Annals of DAAAM for 2010 & Proceedings of the 21st International DAAAM Symposium, Volume 21, No. 1, ISSN 1726-9679
ISBN 978-3-901509-73-5, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria, EU, 2010
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Annals of DAAAM International

USING SERVICE CHALLENGE BASED EVALUATIONS FOR THE SYSTEMATIC INNOVATION OF PROACTIVE REMOTE SERVICES: A CASE STUDY

HOLM, T[imo]; WIENER, P[eter] & HORN, S[tefan]

Abstract: *Remote services of machines and industrial plants - especially proactive elements like software distribution, event monitoring and inventory management - are services, which have become a significant competitive edge for machine- and plant manufacturers. Objective of the Service Challenge based Evaluations described in this contribution was to check whether the remote service modules of Siemens' common Remote Service Platform were sufficiently suited to match the challenges of industrial service and to systematically innovate them, where they didn't, in order to form a company-wide re- and proactive remote service offering.*
Key words: *service challenges proactive remote services*

1. INTRODUCTION

Remote services of machines and industrial plants, often called teleservices, are services, which have become a significant competitive edge for machine- and plant manufacturers. Many supporting information systems – so-called Remote Service Systems (RSS) – are developed individually according to specific customer needs. This development is unnecessarily time and cost intensive (Kuehl & Fay, 2009 and Spies, 2003). Instead the adaption and reuse of established solutions seems to be the way to go (Körner, 2002).

2. PROBLEM - STANDARDIZED PROACTIVE REMOTE SERVICES

Siemens, one of the world's largest suppliers of systems and solutions addressing the machine and plant manufacturing industry, recognized the synergetic potentials of reusing certain remote services across its business sectors (industry, energy and healthcare) early. A common Remote Service Platform (cRSP) provides the basis for secure remote maintenance (see References); it enables remote access to connected systems and plants as well as the transmission of data and the proactive monitoring of devices and systems with the support of agent technology. The platform is provided as an on-demand solution with a usage-based billing model: The customer pays for the services actually performed by the remote technicians on the connected systems. The benefits are a small initial investment, a low capital commitment and good scalability.

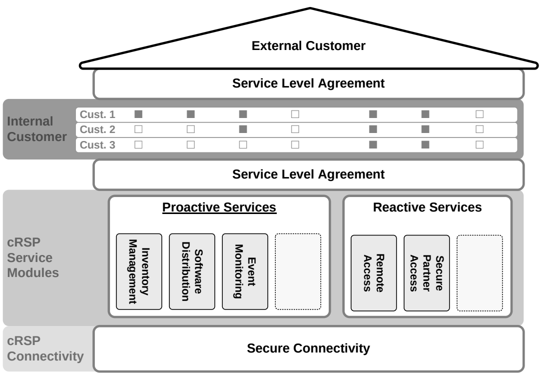

Fig. 1. Simplified Siemens' common Remote Service Platform Architecture

The system's architecture consists of an underlying secure connectivity layer that is shared by all the higher reactive and proactive service modules (see Fig. 1). Whereas this underlying layer is unique and common to all of Siemens' remote services, the proactive modules were (up to a certain point) not used by all the above mentioned sectors – including industry.

But customizing RSS to accommodate the domain of industrial machines and plants is tricky. Usually the ad-hoc approach implies several iterative development cycles, a process which threatens an organisation to possibly loose the competitive edge due to reasons of time. In order to perform a precision landing when it comes to necessary changes in established RSS, a systematic approach for the innovation of industrial information systems is needed.

3. METHODOLOGY - CHALLENGE-BASED EVALUATION

The challenge based evaluation methodology (Holm et al., 2008) concentrates in its core on requirements industrial information systems have to cover when to be used successfully in the industrial plant business. The business fields Engineering, Commissioning, Operation, Modernization and Service, which correspond to the five basic lifecycle phases of every plant, have been researched in order to extract critical success factors that can be influenced considerably by software systems (e.g. RSS). In case of the business field Service a total of four central challenges has been extracted, which correspond to the four layers of an architecture. The components of this generic architecture cover important technical functions that need to be addressed in order to provide plant services like maintenance or repair optimally:

- Data Handling – The bottom layer of the architecture model contains three databases, which are responsible for archiving process, system, and installed base data. Additionally one component is needed to compact system and process data, which in practice can grow up to several terabytes per month within facilities manufacturing 24/7.
- Information Processing – The data processing area takes care of data conditioning, consistency checks and analysis of information coming from the plant. This area additionally uses archived information coming from databases below.
- View Concepts – To control the presentation of information the component view is used. It usually offers either technical or economical views and is needed as user interface for parameterization and analysis.

