README

Manually Upgrading PostgreSQL 9.1 to PostgreSQL 9.4.19

Databases managed by the SAS Web Infrastructure Platform Data Server (including SAS solution data servers configured with the SAS Deployment Wizard) are based on PostgreSQL 9.1.9. This document describes how to manually update those databases to PostgreSQL 9.4.19. The processes described in this document are only valid for PostgreSQL binaries downloaded from SAS.

These steps should only be used for a deployment that is at SAS 9.4M5.

Note: *In this document, the term "data server" refers to the SAS Web Infrastructure Platform Data Server or the solution-specific data server.*

Manual Process

Required Information

Collect the following information before beginning the upgrade.

- The host name and port number for the SAS Web Infrastructure Platform Data Server, and any SAS solution data server. For instance:
  - wipds.hostname.com, 9432
  - fmdb.hostname.com, 9632

  Note: *The host name and port can be located using the SAS Management Console Server Manager plug-in.*
- Location of "SASHome". For instance:
  - UNIX - `/usr/local/SASHome`
  - Windows - `C:\Program Files\SASHome`
- Location of the SAS Configuration Directory. For instance:
  - UNIX - `/usr/local/SASConfig/Lev1`
  - Windows - `C:\SAS\SASConfig\Lev1`
- Data Server Administrator ID and password for all data servers in your cluster. For instance:
  - SAS Web Infrastructure Platform Data Server: dbmsowner/xxxxxxxx
  - Job Monitor Data Server: jmdbadmin/xxxxxxxx
  - Data Remediation Server: rmdbadmin/xxxxxxxx

  Note: *For each data server, the Data Server Administrator ID has a login defined for SAS Administrator. Use the SAS Management Console User Manager plug-in to locate the ID by displaying properties for the SAS Administrator and clicking the* ***Accounts*** *tab.*

- Read/write access in the `WebInfrastructurePlatformDataServer` install directory (location of the PostgreSQL server binaries). For instance:
  - UNIX - `/usr/local/SASHome/SASWebInfrastructurePlatformDataServer/9.4`
  - Windows - `C:\Program Files\SASHome \SASWebInfrastructurePlatformDataServer\9.4`

UNIX and Linux

Each command in the following steps should be run as the SAS installer ID.

1. Shut down your SAS servers and middle-tier servers. Close all SAS clients, such as SAS Management Console.
2. Start the data servers. For example, this is how to start the default Web Infrastructure Platform Data Server instance.
   a. Go to the server instance configuration directory.
   ```
   cd < SAS Configuration Directory>/WebInfrastructurePlatformDataServer
   ```
   b. Run the Web Infrastructure Platform Data Server start/stop script.
   ```
   ./webinfdsvrc.sh start
   ```
   c. Ensure that the database has started.
   ```
   ps –ef | grep –i postgres
   ```
   d. Repeat steps 2a – 2c for each data server.

3. Back up the database.
   a. Go to the directory the PostgreSQL server binaries are in.
   ```
   cd <SASHome>/SASWebInfrastructurePlatformDataServer/9.4/bin
   ```
   b. For data servers on AIX, set LIBPATH.
   ```
   export LIBPATH=<SASHome>/SASWebInfrastructurePlatformDataServer
   /9.4/lib:$LIBPATH
   ```
   c. Set the following environment variable.
   ```
   export LD_LIBRARY_PATH=<SASHome>/SASWebInfrastructurePlatformDataServer
   /9.4/lib:$LD_LIBRARY_PATH
   ```
   d. Set the following environment variables.
   ```
   export PGUSER=<Data Server Administrator ID>
   export PGPASSWORD=<Data Server Administrator password>
   export PGHOST=<hostname>
   export PGPORT=<port number>
   ```
   e. Back up the database.
   ```
   ./pg_dumpall -f "<SAS Configuration Directory>
   /<Data Server Configuration Directory>/db_update.dat"
   ```

For example:

```
./pg_dumpall -f "<SAS Configuration Directory>
/WebInfrastructurePlatformDataServer/db_update.dat"
```

Note: *Make sure no errors have occurred and the file has been created.*

f. Repeat steps 3d– 3e for each data server, being sure to use the appropriate host name, port, Data Server Administrator, and full path for each data server in the command in step 3d.

4. Stop the data servers. For example, this is how to stop the default Web Infrastructure Platform Data Server instance.

   a. Go to the server instance configuration directory.

   ```
   cd <SAS Configuration Directory>/WebInfrastructurePlatformDataServer
   ```

   b. Run the Web Infrastructure Platform Data Server start/stop script.

