Rajant BC|Enterprise 11.15.4 Data Migration

The BC|Enterprise 11.15.4 release includes an update to the embedded time-series database used for storing historical metrics (Prometheus). In this release the version of the bundled Prometheus will be upgraded from 1.6 or 1.8 to version 2.12. The on-disk data formats between the 1.x and 2.x releases is not compatible.

Users wishing to retain their BC|Enterprise v11.15.3 (or earlier) data must migrate their existing data to the new format. Upgrading or installing the new version of BC|Enterprise, WILL NOT automatically migrate the existing data, nor will it remove the old data. Migration is a manual process described below.

Off-site Data Migration

The migration process is IO intensive and can take many hours to complete. To make this process less painful for our users, Rajant will provide data migration services at no cost for existing BC|Enterprise customers.

To request data conversion, please open a support request at https://helpdesk.rajant.com/helpdesk/customer-care-1/submit. The support team will respond with instructions on how to proceed.

Step 1: Local Data Migration

For users wishing to attempt a conversion on their own, please follow the steps below:

If you experience repeated errors during the migration process, please open a Support ticket. Rajant Support will most likely ask that you send your data for conversion, rather than attempt to troubleshoot your specific error.

1. Download the BC|Enterprise data conversion bundle from the Rajant Support site (https://secure.rajant.com) and uncompress the archive on the host running BC|Enterprise. The conversion bundle contains two executables

   'pre-migration-tool' - A tool to help determine the amount of data present in the current BC|Enterprise instance

   'prometheus-storage-migrator' - A tool to convert your BC|Enterprise 11.15.3 historical data to the format used in BC|Enterprise 11.15.4

```
C:\> pre-migration-tool -h

Usage of pre-migration-tool:
  -datapath string
    Path to the v1 storage directory. Used to compute data
    size. If data path contains spaces, please enclose path in quotes.
  -url string
    Prometheus URL. Used to determine conversion lookback. (default
"http://127.0.0.1:9090")
```

2. Determine the amount of data for conversion

Windows:

```
C:\> pre-migration-tool
level=info DataPath= C:\Windows\System32\config\systemprofile\AppData\Roaming\
bcenterprise\var\prometheus\data
level=info PrometheusQuery=http://127.0.0.1:9090
level=info msg="Computing lookback"
level=info LOOKBACK=20h0m0s
level=info msg="Computing disk usage"
level=info DISKUSAGE=4.5M
```

Linux :

```
./pre-migration-tool
level=info DataPath=/opt/bcenterpise/var/prometheus/data
level=info PrometheusQuery=http://127.0.0.1:9090
level=info msg="Computing lookback" level=info LOOKBACK=20h0m0s
level=info msg="Computing disk usage" level=info DISKUSAGE=4.5M
```

Note: `--datapath` is only necessary if BC|Enterprise was configured to store data in a non-standard location (See the "Data Directory" value specified on the "Settings" | "Configuration Setting" in BC|Enterprise)

3. Choose a computer to perform the conversion. It is NOT recommended that you run the conversion on the same computer as the running BC|Enterprise instance. This computer should have a minimum of 16GB memory, a fast SSD with 3X as much free space as your time series data set size

```
Ex: TimeSeries disk usage = 4GB
    Minimum SSD Free space = 12GB
```

4. If the computer performing the migration uses the Windows OS, it should have indexing (Windows Search) disabled and all anti-virus services (ex: Windows Defender, MCafee, etc) turned off.

5. If the computer performing the migration uses the Linux OS, you must increase the "User Level File Descriptor Limits"

```
sudo vi /etc/security/limits.conf
```

Add the following at the bottom of the file

```
# FOR Prometheus conversion
#OSMAX = 1048576 - value below is half that amount
-  soft   nofile   524288
-  hard   nofile   524288
```

6. Stop the BC|Enterprise process

7. Copy the time series data to an alternate location - TARGET (preferably on a different computer)

```
Windows:
Robocopy C:\Windows\System32\config\systemprofile\AppData\Roaming\bcenterprise\var\
prometheus\data %TARGET% /e

Linux:
cp –r /opt/bcenterprise/data/var/prometheus/data $TARGET
```

If you are performing the migration on the BC|Enterprise host, skip the next 2 steps.

