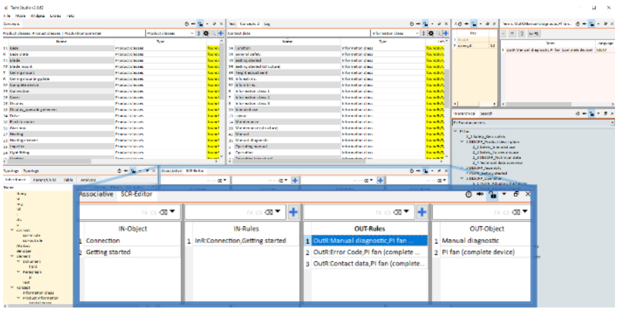

Fig. 4. SCR definition in an CCMS (Klar:suite) by selecting from (yellow marked) topic-metadata [9]. Resulting *In/Out Rules* are displayed in the zoomed viewlet on the bottom.

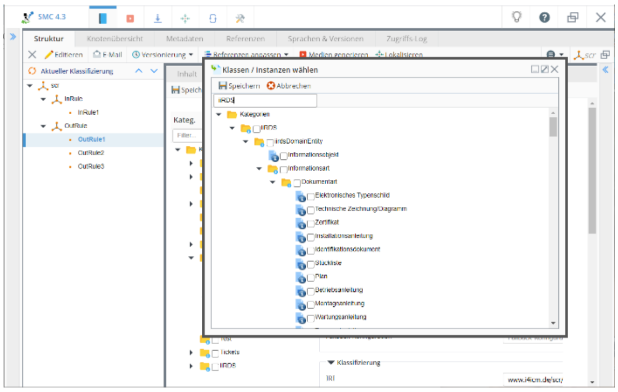

Fig. 5. SCR definition (left side) in an (C)CMS, here Smart Media Creator [10]. Selectors are constructed by selection from the metadata taxonomies.

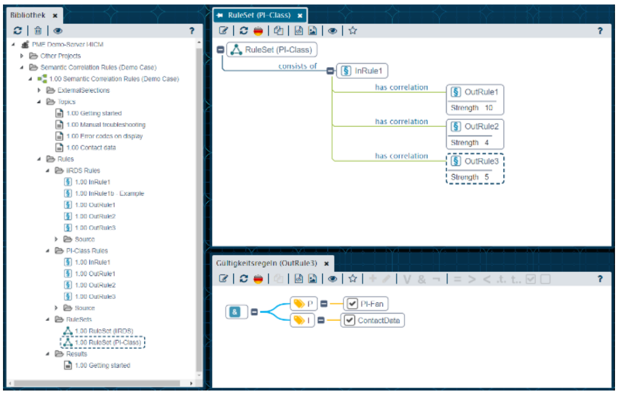

Fig. 6. SCR definition (upper right window) in an SMS, here Ontolis [11]. Selectors are defined within an ontology model as Boolean operators (lower right) and can be managed in the system.

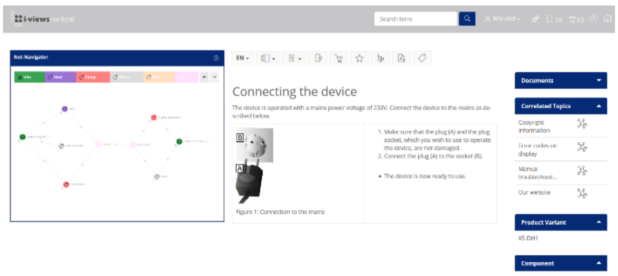

Fig. 7. Dynamic SCR processing within a CDP environment, here I-Views Content. Secondary objects are displayed as correlated objects on the right side. A semantic graph view of SCR can be displayed (left side) as the system used has a primary SMS functionality [12].

Beside the implementation in user interfaces as shown in figure 7, the SCR can be accessed by API-calls and processed by corresponding web-services as in the c-rex environment [13] described in [2]. In general, the API-calls initiated by primary events, trigger graph traversals leading to the provisioning of metadata of correlated secondary objects. However, web services could also process API calls by returning complete microDocs as content packages. This could cover, for example, standardized formats like DITA maps, iiRDS packages, or SCORM learning packages.

5. Discussion and summary

In this article, we proposed a standardized RDFS/OWL notation as an implementation of microDocs for context-aware information delivery. The underlying concept of semantic correlation rules can be realized and implemented in various system types contributing to content-related processes. Using the described semantic technologies, we propose an easy-to-implement and light-weight ontology approach. Correlation rules should be derived from relevant use cases and can then be modelled in the described way. As depicted in figure 3, rules can be continuously improved by analyzing user interaction in the search ad delivery environment. This can be done, for example, by statistical web analytics, AI-driven pattern recognition, or direct user feedback.

SCR can initiate as a starting point more elaborated semantic modelling approaches going beyond content correlations for delivery only. But even within the simple SCR framework given, rules can be used with respect to other goals: For example, dependencies within objects or metadata arising from product configurations can be modeled to some extent. Other types of search applications, like document-based information retrieval systems, can use SCR formalism provided that objects are specified and retrieved by metadata. Also, in classical publishing environments for technical communication, linking between topics might be managed and processed with the help of SCR for all types of media. Similar approaches can be found as relationship tables in DITA environments. SCR can extend this to a more general class-to-class linking, using a semantic modelling formalism. Two aspects must be emphasized on, as they are crucial for future applications. First, the performance through preprocessing or dynamic processing of SCR in corresponding implementations. Second, the maintenance of SCR through updating and versioning. These two aspects are left to further work and publications on SCR.

In summary, SCR can be understood, at the introduced level, as a logic layer between content creation and content delivery, allowing to manage correlations between information objects independent of content creation. microDocs are one of the beneficiaries recently being discussed. Other industrial applications and processes can define corresponding object correlations, not necessarily bound to content objects exclusively.

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References

1. Ziegler W. *Extending intelligent content delivery in technical communication by semantics: microdocuments and content services*, Proceedings of the ETLTC ACM Chapter International Conference. Aizuwakamatsu, Japan. (2020) https://doi.org/10.1051/shsconf/20207703009
2. W. Ziegler, *Rules-Based Content Correlations* tcworld online conference, Germany, (2020)
3. W. Ziegler, *Content management systems tested: Introducing the PI-Fan*, tcworld e-magazine 10/2016
4. *iiRDS – The International Standard for intelligent information Request and Delivery*, https://iirds.org/material-downloads/iirds-version-1-0-1/
5. W3C, *RDF Schema 1.1*, https://www.w3.org/TR/rdf-schema/ (2014)
6. W3C, *Web Ontology Language (OWL)*, https://www.w3.org/OWL/ (2012)
7. I4ICM, SCR 1.1.0, https://www.i4icm.de/downloads/scr/
8. W3C, *Shapes Constraint Language (SHACL)*, https://www.w3.org/TR/shacl/
9. Klarso, *Semantic software solutions*, https://klarso.com/
10. EC-Systems, *The Smart Media Creator*, https://www.ec-systems.de/
11. Ontolis, *Think It – Model It*, https://www.ontolis.com/
12. I-views, *The Smart Data Engine*, https://i-views.com/en/
13. c-rex.net, *Digital Transformation Service*, https://c-rex.net/