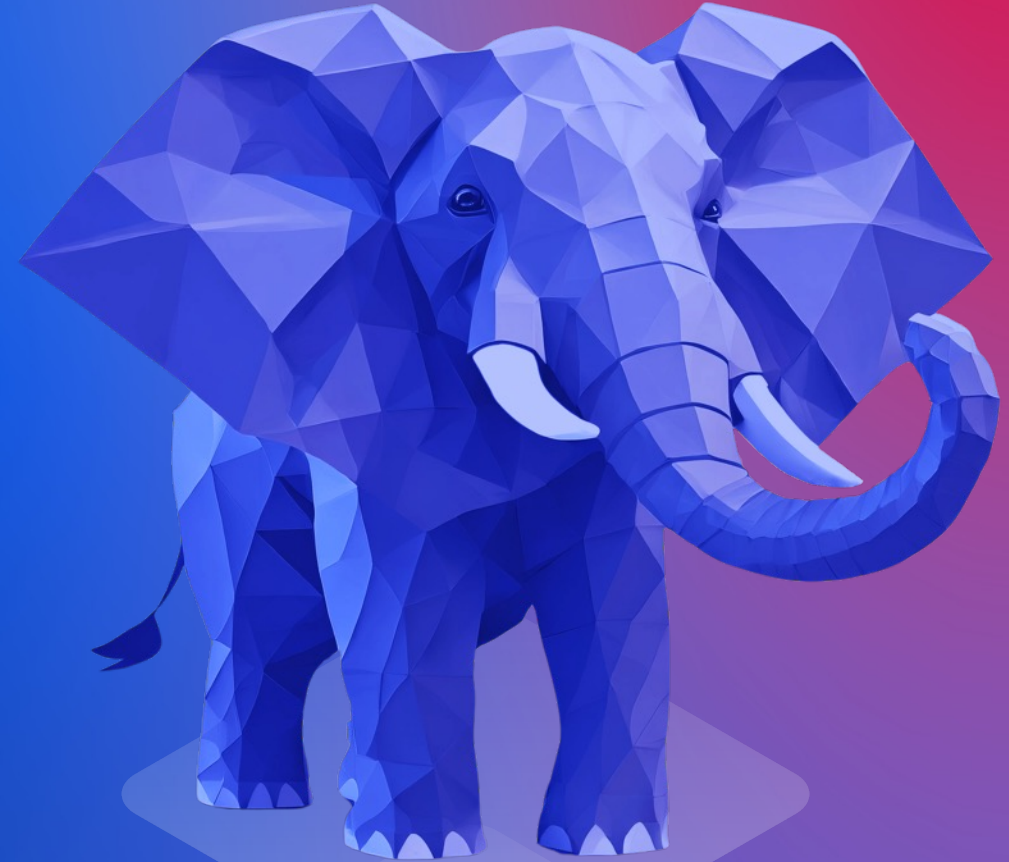


PostgresPro

**Reliable &
High-Performance
Postgres
for big Enterprises**

Andrey Fleyta
flute@postgrespro.com



More details
about
Reliability features



Tomorrow

12:15

Neptune room

Information
about
Everything

At our booth.
Just turn right



Bigger OLTP instances

n*10TB

DB sizes

300+

CPU cores

1TB+

memory

1000+

connections



Postgres Pro Enterprise

High-performing, safe, reliable and scalable DBMS for large enterprises

10 000+

Simultaneous user connections

150+ TB

Database size

3 sec

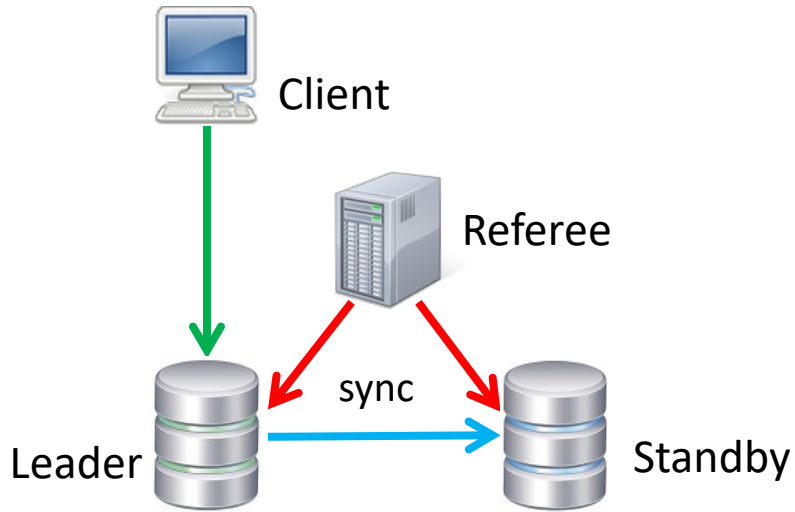
Max failover time



Key features

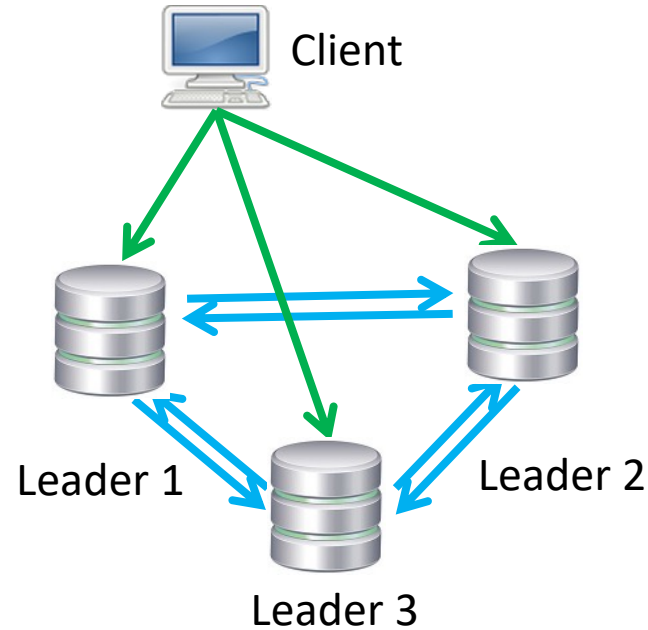
- Built-in High Availability cluster (BiHA)
- 64-bit transaction IDs
