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# CLOUD SERVICE OPTIMIZATION BASED ON REVERSE AUCTION METHOD

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#### ABSTRACT

Cloud administrations have been progressively applied to give accessibility on on-demand basis to a tremendous quantity of computing demands, like resources, information, computing, etc, in which accurately choose and relegate the correct resources to an application or workload. Our manuscript proposes an Original Web based Reverse Auction Method (OWRAM) dependent on web-based calculation for distributing Cloud Computing (CC) applications, which may assist clients as well as suppliers to construct workflow applications in CC scenario. OWRAM comprises of 3 sections: design of web algorithm, compete proportion estimation, and execution evaluation. OWRAM is presented for the cloud client mediator to select the last champ's dependent on web-based algorithm (WA) and VickreyClarkeGroves (VCG) system. Compete investigation is utilized to compute the compete proportion of the proposed algorithmic program contrasted include the online algorithmic program. This examination technique is important to evaluate the execution of proposed algorithmic program, excepting the supposition of the allotment of cloud suppliers' bid prices. This outcome demonstrates that the proposed OWRAM is the proper technique since it permits the cloud client mediator to settle on buy choices through unknown future bid prices. The variation of auction cycles and exchange price can astonishingly impact and work on the execution of the presented reverse auction algorithmic program.

Keywords: Reverse Auction, Cloud Computing, Optimization, Resource Allotment

#### **1.INTRODUCTION**

CC, as another computing worldview, has quickly arisen lately [2, 3], as well as this can take care of the enormous scope issues emerging in engineering, science, industry, and com-merce [4]. As of late, there are many well known business cloud domains, e.g., Linode, Microsoft Azure and (EC2) Amazon elastic-compute-cloud which coordinate a common pool of resource for with suppliers clients to exchange administrations [5, 6]. Fundamental thought of CC is to convey computational resources, like CPU, storage and RAM, as administrations across the web. Cloud clients may buy the CC provisions on their fluctuating and dynamic requests. Then again, the cloud suppliers wrap their resources into various kinds of virtual machines (VMs) as well as plan pricing technique. Though, the profoundly powerful, unmanageable, and dispersed elements of grid scenario generate the impeding of cloud suppliers to value the CC provisions. How to more readily control resources turns into the significant issue of CC among cloud suppliers and clients [1].

As of now, the present work frequently utilizes a constant cost technique and auction related strategy to allot CC provisions. For these 2 techniques, the constant cost technique is accused for innately inadequate with regards to



www.jatit.org advertise productivity what's more, neglecting to quickly adjust to real-time request provision connection modifications [7]. The auction related algorithmic program has been demonstrated to enjoy more benefits [8, 9]. Initially, constant cost algorithmic program can't mirror the difference in response-request condition in cloud resource marketplace. Since the sale is a sort of adaptable marketplace method, this can be the favoured plan for the cloud resource trading. Furthermore, auction related strategy requires minimal worldwide data and empowers trade-off all the more effectively to be carried out with distributed nature [10]. There is a progression of writing about auction related algorithmic plan in cloud resource marketplaces from various perspectives, accomplishing some new outcomes [11–13]. In spite of the fact that the scientists have accomplished many great outcomes utilizing auction related strategies to distribute CC provisions, there are the accompanying issues. (1) The single-turn auction related strategy is regularly created; however, the numerous turn sales are not examined. (2) The cloud suppliers ought to be in a total data circumstance to utilize the aforementioned auction related technique, however not in the inadequate data scenarios. For e.g., a supplier may leave the sale stages without the brief answer from the cloud client. Later, the client needs to settle on choice previously the happening to the following cloud supplier.

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Thus, this can be very fundamental to find the novel evaluating algorithmic program to fulfil the features of CC provisions exchanging. Due to the restrictions of current writing, our manuscript presents an OWRAM to allot CC provisions utilizing the web-based algorithm (WA).

1) Create OWRAM. Dependent on reverse auction method, later the client has provision request prerequisite, the suppliers take cost to offer this resource request. As a general rule, the exchanges for assigning cloud services are in a web-based scenario, where the client needs to settle on buy choices without aware the future bid prices obtained through other suppliers. Therefore, our manuscript builds an OWRAM via utilizing the WA presented through [14].

