Migration to Oracle Autonomous Database

Bern, March 2025

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Oracle

DBAs

run the world

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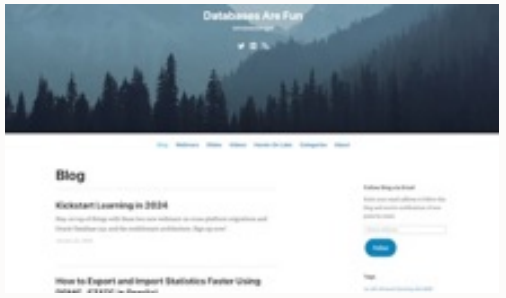

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Webinar | Autonomous Database

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Migration to Oracle Autonomous Database

– Everything you need to know

April 3, 15:00 CET

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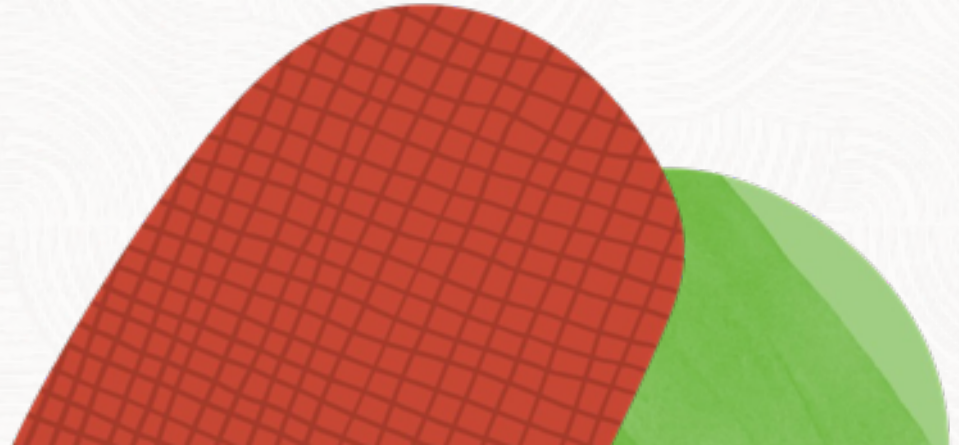
Releases



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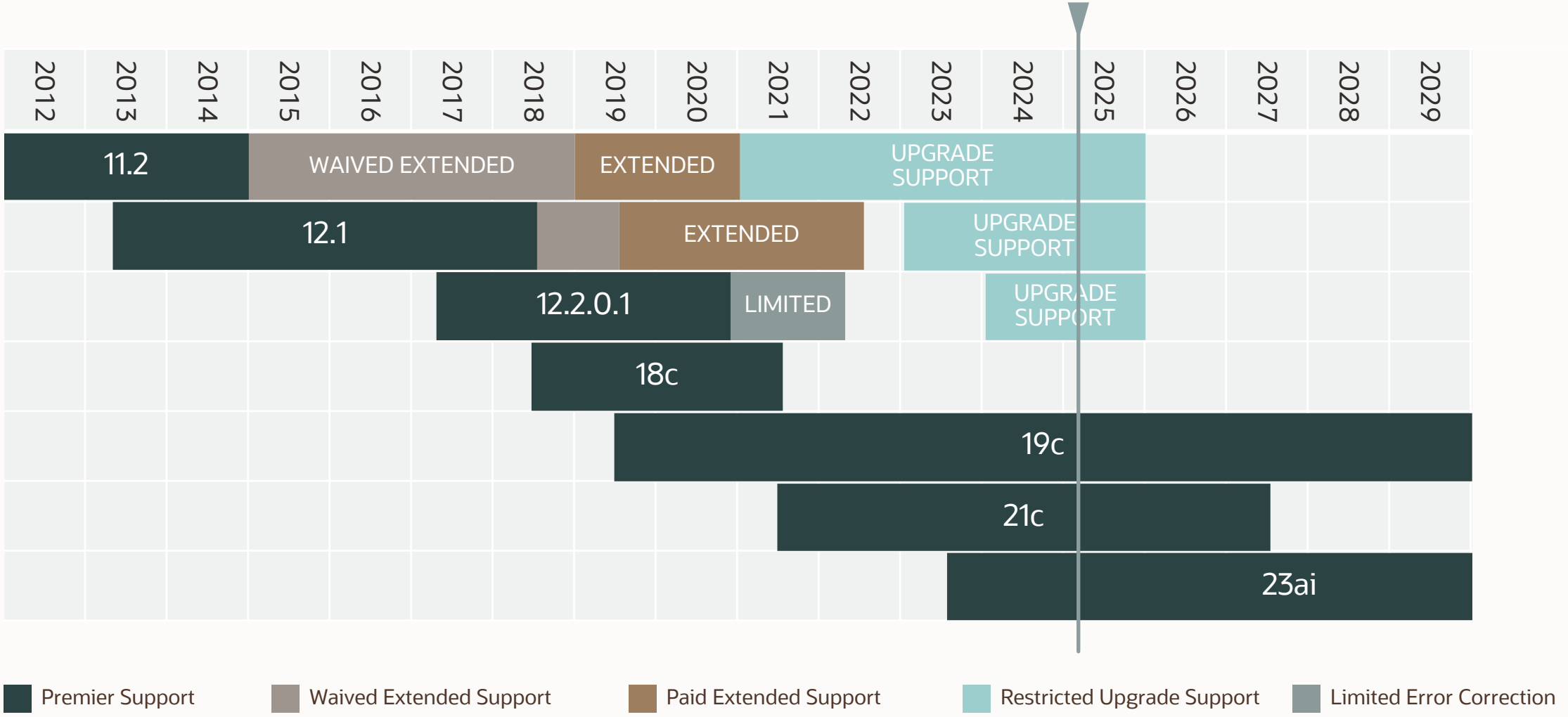
Lifetime Support Policy



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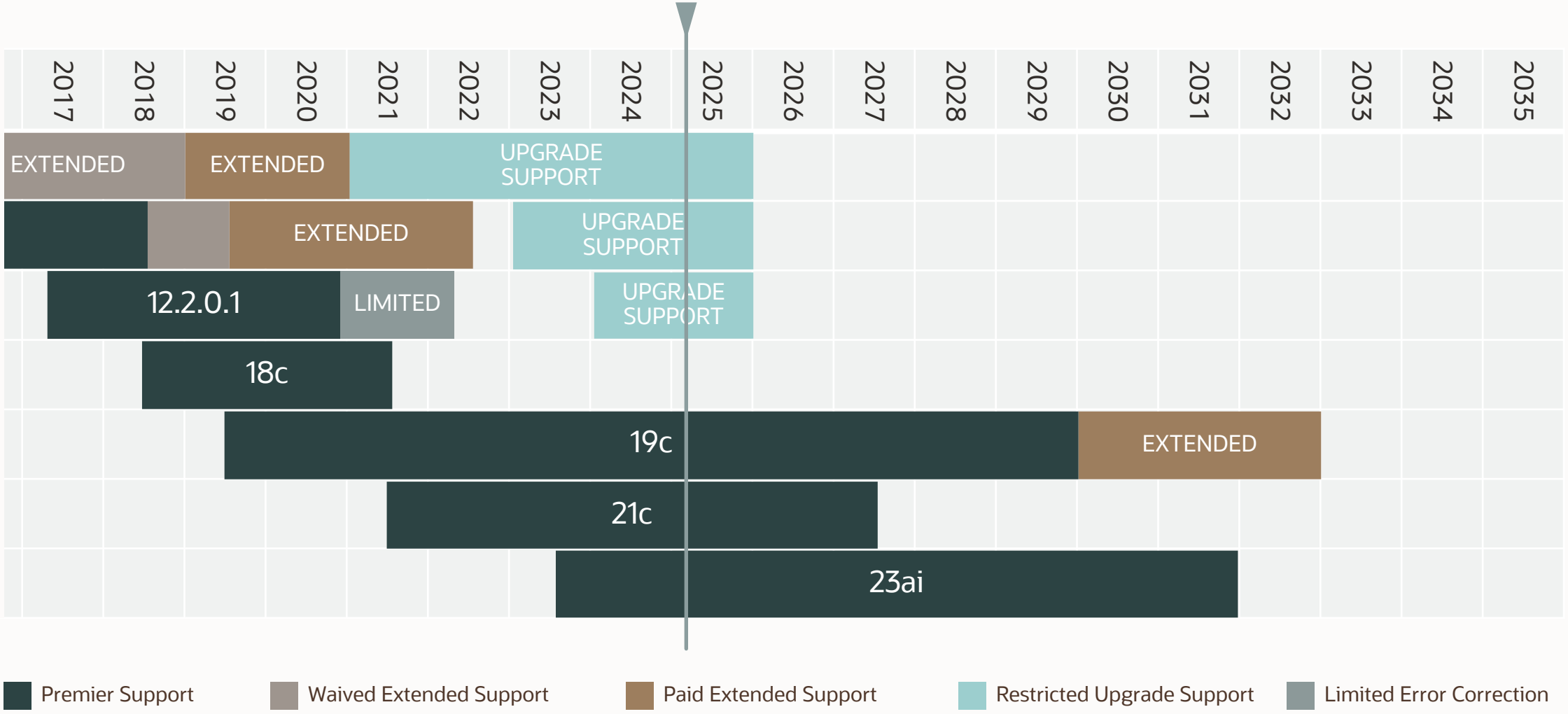

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Oracle Database 23ai

Production

- Oracle Database Cloud Services
- Oracle DB@Azure
- Oracle DB@Google Cloud
- Oracle DB@AWS
- Exadata Cloud@Customer
- Compute Cloud@Customer
- Exadata Database Machine
- Database Appliance (VM)

Development / Testing

- Oracle Database Free for Linux x86
- Oracle Database Free for ARM
- Oracle Database Free for Windows
- Oracle Autonomous Database
- Oracle Exadata Exascale
- Oracle Base Database
- DIY on Oracle Cloud Infrastructure
- Oracle Database 23ai beta program

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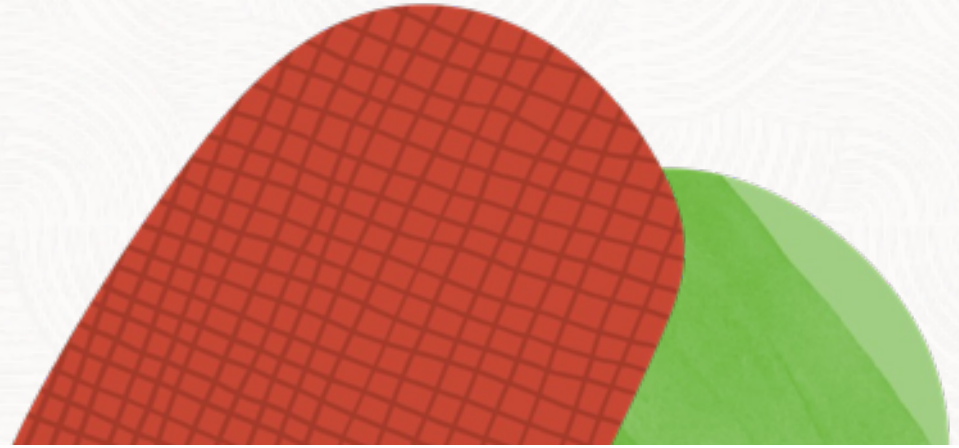
Autonomous Database

A migration approach



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The idea?

A mostly self-managed database environment, taking care on many tasks

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OOW 2017
ORACLE

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Will the DBA's be fired?

https://www.complexsql.com/oracle-18c-impact-on-dbas/

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Autonomous Database – Where?

