

EDB Open Source Learning Day

EDB Postgres Distributed Workshop

Martín Marqués
Engineering Manager



Martín Marqués

Engineering Manager


- PostgreSQL training and support
- High Availability
- DR and Backups
- PostgreSQL contributor



Martín Marqués

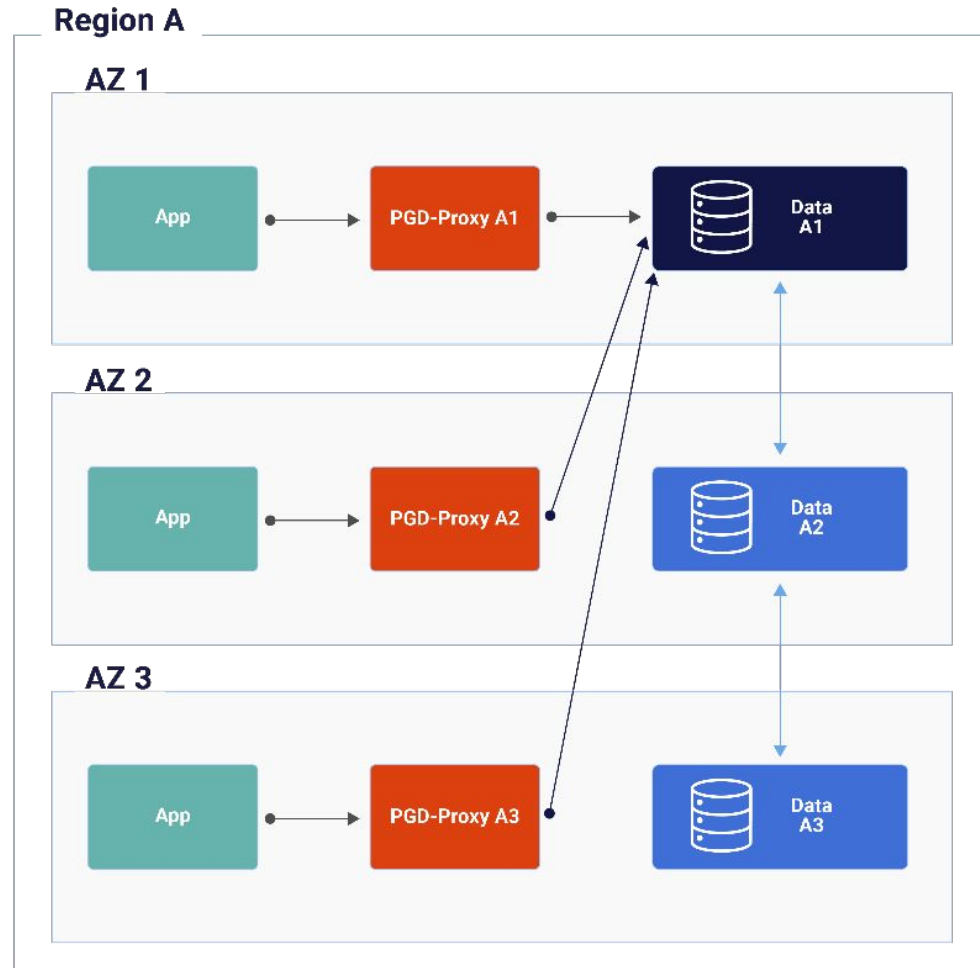
Engineering Manager

- TPA
- Patroni, EFM, RepMgr
- Barman

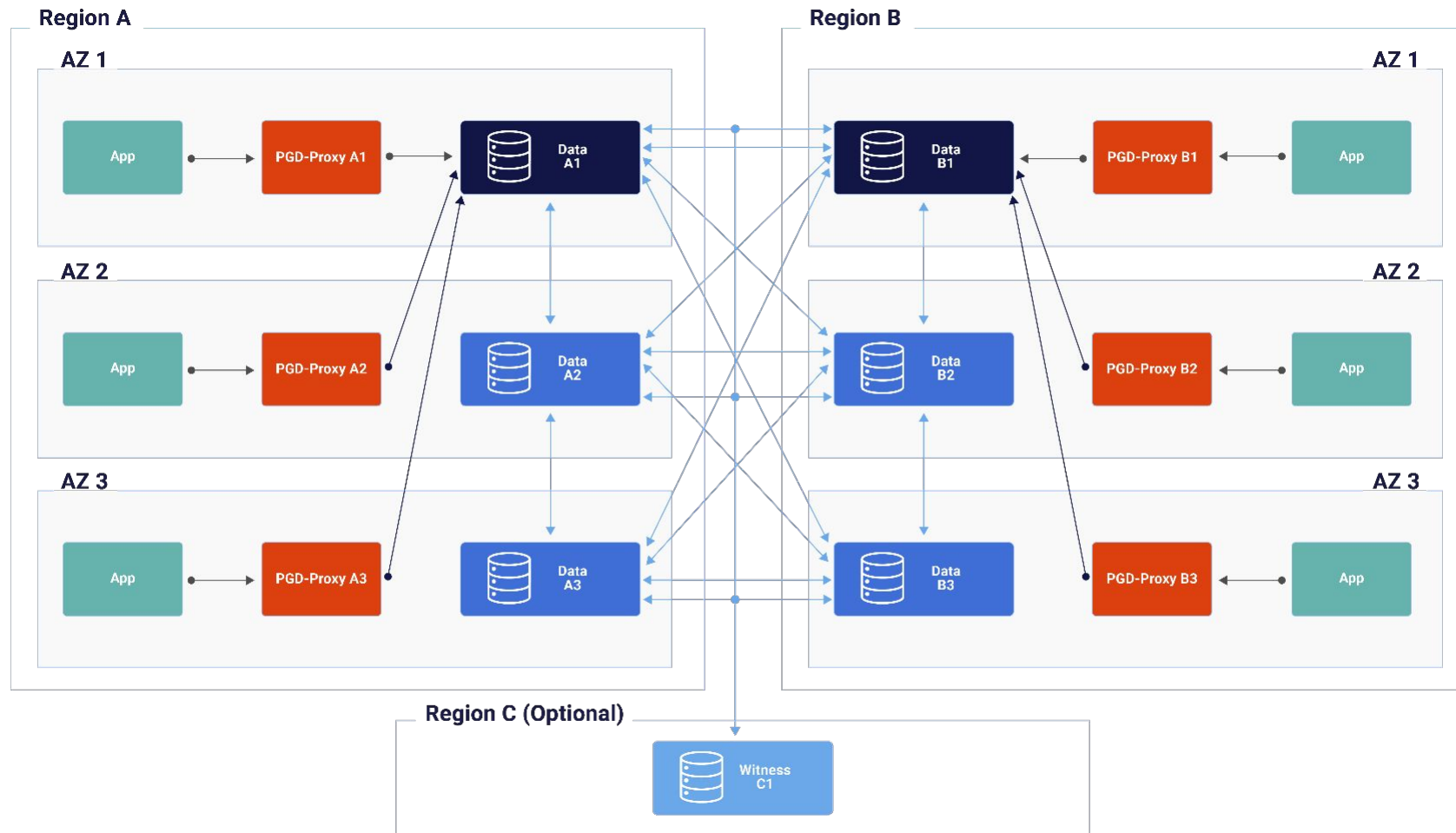


Extreme High Availability with EDB Postgres Distributed

EDB Postgres Distributed, one location



EDB Postgres Distributed, two locations



PGD CLI

```
enterprisedb@bdr1:~ $ /usr/local/bin/pgd --help
```

The EDB Postgres Distributed Command Line Interface (PGD CLI) is a tool to manage your EDB Postgres Distributed cluster. It allows you to run commands against EDB Postgres Distributed clusters. You can use it to inspect and manage cluster resources.

Usage:

```
pgd [command]
```

Available Commands:

check-health	Checks the health of the EDB Postgres Distributed cluster.
completion	Generate the autocompletion script for the specified shell
help	Help about any command
show-camo	Shows BDR CAMO (Commit at Most Once) details.
show-clockskew	Shows the status of clock skew between each BDR node pair.
show-events	Shows events such as background worker errors and node membership changes.
show-nodes	Shows all nodes in the EDB Postgres Distributed cluster and their summary.
show-raft	Shows BDR Raft (consensus protocol) details.
show-replslots	Shows the status of BDR replication slots.
show-subscriptions	Shows BDR subscription (incoming replication) details.
show-version	Shows the version of BDR and Postgres installed on each node.

Flags:

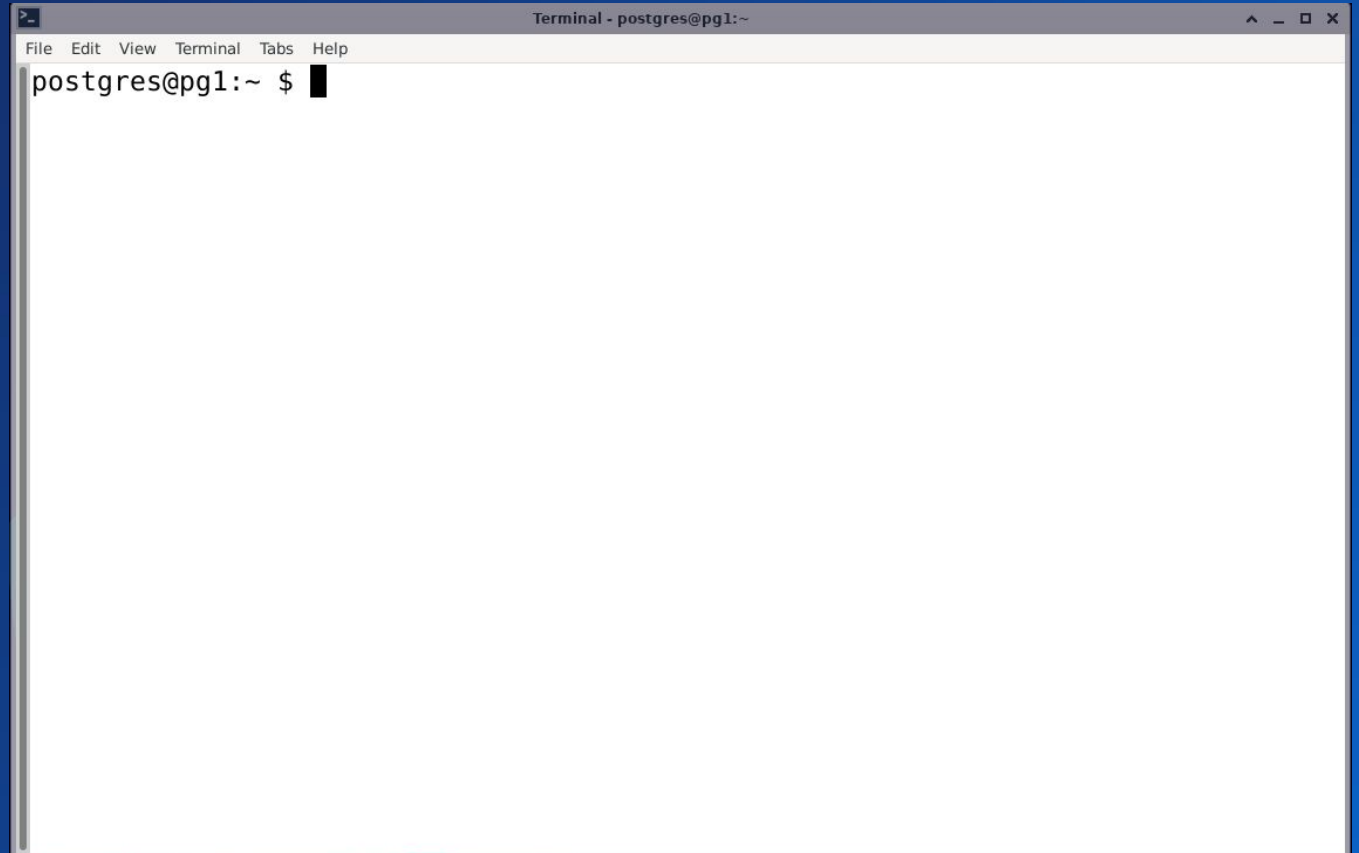
-f, --config-file string	config file; ignored if --dsn flag is present (default "/etc/edb/pgd-config.yml")
--dsn string	database connection string e.g. "host=bdr-a1 port=5432 dbname=bdrdb user=postgres "
-h, --help	help for pgd
-L, --log-level string	logging level: debug, info, warn, error (default "error")
-o, --output string	output format: json, yaml
-v, --version	version for pgd

