Runtime

> ⚠ **Runtime Migration Notes**
>
> The following bugfixes and features are subject to migration. Please perform the described migration tasks if necessary.

RUNTIME Version	Note		
2023.3	The exception codes/domains for the S3 Adapter have been adjusted to follow the same rules the other components use. Updating the models may be necessary.		
2022.9	This Runtime fixes a potential misbehavior of URL Adapter and an easy-to-trigger data loss if using it with FTP-like protocols, introduced in version 2022.8.		
2022.6	This Runtime comes with an updated version of Swagger UI. You may need to restart your Bridge to see the Bridge API documentation.		
2022.1	The minimum version requirements for persistent state databases have changed to • Oracle 12c • SQL Server 2012		
	The handling of external persistent state attributes (**loadExternals**, see Loading External Persistent State Data) has changed. External persistent state attributes will only be loaded once during a persistent state transaction. Subsequent calls of **loadExternals** will be disregarded until session end. The **loadExternals** adapter action cannot be used to reset external attributes of an object.		
2021.7	Due to changes regarding the response content type for traces, you need to update to Builder 7.16.0 and Analyzer 7.15.1 when using this xUML Runtime.		
2021.5	ZIP adapter: Action **unzip** disregards the **overwrite** parameter and does not overwrite existing files.		
2021.4	As of this Runtime version, **CentOS 6** and **RedHat 6** are no longer supported.		
	ZIP adapter: Action **unzip** disregards the **overwrite** parameter and does not overwrite existing files.		
	PAS-264	On Linux the new library version causes change of precision in floating point values. Example differences that may occur:	
		Old	**New**
		123456789012346.7	123456789012346.703125
		65.430000000000007	65.430000000000006821210263296962
		-0.222	-0.22200000000000000288657986402541
2020.15	This release is not recommended because it introduces a service crash with UIs.		
2020.13	RUN-2696	SAP: Some previously hidden exceptions may now be reported. This is mostly (but not exclusively) the case if metadata is present in the model but not on the SAP side.	
2020.12	RUN-2410	SAP libraries updated. Now, default parameters/values in RFCs are respected - that means that it is possible for a parameter or field, that previously has been empty, to now have a default value.	
2020.9	This RUNTIME drops bug-compatible file system handling on Windows. Repositories older than 2011 will not start on Windows. The cause will be clearly stated in logs.		
2020.6	As of this Runtime, the JSON composer has been re-written to be RFC8259-conformant. This may result in slightly different output than before regarding whitespaces or order of keys.		
2020.4	RUN-2599 corrects the behavior of custom constructors in case their parameters are function calls with dynamic parameters. There is a slight chance that existing models have a bug that has been masked by this issue and now the incorrect behavior may surface.		

2019.13 2020.1 2020.2		The transaction logging is broken in this RUNTIME version. Final fix with 2020.3.
2019.13		This RUNTIME does not distinct between **Internal**, **External**, and **User** anymore in the xUML server logs. As of this version, all log entries are logged with category **Internal**.
2018.11	RUN-2264	With this RUNTIME we removed support of BRIDGE version 4.1. Repositories that have been compiled with such versions will not start on BRIDGEs with Runtimes as of version 2018.11.
2018.10	**RUN-2281** RUN-2383 RUN-2407 **RUN-1964** RUN-2388 RUN-2408	With this RUNTIME we finally decided to activate the error log in case of comparison with NULL values (RUN-1964), or navigation to NULL references (RUN-2281) only if the modeler recompiles the service. You can fix these model errors e.g. as follows: • `local int = myNullObject.index` **`if myNullObject.exists()`** Also do something in case `int` did not get initialized. • **`myNullString.exists() and`** `aValidString > myNullString`
2018.7	**RUN-1964** RUN-2388	In Runtime 2018.1, we fixed bug RUN-1964 concerning comparison with NULL values. With RUN-2388, we decided to not throw an exception in this case, but to log an error to the bridgeserver log. That way, all services will still run, but the error will come to notice nevertheless.
2018.6	**RUN-2281** RUN-2383	In Runtime 2018.4, we fixed bug RUN-2281 concerning navigation to NULL references. With RUN-2383, we decided to not throw an exception in this case, but to log an error to the bridgeserver log. That way, all services will still run, but the error will come to notice nevertheless.
2018.4	RUN-2281	With RUN-2281, we fixed a bug concerning navigating to references that are actually NULL. As of this RUNTIME, an exception will be thrown in cases like `local int = myNullObject.index`.
2018.2	RUN-2144	With Runtime 2018.2, we fixed a serious bug (RUN-2144) that led to a session commit although an exception had occurred and the session should have been rolled back. If an exception occurred in an action that was followed directly by a decision node, the exception was logged and the activity was aborted, but the xUML RUNTIME assumed nevertheless that execution has been fine and committed the session. That resulted in SQL, persistent state, JMS and POP3 changes being committed instead of rolled back in case of error. Additionally, no error handlers have been invoked either. Please read Bug: Session Commit on Exception for a more detailed explanation. Runtime 2018.2 is a recommended update, because this bug can lead to inconsistent data.
	RUN-1964	With RUN-1964, we fixed a bug concerning comparison with NULL values. As of Runtime 2018.1, NULL values can only be compared for equality and inequality. All other comparisons like e.g. `aValidString > NULL` are rejected and an exception will be thrown.
2017.7		As of Runtime 2017.7, we had to introduce an implicit dependency to the Windows Universal Runtime. To run services on Windows systems prior to Windows 10 (Windows 7, 8, 8.1, 2008 Server, 2012 Server) an up-to-date system is required. In particular the **KB2999226** update must be installed. See also Update for Universal C Runtime in Windows on the Microsoft Support pages. If this update is not installed, some DLLs are missing and xUML services will not start (not reporting any error). The bridgeserver log will be empty. If you try to start the services manually via `start.bat` (as described on Troubleshooting > E2E xUML Service Startup Fails), you will get

2017.6	With this RUNTIME, we tidied up the system error codes of error domain FUTSM and reduced the error codes to 4 (from more than 20). If you are catching one of the dropped error codes in your model, you need to adapt the code. See System Errors for more information and a mapping of error codes old new.
2017.5	REST services or adapters compiled with a BUILDER previous to 6.0.22 will not start on a BRIDGE with Runtime 2017.5. Please recompile your services in this case.
2017.2	**Starting from this RUNTIME version, Windows Vista is not supported anymore.** Please find the list of all supported operating systems on BRIDGE Installation Guide.
2014.16	**Starting from this RUNTIME version, Windows XP is not supported anymore.** xUML services will not start-up on XP platforms due to technical implications. Please find the list of all supported operating systems on BRIDGE Installation Guide.
2013.5	With this RUNTIME version, the persistent state database schema changed to version 15. The database content will be converted, once a service uses the new persistent state database. You cannot go back to an older RUNTIME version after you have started a service. All composite services which use a shared persistent state database must upgrade the RUNTIME at the same time. If you have many persistent state objects, the schema update might take several minutes.
6.0.92.0	With this RUNTIME version, the persistent state database schema changed to version 14. The database content will be converted, once a service uses the new persistent state database. You cannot go back to an older RUNTIME version after you have started a service. All composite services which use a shared persistent state database must upgrade the RUNTIME at the same time.
6.0.91.0	The RUNTIME upgrades the asynchronous trace database at first start. Although the new schema is fully backwards-compatible, we do not recommend switching back to an older RUNTIME and then back again to the new one. This might result in a corrupted database, that requires manual intervention to be fixed.
6.0.90.0	With this RUNTIME version, the persistent state database schema changed to version 13. The database content will be converted, once a service uses the new persistent state database. You cannot go back to an older RUNTIME version after you have started a service. All composite services which use a shared persistent state database must upgrade the RUNTIME at the same time.

Release Notes of the xUML Runtime 2024

Runtime 2024.2 (25.03.2024)

Bug	Description	Documentation Link
PAS-9358	Execution of Java Code very slow (remove -Djava.compiler=NONE)	

Runtime 2024.1 (08.02.2024)

Improvement	Description	Documentation Link
PAS-9397	PostgreSQL Client Library	
PAS-8399	Switch to Debian bookworm	
Bug	**Description**	**Documentation Link**
PAS-9106	Javascript limitations: JSON.stringify(...) & Object.keys(...)	
PAS-8914	String split() sometimes omits last expected split segment	
PAS-8812	Failed to read and parse "AddOns/SQL/sqlconfiguration.tab" (introduced 2023.6)	
PAS-8544	Update Boost to 1.84.0 to fix listing SMB-shared directories	

Release Notes of the xUML Runtime 2023

Runtime 2023.6 (13.12.2023)

Bug	Description	Documentation Link
PAS-8647	SQL adapter: CLOB conversion error in Unicode mode	
Improvement	**Description**	**Documentation Link**
PAS-8462	Don't initialize the deprecated Map::id field	

Runtime 2023.5 (17.10.2023)

Improvement	Description	Documentation Link
PAS-8270	libcurl 8.4.0	
PAS-8126	Write cURL OPT debug logs to one log message	
New Feature	**Description**	**Documentation Link**
PAS-6981	Apache Kafka Listener Service	
Bug	**Description**	**Documentation Link**
PAS-8236	HTTP Services: cannot send response body along with HTTP 202	
PAS-7656	jsonToClass(): Float parsing is broken for locales where decimal separator is not ".", with JVM started.	

Runtime 2023.4 (28.06.2023)

Bug	Description	Documentation Link
PAS-7217	ctrlapi: Sorting does not work for "/api/pstate/queryObjects"	
Improvement	**Description**	**Documentation Link**
PAS-6939	Support logging of timestamps with nanoseconds	
PAS-5302	PersistentState: Make sure to explain why a search query cannot be generated	
New Feature	**Description**	**Documentation Link**
PAS-6701	S3 Adapter: Provide an option to skip IMDSv1 calls	
PAS-261	Validate logger configuration using JSON Schema	

Runtime 2023.3 (28.04.2023)

> ⚠ **Compatibility Hint**
>
> The exception codes/domains for the S3 Adapter have been adjusted to follow the same rules the other components use. Updating the models may be necessary.