Public cloud

Autonomous Database

Cloud@Customer

Autonomous Database in a VM environment

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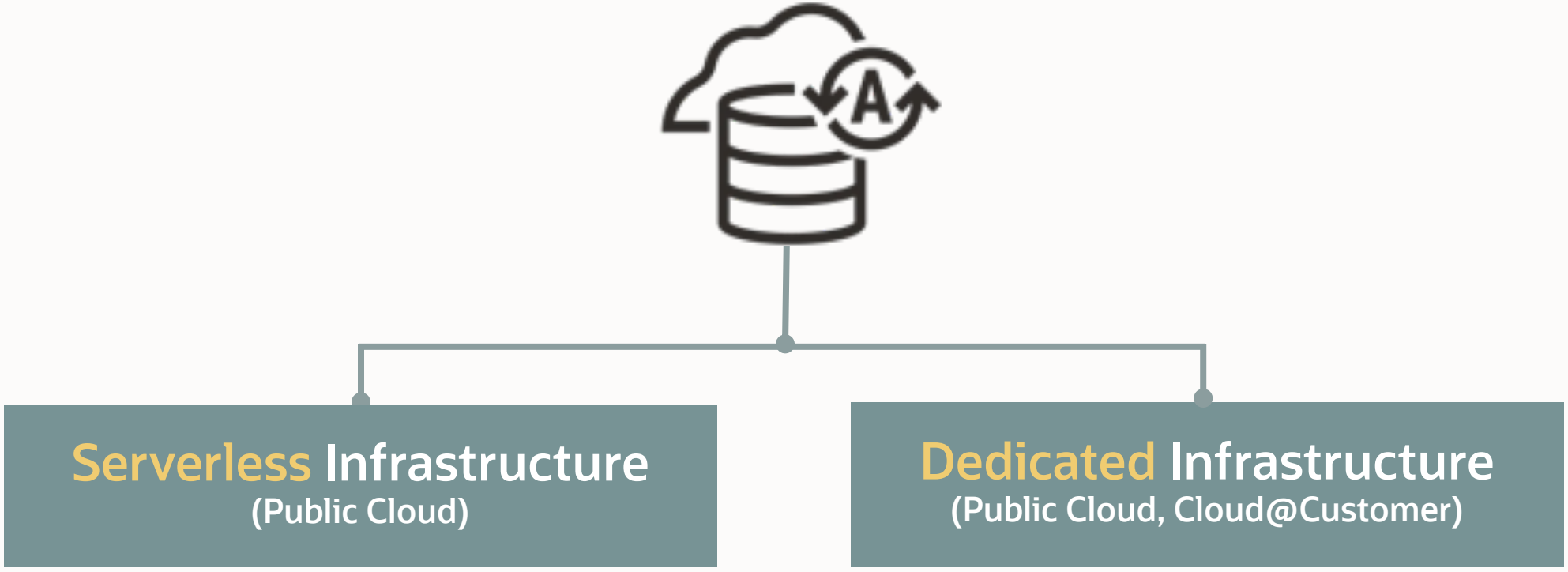
One Autonomous Database – Two Deployment Choices



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One Autonomous Database – Workload Choices

Autonomous Data Warehouse (ADW)

- Data Warehouse, Data Mart
- Data Lake, Machine Learning

Autonomous Transaction Processing (ATP)

- Transactions, Batch, Reporting, IoT
- Application Dev, Machine Learning

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Migration Planning

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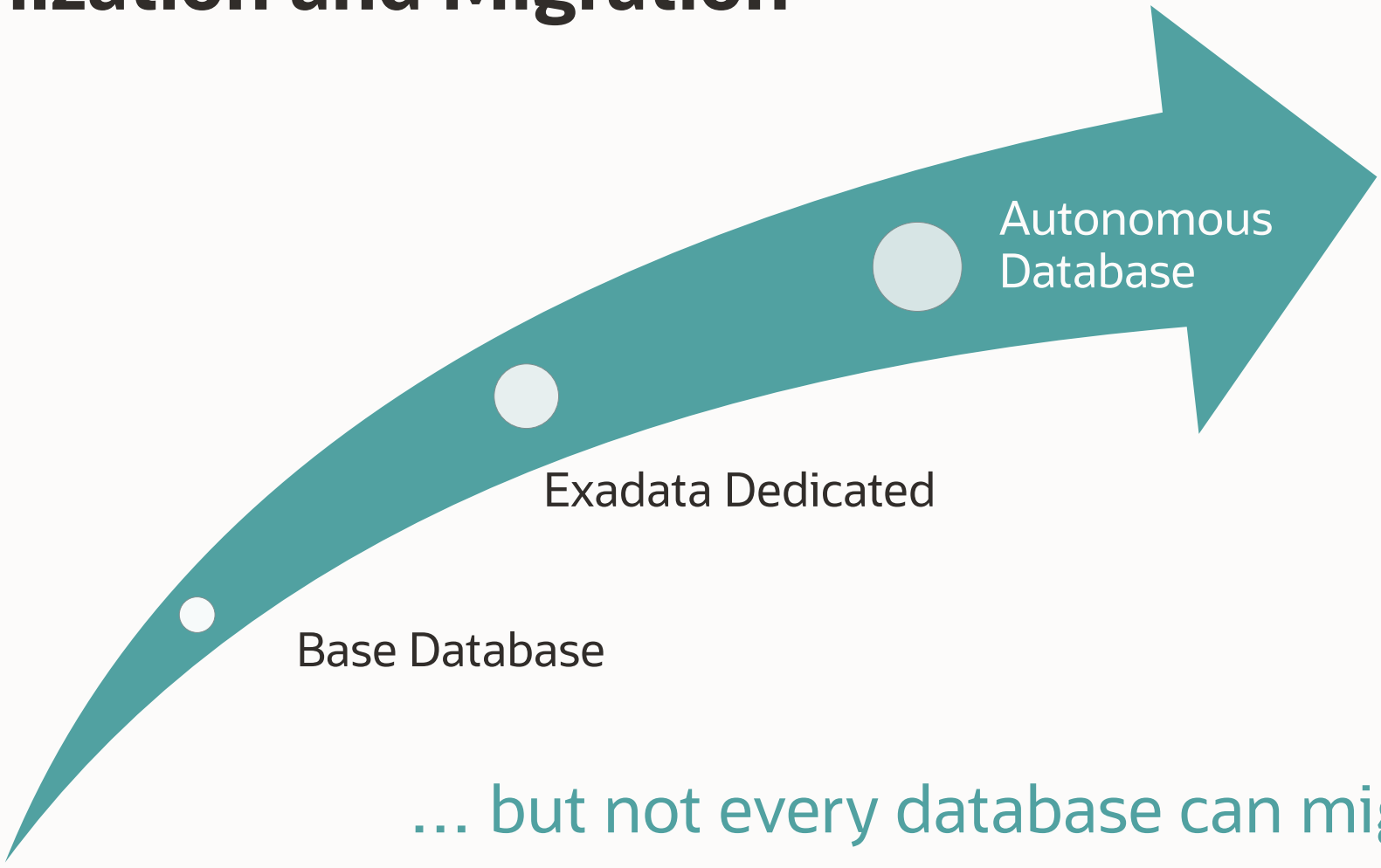
Modernization and Migration



… but not every database can migrate to ADB

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An Autonomous Database migration is a bit like making a movie

You won't start with filming right away

You need a script book
You need to cast actors
You need a film set
You need ...

Now you can start filming your scenes

And then there's still editing and cutting to be done ...

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Migration to Autonomous Database is always a logical migration

- Move the data, not the database
- Spoiler: There may be another option soon

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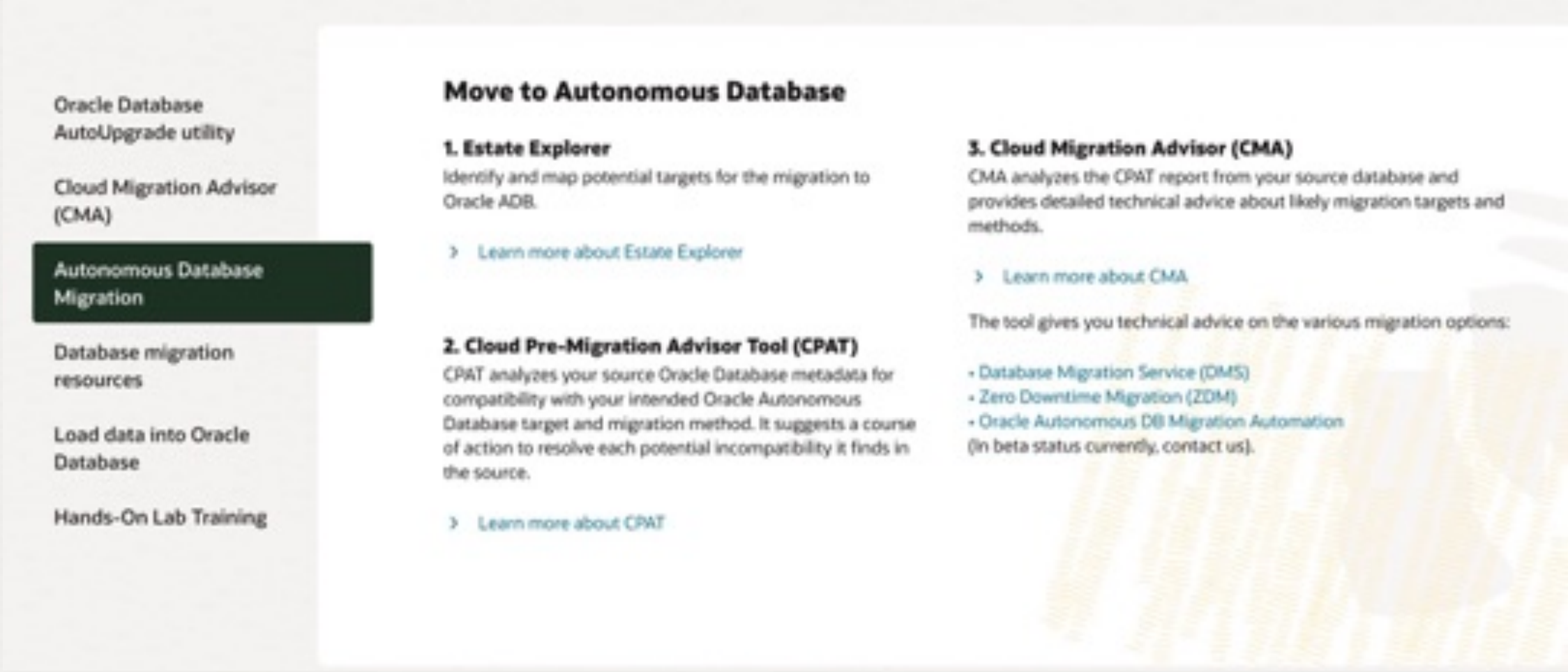
https://www.oracle.com/database/upgrades/#adb-migration



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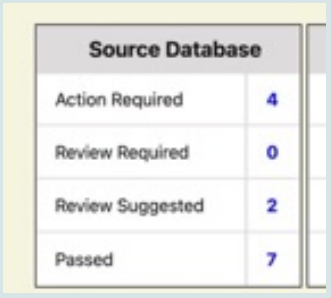
Move to Autonomous Database

Estate Explorer

Identify and map potential targets for the migration to Oracle ADB.

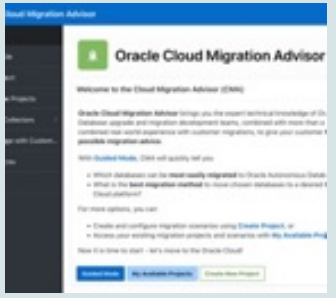
Click for more information



CPAT

Cloud Pre-Migration Advisor Tool – download from MOS Note: 2758371.1

Click for more information



CMA

Cloud Migration Advisor, GUI landscape overview.

The tool gives you technical advice on the various migration options.

Click for more information

DMS

Database Migration Service

Click for more information

ZDM

Zero Downtime Migration

Click for more information

AMA

Oracle **Autonomous** DB **Migration Automation**

In beta status currently.

