

PostgreSQL 12 Server auf CentOS Linux 7

Preface

PostgreSQL is a powerful database system where the SQL language is very similar to Oracle's. That is the reason why we choose PostgreSQL as a database platform for BPS. The origins of PostgreSQL date back to 1986 as part of the POSTGRES project at the University of California at Berkeley and has more than 30 years of active development on the core platform.

PostgreSQL is free and open source, so you can use it for your production schemas without any license costs. Compared to Oracle Express which you may also use for free, PostgreSQL does not impose any technical restrictions on CPU count, memory limit, database size etc. Also there is commercial support available from a number of companies in case you need it.

In this tutorial Linux and PostgreSQL are installed in a virtual machine under [VMware Workstation 15 Player](#).

Installation

Linux

Download Linux ISO

Download CentOS Linux 7 from <https://centos.org/>

Since 7 is not the latest release, you may have to select a mirror first, and then browse to `centos/7/isos/x86_64` to see the ISO files available, for example http://linuxsoft.cern.ch/centos/7/isos/x86_64/ for a popular swiss mirror.

Select the full installation iso, which is probably the biggest like `CentOS-7-x86_64-DVD-1908.iso` 4.3GB. It takes somewhat longer to download but is most convenient for the installation.

Create Virtual Machine

Start VMware Workstation 15 Player

- Create a New Virtual Machine
- Installer Disc image file (iso): `CentOS-7-x86_64-DVD-1908.iso`
- Virtual machine name: `vmpg12`
- Location: `D:\VM\vmpg12`
- Maximum disk size (GB): 120
- Store virtual disk as a single file
- Customize Hardware
 - Memory: 2 GB

- Processors: 2
- Network Adapter: Bridged
- Power on this virtual machine after creation

Install Linux

[Show all config steps](#)





The image shows the CentOS 7 installation language selection screen. At the top left is the CentOS logo. At the top right, it says "CENTOS 7 INSTALLATION" with a keyboard icon and "us" in a dropdown menu, and a "Help!" button. The main heading is "WELCOME TO CENTOS 7." Below it is the question "What language would you like to use during the installation process?". There are two scrollable lists of languages. The left list includes: English, Afrikaans, አማርኛ, العربية, অসমীয়া, Asturianu, Беларуская, Български, বাংলা, and others. The right list includes: English (United States), English (United Kingdom), English (India), English (Australia), English (Canada), English (Denmark), English (Ireland), English (New Zealand), English (Nigeria), English (Hong Kong SAR China), and others. At the bottom right are "Quit" and "Continue" buttons.

CENTOS 7 INSTALLATION

us Help!

WELCOME TO CENTOS 7.

What language would you like to use during the installation process?

English	English	English (United States)
Afrikaans	Afrikaans	English (United Kingdom)
አማርኛ	Amharic	English (India)
العربية	Arabic	English (Australia)
অসমীয়া	Assamese	English (Canada)
Asturiano	Asturian	English (Denmark)
Беларуская	Belarusian	English (Ireland)
Български	Bulgarian	English (New Zealand)
বাংলা	Bengali	English (Nigeria)
		English (Hong Kong SAR China)
		English (Philippines)

Quit Continue

KEYBOARD LAYOUT

CENTOS 7 INSTALLATION

Done

ch

Help!

Which keyboard layouts would you like to use on this system? You may move any layout to the top of the list to select it as the default.

Swiss German; Alemannic; Alsatian (German (Switzerland))

+ - ^ v [Keyboard icon]

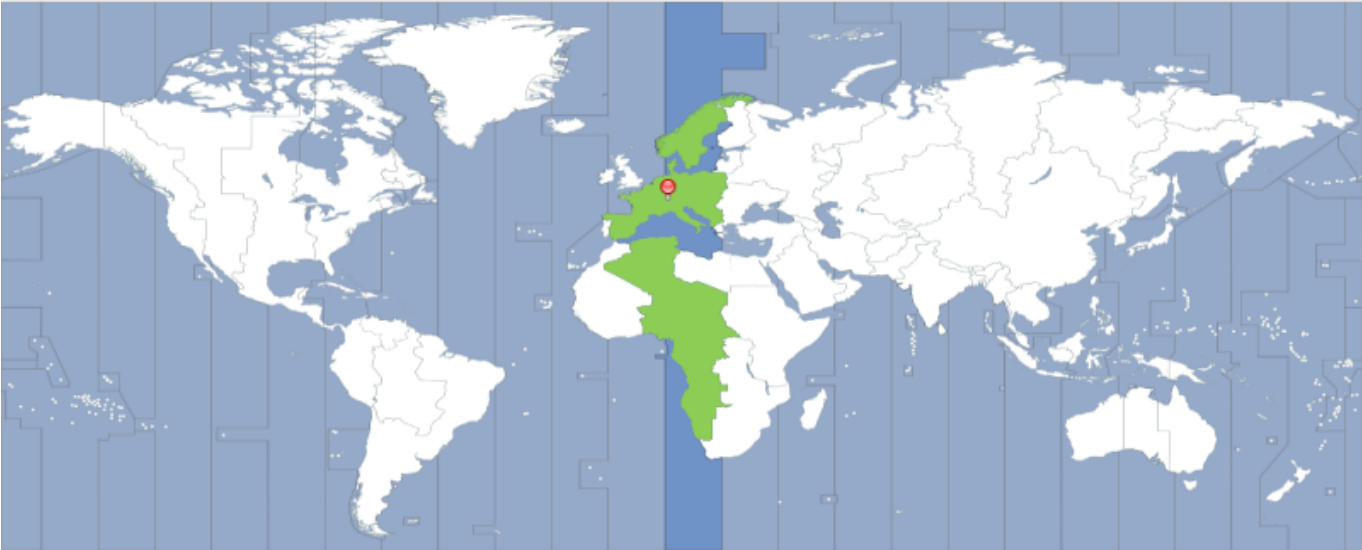
Test the layout configuration below:

Layout switching not configured.

