AMIS
CONCLUSION

MOVING AN ENVIRONMENT WITH CONFIDENTIAL DATA TO OCI

Mark Koreman & Jeroen Gouma

DISCLAIMER

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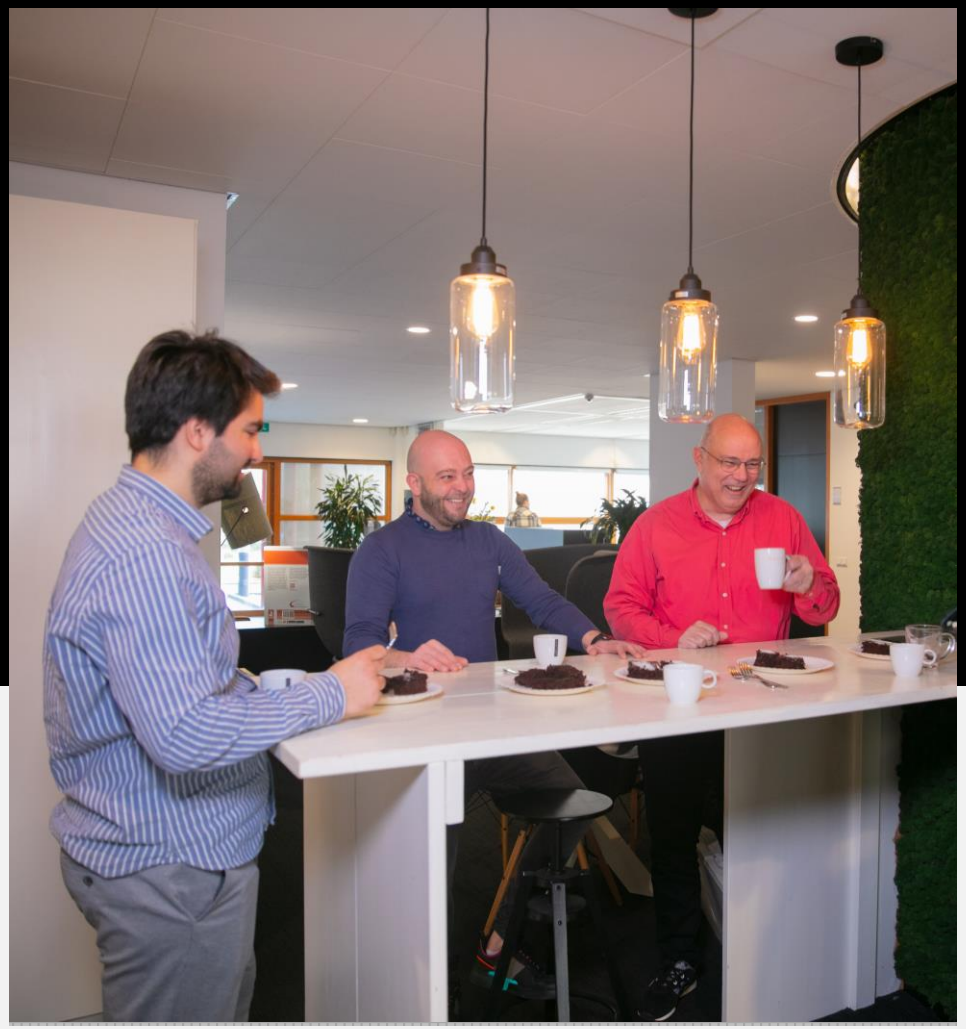
Some information can't be disclosed due to the nature of the environment