8. Perform an overlay install with the new version of BC|Enterprise on the BC|Enterprise host.

9. You may start using the new version of BC|Enterprise immediately. The migrated data can be added at a later time.

Step 2: Running the conversion.

Depending on the amount of data, the dimensionality of your data, CPU and IO speed the migration process could take in excess of 24 hours.

1. Create a folder to hold the the BC|Enterprise data

```
Windows:
  md C:\%USER%\bce\data
Linux:
  mkdir ~/bce/data
```

2. Copy the data archived in step 1 to this folder

```
Windows:
  Robocopy $TARGET C:\%USER%\bce\data /e
Linux:
  cp –r $TARGET ~/bce/data
```

3. Navigate to the folder directly above the data directory

```
Windows:
  cd C:\%USER%\bce\
Linux:
  cd ~/bce/
```

4. Create a sibling directory

```
Windows:
  md dataV2
Linux:
  mkdir dataV2
```

5. Copy the "'prometheus-storage-migrator" migration tool from the BC|Enterprise Host to the current directory

6. Execute the migration tool

Windows:

```
  prometheus-storage-migrator -v1-path C:\%USER%\bce\data -v2-path C:\%USER%\bce\dataV2
-lookback $LOOKBACK_TIME
```

Linux:

```
  ./prometheus-storage-migrator -v1-path ./data -v2-path ./dataV2 -lookback
$LOOKBACK_TIME
```

$LOOKBACK_TIME must be replaced with a time duration for the amount of data you wish to keep. The `pre-migration-tool` , executed on Step 3, will display the maximum time duration for your data. The value will be defined in Hour/Mintues/Seconds. `Ex: 8760h0m0s is 1 year of data`

*You are not required to migrate all of the data. If you only wish to keep 3 months of data, set the LOOKBACK_TIME parameter to **2190h0m0s**.*

***CAUTION**: The LOOKBACK _TIME value MUST NOT exceed the age for your data. Incorrectly setting the LOOKBACK_TIME to extend before the start of your data will cause the migration to fail.*

This command will attempt to convert the data in 60 minute chunks for the entirety of your BC|Enterprise data.

The beginning of the migration process will attempt to scan all data files. During the scanning phase no progress in displayed in the console. This process can take a considerable amount time. Please be patient. Output on the screen will be similar to the following.

```
INFO[0000] Loading series map and head chunks...         source="storage.go:428"
INFO[0000] 27070 series loaded.                          source="storage.go:439"
WARN[0001] Storage has entered rushed mode.              chunksToPersist=891
memoryChunks=15893 source="storage.go:1879" urgencyScore=1
INFO[0002] Completed initial partial maintenance sweep through 21772 in-memory fingerprints
in 1.391839982s.  source="storage.go:1408"
INFO[0004] Completed full maintenance sweep through 17378 in-memory fingerprints in
477.875531ms.  source="storage.go:1408"
INFO[0011] Completed full maintenance sweep through 2923 in-memory fingerprints in
120.909701ms.  source="storage.go:1408"
INFO[0012] Stopping local storage...                     source="storage.go:465"
INFO[0012] Stopping maintenance loop...                  source="storage.go:467"
INFO[0012] Maintenance loop stopped.                     source="storage.go:1471"
INFO[0012] Stopping series quarantining...               source="storage.go:471"
INFO[0012] Series quarantining stopped.                  source="storage.go:1919"
INFO[0012] Stopping chunk eviction...                    source="storage.go:475"
INFO[0012] Chunk eviction stopped.                       source="storage.go:1166"
INFO[0012] Checkpointing in-memory metrics and chunks...  source="persistence.go:633"
INFO[0012] Done checkpointing in-memory metrics and chunks in 15.240166ms.
source="persistence.go:665"
INFO[0012] Checkpointing fingerprint mappings...         source="persistence.go:1526"
INFO[0012] Done checkpointing fingerprint mappings in 3.169439ms.
source="persistence.go:1549"
INFO[0012] Local storage stopped.                        source="storage.go:492"
```