   ```
   ./webinfdsvrc.sh stop
   ```

   c. Ensure that ALL the "postgres" processes have stopped.

   ```
   ps –ef | grep –i postgres
   ```

   d. Repeat steps 4a – 4c for each Data server.

5. Move the 9.1.x database. For example, this is how to move the default Web Infrastructure Platform Data Server database.

   a. Go to the server instance configuration directory.

   ```
   cd <SAS Configuration Directory>/WebInfrastructurePlatformDataServer
   ```

   b. Rename the 9.1.x database.

   ```
   mv data data_91x
   ```

   c. Repeat steps 5a – 5b for each data server.

6. Put the 9.4.19 PostgreSQL binaries into place. This step will only be performed once.

   a. Go to the server binaries install directory.

   ```
   cd <SASHome>/SASWebInfrastructurePlatformDataServer/9.4
   ```

   b. Rename the following 9.1.x directories.

   ```
   mv bin bin_91x
   mv lib lib_91x
   mv share share_91x
   mv include include_91x
   ```

   c. Copy in the 9.4.19 binary package.

   ```
   cp /xxx/xxx/psql_9.4.19_<three-byte code for the operating
   system>.tar <SASHome>/ SASWebInfrastructurePlatformDataServer/9.4
   ```

d. Unpackage the 9.4.19 binary package.

```
tar -xvf  psql_9.4.19_<three-byte code for the operating system>.tar
```

Note: *This command creates new bin, lib, share, and include directories*

7. Initialize a new PostgreSQL 9.4.19 database.

   a. Go to the server binaries directory.

   ```
   cd <SASHome>/SASWebInfrastructurePlatformDataServer/9.4/bin
   ```

   b. Run the initialize database command. For example, this is how to initialize the default Web Infrastructure Platform Data Server instance.

   ```
   ./initdb -D <SAS Configuration Directory>
   /WebInfrastructurePlatformDataServer/data -U updateUser12 -A trust -
   E UTF8 --locale=C
   ```

   c. Repeat steps 7a – 7b for each data server.

8. Update PostgreSQL configuration settings. For example, this is how to do this for the default Web Infrastructure Platform Data Server instance.

   a. Go to the server instance configuration directory.

   ```
   cd <SAS Configuration Directory>
   /WebInfrastructurePlatformDataServer/data
   ```

   b. Rename `postgresql.conf`.

   ```
   mv postgresql.conf postgresql.conf_94
   ```

   c. Copy `postgresql.conf` from old database to this database.

   ```
   cp ../data_91x/postgresql.conf .
   ```

   d. For data servers on the HP-UX for the Itanium Processor Family Architecture, edit `postgresql.conf`.

   ```
   vi postgresql.conf
   ```

   Then add the following line to the very bottom of the file:

   ```
   dynamic_shared_memory_type = sysv
   ```

   e. Repeat steps 8a – 8d for each data server.

9. Start the data servers. For example, this is how to start the default Web Infrastructure Platform Data Server instance.

   a. Go to the server instance configuration directory.

   ```
   cd <SAS Configuration Directory>/WebInfrastructurePlatformDataServer
   ```

   b. Run the Web Infrastructure Platform Data Server start/stop script.

   ```
   ./webinfdsvrc.sh start
   ```

c. Ensure that the database has started.

```
ps -ef | grep -i postgres
```

d. Repeat steps 9a – 9c for each data server.

10. Restore the data. For example, this is how to restore the default Web Infrastructure Platform Data Server instance.

a. Go to the server binaries directory.

```
cd <SASHome>/SASWebInfrastructurePlatformDataServer/9.4/bin
```

b. Set the environment variables.

```
export LD_LIBRARY_PATH=<SASHome>/SASWebInfrastructurePlatformDataServer
/9.4/lib:$LD_LIBRARY_PATH
export PGUSER=<Data Server Administrator ID>
export PGPASSWORD=<Data Server Administrator password>
export PGHOST=<hostname>
export PGPORT=<port number>
```

c. For data servers on AIX, also set LIBPATH.

```
export LIBPATH=<SASHome>/SASWebInfrastructurePlatformDataServer/9.4
/lib:$LIBPATH
```

d. Run the command to restore the data.

```
./psql -h localhost -d postgres -U updateUser12 --set
ON_ERROR_STOP=1 -f "<SAS Configuration Directory>
/WebInfrastructurePlatformDataServer/db_update.dat"
```

e. Run the command to disable login for the updateUser12.

```
./psql -h localhost -d postgres -c "alter role \"updateUser12\"
NOLOGIN;"
```

f. Repeat steps 10a – 10e for each data server.

