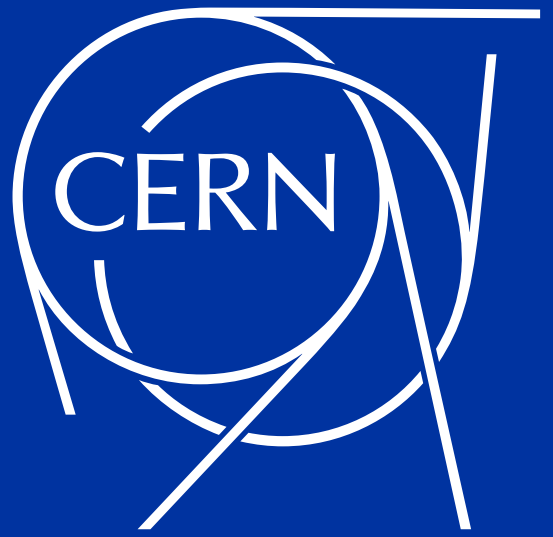
CERN

Andrzej Nowicki

12 years of Oracle DB experience
Database Engineer @ CERN since 2020

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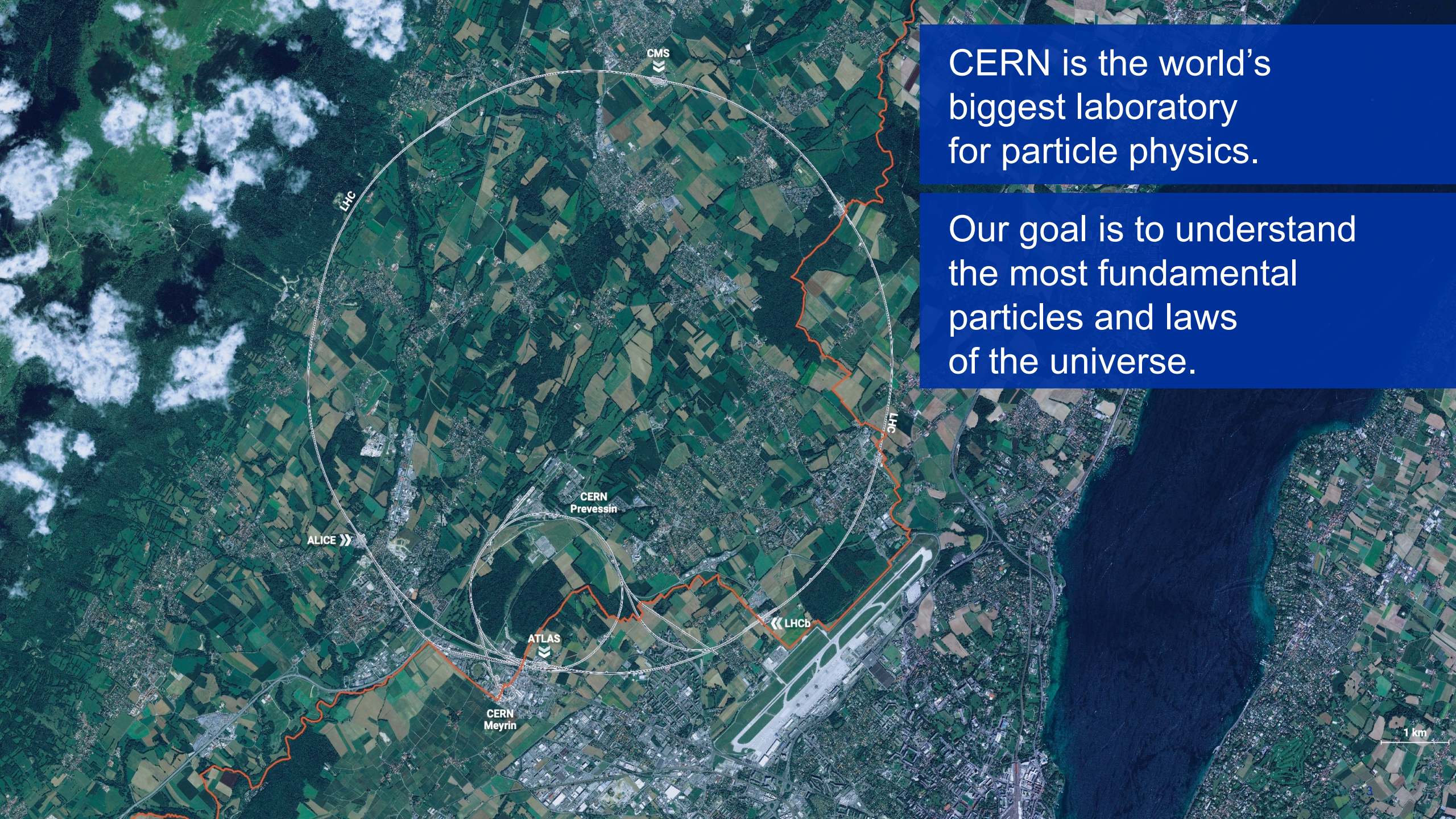
