

Toward a Data Exchange Consortium



Problem Statement

In the era of Internet-of-Things, connected devices, Big data, and Machine Learning, the cleaning industry, along with adjacent service industries such as Facility Management, is rapidly evolving to become a fully integrated and productive part of the end-user activity instead of simply being a necessary evil side activity.

This industry transformation both feeds on data from a large number of diverse sources and also produces a large amount of information.

On the receiving side, every cleaning-related equipment manufacturers collect and process raw data about their products, and end-users also collect data impacting cleaning. For example, the Retail vertical can collect foot traffic statistic that impact when and where cleaning is required; the Education vertical maintains class schedule and attendance; the Hospitality vertical manages guest information; the Healthcare vertical handles patient traffic, and so on...

On the producing side, data is not only used to streamline the cleaning operation, but also to produce new services and solutions. As the business value of data becomes more evident and business cases are being validated, a new community of subject matter experts is emerging to handle the data diversity and complexity, such as integrators, aggregators, data scientist and analyzers, User experience and presentation layer experts..., all interacting with the data at different layers of processing.

As the landscape of data-driven solutions is growing rapidly it becomes both a benefit and curse for the cleaning end-users who are asking for tailored solutions that provide actionable items to address a specific set of problems, and who want a one-stop user experience adapted to their environment.

On one hand, the technology is becoming available to address the end-users complex issues. On the other hand, it becomes increasingly time consuming and expensive to identify the correct solution.

Therefore, how can cleaning industry customers access timely and cost-effective solutions to problems requiring complex analysis of very large and diverse data sources?

The Road toward Standardization

As described on Figure 1, there is a significant risk that the technology transformation of the Facility Ecosystem implodes before it is able to take off caused by few main factors:

1. Even though the Cloud infrastructure and many software tools are the enablers to data-driven solutions, there is still a significant cost and resources required to develop and secure the interfaces between data sources before the data can be processed to do something useful with it. This cost has zero added-value and is money not spent in functionalities and innovation. For example, let's assume a BSC wants to streamline their soap dispensers refill process. Many soap dispensers are now connected to provide their fill level and provide web APIs to access the data from each dispenser. However, the API and data format is different from each manufacturer, so, in order to develop a system that covers the entire fleet of dispensers under management, the BSC would have to either use significant IT resources or hire an expensive third-party consulting to understand the API and the data format from each provider, collect the data in a secure way,

and normalize the data before anyone can process the data. This cost would also be multiplied for every BSC wanting to implement a dispenser refilling solution adapted to their need.

2. As software solutions and services become increasingly available both in number of providers and functionalities offered, it is difficult to find what is available, be aware of new offerings, and understand how it applies to the ecosystem. Even through search engines, it is time consuming to find relevant and comprehensive information. This leads to, either duplication of effort to implement a functionality that could be already available, or missed opportunity.

