

## IBM® DB2® for Linux®, UNIX®, and Windows®

## **Best practices**

## Securely deploying and configuring the DB2 pureScale Feature by using db2ssh

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## **Executive summary**

The main objective of this paper is to highlight the best practices for securely deploying and configuring the DB2 pureScale Feature by using db2ssh. The db2ssh is a wrapper around the Secure Shell (SSH) protocol and Secure Copy Protocol (SCP).

DB2 Version 10.1 Fix Pack 2 introduced db2ssh. You can use db2ssh to run commands as a root user on any host in the General Parallel File System (GPFS) domain. This functionality is achieved by communicating between hosts as a designated non-root ID, thereby removing the requirement of enabling passwordless SSH and remote root login for the root user. As of DB2 Version 10.5, along with GPFS, the installer uses db2ssh to install and configure the DB2 pureScale Feature. Thus, the dependency on passwordless SSH for the root user is removed.

This paper provides the following information:

- An introduction to db2ssh and its configuration
- Information about various methods for installing and configuring the DB2 pureScale Feature with db2ssh enabled
- Troubleshooting tips to resolve problems

## Introduction to db2ssh

Before DB2 Version 10.5, to install and configure the DB2 pureScale Feature, you had to enable the remote root login setting and passwordless SSH for the root user. These requirements posed security concerns such as a lack of accountability of who logged in as the root user and allowing root to root SSH without a password or passphrase.

Along with the DB2 installer, the General Parallel File System (GPFS) required the enablement of the remote root login setting and passwordless SSH for the root user for some of the cluster operations. DB2 Version 10.1 Fix Pack 2 introduced db2ssh to eliminate these dependencies for GPFS. However, the DB2 installer continued to have these dependencies until DB2 Version 10.5. In that release the DB2 installer was enhanced to use db2ssh.

The db2ssh is installed in the /var/db2/db2ssh directory. It consists of three executables:

- db2locssh, which is invoked on the local host
- db2remssh, which the db2locssh program invokes on the remote host
- db2scp, which uses both the db2locssh and db2remssh files

The db2ssh is an SSH wrapper. To use db2ssh, you must set up a dedicated non-root user i.e. <db2sshid>, with passwordless SSH on the hosts where GPFS is installed.

You can specify the <db2sshid> user in the /var/db2/db2ssh/db2ssh.cfg file.

Configuring db2ssh includes a set of private and public root keys that are generated in the /var/db2/db2ssh directory. The public keys on each host are exchanged with every other host's public keys. After you configure db2ssh, if you want to run a command on the remote host as the root user, you must invoke db2locssh utility on the local host as the root user.

The db2locssh utility digitally signs the command with the local host's private key and invokes the db2remssh through the SSH protocol as the <db2sshid> user on the remote host. Once on the remote host, db2remssh verifies the digital message signature by using the originating host's public key. At this point, replay attacks are prevented in one of two ways. For DB2 Version 10.5 FP2 or earlier, 20 seconds are allowed to pass from the time that the message originates to the time that it is received. As of DB2 Version 10.5 FP3, you configure the SSH protocol to protect itself from replay attacks. Regardless of the fix pack, the final steps are to run the command and to return the result to the originating host.

## Useful commands of db2ssh

The following commands are useful for verifying the db2ssh configuration and for troubleshooting db2ssh issues:

• /var/db2/db2ssh/db2locssh version

Displays the version of the db2locssh.

/var/db2/db2ssh/db2remssh version

Displays the version of the db2remssh.

/var/db2/db2ssh/db2scp version

Displays the version of the db2scp.

• /var/db2/db2ssh/db2locssh display\_config

Displays the db2ssh configuration. Sample output is as follows:

version = 1
time\_delta = 0 second(s)
debug\_level = 2
db2sshid = db2ssh1
gskit\_path = /var/db2/db2ssh/lib64/gskit\_db2/
fips\_mode = off
success

• /var/db2/db2ssh/db2locssh reset\_config

Resets the db2ssh configuration to the default values (set\_time\_delta = 20s and gskit\_path ="').

/var/db2/db2ssh/db2locssh set\_gskit\_path

Sets the path to the IBM® Global Security Kit (GSKit), which provides libraries and utilities for SSL and TLS communication. The db2ssh uses GSKit to digitally sign messages.

/var/db2/db2ssh/db2locssh set time delta x

Sets the amount of time that db2remssh uses to decide whether to run a message as the root user. The set\_time\_delta option takes an integer value x that represents the amount of time in seconds.

 /var/db2/db2ssh/db2locssh generate\_keys -keysize keysize exponent exponent

Generates a pair of RSA public and private keys (*root@host.priv* and *root@host.pub*). The keysize and exponent options are optional. If you specify only the generate\_keys option, keys of 2048 are generated.

• /var/db2/db2ssh/db2locssh set\_db2sshid

Sets the non-root ID to use to SSH between hosts. You must set up passwordless SSH for this ID.

/var/db2/db2ssh/db2locssh discover\_gskit

Attempts to discover any available GSKit installations.

/var/db2/db2ssh/db2locssh set\_icc\_fips\_mode on|off

Turns FIPS on or off. The default is off. For information about FIPS compliance, see the IBM Crypto Information Center.

• /var/db2/db2ssh/db2locssh root@remotehost command

Runs the command that is specified for the *command* parameter on the remote host.

## Configuring db2ssh by using the setup\_db2locssh utility

As of DB2 for Linux, UNIX, and Windows V10.5, an installation utility called setup\_db2locssh is included to help configure db2ssh. The setup\_db2locssh utility deploys the binaries that db2ssh requires and generates the root private and public DSA keys.

To use the setup\_db2locssh utility to configure db2ssh :

- 1. Disable remote root login, as follows:
  - a. Modify the SSH configuration file as follows: /etc/ssh/sshd\_config: PermitRootLogin no #disabled
  - b. Make the changes take effect by restarting the SSH daemon. To restart the SSH daemon, issue the following commands:

Linux operating systems: /etc/init.d/sshd restart

#### AIX operating systems:

stopsrc -s sshd startsrc -s sshd

- 2. On all hosts, create a non-root user ID <db2sshid> with the same UID and GID. The <db2sshid> ID establishes an SSH network protocol between a local host and a remote host.
- 3. From the *media\_path/db2/platform*/utilities directory, run the setup\_db2locssh utility:

./setup\_db2locssh <db2sshid>
Setup\_db2locssh utility generates two pairs of keys, as follows:

- A pair of RSA public and private keys for the root user: root@host.priv and root@host.pub, in the /var/db2/db2ssh directory.
- A pair of DSA public and private keys for the SSH user: id\_dsa and id\_dsa.pub, in the *\$HOME* /.ssh directory, where *\$HOME* is the home directory of the <db2sshid> user.

