgs_backup.sh -i <INST>`	Sunday at 10 PM
BACKUP WAL (for PITR recovery)	`sudo -u postgres …/pgs_backup_wal.sh -i <INST> -ArchDir dir`	Every 60 minutes
DUMP full	`sudo -u postgres …/pgs_dump.sh -i <INST>`	Each day at 11 PM
UPDATE-STAT	`sudo -u postgres …/pgs_stat.sh -i <INST>`	Sunday at 2 AM
SEND2TAPE	`sudo -u postgres …/pgs_send2tape.sh -i <INST>`	Chained to BACKUP
REORG	`sudo -u postgres …/pgs_reorg.sh -i <INST>`	Saterday at 5 AM

Note

- Schedule for other DBMS (**MySQL, Oracle, etc**) can be done in a similar way for PostgreSQL

2. **For a WINDOWS host**

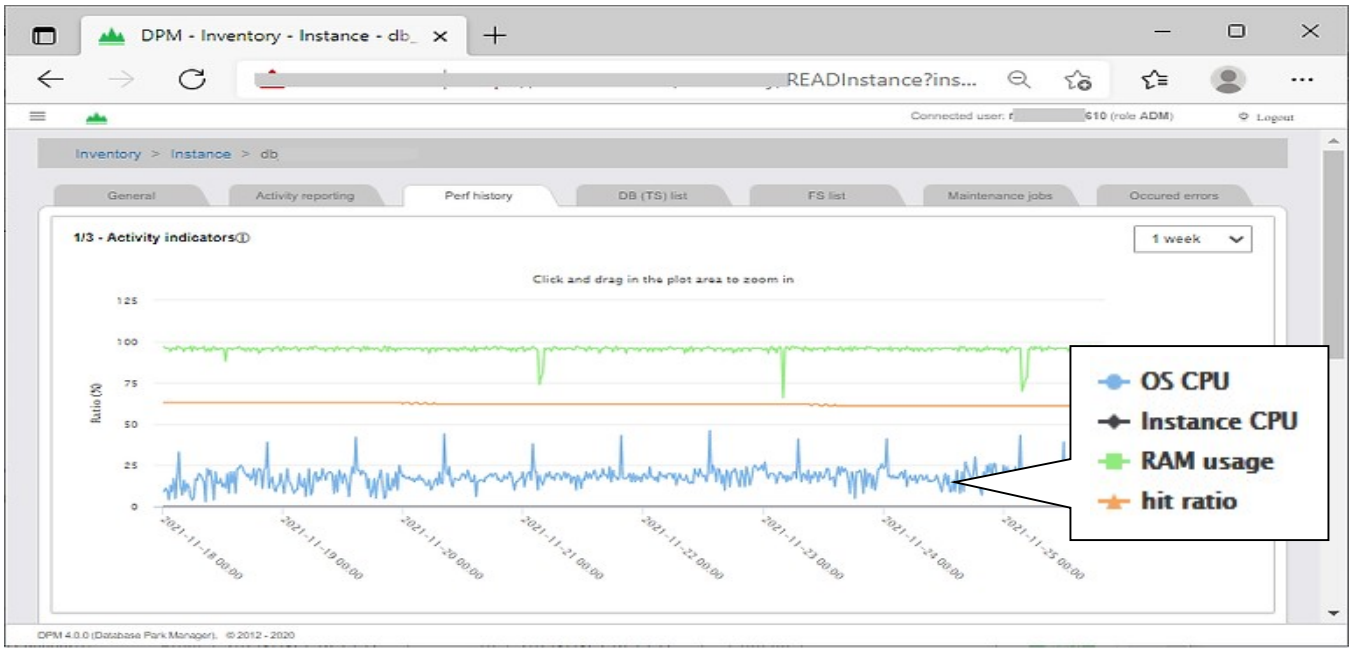
Job	Command-line	Schedule
BACKUP full	`powershell …\pgs_backup.ps1 -i <INST>`	Sunday at 10 PM
BACKUP WAL (for PITR recovery)	`powershell …\pgs_backup_wal.ps1 -i <INST> -ArchDir dir`	Every 60 minutes
DUMP full	`powershell …\pgs_dump.ps1 -i <INST>`	Each day at 11 PM
UPDATE-STAT	`powershell …\pgs_stat.ps1 -i <INST>`	Sunday at 2 AM
SEND2TAPE	`powershell …\pgs_send2tape.ps1 -i <INST>`	Chained to BACKUP

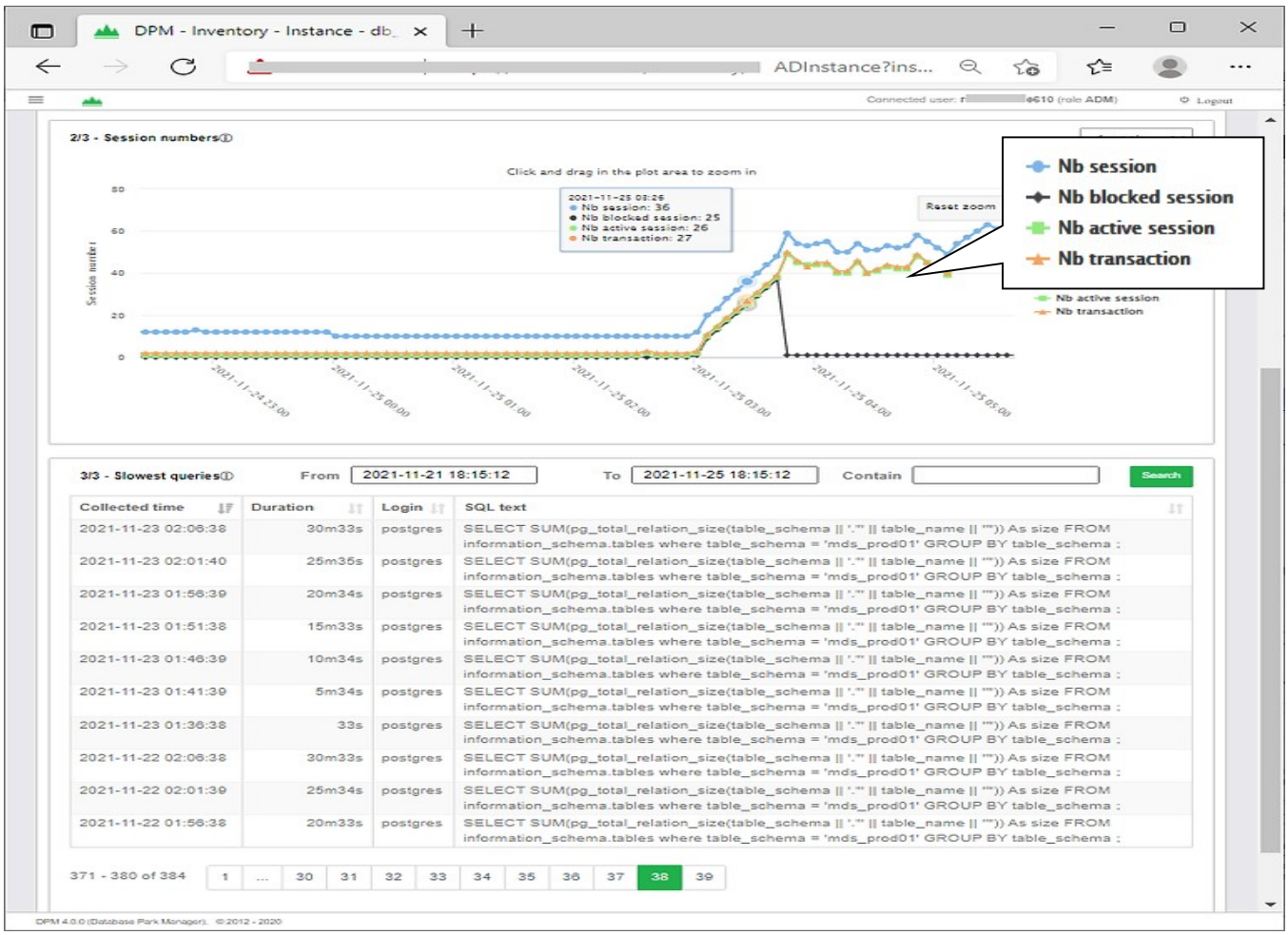
3.2.11 Visualizing collected metrics of an instance

