

# Moab Insight

Administrator Guide 9.1.0

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# Welcome

Welcome to *Moab Insight 9.1.0 Administrator Guide*.

This guide is intended as a reference for system administrators.

In this guide:

- [Chapter 1 Understanding Insight on page 3](#)
- [Chapter 2 Configuring and Troubleshooting Insight on page 11](#)



## Chapter 1 Understanding Insight

This chapter provides an introduction to Moab Insight and information about Insight's features and functions.

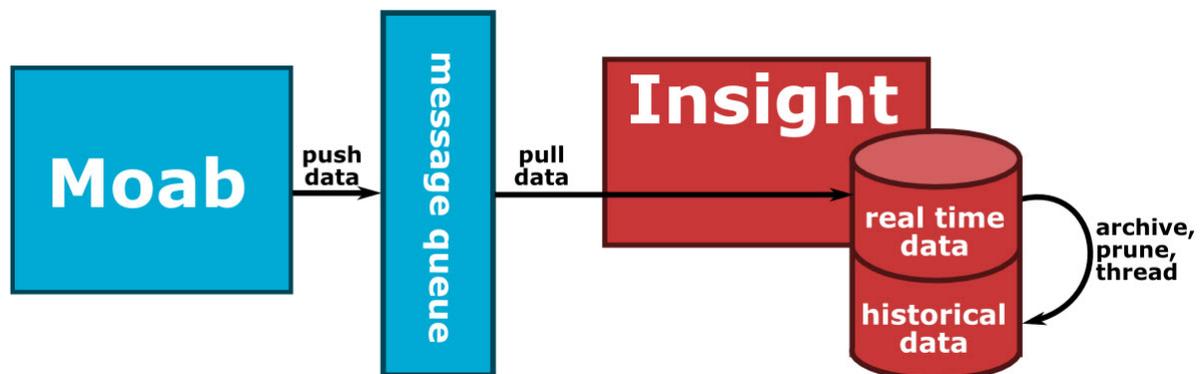
In this chapter:

- [About Insight on page 3](#)
- [The Insight Sample Rate on page 4](#)
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### About Insight

Insight is an optional component of the Moab HPC Suite that collects the data that Moab emits on its message queue and stores it in a database. The message queue is efficient, can be encrypted, and tolerates disconnections and restarts on either side.

You *must* install Insight if you want to use Moab Viewpoint.



Moab publishes a large, coherent snapshot of its object model to the message queue at the end of each scheduling iteration and event-based updates as they occur; for instance, whenever a job starts or finishes. Insight collects this data and writes it to the database. When Moab and Insight experience periods of disconnection, Moab uses a buffer to temporarily save that data. When Insight has resumed listening, Moab will resend the data. You can configure the size of the buffer to suit the needs of your environment. See [Configuring Reliable Message Delivery on page 12](#) for more information.

Insight also takes historical samples of certain aspects of the jobs and nodes stored in Moab's MongoDB database. Moab's Mongo database only stores data

about about the current state of the cluster. Thus completed jobs and deprovisioned nodes quickly disappear from Moab's database. By contrast, Insight's MongoDB database retains both current and historical information including idle, running, and completed jobs. Insight also stores data about currently active and deprovisioned nodes.

To keep the database from growing too large, Insight periodically prunes its database to eliminate stale or expired data. New samples are retained with high temporal granularity. As samples age, they are retained with progressively decreasing granularity. By default, data that is older than two years will be deleted to free resources. You can configure the retention duration to better suite the needs of your environment. See [The Insight Pruning Policy on page 5](#) for more information.

Related Topics

- [Chapter 1 Understanding Insight on page 3](#)

## The Insight Sample Rate

The sample rate is the rate at which Insight samples job, node, and cluster data. This data is used in Viewpoint dashboards, charts, and graphs that show resource utilization over time.

You can make the sample rate as granular as once per minute or as relaxed as once per hour. To maximize the usefulness of samples in statistical analysis and dashboards, ensure that your sample rate divides evenly into 10- and 60-minute intervals. Valid values include 2 minutes, 5 minutes, 10 minutes, 20 minutes, and 30 minutes; but values such as 3 minutes and 15 minutes are invalid.

Insight enables you to tune the sample rate for your environment. See [Tune the Sample Rate on page 4](#) for more information.

