22. hroug
godišnja konferencija

AWR Warehouse

The Good, the Bad and the Ugly

whoami

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Contents

The Case for AWR Warehouse

If AWR is full of useful information....

...then why do we keep throwing it away?

Reasons for Purging AWR

- It's the default (for a reason)
- Database/SYSAUX Growth leads to
  - Longer Backups
  - Longer Upgrades
- Querying affects production performance ($$$)

Enter AWR Warehouse

- Offload AWR History to a separate instance
- Schedule backups and upgrades separately
- Leverage Enterprise Manager for
  - Target Discovery
  - Reporting

Additive Free

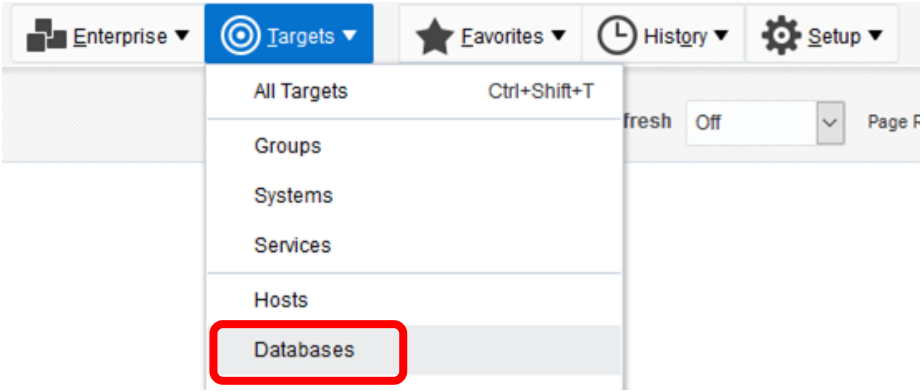
- (Almost) no new tables
- Uses current tables (WRH$ exposed as DBA_HIST_)
- Partitioned by dbid, snap_id
- Except
  - Caw_dbid_mapping
  - ETL process flow

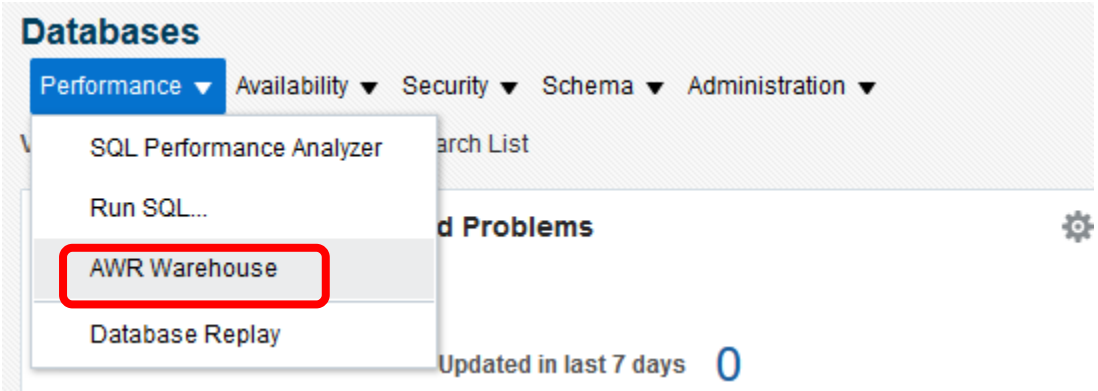
No Hidden Charges

A … single instance Oracle Database can be … used as an infrastructure repository for … Automatic Workload Repository (AWR) Warehouse … without additional license requirements, provided that all the targets are correctly licensed. It may not be used or deployed for other uses.

http://docs.oracle.com/cd/E80920_01/DBLIC/Licensing-Information.htm

Configuring AWR Warehouse

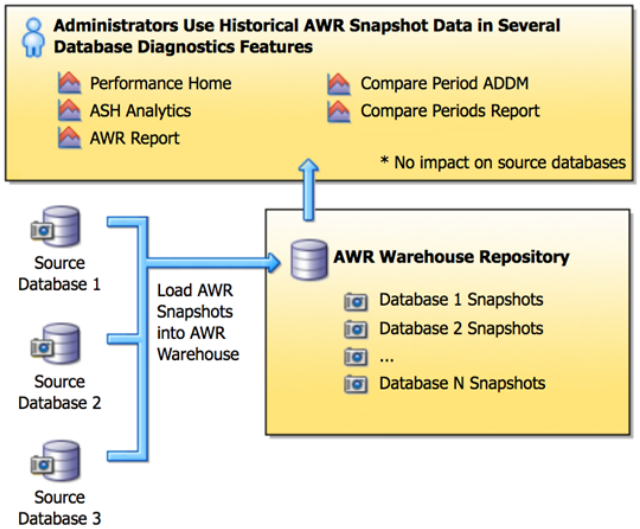

Enterprise
Targets
Favorites
History
Setup
All Targets
Ctrl+Shift+T
Groups
Systems
Services
Hosts
Databases
fresh
Off
Page


Databases
Performance
Availability
Security
Schema
Administration
SQL Performance Analyzer
Run SQL...
AWR Warehouse
Database Replay
arch List
d Problems
Updated in last 7 days
0

Information

AWR Warehouse is not configured.

Collecting and Distributing Snapshots with AWR Warehouse



AWR Warehouse Repository Configuration

Status Not Configured

Configure

AWR Warehouse Database

Name

Version

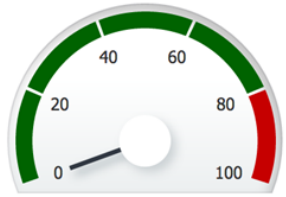
Configured By

Host

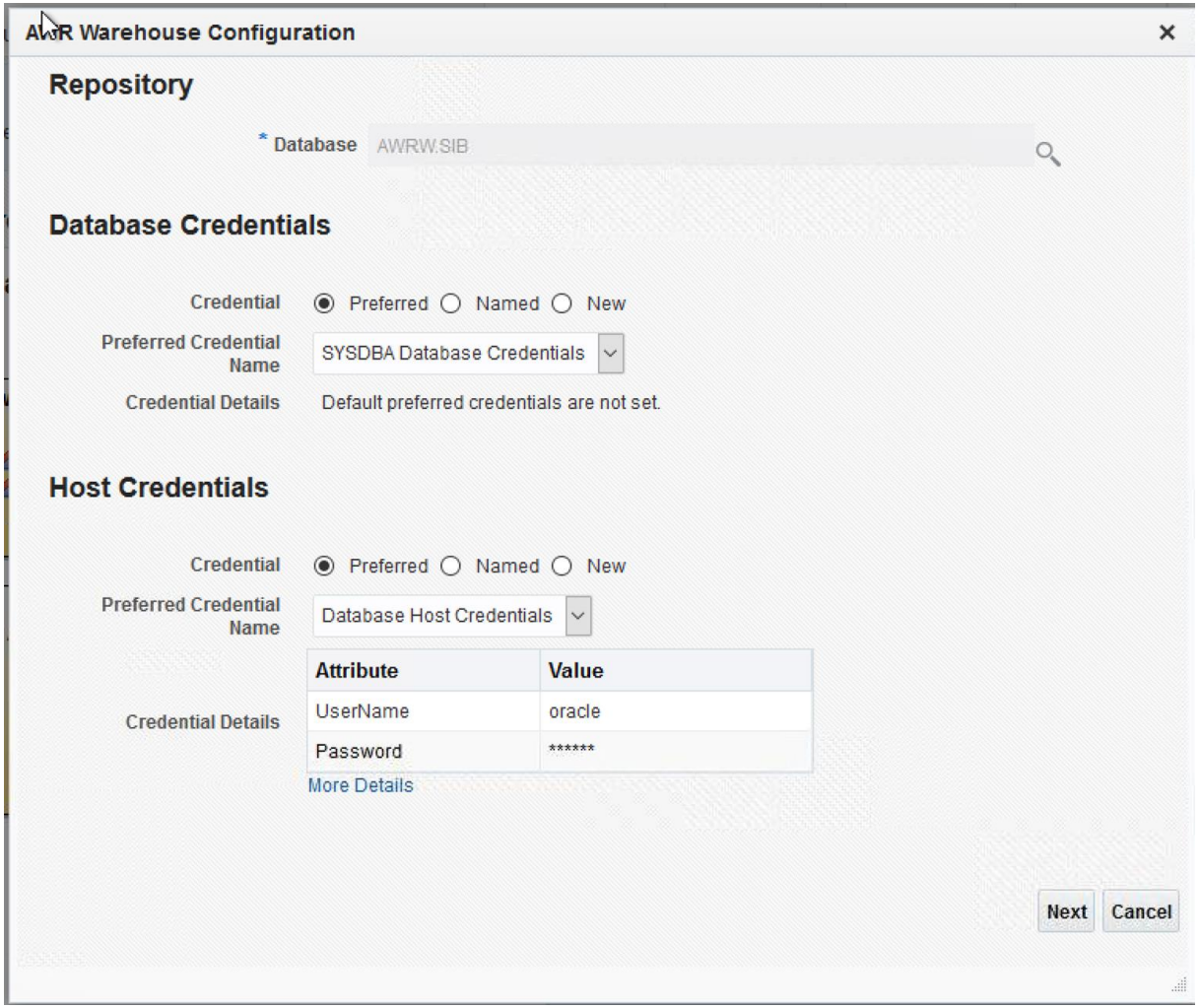
Port

SID / Service Name

Space Used (%)



