GH Tester

Release Note

Version 5.4.0

Check the **readme.txt** included with the software distribution for product details that were not available at release time. Further information is available from Green Hat's website – http://www.greenhat.com.

Important Information

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Welcome

Thank you for your time and interest in GH Tester version 5. We hope that it meets your expectations and provides a new and valuable way to test your SOA projects.

This document describes version 5.4.0 of GH Tester, GH Performance and GH VIE. This release contains both product enhancements and fault-fixes and is intended for our entire customer base. The following sections provide an overview of the changes and customers are advised to read through them prior to upgrading to ensure that they get the best from the product.

Since the launch of GH Tester version 5 many new features have been added to help our customers perform testing quickly and efficiently. Green Hat is able to provide refresher training to organizations to ensure that their test teams are using the product to its full capabilities, giving the best return on the investment that has been made. For further details please contact sales using the details on the front page.

This release is built upon our version 5 GH Tester platform. The version 5 platform was designed to make testing much easier and faster than ever before. Here are just some of the benefits that GH Tester 5 provides:

- Different perspectives to suit the task at hand, including Architecture School, Requirements Library, Recording Studio, Test Lab, Test Factory and Results Gallery
- Powerful Recording Studio – ad hoc system triggering and capture of results, and generation of tests, test data, stubs and more from recorded events. Record enterprise messaging technologies such as IBM WebSphere MQ without modifying the system under test
- Create tests using Services, Operations and Message Exchange Patterns, a new way of creating tests quickly from pre-configured information
- Automatically generated project layouts from architecture layout simplifies asset organization. Filtering helps you focus on your part of the project without distractions.
- Diagramming of architectural components and their inter-dependencies
- Testing results persisted in a database and archiving policies implemented automatically. Results publishers to send results to email recipients and document hosting systems
- Synchronization of external resources, such as TIBCO BusinessWorks, SAP, Software AG's webMethods Integration Server and Broker, and WSDLs
- Message Switch action allows selection of different paths depending on message type/content, greatly increases the power of simulation capability with zero coding
- Separate iteration over test data and test steps, allowing nesting of iterations
- Test repair wizard and differencing window to make it quick to correct outdated tests or to modify them to suit operational restrictions
- Test coverage reporting for TIBCO BusinessWorks projects and Software AG Integration Server *
- Integration with leading SOA Governance products, including Software AG's CentraSite8.0 and 8.2*
- Dedicated test stub simulation for high performance scalable component virtualization
- Many useful keyboard shortcuts
- UDDI v3 integration
- Addition of SOAP 1.2 and digital signatures support
- SSL support in JMS

Please note that your current licensing agreement may not entitle you to use the features marked *, or other features described in this release note.

For further information on using the application please consult GH Tester Quick Start Guide, Reference Guide and other supporting documentation.

New, Modified, or Enhanced Features

This section summarizes new features, changes in functionality, or enhancements that have been introduced since GH Tester v5.2.0 was released. Additional information about these features may be found in GH *Tester Reference Guide*, which is included with the release.

New in 5.4.0

NOTE: For users of the HP Quality Center integration, the server distribution package for all versions was updated in GH Tester 5.2.11. For users upgrading from versions earlier than this, the server files should be redeployed into your Quality Center environment according to the instructions in *GH Tester Integration Guide for HP Quality Center*.

NOTE: In GH Tester 5.4.0, the project database was updated to version 1.9.24.d. If you are upgrading from an earlier version of version of GH Tester, you will need to update your schema. This updated schema is required for all clients. Refer to Database Update (later in this document) for more information. GH Tester 5.2.11.x will operate correctly against schema 1.9.24.d. This is to allow customers to upgrade the database first and upgrade clients subsequently.

NOTE: For all versions of Software AG's webMethods Integration Server, the packages provided by Green Hat (GH Processor JAR and Integration Server Adapter) have changed in 5.4.0. If upgrading from 5.2.11.29 or earlier version of GH Tester then **all** webMethods IS users **MUST** follow the new installation instructions in *GH Tester Software AG webMethods Reference Guide.* This will require new JAR files to be deployed and configuration changes to be made.

NOTE: Customers who are using MySQL as the GH Tester Project Database will need to provide the MySQL database driver as it is not shipped with GH Tester. The Library Manager application must be used after installation to tell GH Tester where to find the driver. The driver can be obtained from the MySQL website. Versions between 5.1.10 to 5.1.19 should be used. For information about using Library Manager, refer to *GH Tester & GH Performance Installation & Deployment Guide*.

NOTE: Depending on resources used, once a GH tester project has been loaded into version 5.4.0 it may no longer load correctly in version 5.2.11. Please ensure you have a back-up of your projects before loading them into 5.4.0.

NOTE: For some of the new advanced stubbing and virtualization capabilities, a license for VIE will be required. Please contact your sales team for detailed information.

Stubs and Virtualization

- Major improvements have been made to stubs, making it much easier to virtualize an entire application, rather than treating it as multiple discrete operations. A new editor has been added to make this possible and existing stubs will, where possible, be displayed using this editor. Users can access the old editor if they wish using the Open With…. option on the shortcut menu in the Test Factory perspective.
- Easy persistent data store support has been added through new data model. These can be created and populated by analyzing recorded messages, by hand and from schemas such as XSDs and SWIFT. Stubs can use data models to store and retrieve information to provide rich application virtualization. Data models can also be used to share information.
- Stubs now support Behaviors, pre-built "patterns" that are used to quickly implement common interaction models without the need to reinvent the wheel, such as market data feeds and trading venues.
- GH Tester can publish stubs to the new GH Server where they can be controlled and managed by a wider community of users (such as developers or less technical testers) using a browser-based UI that does not require an installation of GH Tester. GH Server is a separately licensed product allowing users to see at all times what is going on in their Virtualized Integration Environment.

- Database stubs can be created and run for applications that use JDBC to access Oracle, MySQL, DB2 and SQL Server. Users can then switch dynamically between the real and stubbed database versions. This enables users to create and edit "known"' database configurations for development and testing purposes.
- HTTP-based stubs can now be configured to automatically use a different port if their required IP port is in use. This enables a stub to be run on the same computer as the "live" system as it will automatically find an alternative port. This can be achieved without having to reconfigure the client using the stub.
- Stubs are now created with a debug log level by default to log verbosely about their run-time behavior. This enables speedy identification of any problems during development. Once the stub is operating as required, reduce the log level for optimum performance (e.g. before publishing to the GH Server).

Recording Studio

- A new "Save Wizard" enables users to easily create a wide range of assets from recorded events. Users can select multiple disparate events and create requirements, triggers, tests, operations, stubs and data sets. Data models can be created as part of stub creation.
- The Save Wizard supports creation of data-driven tests and stubs, creating a. Test Data Set for the test/stub automatically which contains the data from the events used by the wizard and a test/stub that iterates over or looks-up content from the Test Data Set.
- SQL statements issued by applications that use JDBC drivers against Oracle, MySQL, DB2 and SQL Server databases can be recorded as events. Tests can be created using these events (as SQL actions) by using the Save Wizard in Recording Studio. To enable this, the new Green Hat JDBC driver, included in this release, must be installed and configured correctly.
- A broad range of events can be captured from transports such as HTTP, MQ, EMS and iProcess without the need for knowledge of specific configuration information (e.g. queue names, operations or schemas). These events can then be used to create a variety of assets including operations, tests, stubs and data sets using the new Save Wizard.
- HTTPS is supported for recording and stubbing. This requires GH Server which is a separately licensed component.
- A new window notifies users about issues occurring during the recording process. A yellow warning triangle is displayed in the bottom left of the screen when there are new issues. Double-clicking this triangle will display the warning messages. These warning messages can be cleared out (individually if required) or copied out. A blue exclamation mark icon is displayed on the Event Monitors panel if there is non-critical information available specific to a particular monitor. Clicking this will also display the window.
- GH Tester can now record both TCP and HTTP traffic without requiring the use of the packet capture libraries used in previous releases. This enables TCP and HTTP traffic to be recorded without requiring GH Tester to be installed locally on either the client or server end of the communication. This includes TCP-based protocols such as FIX.
- Events can be saved and loaded back into Recording Studio at a later time, allowing them to be emailed among users, e.g. between a user and a development team making a new formatter.
- New schemas can be dynamically added to captured events, enabling them to be decoded more easily.
- Attempts are made to automatically content-recognize byte streams in events. In many cases this removes the need for users to select schemas to view the correct content.
- Event monitors can be created on the fly ("Ad hoc Event Monitors"), providing a quick and easy way to start recording, and then create operations from these events if needed.
- When users start a recording in the Recording Studio perspective, they are now automatically prompted to add any dependencies of the selected items to the recording if they wish.
- Recording Studio now supports the concept of Data Masking. This enables the suppression of sensitive data from captured events, such as credit card verification and social security numbers. The feature includes referential integrity so real data can be replaced with realistic-looking data consistently across all captured events, regardless of source.
- Filtering the display of recorded events has been enhanced to include negative filters (that is, hide any messages that match the filter) in addition to the existing positive filters (i.e. show only messages that match the filter).
- A "Type" column has been added to the Events view and uses icons to indicate the type and direction of an event, including whether an event is a request, reply, publish, or subscribe, or if it came from a database.
- Information from the HTTP header is used to distinguish among different service operations that may be received on a single URL.

Test and Stub Actions

- The Function and Decision actions now support and default to the widely used industry standard ECMAScript (of which JavaScript is an example dialect) rather than the Green Hat script language. This takes effect for any new functions created in the project. The Green Hat script language still exists and can be selected using the "legacy" option in the function action. Other scripting languages, such as Groovy, can also be used by installing an appropriate plug-in into the GH Tester installation directory. Tags and built-in GH Tester functions are available within the new scripting languages, enabling a new era of extensibility and flexibility.

- The Lookup Test Data action screen has been enhanced to make it easier to use. In addition, comparison logic can now be used when looking up values. Just include the comparison in the cell in the test data set, e.g. ">1000" will match a lookup against a provided value of 1001.

- A Generate Test Data wizard is available on the Component Tree and as a toolbar button in the Test Factory perspective. This makes it easy and quicker to create a data-driven test or to edit the data in an existing Test Data Set.

- A "Group data by column" list has been added to the Fetch Test Data action to make it easier when working with test data containing repeating elements. In addition, the "Group data by column" list on the Fetch Test Data and Iterate Test Data actions is now sorted alphabetically.

- A new Create Session action enables stubs to generate session tokens for new sessions without coding. This makes it easier to create stubs for services that manage state through techniques such as session IDs in payloads such as URLs, cookies and other parameter mechanisms. This is available under the 'General' test actions.

- SQL Command Actions now support multi-line SQL commands/scripts.

Executing Tests and Stubs (Test Lab Perspective)

- A "Prompt for Suite Run Archive Policy" check box has been added to the "General" page of the Preferences dialog box. This check box enables users to specify how long they wish to retain the results of a suite execution in the GH Tester results database, which in turn gives users more control over the growth of the results database over time. For example, users can indicate that they wish to keep all suites run today for four weeks after which they will be deleted.

- A user may now use the "Run…" option to schedule a test to run according to a define schedule (for example, once at hh:mm, or every Wednesday at hh:mm, and so on). The test is published to a GH Server installation, which requires a separate license, and it will be run at the defined time. Results are stored in the project database and can be viewed using GH Tester.

- A new test execution mode has been introduced called "Slow Fail". In the past, the behavior has been for a test failure to immediately stop test execution and report the failure. This still remains the default behavior but it can be overridden on a test suite scenario or when running a test suite using the Run… option. When running a test under Slow Fail, execution will continue until the end of that test. Regardless of the status of the last step, the overall status of the execution will still be "Failed". Pass and Fail actions will still stop the test, although a 'Pass' action will not be able to update the overall test status to Passed.

- Tests now output more information to the console, especially for non-messaging-based actions, making it easier for users to understand what has happened.