Options

DATE & TIME CENTOS 7 INSTALLATION

Region: City: Network Time



24-hour AM/PM / /

You need to set up networking first if you want to use NTP

INSTALLATION DESTINATION

CENTOS 7 INSTALLATION

Done

ch

Help!

Device Selection

Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

Local Standard Disks

120 GiB



VMware, VMware Virtual S

sda / 120 GiB free

Disks left unselected here will not be touched.

Specialized & Network Disks



Add a disk...

Disks left unselected here will not be touched.

Other Storage Options

Partitioning

Automatically configure partitioning. I will configure partitioning.

I would like to make additional space available.

[Full disk summary and boot loader...](#)

1 disk selected; 120 GiB capacity; 120 GiB free [Refresh...](#)

NETWORK & HOST NAME CENTOS 7 INSTALL

Ethernet (ens33)
Intel Corporation 82545EM Gigabit Ethernet Controller

Ethernet (ens33)

Connected

Hardware Address 00:0C:29:A4:26:49

Speed 1000 Mb/s

IPv4 Address 10.56.1.126


IPv6 Address 2a02:1206:4510:4b10:1c4d:f4e4:febe:5c42/64

Subnet Mask 255.255.0.0

Default Route 10.56.1.1

DNS 10.56.1.1

Host name: Current host name: v



INSTALLATION SUMMARY

CENTOS 7 INSTALL

ch

DATE & TIME
Europe/Zurich timezone

KEYBOARD
Swiss German; Al...an (Switze

LANGUAGE SUPPORT
English (United States)

SOFTWARE

INSTALLATION SOURCE
Local media

SOFTWARE SELECTION
Minimal Install

SYSTEM

INSTALLATION DESTINATION
Automatic partitioning selected

KDUMP
Kdump is enabled

NETWORK & HOST NAME
Wired (ens33) connected

SECURITY POLICY
No profile selected

Quit **Begin Inst**

We won't touch your disks until you click 'Begin I

ROOT PASSWORD

CENTOS 7 INSTA

Done


ch

The root account is used for administering the system. Enter a password for the root user.

Root Password:

Strong

Confirm:





CentOS

CONFIGURATION

CENTOS 7 INSTALL


USER SETTINGS

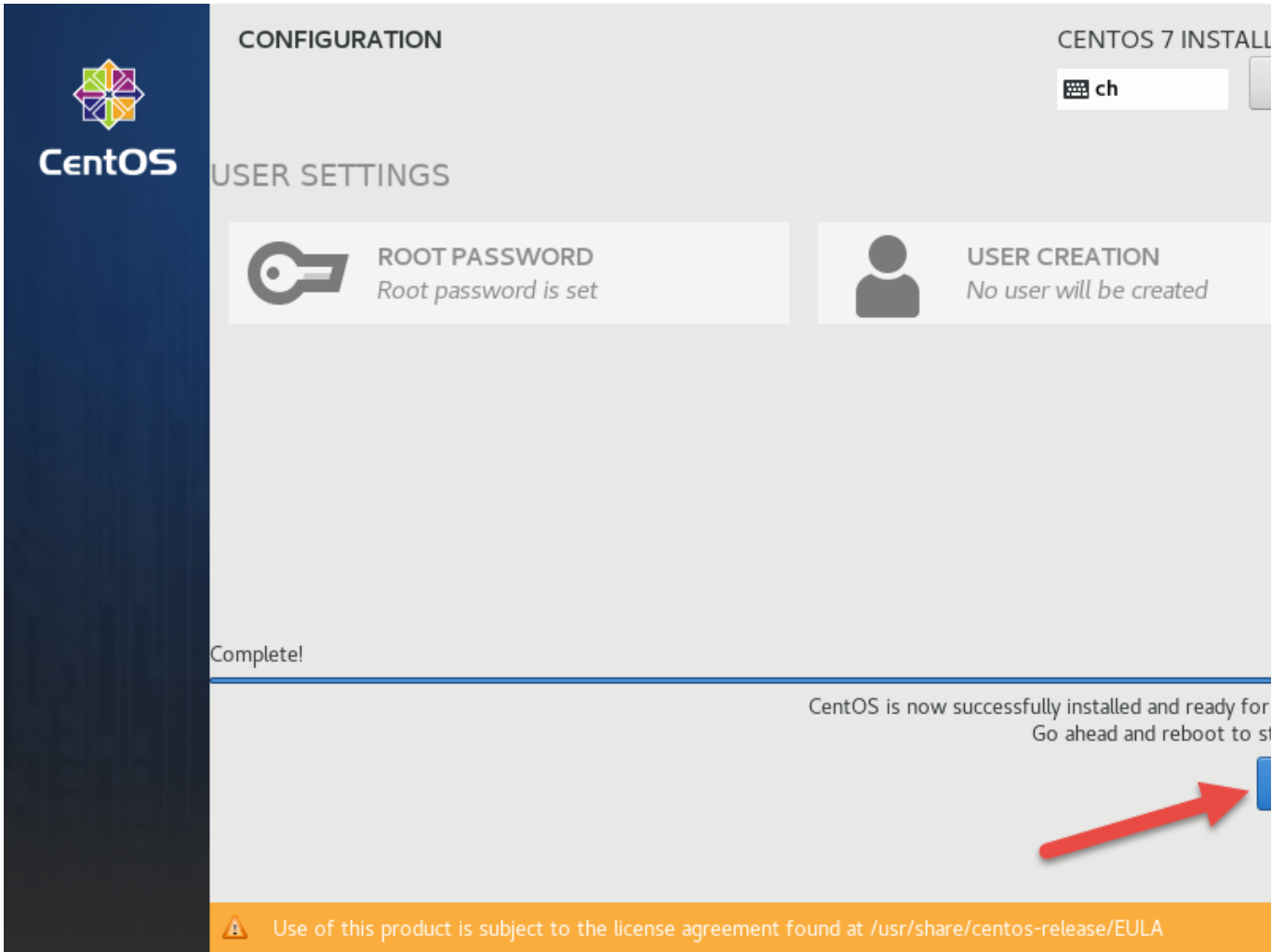
 **ROOT PASSWORD**
Root password is set

 **USER CREATION**
No user will be created

Installing libgpg-error (38/312)

CentOS Core SIG
Produces the CentOS Linux Distribution.
wiki.centos.org/SpecialInterestGroup





The image shows the CentOS 7 installation configuration interface. On the left is a dark blue sidebar with the CentOS logo and the text "CentOS". The main area is light gray and contains the following elements:

- CONFIGURATION** header at the top left.
- CENTOS 7 INSTALL** header at the top right, with a keyboard icon and the text "ch" below it.
- USER SETTINGS** section containing two panels:
 - ROOT PASSWORD**: "Root password is set" (with a key icon).
 - USER CREATION**: "No user will be created" (with a person icon).
- Complete!** text on the left side.
- Message on the right: "CentOS is now successfully installed and ready for... Go ahead and reboot to st...". A red arrow points to a blue button on the right.
- Orange footer bar: "Use of this product is subject to the license agreement found at /usr/share/centos-release/EULA".

```
CentOS Linux 7 (Core)
Kernel 3.10.0-1062.el7.x86_64 on an x86_64
vmpg12 login: _
```

Update

Open a ssh terminal to „vmpg12“ and login as root with the password defined before.

Update the software:

```
yum -y update
```

Install utilities:

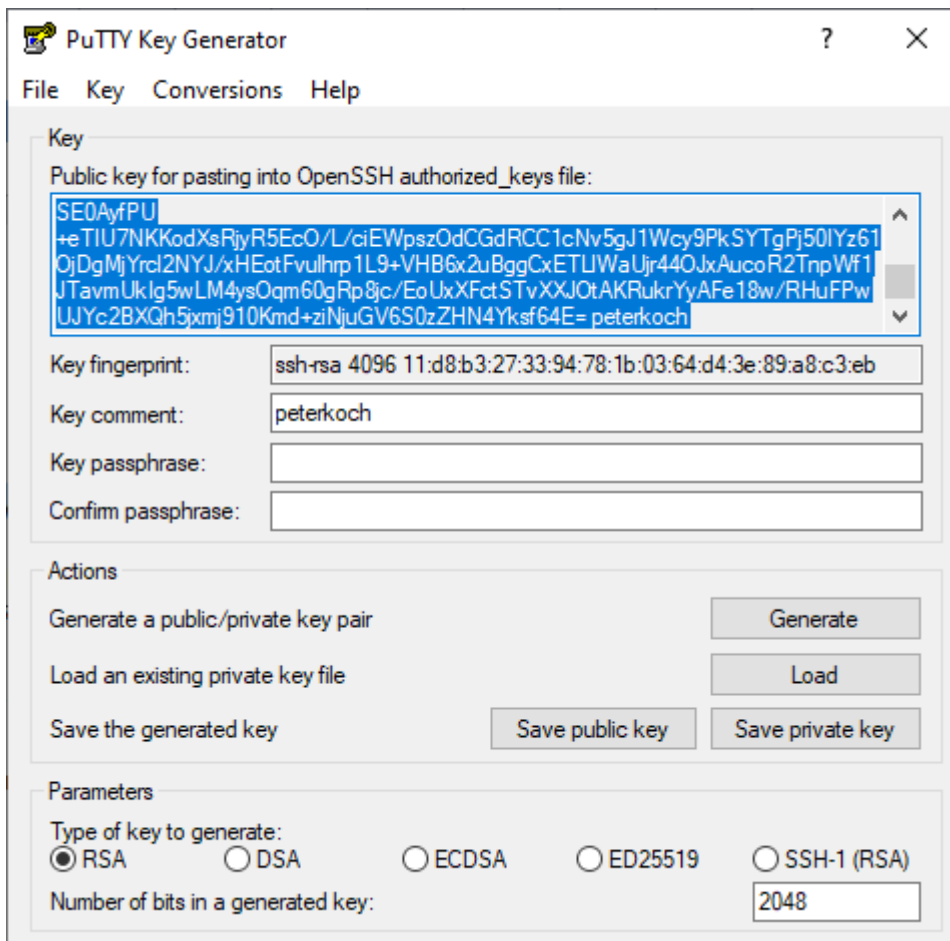
```
yum -y install nano
```

Setup SSH key auth for root

Create ~/.ssh and key

```
ssh-keygen -t rsa -b 4096  
<enter>  
<enter>  
<enter>
```