Bug	Description	Documentation Link
PAS-6837	Unacceptable performance of network requests	
PAS-6514	AliasReader: invalid options read if connection string contains consecutive spaces	
Improvement	**Description**	**Documentation Link**
PAS-6811	S3 Adapter: use correct error domains (AWSS3LM/AWSS3SM)	

Runtime 2023.2 (27.03.2023)

Improvement	Description	Documentation Link
PAS-6485	Update librdkafka to 2.0.2 and modern-cpp-kafka to 2023.03.07	
PAS-6325	Update zlib to 1.2.13	
PAS-6324	Update Xerces to 3.2.4	
PAS-6322	Update SQLite to 3.41.0	
PAS-6321	Update SAP NWRFCSDK to 7.50.11	
PAS-6320	Update OpenLDAP to 2.5.14	
PAS-6319	Update nghttp2 to 1.52.0	
PAS-6318	Update nlohman/json to 3.11.2	
PAS-6317	Update MongoDB drivers to 1.23.2 (C), and 3.7.0 (C++)	
PAS-6316	Update MIT Kerberos to 1.20.1	
PAS-6315	Update libSSH2 to current master + pr802	
PAS-6314	Update libarchive to 3.6.2	
PAS-6313	Update ICU to 72	
PAS-6311	Update fmt to 9.1.0	
PAS-6310	Update Boost to 1.81.0	
PAS-6073	Update OpenSSL to 3.0.8	
PAS-4854	Update SQLAPI to 5.2.3 + patches	
PAS-4240	Update curl to 7.88.1	

Runtime 2023.1 (24.02.2023)

Improvement	Description	Documentation Link
PAS-6047	Support forcing PS owner ID	
PAS-6034	Support SAP adapter encrypted communication	
Bug	**Description**	**Documentation Link**
PAS-5760	(extended)JSON Compose: missing protection against cyclic data items leads to crashes	
PAS-5704	Any type data lost from one step to the next step in persistent state	
PAS-5462	Alias Reader fails on MongoDB Alias	
New Feature	**Description**	**Documentation Link**
PAS-5256	S3 storage adapter	

Release Notes of the xUML Runtime 2022

Runtime 2022.12 (21.12.2022)

Bug	Description
PAS-5667	Crash if SAP connection string has wrong format
PAS-5639	Crash parsing complicated SAP connection string
PAS-5532	Convert + in REST query parameters to blank

Runtime 2022.11 (16.11.2022)

Bug	Description
PAS-5316	Zip adapter crashes service if baseDir is NULL on unzip
PAS-5255	ZIP adapter adds a point when baseDirectory is not set
PAS-5036	Service does not start: Segmentation fault (re-writing external PS)

Runtime 2022.10 (29.09.2022)

New Feature	Description	Documentation Link
PAS-4872	Access to current index in iteration blocks	Iterations
Bug	**Description**	**Documentation Link**
PAS-4779	HTTP Service: memory leak when logging incoming request (log level DEBUG)	

Runtime 2022.9 (07.09.2022)

> ⚠️ **Compatibility Hint**
>
> This Runtime fixes a potential misbehavior of URL Adapter and an easy-to-trigger data loss if using it with FTP-like protocols, introduced in version 2022.8.

Bug	Description
PAS-4777	XML Parser does not follow redirects when downloading schemes
PAS-4773	URL Adapter treats all requests as uploads

Runtime 2022.8 (30.08.2022)

Bug	Description
PAS-4620	ZIP-Adapter cannot deal with UNC pathes
PAS-4551	URL Adapter: one-time memory leak for each FTP-like call with POST as a method

Runtime 2022.7 (03.08.2022)

Improvement	Description	Documentation Link

Bug	Description	Documentation Link
PAS-4541	Automatically change POST to PUT for FTP-like protocols	
PAS-4485	POST redirect should again use POST (was changed in 2022.6 only)	
Bug	**Description**	**Documentation Link**
PAS-4494	HTTP method names must be uppercase (introduced 2022.6)	

Runtime 2022.6 (21.07.2022)

> ⚠ **Compatibility Hint**
>
> This Runtime comes with an updated version of Swagger UI. You may need to restart your Bridge to see the Bridge API documentation.

Bug	Description	Documentation Link
PAS-4333	Array.compact returns an array of empty records for arrays of complex types.	compact() Operation
PAS-4332	Array.compact prevents runtime startup	
PAS-4320	API Request leads to service crash	
PAS-4186	DB Deadlocks may crash certain PersistentState operations	
PAS-4069	Swagger UI: /pstate/classes/:class/queryObjects does not open	
PAS-3767	Float power() operation does fail with negative exponents	
PAS-3412	Using the URLAdapter for HEAD requests is not possible (without workaround)	
PAS-3137	Duplicate error number for SAPSSM	
PAS-309	FlatFile Adapter parses Boolean values only case-sensitive lower-case ("true", but not "TRUE")	Flat File Adapter
Improvement	**Description**	**Documentation Link**
PAS-4276	HTTP-like adapters: Put the actual URL in the error message for "URL is not valid" error	
PAS-4224	Add error details to PSLM/19	
PAS-3830	Configurable HTTP header size limit	
PAS-2858	JSON: directly nested arrays	
PAS-2531	Update JavaScript V8 engine to 10.1.124.8	
New Feature	**Description**	**Documentation Link**
PAS-4072	Apache Kafka Producer Adapter (Runtime)	

Runtime 2022.5 (20.05.2022)

Bug	Description	Documentation Link
PAS-3943	REST Service: crash on empty header that is defined as REST Parameter	
PAS-3874	Crash when serializing broken REST response / reading broken REST request	
PAS-3744	runtime generates application/xml REST response where application/json is expected	
PAS-3708	REST Adapter: crash if simple type given as Body	

Improvement	Description	Documentation Link
PAS-3939	Update curl to 7.83.1	
PAS-3904	Avoid http error 406 when accept header is not set in request	
PAS-3886	JSON Parsing: support converting timestamp to DateTime	
PAS-3145	Update sapnwrfcsdk to version 7.50 patch level 9	
New Feature	**Description**	**Documentation Link**
PAS-3567	JWT token Adapter	

Runtime 2022.4 (29.04.2022)

Bug	Description	Documentation Link
PAS-3793	SQL Server: inserting NULL into VARBINARY(max) column fails	
PAS-3780	Slow performance searching persistent state object with 3 "or" conditions	

Runtime 2022.3 (25.03.2022)

Bug	Description	Documentation Link
PAS-3472	PersistentStateControl queryObjects with includeObjectData=true is slow	
PAS-3416	Service with MongoDB Adapter crashes under load	
PAS-3307	MongoDB pipeline update with upsert=true does not insert	
PAS-2577	Service may crash after re-connecting to PState database due to invalid connection use	
Improvement	**Description**	**Documentation Link**
PAS-266	SAP IDoc (record) parser diagnostic	

Runtime 2022.2 (17.02.2022)

Bug	Description	Documentation Link
PAS-306	SAPRFCAdapter: `typeOf` reports `Any` on adapter outputs	
PAS-2106	Crash if starting request worker thread fails	
PAS-3227	PersistentStateControlAdapter: Service crash when `~` or `!~` operator used with non-string attributes	

Runtime 2022.1 (31.01.2022)

⚠ **Compatibility Hint**

The minimum version requirements for persistent state databases have changed to

- Oracle 12c
- SQL Server 2012

⚠

> ⚠ **Compatibility Hint**
>
> The handling of external persistent state attributes (**loadExternals**, see Loading External Persistent State Data) has changed. External persistent state attributes will only be loaded once during a persistent state transaction. Subsequent calls of **loadExternals** will be disregarded until session end.
> The **loadExternals** adapter action cannot be used to reset external attributes of an object.

Improvement	Description	Documentation Link
PAS-3112	Persistent State: Ignore multiple `loadExternals` adapter calls	
PAS-3043	PersistentStateControl adapter: sorting queried objects by search keys	
PAS-2211	Update SQLAPI to 5.1.8	
PAS-550	Update SQLite to 3.37.2	
New Feature	**Description**	**Documentation Link**
PAS-3016	PersistentStateControl adapter: support "skip"	Retrieving Persistent State Metadata with the PersistentStateControl Adapter
PAS-2533	Creating & converting UUIDs	• createUUID() Function • uuidToBlob() Operation • uuidFromBlob() Operation
Bug	**Description**	**Documentation Link**
PAS-2866	SystemAdapter writes state ERROR in transaction log even though everything worked	

Release Notes of the xUML Runtime 2021

Runtime 2021.10 (30.11.2021)

Bug	Description	Documentation Link
PAS-2612	Some SOAP faults may cause SOAP Adapter crash	
PAS-2510	MIMEAdapter not functioning on 'encode' action in neither way	
PAS-2419	Service may crash after re-connecting to PState database	
PAS-2195	HTTP Headers from a redirect responses (3XX) are merged with actual response headers (introduced 2020.11)	
PAS-2106	Crash if starting request worker thread fails	
PAS-2085	Blob.convertToString() crashes for some empty blobs	
New Feature	**Description**	**Documentation Link**
PAS-2550	Support CURLOPT_SSL_VERIFYSTATUS cURL option	
PAS-2409	Setting default bind address family	
PAS-1600	Abort startup if startup activity fails	
Improvement	**Description**	**Documentation Link**
PAS-2392	Calling SIGTERM should graceful stop xUML runtime	
PAS-336	Improve usability of XML parser	

Runtime 2021.9 (28.09.2021)

Improvement	Description	Documentation Link
PAS-2050	Update certificate bundle	
PAS-2042	Update OpenSSL to 1.1.1l	
PAS-2027	Update libSSH2 to 1.10.0	
PAS-2026	Update SQLAPI to 5.1.6	
PAS-1962	Update curl to 7.79.1	
New Feature	**Description**	**Documentation Link**
PAS-1984	Log additional keys (composite name, transaction ID) to custom channel	
PAS-1677	Allow calling base operations from outside Action Script	
PAS-1600	Abort startup if startup activity fails	
PAS-322	Support for SAP INT8 type	

Runtime 2021.8 (17.08.2021)

Bug	Description
PAS-290	SOAP 1.2 server responds with SOAP 1.1 Fault

Runtime 2021.7 (31.07.2021)

> ⚠ Due to changes regarding the response content type for traces, you need to update to Builder 7.16.0 and Analyzer 7.15.1 when using this xUML Runtime.