To view the information collected from a DBMS environment (instance), you start by searching for the instance and displaying the detail of the instance.

In the "**Instance detail**" page, there are several tabs :

- Perf indicator ➔ history of performance indicators and slow SQL queries (via **xxx_perf.sh**)





- DB List → history of database disk volumes (via **pgs_inventory.sh**)
- FS list → history of FS disk volumes (via **pgs_inventory.sh**)
- Maintenance jobs → list of scheduled exploitation-scripts
- Occured errors → history of alerts arriving on the instance (via **pgs_alert.sh**)

3.2.12 Troubleshoot an instance

If there is a performance problem on an instance, you can display DB real-time information to find the root-cause of the issue. To do this, you search the instance and display its detail, and then go to the tab "**Activity reporting**".

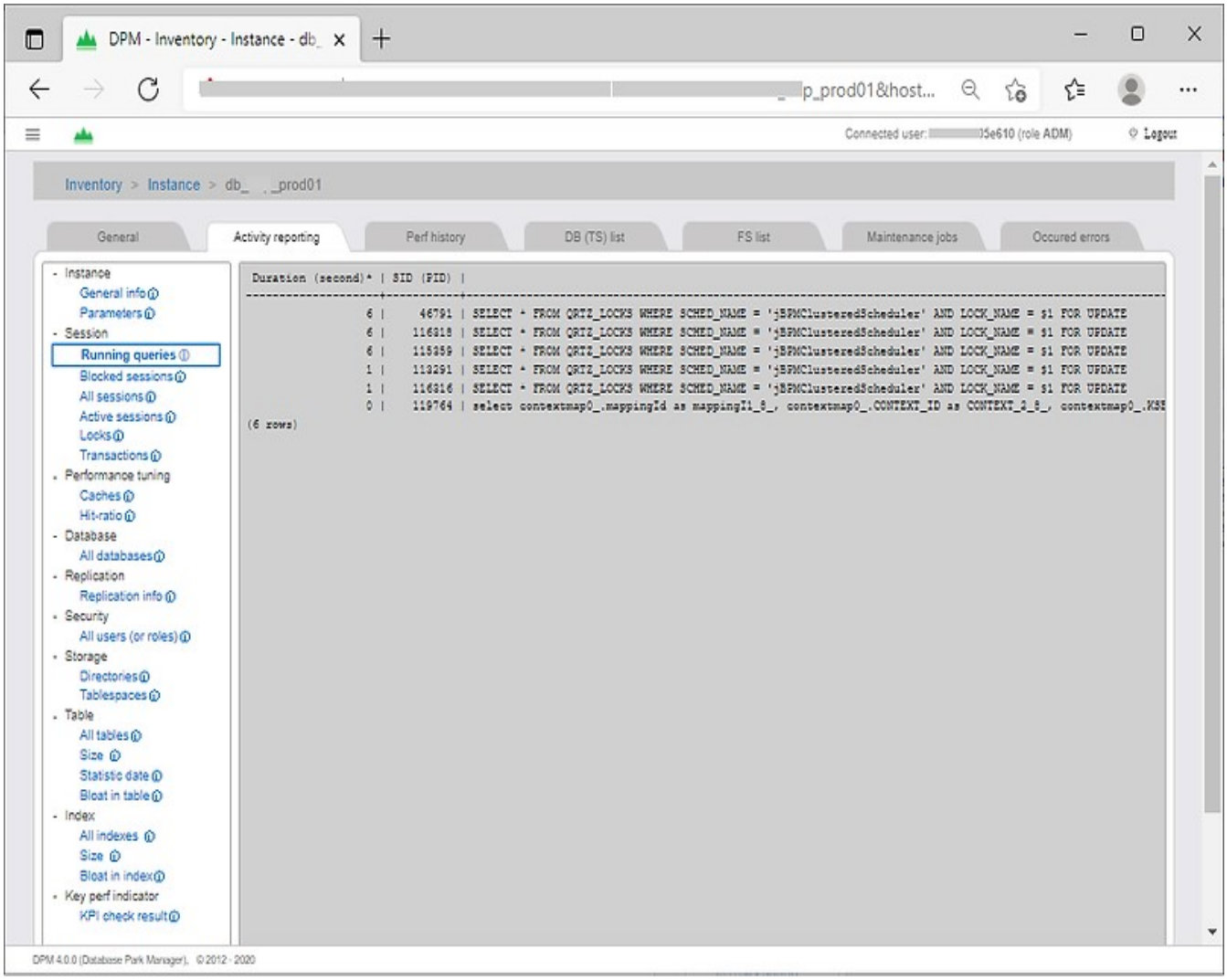
Here, the reports are organized into groups according to the topics:

1) **Instance** → configuration and parameter of the instance
2) **Session** → information in current connections to the instance (running queries, blocked sessions)
3) **Performance-tunning** → find slow queries and their execution plans in the cache
4) **Security** → DB users, profiles, roles, login-triggers
5) **Storage** → information about tablespaces, datafiles
6) **Table** → information about tables (size, constraints, FK, statistics, triggers)
7) **Index** → information about indexes (size, statistics)
8) **KPI** → key performance indicators

Note

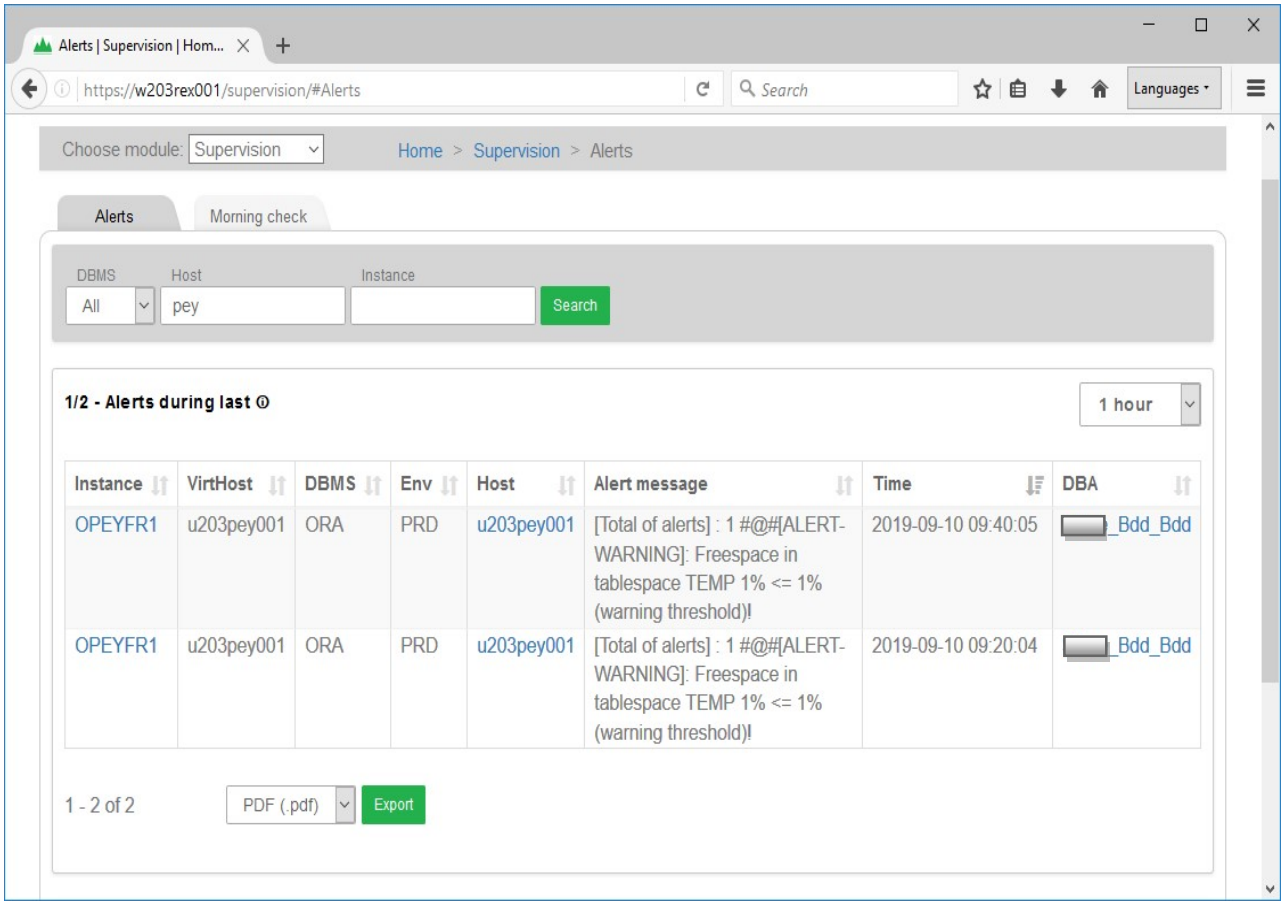
In order to view the activity reports, the following tasks must already be done:

- "**DB-user (remote conn.)**" and its "**Password**" given in "**General**" tab (section "**2/9 - Instance attributes**")
- DBMS **client** is installed on website-host (the sql-client command is in **PATH** variable)

