

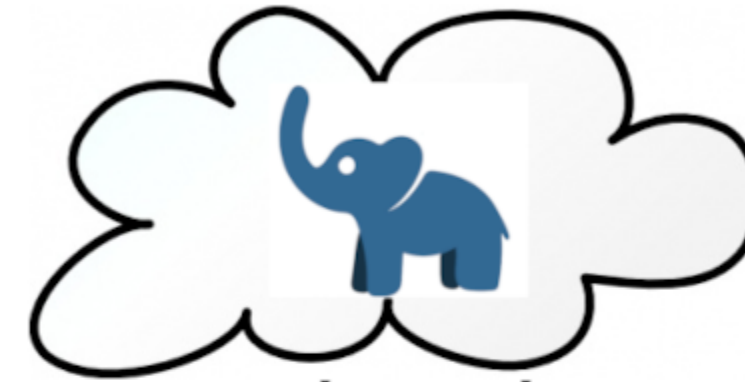
PostGIS überall

Jörg Thomsen, WhereGroup GmbH

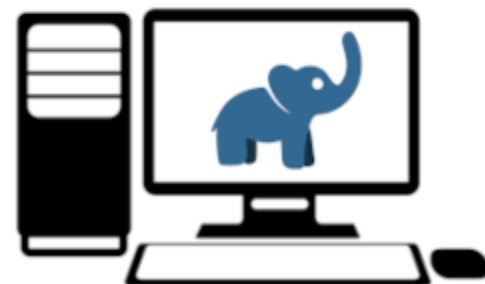
Kapitel 1



virtualization



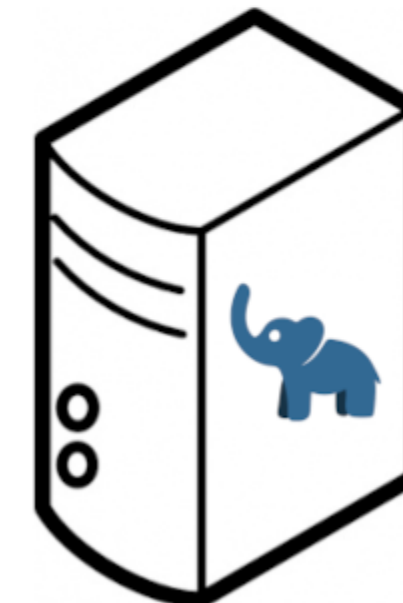
cloud



local

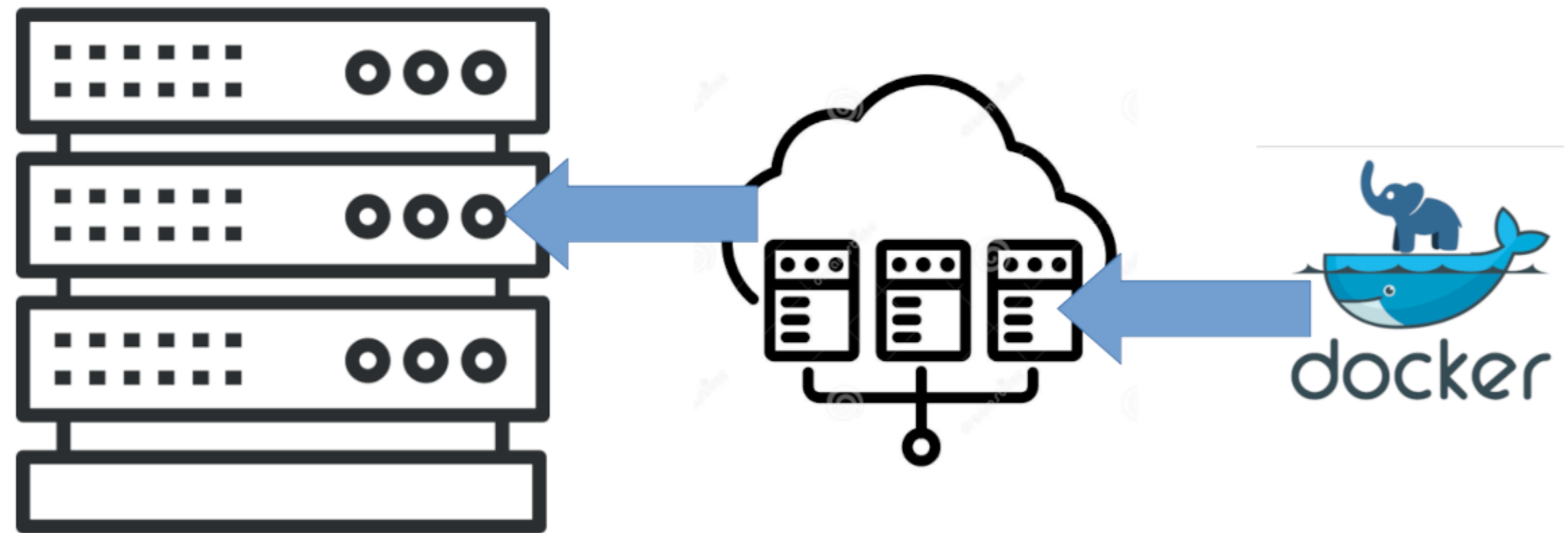


docker



server

Mischformen