0


AWR Warehouse Configuration
Repository
* Database
AWRW.SIB
Database Credentials
Credential
Preferred
Named
New
Preferred Credential Name
SYSDBA Database Credentials
Credential Details
Default preferred credentials are not set.
Host Credentials
Credential
Preferred
Named
New
Preferred Credential Name
Database Host Credentials
Attribute
Value
UserName
oracle
Password
******
Credential Details
More Details
Next
Cancel

Automatic Workload Repository Warehouse

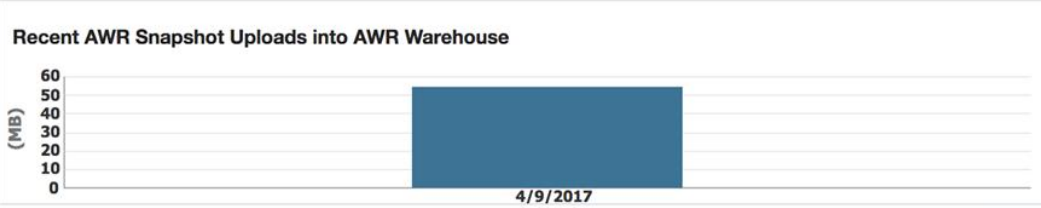
Page Refreshed **Apr 9, 2017 1:23:06 PM HKT**

54 MB

of AWR Snapshots Uploaded to AWR Warehouse

0 DBs

Contribute Snapshots to AWR Warehouse

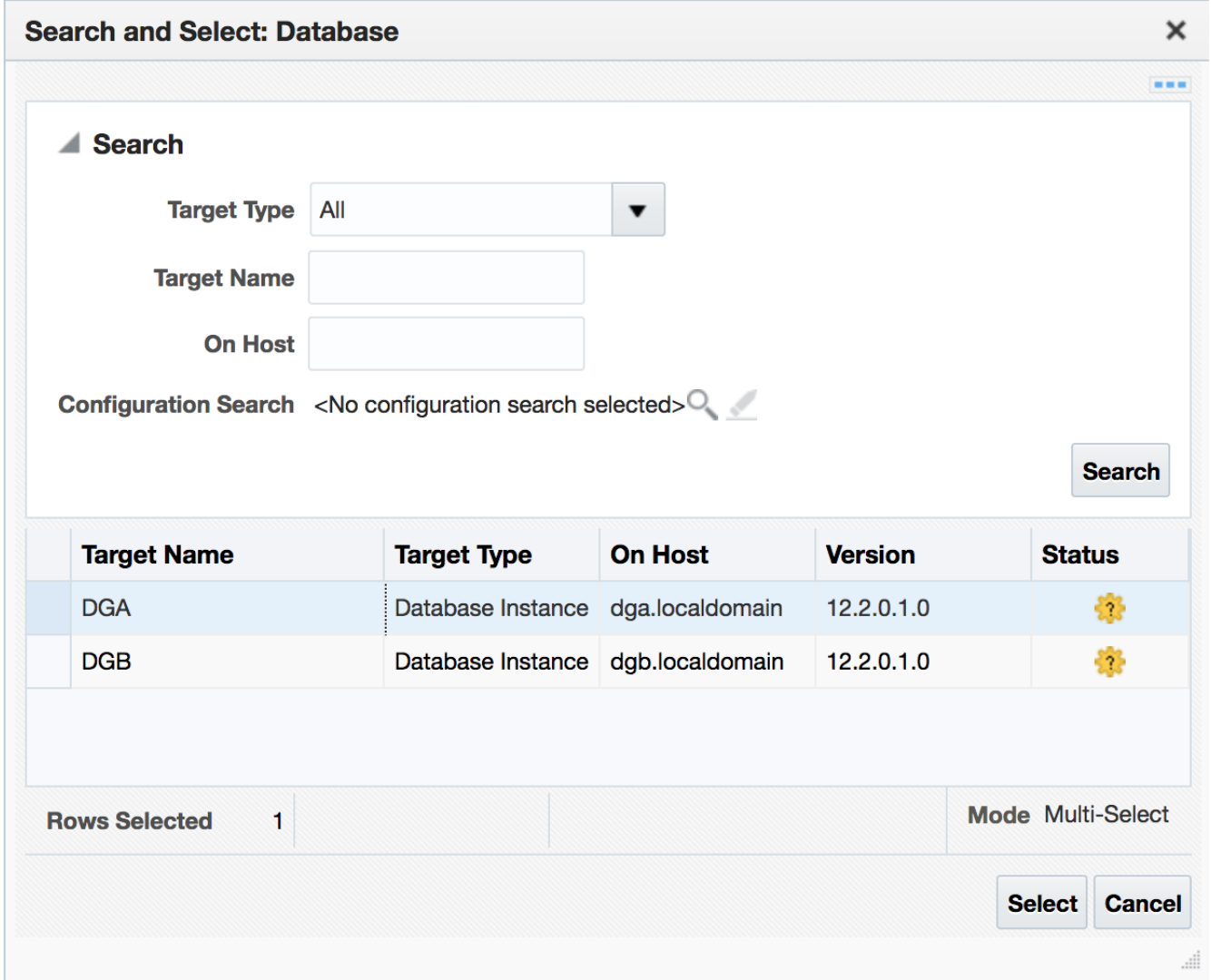


Databases Uploading AWR Snapshots

Actions ▼ View ▼ Add Remove View Errors Privileges... ASH Analytics AWR Report Compare Period ▼ Performance Home

Target Name	Target Type	DB Name	Version	Owner	Snapshot Upload Enabled	Snapshots			
						Oldest	Newest	Days	Count

No Source Databases are Added or View Access to none of the Source Databases is enabled.


Search and Select: Database
Search
Target Type
All
Target Name
On Host
Configuration Search
<No configuration search selected>
Search
Target Name
Target Type
On Host
Version
Status
DGA
Database Instance
dga.localdomain
12.2.0.1.0
DGB
Database Instance
dgb.localdomain
12.2.0.1.0
Rows Selected
1
Mode
Multi-Select
Select
Cancel