Use "pgd [command] --help" for more information about a command.



Demo

PGD CLI



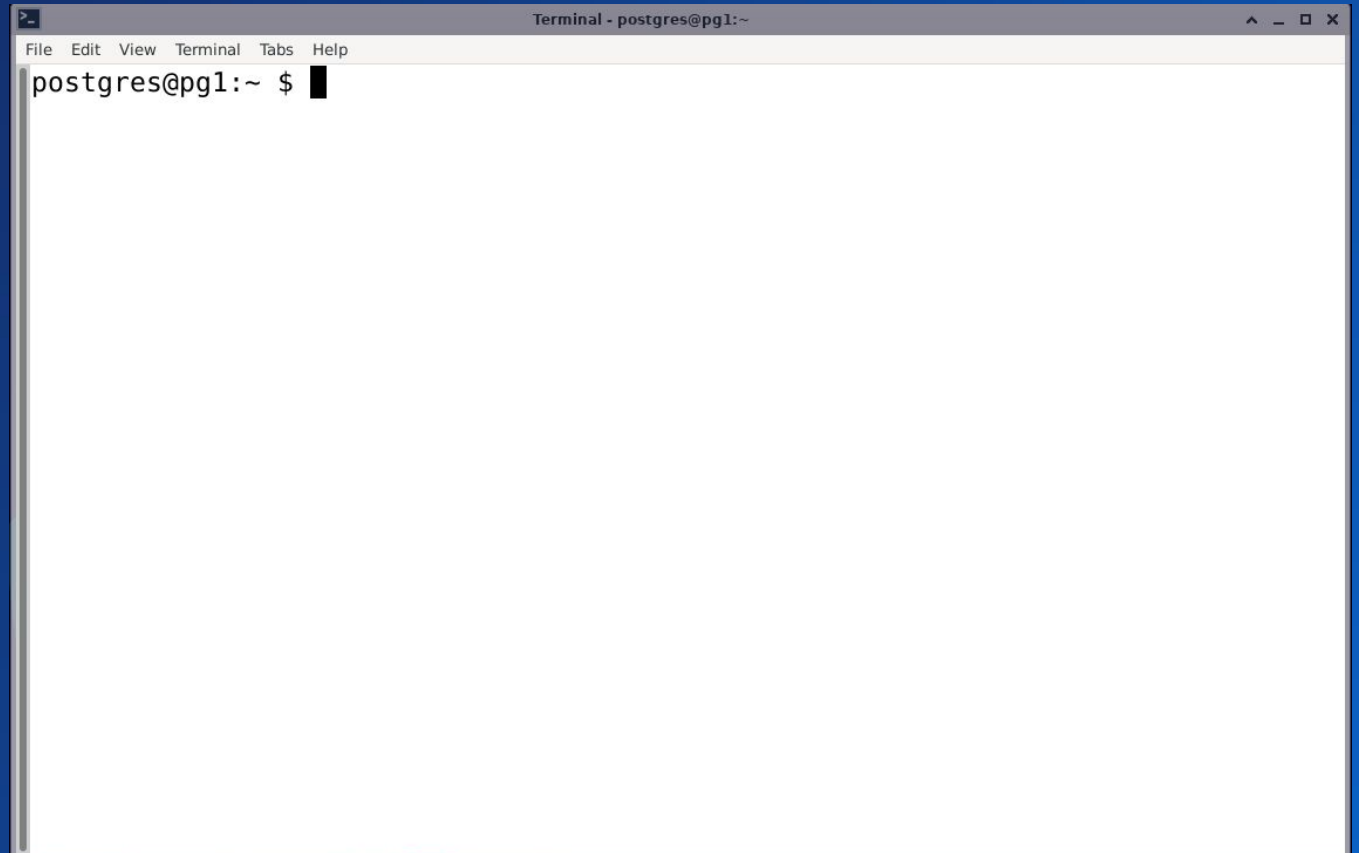
```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```


DDL Replication

- Transparent DDL Replication
- Using consensus
- Resilient to partial failures in most cases

Demo

DDL Replication



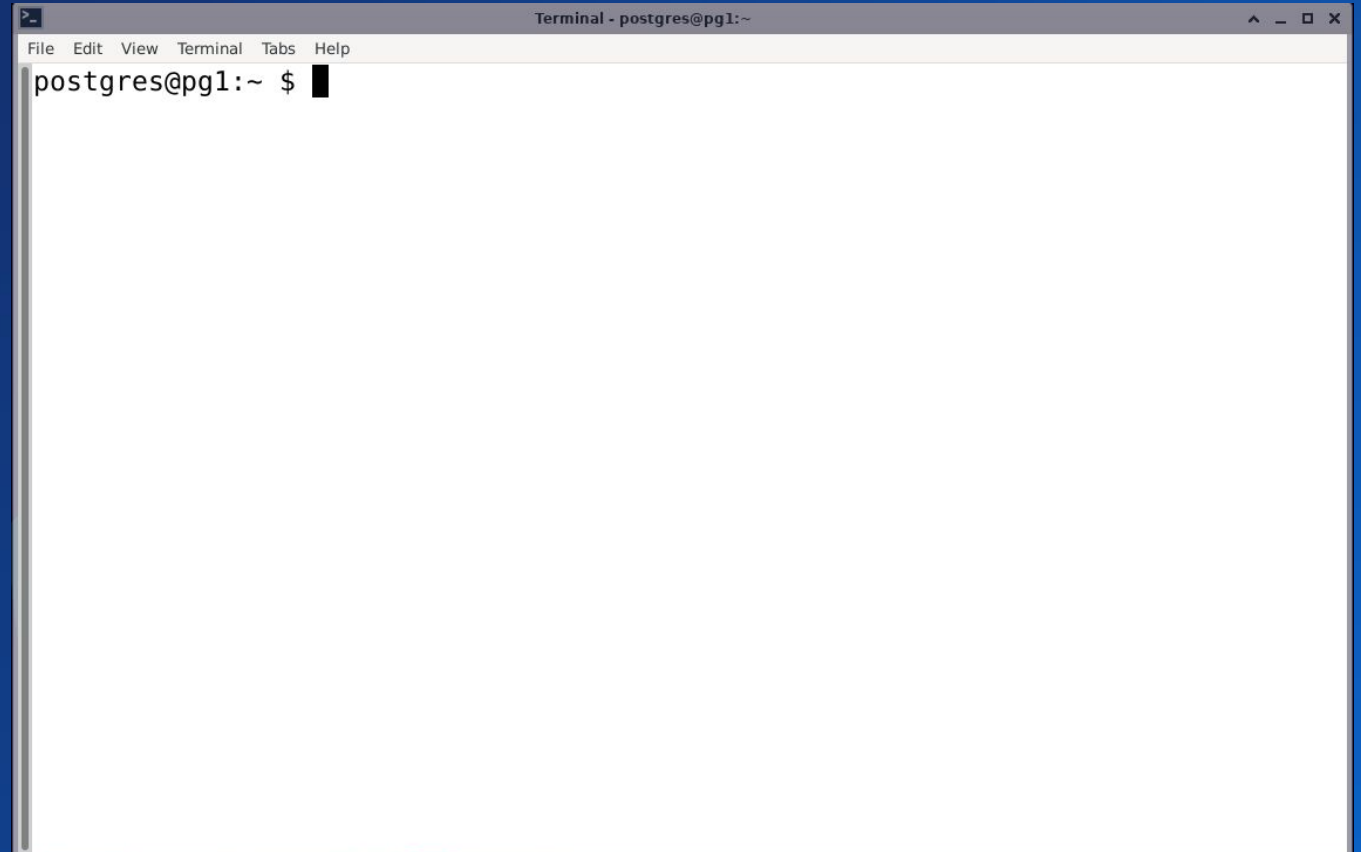
```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $
```

DML Replication

- Every database node is a writable node
- Bi-Directional Replication
- Conflict handling

Demo

DML Replication



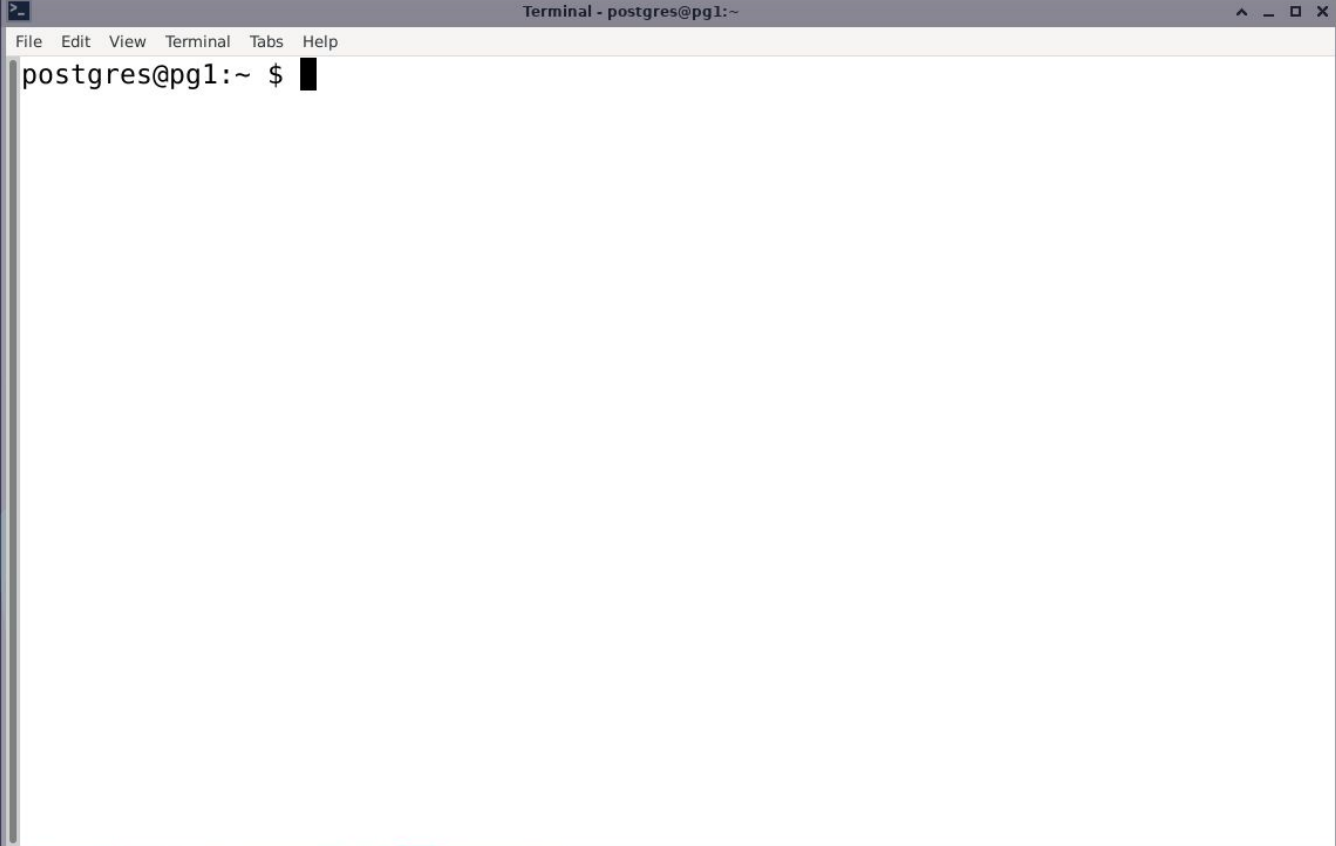
A terminal window titled "Terminal - postgres@pg1:~" with a menu bar containing "File", "Edit", "View", "Terminal", "Tabs", and "Help". The terminal content shows the shell prompt "postgres@pg1:~ \$" followed by a black cursor block.

Global Sequences

- The beauty of Snowflake ID
- Globally Allocated Sequences

Demo

Global Sequences



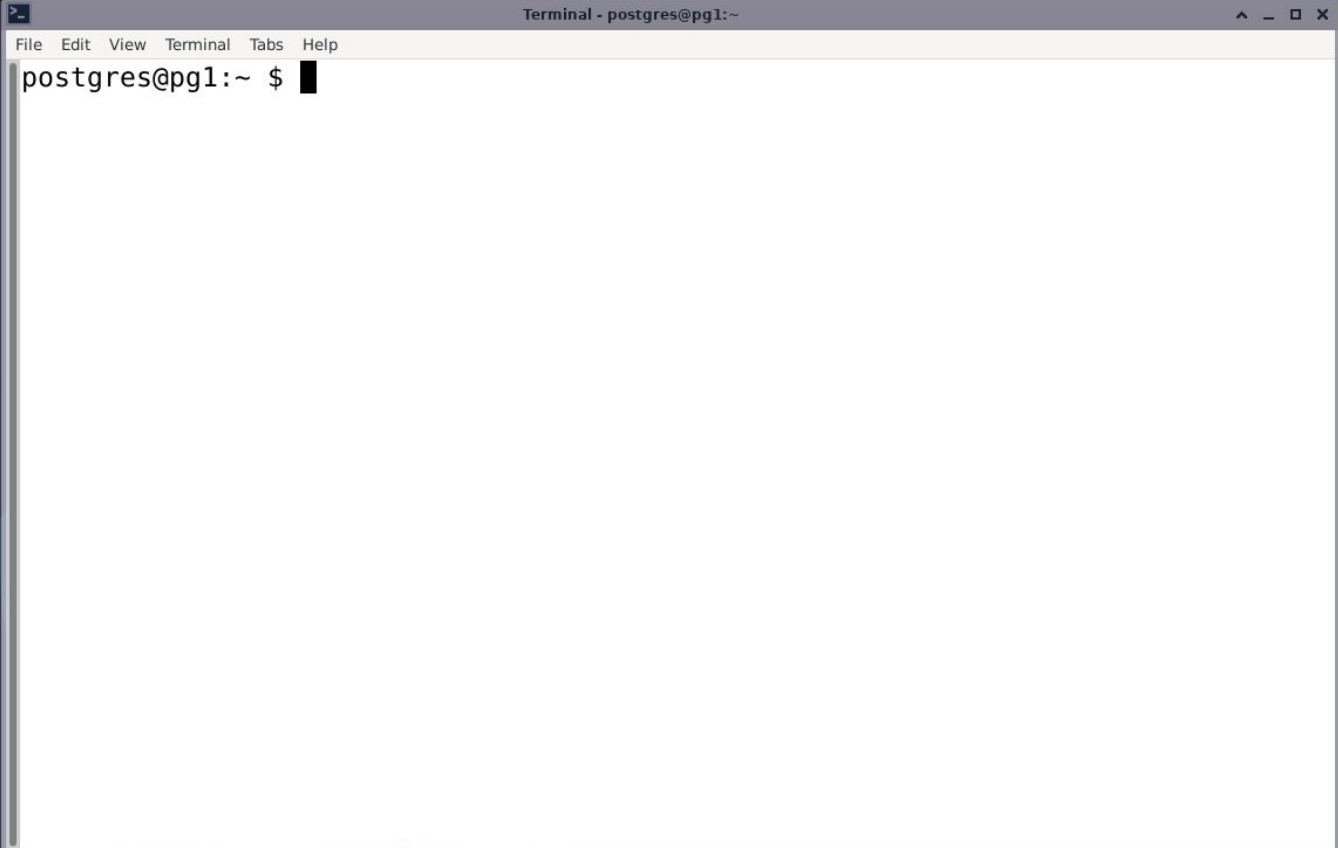
```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```