Direkte Installation

Linux

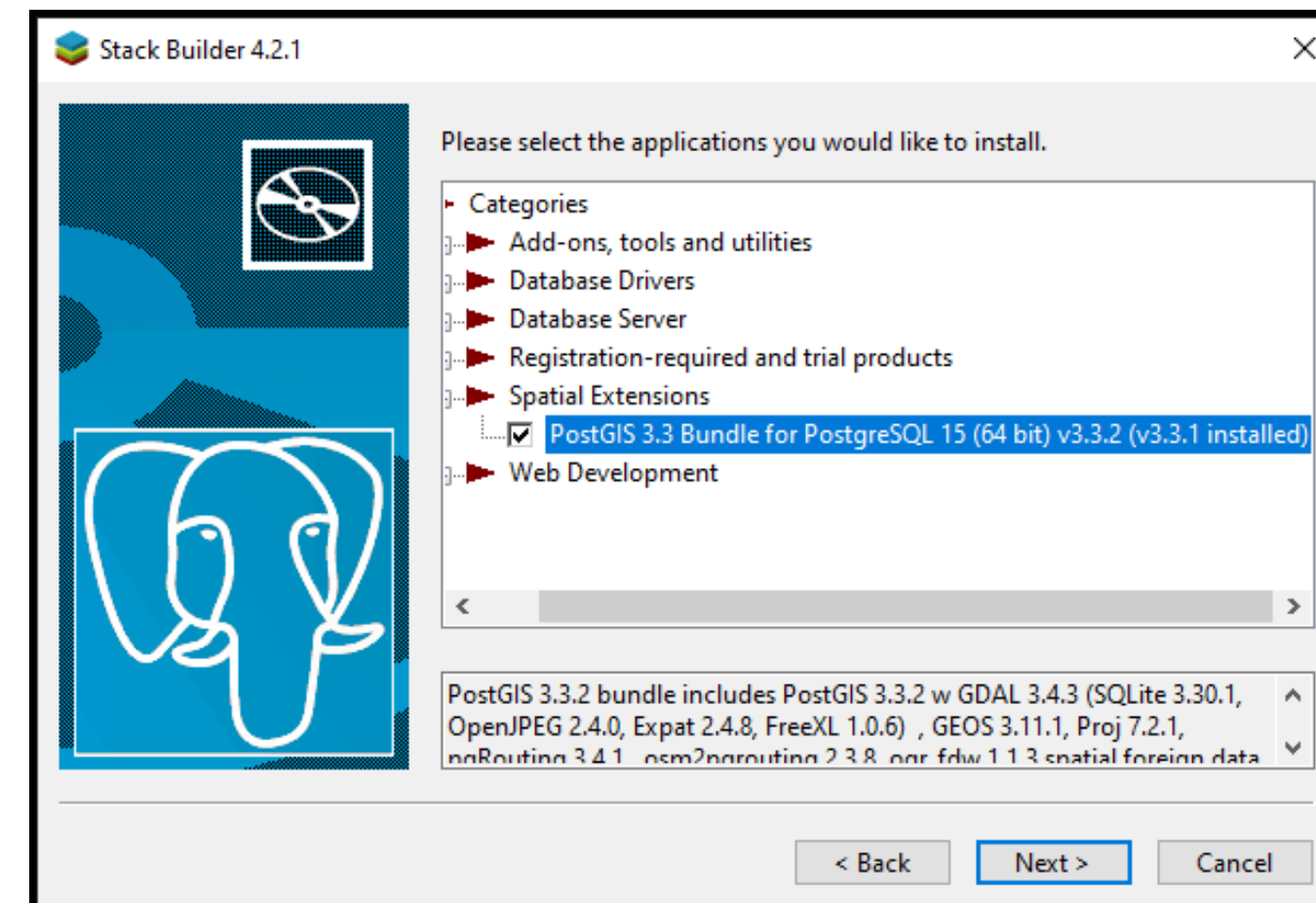
apt install für Debian/Ubuntu:

- Schnelle und einfache Installation
- `sudo apt install postgresql postgis`
- Vorteile: Paketverwaltung, einfache Updates
- Alternative: Kompilieren aus Quellcode (für spezielle Anforderungen)