Contact me

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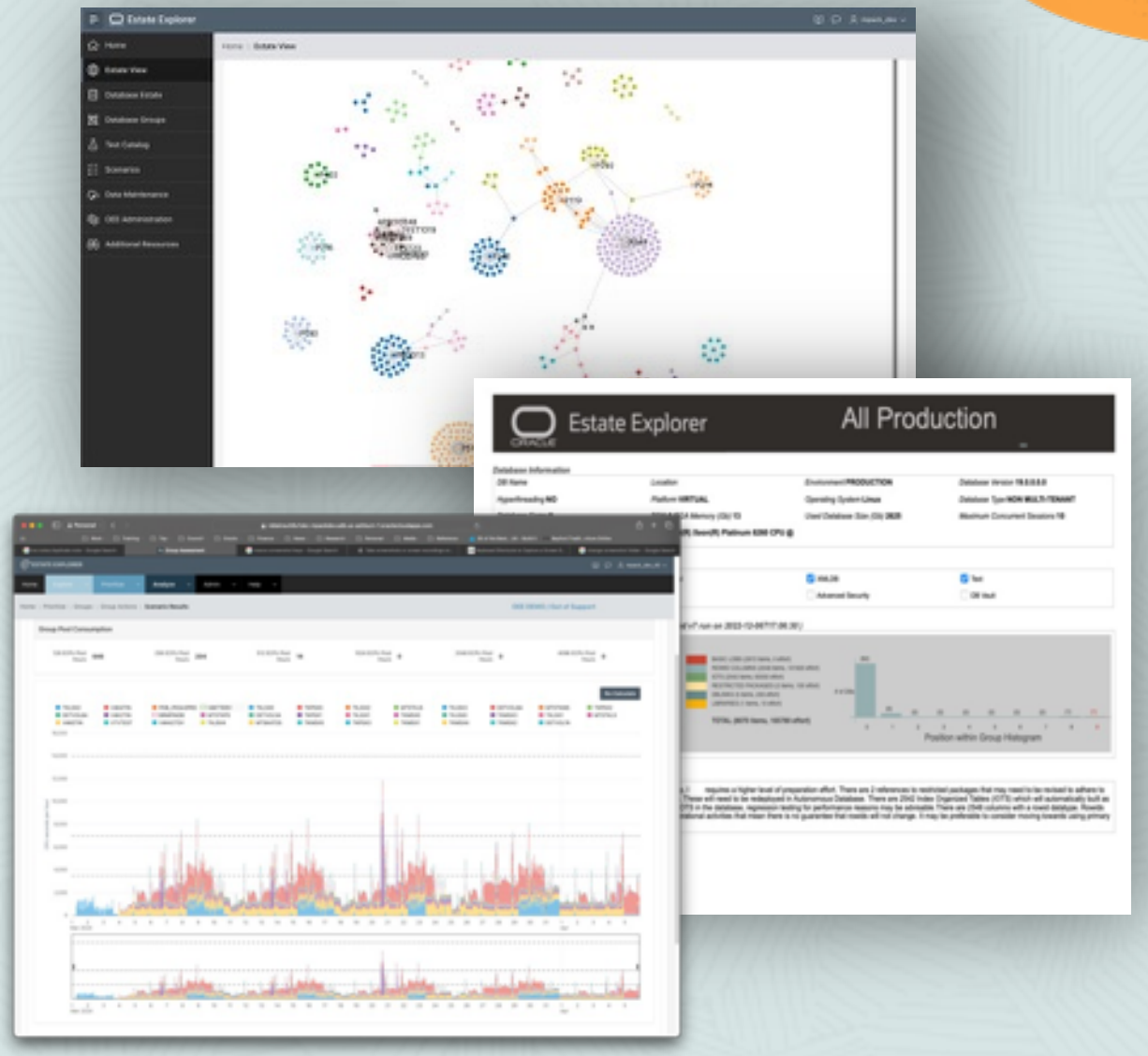
Oracle Estate Explorer

- Analyze 1000's of databases in just a few hours
- View innovative visualizations and detailed reports
- Provide a detailed TCO to compare on-premises and cloud
- Optimize your Autonomous Databases using Elastic Pools



https://www.oracle.com/database/cloud-migration/estate-explorer/

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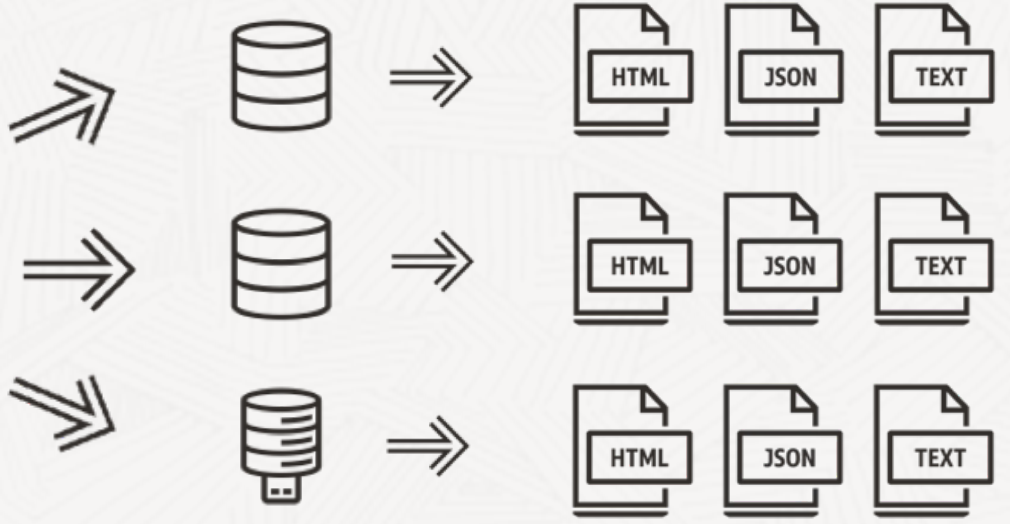
CPAT – Cloud Premigration Advisor Tool

MOS Note: 2758371.1

```
premigration.sh
premigration.cmd
bin
README.txt
misc
lib
p32613591_112048_Generic.zip
```

Shell Script



Discovers information from non-CDB or PDB individually on a per-DB basis

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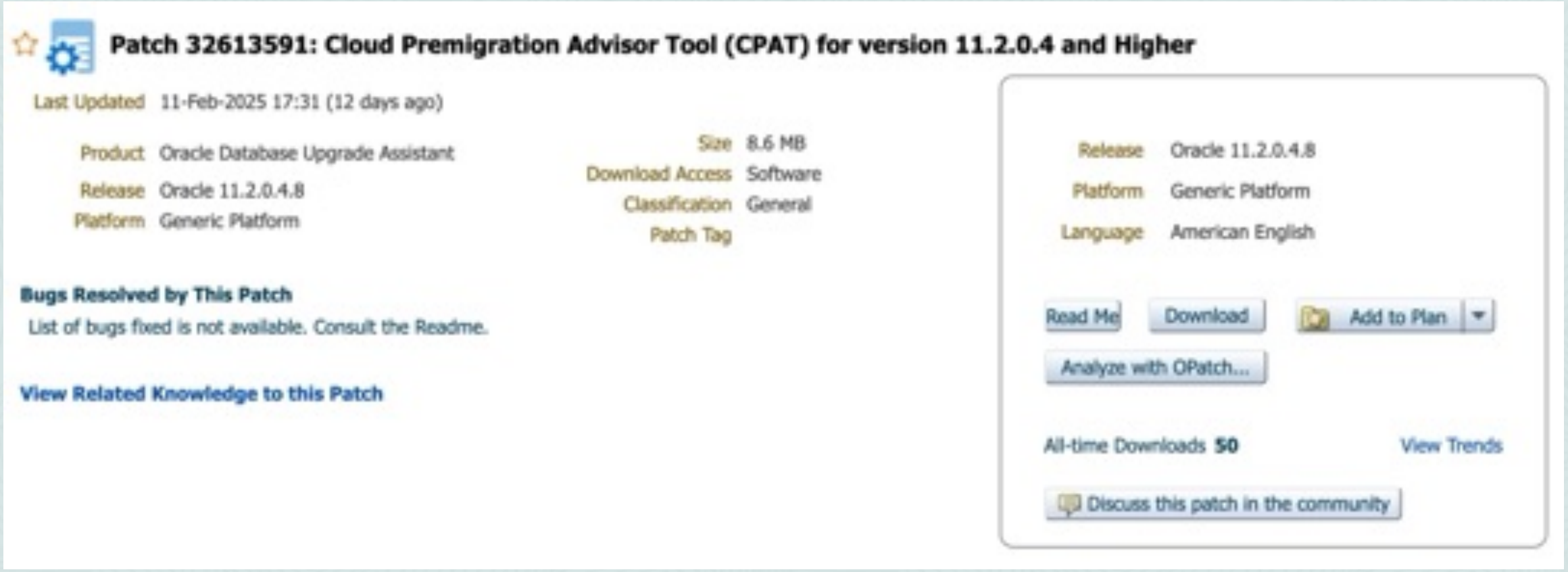
Download CPAT from MOS Note: 2758371.1



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CPAT Howto

Links to the Complete Blog Post Series about CPAT (alexzaballa.com)

- Part 1 – Starting with CPAT
- Part 2 – Options for Running CPAT
- Part 3 – Running CPAT
- Part 4 – Troubleshooting CPAT
- Part 5 – CPAT Checks
- Part 6 – CPAT New Features – December – 2024
- FAQ

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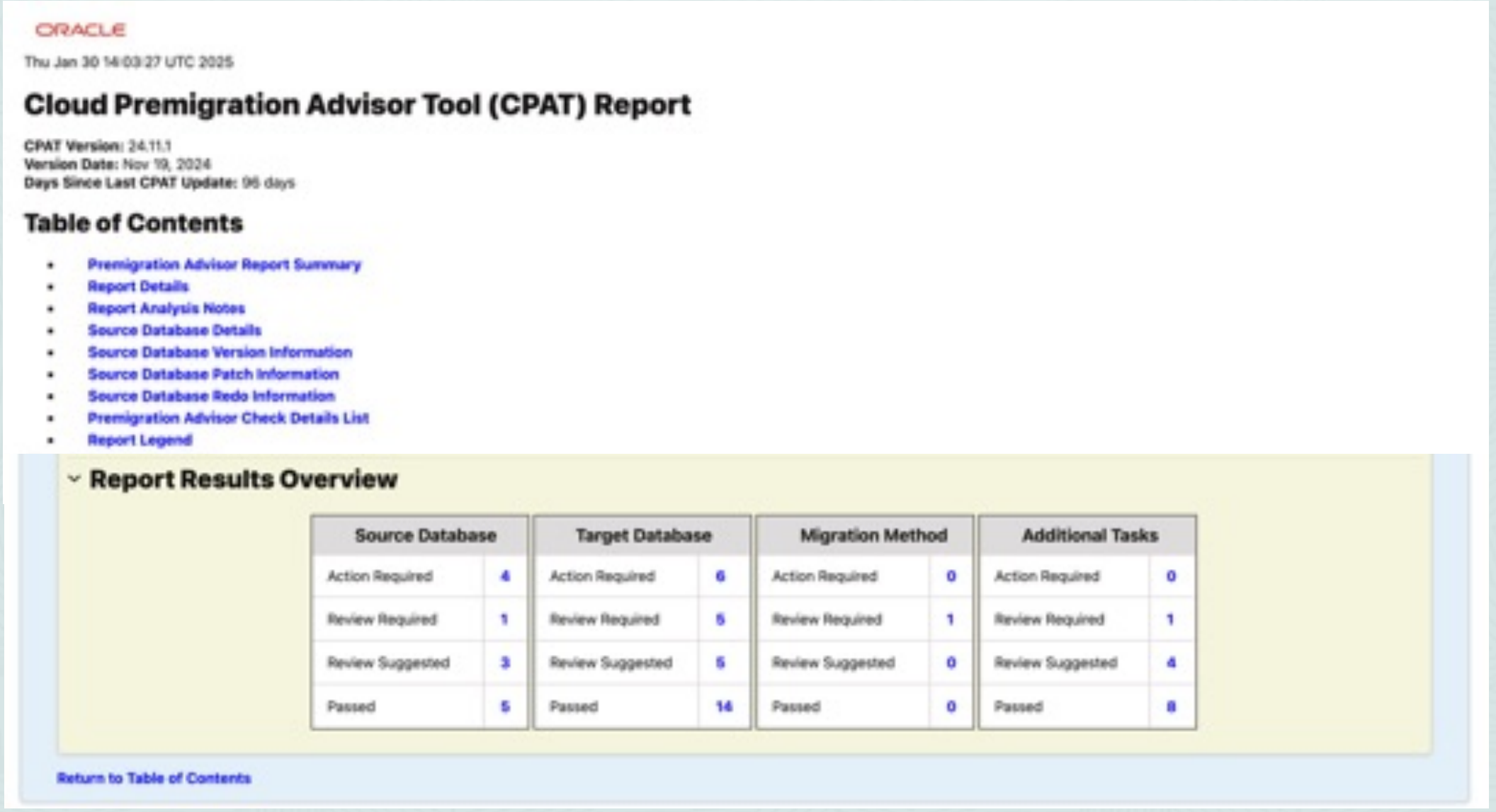
HTML Report



ORACLE

Thu Jan 30 14:03:27 UTC 2025

Cloud Premigration Advisor Tool (CPAT) Report

CPAT Version: 24.11.1
Version Date: Nov 19, 2024
Days Since Last CPAT Update: 96 days

Table of Contents

- Premigration Advisor Report Summary
- Report Details
- Report Analysis Notes
- Source Database Details
- Source Database Version Information
- Source Database Patch Information
- Source Database Redo Information
- Premigration Advisor Check Details List
- Report Legend

Report Results Overview

Source Database		Target Database		Migration Method		Additional Tasks	
Action Required	4	Action Required	6	Action Required	0	Action Required	0
Review Required	1	Review Required	5	Review Required	1	Review Required	1
Review Suggested	3	Review Suggested	5	Review Suggested	0	Review Suggested	4
Passed	5	Passed	14	Passed	0	Passed	8

