Using VMware vFabric Postgres for Data Director

vFabric Postgres 9.1
vFabric Data Director 2.0

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Preface

*Using vFabric Postgres for Data Director* provides information about installing and using the VMware vFabric Postgres for Data Director DBMS together with VMware vFabric Data Director. This version of this publication is for vFabric Data Director 2.0 and for vFabric Postgres 9.1.

**Intended Audience**

This information is intended for anyone who wants to install or use a vFabric Postgres Standard Edition DBMS in conjunction with VMware vFabric Data Director. The information is written for experienced Windows or Linux system administrators who are familiar with virtual machine technology and datacenter operations.

**Related Publications**

The *vFabric Data Director Administrator and User Guide* explains how to use vFabric Data Director how to manage vFabric Postgres databases.

To access the current versions of these and other VMware books, go to [http://www.vmware.com/support/pubs](http://www.vmware.com/support/pubs).
VMware vFabric Postgres is an ACID-compliant, ANSI-SQL-compliant transactional, relational database designed for the virtual environment and optimized for vSphere. It is based on the Postgres open-source relational database and is compatible with PostgreSQL.


**vFabric Postgres Standard Edition**
Supports all standard Postgres connection tools and interaction methods.

**vFabric Postgres Standard Edition for Data Director**
Seamlessly integrates with Data Director and can be managed from the Data Director GUI. You can also use traditional database tools to interact with this version, but some modifications, for example to connection strings, might be required.

This chapter includes the following topics:
- “vFabric Postgres Enhancements,” on page 7
- “Differences Between Standalone vFabric Postgres Databases and Data Director vFabric Postgres Databases,” on page 8

**vFabric Postgres Enhancements**

The VMware vFabric Postgres DBMS includes memory, checksum, and performance features that are not available with an open source Postgres/PostgreSQL DBMS.

**Elastic Database Memory**
Elastic database memory enables vFabric Postgres to run with graceful performance degradation under heavy over-commitment of memory. vFabric Postgres participates in memory resource management with the guest operating system and the vSphere hypervisor to achieve elastic database memory.
vFabric Postgres monitors requests for memory from the vSphere hypervisor and monitors swap activity within the guest operating system. When the hypervisor or the guest operating system needs more memory, the vFabric Postgres buffer manager shrinks the database buffer pool to make memory available. When more memory becomes available, the buffer manager increases the amount of memory dedicated to the buffer pool.

Elastic database memory is enabled by default in the virtual appliance, but is disabled if you use the RPM files. RPM installation is supported only for the standalone version of vFabric Postgres.

**Ease of Tuning on the Appliance**

If you deploy the vFabric Postgres appliance or the vFabric Postgres for Data Director appliance, associated vFabric Postgres databases have higher default values than standard Postgres databases for many critical settings, including shared_buffers, checkpoint_segments, and wal_buffers. The higher default values improve out-of-box vFabric Postgres performance with a slight increase in disk space and memory requirements. The result is that users of an embedded vFabric Postgres database can more easily tune the database for their workload.

If you are using vFabric Postgres, and you use the RPM installation, these changes to default values are not made.

**Automatic Checksums**

By default, vFabric Postgres performs checksums on each write operation to tables or indexes. Performing checksums on each write ensures that when vFabric Postgres retrieves data, that data is clean.

**Checkpoint Tuning**

vFabric Postgres improves on the Postgres algorithm to make the tuning more dynamic.

In I/O-constrained environments, periods of heavy checkpointing activity often alternate with periods of light checkpoint activity.

By default, vFabric Postgres performs dynamic tuning of checkpoint parameters so that rapid changes in available I/O bandwidth or changes in the database workload reduce the likelihood of database throughput oscillations.

**Differences Between Standalone vFabric Postgres Databases and Data Director vFabric Postgres Databases**

vFabric Postgres databases that are deployed with Data Director differ from standalone vFabric Postgres databases in several ways.

**Simplified Configuration**

To configure vFabric Postgres databases deployed from Data Director, users select a database configuration template, and then customize settings such as name, storage allocation, database owner account, and backup template. Data Director updates the postgresql.conf file’s tunable parameters.