- Symmetric fault tolerant cluster (Multimaster)
- Superfast incremental backup
- Advanced adaptive query optimization
- Effective table partitioning
- Compressed File System (CFS)
- Control over resource-intensive operations
- Autonomous transactions
- Data masking
- Postgres Pro Enterprise Manager
- Oracle-style packages
- Ora2pgpro utility
- pg_proaudit extension for detailed logging of various security events
- Advanced authentication policies
- External files (BFile) support
- PL/SQL collections
- Clearing allocated memory and disk
- ...and many others.

HA and scalability



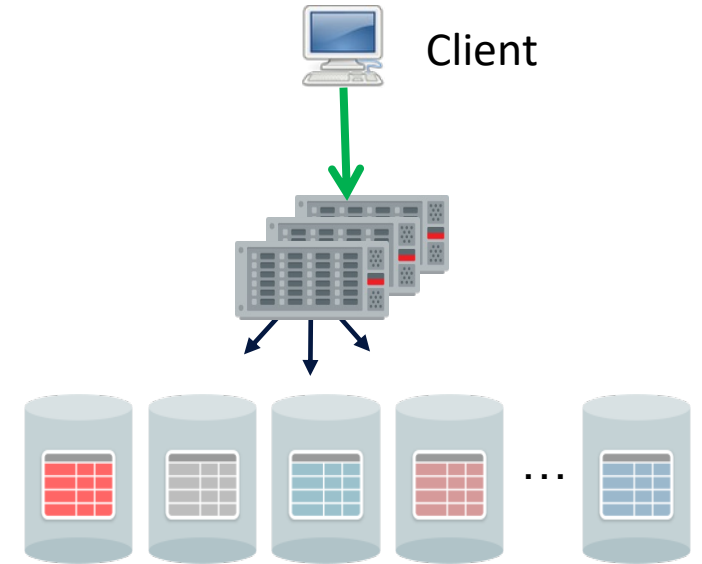
Replica (Standby)

DR, HA, Scalability



Multimaster

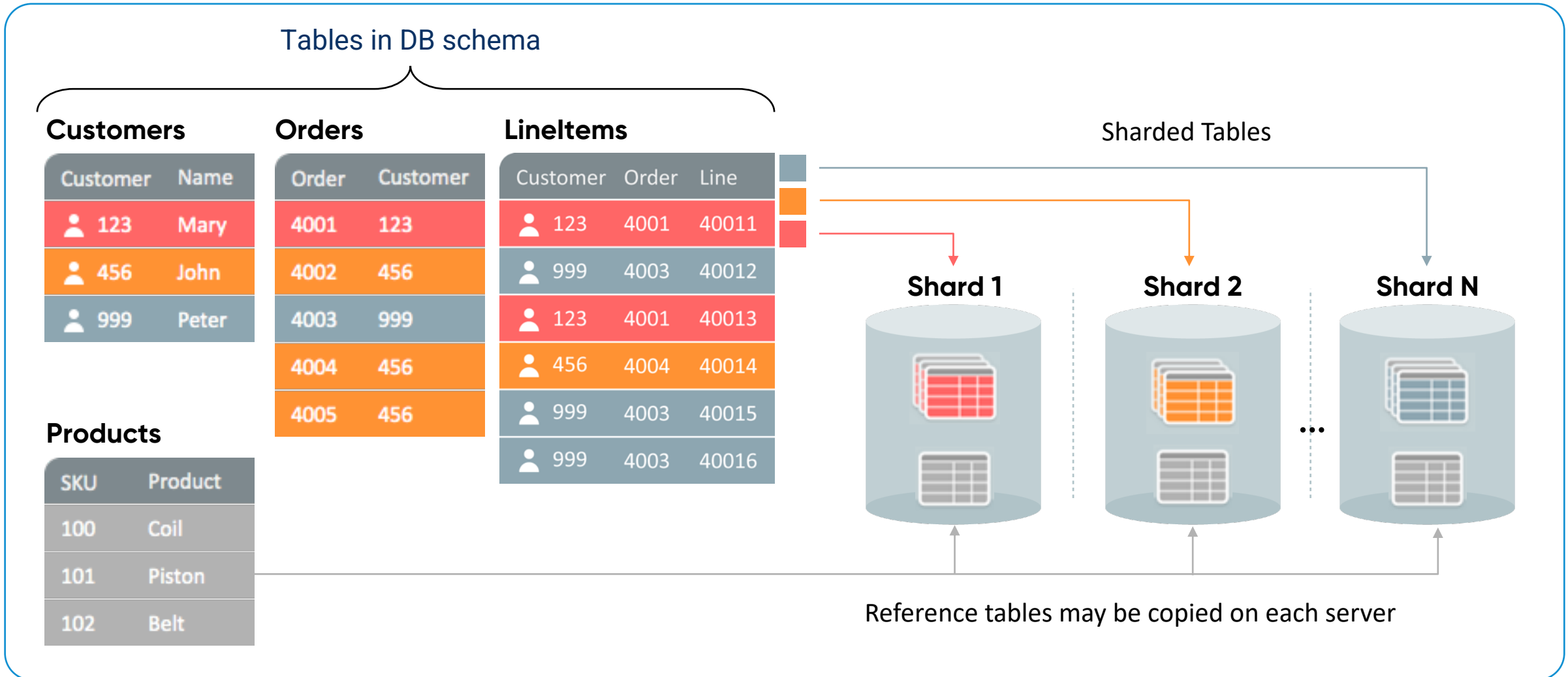
RTO, RPO = 0,
Minimum time of switchover
HA, Scalability



