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> [Technology] Nextcloud on a Raspberry Pi: setting up a web server, a database, PHP and Nextcloud itself

Posted by Richardum 00:43Labels: #Technology apache debian mariadb mysql nextcloud owncloud php raspberrypi

Installing Nextcloud on a Raspberry Pi can be fun, or "fun". Run your own suite of open source web services for greater control, customization, independence, and whatever. I'll share my process for installing it from a tarball on a Raspberry Pi (4) running Raspberry Pi OS (bookworm). Let's hope I don't skip any steps.

Nextcloud's website offers a lot of options, and you can run Nextcloud in containers, install it from snaps, from Fedora's RPM repositories, etc. One benefit of installing it from a simple tarball, from its source, is that you can better understand a lot of its dependencies and the configuration needs. I used their extensive directions found here:

- https://docs.nextcloud.com/server/latest/admin_manual/installation/source_installation.html

Honestly, they're comprehensive enough that you can follow that instead of the below, but hopefully in the end I'll have a streamlined guide, at least for myself.

Regarding storage, going through this on my Raspberry Pi (already in use for other things) used 3.5GB of disk space.

★ Going through it on the docker.io/library/debian:latest container image, I used 4.8GB of disk space (starting from a minimal 172MB!). And this is before user data gets accumulated. So if you want to store a lot, you will likely want to get a larger microSD card for your Pi or use some external USB storage.

Regarding performance, I've had some mixed results. During a demo to a group of friends on a local network using the nextcloudpi docker container, many features were quite slow. However, testing at home recently, using either the container or the source installation described below, those same features were now fast with very low latency!

★ Environment

My environment:

- Hardware:
 - Raspberry Pi 4 Model B Rev 1.4
 - Storage: 29GB
- OS:

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- Raspberry Pi OS (Debian GNU/Linux 12 (bookworm))
- image: 2023-10-10-raspbian-bookworm-arm64-lite.img
- Nextcloud
 - version: 27.1.3
 - build: 2023-10-26T17:25:16+00:00 565dc36226d08d071c30d8ad4fd54126dfa4be79

Nextcloud can work with a variety of databases and web servers, and the choices can be overwhelming. For this process, I'm going with their recommendations in their install guide and making some boring, conventional choices.

Software choices:

- web server: Apache
 - apache2-2.4.57-2
- database: MariaDB (mysql)
 - mariadb-server-1:10.11.4-1~deb12u1

If you would like to follow along but don't have a Raspberry Pi to play with, you can get a very similar set-up experience using a standard Debian GNU/Linux 12 (bookworm) installation. If you like containers, docker.io/library/debian:latest is currently bookworm. I used that with podman to do testing along the way.

Another note is that I generally use systemd but feel free to use your favourite service manager/init system.

1. Set-up Environment

```
# # update the base system
# apt update
# apt upgrade
# # install some useful tools
# apt install vim
# apt install less
# apt install wget
# # install some tools that Nextcloud requires
# apt install bzip2
```

2. Database

As noted above, I'm using MariaDB, a MySQL-compatible derivative. You'll create an empty database, as well as a username and a password, for Nextcloud. Nextcloud will handle table creation on its own. Don't forget to replace *username* and *password* with your own unique values below.

```
# apt install mariadb-server          # 18.3MB download, 197MB installed
# systemctl enable --now mariadb
# mysql -u root
> CREATE USER 'username'@'localhost' IDENTIFIED BY 'password';
> CREATE DATABASE IF NOT EXISTS nextcloud CHARACTER SET utf8mb4 COLLATE utf8mb4_general_ci;
> GRANT ALL PRIVILEGES ON nextcloud.* TO 'username'@'localhost';
```

```
> FLUSH PRIVILEGES;
```

