BEAM

Blacknest Data System (BDS)

BdsServer Daemon – 2.2.6 - 2021-05-18

1. Introduction

The BdsServer daemon is at the heart of the BDS system. It is the main program that deals with sensor data and meta data requests. It provides three, network based, API interfaces that client applications use to read, add and administer the Seismic data.

There is one BdsServer daemon running on the master BDS host computer. Normally this host computer also hosts the BDS's MySql database and seismic sensor data store, although this is not required.

2. Usage

The BdsServer is normally started off and system boot time by the bdsServer initialisation script in /etc/rc.d/init.d. It can thus be started and stopped with the following command line commands:

service bdsServer start
service bdsServer stop

The BdsServer daemon runs as the **bds** user to enhance system security. For debugging the bdsServer also takes the following command line arguments:

-f	Run in foreground mode
-d 0x03	Set debug options. This takes a bit mask in hexadecimal form to enable different levels of debug print outs. Please see the source code for more information on the options.
-c <configFile>	Use the provided configuration file

3. Configuration

The BdsServer uses a single text file to define its configuration. It will use, in order of preference, the file as passed in the command lines "-c" argument, the file "bdsServerDebug.conf" if that exists in the current directory, the file "bdsServer.conf" if that exists in the current directory and then the main file /etc/bdsServer.conf.
This configuration file is read when the program starts up. The main /etc/bdsServer.conf configuration file's mode only allows the user **bds** and **root** to access it to provide a degree of protection for the DataBase password. The configuration file has the following parameters defined:

Name	The BdsServer's name
Mode	The BDS start-up mode. Either master or slave.
DataBase.host	The MySql database host
DataBase.user	The MySql database user
DataBase.password	The MySql database password

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DataBase.name	The MySql database name
DocDir	The pathname of a directory to hold documents
DataStoreMin	Minimum disk space in Gigabytes before moving to the next data store
DataStoreFileMin	In addition to the space reserved by DataStoreMin, this parameter defines the extra space needed per open write file in Megabytes.
DataStore0.name	DataStore 0's name
DataStore0.path	DataStore 0's path
DataStore0.readOnly	Sets the data stores status to read-only. The data store will only be used for read data operations. The BdsServer will not use this store for writing new data files.
MaxNumChannels	Max number of channels to return from a data search
MaxNumSamples	Max number of samples to return in formatted data in Mega Samples
MaxTimePeriod	Maximum time period in seconds
SnapshotPauseAlarm	An alarm email is sent if the snapshot pause exceeds this time. 0 disables this feature.
SnapshotPauseTimeout	The maximum time an API call will block during a snapshotPause period. If this time is exceeded an error ErrorTimeout will be returned. If this is set to 0 calls will block indefinitely.
SmtpServer	The SMTP server to use to send emails. Format is: smtp://localhost
LogFile	The log file path
LogPriority	Log any event of this priority or higher
LogEmailFromAddress	The email from address when emails are sent
LogEmailAddresses	The list of email addresses to send emails (comma separated)
LogEmailPriority	Send an email on all log events of this priority or higher
LogEmailRepeatTime	On certain events, such as disk space low, the system will normally send one event. This allows the event to be reset after the given number of seconds. If this vale is set to 0 then the event will be sent on each occurrence (normally every 60 seconds)
TestDiskFree	The disk low level limit in GBytes when warning logs are sent
TestMemFree	The disk low level limit in MBytes when warning logs are sent
TestCpuUse	The CPU maximum usage in % when warning logs are sent

4. Data Stores

The BdsServer stores the seismic sensor data into “Data Stores”. These data stores can be local disk file storage volumes or remote network mounted file storage volumes. The BdsServer can work with any number of data stores. These are configured using the DataStore[0-9].* entries in the configuration file.

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When storing data the BdsServer will check that there is at least DataStoreMin Gigabytes + DataStoreFileMin Megabytes * numWriteFiles free in the current DataStore. If not it will start storing the data in the next available Data Store with sufficient room.

5. Server Mode

The BDS system can operate in one of two modes: master and slave. When in slave mode the BDS system will not allow writes to seismic data files or the database. Any such API calls made by clients will return the error: “ErrorSlaveMode”. The slave system can however service read requests. The default mode of the BDS system at startup is set by the "Mode" parameter in the configuration file. The ModeSet call can only be made by a user with the “control” group privilege. There is a default user of bdsBackup included for this purpose.

6. Snapshot Pause

The BDS system has a mechanism to allow seismic and database data to be backed up in the form of a self-consistent "snapshot", i.e. no changes to the data are allowed to occur while backing up is in progress.

The BDS system can be placed into and out of a Snapshot pause state using the “SnapshotPause” API call. When the BdsServer is commanded to go into the pause state the BdsServer will lock any future write operations and await all current write operations to complete. After this it will make sure all data is synchronised to disk prior to returning from the function call. Following this transition, external programs may make a snapshot of the database and seismic data files. Any subsequent BDS write requests will be blocked until the end of the pause or a timeout that is specified in the configuration files parameter “SnapshotPauseTimeout”. If “SnapshotPauseTimeout” is set to 0, then calls will block indefinitely. If any API call times out an “ErrorTimeout” error will be returned to the client applications. There is also a “SnapshotPuaseAlarm” parameter which will write a message to the system error logs at the time in seconds prescribed if set to a value other than zero. The pause period should be as short as possible to eliminate the likely hood of data loss during import of real-time data. We recommend a maximum time of 120 seconds.

The SnapshotPause call can only be made by a user with the “control” group privilege. There is a default user of bdsBackup included for this purpose.

7. Server Backup

As well as the Snapshot pause system, the BdsServer supports the databaseBackup and databaseRestore API commands. The databaseBackup will backup the current database and server configuration into the current writeable datastore's Backup directory. This API call can be used with the bdsMetadata and bdsControl programs.

The databaseRestore API command can be used to restore a previously backed up BDS database.

8. Error Logs

The BdsServer will output certain error and warning logs to the standard system's syslog daemon. These will normally be written into the /var/log/messages file.

It's main logging method however is to store errors logs into the /var/log/bds/bds.log file and the database

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table Logs. See the “System Administration” manual for more details.

9. Further Information

For further information please look at the BDS system documentation at:
https://portal.beam.ltd.uk/support/blacknest.

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