

Generic Business Process Model for Quantitative Evaluation

Jamal Al-Tuwaijari, Aad van Moorsel

1. INTRODUCTION

Nowadays, business processes become the backbone of organisations to automate and increase the efficiency and effectiveness of their services and products. The rapid growth of the Internet and other Web based technologies sparked competition between organisations to present faster, cheaper and smart environment for customers. In response to these requirements, organisations are examining how their business processes may be evaluated in order to improve business performance. Quantitative evaluation is a key factor of business process (BP) performance analysis to evaluate and improve the organisations processes. Performance analysis focuses on quantitative evaluation of BP such as service levels, throughput times, and resource utilisation. Performance analytical modelling techniques, such as Stochastic Petri Nets (SPN) [1] have been broadly used for performance analysis of BP. These techniques provide a powerful modelling and analysis tools to determine the effects of various parameters on performance indicators of BP. However, despite the importance of quantitative analysis of BP, hardly any studies are found in the literature that shows the use of models for analysis of the quantitative behaviour and optimisation of BP [2].

2. GENERIC FRAMEWORK

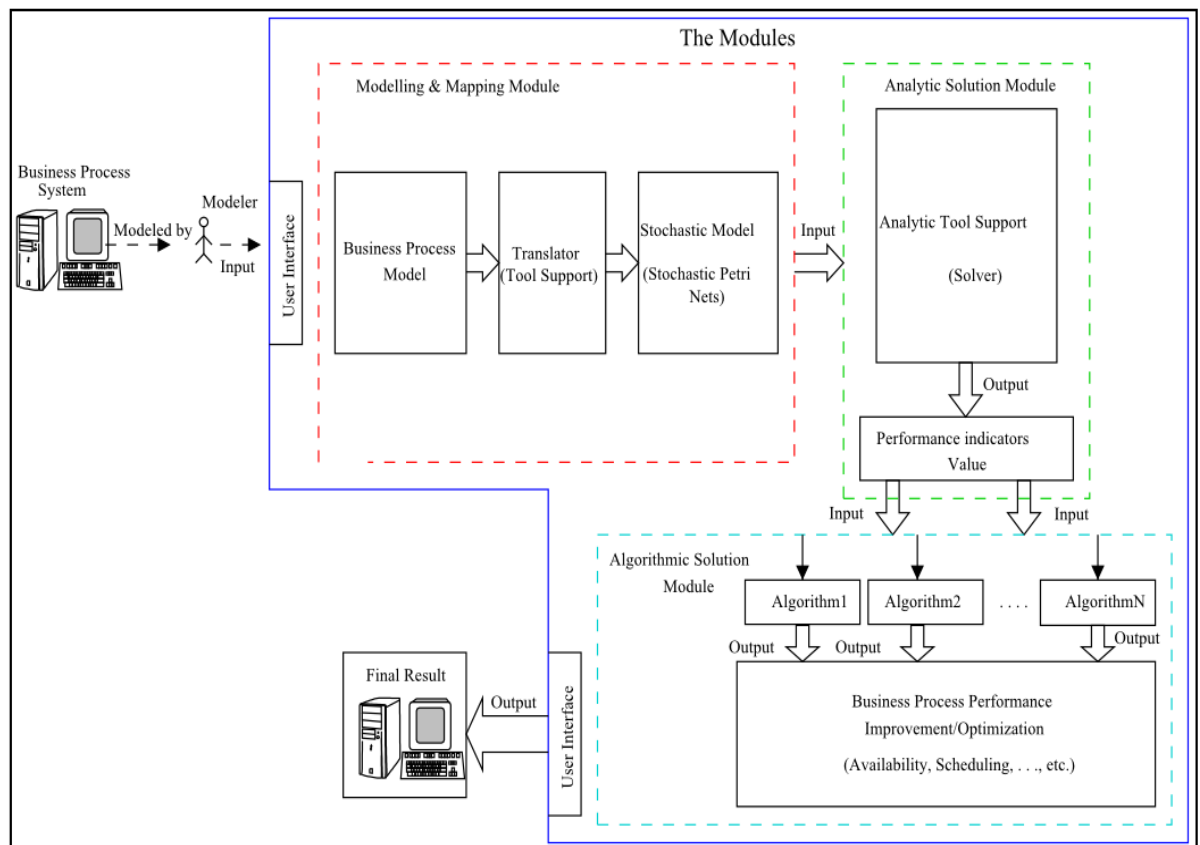
The proposed framework consists of three modules:

- ◆ Modelling and mapping module: A module used to define BP in a formal language and mapped it to stochastic model.
- ◆ Analytical module: Used to analysis stochastic model by standard analytic tool support used as a solver .
- ◆ Algorithmic module: A mathematical module used to solve the desirable algorithms of BP improvement and optimisation (i.e. availability, Scheduling)

3. METHODOLOGY

- ◆ Insert BP model in a formal modelling language.
- ◆ Mapping BP into a Stochastic Petri Nets (SPN) model according to following relation: Task $\rightarrow$ Transition, Resources $\rightarrow$ Place and Relation $\rightarrow$ Arc. The expected execution time of task $eet_i = \lambda^{-1}$, where λ equal the firing delay of transition of SPN model.
- ◆ Compute the performance metrics of SPN model using stochastic Petri net analysis tools. (i.e. Stochastic Petri Net Package (SPNP) [3].

- ◆ Solve the mathematical algorithms of BP improvement and optimisation.



Generic framework for business process modelling and analysis

4. CONCLUSION

This work introduces a generic framework for quantitative evaluation of business process that can be used for improve and optimise any BP. The framework consists of three modules; modelling and mapping module, analytical module and algorithmic module. A software support tools build in Java using the Eclipse platform used for design and execute framework modules. The execution of framework is presented in an automated way.

REFERENCES

- [1] M. Ajmone Marsan, G. Balbo, G. Conte, S. Donatelli, and G. Franceschinis, *Modelling with Generalized Stochastic Petri Nets*. New York, NY, USA: John Wiley & Sons, Inc., 1995.
- [2] H. Jonkers and H. M. Franken, "Quantitative modelling and analysis of business processes," in . Bruzzone and E. Kerckhoffs, eds., *Simulation in Industry: Proceedings 8th European Simulation Symposium*, vol. 1, pp. 175–179, 1996.
- [3] G. Ciardo, J. Muppala, and K. Trivedi, "SPNP: Stochastic Petri Net Package," *Proceedings of the Third International Workshop on Petri Nets and Performance Models PNPM89*, vol. 96, pp. 142–151, 1989.