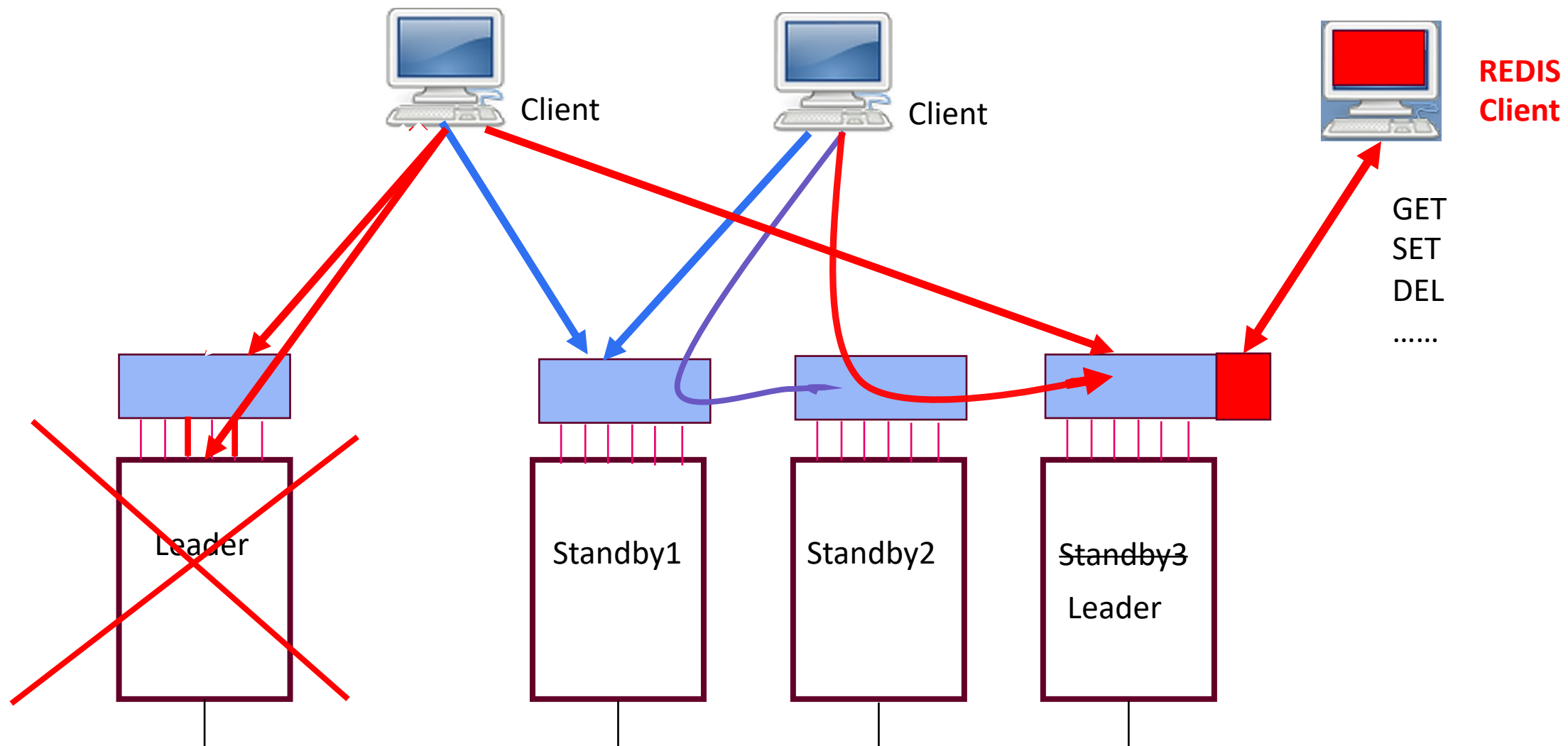
Sharding

Remove limitation on DB size
Scalability

Sharding

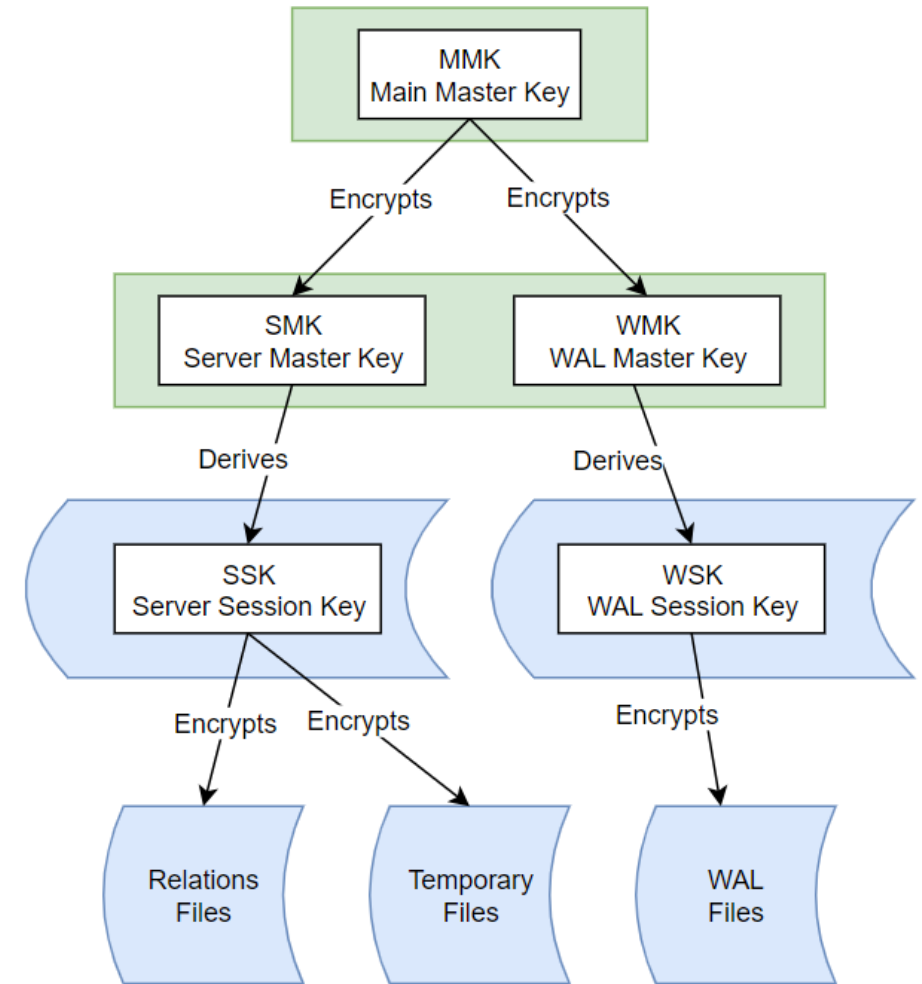


Proxima = Proxy + Pooler + Cache + Load Balancer



Security

- TDE – in 17th version
- Role and user management
- Extended password management (password policy)
- Extended audit
- Data Masking (static and dynamic)
- Superuser blocking (DB admin and DBMS admin)
- Admin without data access (protected schema)
- Analysis for unneeded rights



Performance

- Compression reduce i/o
- A lot of optimization in data caching, indexing, planning
- AQO – adaptive query optimization (ML planning help)
- AQE – adaptive query execution (replanning during processing)