Direkte Installation

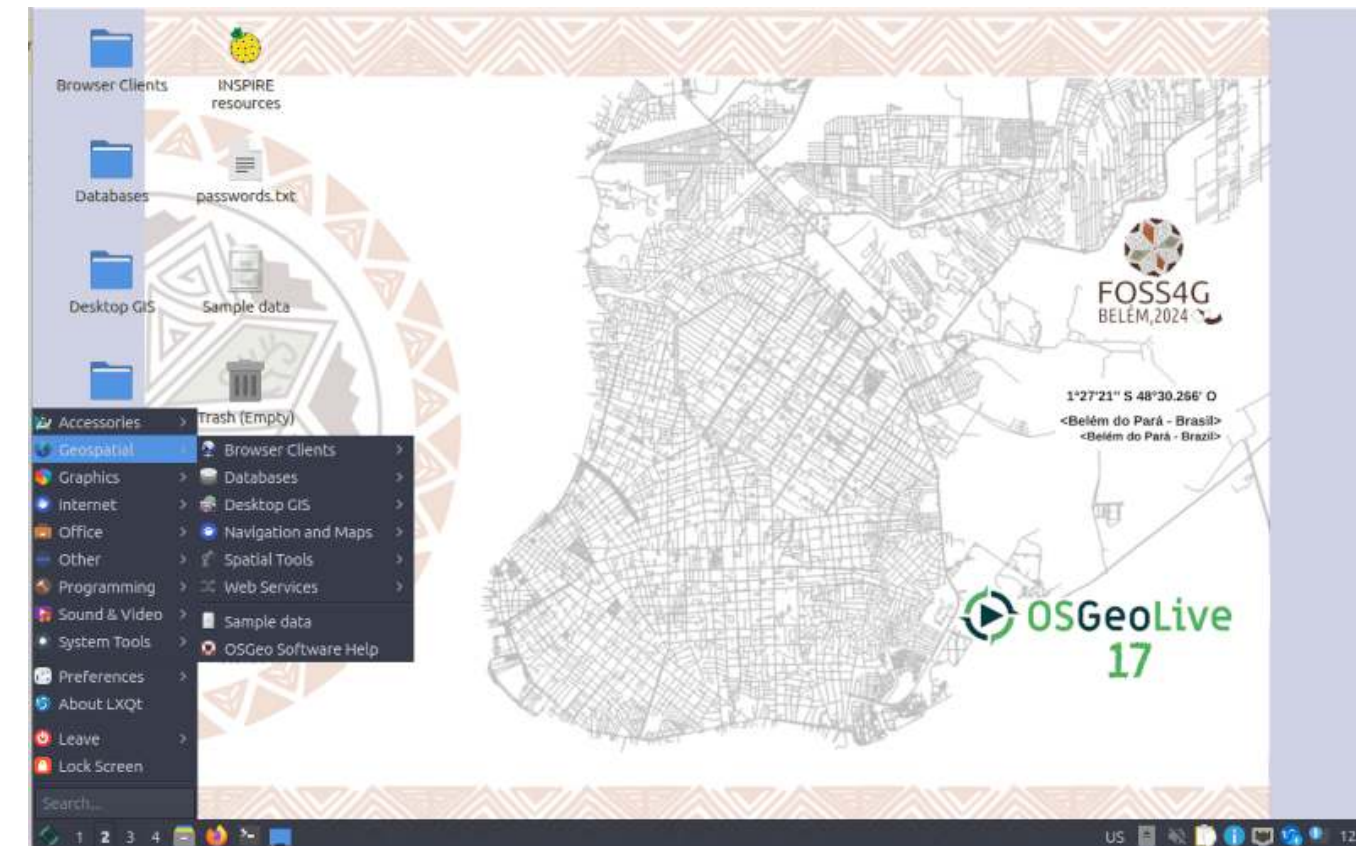
Windows

- Schnelle und einfache GUI-basierte Installation.
- <https://www.enterprisedb.com/downloads/postgres-postgresql-downloads>
- Zuerst PostgreSQL danach PostGIS über den Stackbuilder.