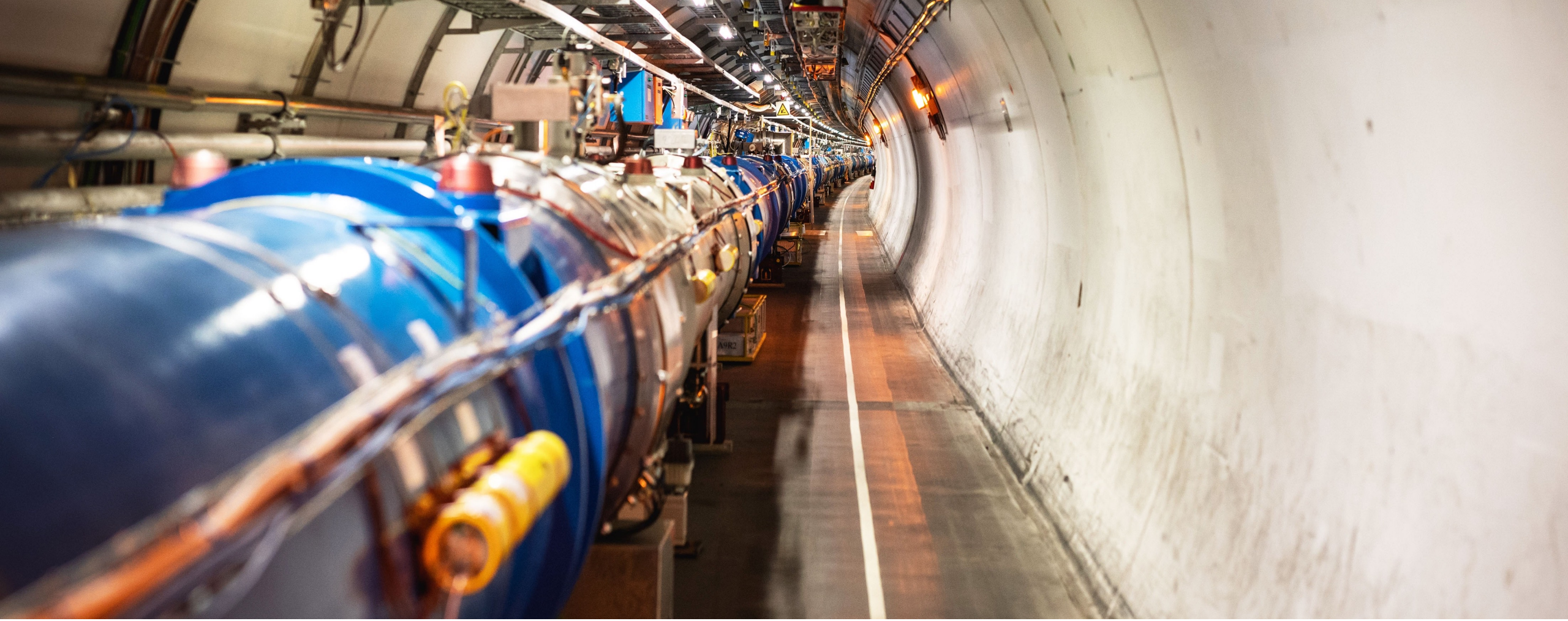
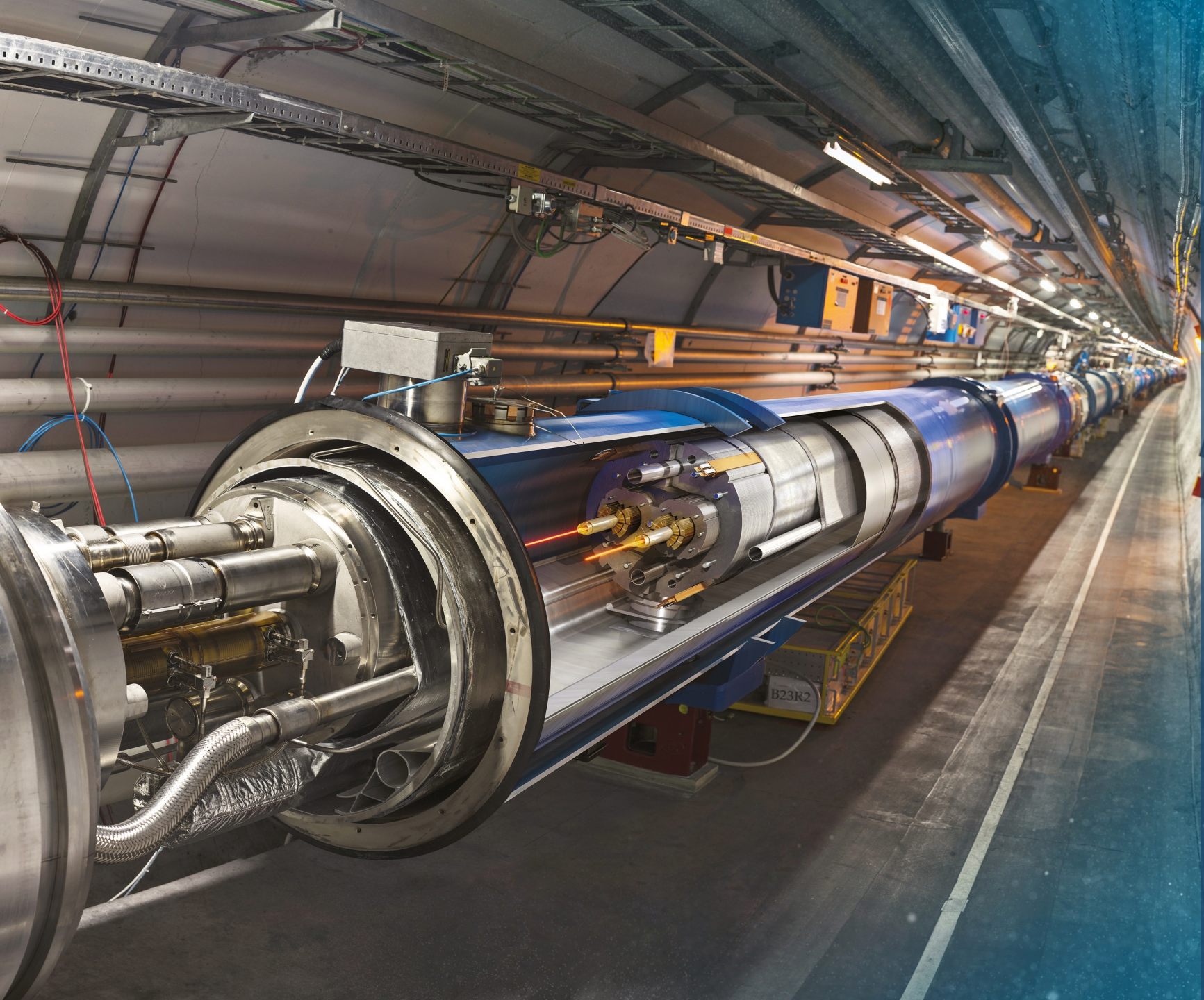