[Load my personal key in PuTTYgen, and copy public key to the clipboard](#)



Add my personal key to authorized keys:

```
nano ~/.ssh/authorized_keys  
<paste>
```

Turn of password auth for ssh:

```
nano /etc/ssh/sshd_config  
...  
PasswordAuthentication no  
...
```

Restart ssh:

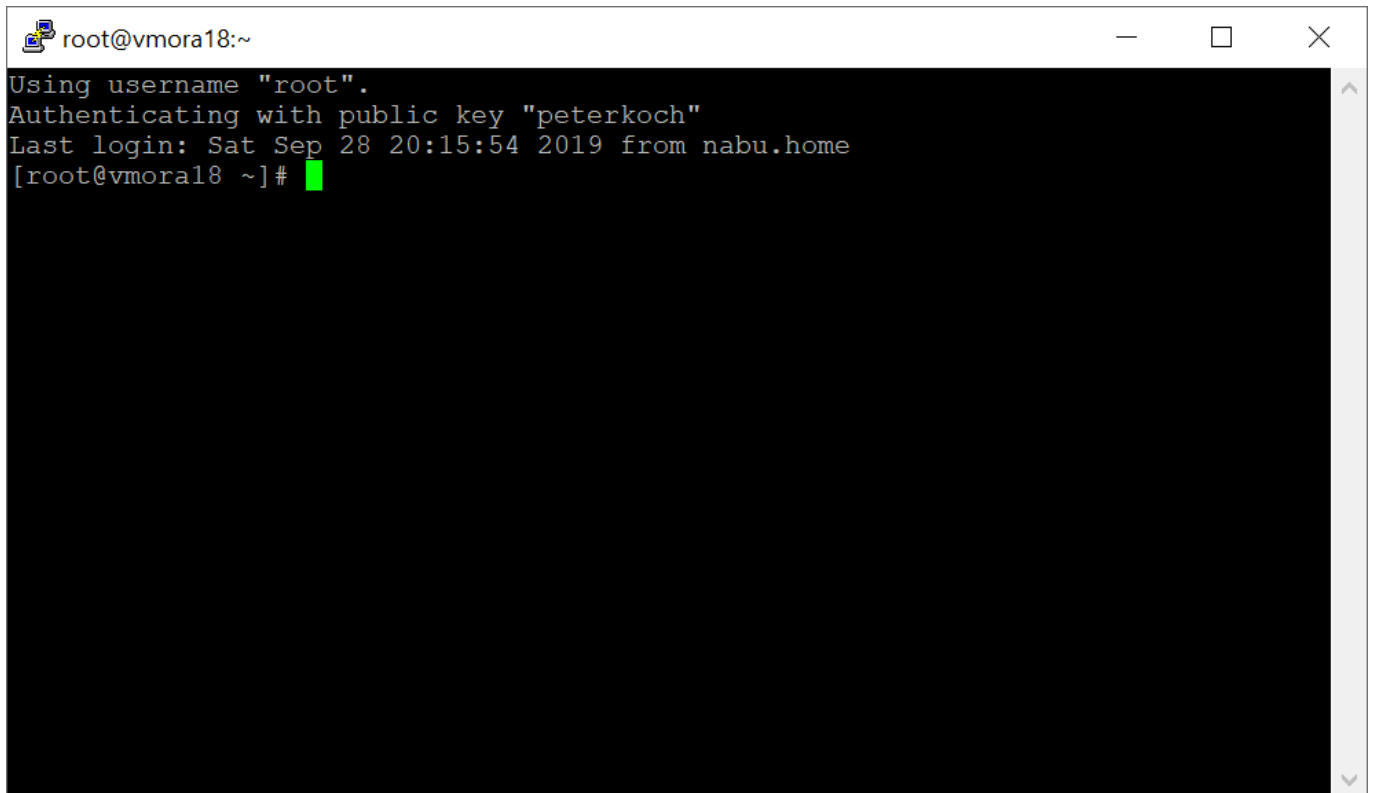
```
service sshd restart
```

Leave SSH terminal yet open in case.

Create and test PuTTY session for root:

- Session
 - Host Name: vmora18
 - Port: 22 / SSH
- Connection
 - Data
 - Auto-login username: root
 - SSH
 - Auth
 - Private key file: (location of my ppk)
- Session
 - Saved sessions: vmora18 - root
 - Save

[Test if autologin successful](#)

A terminal window titled 'root@vmora18:~' with standard window controls. The terminal output shows an SSH login process: 'Using username "root".', 'Authenticating with public key "peterkoch"', 'Last login: Sat Sep 28 20:15:54 2019 from nabu.home', and the prompt '[root@vmora18 ~]#'.

```
root@vmora18:~  
Using username "root".  
Authenticating with public key "peterkoch"  
Last login: Sat Sep 28 20:15:54 2019 from nabu.home  
[root@vmora18 ~]#
```

Motd Logo

Create logo at <http://www.network-science.de/ascii/>

- Text: vmpg12
- Font: slant
- Reflection: no
- Adjustment: center
- Stretch: no
- Width: 80
- do it!