Insight also has a pruning policy that manages how long sample data is retained. See [The Insight Pruning Policy on page 5](#) for more information.

### Tune the Sample Rate

You can uncomment and edit the `archiver.schedule` parameter in the Insight configuration file (`/opt/insght/etc/config.groovy`) to tune the Insight sample rate for your environment. The default is:

```
//archiver.schedule = "0 */1 * * * *" // Every minute
```

Specifying the `archiver.schedule` is similar to configuring a Cron job. There are six space-separated fields representing second, minute, hour, day, month, and weekday. You can give month and weekday names as the first three letters of the English names. For example:

```

0 0 * * * * - the top of every hour of every day
*/10 * * * * * - every ten seconds
0 0 8-10 * * * - 8:00, 9:00 and 10:00 every day
0 0/30 8-10 * * * - 8:00, 8:30, 9:00, 9:30 and 10:00 everyday
0 0 9-17 * * MON-FRI - on the hour from 9:00 to 5:00 on weekdays
0 0 0 25 12 ? - every Christmas at midnight

```

**i** Configuring a higher sampling rate than the rate at which Moab conducts scheduling cycles may have little benefit. Moab Workload Manager emits most data to Insight only after it polls the resource managers and schedules jobs. Thus, Moab emits a great deal of the data only after the scheduling cycle completes. See Moab Workload Manager's `MPOLLINTERVAL` parameter for more information.

Configuring Insight to sample more frequently than Moab schedules may result in wasted processing time; not more granular data.

## The Insight Pruning Policy

The Insight pruner controls how large the samples collections (such as `job_samples`, `node_samples`, `system_samples`) in the Insight MongoDB database grow and how far back in time they stretch. Pruning is designed so that recent data is retained at a very high granularity while older data is retained at a lower granularity. By default, after two years data expires and is removed to free up space. Pruning helps prevent the Insight MongoDB database from getting so large that it consumes all resources on the host.

**i** Pruning is performed by the Insight MongoDB. Insight does not have to be running in order for pruning to occur.

The following rules govern temporal granularity in the samples collections.

- Retain minute granularity for the last 60 minutes
- Retain 10 minute granularity for the last 24 hours
- Retain hour granularity for the last seven days
- Retain 6 hour granularity for the last month
- Retain day granularity for up to two years

For the last hour, Insight will retain per minute samples. For data older than one hour, the finest granularity that will be retained is one sample per 10 minutes. Still older data is governed by the rules above.

During the last hour, the samples are retained with one-per-minute granularity; during the last day, with one-per-ten-minutes granularity; during the last week, with one-per-hour granularity; during the last month, with one-per-six-hours granularity; and finally, indefinitely, with one-per-day granularity.

The default Insight pruning policy is complex and states the following: keep minute-by-minute samples back to the beginning of the previous hour; keep 10-minute samples back to the beginning of the previous day; keep hourly samples back to the beginning of the previous week; keep 6-hour samples back to the beginning of the previous day; and keep daily samples forever.

The following is an example of the sample dates that could be present if the local time was 2016-10-28 19:45:00 MST.

```
... // For the last hour one sample per minute is retained
"sampleDate" : "2016-10-28 19:45:00 MST"
"sampleDate" : "2016-10-28 19:44:00 MST"
"sampleDate" : "2016-10-28 19:43:00 MST"
"sampleDate" : "2016-10-28 19:42:00 MST"
"sampleDate" : "2016-10-28 19:41:00 MST"
... // For the last day one sample per 10 minutes is retained
"sampleDate" : "2016-10-28 19:40:00 MST"
"sampleDate" : "2016-10-28 19:30:00 MST"
"sampleDate" : "2016-10-28 19:20:00 MST"
"sampleDate" : "2016-10-28 19:10:00 MST"
... // For the last week one sample per hour is retained
"sampleDate" : "2016-10-27 18:00:00 MST"
"sampleDate" : "2016-10-27 17:00:00 MST"
"sampleDate" : "2016-10-27 16:00:00 MST"
"sampleDate" : "2016-10-27 15:00:00 MST"
"sampleDate" : "2016-10-27 14:00:00 MST"
... // For the last month one sample per 6 hours is retained
"sampleDate" : "2016-10-27 12:00:00 MST"
"sampleDate" : "2016-10-27 06:00:00 MST"
"sampleDate" : "2016-10-27 00:00:00 MST"
"sampleDate" : "2016-10-26 18:00:00 MST"
"sampleDate" : "2016-10-26 12:00:00 MST"
"sampleDate" : "2016-10-26 06:00:00 MST"
"sampleDate" : "2016-10-26 00:00:00 MST"
... // For the last two years one sample per day is retained
"sampleDate" : "2016-09-28 00:00:00 MST"
"sampleDate" : "2016-09-27 00:00:00 MST"
"sampleDate" : "2016-09-26 00:00:00 MST"
"sampleDate" : "2016-09-25 00:00:00 MST"
```

