Gplus for WFM Adapter

Hardware and Software Requirements – 7.2

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Contents

1 Overview

Welcome to the Gplus *Adapter for WFM Hardware and Software Requirements*. This a generic guide to the installation requirements for the family of G*plus* Adapters for Workforce Management (WFM).

This document is valid only for the 7.2releases of this product.

Note: For versions of this document created for other releases of this product, visit the Genesys Technical Support website.

1.1 About G*plus* Adapter for WFM Requirements

The G*plus* Adapter for WFM refers to the four products that provide integration between four vendor Workforce Management systems and Genesys routing. Presently, there are G*plus* Adapter versions for the following WFM vendors:

- Aspect
- IEX (NICE)
- Teleopti
- Verint

While there are slight differences in performance between the different vendor versions of the G*plus* Adapter, this guide presents requirements that are suitable for all four.

2 Supported Genesys Versions

Uses:

- Configuration Platform SDK - 8.5
- Open Media Platform SDK - 8.5
- Voice Platform SDK - 8.5
- Management SDK - 8.5

Supports:

- Framework 7.6 - 8.5 for Voice TServer/SIPServer
- Framework 7.6 - 8.5 Email through Interaction Server
- Framework 8.0 - 8.5 Chat/iWD/OpenMedia through Interaction Server
- Outbound Contact Server (OCS) 7.6 - 8.5
- Outbound Contact Server (OCS) 8.0 - 8.5 for Push Preview Campaigns

Required for 8.1 multimedia VQ event parsing:

- Orchestration Server Version 8.1.200.40
- Universal Routing Server Version 8.1.200.22

3 General Requirements

A discovery session with Professional Services is always recommended to finalize system design and configuration. The following are some of the considerations that impact performance and design decisions:

- Number of concurrent agents
- Number of streams the adapter will support
- Call patterns and peak loads
- Call routing
- Temporary data retention needed for historical reports.
- Hardware platform selected.
- Genesys system architecture.
- WFM reporting requirements and considerations.

The G*plus* WFM Adapter is standalone Java application that provides both Real Time Adherence (RTA) and Historical data feeds to Workforce Management (WFM) applications. A single instance of the G*plus* Adapter on a dedicated server can be expected to support up to 2 million calls per day.

Multiple instances of the G*plus* Adapter can be distributed between multiple servers to scale the application for larger, distributed call centers. A single Adapter also has the capability to provide multiple Historical and RTA data "streams".

3.1 Supported Java Version

Java 17 is recommended (a minimum of Java 11 is required) to run this version of the G*plus* Adapter for optimal performance and compatibility. Version 7.2 not backwards compatible to Java versions earlier than Java 11.

3.2 Supported Operating Systems

Java gives the application some isolation from the underlying operating system on the server but there are still dependencies. The G*plus* Adapter has only been installed and tested against the Java 17 and Java 11 versions on Linux and Windows.

- Microsoft - Windows Server 2012 and higher (64 bit)
- Linux – Red Hat 6.x – 8.x (64 bit)

Note: The Adapter supports integration with the Solution Control Server. Determining a supported operating system should also consider that the Genesys Local Control Agent (LCA) must also be installed on the same server. Oracle added supported Java versions for Linux on ARM and Mac in Java 7 but Genesys does not presently support either of those operating systems.

3.3 Supported Hardware

The supported hardware is essentially determined by the servers that can run a supported version of Java on one of the operating systems listed above. This restricts the supported hardware to one of Intel x86 or AMD processors.

4 Performance Considerations

Despite the fact that the 5.0 and later versions of the G*plus* Adapter now retain all of the call/interaction information in memory, the peak memory requirements for the new versions are significantly reduced. This is relevant because memory depletion during high load was the usual mode of failure when the event processing cannot keep pace with the events arriving from the monitored servers.

Prior versions dealt with this constraint by increasing the memory allocation to reduce the likelihood of an `OutOfMemory` error but Versions 5.0 and greater were designed to reduce the fluctuations in utilized memory associated with report generation.