When scanning is complete, the process will start migrating individual time series chunks and you will see messages like;

```
1 / 4038    [=>-------------------------------------------]  00.01% 02m23s
…
1323 / 4038 [=======>-----------------------------------]  32.76% 44m23s
level=info msg="write block" mint=1563883200000 maxt=1563890400000
level=info msg="head GC completed" duration=1.559054ms
1329 / 4038 [========>----------------------------------]  32.91% 44m20s
level=info msg="write block" mint=1563904800000 maxt=1563912000000
level=info msg="head GC completed" duration=1.626951ms
...
2691 / 4038 [==========================>-----------------]  66.64% 46m6s
Migration complete.
level=info msg=Done.
```

Eventually, the process should finish with a "Migration complete" message. Do not be surprised if the process percent indicator has not reached 100%, this simply means that the migration tool did not find records for every 60 minute time chunk between now and the beginning of your data.

When the process has completed the dataV2 directory will be populated with a series of randomly named files and directories. These files and directories contain the migrated data.

```
Ex:
dataV2/01DN52QEMAWYT56FAD1THQQHEF/
dataV2/01DN52QEMAWYT56FAD1THQQHEF/meta.json
dataV2/01DN52QEMAWYT56FAD1THQQHEF/index
dataV2/01DN52QEMAWYT56FAD1THQQHEF/chunks/
dataV2/01DN52QEMAWYT56FAD1THQQHEF/chunks/000001
dataV2/01DN52QEMAWYT56FAD1THQQHEF/tombstoned
```

Installing Migrated Data

If you performed the migration on a different host

1. Add the directories and files inside the dataV2 directory to an archive (tar or zip)
2. Copy the archive to the machine running the upgraded BC|Enterprise instance
3. Stop the running BC|Enterprise instance
4. Expand the archive into the existing /data directory

Windows:
```
C:\Windows\System32\config\systemprofile\AppData\Roaming\bcenterprise\var\prometheus\data
```

Linux:
```
tar –xvf datav1.tar /opt/bc_enterprise/data/var/prometheus/data
```

If you performed the migration on the BC|Enterprise host

1. Copy the migrated data to the appropriate location

Windows:
```
Robocopy C:\%USER%\bce\dataV2 C:\Windows\System32\config\systemprofile\AppData\Roaming\
bcenterprise\var\prometheus\data /e
```

Linux:
```
cp –r ~/bce/dataV2/* /opt/bc_enterprise/data/var/prometheus/data
```

2. Install the new version of BC|Enterprise

Verify Data Migration and Clean up

1. Start BCE - your older historical data should now be available. To verify:
   A. Login to BC|Enterprise
   B. Choose "History" from the side bar
   C. Select the dashboard of a Breadcrumb that you know has been running consistently during the timespan for which you converted data.
   D. Using the "TimePicker" on the upper right area of the screen, change the time period to the start date (displayed by the `pre-migration-tool` in Step 2 of Local Data Migration). The historical data should be displayed in the dashboard.

2. Once you have verified the converted data is available it is safe to remove the previous version's data directories. BC|Enterprise can remain running while deleting old data. The naming convention of v1 data is to use a 2 character directory naming convention. The following commands simply remove all directories which have a 2 character name.

Windows:
```
C:\> cd Windows\System32\config\systemprofile\AppData\Roaming\bcenterprise\var\
prometheus\data
C:\...\data> for /d %D in (./??) do rd "%~D"
```

Linux
```
cd /opt/bc_enterprise/data/var/prometheus/data
rm -r ??
```

Note: After restarting BC|Enterprise, the `prometheus` service will begin optimizing the converted data. This is expected and normal. This process will consume some additional CPU and IO resources, but should not have a noticeable effect on BC|Enterprise performance.