Performance Tuning Guidelines for PowerExchange for Cloud Applications for PowerCenter

Abstract

Use PowerExchange for Cloud Applications to read data from or write data to multiple data sources. Multiple factors such as hardware parameters, Informatica Cloud Agent system configuration parameters, and PowerCenter mapping parameters impact the adapter performance. You can optimize the performance by tuning these parameters appropriately. This article describes general reference guidelines to help you tune the performance of PowerExchange for Cloud Applications mappings.

Supported Versions

- PowerExchange for Cloud Applications 9.6.1 HotFix 4

Table of Contents

Overview

Performance tuning is an iterative process in which you analyze the performance, use guidelines to estimate and define parameters that impact the performance, and monitor and adjust the results as required.

This document describes the key hardware, Informatica Cloud Agent system configuration parameters, and PowerCenter mapping parameters that you can tune to optimize the performance of PowerExchange for Cloud Applications.

Note: The performance testing results listed in this article are based on observations in an internal Informatica environment using data from real-world scenarios. The performance of PowerExchange for Cloud Applications might vary based on individual environments and other parameters even when you use the same data.

Performance Tuning Areas

You can optimize the performance of Cloud Applications mappings by tuning the following areas:

- Hardware
- Cloud Agent system configuration parameters
- PowerCenter session
- PowerCenter mapping

Tune the Hardware

You can tune the following hardware parameters to optimize the performance of the machine where the PowerCenter Integration Service runs:

- CPU frequency
- NIC card ring buffer size

CPU Frequency

Dynamic frequency scaling adjusts the frequency of the processor on-the-fly either for power savings or to reduce heat. Ensure that the CPU operates at least at the base frequency.

When CPUs are underclocked, where they run below the base frequency, the performance degrades by 30% to 40%. Informatica recommends that you work with your IT system administrator to ensure that all the nodes on the cluster are configured to run at their supported base frequency.

To tune the CPU frequency for Intel multicore processors, perform the following steps:

1. Run the lscpu command to determine the current CPU frequency, base CPU frequency, and the maximum CPU frequency that the processor supports.
2. Request your system administrator to perform the following tasks:
    a. Increase the CPU frequency to the supported base frequency.
    b. Change the power management setting to **OS Control** at the BIOS level.
3. Run CPU-intensive tests to monitor the CPU frequency in real time and adjust the frequency for improved performance. On Red Hat operating systems, you can install a monitoring tool such as cpupower.
4. Work with your IT department to ensure that the CPU frequency and power management settings are persisted even for future system reboots.

NIC Card Ring Buffer Size

NIC configuration is a key factor in network performance tuning. When you deal with large volumes of data, it is crucial that you tune the Receive (RX) and Transmit (TX) ring buffer size. The ring buffers contain descriptors or pointers to the socket kernel buffers that hold the packet data.

You can run the ethtool command to determine the current configuration. For example, run the following command:

```
# ethtool -g eth0
```

The following sections show a sample output:

```
Ring parameters for eth0:
Pre-set maximums:
RX: 2040
RX Mini: 0
RX Jumbo: 8160
TX: 255

Current hardware settings:
RX: 255
RX Mini: 0
RX Jumbo: 0
TX: 255
```

The **Pre-set maximums** section shows the maximum values that you can set for each parameter. The **Current hardware settings** section shows the current configuration details.

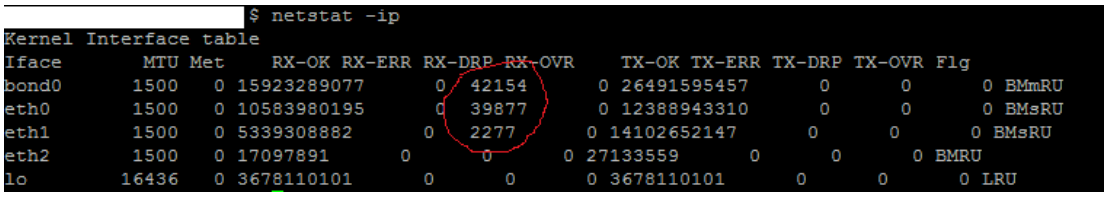
A low buffer size leads to low latency. However, low latency comes at the cost of throughput. For greater throughputs, you must configure large buffer ring sizes for RX and TX.