Bug	Description	Documentation Link
PAS-1342	xUML Runtime API: service crashes when calling /pstate/objects/{objectId}/states for an existing {objectId}	
PAS-1448	ZIP Adapter: Runtime crashes if basePath is empty	
PAS-1536	xUML Runtime API: service crashes when calling /pstate/classes/{class}/queryObjects	
Improvement	**Description**	**Documentation Link**
PAS-1032	Update curl to 7.78.0	

Runtime 2021.6 (30.06.2021)

Bug	Description	Documentation Link
PAS-1155	ZIP Adapter: unzip action does not overwrite files regardless the 'overwrite' parameter	
PAS-894	REST Adapter does not send proper Accept header when expecting Blob responses	
PAS-260	using blobBodyContentType on adapter call leads to RESTLM-19 during runtime	

Improvement	Description	Documentation Link
PAS-1283	Control emitting type discriminator when serializing to JSON	
PAS-556	Upgrade SQLAPI to 5.1.4	
PAS-267	xUML API health check endpoint /api/isAlive	[xUML Runtime API Reference](#)
PAS-265	Enable ZIP-Adapter to compress/decompress using password	
New Feature	**Description**	**Documentation Link**
PAS-1169	Operations: classToExtendedJSON() /extendedJSONToClass()	

Runtime 2021.5 (30.05.2021)

⚠ **Known Issues**

ZIP adapter: Action **unzip** disregards the **overwrite** parameter and does not overwrite existing files.

Improvement	Description	Documentation Link
PAS-988	Improve pas-blue theme (details button and font in selection lists)	

Runtime 2021.4 (04.05.2021)

⚠ As of this Runtime version, **CentOS 6** and **RedHat 6** are no longer supported.

⚠ **Known Issues**

ZIP adapter: Action **unzip** disregards the **overwrite** parameter and does not overwrite existing files.

⚠ The following bugfixes and features have dependencies or are subject to migration.

Issue	Comment
PAS-264	On Linux the new library version causes change of precision in floating point values. Example differences that may occur:

Old	New
123456789012346.7	123456789012346.703125
65.430000000000007	65.430000000000006821210263296962
-0.222	-0.222000000000000288657986402541

Bug	Description	Documentation Link
PAS-259	ZIP adapter cannot create directories when basePath containes drive letter on windows	
PAS-258	Zipped file with umlaut is not unzipped correctly	
PAS-283	XML Parser: throw error if parsing Any and no xsi:type attribute present.	

Improvement	Description	
PAS-264	SAP NW RFC 7.50 Patch 7	
PAS-2	libcurl 7.76.1	
PAS-790	Improve pas-blue theme	

Runtime 2021.3 (25.03.2021)

Bug	Description	Documentation Link
RUN-2724	xUML operations and Java operations trx log elapsed time in different units	
RUN-2726	Filesystem AddOn: Allow stating big (>2GiB) files.	
RUN-2746	xUML API: Asynchronous Trace: Incorrect locking leads to hang	
RUN-2747	xUML Runtime API: /trace/configurations/{classifier}/identifiers/ does not filter by classifier	

Improvement	Description	Documentation Link
RUN-2745	User Interface: Create UI theme (pas_blue) for standard PAS applications	Overview on the UI Design Capabilities

Runtime 2021.2 (03.03.2021)

Bug	Description	Documentation Link
RUN-2727	URL Adapter does not accept headers with empty value anymore (introduced 2020.4)	

New Feature	Description	Documentation Link
RUN-2665	MongoDB Adapter	

Improvement	Description	Documentation Link
RUN-2381	Limiting request body size for HTTP-like services	

Runtime 2021.1 (29.01.2021)

Bug	Description	Documentation Link
RUN-2401	PS: OBJECT_IDENTIFIERS have spurious values	
RUN-2715	URL adapter return httpHeaderMap	
RUN-2717	Scheduler is not running anymore with Runtime 2020.17	

RUN-2718	ZIP Adapter: Unhandled file system errors lead to crashes	
RUN-2720	URL/SOAP Adapter: some HTTP header lines have header name twice	
RUN-2722	Using classToJSON on REST AdapterResponse after HTTP 204 response leads to crash	
New Feature	**Description**	**Documentation Link**
RUN-2648	Support HTTP "Digest" header for HTTP-based Adapters	- REST Service Reference - SOAP Adapter Reference - URL Adapter Reference - REST Adapter Reference
RUN-2719	Crypto Adapter: Ability to choose hashing algorithm	Crypto Adapter

Release Notes of the xUML Runtime 2020

Runtime 2020.17 (10.12.2020)

Bug	**Description**	**Documentation Link**
RUN-2685	Missing Elapsed Time and State in JSON transaction logging	
RUN-2707	Wrong trx_level filter for json logging in docker	
RUN-2709	getServiceContext('HTTP') does not return HTTP headers anymore (introduced in 2020.11)	
RUN-2712	Memory Adapter: Highly concurrent map replacement leads to memory leaks and crashes	
Improvement	**Description**	**Documentation Link**
RUN-2587	make convertTo() operations tolerant of NULL values	
RUN-2713	Update ca-bundle.crt in runtime	

Runtime 2020.16 (06.11.2020)

Internal release.

Runtime 2020.15 (04.11.2020)

> ⚠ This release is not recommended because it introduces a service crash with UIs.

Bug	**Description**	**Documentation Link**
RUN-1808	SAPTRFCCreateTransaction throws 2 different exception errors in one call	
RUN-2704	Accesses to memory maps hang up or crashes the service (introduced 2020.11)	

New Feature	Description	Documentation Link
RUN-2344	Cancel running session	Additional xUML Service Tabs
RUN-2703	htdoc fallback file for directory	

Runtime 2020.14 (14.10.2020)

Bug	Description	Documentation Link
RUN-2336	Runtime writes duplicate error log on division by zero	
RUN-2701	MemoryAdapter lookups lead to service crash under high concurrency (introduced 2020.11)	
RUN-2702	Strings containing UTF-8 characters with more than 2 bytes are corrupted by JNI	
Improvement	**Description**	**Documentation Link**
RUN-2399	xUML Runtime API: Interface for asynchronous trace management	xUML Runtime API Reference

Runtime 2020.13 (01.09.2020)

⚠️ **Compatibility Hints**

Issue	Hint
RUN-2696	SAP: Some previously hidden exceptions may now be reported. This is mostly (but not exclusively) the case if metadata is present in the model but not on the SAP side.

Bug	Description	Documentation Link
RUN-2385	BESM/9 is logged twice	
RUN-2621	Can not receive response from rfc INBOUND_IDOCS_FOR_TID	
RUN-2689	Crash with very high connection count	
RUN-2690	PersistentState: GetHandle should not remove unfinished objects (also: cause of deadlocks)	
RUN-2696	SAP: Errors during preparing/receiving RFC parameters not always result in an exception	
New Feature	**Description**	**Documentation Link**
RUN-2106	Array.compact()	
Improvement	**Description**	**Documentation Link**
RUN-2322	xUML Runtime API: Expose Scheduler Service	
RUN-2460	Allow steps in DateTime patterns of Scheduler Service	
RUN-2693	xUML Runtime API: Expose Timer Service	
RUN-2694	xUML Runtime API: Expose Start-up/Shut-down Activity	

Runtime 2020.12 (21.08.2020)

> ⚠️ **Compatibility Hints**
>
> | Issue | Hint |
> |---|---|
> | RUN-2410 | SAP libraries updated. Now, default parameters/values in RFCs are respected - that means that it is possible for a parameter or field, that previously has been empty, to now have a default value. |

New Feature	Description	Documentation Link
RUN-2679	Configurable automatic adapter HTTP headers	- Frontend Components - REST Adapter > HTTP Headers - REST Service Reference - Using the URL Adapter with the HTTP Protocol > HTTP Headers - URL Adapter Reference - SOAP Call and HTTP Headers - SOAP Adapter Reference

Improvement	Description	Documentation Link
RUN-2410	Update sapnwrfcsdk to version 7.50 patch level 6	
RUN-2475	Update SQLAPI (5.0.0)	
RUN-2619	SQL adapter: support MySQL 8	

Runtime 2020.11 (04.08.2020)

Bug	Description	Documentation Link
RUN-2114	Handle HTTP headers correctly and consistently	
RUN-2360	JSON serialization replaces attribute names with integer values	
RUN-2379	Throw exception if convertDurationToDateTime() is applied on invalid duration string	
RUN-2551	Crash with corrupted AddOns/SQL/sqlconnection.tab	
RUN-2678	Unparsable JSON response from xUML REST service	

New Feature	Description	Documentation Link
RUN-2674	Configurable incoming HTTP headers roles	- HTTP Protocol Support - Frontend Components - HTTP Service - Calling REST Services - SOAP Service - SOAP Headers within Service Context

Improvement	Description	Documentation Link
RUN-2390	Create map if not exists when storing values using MemoryAdapter	

Bug	Description	Documentation Link
RUN-2414	MemoryAdapter return old value after changing or removing	Memory Adapter
RUN-2447	Use reader-writer lock to improve concurrent memory adapter access	
RUN-2633	Support more libcurl options	
RUN-2653	Log REST_REQUEST also for bad requests	

Runtime 2020.10 (19.06.2020)

Bug	Description	Documentation Link
RUN-2448	Nested maps are not correctly deserialized by classToJson()	
RUN-2658	Memory leak if reverse host lookup fails	
RUN-2670	JSON deserialization omits attributes before e2e:type	
Improvement	**Description**	**Documentation Link**
RUN-2673	Update J2RE for docker for service to 11.0.7	

Runtime 2020.9 (08.06.2020)

> ⚠️ **Compatibility Hints**
>
> This RUNTIME drops bug-compatible file system handling on Windows. Repositories older than 2011 will not start on Windows. The cause will be clearly stated in logs.

