The specific challenges for maintenance of software and its related hardware for the domain of automated Production Systems is discussed. Presenting four industrial case studies from renowned and world market leading German machine and plant manufacturing companies, these challenges and different solution approaches are introduced with a focus on software architectures to support modularity as a basis for maintaining long-living automated Production Systems. Additionally, most critical as-pects hindering classical approaches from software engineering to be successful, e.g., modes of operation and fault handling, are discussed. In the last decades, research in the field of software engineering for automated Production Systems (aPS) has been focusing on developing domain specific model-driven engineering approaches supporting the development process, but mostly neglecting the operation, maintenance and re-engineering aspects. However, the success of model-driven engineering in aPS industry has been limited because the effort to introduce model-driven engineering and to change the entire existing legacy software is estimated as too high and the benefit as too low against the background of customer specific solutions expecting a low degree of reuse.