Selective Replication

- Replication Sets
- Node Subgroups

Demo

Selective Replication

A terminal window titled "Terminal - postgres@pg1:~" with a menu bar containing "File", "Edit", "View", "Terminal", "Tabs", and "Help". The terminal content shows the prompt "postgres@pg1:~ \$" followed by a black cursor block.

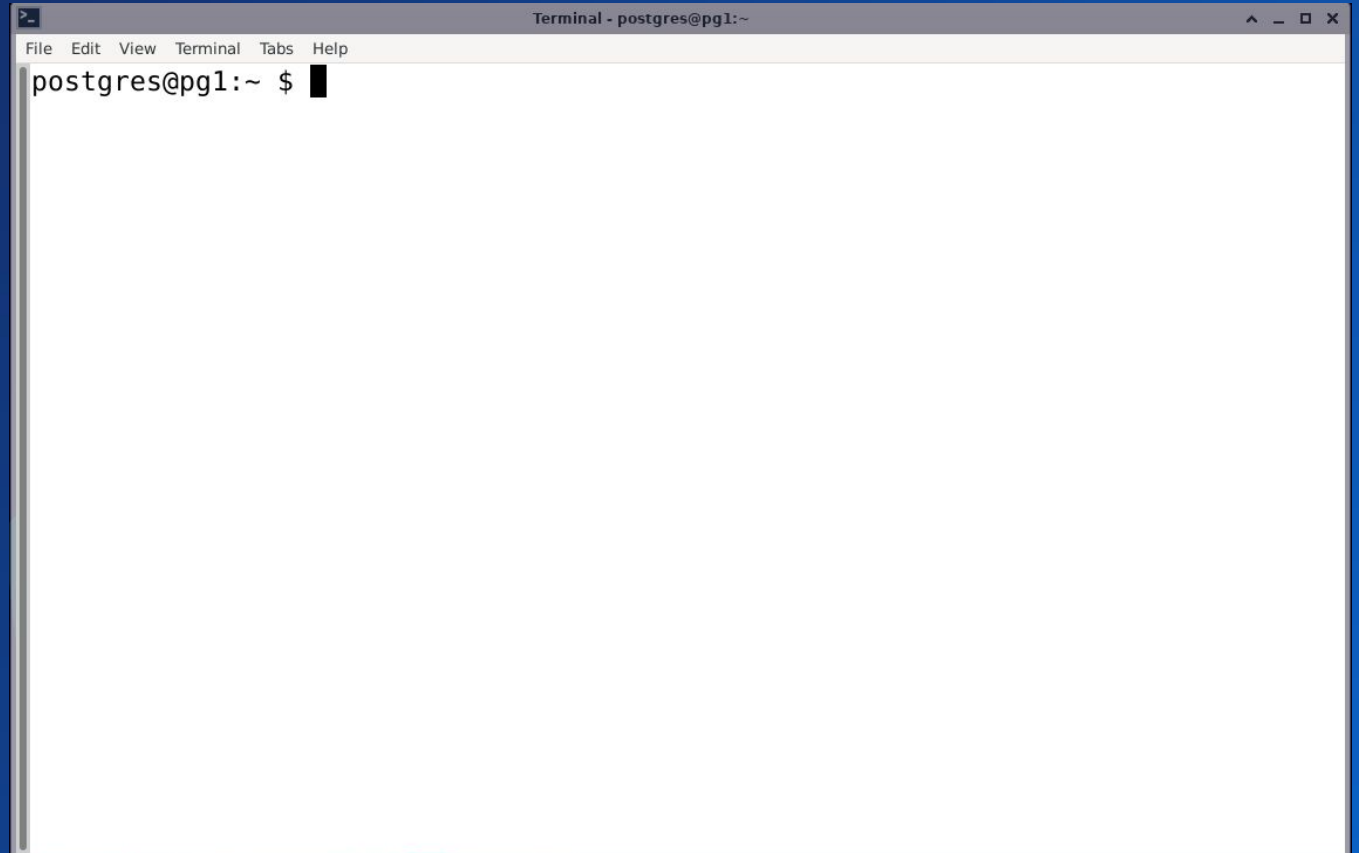
```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```

A decorative graphic on the left side of the slide, consisting of a dark blue background with a wavy, light blue border that curves from the top to the bottom.

Nearly-zero Downtime and Fault Tolerance

Demo

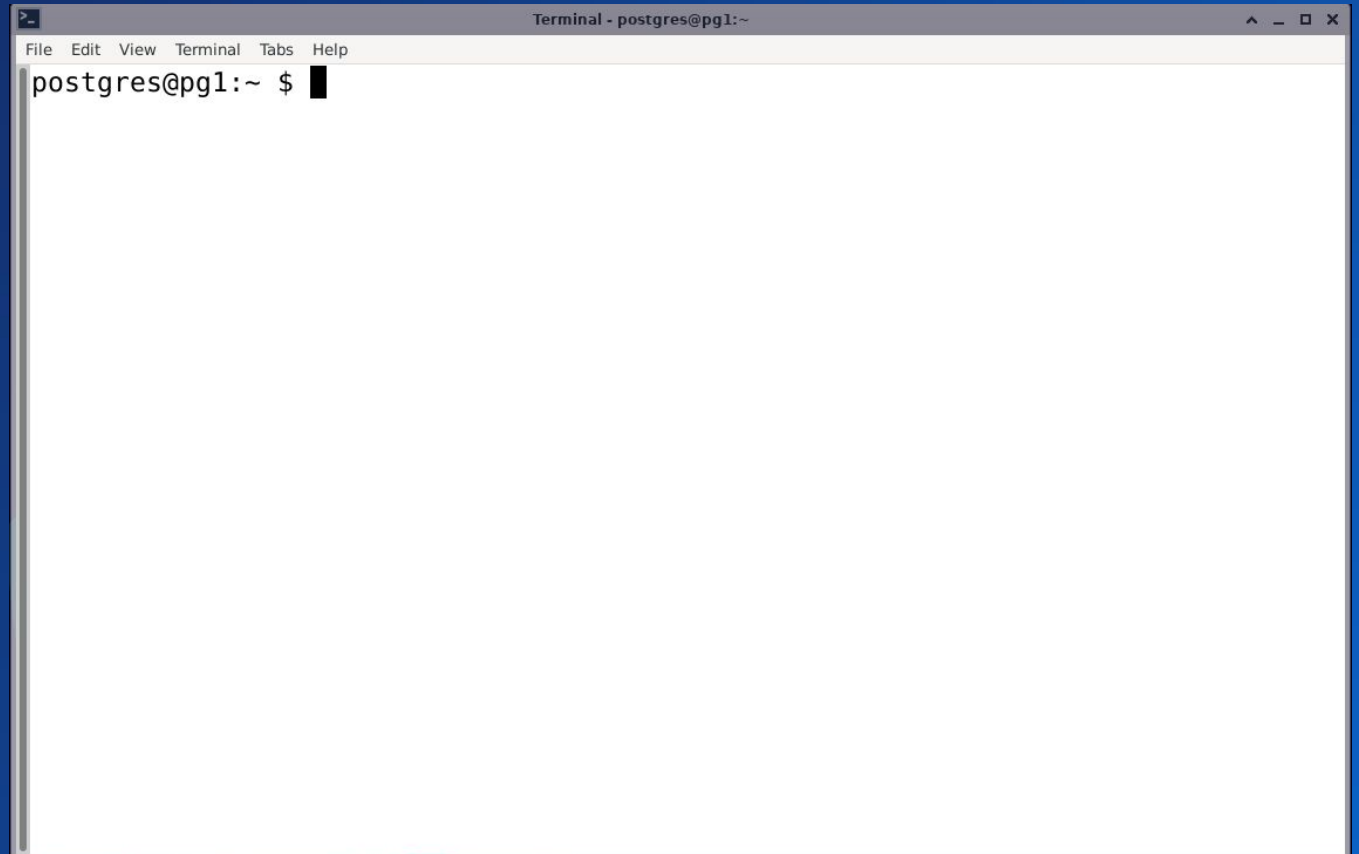
Switchover