- Query Replan
- Hints + PG_hint_plan, plan freeze, plan management
- Lot of indexes
- Partitioning with many optimizations
- ILM
- Pg_PWR for analysis
- Optimization for multicore computers



Postgres Pro Machine



- Integrated hardware and software
 - High-throughput low-latency interconnect
 - Special synchronization of the nodes
 - Redeveloped nodes communication and replication
 - RDMA
-
- Dramatical improve in tps for Postgres Pro Shardman
 - Valuable speedup of streaming replication

HTAP Support



- Processing OLTP & OLAP in single instance



- Moving part of the data to external S3



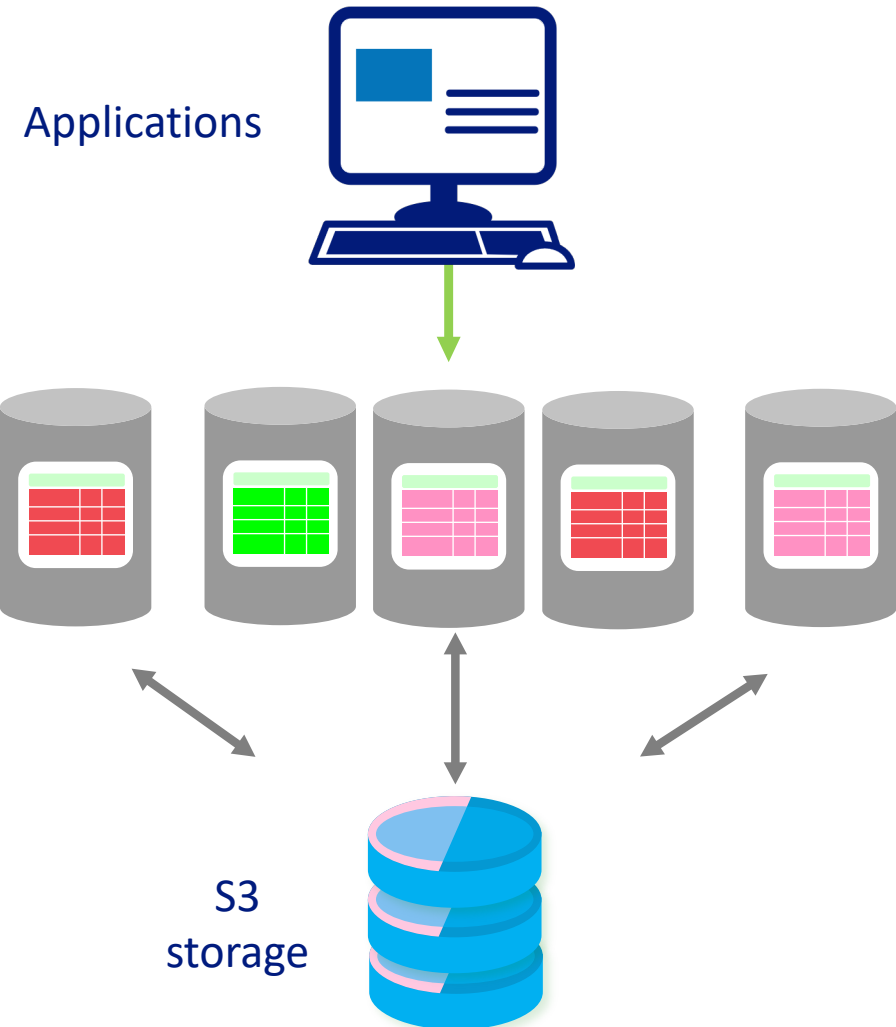
- Single point of access to the whole amount of data