AGENDA

INTRODUCTION

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Mark Koreman

Principal technical consultant

Database specialist

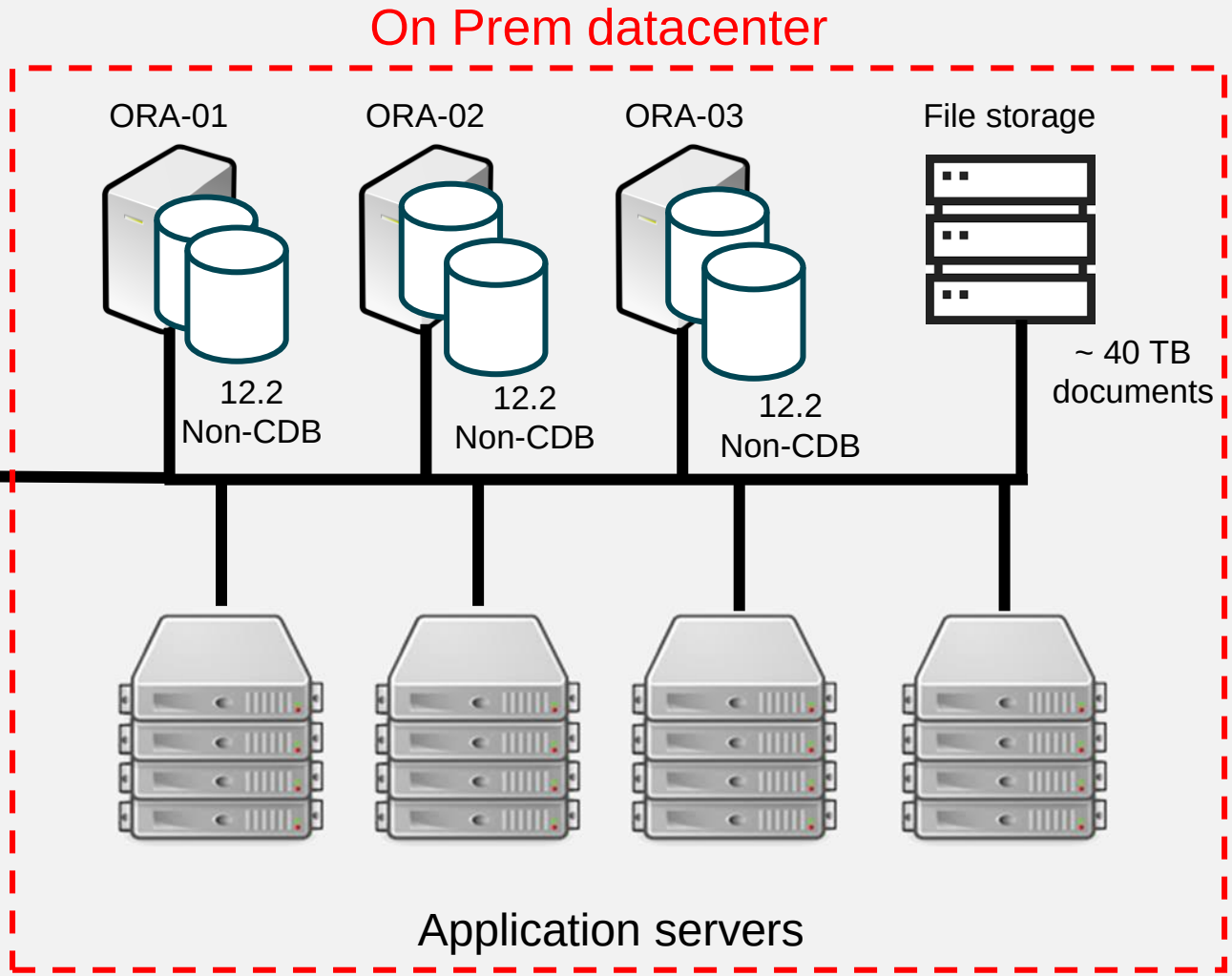
Jeroen Gouma

Principal technical consultant

Cloud migrations

INITIAL SITUATION

- Hardware out of support
- Oracle license renewal
- Database upgrade required