CERN is the world's biggest laboratory for particle physics.

Our goal is to understand the most fundamental particles and laws of the universe.



Large Hadron Collider (LHC)



Large Hadron Collider (LHC)

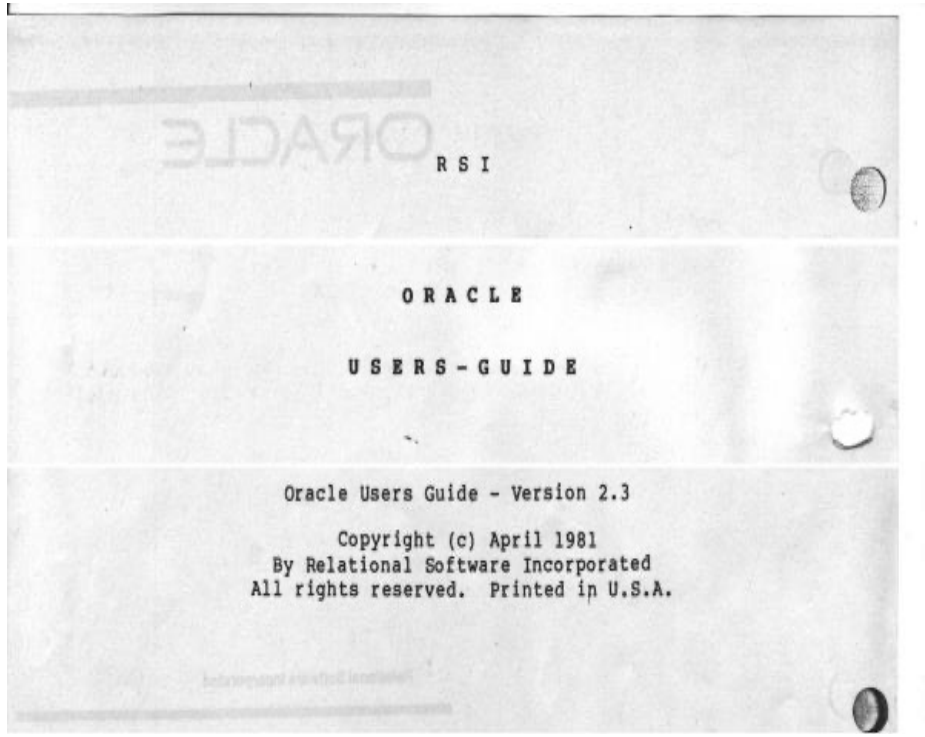
- 27 km (17 mi) in circumference
- About 100 m (300 ft) underground
- Superconducting magnets steer the particles around the ring
- Particles are accelerated to close to the speed of light

IT @ CERN

Databases at CERN

Oracle since 1982

- 105 Oracle databases, more than 11.800 Oracle accounts
- RAC, Active Data Guard, GoldenGate, OEM, RMAN, Cloud, …
- Complex environment