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HTML Report

Report Details

CPAT Application Version:	24.11.1
Report Generated On:	Thu Jan 30 13:41:09 UTC 2025
Analysis Mode:	FULL
Target Cloud Type:	ATPS
Migration Method(s):	[DATAPUMP]
Command Line Options:	--connectstring jdbc:oracle:oci:@ --targetcloud ATPS --sysdba --pdbname GSI --outdir /home/oracle/cpat/cpat_24_11_1/GSI --logginglevel FINE --outfileprefix GSI --migrationmethod DATAPUMP --reportformat HTML TEXT --resultlevel R0

More Details

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HTML Report

- Report Analysis Notes
- Source Database Details
- Source Database Version Information
- Source Database Patch Information
- Source Database Redo Information

Source Database Details

Source Cloud Vendor:	Oracle Cloud Infrastructure (Database)
Source Database Host Name:	onprem
Source Oracle SID:	CDB1
Source Database Created Date:	Wed Jan 29 09:42:27 UTC 2025
Source Database DBID:	1195381187
Source Database Unique Name:	CDB1_vr2_fra
Source Instance Name:	CDB1
Source Database Name:	CDB1
Source Database Username:	SYS
Source Database Port String:	x86_64Linux 2.4.xx
Source Database Platform ID:	13
Source Database Container Name:	GSI
Source DB Block Size in KB:	8
Source DB Combined Size of DATA, TEMP, LOG, and CONTROL File Usage in GB:	212.771
Source DB Size of DATA File Usage in GB:	209.085
Source DB Size of TEMP File Usage in GB:	0.668
Source DB Size of LOG File Usage in GB:	3.0
Source DB Size of CONTROL File Usage in GB:	0.017
Source Database Applications:	EBS (Owner: APPLSYS), FINANCIALS (Owner: AR)

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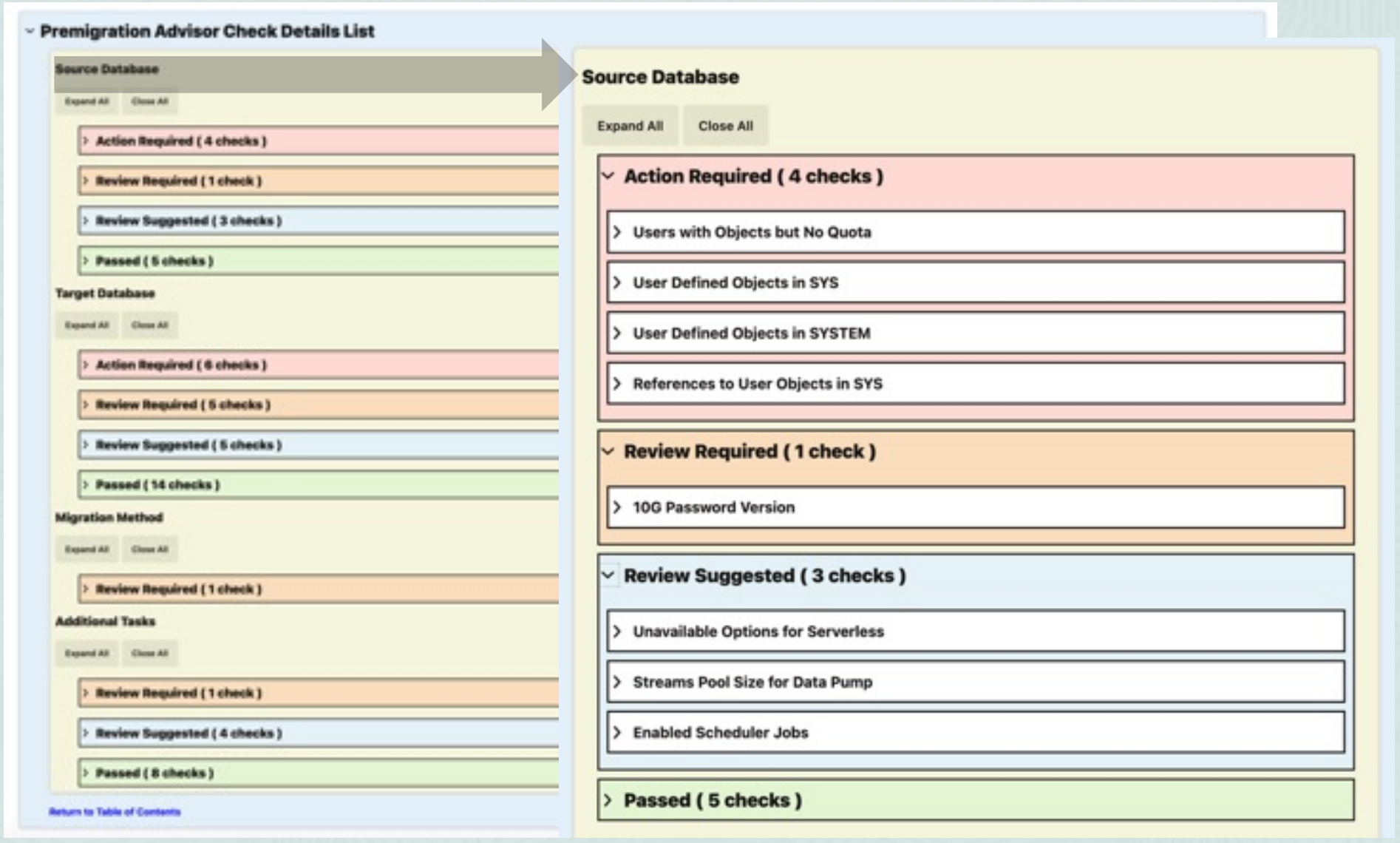
HTML Report



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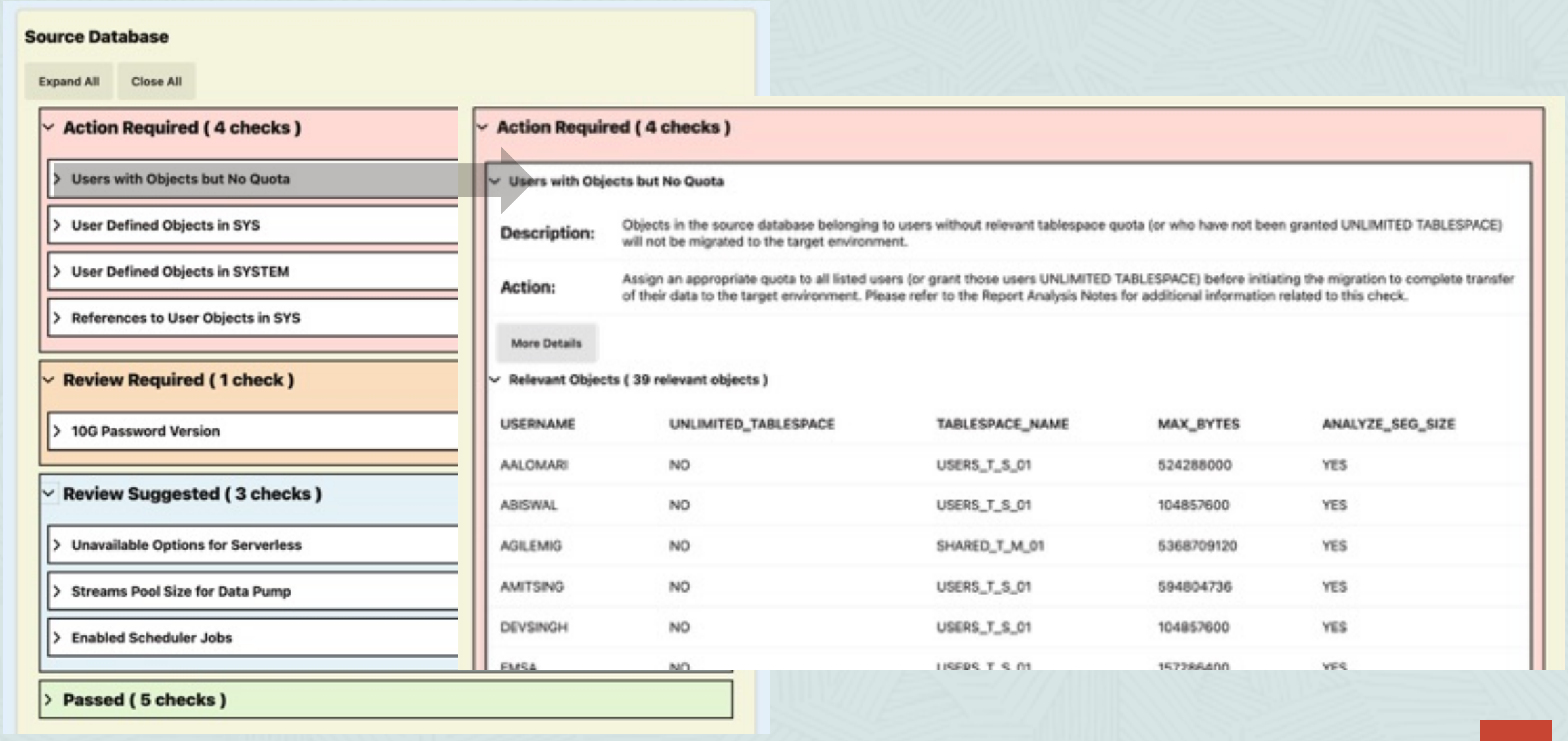
HTML Report



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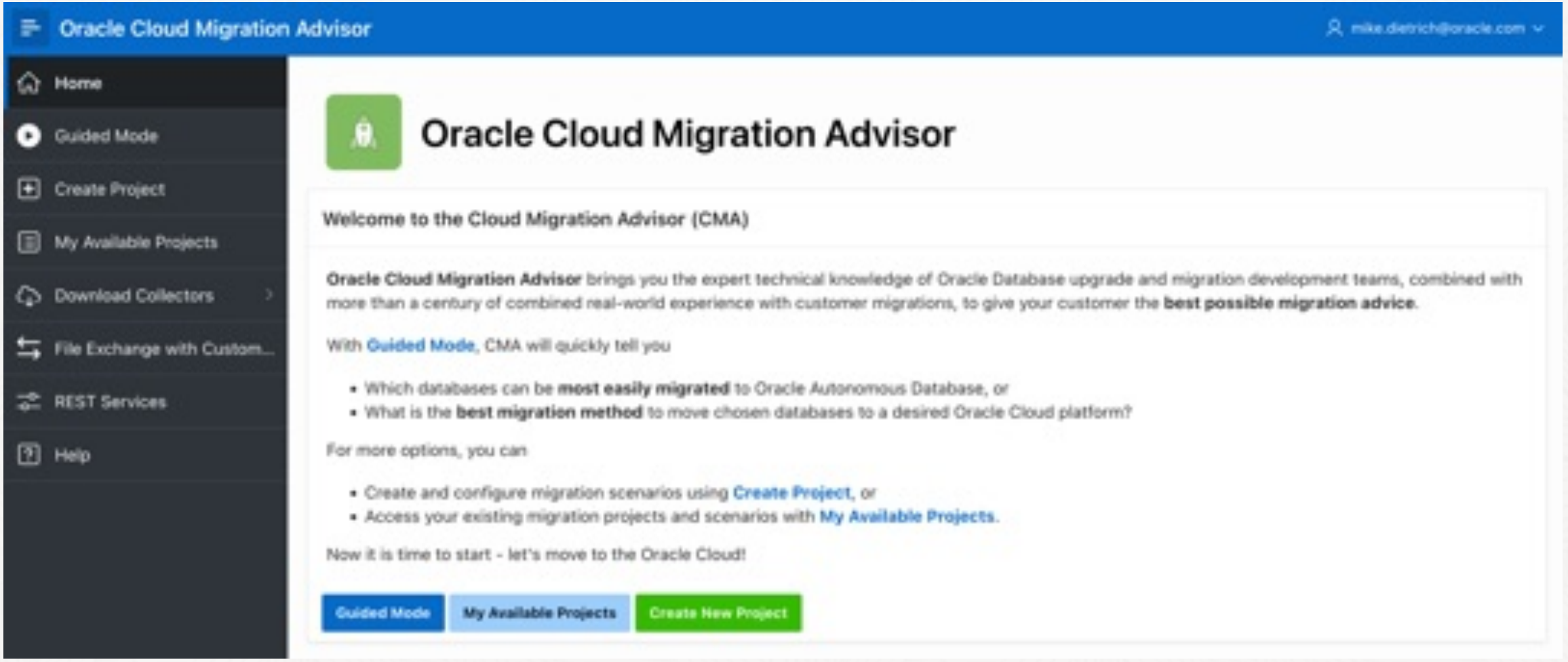
Optional: Load data into CMA



