

Abstract

This research outlines an agenda on modeling of some traditional and real-life applications on a distributed domain. In this dissertation, we have considered the following areas of data and process handling by using both bottom-up (from individual site to federated view) and top-down approaches.

- A. Transactional Processing System complexities are revisited with 2PC modeling process using Petri Net. Uncertainties, Synchronization, Sharing, and Communications including failures are formalized.
- B. Some real life applications from the Business Process Reengineering domain is considered.
 - 1. A case study on agent based distributed frame work for global product ordering using Workflow Net is modelled to analyse the issues like; decision making, product realization, and strategy building.
 - 2. VDW operations are modelled to exploit the decision making functions. A frame work for dynamic analysis of a location independent ordering process. For garment industry is built.
 - 3. A health meta-data server is built. Mobile phones are used to access the meta-data server. System finds the (Android OS) location and extends the service on spot or by relocation using ambulances. Availability, survival rate, and cost benefit is compared with other advanced models.
- C. Uncertainties and Timing of events are modeled using Generalized Stochastic Petri Net (GSPN) from the SCM domain.
 - 1. The Beer Game phenomena is modelled and used to formalize the SCM operations.
 - 2. SCM operation over multi stage, and multi-tier systems is extended to surface out the Bull Whip Effect (BWE). It is measured using BWE index.
 - 3. A demand forecast variance analysis is modeled to supplement the controlling issues of the BWE. Forecasting and accuracy becomes complicated due to longer lead times among the geographically dispersed SCM players.

Thesis Title: A Study On Data And Process Modelling For Distributed Systems Using High Level Nets

We used GSPN as a tool to implement concurrent systems. The proposed solution guarantees that the implementation for a given concurrent system is correct, i.e., consistent with the specification of the system itself.

At best, these models and algorithms are evaluated using failure traces and are rarely publicly available. Modelling activities are still necessary to increase operational efficiency at a lower cost and we conclude with the proposal of a model of a framework for a distributed meta-data services.