Terms of Reference for the ISO 15926-9
Date: 2 Oct 2013
TC184/SC4/WG3 project

Date	Version	Who	Description
2 Oct 2013	1.0	P.P. Pruijn	TC184/SC4/WG3 comments
10 Sep 2013	0.9	P.P. Pruijn	Initial release

NOTE: ISO 15926-9 is attached to this TOR, to be able to read the work that was already done.

Content

1.   Purpose

The purpose of the Term of Reference (TOR) is to define the scope, planning, participation and funding for develop Part 9: Implementation methods for the integration of distributed systems – Façade implementation of the ISO 15926: Industrial automation systems and integration — Integration of lifecycle data for process plants including oil and gas production facilities.

Target audience

ISO 15926-9 is written for programmers, data integration specialists and system architecture professionals. These can be working for software companies to produce commercial of the shelve software suites, or part in large projects in plant owner or EPC contractor companies. It is the plan to accompany Part 9 with a user guide, where the various options are discussed in implementing the part 9 principles.

Use case

A typical use case would be the creation of a private triple store with ISO 15926 linked data. In order to make it compliant to ISO 15926 the interface of the data being uploaded must be compliant to ISO 15926-8. The triple store must then be extended with procedures and programs according to ISO 15926-9. However the data storage and data integration can be proprietary, or using a defacto standard protocol like Enterprise Service Bus.

Data scope

The underlying architecture of Part 9 should be the same both for reference data or project data. In the case of project data the size of the data can become huge, like billions of triples. For performance reasons other solutions might be explored for project data, but the preference is that solutions still be able to be used for reference data.

2.   Terms and definitions

For the purposes of these terms of reference, the definitions as in ISO 15926-1 apply.

Façade: services which capabilities and interfaces comply with the specifications of ISO 15926-9.
NOTE: a triple store needs extra functionality added and the data needs to have a certain structure to become a Facade. The additions and rules are defined in ISO 15926-8 and ISO 15926-9.

IRI: (internationalized resource identifier): a sequence of characters that conforms to an Internet standard and identifies a unique thing or concept according to a standard registration scheme. Defined by http://www.ietf.org/rfc/rfc3987.txt

OWL: (Web Ontology Language): a family of knowledge representation languages for authoring ontologies. The languages are characterized by formal semantics and RDF/XML-based serializations for the Semantic Web. Defined by http://www.w3.org/TR/owl2-syntax/

RDF: (Resource Description Framework): a standard formal language for representing information in a logical form, defined by : http://www.w3.org/RDF/

SPARQL: (SPARQL Protocol and RDF Query Language): a standard formal language for querying an information store that can be represented as an RDF corpus (commonly called an RDF triple store), defined by http://www.w3.org/standards/techs/sparql

Testing:

> **Validation testing**: assessment of completeness and accuracy for intended purpose, aka, "fit for purpose"
>
> **Conformance testing:** determine whether an implementation meets the requirements of a standard.
>
> **Interoperability testing:** determine whether two or more devices, applications, or systems can reliably exchange and use information without need of user intervention once configured.

Triple store: a purpose-built database that represents information as RDF triples, i.e. sentences of the form: subject term, verb term, optional object, where the terms are IRIs and the optional object is a term or a data value.

NOTE: it is not required that published triples are actually stored as triples; just that the system acts as a triple store.

3. Summary

Part 9 Façades play a pivotal role in the target of ISO 15926: Integration of lifecycle information. They provide the means by which lifecycle information in standard forms conforming to ISO 15926 is made available to diverse stakeholders.

A Part 9 façade consists of services that provides a secure means of performing the following functions on "reference data" or "project data" that are represented as specified in Part 8:

- import
- validate
- store
- dereference
- export
- secure
- transact / log

A chain of façades may be formed to hand over data in order to consolidate distributed information sources into the required integrated lifecycle information of a facility.

All Part 9 façades shall implement the Part 9 interface and be able to follow the part 9 technical procedures for managing and handing over lifecycle information, involving export, import, validation, transaction logging and dereferencing. The physical implementation is up to the software suppliers.

Access to information using the Part 9 specifications shall be independent of the internal structure of the data maintained behind the Façade and of the nature of the interface implementation. Access to data will not, however, be independent of data content and security arrangements.

4.   Scope

There are two parts: existing scope and proposed scope.

Existing scope is work already done on Part 9.

The existing index is:

- **ISO 15926 endpoint, defining services and file**
  An ISO 15926 endpoint exposes objects and template instances. It can either be a web service or an exchange file. It only exposes self-owned data. The endpoint has a unique identifier.

- **Manifest of an ISO 15926 endpoint**.
  An endpoint exposes a manifest, which is a distinct list of metadata and OWL classes exposed.