- Columnar storage + Compression



- Standard formats at S3



10 years

On the market,
since 2015

>29 years

Experience in
PostgreSQL

№1

Among non-American
PostgreSQL contributors,
№2 in overall global ranking

>300

Customers including
leading government and
business companies

>400

**Specialists in
the team**

Including
PostgreSQL
Major Contributors

>100 patches

Committed to each annual
open source PostgreSQL
release

>\$25 mln

Invested in Postgres development



Support for Enterprises

- 24x7 + SLA
- Bug fix guarantee
- Support many HW platforms
- Support OS versions customers used
- Professional services
- Training & Certification
- Migration

6

hardware
platform

5

variants of
DBMS

5

major
releases

35

OS versions

>100

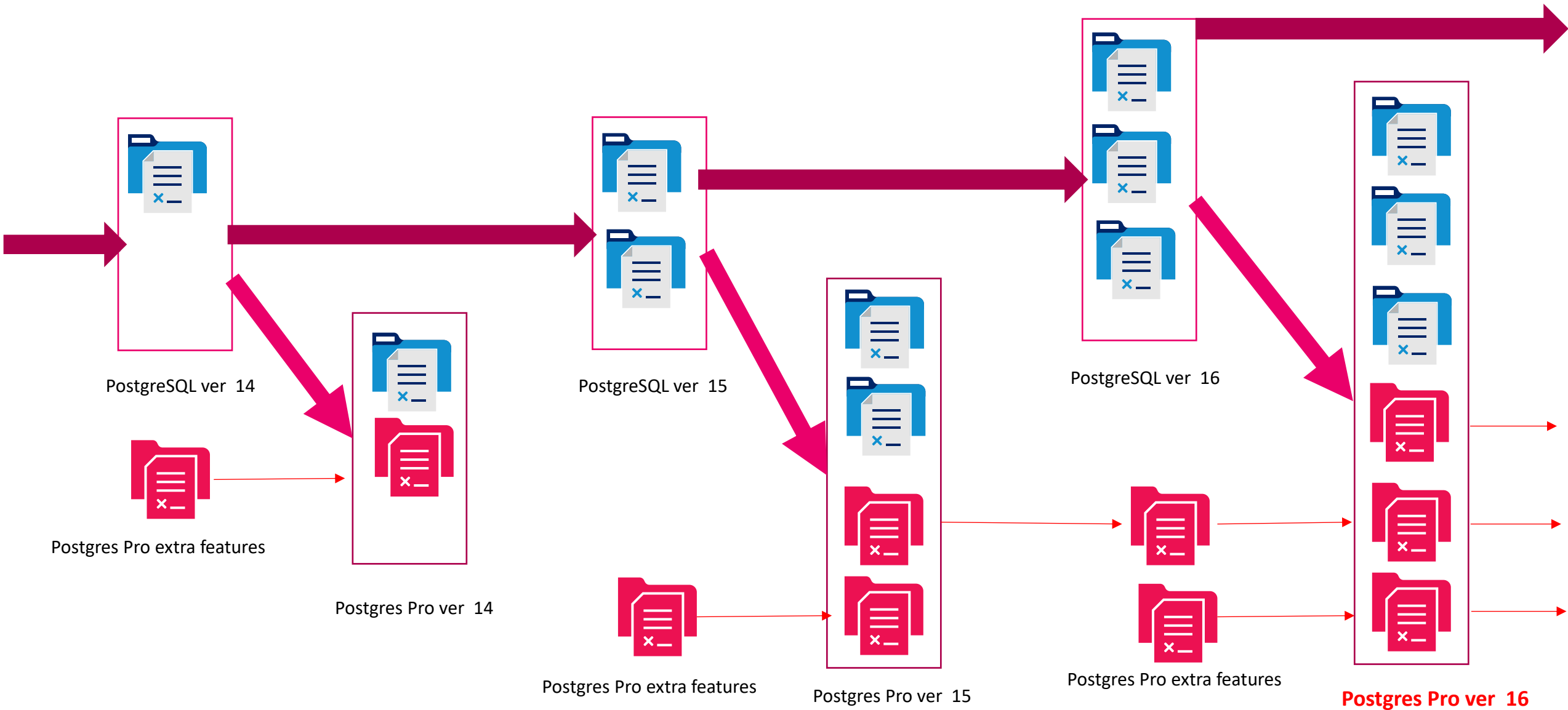
DBMS versions
released

~70 000

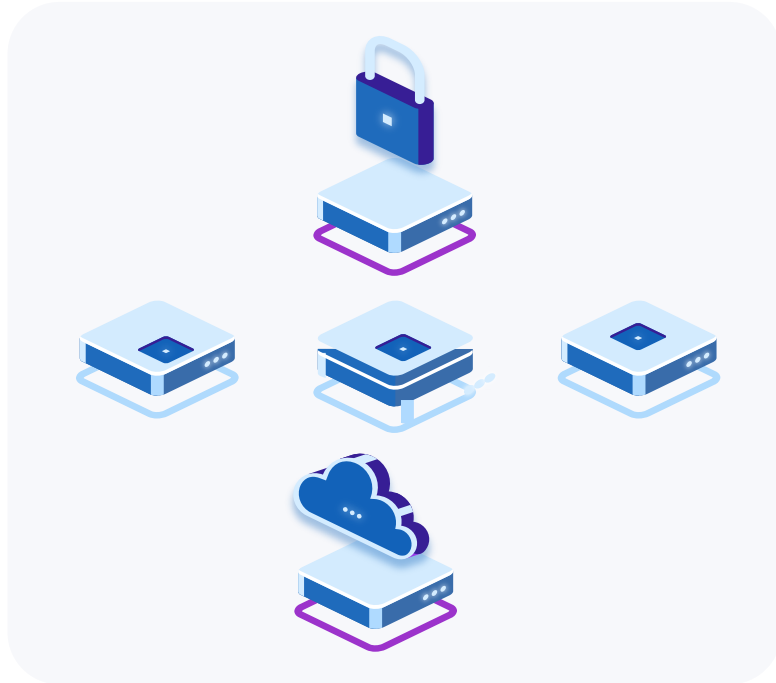
packages assembled
and tested



Release process



Postgres Pro Advantages



Performance

Up to 2 times better performance compared to PostgreSQL

Scalability

Shardman and Multimaster

Reliability

Built-in High Availability cluster

Easy Management

Postgres Pro Enterprise Manager