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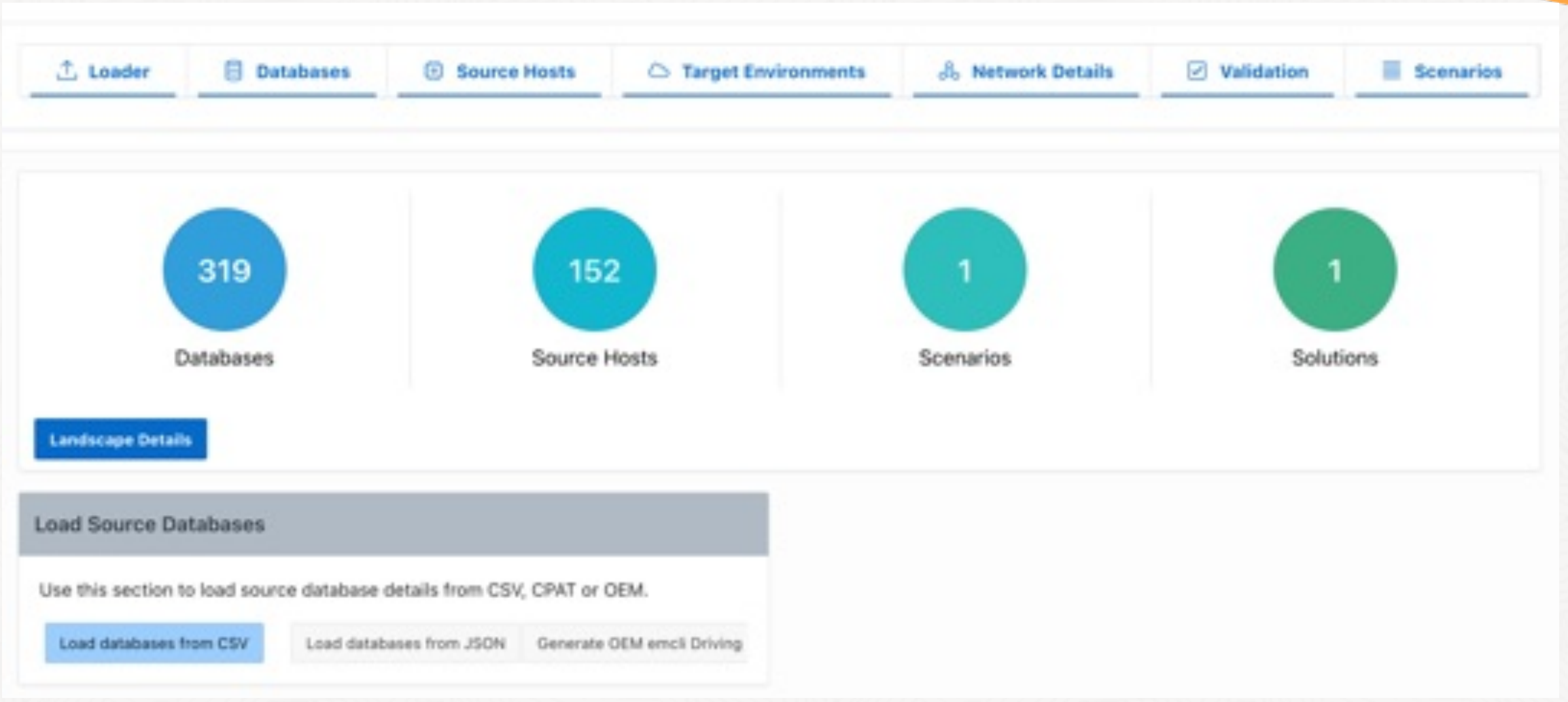
Project Overview



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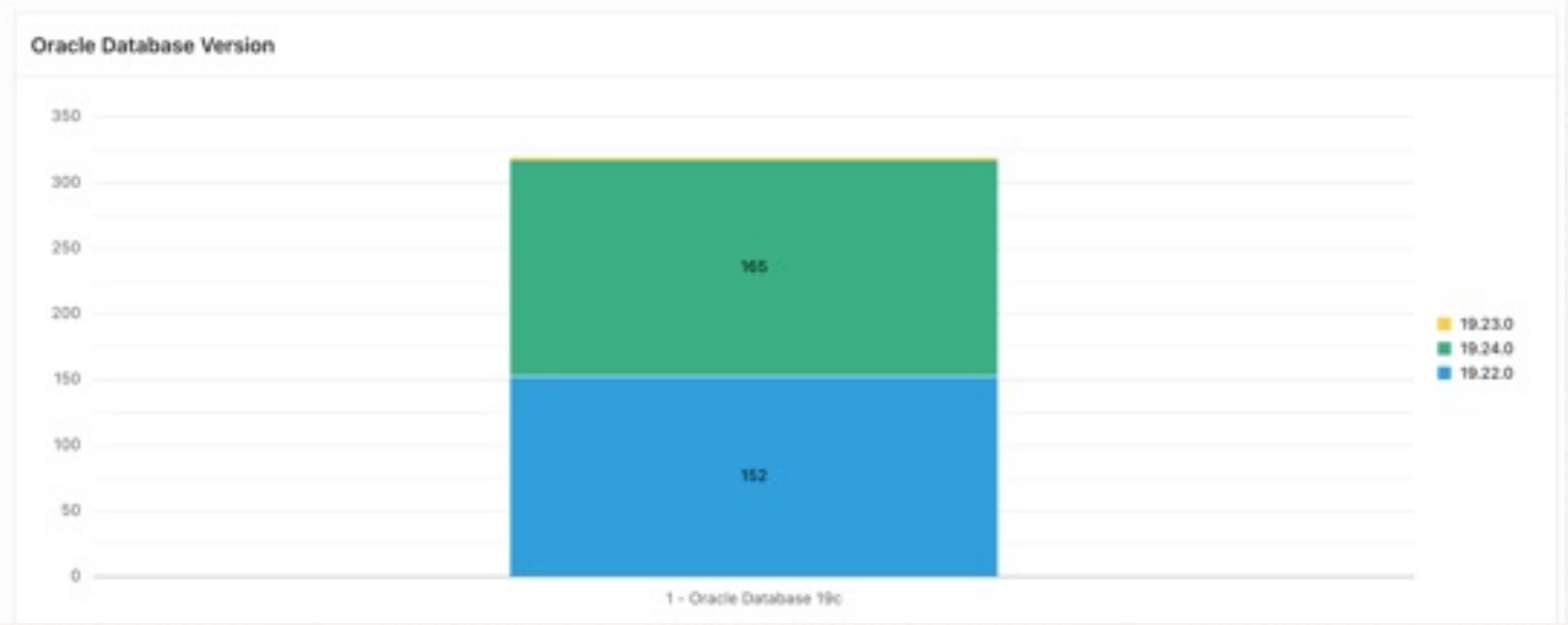
Project Overview



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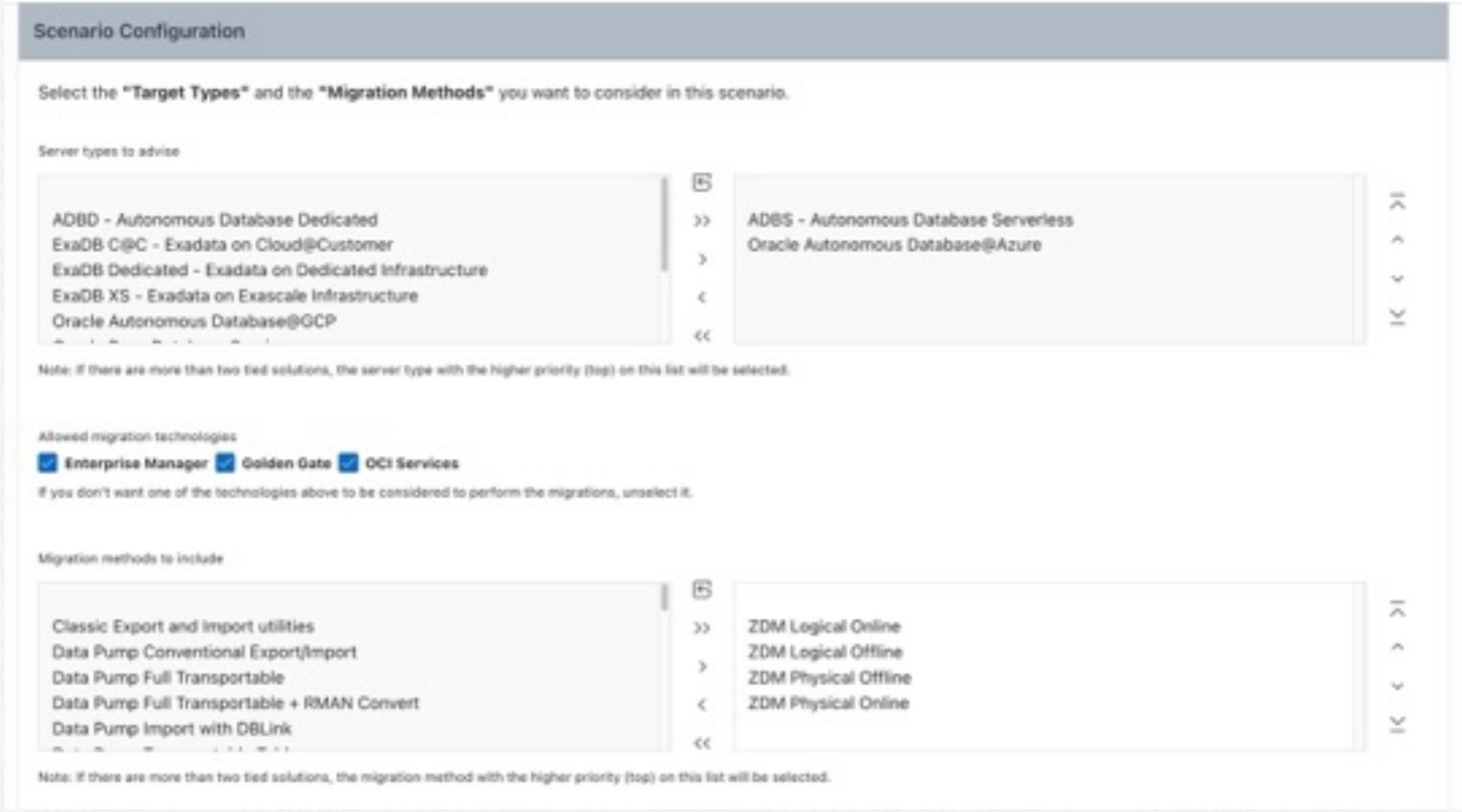
Project Overview



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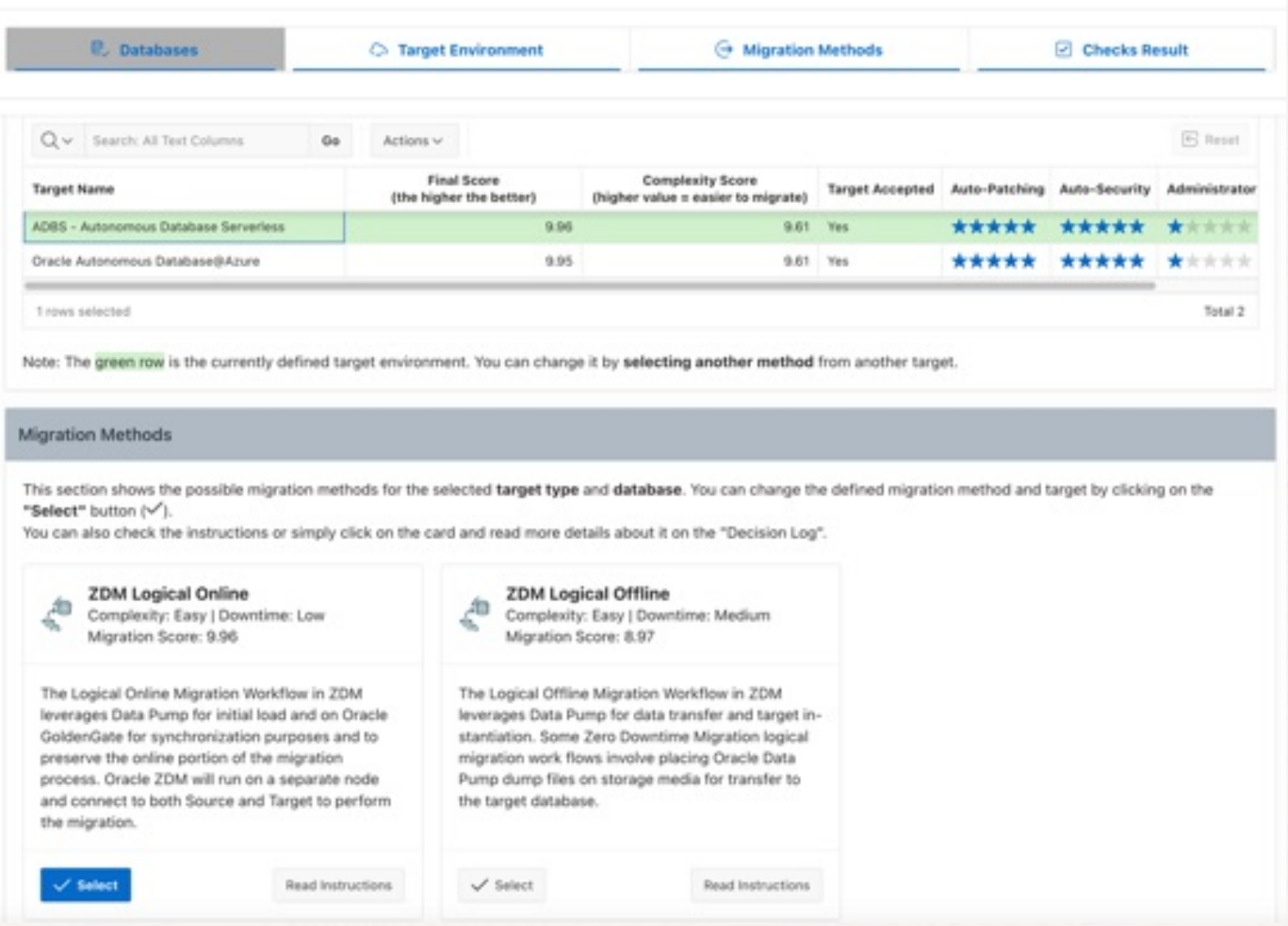
Project Overview



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CMA – How to get the tool?

