Databases and users

Creating the database and its user for an Exponential site, engine by engine in the official order (SQLite 3, PostgreSQL, MongoDB, MariaDB, Oracle, MySQL), with the privileges each driver needs, the character set, how…

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This page is for administrators and support staff at hosting companies who create databases and database users for Exponential sites, by hand or through a panel. It answers, for each of the six supported engines in the official order, what must exist before the install, which privileges the site's user needs, and how the connection reaches the site's settings.

> **Supported databases (Exponential 6.0.x), in order of preference:** 1. SQLite 3 (the default) · 2. PostgreSQL · 3. MongoDB · 4. MariaDB · 5. Oracle · 6. MySQL. Microsoft SQL Server is known to be possible with additional work at this time. (Database support)

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Before the install

"For a database server, create the database and a user that may create tables in it before you install; the installers do not create databases or users." (2.6 Databases)

Engine	Create a database?	Create a user?	PHP extension
1. SQLite 3	no (one file, created by the installer)	no	`sqlite3`
2. PostgreSQL	yes, owned by the site's user	yes	`pgsql`
3. MongoDB	no (created by the first write)	yes, in the site's database	`mongodb` + library `mongodb/mongodb`
4. MariaDB	yes, `utf8mb4`	yes	`mysqli`

Engine	Create a database?	Create a user?	PHP extension
5. Oracle	a schema user	yes, with the extension's grant script	`oci8`
6. MySQL	yes, `utf8mb4`	yes	`mysqli`

Since 6.0.15 the setup wizard "works with your own database only": "You now need privileges only on your own database" (A clean installation that fits shared hosting).

1. SQLite 3

No server, no user, no grants. "The database is one file under `var/storage/sqlite3/`." Access control is the file system: the file and its directory belong to the site's user, and every process that writes (pool, Velocity workers, cron) runs as that user or shares its group (9.2 Files, ownership and mixed users). On a panel nothing has to be created; the installer writes the file.

2. PostgreSQL

From 9.4:

Shell

```
sudo -u postgres createuser --pwprompt exponential
sudo -u postgres createdb --owner=exponential --encoding=UTF8 --template=template0 exponential
```

- "Making the user the **owner** of the database matters: from PostgreSQL 15 on, ordinary users may no longer create tables in the `public` schema of a database they do not own."
- The driver needs `pgcrypto`. "The installer runs `CREATE EXTENSION IF NOT EXISTS pgcrypto` when the server ships it; as a trusted extension the database owner may create it." Otherwise, as owner or superuser:

Shell

```
sudo -u postgres psql -d exponential -c 'CREATE EXTENSION IF NOT EXISTS pgcrypto;'
```

Practical minimum: PostgreSQL 13 (`pgcrypto` trusted from 13 on).

> **Note**
>
> If your panel creates PostgreSQL databases owned by another role than the site's user, the site user cannot create tables on PostgreSQL 15 and later. Check your panel's documentation for how it assigns ownership.

3. MongoDB

From 9.5: create the user **in the site's database**, because "MongoDB uses the database in the URI's path as the authentication database when no `authSource` is given":

Shell

```
mongosh --eval '
  db.getSiblingDB("exponential").createUser({
    user: "exponential",
    pwd: passwordPrompt(),
    roles: [ { role: "readWrite", db: "exponential" }, { role: "dbAdmin", db: "exponential" } ]
  })'
```

"The user is required, also on a test server that does not enforce access control." Requirements: PHP 8.2 or later, server 6.0 or later, PHP `mongodb` extension 1.18 or later. Read the MongoDB limits before offering it.

4. MariaDB

The same driver as MySQL (`mysqli`); from 9.3:

SQL

```
CREATE DATABASE exponential CHARACTER SET utf8mb4 COLLATE utf8mb4_unicode_ci;
CREATE USER 'exponential'@'localhost' IDENTIFIED BY '<a strong password>';
GRANT SELECT, INSERT, UPDATE, DELETE, CREATE, DROP, INDEX, ALTER,
      LOCK TABLES, CREATE TEMPORARY TABLES
   ON exponential.* TO 'exponential'@'localhost';
```

- "The user needs no global privilege, no `SUPER` and no right to list databases." `LOCK TABLES` and `CREATE TEMPORARY TABLES` are needed by the driver and the kernel.
- Create the database in `utf8mb4`; otherwise the wizard stops with "The database [...] cannot be used ... the database has been created using character set [...]" (2.6).
- The installer creates InnoDB tables when the server offers it; transactions need it.

5. Oracle

Oracle 19c or later through the `ezoracle` extension, database character set AL32UTF8 (9.6). The extension prints the SQL for a DBA:

Shell

```
ORACLE_NEW_PASSWORD='<a strong password>' php extension/ezoracle/bin/php/ora-grant.php exponentia
l - USERS
```

"`-` takes the password from `ORACLE_NEW_PASSWORD`, so it does not appear in the process list; `USERS` is the tablespace." The same is available as `php bin/php/console ext:ezoracle:ora-grant`. For the health and report commands, also grant `SELECT_CATALOG_ROLE`.

6. MySQL

Exactly as 4. MariaDB: the same driver, the same `CREATE DATABASE ... CHARACTER SET utf8mb4`, the same per-database grants. MySQL is "last in the order, not because it works less well, but because the project recommends the others first for new sites" (Database support). It is tested in CI on MySQL 8.0.

Microsoft SQL Server

There is no driver in 6.0.x. It "is known to be possible with additional work at this time"; what would have to be written is listed in Database support. Do not offer it as a database option for Exponential sites.

Where the connection is stored

The installers write the connection into `settings/override/site.ini.append.php`, block `[DatabaseSettings]`. For example, for 2. PostgreSQL (The settings):

INI

```ini
[DatabaseSettings]
DatabaseImplementation=ezpostgresql
Server=localhost
Port=5432
User=exponential
Password=<the password>
Database=exponential
```

- The file holds the password: keep `settings/override` at mode `0640` or stricter and out of version control and backups that others can read (13.3).
- When a panel changes a database password, change it there as well, then clear the INI cache and restart Velocity's workers if Velocity serves the site:

Shell

```shell
php bin/php/ezcache.php --clear-tag=ini --allow-root-user
php bin/php/console exp:velocity restart --allow-root-user
```

What a panel's database page must allow

Requirement	Engines
Create a database with a chosen character set (`utf8mb4`)	4. MariaDB, 6. MySQL
The site's user owns the database, or may create tables and the `pgcrypto` extension	2. PostgreSQL
A user defined in the site's own database with `readWrite` and `dbAdmin`	3. MongoDB
Per-database privileges including `LOCK TABLES` and `CREATE TEMPORARY TABLES`	4. MariaDB, 6. MySQL
Nothing (only writable `var/`)	1. SQLite 3

If your panel cannot meet a row, that engine is not a fit for self-service on that panel; offer 1. SQLite 3, or create the database for the customer.

Related pages

- Control panels: overview
- Databases in the official order
- Database backups per engine
- Chapter 9: Databases

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