Message Differencing Window

- In the Message Differences window, after repairing one of multiple errors in a message using the "Overwrite expected field," "Disable field validation," or "Replace with regex match" actions, the next error in the message will be selected automatically.

- In the Message Differences window, if the actual message contains additional nodes not found in the expected message, the extra nodes will be added to the expected message when repairing with the "Overwrite Expected Field" action.

- The Message Differencing window will not overwrite fields that contain RegEx expressions or tags. This is to prevent configured fields being automatically (and probably accidentally) overwritten with static content. The console window in GH Tester will provide feedback to the user indicating which fields were not automatically update warns users if a message/field that they are about to overwrite contains tags. The Message Editor must be used if the intention is to change the field.

Usability and Efficiency

- There is a new user preference that controls whether new "Run Test" actions are created with the run test in parallel or in series with the parent.

- When a new action is added to a test or stub, it is expanded automatically.

- If a user saves a resource that is currently running (for example, a stub), a prompt is displayed asking if the resource should be restarted automatically.
- In the Architecture School perspective's Schema Library view, users can now collapse the panel that contains the "Binding Properties", "Data Masking", and "Rule Cache" tabs to allocate more screen space for the schemas.
- The shortcut key CTRL+F / '"Find"' has been implemented in actions that use the Message Editor. When dealing with messages containing a large number of elements, this new search facility (which is only available when the Action Editor is docked) makes it much easier to find a specific element.
- To enable users to easily set the default value of a new tag to Null, a "Null" check box has been added to the Create Tag dialog box.
- In the Results Gallery perspective, clicking the resource-type button (under "Test Results") now opens the "Select a Resource" dialog box automatically.
- The New Project wizard and Project Settings dialog box have been changed to group all server names on a single panel and to validate any entered server names automatically.

GH Performance

- GH Performance no longer pauses between transitions to write results to the database. Writing results to the database is now executed in parallel with the start of the next phase. This means that apart from a small delay whilst tests are prepared and the agents confirm they are ready, there are no gaps in load generation. However, the last phase will not complete until all the data is written.
- The System Statistics (SysStat) probe now supports wildcarding of process names and the capturing of statistics from processes started after a performance test has started.
- There is a new probe for JMX.
- The mechanism to install multiple agents on a single computer has been simplified.
- Load generation agents can be configured to stream results to a local file rather than to the results database. Once the test completes the agents will copy the contents of the file into the results database and then delete the file so that analysis can proceed as normal. Using this option can increase the overall amount of load that can be generated because the agents are not affected by the speed with which results can be written to the database. The default behavior has not been changed. This option is enabled using Library Manager to add the JVM argument –Dgreenhat.te.is.file.caching=true on the Performance Test Coordinator machine (the copy of GH Tester which starts the execution of the performance test). This value does not need to be set on the agents. See *GH Tester Installation and Deployment Guide* for more information about JVM arguments in Library Manager.

IBM WebSphere (MQ and Application Server)

- Two new IBM WebSphere MQ recording techniques have been added to GH Tester. These are non-destructive and enable MQ messages to be captured in the Recording Studio perspective from one or more queues without removing the messages from the queues and without affecting the functionality of the system-under-test. This approach eliminates the need for proxy queues and other workarounds.
- An IBM WebSphere Application Server resource has been added to the Architecture School perspective. Currently this is used to enable easy JDBC database stubbing from within WebSphere Application Services but functionality will be extended in the future.
- GH Tester can now apply IBM code pages to IBM WebSphere MQ messages.

IBM Rational

- Integration is provided with IBM Rational Quality Manager (RQM) version 3.

HP Quality Center

- GH Tester's HP Quality Center plug-in now supports HP Quality Center 11.
- HP Quality Center has now been added as a defect and change management integration to GH Tester, allowing the same kind of deep linking previously provided for JIRA and IBM Rational Team Concert.

Software AG Integration (Integration Broker, Integration Server and CentraSite)

- Users of the Software AG webMethods Integration Server should pay special attention to the note above concerning the upgrade process.
- Basic Authentication has been added to the webMethods Broker transport if using Software AG webMethods Integration Server 8.2.1 (or later) is being used.
- Support has been added for the Software AG webMethods Vector type.

- The use of Software AG webMethods Broker transports over SSL is now supported.

- Integration with Software AG's CentraSite prior to version 8 is no longer supported.

- The Result Publisher mechanism has been extended to support CentraSite as a destination when test suites are executed, either for documentation purposes or for Certification purposes. The test suite icon is decorated when it has one or more Results Publishers on it. The previous integration method using menus in the Test Factory and Test Lab perspectives and the "Tools" menu has been removed.

- Support has been added for Software AG webMethods Integration Server service exceptions in Recording Studio, tests and stubs, allowing users to record exceptions, expect them in tests and generate them from stubs. The EXCEPTION_RuntimeException(IData) structure will contain the error from IS.

- webMethods Integration Server streams are supported in tests and in Recording Studio.

Financial Services Formatters and Transports

- A FIX transport and a FIX message schema have been added, in addition to the FIX capabilities added in version 5.2.9. The transport enables users to record FIX traffic and to create tests and stubs that that use the FIX protocol and message formats.

- The Federal Reserve Wire Network (Fedwire) message format is now natively supported. Fedwire messages are recognized and expanded automatically within Recording Studio and the Message Editor, thus enabling Fedwire traffic to be recorded, and tests and stubs to be built for it.

- The CHIPS message format is now natively supported. CHIPS messages are recognized and expanded automatically within Recording Studio and the Message Editor, thus enabling Fedwire traffic to be recorded, and tests and stubs to be built for it.

- Improvements have been made to the way in which GH Tester recognizes SWIFT messages to make it easier to extract SWIFT content from recorded traffic.

TIBCO

- SOAP with EMS bindings defined within Business Works projects are now correctly synchronized as operations within GH Tester.

- Support has been added for direct (non-JNDI) EMS connections in TIBCO BusinessWorks projects.

Web Services, WSDLs, SOAP, HTTP, JSON and REST

- Native support for testing of RESTful services has been added.

- JSON has been added as a supported formatter and schema.

- Support has been added for synchronizing WSDL schemas from servers requiring basic authentication.

- The HTTP client and server transports have been merged together into a single HTTP transport. HTTP client and server transports from earlier versions of GH Tester will be automatically converted to a transport that can act as both a client and server. If a project had a client transport and a server transport then it will still have 2 transports in 5.4 but users could opt to configure operations to use just one of them if desired.

- The HTTP transport behavior has changed so that HTTP request addresses no longer have a trailing forward slash automatically removed at runtime.

- Support for the "SOAPAction" header in HTTP messages has been enhanced and is now consistent in implementation of the standard practice to quote the SOAPAction header.

- A user can now selectively enable/disable HTTP header properties within stubs and operations. When a stub is created from recorded traffic, all of the recorded headers will be copied to the operation but only the SOAPAction header will be enabled.

- Header schemas of HTTP Transport request/reply messages are now editable.

- It is now permissible to send SOAP messages that do not conform to their associated schema to a system under test, further supporting negative testing.

- Security Assertion Markup Language (SAML) tokens can be used as part of WS-Security headers on publish and send request actions.

SAP

- It is much easier to create tests and stubs with large IDocs as Recording Studio now records and displays them.

- The Subscribe action supports the SAP transport in "watch" mode without the need to reconfigure the SAP system to re-route messages.

Formatters and General Transports

- A number of EDIFACT dictionaries are now natively supported as GH Tester schemas. EDIFACT messages are recognized and expanded automatically within the Message Editor and Recording Studio. The Schema Library within the Architecture School perspective lists the supported EDIFACT dictionaries.

- File Schemas can now be applied to string nodes as well as byte array nodes within messages.

- COBOL Copybook schemas can now be applied to text nodes as well as to byte array nodes.

- If a class is encountered that cannot be instantiated when creating a Java object schema, processing now continues to other classes within that JAR file rather than stopping. Users will be warned about the classes that failed to instantiate. In addition, support has been added for the "BigDecimal", "BigInt", and "Enum" types.

- Record Layout schemas now support custom formatters. This enables users to provide their own Java classes for formatting individual fields when expanding and collapsing content.

Other New Features

- Support has been added for operations which use different transports for publish and subscribe. On the "Message Exchange Pattern" tab of the Operation dialog box, clicking "Publish/Subscribe" in the "Pattern" list displays "Publish" and "Subscribe" tabs on the lower half of the "Message Exchange Pattern" tab, enabling users to define separate transports for publish and subscribe.

- From this release onwards, 64-bit JVMs are supported on Windows and Linux. This requires the 64-bit version to be downloaded and installed. 64-bit builds are functionality equivalent to 32-bit builds but 64-bit builds can be allocated significantly more memory. For some third party integrations (e.g. TIBCO), users will also need to install and configure the 64-bit version of the relevant third party application and/or its libraries, as well as updating the configuration in Library Manager.

- Support has been added for the Composite Software JDBC database driver.

- In the Architecture School perspective's Schema Library, it is now possible to apply COBOL Copybook schemas and view nodes for text-based messages.

- Physical Database connections can now be named, which makes it easier to select individual connections.

- Test suite assets in the component tree have a decoration on them if they use a Results Publisher.

New in 5.2.11

- A new concept called a Test Cycle has been introduced allowing organizations to have a common parent for all test runs, such as those executed in HP Quality Center or by individual users who might be working across multiple projects. A Test Cycle is a container for tests and test suites that spans multiple users and projects. The results of every test executed inside an active Test Cycle are persisted to the database, regardless of whether the test is inside a suite or not. Please see *GH Tester Reference Guide* for more information.

- The new "Compare Files" action lets you compare records from files, focusing on the columns of interest. This extremely powerful action provides a simple and fast way of checking data has been distributed or reconciled in the right way. Two distinct records can be compared for equality, or multiple records can be summed and compared to the value of a summary record. Please see *GH Tester Reference Guide* for more information.

- A schema editor has been added for managing record layouts for defining a file schema that is composed of fixed width, custom, or delimited fields. Additionally, a wizard is available for creating fixed width layouts from Excel-formatted specifications based on a customizable import profile. Complex field formatting is accommodated through a range of configurable options, or can be extended using an API. Please see GH *Tester Reference Guide* for more information.

- GH Tester has been certified against version 8.2 of the webMethods stack, including Integration Server, Broker, BPMS and CentraSite 8.2.

- GH Tester now supports publishing of both reports and stubs to any Software AG CentraSite asset type. This version of GH Tester supports CentraSite 8.x – earlier versions are not supported. The UDDI/XML Registry browser has been updated to allow searching for any asset type including custom asset types. The method for publishing reports in CentraSite has been simplified and works in a similar way to the current Email publishing. For more information, please refer to *GH Tester CentraSite Integration Guide*.

- Library Manger now includes the latest versions of supported TIBCO products, as follows: TIBCO Rendezvous 8.3.1, TIBCO Runtime Agent (TRA) 5.7.1, TIBCO Hawk 4.9, TIBCO ActiveMatrix/BW 5.9.0, and TIBCO EMS 6.0.1. TIBCO Designer 5.7.1 is also supported.
NOTE: The 64-bit version of TIBCO Rendezvous is not currently supported, and using the 32-bit version with the 64-bit version of TIBCO BusinessWorks will cause issues with the TIBCO BusinessWorks Coverage and Performance reports in the Results Gallery perspective. For this reason, it is recommended that the 32-bit versions of all products be installed.

- The size of the GH Tester installation package has been reduced dramatically by removing most of the PDF documentation and online help files. Only core documentation is now included (Release Notes, readme.txt, and Quick Start PDFs/online help for GH Tester/GH Performance Tester). For more information about obtaining the full suite of GH Tester documentation, see `download_docs.pdf`, included with the installation package.

- JIRA is now supported for tracking defects using GH Tester's built-in defect integration point.