Informatica recommends that you use the ethtool command to determine the current hardware settings and the maximum supported values. Then, set the values based on the maximum values that are supported for each operating system. For example, if the maximum supported value for RX is 2040, you can use the ethtool command as follows to set the RX value to 2040:

```
# ethtool -G eth0 RX 2040
```

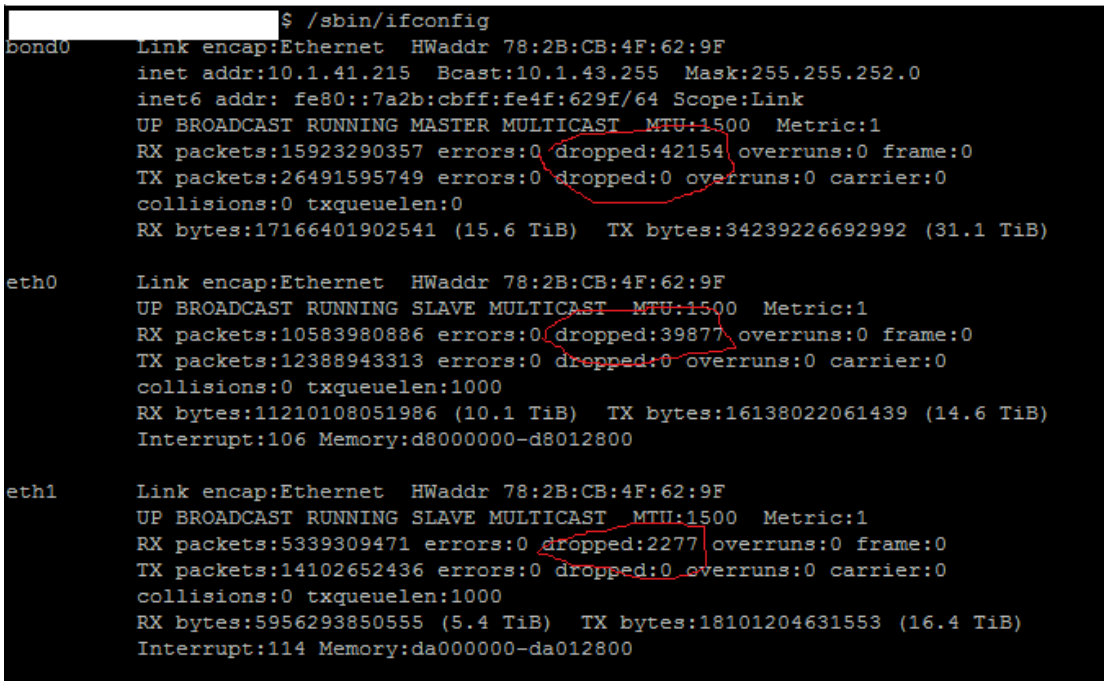
If you set a low ring buffer size for data transfer, packets might get dropped. To find out if packets were dropped, you can use the netstat and ifconfig commands.

The following image shows a sample output of the netstat command:



The RX-DRP column indicates the number of packets that were dropped. Set the RX value such that no packets get dropped and the RX-DRP column shows the values as 0. You might need to test several values to optimize the performance.

The following image shows a sample output of the ifconfig command:



The status messages indicate the number of packets that were dropped.

