

PostgreSQL 9.6.x deployment on Linux

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Summary: CAST does not provide a CAST Storage Server (CSS) installer for Linux environments, however, CAST recommends installing the equivalent PostgreSQL version on a Linux server to take advantage of the superior performance over CSS installed on Windows - please follow the instructions below to do so.

Note that these instructions are for deploying PostgreSQL 9.6.x - equivalent to CSS3.

Installation via YUM

PostgreSQL can be installed using RPMs (binary) or SRPMs (source) managed by [YUM](#). This is available for the following Linux distributions (**CAST recommends to use only 64-bit platforms**):

- Fedora
- Red Hat Enterprise Linux
- CentOS
- Scientific Linux
- Oracle Enterprise Linux

Configure your YUM repository

Locate and edit your distribution **.repo** file, located:

- On **Fedora**: `/etc/yum.repos.d/fedora.repo` and `/etc/yum.repos.d/fedora-updates.repo`, **[fedora]** sections
- On **CentOS**: `/etc/yum.repos.d/CentOS-Base.repo`, **[base]** and **[updates]** sections
- On **Red Hat**: `/etc/yum/pluginconf.d/rhnplugin.conf` **[main]** section

To the section(s) identified above, you need to append a line (otherwise dependencies might resolve to the postgresql supplied by the base repository):

```
exclude=postgresql*
```

Update the RPM package

```
[postgres@cssx data]$ rpm -ivh https://download.postgresql.org/pub/repos/yum/9.6/redhat/rhel-7-x86_64/pgdg-centos96-9.6-3.noarch.rpm
[postgres@cssx data]$ yum update
```

Install latest service pack from PostgreSQL

```
[postgres@cssx data]$ yum install postgresql96 postgresql96-server postgresql96-libs postgresql96-contrib postgresql-devel
```

Configure data storage location

You cannot customize the location of PGDATA by using `./postgresql96-setup`, therefore you need to edit the following file and change the default location of PGDATA:

```
/usr/lib/systemd/system/postgresql-9.6.service
```

Initialize the PostgreSQL database server to configure data storage location

Once installed, please run the following command to initialize the server:

```
[postgres@cssx data]$ export PGSETUP_INITDB_OPTIONS="-E 'UTF-8' --no-locale"
[postgres@cssx data]$ cd /usr/pgsql-9.6/bin
[postgres@cssx data]$ ./postgresql96-setup initdb
```

Configuring the server/database

Edit the `pg_hba.conf` file

Edit the `pg_hba.conf` file at `/usr/local/pgsql/data` using the `vi` command:

```
[postgres@cssx data]$ vi pg_hba.conf
```

Please replace the sample `192.168.x.x` IP address and `/24` subnet below with the appropriate allowed client IP addresses/subnets:

```
# TYPE DATABASE USER CIDR-ADDRESS METHOD
local all all trust
# IPv4 local connections:
host all all 127.0.0.1/32 trust
host all all 192.168.21.57/24 md5
# IPv6 local connections:
host all all ::1/128 md5
```

Note that adding the following line will ensure ANY client can connect:

```
host all all 0.0.0.0/0 md5
```

Check server configuration

To check if the server itself is configured correctly for CAST AIP, we need to verify and modify certain parameters in the `postgresql.conf` (the file is in the `postgresql` directory `\db_data`).

pgtune

The `postgresql.conf` settings listed below are directly related to available RAM for the CSS server - and as such their configuration is specific to the host machine. Please use <http://pgtune.leopard.in.ua/> on the host machine to identify the correct settings for your host machine and then modify `postgresql.conf` with the settings provided by `pgtune`:

- `shared_buffers`
- `effective_cache_size`
- `maintenance_work_mem`
- `min_wal_size`
- `max_wal_size`
- `wal_buffers`



When running `pgtune`, set the DB version to 9.6, the DB type to "Mixed type of applications", and the number of connections to 300.

Other settings

The following settings should also be modified to the values listed below:

Parameters	Required value	Comments
listen_addresses	'*'	Instead of localhost by default. Enables connectivity from other machines.
Port	2282	
max_connections	300	
temp_buffers	32MB	
work_mem	64MB	Higher value than the setting provided by pgtune.
maintenance_work_mem	1024MB	Memory for backup/restore/vacuum operations.
fsync	off	
synchronous_commit	off	
full_page_writes	off	
commit_delay	10	
checkpoint_completion_target	0.9	
cursor_tuple_fraction	1.0	
log_checkpoints	on	
log_destination	'stderr'	
logging_collector	on	
log_line_prefix	'%t [%p]: [%l-1] '	Don't forget the space before final quote mark
log_temp_files	1024kB	
log_autovacuum_min_duration	1000ms	
autovacuum_vacuum_cost_limit	200	
bytea_output	'escape'	
datestyle	'iso, mdy'	Ensure that this option is active (it may already be active).
lc_messages	'C'	
lc_monetary	'C'	
lc_numeric	'C'	
lc_time	'C'	
max_locks_per_transaction	4096	Higher value than 64 by default.
standard_conforming_strings	on	



Please refer to the parameters in the attached [postgres.conf](#) file - this is taken directly from the CAST AIP CSS 3.0.x setup.

