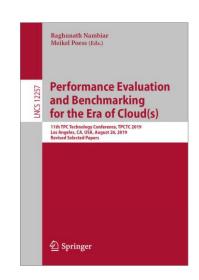


peakmarks® Installation for Oracle 19c / 21c / 23c with CDB architecture



peakmarks® showcased its software at the 2019 TPC Technology Conference in Los Angeles.

peakmarks® Version 10.2 February 2024

Copyright Information



peakmarks® Software and related documentation are protected by intellectual property laws and are subject to a license agreement. Explicit permission is mandatory for any use, modification, distribution, display, transmission, licensing, transfer, publication, or demonstration of the peakmarks® software and its documentation, as stated in the license agreement. Reverse engineering, disassembling, or decompiling of this software is strictly prohibited.

peakmarks® is a registered trademark. Other names may be trademarks of their respective owners.

Agenda



- 1 Directory Organization
- 2 Environment Variables
- 3 Installation of Oracle Database
- 4 Database Organization
- 5 Installation of peakmarks® Schema
- 6 Installation of peakmarks® Software
- 7 Oracle Services for In-Memory Column Store Instance Affinity
- 8 Drop peakmarks® Schema
- 9 Summary of Scripts

Naming Conventions



Database name ORA19C / ORA21C / ORA23c

Instance names ORA19C / ORA21C / ORA23C for a single instance

ORA19C1 / ORA21C1 / ORA23C1 for RAC instance 1

ORA19C2 / ORA21C2 / ORA23C2 for RAC instance 2

peakmarks® PDB PMK

Connect string SYSTEM user

Connect string peakmarks user

system/manager@SYSAWR

bench/bench@PMK

peakmarks® base directory ../pmk

Abbreviations and Metrics



[MBps]	megabyte per second	[qps]	queries per second
[GBps]	gigabyte per second	[rps]	rows per second
		[tps]	transactions per second
[dbps]	database blocks per second	[kBpt]	kilobyte per transaction
[rbps]	redo blocks per second	[Mops]	million operations per second
[dbpt]	database blocks per transaction	[IVIOPS]	minori operations per second
		Nodes	number of cluster nodes
[s]	seconds	Nodes Jobs	number of cluster nodes number of workload processes
[s] [ms]	seconds milliseconds		
[ms]	milliseconds	Jobs	number of workload processes
[ms]	milliseconds	Jobs BuCache	number of workload processes Database Buffer Cache



Simple. Representative. Fast.





The peakmarks® Software is delivered as a ZIP file

The location of the installation is called the peakmarks base directory

Create a peakmarks base directory and provide Oracle access to it, e.g.

- /u01/app/pmk
- c:/pmk

Use a shared file system on Oracle RAC systems, e.g.

/acfs01/pmk



When unpacking the ZIP file, the following directory structure is automatically created:

../pmk/awr for AWR reports

../pmk/bin for binaries and peakmarks specific SQL monitoring scripts

../pmk/cfg for peakmarks configuration files

../pmk/doc for peakmarks documentation

../pmk/log for working directory of SQL*Plus sessions

../pmk/sql for generic SQL monitoring scripts

../pmk/tmp for temporary files



Protection on Linux systems

\$ chown —R oracle pmk

\$ chgrp —R oinstall pmk

\$ chmod -R 755 pmk



Simple. Representative. Fast.



Environment Variables

Environment Variables



Besides the conventional Oracle environment variables, two additional environment variables are necessary for peakmarks



- PEAKMARKS BASE
- ORACLE_PATH (on Windows set registry variable SQLPATH instead)

In the peakmarks base directory are some example bash scripts for initializing all environment variables

```
../pmk/bash_profile_ORA19C ../bash_profile_ORA19C1 ../bash_profile_ORA19C2
```

../pmk/bash_profile_ORA21C ../bash_profile_ORA21C1 ../bash_profile_ORA21C2

../pmk/bash_profile_ORA23C ../bash_profile_ORA23C1 ../bash_profile_ORA23C2

Environment Variables



Example bash script for Linux environments

```
# !/bin/ksh
   Copyright © 2016 - 2024 peakmarks Ltd. All rights reserved. support@peakmarks.com
   Config File....: bash_profile_ORA19C1
   Release.....: 15-Feb-2024, PRO
   Description....: Oracle RDBMS environment variables for peakmarks® Software
   Certified....:
   Notes.....: use shared directory for RAC installations, e.g. /acfs01/pmk
# Oracle environment
export ORACLE_SID=ORA19C1
export ORACLE HOME=/u01/app/oracle/product/19.0.0.0/dbhome_1
export PATH=$ORACLE HOME/bin:$PATH
# peakmarks environment
export PEAKMARKS_BASE=/acfs01/pmk
export ORACLE PATH=$PEAKMARKS BASE/bin:$PEAKMARKS BASE/sql
```