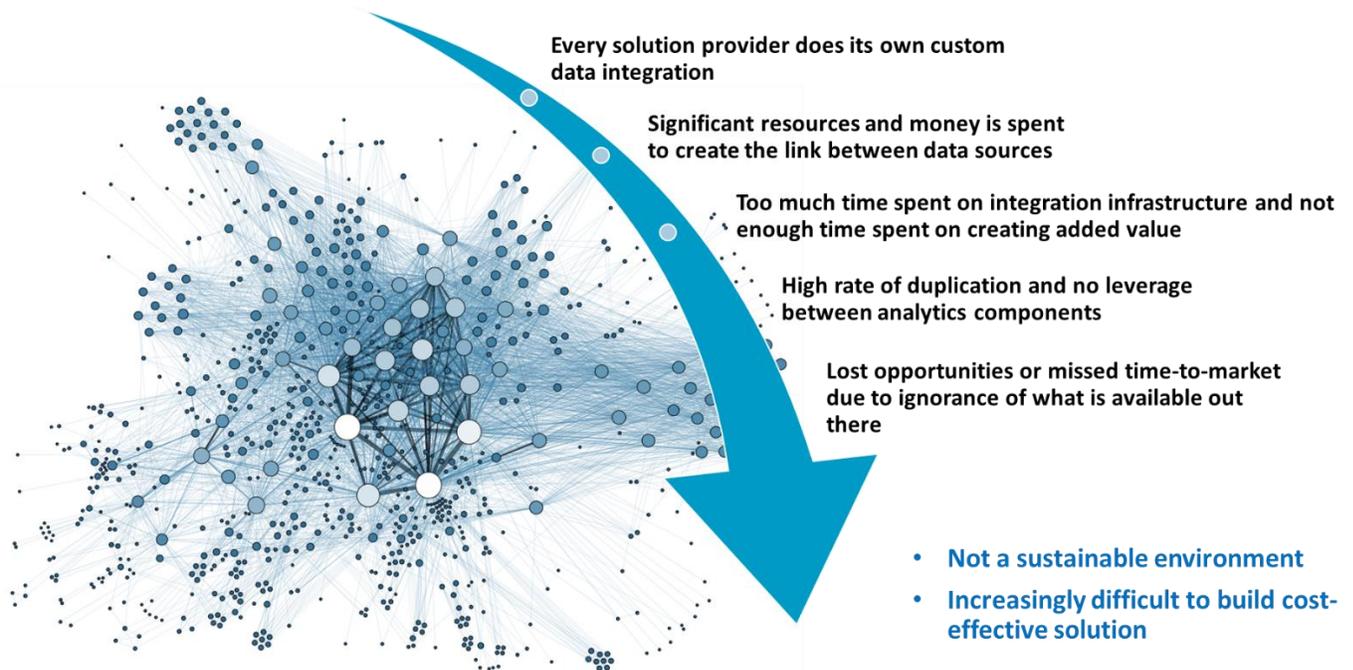


Figure 1: Today's Environment

The risks inherent to Big Data and distributed data sources and applications are not new and specific to the Facility ecosystem. The Healthcare industry, which can be considered one of the pioneer in Big Data, has faced similar issues with the increasing diversity of medical devices, physicians, and insurance companies, all interacting through electronic medical data. The response of the industry has been the development of data communication standard (see HL7 for example).

As described in Figure 2, a similar paradigm can be applied to the Facility ecosystem, where a Facility Data Exchange standard defines the format of data, the rules to publish and access the data (such as security requirements for example), and a set of guidelines and methodologies to help developers and users with examples and best practices. In such an environment, publishers and consumers of data don't need to spend resources to communicate with each other on a one-to-one basis; by complying to the standard, the publisher broadens the users base by advertising its data in the exchange's repository; the consumer is guaranteed that the data is consistent and reliable across all the data sources. In the previous example, the BSC can find the list of all dispenser providers on the exchange and can get data from all of them using one interface and knowing that the requests will be successful.

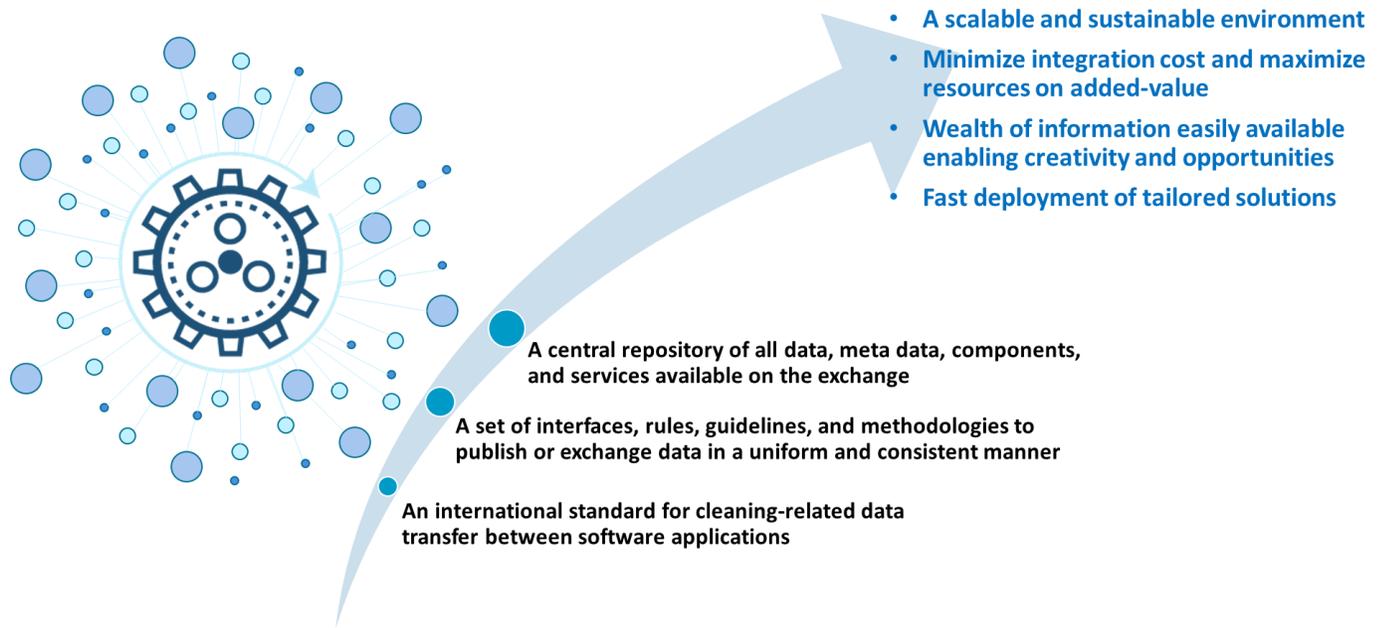


Figure2: Data Exchange Standard

A Facility Data Exchange Consortium

In order to implement a standard that is widely accepted by the industry, covers all facets of the ecosystem, and is both reliable and evolutive, the standard definition should be owned and defined by the industry itself through a consortium represented by the leaders of all layers and verticals of the industry such as, but not restricted to:

- Tools and equipment manufacturers
- Software and solution providers (ERP, workforce management, tasks management, fleet management...)
- BSCs and other service providers
- End-users from all verticals (Retail, Education, Healthcare, Hospitality, Entertainment, Manufacturing...) and the equipment distribution industry

Ideally, the consortium would be sponsored and reside under the umbrella of an existing professional organization such as ISSA to guaranty the independence of the consortium governing body.