**No Superuser Admin Privileges**

Each Data Director database user has only database administrator rights. As a result, tools that require superuser privileges, such as COPY FROM, COPY TO, and tools that operate on the system catalog, do not work.

**No pg_dumpall**

The pg_dumpall tool requires superuser privileges, and does not work with vFabric Postgres databases deployed from Data Director.
No CREATE or DROP Database Privileges

Data Director users have privileges only within the database. You cannot use database client tools to create or drop databases. Use the Data Director UI to create and drop databases.

Object Naming

Database names can only use alphanumeric characters, underscore (‘_’) or hyphen (‘-’).

For object names, the standard Postgres requirements apply.
Before you install vFabric Postgres, review the requirements and the deployment or installation process.

This chapter includes the following topics:

- “Installation Overview,” on page 11
- “System Requirements,” on page 11
- “Deploy the OVA File on vSphere 5.x,” on page 12

Installation Overview

Installing vFabric Postgres in a Data Director environment consists of several tasks.

1. Deploy the OVA files on a vSphere 5.x system. See “Deploy the OVA File on vSphere 5.x,” on page 12.
2. In Data Director, build a DBVM template from the deployed OVA. See Building DBVMs and Base Templates in the vFabric Data Director Administrator and User Guide.
3. Create a vFabric Postgres database by following the instructions in the vFabric Data Director Administrator and User Guide

System Requirements

For vFabric Postgres for Data Director, you always deploy a virtual appliance (OVA) on vSphere 5.x.

Resource Requirements

The host where you deploy the OVA, or the virtual machine where you install the RPM files (standalone only), has the following minimum requirements.

- **RAM**: 512 MB
- **CPUs or vCPUs**: 1
- **Disk Space**: 12 GB

Database Clients

In most cases, you interact with vFabric Postgres for Data Director from the Data Director UI.

As part of vFabric Postgres, you can download custom JDBC, ODBC, and LIBPQ drivers and client tools. Different sets of drivers and tools are available for the standalone vFabric Postgres Standard Edition and the vFabric Postgres Standard Edition for Data Director.
Database clients for Windows, Linux, and MAC OS X, both 32 bit and 64 bit, are included. Many community PostgreSQL clients, such as Npgsql, and psycopg2 are supported in both 32-bit and 64-bit configurations.

Deploy the OVA File on vSphere 5.x

You can deploy the OVA file on vSphere 5.x for use during development or for production environments.

Prerequisites

Download the OVA file from the VMware download site.


Procedure

1. Connect to a vCenter Server with the vSphere Web Client.
2. Select an inventory object that is a valid parent object of a virtual machine, such as a datacenter, folder, cluster, resource pool, or host.
3. Select Actions > All vCenter Actions > Deploy OVF Template.
4. If prompted, download the client plug-in.
   You have to close all browsers to download the plug-in.
5. Specify the source location and click Next.
6. If prompted, accept the license agreement and wait for the deployment process to complete.
7. (Optional) Change the resource allocation for the virtual appliance. The default configuration is as follows.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>512 MB</td>
</tr>
<tr>
<td>vCPU</td>
<td>1</td>
</tr>
<tr>
<td>Hard Disk 1 - root disk (vmname.vmdk)</td>
<td>2 GB</td>
</tr>
<tr>
<td>Hard Disk 2 - data disk (vmname_1.vmdk)</td>
<td>8 GB</td>
</tr>
<tr>
<td>Hard Disk 3 - swap disk (vmname_2.vmdk)</td>
<td>1 GB</td>
</tr>
<tr>
<td>Hard Disk 4 - diagnostic disk and core disk</td>
<td>1 GB</td>
</tr>
<tr>
<td>(vmname_3.vmdk)</td>
<td></td>
</tr>
</tbody>
</table>

8. Set the network configuration if you want to set a static IP address, or leave the settings blank to have the virtual machine use DHCP.
   You can use the network configuration script /opt/vmware/share/vami/vami_config_net to change the IP address of the virtual appliance.
9. Power on the new virtual machine and log in as root, using the random password that is displayed.
10. Change the password with the /opt/aurora/sbin/setpassword command.
    The command sets the password for the user with user name root and the user with user name postgres on both system and the database.
You can use vFabric Postgres client tools on Windows or Linux to print configuration parameters and to back up and restore vFabric Postgres databases. The command line front end to PostgreSQL, psql, is also included.