Copy logo to clipboard, and paste to motd

```
nano /etc/motd  
<paste>
```

Disable SELinux

```
nano /etc/selinux/config  
...  
SELINUX=disabled
```

Disable firewall and reboot

```
systemctl stop firewalld
```

```
systemctl disable firewalld  
reboot
```

Database

Install software and create initial database

Install the repository RPM:

```
yum -y install  
https://download.postgresql.org/pub/repos/yum/reporepms/EL-7-x86_64/pgdg-redh  
at-repo-latest.noarch.rpm
```

Install the client packages:

```
yum -y install postgresql12
```

Install the server packages:

```
yum -y install postgresql12-server
```

Initialize the database:

```
/usr/pgsql-12/bin/postgresql-12-setup initdb
```

Enable automatic start:

```
systemctl enable postgresql-12  
systemctl start postgresql-12
```

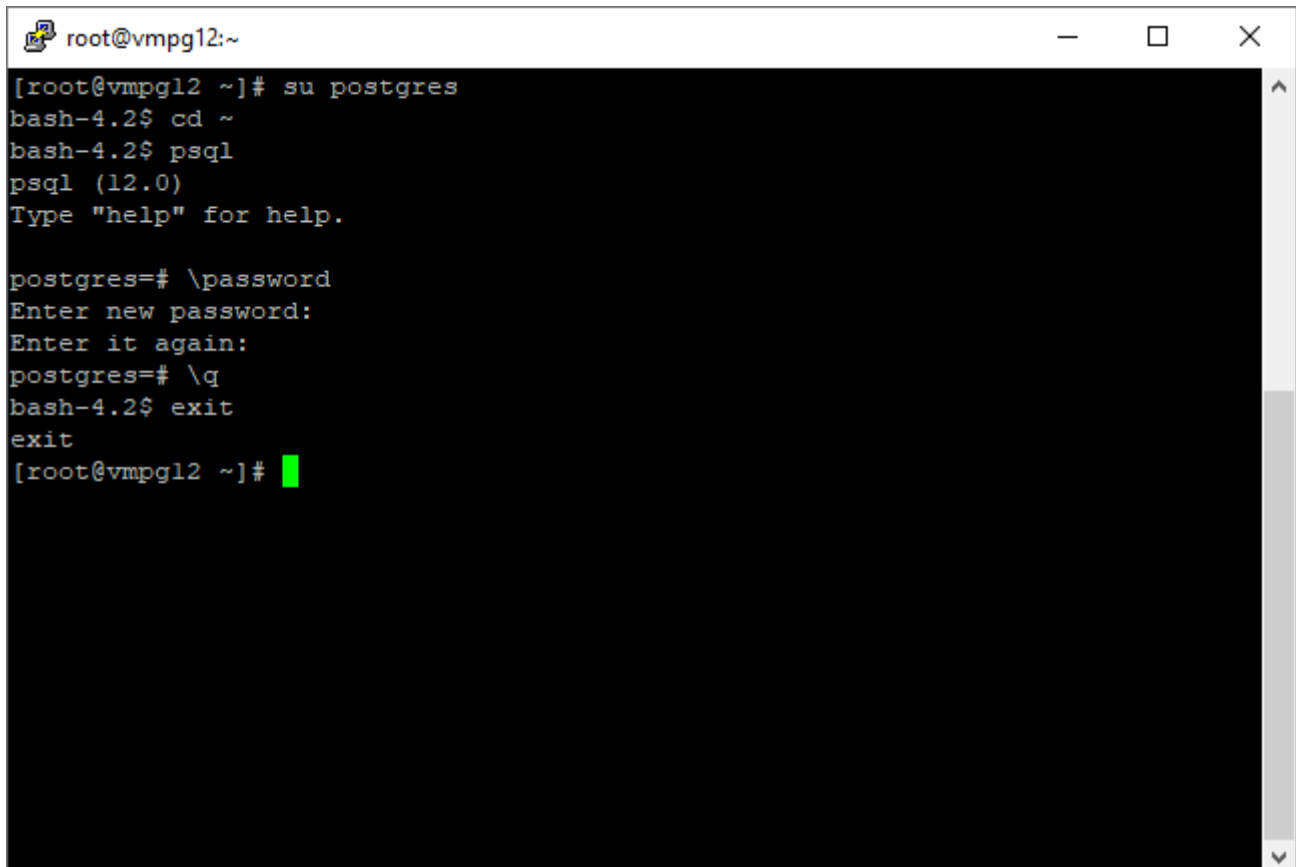
Enable password authentication

Upon installation Postgres is set up to use „ident“ authentication, meaning that it associates Postgres roles with a matching Linux system account. If a Postgres role exists, it can be signed in by logging into the associated Linux system account. We want to change to password od „md5“ authentication.

First set the password for user postgres:

```
su postgres  
cd ~  
psql  
\password  
<enter password 2x>  
\q  
exit
```

Example log:



```
root@vmpg12:~  
[root@vmpg12 ~]# su postgres  
bash-4.2$ cd ~  
bash-4.2$ psql  
psql (12.0)  
Type "help" for help.  
  
postgres=# \password  
Enter new password:  
Enter it again:  
postgres=# \q  
bash-4.2$ exit  
exit  
[root@vmpg12 ~]#
```

Now edit the host-based authentication (HBA) configuration file `pg_hba.conf` and change the two lines starting with „host all all..“ from „ident“ to „md5“:

```
nano /var/lib/pgsql/12/data/pg_hba.conf  
...  
# IPv4 local connections:  
host    all             all             127.0.0.1/32      md5  
# IPv6 local connections:  
host    all             all             ::1/128           md5  
...
```

Restart service:

```
systemctl restart postgresql-12
```

Test from root prompt:

```
psql -U postgres -h localhost  
<password>  
\q
```

Enable connections from other machines

Locate config files

```
find / -name "postgresql.conf"
```



```
find / -name "pg_hba.conf"
```

Edit postgresql.conf and set listen_address to *

```
nano /var/lib/pgsql/12/data/postgresql.conf
...
listen_addresses = '*'
...
```

Edit pg_hba.conf and add lines for external access

```
nano /var/lib/pgsql/12/data/pg_hba.conf
...
# IPv4 all connections from any address:
host    all             all             0.0.0.0/0       md5
# IPv6 all connections from any address:
host    all             all             :::/0           md5
```

Restart

```
systemctl restart postgresql-12
```

Tuning

Edit postgresql.conf for the following modifications.