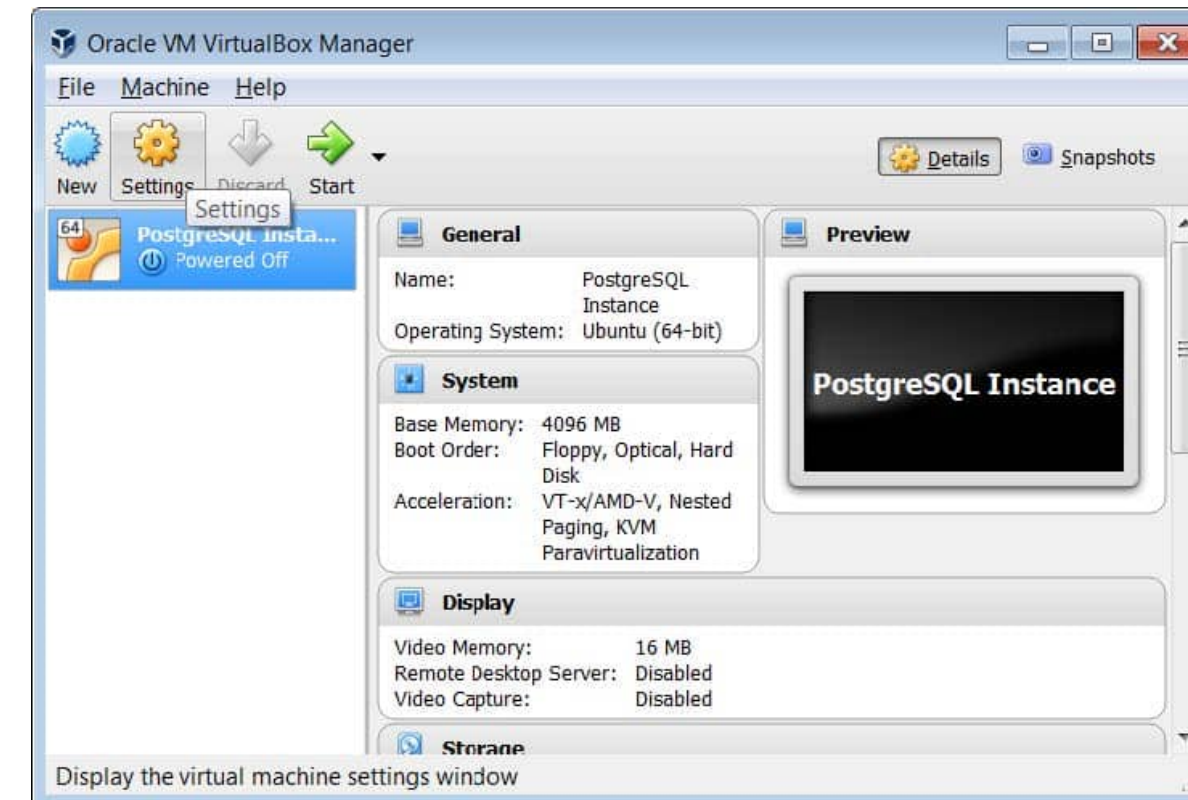
PG in virtueller Maschine I

- OSGeoLive (jährliches Release)
- Ubuntu als Basis-OS
- Open Source Geospatial Softwaresammlung
- Daten in unterschiedlichen Formaten
- Beschreibungen und Dokumente zum Schnelleinstieg
- Unterstützung verschiedener Sprachen
- Projekt der OSGeo & weitere
- OSGeoLive <https://live.osgeo.org>
- ISO ist ohne pgAdmin



PG in virtueller Maschine II

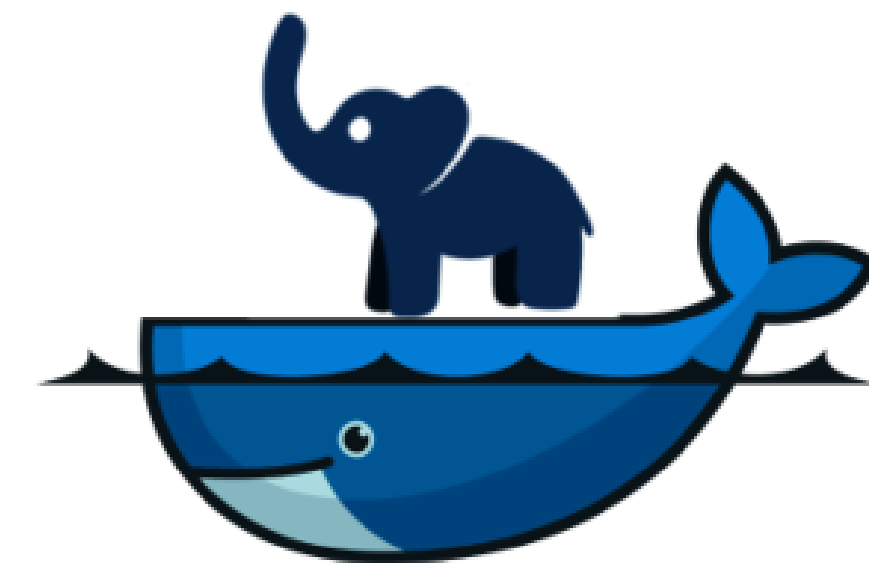
- Debian oder Ubuntu (oder Windows)
- Server-Variante
- Nachträgliche / händische installation von PostgreSQL/PostGIS
- In der VM DB-Zugriff nur psql (= Kommandozeile)
- Zugriff vom Hostsystem mit pgAdmin/DBeaver/QGIS