#### **Consider the following example:**

Assume that there are four hosts: sles227, sles231, sles235, and sles239. The following commands generate the keys for the sles227 host:

```
sles227 : media_path/db2/linuxamd64/utilities #
./setup_db2locssh db2ssh1
DBI1070I Program setup_db2locssh completed successfully
```

The pair of RSA public and private keys that are generated for the root user for the host sles227 are as follows:

```
sles227:~ # ls /var/db2/db2ssh/root*
/var/db2/db2ssh/root@sles227.priv
/var/db2/db2ssh/root@sles227.pub
```

The DSA public and private keys that are generated for the SSH user (db2ssh1 in this example) for the host sles227 are as follows:

```
db2ssh1@sles227:~/.ssh> ls -rlt
-rw-r--r-- 1 db2ssh1 db2grp1 605 Jun 11 11:46 id_dsa.pub
-rw------ 1 db2ssh1 db2grp1 672 Jun 11 11:46 id_dsa
```

The following setup db2locssh commands generate keys for the other three hosts:

```
sles231:media_path/db2/linuxamd64/utilities #
./setup_db2locssh db2ssh1
DBI1070I Program setup_db2locssh completed successfully.
sles235:media_path /db2/linuxamd64/utilities #
./setup_db2locssh db2ssh1
DBI1070I Program setup_db2locssh completed successfully.
sles239:media_path /db2/linuxamd64/utilities #
./setup_db2locssh db2ssh1
DBI1070I Program setup db2locssh completed successfully.
```

4. Exchange the root public keys, root@*host*.pub, that were generated in the /var/db2/db2ssh directory on each host. After this exchange, every host has the public keys of all other hosts in its /var/db2/db2ssh directory.

In the example of the four hosts sles227, sles231, sles235, and sles239, after the keys are exchanged among the hosts, the following keys are in the /var/db2/db2sssh directory on all the hosts mentioned above

```
ls /var/db2/db2ssh
.metadata .remote_shell_cmd db2locssh db2remssh db2scp
db2ssh.cfg gskit lib32 lib64 root@sles227.priv
root@sles227.pub root@sles231.pub root@sles235.pub
root@sles239.pub
```

- 5. As an SSH user, for example, db2ssh1, create a file called authorized\_keys in the *\$HOME*/.ssh directory, where *\$HOME* is the home directory of the db2ssh1 user.
- 6. Append the contents of each id\_dsa.pub public key from each host to the authorized\_keys file.
- 7. Copy the authorized\_keys file to the *\$HOME*.ssh directory on each host, where *\$HOME* is the home directory of the db2ssh1 user.
- 8. Change the permission of the authorized keys on all the hosts by issuing chmod 644 authorized\_keys.
- 9. On each host, perform the following steps:
  - a. Log in to each host as an SSH user, for example, db2ssh1.
  - b. SSH to all the hosts to check whether you can communicate across all hosts without a password prompt. Examples for the sles227, sles231, sles235, and sles239 hosts follow:

On sles227 as db2ssh1 user (su - db2ssh1)

```
ssh sles227
ssh sles231
ssh sles235
ssh sles239
```

On sles231 as db2ssh1 user (su – db2ssh1)

```
ssh sles227
ssh sles231
ssh sles235
ssh sles239
```

On sles235 as db2ssh1 user (su - db2ssh1)

```
ssh sles227
ssh sles231
ssh sles235
ssh sles239
```

On sles239 as db2ssh1 user (su - db2ssh1)

```
ssh sles227
ssh sles231
ssh sles235
ssh sles239
```

Note : To populate the known\_hosts with both the short and fully qualified host names, authenticate both types of names.

10. Verify the db2locssh utility configuration by issuing the following remote commands as the root user on each host:

For example, the following list shows the commands to issue as the root user on sles227 and the associated output:

/var/db2/db2ssh/db2locssh sles227 'hostname'

The command output is sles227.

• /var/db2/db2ssh/db2locssh sles231 'hostname'

The command output is sles231.

/var/db2/db2ssh/db2locssh sles235 'hostname'

The command output is sles235.

• /var/db2/db2ssh/db2locssh sles239 'hostname'

The command output is sles239.

The following list shows the commands to issue as the root user on sles231and the associated output:

• /var/db2/db2ssh/db2locssh sles227 'hostname'

The command output is sles227.

/var/db2/db2ssh/db2locssh sles231 'hostname'

The command output is sles231.

/var/db2/db2ssh/db2locssh sles235 'hostname'

The command output is sles235.

• /var/db2/db2ssh/db2locssh sles239 'hostname'

The command output is sles239.

The following list shows the commands to issue as the root user on sles235 and the associated output:

/var/db2/db2ssh/db2locssh sles227 'hostname'

The command output is sles227.

• /var/db2/db2ssh/db2locssh sles231 'hostname'

The command output is sles231.

/var/db2/db2ssh/db2locssh sles235 'hostname'

The command output is sles235.

/var/db2/db2ssh/db2locssh sles239 'hostname'

The command output is sles239.

The following list shows the commands to issue as the root user on sles239and the associated output:

• /var/db2/db2ssh/db2locssh sles227 'hostname'

The command output is sles227.

• /var/db2/db2ssh/db2locssh sles231 'hostname'

The command output is sles231.

• /var/db2/db2ssh/db2locssh sles235 'hostname'

The command output is sles235.

/var/db2/db2ssh/db2locssh sles239 'hostname'

The command output is sles239.

# Installing and configuring a DB2 pureScale with db2ssh enabled

Three methods are available to install and configure a DB2 pureScale instance with the db2ssh enabled: the script installation the graphical user interface (GUI) method, and the silent installation.

#### Script installation method

With this method, you install and configure the DB2 pureScale Feature by using the command-line interface. Although the db2\_install command installs all components for the DB2 product that you specify, it does not perform instance creation, DAS creation, or configuration. You might prefer this method of installation if you want to do the configuration after the installation.

To install by using the script installation method:

- 1. From the DB2 media, configure db2ssh and verify its functionality as described in the section "Configuring db2ssh by using the setup\_db2locssh utility".
- 2. Check whether all the hosts meet the minimum requirements for the DB2 pureScale installation by issuing the db2prereqcheck command. (Refer to the knowledge center for details)
- 3. From the media, install the DB2 pureScale Feature by issuing the db2\_install command. An example follows:

```
sles227: # ./db2_install -b /opt/IBM/db2/V10.5 -p server -f
PURESCALE -1 /tmp/install.log -t /tmp/install.trc
```

4. Create an instance by issuing the db2icrt command, providing member and CF details. An example follows:

```
db2icrt -d -instance_shared_dev /dev/sdt -tbdev /dev/sde
-cf sles227 -cfnet sles227-ib0 -m sles231 -mnet sles231-ib0
-u db2inst1 db2inst1
```

5. Extend the DB2 instance by issuing the db2iupdt command to add a member and CF. Examples follow:

```
root@sles227 ~ /opt/ibm/db2/V10.5/instance/db2iupdt -add -m
sles235 -mnet sles235-ib0 db2inst1
The execution completed successfully.
For more information see the DB2 installation log at
"/tmp/db2iupdt.log.17370".
DBI1070I Program db2iupdt completed successfully.
root@sles227 ~ /opt/ibm/db2/V10.5/instance/db2iupdt -add -cf
```

```
sles235 -cfnet sles235-ib0 db2inst1
The execution completed successfully.
For more information see the DB2 installation log at
"/tmp/db2iupdt.log.17372".
DBI10701 Program db2iupdt completed successfully.
```

6. Check that the DB2 software starts on all hosts by issuing the db2start command:

```
db2start
ADM12026W The DB2 server has detected that a valid license for
the product "DB2 Enterprise Server Edition" has not been
registered.
07/16/2013 02:23:20 1 0 SQL1063N DB2START processing was
successful.
07/16/2013 02:23:20 0 0 SQL1063N DB2START processing was
successful.
SQL1063N DB2START processing was successful.
```

### Graphical User Interface installation method

The DB2 Setup wizard provides an easy-to-use GUI for installing DB2 software, including the DB2 pureScale Feature. The interface helps perform initial setup and configuration tasks as well. The DB2 Setup wizard can also create DB2 instances and a response file to duplicate an installation on other machines.

