

Max-Min Workflow scheduling Approach Based for Cloud Computing

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Abstract: In late computational pattern distributed computing has grown up quickly as utility. With the headway of innovation distributed computing has new test in registering of dynamic client demands. The assets are not all that wide, so the errands are not between needy, in this situation use of assets isn't effective and subsequently makespan increments. Existing errand booking strategies don't give the effective outcomes so to conquer this test work process planning strategy is required. Work process planning deals with the work process execution. In this paper makespan based work process planning technique for distributed computing frameworks is proposed. Work process booking is utilized to plan and oversee between subordinate assignments on circulated assets. Reproduction of proposed strategy is done on workflowsim.

Keywords: Cloud Computing, Makespan, Workflow management, Max-Min, Scheduling

1. Introduction

Distributed computing is a generally utilized innovation in processing worldview where applications, information and IT administrations are given over the Internet. The augmentation of cloud is on-request administration, self-administration and pay-per-use nature (Singh et al., 2013). The Cloud processing can give different sorts of administrations like Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) and so forth to end clients. This is a direct result of new methodologies in distributed computing. It gets challenges from different various kinds of issues like security, execution, information base administration, virtual machine movement, work process booking and so forth Planning of work process is the significant issue in the work process applications as it were. The logical investigation is calculation and information concentrated and regular to takes is for a long execution time. In different viewpoints, the information escalated assumes a significant part in the web climate just as

in logical applications (Guo et al., 2012). It is discovered that the work process booking is a fascinating territory of examination with regards to conveyed frameworks. The main exploration territory in work process booking can be the logical examination, medical services, informal communication, schooling, reconnaissance's and business. These issues can contain a wide assortment of huge scope applications. The execution of complex work process in the disseminated framework requires both calculation cost just as correspondence costs (Tharsanee et al., 2017).

Cloud specialist co-op offers heterogeneous assets of various abilities at various costs. The planning plan of work process may bring about different makespan, that may thusly in to more cost for every execution. Consequently, Makespan is a vital and fundamental Quality of Service (QoS) boundary that needs to be considered for viable cloud work process booking (Tharsanee et al., 2017). Normally the Directed Acyclic Graphs (DAGs) addresses the work processes. In some notable circumstances, where the DAG is self-assertive, most issues identified with time or potentially dormancy minimization are NP-hard (Agrawal et al., 2010).

2. Workflow Management System

The work process can be characterized as the ID of interfaces inside the design that empowers the items to interoperate at an alternate variety of the levels. The reference model of work process is given beneath:

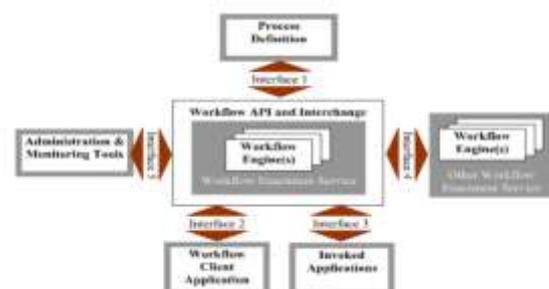


Figure 1: Workflow Reference Model

Work process Engine: Workflow Engine is a product application that addresses and acts like Data Centre Broker. It oversees Virtual Machine (VM) creation, the executives and accommodation of cloudlets to VM, and furthermore obliterates VM after its utilization.

Interaction Definition: This is the portrayal of cycle of work process in the structure which supports computerized control (Sharma et al., 2017).

Work process Interoperability:

This shows the interfaces to help interoperability between different work process frameworks. We can call it work process parser that parses a DAX into task so work process Sim can oversee it.

Conjured Application: This application has the element to help communication with an assortment of IT applications (Sharma et al., 2017).

Work process Client Application: This application has the interfaces to help association with the client (Sharma et al., 2017).

Organization and Monitoring: This will give the checking and perception of framework and metric capacities to arrange the general administration of composite work process application conditions (Sharma et al., 2017).

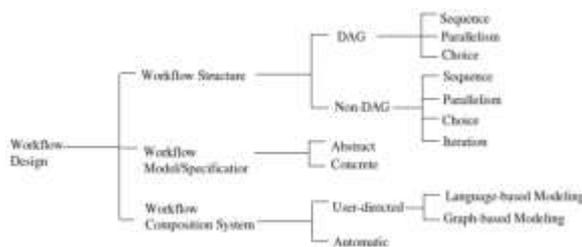


Figure 2: Workflow Design Taxonomy

3. Workflow Scheduling

Work process applications are addressed as Directed Acyclic Graphs (DAGs) with priority obliged errands which are between subject to one another. Each errand in the work process will have some yield and information documents which depends on the particular application. The time taken for the info and yield document move will likewise affect the general execution season of the work process. Subsequently, it is fundamental to consider the size of the info and yield records of the undertaking under execution and the transmission capacity that the virtual machine offers for the information move (Tharsanee et al., 2017). The administration and planning of assignment's

execution work process on shared assets is finished with the assistance of work process booking. We thusly focus on limiting execution season of a work process application.

