

Remote maintenance and services in industrial automation for SMEs

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This project aims to develop a concept with an optimized or new remote maintenance solution and to deliver this as a recommendation to Actemium Switzerland. VPN and WebRTC technologies were considered as possible solutions. The results show that the VPN technology is preferred due to high security requirements and suitability in any use case, while WebRTC only proves to be suitable for limited use cases and inefficient for critical applications.

Introduction and objectives

Actemium Switzerland currently uses a remote maintenance solution that is functional, but has potential for improvement in terms of efficiency, security and cost optimization. The aim of this thesis is to analyze the technological and security requirements and to determine an optimized or new remote maintenance solution and thus recommending a new concept that meets the increasing customer requirements.

Research design

A combination of literature research and qualitative interviews with end customers as well as an exploratory discussion with direct stakeholders from the preliminary bachelor study served to identify the exact requirements to determine an optimized or new remote maintenance solution. It was also helpful to analyze the current process to discover any bottlenecks in the process itself. At the same time, the suitability of WebRTC as an alternative and previously unused technology for remote maintenance in industrial automation was investigated. A concept model (see Figure 1) was created to check the feasibility of the implementation. The potential value was also assessed using a SWOT analysis and underlined with the Technology Acceptance Model.

Results

The results show that the VPN technology remains the preferred solution for critical industrial applications.

These applications require to meet high security standards which include access to operating system management, complex network configurations, and data-intensive transmissions. Furthermore, VPN provides the necessary infrastructure to ensure network security, efficiency, encryption, and system integrity. While WebRTC would be an interesting use case for avoiding conflicts between manager for IT and OT, respectively, and it could be used for some aspects of remote maintenance, the effort involved in ensuring adequate data protection and system access would currently place a disproportionate burden on resources. Hence, the development of a new or optimized remote maintenance concept using VPN Technology for Actemium Switzerland remained the main objective of this thesis. Furthermore, the benchmarking of VPN solutions confirmed that pursuing a combination of make and buy is the most convenient approach to achieve standardization and scalability.

Recommendations

Based on the results, it is recommended to continue investing in VPN technologies. Investment should be made in more advanced security protocols, improved network monitoring tools, and regular security audits to ensure the integrity and reliability of the remote maintenance systems. WebRTC could be used as a supplement for certain direct communication tasks within a protected environment or for specific applications that do not require full system access.



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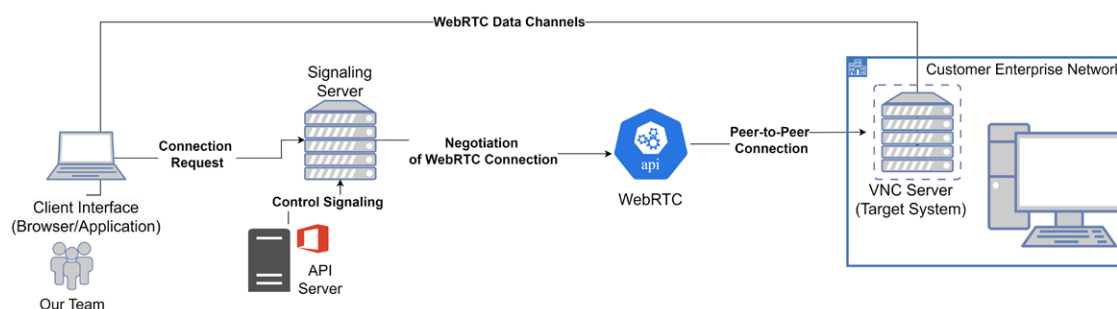


Figure 1: WebRTC Concept for Actemium Schweiz AG