Service Know-How Integration – By using and parameterizing an information system, the user is able to actively put

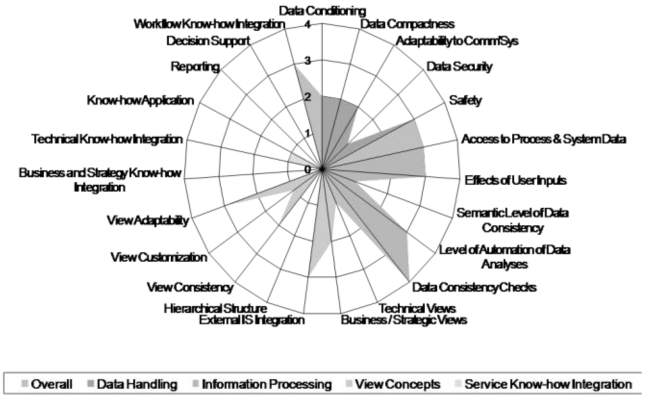

Fig. 2.Evaluation results of proactive remote service *software distribution*

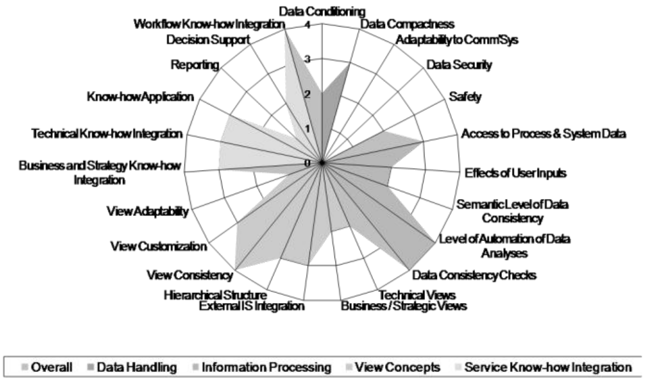

Fig. 3.Evaluation results of proactive remote service *event monitoring*

Fig. 4.Evaluation results of proactive remote service *inventory management*

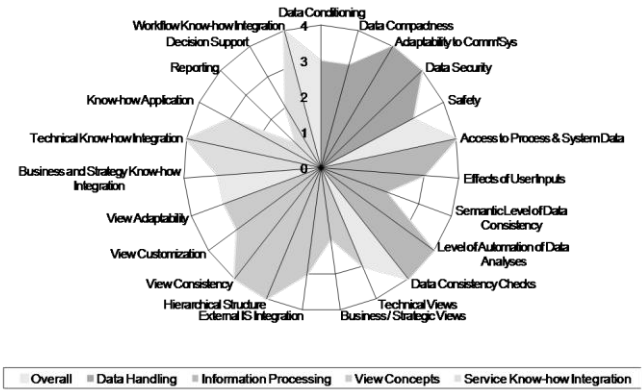

Fig. 5.Overall evaluation results of the *combined proactive remote service modules*

knowledge into it. This knowledge database constitutes the fourth part of the architecture.

Each success factor associated with the above mentioned reference components is detailed by a number of so-called Sub-Challenges (23 in total), which are again detailed further by best practices. Best practices constitute concepts for addressing the superior challenges and serve as metric for the evaluation regarding the support a user gets when using a particular information system.

This framework allows executing reproducible and comparable evaluations between competing information systems, which results are independent from the particular evaluator. Best Practices of higher value can be used in order to systematically innovate information systems and derive development roadmaps.

The objective of the evaluations described in this contribution was to check whether these proactive modules were sufficiently suited to match the challenges of industrial service and to systematically innovate them, where they didn't, in order to form a company-wide, proactive remote service offering.

4. CONCLUSION AND OUTLOOK

Figures 2 to 4 show the results of the three evaluations; each kiviat diagram is covering one of the proactive remote service modules *software distribution*, *event monitoring,* and *inventory management*. The 23 axes represent the corresponding sub-challenges of industrial service business, the pictured area symbolizes the level of support a user gets when using the evaluated object. Figure 5 shows the overall service support, offered by the combined modules. Although the evaluation concludes, that the overall system is well suited for the challenges of industrial service - it covers 19 of the 23 sub-challenges with best practices ranked three or higher - three sub-challenges were rated with a value of only two, and the sub-challenge *Reporting* actually scored a one.

In order to address these (admittedly small) improvement potentials, individual innovation roadmaps for all three proactive modules were systematically derived. For instance in order to address the industry specific sub-challenge of *Decision Support*, the coverage of automation system family specifics was triggered and quickly piloted, in order to allow seamless integration of proactive services during plant engineering and manufacturing.

Currently these innovation roadmaps are implemented and tested within several bigger, piloting projects.

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