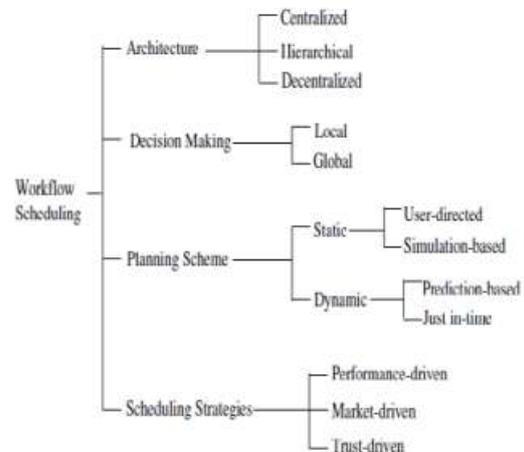


Figure 3: Taxonomy of Workflow Scheduling

Work process planning is a difficult errand in distributed computing, as the assets are focal which satisfies the need of all sort of occupations. In this way, it is hard to anticipate which assets will be accessible at the hour of genuine execution of the positions. It is hard to accomplish most extreme conceivable use of assets as a result of conditions, and diverse burden and asset prerequisites among various levels (Singh et al., 2013).

4. Max-Min Workflow scheduling

This calculation beats the disadvantage of the min-min (Sharma et al., 2017) calculation. The means performed by Max-Min calculation practically same as the Min-Min calculation did. The principle distinction in advances reflects just in the subsequent stage, where an undertaking with most extreme consummation time is chosen as in min-min and has been relegated to asset R that gives the base fulfilment time. Consequently, we can call this calculation as Max-Min calculation. These means are rehashed until the metatask get unfilled or every one of the undertakings are planned.

Now, here we representing a workflow application as a DAG which is represented by $G=(V,E)$, where $V = \{T_1, \dots, T_n\}$ is the set of tasks, and E represents the data dependencies between these tasks, that is, $f_{j,k} = (T_j, T_k) \rightarrow E$ is the data produced by T_j and consumed by T_k . We have a set of virtual resources as $VM = \{1, \dots, j\}$, a set of compute sites $PE = \{1, \dots, r\}$, and a set of tasks $T = \{1, \dots, n\}$. The proposed MMW scheduling method is given below:

Algorithm 1: Max-Min Workflow Scheduling (MMW)
 Input: Workflow in DAG
 Output: Minimum completion time

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Phase 1
Calculation of minimum completion time of each task
1 for i = 1 to n //all task in metatask
2 for j = 1 to m //all resources
3 CTij = ETij + RT //compute completion time
4 End j
5 End i

Phase 2
Find task with maximum completion time and assign to resource with minimum execution time
6 do
7 for each task in metatask list (ML) with maximum completion time and map on to resource
8 assign all task from metatask to resource with minimum completion time
9 remove Ti from metatask list
10 update resource Rj ready time RTj
11 update completion time of unassigned task in metatask list
12 while(ML≠Null)
13 End
    
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The primary point of max-min planning calculation is to decrease the holding up season of huge size occupations. In this calculation, little size undertakings are simultaneously executed with enormous size errands, henceforth diminishing the makespan and gives better asset usage.

5. Results and Discussion

The proposed work process booking approach has been executed on WorkflowSim by automatically expanding the center system gave in the WorkflowSim. The fundamental arrangement is given in after tables.

Table 1: VM Configuration

Parameter	Value
Size	10000
RAM	512
MIPS	1000
BW	1000
Number of CPU	1
Vmm	Xen

Table 2: Host Configuration

Parameter	Value
RAM	2048
Storage	1000000
BW	10000

Table 3: Workflow Makespan Result Analysis

Case Number	Number of Task	Number of VM	Makespan
1: Montage_25	25	5	56.95
2: Montage_50	50	5	129.42
3: Montage_100	100	5	256.44

After execution of the MMW planning calculation for various work processes their makespan has been determined. Estimation of makespan for all cases has been determined. As demonstrated in table case 1 shows the makespan of work process with 25 cloudlets and 5 VM is 56.95, on the off chance that 2 makespan of a work process with 50 cloudlets and 5 VM is 129.42, comparatively makespan of 100 cloudlets with 5 VM is 256.44 on the off chance that 3. Thus result table shows that as intricacy of work process increments regarding task hub in DAG their culmination time is additionally increments.

6. Conclusion and Future Work

The fundamental goal of the proposed work is to limit the general finish season of the work process however no thought was given on the asset use. It has been broke down that proposed plot is adequately compelling to ideally utilize the assets. The recommended technique is executed to reproduce and separate outcomes by utilizing the WorkflowSim test system. Because of static nature of assets asset allotment isn't adequately accomplished to limit the makespan. There is need of dynamic strategy to decrease makespan as size and intricacy of work process increments.

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