**Note** Different client tools and libraries are available for vFabric Postgres and for vFabric Postgres for Data Director. Go to the correct download location to download the tools and libraries you need.

This chapter includes the following topics:

- “Overview of Tools and Libraries,” on page 13
- “Client Tool Packages and Drivers,” on page 14
- “Install the Client Tools Package,” on page 15
- “Add an x86 vFabric Postgres ODBC Data Source on Windows,” on page 16
- “Relink Your Application with vFabric Postgres libpq,” on page 16

### Overview of Tools and Libraries

The vFabric Postgres client tools are based on the Postgres client database tools and are customized for vFabric Postgres. The tools support common configuration commands. The libraries include several APIs and the ODBC driver for PostgreSQL.

Separate download packages are available for vFabric Postgres and for vFabric Postgres for Data Director. Versions for Linux x86, 32 bit and 64 bit, for Windows x86, 32 bit and 64 bit, and for Mac-OS are available.

**Linux**
The Linux RPM includes ODBC drivers for vFabric Postgres. The Linux ODBC driver requires unixODBC-2.3.1 or greater.

**Windows**
The vFabric Postgres client tool installer package for Windows includes ODBC and JDBC drivers for vFabric Postgres.

The following vFabric Postgres client database tools are included in the vFabric Postgres client tools packages.

**Table 3-1. vFabric Postgres Client Tools**

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pg_config</td>
<td>Prints the current vFabric Postgres installation's configuration parameters.</td>
</tr>
<tr>
<td>pg_dump</td>
<td>Backs up vFabric Postgres databases</td>
</tr>
<tr>
<td>pg_restore</td>
<td>Restores vFabric Postgres databases from archives created by pg_dump.</td>
</tr>
<tr>
<td>psql</td>
<td>Command line based front end to PostgreSQL.</td>
</tr>
</tbody>
</table>
The vFabric Postgres client tools ship with the following libraries.

Table 3-2. vFabric Postgres Client Tool Libraries

<table>
<thead>
<tr>
<th>Library</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>libpq.so (Linux) or libpq.dll (Windows)</td>
<td>The C API to PostgreSQL. Libpq is the underlying engine for several PostgreSQL APIs such as those written for C++, Perl, Python, Tcl, and ECPG.</td>
</tr>
<tr>
<td>psqlodbcw.so (Linux) or psqlodbc35w.dll (Windows)</td>
<td>The ODBC driver for PostgreSQL.</td>
</tr>
</tbody>
</table>

The vFabric Postgres client tool libraries are customized for use with vFabric Postgres databases, but you can use the standard Postgres libraries. To ensure that you link with the vFabric Postgres libraries, do one of the following:

- If you want to keep the standard Postgres libraries on your system, ensure that your LD_LIBRARY_PATH environment variable specifies the location of the vFabric Postgres libraries first.
- If you do not want to keep the standard Postgres libraries, remove them and ensure that your LD_LIBRARY_PATH environment variable points to the location of the vFabric Postgres libraries on your system.

**Client Tool Packages and Drivers**

You can download client tool packages for Windows and Linux from the VMware download site. After you download the tools, you can use the drivers included in the packages.

**Packages**

If you plan to write code, and you plan on compiling an application to link with libpq, download both the client package and the development package.

You can download the client tool package for your platform from the VMware download site. Be sure to download the appropriate package for your environment.

vFabric Postgres


vFabric Postgres for Data Director


You can download tools and drivers for Windows, Linux, Java, or Macintosh.

**Drivers**

The vFabric Postgres client tools package includes a JDBC driver and an ODBC driver customized for vFabric Postgres. Use the vFabric Postgres JDBC or ODBC drivers, not the standard Postgres drivers, to connect to Data Director.

**JDBC Driver**

After installation, you can find the JDBC driver in the following locations.

