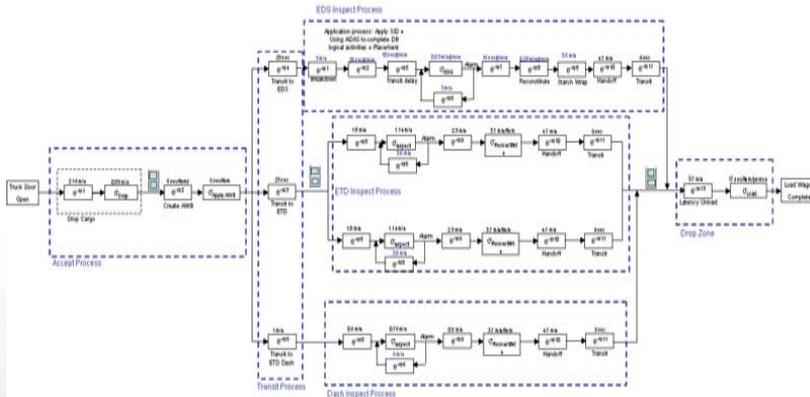


# Enterprise Modeling Using Discrete Event Simulations to Understand Process Imbalances and Manage Resource Allocations Based On Varying Economic Constraints

Modeling and Simulation Group

Computational Sciences & Engineering Division



## Problem Statement:

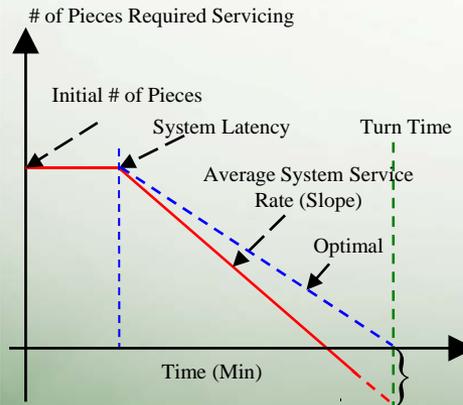
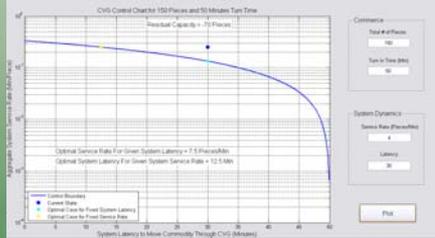
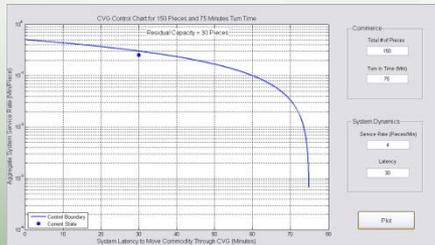
- Many systems can't be modeled as Markov processes due to non-deterministic behaviors that are elicited as a result of instantaneous revenue changes brought about by desires to either (1) exceed customer expectations or (2) take advantage of opportunities to increase short term revenue. These actions change the system's historical dependencies and are reflected in differences in state space projections. To better understand the impacts these decisions have on the system, an approach must be taken that allows for the study and analysis of the *nonlinear* interaction principles that exists between the system, the context within which it operates, and the personnel who manage and control it.

## Technical Approach:

- Discrete event simulation (DES) merged with human factors analysis provides the foundation within which to discern system operating principles from human performance variations leading to an understanding of the interaction principles at play in the system.

## Benefit:

- A DES process model can identify system imbalances and provide a venue for conducted scenario evaluations under varying constraints. The knowledge gathered from this can be used to develop resource allocations strategies to (1) reduce the impact on operations and personnel and (2) optimize system efficiency while holding or reducing costs.



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