Enterprise Systems: Architecture, Implementation and Infrastructure Management

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While focusing on a holistic and integrated view of an organization, enterprise architectures can be subdivided into components such as business architecture, data architecture, application architecture, and technology architecture in order to contain the complexity of the design problem. This wide scope of systems, requires a great flexibility in technology and management that is not necessarily required in systems with a more narrow impact. This minitrack seeks to investigate issues specific to architecture, implementation, and infrastructure for enterprise-wide systems. The diversity of topics represented in the three papers in this area are testament to the breadth of areas that impact upon enterprise systems.

Armour, Kaisler, Getter, and Pippin in their paper titled: "**A UML-driven Enterprise Architecture Case Study"** address the issues of UML modeling of US Capitol Police enterprise management system modeling. The authors developed a comprehensive set of context, process and use cases models for the overall USCP enterprise as well as each of the USCP administrative BAPs and several of the law enforcement systems. These models were used to validate the requirements, interrelationships, and constraints of each information system with the stakeholders. The authors created an enterprise system architecture that is driving the remediation, renovation, and replacement of USCP information systems. The future research directions include integration of agent markup languages (specifically DAML) for modeling interaction content and investigation of better mechanism for modeling the dynamic properties of business systems through further extensions to UML.

Sridhar and Dutta look at the issues of technology proliferation in developing countries in **"Modeling The Growth of Cellular Services in India: A System Dynamics Approach."** Models for technology proliferation that apply in the United states and other more developed countries are not necessarily applicable to other locales which may have a monopoly or oligopoly structure. The authors use the systems dynamics methodology to develop an initial model of cellular service provision within the duopoly market structure. Because the basic construct of a systems dynamics model is the feedback loop, insights into causal mechanisms of growth are obtained as a byproduct of model structure. They describe preliminary tests of the model using subscriber growth data for the Indian cellular industry, perform sensitivity analyses to demonstrate the model's potential as a decision support tool, and conclude by identifying model extensions that would help capture this and similar evolving oligopoly market structures.

The underlying networks that support larger enterprises may become quite complex and require a specific focus. Kawatra takes a mathematical approach in "**A Hop Constrained MIN-SUM Arborescence with Outage Costs**." He analyzes the arborescence problem that is frequently encountered in the network design, routing and scheduling. His proposal consists of finding links to connect a set of geographically remote nodes to a central node such that for each remote node j there is exactly one link entering node j, and for each remote node, a unique path exists from the central node to node j. He studies the problem of selecting links in a min-sum arborescence with hop constraints problem where each terminal node has an associated outage cost. The location of the central node and terminal nodes, and the limit h on the number of hops between the central node and each terminal node is given. The problem is formulated as an integer programming problem and a Lagrangian-based heuristic method is applied to solve it. The quality of this heuristic solution is then estimated using the lower bound given by the Lagrangian method. Subgradient optimization method is further used to find good lower bounds.

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