- Support for IBM's Rational Quality Manager has been added, allowing this tool to be used to initiate execution of tests and to have the results of those tests published back into RQM. This integration has been certified by IBM and Green Hat's GH Tester is now Ready for Rational.

- When clicking on a publishing action to launch the Differences window (from the console), the left side of the window displays the configured/sent message, while the right side of the window displays the received message. This new functionality provides users with additional information regarding the original message, which may be useful in trying to modify or repair the message. To view the expected message, the Differences window can be launched by clicking the assertion output in the console – multiple Differences windows can be displayed at the same time.

- Detailed reports for individual tests that were executed within a test suite or test cycle are now stored in the project database. Tests can be selected as an asset-type in the Results Gallery perspective, enabling users to view the full execution history of such tests. This also allows runs of the same test in different situations to be compared more easily.

- Containing suite details for tests executed prior to database schema 1.9.24.c can be populated in the results database using the `backfill-results` argument with the `GHTesterCmd` executable or script. Once executed, the run history for tests executed in a test suite can be viewed in the Results Gallery perspective. For more information, see the "Results Gallery" chapter in *GH Tester Reference Guide*.

- In the Differences window, clicking on a linked (underlined) log message in the console area will expand and select the applicable node in the message trees displayed above. Additionally, users can now copy a selected portion of the console or all of the console using CTRL+C or the context menu.

- GH Tester now includes full support for the following packetizers (utilized in record layouts, file schemas, and the TCP-UDP transport): Delimited, File, Length, Split Token, Swift, and Token. This provides greater flexibility throughout GH Tester in using files to publish and read messages.

- Numerous improvements have been made around the handling of SQL data in the Message Differences window. Clicking on a console error for stored procedures or SQL queries will display the Message Differences window, and changes to expected results can be made.

- GH Tester supports "deterministic" stubs that provide multiple runtime execution options. The stub behavior style controls how stub instances are created and how they process requests.

- Support for webMethods JMS transports has been made easier to use. Providers for webMethods JMS 6.5, 7.1, 8.0, and 8.2 are now available in Library Manager. See *GH Tester JMS Messaging Plugin Guide* for more information.

- SSL support has been added to the webMethods Broker transport (not supported in version 6.1).

- An optional comment can be included when adding rules to the rule cache to improve documentation, for example, to explain why a rule has been added or what its purpose is. As an adjunct to this, the "Path" field in the Architecture School perspective's Rule Cache view is now right justified to help make its contents easier to identify when the path is longer than the current field size, reducing the need to add comments.

- In the Results Gallery perspective, the Total Iterations, Passed, and Failed columns display a total of these columns for their children. For a scenario that contains child scenarios, the columns display totals for all the child resources below this level.

- When creating tests from the Recording Studio perspective, tags can be used as part of the test names to include values from promoted fields. The actual test name derived after evaluating the tags is used to group events together into a single test.

- Repeating elements can now be read from incoming messages without requiring the use of a test data set.

- The TIBCO EMS transport now provides the ability to specify a non-default watch connection factory if users want to record messages and/or watch messages across a queue that does not use the default port 7222, or where the topic connection factory "TopicConnectionFactory" does not exist. See *GH Tester TIBCO Messaging Plugin Guide* for more information.

- Users can now search for test resources using CTRL+F in the Test Suite editor and the Run… dialog box.

- If local names are used for namespace matching (according to the settings on a test), strikethrough text and a tooltip will be used to indicate it where appropriate (i.e. in message editors and the Message Differencing window).

- The behavior for empty tests has been clarified so that if a test is empty or fails to compile, it will fail when executed. Additionally, any suite containing such a test will fail when executed. This makes it easy to write a list of tests, paste them into GH Tester and then include them in a suite. The test will fail until the user specifies the criteria that must be satisfied to make it pass. This better supports agile and test driven development approaches.

- Defects can be raised directly from the Difference window using any of the Green Hat supported defect providers.

- The contents of the "Comment" action are now logged in reports for the tests that contain them.

- It is now possible to configure the units of time for the "Initial target iterations" of a load generating test in a Constant Growth performance test (i.e. users can now configure load generating tests to run less than once per second).

- Multiple Queue Manager connections can now be configured on the IBM WebSphere MQ transport. The number of connections can be configured using the QM Connections field, under the "Advanced" tab, when configuring the physical transport.

- Significant performance enhancements have been made to test data set processing from Excel and CSVs, reducing the amount of memory required.

- GH Tester now provides a Base64 formatter in the Schema Library. The formatter can be applied to a text node in a message for encoding and decoding Base64 strings.

New in 5.2.10

- Test actions can be enabled or disabled within a test. Enabled actions will be executed as usual. Disabled actions are now skipped without having to remove them from the test. When a test action is disabled, its result in the console is reported as "skipped".

- Custom reports can now be created and published. These reports are based on existing reports available in GH Tester's Results Gallery perspective and a new Detailed Test Suite Report which contains the detailed test execution report for every test in the suite. For more information, please see *GH Tester Reference Guide*.

- A new concept of a Result Publisher has been introduced. These allow an email to be sent when a test suite has finished execution, passed or failed, containing some text and/or a report. The emails use the new custom reports feature and can send the report to a distribution list in PDF, HTML or as a link. Publishing can be disabled on a tool-wide basis from a new toolbar icon. This mode is designed for use during development and maintenance of test cases.

- GH Tester now supports integrations with Open Services for Lifecycle Collaboration (OSLC) change management systems. These integrations let you define an OSLC compliant change management system in GH Tester that can be accessed directly from the Test Lab perspective for raising defects in the context of an executed test or test suite. This can be used to access IBM's Rational Team Concert and others.

- A new probe has been added, the Windows Performance Monitor probe, which collects statistics and performance data using perfmon. The performance objects and counters available are the same as those available through the Performance applet of the Microsoft Management Console on the local system.

    NOTE: The probe requires that the Microsoft Visual C++ 2010 Redistributable package (available here http://www.microsoft.com/downloads/en/details.aspx?FamilyID=A7B7A05E-6DE6-4D3A-A423-37BF0912DB84&displaylang=en) be installed on both the machine used to configure the probe, and the machine that the probe will be executed on. There is no need to install it on the machine being monitored unless that machine is also running the probe.

- CentraSite action templates are now provided for CentraSite 8 ActiveSOA users to allow customers to build Quality Policies into their lifecycle governance processes. Details about the templates and how to install them can be found in *GH Tester CentraSite Integration Guide*.

- Users can now obtain (via the context menu onto the clipboard) a URL from the Task Monitor entry (in the Test Lab perspective) of a test suite or test within a suite. This URL can then be used to open GH Tester and directly display the execution report for the selected asset in the Results Gallery perspective. The URL can be applied when opening GH Tester, or pasted into Internet Explorer or Firefox (which will in turn launch GH Tester). These URLs can be passed around using instant messaging, email, or lodged into defect tracking systems.

- Numerous improvements have been made around the handling of SQL data in the Message Differences window. Clicking on a console error for stored procedures or SQL queries will display the Message Differences window, and changes to expected results can be made.

- GH Tester now supports Microsoft SQL Server 2005 as the project database and migration from this version onwards will be provided.

- A number of performance enhancements have been made across the product affecting the project tree in the Test Lab and Test Factory perspectives as well as the message differencing window and general project loading.

- When importing packages from webMethods Integration Servers, users can limit the number of referenced services imported for each selected package. See *GH Tester webMethods Plugin Guide* for more information.

- The GH Tester installation program on Windows now allows users to select whether the application should be installed for the current user or for all users.

- When executed in the Test Lab perspective, the overall status (Passed or Failed) of a test or suite is printed to the console.

- Additional filter types can now be applied in the Iterate Test Data test action (Equality, Length, Regex, Is Null, Not Null, and Assert Using Function).

- When creating a cache rule based on a selected message field, a Comment field is now available in the Add to Rule Cache dialog box. The comment can be used to more easily identify one rule from the next in the Rule Cache view of the Architecture School perspective.

- IMS and IMSVS are now an integrated part of an MQ Message, with entries for both now available in the Schema menu when editing the message. Additionally, these message parts will be interpreted as expected when recording and subscribing to messages.

- A single installation instance of GH Tester may now be executed by multiple (different) users at the same time. To accommodate this functionality, GH Tester port allocation is dynamic (i.e. GH Tester ports are no longer configured in the Library Manager). This is particularly relevant to customers using Citrix. Changes may be required to your license arrangements to use GH Tester in this fashion.

New in 5.2.9

- GH Tester has moved from Eclipse platform 3.3 to 3.6 to take advantage of some new features in 3.6. If third party team providers are used for source control with GH Tester, compatibility for those providers should be verified.

- By default, the name of the current project is now displayed in the title bar of the GH Tester window. This setting can be changed using the General preferences.

- GH Tester now supports the Financial Information eXchange (FIX) Protocol. FIX dictionaries can be added to GH Tester's schema library and applied to messages like other formats/schemas.

- When more than one source is being synchronized (or checked for synchronization) in GH Tester, users now have the option to enable or disable any of the available sources.

- A new preference is available in GH Tester (under XML) to ignore namespaces when analyzing XML. When enabled, local names will be used for comparison.

New in 5.2.7

- Numerous enhancements have been made in the Message Differences window, including the following: line wrapping the detail text for a selected node behaves as configured in the Test Console, differences displayed in the detail area are highlighted according to the difference type, horizontal scroll bars for the header and body of the message are kept in sync, all of the available controls are now displayed in the top of the window, users can move through specific difference types using the "Next" and "Previous" arrows next to each type, the toolbar buttons (Filter, Expand, Collapse, Copy) are now in a vertical toolbar next to the Key panel, repair actions for the expected message (header and body) are available in the context menu, and message expansion level is controlled by GH Tester's Message Settings preferences.

- A new JVM argument (-Dgreenhat.wmis.drop.xml.attributes) can be used in Library Manager to designate fields to be dropped in messages received from webMethods IS. Fields to drop should be in a comma separated list following the argument (for example, -Dgreenhat.wmis.drop.xml.attributes=@version,@encoding). See GH *Tester Installation and Deployment Guide* for more information about JVM arguments in Library Manager.

- "Start Time" and "Elapsed Time" labels are now displayed in the progress page of the Solstice Integra Suite migration tool. Additionally, these times are captured in the summary log file.

- When a "Bytes" schema has been applied to a message node, the encoding and new line type (native, Windows, UNIX, or Mac) can be set when viewing the field properties (right-click the field and select "Properties").

- Test data sets now use unique file extensions: File = .sit, Directory = .fst, Excel = .ext, and Database = .dbt. When indicating the path to a data set (for example, when using the lookupTD function), the extension should be used.

- The lookupTD and dbQuery functions have been modified so that the "Logical/" prefix is no longer used when indicating the path to the desired resource (i.e. the data set or the database). See the "Functions" chapter in *GH Tester Reference Guide* for additional information.

- TIBCO SmartSockets support is now included in GH Tester. See *GH Tester TIBCO Messaging Plugin Guide* for more information.

- GH Tester now supports HTTP authentication on server resources. See *GH Tester HTTP and Web Services Plugin Guide* for more information.

New in 5.2.6

- When editing test suite scenarios, the contents of the References table are sorted (by default) according to the contents of the Reference column. Additionally, the table can be sorted according to any other column by clicking on the desired column heading.

- If an Excel data source references a file containing multiple worksheets, users now have the ability to specify which worksheet to use in the data source.

- In the Recording Studio perspective, generic JMS transports can now be recorded when messages are exchanged using topics. Replies to temporary topics may also be recorded. If the system under test replies before GH Tester can set up a subscription to the reply message, however, no message will be shown. Queue-based destinations are not currently supported. **Please note**, every effort has been made to test this feature against a variety of JMS implementations, but this list cannot be exhaustive. Please contact Green Hat if the implementation you use is not behaving as expected.

