Technical Recommendation for usage of UUIDs in SC4 standards
ISO TC184 SC4 Ad hoc Group 3 (AhG 3)

Unique Universal Identifiers (UUIDs) are defined in the W3C recommendation RFC 9562. They are numbers generated by a computer that are unique for most practical purposes. Therefore, computer applications can use them as synthetic keys to find items. The primary advantage of a UUID is that it can be generated by any application at any time. The primary disadvantage is that once the connection between an item and its UUID is lost, it cannot be repaired.

UUIDs can enable new links between standards. Although, in many cases the links may be found by other means, such as data queries. Therefore, a UUID solution should provide linkages that are new or more efficient. AhG3 has focused on linking data defined by STEP, QIF and MTConnect. SC4 may want to give consideration to linkages between PLIB, MANDATE, ISO 15926, AS9102, ISO 18828 and ISO 20534.

For many years SC4 has been developing standards in which internal identifiers (usually integers) connect data items. Internal identifiers are much smaller (8 bytes) than universal identifiers (128 bytes). The SC4 standards could replace their internal identifiers with universal ones, but as yet, this is not practical. When a data item is found it must be processed which implies it must be understood, so if the UUID's are fully universal, then all SC4 standards (and all other standards) have to be harmonized.

Therefore, AhG3 recommends UUID's are used as external references between standards. This requires a protocol so that when there is a reference from A to B, a system can be found to process the data of B. Various schemes have been proposed during the life time of AhG3, including at least two for ISO 10303. The conflict on which scheme is best has led to three years of discussion.

Fortunately, a W3C recommendation has been published to locate the system. Decentralized Identifiers (DIDs) v1.0 (w3.org) recommends the method be specified as a prelude to the identifier. Thus, for example, the conflict between purposes in ISO 10303 can be resolved by using different DiD's. The first DiD below is used to connect data in a digital thread. The second DiD below is used to archive data for a CAD system. The third DiD shows how the same convention can be extended to data that has a QIF encoding. The data that follows the final colon depends on the protocol and maybe a UUID as shown.

did:thread:step: 0d7b99ce-e079-4db8-9559-30e60b131e4a

did:archive:step: ad62d1c1-3371-4431-9918-40f91cf9f53f

did:thread:qif: 059ce9f7-50a1-4cde-a478-477c45f718a1

NOTE 1: The additional data in front of the colon need not be required if it can be assumed by the context.

Note 2: The protocol identified by the labels may include a mechanism to recover lost connections.

WG12 and WG15 are currently pursuing different methods for deploying UUID's. The reasons for the differences are technical and intrinsic to the application. ISO 10303 wishes to archive data for the long term. ISO 23247 wishes to link data into a digital thread. When there is scope for ambiguity, AhG3 recommends DiDs should be associated with the UUID, to give them context, and assist in their management and validation.

Enabling Resolution

Resolution 1073: (Virtual Meeting – May 2021)

Establish an Ad Hoc Group on UUID management for industrial data.

Noting the technical discussions among experts from WG 3, WG 12, WG 15 and others on the opportunity to align concepts on the use of UUID in industrial data, SC 4 establishes an Ad Hoc Group “UUID management for industrial data” with the following terms of reference:

- Define the opportunity space for UUID in context of SC 4 standards,
- Identify use cases for UUID in industrial data,
- Provide recommendations to SC 4 on the scope and applicability of UUIDs to SC 4 standards,
- Provide a report to SC 4 upon completion.

SC 4 nominates Martin Hardwick as Convenor with appreciation to serve in that capacity, appoints

Allison Barnard Feeney
Peter Benson
Keith Hunten
Alan Johnston
David Odendahl
Thomas Thurman
Jean Brange
Mikael Hedlind
Bengt Olsson
Max Ungerer
Hiroshi Murayama
Hyunjeong Lee
Nils Sandsmark
to the group and invites National Bodies and Liaisons to nominate experts.

List of Participants

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