- 1. From the DB2 installation media, configure db2ssh and verify its functionality as described in the section "Configuring db2ssh by using the setup\_db2locssh utility".
- 2. Check whether all the hosts meet the minimum requirements for the DB2 pure Scale Feature installation by issuing the db2prereqcheck command.(Refer to the knowledge center for details)

3. Launch the DB2 graphical installer by going to the SERVER folder on the downloaded product image or to the root directory of the product installation DVD and issue the db2setup command:

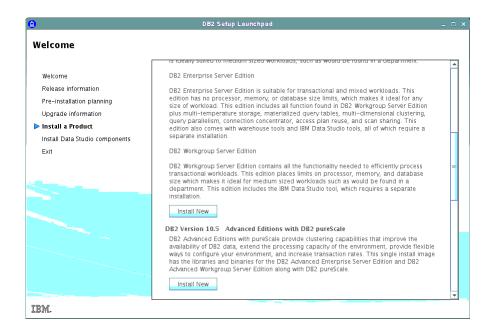
#./db2setup -t /tmp/db2setup.trc -l /tmp/db2setup.log

The following steps show an example of how to use the DB2 setup wizard

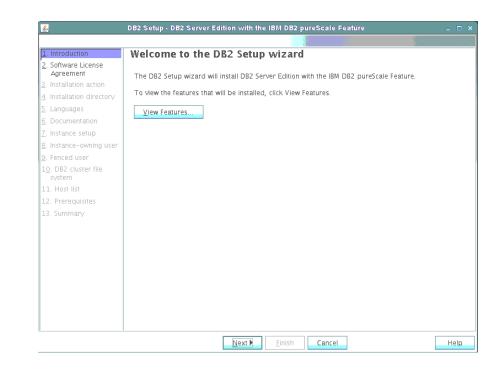
1. In the left pane of the DB2 Setup Launchpad, click Install
 a Product:



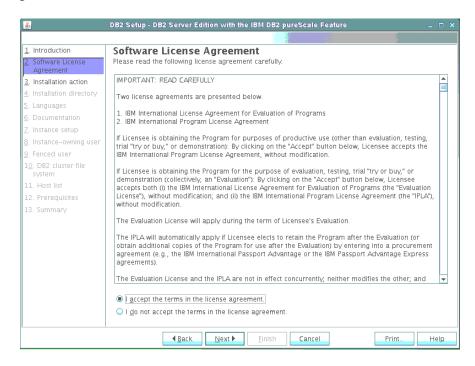
 Under " DB2 Setup Launchpad" panel a, select Advanced Editions with DB2 pureScale, and click Install New:



3. Select "Introduction panel " and click Next:



4. Select "Software License Agreement panel", click I accept the terms in the license agreement and then click Next.



5. Select "Installation action" panel, click **Install DB2 Server Edition with the IBM DB2 pureScale Feature**. (Alternatively, you can save settings in a response file without installing or both install and save settings in a response file.) Click **Next**.

<u></u>	DB2 Setup - DB2 Server Edition with the IBM DB2 pureScale Feature $\_$ $\Box$ X
1. Introduction 2. Software License Agreement	Select installation, response file creation, or both The DB2 Setup wizard can install DB2 Server Edition with the IBM DB2 pureScale Feature on this computer and on all the hosts that you specify as part of the DB2 cluster. Alternatively you can create a response file of all the values entered in this wizard, which you can use later to run the install silently.
3. Installation action	
4. Installation directory	Install DB2 Server Edition with the IBM DB2 pureScale Feature
5. Languages 6. Documentation	Save my installation settings in a response file
<u>7</u> . Instance setup	No software will be installed on this computer.
8. Instance-owning user 9. Fenced user	Install DB2 Server Edition with the IBM DB2 pureScale Feature and save my settings in a response file
1 <u>0</u> . DB2 cluster file system	Response file name /root/db2server.rsp ····
11. Host list	
12. Prerequisites	
13. Summary	
	▲ Back         Mext ▶         Einish         Cancel         Help

6. Select "Installation directory" panel, specify the installation directory for the DB2 binary files. The directory path must exist and be valid on each host. Click Next

<u></u>	DB2 Setup - DB2 Server Edition with the IBM DB2 pureScale Feature
1. Introduction	Select the installation directory
<ol> <li>Software License Agreement</li> </ol>	The DB2 Setup wizard installs DB2 Server Edition with the IBM DB2 pureScale Feature in the following directory on each specified host. The path must be valid on each host. To select a different directory, type the path or click the ellipsis button and select another directory.
<u>3</u> . Installation action	type the path of thet the empsis patton and select another directory.
4. Installation directory	The wizard will install to the specified directory on all the DB2 cluster hosts.
<u>5</u> . Languages	Directory / (opt/ibm/db2//10.5
<u>6</u> . Documentation	Directory /opt/ibm/db2/V10.5 Space required: 2843 MB Space available: 53376 MB
<u>7</u> . Instance setup	
<u>8</u> . Instance-owning user	
<u>9</u> . Fenced user	
1 <u>0</u> . DB2 cluster file system	
11. Host list	
12. Prerequisites	
13. Summary	
	Image: Application of the second s

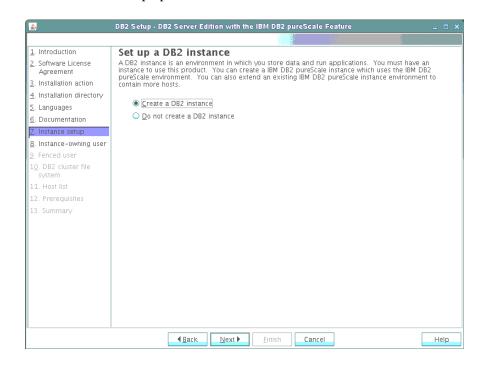
7. Select " Languages" panel, choose the language that you want to use in your environment. Click **Next**.

