



# ORACLE DATABASE BACKUP IN CLOUD

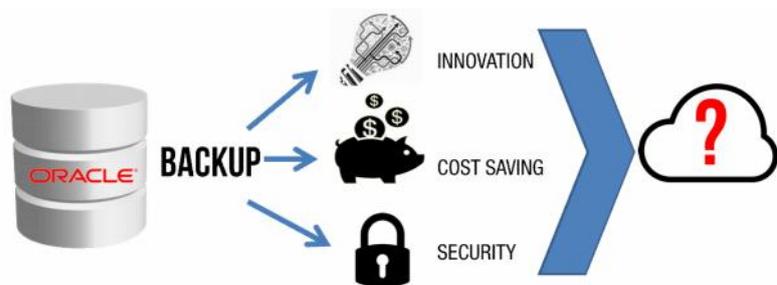


Technical contribution:

Nicola Gandolfi  
*DBA Service Desk Leader*  
Fabio Zanchi  
*Solution Architect*

## PREMISE

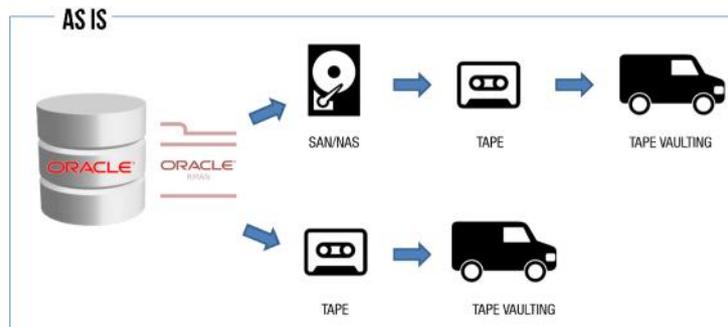
This document is the result of vendor independent analysis, comparing service packages offered by different Cloud providers. The objective of this study was to identify solutions that delivers optimum results for the Cloud backup of Oracle databases in terms of innovation, cost saving and security.



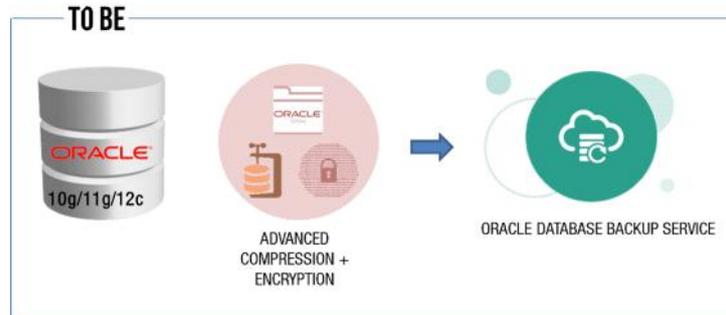
The study revealed a new solution that harnesses the benefits of 'Oracle Database Backup Cloud Service' for migrating an Oracle database backup to Cloud. Besides the intrinsic and cost reduction benefits of switching to the Cloud, the solution offers enhanced functionality and the advantages through a choice of bundled products.

## 1. INTRODUCTION ORACLE BACKUP CLOUD

The Oracle Database Backup Cloud Service offers a safe alternative to the traditional Disaster Recovery solutions that require the implementation of an off-site Backup.



In addition to the removal of the initial investment and maintenance costs (shipping, management and infrastructures), the solution simplifies the data backup process. This offers the possibility to set the storage volume size at any time and delivers access data from any server connected to the internet, 24h7.



ODBS is a bundled, integrated backup-as-a-service solution, scalable and easily adjustable at design stage, able to store backups to Oracle Cloud safely, meeting requirements arising from the increase in managed data. ODBS features:

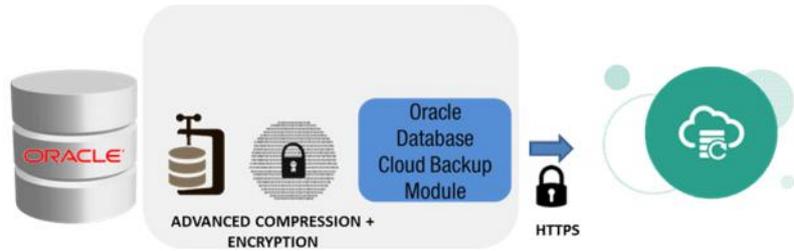
- End to End security: Featuring the option of an encrypted, dedicated VPN connection. All data are encrypted before being stored in the Cloud.
- Reliability: Data redundancy thanks to triple mirroring.
- Space optimization: Reduction of utilized backup space thanks to data compression, resulting in cost saving.
- Scalability: Flexibility to purchase only for the necessary space. This feature can be implemented at any time.
- Continuous accessibility: Backups are always accessible, data recovery is faster, restore time is in minutes and hours NOT days, which is the case for offsite backup.
- Traceability: Cloud space monitoring.
- Test environment: Easy access allows the use of backups to clone databases, create test and quality assurance environments in Cloud.
- Compatibility: The implementation requires minimal adjustments to the existing Oracle infrastructure.

## 2. OVERVIEW ORACLE BAKCUP CLOUD MODULE

The first step in the implementation of the service is an installation of the ODCBM module on the database server using classical oracle commands, which allows RMAN to perform database backups directly on ODBS. This module is available for download from the Oracle website.

The installation of this module requires JDK version 1.7 or above on the database server. Download the libopc.so or oraopc.dll library (depending on the operating system) directly in \$ORACLE\_HOME/lib and create the wallet files, where the ODBS Storage access credentials are safely stored.

If the database server has more than one ORACLE\_HOME, a module has to be installed in every ORACLE\_HOME location.



## 2.1 SECURITY

Given the importance of privacy and data security, especially within shared environments and public access, the service applies mandatory encryption to every RMAN backup, without the need to purchase an oracle advanced security license. For maximum data security assurance, the RMAN backup will not be executed if encryption is not configured and an error message will be displayed. (see section 3.3)

## 2.2 COMPRESSED BACKUPS TO ENHANCE PERFORMANCE

ODBC service is the only one to offer the option for RMAN backup compression, without having to buy The Oracle advanced compression option license; the possibility to reduce the size of the files allows the management of a large quantity of data using less storage and therefore less costs.

## 2.3 SUPPORT MATRIX

The following chart shows the compatibility between oracle database versions / operating systems and ODBS service:

SUPPORT MATRIX ODBCM	
Oracle Database	10gR2, 11g, 12c (EE, SE, SE1)
Operative System (64 Bit)	Linux, Solaris x86-64, SPARC, Windows, AIX, HP-UX, zLinux
RMAN Compression	HIGH, MEDIUM, BASIC, LOW
RMAN Encryption	Password, TDE, Dual-mode

## 3. ODBS IMPLEMENTATION

This section shows the process to correctly configure the Oracle Backup Cloud Module.

### 3.1 ODBS MODULE INSTALLATION

ODBCM installer can be downloaded from Oracle website

<http://www.oracle.com/technetwork/database/availability/oracle-cloud-backup-2162729.html>

### Oracle Database Cloud Backup Module

You must accept the OTN License Agreement to download this software.

Accept License Agreement |  Decline License Agreement

Oracle Database Cloud Backup Module is to be used only to back up to the Oracle Database Backup Cloud Service or the trial subscription of Oracle Storage Cloud Service.

Supported Oracle Database Versions (EE,SE,SE1,SE2): 10gR2 and above. (Refer to the documentation for more details)

Supported Platforms (64-bit) : Linux, Solaris, SPARC, Windows, HP-UX, AIX, zLinux

 All Supported Platforms (2,591,749 bytes) Note: Requires JDK version 1.7 or higher).

For installation instructions and patch requirements, see the Oracle Database Backup Cloud Service documentation. See the white paper for more details about the service. For FAQ, refer to the MOS Note 1640149.1.