Easy migration from Oracle

Oracle-style packages, ora2pgpro utility and others

Safety

Embedded data security tools

Price

Up to 10 times more cost-effective compared to other popular solutions

Work with VLDB and heavy workload

WEEKDAY_PLAN

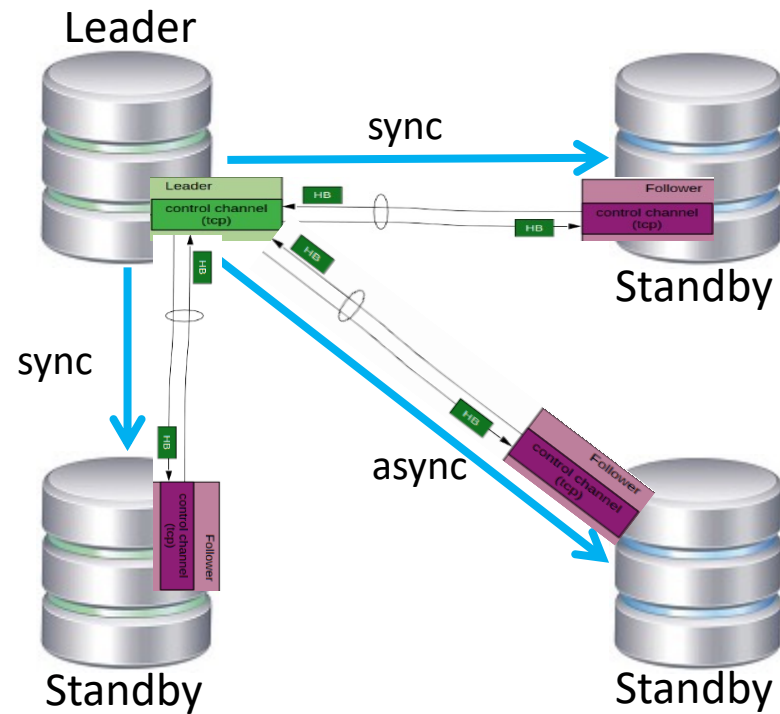
Resource Consumer Group	Resource Plan Directives
Order Entry	CPU = 1 Read priority = 4
Shipping	CPU = 2 Read priority = 4

NIGHT_PLAN

Resource Consumer Group	Resource Plan Directives
Billing	CPU = 4 Read priority = 4
Order Entry	CPU 2 Read priority = 2
Shipping	CPU = 2 Read priority = 2

- Workload distribution – replica, multimaster, sharding
- Partitioning, interval and ref partitioning, auto creation
- Vertical scalability to 1000+ processes
- Compression (CFS)
- 64 bit xid counters
- Resource manager – priority for cpu, io_read, io_write using

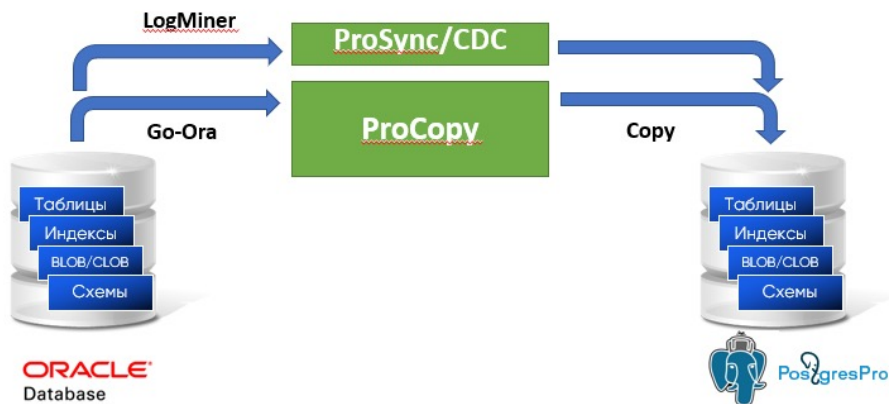
Built in High Availability (BiHA)



- Much simpler to install, configure and support
- Automatically select new Leader in case of failure
- Switch nodes outside the cluster in read-only mode
- Has no drawbacks of external cluster software