11. Stop the data servers. For example, this is how to stop the default Web Infrastructure Platform Data Server instance.

a. Go to the server instance configuration directory.

```
cd <SAS Configuration Directory>/WebInfrastructurePlatformDataServer
```

b. Run the Web Infrastructure Platform Data Server start/stop script.

```
./webinfdsvrc.sh stop
```

c. Ensure that ALL the “postgres” processes have stopped.

```
ps -ef | grep -i postgres
```

d. Repeat steps 11a – 11c for each data server.

12. Update the PostgreSQL configuration settings. For example, this is how to update the settings for the default Web Infrastructure Platform Data Server instance.
    a. Go to the server instance configuration directory.
    ```
    cd <SAS Configuration Directory>
    /WebInfrastructurePlatformDataServer/data
    ```
    b. Copy `pg_hba.conf` from the old database to this database.
    ```
    cp ../data_91x/pg_hba.conf .
    ```
    c. Repeat steps 12a – 12b for each data server.

13. On the machine where PostgreSQL was upgraded, rename the `<SAS Configuration Directory>/Lev1/Web/SASEnvironmentManager/agent-5.8.0-EE/data` directory.
    ```
    mv <SAS Configuration Directory>/Lev1/Web/SASEnvironmentManager
    /agent-5.8.0-EE/data <SAS Configuration Directory>/Lev1/Web
    /SASEnvironmentManager/agent-5.8.0-EE/data_archive
    ```

14. Restart your SAS servers, middle-tier servers, and clients.

15. Using the procedures described in the middle tier Instructions.html document, perform the following tasks:
    - Validate the middle tier.
    - Perform an ad hoc backup with the Deployment Backup and Recovery Tool (or Backup Manager).
16. After you finish the upgrade, if you see that the server version is still 9.1.x in the SAS Environment Manager console or that some metrics are unavailable for a long time, perform a rediscovery with SAS Environment Manager.

After you have upgraded PostgreSQL, the SAS Installation Qualification tool will return failures on the updated files in the `/SASWebInfrastructurePlatformDataServer/9.4` directory. This is expected and should not be a concern.

Windows

Each command in the following steps must be run as the SAS installer ID.

1. Shut down your SAS servers and middle-tier servers. Close all SAS clients, such as SAS Management Console.
2. Start the data servers. For example, this is how to start the default Web Infrastructure Platform Data Server instance.
    a. Open the Services app by clicking the **Start** button.
    b. Type **`services`** in the search text box, and click **Services** in the results.
    c. Scroll through the **Services** window and find the data server (for example, "SAS [Metadata-Lev1] Web Infrastructure Platform Data Server").
    d. Right-click the data server and select **Start**.

e. Repeat steps2a – 2d for each data server.

3. Back up the database.
   a. Open a command prompt by clicking the **Start** button.
   b. Type **`cmd.exe`** in the search text box, right-click "command prompt" or "cmd.exe" under **Programs**, and select **Run as administrator**
   c. Go to the directory the PostgreSQL server binaries are in.

```
cd <SASHome>\SASWebInfrastructurePlatformDataServer\9.4\bin
```

   d. Run the command to back up the data store. For example, this is the command to back up the data store for the Web Infrastructure Platform Data Server instance.

```
pg_dumpall -h <host name> -p <port> -U <Data Server Administrator>
-S <Data Server Administrator> -W -l postgres –f "<SAS Configuration
Directory>\WebInfrastructurePlatformDataServer
\db_update.dat"
```

   e. Enter the Data Server Administrator password when prompted. This will happen multiple times.

      Note: *Ensure the file is created and no errors occurred.*
   f. Repeat steps 3d – 3e for each data server, being sure to use the appropriate host name, port, Data Server Administrator, and full path for each data server in the command in step 3d.

4. Stop the data servers. For example, this is how to stop the default Web Infrastructure Platform Data Server instance.
   a. Open the Services app by clicking the **Start** button.
   b. Type **`services`** in the search text box, and click **Services** in the results.
   c. Scroll through the **Services** window and find the data server (for example, "SAS [Metadata-Lev1] Web Infrastructure Platform Data Server").
   d. Right-click the data server and select **Stop**.
   e. Repeat steps 4a – 4d for each data server.

   Note: *Ensure that all postgres processes have stopped by checking the task manager.*

5. Move the 9.1.x database. For example, this is how to move the default Web Infrastructure Platform Data Server database.
   a. Go to the server instance configuration directory.

```
cd <SAS Configuration Directory>\WebInfrastructurePlatformDataServer
```

   b. Rename the 9.1.x database.

```
rename data data_91x
```

   c. Repeat steps 5a – 5b for each data server.