- **Microsoft Windows**
  
  C:\Program Files\VMware\vPostgres\9.1\JDBC

- **Linux**
  
  /opt/vmware/vpostgres/current/JDBC

The Samples directory contains a simple Java example and README file that show how to connect to Data Director using JDBC.
For example, if your application uses the JDBC driver to access a database, and you install the application as /usr/local/lib/myapp.jar and the PostgreSQL JDBC driver as /usr/local/pgsql/share/java/postgresql.jar, you run the application as follows.

```
export CLASSPATH=/usr/local/lib/myapp.jar:/usr/local/pgsql/share/java/postgresql.jar:.java
```

**ODBC Driver**

The vFabric Postgres installation process installs the vFabric Postgres ODBC driver. You can verify the Windows ODBC driver installation as follows.

1. Select Start > Administrative Tools > Data Sources (ODBC).
2. Click the Drivers tab.
3. Verify that the VMware vFabric Postgres ODBC driver appears in the list of installed ODBC drivers.

**Install the Client Tools Package**

You can install the vFabric Postgres Client Tools on Windows or Linux systems. The package includes drivers customized for vFabric Postgres. You can install only the base package, or install the development RPMs as well.

**Prerequisites**

- Download the package.
- If you are using vFabric Postgres for Data Director, verify that the Data Director ESXi host is running.

**Procedure**

1. Install the package.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Installation Process</th>
</tr>
</thead>
</table>
| Linux            | Install the RPM files by running the following command. | rpm -ivh pathToClientRpmns
|                  | pathToClientRpmns is the full pathname of the RPM package location on your system. The default installed location is /opt/vmware/vpostgres/9.1. Use -Uvh instead of -ivh if you perform an upgrade. |
| Windows          | a. Double-click the installer to start the installer. |
|                  | b. Accept the license agreement and confirm the install location. |
| Macintosh        | Run or rerun the installer. You can double-click the PKG file to start the installer GUI or install from the command line by running the following command. |
|                  | # sudo installer -pkg /path/to/VMware-vPostgres-client-----.pkg -target / |

2. Ensure that your PATH environment variable includes the location of the vFabric Postgres client tools, for example C:\Program Files\VMware\vPostgres\9.1\bin.

**What to do next**

If you install both the x86 and the 64 bit vFabric Postgres client tools on a 64-bit Windows system, see “Add an x86 vFabric Postgres ODBC Data Source on Windows,” on page 16.
If you are developing a custom application, relink with libpq. See “Relink Your Application with vFabric Postgres libpq” on page 16.

Add an x86 vFabric Postgres ODBC Data Source on Windows

If you install both the x86 and the 64-bit vFabric Postgres client tools on the same 64-bit Windows system, you must explicitly add an x86 ODBC data source.

**Prerequisites**

Install the x86 and the 64-bit vFabric Postgres client tools.

**Procedure**

1. In Windows Explorer, go to C:\Windows\SysWOW64\.
2. Double-click odbcad32.exe.
3. Select the System DNS tab and click Add.
4. Click the VMware vFabric Postgres Unicode 32bit data source.
5. Click Finish.

Relink Your Application with vFabric Postgres libpq

If you want to use an existing Postgres application with vFabric Postgres, you can relink the application.

Because vFabric Postgres libpq.so is dynamically linked with libssl, the static ld linker does not recognize the rpath of $ORIGIN. You can relink to specify the rpath.

**Prerequisites**

Install the vFabric Postgres client tools. You can relink without installing the development RPMs.
Procedure