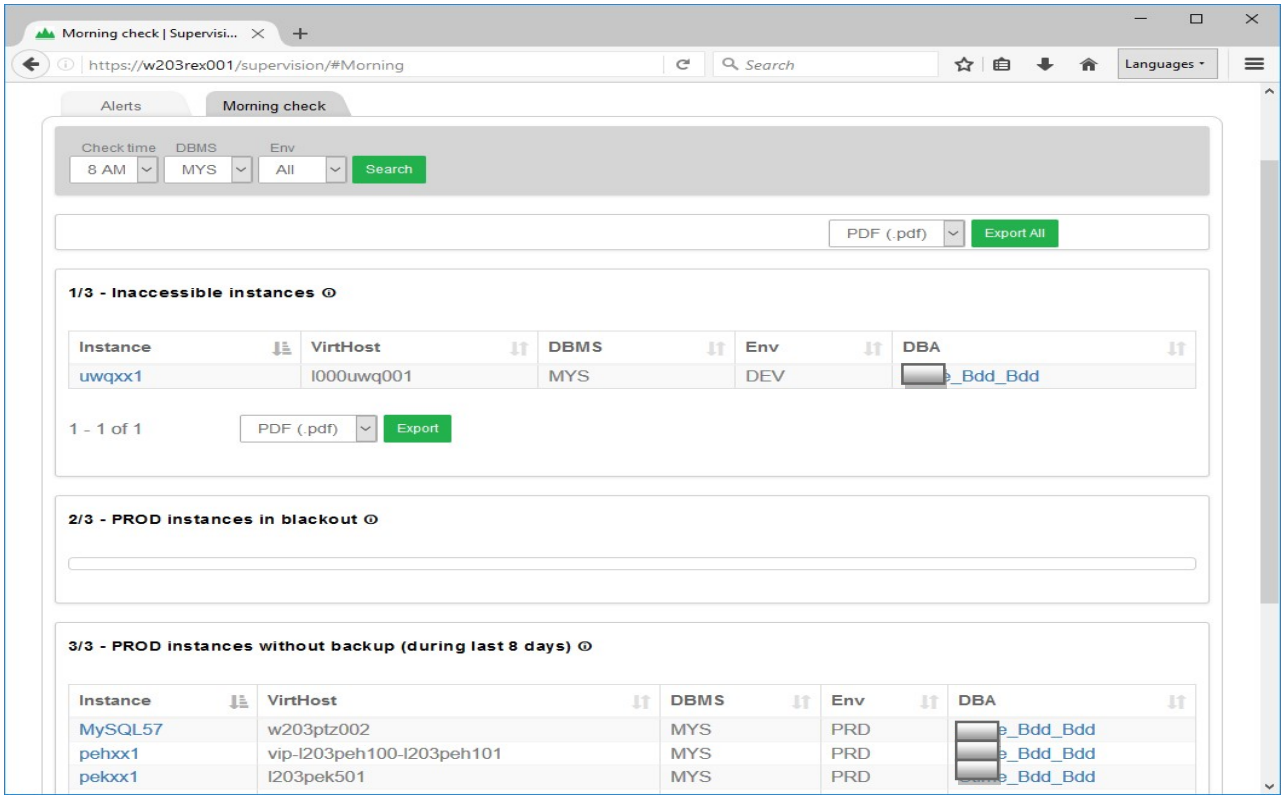


3.3 «**Supervision**» module

You can view all the alerts and errors of the exploitation-scripts (Go to **home-page** → "**Alerts**") :

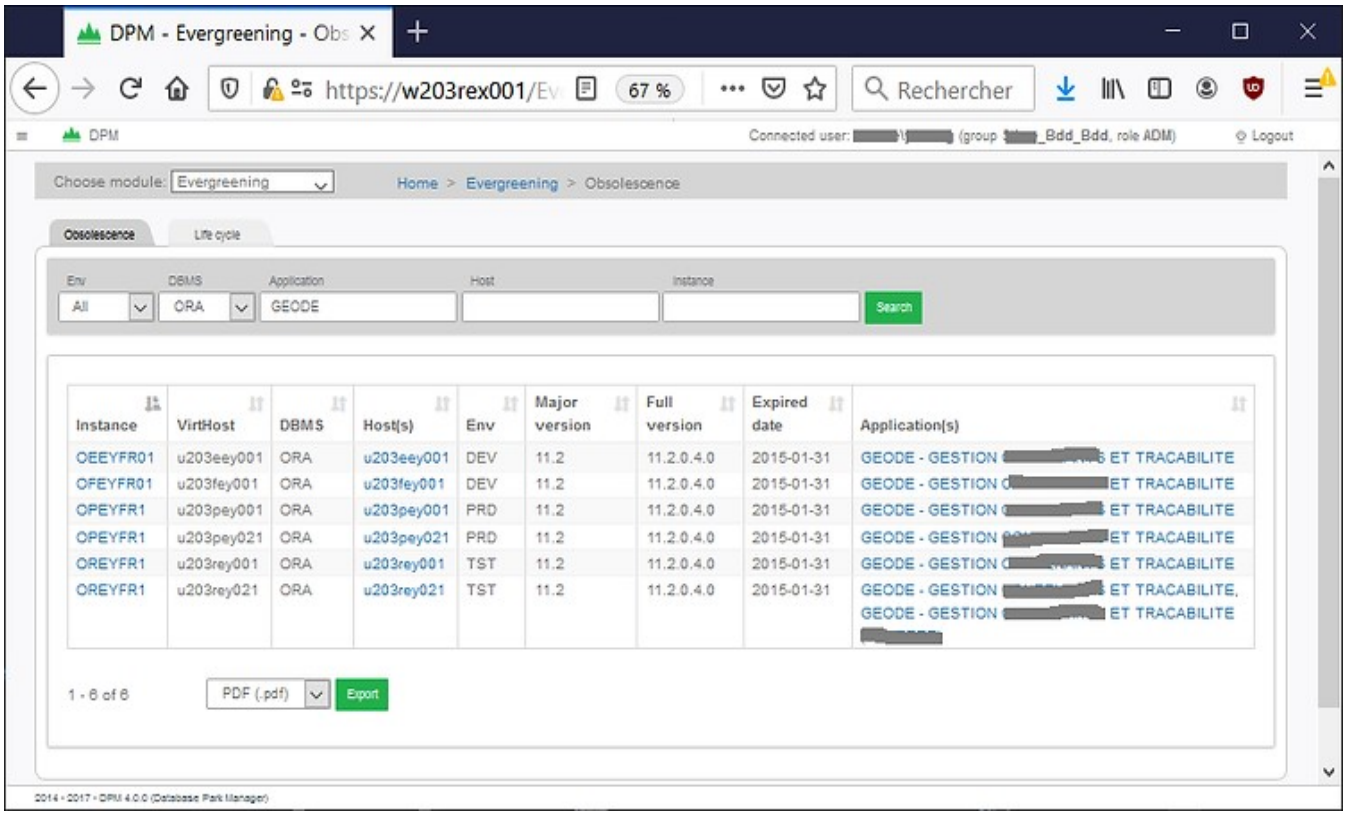


You can view the result of the "**Morning-check**" (Go to **home-page** → "**Mrorning check**") :