PostgreSQL-Container

<https://hub.docker.com/r/postgis/postgis/>

- Zum Testen schnell verfügbar und schnell entsorgt
- Auch im dauerhaften produktiven Einsatz bewährt
- Einfaches Updates, Rollbacks (der PG-Version), Automatisierung
- Isoliert



docker

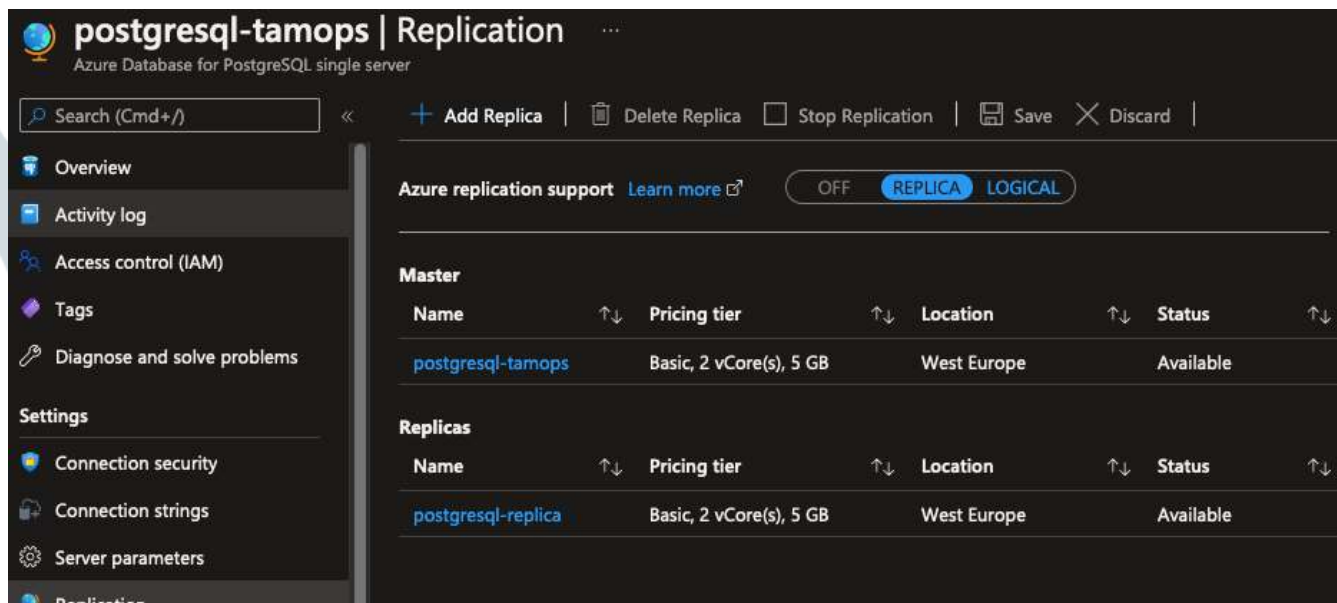
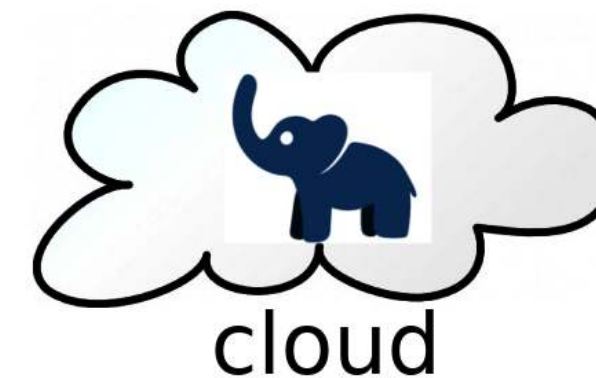
PostgreSQL-Container

```
docker run --rm -p 5436:5432 -e POSTGRES_DB=mydatabase -e POSTGRES_USER=myuser  
-e POSTGRES_PASSWORD=mypassword -v ./pgdata:/var/lib/postgresql/data  
postgis/postgis:17-3.5
```

- 'postgis/postgis:15-3.3' nicht 'latest' nutzen
- '-v ./pgdata:/var/lib/postgresql/data' [Ordner im Host-Dateisystem]:[PostgreSQL Datenordner im Container]
- POSTGRES_PASSWORD: mindestens zu setzende Variable (wenn kein user gesetzt, dann für standard-user postgres)
- POSTGRES_DB: Datenbank, die beim Starten angelegt wird, (optional)
- '-p 5432:5432' Port-Mapping
 - Erste Zahl = Port auf dem Host Rechner, dieser wird dann z.B. in dbeaver verwendet, um mit der Datenbank zu verbinden
 - Zweite Zahl = Port im Container (immer 5432)

PostgreSQL As A Service (Cloud)

- diverse Anbieter auch EU
- nur PostgreSQL/PostGIS, kein Server zu warten
- einfache Skalierung der Ressourcen
- einfache Skalierung der Verfügbarkeit (cluster, failover)



The screenshot shows the Azure portal interface for a PostgreSQL server named "postgresql-tamops". The page is titled "Replication" and includes a search bar and navigation options like "Add Replica", "Delete Replica", "Stop Replication", "Save", and "Discard". The "Azure replication support" section is currently set to "OFF", with "REPLICA" and "LOGICAL" options available. Below this, there are two tables: "Master" and "Replicas".