4.1 Data Collection

Received voice, Open Media interaction and agent events are buffered in a queue and processed in the order that they arrive. It is the growth of this event queue that causes the memory depletion and eventual failure if the event processing cannot keep up with the event stream from the connected Configuration Server, TServer(s), SIPServer(s) and Interaction Server(s).

It should be noted that other media do not usually have the event frequency associated with voice calls and the memory depletion described above is typically only a factor with high volume call centers.

The heap memory size for the JDK will determine the length of time that the higher call volumes will be handled safely as the calls are buffered until they can be processed. More available memory allows for more calls to be buffered.

4.2 Streams

Streams were introduced in Version 5.1 to reduce the number of adapter instances required to provide data to multiple WFM vendor application instances. One adapter is capable of supplying more than one individually configured Historical or RTA data stream while still only using one connection to each of the monitored TServers, SIP Servers, Interaction Servers or Configuration Servers.

There is a significant reuse of resources when an Adapter instance is implementing more than one data Stream but it may be necessary to increase the memory available to the Adapter as there is some memory overhead associated with each stream instance.

Load tests with high call volumes found that a single adapter could only support 4 streams reliably. It should be noted that the test call volumes for each stream were in the order of 15 calls per second.

4.3 Report Generation

Report generation had been the bottleneck in prior versions as the embedded database dealt with high volumes of data in unexpected ways; none of them positive. Under high call volumes, the database would slow and the reports could take several minutes in some instances. This problem has been eliminated with the removal of the database in Version 5.0. Reports that could take minutes in prior versions now complete in seconds.

While the time taken to generate the reports will still cause some backup of the event queue with the associated increase in utilized memory, the short duration of the report generation limits this memory increase to a minimal and manageable amount. However, call centers with a high call volume will see a

higher memory spike than a call center with a lower call volume and this must be taken into account in the memory allocation.

4.4 Data Retention

Supporting daily summary reports requires the G*plus* Adapter to retain two days of data to ensure that any sessions that started on the prior day are reported correctly. Data older than two days is removed so the amount of memory required for the retained agent and call data should stabilize after a few days of operation,

This retained data will be one of the mostly static portions of the utilized memory that must be taken into account when considering the base memory requirements.

4.5 RTA

Real Time Adherence (RTA) data streams do not represent a significant load or memory requirement in the G*plus* Adapter operation. Adapter instances just producing an RTA stream with no historical reports would not see the brief memory peak associated with Report Generation.

4.6 Configuration Memory

The G*plus* Adapter has used the Genesys Configuration Platform SDK to manage the connection to the Configuration Server since Version 4.5. The G*plus* Adapter relies on change notifications from the Configuration Server to maintain its configuration state and it retains all of that state in memory. This configuration state includes all of the monitored DN, Place and agent information.

The configuration state represents another static block of utilized memory that should remain reasonably consistent during the normal adapter operation. Call centers with a large number of agents (> 5,000) may require more memory than the default 4GB for the JVM memory allocation.

Configuration Server queries have been improved so that *disabled* configuration objects are no longer included. This may represent a significant reduction in the amount of memory allocated depending upon the number of those objects retained in the Configuration Server database.

4.7 Logging and Disk Drive Space

The G*plus* Adapter logging is reasonably verbose and the log files can consume a significant amount of the storage drive.

The adapter can be configured to produce archived log files but even those files start to get large in a very busy call center. Up to 2 - 3 GB of archived log files could be generated for each day that the adapter is running. The total amount of space used by the adapter logs can be configured but any decision as to the maximum size must also include the number of days for which adapter logs are to be retained.

The removal of the embedded database has meant that a persistence mechanism had to be added so that the Adapter could still generate the daily summary report in the event of a mishap. Recovery logs were added to provide persistence; they are not intended to be viewed by operating personnel. These logs are "played back" when the adapter is restarted and the adapter is returned to the state immediately prior to the mishap. The recovery logs are compressed but a large call center could still

see 2 GB of logs created daily. The adapter retains 7 days of these logs and automatically removes the older logs.

4.8 Virtual Images

While it is quite possible that the G*plus* Adapter can be run on a Virtual Machine successfully, it is also necessary to ensure that the G*plus* Adapter is running in a Virtual Image that meets the hardware/software requirements discussed in this document. Problems have been noted with virtual storage when the disk image is contained on a remote storage array rather than the local hard drive. Latency can affect the logging efficiency and reduce the Adapter's performance.