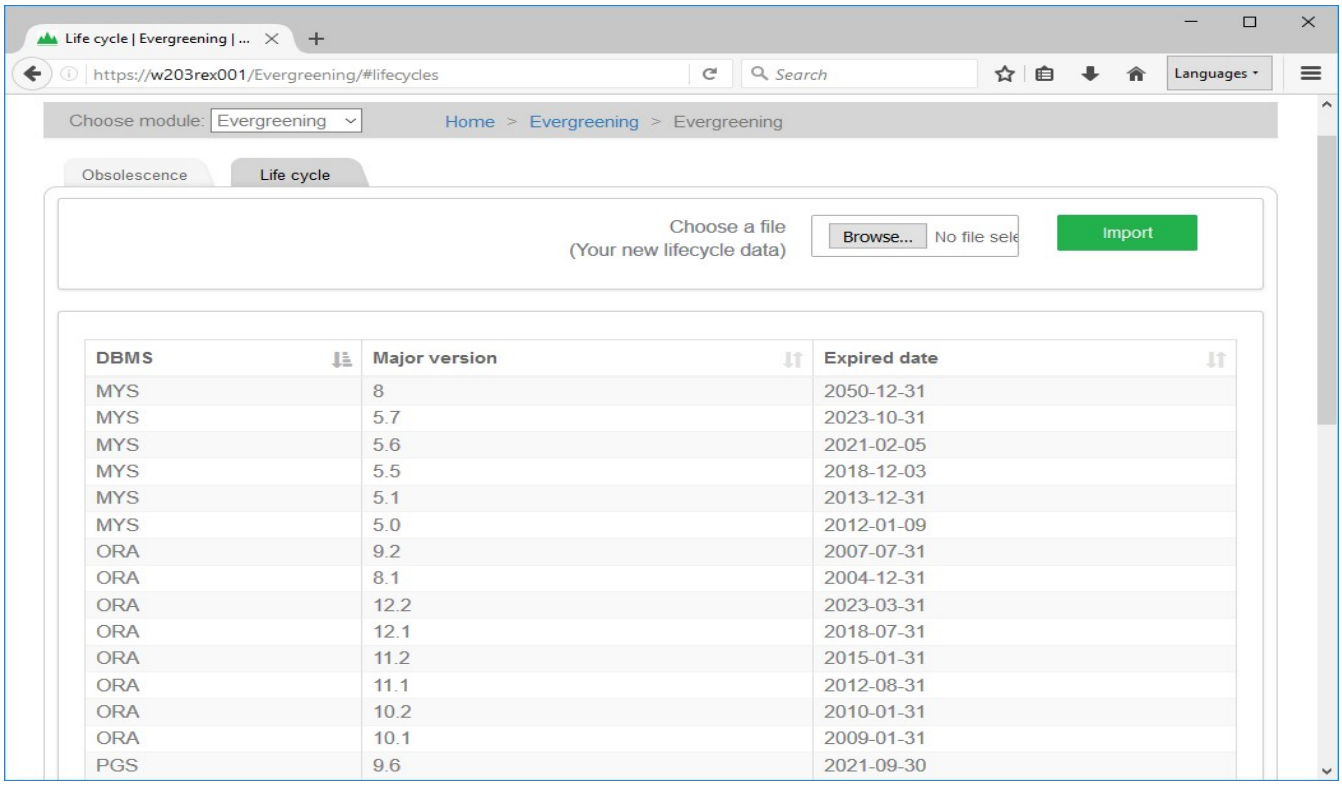


3.4 «**Evergreening**» module

You can view the instances whose DBMS versions are no longer supported by the publishers (Go to **home-page** → click on "**Obsolescence**"):

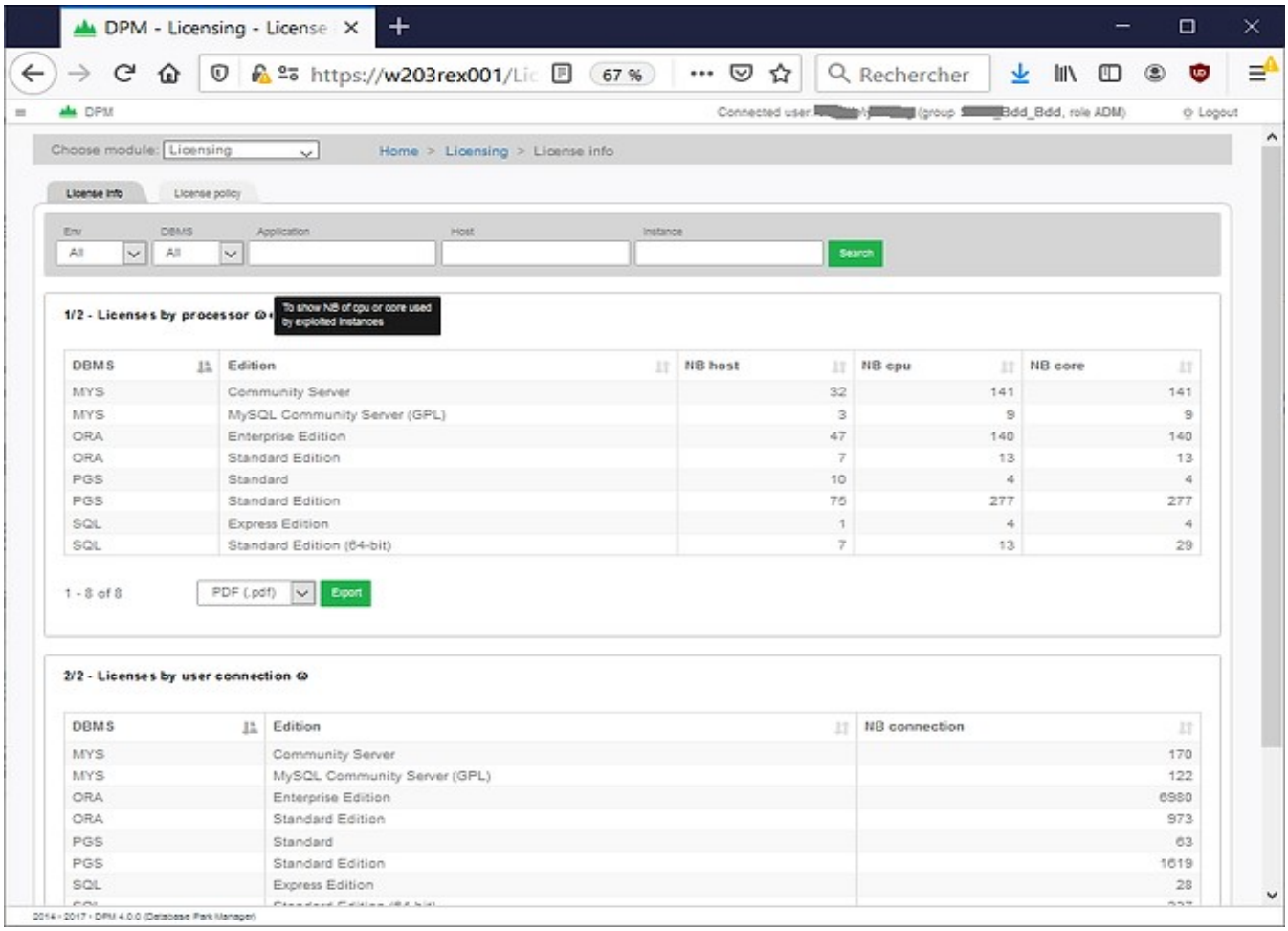


You can view the DBMS lifecycle matrix (Go to **home-page** → click "**Life cycle**") :