<u></u>	DB2 Setup - DB2 Server Edition with the IBM DB2 pureScale Feature $\_$ $\Box$ X
Introduction     Software License Agreement     Installation action     Installation directory     Languages     Occumentation     Z. Instance setup     Instance setup     Senced user     10. DB2 cluster file     system     11. Host list     12. Prerequisites     13. Summary	Select the languages to install         You can install the user interface and product messages in several languages.         Available languages         Chinese (Irraditional)         Czech         French (Standard)         German         Confirm installation directory         The wizard will install to the specified directory on all the DB2 cluster hosts.         Directory       /opt/ibm/db2/V10.5         Space required: 2843 MB         Space available: 53376 MB
	▲Back         Next ►         Einish         Cancel         Help

8. Select "Documentation" panel, specify whether you want to access the DB2 Information Center on the IBM website or on an intranet server. You can change the setting after the installation is complete. Click **Next**.

<u>*</u>	DB2 Setup - DB2 Server Edition with the IBM DB2 pureScale Feature
Introduction     Software License     Agreement     Installation action     Installation directory     Languages     Cocumentation	Specify the location of the DB2 Information Center The DB2 Information Center contains documentation for DB2 products. The DB2 Information Center can be accessed on the IBM Web site, installed and accessed on another computer on your intranet, or installed and accessed on a local computer. This setting can also be changed after installation is complete. Select the location from which you will access the DB2 Information Center: © On the IBM Web site
Z. Instance setup 8. Instance-owning user	If you want to install and access the DB2 information Center locally, install the DB2 information Center on this computer from the CD labeled DB2 Information Center.
9. Fenced user 1 <u>0</u> . DB2 cluster file system	On the following intranet server Host name
11. Host list 12. Prerequisites 13. Summary	Port number
	▲ Back     Next ▶     Einish     Cancel

9. Select "Instance setup" panel, click Create a DB2 instance. Click Next



10. Select "Instance-owning user" panel, enter a password for the DB2 instance owner and select the **User For DB2 GPFS Communication** check box. By default, the value of the <db2sshid> user is used, as shown in red. Click **Next** 

<u>s</u>	DB2 Setup - DB2 Server Edition with the IBM DB2	pureScale Feature	_   ×
Introduction     Software License Agreement     Installation action     Installation directory     Languages     Occumentation     Instance setup     Instance-owning user	Set user information for the DB2 Specify the instance-owning user information for the instance functions, and will store instance information instance will be the same as the user name.	D82 instance. D82 will use this in the user's home directory. db2sdin2 db2ladm1	The name of the
<ol> <li>Fenced user</li> <li>DB2 cluster file system</li> <li>Host list</li> <li>Prerequisites</li> <li>Summary</li> </ol>	GID Password Confirm password Home directory Existing User For Instance User name	120 ••• /home/db2sdin2 ····	Use default <u>G</u> D
	✓ User For DB2 GPFS Communication SSH User Name This User will be used for DB2 GPFS Communication If not specified, this will default to instance	db2ssh1 ····	]
	▲ Back Next ► Einish	Cancel	Help

11. Select "Fenced user" panel, enter a password for the fenced user. User-defined functions and stored procedures are run under this user ID and group. Click **Next**.

1. Introduction       2. Software License Agree         2. Installation action       Specify the required information for the fenced user. Fenced user defined functions (UDFs) and stored procedures will execute under this user and group.         (a) Installation directory       (b) New user         (c) Languages       User name         (c) Instance-owning user       (c) UD         (c) Perceduser       GlD         (c) DB2 cluster file syste       Confirm password         (c) Percequisites       (c) Onfirm password         (c) Summary       (c) Existing user	<u>*</u>	DB2 Setup - DB2 Server	Edition with the IBM DB2 pureScale Feature	_ = ×
2. Software License Agre.       Specify the required information for the fenced user. Fenced user defined functions (UDFs) and stored procedures will execute under this user and group.         3. Installation action       Installation directory         5. Languages       User name         6. Documentation       UID         7. Instance-owning user       Group name         8. Instance-owning user       GID         10. DB2 cluster file syste       Password         11. Host list       Confirm password         12. Prerequisites       Home directory         13. Summary       Home directory				
User name 🗾 🔐	Introduction     Software License Agrey     Installation action     Installation directory     Languages     Documentation     Instance setup     Instance-owning user     Pereced user     Io. DB2 cluster file syste     I. Host list     I2. Prerequisites	Set user inform Specify the required infor procedures will execute of Wew user User name UID Group name GID Password Confirm password Home directory	ation for the fenced user         mation for the fenced user. Fenced user defined functions         db2sdfe7         db2fadm1         114         •••         /home/db2sdfe7	(UDFs) and stored
	e I	▲ Back	Next  Einish Cancel	Help

12. Select "S DB2 Cluster File System" panel, specify shared disk and tiebraker disk

- A shared disk partition device path. Use one of the predefined disks to create a shared file system that is used by the DB2 pureScale environment for instance files that are shared across all machines.
- A DB2 cluster services tiebreaker device path. A small disk is enough for the tiebreaker device path.

Click Next.

<u></u>	DB2 Setup - DB2 Server Edition with the IBM DB2 pureScale Feature	
Introduction     Software License Agreement     Installation action     Installation directory     Languages     Documentation     7. Instance setup	Set up a DB2 Cluster File System Setting up a IBM DB2 pureScale environment requires access to a shared file DB2 cluster file system will be used for this purpose. A shared disk partition is required to store shared database data. This pa must be accessible by all hosts. The partition will be used exclusively by th copy and must not have a file system created. Example of a device path is /dev/sdb.	rtition
<ol> <li>Instance setup</li> <li>Instance-owning user</li> </ol>	Shared disk partition device path /dev/sde	
<ol> <li><u>9</u>. Fenced user</li> <li><u>10</u>. DB2 cluster file system</li> <li>11. Host list</li> <li>12. Prerequisites</li> <li>13. Summary</li> </ol>	Mount point //db2sd_20130730190903 DB2 Cluster Services Tiebreaker A shared disk partition is required for cluster recovery purposes. This pa 25 megabytes in size and accessible by all hosts. This partition must be a disk partition specified above. Device path //dev/sdt	
	▲Back Next ► Einish Cancel	Help

13. On the "Host List" panel, specify each participating machine by clicking **Add** and entering the remote host name

1. Introduction	Host List
2. Software License Agrei	Add the hosts that will be part of the IBM DB2 pureScale environment. Hosts will be validated and
<ol> <li>Installation action</li> </ol>	automatically assigned as cluster caching facilities (CFs) or DB2 members as they are added to the list. The cluster interconnect netname refers to the IP address or hostname of the interconnect used for high
1. Installation directory	speed communication between members and cluster caching facilities in the DB2 instance.
. Languages	Host Name Icanon Cluster Interconne
. Documentation	🛃 Add Remote Host 🗙
. Instance setup	sles227 sles227-ib0.i
<ol> <li>Instance-owning user</li> </ol>	sles231 sles231-ib0.i  sles231-ib0.i
<ol> <li>Fenced user</li> </ol>	
1 <u>0</u> . DB2 cluster file syste	Host name sies235
11. Host list	
12. Prerequisites	
13. Summary	OK Cancel Help
	Add Remove Validate Hosts
	cinstance Settings
	Preferred primary cluster caching facility.sles231
	Preferred secondary cluster caching facility.Not assigned
	Number of DB2 members: 1 Advanced

