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**A Cost-Effective Deadline-Constrained Dynamic Scheduling Algorithm for Scientific Workflows in a Cloud Environment**

**Abstract:**

Cloud Computing, a distributed computing paradigm, enables delivery of IT resources over the Internet and follows the pay-as-you-go billing model. Workflow scheduling is one of the most challenging problems in Cloud computing. Although, workflow scheduling on distributed systems like Gridsand Clustershave been extensively studied, however, these solutions are not viable for a Cloud environment. It is because, a Cloud environment differs fromother distributed environmentin two major ways: on-demand resource provisioning and pay-as-you-go pricing model. Thus, to achieve the true benefits of workflow orchestration onto Cloud resourcesnovel approaches that cancapitalize the advantages and address the challenges specific to a Cloud environment needs to be developed. This workproposesa dynamic cost-effective deadline-constrained heuristic algorithm for scheduling a scientific workflowin a public Cloud. The proposed technique aims to exploit the advantages offered by Cloud computing while taking into account the virtual machine performance variability and instance acquisitiondelayto identify a just-in-time schedule of a deadline constrained scientific workflow at lesser costs. Performance evaluation on some well-known scientific workflows exhibitthat the proposed algorithm delivers better performance in comparison tothecurrentstate-of-the-art heuristics.

**Existing System:**

Scale applications are usually constructed as workflows. A workflow is a loosely coupled coarse-grained parallel appli-cation that consistsof a set of computational tasks linked through control and data dependencies.

Scientific workflows may varyin size from a few tasks with limited resource needs to millions of tasks requiring tens of thousands of processing hours, terabytes of storage and high bandwidth network resources. Such complex workflowsdemand a high-performance compu-ting environment and often it is desirable to distribute its tasks amongstmultiplecomputingnodes in order to complete the work in a reasonable time.

Traditionally, developers of scientific applications have used local workstations, supercomputers,clusters and grids platformsfor running such workflows. Each of these platforms offer various trade-offs in terms of usabil-ity, performance and cost.

**Proposed System:**

Clouds give an illusion of unlimited computing resources, with thehelp of virtual-ization concept, whichmay be provisioned on demand in a reasonable time frameand charged on a pay-per-usebasis. Cloud platforms,thus,offersan alternativefor executing scientific applications in which resources are no longer hosted bythe research institutionsbut leased from big data centresas and when required. Outsourcing of scientific computa-tion to Cloud platforms may not only help in potentially loweringthe financial burden of resource over-provisioning, but also in reducing the effort and cost of operating, maintaining and periodically upgrading local computing infra-structures.