Master				
Name	Pricing tier	Location	Status	
postgresql-tamops	Basic, 2 vCore(s), 5 GB	West Europe	Available	

Replicas				
Name	Pricing tier	Location	Status	
postgresql-replica	Basic, 2 vCore(s), 5 GB	West Europe	Available	

PostgreSQL As A Service (Cloud)

The screenshot displays the Azure portal interface for an Azure Database for PostgreSQL flexible server. The top navigation bar includes the Microsoft Azure logo, a search bar, and the Copilot icon. The main content area is titled 'cit-tst-alkis-we-pgsql' and shows various monitoring and management options.

Navigation and Tools:

- Home >
- Search resources, services, and docs (G+)
- Copilot
- Home >
- cit-tst-alkis-we-pgsql (Azure Database for PostgreSQL flexible server)
- Search
- Delete, Reset password, Restore, Restart, Upgrade, Stop, Refresh, CLI / PS, Feedback

Essentials:

- Getting started, Properties, Recommendations (3), **Monitoring**, Tutorials
- You can monitor your server to help you troubleshoot and optimize your workload. [Learn more](#)

Monitoring Cards:

- Visualize data with workbooks:** Use workbooks to create visualizations of data to provide insights into the overall health of the underlying components.
- Get alerted to issues:** Create alerts to monitor resource health, usage, cost and more.
- Resource health:** Resource health watches your resource and tells you if its running as expected.
- Activity logs:** Use the Activity log, to determine what, who and when performed any action on your flexible server resource.
- Scale compute or storage:** Scale up if you see high CPU or memory utilization. Scale up to its close to 80% Scale up if you're reaching the maximum connect limit.

Time Range: Show data for last: 1 hour, **6 hours**, 12 hours, 1 day, 7 days, 30 days

Monitoring Charts:

- Cpu and Memory:** Line chart showing CPU percent (Avg) at 31.9071% and Memory percent (Avg) at 24.8565% over the last 6 hours.
- Database availability:** Line chart showing Database Is Alive (Max) at 1 over the last 6 hours.
- Storage:** Line chart showing Storage percent (Avg) at 62.3932% over the last 6 hours.
- DB Connections:** Line chart showing Failed Connections (Sum) and Succeeded Connections (Sum) over the last 6 hours.
- Throughput:** Line chart showing throughput over the last 6 hours.

Left Navigation Menu:

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Resource visualizer
- Migration
- Settings
 - Compute + storage
 - Networking
 - Databases
 - Connect
 - Server parameters
 - Replication
 - Maintenance
 - High availability
 - Backup and restore
 - Long-term retention (Vaulted backups)
 - Advisor recommendations
 - Locks
- Power Platform
- Security
 - Data encryption

Add or remove favorites by pressing Ctrl+Shift+F

PostgreSQL Installationsmöglichkeiten

Option	Vorteile	Nachteile
Lokale Installation	<ul style="list-style-type: none">■ Einfach einzurichten■ Volle Kontrolle■ Keine Abstraktionsschicht, hohe Performance■ Kostenfrei	<ul style="list-style-type: none">■ Eingeschränkte Skalierbarkeit■ Hoher Wartungsaufwand■ Hardware-Abhängigkeit■ Keine Isolation
Virtuelle Maschine	<ul style="list-style-type: none">■ Isolation von anderen Diensten■ Einfach migrierbar■ Snapshots für Backups und Rollbacks■ Paralleler Betrieb verschiedener Versionen	<ul style="list-style-type: none">■ Erhöhter Hardware-Overhead■ Komplexere Einrichtung■ Regelmäßige Wartung von VM und Datenbank erforderlich

PostgreSQL Installationsmöglichkeiten

Option	Vorteile	Nachteile
Docker	<ul style="list-style-type: none">■ Portabilität■ Schnelle Bereitstellung■ Isolierung■ Automatisierung möglich	<ul style="list-style-type: none">■ Erfordert Kenntnisse in Docker■ Datenpersistenz muss separat verwaltet werden■ Performance bei hoher Last geringer
Cloud	<ul style="list-style-type: none">■ Flexibel skalierbar■ Weniger Wartungsaufwand■ Hochverfügbarkeit durch Anbieter■ Einfacher Zugriff von überall	<ul style="list-style-type: none">■ Kontinuierliche Kosten■ Anbieterabhängigkeit (Lock-in-Effekt)■ Zusätzliche Sicherheitsvorkehrungen für Datenschutz nötig■ Höhere Latenz

Linux oder Windows?