SOME FACTS

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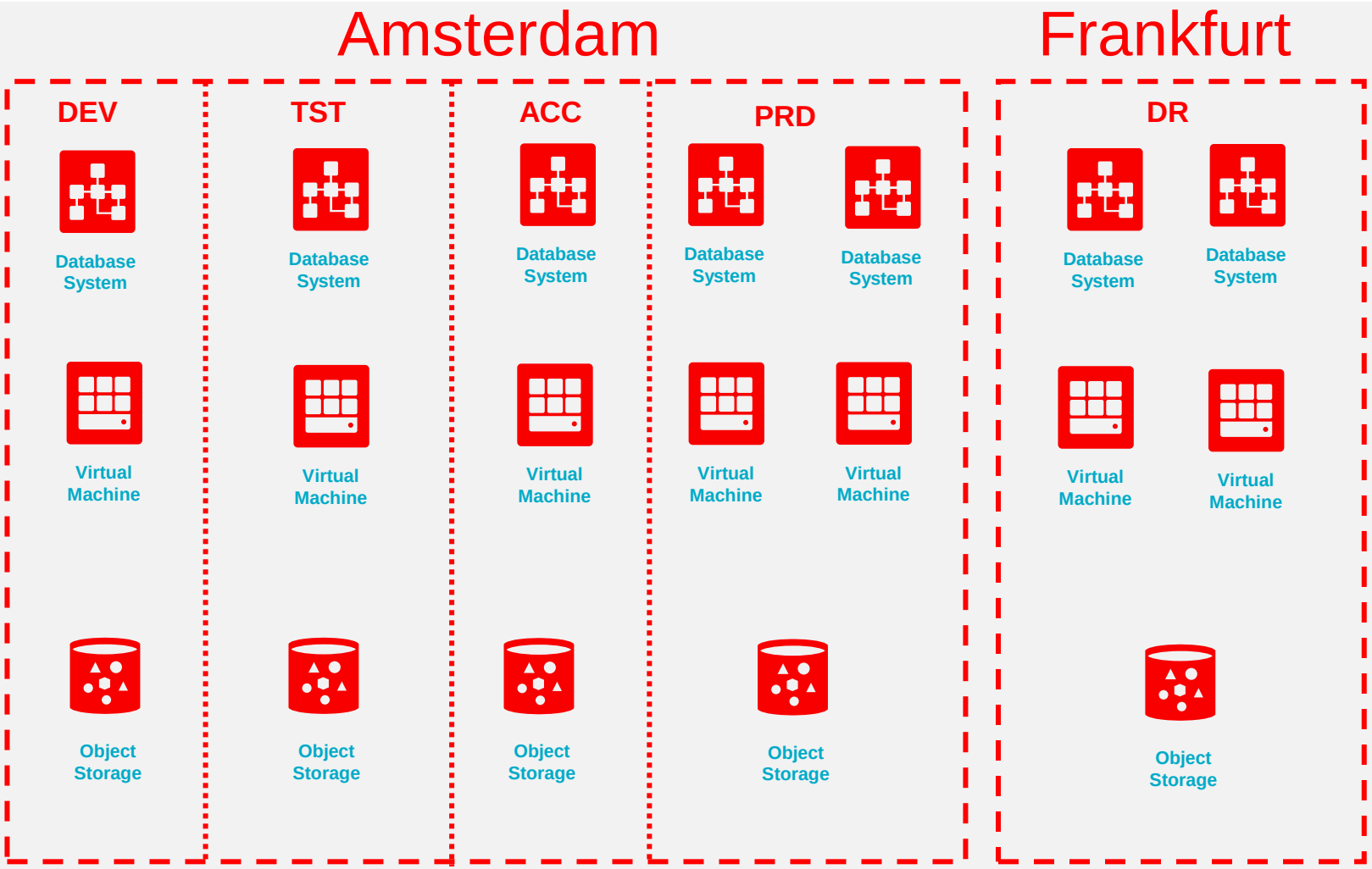
- 3 production environments
- Largest production database 8 TB data, 2 others < 256 GB
- Oracle 12.2 (approaching out of support)
- Dataguard
- Active Dataguard
- External parties query directly to database (via active Dataguard)