Avoid session disconnect at long running queries:

```
tcp_keepalives_idle = 60
tcp_keepalives_interval = 60
```

For good BPS performance on a machine with 2GB RAM, 2 Processors and SSD disk:

```
max_connections = 25
shared_buffers = 512MB
work_mem = 16MB
maintenance_work_mem = 128MB
effective_io_concurrency = 200
max_worker_processes = 2
max_parallel_workers_per_gather = 1
max_parallel_workers = 2
wal_buffers = 16MB
max_wal_size = 2GB
min_wal_size = 1GB
checkpoint_completion_target = 0.9
random_page_cost = 1.1
effective_cache_size = 1GB
default_statistics_target = 100
```

Restart

```
systemctl restart postgresql-12
```

pgAdmin 4

Install and setup

Install pgAdmin4

```
yum -y install epel-release
yum -y update
yum -y install pgadmin4
```

Start and enable httpd service to start on boot

```
systemctl start httpd
systemctl enable httpd
```

Clone sample virtual host config and edit it

```
cp /etc/httpd/conf.d/pgadmin4.conf.sample /etc/httpd/conf.d/pgadmin4.conf
nano /etc/httpd/conf.d/pgadmin4.conf
```

Modify it to read this way:

</etc/httpd/conf.d/pgadmin4.conf>

```
<VirtualHost *:80>
ServerName vmpg12
LoadModule wsgi_module modules/mod_wsgi.so
WSGIDaemonProcess pgadmin processes=1 threads=25
WSGIScriptAlias /pgadmin4 /usr/lib/python2.7/site-packages/pgadmin4-
web/pgAdmin4.wsgi

<Directory /usr/lib/python2.7/site-packages/pgadmin4-web/>
    WSGIProcessGroup pgadmin
    WSGIApplicationGroup %{GLOBAL}
    <IfModule mod_authz_core.c>
        # Apache 2.4
        Require all granted
    </IfModule>
    <IfModule !mod_authz_core.c>
        # Apache 2.2
        Order Deny,Allow
        Deny from All
        Allow from 127.0.0.1
        Allow from ::1
```

```
</IfModule>
</Directory>
</VirtualHost>
```

Check config and restart apache

```
httpd -t
systemctl restart httpd
```

Create pgAdmin data directories and set apache as owner

```
mkdir -p /var/lib/pgadmin4/
chown -R apache:apache /var/lib/pgadmin4
mkdir -p /var/log/pgadmin4/
chown -R apache:apache /var/log/pgadmin4
```

Edit site config file

```
nano /usr/lib/python2.7/site-packages/pgadmin4-web/config_distro.py
```

to:

[config_distro.py](#)

```
HELP_PATH = '/usr/share/doc/pgadmin4-docs/en_US/html'
UPGRADE_CHECK_ENABLED = False
LOG_FILE = '/var/log/pgadmin4/pgadmin4.log'
SQLITE_PATH = '/var/lib/pgadmin4/pgadmin4.db'
SESSION_DB_PATH = '/var/lib/pgadmin4/sessions'
STORAGE_DIR = '/var/lib/pgadmin4/storage'
```

Initialize pgAdmin 4

```
python /usr/lib/python2.7/site-packages/pgadmin4-web/setup.py
<enter your email>
<enter password 2>
```