After you add all the participating machines, the panel should look similar to the following one. Click **Next** 

L. Introduction	Host List				
. Software License Agrei			DB2 pureScale environm		
<ol> <li>Installation action</li> </ol>	The cluster interconr	ed as cluster caching nect netname refers ti	facilities (CFs) or DB2 m o the IP address or hostr	embers as they: name of the inte	are added to the list. rconnect used for higi
<ol> <li>Installation directory</li> </ol>	speed communicatio	n between members	and cluster caching facil	ities in the DB2	instance.
5. Languages	Host Name [canon	Cluster Interconne	Cluster Caching Fa	Member	Validation
5. Documentation	sles227	sles227-ib0.i.		~	Successful
Z. Instance setup	31632.27	sieszz7-ib0.i		•	Succession
<ol> <li>Instance-owning user</li> </ol>	sles231	sles231-ib0.i 💌		×	Successful
<u>9</u> . Fenced user	sles235	sles235-ib0.i 🔻	<b>v</b>		Successful
1 <u>0</u> . DB2 cluster file syste					
11. Host list	sles239	sles239-ib0.i 🔽	×		Successful
12. Prerequisites					
13. Summary					
	Add Rem	ve Validate <u>H</u>	osts		
	Jantanan Cattinga				
	Instance Settings—				
	Preferred primary	/ cluster caching facili	ty:sles239		
	Preferred second	ary cluster caching fa	cility:sles235		
	Number of DB2 n	nembers:2			Advanced

14. On the "DB2 pureScale prerequisites Checking" panel, ensure that all the prerequisites are met on all the participating machines:

- 1. Click Verify prerequisites.
- 2. Correct any errors.

Click Next.

<u></u>	DB2 Setup - DB2 Server Edition	with the IBM DB2 pureScale Fea	iture _
1. Introduction     2. Software License Agrei     3. Installation action     4. Installation directory	DB2 pureScale Prereq Run the tool below to ensure that a Verify Prerequisites	uisites Checking all prerequisites for DB2 purescale	are met
<u>5</u> . Languages	Prerequisite	Status	Recommendations
<u>6</u> . Documentation	OPENSSH	×	<b></b>
<u>7</u> . Instance setup <u>8</u> . Instance-owning user	OPENIBD	~	=
<u>9</u> . Fenced user	MODPROBE	×	
1 <u>0</u> . DB2 cluster file syste 11. Host list	SSH	×	
12. Prerequisites	FREESPACE	×	
13. Summary	DISKINFO	✓	
	Export the results of this pre Export	requisite check into a text file	
	<b>▲</b> <u>B</u> ack <u>N</u> €	ext 🕨 Einish Cancel	Help

15. On the Summary" panel, which displays all the instance user settings, including the SSH user name (marked in red in the following screen capture), click **Finish** 