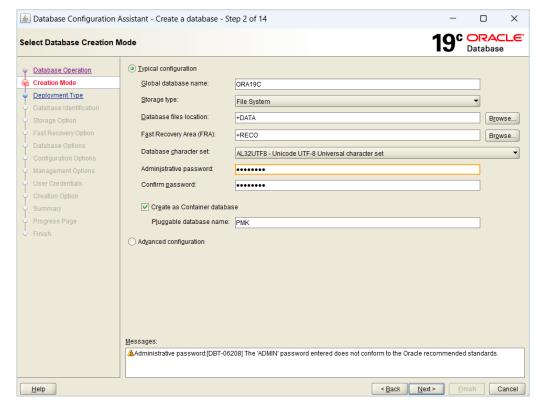


Simple. Representative. Fast.





Use DBCA to install Oracle database





Login as SYSDBA and test peakmarks environment

You should see the peakmarks header and SQL*Plus prompt with the username and instance name

```
$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Tue Jan 23 15:37:03 2024

Version 19.21.0.0.0

Copyright (c) 1982, 2022, Oracle. All rights reserved.

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

Version 19.21.0.0.0

Swiss Precision in Performance Management
Copyright (c) 2016-2024 www.peakmarks.com

SYS@ORA19C1 SQL>
```



Check database status

```
SYS@ORA19C1 SQL> @cdb
Tue 23-Jan-2024 15:42:05
Container Database
Oracle....: 19.21.0
Database...: CDB$ROOT
Instance...: ORA19C1
RAC nodes...: 1
Server....: PMEXA01.LAB.LOCAL
         Container
                                                            Operating |
                                                                              CDB Log
                                                                                                Force Flash Database DataGuard
                                 0pen
Con# Ins# Database
                             DB# Mode
                                           Creation
                                                            system
                                                                               Arch mode
                                                                                                log? back? in Cache status
     1 ORA19C
                      1212038745 READ WRITE 21-JAN-2024 14:58 Linux x86 64-bit YES NOARCHIVELOG NO
                                                                                                                    NONE
      2 ORA19C
                    1212038745 READ WRITE 21-JAN-2024 14:58 Linux x86 64-bit YES NOARCHIVELOG NO
                                                                                                     NO
                                                                                                           NO
                                                                                                                    NONE
SYS@ORA19C1 SQL>
```



peakmarks uses Oracle Managed Files

Oracle Managed Files (OMF) MUST be configured to

- Create the pluggable peakmarks database
- Create the peakmarks tablespaces
- At least db_create_file_dest must be configured

SYS@ORA19C1 SQL> show parameter db_cre	@ORA19C1 SQL> show parameter db_create				
Parameter	Туре	Value			
db_create_file_dest	string	+DATA			
db_create_online_log_dest_1	string	+DATA			
db_create_online_log_dest_2	string	+RECO			
db_create_online_log_dest_3	string				
db_create_online_log_dest_4	string				
db_create_online_log_dest_5	string				
SYS@ORA19C1 SQL>					



peakmarks does not support global database names

Unset global names and global database links (default in Oracle 19c on-premises)

SYS@ORA19C1 SQL> show parameter global				
Parameter Ty	/pe	Value		
allow_global_dblinks bo	oolean	FALSE		
global_names bo	oolean	FALSE		
global_txn_processes in	nteger	1		
SYS@ORA19C1 SQL>				