```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```

Demo

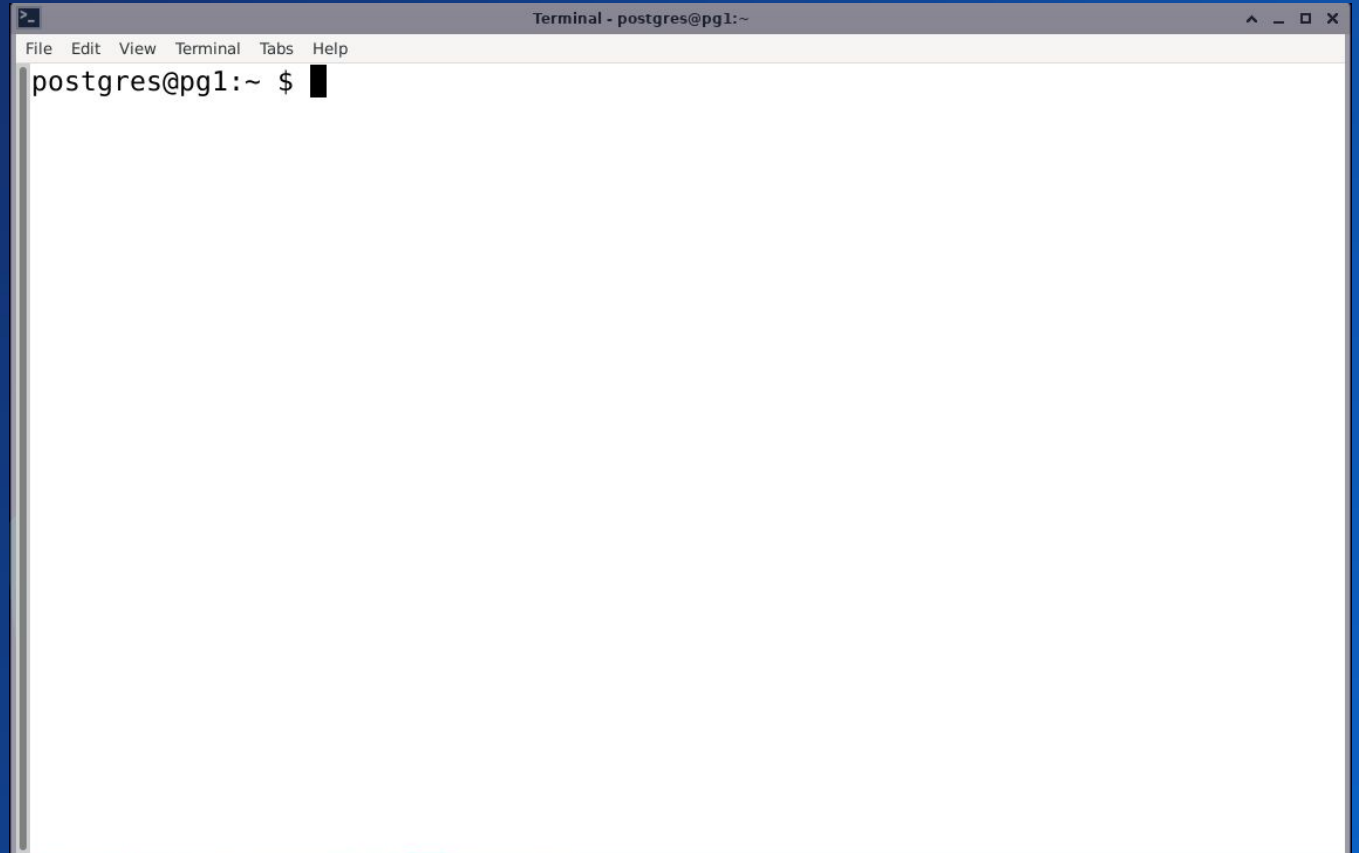
Failover



```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```

Demo

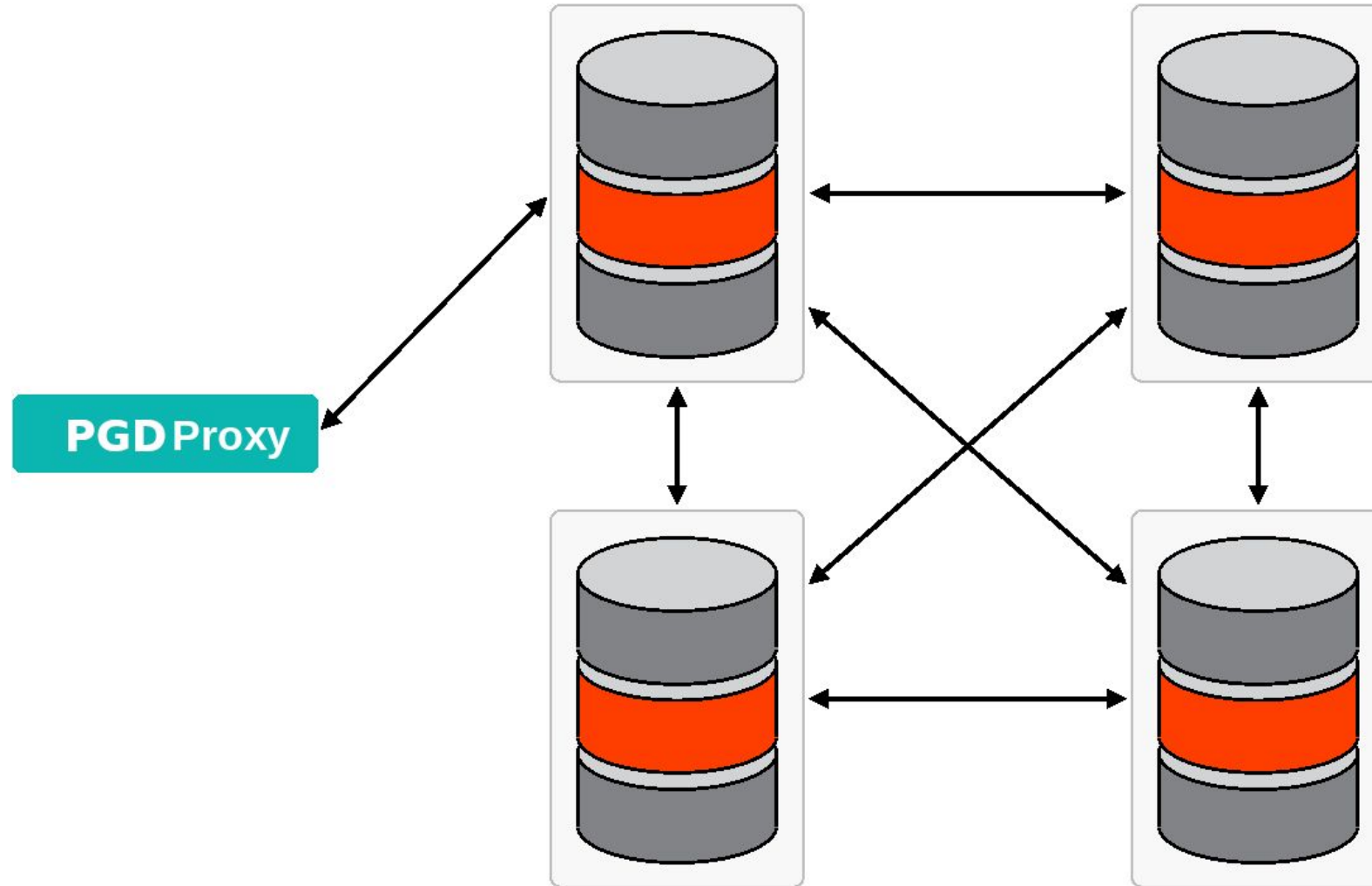
DML and DDL replication on Partial failure

A terminal window titled "Terminal - postgres@pg1:~" with a menu bar containing "File", "Edit", "View", "Terminal", "Tabs", and "Help". The terminal content shows the prompt "postgres@pg1:~ \$" followed by a black cursor block.

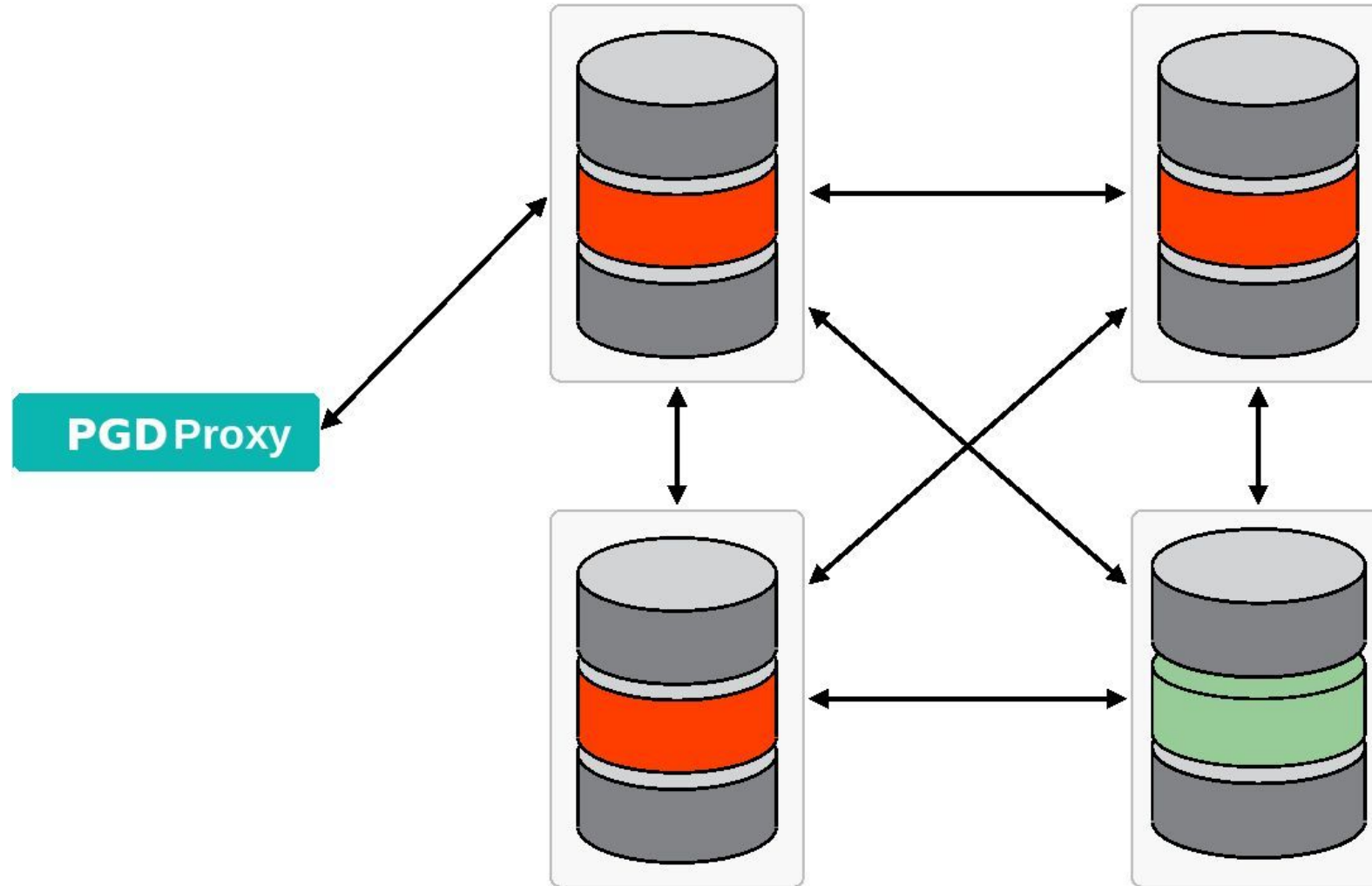
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Terminal - postgres@pg1:~  
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postgres@pg1:~ $ █
```