#### Related Topics

- [Chapter 1 Understanding Insight on page 3](#)

## Configuration Values

The `/opt/insight/etc/config.groovy` file contains the configuration values.

The following table identifies and describes the Insight-specific settings that you can change.

Property	Type	Default	Description
<b>archiver.jobs.expireAfterSeconds</b>	Integer	63244800	The number of seconds a completed job will remain in the Insight Mongo database before being pruned.
<b>archiver.jobSamples.expireAfterSeconds</b>	Integer	63244800	The number of seconds a job sample will remain in the Insight Mongo database before being pruned.
<b>archiver.jobStateJournal.expireAfterSeconds</b>	Integer	63244800	The number of seconds a job state journal record will remain in the Insight Mongo database before being pruned.
<b>archiver.nodeHistory.expireAfterSeconds</b>	Integer	63244800	A node that has not been updated in this number of seconds will be pruned from node_history collection in the Insight Mongo database.
<b>archiver.nodeLifeCycleJournal.expireAfterSeconds</b>	Integer	63244800	A node life cycle record older than this number of seconds will be pruned from the Insight Mongo database.
<b>archiver.nodes.expireAfterSeconds</b>	Integer	63244800	A node that has not been updated in this number of seconds will be pruned from the nodes collection in the Insight Mongo database.
<b>archiver.nodesAuxiliary.expireAfterSeconds</b>	Integer	63244800	A node auxiliary record that has not been updated in this number of seconds will be pruned from the Insight Mongo database.

Property	Type	Default	Description
<b>archiver.nodeSamples.expireAfterSeconds</b>	Integer	63244800	The number of seconds a node sample will remain in the Insight Mongo database before being pruned.
<b>archiver.reservations.expireAfterSeconds</b>	Integer	63244800	A reservation that has not been completed in this number of seconds will be pruned from the Insight Mongo database.
<b>archiver.systemSamples.expireAfterSeconds</b>	Integer	63244800	The number of seconds a system sample will remain in the Insight Mongo database before being pruned.
<b>health.stale.threshold.seconds</b>	Integer	300	Insight tables are considered stale if they have not been updated within this many seconds.
<b>insight.port</b>	Integer	5568	Port on which Insight listens for control messages (start, stop, sync, health).
<b>insight.skip.database.migration</b>	Boolean	false	If true, Insight will skip migrating data written by older versions of Insight to the current database schema.
<b>moab.dataPort</b>	Integer	5574	Port on which Insight listens for incoming messages from Moab.
<b>moab.mongo.databaseName</b>	String	moab	The MongoDB database name to use for Moab.
<b>moab.mongo.host</b>	String	127.0.0.1	The MongoDB host to use for Moab.

Property	Type	Default	Description
<b>moab.mongo.password</b>	String	secret4	(Optional) The password to use when connecting to MongoDB for Moab.
<b>moab.mongo.port</b>	Integer	27017	The MongoDB port to use for Moab.
<b>moab.mongo.username</b>	String	insight_user	(Optional) The username to use when connecting to MongoDB for Moab.
<b>mongo.databaseName</b>	String	insight	The MongoDB database name to use for Insight.
<b>mongo.host</b>	String	127.0.0.1	The MongoDB host to use for Insight.
<b>mongo.password</b>	String	secret4	(Optional) The password to use when connecting to MongoDB for Insight.
<b>mongo.port</b>	Integer	27017	The MongoDB port to use for Insight.
<b>mongo.username</b>	String	insight_user	(Optional) The username to use when connecting to MongoDB for Insight.
<b>moab.reliabilityPort</b>	Integer	5575	Port used for reliable message delivery between Moab and Insight.
<b>messageQueue.secretKey</b>	String	_	Base64-encoded AES key used to encrypt messages sent from Moab to Insight.
<b>worker.count</b>	Integer	20	The number of worker threads Insight will use to process messages from Moab.