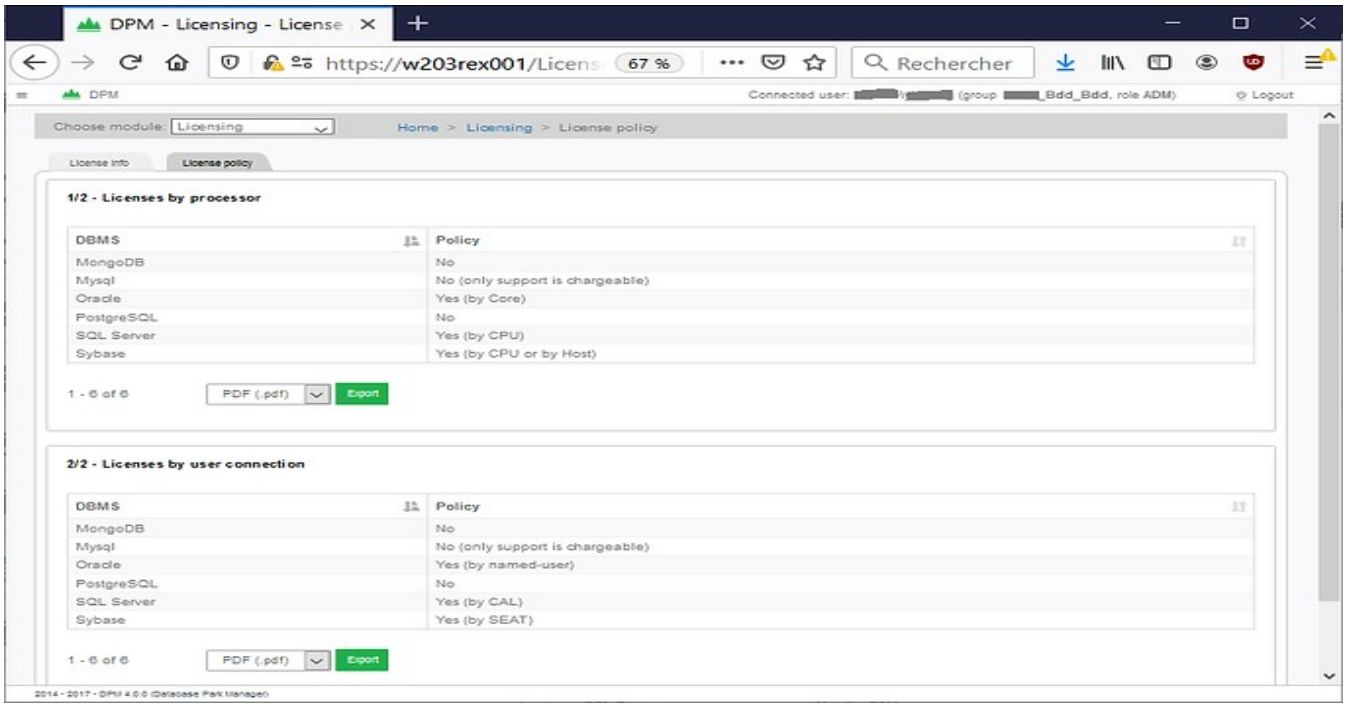


3.5 **«Licensing»** module

You can view the numbers of CPUs (or CORE) or numbers of connections in the DBMS instances (Go to **home-page** → click on "**License info**") :



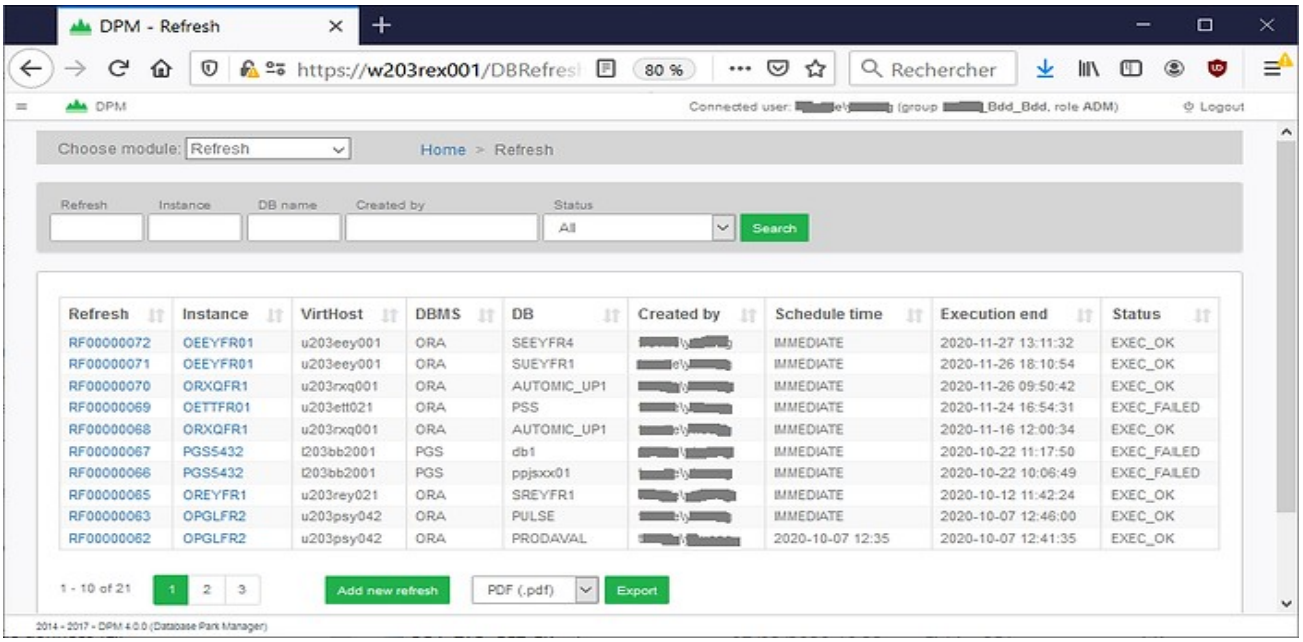
You can view the license policies (Go to **home-page** → click "**License policy**") :



3.6 «**Refresh**» module

You may need to refresh the data of a **database** (USER in oracle) of an environment (eg: DEV) by another environment (eg: PROD). **DB-Refresh** module may accomplish the task:

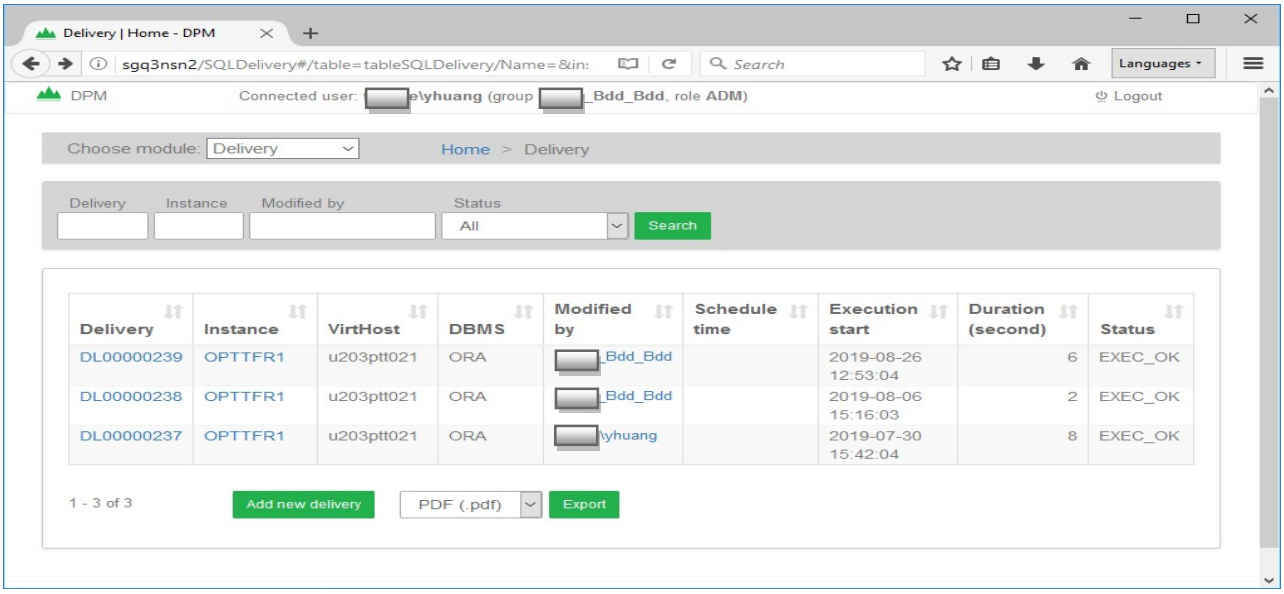
- Create a **refresh** for a DB in an instance with backup on db-host or from another host (eg: **original instance**)
- Modify an existing **refresh** which has not yet been executed
- Delete a **refresh**
- Note: this module may be disabled (see "**Park setting**" in "**Administration**" page) !



3.7 «**Delivery**» module

You can manage the deliveries of the SQL scripts (usually corresponding to DB-CHANGE) in this module:

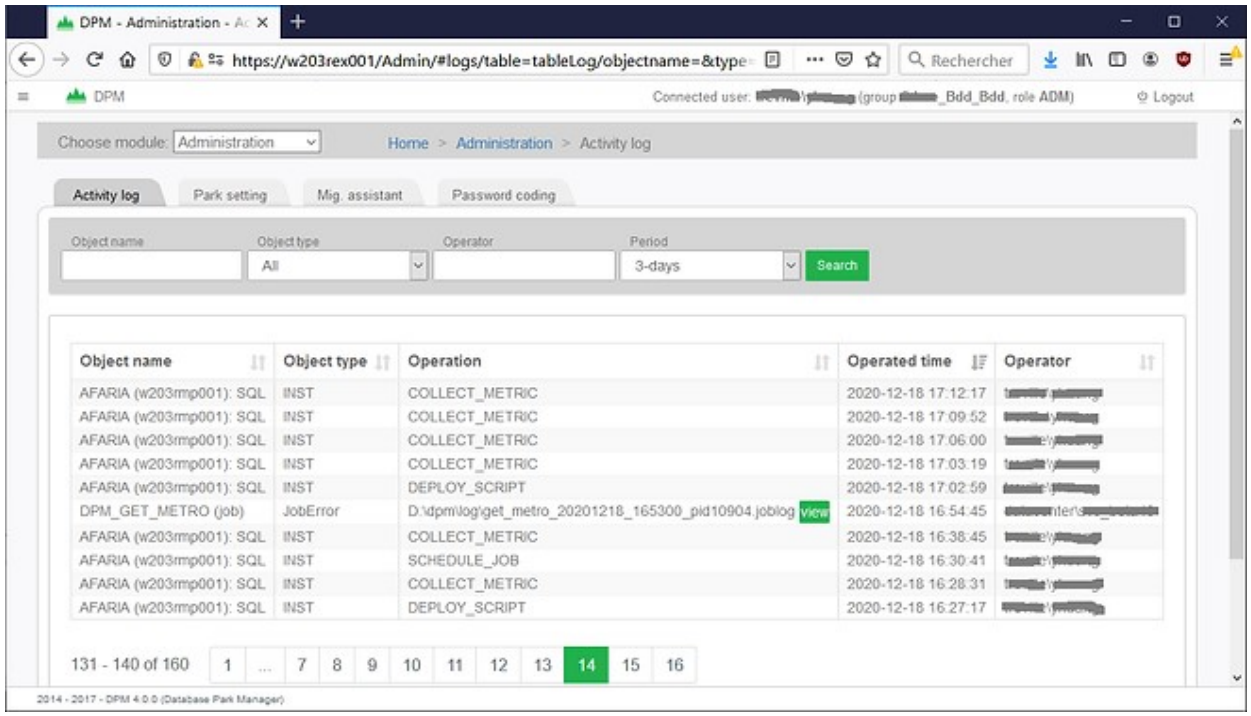
- Create a **delivery** for an instace with a list of SQL scripts (accessible from your desktop)
- Modify an existing **delivery** which has not yet been executed
- Delete a **delivery**
- Note: this module may be disabled (see "**Park setting**" in "**Administration**" page) !



3.8 «Administration» module

In this module:

1. You can view website activity logs (go to "**Administration**" → click "**Activity log**" tab) :
   - All user LogIn/LogOut (succeeded or failed)
   - All changes for instance, hosts, application, users



2. You can do some settings (eg: number of lines displayed in the pages) :
   Go to **Administration** → Click «**Park setting**» → …
3. You can be assisted to migrate an existing park to DPM (**Administration** → click «**Mig. assistant**»):
   - The idea is to import the applications, instances and hosts from text-files
   - Each text file contains a type of object (eg: APPLICATION)
     In the header of script **<dpm_dir>\bin\import_obj.ps1**, you may view the format for the files
     - You can proceed to upload a file by clicking «**Import object**» button
4. You can encyt or decrypt password (used in «**dpm.conf**» for exploitation-scripts) graphically

3.9 Set up HTTPS for the website

It is possible to change website setting via "**IIS Manager**" tool (%windir%\system32\inetsrv\InetMgr.exe):
- View the website settings (site directory, IP, port, application pool, etc.)
- Start/stop website,start/stop scheduled-tasks etc.