Rolling Upgrade

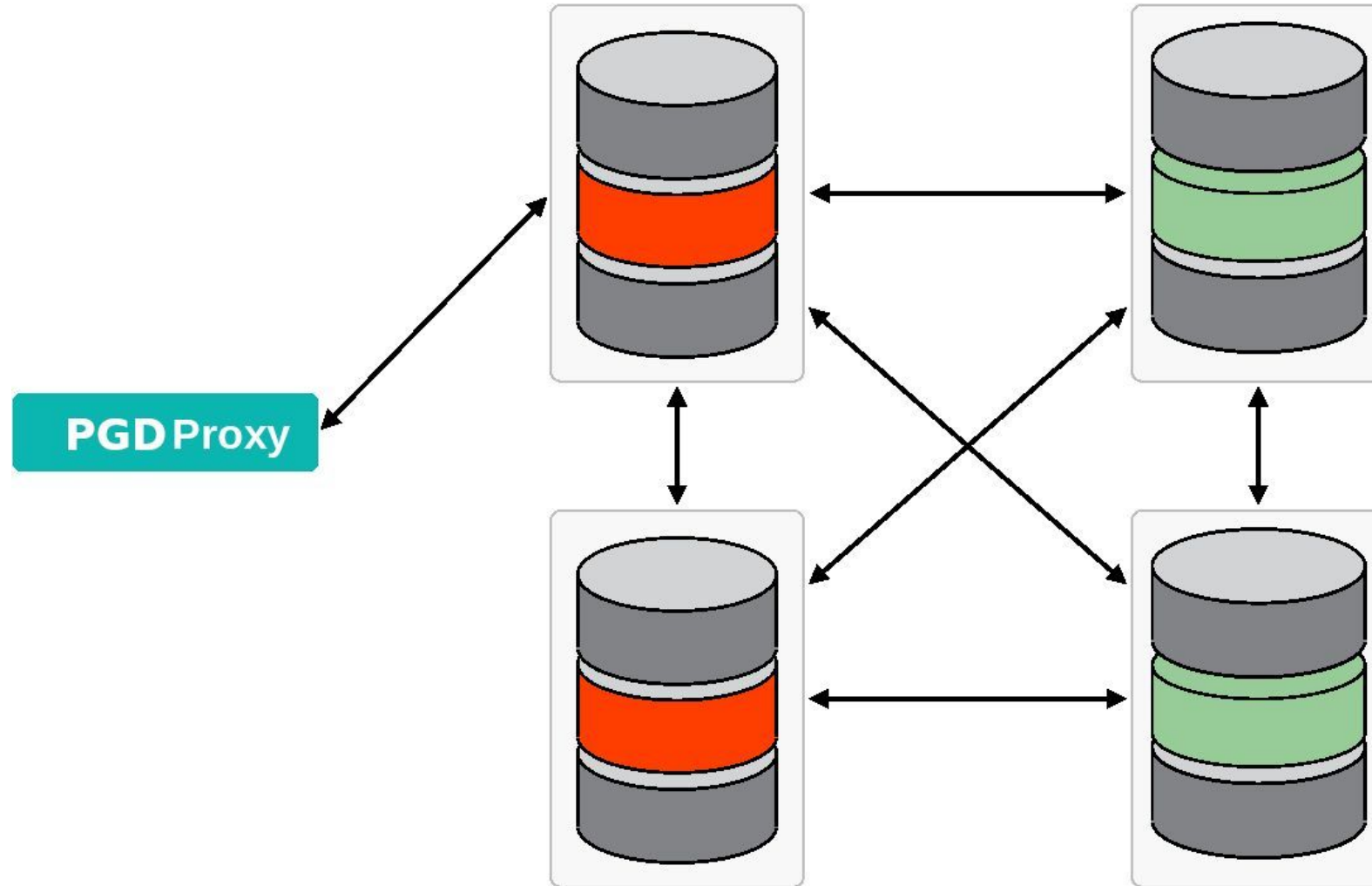
Rolling Upgrade?