Send us an email – it is an APEX app

- Vagrant build
- Zip file ready to be installed into ADB-free
- Oracle internal: cma.oraclecorp.com

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Migration Execution

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Logical Migrations

Move your data, not your database

How do you approach it?

- Full database export?
- Schema export?

We have tools

- ZDM – Zero Downtime Migration
- DMS – Database Migration Service
- AMA – Autonomous Migration Automation

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Why no Full Database Export?

Oracle Autonomous Database is different

- Different admin user
- No DBA role
- Different key role names
- You can't put anything in SYS or SYSTEM
- XML Binary schema objects are not supported
- Libraries are not really supported
- Database Links and External Tables require extra work
- ...

Be aware that certain objects aren't part of schema exports!

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AMA Flow

Plan

- Check source database
- Create logic
- Create scripts
- Quiesce jobs

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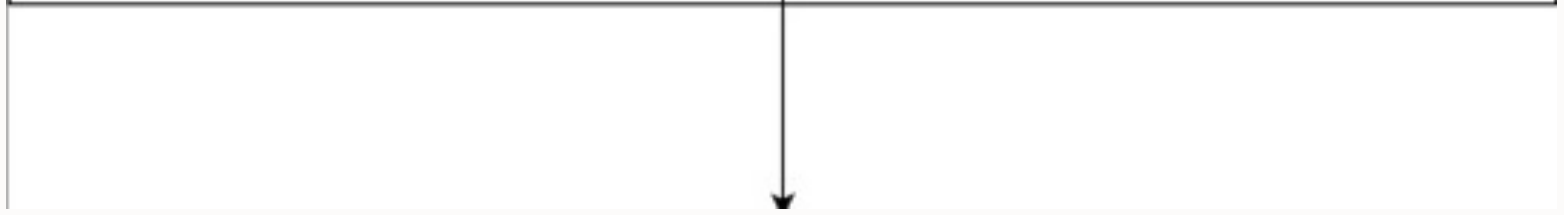
AMA – Autonomous Migration Automation

Before you start …

Before you start On-Prem	*Before you start ADB-S Target*
Gather sys/system stats create migration user enable restricted session set job_queue_processes to 0	Enable OLAP/Java in ADB



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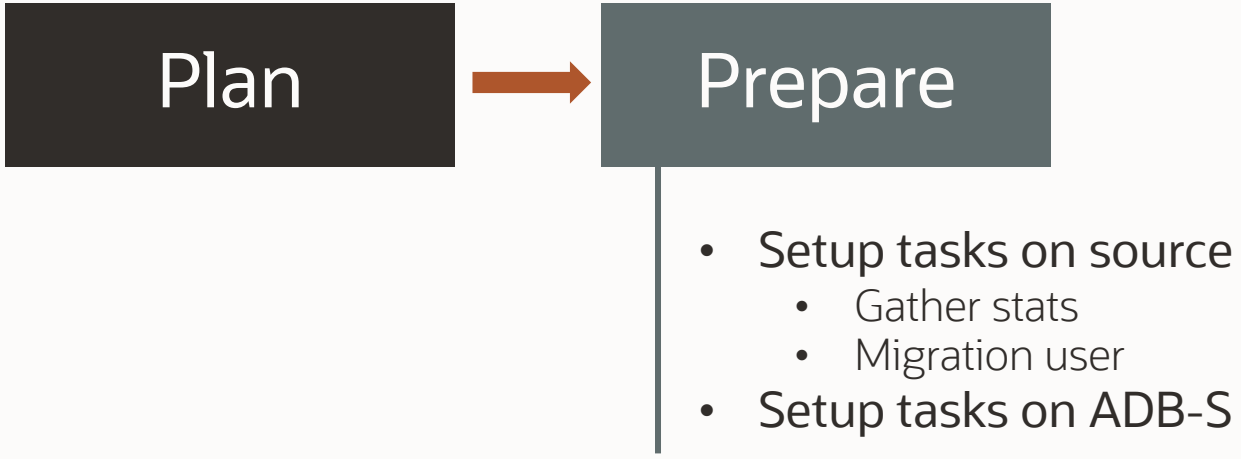
AMA Flow



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AMA – Autonomous Migration Automation

Preparation:

Preparation Activity on Source	*Preparation Activity on ADB-S Target*
Collect allowed ROLES	
	Create ROLES
Collect Profiles	
	Create Profiles
	Create Storage Credential (Object Storage / NFS)
Export User Definition	
	Import User Definition
Export Function, Types, Packages	
	Importing Function, Types, Packages
	Granting Migration Privileges to Users
	Altering user profiles
Collect SQL Profiles/Plans/Patches	
	Creating SQL Profiles/Plans/Patches

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AMA Flow

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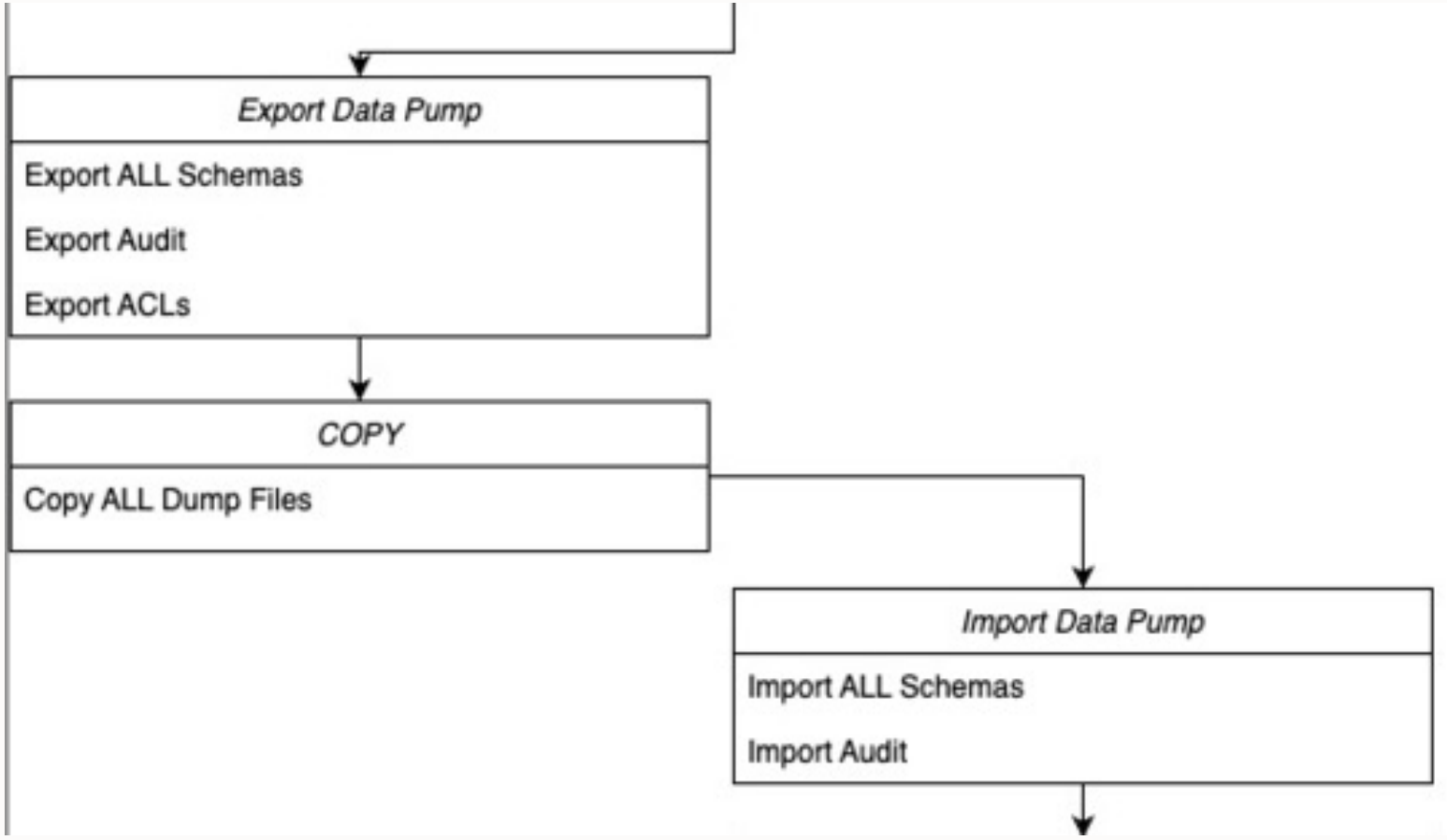
AMA – Autonomous Migration Automation

Export and import:



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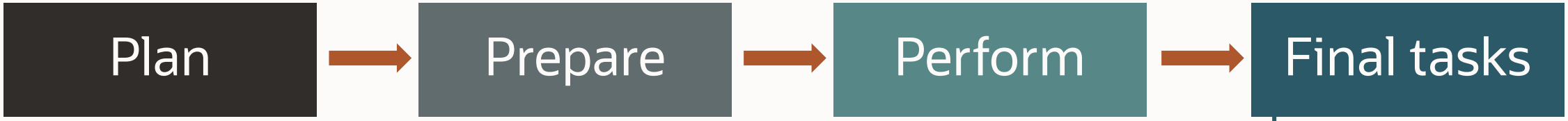
AMA Flow



- Cross-schema
  - Index creation
  - Foreign keys
- Grant privs
- Profile functions
- Profile adjustment
- Queues
- Recompilation
- Functional indexes
- … and much more