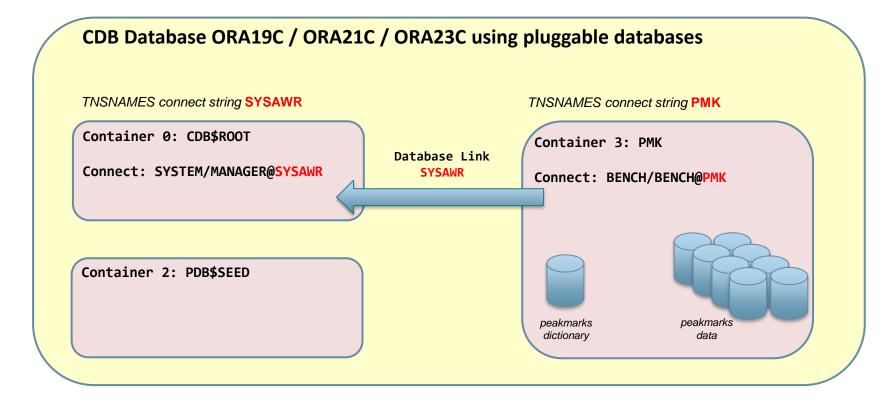


Simple. Representative. Fast.



Database Organization







TNSNAMES connect strings

Following TNSNAMES connect strings (the actual syntax depends on the platform) on <u>all instances</u> are required for

- Accessing SYSTEM account via SYSAWR (for CDB AWR snapshots)
- Accessing peakmarks account via PMK

```
ORA19C =
  (DESCRIPTION =
   (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
   (CONNECT DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = ORA19C)
SYSAWR =
  (DESCRIPTION =
   (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
   (CONNECT DATA =
      (SERVER = DEDICATED)
      (SERVICE NAME = ORA19C)
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
   (CONNECT DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = PMK)
```



Simple. Representative. Fast.





Follow these steps

Connect to SYS as SYSDBA

Use script CreatePDB.sql to create a pluggable peakmarks® database; script includes several activities:

- Set password of SYSTEM account
- Changes common CDB instance configuration parameters
- Collects statistics on the dictionary, fixed objects, and SYS schema
- Disables administrative tasks
- Unset password security features
- Unset resource limits
- Creates and opens the pluggable peakmarks® database
- Disables automatic AWR snapshots and administrative tasks on the PDB level

If the PDB already exists, drop it first, e.g., with the script DropPDB.sql; details from slide 51 ff



Script header CreatePDB.sql

```
Copyright @ 2016 - 2024, peakmarks Ltd. All rights reserved.
Script....:
                  CreatePDB.sal
                  15-Feb-2024, MDR
Release....:
Description...:
                  create, open and save state of pluggable peakmarks database
Parameter....:
                   &1 - name of peakmarks PDB
                   &2 - name of PDB admin user
                   &3 - password of PDB admin user
                   &4 - initial user tablespace size in [GByte]
                   &5 - password of SYSTEM user
Run script as..:
                   SYS
Example....:
                   $ sqlplus / as sysdba
                   SQL> @CreatePDB.sql PMK bench bench 8G manager
Portability...:
                   Oracle 19c CDB
                   Oracle 21c CDB
                   . check log file for errors
Notes....:
                   . this script takes some minutes
Requirements...:
                   . check the following Oracle configuration parameter
                    DB CREATE FILE DEST = ... (OMF location for database files)
                     GLOBAL NAMES
                                       = FALSE (no global database naming)
```



Execute script CreatePDB.sql



Script processing CreatePDB.sql – this will take some minutes

```
BY DOWNLOADING, INSTALLING, COPYING, ACCESSING OR USING THIS PROGRAM YOU
AGREE TO BE BOUND BY THE TERMS OF THE PEAKMARKS LICENSE AGREEMENT. IF YOU
DO NOT AGREE YOU MAY NOT DOWNLOAD, INSTALL, COPY, ACCESS OR USE THIS PROGRAM.
Swiss Precision in Performance Management
Copyright (c) 2016-2024 www.peakmarks.com
-----
running script CreatePDB.sql - create and open pluggable peakmarks database
. CDB administrative tasks disabled
. CDB AWR threshold settings adjusted
. CDB password security features unset
. CDB resource limits for default profile unset
. CDB password set for user SYSTEM
. create pluggable peakmarks database ...
. pluggable peakmarks database created
. pluggable peakmarks database opened
. PDB system privileges granted
. PDB object privileges granted
. PDB administrative tasks disabled
. PDB AWR snapshots disabled
. perform some checks
. -> check pdb creation in logfile CreatePDB.log
. -> check pluggable database(s) ..... with SQL> @pdb
. next steps are
. -> connect to peakmarks PDB
. -> install peakmarks software
SYS@ORA19C1 SQL>
```