1. Introduction       Start copying files and create response file         2. Software License Agrep       The DB2 Setup wizard has enough information to start copying the program files and create the response file.         3. Installation action       Finish to begin copying files and create the response file.         4. Installation directory       Current settings         5. Languages       DB2 Cluster file system device path: /dev/sde         6. Documentation       Instance setup         8. Instance-owning user       0.2 Cluster file system device path: /dev/sde         9. Fenced user       Instance name:         10. DB2 cluster file syste       Mew instances:         11. Host list       Service name:         12. Prerequisites       Miser name:         13. Summary       UDE:         13. Summary       UDE:         14. How directory:       /home/db2sdin2         15. How directory:       /home/db2sdin2         16. How directory:       /home/db2sdin2         17. Procenting uration:       UDE:         18. Summary       UDE:         19. Decomponent in the directory:       /home/db2sdin2         19. Decomponent in the directory:       /home/db2sdin2         19. Decomponent in the directory:       /home/db2sdfe7         10. Discone user in formation:       <	<u> </u>	DB2 Setup - DB2 Server Edition with the IBM DB2	pureScale Feature	
2. Software License Agret         3. Installation action         4. Installation action         4. Installation directory         5. Languages         6. Documentation         7. Instance setup         8. Instance -owning user         9. Fenced user         10. DB2 cluster file system         11. Host list         12. Prerequisites         13. Summary         13. Summary         13. Summary         14. Host list         15. Summary         13. Summary         14. Host list         15. Summary				
3. Installation action       file. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Finish to begin copying files and create the response file.         4. Installation directory       5. Languages         5. Documentation       Current settings         7. Instance setup       B. Instance-owning user         9. Fenced user       0DB2 cluster file system device path: /dev/sde         10. DB2 cluster file system       CF port: setup contained in the settings, click Back. If you are satisfied with the settings, click Finish to begin copying files and create the response file.         12. DB2 cluster setup       New instances:         13. Summary       CF port: range: could begin copying files and create the response file.         13. Summary       UID: configuration: setup configuration: User name: cluster information: User name: cluster information: CID: configuration: could configur	1. Introduction	Start copying files and create res	ponse file	
<pre>3. Installation action 4. Installation directory 5. Languages 6. Documentation 7. Instance setup 8. Instance-owning user 9. Fenced user 10. DB2 cluster file syste 11. Host list 12. Prerequisites 13. Summary </pre> Find the file setup 13. Summary Finish to begin copying files and create the response file. 4. Instance many files and create the response file. 5. Current settings UB2 cluster file system device path: /dev/sde 10. DB2 cluster file system device path: /dev/sde 11. Host list 12. Prerequisites 13. Summary  Finish to begin copying files and create the response file. 6. Current settings UB2 cluster file system device path: /dev/sde 11. Host list 12. Prerequisites 13. Summary  Finish to begin copying files and create the response file. 6. Current settings UB2 cluster file system device path: /dev/sde 13. Summary  Finish to begin copying files and create the response file. 6. Current settings UB2 cluster file system device path: /dev/sde 13. Summary  Finish to begin copying files and create the response file. 6. Current settings UD2 cluster file system device path: /dev/sde 13. Summary  Finish to begin copying files and create the response file. 6. Current settings UD2 cluster file system device path: /dev/sde 13. Summary  Finish to begin copying files and create the response file. 14. Home directory: //oneg/db2sdfe7  Finish to begin copying files and create the response file.	2. Software License Agrei	The DB2 Setup wizard has enough information to star	t copying the program files and	create the response
<pre>S Languages S Languages D current settings Current settings Lustances: Instance setup Instance owning user F H ow instances: Instance name: Instance name: F H ort range: F H ort: F H ort</pre>	<ol> <li>Installation action</li> </ol>	Finish to begin copying files and create the response 1	rile.	the settings, thick
5. Languages       UB2_CIUSTER SERVICES TIEDREAKER GISK GeVICE path: /dev/sdt         6. Documentation       DB2_Cluster file system device path: /dev/sdt         7. Instance setup       Instance name:         8. Instance-owning user       9. Fenced user         10. DB2_cluster file system device path:       /dev/sde         9. Fenced user       GD000-60005         10. DB2_cluster file system device name:       db2sdin2         9. Fenced user       CF port:       56000         10. DB2_cluster file system device name:       db2c_db2sdin2         11. Host list       Service name:       db2c_db2sdin2         12. Prerequisites       Port number:       50000         13. Summary       UDD:       120         Group name:       db2sdin2       UDD:         UDD:       120       Group name:         Gib:       Language:       db2sdin2         VID:       121       Group name:         UDD:       121       Group name:         Group name:       db2Fadm1       GID:	4. Installation directory	Comment antilana		
6. Documentation       DB2 cluster file system device path: //dev/sde         7. Instance setup       New instances:         8. Instance-owning user       Instance name:       db2sdin2         9. Fenced user       GO000-G0005         10. DB2 cluster file system       CF waragement port:       56000         11. Host list       CF waragement port:       56000         12. Prerequisites       DFort number:       50000         13. Summary       UID:       L20         Group name:       db2sdin2         UID:       L21         Group name:       db2sdin2         USer name:       db2sdin2         UD:       L21         Group name:       db2fadm1         GID:       L14         Ho	<u>5</u> . Languages		VICE DETD: /dev/sdt	
<pre>new instance name: db2sdin2 §. Instance name: db2sdin2 FCH port range: 60000-60005 CF port: 56001 10. DB2 cluster file syste 11. Host list 12. Prerequisites 13. Summary  New instance user information: User name: db2sdin2 VID: 120 Home directory: chome/db2sdin2 SSH User name: db2sh1 Fenced user name: db2sh1 Fen</pre>	6. Documentation			<b>^</b>
8. Instance -owning user       Instance name:       db2sdin2         9. Fenced user       FCW port range:       60000-60005         10. DB2 cluster file syste       CF Management port:       5600         11. Host list       Service name:       db2c_db2sdin2         12. Prerequisites       Port number:       50000         13. Summary       UB2       UID:       120         Group name:       db2sdin2       UID:       121         Group name:       db2sdfe7       UID:       121         Group name:       db2fadm1       GID:       114         Home directory:       /home/db2sdfe7       14       Home directory:	Z. Instance setup	New instances:		
2. Fenced user 10. DB2 cluster file syste 11. Host list 12. Prerequisites 13. Summary 14. Gorban Port number: 15. Summary 15. Summary 16. Summary 17. S	B. Instance-owning user		db2sdin2	
C + port: 55000 10. D82 cluster file syste 11. Host list 12. Prerequisites 13. Summary  C + port: make: db2c_db2sdin2 Port number: 50000 Instance user information: User name: db2iadm1 GID: 120 Home_directory: //one_db2sdin2 SSH User name: db2ssh1 Fenced user information: User name: db2ssh1 Fenced user information: User name: db2ssh1 Fenced user information: User name: db2ssh1 Fenced user information: User name: db2ssfe7 UID: 121 Group name: db2sdfe7 UID: 121 Group name: db2sdfe7 (]utton_coching_focilition: 4	9 Fenced user			
<pre>II. Host list II. Host list II. Host list II. Frerequisites II. Summary II. Host list II. Host l</pre>				
22. Prerequisites       Service name:       db2c_db2sdin2         13. Summary       Port number:       50000         Instance user information:       User name:       db2sdin2         UID:       120         Group name:       db2sdin2         Home directory:       /home/db2sdin2         VSer name:       db2sdin2         UID:       120         Home directory:       /home/db2sdin2         SSH User name:       db2sdre7         UID:       121         Group name:       db2fadm1         GID:       114         Home directory:       /home/db2sdfe7         Cluctor coching facilitior:       III	-		50000	
Instance user information: User name: db2sdin2 UID: 120 Group name: db2iadm1 GID: 120 Home_directory: /home/db2sdin2 SSH User name: db2ssh1 Fenced user information: User name: db2sdfe7 UID: 121 Group name: db2fadm1 GID: 114 Home directory: /home/db2sdfe7 Cluctor coching facilition:				
User name: db2sdin2 UID: 120 Group name: db2iadm1 GID: 120 Home/db2sdin2 SSH User name: db2sh1 Fenced user information: User name: db2sdfe7 UID: 121 Group name: db2fadm1 GID: 114 Home directory: //home/db2sdfe7 Guetor caching facilities: m			50000	
Group name: db2iadm1 GID: 120 Home directory: /bome/db2sdin2 SSH User name: db2ssh1 Fenced user information: User name: db2sdfe7 UID: 121 Group name: db2fadm1 GID: 114 Home directory: /home/db2sdfe7	13. Summary		db2sdin2	
GID: 120 Home directory: Champe/db2sdin2 SSH User name: db2ssh1 Fenced user information: User name: db2sdfe7 UID: 121 Group name: db2fadm1 GID: 114 Home directory: //home/db2sdfe7 Guetor caching facilition: ■		010		
Home directory: //home/db2sdin2 SSH User name: db2ssh1 Fenced user information: User name: db2sdfe7 UID: 121 Group name: db2fadm1 GID: 114 Home directory: //home/db2sdfe7 Clucton coching focilition: III				
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Fenced user information:         User name:       db2sdfe7         UID:       121         Group name:       db2fadm1         GID:       114         Home directory:       /home/db2sdfe7				
User name: db2sdfe7 UID: 121 Group name: db2fadm1 GID: 114 Home directory: //home/db2sdfe7 (luttor caching facilities: III)			db2ssh1	
UID: 121 Group name: db2fadm1 GID: 114 Home directory: /home/db2sdfe7				
Group name: db2fadm1 GID: 114 Home directory: //home/db2sdfe7				
GID: 114 Home directory: /home/db2sdfe7		UID:		
Home directory: /home/db2sdfe7		Group name:	db2fadm1	
		GID:	114	
		Home directory:	/home/db2sdfe7	
				<b></b>
ABack Finish Cancel Hel		Back Finish	Cancel	Help

16. On the "Setup Complete" panel, review the post-installation steps or log file contents by clicking the applicable tab. Click **Finish** 

🛃 Setup Complete _ 🗆 🗙
Setup has completed successfully
If you have not already done so, it is recommended that you complete the post-install steps after installation.
You can also review the log file for more details of the setup process. The setup log files db2setup.log and db2setup.err are located in the /tmp directory.
Post-install steps Log file
Checking license agreement acceptance :Success Installing DB2 file sets :Success Installing or updating DB2 HA scripts for IBM Tivoli System Automation for Wultiplat Installing or updating DB2 Cluster Scripts for IBM General Parallel File System (GPF Installing or updating DB2 SSH Utilities :Success Compiling GPL :Success
Executing control tasks :Success Updating global registry :Success
Click Finish to exit.
Einish

### Silent installation method

You can install and configure the DB2 pureScale Feature by using a silent interface, which refers to using a response file. You can create a response file in the following ways:

- By manually creating a file and typing in values.
- By saving settings while using the DB2 Setup wizard.
- By copying one of the sample response files from the DVD and modifying it. Samples are typically available in the db2/platform/samples directory.