- GH Tester now includes the following suite-based system tags: %%SUITE/NAME%% (the name of the currently executing suite), %%SUITE/PATH%% (the path of the currently executing suite), and %%SUITE/SCENARIO/NAME%% (the name of the scenario that is currently being executed by the suite). The suite and scenario details refer only to the item that is the immediate parent of the calling test.

- The GH Tester Source Control Management utility (GHTools.exe) now provides the ability to configure network connection preferences, including proxy connection options (in the Source Control/GH Tester Tools application, select Window > Preferences and see General > Network Connections).

- The HTTP transport will now forcibly close sockets on Send Reply actions after the configured 'Client Socket Settings Response Timeout' (found within the HTTP server transport configuration). This new behavior enables stubs to continue executing where clients do not acknowledge replies in a timely fashion.

New in 5.2.4

- The performance of GH Tester when opening large projects has been greatly improved in the current release.

- When selecting a Test Suite instance in the Results Gallery perspective, the execution status (passed or failed) of each instance is now included next to the entry's date and time.

- A new GH Tester preference is available under the Message Comparison group (Navigation – Loop when navigating differences). If this setting is disabled, the "Next difference" and "Previous difference" buttons in the Message Differences toolbar and context menu will be unavailable if there is no "next" or "previous" difference (i.e. if you are viewing the last or first difference in the message). If the message contains no differences, neither button will be available. If this preference is left enabled, which is the default, the buttons will always be available and the window will loop from the end of the message to the beginning when navigating.

- When creating tests using the MEP wizard, users now have the option to add the tests to a new or existing test suite. Additionally, users can execute the new or existing suite once the wizard is finished, and they can opt to have GH Tester overwrite expected messages in the tests with the messages that are received.

- The SWIFT formatter has been enhanced to include the formats ACKNAK, MT202COV and MT205COV.

New in 5.2.3

- Test artifacts can be executed on a remote engine using the Run… dialog box in the Test Factory and Test Lab perspectives. See *GH Tester Reference Guide* for more information about custom execution options.

- Stubs can be configured with an optional session "state" (start and finish). The start state of a stub can be set within the stub properties, and it can be used as a condition for executing any of the actions within a message case. The stub's state can be switched at the conclusion of a message case action, or by setting the SESSION/STATE tag. See *GH Tester Reference Guide* for more information.

- GH Tester now supports webMethods BPMS version 8.

- When adding a TIBCO BusinessWorks project to a GH Tester project, Design Time Libraries that are referenced in the BW project can now be linked and imported into GH Tester. Additionally, Design Time Libraries can be added to and utilized in a GH Tester project in much the same way that a TIBCO BusinessWorks project can.

- In addition to its current support of testing serialized POJOs (Java objects with public members), GH Tester now supports serialized JavaBeans (Java objects whose members are accessed through getter and setter methods, and who provide "no argument" constructors). See *GH Tester Java Object Plugin Guide* for more information.

- Receive Reply and Subscribe actions contain a new field, Tolerance, that specifies the number of additional milliseconds (beyond the existing timeout period) to wait for a received message. If a message is received after the timeout but during the additional tolerance period, the test still fails and no validation is performed, but the console reports that the message was received late. The default timeout tolerance can be set under the General settings of GH Tester's preferences.

- GH Tester now supports Action Maps in the GUI Interaction test action.

- The "Filter" field (under Subscriber Configuration) for subscribers that use JMS-based transports is now labeled "Message Selector".

- In GH Tester messages, "xsi:nil" is now mapped to null field actions (i.e. to a "Null" text field in a publisher, and to an "Is Null" validate action in subscribers).

- Any HTML report that is available in the Results Gallery perspective can be viewed externally in the GH Tester workstation's default browser.

New in 5.2.2

- When using the context menu to set the bindings for a logical component in the Architecture School perspective, the list of available environments is now grouped into submenus if there are more environments available than can be displayed in a single list.

New in 5.2.1

- The filter and search options that are common within GH Tester's component trees (down the left side of the Test Factory and Test Lab perspectives) are now available in the resource selection dialog box when linking GH Tester tests in HP Quality Center.

New in 5.2.0

- SAP IDocs (Intermediate Documents) are now supported by GH Tester. IDocs can be applied to the root of a message, or they can be applied to a message node like a schema. Like BAPIs and RFCs, IDocs can be imported into GH Tester when synchronizing with the SAP server.

- GH Tester now provides the ability to allow or deny access to projects or to certain perspectives within a project according to defined project permissions. New projects can be created or existing projects converted to utilize LDAP (for example, Microsoft ActiveDirectory) to control which users can work with a project, and what those users can do in that project.

- GH Tester has added to its market leading GUI Testing capabilities through a separately licensed module. The "GUI Interaction" test action now allows users to execute HP QuickTest Professional scripts alongside back-end testing actions, as well as Green Hat's own GUI testing module. Additionally, output generated from the script referenced in the test action can now be stored in tags. The stored data is then available for use in other parts of the application, allowing the GH Tester script to read information off of a screen and use it in the next part of the test script. See the "Test Actions" chapter in *GH Tester Reference Guide* for more information.

- GH Tester now provides support for sending and receiving email messages through the use of the email transport. See *GH Tester Email Transport Plugin Guide* for more information.

- Support has been added for monitoring of local and remote log files. Functionality includes the ability to synchronously look for log file entries associated with a particular transaction (thus screening out data from other concurrent test executions), allowing users to build tests that will fail if log files do not contain the right lines. Wizards help with automatic creation of regular expressions, tagging and so on. *This feature is in beta and we welcome feedback from the user community.*

- Users can automatically create a new baseline for a test run (from the Run… menu), overwriting existing results. They can also make a copy of a subset of the tests in a suite and re-run them, creating a new baseline at

the same time, and then use this copy to compare against a new or previous version of the system. This can help with debugging and diagnosis of regression issues.

- The context menu used to add rules for selected fields in a message editor has been enhanced to include new options. In addition to adding rules to the cache, users can now enable, disable, and edit rules directly.

- The results differencing window has been greatly enhanced to allow interactive modification of the expected message and real-time re-evaluation of the validation rules giving instant feedback of the effect of changes.

- Enhanced support has been added for Software AG's CentraSite 8 (ActiveSOA) with new quality policies and new functionality allowing GH Tester to automatically maintain documentation assets for services.

- The resource selector for HP Quality Center has been enhanced to include the same options as present on the component view inside GH Tester. If the resource selector is opened and there is no current selection, focus will move to the parent folder of the last accessed resource.

- A new Governance API allows customers to build rules to enforce certain standards in their GH Tester projects. Currently the rules are evaluated by a separate command line utility and a report generated. *This feature is in beta and we welcome feedback from the user community.*

- A new external test ID has been added to test assets for population by the user.

- Various usability enhancements, based on feedback from our user community, have been included.

Closed Issues

Resolved in 5.4.0

- GHT5-23806: Irrelevant error messages emitted when the webMethods server components are started up have been suppressed.
- GHT5-23188: The System Statistics (SysStat) probe on Linux and Solaris will now report on processes that are started after the probe has started. Wildcards may also be used within process names in the configuration of the SysStat probe on Solaris.
- GHT5-23096: When a user clears the last task from the Test Lab the console is also cleared to reclaim memory.
- GHT5-23751: Various issues that could cause ConcurrentModification exceptions have been fixed.
- GHT5-23738: A Data source fetch over HTTP now works correctly on the second and subsequent file access.
- GHT5-23574: The SWIFT schema has had numerous updates to bring it in line with changes made to the standard in 2011.
- GHT5-23546: An issue has been fixed that caused an exception in some circumstances when trying to edit publish or subscribe actions created using CTRL+N.
- GHT5-23528: Changes have been made to reduce the amount of memory used when processing XSD files.
- GHT5-23494: It is now possible to set a Byte Formatter on Base64 decoded node in a message.
- GHT5-23492: An issue that could cause GH Tester to select the incorrect failure path following a failing Assert Action has been resolved.
- GHT5-23484: resetTags() used with wildcards no longer causes an error if the provided pattern matches system or environment tags
- GHT5-23429: XML in plain text fields is no longer normalized to allow users to create XML strings with unusual spacing requirements.
- GHT5-22971: Intermittent application hangs when running Test Suites while writing results to the project database have been resolved.
- GHT5-23356: The sudo option in the Run Command action now correctly uses the password that has been entered.
- GHT5-23279: WMIS header fields can now be asserted.
- GHT5-23177: It is now possible to synchronize with a webMethods IS server if there is an invalid package element defined in WMIS.
- GHT5-23168: The System Statistics probe has been modified to work correctly on newer 64-bit Sun machines.
- GHT5-23160: Copybooks with comments that end in a hyphen can now be processed.
- GHT5-23141: A change has been made to allow a higher numbers of Log Measurement counters to be exported to Excel.
- GHT5-23133: A problem that meant it was not possible to test the execution of functions containing list tags indexed by another tag has been resolved. However, when GH Tester prompts the user for 'test' values of the tags so that it can run the function the list tag value must be specified using { }. For example, if you are testing the function eq(%%customers[custNum]%%,"Tom") then the customers tag value must be entered as {Tom, Harry}.
- GHT5-23101: A fix has been made to schema root node validation when the "XML Name Matching" option is set to "Local Name". This corrects a problem where GH Tester was not correctly matching nodes during validation. For example, A SOAP Fault element in expected and actual messages will now match when namespace prefixes would previously have prevented it.
- GHT5-23093: The ne() function no longer causes an errors if the first operand is null().
- GHT5-23067: Improvements have been made to ensure SQL cursors opened by GH Tester are closed properly.
- GHT5-23066: Software AG BPMS tasks now show configuration details in all panels of the Retrieve Task and Modify Task actions.
- GHT5-23065: The default installed versions of the RunTests.ini, Agent.ini and TestEngine.ini configuration files have been modified so that INFO logs will not appear by default.
- GHT5-23060: SOAP Headers were compiled by GH Tester using a SOAP Envelope 1.1 namespace which causes errors when using SOAP 1.2 messages. This has been resolved and SOAP 1.2 messages now work correctly.
- GHT5-23052: Direct iProcess connections can now be made when the Director cannot be reached.