(2) Compute the compete proportion. Compete examination presented through [15] can utilized to compute the compete proportion of the execution of OWRAM. The benefit of

E-ISSN: 1817-3195 compete investigation is that it needn't bother with any presumption of the allotment from later occasions.

(3) Evaluate the execution. The compete proportion determined through the compete investigation can be utilized for estimating the execution of OWRAM via examination with ideal offline-auction algorithmic program.

The principal tasks of our manuscript are as per the following. To begin with, our manuscript presents the many-turn period measurement into customary sale-based strategy to present an OWRAM to allot CC provisions. Next, the OWRAM may assist the cloud client make buy choices while he doesn't have data about forthcoming bidprice arrangements of suppliers. Then, exchange price of auction provision can be brought into OWRAM, in which client needs to assign an expense to a mediator to auction provision. Various simulation tests display that presented OWRAM is successful in provision usage and has best execution in client efficacy. The auction turns and the exchange price operate a significant job to the client mediator's choice. The auction effectiveness may be enhanced from these 2 variables. This manuscript is coordinated as follows. Area 2 presents related work. Segment 3 portrays reverse auction marketplace. Segment 4 proposes OWRAM. Segment 5 clarifies the exchanging methodologies with compete investigation. Segment 6 presents the simulation also, sums up the exploratory outcomes. Section 7 gives conclusion.

# 2. RELATED WORK

Auction related algorithmic program have been utilized in different scenarios, for example, wireless networks, cloud computing and grid computing. The design is to investigate how the clients and suppliers act in a compete case. It displays that various auction classes have been examined in the plan of the algorithmic programs. A significant accomplishment about auction configuration can be (VCG) VickreyClarkeGroves method; this can be an overall strategy to the development of trustworthiness methods in the marketplace of an auction.

Overall heuristics sensible or approximatives to combinative sales were VCG related methods also have trustworthy

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provisions this is reasonable to a broad type of
provisions, this is reasonable to a broad type of
price minimal issues [14]. The outcomes
basically demonstrate that only trustworthy
auction algorithmic program is effective.
Therefore, to the CC provisions marketplace, the
auction related algorithmic program is likewise
trustworthy in case a client or a supplier has no
individual former to the middle supplier has no
motivating forces to he with regards to their
private data. The present examinations have
planned several auctions related algorithmic
programs to assign resources. Many famous
auction structures are combinatorial auction,
English as well as double-auction. [16] presented
a combinative auction to plan commercial centre
system to CC provisions. The introduced suction
system to CC provisions. The introduced auction
algorithmic program assists clients create work
process application programs in CC scenario,
where the clients want to make various sorts out
of provisions at various time-slots. [16]
contemplated an English auction related
algorithmic program for CC provision. They
introduced a sale structure for CC, various plans
of auction related algorithmic programs were
additionally examined [18] Introduced 2 suction
additionally examined. [16] introduced 2 addition
plans to distribute vivis for clients. They
contended that combinative auction related
algorithmic programs were more effective than
the constant cost algorithmic programs. The
cause is that VMs having most noteworthy
evaluation are allotted to clients. [12] Presented
the many part Vickery auctions furthermore.
single direction VCG-combinative auction
machanisms to handle the distribution of aloud
These demonstrated the mentional and
resources. They demonstrated the particular 2
direction auction related algorithmic programs
were effective techniques. [19] Presented another
launch of the arrangement protocol among client
with supplier by utilizing a continuing double
auction design. They investigated and displayed
various scheduling systems, which may be
utilized into the genuine cloud resource
avalanging A faw examinations presented the
dauble quotion structures into combinative
double auction structures into combinative
auction plan. For e.g., [13] examined a
combinative double auction related algorithmic
program where a mediator executed the
allotment of suppliers' VMs as indicated by the
clients' demands for the CC. Truth be told, in the
aforementioned auction method cloud suppliers
trade resources and clients take hid prices to
sattle on huy choices which is known as forward
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Lately, another auction design, i.e., reverse auction mechanism, has drawn in

www.jatit.org additional consideration. Reverse auction design can have great capacity to CC[31]. This can be unique from the customary auction structures, where the supplier can be a bidder and client can be an auctioneer. Specifically, in reverse auction design, the suppliers provide offers. The cloud clients assess the offers through auctioning requirements as well as decide the last victors. [20] Researched the plan about reverse marketplace of auction. [21] Expanded the continual double auction issue as well as matched by an original auction dependent with sets with tags. [22] Utilized reverse auction to plan a resource procurance method as well as displayed 3 potential reverse auction algorithmic programs for cloud resource procurance.