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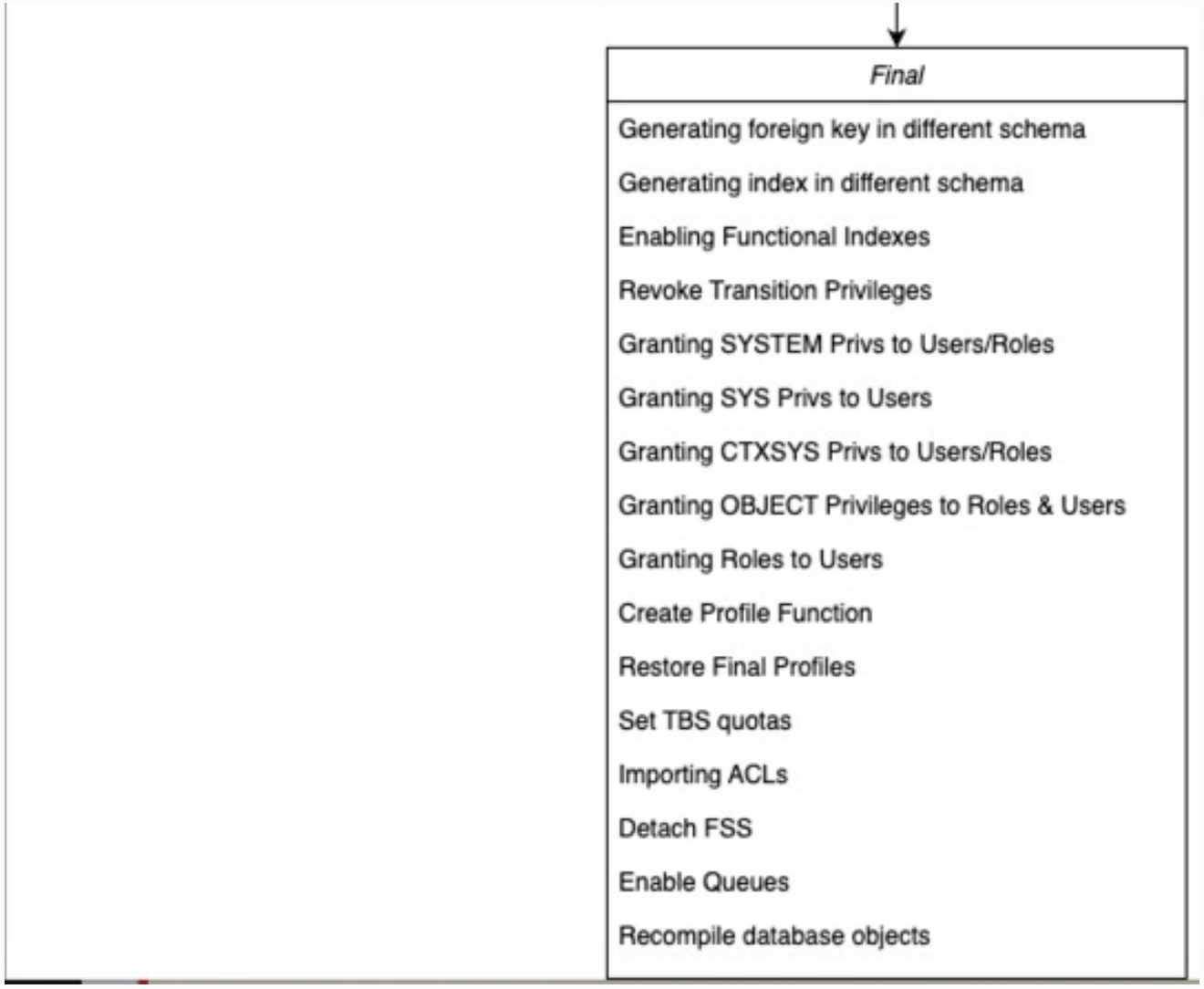
AMA – Autonomous Migration Automation

Final tasks:



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How does this look like?

Flow Chart Overview @Console

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```
[oracle@ephx31vm1-jlosd1 OUTPUT]$ cat __US3BLDW_MIGRATION_CONTROL_FILE.ctl

---
---
--- PLAN PHASE ---
--- All steps in this phase affect the source database ---
--- * You can collect the statistics or create the migration user in advance  ---
--- * Get familiar with the restricted session privilege and how to prepare it  ---
--- * shortly before the migration starts make sure no unwanted user is connected  ---
---   to the source database, turn on restricted session and disable the scheduler ---
---
---

    ####    S O U R C E    ####                                    ####    T A R G E T    ####

PLAN TARGET 00001 01 ..................................................... 00001_US3BLDW_SQL_ENABLE_OLAP_JAVA.sh
PLAN SOURCE 00002 01 00002_US3BLDW_SQL_OPTIONAL_SOURCE_STATS.sh
PLAN SOURCE 00003 01 00003_US3BLDW_SQL_CREATE_MIG_USER_SRC.sh
PLAN SOURCE 00004 01 00004_US3BLDW_SQL_SET_JOB_QUEUE_PROCESSES.sh
PLAN SOURCE 00005 01 00005_US3BLDW_SQL_ENABLE_RESTRICTED_SESSION.sh
---
```


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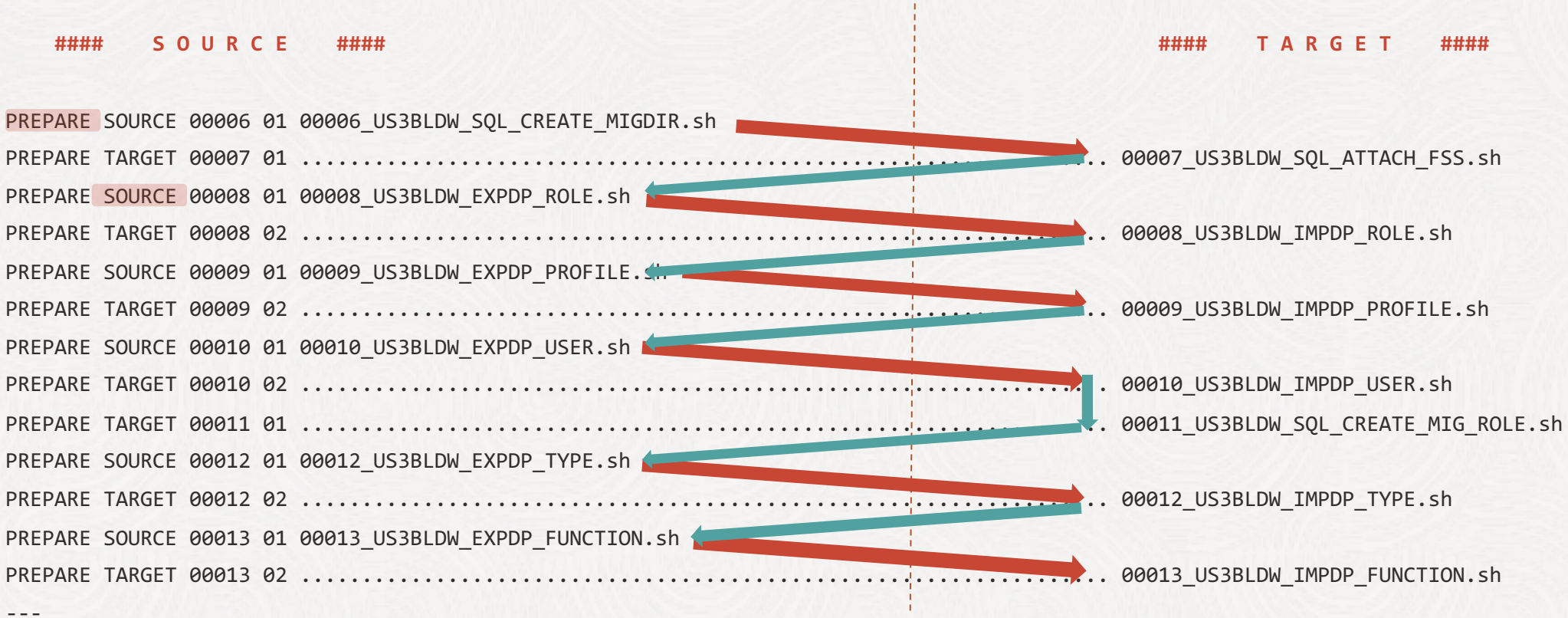
```
---
--- PREPARATION PHASE ---
--- All steps in this phase will prepare the source and target database ---
--- The scripts depend on each other, so execute in this phase one script after the other ---
---
---
```




```
---
```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```
---
--- PERFORM PHASE ---
--- Commonly in this phase nothing depends on each other (except you for example have objects that depend on objects stored in other schema) ---
--- So export jobs can be started in parallel and imports once the export finished ---
---
---
```

#### S O U R C E ####	#### T A R G E T ####
PERFORM SOURCE 00014 01 00014_US3BLDW_EXPDP_AUDIT_TRAILS.sh	
PERFORM TARGET 00014 02	00014_US3BLDW_IMPDP_AUDIT_TRAILS.sh
PERFORM SOURCE 00015 01 00015_US3BLDW_SQL_GEN_SQL_PROFILE_STAGE_TAB.sh	
PERFORM SOURCE 00015 02 00015_US3BLDW_EXPDP_SQL_PROFILES.sh	
PERFORM TARGET 00015 03	00015_US3BLDW_IMPDP_SQL_PROFILES.sh
PERFORM TARGET 00015 04	00015_US3BLDW_SQL_APPL_SQL_PROFILE_STAGE_TAB.sh
PERFORM SOURCE 00016 01 00016_US3BLDW_SQL_GEN_SQL_PATCHES_STAGE_TAB.sh	
PERFORM SOURCE 00016 02 00016_US3BLDW_EXPDP_SQL_PATCHES.sh	
PERFORM TARGET 00016 03	00016_US3BLDW_IMPDP_SQL_PATCHES.sh
PERFORM TARGET 00016 04	00016_US3BLDW_SQL_APPL_SQL_PATCHES_STAGE_TAB.sh
PERFORM SOURCE 00017 01 00017_US3BLDW_EXPDP_SCHEMA_FUSION.sh	
PERFORM TARGET 00017 02	00017_US3BLDW_IMPDP_SCHEMA_FUSION.sh
PERFORM SOURCE 00018 01 00018_US3BLDW_EXPDP_SCHEMA_FUSION_OCSERVER11G.sh	
PERFORM TARGET 00018 02	00018_US3BLDW_IMPDP_SCHEMA_FUSION_OCSERVER11G.sh

```
...
```


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```
---
--- POST PHASE ---
--- Here execute again all scripts one after the other as they might have dependencies again ---
---
---
```

#### S O U R C E ####	#### T A R G E T ####
POST TARGET 00081 01	00081_US3BLDW_SHELL_ROWCOUNT.sh
POST TARGET 00082 01	00082_US3BLDW_SQL_REMOVE_MIG_ROLE.sh
POST TARGET 00083 01	00083_US3BLDW_SQL_SYS_PRIVS.sh
POST TARGET 00084 01	00084_US3BLDW_SQL_CTXSYS_PRIVS.sh
POST TARGET 00085 01	00085_US3BLDW_SQL_DATAMINING_PRIVS.sh
POST TARGET 00086 01	00086_US3BLDW_SQL_OBJECT_PRIVS.sh
POST TARGET 00087 01	00087_US3BLDW_SQL_ROLE_PRIVS.sh
POST TARGET 00088 01	00088_US3BLDW_SQL_TBS_QUOTES.sh
POST TARGET 00089 01	00089_US3BLDW_SQL_DETACH_FSS.sh
POST SOURCE 00090 01 00090_US3BLDW_EXPDP_NETWORK_ACL.sh	
POST TARGET 00090 02	00090_US3BLDW_IMPDP_NETWORK_ACL.sh
POST TARGET 00091 01	00091_US3BLDW_SQL_SET_AQ_STATUS.sh
POST TARGET 00092 01	00092_US3BLDW_SQL_RECOMPILE.sh

