IN29 Presentation

Interactive Content Delivery: Technologies, Use Cases and Industrial Applications for IoT Scenarios

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Content delivery has become one of the recent topics focused on in approximately the last five years. Companies are increasingly discovering the value of well-structured and addressable content for supporting a variety of content-driven scenarios mainly for after-sales information processes. In industrial applications, the Internet of Things, and respective Industry (IoT/I4.0) use cases demand granular content chunks which can be retrieved and accessed in a technically unique way. Content delivery portals (CDP) offer such accessibility for content originating from the content management systems (CMS) or other structured data sources. Moreover, CDP allow the tracking of information use and of system usability via content analytics. The combination of the latter technologies with industrial analytics for complex IoT-ready products can reveal new possibilities for the interaction of humans, machines and information systems.

Content Delivery Basics

The basic use cases for Content Delivery currently cover customer and service information for the use and maintenance of products. But there are also applications which address technical sales information and support sales processes by retrieving and assembling information for the customers and sales staff. The common denominator of these approaches is the prestructuring of granular content and their enriching via semantic metadata. This usually takes place within the content management systems (CMS) via topic-based approaches and the usage of intelligent classification methods, e.g. the PI-classification. Intelligent means in this context, that content can be requested, processed, and delivered manually or automatically according to the corresponding use case.

Manual access to CDP and to required content is provided generally by three different means: direct searches (i.e. full-text searches), structured searches via metadata (facetted searches), and navigation (documental and visual structures). The second and third methods rely on the quality and on the level of depth of the corresponding metadata. Full-text searches on the other hand can make use of traditional database indexing or more elaborated technologies. The latter can cover for example terminology-based, ontology-based retrieval (augmented intelligence) or approaches from artificial intelligence. In all these cases, one tries to make use of the content relations usually hidden in simple classification schemes. These advanced content retrieval technologies become increasingly important when the amount of unstructured content included in the CDP is growing.

The above described manual CDP access yields in many cases a manifold information set of documents, topics or more granular data. In contrast, a system based upon requests and the delivery of content is usually event-driven and should yield a precise and uniquely addressable content object. In such situations, semantic, event- and process-driven metadata become crucial. In the following, we will also discuss the nature of the mentioned events.

CDP Implementation for industrial and robotics systems

In a simple picture, CDP can be used as off-site portals or mobile applications for the described retrieval of content (see Fig. 1). They can also be connected on-site to physical products and their software and interfaces. This yields the possibilities of connecting to modern IoT/Industry 4.0 scenarios. The content itself can stem from CMS or additional information sources which build up the total set of structured and unstructured information.

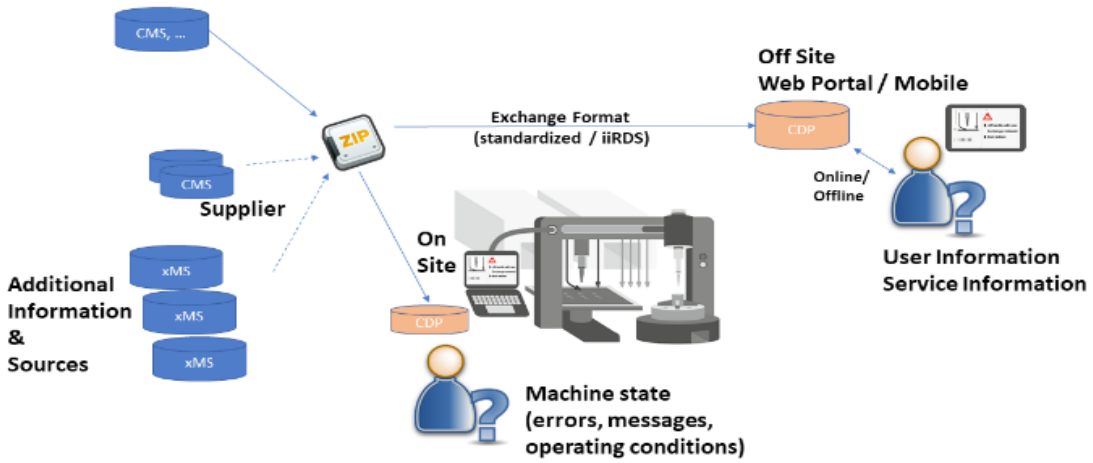

Fig. 1: Content delivery of information connected to industrial applications in a simply depicted I4.0 scenario.

Use cases and utilizations for utilizing the IoT or Industrie 4.0

Various methods are being considered as methods for utilizing IoT in CDP. ISE is researching as one case study the field work use cases in which the Microsoft HoloLens (Note) was utilized for machine maintenance as per the following:

- If a service engineer who is wearing the HoloLens looks through the HoloLens at the area to be maintained when maintaining the subject machine, the image data in the HoloLens which is the seen visual information is transmitted to the corresponding server based upon the CDP information's bidirectional functions.
- And, the service engineer receives from the server several work options (as necessary, driven also by AI technologies, etc.) for the work that must next be done.
- And, the service engineer selects the work which is to be performed from amongst those options, and performs the work based upon those instructions.

In regard to the use case in the aforementioned field work, at the TC Symposium 2018 which was convened in Tokyo, ISE appealed to many experimental collaborators that there are possibilities for practical usage through the experiments which use the HoloLens.

Smartphones, tablets or other smart glasses can be used as the device, and by using the HoloLens the service engineers can check the work status based upon MR (Mixed Reality) technologies, thus hands-free work can be performed based upon the instructions that are displayed in the HoloLens.

CDP information management systems responsible for robots and human interfaces

In anticipation of the future, ISE began working on joint research with Keio University (http://www.k2.keio.ac.jp/k2_topics/real-haptics.html) in Japan in August of this year which is pioneering real haptic technologies (Note) that coordinate CDP and robotic technologies. ISE's role is the developing of information management systems which include CDP for those purposes. Via the unique force haptic technologies "Real haptic technologies" which convey with high precision hardness, softness, deformations and deflections, etc. the sense that the objects were touched by the robots can be directly conveyed to you just as if you directly touched them yourself.

Analytics and metrics

For the first time, CDP allow for the direct tracking and measuring of user interactions with the content and systems. This means, that one can measure content access by methods derived from web analytics. Most (and least) frequently accessed topics, successful (and unsuccessful) search terms, the use of metadata for retrieval and many more indicators yield a sophisticated picture of the content architecture and its acceptance.

The combination with industrial products and especially robotics systems now enhances the analytic environment. The use interaction with the product can be detected and tells about the machine and user-driven events. In case the situation requires information deliveries to the user, the corresponding events can request the CDP to deliver the information.

Moreover, analytics via the means of event statistics and AI methods, one can trigger predictive (information and product) processes which for example might be relevant to product services and safety.

Summary

In order to practically apply IoT or Industrie 4.0, it is essential to develop various systems such as the information support systems for the aforementioned service engineers, and the CDP information management systems which are responsible for the robot and human interfaces.

We believe that the new mission for technical communicators is to be responsible for focusing on the developing of the information support systems and information management systems that utilize such CDPs. They offer new ways of accessing information and also new ways of analyzing the interaction with users.

International standardization with regard to information management in this new field is also important. In this sense, the activities for standardizing tekom's iiRDS can be evaluated.

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