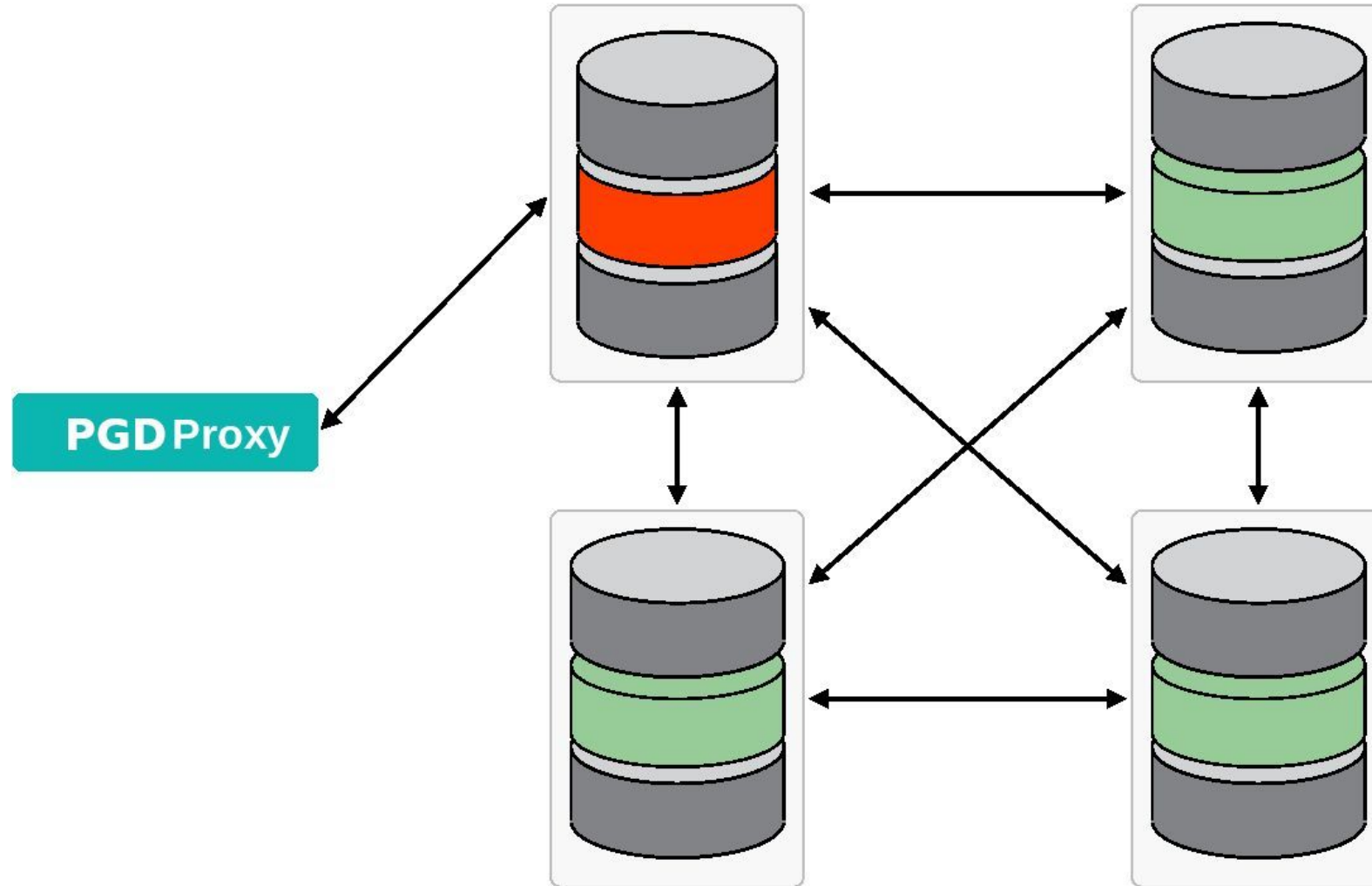
Rolling Upgrade...



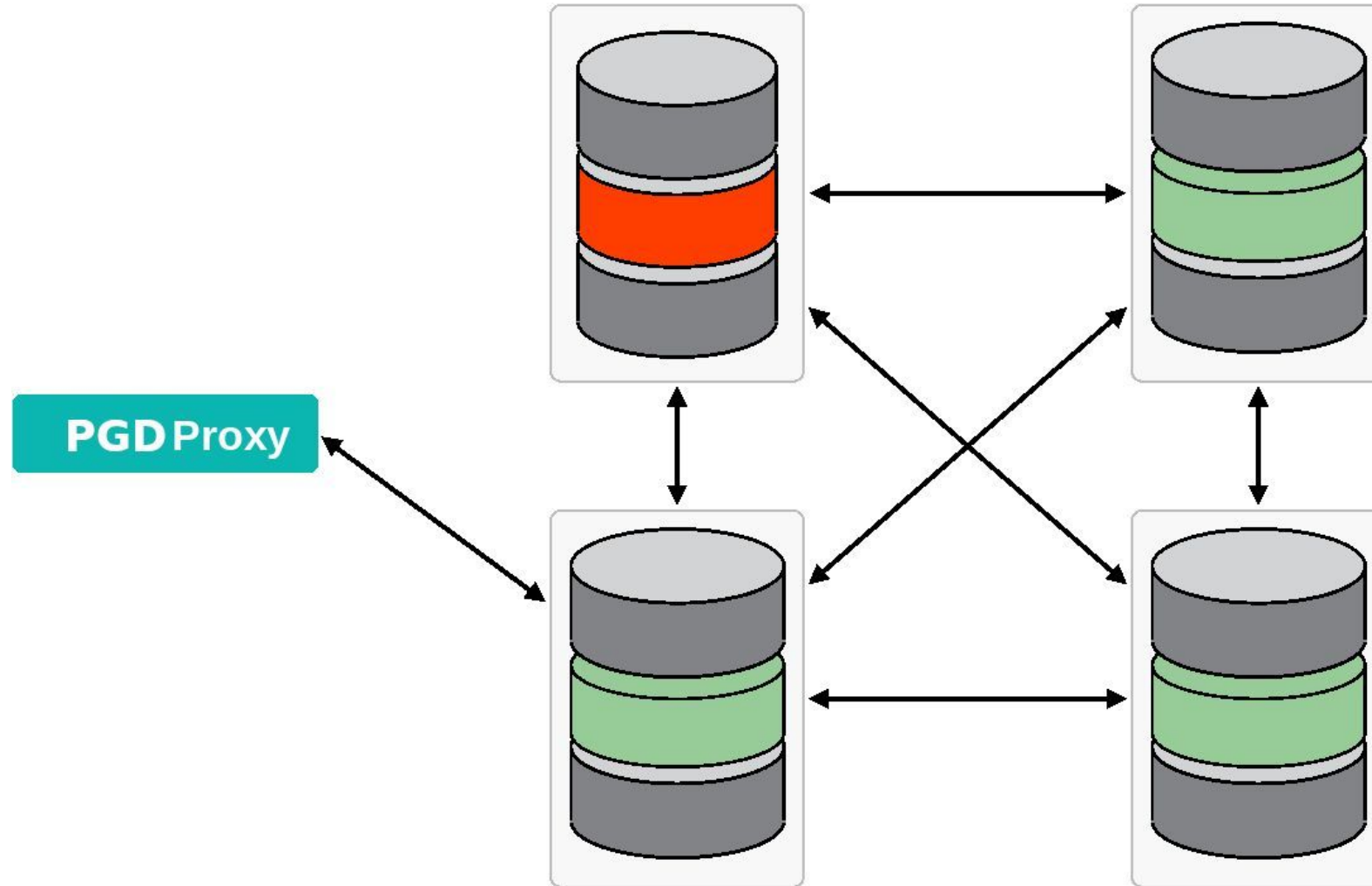
Rolling Upgrade...



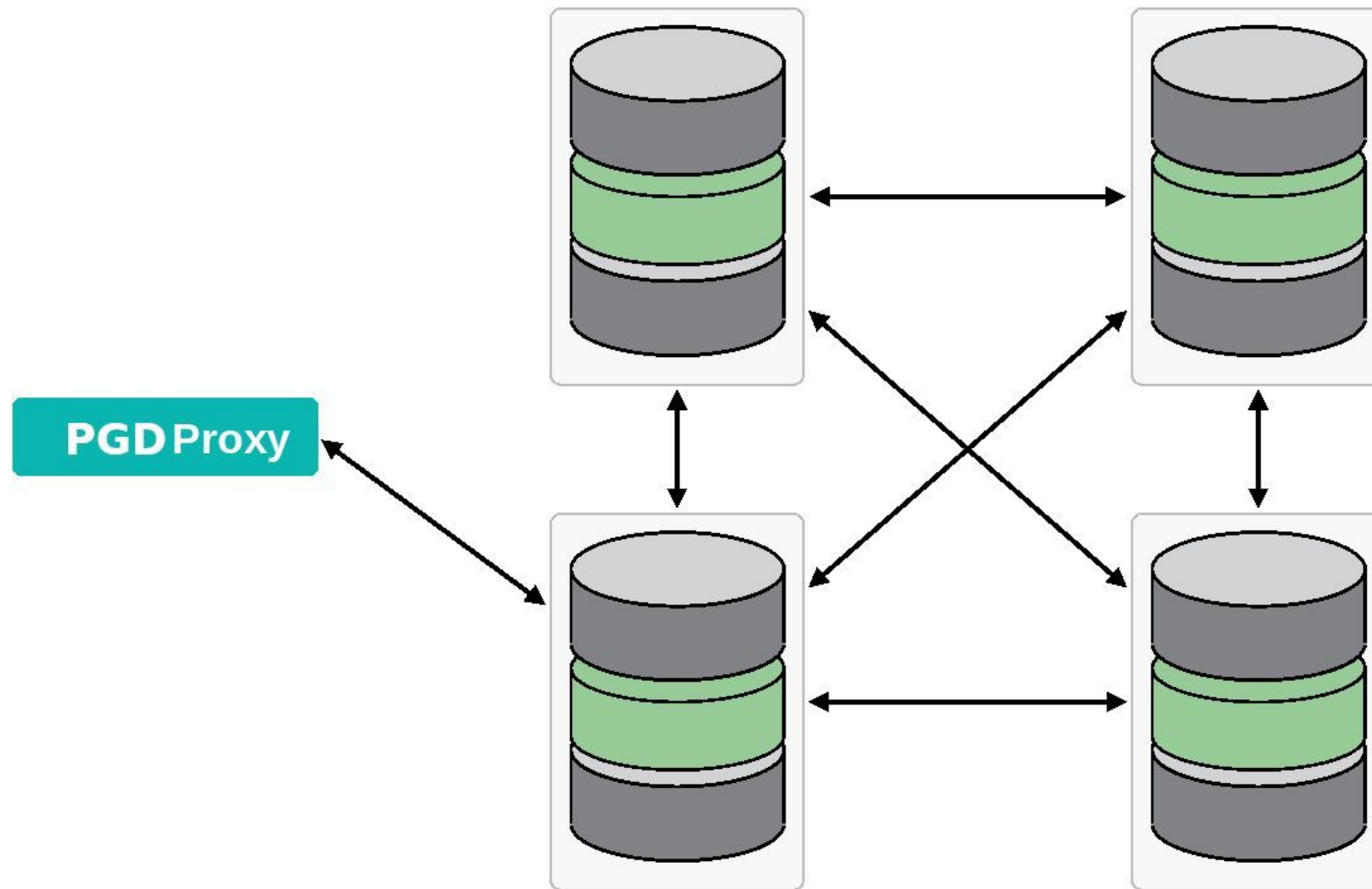
Rolling Upgrade...