◆ Relink with vFabric Postgres based on your operating system.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Relinking Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Linux</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a See /opt/vmware/vpostgres/current/share/libpq-doc/README.vpostgres-libpq.</td>
</tr>
<tr>
<td></td>
<td>b Override the dynamic library search path by adding /opt/vmware/vpostgres/current/lib-public to LD_LIBRARY_PATH.</td>
</tr>
<tr>
<td></td>
<td># export LD_LIBRARY_PATH=/opt/vmware/vpostgres/current/lib-public</td>
</tr>
<tr>
<td></td>
<td># mypgopp</td>
</tr>
<tr>
<td></td>
<td>- or -</td>
</tr>
<tr>
<td></td>
<td>c Relink using the vFabric Postgres libpq.</td>
</tr>
<tr>
<td></td>
<td># gcc -o mypgapp t.c -L/opt/vmware/vpostgres/current/lib -Wl,-rpath=/opt/vmware/vpostgres/current/lib -lpq</td>
</tr>
<tr>
<td><strong>Windows</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Copy libpq and other libraries to the directory of the application binaries and relink.</td>
</tr>
<tr>
<td></td>
<td>By default, the libraries and header files are in the following locations.</td>
</tr>
<tr>
<td></td>
<td>Development libraries C:\Program Files\VMware\vPostgres\9.1\dev</td>
</tr>
<tr>
<td></td>
<td>libpqport.lib and libpq.lib libraries C:\Program Files\VMware\vPostgres\9.1\dev\lib</td>
</tr>
<tr>
<td></td>
<td>libpq header files C:\Program Files\VMware\vPostgres\9.1\dev\include</td>
</tr>
<tr>
<td><strong>Mac OS X</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perform one of the following tasks.</td>
</tr>
<tr>
<td></td>
<td>n Override the dynamic library search path by adding the /opt/vmware/vpostgres/9.1/lib to the DYLD_LIBRARY_PATH environment variable, as follows:</td>
</tr>
<tr>
<td></td>
<td># export DYLD_LIBRARY_PATH=/opt/vmware/vpostgres/9.1/lib</td>
</tr>
<tr>
<td></td>
<td># mypgopp</td>
</tr>
<tr>
<td></td>
<td>n Relink using the vFabric Postgres libpq library during compilation. Relinking requires the Xcode developer toolset. For example, to embed the full path of libpq.dylib in the executable binary mypgapp, run this command.</td>
</tr>
<tr>
<td></td>
<td># gcc -o mypgapp mypgapp.c -L/opt/vmware/vpostgres/9.1/lib -lpq</td>
</tr>
<tr>
<td></td>
<td>n Relink using the vFabric Postgres libpq after compilation. Relinking requires the Xcode developer toolset. Note: This changes the binary to use vPostgres libpq</td>
</tr>
<tr>
<td></td>
<td># install_name_tool --change &quot;/usr/lib/libpq.5.dylib&quot; &quot;/opt/vmware/vpostgres/9.1/lib/libpq.5.dylib&quot; mypgapp</td>
</tr>
<tr>
<td></td>
<td>To confirm which library is linked, run this command.</td>
</tr>
<tr>
<td></td>
<td># otool -L mypgapp</td>
</tr>
</tbody>
</table>
Managing vFabric Postgres

After you have installed the vFabric Postgres DBMS and the client tools, you can perform a variety of management tasks.

**Note** If you are using the vFabric Data Director version of vFabric Postgres, you perform most of your management tasks from the Data Director GUI. This includes creating, monitoring, and managing vFabric Postgres databases, and managing license keys for production systems. See *vFabric Data Director Administrator and User Guide*.

This chapter includes the following topics:

- “Use the Data Director vFabric Postgres Console,” on page 19
- “Connecting to a vFabric Postgres Database,” on page 20
- “Using psql to Load Data and to Query vFabric Postgres Databases,” on page 23
- “Services that Accept Remote Connections,” on page 23
- “Stop and Start the Service on the Appliance,” on page 24
- “Import Postgres or vFabric Postgres Databases,” on page 24
- “Troubleshooting Guidelines,” on page 25

**Use the Data Director vFabric Postgres Console**

The vFabric Postgres Console allows privileged users to monitor and modify a vFabric Postgres database. You can use the vFabric Postgres console instead of client tools to manage your databases.

**Prerequisites**

Log in to Data Director as a user who has privileges to view and modify a database.

**Procedure**

1. Select the organization in which the database was created, click Manage and Monitor, and select the database.

   On this management page, you can use the available tabs to get an overview, view reports and logs, and perform other tasks for vFabric Postgres databases or Oracle databases.

2. Click the Console icon in the top-right corner to display the vFabric Postgres management console.

   You can examine and customize the database from the console.

3. Click the Catalogs or Schemas icons on the left to review catalogs and schemas for just that database.
From the console, right-click the database icon and select one of the available actions.

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refresh</td>
<td>Refreshes the database</td>
</tr>
<tr>
<td>Vacuum Analyze Database</td>
<td>Performs a standard Postgres Vacuum Analyze operation.</td>
</tr>
<tr>
<td>Enter SQL</td>
<td>Displays a window for entering and executing SQL commands and viewing and examining output.</td>
</tr>
</tbody>
</table>

For more information about managing vFabric Postgres databases with Data Director, see the vFabric Data Director Administrator and User Guide.

