

xUML Runtime Transaction Concepts

In general, the xUML Runtime supports implicit and explicit commit of transactions.

- [Fast-running ACID transactions](#) are supported by the concept of xUML Runtime sessions.
- [Long-running transactions](#) are supported via BPMN 2 or persistent state concepts.
- As a part of [other transaction concepts](#), SAP tRFC is supported.

Fast-running ACID Transactions

The xUML Runtime works with the concept of **sessions**. Sessions are equivalent to units of work, that can be committed or rolled back depending on the status at the end of the session.

The following action types are affected on commit / roll back:

| Action Type | Example |
|----------------------------------|--|
| database access | insertion or deletion of database records |
| persistent state handling | creation of a persistent state object, sending of a persistent state signal, sending of conversation signals |
| JMS activities | sending or receiving of JMS messages with acknowledge mode transacted |
| POP3 activities | deletion of mails from POP3 server |

A session corresponds to one concrete instance of an execution of a service, namely of

- SOAP services,
- timer services
- schedulers
- HTTP services
- SAP RFC services
- JMS services
- Java services

Each session may contain multiple actions of the above described types. Per default, a session gets committed implicitly by the xUML Runtime when it is terminated without any exception. In this case, all involved transaction resources are committed. Additionally, explicit commits inside a session are allowed for all types of service adapters described above.

If an exception occurred during session execution and if this exception is not being caught, the session gets implicitly rolled back. The xUML Runtime will then rollback all not committed transactions.

However, for all other actions not mentioned in the table above, the session concept does not apply, e.g. file manipulations, external service calls, system adapter calls, and more.

Transaction Id

Each session is identified by a transaction id.

Runtime 2019.9 HTTP header **X-Transaction-ID** identifies the transaction the call belongs to. You can set the transaction id manually with [setTransactionID](#). If not set, the Runtime will generate one.

This header will be passed through the callstack to identify all service calls that belong to a transaction.

Long-running Transactions

For long-running business processes, the xUML Runtime supports parts of the [BPMN 2 compensation semantics](#). If processes are defined via state machines, the UML concept of [history states](#) is supported. Concerning both concepts it is important to regard that in practice they should be integrated into an overall concept of error handling to make sense at all (e.g. annulation processes).

Other Transaction Concepts

Some backend systems have their own transaction concept, e.g. **SAP tRFC**. SAP tRFC has been implemented into the xUML Runtime by the use of a state machine. The correctness of this implementation has been verified by SAP during a certification process.

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