Automatic Workload Repository Warehouse

Page Refreshed **Apr 9, 2017 1:43:29 PM HKT**

0 MB

of AWR Snapshots Uploaded to AWR Warehouse

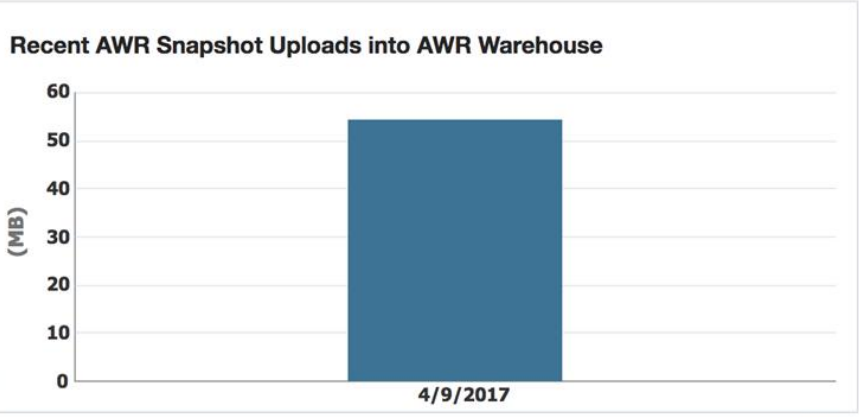
1 DBs

Contribute Snapshots to AWR Warehouse

There are no Incidents

1 DBs

Without Recent Uploads



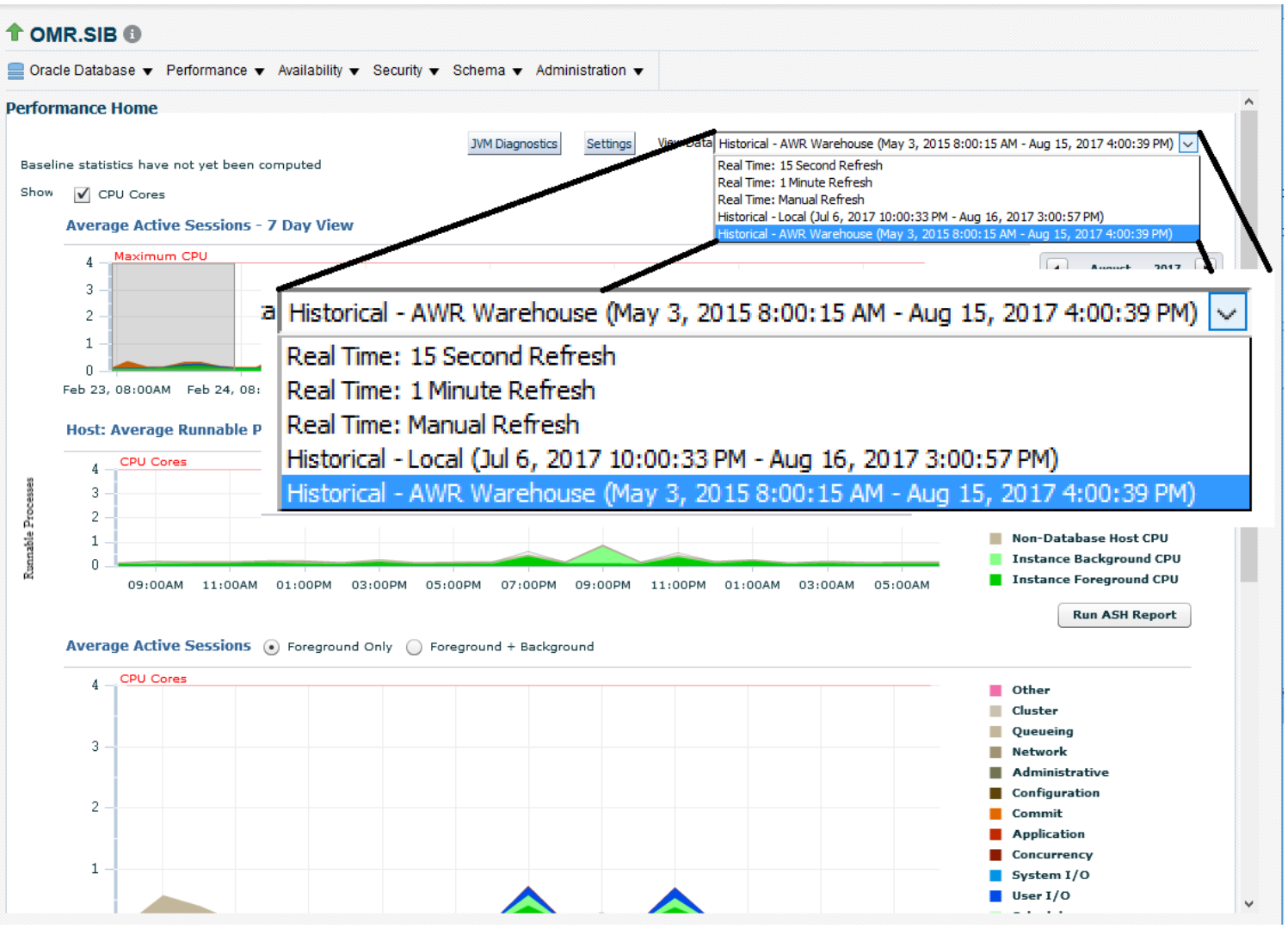
Databases Uploading AWR Snapshots

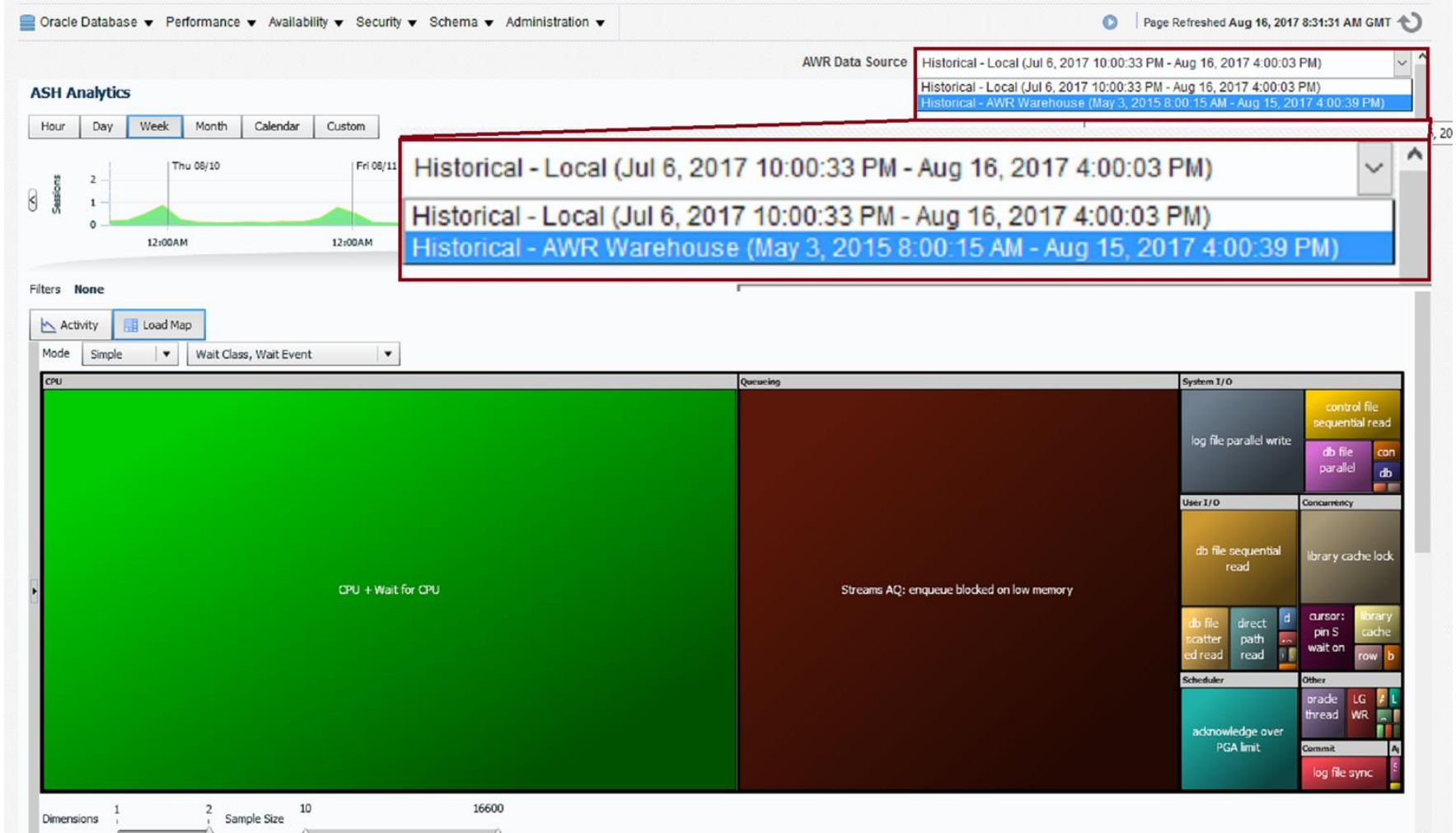
Actions ▼ View ▼ | Add | Remove | View Errors | Privileges... | ASH Analytics | AWR Report | Compare Period ▼