Elefanten lieben die Freiheit.

Kapitel 2

Wichtige Dateien

- pg_hba.conf, postgresql.conf, Datenverzeichnis
- Linux:
 - /etc/postgresql/[version]/[clustername]
 - /var/lib/postgresql/[version]/[clustername]
- Windows: Installationspfad, z.B.
C:\Program Files\PostgreSQL

pg_hba.conf

```
local  all          postgres          trust
# TYPE  DATABASE        USER            ADDRESS          METHOD
# IPv4 local connections:
host   all            all             127.0.0.1/32    scram-sha-256
```

<https://www.postgresql.org/docs/current/auth-pg-hba-conf.html>

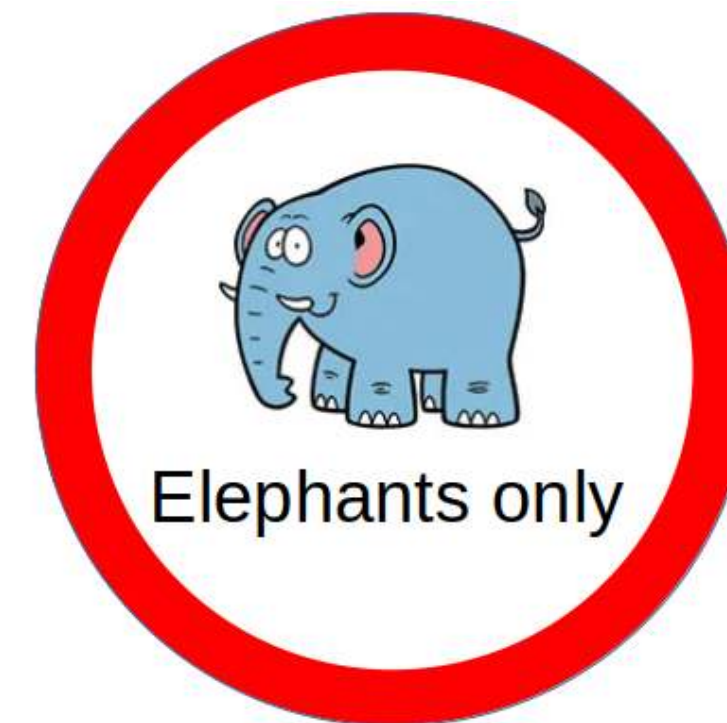
postgresql.conf

```
#-----  
# FILE LOCATIONS  
#-----  
  
# The default values of these variables are driven from the -D command-line  
# option or PGDATA environment variable, represented here as ConfigDir.  
  
data_directory = '/var/lib/postgresql/17/main'          # use data in another directory  
                                                         # (change requires restart)  
hba_file = '/etc/postgresql/17/main/pg_hba.conf'       # host-based authentication file  
...  
#-----  
# CONNECTIONS AND AUTHENTICATION  
#-----  
  
# - Connection Settings -  
  
#listen_addresses = 'localhost'                       # what IP address(es) to listen on;  
                                                         # comma-separated list of addresses;  
                                                         # defaults to 'localhost'; use '*' for all  
                                                         # (change requires restart)  
port = 5432                                           # (change requires restart)  
max_connections = 100                                 # (change requires restart)
```