The installer must be unzipped, it contains the **opc\_install.jar** and **opc\_readme.txt** files; **opc\_install.jar** allows the module installation through the installation command line, which requires the following parameters:

#### Oracle Database Backup Service PARAMETERS:

CAPTION	Location/ Value
ODBS – Account ID	myaccount@mycompany.com
ODBS - Password	myPassword
ODBS – Identity Domain	myDomain
ODBS – Service Name	myService
Local wallet location to store ODBS credentials (-walletDir)	/home/oracle/OPC/wallet

#### Local Database PARAMETERS:

CAPTION	Location/ Value
ORACLE_BASE	/orclbase
ORACLE_HOME	/orclhome
ORACLE_SID	mySID
-libDir	/home/oracle/OPC/lib
Oracle Wallet for RMAN encryption (optional)	\$ORACLE_BASE/admin/\$ORACLE_SID/wallet

With Oracle user it is possible to proceed with the module installation and, if the system meets the necessary prerequisites (Skill Matrix - JDK v 1.7 or above – Internet ports opened), to execute `opc_install.jar`:

```
java -jar opc_install.jar -serviceName storagesvc -identityDomain a425076 -
opclId 'rossi@aaa.it' -opcPass 'xxxxxxx' -walletDir /app/oracle/
product/12.1.0/dbs/opc_wallet1 -libDir $ORACLE_HOME/lib -host https://
storagesvc-a425076.storage.oraclecloud.com/v1/storagesvc-a425076
```

*Oracle Database Cloud Backup Module Install Tool, build 2014-03-13*

*Oracle Database Cloud Backup Module credentials are valid.*

*Oracle Database Cloud Backup Module wallet created in directory /orclhome/dbs/opc\_wallet.*

*Oracle Database Cloud Backup Module initialization file /orclhome/dbs/opct1.ora created.*

*Downloading Oracle Database Cloud Backup Module Software Library from fileopc\_linux64.zip.*

*Downloaded 13165919 bytes in 204 seconds. Transfer rate was 64538 bytes/second.*

*Download complete.*

*Extracted file /orclhome/lib/libopc.so*

## 3.2 RMAN CONFIGURATION

During the module installation process the configuration file `opc<SID>.ora` was created to the path `$ORACLE_HOME/dbs`, which contains the configuration necessary for the connection to the Oracle Cloud storage.

Using RMAN, the **SBT** channel allocation needs to be configured, by using the ODBS `libopc.so` library and setting the absolute path for the `opc<SID>.ora` file, as shown:

```
RUN {
    allocate channel odbs11 type sbt
    PARMS='SBT_LIBRARY=libopc.so,SBT_PARMS=(OPC_PFILE=/app/oracle/
product/12.1.0/dbs/opcmySID.ora)';
    [...]
}
```

Or:

```
RMAN> configure channel device type sbt parms 'SBT_LIBRARY=/orclhome/
lib/libopc.so 11 ENV=(OPC_PFILE=/orclhome/dbs/opcmySID.ora)';
```

At this stage the configuration is complete and it is now possible to execute the backup /restore with same command lines used in Oracle RMAN.

### 3.3 ENCRYPTION CONFIGURATION

ODBCM applies encryption to RMAN backups and does not allow the Cloud upload of no encrypted backups. If the encryption of backups has not been executed, the following error message will be displayed by the user:

```

RMAN-00571: =====
RMAN-00569: =====ERROR MESSAGE STACK FOLLOWS =====
RMAN-00571: =====
RMAN-03009: failure of backup command on ORA_SBT_TAPE_1 channel at
02/14/2014 14:00:43
ORA-27030: skgfwrt: sbtwrite2 returned error
ORA-19511: non RMAN, but media manager or vendor specific failure, error text:
KBHS-01602: backup piece 14p0jso8_1_1 is not encrypted
  
```

Configuration of the encryption is possible with the following command line:

```
RMAN> set encryption on identified by "myPassword" only;
```

With the same password it is possible to enable the decryption before backup restore:

```
RMAN> set decryption identified by "myPassword" only;
```

The service features the option for encryption configuration, using a **wallet file** to enable a safer encryption as opposed to a password-based security; the latter should only be used when strictly necessary.

It is important to take into consideration that the encryption process can cause a minimal increase in CPU usage.