Bug	Description	Documentation Link
RUN-2645	FileSystemAdapter: Creation of a folder for a network path with forward slashes fails	
RUN-2655	REST AddOn: Tabfiles not unloaded from memory	
RUN-2659	Memory leak logging SOAP Requests (Debug log level)	
RUN-2661	Interactive debugger: Setting values lead to memory leaks	
RUN-2662	Using security interceptor may leak memory	
RUN-2663	Memory leaks parsing Timer/EventObserver tabfiles	
RUN-2664	Memory leak in SAPIDocRecordComposer	
RUN-2666	Windows: crash on startup when using JSON logger configuration, or when changing log level via Console	

Runtime 2020.8 (18.05.2020)

Bug	Description	Documentation Link
RUN-2646	Memory leak serializing DateTime to JSON (introduced 2020.5)	

New Feature	Description	
RUN-2626	Extend logger config format	

RUN-2627	Logging to channels	• xUML Runtime Logger Configuration
		• Log Adapter pp.
		  ○ Defining a Custom Logger Configuration
		  ○ Log Adapter Reference

RUN-2649	Validate pattern strings in logger configuration	
Improvement	**Description**	
RUN-2644	xuml Docker image: Oracle Instant Client 19.6 and runtime java 1.4.0	
RUN-2650	Improve help text of Runtime Command Line	xUML Runtime Command Line Options
RUN-2652	xuml Docker image: use debian:buster-slim	

Runtime 2020.7 (09.04.2020)

Bug	Description	Documentation Link
RUN-2631	Startup not aborted if duplicated PS transition names are found.	
RUN-2632	Cannot select a Boolean using SQLite	
RUN-2635	Log may not be rotated if there's no log at current date/hour and log settings get adjusted	
RUN-2639	Infinite busy looping if client closes connection while service is still reading data from it	
RUN-2640	Cannot start container if repository already existent	
RUN-2643	Custom transaction log uses microseconds for "elapsed" field (introduced 2020.5)	
New Feature	**Description**	**Documentation Link**
RUN-2502	CURLOPT_NOPROXY missing for URL adapter	Setting cURL Options on the URL Adapter > Native cURL Options
Improvement	**Description**	**Documentation Link**
RUN-2637	Support <<DirectoryAlias>> for File System adapter "copy" action	

Runtime 2020.6 (18.03.2020)

> ⚠ **Compatibility Hints**
>
> As of this Runtime, the JSON composer has been re-written to be RFC8259-conformant. This may result in slightly different output than before regarding whitespaces or order of keys.

Bug	Description	Documentation Link
RUN-2586	URLAdapter doesn't send content when method is GET	
RUN-2617	Start log shows many "Closing connection" logs in last line	

RUN-2622	Calling LDAPS via URL adapter fails randomly	
RUN-2629	SQL Adapter: Incorrect computation of BLOB parameter bindings number	
RUN-2630	Hourly transaction log rotation does not work	
Improvement	**Description**	**Documentation Link**
RUN-2590	Add support for HTTP/2.0 in HTTP based Adapters (URL /REST/etc)	
RUN-2616	Serialize data items (classToJSON) using nlohmann /json	• classToJSON() Operation
RUN-2618	Logging complex types as log details	• log() Macro • report() Macro • Log Adapter pp.

Runtime 2020.5 (10.03.2020)

Bug	Description	Documentation Link
RUN-2620	Crash with intensive transaction logging	
RUN-2624	Cannot delete persistent state objects offline when using SQLite (introduced 2019.8)	
RUN-2625	Crash on shutdown when Debug log level is active (since 2019.13)	

Runtime 2020.4 (28.02.2020)

> ⚠️ **Compatibility Hints**
>
> RUN-2599 corrects the behavior of custom constructors in case their parameters are function calls with dynamic parameters. There is a slight chance that existing models have a bug that has been masked by this issue and now the incorrect behavior may surface.

Bug	Description	Documentation Link
RUN-2426	URL-Adapter - Error description not populated	
RUN-2462	Sorting condition cannot access context items	
RUN-2599	Custom constructor throws senseless errors if called with arguments referring function output	
RUN-2603	Out of memory sometimes not logged.	
RUN-2610	SFTP transfer can crash if log level = debug (introduced 5.1.43004)	
RUN-2611	URL adapter: static HTTP headers produce start-up error: Expected Request element, found "HeaderParameter".	
RUN-2612	HTTP Service leaks memory when using outputHeaderParameters (introduced 2019.3)	
New Feature	**Description**	**Documentation Link**

RUN-2608	Action 'copy' in FileSystemAdapter	• File System Adapter pp. • Making a Copy of a File • System Errors
Improvement	**Description**	**Documentation Link**
RUN-2403	String.replace() should accept empty string	
RUN-2607	jsonToClass: support dateTime parsing of "/Date (80870400000+0000)/"	

Runtime 2020.3 (11.02.2020)

Bug	**Description**	**Documentation Link**
RUN-2602	Log rotation does not work (introduced 2019.13)	

Runtime 2020.2 (27.01.2020)

> ⚠ **Known Issues**
>
> The transaction logging is broken in this RUNTIME version. Final fix with 2020.3.

Bug	**Description**	**Documentation Link**
RUN-2595	Memory leak with URL Adapter when using dynamic addditionalHeaders, proxyType, or commands (since 2014.3)	
Improvement	**Description**	**Documentation Link**
RUN-2596	REST Service: Respond with client error (HTTP 400) instead of server error (HTTP 500) if request body cannot be parsed	

Runtime 2020.1 (16.01.2020)

> ⚠ **Known Issues**
>
> The transaction logging is broken in this RUNTIME version. Final fix with 2020.3.

Bug	**Description**	**Documentation Link**
RUN-2591	Transaction log level always set to "NONE" (introduced 2019.13)	
RUN-2594	Crash on PS "reset" RPC Control Port action	
New Feature	**Description**	**Documentation Link**
RUN-2564	xUML Runtime API: change log level	xUML Runtime API Reference
Improvement	**Description**	**Documentation Link**
RUN-2592	Command line option for license file	xUML Runtime Command Line Options

Release Notes of the xUML Runtime 2019

Runtime 2019.13 (31.12.2019)

> ⚠ **Known Issues**
>
> The transaction logging is broken in this RUNTIME version. Final fix with 2020.3.

> ⚠ **Compatibility Hints**
>
> This RUNTIME does not distinct between **Internal**, **External**, and **User** anymore in the xUML server logs. As of this version, all log entries are logged with category **Internal**.

Bug	Description	Documentation Link
RUN-2583	SOAP/REST/HTTP service connections fail	
New Feature	**Description**	**Documentation Link**
RUN-2534	Scalable and configurable logging	

Runtime 2019.12 (06.12.2019)

Bug	Description	Documentation Link
RUN-2585	Crash in SQLAdapter::getHandle if database connection fails (introduced 2018.3)	

Runtime 2019.11 (14.11.2019)

Bug	Description	Documentation Link
RUN-2571	XML Parser: Not all entities downloaded with curl	

Runtime 2019.10 (25.10.2019)

Bug	Description	Documentation Link
RUN-2542	Log fatal errors in bridgeserver.log	
RUN-2558	Startup crash if SOAP Server has invalid PortNumber element	
RUN-2565	Service with pstate does not start: [PSADLM][43][Detected objects for which no metadata exist in the repository...]	
RUN-2566	List of pstate classes has duplicate entries	
Improvement	**Description**	**Documentation Link**
RUN-2557	Automatic migration of <<External>> PS Attributes	

Runtime 2019.9 (08.10.2019)

Bug	Description	Documentation Link

Bug	Description	Documentation Link
RUN-2553	Persistent State Engine generates duplicated OBJECT_ID	
RUN-2556	e2e:type not rendered as part of REST body	

New Feature	Description	Documentation Link
RUN-2555	Make it possible to use proxy when retrieving online XSDs and DTDs	

Runtime 2019.8 (24.09.2019)

Bug	Description	Documentation Link
RUN-2525	Startup crash if HTTP Server has empty PortNumber element	
RUN-2535	xmlToClass: external schemas not looked for in ${INSTANCES_HOME}/resource	
RUN-2536	xmldsig-core-schema.xsd cannot be retrieved by the xml parser, runtime hangs	
RUN-2539	Inspection List Settings For Asynchronous Traces of PState Classes Are Not Saved Anymore	

New Feature	Description	Documentation Link
RUN-2430	External persistence for selected properties of PState classes	- Persistent State Classes - Persistent State Components - Getting Copies of Persistent State Objects

Improvement	Description	Documentation Link
RUN-2416	Don't raise exception when native XML parser raises a warning	
RUN-2458	Propagate Transaction ID and Correlation ID in REST /HTTP communications (as with SOAP)	- Contents of the Transaction Log - JMS Adapter Reference
RUN-2532	Increase log severity for PSLM log entries	
RUN-2546	HTTP header X-Sender-Host and X-Sender-Service	HTTP Protocol Support

Runtime 2019.7 (01.07.2019)

Bug	Description	Documentation Link
RUN-2522	Persistent State modifying commands do not work if runtime is stopped (SQL Server only)	

Runtime 2019.6 (19.06.2019)

Bug	Description	Documentation Link
RUN-2520	Persistent State objects lost due to ownership change	

Runtime 2019.5 (05.06.2019)

Bug	Description	Documentation Link
RUN-2493	Runtime tries to start trace port for each tab file	
RUN-2496	ZIP Adapter generates invalid zip for big data	
RUN-2499	Memory leak 10-20 bytes per REST service call (introduced 2018.5)	
RUN-2505	getServiceContextValue("tcpip","remoteHostname" or "localHostname") return null and are very slow	
RUN-2507	Two services with same control port will start (introduced 2018.12)	
RUN-2510	classToJSON(): unescaped double quotes in generated e2e:type attribute values	
RUN-2511	URL adapter should always return httpStatus and httpHeaderParameters even with stream	
RUN-2513	HTTP Service with basic auth returns 403 on success (introduced 2019.3)	
New Feature	**Description**	**Documentation Link**
RUN-2484	Query alias values at runtime	Alias Reader
RUN-2485	Utility function to parse and build URLs	- parseUrl() Function - composeUrl() Function

Runtime 2019.4 (15.04.2019)

Bug	Description	Documentation Link
RUN-2479	User Interface: IE11: SwaggerUI Button rendering	
RUN-2490	Memory corruption if component name is long	
RUN-2492	Persistent state: search handles IO_EXIT is wrong	
New Feature	**Description**	**Documentation Link**
RUN-2442	REST interface for persistent state control port actions	xUML Runtime API
RUN-2463	Do not serialize DataItem attributes marked by the compiler	Attribute Specification > Visibility
Improvement	**Description**	**Documentation Link**
RUN-2404	User Interface: Respect browser language for custom UI data tables	
RUN-2423	Reduce severity of reporting missing startup / shutdown activities.	
RUN-2480	Update libssh2 to 1.8.2	
RUN-2481	Update OpenSSL to 1.1.1b	
RUN-2482	Update OpenLDAP to 2.4.47	