- GHT5-23049: Data entered for values on the Filter tab of a Message Case action is now saved and restored properly even if there is no matching Assert tab value defined.
- GHT5-22478: File and directory names containing spaces now work correctly with Directory Data Sources.
- GHT5-23034: Log Actions running in parallel no longer lose data in output files.
- GHT5-23024: A user is now told if a test has not been saved due to an OutOfMemory error. Previously no indication would have been given to the user that the test had not saved.
- GHT5-23016: Performance tests can now be run on the command line.
- GHT5-22999: Create Test... (from template) no longer allows special characters in test names.
- GHT5-22993: regEx() function now includes all matches subsequent to an empty match when using zero-width look ahead assertions.
- GHT5-22954: QTP integration in the GUI Interaction action now correctly substitutes tag values in the Test Folder.
- GHT5-22830: Scalar types can now be marked as repeating (where the schema allows it).
- GHT5-22878: Dragging a requirement onto a receive-reply no longer clears out timeout and tolerance values.
- GHT5-22948: Linefeeds have been added into the RunTests output (Close to "Running:" in the output) to make it easier to be parsed in scripts.
- GHT5-22940: Stored Procedure actions can now be used in performance tests.
- GHT5-22933: Line feeds have been added to the console output lacks line feeds when output through class StandardConsole.
- GHT5-22915: A bug which could causes repeating elements within the expected results of a test to be duplicated when the Message Differencing Window is opened has been fixed.
- GHT5-22904: When refreshing Excel Test Data Sets GH Tester no longer holds any resources open that prevent Excel from saving the file.
- GHT5-22902: An issue that could cause a Stack Overflow exception when importing Java Objects has been resolved.
- GHT5-22925: A problem which meant that Log Measurement data sometimes wasn't shown when opening a chart has been resolved.
- GHT5-22924: GH Tester now reports path/filename during project load if a corrupt file is found. This can make it easier for support team resolve the problem.
- GHT5-22879: An issue which could cause Failure/Pass paths to "vanish" when the associated action is moved has been resolved.
- GHT5-22864: An issue which could cause a Null Pointer exception when re-synchronizing BW project has been resolved.
- GHT5-22857: An issue has been resolved that meant that a Software AG webMethods IS server could become unresponsive if the server is unable to communicate with the GH Tester client used for recording/stubbing.
- GHT5-22840: A problem that could result in "Is Null" validation being automatically added into the Message Differences window after editing an HTTP XML field to use "Not Null" rather than "Equality" validation has been resolved.
- GHT5-22767: An issue that could result in a Send-Request/Receive-Reply pair being created that was not correctly connected when a SR/RR pair was dragged from a test-template into a test has been resolved.
- GHT5-22743: Username/passwords are now correctly stored in encrypted form for all physical connections.
- GHT5-22738: MQ Keystores now work correctly in performance tests.
- GHT5-22736: Improvements have been made to the way in which GH Tester accesses a pool of database connection resources during GH Performance tests to avoid race conditions. Errors referencing "…config.icm already exists" were caused by this problem.
- GHT5-22683: An issue that could result in data that was too big for the Results Database database schema when using the TIBCO EMS Probe has been resolved.
- GHT5-22676: The GH Tester README file was missing from the installed product.
- GHT5-22648: The Create Parameterized Test function in Recording Studio now analyses all selected messages when creating the messages used in the test. Previously only the first message was used which meant that elements not present in the first message would not be created automatically.
- GHT5-22639: GH Tester will now re-use client IDs when connecting to Software AG's webMethods Broker.
- GHT5-22626: Errors that occurred when using the message editor for SOAP headers have been resolved.
- GHT5-22624: A problem that could result in inconsistencies in the list of dependent (referenced) services between GH Tester and a Software AG webMethods IS instance have been resolved.

- GHT5-22613: The EMS Probe can now use a direct connection as well as a JNDI-based connection.
- GHT5-22578: The main phase of a GH Performance test can now access tag values set in the Initialise section of the test.
- GHT5-22525: GH Tester now supports WSDLs that define operations using mixed message types.
- GHT5-22518: The Assert tab on the Run Command action now correctly refreshes the UI layout when a user switches the action type on a field from equality to regex.
- GHT5-22323: Problems using Run... and Re-Run failures from the Task Monitor have been resolved
- GHT5-22316: An issue that caused incorrect values when reformatting of some copybook fields has been resolved.
- GHT5-22175: Schemas containing a maxOccurs of 9999999999 will now load properly.
- GHT5-22120: An error that occurred when sending MIME content to a server has been resolved.
- GHT5-21460: Excel fields containing links in XLXS files are now read correctly.
- GHT5-21360: If a test in a test suite fails to compile (for example, a transport it uses does not have a mapping in the current environment) then the overall status of the suite is now failed.
- GHT5-21074: The information reported to the user when a Software AG webMethods IS server cannot be contacted has been improved.
- GHT5-20970: When previewing SOAP messages the normalize document setting is now honored when previewing the document. The document will still be normalized when it is published.
- GHT5-20889: The user was being prompted to save changes too often when using the docked action panel.
- GHT5-20886: The Library Manager application on non-Windows platforms did not allow the tibrvjms.jar to be located.
- GHT5-20826: Iterate-While can now be used to iterate exactly once.
- GHT5-20820: The Field Editor will now properly resize to fit Field Action editors if there is not enough room for them to fit.
- GHT5-20649: Deterministic stubs created from Recording Studio by selecting events now generate the correct sequence of message events when the source messages were not simple SR/RR pairs.
- GHT5-20489: It is now possible to synchronize Tibco Business Works service agents
- GHT5-20448: An error that meant it wasn't possible to stop recording if the environment had been switched after recording had started (in Recording Studio) has been resolved.
- GHT5-20428: When setting up Agents and test engines for Performance Tests it is no longer necessary to specify the names of the test engines in the Agent.config file and within GH Tester.
- GHT5-20369: Schemas within Schema Library can now be refreshed when the file on disk is modified.
- GHT5-20343: Test Data Set paths containing project tags now work correctly in performance tests.
- GHT5-20224: Log Measurement counters are now available in Graph probes list.
- GHT5-19758: SOAP types and array sizes comparison now works correctly if (different) namespace prefixes resolve to the same URL.
- GHT5-19136: It is now possible to record an operation with a tag driven destination
- GHT5-19562:The TIBCO BusinessWorks coverage report no longer reports non-completed tasks as missed.
- GHT5-19718: The "Fail" action no longer prints twice.
- GHT5-20490: GH Tester now supports underscores in field names of COBOL Copybook files.
- GHT5-20802: TIBCO BusinessWorks synchronization has been changed to report folder and service component synchronization states consistently. Previously, deletion of a folder in BusinessWorks caused incorrect reporting of synchronization state for other folders in a project. An inline migration will occur the first time when BusinessWorks is synchronized with this release. Until this is done, the reported synchronization state will be: "Source copy updated."
- GHT5-20847: GH Tester's COBOL Copybook schema now parses values for the PIC S9(13)V99 COMP-3 COBOL picture correctly.
- GHT5-21628: Previously, there could be GUI behavior problems when performance tests that use Externally Defined load profiles were being edited. These problems have been resolved.
- GHT5-21747: In the Recording Studio perspective, Byte, Map, and Text schemas are now applied correctly to TIBCO EMS send reply and receive reply messages.
- GHT5-21821: Several TIBCO iProcess integration issues have been resolved.
- GHT5-21857: An issue has been fixed that could prevent users from being able to select a procedure when creating a Trigger in the Recording Studio perspective.

- GHT5-21896: An issue has been fixed that could prevent users from being able to select the identity created for a WSDL protected by basic authentication (that is, user name and password) when synchronizing with that WSDL.
- GHT5-21907: An issue has been fixed that could cause an Ad Hoc Monitor created for a TIBCO EMS transport to fail to operate.
- GHT5-21917: GH Tester's "SettlementDate" function, which is a working days calendar function, can now generate detailed error messages.
- GHT5-21919: An issue has been fixed that could cause a summary report to exclude a detailed report when reporting the results of a sub-test in a test suite.
- GHT5-21993: An issue has been fixed that could cause GH Tester not to save all the changes on the Message Differences window if any actions or regular expressions are disabled and any fields on the screen are overwritten.
- GHT5-21997: In the Architecture School perspective's Physical View, when using the "Config" tab on the Host dialog box, GH Tester now waits until a host name has been entered fully before verifying the host name and searching for the host's IP address.
- GHT5-22026: In the Architecture School perspective's Physical View, the "Settings" tab on the "Config" tab on the Web Server (HTTP Transport) settings dialog box now enables users to set up single client/server transports. In addition, the new "Client" and "Server" tabs on the "Config" tab enable users to enter additional client/server settings.
- GHT5-22085: GH Performance now releases a floating GH Performance Tester license key after a user quits the GH Performance application.
- GHT5-22101: GH Tester now supports BPMS Complex Types in schemas.
- GHT5-22207: An issue has been fixed that could cause a "conncurrent.ExecutionException" if a quick tag is added to the equality action on a repeating element in a subscribe action and the equality action is disabled.
- GHT5-22209: For any new TIBCO Rendezvous (RV) messages saved from the Recording Studio perspective, GH Tester now ensures that all RV message sub-nodes default to type "RV Message" and that any RV schemas involved do not contain any errors. However, for any RV messages saved from the Recording Studio perspective in earlier versions of GH Tester, message sub-nodes must be set to type "RV Message" manually.
- GHT5-22242: An issue has been fixed that could cause a "NullPointerException" error when attempting to open the results of a failed IBM WebSphere MQ test.
- GHT5-22315: GH Tester now supports leading separate usage clauses correctly.
- GHT5-22324: If multiple asserts are used one after another in a test, they will all be executed by GH Tester as expected. However, any failures will result in a failed test and the result of each assert is displayed correctly in the detailed report.
- GHT5-22326: GH Tester can now trigger, throw, or simulate Software AG webMethods Integration Server exceptions.
- GHT5-22333: An issue has been fixed that could cause Oracle System Statistics probe errors when running Windows Server 2008 R2.
- GHT5-22355: It is now possible to specify GH Tester's HTTP port by using the "-D" argument. In Library Manager (Application section), enter text of the following format in the "JVM Arguments" field: -Dgreenhat.http.port=<*Port Number*>
- GHT5-22369: In the Architecture School perspective's Schema Library, all Software AG webMethods schemas are now displayed according to the project's logical resources.
- GHT5-22370: An issued has been fixed that could cause a File created in the Architecture School perspective's Logical View to appear to have more than one "Name" field.
- GHT5-22389: Valid values entered in COBOL Copybook CP037 (EBCDIC) fields are now saving as expected in GH Tester messages.
- GHT5-22412: An issue has been fixed that could cause changes to Software AG webMethods Integration Servers not to be detected during synchronization.
- GHT5-22414: An issue has been fixed that could exceptions in GH Tester when a test has a log message that contains only a "newline".
- GHT5-22426: For CentraSite 8.2 (and later), GH Tester now supports stylistic formatting of published reports.
- GHT5-22427: For CentraSite 8.2 (and later), GH Tester can now publish stubs that are direct children of service components.
- GHT5-22438: When using the "Iterate Test Data" action, all filter expressions are now applied as expected. Have reversed the sentence order to improve readability.

- GHT5-22447: An issue has been fixed that could cause errors when moving linked actions within tests.
- GHT5-22455: It is now possible to copy SOAP message header values when copying and pasting SOAP messages into text nodes.
- GHT5-22467: GH Tester now supports the use of brackets and underscores in item names of fields of COBOL Copybook file names.
- GHT5-22476: An issue has been fixed that could cause a "RejectedExecutionException" error when using a slow connection to the project results database.
- GHT5-22480: An issue has been fixed that could cause "OutOfMemoryError" errors while running tests that run other tests. From now on, if GH Tester starts to run of memory while executing such tests, it will purge any child tests from memory.
- GHT5-22486: An issue has been fixed that could cause "loader constraint violations" when publishing test suite results by e-mail.
- GHT5-22487: In GH Tester, it is now possible to specify a user ID for each IBM WebSphereMQ publish action.
- GHT5-22499: Synchronizing a large Software AG webMethods package is no longer causing a Java heap space error. System property greenhat.wmis.schemaSync.chunkSize can be used to control the maximum number of services for which schema synchronization data will be pulled back from WMIS in a single request.
- GHT5-21760 - Tag replacement now occurs for all Tag Aware text fields in WS-Security tokens.
- GHT5-22121 - A user can now double-click on the Test Results table for a performance test in order to open the chart.
- GHT5-23257 - WMIS probe now deals with passwords correctly.
- GHT5-23245 - Support expansion of leaves under WebMethodIData nodes.
- GHT5-22501: Control flow is now resumed properly in future iterations of an iteration action after one iteration fails due to an assert action asserting false.
- GHT5-22508: The Schema wizard now takes account of the settings of the "Include Text nodes" and "Include optional fields" check boxes on the "Message Settings" page of the Preferences dialog box. .In addition, an issue has been fixed that could excessive memory consumption by GH Tester while using the Schema wizard and the Requirements Library.
- GHT5-22509: An issue has been fixed that could cause a "NullPointerException" in the Results Gallery perspective when a scenario has no parent.
- GHT5-22511: An issue has been fixed that could cause a "NullPointerException" in the Results Gallery perspective when an iteration count is "Null".
- GHT5-22513: GH Tester reports are now published only when they are configured to publish.
- GHT5-22517: Action statuses are now reported correctly in Results Gallery perspective after an assert action asserts false in one iteration of an iterate action.
- GHT5-22536: GH Tester can now send invalid SOAP messages with schemas to a system under test even if the messages do not conform to the schemas.
- GHT5-22551: GH Tester now supports cancellation of JMS subscribes to Oracle WebLogic queues.
- GHT5-22557: Header schemas of HTTP Transport receive reply messages are now editable.
- GHT5-22562: GH Tester no longer applies time zone offset corrections to date-only columns in databases that are marked as type "Timestamp".
- GHT5-22563: GH Tester's COBOL Copybook lexical analyzer has been enhanced to allow more characters in identifier names.
- GHT5-22578: Tag values set up in the Initialise phase of a GH Performance test are now available in the main test phase.
- GHT5-22589: An issue has been fixed that could cause the "Physical" resource list on the "Bindings" tab on the Environment Editor not to be sorted in alphabetical order.
- GHT5-22597:When generating tests from the Recording Studio perspective, the "Validate Element Action" is now used instead of the "Validate Message Action" for validating XML.
- GHT5-22613: An issue has been fixed that could cause a "ClassCastException" error when configuring TIBCO EMS probes to connect directly instead of a JNDI connection.
- GHT5-22624: Server-side synchronization of Software AG webMethods now identifies dependency changes in the Architecture School perspective.
- GHT5-22626: Headers of SOAP messages can be edited in the same way as the bodies.