Connecting to a vFabric Postgres Database

If you do not want to use the Data Director UI to manage your vFabric Postgres database, you can instead connect using standard database connections such as pgAdmin or JDBC. The connection strings differ slightly from the standard Postgres connection strings.

Connect to a vFabric Postgres Database with the pgAdmin Tool

You can connect to a vFabric Postgres database in several different ways, including the pgAdmin tool.

The Windows pgAdmin tool works only with Windows 32-bit systems. If you run Windows 64-bit, install the 32-bit versions of the vFabric Postgres client tools. The tool’s installer places the 32-bit tools in the C:\Program Files (x86) tree.

Prerequisites

- If you do not have pgAdmin installed, download the version of the tool that is appropriate for your system from the Postgres Web site and install the tool.
- Obtain the Data Director DB Name Service IP address. See “Obtain the DB Name Service IP Address,” on page 22.
- On Windows, ensure that pgAdmin uses the vFabric Postgres libpq library.
  - Copy the C:\Program Files\pgAdmin III\version directory to C:\Program Files\pgAdmin III\version-vPostgres, where version is the pgAdmin version number, for example, 1.14.
  - Copy all the files in your C:\Program Files\VMware\vPostgres\1.0\bin directory to C:\Program Files\pgAdmin III\<version>-vPostgres.

Procedure

1. Start pgAdmin from the C:\Program Files\pgAdmin III\version-vPostgres directory.
2. Select File > Add Server.
3. Specify the connection information when prompted.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>A meaningful name for the server, such as Data Director.</td>
</tr>
<tr>
<td>Host</td>
<td>The [UUID][DB Name Service IP or FQDN] part of the connection string.</td>
</tr>
<tr>
<td>Port, Service, Maintenance DB</td>
<td>Leave the defaults.</td>
</tr>
<tr>
<td>Username</td>
<td>Database user name. This is usually the database owner user ID.</td>
</tr>
<tr>
<td>Password</td>
<td>Password for the database user. You can optionally store the password.</td>
</tr>
</tbody>
</table>
Option | Description
---|---
Color (Optional) | Color to denote this server in the object browser and in diagrams.
Server group (Optional) | Enter a server group in which to place this server, or accept the default.

4 Click the Advanced tab and type the DB Name Service IP address in the Host field.
5 Click OK.

**Obtain the Connection String**

Before you can connect to a vFabric Postgres database, obtain the connection string.

Data Director uses its DB Name Server virtual machine to route database connections to vFabric Postgres databases deployed with Data Director. The connection string has the following format.

\{UUID\}.DBNameService_IP_Address

The curly brackets, { }, are part of the connection string and enclose the UUID. You can obtain the connection string from the Data Director UI, or you can construct the connection string if you know the UUID and DB Name Server host name.

**Procedure**

1 Log in to your Data Director organization as a user with database privileges.
2 Select the database group for the database and click the database name.

   The database connection string appears in the Connection String field. The connection string includes the JDBC connection information and has the format

   `jdbc:postgresql:/{UUID}.DB_Name_Service_IP_or_FQDN/db_name?user=user_ID`

   - \{UUID\} Database name, enclosed in curly brackets.
   - DB_Name_Service_IP_or_FQDN Either the IP address of the Data Director DB Name Service network or the fully qualified domain name.
   - db_name Name of the vFabric Postgres database to connect to.
   - user_id User ID to log in to the vFabric Postgres database.
3 Copy the connection string and paste it into the right place in your application using the appropriate approach.

<table>
<thead>
<tr>
<th>Connection mechanism</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool</td>
<td>If you use a tool such as pgAdmin, copy the {UUID}.DB_Name_Service_IP_or_FQDN part of the connection string to specify the host. Specify the user name in the pgAdmin server connection properties.</td>
</tr>
<tr>
<td>JDBC</td>
<td>If you use JDBC, paste the entire connection string into the jdbc.url field in your jdbc.properties file.</td>
</tr>
</tbody>
</table>

**What to do next**

Connect to the database. See “Connect to a vFabric Postgres Database with the pgAdmin Tool,” on page 20 and “Connecting to a vFabric Postgres Database,” on page 20.
Obtain the DB Name Service IP Address

If you connect to the vFabric Postgres database with the pgAdmin tool, you must obtain the DB Name Service IP address.