To install silently:

- 1. From the DB2 media configure db2ssh and verify its functionality as described in the "Configuring db2ssh by using the setup\_db2locssh utility" section.
- 2. Check whether all the hosts meet the minimum requirements for the DB2 pureScale Feature installation by issuing the db2prereqcheck command (Refer Knowledge center for details).
- 3. Choose the response file from the media path. In the response file, ensure that the value of the DB2\_INST.DB2SSHID\_USERNAME keyword is the same as the user name that you provided while configuring the db2ssh.
- 4. From the media, install and configure the DB2 pure Scale Feature by issuing the db2setup command with the -r parameter. An example follows:

```
./db2setup -r /root/db2server.rsp -t /tmp/pure.log -t
/tmp/pure.trc
The execution completed successfully.
For more information see the DB2 installation log at
"/tmp/pure.log".
```

# Creating a user-managed GPFS cluster with db2ssh enabled

In a DB2 pureScale environment, all data and logs must be on a GPFS system. The only supported user-managed file system is a GPFS system.

The main way to manage DB2 cluster services is by using the db2cluster utility. The utility acts on both the cluster manager and shared file system cluster of the DB2 pureScale® Feature.

The db2cluster\_prepare utility is a wrapper around the db2cluster utility. You can use the db2cluster\_prepare utility to create a GPFS file system. You can also use the utility to convert a user-managed GPFS file system to a GPFS file system that is managed by the DB2 software. The utility is also helpful for converting an instance that is not a pureScale instance to a pureScale instance.

The following sections show how to use the db2cluster\_prepare and db2cluster utilities to create a user-managed file system with db2ssh enabled.

## Using the db2cluster\_prepare utility

To create a user-managed GPFS file system by using the db2cluster prepare utility:

- 1. From the DB2 media, configure db2ssh and verify its functionality as described in the "Configuring db2ssh by using the setup\_db2locssh utility" section.
- 2. Check whether all the hosts meet the minimum requirements for the DB2 pureScale Feature installation by issuing the db2prereqcheck command. [Refer Knowledge center for details]
- 3. From the media, install the DB2 pureScale Feature by issuing the db2\_install command.
- 4. From the DB2 installation path, run the db2cluster prepare utility. An example follows:

```
root@sles227 ~ /opt/ibm/db2/V10.5/instance/db2cluster_prepare -
instance_shared_dev /dev/sdf -1 /tmp/cluster.log -t
/tmp/cluster.trc
DBI1446I The db2cluster_prepare command is running.
For more information see the DB2 installation log at
"/tmp/cluster.log".
DBI1070I Program db2cluster prepare completed successfully.
```

#### 5. Extend the GPFS cluster, using db2cluster utility. An example follows:

```
sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -create -host
sles227 -domain gpfsdomain
The shared file system cluster has been successfully created.
sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -add -host
sles231
Host 'sles231' has been successfully added to the shared file
system cluster.
sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -add -host
sles235
Host 'sles235' has been successfully added to the shared file
system cluster.
sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -add -host
sles239
Host 'sles239' has been successfully added to the shared file
system cluster.
```

6. Issue the mmlscluster command and ensure db2ssh is configured by looking at value for Remote shell command and Remote file copy command:

```
sles227:/opt/ibm/db2/V10.5/bin # /usr/lpp/mmfs/bin/mmlscluster
GPFS cluster information
_____

        GPFS cluster name:
        db2cluster_20130716012315.in.ibm.com

        GPFS cluster id:
        14512172381151178504

GPFS cluster id:14512172381151178504GPFS UID domain:db2cluster_20130716012315.in.ibm.comRemote shell command:/var/db2/db2ssh/db2locssh
Remote file copy command: /var/db2/db2ssh/db2scp
GPFS cluster configuration servers:
______
 Primary server: sles227.in.ibm.com
  Secondary server: sles231.in.ibm.com
Node Daemon node name IP address Admin node name
Designation
_____
              _____
  1 sles227.in.ibm.com 9.122.215.227 sles227.in.ibm.com
quorum-manager
     sles231.in.ibm.com 9.122.215.231 sles231.in.ibm.com
   2
quorum-manager
  3. sles235.in.ibm.com 9.122.215.235 sles235.in.ibm.com
quorum-manager
  4. sles239.in.ibm.com 9.122.215.239 sles239.in.ibm.com
quorum-manager
```

### Using the db2cluster utility

To create a user-managed GPFS file system by using the db2cluster utility:

- 1. From the DB2 media, configure db2ssh and verify its functionality as described in the "Configuring db2ssh by using the setup\_db2locssh utility" section.
- 2. From the media, install the DB2 pureScale Feature by issuing the db2\_install command.
- 3. Run t db2cluster utility from <InstallPath>/bin/. An example follows:

```
sles227:/opt/ibm/db2/V10.5/bin #./db2cluster -cfs -create -
host hostname1 -domain domainname
    sles227:/opt/ibm/db2/V10.5/bin #./db2cluster -cfs -add -host
hostname2
    sles227:/opt/ibm/db2/V10.5/bin #./db2cluster -cfs -start -all
    sles227:/opt/ibm/db2/V10.5/bin #./db2cluster -cfs -create -
filesystem fsname -disk dev_path -mount mount_point
```

4. On all the hosts in the cluster, issue the mount command and check whether the new file system is mounted on all machines. An example follows:

```
sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -create -host
sles227 -domain gpfsdomain
The shared file system cluster has been successfully created.
sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -add -host
sles231
Host 'sles231' has been successfully added to the shared file
system cluster.
sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -add -host
sles235
Host 'sles235' has been successfully added to the shared file
system cluster.
sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -add -host
sles239
Host 'sles239' has been successfully added to the shared file
system cluster.
```

5. Issue the mmlscluster command. An example follows:

```
sles227:/opt/ibm/db2/V10.5/bin # /usr/lpp/mmfs/bin/mmlscluster
GPFS cluster information
```

```
_____
 GPFS cluster name:gpfsdomain.in.ibm.comGPFS cluster id:14512172381151178504GPFS UID domain:gpfsdomain.in.ibm.comRemote shell command:/var/db2/db2ssh/db2locssh
 Remote file copy command: /var/db2/db2ssh/db2scp
GPFS cluster configuration servers:
    ------
 Primary server: sles227.in.ibm.com
 Secondary server: sles231.in.ibm.com
Node Daemon node name IP address Admin node name
Designation
_____
 1 sles227.in.ibm.com 9.122.215.227 sles227.in.ibm.com
quorum-manager
  2 sles231.in.ibm.com 9.122.215.231 sles231.in.ibm.com
quorum-manager
  3 sles235.in.ibm.com 9.122.215.235 sles235.in.ibm.com
quorum-manager
 4 sles239.in.ibm.com 9.122.215.239 sles239.in.ibm.com
quorum-manager
```

6. Start the GPFS cluster by issuing the following command:

sles227:/opt/ibm/db2/V10.5/bin # ./db2cluster -cfs -start -all
All specified hosts have been started successfully.