- Single point of authentication
- SSL support
- Clients can connect to any node
- Detect Leader on-the-fly
- If Client creates session objects (temporary objects, prepare statements...) it is linked to dedicated backend process.
- Dynamic dedicated mode
- Redis cache
 - In-memory key-value storage
 - Fast access by the key
 - SET/ GET/ GETSET/ DEL/ ...
 - Invalidates data if they changed in DB

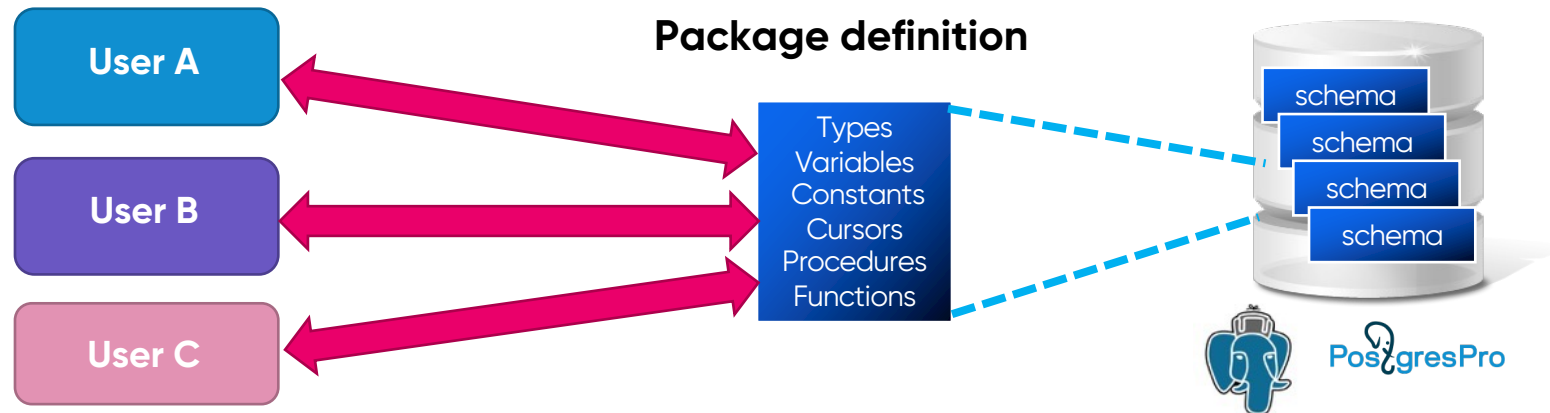
ProGate for data migration. ProCopy + ProSync + pro_validate



- From Oracle to Postgres Pro Enterprise
- Schema, tables files...
- Continues after stop
- BLOB, CLOB, Bfiles
- Names mapping
- Copy tables in parallel
- pro_validates checks DB concistency (DB files and rights to access, broken indexes, block checksums, read all records, pg_catalog concistency)

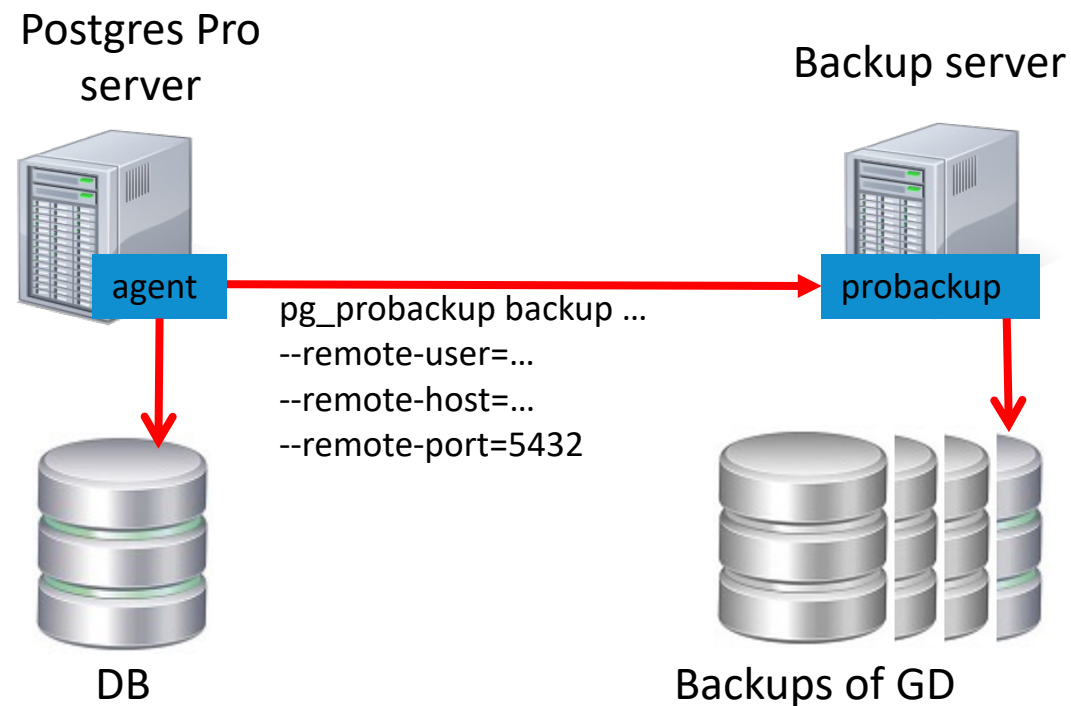
Simplify application migration from Oracle

- Packages in Postgres
- 4 system packages from Oracle/pgpro_utils + DBMS_LOB
- Indexed by table support
- BFile support

