Simulation Apps At LEONI: Use Cases, Challenges And Solutions Within A Global Company

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Abstract

With the Creation, roll-out, and maintenance of COMSOL Simulation apps, the role of simulation engineers and departments is expanding to include responsibilities similar to those of software developers. Within our department, we have undergone this transformation and will share the key aspects of our journey.
At LEONI Wiring Systems, COMSOL Simulation Apps meanwhile play a crucial role in enhancing the efficiency and accuracy of engineering tasks. These applications support LEONI engineers by providing reliable simulations for various technical questions, significantly improving day-to-day operations.
Key use cases include electro-thermal simulation apps, which are essential for calculating cable (bundle) temperatures and dimensioning and sizing cable harnesses for both low and high voltage wiring systems. Additionally, we use apps in the early design phases of (electronic) fuse boxes. These apps facilitate the fast creation and evaluation of electro-thermal performance in application-specific setups. They also enable the generation of industry-standard results representations, such as derating and time current characteristics plots (tCC-Plots), by allowing for fast geometry and model generation as well as the computation of results.
Despite the significant benefits, implementing and using COMSOL Simulation Apps within a large company like LEONI presents several challenges. To address these, LEONI has opted to share apps as compiled executables. Ensuring app accessibility for globally distributed engineering centres and achieving obstacle-free availability of COMSOL Runtime are critical. Balancing act between error handling and development effort. Effective hosting of apps and managing security, are also essential considerations. Additionally, tracking users and informing them about updates is necessary to maintain the relevance and effectiveness of the apps. Furthermore, advertising and promoting the apps, providing adequate training and documentation, developing apps with a consistent graphical user interface (GUI), and performing updates, bug fixes, and quality checks (unit tests) for the apps are necessary steps to ensure their successful implementation and operation.
Overall, COMSOL Simulation Apps are integral to LEONI's engineering processes, offering substantial benefits while also presenting challenges that require careful management and continuous improvement.