- GHT5-22638: An issue has been fixed that could cause GH Tester not to recognize a data set until it is selected in the Test Factory perspective and Refresh is clicked.
- GHT5-22639: GH Tester now supports reconnecting a Software AG webMethods Broker to an existing Client ID if a connection attempt fails.
- GHT5-22672: GH Tester now supports better error logging from exceptions in (Java) "FutureTasks".
- GHT5-22702: GH Tester now supports vectors within IData instances. GH Tester also now supports Software AG webMethods table objects so that they are viewed as document lists.
- GHT5-22728: When synchronizing with a WSDL with multiple operations, GH Tester now adds the"SOAPAction"for each operation to the HTTP Header and Stub Header filters, which ensures that messages are recorded only for those operations that are executed.
- GHT5-22736: An issue has been fixed that could cause errors when creating resource files for use during performance tests.
- GHT5-22738: GH Tester now transmits key stores to agents when running GH Performance tests, which ensures that transports relying on SSL will operate correctly.
- GHT5-22743: In GH Tester, Software AG webMethods Integration Server passwords are now encrypted.
- GHT5-22744: An issued has been fixed that could cause a "NullPointerException" when running TIBCO Active Enterprise tests on Oracle Solaris and Microsoft Windows.
- GHT5-22748: When GH Tester runs from a command prompt, if there are TIBCO Active Enterprise tests in a project, BusinessWorks schemas are now built at load time instead of waiting until test execution.
- GHT5-22788: When attempting to publish a FIX message, the action now fails if the message cannot be published.
- GHT5-22845: The number of transactions specified in a GH Performance license is now used when calculating the load of a Constant Growth test that specifies the target per minute or per hour.
- GHT5-22851 : If Library Manager is run on a Windows machine with User Access Control (UAC) turned on then it will now prompt for escalated privileges so that it can write the configuration to the installation directory. Previous versions of Library Manager would silently fail to write the configuration if run by a non-administrative user under UAC
- GHT5-22864: GH Tester now supports XSDs that are UTF-16 encoded without a byte order mark.
- GHT5-22865: The "Run Command" action now supports the use of SSH private keys to connect to remote hosts.
- GHT5-22876: The GH Tester system property "com.ghc.ghTester.gui.console.trim" enables control of Test Lab Console window output. If the value is set to "True" rather than a specific size, Console window output will now be trimmed when it reaches 300,000 characters. This can help to reduce the amount of memory used by GH Tester in long-running (or verbose) tests.
- GHT5-21665: The Message Differences window is now correctly remembering the relative divider positions between messages and header/body even when it is fully maximized.

Resolved in 5.2.11

- T10192: When validating a message with the "Assert using function" action, expanded XML no longer overwrites non-equality actions if an equality action exists.
- T10352: Stubs are now able to make use of execution scope tags in the same way that tests can.
- T10401: GH Tester messages containing RFH header content can be saved as expected.
- T10451: Filtering in test data iterators works as expected when repeating elements are used in a message.
- T10613: Tag lists throughout the GH Tester GUI (for example, Run Test action, Value and Store tabs, mapped and unmapped lists, etc.) are now displayed in alphabetical order.
- T11064: SQL Query results are no longer rejected if field type TIMESTAMP WITH TIME ZONE is used.
- T11100: webMethods JMS transports (versions 6.5, 7.1, 8.0, and 8.2) are now supported natively in GH Tester.
- T11144: GH Tester no longer requires write access to the installation directory at runtime, meaning that non-admin users can run the application if an admin user installs it.
- T11315: If the project database is configured properly, links to open test results in the Results Gallery perspective are now added to the console report for test suites and for tests that are executed inside a Test Cycle. The link will not appear at all if there are no results to view (i.e. if the test was not executed inside a Test Cycle, or if the project database was not configured).
- T11458: Whitespace preferences are now being honored as expected according to the "Default xml:space to preserve" setting in GH Tester's preferences.

- T11472: Excel and CSV Test Data Sources have been optimized to reduce the amount of memory that they require, eliminating performance degradation over time in GH Tester. Note that the File test data set no longer supports being used to list files in a directory – the Directory test data set should be used for this function.
- T11508: If a test is empty or fails to compile, it will fail when executed. Additionally, any suite containing such a test will fail when executed.
- T11686: The Library Manager application runs as expected on the AIX platform.
- T11726: When overwriting an expected message in the Message Differences window, all subscriber field actions on the Filter, Assert, and Store tabs, as well as any rules, are maintained. Tags in Equality actions are also maintained if the value has not changed significantly.
- T11767: The database schema upgrade scripts include new indexes that have been found to generally improve the performance of various features, most noticeably using the Run… option to execute a test suite.
- T11797: The Length validation action in GH Tester is working as expected.
- T11825: When results publishing is enabled in a project, only the publishers specified in the command line or enabled in the GUI are utilized.
- T11847: If a test containing a SQL Query action is run within a suite, the test is executed as expected and the number of iterations executed is reported correctly.
- T11893: When synchronizing with a webMethods 8.0 Integration Server, if a service name cannot be extracted when creating an operation for the service, the operation is not created and a warning is displayed for that service.
- T11903: When using GH Tester's docked message editor, dragging and dropping a requirement into an action works as expected (i.e. the message is added to the action).
- T11910: TIBCO BusinessWorks private processes are working as expected within performance tests.
- T11920: Ad-hoc tests executed from HP Quality Center can now have their results stored in the project database if the tests are executed within an active Test Cycle that is configured to store results from external tools.
- T11939: When linking a GH Tester test in HP Quality Center, pressing CTRL+F will open a search dialog box where users can more easily locate the desired test.
- T11945: When selecting a GH Tester environment for a test set in HP Quality Center, the list of available environments is now ordered alphabetically.
- T11952: If a GH Tester test executed from HP Quality Center fails (for example, fails to compile), those tests will be reported as failed in the Quality Center run test dialog box.
- T12045: GH Tester is no longer generating an exception in the Recording Studio perspective when used with WMIS.
- T12068: EMS receivers remain connected for a short period of time after a test is completed because they are being cached by GH Tester – this is preventing the queue from being purged. To disable caching, enter the following JVM argument in GH Tester's Library Manager: -Dgreenhat.jms.pool.maxIdle=0
- T12095: If a webMethods schema fails to refresh once, GH Tester will stop trying to refresh it in order to avoid becoming unresponsive.
- T12097: If you mistakenly configure an Excel test data set to contain a header row when none exists (i.e. the first row of data is read as a header row), disabling the header row option and refreshing the data will clear the preview rows and re-display the data as expected.
- T12102: If you reconfigure a Hawk probe configuration to remove one or more existing microagents, the applicable counters no longer appear in the chart.
- T12187: If a project fails to load, the displayed error message now contains a "Details" button that provides information that can help resolve the issue or help Green Hat support in reproducing the problem.
- T12203: When "Accept Fields in Any Order" is enabled, messages that use a different namespace prefix than what is expected and those having XML namespaces in different locations will match (pass) as expected.
- T12245: Memory resources consumed by the Map action are being released as expected when the containing test finishes executing (i.e. GH Tester is no longer running out of memory).
- T12256: A time discrepancy between an EMS server and workstation is no longer causing errors in GH Tester.
- T12286: SWIFT 192/292 and 196/296 message types are now working as expected in GH Tester.
- T12294: When using certain programs in the Run Command action to output a value for an XML field, a carriage return is no longer being appended to the result. Note that issuing the "dir" command will still append a new line to the end.
- T12313: GH Tester performance issues (during design and runtime) when working with Test Data Sets on large delimited files have been addressed.

- T12325: A long console log can result in GH Tester using significant amounts of memory. To address this potential issue, a new JVM argument has been added that clears the console when it reaches 300,000 characters, which results in the capping of memory in use. To activate this fix, add the following console trimming option under JVM Arguments in Library Manager: -Dcom.ghc.ghTester.gui.console.trim=true
- T12333: Identity stores are now supported on the AIX platform.
- T12345: Tags used in the "Working Directory" field of the Run Command action are resolved at runtime as expected.
- T12373: Spaces are no longer being trimmed or removed from message fields.
- T12433: GH Tester's SSL implementation no longer forces the use of the Sun JVM, enabling SSL connections on platforms that use a different JVM.
- T12458: When publishing an array of type "String" in a webMethods IS message, the first element is normally used to determine the type. If this first element is null, however, the type will default to String[]as indicated by the meta type.
- T12461: TIBCO performance keys now work with JMS transports that have a TIBCO provider.
- T12474: Tear down actions no longer affect the overall passed/failed status of a test (for example, if a tear down action fails, it will not cause an otherwise passing test to fail).
- T12485: The "Run..." and "Re-run Failures…" context menu commands in the Task Monitor (in the Test Lab perspective) work as expected.
- T12486: If multiple asserts are used one after another in a test, they will all be executed as expected, but any failures will result in a failed test, and the result of each assert is displayed correctly in the detailed report.
- T12529: When deleting test suite results from the project database, if ALL projects and ALL suites were selected, the results deleted may have been incorrect.

Resolved in 5.2.10

- T9733: Synchronizing with a large number of webMethods IS packages no longer causes connection problems between GH Tester and the Integration Server.
- T10364: When a GH Tester test case is edited in QualityCenter, the test is opened in GH Tester as expected.
- T11201: After closing a project that was opened by double-clicking the project file, GH Tester no longer re-opens the same project after launching again.
- T11314: When working with a large GH Tester project in Quality Center, a running instance of GH Tester can be used to improve performance when selecting a resource or refreshing the project.
- T11329: Pop-up windows in GH Tester (for example, Message Differences, action editors) will open using the same location and state (maximized, minimized, floating) as when they were closed.
- T11339: The performance of GH Tester has been improved when working with test suites containing many tests or large tests.
- T11385: If GH Tester is running and a test is edited in QualityCenter, the running instance of GH Tester is used and the test is opened as expected.
- T11386: The procedure for adding test types for filtering the Test Lab perspective in HP Quality Center has been documented in *GH Tester Add-in Guide for HP Quality Center*.
- T11418: For HP Quality Center users, the button created using the example script in *GH Tester Add-in Guide for HP Quality Center* now sets the environment for every test instance in the test set instead of only the selected test instance.
- T11558: When Library Manager is launched via the installer, the "Cancel" button is disabled to ensure that pre-configured library changes or any user changes are saved when clicking "OK" or closing the window.
- T11591: When creating a test from a template, the CTRL+F (find) shortcut works as expected to search for a specific template to use.
- T11641: The port number configured in iProcess resources is now honored if it contains a valid numeric value.
    NOTE: Resources that had previously contained a valid but incorrect port number will now fail to work. This can be resolved by updating the port number directly or by using the discovery feature.
- T11657: A Stored Procedure action will no longer quit (i.e. fail) if it encounters a closed cursor.
- T11658: The Message Differences window can be launched from the Results Gallery perspective for tests containing a Stored Procedure or SQL Query action.
- T11660: When opening a window from a field in the Message Differences window (for example, double-click to open the Field Editor), your position in the message is maintained after closing the opened window.
- T11666: The Message Differences window is working as expected when message handlers are in use.