- **Location of ISO 15926 endpoints**.
  Rules that endpoints must be locatable, but that there are no rules how this must be implemented.

- **Querying an ISO 15926 endpoint**.
  About the ways an endpoint must respond to SPARQL query, but is allowed to use other query methods.

- **Security considerations for an ISO 15926 endpoint**.
  About architecture by location in a DMZ and reference to policy on security by W3C.

- **Authentication norms for an ISO 15926 endpoint**.
  What parts of authentication are in and out of scope.

- **ISO 15926 client**.
  About the way ISO 15926 client software must be able to operate.

- **ISO 15926 Reference data service**.
  About the requirements for Reference data services.
  NOTE there may be many RDL services.

To see explanation on these topics, please read the Part 9 version that is attached.

Additionally proposed scope of Part 9 is:

Façade population - rules for validation and compliance check of import of RDF/XML files that conform to Part 8 of this standard, logging of population transactions.

Façade data changes – rules for correcting invalid data and for maintaining versions of data; logging of corrections and changes.

Façade data export – rules for selection of data to be exported and generation of a corresponding transfer file that conforms to Part 8. Transfer of the file to the target recipient, or to a file system; logging of export transactions. Discussions how to prevent the data from being changed by the receiver; legal data vault solutions.

Façade query processing – rules for the acceptance, processing and response to SPARQL queries against the information maintained by the façade. Restricted data that is available in the data store should not be able to be queried by an unauthorized. Simple solutions must be available for this, e.g. in bid quotation procedures.

Security –
- Rules for the authentication of façade clients
- Control of access to information maintained by the façade, according to client privileges, including population, correction, query, and export,
- Support for encryption of information during query, import and export transfers.

Federation – support for creation of federations of façades; guidelines for distribution architecture, data sharing, and central security services (informative).
NOTE: look into the work of http://tscp.org

URI Dereferencing – rules for online availability of resources associated with URIs (dereferenceability) and allocation of responsibility for de-referencing URIs in a federation of participating façades.
NOTE: see http://www.w3.org/TR/cooluris/ for the requirement and solutions.

Validation: Well-formedness, OWL Schema Compliance, Other Validation (duplicates, cardinalities, etc.) – the types of validation rules, the requirements for validation capabilities, the form of validation requests, and the form of façade responses of success and failure. The content validation rules themselves are out of scope; they are in scope of ISO 15926-10. However informative examples will be presented. Validation compliancy levels are to be defined in ISO 15926-10.

Data hand-over (for lack of a better term)

- activation of the export function in the source façade for the data to be handed over;
- invoking the population function in the target façade;
- sending transfer file and confirming successful completion of transaction;
- logging (or contractual transmittals) of handover transactions.

Data Caching – rules for managing information that is "cached" (copied into a Façade that doesn't "own" it), support for a 'subscription' interface to enable a caching Façade to obtain relevant updates from the owning Façade, including actual data changes and the beginning of a new temporal part with new data values.

NOTE: Part 9 is not about how to do caching, but the rules in data updating to facilitate better caching.