7. On all the machines, mount the file system. An example follows:

## Enabling db2ssh logging for AIX operating system

By default, an AIX system does not do syslogging. To enable db2ssh logging for AIX operating system:

1. In the /etc/syslog.conf file (syslog configuration file), add the following lines:

\*.debug /tmp/syslog.out rotate size 10m time 1w files 10 # 10 files, 10MB each, weekly rotate kern.debug /var/log/kern.log rotate files 12 time 1m compress # 12 files, monthly rotate, compress

2. As the root user, issue the following commands. The syslog files must exist before syslogd writes to them.

touch /tmp/syslog.out

touch /var/log/kern.log

3. Restart syslogd by issuing the following command:

refresh -s syslogd

## **Troubleshooting tips**

If you do not follow the best practice procedures in this paper for installing and configuring the DB2 pureScale Feature with db2ssh enabled, you might encounter problems. This section provides some troubleshooting tips to help you to resolve the problems without having to contact IBM support for help.

#### Failure of remote command execution using db2locssh

#### **Error condition:**

sles227: /var/db2/db2ssh/db2locssh <hostname> 'hostname' failure

#### Solution:

If you missed any of the steps for configuring db2ssh or manually changed the contents of the /var/db2/db2ssh directory after successful configurations, you might encounter this error. If so, perform the following steps:

- 1. On each host, check each whether the public keys of all the hosts are in the /var/db2/db2ssh directory. As a <db2sshid>. user, verify SSH from every host to all other hosts without being prompting for a password.
- 2. Check whether the system clocks across all the hosts are in sync. Setting the time delta keyword requires that the system clocks are in sync across the cluster
- 3. If you performed the previous steps but the command still fails, collect system logs and contact IBM support.

#### Changing the value of the db2sshid user to a different user ID

#### **Error condition:**

If you change the <db2sshid> user to a different user ID by using the setup\_db2locssh utility, an error message is returned. For example, assume that you configured the db2ssh to use the db2ssh1 user ID and then tried to configure it to use a different user ID, db2ssh2.

root@sles227 ~./setup\_db2locssh db2ssh2
The following error message is returned:

db2ssh is already configured on the host sles227.in.ibm.com with user db2ssh1  $\,$ 

#### Solution:

- 1. Create the db2ssh2 user on every host in the GPFS domain with the same user ID and password.
- 2. Across all the hosts, configure passwordless SSH for the db2ssh2 user ID.
- 3. On each of the hosts, update the db2ssh configuration by issuing the following command: /var/db2/db2ssh/db2locssh set db2sshid db2ssh2

## Converting GPFS configuration from openSSH to the db2ssh

#### **Error condition:**

Ideally, after you create a DB2 pureScale instance, GPFS uses db2locssh as the remote shell command and db2scp as the remote copy command. However, in some cases, you might get an error or warning during instance creation that indicates that the installer is not able to set the GPFS configuration to use db2ssh.

#### Solution:

1. Check the GPFS configuration by issuing the mmlscluster native command. A sample command and its output below

root@sles227 ~/usr/lpp/mmfs/bin/mmlscluster

```
GPFS cluster informationGPFS cluster name:GPFS cluster id:GPFS UID domain:Remote shell command:/usr/bin/sshRemote file copy command:/usr/bin/scp
```

- 2. Perform one of the following steps:
  - To change the GPFS configuration to use the db2locssh and db2scp commands, issue the mmchcluster command. An example follows:

root@sles227 ~/usr/lpp/mmfs/bin/mmchcluster -r
/var/db2/db2ssh/db2locssh -R /var/db2/db2ssh/db2scp

• To change the GPFS configuration to use openSSH and the scp program instead of the db2locssh and db2scp utilities, issue the mmchcluster command. An example follows:

```
root@sles227 ~/usr/lpp/mmfs/bin/mmchcluster -r
/usr/bin/ssh -R /usr/bin/scp
```

## Instance upgrade failure

#### **Error condition:**

If you try to upgrade a pureScale instance to DB2 Version 10.5, the db2iupgrade command fails if the GPFS configuration does not use the db2locssh and db2scp utilities.

#### Solution:

Before performing the upgrade, perform the following steps:

- 1. Configure db2ssh with the <db2sshid> user, as described in the "Configuring db2ssh by using the setup\_db2locssh utility" section.
- 2. Check whether the GPFS configuration is using openSSH and the SCP program.
- 3. If the configuration is using openSSH and the SCP program, change the configuration to use the db2locssh and db2scp utilities by issuing the mmchcluster command.

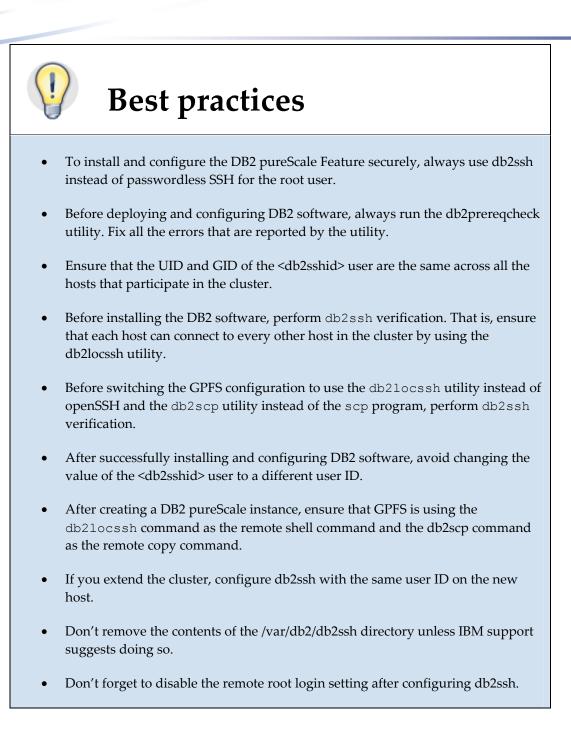
## Removing db2ssh configuration for a user

#### **Error condition:**

If changes to the /var/db2/db2ssh directory resulted in missing keys or file corruption, you must clean up the db2ssh and start fresh.

#### Solution:

- 1. On all the hosts remove all the contents of the /var/db2/db2ssh directory.
- 2. On all the hosts, delete the <db2sshid> user.
- 3. On all the hosts, create a new <db2sshid> user with the same UID and GID.
- 4. Configure the db2ssh with the <db2sshid> user, as described in the "Configuring the db2ssh by using the setup\_db2locssh utility" section.



## Conclusion

Security is a vital aspect of any database management software because the information that is stored in the database is very valuable and sensitive. From DB2 Version 10.5, the DB2 install and cluster utilities have been enhanced to make use of db2ssh (if configured) for pureScale operations. This paper highlights the best practices for installing and configuring the DB2 pureScale Feature in a highly secure way by using the db2ssh, without having to enable passwordless SSH for the root user.

## **Further reading**

- Information Management best practices
   (<u>http://www.ibm.com/developerworks/data/bestpractices/</u>)
- DB2 for Linux, UNIX, and Windows best practices (<u>http://www.ibm.com/developerworks/data/bestpractices/db2luw</u>)
- IBM DB2 Knowledge Center (<u>http://www-</u> 01.ibm.com/support/knowledgecenter/SSEPGG\_10.5.0/com.ibm.db2.luw.kc.doc/ welcome.html)

## Contributors

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