- T11671: A TIBCO BusinessWorks project containing a period in the project hierarchy path can be synchronized with GH Tester as expected.
- T11693: SWIFT MT700 messages are now working as expected in GH Tester.
- T11696: Log Measurements can be viewed and added to charts in GH Performance Tester as expected.
- T11716: When using an assertion and the "Retry query until assertion passes" option in the SQL Query action, the action retries the query as configured until the timeout is reached or the expected data is returned.
- T11735: When running from the command line on Linux, a test suite that contains another test suite executes as expected.
- T11758: An SAP logical transport can be set in the definition of an operation that has been built manually.
- T11764: GH Tester's Library Manager now includes JMS provider entries for WebLogic JMS thin and thick client JARs.
- T11771: HTTP "watch" mode is now available in the Subscribe test action. When using an HTTP server transport, "participate" mode is the only option. When using an HTTP client transport, Send Request and Receive Response actions use "participate" mode while the Subscribe action uses "watch" mode.
- T11821: Installing GH Tester from the command line using the silent (/S) option is working as expected. Note, however, that the unpacking method used by the installer is incompatible with certain Symantec antivirus and firewall tools. Users should be aware of this potential issue.

Resolved in 5.2.9

- T9820: The filenames for project resources in the Physical View of the Architecture School perspective are now based on the configuration of the resource. Probe resources will have the name of their containing resource added, and these filenames have a 128-character limit. All other filenames have a 64-character limit.
- T10850: Multiple tags are now supported in message fields when a COBOL Copybook schema is in use.
- T10907: The Next or Previous arrow is available in the Message Differences window when only one difference of the selected type exists.
- T11038: Results for stored procedure steps are now logged by GH Tester.
- T11190: Charts saved in GH Performance Tester can be reopened as expected.
- T11223: When using the Run Test action, the parent test will fail if the child test fails in any phase of the test.
- T11260: Run profile delays in v3/v4 GH Tester tests are migrated as expected using appropriate pacing options.
- T11312: When re-migrating a Solstice Integra Suite project, failed tests will be migrated along with all other project artifacts.
- T11353: When executing a test using the Run… option, the available tests are listed in alphabetical order.
- T11387: The environments used in a scenario are now displayed next to the Test Suite instance and in reports.
- T11390: XML field actions in GH Tester v3/v4 projects are now migrated as expected in GH Tester v5.
- T11399: When appropriate, message bodies (in the received and expected messages) are more closely aligned to one another in the Message Differences window.
- T11425: Functions migrated from GH Tester v3/v4 now specify a resource path that is valid in GH Tester v5.
- T11440: The GH Tester installer will present an error to the user if there is not enough disk space to continue.
- T11442: When adding Receive Reply actions to a test, the labels used to select the Send Request action are now more informative.
- T11456: Tags used in v3/v4 GH Tester tests are created properly when migrating to GH Tester v5.
- T11460: Tests migrated from GH Tester v3 have the xml:space preference enabled by default, and tests migrated from GH Tester v4 will maintain the state from the original test.
- T11511: Messages within Receive Reply and Send Reply actions are expanded automatically according to the system preference when using the docked action editor.
- T11583: The SQL result for TIMESTAMP(6) fields is no longer dependent on the user's local time zone.
- T11586: Environment tags in v3/v4 GH Tester projects are created as expected when migrated to GH Tester v5.
- T11593: When using multiple Run Test actions (in parallel, with the parent test waiting for the child to complete), GH Tester no longer throws an exception if any subscribers in the called tests fail to start in time or fail to find any suitable messages in their subscribed queue.
- T11601: Resources in a test suite are loaded only when needed so that suite execution can start more quickly.
- T11607: RFH headers are now interpreted correctly by GH Tester.

- T11610: Excel fields containing links in XLXS files are now read correctly by GH Tester.
- T11612: Field 57C is now included in GH Tester's SWIFT Message MT103 schema.
- T11626: Excel test data in projects created in earlier versions of GH Tester is imported correctly to the current version.

Resolved in 5.2.8

- T11499: Connections to a TIBCO EMS server are cleared properly when a test finishes executing, meaning that any unused connections will be closed as expected.
- T11566: When using the Run Test action (serially or in parallel), child logging information will appear in the Results Gallery perspective the same as it does in the Test Lab perspective.

Resolved in 5.2.7

- T10636: When repairing a field with a regular expression, the expression will be updated even if the field had been marked previously with a regular expression.
- T10742: Comparison ignores and data substitutions are migrated correctly from Solstice Integra Suite.
- T10831: Certain dialog boxes within GH Tester now support scrolling and wrapped text to ensure that the "OK" and "Cancel" buttons are available on screen.
- T10857: When testing a query in the SQL Query action, the progress of the query is now displayed and users can cancel the query, if desired.
- T10932: When running a test suite using the Run… option, the suite will be executed as expected according to the "Run Resources" preference (i.e. the saved version or the current version).
- T11187: When applying a schema to a message and selecting the "retain content" option, attributes are not removed from the message.
- T11216: Fields that have been mapped to tags by the user (or those set to "No mapping") are no longer overwritten when used in test data iterations.
- T11234: When a schema is loading in a test containing a stored procedure, the process can be cancelled as expected. Note, however, if you cancel the schema refresh, the only way to import the schema without restarting GH Tester is to rebuild the physical database resource in the Architecture School perspective (right-click and select "Rebuild").
- T11239: Both expressions in the Equals function are evaluated as strings, regardless of whether or not one or both expressions are quoted (including tags).
- T11273: Memory consumption and performance of the Solstice Integra Suite migration tool has been improved, allowing larger projects to be migrated completely.
- T11306: When migrating a Solstice Integra Suite project, Test IDs are saved so that a cancelled migration can be resumed at a later time (i.e. duplicate Test IDs will not be created during the second migration).
- T11313: The Solstice Integra Suite migration program now contains options to minimize the number of physical HTTP resources that are created during the migration.
- T11317: When migrating a Solstice Integra Suite project, cached values are converted to "Store" actions as expected.
- T11323: Selecting "Close All" from the context menu in the Test Factory perspective closes all editors as expected.
- T11342: When a SOAP 1.2 fault is sent by an HTTP stub to a Receive Reply step, the message sent contains the correct SOAP fault structure.
- T11426: When migrating a GH Tester project using deterministic IDs, the path actions associated with Decision actions (True/False) and Lookup Test Data actions (Found/Not Found) now have deterministic IDs.
- T11430: A GH Tester project can be migrated without errors to a folder that was used for a previous migration and subsequently deleted.
- T11431: Empty/null fields received in the Recording Studio perspective from a webMethods Broker are received and displayed properly ("is null").
- T11434: Some inconsistencies in the Message Differences window (when first opened) have been resolved.
- T11476: A physical UDDI Server resource can be created in GH Tester's ArchitectureSchool as expected.
- T11513: Connection issues from GH Tester to systems requiring keyboard interaction can be resolved by adding the following JVM argument in GH Tester's Library Manager: -Dgreenhat.ssh.keyboard.interactive=true

- T11519: If necessary when configuring the TIBCO EMS transport, users can enter a ConnectionFactory class name in the initialContextFactory field.
- T11520: Results Server displays reports as expected when invoked from HP Quality Center.

Resolved in 5.2.6

- T10257: If any stubs in a scenario fail to compile or start, all stubs are stopped and none of the tests in the scenario are executed.
- T10530: Re-running failed tests in a suite a second time executes the failed tests as expected.
- T11016: "Accept fields in any order" (in the configuration of a validation action for a message) now applies to messages containing child fields with the same name.
- T11090: The deletion of historical results from the Results Gallery perspective can be cancelled once the operation begins.
- T11160: Performance test data can be deleted from GH Performance Tester as expected.
- T11253: The content received in a Solace JMS message with bytes payload can be viewed as expected.
- T11261: When testing with certain WSDLs that are referenced via URL, overwriting message fields in the Message Differences window is working as expected.
- T11271: GH Tester now synchronizes the listeners in a class to eliminate "ConcurrentModificationException" errors that may occur.
- T11283: The toolbar used for building file schemas in the Schema Library has been restored in GH Tester.
- T11311: COBOL Copybook schemas can be created in the Architecture School perspective's Schema Library as expected.
- T11325: When migrating a v3/v4 GH Tester project, migrated transports can be merged into existing transports (in the target project) as expected.
- T11334: The creation of deterministic resource IDs has been enhanced in the GH Tester migration program (see *GH Tester Migration Guide* for more information).
- T11352: Oracle queries and stored procedures execute as expected, regardless of current time zone.
- T11359: The Assert action is now supported when migrating v3/v4 GH Tester projects.
- T11390: XML field actions are migrated correctly from v3/v4 GH Tester projects.
- T11410: Within an action group, Receive Reply actions are no longer promoted/executed before their associated Send Request actions.
- T11417: The XML field expander property "Send NULL Values" is only used when publishing XML – it has no effect when opening or editing the message.

Resolved in 5.2.5

- T11281: The GH Tester database update scripts for Oracle can be executed from SQLPlus.
- T11282: All infrastructure components from a synchronized TIBCO BusinessWorks project appear in the Logical View of the Architecture School perspective (as expected) after reopening the project.

Resolved in 5.2.4

- T8521: A WSDL containing a space in its URL can be synchronized with GH Tester without issues.
- T9836: The data in a File Data Source whose path contains a tag can be previewed in GH Tester without issues.
- T11028: When using the docked action editor, users are no longer prompted to apply changes when no changes have been made.
- T10992: Message fields no longer show as invalid (red "x" on the field) when pasting a message or using a valid SWIFT message schema.
- T11086: Multiple test resources can be selected when generating an ANT script in GH Tester.
- T11142: The "Iterate Test Data" test action now contains an "Iterations" field (same as the "Iterate" test action), which can be used to handle migrated GH Tester tests that used a run profile to execute a test with a predefined set of data rows.
- T11162: In HP Quality Center, environments for test suites containing GH Tester projects can be selected without issues.
- T11209: A "Run Command" test action that has been migrated from GH Tester v4 can be opened without issues in GH Tester v5.

- T11228: Expected documents from Solstice Integra Suite tests that use the SQL protocol are migrated as expected to GH Tester.
- T11233: When executing tests via ANT, all files in the script are processed as expected.
- T11240: If CDATA elements in a migrated Solstice Integra Suite test are ignored globally, then both stdout and stderr will be ignored in the resulting GH Tester test.