RSI

ORACLE

USERS-GUIDE

Oracle Users Guide - Version 2.3

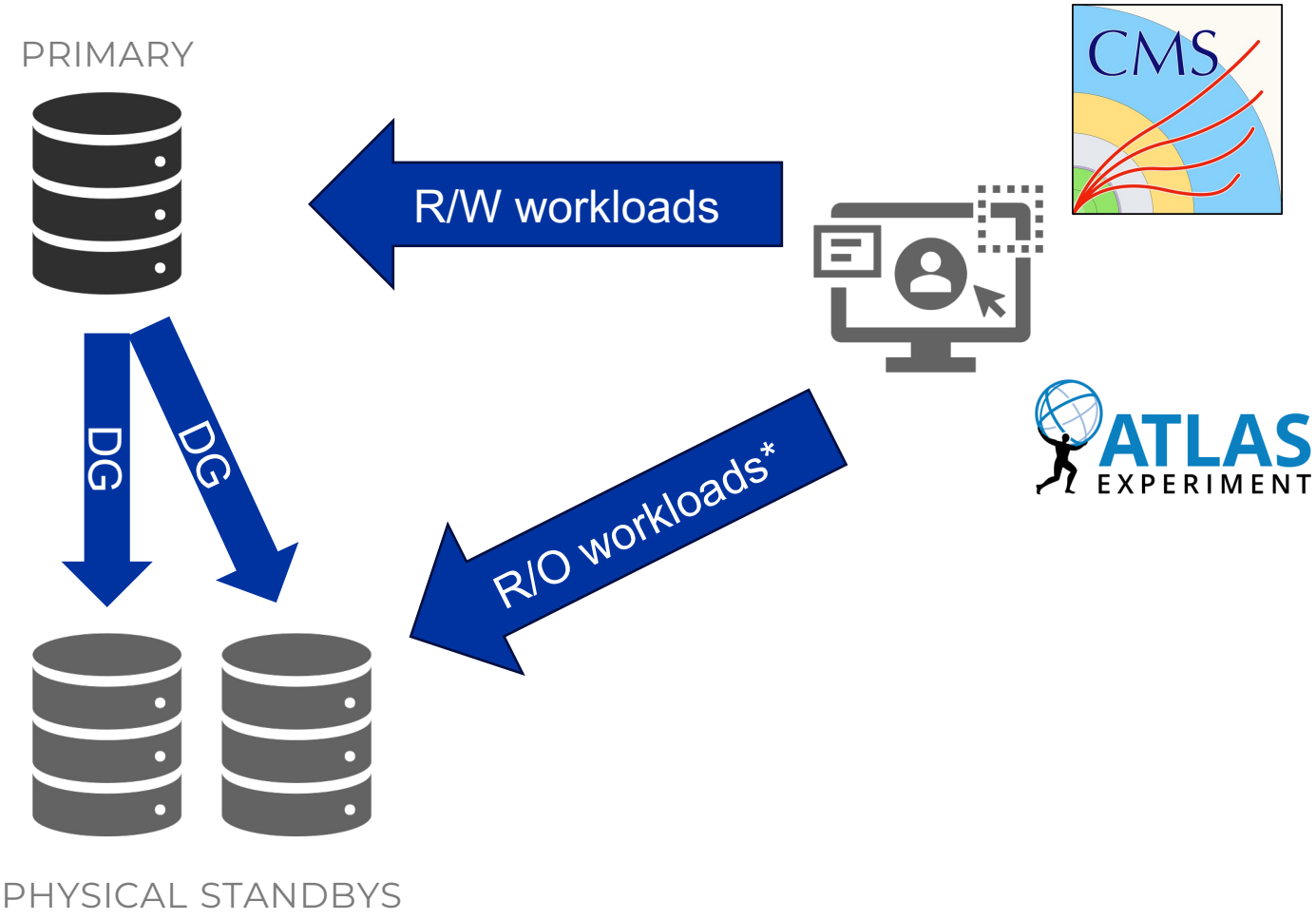
Database on Demand (DBoD) since 2011

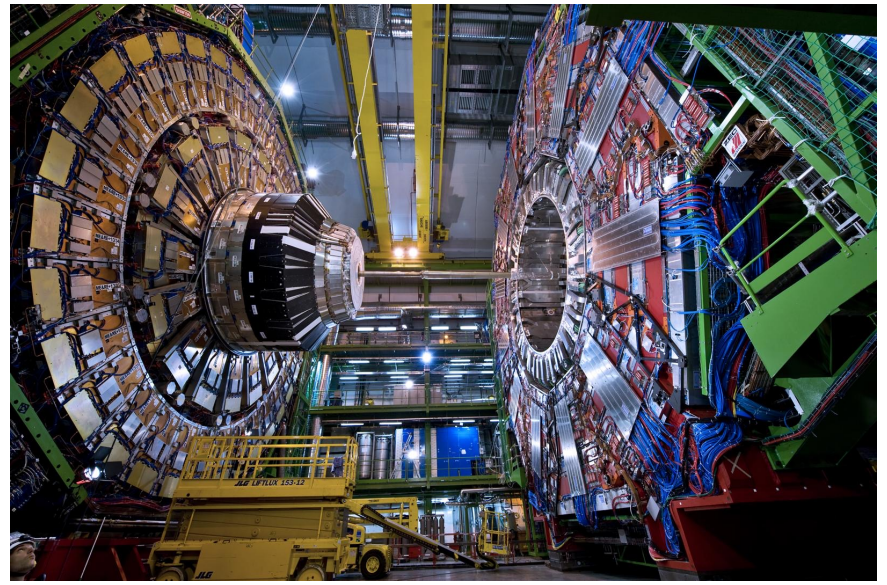
- MySQL, PostgreSQL, InfluxDB
- Automated backup and recovery services, monitoring, clones, replicas
- HA MySQL clusters (Proxy + primary replica)