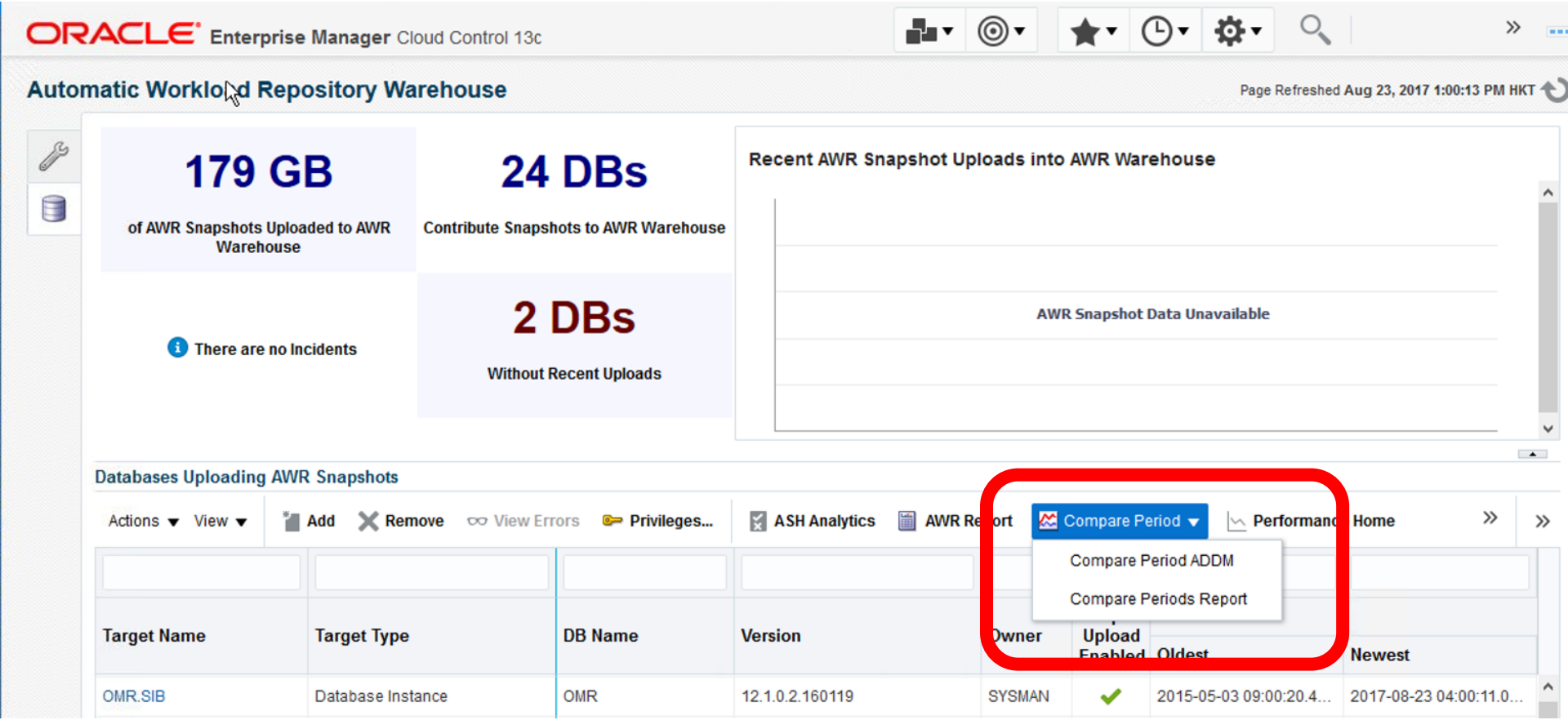
Target Name	Target Type	DB Name	Version	Owner	Snapshot Upload Enabled	Snapshots		
						Oldest	Newest	Days
DGA	Database Instance	DGA	12.2.0.1.0	SYSMAN	✔			0

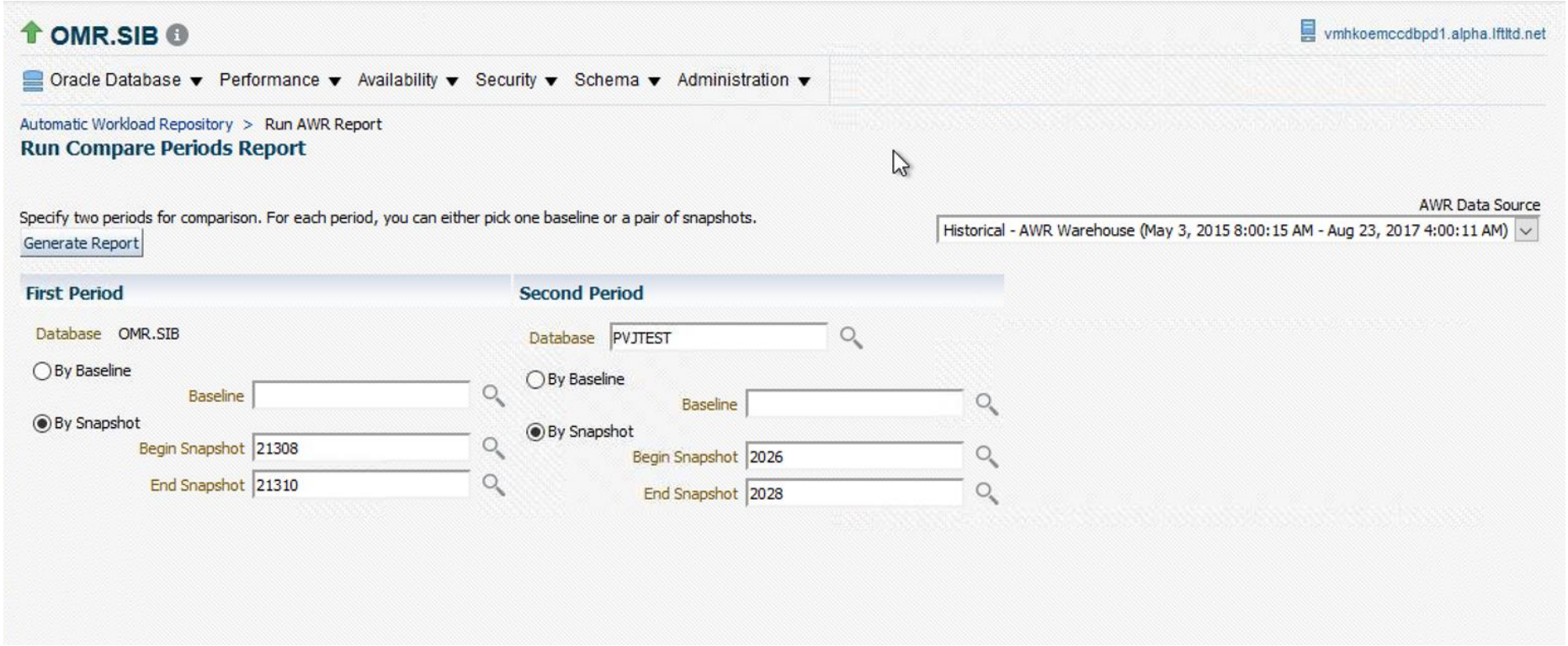
Columns Frozen 2

Using AWR Warehouse


OMR.SIB
Oracle Database
Performance
Availability
Security
Schema
Administration
Performance Home
JVM Diagnostics
Settings
View Data
Historical - AWR Warehouse (May 3, 2015 8:00:15 AM - Aug 15, 2017 4:00:39 PM)
Real Time: 15 Second Refresh
Real Time: 1 Minute Refresh
Real Time: Manual Refresh
Historical - Local (Jul 6, 2017 10:00:33 PM - Aug 16, 2017 3:00:57 PM)
Historical - AWR Warehouse (May 3, 2015 8:00:15 AM - Aug 15, 2017 4:00:39 PM)
Baseline statistics have not yet been computed
Show
CPU Cores
Average Active Sessions - 7 Day View
Maximum CPU
Feb 23, 08:00AM
Feb 24, 08:
Host: Average Runnable P
CPU Cores
Runnable Processes
09:00AM
11:00AM
01:00PM
03:00PM
05:00PM
07:00PM
09:00PM
11:00PM
01:00AM
03:00AM
05:00AM
Non-Database Host CPU
Instance Background CPU
Instance Foreground CPU
Run ASH Report
Average Active Sessions
Foreground Only
Foreground + Background
CPU Cores
Other
Cluster
Queueing
Network
Administrative
Configuration
Commit
Application
Concurrency
System I/O
User I/O


Oracle Database
Performance
Availability
Security
Schema
Administration
Page Refreshed Aug 16, 2017 8:31:31 AM GMT
AWR Data Source
Historical - Local (Jul 6, 2017 10:00:33 PM - Aug 16, 2017 4:00:03 PM)
Historical - Local (Jul 6, 2017 10:00:33 PM - Aug 16, 2017 4:00:03 PM)
Historical - AWR Warehouse (May 3, 2015 8:00:15 AM - Aug 15, 2017 4:00:39 PM)
ASH Analytics
Hour
Day
Week
Month
Calendar
Custom
Thu 08/10
Fri 08/11
Sessions
12:00AM
12:00AM
Filters None
Activity
Load Map
Mode
Simple
Wait Class, Wait Event
CPU
CPU + Wait for CPU
Queueing
Streams AQ: enqueue blocked on low memory
System I/O
log file parallel write
control file sequential read
db file parallel
User I/O
db file sequential read
Concurrency
library cache lock
db file scatter ed read
direct path read
cursor: pin S wait on
library cache
row
Scheduler
acknowledge over PGA limit
Other
oracle thread
LG WR
Commit
log file sync
Dimensions
Sample Size
10
16600


ORACLE Enterprise Manager Cloud Control 13c
Automatic Workload Repository Warehouse
Page Refreshed Aug 23, 2017 1:00:13 PM HKT
179 GB
of AWR Snapshots Uploaded to AWR Warehouse
24 DBs
Contribute Snapshots to AWR Warehouse
There are no Incidents
2 DBs
Without Recent Uploads
Recent AWR Snapshot Uploads into AWR Warehouse
AWR Snapshot Data Unavailable
Databases Uploading AWR Snapshots
Actions
View
Add
Remove
View Errors
Privileges...
ASH Analytics
AWR Report
Compare Period
Performance Home
Compare Period ADDM
Compare Periods Report
Target Name
Target Type
DB Name
Version
Owner
Upload Enabled
Oldest
Newest
OMR.SIB
Database Instance
OMR
12.1.0.2.160119
SYSMAN
2015-05-03 09:00:20.4...
2017-08-23 04:00:11.0...