The main responsibilities of the consortium are

- To develop and maintain the interfaces, rules, guidance and methodologies, which are a set of technical documents including information such as messages definition, data types, communication protocols and sequences, secure communication...
- To manage and maintain the repository which is a database and query mechanism to identify all functionalities published by providers, documentation and examples on how to access and use these functionalities
- To develop and maintain test suites and data samples that each publisher must successfully run in order to obtain the certification and compliance to the standards, and that consumers can use to validate their client implementation
- To provide training, templates, samples, and documentation to help in the implementation of the standard

Both publishers and consumers on the exchange would be members of the consortium and follow a simple operating workflow described in Figure 3.

Publishers on the exchange

- Subscribe to the Standard organization to access the interfaces, rules, methodologies, templates and training
- Develop their data stream, components, services... according to the standard; implementation of the interface should be a fairly straight forward with minimal development effort by following the guiding principles, templates, and examples provides.
- Test the implementation using the test suite provides by the standard; the test suite includes client applications, test scripts to run predefined test cases, and test data that validate the interface implementation and secure access to services
- Receive a certificate of compliance based on successful test results
- Add the service and functionalities to the repository to give access to the community at large. Note that the exchange doesn't host the services. Publishers are free and responsible for the deployment in their own production environment, whether it is in their own infrastructure or on the cloud. The repository is simply a database providing all pertinent information on how to access the services.

Consumers on the exchange

- Also subscribe to the Standard organization to access the interfaces, rules, methodologies, templates and training
- Identify the data, functionalities, services available on the exchange by querying the repository
- Simply follow the instructions provided by the repository, templates, and examples to quickly access the pertinent information from the selected publisher.

Note that an organization can be both a publisher and consumer of the exchange, and that a publisher can implement new functionalities and services by consuming existing offerings on the exchange.

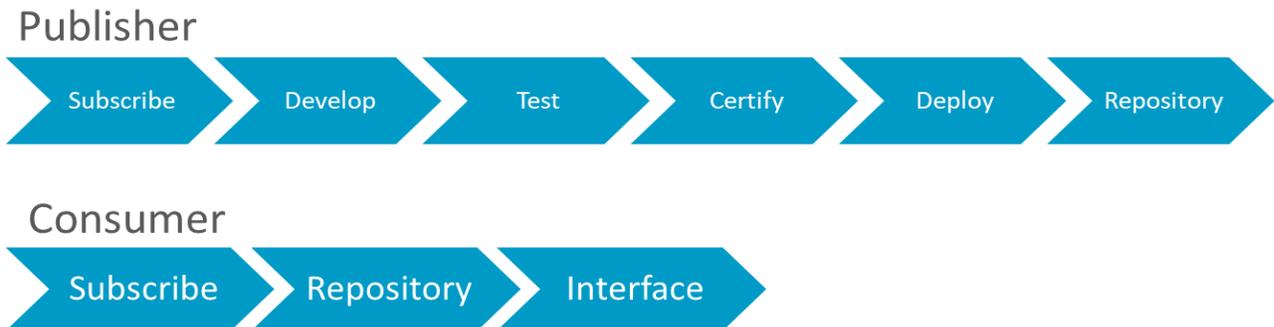


Figure 3: Operating Principles

Implementation

The founding and governing body of the consortium is composed of a small group of partners representing a broad and global view of the Facility ecosystem including

- A Building Service Contractor (Cummins Facility Services)
- A large industrial and commercial equipment manufacturer (Tennant)
- A small tools and equipment manufacturer (Hydro Systems)
- A Home and Cleaning solutions provider (Freudenberg)
- A large equipment distributor (ISC)
- A cleaning-related Software as a Service (SaaS) provider (facilityApps)
- A large online e-commerce provider (Amazon Business)

Organized as a non-profit organization under the US law, the main order of business of this governing body is to promote and implement its mission to 'advance global open standards for secure data transfer and integration in the facility ecosystem, developed by the industry subject matter experts, so that the

benefits of electronic information technology are widely, quickly, and economically available to the industry'.

To achieve this goal, the organization is responsible for

- Promoting the standard idea and concept the industry
- Growing the membership base
- Identify and organize working groups of subject matter experts who will develop the first set of standards
- Validate the exchange through real-life and production use cases