TARGET SITUATION



CHALLENGES ON PREMISE SITUATION

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- 5 environments (dev/tst/3xprd) are all different (size, time settings, schema's)
- Time settings and time zones are (mis)used in all possible ways
  - (OS, DB-timezone, NLS-settings, listener, etc.)
- Migrate from single instance to multi-tenant
- Application's not really up-to-date (JDBC Drivers out-dated)
- Knowledge of current situation scattered around
- Multiple parties involved (also external)
- Cloud is a different game to play ☺

MIGRATION REQUIREMENTS AND DOUBTS

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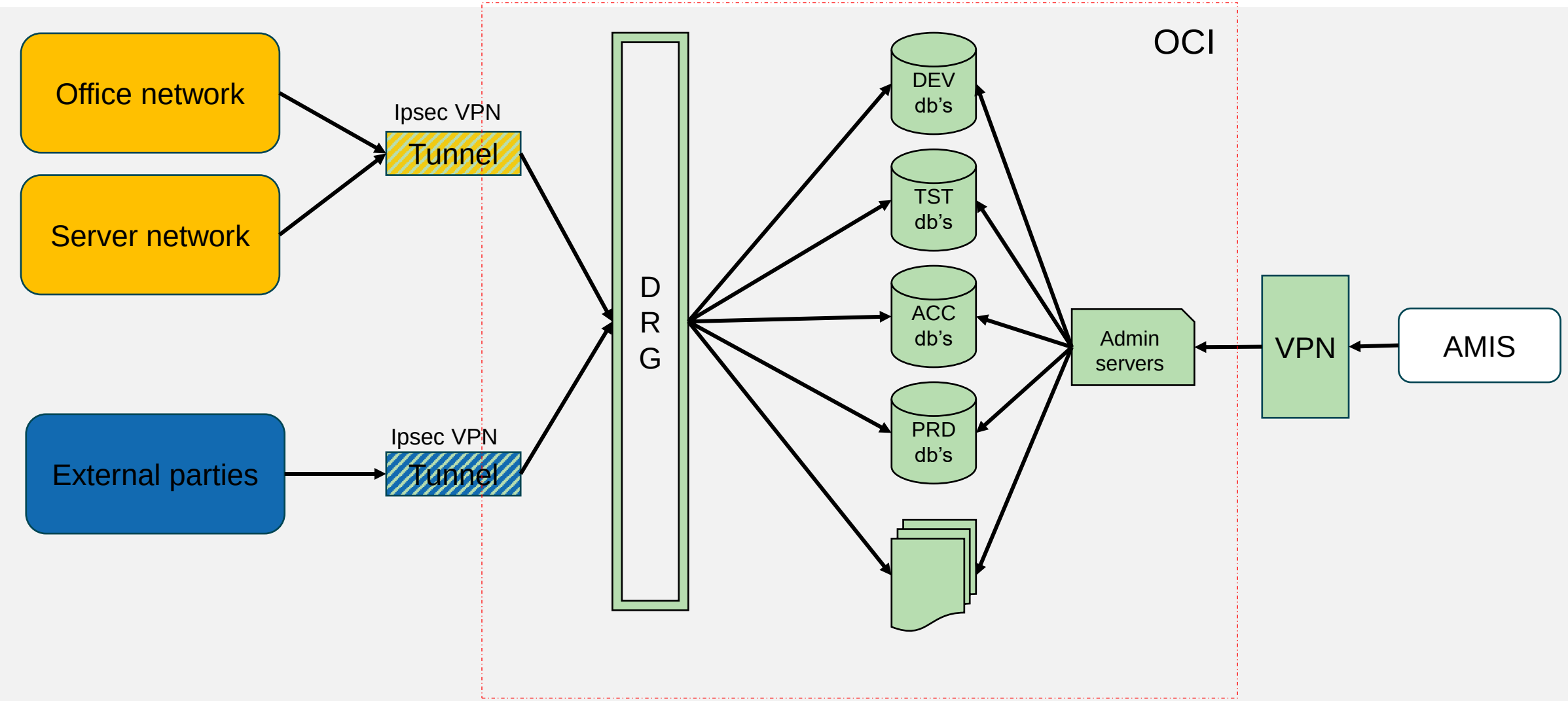
- **Requirements:**
  - Downtime close to zero as possible
  - 7 day window to rollback without data loss
  - Use secure/encrypted sqlnet connections
- **Doubts:**
  - Previous migration was a disaster, Fear !
  - Performance during peak hours
  - CPU power
  - Connectivity & bandwidth between on-prem and OCI