Related Topics

- [Chapter 1 Understanding Insight on page 3](#)

## Chapter 2 Configuring and Troubleshooting Insight

This chapter provides procedures for customizing and troubleshooting Insight.

In this chapter:

- [Tuning Insight for Your System on page 11](#)
- [Configuring Reliable Message Delivery on page 12](#)
- [Troubleshooting on page 13](#)

### Tuning Insight for Your System

This topic provides information to tune your configuration to keep pace with Moab Workload Manager.

In this topic:

- [Available Hardware on page 11](#)
- [Java Runtime Environment on page 11](#)

#### Available Hardware

The number of threads Insight uses to process messages from Moab can be adjusted by changing the **worker.count** parameter in `/opt/insight/etc/config.groovy`.

If the Insight Server Host has many processors you may want to consider increasing the number of threads. For example, if the Insight host has 16 cores you may consider configuring 4 threads per core.

```
// 16 cores * 4 threads per core = 64 cores  
worker.count = 64
```

**i** Once you have changed this value you will need to restart Insight for the changes to take effect.

#### Java Runtime Environment

Insight should be run on Oracle® Java® Runtime Environment (JRE) version 8.

Normally Insight will fail to start and will log an error to `/opt/insight/log/insight.log` if run on an unsupported JRE. The following is a sample error message:

```
java.lang.Exception: Unsupported Java Virtual Machine (OpenJDK 64-Bit Server VM): see
the Requirements section of the Insight Installation Guide.
```

This verification check prevents you from accidentally using a JRE which is known to have problems with Insight. However, there may be times when you want to force Insight to run on an unsupported JRE. This might happen if a supported JRE is not available for your platform. In these cases you tell Insight to skip the JRE verification check by setting the `insight.skip.jre.verification` parameter in the `/opt/insight/etc/config.groovy` configuration to "true". For example:

```
insight.skip.jre.verification = true
```

**i** By default, Insight sets its `JAVA_HOME` environment variable to `/user/java/latest`. To use a different JRE, edit `/opt/insight/etc/insight.conf` and change the value of `JAVA_HOME`.

#### Related Topics

- [Chapter 2 Configuring and Troubleshooting Insight on page 11](#)

## Configuring Reliable Message Delivery

### Context

Moab and the Insight daemon gracefully handle disconnects or restarts. If you restart Moab, you do not have to restart Insight. To handle instances of disconnect, or downtime, Moab stores all data it attempts to send to Insight in memory and on disk. Once Moab generates enough data to meet the maximum storage size, it begins to delete the oldest data and make room for the new data. The size of the data on the disk is two times the maximum storage size. By default, the maximum storage size is 1 GB with 2 GB max on disk. You can customize the storage size for your unique environment.

### To configure reliable message delivery

1. Open the Moab configuration file on the Moab head node and set the **INSIGHTSTORESIZE** and **INSIGHTSTOREDIR** configuration parameters. See Appendix A: Moab Parameters in Moab Workload Manager for parameter information.

```
[moab]$ vi /opt/etc/moab
...
INSIGHTSTORESIZE 2048 # 2 GB store size with 4 GB on disk
INSIGHTSTOREDIR /tmp/insight_store
...
```

If **INSIGHTSTOREDIR** is a relative path, the Moab home directory is prepended to it. It uses the given path if it is an absolute path.

2. Restart Moab in order for the new configuration parameters to take effect.

Related Topics

- [Chapter 2 Configuring and Troubleshooting Insight on page 11](#)

## Troubleshooting

This topic contains information on troubleshooting and resolving issues.

- [Remove node or job from Insight](#)
- [Sync Insight database with Moab database](#)

### Remove node or job from Insight

To remove a node or job from the Insight MongoDB database use:

```
/opt/insight/utils/delete-objects-from-db.py
```

**i** Run `delete-objects-from-db.py -h` for more usage information.

### Sync Insight database with Moab database

**i** This procedure lets you force a sync of the Insight database with the Moab database. For example, if Insight has been down for more than two days.

To temporarily stop all traffic to Insight and sync all jobs in the Insight database with the jobs in the Moab database use:

```
/opt/insight/utils/sync.py
```

Related Topics

- [Chapter 2 Configuring and Troubleshooting Insight on page 11](#)