Installing the G*plus* Adapter in a Virtual Image puts the onus on the customer to ensure that the environment meets the minimum requirements and is not detrimentally affecting the G*plus* Adapter.

4.9 Scaling

As has been noted, the most significant performance factor is the number of calls or interactions that the call center handles daily. If the predicted call center load is less than 2 million calls per day and the number of agents is less than 20,000, it is likely that the G*plus* Adapter will run satisfactorily if the requirements listed in the next section are met. Increasing either of these numbers would necessitate design decisions beyond the scope of this document and it is recommended that Professional Services be contacted.

5 Storage requirements

5.1 Resource recommendations

- Memory consumption is proportional to the size of the customer's Configuration Server database.
- Standard operating resources are substantially lower; however, spikes can occur due to environment issues, such as server disconnects, which can cause significant memory and CPU load.

Storage estimates

Agents	Memory	CPUs
< 5k concurrent	4 GB	1 CPU
5k - 10k concurrent	8 GB	1 CPU
10k+	12 GB	2 CPUs

These estimates were compiled under the following scenarios:

Media type	TServers only	TServers and Interaction Servers
Voice calls	60 interactions / second	20 interactions / second
Emails	-	20 emails / second

- These volumes are per historical stream. For example, 5 interactions per second with three reporting streams should be considered as 15 interactions per second. RTA streams do not contribute substantially to resource requirements.
- These tests were conducted with 8 GB RAM, 1 CPU at a speed of 2.7GHz, 100k concurrent agents, and clean routing (mostly an issue for multimedia interactions on Interaction Server).

5.2 Storage sizing calculator

The adapter retains recovery logs for 7 days. The recovery logging for the adapter stores the full data for every event it receives from Configuration Server, Interaction Server and TServer. Customers will need to provide enough storage to handle 7 days of TServer and Interaction Server event data. In addition, the adapter downloads a fresh copy of all CME data daily from Configuration Server. A rough approximation for how much storage is required for a week's worth of recovery logs can be expressed with the following formula:

```
Storage = 7 × (EventSize × #Events + CMESize) × Compression × Padding
```

Storage: The amount of storage required by the adapter.

EventSize: The average size of TServer/Interaction Server events in Bytes. This depends on the business rules of the contact center and how much user data is being attached to events. A typical value would be in the range of 1-5KB.

#Events: The average number of TServer/Interaction Server events processed in a typical day. This can vary widely depending on the complexity and size of the contact center as well as call volume.

CMESize: The aggregate size of all CME data being monitored by the adapter. The amount of memory taken up by the Configuration Server application can be used as an approximation.

Compression: A multiplier representing the amount of compression of the gzip log files, typically 0.05-0.10.

Padding: A multiplier to provide extra space in case of periods of high activity or unexpected restarts. A value of 2 is recommended.

Example:

To calculate the amount of storage required by a contact center for a week's worth of recovery logs with an average EventSize of 3KB, and 5 million events per day, with a CME size of 1GB:

```
Storage = 7 × (3KB × 5,000,000 + 1GB) × 0. 10 × 2 = 21GB per week
```

5.3 Other storage requirements

The speed and throughput requirements for recovery log storage depend on the amount of logging calculated in the previous section. If the adapter writes 21GB per week then it writes 3GB per day and if most of the logging takes place during the 16 busiest hours of the day, then the adapter will need to write at a rate of:

```
Rate = 3GB ÷ 16hr = 56 MB/s
```

This kind of throughput can be handled by most disk storage providers.

6 Hardware Sizing

6.1 Minimum Requirement

Intel x86

- Core 2 Duo 2.66 GHz or newer processor
- 4 GB RAM
- Minimum 100 GB disk drive space

6.2 Instance Parameters

1. Maximum voice calls per day - less than 2 million.
2. Number of configured agents - less than 20,000.
3. Maximum handled emails per day - less than 25 thousand.
4. Interval reports enabled and generated every 15 minutes.
5. Daily report enabled.
6. RTA enabled.
7. Event logs retained for 10 days.