

HD-X Analyzer Quanterix® Reporting Tool Technical Information

USER-0071 01

Software Version 1.0.0.X





Customer Support

Customer support is available 8 AM to 5 PM, EDT.

email: techsupport@quanterix.com

Contact Us

Quanterix Corporation

900 Middlesex Turnpike

Billerica, MA 01821

email: techsupport@quanterix.com

The Quanterix products referenced in this document are for research use only and are not for diagnostic or therapeutic procedures.

© 2019 Quanterix Corporation. All rights reserved.

Simoa and Quanterix are registered trademarks of Quanterix Corporation.

This product is protected by US and Foreign patents and patent filings.

Quanterix Corp. provides this document to its customers with a product purchase to use in the product operation. This document is copyright protected and any reproduction of the whole or any part of this document is strictly prohibited, except with the written authorization of Quanterix Corp.

The contents of this document are subject to change without notice. All technical information in this document is for reference purposes only. System configurations and specifications in this document supersede all previous information received by the purchaser.

Quanterix Corp. makes no representations that this document is complete, accurate, or error-free and assumes no responsibility and will not be liable for any errors, omissions, damage, or loss that might result from any use of this document, even if the information in the document is followed properly.

This document is not part of any sales contract between Quanterix Corp. and a purchaser. This document shall in no way govern or modify any Terms and Conditions of Sale, which Terms and Conditions of Sale shall govern all conflicting information between the two documents.

Contents

1	Overview	1
2	Reporting Schedule	1
3	Obfuscation of Sensitive Data	2
4	Data Collected	3
	QRT_SystemInfo.sql.....	3
	QRT_MaintenanceTask.sql.....	3
	QRT_RunReliability.sql	4
	QRT_DataQualityTest.sql.....	5
	QRT_DataYield.sql	5

1 Overview

The Quanterix™ Reporting Tool (QuaRT) program is used to provide information on the performance and reliability of the HD-X Analyzer to Quanterix. This information is important for monitoring the HD-X Analyzer, for tracking performance with service calls, and providing feedback to the customer on the collected data. The QuaRT program is installed as part of the Customer Support Tool (CST).

2 Reporting Schedule

Using the CST Configuration Utility, QuaRT can be set to automatically run when the instrument computer is turned on. This schedule ensures that QuaRT will not be automatically run when the HD-X Analyzer is in operation.

Alternatively, QuaRT can be run on-demand using the CST. If the Simoa® software is not active, QuaRT can be run at any time, even if it is set to run on an automatic schedule.

Refer to the document *Quanterix Customer Support Tool User Guide* for instructions on how to set the QuaRT run schedule.

3 Obfuscation of Sensitive Data

As part of collecting data for Customer Support, QuaRT obfuscates data from the database for some parameters that are considered customer-specific, sensitive, or proprietary. This data includes HD-X Analyzer software usernames, assay names, batch names, and other information.

These parameters are marked in bold type with an asterisk in the tables below.

To obfuscate these values, the QuaRT software computes a unique string of characters (a *salt*) from the PC by reading and then encrypting the processor ID string. After the salt is appended to each sensitive parameter, the MD5 hash is computed. This hashed value is reported; the salt is never reported to Quanterix. This mechanism protects customer privacy and proprietary information while still allowing Quanterix to monitor patterns of instrument usage and reliability.

For example, if QuaRT data indicates that batches on a particular weekday always fail, it would be possible to see if a unique username was used on those days. However, any connection to an actual user would only be available to the customer.

As an example, a customer assay with the name "Homebrew Assay 1" is reported by QuaRT with a value of "EF0CD653EA048DA0994E8DBE91D6EE98" where the exact value is unique to each assay on each HD-X Analyzer.

The MD5 hash values are computed within the QuaRT SQL queries. Below is the format for how this is computed, where @Data is the data to be obfuscated and @Salt is the salt value as defined above.

```
CONVERT(NVARCHAR(32),HASHBYTES('MD5', CAST(@Data As VARBINARY(MAX)) +  
CAST(@Salt as VARBINARY(MAX))),2)
```

4 Data Collected

The QuaRT tool executes a set of five queries against the HD-X Analyzer software’s SQL database and generates comma separated value (CSV) format output files. The following sections describe the data collected for each query.

QRT_SystemInfo.sql

This query collects data related to the PC.

Value	Description
InstrumentSerialNumber	Serial number of the HD-X Analyzer.
ReportExecutedDate	Timestamp for when QuaRT was run.
SystemStartupTime	Last time the PC booted up.
Disk1_SpaceTotal	Total disk space on the PC hard disk (MB).
Disk1_SpaceAvailable	Available disk on the PC hard disk (MB).
TotalPhysicalRAM	Amount of RAM installed (MB).
DB_DatabaseSize	Size of the SQL Server database file (MB).
DB_UnallocatedSpace	Unallocated space in the database file (MB).
DB_Reserved	Reserved space in the database file (MB).
DB_DataSize	Size of the database data file (MB).
DB_IndexSize	Size of the database index file (MB).
DB_Unused	Unused space in the database (MB).
QueryVersion	Version of the SQL query.

QRT_MaintenanceTask.sql

This query collects data related to the running of HD-X Analyzer software maintenance tasks. Values marked with an asterisk are obfuscated, as described in this chapter.