Next, we need to add some configuration to MariaDB/MySQL in `/etc/mysql/my.cnf` (which maps to `/etc/mysql/mariadb.cnf` for me). The installation guide suggests the following settings. I'll note that my default config already has a similar `[client-server]` section, so I excluded I only added the other ones that weren't present. The `transaction_isolation` and `binlog_format` settings are particularly important.

```
[server]
skip_name_resolve = 1
innodb_buffer_pool_size = 128M
innodb_buffer_pool_instances = 1
innodb_flush_log_at_trx_commit = 2
innodb_log_buffer_size = 32M
innodb_max_dirty_pages_pct = 90
query_cache_type = 1
query_cache_limit = 2M
query_cache_min_res_unit = 2k
query_cache_size = 64M
tmp_table_size= 64M
max_heap_table_size= 64M
slow_query_log = 1
slow_query_log_file = /var/log/mysql/slow.log
long_query_time = 1

[client-server]
!includedir /etc/mysql/conf.d/
!includedir /etc/mysql/mariadb.conf.d/

[client]
default-character-set = utf8mb4

[mysqld]
character_set_server = utf8mb4
collation_server = utf8mb4_general_ci
transaction_isolation = READ-COMMITTED
binlog_format = ROW
innodb_large_prefix=on
innodb_file_format=barracuda
innodb_file_per_table=1
```

Later on, when configuring Nextcloud itself, you'll provide it with the database name, username, password and host (in this case, localhost). You can manually configure it or use the web installation wizard (which I'll do for in post.) [Light Dial](#)

3. PHP

Nextcloud requires a bunch of PHP modules, some of which were already installed on my system, and some not. Below I only show install commands for those that I were not already there. You can view Nextcloud's [documentation](#) to see all the modules they require and recommend, including some optional ones that I am skipping.

```
# apt install php
#
# # install required modules
# apt install php-curl
# apt install php-gd
# apt install php-json
# apt install php-mbstring
# apt install php-xml           # SimpleXML, XMLReader, XMLWriter
# apt install php-zip
# apt install php-mysql        # for DB since I use MariaDB
#
# # install recommended modules
# apt install php-bz2           # for installing packages
# apt install php-intl          # faster language translation performance (I run
# apt install php-redis         # cache for faster performance; alt: php-acpu, pl
# apt install redis-server      # see notes
# systemctl enable --now redis-server # or redis-server
#
# # file preview generation
# apt install php-imagick        # image preview generation (22.4MB down, 84.0MB
# apt install ffmpeg            # video preview generation; alt: avconv; (127MB
# apt install libreoffice        # (318MB down, 1,235MB installed)
```

You may want to [review suggested configuration changes](#) to see which ones you need.

4. Web server

As noted above, I'm using Apache 2. We will enable some modules; several that Nextcloud want were enabled by default but I'm listing them anyway.

It's 2023, so of course we will encrypt our connections and traffic. In this case, we are going to use a default self-signed certificate, but if you are actually going to deploy it, at least use Let's Encrypt to get a certificate for your actual domain.

```
# apt install apache2
# systemctl enable --now apache2
#
# # required modules, for at least pretty urls :)
```

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```
# a2enmod rewrite
# # recommended modules
# a2enmod headers
# a2enmod env          # already enabled for me
# a2enmod dir          # already enabled for me
# a2enmod mime         # already enabled for me
#
# # SSL
# a2enmod ssl
# a2ensite default-ssl
#
# # use php-fpm, Nextcloud recommends it over mod_php
# apt install php-fpm
# a2enmod proxy_fcgi
# a2enmod setenvif      # already enabled for me
# a2enconf php8.2-fpm
# systemctl enable --now php8.2-fpm
#
# systemctl restart apache2
# systemctl reload apache2
```

Next, we'll configure our Nextcloud site in Apache. You can set it up as either a sub-directory or a subdomain on your host. I picked sub-directory. More details [here](#). Note that it disables mod_dav, as Nextcloud uses SabreDAV.

Nextcloud Apache Configuration

Create this file /etc/apache2/sites-available/nextcloud.conf with the following content:

```
Alias /nextcloud "/var/www/nextcloud/"

<Directory /var/www/nextcloud/>
    Require all granted
    AllowOverride All
    Options FollowSymLinks MultiViews

    <IfModule mod_dav.c>
        Dav off
    </IfModule>
</Directory>
```

Afterwards, run this:

```
a2ensite nextcloud.conf
systemctl reload apache2
```

We will actually create and populate the /var/www/nextcloud directory when we finally get to installing Nextcloud itself from its tarball.

5. Nextcloud

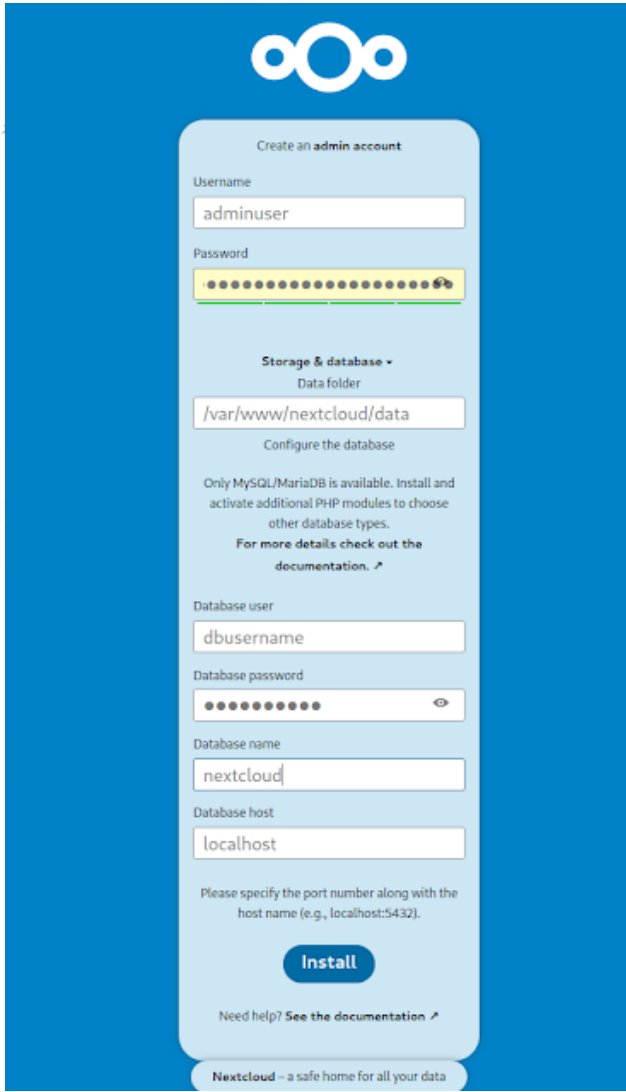
Now that we have our web server, database, and PHP configured, we can finally install Nextcloud itself. As noted above, I am installing it from their latest source tarball. You can find it by going to their Install page > Community Projects > Archive, or just follow this direct link: <https://download.nextcloud.com/server/releases/latest.tar.bz2>