SIMPLIFIED NETWORK LAYOUT



ROAD TO NEW WORLD

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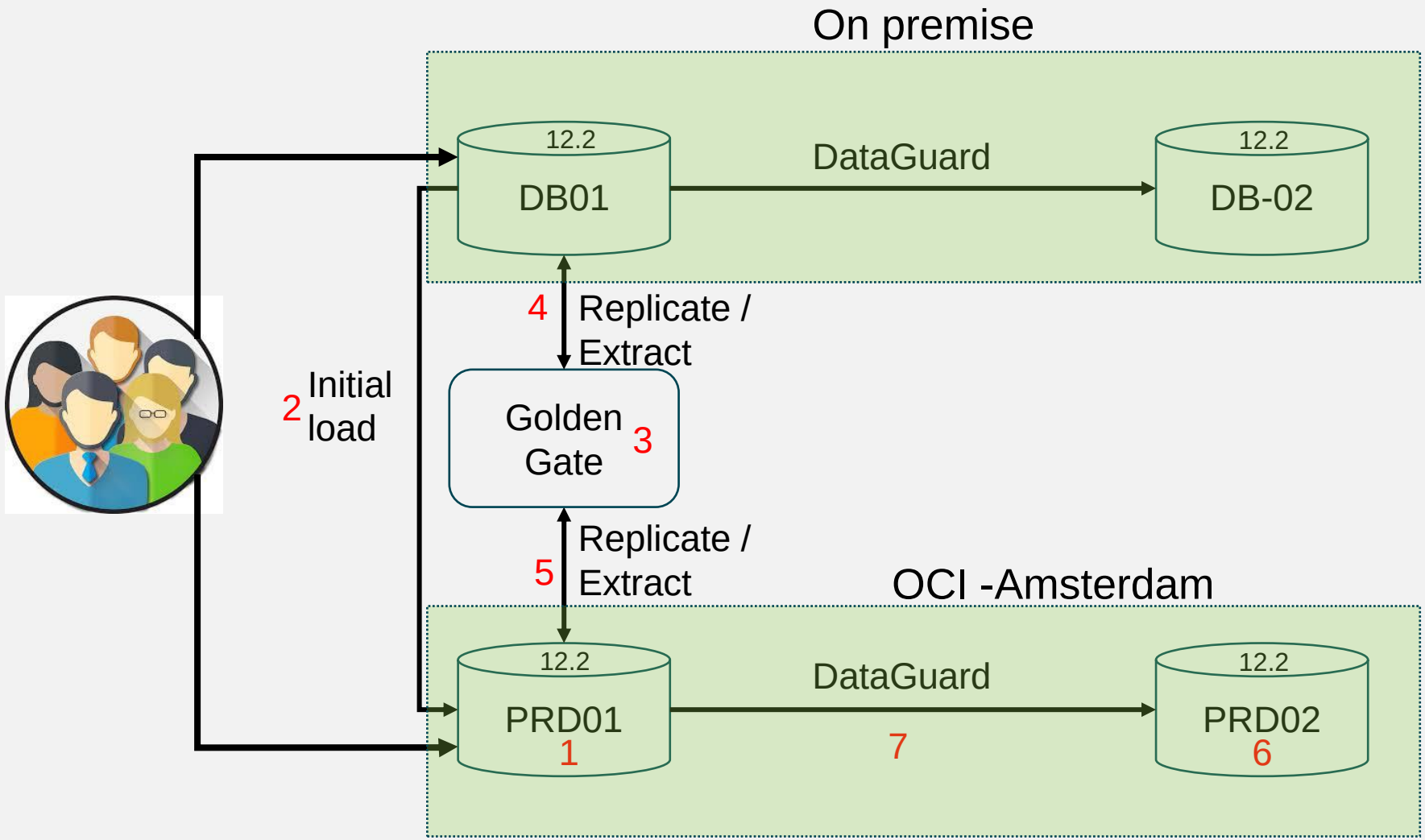
- **Migration methods**
  - Refreshable PDB for initial load
  - Golden Gate bi-directional
- **Points of attention:**
  - Sequences
  - DDL changes
  - New schema’s
  - Application database jobs
  - Moving from non-CDB to CDB requires all application related scripts to be adapted
  - Connectivity