6. Upgrade to the 9.4.19 PostgreSQL binaries. This step will only be performed once.
   a. Go to the server binaries install directory.
      ```
      cd <SASHome>\SASWebInfrastructurePlatformDataServer\9.4
      ```
   b. Rename the 9.1.x directories.
      ```
      rename bin bin_91x
      rename lib lib_91x
      rename share share_91x
      rename include include_91x
      ```
   c. Copy in the 9.4.19 binary package.
   d. Unpackage the 9.4.19 binary package by unzipping `psql_9.4.19_<three-byte code for the operating system>.zip` in the `<SASHome>\SASWebInfrastructurePlatformDataServer\9.4` directory. Depending on the settings of your system, you may see a Destination Folder Access Denied message asking you to provide administrator permission.

7. Initialize a new PostgreSQL 9.4.19 database.
   a. Go to the server binaries directory.
      ```
      cd <SASHome>\SASWebInfrastructurePlatformDataServer\9.4\bin
      ```
   b. Run the initialize database command. For example, this is how to initialize the database in the default Web Infrastructure Platform Data Server instance.
      ```
      initdb -D "<SAS Configuration Directory>
      \WebInfrastructurePlatformDataServer\data" -U updateUser12 -A trust
      -E UTF8 --locale=C
      ```
   c. Repeat steps 7a – 7b for each data server.

8. Update the PostgreSQL configuration settings. For example, this is how to do this for the default Web Infrastructure Platform Data Server instance.
   a. Go to the server instance configuration directory.
      ```
      cd <SAS Configuration
      Directory>\WebInfrastructurePlatformDataServer\data
      ```
   b. Rename postgresql.conf.
      ```
      rename postgresql.conf postgresql.conf_94
      ```
   c. Copy in `postgresql.conf` from old database to this database.
      ```
      copy ..\data_91x\postgresql.conf .
      ```
   d. Repeat steps 8a – 8c for each data server.

9. Start the data servers. For example, this is how to start the default Web Infrastructure Platform Data Server instance.
   a. Open the Services app by clicking the **Start** button.
   b. Type **`services`** in the search text box, and click **Services** in the results.
   c. Scroll through the **Services** window and find the data server (for example, "SAS [Metadata-Lev1] Web Infrastructure Platform Data Server").
   d. Right-click the data server and select **Start**.
   e. Repeat steps 9a – 9d for each data server.

10. Restore the data. For example, this is how to restore the default Web Infrastructure Platform Data Server instance.
   a. Go to the server binaries directory.
   ```
   cd <SASHome>\SASWebInfrastructurePlatformDataServer\9.4\bin
   ```
   b. (Optional) Set the command prompt console code page. For example, English (United States) the console is usually 437 and windows is 1252. You can run the following command to set the command console to 1252.
   ```
   chcp 1252
   ```
   c. Run the command to restore the data.
   ```
   psql -p <port> -d postgres -U updateUser12 --set ON_ERROR_STOP=1 -f
   "<SAS Configuration Directory>\WebInfrastructurePlatformDataServer
   \db_update.dat"
   ```
   d. Run the command to disable login for the updateUser12.
   ```
   psql -p <port> -d postgres -U <Data Server Administrator> -W -c
   "alter role \"updateUser12\" NOLOGIN;"
   ```
   e. Enter the Data Server Administrator password when prompted.
   f. Repeat steps 10a – 10e for each data server.
11. Stop the data servers. For example, this is how to stop the default Web Infrastructure Platform Data Server instance.
   a. Open the Services app by clicking the **Start** button.
   b. Type **`services`** in the search text box, and click **Services** in the results.
   a. Scroll through the **Services** window and find the data server (for example, "SAS [Metadata-Lev1] Web Infrastructure Platform Data Server").
   b. Right-click the data server and select **Stop**.
   c. Repeat steps 11a – 11d for each data server.

   Note: *Check the task manager to ensure that all postgres processes have stopped.*

12. Update the PostgreSQL configuration settings. For example, this is how to do this for the default Web Infrastructure Platform Data Server instance.
    a. Go to the server instance configuration directory.
    ```
    cd <SAS Configuration
    Directory>\WebInfrastructurePlatformDataServer\data
    ```
    b. Copy in `pg_hba.conf` from old database to this database.
    ```
    copy ..\data_91x\pg_hba.conf .
    ```
    c. Repeat steps 12a – 12b for each data server.