```
---
---
--- END OF MIGRATION ---
```


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It can run automated ...

Work-in-progress

- Database links conversion
- External tables conversion
- XML binary conversion

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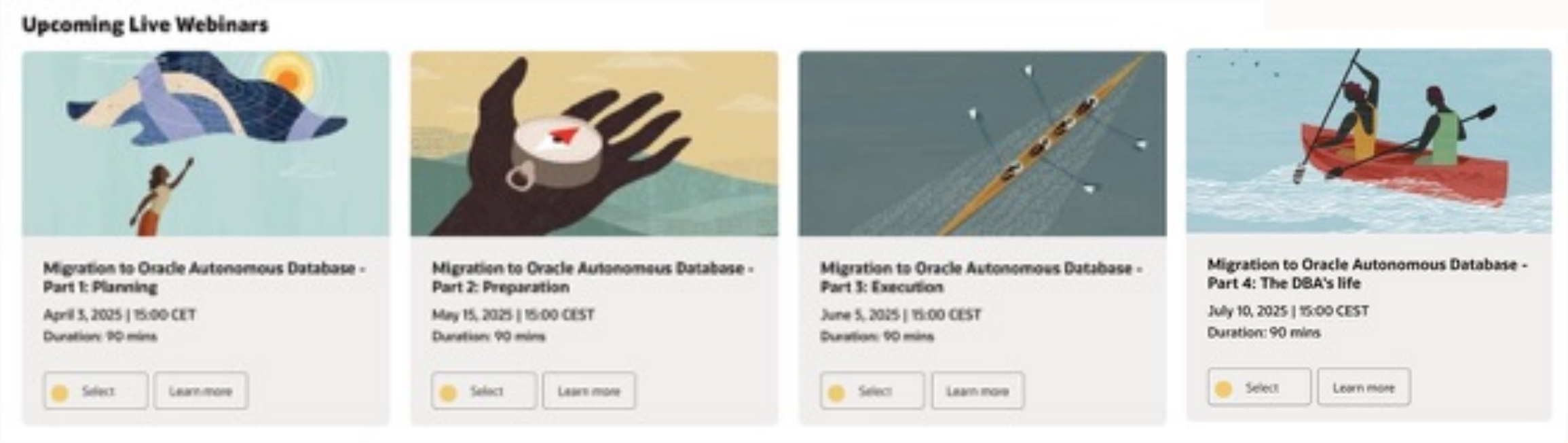
Virtual Classroom Seminars

https://go.oracle.com/LP=114938?elqCampaignId=341007



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Important Things To Consider

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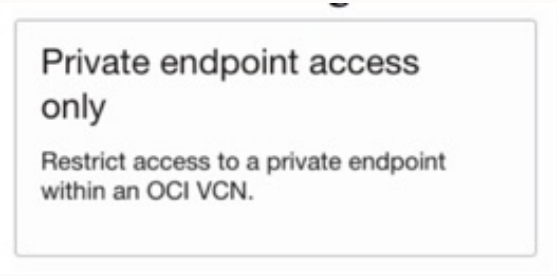
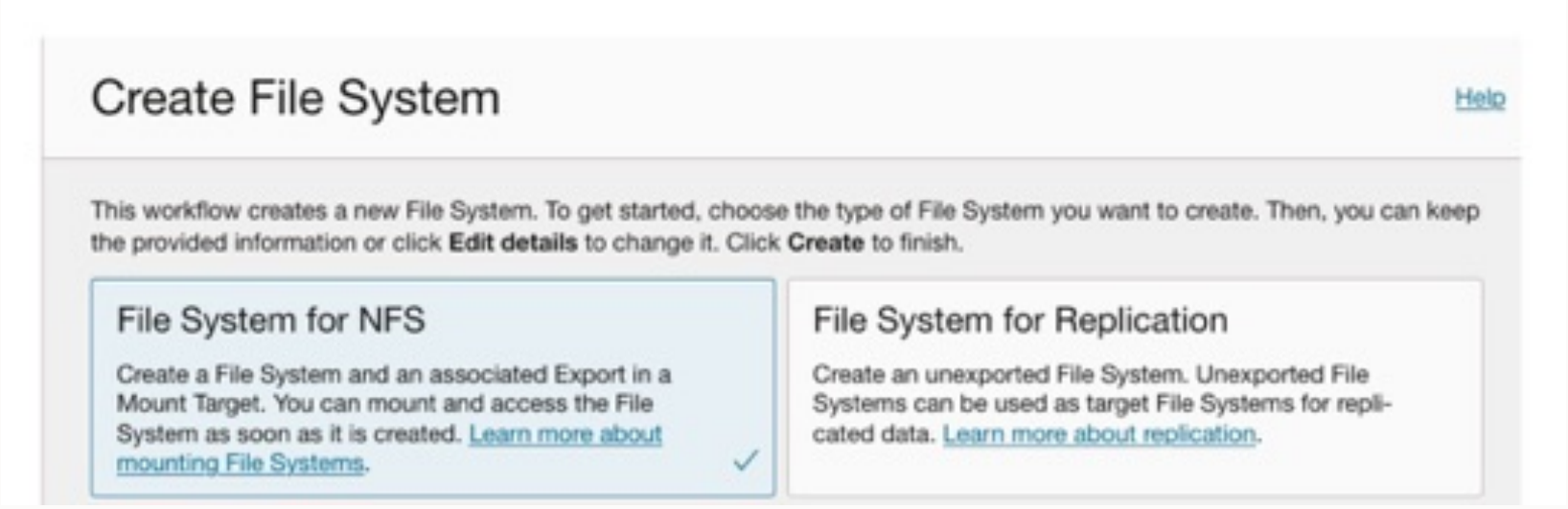
NFS vs Object Storage

We recommend to use NFS instead of object storage for the migration

- Easier to setup
- Performance seems to be better
- NFS requires "private endpoint access only"





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Pre-Defined Services to connect to ADB

Service	Parallel by Default	Resource Shares (when 100%)	Purpose
TPURGENT	Manual	12	Highest priority short-running queries
TP	N	8	short-running queries and transactions
HIGH	Y	4	low-concurrency analytic workloads
MEDIUM	Y	2	analytic workloads like long-running queries scanning large data sets, batch data load processes
LOW	N	1	short-running queries and transactions

For regular workloads, use TPURGENT, TP or LOW

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Tools out-of-the-box

SQL Developer Web

Web-based Function rich, low code development env

No client software needed

Oracle REST Data Services

Execute SQL and PL/SQL

Build Data Models, generate DDL statements

Monitor and manage the DB

APEX

Ability to REST enable a schema and autogenerate REST endpoints for tables, views, and procedures

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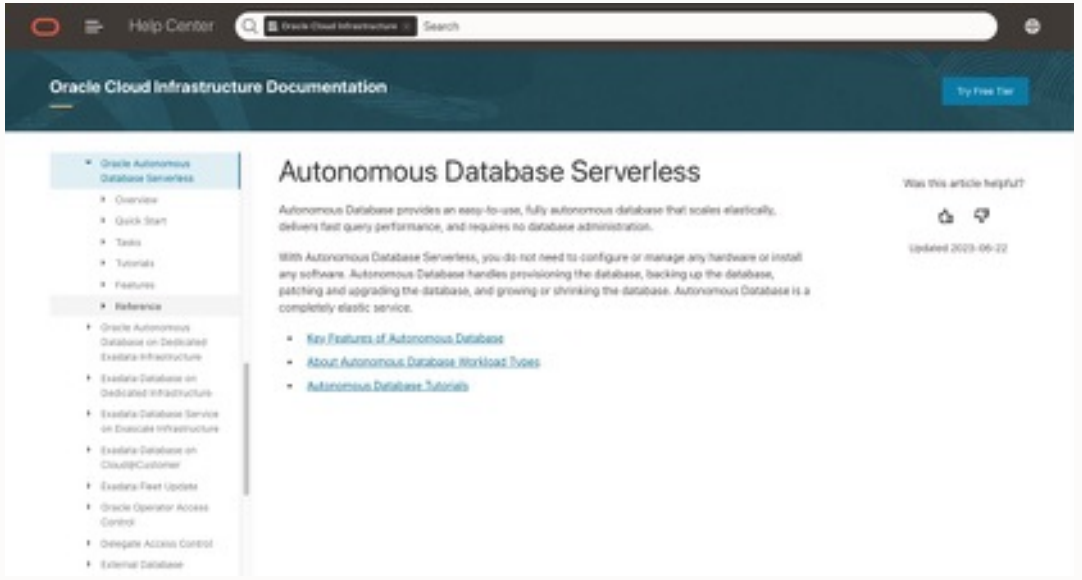
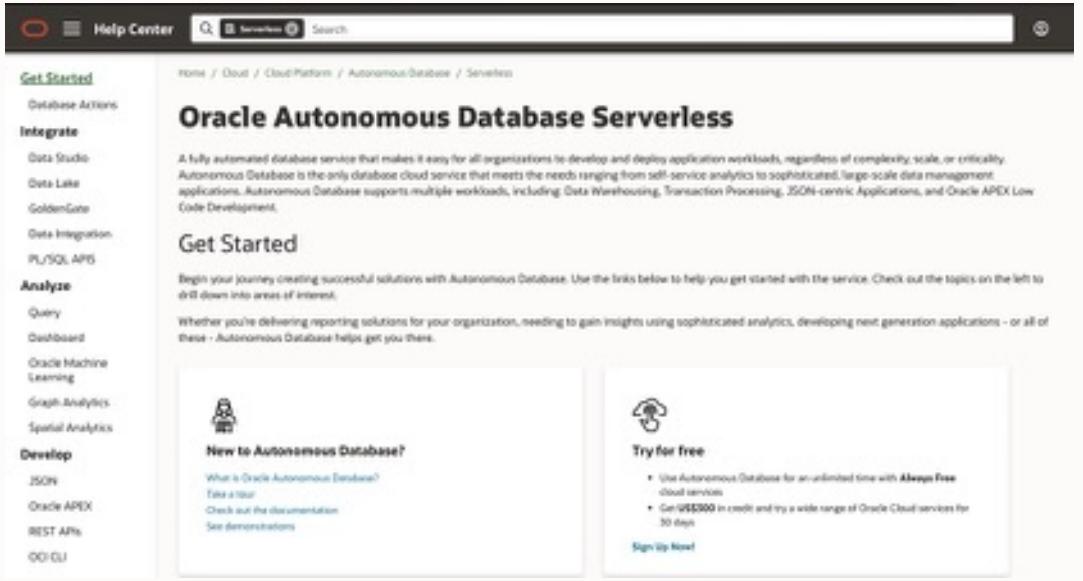
Autonomous Database Essentials



OCI Documentation for everything "outside" the database

i.e deploy, start-stop, manage through the console

https://docs.oracle.com/en-us/iaas/autonomous-database-serverless/index.html



Database Documentation for everything "inside" the database

i.e. schema, capabilities, using the database through a connection

https://docs.oracle.com/en/cloud/paas/autonomous-database/serverless/index.html

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Do you plan to migrate to Autonomous Database?

Talk to us – we will guide you!

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Key Learnings

1. Find the right candidates for ADB
2. Follow our migration approach
3. Ask us about your ADB migration project

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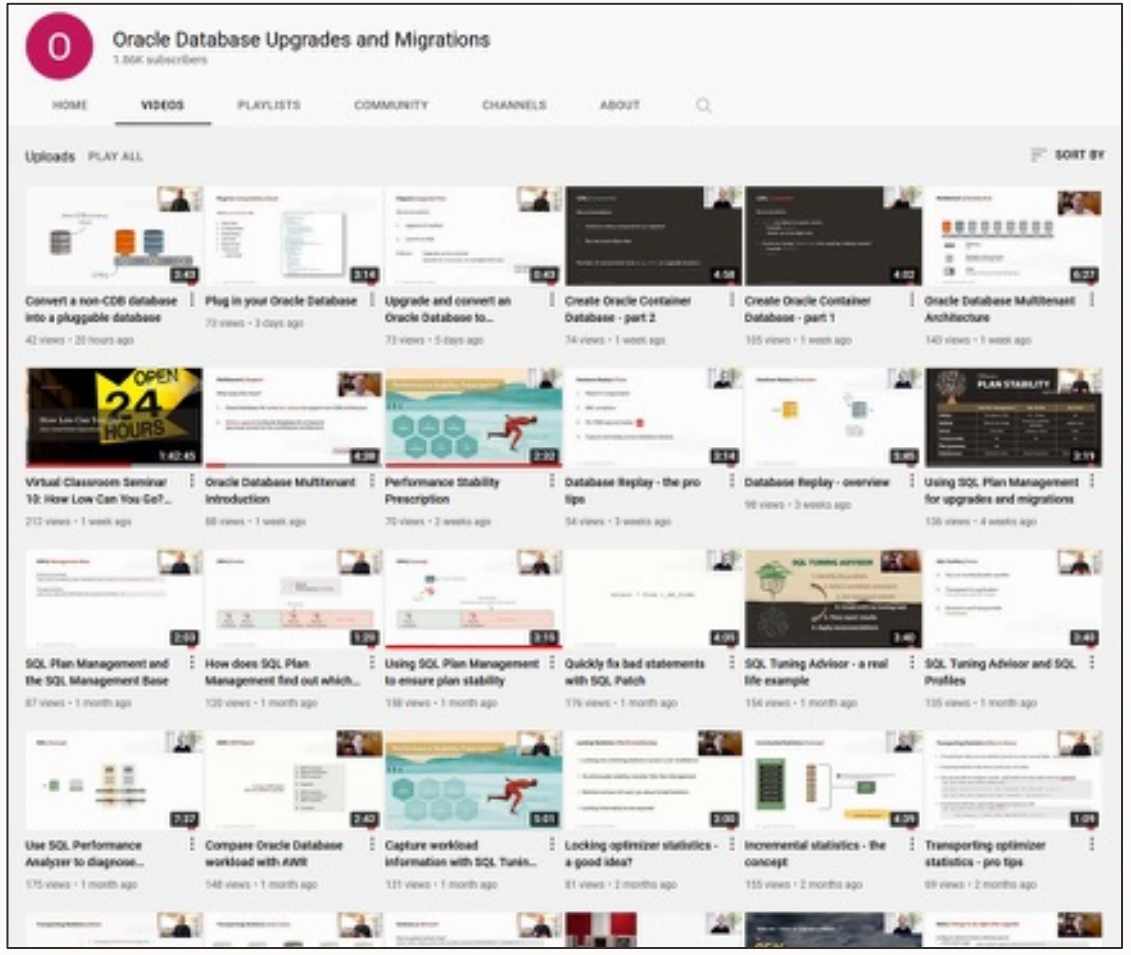
YouTube | Oracle Database Upgrades and Migrations



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- New videos every week
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Thank You

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