Resolved in 5.2.3

- T9753: Report tabs in the Results Gallery perspective are always cleared before displaying any new data to ensure that the report displayed is current.
- T10270: When repairing differing message fields with a regular expression in the Message Differences window, the action will not be performed if the target field does not contain comparable content (i.e. its structure is not similar to the compared field), and the console output will indicate that no change was made.
- T10478: Ignored header items (in the Message Differences window) are counted correctly.
- T10587: Issues have been resolved with installing GH Tester on Windows XP SP2 when certain antivirus tools are running.
- T10675: Authentication specified under "Watch Settings" for EMS is being utilized as expected.
- T10750: Unsupported items in a project's "/Logical" directory do not cause issues when opening the project.
- T10814: When executed within an "Iterate" test action, the "Increment" field action works as expected, regardless of whether or not the "Creates new test iteration" option is enabled.
- T10832: The Message Differencing window now works in Windows 7 when using Aero themes.
- T10871: XML message validation now supports tagged namespaces.
- T10879: Disabled Validate Xpath field actions containing an unknown tag do not cause a test to fail.
- T10936: When empty text nodes are deleted from a message, they are no longer added back when the message is opened for editing or when the message is migrated.
- T10953: TIBCO AE messages containing a "null ^exception^" field (commonly found in operation reply messages) and a string field containing expanded XML are sent properly.
- T10958: When opening a test asset from the project explorer or the console in the Test Lab perspective, the asset is opened for viewing/editing in the Test Factory perspective.
- T10961: Database connections used by SQL test actions are now recycled by GH Tester.
- T10987: Improvements have been made in the performance of the Message Differences window when comparing extremely large messages.
- T11002: When migrating GH Tester messages that declare the SOAP-ENV namespace, the namespace is removed in the migrated test/message since the declaration is part of the SOAP envelope in GH Tester v5.
- T11027: For RV tests migrated from GH Tester v3 or v4, non-environment tags used in a subscriber subject will be replaced with an RV wildcard character (>). Additionally, a filter will be added to the subject field of the subscriber header that filters for the original tagged subject.
- T11039: Validating an empty returned field using "Is Null" validation works as expected.
- T11049: GH Tester now supports sys_refcursor stored procedure output parameters.
- T11064: SQL Query results are no longer rejected if field type TIMESTAMP WITH TIME ZONE is used.
- T11091: Leading spaces in the DB connection URL are trimmed (both in the project properties and when connecting to the database) to avoid connection errors.
- T11108: When using the SWIFT formatter, a blank field that is the only member of a parent group can be parameterized from a dataset, as expected.
- T11186: When migrating v3/v4 GH Tester projects, the creation of deterministic resource IDs can be enabled (see *GH Tester Migration Guide* for more information).
- T11189: Tests that reference a test data source can be executed from the command line without issues.
- T11113: Tag names can now be preceded by a % sign.
- T11137: EMS messages can be received from a queue when subscribing in "Watch" mode and using a message selector.
- T11156: When selecting a test to run with the "Run Test" action, users can select a test that is stored in the same folder as the test containing the action.

Resolved in 5.2.2

- T10894: Tests and suites can now be opened using the "Open" icon, and tests can be opened from a suite using the icon or by double-clicking.
- T10898: GH Tester performance has been improved when opening the Message Differences window for large message comparisons.
- T11003: When migrating IBM WebSphere MQ tests from Solstice Integra Suite, subscribe test actions are no longer created if the expected document being migrated is empty.
- T11015: When migrating Solstice Integra Suite projects, the Integra test ID is automatically inserted into the "External ID" field of the destination test.
- T11020: When migrating a Solstice Integra Suite project to a GH Tester project that was not created by the migration manager, users now have the option to change the migration settings or select a different project without having to exit the migration wizard.
- T11026: When migrating a Solstice Integra Suite project to a GH Tester project, errors and warnings are populated as Comment actions in migrated tests.

Resolved in 5.2.1

- T10874: A stored procedure that returns a cursor can be executed as expected.
- T10876: The "Run Command" test action can be edited as expected.
- T10903: The Working Directory parameter is preserved and set in the GH Tester Run Command action when migrating Solstice Integra Suite tests that use the Commandline protocol. See Known Issues for more information about UNC paths as the current directory.
- T10912: The necessary logical components and SQL assertions are created when SQL tests are migrated from Solstice Integra Suite.
- T10913: Solstice Integra Suite comparison ignores are migrated properly to the GH Tester rules cache.
- T10917: Cached values in Solstice Integra Suite tests are migrated as global tags in GH Tester.
- T10918: When migrating Solstice Integra Suite tests that use the Commandline protocol, any cached values on the XML output are migrated as XPath store actions in GH Tester. Additionally, the expected XML in the migrated test appears as plain text in Standard Output or Standard Error under the Assert tab.
- T10920: The XML payload in MQ messages migrated from Solstice Integra Suite now matches the original format (single-line).

Resolved in 5.2.0

- T9342: When switching environments from the toolbar, the current environment is displayed at the top of the list and is unavailable for selection.
- T9811: The project root tag is used for file locations within the project rather than an absolute path.
- T9912: When switching to the Results Gallery perspective from the Test Factory or Test Lab perspectives, the selected resource (or first of multiple selected resources) will be selected in the Results Gallery perspective if historical results are available for it.
- T10082: Test artifacts now contain a user-defined External ID field and a read-only Internal ID field.
- T10271: The project root tag is used for a Directory Data Source within the project rather than an absolute path.
- T10471: GH Performance Tester Agents continue to run when the user logs off or locks the workstation.
- T10479: The default path to `tibrv.jar` for TIBCO Rendezvous 8.1 has been updated in the Library Manager utility. Upgrading users should edit and reselect the file, however, since the incorrect path may be cached.
- T10540: More details are available in the error dialog box when the project database connection fails.
- T10563: Triggers can be run as expected against a webMethods operation that is part of a cluster.
- T10575: Custom message properties are copied to subscriber-based test actions from recorded JMS messages.
- T10590: When working with TIBCO AE messages in a BusinessWorks repository, Generic Application is initialized before test execution.
- T10608: Missing tags are now captured by GH Tester as such, and test actions that use them are still editable.
- T10626: Support for the JCC JDBC drivers for IBM's DB2 database is now included in GH Tester.
- T10659: Services from imported webMethods 8 packages can be recorded as expected.

- T10693: Pipeline data is removed properly when executing a webMethods test against a stub.
- T10738: Schema(s) for TIBCO Private Process tests can be refreshed in GH Tester as expected.
- T10774: GH Tester users are notified if the project database becomes unavailable.
- T10781: The SQL Query and SQL Command actions utilize a scrollbar if the query is too large.
- T10782: Saving a project can be cancelled if the destination drive is unavailable.

Database Update

This release of GH Tester provides a schema version of 1.9.24.d for the project database. The updated schema (from version 1.9.24.c) adds support for Test Suite archive-policies and extends the column size used for the EMS probe.

If you are upgrading to this version of GH Tester from an earlier release, you should apply the appropriate update script(s) that can be found in the scripts directory of your GH Tester installation (for example, C:\Program Files\GreenHat\GHTester\scripts). See *GH Tester Installation and Deployment Guide* for more information.

GH Tester 5.2.11.x will operate correctly against schema 1.9.24.c. This allows customers using 5.2.11.x to upgrade project databases first (and continue using 5.2.11.x) and then upgradeclients to 5.4.0 as required.

Known Issues

Test Cycles and Coverage Reports

If you are using Test Cycles and want coverage reports, the applicable tests must still be executed from within a test suite (i.e. coverage reports will not be produced for tests that are executed outside of a test suite).

Column Level Validation Cannot be Displayed in the Message Differences Window

Validation on table rows and cells performed within the SQL Query action works as expected and is displayed in the console accurately. If column-level validation is used, however, any differences are displayed correctly in the console, but they are unable to be displayed in the Message Differences window as it is currently only able to display row-by-row and cell-by-cell validation issues.

Duplicated Physical Resources when Using Source Control

GH Tester now uses a different method of creating filenames for physical resources. For this reason, source control users may see duplicate items due to the way the project was updated/committed after the resource change. In this case, the newer/newly named resource should be kept.

webMethods Broker Events

When recording webMethods Broker events, some fields may be seen to contain null rather than their actual content. This occurs because elements wired to a byte-array by an IS to publish can only be un-wired by another IS, this is an internal mechanism of IS and cannot be overcome. This has been seen with the MQ adapter notifications for the "MsgBody" and "MsgBodyByteArray" fields, but may affect others. Further information can be found via Software AG support, incident number 5019024.

Logical View

Sometimes adding a service component to the logical view will not add it to the diagram.

If there are a small number of objects on the logical view then the zoom level may automatically set itself to a very high level.

10905: User Names Containing "#" Character

The Eclipse framework (and therefore GH Tester) does not support user names that contain the "#" symbol. This issue may result in the deletion of project files as GH Tester cannot interpret the full path to the user's "Documents and Settings" directory for application preferences.

The workaround for this issue is to create a folder to use as a GH Tester workspace (for example,C:\GH) and edit **TestEngine.ini** (found in C:\Program Files\GreenHat\GHTester, by default) to point to it. The line below "-data" should be changed from "@user.home/.ghTester5/perf-workspace" to "C:/GH/.ghTester5/perf-workspace".

UNC Paths as Current Directory in Run Command Action

Cmd.exe, used by the GH Tester Run Command test action, may return an error when trying to process a UNC path. More information regarding the resolution is available at http://support.microsoft.com/kb/156276/EN-US.

10766: Various issues with performance tests if running multiple test engines on one agent

10158: Issue with SSL tab referencing one of a number of identity stores

In a project with multiple identity stores the GUI does not always correctly reflect the one selected.

If you select any identity store from the Identity Store drop down menu and click OK to close the transport window, GH Tester will select the correct identity store when processing the data. This can be seen when opening up the physical files in the Physical folder of the GH Project on your C drive. The HTTP file references the id of the selected Identity Store correctly.

Error scenario

If you select any identity store from the Identity Store drop down menu, **but then reselect the Identity Store drop down menu** it will not retain the selected id store and will default back to the first id store in the drop down menu. Clicking OK on the window will then rewrite the physical files on your drive to reference the first id store in the list. So this should be avoided until fixed.

Simultaneous Modifications

If a message is opened in a message editor (for example, a Subscribe action) and the message differences window at the same time, changes made in one window will be overwritten or reverted when closing the other window. More specifically, the content of the window that is closed last will overwrite the content of the window that was closed first.

This also applies if the message differences window is used to correct messages used in a stub if the stub editor window is open. Note that this problem can be avoided by selecting the user preference, "*Run from Disk*" as opposed to *"Run from Memory"*.

User Permissions on Linux

The user of the Recording Studio perspective on the Linux platform requires administrative privileges. Before you can run GH Tester as an administrator, however, you must run the Library Manager as an administrator (this is due to the way the *.GHTester5* directory is created under the user's home directory). Similarly, if you want to run GH Tester as a non-admin user, you must first run Library Manager as that non-admin user.

WS Security

Currently only outbound actions are supported within the WS-Security node processor.

Results Rendering

The third party rendering engine has performance issues when dealing with larger reports, this may be alleviated by increasing the amount of memory allocated to the application.

Invalid Schema Messages

Some message fields may be displayed as invalid (red "x"), even though they are valid fields/messages.

SCM

If a newer version of GH Tester is installed after adding team providers to SCM, the providers will have to be reinstalled unless their installation is outside of the GH Tester install folder (detailed in *GH Tester Installation and Deployment Guide*).

TIBCO BusinessWorks Private Processes

- The BW private process transport uses HTTP as its primary communication method, but GH Tester's "Publish" test action does not support HTTP. Therefore, the Send Request/Receive Reply action pair should be used for testing private processes.

- Error schemas are not supported (for example, if a process outputs an error schema rather than an end schema, the error schema/output is not supported in GH Tester).

- GH Tester does not support the following content in private process schemas:
  - A "Choice" content option at the root of the schema
  - Pointing to an AE message from anywhere (i.e. inner or at the root) causes a known deserialization issue
  - The "Java Object Reference" type is not supported at any level
  - The inline WSDL message content option is not supported

- If you get a connection error when calling a private process, please check the network settings. If you open the Designer Engine Custom Properties in the Physical View of the Architecture School perspective, you will find the host and port number. The host/port in the Physical View menu must match the host/port in the GHEnable.proj design time library in the BW project. The BW host/port can be set when the project is deployed.

Data Transfer Objects (DTOs)

DTO support is currently limited to the following:

- Classes with a default constructor and publicly visible member variables
- Member variables must be primitives, wrapper objects, Strings or other objects within the JAR file
- JMS providers who use the Context Class Loader to obtain message definitions