### 3.4 COMPRESSION CONFIGURATION

RMAN supports backup compression. It is possible to configure ODBS backup compression using HIGH, MEDIUM, BASIC and LOW compression algorithms

Compression Level	Performance Benefits and Trade-Offs
HIGH	Suitable for backup on slower networks that bottleneck the process
MEDIUM	Recommended for most environments, offers a good speed / compression ratio
BASIC	Default compression
LOW	Slightest effect on backup process speed

Example:

```

RMAN> configure compression algorithm 'MEDIUM';
RMAN> backup as compressed backupset database plus archivelog;
  
```

From internal tests and POC carried out for clients, we verified that the MEDIUM level presents a compression factor varying between X5 and X6. Using a 440GB database we obtained the following results:

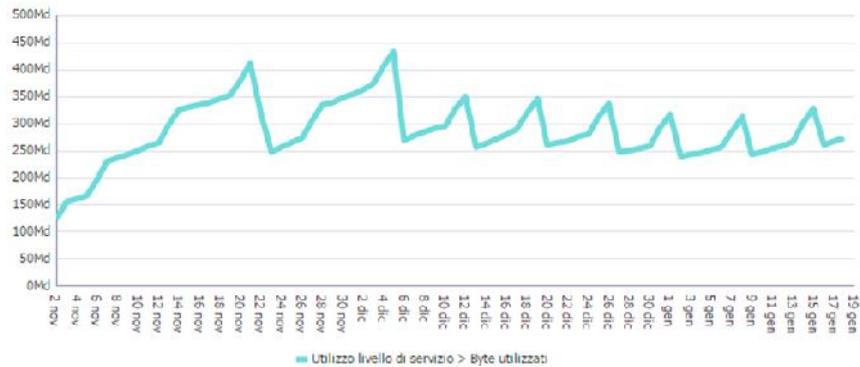
	Duration	Size Backup
Bck Rman FULL con ODBS	3h	60Gb
Bck Rman FULL	1h 30m	300Gb

The compression algorithm can also cause a rise in CPU usage, relatively to the selected type of compression.

### 3.5 ADDITIONAL TOOLS

Oracle Database Backup Service features a Dashboard to manage all purchased Cloud services. For the ODBS service it is possible to display the purchased Cloud space usage.

Example:



## 4. CONCLUSION

Oracle Database Cloud Module provides off-site backup storage for Oracle Databases.

Compared to the traditional tape-based off-site storage, Oracle Cloud backups offer numerous advantages:

- they are more easily accessible
- restore process is, in the majority of cases, faster and safer
- they substantially reduce costs associated with off-site backups maintenance
- they can be implemented with minor changes to the existing Oracle infrastructures.

In this document we have highlighted the ease of the operations necessary to install the ODBS service, with the additional benefit, using RMAN, of the following free licenses for:

- Oracle Advanced Security
- Oracle Advanced Compression

This is provided to further enhance reliability, the performance and security.

## 5. HOW CAN SORINT.LAB HELP YOUR BUSINESS

Sorint.lab has over 30 years of experience delivering technology projects to some of the world's leading organizations. We will bring this experience to support you at every step of your Oracle database backup migration to Cloud storage, specifically with:

- Assessment of existing infrastructure, design of new service implementation project.
- POC: backup configuration and test, to verify project feasibility and resources capacity.
- Oracle Database Backup Cloud Service implementation and associated integration with the existing database environment.
- Backup process monitoring services, periodic restore tests and capacity plans to verify the suitability of Cloud space usage and backup correct operation.



For more detailed information about our services and solutions: [welisten@sorint.it](mailto:welisten@sorint.it)

© The information contained in this document is of a confidential and proprietary nature and is submitted by SORINT.lab S.p.A. on the understanding that it will be used for evaluation purposes only. The copyright to this document is owned by SORINT.lab S.p.A.. No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, including, without limitation, by electronic, mechanical, photocopying, recording or otherwise, without SORINT.lab S.p.A. prior written consent. SORINT.lab S.p.A. endeavors to ensure that the information contained in this document is correct, and whilst every effort is made to ensure the accuracy of such information it accepts no liability for any error or omission in the same. All trademarks and product names used within this document are hereby acknowledged.

April 2017

Confidential  
Property of SORINT.lab S.p.A.  
White Paper  
ORACLE DATABASE BACKUP CLOUD

SORINT.lab S.p.A.  
Via Zanica, 17 24050 Grasobbio (BG) - Italy  
Tel +39 035697511 - Fax +39 035697590

Follow us on   

[WWW.SORINT.IT](http://WWW.SORINT.IT)