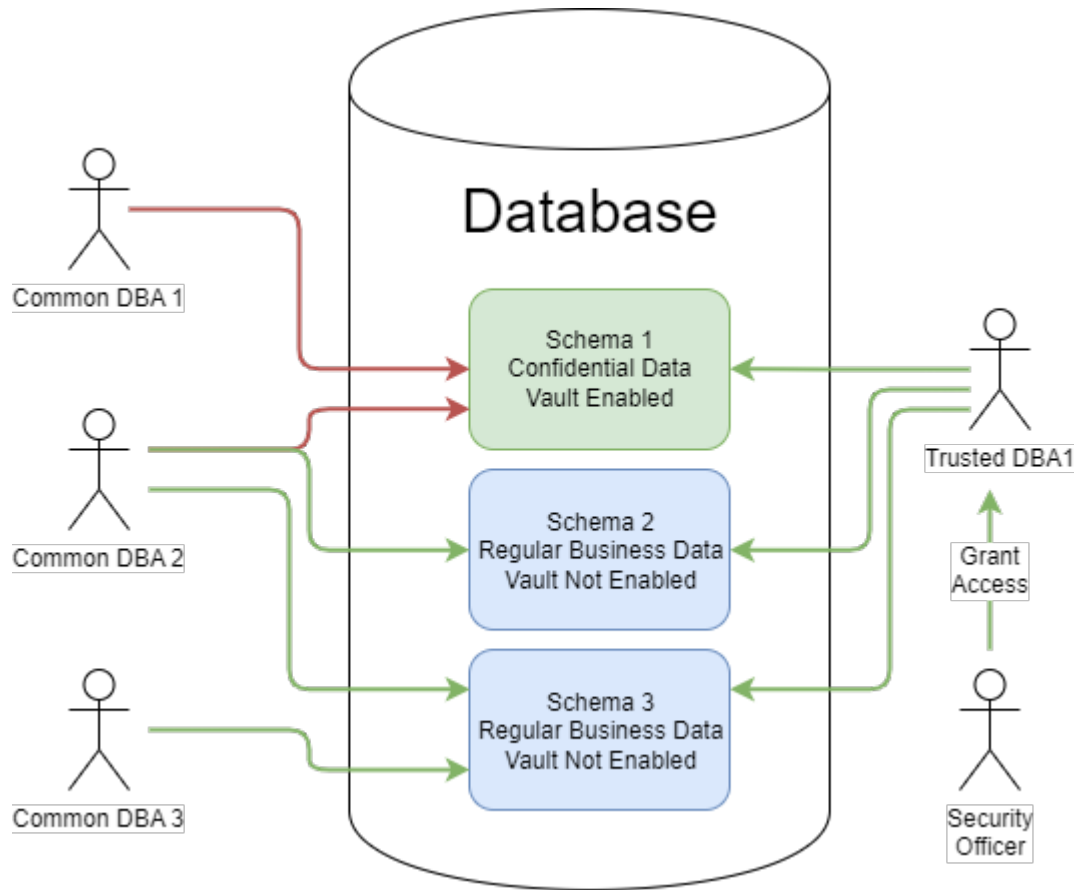


Backup (probackup 3 + addons in DBMS)

- Version 3 supports different DB versions
- Incremental backups and full backup
- Merge full and incremental backup
- Backup and restore in parallel
- Backup compression
- Testing backup
- Retention policy
- Backup into S3
- Remote backup through agent
- Integration with backup software
- Supports DB compression (CFS), sharding



DBA without access to data



- Protect data from privileged users
- Limits SUPERUSER
- Protected schema
- Administration rights are split between Security Officer and Data owner

AQO and AQE

- AQO – adaptive query optimization
 - Automatically analyze mistakes in planning
 - Prepare recommendation to optimizer
 - Delta learning
 - Replicate knowledge base
- AQE – adaptive query execution
 - Control time and memory usage during processing
 - Recheck before replanning
 - Replan query



Postgres Pro Enterprise Manager (PPEM). Dashboard

PostgresPro
ENTERPRISE MANAGER

УПРАВЛЕНИЕ

- Дашборд
- Экземпляры
- Базы данных
- Журнал событий
- Резервное копирование

СИСТЕМА

- Управление пользователями
- Настройки

Поиск

admin user
Добавление агента в инстан...

Дашборд

ЭКЗЕМПЛЯРЫ

6

РАЗМЕР ЛОГОВ

33.18 MB

ПОСЛЕДНИЕ УВЕДОМЛЕНИЯ

24.08.2023, 03:34, **REINDEX успешно выполнен**
REINDEX (VERBOSE) DATABASE "pgbench" (instance 'PgPro-EE' [2])

24.08.2023, 03:34, **ANALYZE успешно выполнен**
ANALYZE (VERBOSE) DATABASE pgbench (instance 'PgPro-EE' [2])

23.08.2023, 18:24, **Инстанс удален**
Удаление инстанса '14/main' (231) выполнено успешно

БАЗЫ ДАННЫХ

26

ОБЩИЙ РАЗМЕР БД

5.7 GB

ЖУРНАЛ СОБЫТИЙ

Дата, время	Экземпляр	База данных	Тип	Текст сообщения
23.08.2023, 14:42:21.66	PgPro-EE	test71	ERROR	syntax error at or near "120"
23.08.2023, 13:54:56.83	PgPro-EE	postgres	ERROR	backend with pid=596505 not found
23.08.2023, 13:54:56.49	PgPro-EE	pgbench	FATAL	connection to client lost
23.08.2023, 13:53:01.00	PgPro-EE	postgres	FATAL	connection to client lost
21.08.2023, 23:00:27.55	PgPro Manager repository		ERROR	requested WAL segment 000000010000002500000086 has already been removed

[ПЕРЕЙТИ К ЛОГАМ >](#)