OMR.SIB
vmhkoemccdbpd1.alpha.lftltd.net
Oracle Database
Performance
Availability
Security
Schema
Administration
Automatic Workload Repository > Run AWR Report
Run Compare Periods Report
Specify two periods for comparison. For each period, you can either pick one baseline or a pair of snapshots.
Generate Report
AWR Data Source
Historical - AWR Warehouse (May 3, 2015 8:00:15 AM - Aug 23, 2017 4:00:11 AM)
First Period
Database OMR.SIB
By Baseline
Baseline
By Snapshot
Begin Snapshot 21308
End Snapshot 21310
Second Period
Database PVJTEST
By Baseline
Baseline
By Snapshot
Begin Snapshot 2026
End Snapshot 2028

WORKLOAD REPOSITORY COMPARE PERIOD REPORT

Report Summary

Snapshot Set	DB Name	DB Id	Unique Name	DB Role	Edition	Release	Cluster	CDB	Host	Std Block Size
First (1st)	OMR	1521710113	OMR	PRIMARY	EE	12.2.0.1.0	NO	NO	vmhkoemccdbpd1	8192
Second (2nd)	PVJTEST	2122366327	PVJTEST	PRIMARY	EE	12.2.0.1.0	NO	NO	vmhkoemawrbpd1	8192

Snapshot Set	Instance	Inst num
First (1st)	OMR	1
Second (2nd)	PVJTEST	1

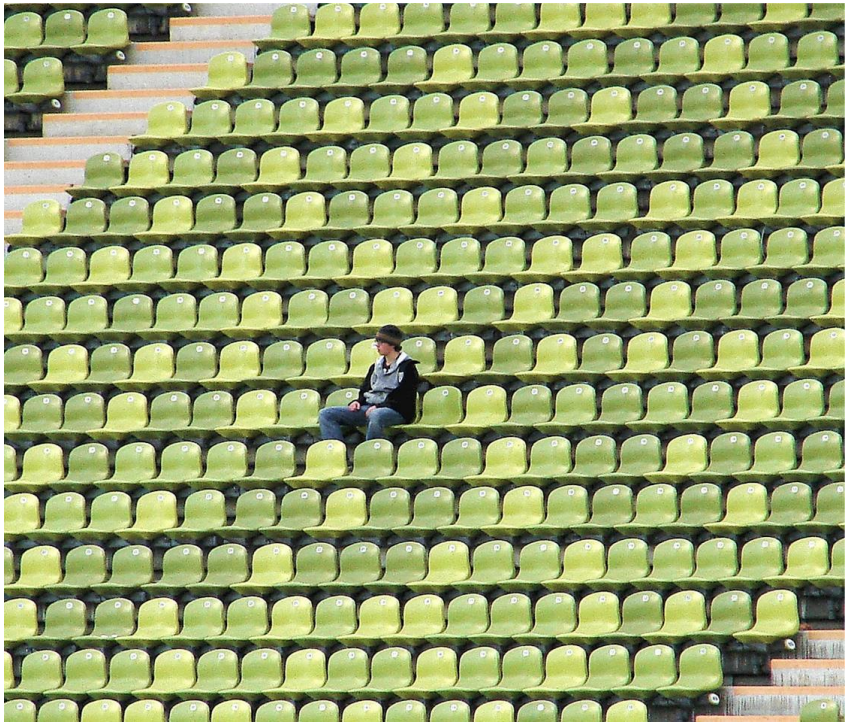
Snapshot Set	Begin Snap Id	Begin Snap Time	End Snap Id	End Snap Time	Avg Active Users	Elapsed Time (min)	DB time (min)
1st	21308	23-Aug-17 02:00:59 (Wed)	21310	23-Aug-17 04:00:11 (Wed)	0.1	119.2	10.4
2nd	2026	28-Jun-17 03:00:01 (Wed)	2028	28-Jun-17 05:00:14 (Wed)	0.0	120.2	0.2
%Diff					*-100.0*	*0.9*	*-97.7*

Host Configuration Comparison

	1st	2nd	Diff	%Diff
Number of CPUs:	4	4	0	0.0
Number of CPU Cores:	4	4	0	0.0
Number of CPU Sockets:	2	2	0	0.0
Physical Memory:	15951.3M	7872.4M	8079M	-50.6
Load at Start Snapshot:	.75	1.85	1.1	146.7
Load at End Snapshot:	.49	1.5	1.01	206.1

A Couple of Recommendations

Keep It Separate



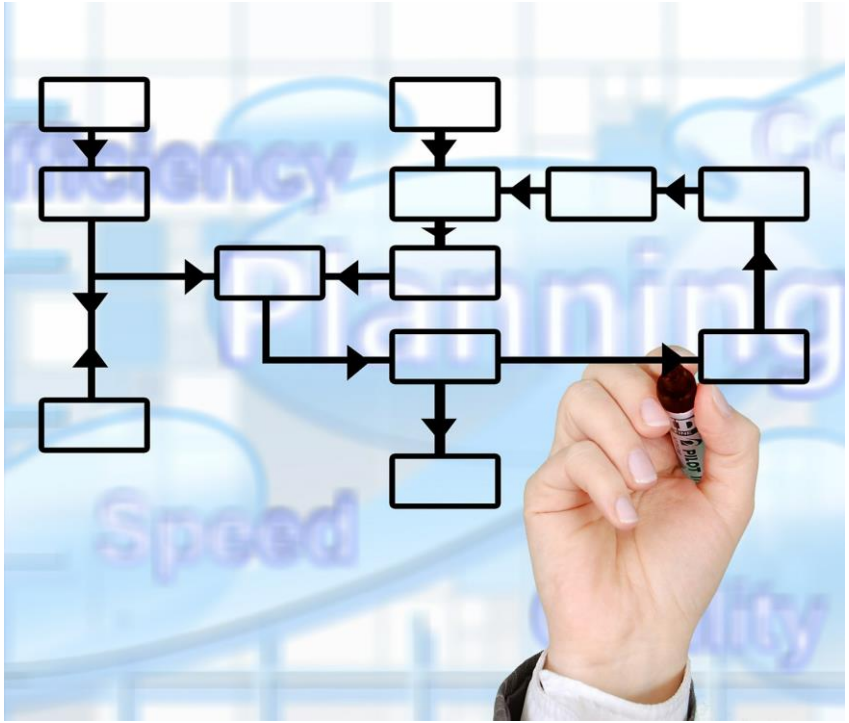
- A Dedicated Instance
- On a Dedicated Host
- Not OEM Repository

Welcome to the Future

- Use 12cR2 for the Repository database
- Low risk exposure to
  - New features
  - New bugs