Perform some checks

Check pluggable database

```
SYS@ORA19C1 SQL> @pdb
Tue 23-Jan-2024 15:49:55
Pluggable Database(s)
Oracle....: 19.21.0
Database...: CDB$ROOT
Instance...: ORA19C1
RAC nodes...: 2
Server....: PMEXA01.LAB.LOCAL
                                                                                  Max PDB
                                                                                             Max Diag
                                                                                                        Max Audit
         Pluggable
                                  0pen
                                                                                     Size
                                                                                                 Size
                                                                                                             Size
                                                                         Local
Con# Ins# Database
                                            Creation
                                                              Res? Proxy UNDO
                              DB# Mode
                                                                                   [GByte]
                                                                                              [GByte]
                                                                                                          [GByte]
                       2264675154 READ WRITE 23-JAN-2024 15:49 NO
                                                                                     0.00
                                                                                                 0.00
                                                                                                             0.00
       2 PMK
                       2264675154 READ WRITE 23-JAN-2024 15:49 NO
                                                                                     0.00
                                                                                                 0.00
                                                                                                             0.00
SYS@ORA19C1 SQL>
```



Perform some checks

Test TNSNAMES.ORA connect strings system/manager@SYSAWR and bench/bench@PMK

```
SYSEMORA19C1 SQL> connect system/manager@SYSAWR

Connected.

Swiss Precision in Performance Management

Copyright (c) 2016-2024 www.peakmarks.com

SYSTEM@SYSAWR SQL> connect bench/bench@PMK

Connected.

Swiss Precision in Performance Management

Copyright (c) 2016-2024 www.peakmarks.com

BENCH@PMK SQL>
```



Simple. Representative. Fast.



Installation of peakmarks® Software

Installation of peakmarks® Software



Follow these steps

Connect to peakmarks® PDB

Use script InstallPMK.sql to install peakmarks® Software; script includes following activities:

- Creating database link SYSAWR to SYSTEM account
- Compiling programs
- Creating peakmarks® dictionary
- Initializing internal tables



Script header InstallPMK.sql

```
-- Copyright © 2016 - 2024, peakmarks Ltd. All rights reserved.
                                                                      support@peakmarks.com
   Script.....: InstallPMK.sql
   Release....: 15-Feb-2024, MDR
   Description...: install and initialize peakmarks software
                      &1 - path of peakmarks base directory
   Parameter...:
                      &2 - password of SYSTEM user
   Run script as..:
                      peakmarks user
                    $ sqlplus bench/bench@PMK
   Example....:
                      SQL> @InstallPMK /u01/app/pmk/ manager
                      SQL> @InstallPMK /acfs01/pmk/ manager
                      SQL> @InstallPMK c:/pmk/ manager
   Portability...:
                      Oracle 19c
                      Oracle 21c
   Notes..... check log file InstallPMK.log for errors
   Requirements...:
```



Execute script InstallPMK.sql





Script processing InstallPMK.sql

```
BY DOWNLOADING, INSTALLING, COPYING, ACCESSING OR USING THIS PROGRAM YOU
AGREE TO BE BOUND BY THE TERMS OF THE PEAKMARKS LICENSE AGREEMENT. IF YOU
DO NOT AGREE YOU MAY NOT DOWNLOAD, INSTALL, COPY, ACCESS OR USE THIS PROGRAM.
-----
Swiss Precision in Performance Management
Copyright (c) 2016-2024 www.peakmarks.com
-----
running script InstallPMK.sql - install peakmarks software
. database link to SYSTEM created
. install native, compiled plsql
. install layer 2 - catalog and core functionality
. install layer 3 - platform and performance management
. install layer 4 - peakmarks configuration
. install layer 5 - peakmarks data model
. install layer 6 - workload processing
. install layer 7 - workload execution control
. install layer 8 - command line interface
. perform some checks
. check software installation in logfile InstallPMK.log
. check peakmarks directories ...... with SQL> @dir
. check status of software installation (packages) ..... with SQL> @pls
. check status of software initialization (journal) ..... with SQL> @jrn
. next steps are
. -> configure peakmarks configuration parameter
. -> check oracle database and instance configuration
. -> load peakmarks database
. -> run workloads, start with smart peakmarks configurations
Swiss Precision in Performance Management
Copyright (c) 2016-2024 www.peakmarks.com
-----
BENCH@PMK SQL>
```