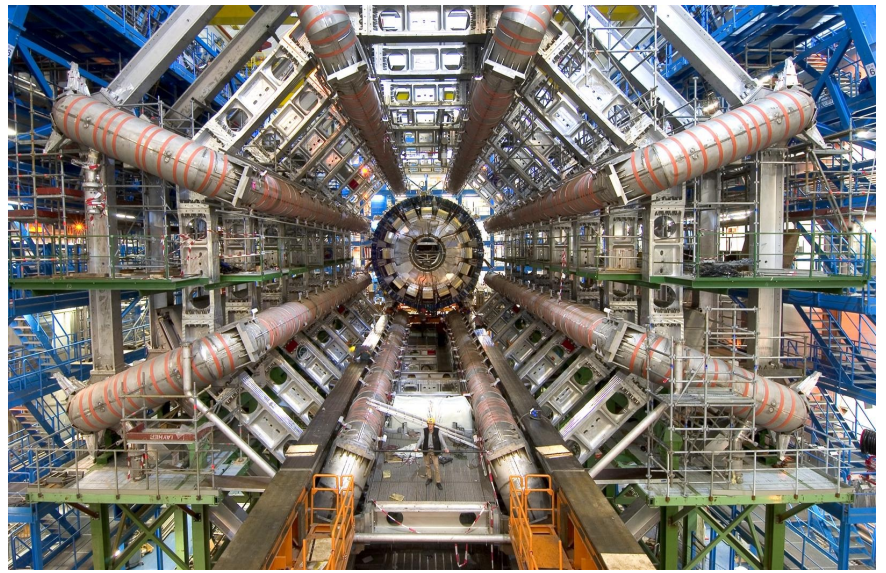
Active Data Guard

Active Data Guard

Real-Time Query on the Active Data Guard







* - R/W also possible with *adg_redirect_dml*

Active Data Guard

Real-Time Query on the Active Data Guard

Reasons:

- Better scaling, higher total performance
- Allow more „analytical” queries in an OLTP environment

Our recommendations:

- Keep your DB patched
- Test your queries
- Prepare a fallback mechanism on the app side (due to maintenance of standby)

Backups on the Standby Databases

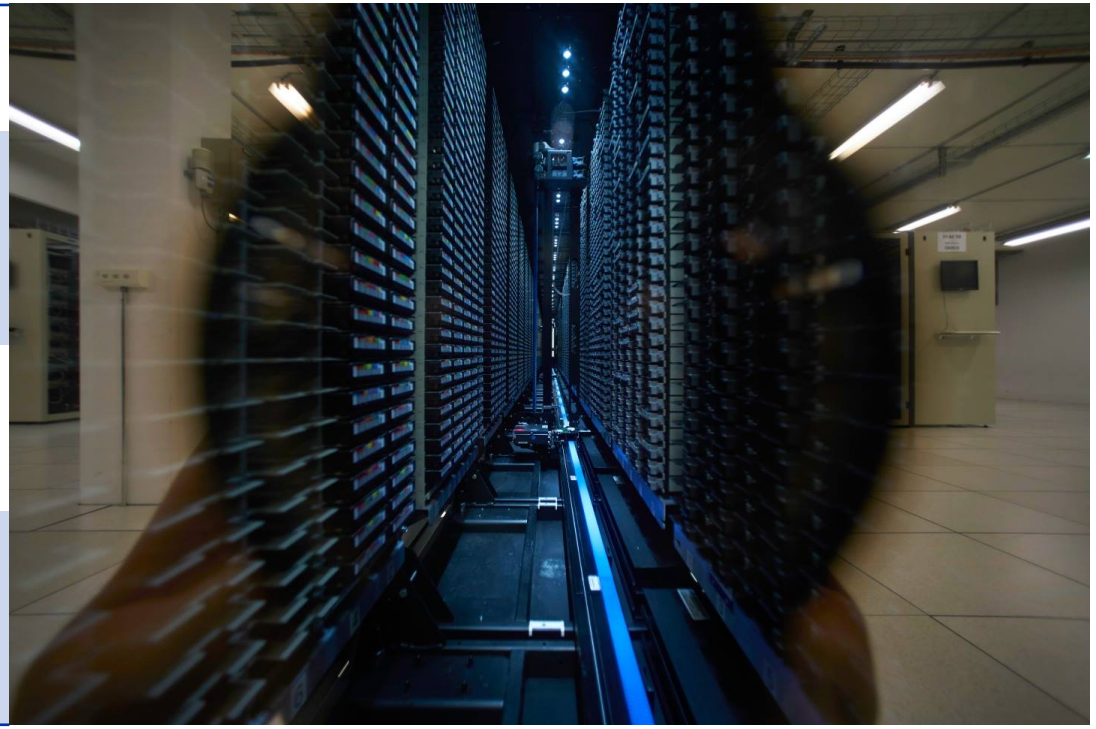
Backups on the Standby Databases

Summary:

- ~3 PB of backups (arch + datafile) stored on disks
- ~2 PB of backup data written monthly to disks
- On top of that, ¼ is written to tapes

Backup distribution per type:

- 750 TB of archivelogs
- 2 PB of datafile backups



Backups on the Standby Databases

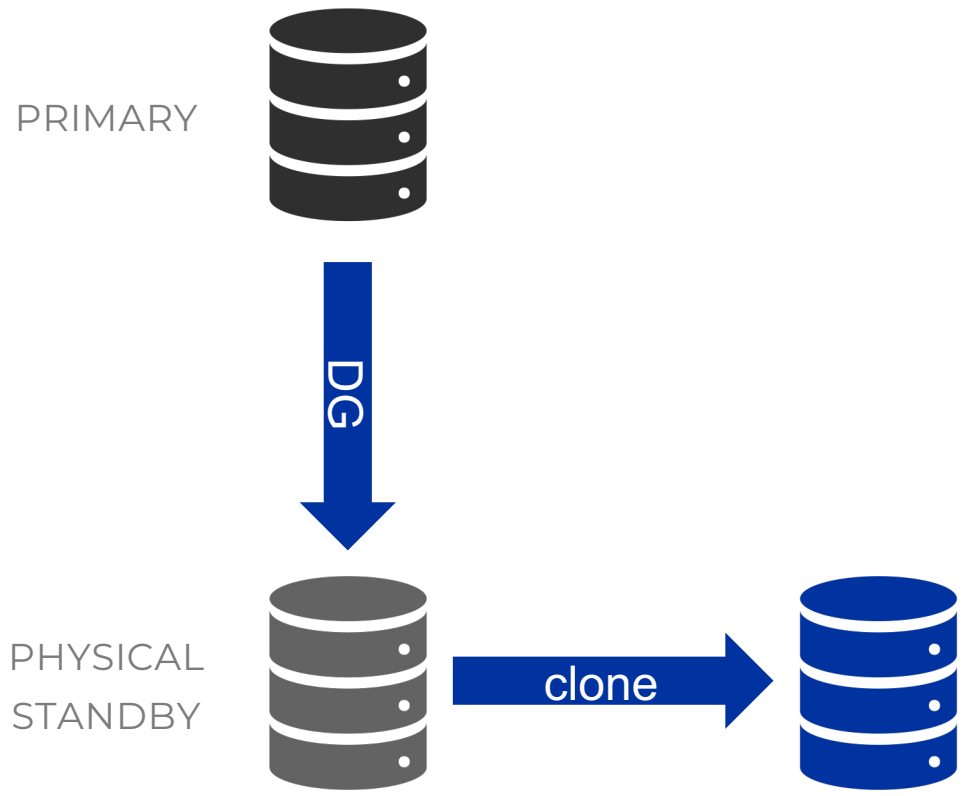
Offloading the backup operations to the standby

Primary:	**Benefits:**
• archivelog backups	• Off-load I/O from the primary • 3x less backup I/O on the primary
Physical Standbys:	**Recommendations:**
• datafile backups	• Use the block change tracking for fast backups • Use the RMAN catalog • Monitor the Data Guard lag