Rolling Upgrade...



Rolling Upgrade!



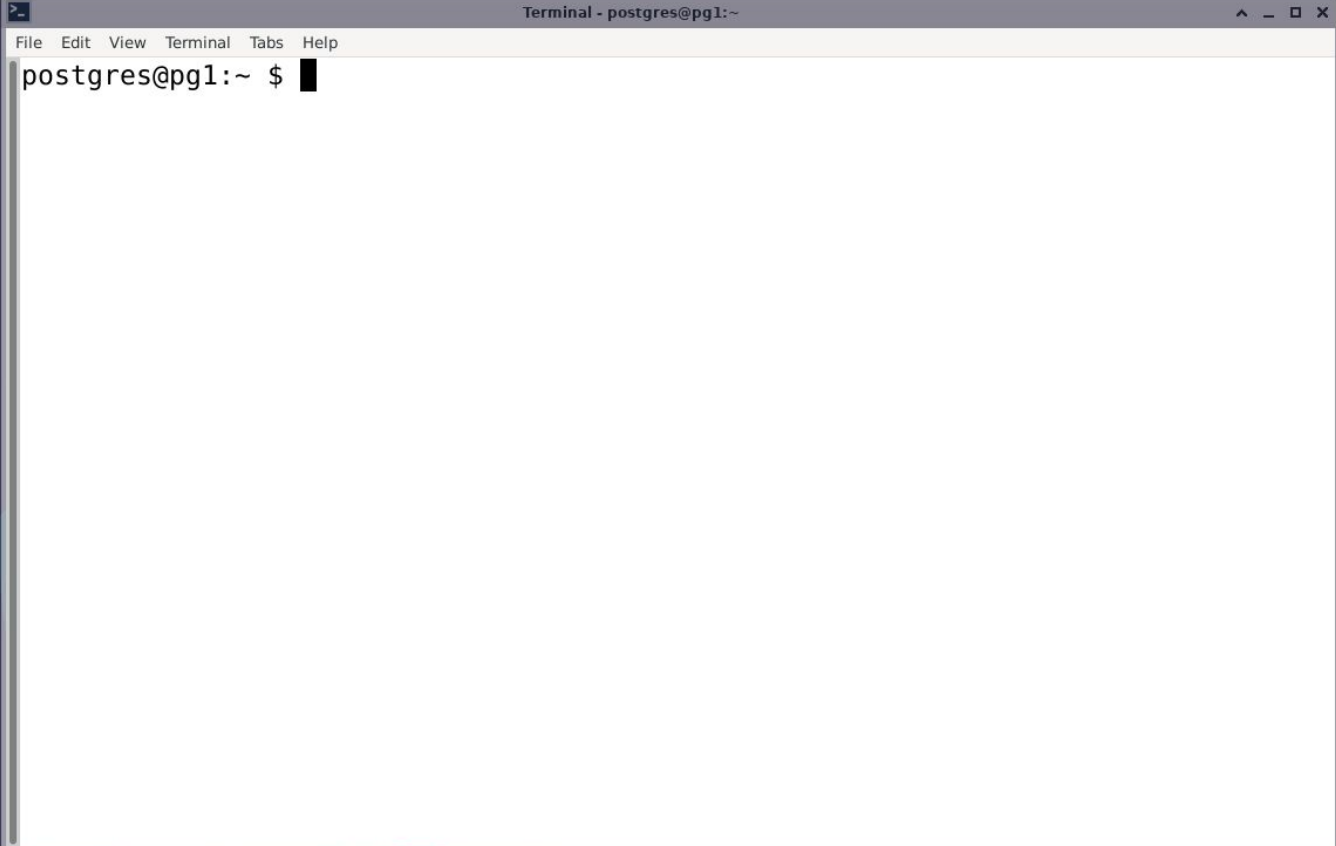
Rolling Upgrade

Version upgrade possible for:

- BDR extension
- Postgres minor version
- Postgres **major** version

Demo

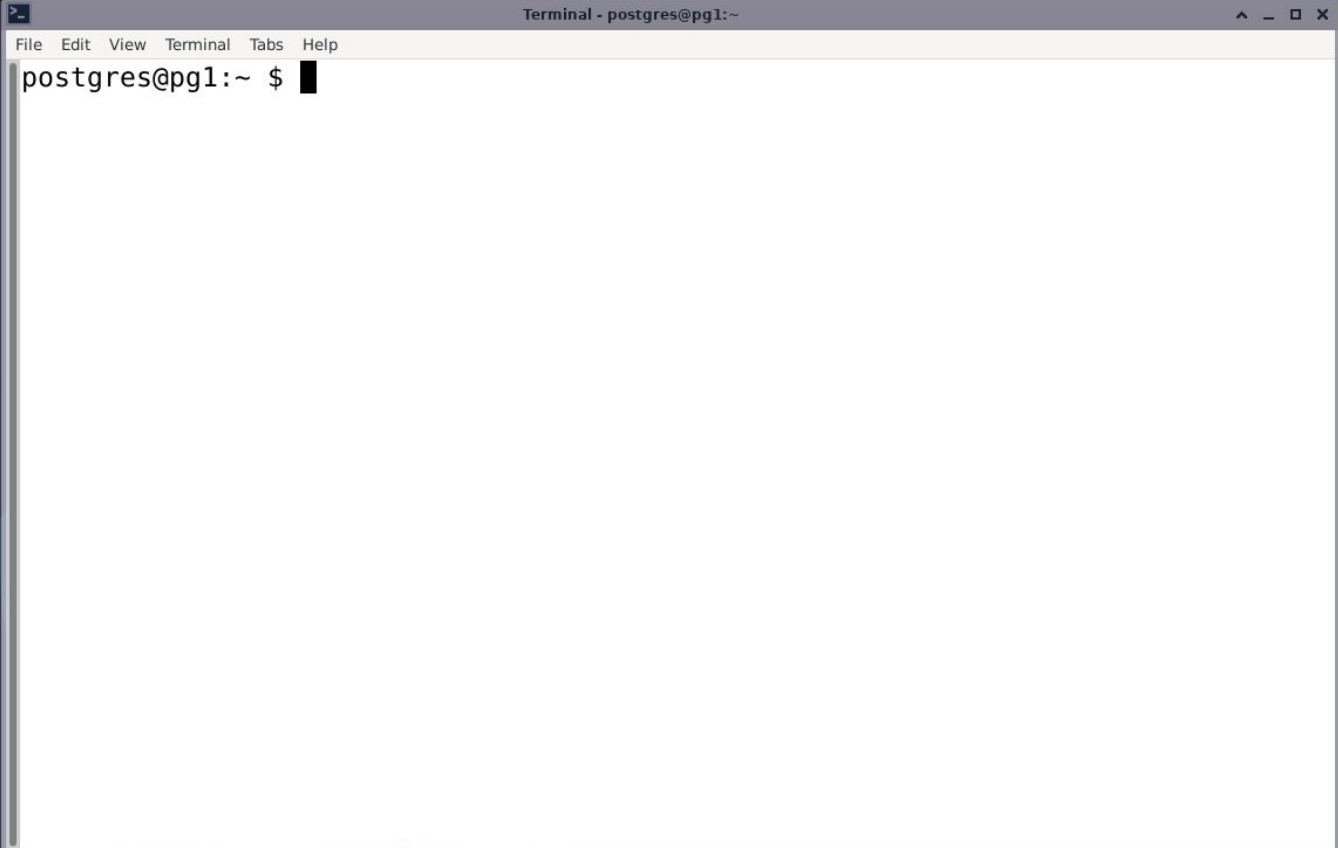
Rolling Upgrade of the BDR extension

A terminal window titled "Terminal - postgres@pg1:~" with a menu bar containing "File", "Edit", "View", "Terminal", "Tabs", and "Help". The terminal content shows the prompt "postgres@pg1:~ \$" followed by a black cursor block.

```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```


Demo

Rolling Upgrade of Postgres

A terminal window titled "Terminal - postgres@pg1:~" with a menu bar containing "File", "Edit", "View", "Terminal", "Tabs", and "Help". The terminal content shows the prompt "postgres@pg1:~ \$" followed by a black cursor block.

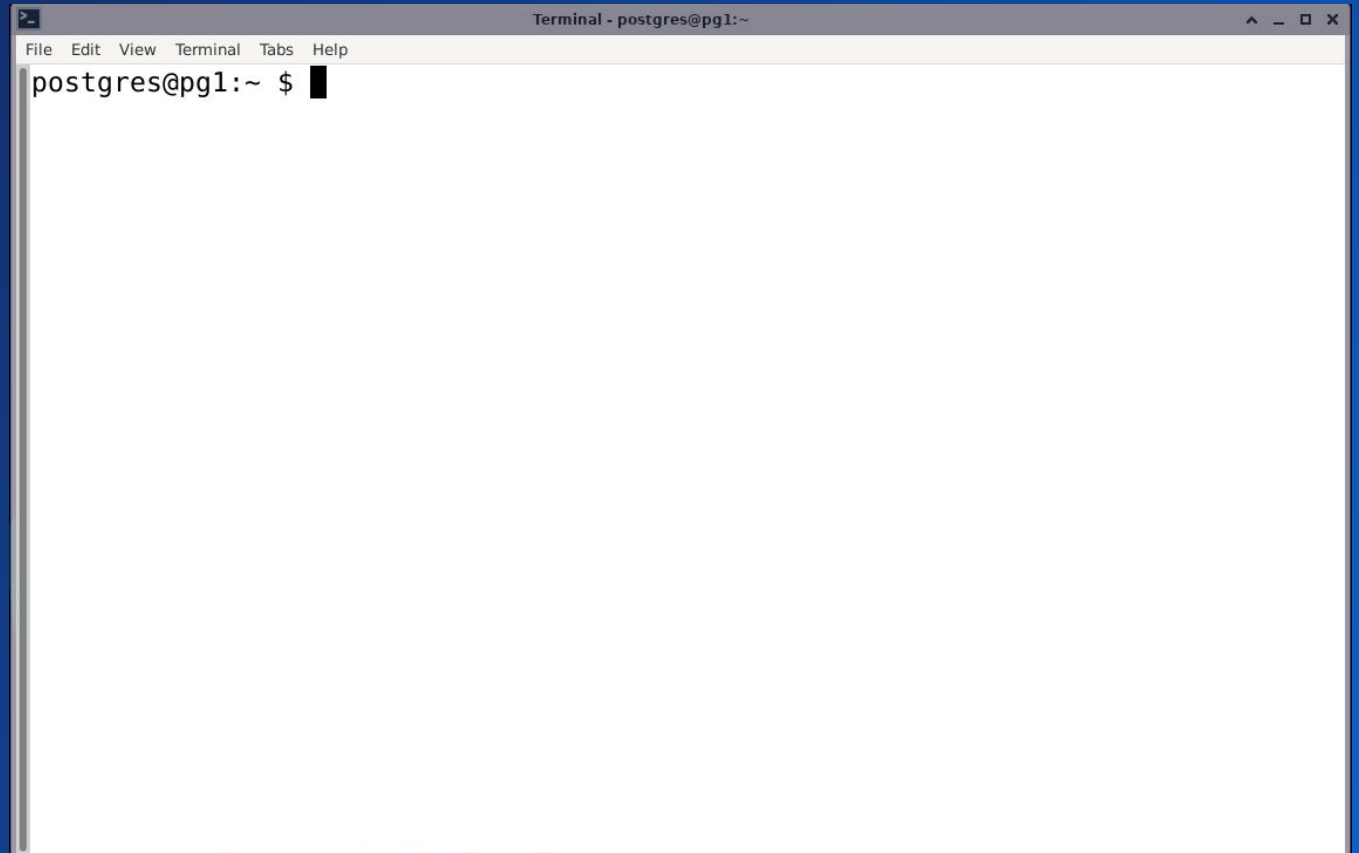
```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```