Monitoring peakmarks[®] installation – database directories

```
BENCH@PMK SQL> @dir
Tue 23-Jan-2024 15:55:04
peakmarks Database Directories
Oracle....: 19.21.0
Database....: PMK
Instance...: ORA19C1
RAC nodes...: 2
Server....: PMEXA01.LAB.LOCAL
Con# Owner
                     Directory
                                               Path
                                               /acfs01/pmk/
  5 SYS
                     PEAKMARKS_BASE
  5 SYS
                     PMK_AWR
                                               /acfs01/pmk/awr/
                                               /acfs01/pmk/bin/
  5 SYS
                     PMK_BIN
  5 SYS
                     PMK CFG
                                               /acfs01/pmk/cfg/
  5 SYS
                     PMK TMP
                                               /acfs01/pmk/tmp/
5 rows selected.
BENCH@PMK SQL>
```



Monitoring peakmarks[®] installation – PL/SQL packages

```
BENCH@PMK SQL> @pls
Tue 23-Jan-2024 15:55:30
PL/SQL Package(s) in current schema
Package....:
Oracle....: 19.21.0
Database...: PMK
Instance...: ORA19C1
RAC nodes...: 2
Server....: PMEXA01.LAB.LOCAL
                                                       Parsed
                                                                 Code
                                                         Size
                                                                 Size
                                                      [KByte] [KByte] Creation Time Last DDL Time Code Type
Name
                                Type
                                             Status
ALC
                                PACKAGE
                                             VALID
                                                                  0.4 11-01-24 10:12 11-01-24 10:12 NATIVE
ALC
                                PACKAGE BODY VALID
                                                         4.9 5.0 11-01-24 10:12 11-01-24 10:12 NATIVE
                                PACKAGE
                                             VALID
                                                         36.0
                                                                 11.3 11-01-24 10:12 11-01-24 10:12 NATIVE
                                PACKAGE BODY VALID
                                                                 19.3 11-01-24 10:12 11-01-24 10:12 NATIVE
WLM
                                PACKAGE
                                             VALID
                                                         13.4
                                                                 3.6 11-01-24 10:12 11-01-24 10:12 NATIVE
WLM
                                                         3.2
                                                                 19.9 11-01-24 10:12 11-01-24 10:12 NATIVE
                                PACKAGE BODY VALID
Total
                                                        216.2
                                                                421.3
50 rows selected.
BENCH@PMK SQL>
```



Monitoring peakmarks® installation – installation process

```
BENCH@PMK SQL> @jrn
Tue 23-Jan-2024 15:56:10
peakmarks Journal
Program....:
Test...:
Text....:
Database....: PMK
                                Oracle....: 19.21.0
                                Build....: 240215
Instance...: ORA19C1
RAC nodes...: 2
                                Platform....: pmexa01.lab.local
Node Program
                     Test
                                Msg# Timestamp
                                                        Message
  2 InstallPLS
                                  1 23-JAN 15:52:50.198 DFM-23123: DFM installed
  2 InstallPLS
                                  2 23-JAN 15:52:52.572 PCM-23123: PCM installed
  2 InstallPLS
                                  3 23-JAN 15:52:53.227 CFG-23123: CFG installed
  2 InstallPLS
                                  4 23-JAN 15:52:54.248 SEQ-23123: SEQ installed
                                  5 23-JAN 15:52:56.612 WLM-23123: WLM installed
  2 InstallPLS
  2 InstallPLS
                                  6 23-JAN 15:52:58.132 BCM-23123: BCM installed
  2 InstallPLS
                                  7 23-JAN 15:52:59.665 HLP-23123: HLP installed
7 rows selected.
BENCH@PMK SQL>
```



Simple. Representative. Fast.