Database Clones

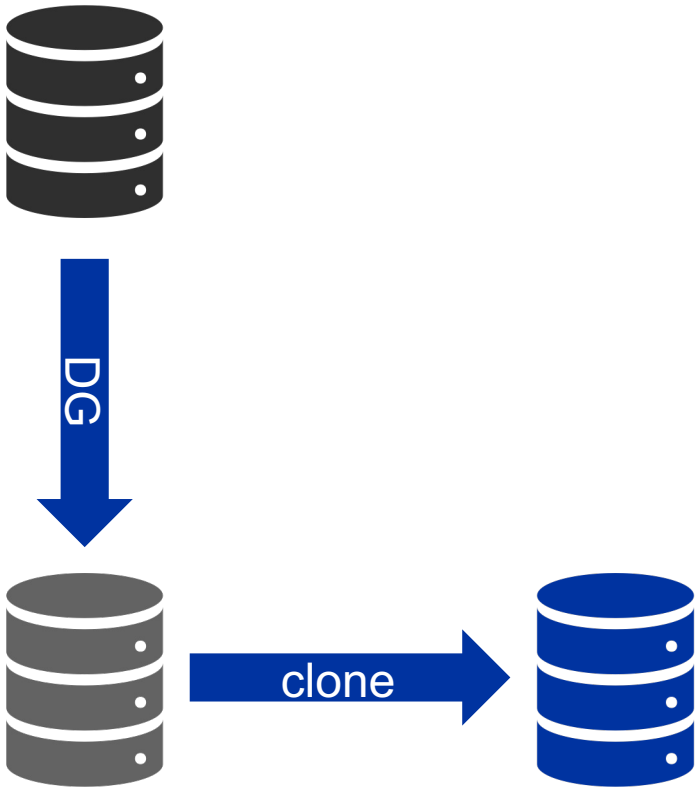
Database Clones

Using Physical Standby as a source of consistent datafiles for Thin Clones



Database Clones

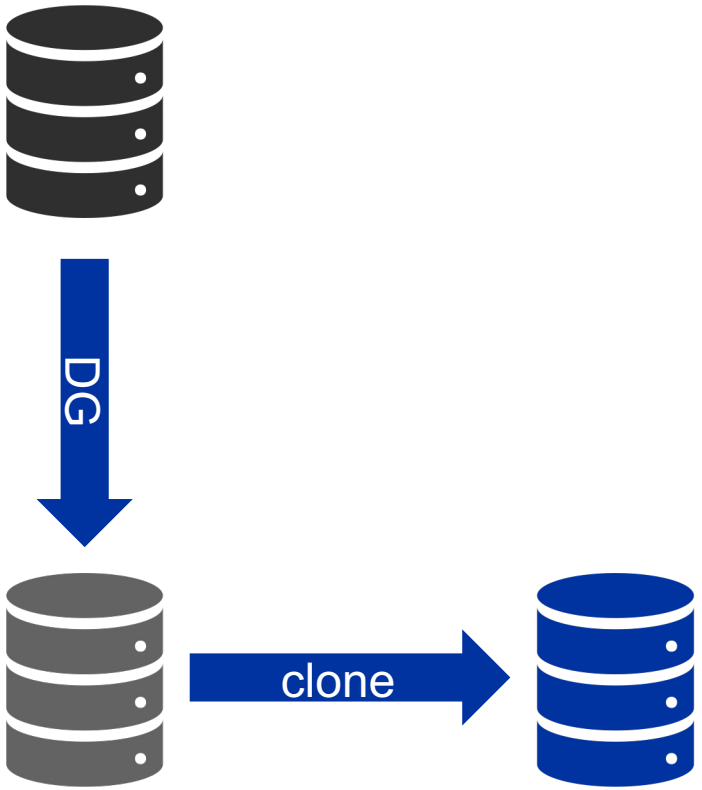
Key points



- 4 minutes to create a clone of a 10TB database
- Thin Clones (Copy On Write)
  using the dNFS snapshots

Database Clones

Step by step:



1. Stop physical standby apply to have consistent datafiles
2. Create a read-only storage snapshot
3. Resume the apply on physical standby
4. Use the clonedb.pl script to prepare the clone
5. dbms_dnfs.clonedb_renamefile
6. Open the clone of the database

Database Clones (alternative solution)

Oracle Multitenant Pluggable Database Snapshot Cloning:
Use Cases and Supported Platforms
(Doc ID 1597027.1)

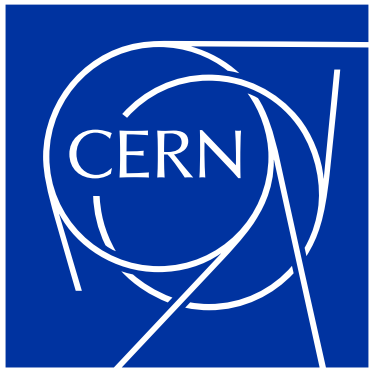
Waiting for 23c

DBMS_DG PL/SQL improvements

Currently, we invoke dgmgrl commands from a bash script to automate the setup of the standby databases.

In 23c, it will be possible to do that from PL/SQL calls.

Thank you !



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