RUN-2483	Update curl to 7.64.1	
RUN-2491	Update MIT Kerberos to 1.17	

Runtime 2019.3 (01.03.2019)

Bug	Description	Dokumentation Link
RUN-2466	Can not stop xUML service with Console <=6.0.58.1 and Builder (introduced 2018.12)	
RUN-2468	JSON Parser crashes on unbalanced object/array end	
RUN-2470	REST Service: empty body causes creation of body parameter with wrong metadata	
RUN-2472	Log level change not fully applied to SOAP and HTTP service (introduced 2016.1)	

Runtime 2019.2 (08.02.2019)

Bug	Description	Documentation Link
RUN-2464	Persistent State date filters do not work (introduced 2018.12)	
RUN-2465	Persistent State: Primary Key Search fails if the primary key is defined out of order (introduced 2018.12)	
Improvement	**Description**	**Documentation Links**
RUN-2459	New persistent state algorithm: Favor Objects	- Persistent State Components - Performance Considerations of Persistent State > Event Selection Algorithm

Runtime 2019.1 (24.01.2019)

Bug	Description	Documentation Link
RUN-2419	Cannot cancel SOAP or REST adapter session (introduced 2018.3)	
RUN-2450	No bridgeserver.log on the first day of a year	
RUN-2454	Runtime handles "If-Modified-Since" header incorrectly	
Improvement	**Description**	**Documentation Link**
RUN-2418	REST Header parameter should be ignored if not set	Implementing REST Methods > Output: Header Parameter
RUN-2438	Improved persistent state performance: deletion of PS objects	
RUN-2440	Remove 32-bit Windows and Linux platforms	

Release Notes of the xUML Runtime 2018

⚠

> ⚠ **Compatibility Hint**
>
> | Bug | Hint |
> |---|---|
> | RUN-2264 | With this RUNTIME we removed support of BRIDGE version 4.1. Repositories that have been compiled with such versions will not start on BRIDGEs with Runtimes as of version 2018.11. |

Runtime 2018.12 (10.12.2018)

Bug	Description	Documentation Link
RUN-2287	Bad interaction between SQL and PS add-ons leads to crash on shutdown	
RUN-2422	You can no longer query the sessions during shutdown (introduced 2018.11)	
RUN-2432	Values for 'self' missing from trace for PS transitions	
New Feature	**Description**	**Documentation Link**
RUN-2406	Support blob with content-type as REST operation output.	
Improvement	**Description**	**Documentation Link**
RUN-2421	Provide more information in exceptions (e.g. callstack) for errors regarding NULL comparisons	

Runtime 2018.11 (24.09.2018)

Improvement	Description
RUN-2409	User Interface: Updated REST test tool (Swagger UI 3.18.3)
RUN-2264	Remove support for 4.1 repositories: Do not start if repository uses old formats

Runtime 2018.10 (21.08.2018)

> ⚠ **Compatibility Hint**
>
> | Bug | Hint |
> |---|---|
> | **RUN-2281** RUN-2383 RUN-2407 **RUN-1964** RUN-2388 RUN-2408 | With this RUNTIME we finally decided to activate the error log in case of comparison with NULL values (RUN-1964), or navigation to NULL references (RUN-2281) only if the modeler recompiles the service.

You can fix these model errors e.g. as follows:

• `local int = myNullObject.index` **`if myNullObject.exists()`**
  Also do something in case `int` did not get initialized.
• **`myNullString.exists() and`** `aValidString > myNullString` |

Improvement	Description

RUN-2407	Conditional enable: exception or error in case of object navigation on null references
RUN-2408	Conditional enable: error in case of conditions with null

Runtime 2018.9 (16.08.2018)

Bug	Description
RUN-2402	Service does not start: No connection manager "SQL_QUERY" is registered (introduced 2018.4)
Improvement	**Description**
RUN-2404	User Interface: Respect browser language for custom UI data tables

Runtime 2018.8 (02.08.2018)

Bug	Description
RUN-2398	xUML service may hang shutting down if the license is invalid/missing
Improvement	**Description**
RUN-2376	Change case sensitive license check for short machine name
RUN-2397	SAP connection per xUML session

Runtime 2018.7 (2018/07/05

⚠️ **Compatibility Hint**

Bug	Hint
RUN-1964 RUN-2388	In Runtime 2018.1, we fixed bug RUN-1964 concerning comparison with NULL values. With RUN-2388, we decided to not throw an exception in this case, but to log an error to the bridgeserver log. That way, all services will still run, but the error will come to notice nevertheless.

Bug	Description
RUN-2388	Behavior for condition has changed

Runtime 2018.6 (01.06.2018)

⚠️ **Compatibility Hint**

Bug	Hint
RUN-2281 RUN-2383	In Runtime 2018.4, we fixed bug RUN-2281 concerning navigation to NULL references. With RUN-2383, we decided to not throw an exception in this case, but to log an error to the bridgeserver log. That way, all services will still run, but the error will come to notice nevertheless.

Improvement	Description
RUN-2383	Runtime logs error in case of object navigation on NULL values

Runtime 2018.5 (24.05.2018)

Bug	Description
RUN-2226	Not all properties properly set on the event object in `onUnhandledSignal`
RUN-2382	Runtime prefers JSON regardless what is specified in Accept header
New Feature	**Description**
RUN-1955	Support for Transfer-Encoding: chunked
RUN-2378	Support IPv6 for REST, HTTP and SOAP service
RUN-2380	Support providing DB library paths via configuration file or command line

Runtime 2018.4 (24.04.2018)

> ⚠️ **Compatibility Hint**
>
> | Bug | Hint |
> | --- | --- |
> | RUN-2281 | With RUN-2281, we fixed a bug concerning navigating to references that are actually NULL. As of this RUNTIME, an exception will be thrown in cases like `local int = myNullObject.index.` |

Bug	Description
RUN-2179	Error during startup but service is running: [Fatal][External][PSADLM][15] [Command ... is declared twice.]
RUN-2281	Runtime allows object navigation on NULL Ref
RUN-2355	Crash on shutdown with SQLServer PS database (introduced 2018.2)
RUN-2356	Custom transaction handling (ROLLBACK) does not work on SQL Server
RUN-2358	Crash if accepting socket cannot be created (since 2017.8)
RUN-2359	REST path-parameters are not URL-decoded
RUN-2361	JSON Composer does not escape control characters (0x00-0x1F) properly
New Feature	**Description**
RUN-2188	Access to transaction isolation level via SQLAPI / SQL Alias
RUN-2367	REST Adapter does not support media type parameters
RUN-2368	Composing compact JSON
RUN-2375	Support setting root name and namespace dynamically for `classToXML`
Improvement	**Description**
RUN-2191	Log errors in case of internal persistent state errors.
RUN-2205	Improve the SQL error descriptions with detailed SQL Statement
RUN-2325	User Interface: Update ui theme e2e
RUN-2335	Log needed xUML Runtime version if a feature is missing
RUN-2370	REST: Better behaviour if a response contains data when it shouldn't

Runtime 2018.3 (22.02.2018)

Bug	Description

RUN-2323	Persistent state engine stops working without error
Improvement	**Description**
RUN-2147	Cancel SQL adapter requests

Runtime 2018.2 (14.02.2018)

> ⚠ **Compatibility Hints**
>
> | Bug | Hint |
> |---|---|
> | RUN-2144 | With Runtime 2018.2, we fixed a serious bug (RUN-2144) that led to a session commit although an exception had occurred and the session should have been rolled back. If an exception occurred in an action that was followed directly by a decision node, the exception was logged and the activity was aborted, but the xUML RUNTIME assumed nevertheless that execution has been fine and committed the session.
That resulted in SQL, persistent state, JMS and POP3 changes being committed instead of rolled back in case of error. Additionally, no error handlers have been invoked either. Please read Bug: Session Commit on Exception for a more detailed explanation.
Runtime 2018.2 is a recommended update, because this bug can lead to inconsistent data. |
> | RUN-1964 | With RUN-1964, we fixed a bug concerning comparison with NULL values. As of Runtime 2018.1, NULL values can only be compared for equality and inequality. All other comparisons like e.g. `aValidString > NULL` are rejected and an exception will be thrown. |

Bug	Description
RUN-1964	Comparison operators do not work correctly with NULL values.
RUN-2133	Type DateTime is not supported for castValue()
RUN-2144	Exception during iteration is ignored if it is followed by a decision (see also compatibility hint above)
RUN-2172	Error LCELM 36 license key has expired on
RUN-2310	Decision node after an adapter / call node inhibits automatic error propagation and rollback mechanism (see also compatibility hint above)
RUN-2320	Data race during unique name creation
RUN-2328	SQL adapter no rollback after exception (see also compatibility hint above)
RUN-2333	Wrong behaviour of FileSystemAdapter action rename if new name is missing
RUN-2334	Cannot create new PS Schema on MySQL
RUN-2341	jsonToClass(): does not convert integers to floats in arrays of floats
New Feature	**Description**
RUN-2296	Allow static path but dynamic file for File System adapter and Flat File adapter
Improvement	**Description**
RUN-2286	parseDateTimeExpression throws exception on non-matching strings (if compiled with Builder 7.0.0-beta2 or newer)
RUN-2295	Run regression tests with memory leak check (linux64dev)
RUN-2314	Allow overriding timestamp when logging custom TRX entries
RUN-2317	Add system ip address to serviceContextValues
RUN-2325	User Interface: Update ui theme e2e

Release Notes of the xUML Runtime 2017

Runtime 2017.10 (07.12.2017)

Improvement	Description
RUN-2316	JSON ComposerOptions for REST service and adapter

Runtime 2017.9 (17.11.2017)

Bug	Description
RUN-2288	Java-Adapter logs exceptions on shutdown
RUN-2292	Service crashes due to incorrect OpenSSL initialization
RUN-2300	HTTP body Blob shouldn't be NUL-Terminated
RUN-2304	REST Adapter crashes if response body begins with a NULL byte

Runtime 2017.8 (28.09.2017)

