Abstract: The principles of application of a Shelf Life Decision System (SLDS) for the optimization of the distribution of chilled fresh and minimally processed food products are developed. The SLDS integrates predictive kinetic models of food spoilage, data on initial quality from rapid techniques, and the capacity to continuously monitor temperature history of the food product with Time Temperature Integrators (TTIs) into an effective chill chain management tool that leads to an improved narrow distribution of quality at consumption time, effectively reducing the probability of products consumed past shelf life end. The applicability and effectiveness of the SLDS is demonstrated and evaluated based on actual food spoilage and TTI kinetics and chill chain data employing the Monte Carlo simulation method.