

# AN ENHANCED CRITICAL PATH METHOD FOR MULTIPLE RESOURCE CONSTRAINTS

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**ABSTRACT:** Traditional Critical Path Method considers only logical dependencies between related activities that may have to share common resources. The method has then been expanded to allow for the identification of resource-constrained activities and the size of those resources. They are usually called activity-based resource assignments and leveling. However, once the number of resources increases, it becomes more and more difficult to draw the corresponding graph/network and explore the resource- constrained critical path. Therefore, in order to solve a multiple-resource-constrained project, the Petri Nets theory is introduced for modeling those resource sharing processes. Because Petri nets is commonly used for modeling the dynamic behavior of discrete systems, it is intended in this research to apply Petri net theory in modeling and analyzing complicated projects with multiple resource constraints. Furthermore, analysis on the size of each resource for performance enhancement can then be done by changing the numbers of tokens in each of the resource places that were added for resource constraints. Cost analysis has to be reconsidered since the additions of resources constraints will alter the original schedule of each activities and increase the duration of the project. Activity crashing may have to be done that shifts more resources towards required activity and results in decreased project duration.

**Keywords:** critical path method, Petri net, resource constraints.