Oracle Services for In-Memory Column Store Instance Affinity

For RAC installations only



When using Oracle RAC some additional service configuration is necessary to bind peakmarks® tables to certain column stores

- peakmarks® Software uses hard-coded service names PMKCS{n} with n = instance number
- Assign peakmarks® service to each instance with Oracle srvctl Utility



Example

- Database name ORA19C
- Three instances with the following names ORA19C1, ORA19C2, ORA19C3
- Hard-coded peakmarks® service names PMKCS1, PMKCS2, PMKCS3



Instance 1

Instance Name ORA19C1 peakmarks® Service PMKCS1



Instance 2

Instance Name ORA19C2 peakmarks® Service PMKCS2



Instance 3

Instance Name ORA19C3 peakmarks® Service PMKCS3



Example

- Use Oracle srvctl utility to bind peakmarks service to specific instance
- \$ srvctl add service -db ORA19C -service PMKCS1 -preferred ORA19C1





Assign services to specific instance

Instance 1

Instance Name ORA19C1 peakmarks® Service PMKCS1



\$ srvctl add service
-db ORA19C -service PMKCS1
-preferred ORA19C1

Instance 2

Instance Name ORA19C2 peakmarks® Service PMKCS2



\$ srvctl add service
-db ORA19C -service PMKCS2
-preferred ORA19C2

Instance 3

Instance Name ORA19C3 peakmarks® Service PMKCS3



\$ srvctl add service
-db ORA19C -service PMKCS3
-preferred ORA19C3



Monitor services

Instance 1

Instance Name ORA19C1 peakmarks® Service PMKCS1



Instance 2

Instance Name ORA19C2 peakmarks® Service PMKCS2



Instance 3

Instance Name ORA19C3 peakmarks® Service PMKCS3



After restarting the database:

\$ srvctl status service -db ORA19C
Service pmkcs1 is running on instance(s) ORA19C1
Service pmkcs2 is running on instance(s) ORA19C2
Service pmkcs3 is running on instance(s) ORA19C3



Simple. Representative. Fast.





Drops the whole peakmarks pluggable peakmarks® database, including

- peakmarks® dictionary with all results
- peakmarks® data for performance assessment
- peakmarks® Software



Script header DropPDB.sql

```
-- Copyright @ 2016 - 2024, peakmarks Ltd. All rights reserved.
                                                                    support@peakmarks.com
   Script..... DropPDB.sql
   Release.....: 15-Feb-2024, MDR
   Description...: close and drop pluggable peakmarks database
   Parameter....: &1 - name of peakmarks PDB
   Run script as..: SYS in CDB$ROOT
   Example....:
                   $ sqlplus / as sysdba
                     SQL> @DropPDB PMK
   Portability...:
                     Oracle 19c CDB
                     Oracle 21c CDB
                   . check log file for errors
   Notes....:
   Message range..:
                     DBM-12xxx
```



Script execution DropPDB.sql

```
$ sqlplus / as sysdba

$QL*Plus: Release 19.0.0.0.0 - Production on Tue Jan 23 16:59:29 2024

Version 19.21.0.0.0

Copyright (c) 1982, 2022, Oracle. All rights reserved.

Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.21.0.0.0

Swiss Precision in Performance Management
Copyright (c) 2016-2024 www.peakmarks.com

SYS@ORA19C1 SQL> @DropPDB PMK
```



Script processing DropPDB.sql

```
BY DOWNLOADING, INSTALLING, COPYING, ACCESSING OR USING THIS PROGRAM YOU
AGREE TO BE BOUND BY THE TERMS OF THE PEAKMARKS LICENSE AGREEMENT. IF YOU
DO NOT AGREE YOU MAY NOT DOWNLOAD, INSTALL, COPY, ACCESS OR USE THIS PROGRAM.
Swiss Precision in Performance Management
Copyright (c) 2016-2024 www.peakmarks.com
running script DropPDB.sql - drop pluggable peakmarks database
Press <RETURN> to drop pluggable peakmarks database ... or cancel script NOW with CTRL-C!
. close pluggable peakmarks database ...
. pluggable peakmarks database closed
. drop pluggable peakmarks database ...
. pluggable peakmarks database dropped
. check operation in logfile DropPDB.log
. check status of pluggable databases..... with SQL> @pdb
SYS@ORA19C1 SQL>
```



Simple. Representative. Fast.



Summary of Scripts

Summary of scripts



Scripts for peakmarks installation

SQL> @CreatePDB

SQL> @DropPDB

SQL> @InstallPMK

Scripts to monitor installation

SQL> @dir.sql

SQL> @cdb.sql

SQL> @pdb.sql

SQL> @jrn.sql

SQL> @pls.sql

SQL> @where.sql

SQL> @db_links



Identify Key Performance Metrics for Oracle Database Platforms.

On-Premises and in the Cloud.

For Quality Assurance, Evaluations, and Capacity Planning.