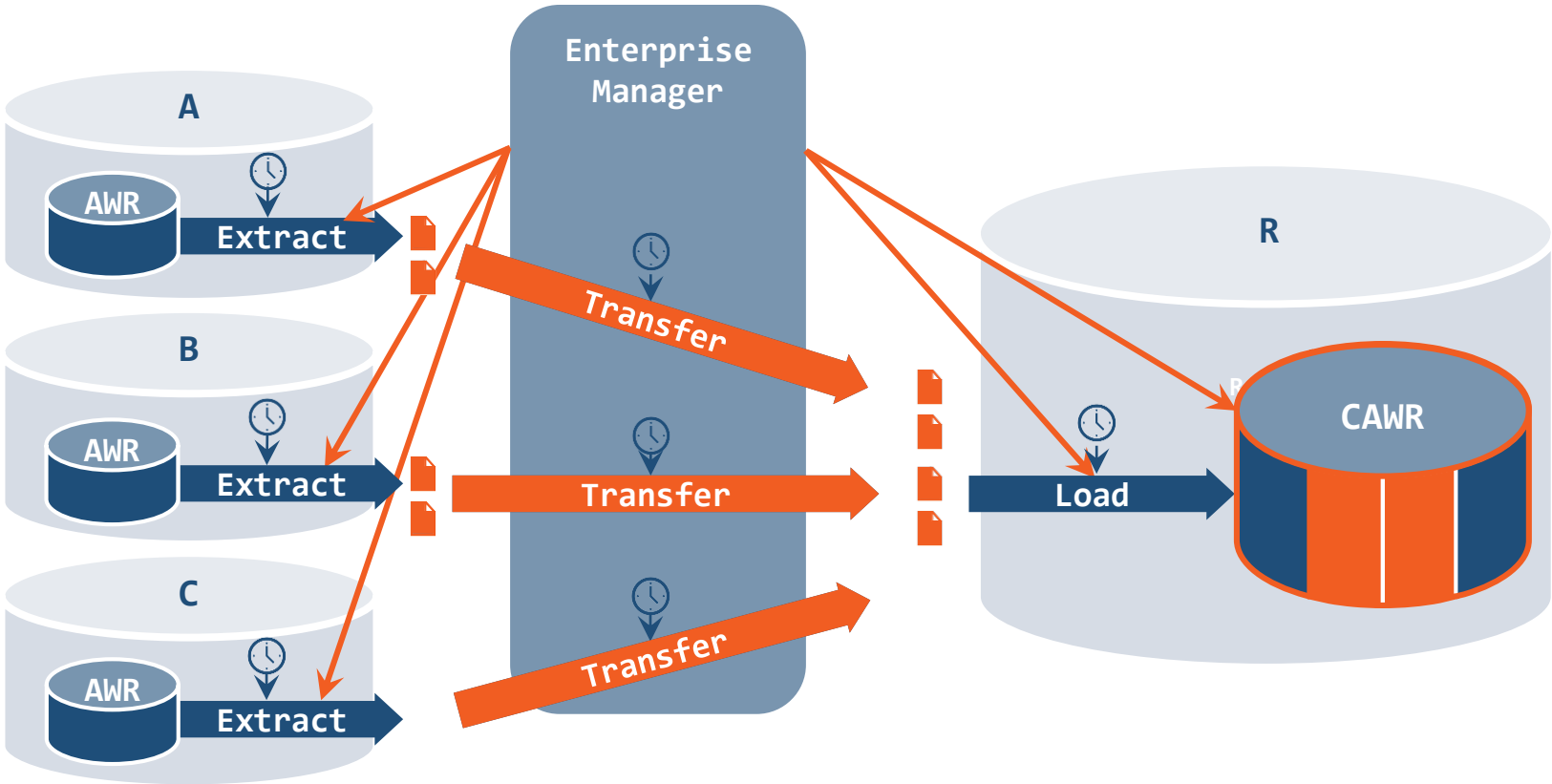
ETL Process Flow

ETL Process Flow - General Points

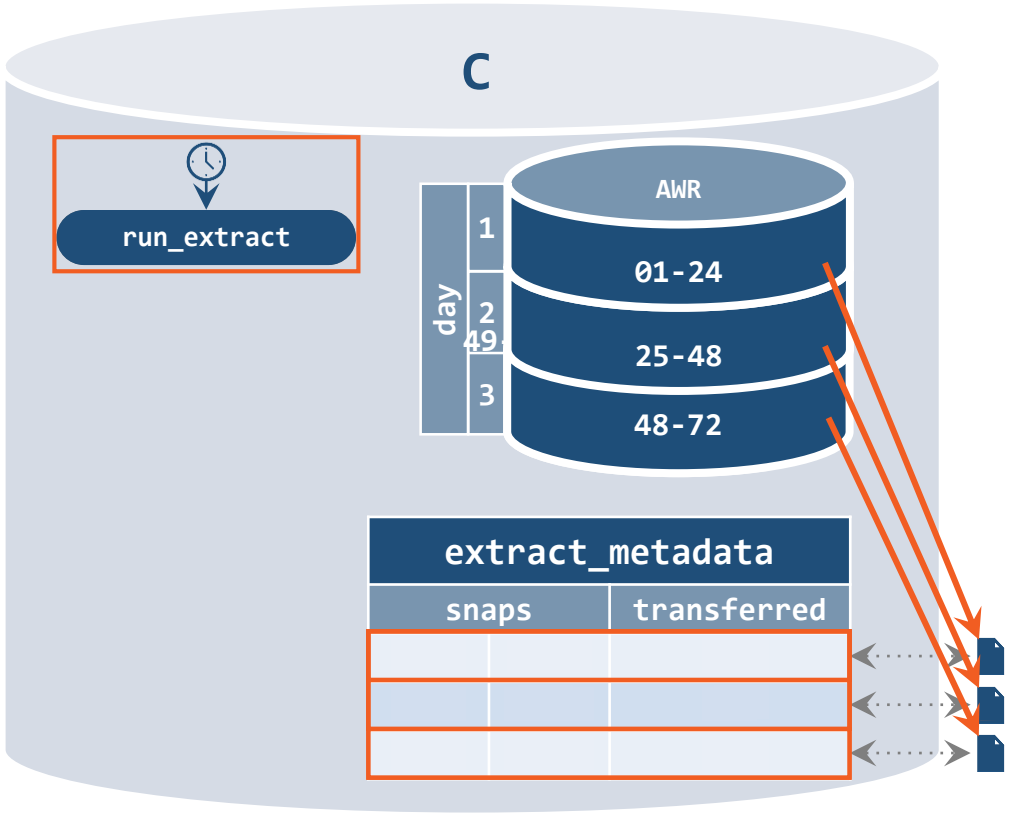


- Use the Source
- Separate schedules
  - All objects owned by dbsnmp
- Some simplifications
  - Table Names (CAW_ prefix)
  - Error Handling

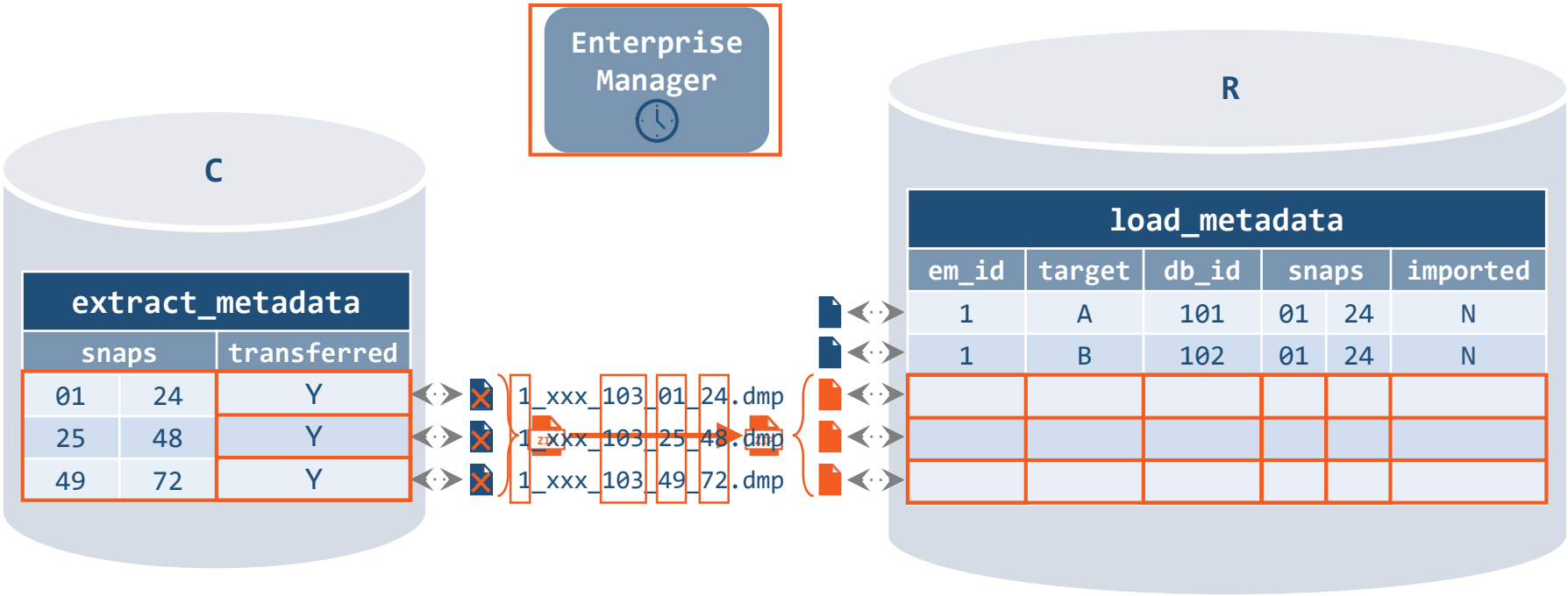
Overview


Enterprise Manager
A
AWR
Extract
B
AWR
Extract
C
AWR
Extract
Transfer
Transfer
Transfer
R
Load
CAWR