MIGRATION PLAN



AND THEN… MIGRATE

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- First (small) production migration was succesfull
- Largest PRD environment failed ☹
  - Huge amount of memory required, a lot more then expected

    SGA is huge
  - Focus too much on CPU
- Fall back scenario not properly tested, stress, caused 1 hour downtime during peak hours

PRODUCTION MIGRATION V2

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- Same scenario, but with lot more CPU (so more memory, 1 CPU= 16 GB MEM)
- **On prem:**
  - CPU 2 with each 8 cores
  - Memory 256 GB
- **OCI:**
  - CPU 40 with each 2 cores
  - Memory 640 GB
  - OS 50% 320 GB
  - Database 50% 320 GB
- Migration was successful, all databases running in OCI

CAPACITY ISSUE'S IN DC OCI AMSTERDAM

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- Oracle 12.2 no longer available, support on 12.2 ending abruptly
- Extension for usage on 12.2 was granted

- E4 hardware limited available

- Oracle 12.x only on E4
- Oracle 19.x only on E5

- Same scenario as migration

BEING BETTER PREPARED

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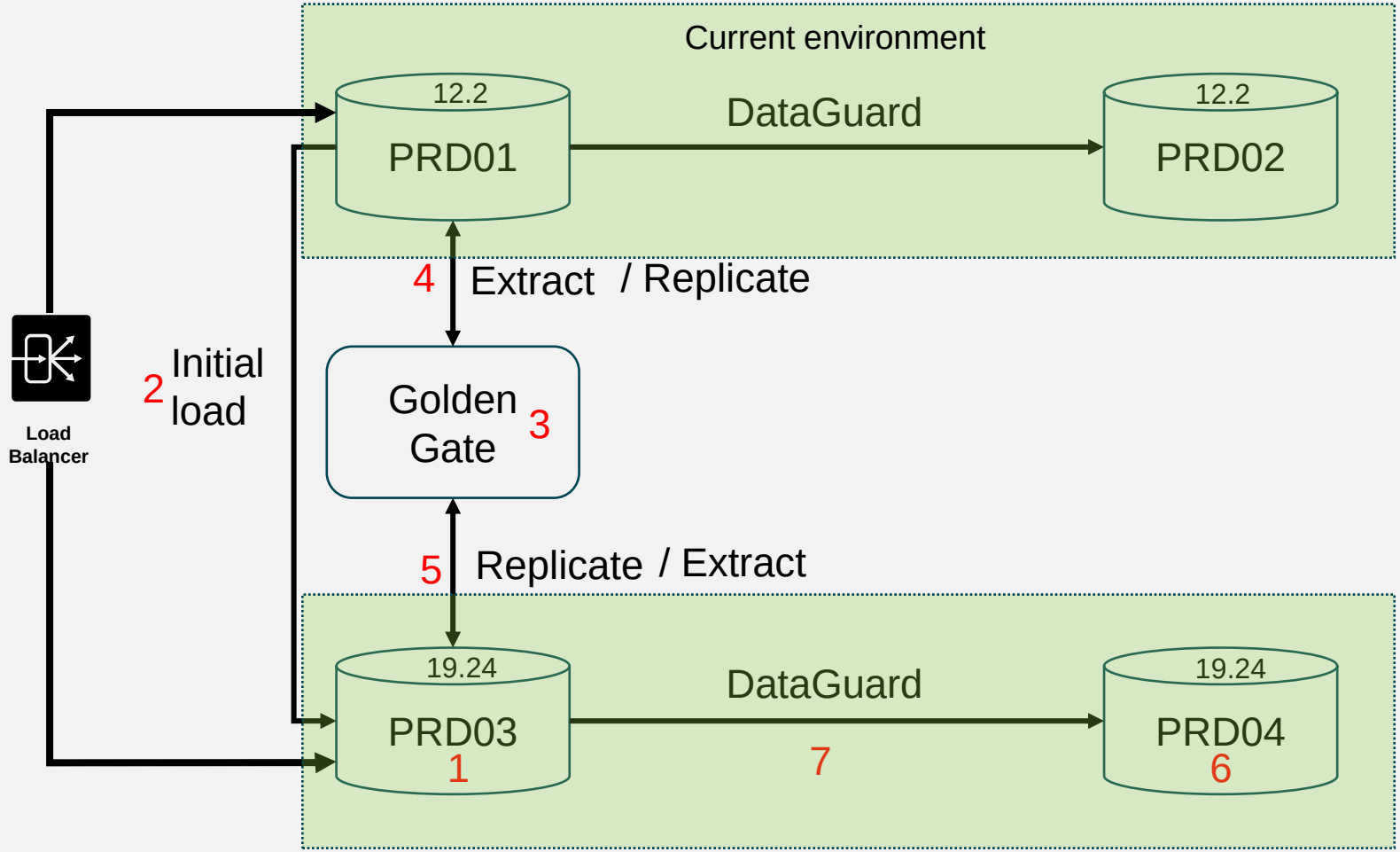
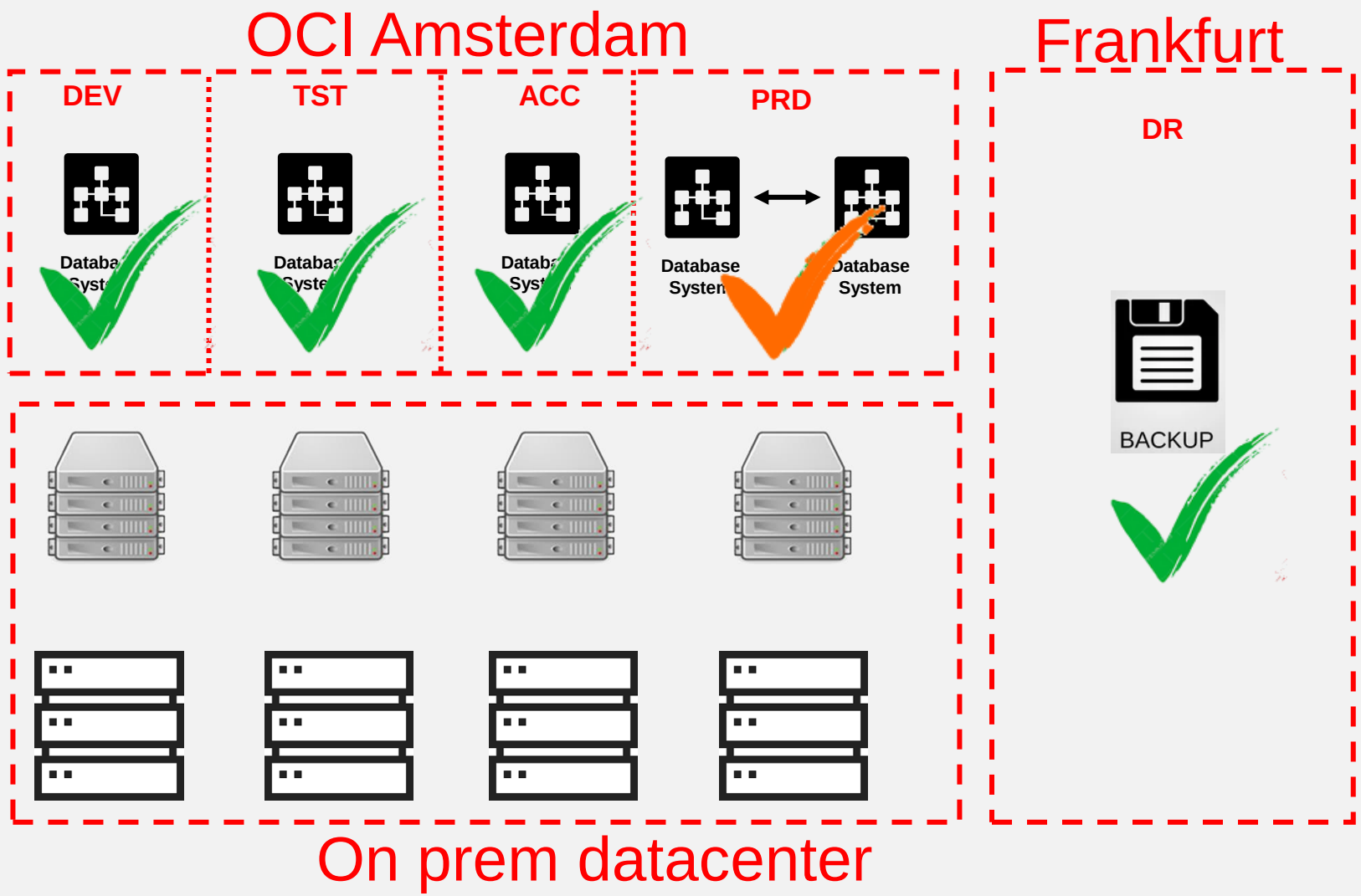
- Real Application Testing (AKA : RAT)
- Solve application specific issues