Replication Conflicts

- Conflicts can occur in distributed systems
- Even more when multiple nodes are writable
- Conflicts are:
 - detected
 - resolved
 - logged

Demo

Conflict Resolution



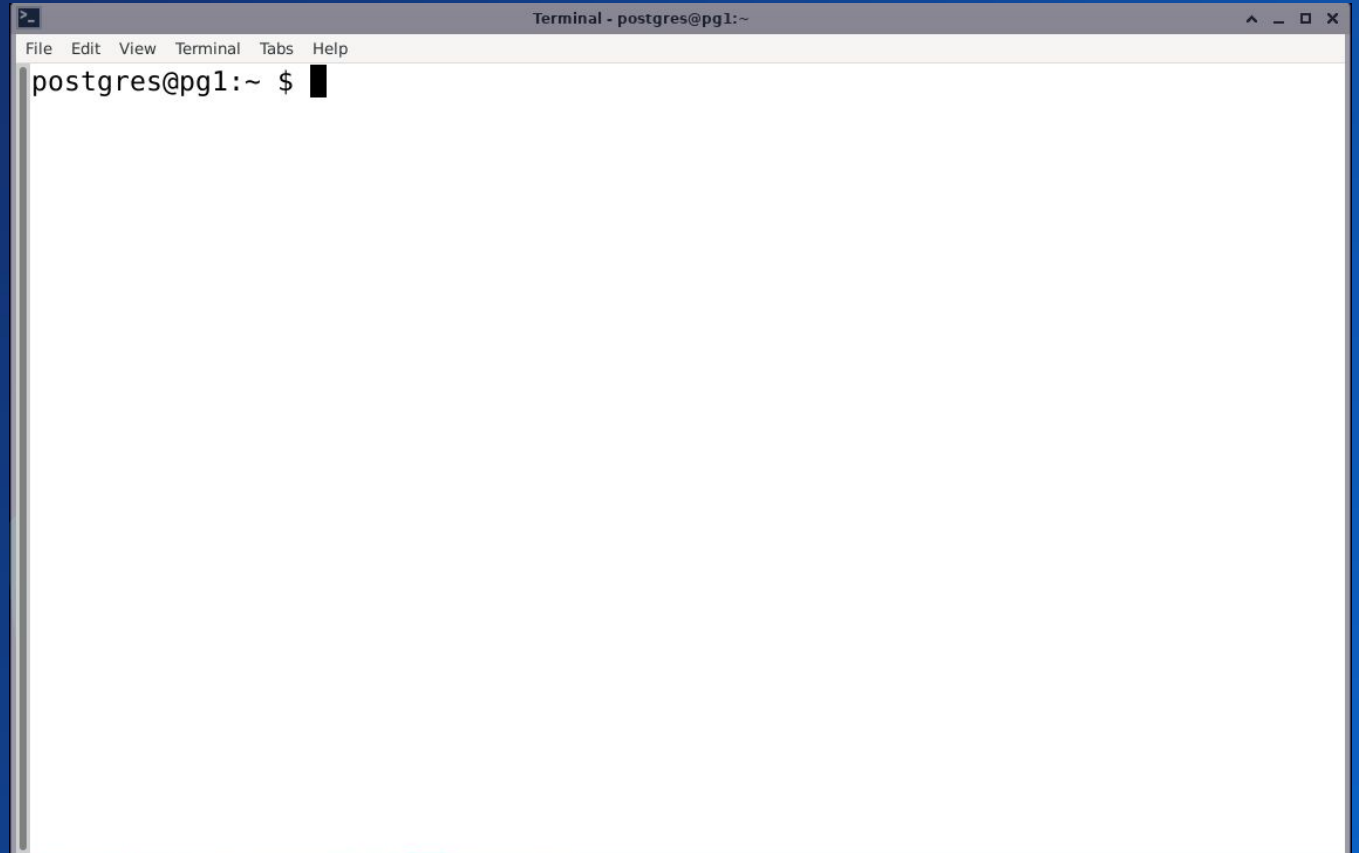
```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```

Replication Performance

- Replication Performance
= **Capacity** != **Speed**
- Logical Replication
is more efficient than
Physical Replication
- We also have
Parallel Apply

Demo

Replication Performance and Parallel Apply



```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $
```

Group Commit

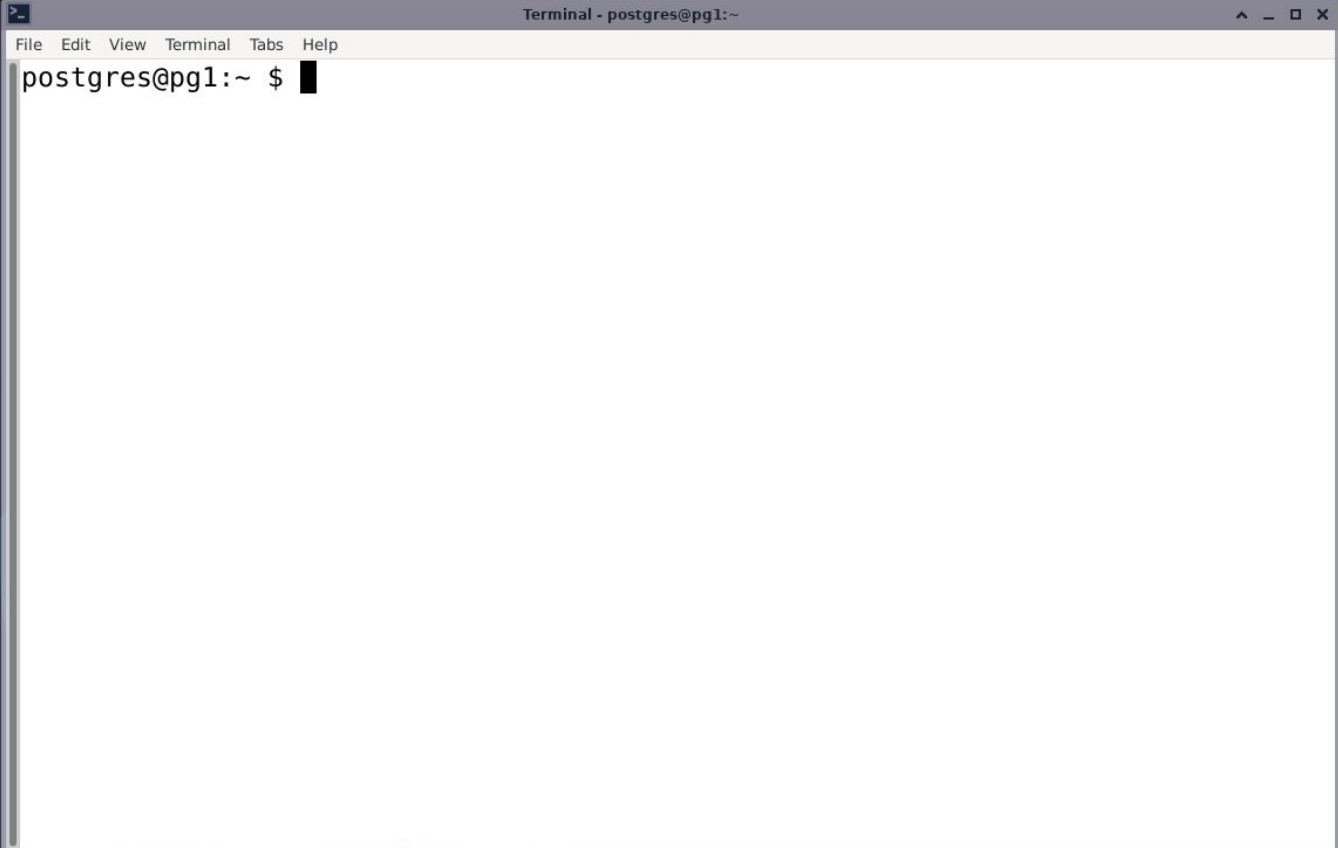
- Commit Scopes defined using a declarative syntax
- Very flexible yet very clear
- Includes Lag Control and Commit At Most Once as special cases

Commit Scope Examples

- **ANY 2 (grp) GROUP COMMIT**
- **MAJORITY (grp1) GROUP COMMIT ON durable AND ANY 1 (grp2) GROUP COMMIT ON received**
- **ANY 1 (grp1) LAG CONTROL (max_lag_size = 10MB)**
- **ALL (grp1) CAMO**

Demo

Group Commit and Commit Scopes

A terminal window titled "Terminal - postgres@pg1:~" with a menu bar containing "File", "Edit", "View", "Terminal", "Tabs", and "Help". The terminal content shows the prompt "postgres@pg1:~ \$" followed by a black cursor block.

```
Terminal - postgres@pg1:~  
File Edit View Terminal Tabs Help  
postgres@pg1:~ $ █
```

Questions?



Thank you!

martin.marques@enterprisedb.com

Completa esta encuesta para participar en el sorteo y tener
la oportunidad de ganar los
Bose QuietComfort Earbuds II