You can use the vSphere Client to obtain the DB Name Service IP address from the Data Director vApp. Ask your system administrator for help if you do not have access to the vSphere Client.

Procedure

1. Log in to vSphere Client as an administrator.
2. Select Hosts and Clusters and find and expand the Data Director vApp in the left pane.
3. Click DB Name Server to select it, and click the Summary tab.

   The IP address is listed in the General pane.

What to do next

“Connect to a vFabric Postgres Database with the pgAdmin Tool,” on page 20.

Connect to a vFabric Postgres Database with JDBC

You can connect to a vFabric Postgres for Data Director database by using custom connection strings. If you are using the standalone version of vFabric Postgres, you do not need to customize your connection strings.

Prerequisites

Deploy the vFabric Postgres Standard Edition for Data Director virtual appliance in your environment.

Procedure

- Use the following connection string.

  jdbc:postgresql://{UUID}.host_name/rdb_name?user=<user name>

  The curly brackets, {}, are part of the connection string and enclose the UUID.

Example: Connecting with JDBC

Assume that you use JDBC to connect to a database with the following characteristics.

<table>
<thead>
<tr>
<th>Database name</th>
<th>myDB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host name</td>
<td>w1-devtest-22.dev.mycorp.com</td>
</tr>
<tr>
<td>UUID</td>
<td>d35f7ab1-d70e-4d98-c121-122f68e4ab60</td>
</tr>
<tr>
<td>User name</td>
<td>dbowner</td>
</tr>
</tbody>
</table>

You can use the following JDBC connection string.

jdbc:postgresql://{d35f7ab1-d70e-4d98-c121-122f68e4ab60}.w1-devtest-22.dev.mycorp.com/mydb?user=dbowner

Connect to a vFabric Postgres Database with psql

You can connect to a vFabric Postgres for Data Director database with psql by using custom connection strings. If you are using the standalone version of vFabric Postgres, you do not need to customize your connection strings.

Prerequisites

Deploy the vFabric Postgres Standard Edition for Data Director virtual appliance in your environment.
Procedure

- Use the following connection string.

```bash
psql -h {UUID}.DB_Name_Service_IP -p 5432 -d DB_name -U db_user_name
```

**Example: Connecting with psql**

For example, assume that you use psql to connect to a database with the following characteristics.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UUID</td>
<td>1234-5678-9012-3456</td>
</tr>
<tr>
<td>DB Name Service port</td>
<td>5432</td>
</tr>
<tr>
<td>DB Name Server IP address</td>
<td>10.0.0.1</td>
</tr>
<tr>
<td>database user name</td>
<td>dbuser</td>
</tr>
</tbody>
</table>

You can use the following psql command to connect to the database.

```
$ psql -h {1234-5678-9012-3456}.10.0.0.1 -p 5432 -d myDB -U dbuser
```

Psq1 connects to myDB, prompts for the password, and logs you in.

**What to do next**

You can now load data and query the database using psql. See “Using psql to Load Data and to Query vFabric Postgres Databases,” on page 23.

**Using psql to Load Data and to Query vFabric Postgres Databases**

You can use psql commands to load data into a vFabric Postgres database and to query a vFabric Postgres database.

**Loading Data with psql**

Use the psql command `\COPY` (back slash-COPY) to load data into vFabric Postgres databases. Do not use the psql `COPY FROM` or `COPY TO` command. The `COPY FROM` (or `COPY TO`) command must run on the server with superuser privileges and cannot load data into remote clients such as vFabric Postgres for Data Director. The `\COPY FROM` and `\COPY TO` commands use the client session to read and write from local files. These commands support relative paths, and use the psql communication layer to load data to, or from, the server.

For example, the following psql command loads data from a text file, `shelterlists.txt`, into the vFabric Postgres database table `shelters` in the schema `rescues`.

```
copy rescues.shelters from 'C:\shelterslists.txt';
```

**Querying vFabric Postgres Databases with psql**

After you connect to a vFabric Postgres database, you can query the database. For example, using psql, connect to the database and type the psql command at the database prompt.