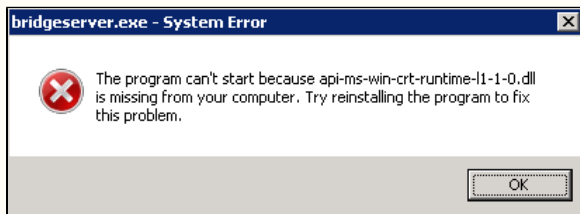| Bug	Description
RUN-2230	Persistent State Adapters: actions have no trx log entries
RUN-2265	SOAP calls are getting slow with increasing load if service connection limit is exceeded
RUN-2282	Crash on intensiv usage of SSL protocols
RUN-2283	Transaction log level of REST Adapter should be IO_EXTERNAL
Improvement	**Description**
RUN-2263	Remove support for 4.1 repositories: Print error if repository uses old formats
RUN-2284	No longer support "Tracing and Mockups Enabled" changes during runtime

Runtime 2017.7 (14.09.2017)

> ⚠️ **Compatibility Hint**
>
> As of Runtime 2017.7, we had to introduce an implicit dependency to the Windows Universal Runtime.
>
> To run services on Windows systems prior to Windows 10 (Windows 7, 8, 8.1, 2008 Server, 2012 Server) an up-to-date system is required. In particular the **KB2999226** update must be installed.
> See also Update for Universal C Runtime in Windows on the Microsoft Support pages.
>
> If this update is not installed, some DLLs are missing and xUML services will not start (not reporting any error). The bridgeserver log will be empty. If you try to start the services manually via `start.bat` (as described on Troubleshooting > E2E xUML Service Startup Fails), you will get
>
> **bridgeserver.exe - System Error**
> ❌ The program can't start because api-ms-win-crt-runtime-l1-1-0.dll is missing from your computer. Try reinstalling the program to fix this problem.
>
> [OK]

Bug	Description
RUN-2267	Potential crash if optional repository file is missing
RUN-2279	Memory leak if item retrieved from memory does not match expected metadata
RUN-2280	Crash if deadlock occurs during SearchHandles
Improvement	**Description**
RUN-2009	Update Windows Compiler to VC2017
RUN-2192	Update SQLite to 3.20
RUN-2250	Drop support for RedHat/CentOS 5
RUN-2268	Update ICU to 59.1
RUN-2269	Update Xerces to 3.2.0
RUN-2270	Update SQLAPI to 4.1.11
RUN-2273	Update zlib to 1.2.11
RUN-2274	Replace Heimdal with MIT Kerberos
RUN-2275	Update OpenLDAP to 2.4.45
RUN-2276	Update OpenSSL to 1.0.2l
RUN-2277	Update curl to 7.55.1

Runtime 2017.6 (21.08.2017)

> ⚠️ **Compatibility Hint**
>
> | Bug | Hint |
> | --- | --- |
> | RUN-2259 | With this RUNTIME, we tidied up the system error codes of error domain FUTSM and reduced the error codes to 4 (from more than 20). If you are catching one of the dropped error codes in your model, you need to adapt the code. See System Errors for more information and a mapping of error codes old new. |

Bug	Description
RUN-2244	Wrong duration result in DateTime.difference()
RUN-2248	JSON parser silently ignores number parsing errors
RUN-2256	SQL Error Messages - Duplicate error code 35
RUN-2257	Textual error in error message FUMSM_CAST_INTEGER_WRONG_STATIC_TYPE
RUN-2258	Typo in log error message

Improvement	Description
RUN-2224	Throw exception if trying to retrieve value of wrong type from the memory adapter
RUN-2246	Give more details about file system adapter error FSADSM 22
RUN-2249	Remove Solaris-x86 support
RUN-2255	Helgrind: DB processed statements
RUN-2259	Unused error codes
RUN-2266	Remove broken conversion functions

Runtime 2017.5 (06.07.2017)

> ⚠ **REST compatibility hints**
>
> REST services or adapters compiled with a BUILDER previous to 6.0.22 will not start on a BRIDGE with Runtime 2017.5. Please recompile your services in this case.

Bug	Description
RUN-2148	REST AdapterResponse not set in case of non-HTTP errors
RUN-2187	PState adapter raises deadlocks on MS SQL Server in load balancing scenario
RUN-2223	REST Adapter populates default response object even in error cases with defined ResponseDefinition
RUN-2227	Bidirectional object references lead to service crash
RUN-2231	REST Adapter may cause service crashes if used as the only URL-accessing adapter

New Feature	Description
RUN-2213	REST Adapter: Support segment composition
RUN-2219	REST: Respect 'ignoreHTTPErrors' flag from the alias
RUN-2222	REST: Allow setting external names for header and query parameters
RUN-2225	REST: support for response headers in method signatures

Improvement	Description
RUN-2182	Java Service: call all lifecycle hooks at appropriate moments

Runtime 2017.3 (24.05.2017)

Bug	Description
RUN-2158	MIME header decoding of multi line Q-encoded string
RUN-2195	Service crashes on startup when DB-connection "Options" is empty.

RUN-2197	Relative REST path is not set properly
RUN-2198	Rest Service does not provide error message into error object
RUN-2199	Crash when listing PS classes in offline mode
RUN-2200	SOAP with attachment start header is wrong
RUN-2201	Float number formatting can't shift more than 10^9
RUN-2202	REST Adapter calculates Content-Length with ominous NUL byte
RUN-2206	Check for required symbols and fail gracefully
RUN-2207	Service crashes while using MIME Adapter
RUN-2212	Runtime crashes on SOAP 1.2 fault
RUN-2216	Runtime crash: SQL adapter but no Map usage and compiled with Builder before 6.0.18.1
RUN-2217	REST call returns HTTP 400 when Query URL ends with '&'

Runtime 2017.2 (30.03.2017)

> ⚠ **Windows Vista not supported anymore**
>
> **Starting from this RUNTIME version, Windows Vista is not supported anymore.**
> Please find the list of all supported operating systems on BRIDGE Installation Guide.

Bug	Description
RUN-2183	Error 401: Unauthorized - Navision SOAP access with domain user
RUN-2184	Not able to access AdapterResponse object of the REST adapter if an exception is thrown because of HTTP Code >= 400
RUN-2185	REST-Adapter works slow on Windows-Environment
RUN-2186	REST call logs ERROR in transaction log although there was no error
RUN-2190	SAP: Empty field of TIMS type is no longer equivalent to 000000

Runtime 2017.1 (07.02.2017)

Bug	Description
RUN-1920	Persistent State: Signal conversation hangs in SafeConnect while handling tRFC protocol
RUN-2152	Persistent State: event is not delivered
RUN-2153	Persistent State: errors during commit phase remain unhandled
RUN-2161	REST Adapter: crashes on unhandled HTTP response code
RUN-2170	Persistent State: Objects are not visible anymore when service is stopped
RUN-2176	REST Service: Solaris 10: crash if funny HTTP code set for response
RUN-2177	Windows: crash on startup when using "Follow Redirects" on URL Alias
RUN-2178	URL Adapter: Follow redirects is interpreted as HEX
Improvement	**Description**
RUN-1995	Persistent State: Speed up persistent state engine performance

RUN-1999	Persistent State: Option for safe or fast database access using SQLite
RUN-2024	Service will not start if it finds persistent state objects which have no class definition
RUN-2100	Persistent State: Replace 'IMAGE' with 'VARBINARY(MAX)' in SQL Server's Persistent State schema.
RUN-2160	Persistent State: Block changes to Persistent State primary keys.
RUN-2163	Persistent State: Remove legacy MaxDeliveryTrials for signals
RUN-2173	REST Adapter sets Content-Lenght=0 for PUT/POST/PATCH without body

Release Notes of the xUML Runtime 2016

Runtime 2016.9 (16.11.2016)

Bug	Description
RUN-1992	URL Adapter Session to a SFTP Server hangs
Improvement	**Description**
RUN-2122	Update libcurl 7.51.0
RUN-2123	Update libssh2 1.8.0
RUN-2124	Update OpenLDAP 2.4.44
RUN-2125	Update OpenSSL 1.0.2
RUN-2151	REST Service: rename Response.statusCode to httpStatus

Runtime 2016.7 (04.11.2016)

Bug	Description
RUN-2136	Parsing of SOAP-Fault for SOAP 1.2 not properly implemented
RUN-2142	User Interface: Order on REST tags not respected

Runtime 2016.6 (06.10.2016)

Bug	Description
RUN-2066	Prevent XML Entity Injection Denial of Service
RUN-2108	Controller Service leaks memory on each request
RUN-2110	If array of values for cURL 'list' option contains NULL, the option will be set incorrectly
RUN-2117	Missing transaction log for "is alive" check on DB connection (since 2013.4)
RUN-2119	SQL adapter: memory leak
RUN-2129	Crash if 'options' parameter of XMLtoClass is null
RUN-2132	SOAP request fails due wrong generated XMLAttribute
RUN-2134	SOAP Headers are not escaped correctly
Improvement	**Description**
RUN-2130	User Interface: New E2E Logo

New Feature	Description
RUN-2068	REST adapter
RUN-2099	Support multiple different responses for a REST service
RUN-2115	Support placeholders in SQL statements

Runtime 2016.5 (12.07.2016)

Bug	Description
RUN-2090	classToXML() generates empty out if first element of an array is empty
RUN-2092	SQLAdapter returns 1900-01-01 instead of actual value
RUN-2103	SAP Message Composer crashes if complex array contains nulls
RUN-2105	REST response and code ignored in case of authorization error
Improvement	**Description**
RUN-2097	Display service name for REST API

Runtime 2016.4 (15.06.2016)

Bug	Description
RUN-1952	Service crashes when deleting object from orphaned persistent state class
RUN-2029	Base64 Blob To JSON contains Linebreaks
RUN-2033	fetchNext sql adapter call crashes, if a commit was called since getHandle
RUN-2049	Misleading Error when client does not send SOAPAction in HTTP Header
RUN-2057	REST Service: Changes in log level not always picked up
RUN-2069	Unable to start service: failed to read and parse castValue.tab
Improvement	**Description**
RUN-2053	User Interface: Swagger: XML input template
RUN-2077	Add timestamp to Errors
RUN-2083	User Interface: REST Service: support for authentication in REST descriptor

Runtime 2016.3 (08.04.2016)

Bug	Description
RUN-2045	SQL Adapter is leaking memory with stored procedure output.
RUN-2047	Using Swagger UI: RESTADLM:9 warnings
RUN-2048	Mistake in error description FUSSM 5
RUN-2052	SOAP RPC Service: wrong "xsd:Unknown" type
RUN-2060	SAPNW: Crash in IDocRecordComposer (introduced 2015.5)
Improvement	**Description**
RUN-2050	User Interface: Remove validation from REST documentation
RUN-2058	REST Service: XML response without extra <result> element