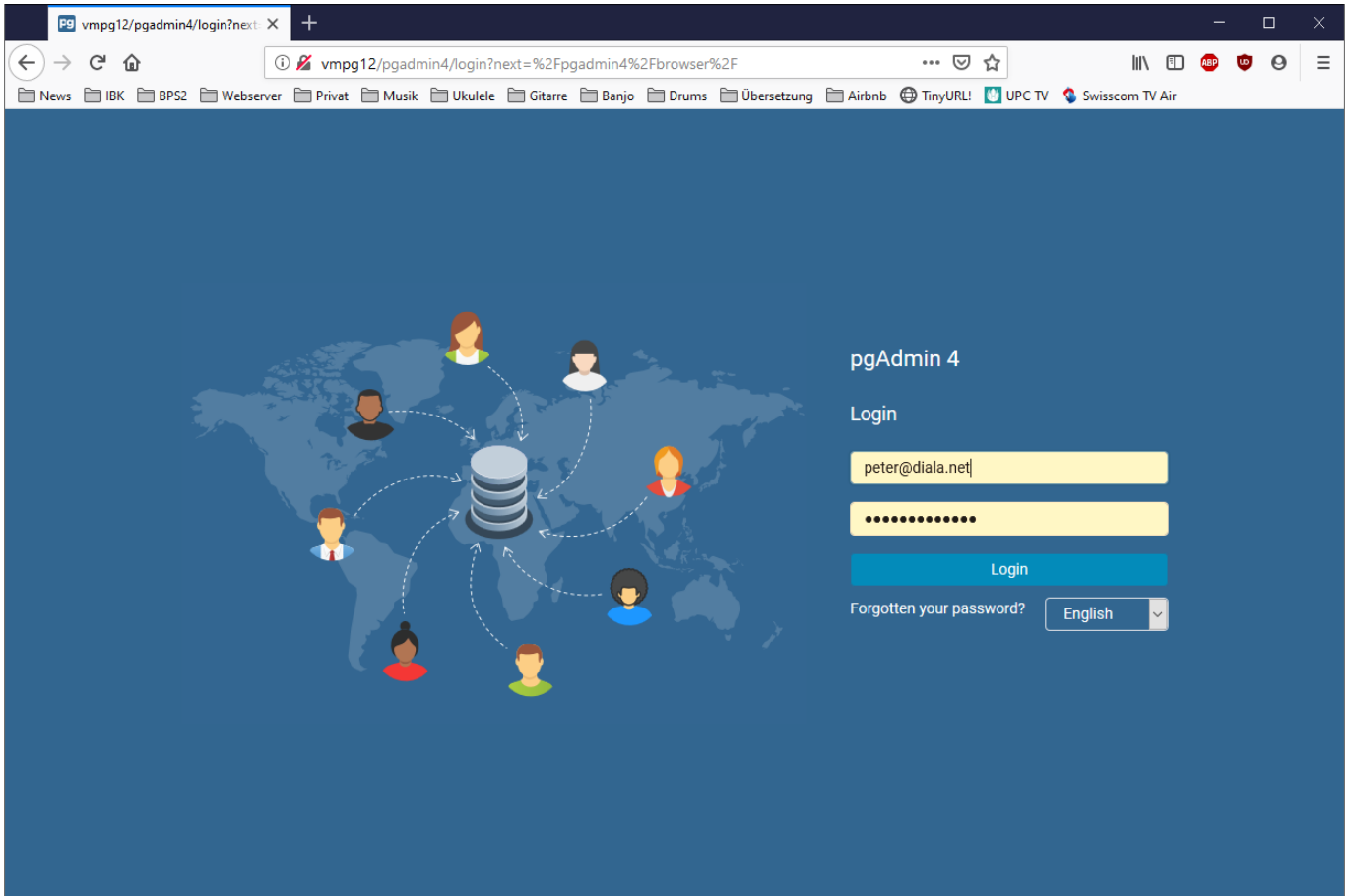
Reboot

```
reboot
```

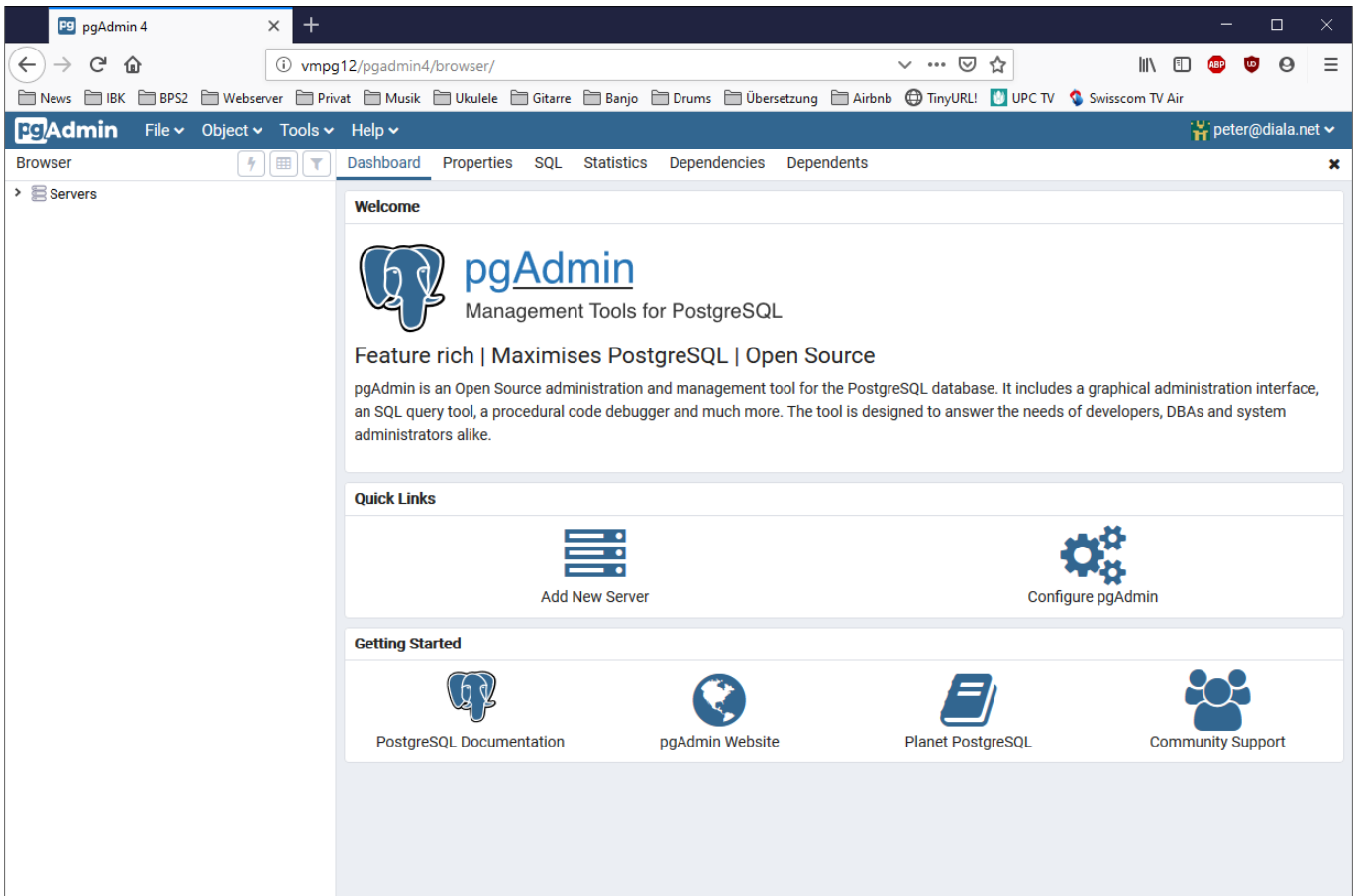
First steps in pgAdmin 4

Address in browser:

```
http://vmpg12/pgadmin4
```



Enter your email and password to login



Add new server:

Create - Server

General Connection SSL SSH Tunnel Advanced

Name:

Server group:

Background:

Foreground:

Connect now?:

Comments:

⚠ Either Host name, Address or Service must be specified.