You can run SQL script files using the `psql -f SQL_script_filename` command, where the file named `SQL_script_filename` contains a series of SQL commands. Psql reads the file, runs the SQL commands, and exits.

**Services that Accept Remote Connections**

When the vFabric Postgres server is running, it includes services that accept remote connections.

If you install the vFabric Postgres DBMS as an appliance, it includes standard services and services specific to VMware virtual appliances. These services accept remote connections by default. You can set the DBMS parameters to add or remove services or change ports.
### Table 4-1. vFabric Postgres Services that Accept Remote Connections

<table>
<thead>
<tr>
<th>Service</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postgres service</td>
<td>5432</td>
</tr>
<tr>
<td>SSH service</td>
<td>22</td>
</tr>
<tr>
<td>VAMI (Virtual Appliance Management Infrastructure) Web Management UI. You can connect to port 5480 via https to update or reconfigure the appliance.</td>
<td>5480</td>
</tr>
<tr>
<td>VAMI SFCB broker</td>
<td>5488 and 5489</td>
</tr>
</tbody>
</table>

### Stop and Start the Service on the Appliance

Stop and start the service on the appliance if you change the configuration.

If you installed the vFabric Postgres database service as an appliance, use the following commands to stop and then restart the service. For the appliance service, these commands also stop and start the VMware HA (high availability) monitor process that makes sure the database process is up and running.

**Procedure**

1. Change the configuration.
2. Stop the service.
   ```
   $service aurora_mon stop
   ```
3. Restart the service.
   ```
   $service aurora_mon start
   ```

### Import Postgres or vFabric Postgres Databases

If you cannot use an existing Postgres or vPostgres database from vFabric Postgres or vFabric Postgres for Data Director, you can dump the database and import or restore it.

You might not be able to use a Postgres database from vFabric Postgres or vFabric Postgres for Data Director, a database created from vFabric Postgres in Data Director, or a database created in Data Director from the standalone version of vFabric Postgres. You might also have problems if a new major version of vFabric Postgres has been released.

If this happens, you can export the database to text format by using either the `pg_dumpall` or the `pg_dump` utility, as follows.

**pg_dumpall**

Dumps every object for all databases. You can load the resulting dump into the vFabric Postgres appliance or a virtual machine on which the vFabric Postgres RPMs have been installed with the `psql` command. You cannot use this command with vFabric Postgres for Data Director.

**pg_dump**

Supports a granular dump based on schemas or tables and includes a custom format. You can load into all versions of vFabric Postgres.

**Procedure**

1. Decide whether you want to use `pg_dumpall` or `pg_dump`.
Use each command with the correct corresponding restore option.

```
pg_dumpall > mydump.sql
psql -d postgres -f mydump.sql
pg_dump -Fc -d mydb > mydbdump.dmp
dropdb mydb
pg_restore -C -d postgres mydbdump.dmp
```

**Troubleshooting Guidelines**

Use the options listed in this section to analyze connection or performance problems.

**Client Cannot Connect**

If your client cannot connect to the vFabric Postgres appliance or to a vFabric Postgres server installed using RPMs, follow these steps to troubleshoot the issue.

1. Ping the server IP from your client.
2. Verify that Postgres 9.1 is running by running the following command on the command line.
   ```
   ps ax | grep postgres
   ```
3. Try to connect a local PostgresSQL client to the vFabric Postgres server.
4. Review the logs in `/var/vmware/vpostgres/current/pgdata/pg_log`

**Database Transactions Per Second Less Than Expected**

If the database transactions per seconds are less than expected, follow these steps to troubleshoot the issue.

1. Make sure your PGDATA VMDK is on a high-performance datastore.
2. Look for missing indexes in your SQL queries.
3. Analyze concurrent queries for conflicts.
4. Increase the number of vCPUs and/or memory.
5. As a last resort, turn off `synchronous_commit` in
   `var/vmware/vpostgres/current/pgdata/postgresql.conf` and restart the appliance. Monitor for performance changes. See the Postgres documentation for details.
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