  High number of child cursors
  Unbalanced indexes
  Use of sql profiles
  Use of bind variables

UPGRADE PLAN DATABASE



CURRENT SITUATION



POST MIGRATION & UPGRADE

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- Query improvements
- CPU further downscale
- Password rotation (new feature in 19)
- Unified auditing
- Use OCI native (sometimes free) services where possible:
  - Datasafe
  - Datamasking
  - Unified auditing
  - Zero Data Loss Recovery Service

- Move application servers and file storage to OCI

- Compare **all** (database) settings
- Do not focus on only CPU or Memory
- Have a thoroughly tested fallback scenario
- Prepare for the worst
- Lifecycle management is crucial

Working on cloud migration?

Planning cloud migration?

WHAT'S NEXT…

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- **Continuous performance improvements**
  - Query hints
  - Database settings
  - Index rebuild / Index monitoring
  - SQL profiles
  - Use of bind variables
  - ….
- **Security**
  - Auditing database activities (who, what, when)
  - Password rotation
  - Secure connections to database
  - Privilege analysis (rule of least privileges)
- **Migrate application server to OCI**
  - Upgrade to latest Linux
  - Upgrade to new(est) appserver version
  - Upgrade to newest jdbc driver
- **Migrate storage to OCI**
- **Direct connection between Azure and OCI**
- **Create full DR environment in Frankfurt**
- **Improve performance & stability testing**
  - RAT (Real Application testing)