Tune the Cloud Agent System Configuration Parameters

You can add performance tuning parameters to the `caas.config` file to enhance the performance. The `caas.config` file is available on the system where the PowerCenter Integration Service is installed, in the following directory:

```
<Informatica installation directory>\server\bin\javalib\449304
```

Add the following parameters to the instanceName option to tune the mapping performance:

- `bufferSize`
- `blockSize`

The following snippet shows the parameters added to the instanceName option:`"instanceName":"Informatica Connectivity as a Service","bufferSize":1024,"blockSize":102`

Save the file after adding the parameters. The value for bufferSize and blockSize is in MB. The recommended bufferSize is 1024MB.

By default, the blockSize is equal to 1/10th of the bufferSize. These settings are applicable to all PowerCenter sessions configured for PowerExchange for Cloud Applications.

The Buffer Size setting specifies the amount of memory that the Informatica Cloud Agent uses as DTM buffer memory. When you increase the DTM buffer memory, the Informatica Cloud Agent creates more buffer blocks, which improves performance during momentary slowdowns.

You can set the Buffer Block Size based on the row size of data. If you do not know the approximate size of the rows, choose the largest precision of all the source and target precisions for the total precision in the buffer block size calculation. The total precision represents the total bytes needed to move the largest row of data. For example, if the total precision equals 33,000, then the Informatica Cloud Agent requires 33,000 bytes in the buffer block to move that row. If the buffer block size is only 64,000 bytes, the Informatica Cloud Agent cannot move more than one row at a time.

The bufferSize and blockSize parameters defined in the `caas.config` file are used by Informatica Cloud Agent to improve the performance of PowerExchange for Cloud Applications. It does not impact the PowerCenter session level configuration or performance.

Tune the PowerCenter Session

You can set the buffer memory at the session level in PowerCenter. When the PowerCenter Integration Service initializes a session, it allocates blocks of memory to hold source and target data. The PowerCenter Integration Service allocates at least two blocks for each source and target partition. Sessions that use a large number of sources and targets might require additional memory blocks. If the PowerCenter Integration Service cannot allocate enough memory blocks to hold the data, it fails the session.

For more information about how to set the buffer memory, see the *PowerCenter Advanced Workflow Guide* and *PowerCenter Performance Tuning Guide*.

Tune the PowerCenter Mapping

You can tune the following parameters at the mapping level in the Designer Tool to optimize the performance:

- Ports precision
- Data movement mode
- Data type mapping

For more information, see the *PowerCenter Performance Tuning Guide*.

Ports Precision

Precision is the maximum number of significant digits for numeric data types, or maximum number of characters for string data types. For numeric data types, precision includes scale.

You can tune the precision in Model repository mappings.

When mappings contain ports with a larger precision than required, the mapping performance degrades. Informatica recommends that you set the precision judiciously for all source ports, transformation ports, and target ports. For instance, if a string port can handle data of a maximum of 200 characters, set the precision to 200. Do not set the precision to a high value such as 1000.

Data Movement Mode

When you run mappings on the Integration Service, the logical Data Transformation Manager (LDTM) component of the Integration Service determines whether to use the ASCII or Unicode data movement mode for mappings that read from a flat file or relational source. The LDTM determines the data movement mode based on the character set that the mapping processes. When a mapping processes all ASCII data, the LDTM selects the ASCII mode. In ASCII mode, the Integration Service uses one byte to store each character, which can optimize mapping performance. In Unicode mode, the Integration Service uses two bytes for each character.

For more information about the data movement mode, see the "PowerCenter Integration Service Architecture" chapter in the *Informatica Application Service Guide*.

Data Type Mapping

When the Integration Service reads source data, it converts the native data types to the comparable transformation data types before transforming the data. When the Integration Service writes data to a target, it converts the transformation data types to the comparable native data types.

When you map source ports to transformation ports and then to target ports, avoid unnecessary data type conversions. For instance, do not map a port of the string data type to a port of the date data type. Ensure that you map ports to the same data type in all components of the mapping. Also, remove all unconnected ports from the mapping.

Authors

Vivek Patel
Lead QA Engineer

Chanchal Das
Lead Technical Writer