Non-Façade sources – support for small equipment providers who are data owners but not integrated into the network as Façades. Their owned data may enter a Façade in standard form, but not by the population interface, or be provided via a Façade that serves as a collector/translator for information from multiple smaller providers.
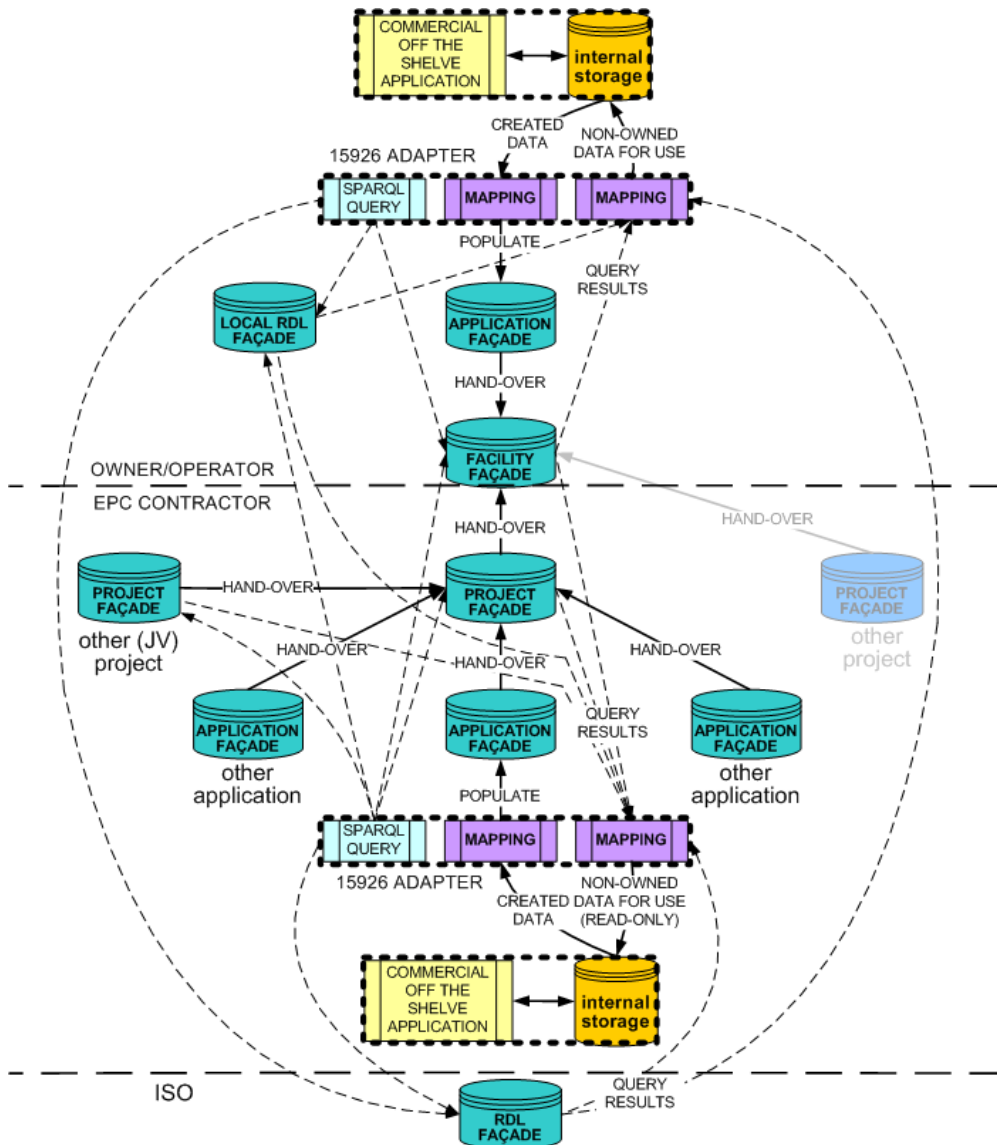

Figure 1 Typical configuration for an EPC contractor and Facility Owner/Operator

COTS = Commercial Of The Shelve software
RDL = Reference Data Library.

NOTE - This configuration is only to show the various possibilities. Actual configurations will be different.

5.   Out of scope

Compliancy levels and content of validation rules to be defined in ISO 15926-10.

6.   Planning

By March 31, 2015 the part need to be accepted by ISO for publication.
Given the ISO rules, draft, ballot and publish dates should be determined.

For the execution of part 9 prototypes have to be programmed, and tested for alternative solutions. In the end, only things remain to be put into part 9 that are crucial for the proper interoperability. If different solutions do not influence the proper operation of ISO 15926 interoperability, they will be presented as informative.
Prototypes comprise of:

- Solutions for Procedure (population and handover) behavior;
- Dereferencing solutions;
- Central security servers and federated façades;
- Publication of manifest;
- Complex data validation, types of rules, determination of compliance levels;
- Performance solutions, cashing behavior, billions of triples test.

See next page for a planning table.

Table 1 – Planning

Prototypes		2013			2014								
(Proof of Concept)		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Population and handover													
	Publication of manifest	X											
	Façade population	X											
	Façade data changes	X											
	Façade data export	X											
	Logging and contractual transmittals		X										
Dereferencing													
	URI dereferencing from standard namespace addresses		X										
	Redirecting calls to single objects after data handover		X										
	Façade query processing		X										
	Facade manifest			X									
Security													
	Authentication			X									
	Control of access			X									
	Support of encryption			X									
	Creation of federations				X								
Validation and Compliancy													
	Validation of data using different types of rules				X								
	Retermination of compliance levels				X								
	Determination of interoperability				X								
Performance													
	Cashing behavior					X							
	Billions of triples test					X							
Non-facade													
	Data exchange using files					X							
	Using online forms or spreadsheets					X							

		2013			2014								
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Consensus building							X	X					
Draft part 9									X	X			
Work with convener											X	X	
Release													X

7.   Participation

The following persons will participate in the TOR and standard:
- Peter Paul Pruijn (Project Lead)
- Rahul Patil
- Onno Paap
- Hans Teijgeler
- Victor Agroskin
- Ed Barkmeyer

8.   Funding

Man-hours of project team members will be borne by their respective companies or donated voluntary.