13. On the machine where PostgreSQL was upgraded, rename the `<SAS Configuration Directory>/Lev1/Web/SASEnvironmentManager/agent-5.8.0-EE/data` directory to `<SAS Configuration Directory>/Lev1/Web/SASEnvironmentManager/agent-5.8.0-EE/data_archive`

14. Restart your SAS servers, middle-tier servers, and clients.

15. Using the procedures described in the middle tier Instructions.html document, perform the following tasks:
    - Validate the middle tier.
    - Perform an ad hoc backup with the Deployment Backup and Recovery Tool (or Backup Manager).
16. After you finish the upgrade, if you see that the server version is still 9.1.x in the SAS Environment Manager console or that some metrics are unavailable for a long time, perform a rediscovery with SAS Environment Manager.

After you have upgraded PostgreSQL, the SAS Installation Qualification tool will return failures on the updated files in the `/SASWebInfrastructurePlatformDataServer/9.4` directory. This is expected and should not be a concern.

Scripted Process

The following process uses scripts available from SAS Technical Support at http://ftp.sas.com/techsup/download/hotfix/pgsql_9.4.19.html. The scripts can only be used on Windows or Linux. If you are using a non-Linux UNIX operating system, you must use the manual process.

Note: *The following process requires python. If you do not have python and cannot install it, you must use the instructions described in the "Manual Process" section above.*

1. Download the following two files from http://ftp.sas.com/techsup/download/hotfix/pgsql_9.4.19.html:
   - `upgrade_data_servers.csv`
   - `upgrade_data_servers.py`

2. Stop all SAS servers.

3. Edit the `upgrade_data_servers.csv` file you downloaded to specify the location of the following items in the first three rows of the file:
   - location of SASHome
   - location of the SAS Configuration Directory
   - location of the PostgreSQL binaries that you downloaded from SAS Technical Support

4. Use the following command to Run the script in analyze mode:
   ```
   python upgrade_data_servers.py -c upgrade_data_servers.csv –a
   ```
   The output lists the data servers that are running on the machine where this command is used and their ports.

5. In the `upgrade_data_servers.csv` file, fill in one row for each data server, inserting the directory name of the data server under SASConfig/LevX and the port number that the data server is listening on. In addition, fill in the admin user ID and password for the data server (not the individual database admin, but the entire DBMS super admin).

6. Run the script in validate mode, which validates the information you placed in the CSV file.
   ```
   python upgrade_data_servers.py -c upgrade_data_servers.csv –v
   ```

7. When validation is successful, run the tool to upgrade the data servers to the new PostgreSQL version. Every data server on the machine must be upgraded at the same time.
   ```
   python upgrade_data_servers.py -c upgrade_data_servers.csv –u
   ```

8. Repeat steps 2-7 on each machine in your deployment that has a data server.

Migration

If you need to migrate an upgraded data server (including Web Infrastructure Platform Data Server) to a new location, you must ensure that all data servers still using PostgreSQL 9.1 on each machine have been upgraded. This should to be done prior to running the SAS Migration Utility to create the migration package. Note that the PostgreSQL 9.1 installation files, located in `<SASHome>/SASWebInfrastructurePlatformDataServer/9.4` when present, must be upgraded even if there is no Web Infrastructure Platform Data Server running on the machine.

Here are the specific steps:

1. On the migration source machines, use steps 1 - 16 of the operating system-specific instructions in the previous sections to upgrade all data server instances in the configuration directories to be migrated.

2. If a migration source machine has a `<SASHome>/SASWebInfrastructurePlatformDataServer/9.4` (for UNIX; `<SASHome>\SASWebInfrastructurePlatformDataServer\9.4` for Windows) installation directory but no configured Web Infrastructure Platform Data Server, the files still must be upgraded from PostgreSQL 9.1 to PostgreSQL 9.4.19. To accomplish this upgrade, perform step 6 from the appropriate operating system-specific section. Step 6 upgrades the PostgreSQL installation files only.

3. Perform the following steps on each target machine:
   a. Run the SAS Deployment Wizard and select **Install SAS Software** on the **Select Deployment Type** page. Ensure that **Configure SAS Software** is not selected.
   b. After the SAS Deployment Wizard has completed, perform step 6 from the appropriate operating system-specific section. Step 6 upgrades the PostgreSQL installation files only.
   c. Rerun the SAS Deployment Wizard and select **Configure SAS Software** on the **Select Deployment Type** page. Ensure that **Install SAS Software** is not selected. The SAS Deployment Wizard will initialize the databases at the PostgreSQL 9.4 version, so no additional manual steps are needed.