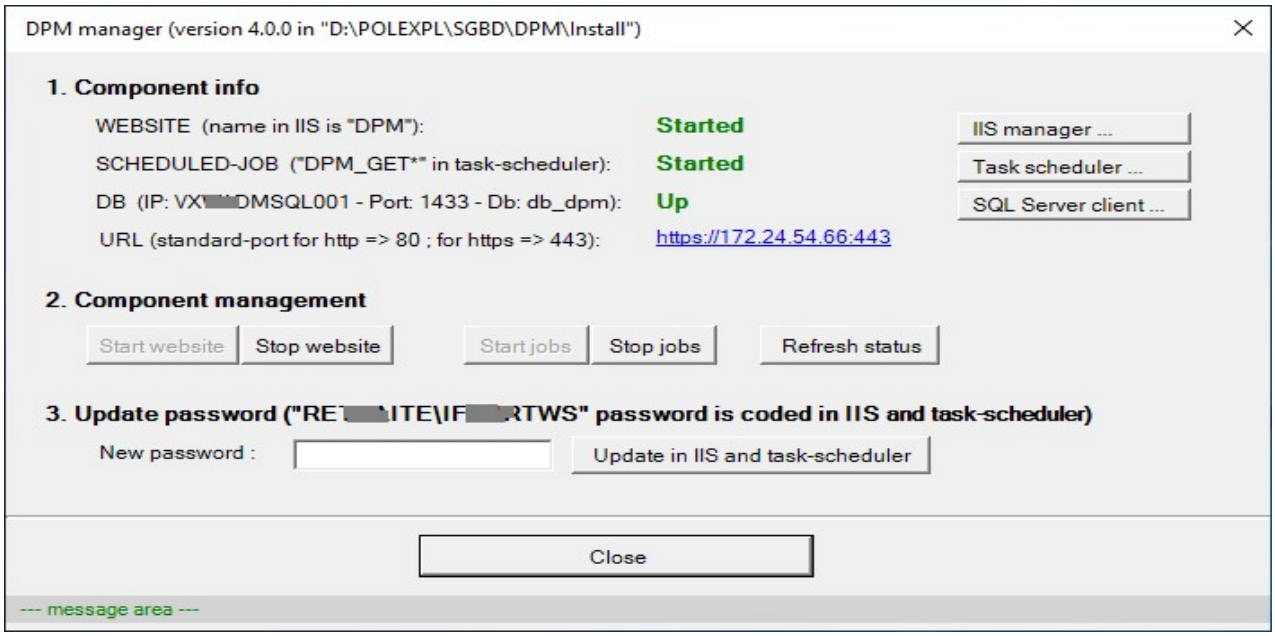
You can set up **HTTPS** protocol for **website**:
1. Create a self-signed certificate named "**DPM_CERT**" (or use the one provided by WINDOWS):
   Main page (**home page**) → **Server certificates** → **Create a self-signed certificate**
2. Add a new link to the certificate by going to the "**DPM**" site
   Link … → **Add** … → fill in the elements below and add the link:
   - Choose «**https**» for «**Type**»
   - Enter the **IP** (same as in http-link)
   - Choose the **port** (different from the http-link. If **443**, then no need to specify it in URL)
   - Choose the «SSL certificat» (you may use the one supplied by Windows)
3. Update the port in file **<installation_dir>\conf\dpm.conf** ($env:website_port)

You can now access the website via https with URL below:
https://<host>:<http_port> (eg: https://w203rex001:443)

3.10 **DPM manager**

To facilitate the management of various DPM components, there is a graphic utility :

- On the desktop, there is the icon "**DPM manager**"
- This utility is also available in WINDOWS "**Start**" menu



In this utility, you can do the actions below:

- Stop/start/status of **website** and **4 scheduled-job**
- Launch tool "**IIS manager**" to view/modify the parameters of website "**DPM**" in IIS
- Launch "**Task-Scheduler**" tool to manage 4 scheduled jobs ("DPM_GET_*")
- Launch "**SQL Server Management Studio**" tool to connect to website DB
- Spread password change of the **Windows-account** of **website**. In fact, website ("DPM" ApplicationPool in IIS) is started with a Windows-account (AD or Workgroup), if the password of this account changes, it should be changed in the **website** too (since this password is hardcoded in **IIS** website and scheduled-jobs). To do this, you can proceed as follows:
  - Enter new password in "**New password**" and then click «**Update in IIS and task-scheduler**» button

4 FAQ

1. How to check if IIS is activated ?
   If the command "**%windir%\system32\inetsrv\InetMgr.exe**" exists, then **IIS** is activated.

2. Where are the log files for IIS ?
   Run "**IIS Manager**" ("%windir%\system32\inetsrv\InetMgr.exe"):
   In **Main-page** → Double-click "**Logging**":
   In the dialog box, search in "**Directory**" (default: "%SystemDrive%\inetpub\logs\LogFiles")

3. What are the powershell scripts used by website ?
   The scripts used by **DPM** website are in **<dpm_dir>\bin**:
   get_metrol.ps1 → retrieve the **metrology** and integrate it into the website DB
   ...
   These scripts can be called directly by **website** or they can also be used manually by a DBA

4. Where are the DBMS exploitation-scripts stored for deployment ?
   With **website**, you can easily deploy DB exploitation-scripts to db-hosts.
   These exploitation-scripts are stored in directory "**<dpm_dir>\dba_script**" :
   - **pgs_unix** → exploitation-scripts for PostgreSQL under UNIX (Linux)
   - **pgs_win** → exploitation-scripts for PostgreSQL under WINDOWS
   - ...

5. Where are the log files for website or instance manipulation ?
   In case of issues of website or various instance manipulation, there may be some log files generated.

   The directory "**<dpm_dir>\log**" contains all log files of DPM :
   - **ERRORLOG.txt** → error log files for **website**
   - **get_metro_20171010_155107.joblog** → log file for script **get_metro.ps1**
   - …

6. How to connect to a host in DMZ ?
   If a DB host is in DMZ, so accessible under another IP, you can map the host to the IP in the file "**c:\windows\system32\drivers\etc\hosts**" with the format below:
   <IP accessible> <hostname>

7. How to supervise the website ?
   The script "**<dpm_dir>\bin\supervise_website.ps1**" allows to check website status in IIS (if DOWN, send a mail).
   You may schedule it in "**Task-Scheduler**" as follows (option "**Run with highest privileges**" should be checked for the job):
   powershell <dpm_dir>\bin\supervise_website.ps1 <mail_address> <mail_server>

8. How to backup DPM ?
   In order to do a disaster recovery for DPM, 3 elements should be backed up:
   1. Configuration file → "**<dpm_dir>\conf\dpm.conf**"
   2. SSH keys → "**<dpm_dir>\conf\pub.ssh**" and "**<dpm_dir>\conf\private.ssh**"
   3. website DB → "**SQL Server Management Studio**" may backup a database