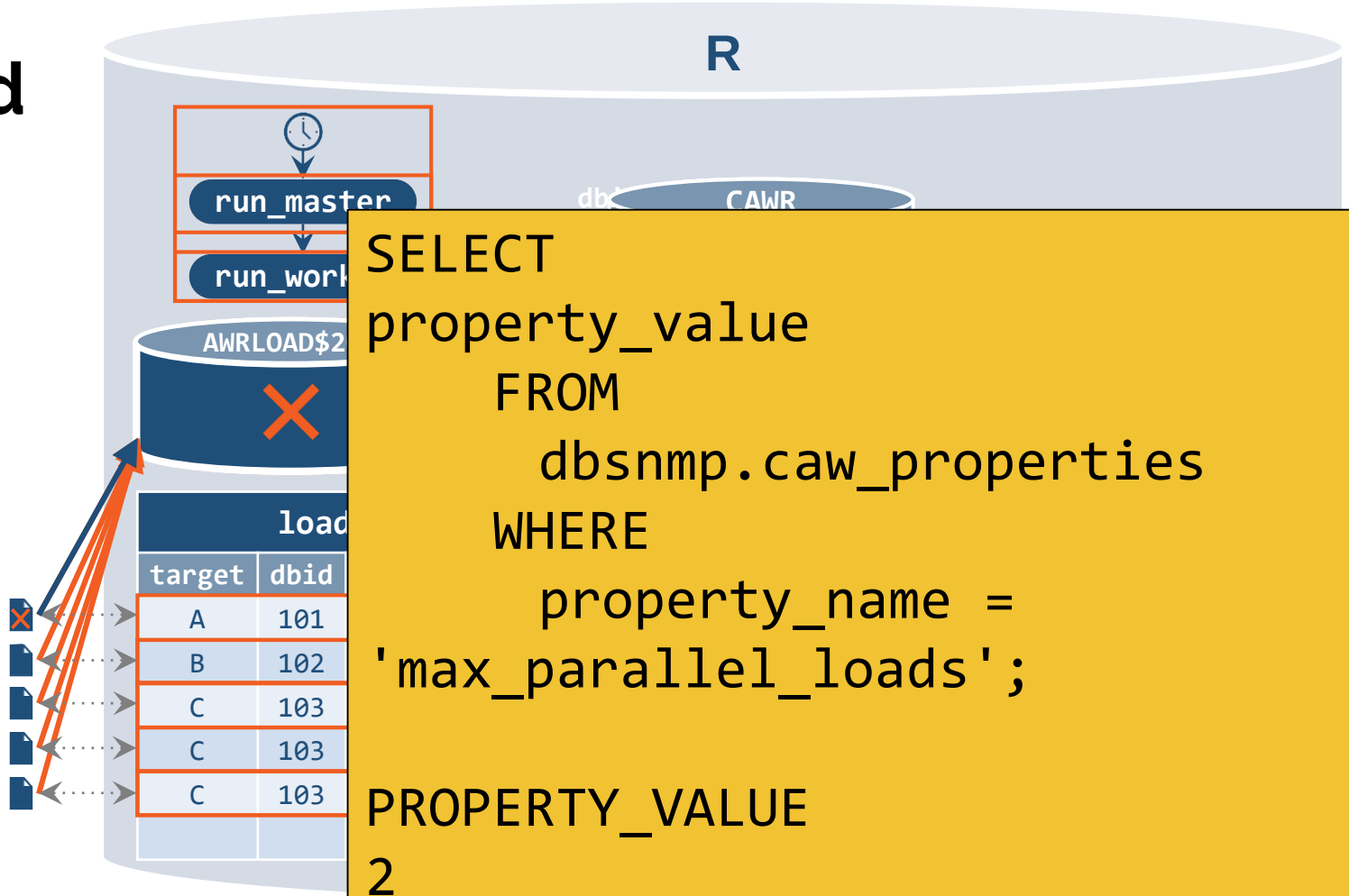
Extract


C
run_extract
AWR
day
1
2
49
3
01-24
25-48
48-72
extract_metadata
snaps
transferred

Transfer


Enterprise Manager
C
R
extract_metadata
snaps
transferred
01 24 Y
25 48 Y
49 72 Y
1_xxx_103_01_24.dmp
1_xxx_103_25_48.dmp
1_xxx_103_49_72.dmp
load_metadata
em_id target db_id snaps imported
1 A 101 01 24 N
1 B 102 01 24 N

Load

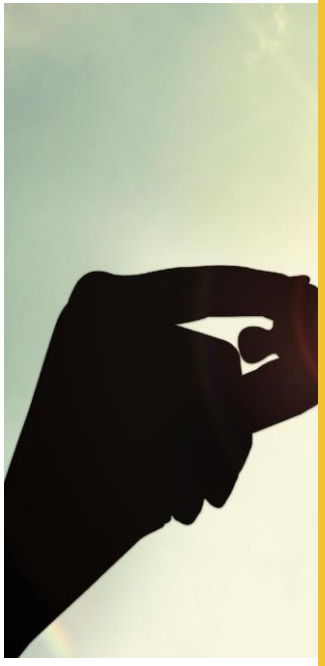



```
SELECT
property_value
    FROM
      dbsnmp.caw_properties
    WHERE
      property_name =
'max_parallel_loads';

PROPERTY_VALUE
2
```