New Feature	Description
RUN-2043	Option to enable/disable delimiter for empty values in EDIFACT

Runtime 2016.2 (08.03.2016)

Bug	Description
RUN-1930	In some cases setting cURL options wrongly results in misleading error message
RUN-1931	CURLAUTH_NEGOTIATE is not implemented
RUN-1932	CURLOPT_HTTPAUTH should be a bitfield, not constant
RUN-1976	Cannot start service with SAP NW (missing msvcr80.dll)
RUN-1993	SAPNW: Allow to specify default connection pool size
RUN-2002	Huge ambigious callstack
RUN-2016	Error calling MTOM/XOP service with URL encoded href
RUN-2017	FileSystemAdapter status return size 0 but there are data
RUN-2018	Parse error if MTOM message does not end with new line
RUN-2030	Fix directory traversal attack vulnerability
Improvement	**Description**
RUN-1991	SAPNW: Bridge is RFC server: support parallel connections
New Feature	**Description**
RUN-1961	REST Service
RUN-2021	REST Service: Test client (swagger)

Runtime 2016.1 (12.01.2016)

Bug	Description
RUN-1979	SAPNW: Cannot start SAP service if no SAP connection in component diagram is defined
RUN-1981	Service crash upon triggering persistent state transition from Console
RUN-1985	SAPNW: SAP adapter is slow if pool size is to small
RUN-1987	SAPNW: SAP connection is not always closed
RUN-2003	SAPNW: Use same SAP pool for identical connection string
Improvement	**Description**
RUN-1984	SAPNW: Make unrecognised value of SAP FieldPadding a warning instead of error
RUN-1986	SAPNW: SAP RFC adapter write into transaction log if pool is exhausted

Release Notes of the xUML Runtime 2015

Runtime 2015.18 (30.11.2015)

Bug	Description
RUN-1971	RUNTIME creates PS DB object field as 65kbyte "BLOB" type in MySQL

RUN-1973	Service crashes if persistent state database connection is lost (introduced 6.0.92.0)
RUN-1977	Displaying persistent state owners: Unknown column 'OBJ.OBJECT_ID' in 'field list'
Improvement	**Description**
RUN-1978	Upgrade SAP NWRFCSDK to 7.20.38

Runtime 2015.17 (10.11.2015)

Bug	Description
RUN-1970	SOAP message parsing does not handle default namespaces correctly

Runtime 2015.16 (04.11.2015)

Bug	Description
RUN-1967	Stored procedure's INOUT parameters are not returned
Improvement	**Description**
RUN-1962	SOAP/XML adapter: generate CDATA elements

Runtime 2015.15 (16.10.2015)

Bug	Description
RUN-1956	Can't call stored procedure through ODBC
Improvement	**Description**
RUN-1951	support result set as return type of stored procedures
New Feature	**Description**
RUN-1957	Support Unicode and non-Unicode modes for SQL Adapter

Runtime 2015.14 (21.09.2015)

Bug	Description
RUN-1927	Use WINSSPI instead of Heimdal for Windows cURL builds.
Improvement	**Description**
RUN-1941	Update OpenSSL 1.0.2d
RUN-1947	Update libSSH2 to 1.6.0
RUN-1948	Update cURL to 7.44.0

Runtime 2015.13 (03.09.2015)

Bug	Description
RUN-1943	jsonToClass() not working with arrays at top level

Runtime 2015.12 (31.08.2015)

Bug	Description
RUN-1925	Correct trace details for 'select distinct'

Runtime 2015.11 (13.07.2015)

Bug	Description
RUN-1922	Put hashmap to memory and get value at the same time blocks process
Improvement	**Description**
RUN-1923	SQLite 3.7.16.2
RUN-1924	SQLAPI 4.1.4

Runtime 2015.10 (30.06.20115)

Bug	Description
RUN-1918	Service doesn't start if persistent state database (MySQL) is empty (introduced 2014.1)
RUN-1919	After some time no new SAP Connections are made

Runtime 2015.9 (26.06.2015)

Bug	Description
RUN-1876	SAPNW: Service crash if you debug on SAP side
Improvement	**Description**
RUN-1911	Upgrade OpenSSL to latest 1.0.0 version
RUN-1914	SAPNW: Update SAP libraries to patchlevel 35
RUN-1916	SAPNW: RFC connections are not limited to 10 per service

Runtime 2015.8 (17.06.2015)

Bug	Description
RUN-1913	SOAP service: empty HTTP headers are reported as error (introduced 2015.3)
Improvement	**Description**
RUN-1908	Update SQLAPI to version 4.1.5
RUN-1909	Upgrade SQLite to 3.8.10.2

Runtime 2015.7 (27.05.2015)

Bug	Description
RUN-1819	FileAdapter: readLine: if a line is very long, RUNTIME can crash
RUN-1901	Service stopped unscheduled - SQL Adapter

RUN-1904	Error Text for SSPSM 37 not helpful
New Feature	**Description**
RUN-1860	Trace the expression of the Distinct and GroupBy statements
RUN-1887	extend Control Port Command for Trace Deletion

Runtime 2015.6 (29.04.2015)

Bug	Description
RUN-1862	RUNTIME crashes if input and output of iterator node are the same Array
RUN-1892	SEARCH HANDLES": 102 42000 Incorrect syntax near 'LIMIT'
Improvement	**Description**
RUN-1888	New SOAP request for deleting multiple pstate objects
RUN-1897	Update SAP nwrfcsdk 7.20.33

Runtime 2015.5 (16.04.2015)

Bug	Description
RUN-1894	Memory map is missing after removing an single element
RUN-1895	TransactionID is empty in trace (introduced 2015.3)

Runtime 2015.4 (09.04.2015)

Bug	Description
RUN-1886	Maps nested in parent structure are not copied correctly when parent is copied
RUN-1889	JSON Composer's "keepNulls" not applied to nested structures
RUN-1893	User Interface: UI: Get JS error, when datetime picker value is empty
Improvement	**Description**
RUN-1882	Flat File compose: improve performance for zero values

Runtime 2015.3 (20.03.2015)

Bug	Description
RUN-1858	SOAP adapter (doc-encoding) with many parameters creates wrong request
RUN-1862	RUNTIME crashes if input and output of iterator node are the same Array
RUN-1865	Service crashes upon deleting a mail without subject (POP3 adapter action commit)
RUN-1868	RegTest: FlatFile/EdifactOrderRT/Invoice has a problem with pins
RUN-1880	Remove null values from JSON composer output
RUN-1881	SAP System Errors make funny-looking error messages in logs
Improvement	**Description**
RUN-1795	JSON composer can write null values

RUN-1873	Update openssl to 1.0.0l on linux-64 and solaris-x86
New Feature	**Description**
RUN-1877	Flat File Parser: add posibility to supress empty strings when parsing

Runtime 2015.2 (18.02.2015)

Bug	Description
RUN-1771	Cannot mock-up memory adapter
RUN-1844	Mocked values are being written to trace even though they are not used.
RUN-1851	js adapter is not correctly initialized in Persistent State Usage
RUN-1853	XML date is changed or not parsed correctly during persistent state processing
RUN-1855	RFC Adapter (IDOC_INBOUND_ASYNCHRONOUS) does not throw error when IDOC is inconsistent and SAP refuses it
Improvement	**Description**
RUN-1800	classToXml is always using "utf-8" in xml header, even if other encodings are required/used
RUN-1843	Optimize memory consumption for xmlToClass and SOAP parsing
RUN-1857	Security vulnerability: Disable external entities in SOAP service requests

Runtime 2015.1 (06.01.2015)

Bug	Description
RUN-1822	can not handle negative values in function convertTimeTicksToDateTime
RUN-1839	classToJSON must not escape forward slash (solidus)
Improvement	**Description**
RUN-1838	Return HTTP Headers and status code for SOAP adapter

Release Notes of the xUML Runtime 2014

Runtime 2014.19 (12.12.2014)

Bug	Description
RUN-1826	getObjectHandles on Oracle and SQLServer DB fails
New Feature	**Description**
RUN-1762	User Interface: DateTime picker

Runtime 2014.18 (10.11.2014)

Bug	Description
RUN-1804	Missing data if reading TEXT fields from SQL Server using ODBC
Improvement	**Description**

RUN-1813	Update ca-bundle.crt
New Feature	**Description**
RUN-1515	Respond with SOAP 1.2 from services
RUN-1794	SendSignal via Console (RUNTIME part)
RUN-1799	Report PState control port actions in transaction log

Runtime 2014.17 (2014.10.13)

Bug	Description
RUN-1782	Crash if license file missing or not a valid XML
RUN-1793	SOAP 1.2 Array handling
RUN-1801	XML validation does not work
New Feature	**Description**
RUN-1741	Support Kerberos via cURL

Runtime 2014.16 (2014.09.05)

> ⚠ **Windows XP not supported anymore**
>
> **Starting from this RUNTIME version, Windows XP is not supported anymore.** xUML services will not start-up on XP platforms due to technical implications.
> Please find the list of all supported operating systems on BRIDGE Installation Guide.