The server needs to be restarted to take into account any modification.

Start the PostgreSQL database server

```
[postgres@cssx data]$ systemctl enable postgresql-9.6.service
[postgres@cssx data]$ systemctl start postgresql-9.6.service
```

Create users

The equivalent CAST Storage Service provided by CAST includes two default users as follows:

Username	Password	Permissions	Notes
operator	CastAIP	SUPERUSER	-
guest	WelcomeToAIP	-	Note that in the CAST AIP 8.3.11, the "guest" user is no longer used.

If you would like to create these users, use the following commands:

```
[postgres@cssx data]$ psql
*create user operator with SUPERUSER password 'CastAIP';
*create user guest with password 'WelcomeToAIP';
*grant postgres to operator;
```

CAST AIP 8.3.12 - custom users

If you are using **CAST AIP 8.3.12**, you are also free to create your own users and then use them with CAST AIP and related software - you need to have a minimum of one user with the SUPERUSER permission and then grant the "postgres" role to this user. For example:

```
[postgres@cssx data]$ psql
*create user my_user with SUPERUSER password 'my_password';
*grant postgres to my_user;
```

When using **CAST AIP 8.3.30**, it is possible to create custom users that do NOT require the SUPERUSER permission if you prefer not to grant this. For example, this script creates a role "my_role" with the password "my_password" that can login. The role has not been granted the SUPERUSER permission and instead only the minimum permissions required to operate CAST AIP are granted:

```
[postgres@cssx data]$ psql
*create role my_role LOGIN PASSWORD 'my_password' NOSUPERUSER INHERIT NOCREATEDB NOCREATEROLE NOREPLICATION;
*grant create, connect, temporary on database postgres to my_role;
```

postgres database

All CAST AIP products will expect the CAST AIP schemas to be members of the **postgres database** - i.e. all connections to a PostgreSQL instance will connect direct to the **postgres database**. This database is created by default during the installation of the PostgreSQL instance and should be retained. While you can create an alternative custom database, it is not possible to connect to a custom database using any CAST AIP products.

CAST AIP schemas



Note that when installing PostgreSQL for use with AIP Console, you do not need to install the CAST AIP schemas - this is done in the AIP Console interface.

Using CAST Server Manager, connect to the '**postgres**' database and follow the installation instructions in [Install CAST AIP schemas](#). Please make sure you are using the correct port and connection string when connecting to the PostgreSQL Server:

Add Server Connection Profile

Standard	
Server type	CASTStorageService
Profile name	CSS_LINUX
Server Name/IP:Port	192.168.200.104:2282
Trusted connection	False
User name	operator
User password	*****
Save User password	True
Server version	CASTStorageService 3.0.0
Server Connection mode	Usual
Server Connection string	LIBPQ:192.168.200.104:2282

Test OK Cancel Help

i Note: When you execute CAST Server Manager to install the schemas, the Connection profile, including the user name and password, are stored in a **CWSIProfileConnection.INI** located in the CAST_ALL_USERS_PATH (refer to the [CastGlobalSettings.ini](#) file to set this variable). If any user executes CAST Server Manager on a machine where this file has been defined, they will see the list of Server Connection Profiles stored in CWSIProfileConnection.INI. The password of the SQL user (operator) is encrypted in this file. If you don't want to share the password with all users, you can predefine the list of Server Connection Profiles and set this file as read-only for the users.

How to log all statement's plan

Change the following parameters in the configuration file (`..db_data\postgresql.conf`):

```

auto_explain.log_min_duration = '0s'           # setting this to zero logs all plan
auto_explain.log_nested_statements = on        # log statements executed inside a function
auto_explain.log_verbose = on                  # it's equivalent to the VERBOSE option of EXPLAIN
auto_explain.log_buffers = on                  # it's equivalent to the BUFFERS option of EXPLAIN
auto_explain.log_analyze = on                  # causes EXPLAIN ANALYZE output; when this parameter is on, per-
plan-node timing occurs for all statements executed, whether or not they run long enough to actually get
logged. This can have an extremely negative impact on performance. Turning off auto_explain.log_timing
ameliorates the performance cost, at the price of obtaining less information.
shared_preload_libraries = 'auto_explain'     # change requires restart

```

Set this parameter to **off** when only actual row counts, and not exact times, are needed:

```

auto_explain.log_timing = off                   # this parameter has no effect unless auto_explain.log_analyze
is enabled

```