```
# cd /var/www
# wget https://download.nextcloud.com/server/releases/latest.tar.bz2 # 172MB download,
# tar -xf latest.tar.bz2 # this unpacks 'n
# chown -R www-data:www-data /var/www/nextcloud/
#
# # verify that necessary services are running
# systemctl status mariadb
# systemctl status php8.2-fpm
# systemctl status apache2
```

Now, if everything went smoothly, you should be able to pop open <https://yourpihostname:443/> and be greeted with the initial configuration page!

- create an admin account
- configure database settings (back from step #2 up above)
- install recommended apps

Now you can have some fun playing around. Some features require extra configuration, like using Nextcloud Office with Collabora Online (Development Edition, CODE), and I may update this in the future with some more nuance.



The image shows the Nextcloud installation interface on a blue background. At the top is the Nextcloud logo. The main section is titled "Create an admin account". It contains several input fields: "Username" with the value "adminuser", "Password" (masked with dots), "Data folder" with the value "/var/www/nextcloud/data", "Database user" with the value "dbusername", "Database password" (masked with dots), "Database name" with the value "nextcloud", and "Database host" with the value "localhost". There is a note about MySQL/MariaDB and a link to documentation. At the bottom is an "Install" button and a footer with the text "Nextcloud - a safe home for all your data".

Create an admin account

Username
adminuser

Password
●●●●●●●●●●●●●●●●

Storage & database ▾
Data folder
/var/www/nextcloud/data

Configure the database

Only MySQL/MariaDB is available. Install and activate additional PHP modules to choose other database types.
For more details check out the documentation. ↗

Database user
dbusername

Database password
●●●●●●●●●●●●●●●●

Database name
nextcloud

Database host
localhost

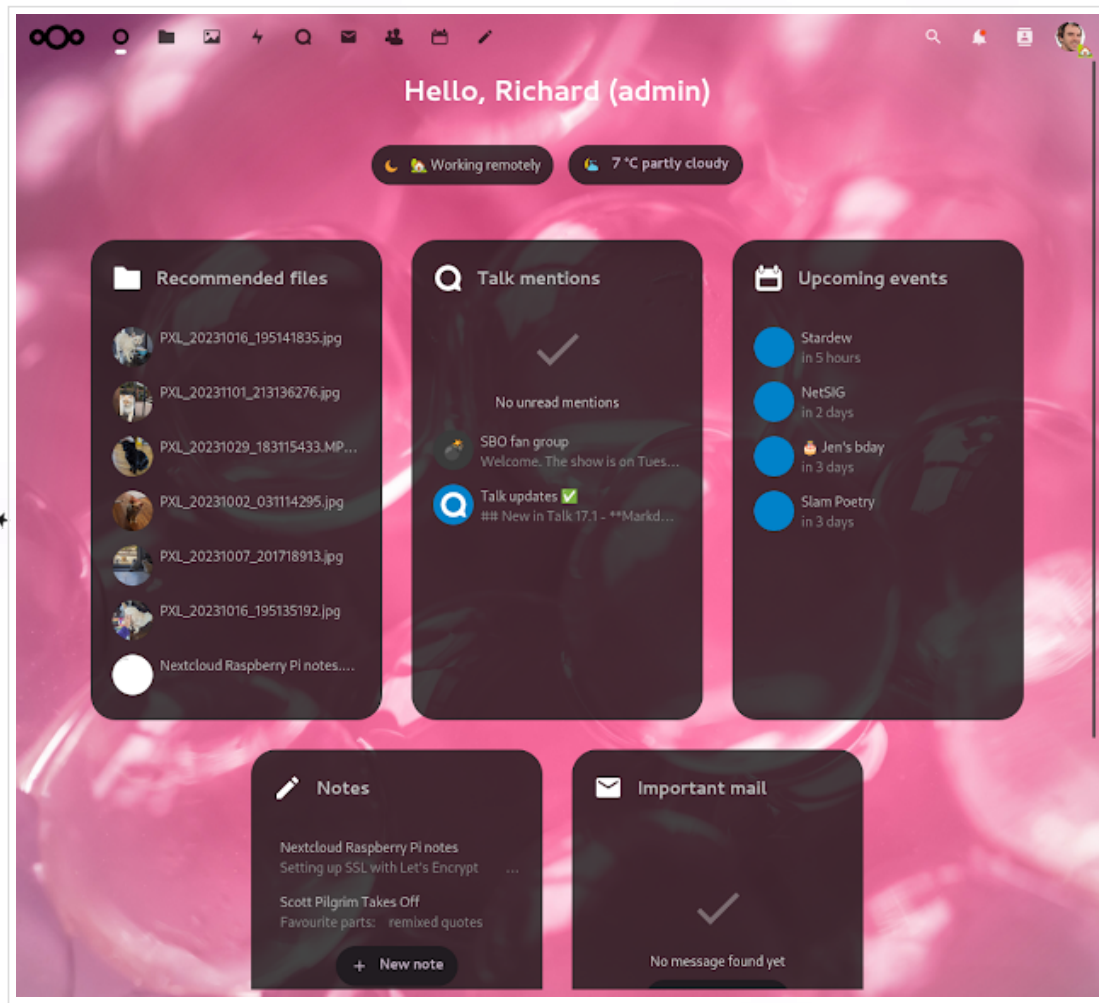
Please specify the port number along with the host name (e.g., localhost:5432).

Install

Need help? See the documentation ↗

Nextcloud - a safe home for all your data

Admin user and DB set-up screen



User dashboard with some test data added

Next steps

In a future post, I may discuss setting up a Google Docs-like experience with Nextcloud Office using Collabora Online office, as well as explore more of the options and configuration settings. I will also discuss the much-simpler ways of installing and running Nextcloud (e.g. from VM or container images!)

Update: just wrote up the very quick-to-start-but-deprecated nextcloudpi container image.

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