Bug	Description
RUN-1783	Can not start service on Solaris 10 (stpcpy: referenced symbol not found)

Runtime 2014.15 (2014.08.22)

Bug	Description
RUN-1754	Cannot set the status code in the postprocessor
RUN-1764	Support configurable prefix/namespace for SOAP encoding attribute.
RUN-1765	BuildMap throws exception on parameter array of HTTP Parameter
RUN-1766	SAP-NW: improve compatibility: float
RUN-1767	SAP-NW: improve compatibility: no padding with nested structures
RUN-1770	SAP-NW: improve compatibility: empty EDI_DC40
RUN-1778	SQL adapter: error SQLSM/9 should not be fatal
RUN-1780	User Interface: Don't use any alert but console logs
Improvement	**Description**
RUN-1772	Memory Adapter needs pretty long to store / retrieve Map object
New Feature	**Description**
RUN-1762	User Interface: DateTime picker
RUN-1777	SAP-NW: padding of RFC data can be disabled

Runtime 2014.14 (17.07.2014)

Bug	Description
RUN-1750	Fatal error executing timeout function "0.4"
RUN-1761	Unreadable characters on SOAP_EXIT line in transaction log (introduced 2014.10)

Runtime 2014.13 (14.07.2014)

Bug	Description
RUN-1759	memory leak: select first|last from array with empty result

Runtime 2014.12 (09.07.2014)

Bug	Description
RUN-1751	Cannot create hash map from an array with Group elements
RUN-1755	xmlToClass fails if duration has microseconds
RUN-1758	User Interface: Fileupload doesn't work on Firefox
Improvement	**Description**
RUN-1748	Support SOAP 1.2 action attributes
RUN-1753	Write HTTP service input and output

Runtime 2014.11 (26.05.2014)

Bug	Description
RUN-1742	SAP-NW firmware must preserve padding spaces
RUN-1743	SAP-NW: SAPIdocRecordParser must support empty segments

Runtime 2014.10 (12.05.2014)

Bug	Description
RUN-1718	Transaction log shows wrong URL for SOAP request when url is defined dynamically and statically
RUN-1729	RUNTIME crashes at shutdown with SAPNW Service
RUN-1731	Windows: Details for network errors are wrong
RUN-1736	unable to remove zip file previously opened with the zip adapter

Runtime 2014.9 (24.04.2014)

Feature	Description
RUN-1722	IDoc composer/parser should support the DC40 and DD40 classes

Runtime 2014.8 (10.04.2014)

Bug	Description
RUN-1723	Memory leak if using constructors

Runtime 2014.7 (02.04.2014)

Bug	Description
RUN-1721	SOAP adapter using https fails with errno 131 (server is IIS)
New Feature	**Description**
RUN-1515	Respond with SOAP 1.2 from services
RUN-1721	SOAP and URL adapter: new option CURLOPT_SSL_OPTIONS=CURLSSLOPT_ALLOW_BEAST

Runtime 2014.6 (13.03.2014)

Bug	Description
RUN-1706	PS getObjectHandles results in a invalid SQL when using tagged value 'Max Results'
RUN-1715	Cannot access map elements of memory-map
RUN-1716	SOAP parser does not work in case of array, href and RPC encoding (introduced 5.1.85.2)

Runtime 2014.4 (2014/02/27)

Bug	Description
RUN-1699	Can not get response from URL adapter after caught exception
RUN-1707	Missing files in asynchronous trace
RUN-1708	SOAP adapter crashes on HTTP status 500

Runtime 2014.3 (20.02.2014)

Bug	Description
RUN-1655	JavaScript: Crashes RUNTIME when setting unknown record field
RUN-1698	Service dies parsing JSON date-time
RUN-1700	JavaScript: Cannot assign JavaScript objects containing arrays to bridge items
RUN-1701	JavaScript: Cannot assign non-numeric date to bridge DateTime
RUN-1702	JavaScript: Bridge strings contain literal "null" or "undefined" when assigned null or not defined value
Improvement	**Description**
RUN-1676	URL adapter options: allow Boolean and Integer types as values as well

New Feature	Description
RUN-1660	Crypto: Support PKCS#8 key format

Runtime 2014.2 (10.02.2014)

Bug	Description
RUN-1348	Error message upon http call: favicon.ico not found
RUN-1669	Solaris: sftp login fails: Failure establishing ssh session
RUN-1670	Persistent state getObjectCopy returns empty object (no data)
RUN-1696	Header character encoding not taken into account for MIME converter

Runtime 2014.1 (23.01.2014)

Bug	Description
RUN-1242	cannot rollback - no transaction is active
RUN-1667	With log level Debug, SOAP request and response is not written in chronological order
RUN-1674	PState upgrade to version 15 fails on MySQL
RUN-1682	Deadlock if you get the error "Did not find authorization data (db username/password) in repository for database"

Release Notes of the xUML Runtime 2013

Runtime 2013.5 (15.11.2013)

> ⚠ **Incompatible Persistent State Database Schema**
>
> With this RUNTIME version, the persistent state database schema changed to version 15. The database content will be converted, once a service uses the new persistent state database. You cannot go back to an older RUNTIME version after you have started a service. All composite services which use a shared persistent state database must upgrade the RUNTIME at the same time.
> If you have many persistent state objects, the schema update might take several minutes.

Bug	Description
RUN-1661	Persistent state sqlite error "database busy" during service shutdown
RUN-1662	Crash if query persistent state object with filter value <
RUN-1664	Several PS objects with the same ID are created if parallel scheduler work on the same file
RUN-1665	Persistent state getObjectHandle returns wrong object

Runtime 2013.4 (01.11.2013)

Bug	Description
RUN-1651	RUNTIME error when using StoredProc that returns Boolean
RUN-1652	getObjectHandles ignores stateCondition
RUN-1658	SQL adapter SQLAPI options did not work (introduced 5.1.82.0)

Runtime 2013.3 (22.10.2013)

Bug	Description
RUN-1627	SOAP Service returns only year in DateTime field, results in Error
RUN-1636	Memory leak on Solaris
RUN-1642	Memory leaks if storing maps in memory adapter (introduced 2013.1)
RUN-1643	File system adapter removes directory recursively (introduced 2013.1)
Improvement	**Description**
RUN-1638	JSON: support arrays as root elements
RUN-1639	URL adapter: support PATCH HTTP method

Runtime 2013.2 (18.09.2013)

Bug	Description
RUN-1620	Interactive debugger: stop at the final activity node
RUN-1630	Parsing SOAP requests does not work if namespace prefixes are not unique
RUN-1634	The transliteration functions removeAccents() and toASCII() seem to be confused
New Feature	**Description**
RUN-1631	Basic REST support for <<HTTPPort>> operations

Runtime 2013.1 (05.09.2013)

Fix Crash	Description
RUN-1597	Service crashes at RUNTIME if FlatFiles' record contains complex type where simple type is expected in Composer
Bug	**Description**
RUN-1579	Readline throws: Value is empty
RUN-1591	Insert DateTime with microseconds into SQL Server fails
RUN-1607	JSON parser does not understand Any type
RUN-1621	Repositories with umlauts in path does not start
RUN-1624	RUNTIME returns empty response if FlatFileComposer fails.
Improvement	**Description**
RUN-1602	Hash map should behave like any other class when used in the memory adapter
RUN-1609	Improve performance of memory-stored HashMaps by providing direct access interface through memory adapter
RUN-1622	Support authentication type 'None'

RUN-1626	Support Map class in JavaScript
RUN-1629	jsonToClass(): Convert integer value to float if target field is of float type
New Feature	**Description**
RUN-1603	String method "transliterate"
RUN-1618	Enable removal of folder, even when there are files in the folder

Release Notes of the xUML Runtime 6.0

Runtime 6.0.92.3 (31.07.2013)

Bug	**Description**
RUN-1588	Hash-Map Table not created out of JSON String
RUN-1604	Error message during service startup in embedded server
RUN-1605	Step over/into at end of service or transition does not proceed at next action
RUN-1606	Service starts successfully but cannot be accessed
New Feature	**Description**
RUN-1603	String method "transliterate"

Runtime 6.0.92.2 (10.07.2013)

Bug	**Description**
RUN-1583	Hanging ps object and service crash due to huge asynchronous trace

Runtime 6.0.92.1 (05.07.2013)

Bug	**Description**
RUN-1584	Unexpected error: SOAP Error SOAPADSM 17 - UserName is empty, then server crash
Improvement	**Description**
RUN-1587	Hash-Map key should support all base types as key

Runtime 6.0.92.0 (26.06.2013)

> ⚠ **Incompatible Persistent State Database Schema**
>
> With this RUNTIME version, the persistent state database schema changed to version 14. The database content will be converted, once a service uses the new persistent state database. You cannot go back to an older RUNTIME version after you have started a service. All composite services which use a shared persistent state database must upgrade the RUNTIME at the same time.

Bug	**Description**
RUN-1592	Creating persistent state transition with absolute timeout greater 2038-12-31 fails (only MySQL)
RUN-1594	Service crash calling parseLocalDateTimeExpression with empty string

RUN-1595	Web Service cannot read binary file
Improvement	**Description**
RUN-1568	Resolve indexes to names in error messages.
RUN-1394	Persistent State: Cluster Fail-over (reconnect retry)
RUN-1593	Display persistent state objects which are in the initial state

Runtime 6.0.91.1 (06.06.2013)

New Feature	Description
RUN-1582	Support mySQL for persistent state
Bug	**Description**
	SQL adapter: MySQL: Support multiple SQL queries in one transaction SQLAPI option "HandleResult" is set to "store". Without the option, you will get the error: `2014 Commands out of sync; you can't run this command now.` More information on: http://sqlapi.com/ServerSpecific/MySQL.html

Runtime 6.0.91.0 (21.05.2013)

⚠️ **Asynchronous Trace DB schema**

The RUNTIME upgrades the asynchronous trace database at first start. Although the new schema is fully backwards-compatible, we do not recommend switching back to an older RUNTIME and then back again to the new one. This might result in a corrupted database, that requires manual intervention to be fixed.

Bug	Description
RUN-1577	Type mismatch for testcase does not lead to error
RUN-1581	Wrong order of persistent state transition in asynchronous trace
Improvement	**Description**
RUN-1572	Offer JavaScript adapter for Solaris

Runtime 6.0.90.1 (14.05.2013)

Crash	Description
RUN-1575	Service containing JavaScript adapter crashes RUNTIME on shutdown

Runtime 6.0.90.0 (30.04.2013)

⚠️ **Incompatible Persistent State Database Schema**

With this RUNTIME version, the persistent state database schema changed to version 13. The database content will be converted, once a service uses the new persistent state database. You cannot go back to an older RUNTIME version after you have started a service. All composite services which use a shared persistent state database must upgrade the RUNTIME at the same time.

Bug	Description

RUN-988	history state in a fork/join context does not work
Improvement	**Description**
RUN-1567	FlatFile adapter: trace input or output file name
New Feature	**Description**
RUN-1306	Allow canceling a hanging SOAP/URL adapter call
RUN-1544	Add request ID (session ID) to bridgeserver.log

Runtime 6.0.89.0 (29.04.2013)

Bug	Description
RUN-1569	Incorrect file names in composed MIME messages (introduced 5.1.77.0)

Bug	Hint
RUN-2407 RUN-2408	With this RUNTIME, we finally decided to activate the error log in case of comparison with NULL values only if the modeler recompiles the service.

Documentation Links