Value	Description
InstrumentSerialNumber	Serial number of the HD-X Analyzer.
Username *	Username of the HD-X Analyzer user that ran the task.
EventDateCreatedUTC	Timestamp for the maintenance task execution.
NiceID	Software code for the maintenance task execution state.

EnglishMessage	Descriptive message for the maintenance task.
MaintenanceLastRunDate	Last time the maintenance task was run.
MaintenanceTaskName	Name of the maintenance task.
QueryVersion	Version of the SQL query.

QRT_RunReliability.sql

This query collects data on errors both during the running of batches on the HD-X Analyzer. Values marked with an asterisk are obfuscated, as described in this chapter.

Value	Description
InstrumentSerialNumber	Serial number of the HD-X Analyzer.
BatchName *	Name of the batch.
BatchId	Database ID for the batch.
ScheduledJobs	Number of jobs scheduled for the batch.
FinishedJobs	Number of jobs that did not stop with an error in the batch.
SuccessRate	Fraction of jobs that completed.
BatchDate	Timestamp for the start of the batch.
BatchEndDate	Timestamp for the end of the batch.
MessageResourceIdentifier	HD-X Analyzer software code for failure event, if any.
EnglishMessage	Descriptive message of failure, if any.
EventSeverity	Severity of failure, if any.
SoftwareVersion	Version of the HD-X Analyzer software.
QueryVersion	Version of the SQL query.
AggregatedMessageResourceIdentifier	A list of all MessageResourceIdentifier codes that may have occurred in the batch.
AggregatedEnglishMessage	A list of all EnglishMessage descriptions that may have occurred in the batch.
AggregatedEventSeverity	A list of all EventSeverity codes that may have occurred in the batch.

QRT_DataQualityTest.sql

This query collects data related to optical performance of the HD-X Analyzer. The “test” is done entirely within the SQL query and does not involve the instrument hardware.

Value	Description
InstrumentSerialNumber	Serial number of the HD-X Analyzer.
StartDate	Start date for data quality query.
EndDate	End date for data quality query.
Test	Identifier for the test performed.
Result	Result of the test.
Notes	Any notes, if available.
QueryVersion	Version of the SQL query.

QRT_DataYield.sql

This query collects information on reliability and quality on a job-level basis. Values marked with an asterisk are obfuscated, as described this chapter.

Value	Description
JobId	Individual database job ID number.
BatchDate	Date the batch started.
BatchName *	Name of the batch for the job.
DateJobStarted	Date the individual job started.
DateJobFinished	Date the individual job started.
Discriminator	Specimen or calibrator tag.
BatchId	Database batch ID for the job.
InstrumentSerialNumber	Serial number of the HD-X Analyzer.
SoftwareVersion	Version of the HD-X Analyzer software.
Username *	Username of the HD-X Analyzer user that ran the batch.
AssayName *	Name of the assay. This is <i>not</i> obfuscated for Quanterix kit assays.
AssayCreatedBy *	Name for the HD-X Analyzer account used to create the assay. This is <i>not</i> obfuscated for Quanterix kit assays.

Value	Description
PlexName *	Name of the plex. This is <i>not</i> obfuscated for Quanterix kit assays.
BeadColorBarcode	Bead color barcode.
ImageAnalysisVersion	Version of the image analysis software used for the batch.
NumberBeads	Number of beads detected in image.
NumberPositives	Number of wells with positive RGP growth.
lbead	Per-bead intensity.
FractionOn	The fraction of the beads in this job with sample.
lsingle	Intensity for a single enzyme.
ReplicateResultId	An ID number that identifies jobs as being part of a set of replicate samples.
L1DRAvailable	True/false flag indicating that image analysis was successful.
JobCancelled	True/false flag indicating if the job was cancelled.
JobFinished	True/false flag indicating if the job finished.
CommercialAssay	True/false flag indicating if the assay is a Quanterix kit.
Error	Final status message for the job.
WellLocation	Well location for the job.
LaneNumber	Lane number for the job.
LoadingBay	Loading bay number for the job.
SampleShortName *	Sample short name, if any.
SampleType	Sample type (specimen or calibrator)
BeadReagentBarcode	Barcode for the bead reagent.
DetectorReagentBarcode	Barcode for the detector reagent.
SBGReagentBarcode	Barcode for the SBG reagent.
RGPReagentBarcode	Barcode for the RGP reagent.
FractionImageDebris	Fraction of the image masked due to debris.
FractionWellsDebris	Fraction of the sample wells masked due to debris.

Value	Description
IndexingWellsTotalLostBothVisibleAndMissing	Count of wells lost to indexing errors.
MeanDecodingIntensity	Mean intensity of beads during plex decoding.
FillPercent	Percentage of wells filled with a bead from the unlabeled plex (i.e. the sample bead in singleplex assays).
Empties488F1MeanIntensity	Measure of empty well intensity.
FocusScoresAvg	Average focus score for the disk.
NumberPositiveEmpties	Number of empty wells with positive RGP growth.
NumberValidWells	Number of valid usable wells in the image.
Focus_FracImageLost	Fraction of image lost due to focus issues.
DiskArrayBarcode	Barcode for the disk.
Notes	Informational messages created during image analysis.
Warnings	Image analysis software notes.
L1DR_Errors	Errors encountered during image analysis.
InstrumentMessages	Job related messages from the HD-X Analyzer software.
QueryVersion	Version of the SQL query.