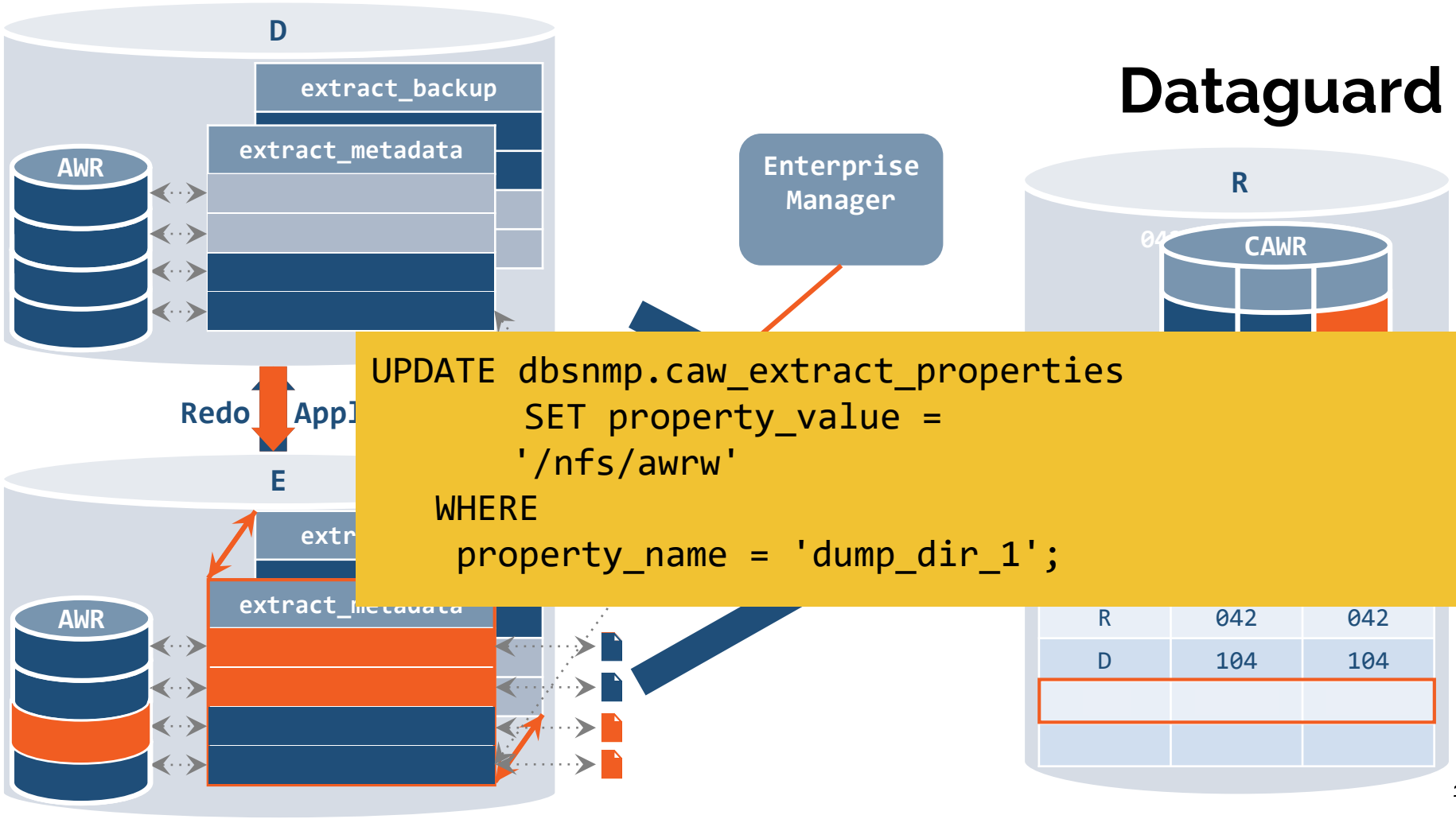
Advanced Topics

Reconnecting with AWR Repository Instance



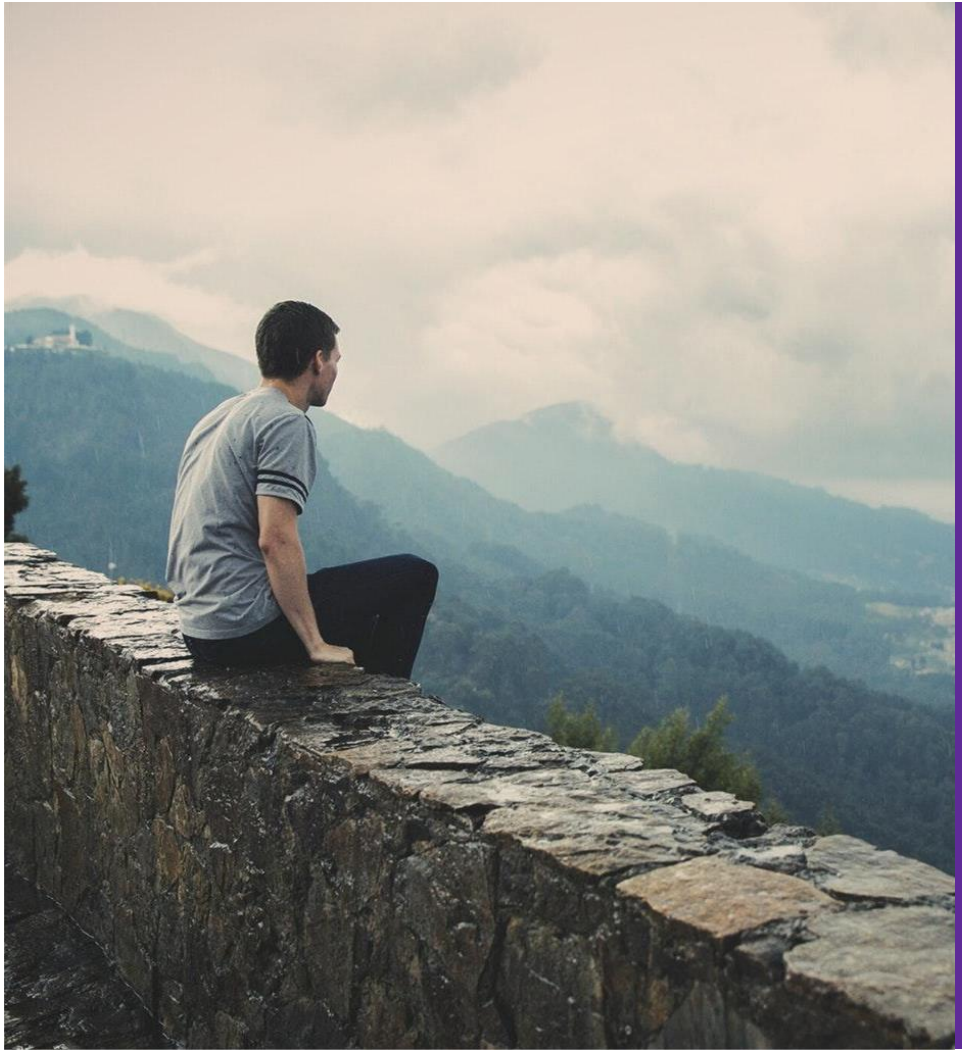
```
UPDATE sysman.db_caw_repos_e
    SET
        target_guid = (
                SELECT
                        target_guid
                FROM
                        sysman.mgmt$target
                WHERE
                        target_name = 'AWRW'
                AND
                        target_type = 'oracle_database'
        );
```

Dataguard




```
UPDATE dbsnmp.caw_extract_properties
        SET property_value =
        '/nfs/awrw'
    WHERE
     property_name = 'dump_dir_1';
```

In Summary



AWR Warehouse saves you $$$

Install it, use it

Understand how it works

Further Reading

https://docs.oracle.com/database/122/TDPPT/using-automatic-workload-repository-warehouse.htm

http://dbakevlar.com/category/awr-warehouse/

https://jolliffe.hk/category/enterprise-manager/awr-warehouse/

Thank You!

Any Questions?

Contents

The Automatic Workload Repository (AWR)

The Automatic Workload Repository (AWR)

A built-in repository in every (Enterprise Edition) Oracle database

Regular snapshots of vital statistics

Data stored in SYSAUX tablespace

Enabled by default

Part of the Diagnostic and Tuning Option ($$$)

Either Query data yourself

Also tightly integrated with Enterpise Manager

Active Session History (ASH)

Every second the state every non-idle session is recorded (in memory), and exposed as

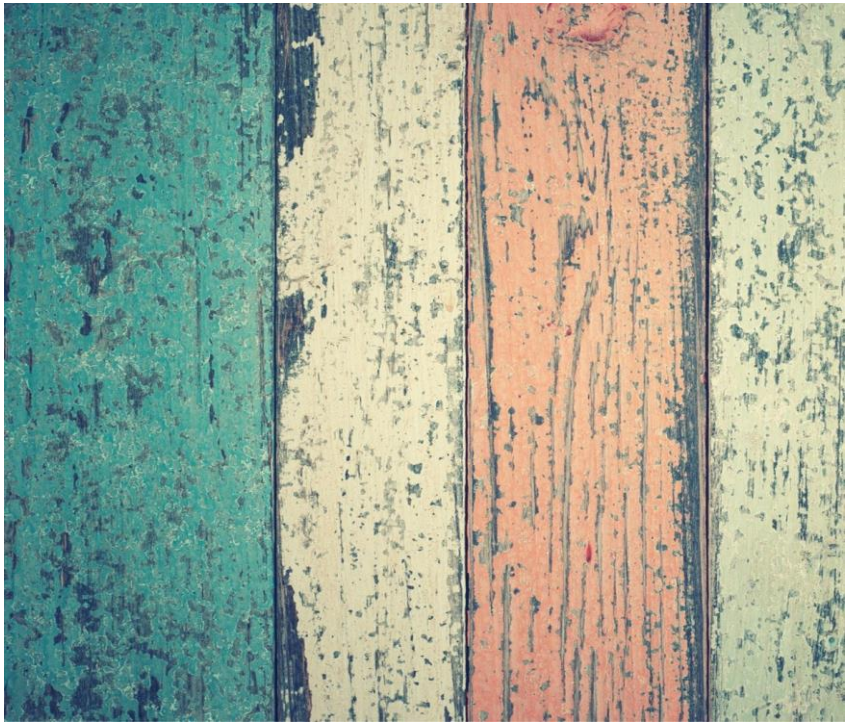
V$ACTIVE_SESSION_HISTORY

One in ten moved to persistent storage:

DBA_HIST_ACTIVE_SESSION_HISTORY

Useful for troubleshooting performance issues after they happen

Partitioning



AWR Tables partitioned on dbid, snap_id

Initial Partition labeled <table>_MXDB_MXSN

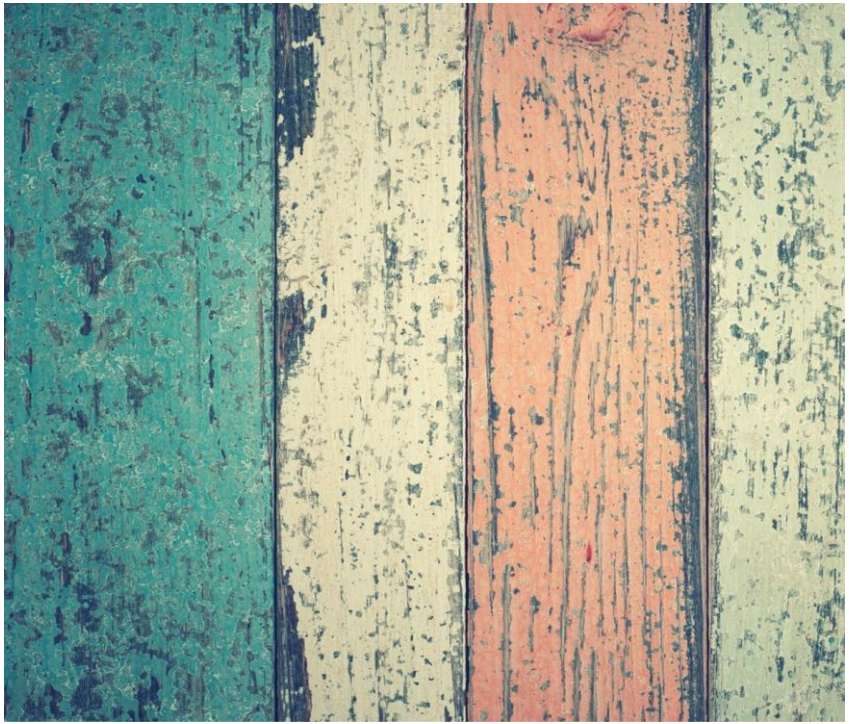
For every database added a new partition <table>_<dbid>_0 is created

As more snapshots added for database, extra partition

<table>_<dbid>_<snapid>

When querying AWRW tables, try to provide dbid and snap_id for better performance (partition pruning)

When Partitioning Goes Wrong



After Upgrade AWR Warehouse Repository from 12.1 to 12.2.

ORA-00600: internal error code, arguments: [kewrspbr_2: wrong last partition]

MOS Doc ID 2020227.1 describes similar issue after upgrade to 12.1.

Solution: Recreate Table and Partitions manually

```
DROP TABLE "SYS"."WRH$_CON_SYSMETRIC_HISTORY";
CREATE TABLE "SYS"."WRH$_CON_SYSMETRIC_HISTORY" (
...) ...;
BEGIN
    FOR l_dbid IN (SELECT DISTINCT dbid FROM
    dba_hist_snapshot ORDER BY dbid)
    LOOP
    EXECUTE IMMEDIATE 'alter table
    WRH$_CON_SYSMETRIC_HISTORY split partition
    WRH$_SYSME_HIST_MXDB_MXSN at ('
```

When Partitioning Goes Wrong – Part 2