<https://www.postgresql.org/docs/current/config-setting.html>

Datenverzeichnis

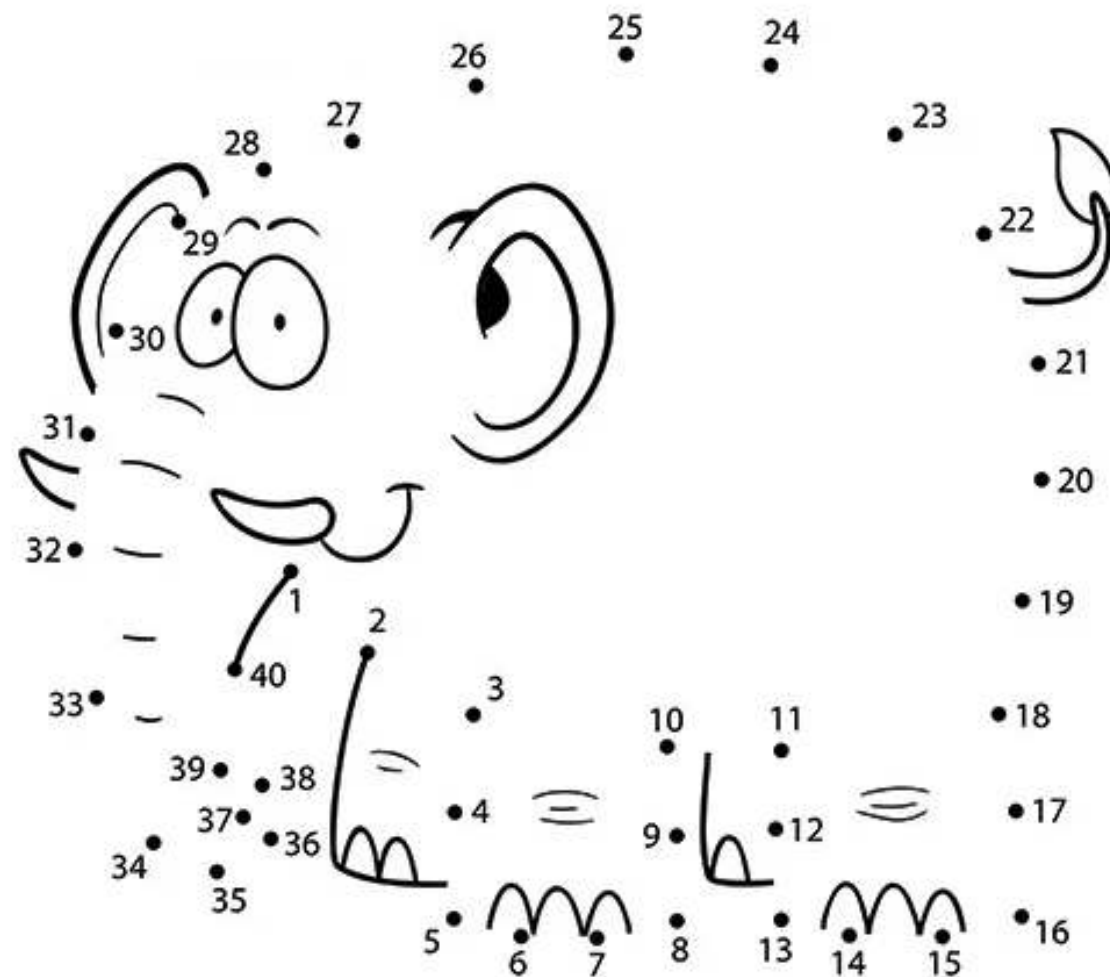
```
joerg@nebukadnezar:~$ sudo ls /var/lib/postgresql/17/main/base/16388
112      16407  16447  16487  16591  2606  2654  2703  3258  3600  4158
113      16408  16448  16488  16593  2606_fsm  2655  2704  3350  3600_fsm  4159
1247     16408_fsm  16449  16489  16595  2606_vm  2656  2753  3351  3600_vm  4160
1247_fsm 16408_vm  16449_fsm  16489_fsm  16597  2607  2657  2753_fsm  3379  3601  4163
1247_vm  16411  16449_vm  16489_vm  16599  2607_fsm  2658  2753_vm  3380  3601_fsm  4164
1249     16412  16452  16492  16601  2607_vm  2659  2754  3381  3601_vm  4165
1249_fsm 16413  16453  16493  16603  2608  2660  2755  3394  3602  4166
1249_vm  16413_fsm  16454  16494  16605  2608_fsm  2661  2756  3394_fsm  3602_fsm  4167
1255     16413_vm  16454_fsm  16494_fsm  16607  2608_vm  2662  2757  3394_vm  3602_vm  4168
1255_fsm 16416  16454_vm  16494_vm  16609  2609  2663  2830  3395  3603  4169
1255_vm  16417  16457  16497  16651  2609_fsm  2664  2831  3429  3603_fsm  4170
1259     16418  16458  16498  16651_fsm  2609_vm  2665  2832  3430  3603_vm  4171
1259_fsm 16418_fsm  16459  16499  16651_vm  2610  2666  2833  3431  3604  4172
1259_vm  16418_vm  16459_fsm  16499_fsm  16654  2610_fsm  2667  2834  3433  3605  4173
13431    16421  16459_vm  16499_vm  16655  2610_vm  2668  2835  3439  3606  4174
13431_fsm 16422  16462  16502  174  2611  2669  2836  3440  3607  5002
13431_vm 16423  16463  16503  175  2612  2670  2836_fsm  3455  3608  548
13434    16423_fsm  16464  16504  2187  2612_fsm  2673  2836_vm  3456  3609  549
13435    16423_vm  16464_fsm  16504_fsm  2224  2612_vm  2674  2837  3456_fsm  3712  6102
13436    16426  16464_vm  16504_vm  2228  2613  2675  2838  3456_vm  3764  6104
```



PostGIS überall

Interesse geweckt?


Fragen Sie gerne.



 Webseite
<https://wherogroup.com>

 E-Mail
joerg.thomsen@wherogroup.com

 Telefon
+49 228 / 90 90 38 - 0

 Adresse
WhereGroup GmbH
Bundesallee 23
10717 Berlin

 WhereGroup Shorts
<https://wherogroup.com/shorts/>