Create - Server

General Connection SSL SSH Tunnel Advanced

Host name/address:

Port:

Maintenance database:

Username:

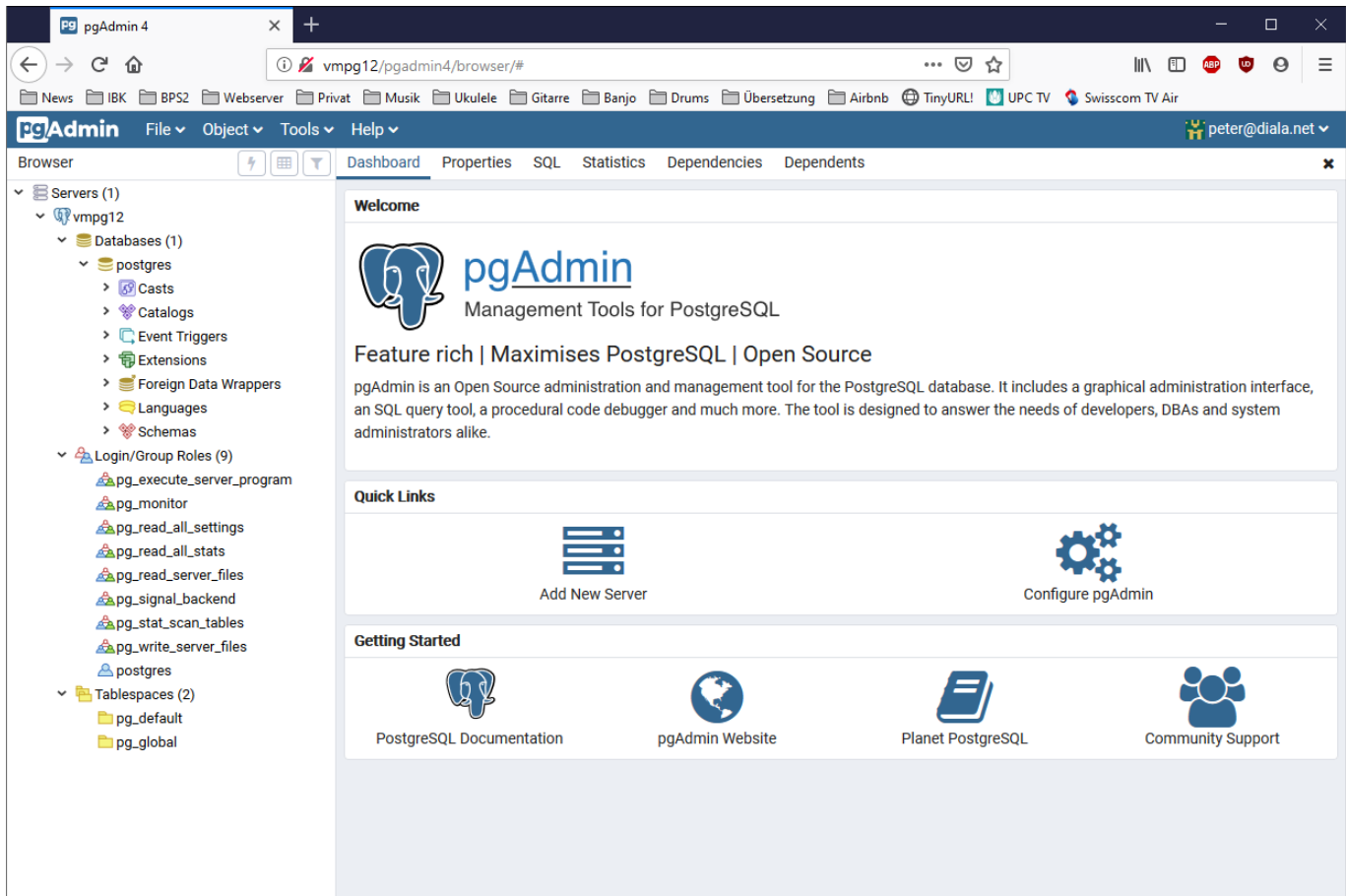
Password:

Save password?:

Role:

Service:

So we are ready to go:



From:
<https://bps.ibk-software.com/> - **BPS WIKI**

Permanent link:
<https://bps.ibk-software.com/dok:pg12cos7>

Last update: **22.03.2021 16:14**