> Although, the aforementioned auction related algorithmic program plans are examined in offline circumstances where the last victors are reported subsequently gathering the entire offers. Actually, both clients and suppliers frequently settle on choices under inadequate data [23]. In particular, unique suppliers reach at various time slices as well as cloud clients are needed to conclude whether to acknowledge every bid price as this can be accepted unless aware the future bid prices [30]. In 1999, the web auction algorithmic program was initially presented to settle this sort of dynamical cloud or grid resource allotment issue, also the researchers applied the compete examination to compute the compete proportion to evaluate the execution of web auction algorithmic program [15]. The Compete examination has acquired more acknowledgment in the domains of operation researches, economics and finance. This can be not quite the same as the conventional normal case investigation, which concentrates on the supposition about the circulation with the forthcoming occasions from certain perspectives known probabilities also attempts to accomplish the great mean case execution. Numerous scientists broaden Goldberg's task from the accompanying viewpoints. [24] Examined the web trustworthy system dependent on the offline Vickrey design. For the restricted provision merchandise, [25] introduced an incentive well-matched web auction also demonstrated the particular auction had an optimal compete proportion concerning the income and social effectiveness. [26] Considered a reverse web auction issue and planned web reverse auction algorithmic

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Lately, a few investigations started to plan web auction algorithmic program to distribute the CC servicing. In particular, [27] examined a system for trustworthy web auctions where clients including heterogeneous requests could arrive and exit privately. They planned an original offering language, wherein clients' heterogeneous requests were summed up to be controlled and kept in predictable structures [28]. Depending on the particular offering language, they presented an incentive well-matched web cloud auction algorithmic program as well as received few novel outcomes [29]. [7] Provided the principal online combinative auction algorithmic program for CC issue. The similar outcomes were displayed where the auction frameworks were adequately expressive to enhance framework effectiveness over the temporal area rather than at a separated time point. [8] Presented the web auction into the resource distribution for grid processing organizations and planned the online auction related algorithmic program. They introduced a novel multi-property multicycle reverse auction, for grid resource allotment issue to assist broker of grid to settle on multi-property choices in inadequate data.

#### 3. DESCRIPTION OF REVERSE AUCTION MARKETPLACE

There is a reverse auction marketplace which stays aware of the demands as well as bid prices assembled through clients with suppliers, accordingly. Later the cloud client broker gets guidelines from client; it registers how as well as when to assign funding for buys the CC services from which suppliers.



Figure 1: Proposed Web based Reverse Auction Method Flowchart

Fig.1. shows flow diagram for reverse auction plan as well as displays how participators operate through marketplace. Client presents request as well as personal data for client broker (Tag a). In the marketplace of reverse auction, a client broker searching supplier that satisfy client's requests (Tag b). Later the cloud suppliers take offers in an internet-based way (Tag e), the cloud client broker announces as well as reports to the clients who are the victors/failures of the auction (Tag c). At the point when the payment as well as charging is done (Tag d), the cloud clients with suppliers develop the link and finish the plan. In the marketplace of reverse auction, clients as well as suppliers have various objectives, methods as well as response request plans. These individuals were proposed with accompanying through short clarification.

3.1. Cloud Clients.

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In the marketplace of reverse auction, client's job is to present request obliged through financial plan, cost priorities, and size of memory to representative. This assumes the particular client have a financial plan of f0, which implies client have funding in total amount f0 to buy resource provisions in cloud. Every provision can be categorized through a 3-tuple Mi = (Di, ABCi, Si), where Di is the Due date of the services, ABCi addresses the mystery advance booking cost, and Si indicates the minimal size of memory. The objective of the cloud client is to consume his funding in total amount to increase the efficacy inside his relating due dates.

# 3.2. Cloud Client's Broker.

Every cloud client has client broker otherwise dealer. In cycle of auction, client broker addresses client to declare resource demands of cloud. His work relies upon client's demand to look suppliers which may satisfy client's request, afterward welcome the supplier for bidprice. Toward game conclusion, selects auction's champ for the benefit of client. Actually, client broker may be viewed as salesperson of sale marketplace in reverse auction. Not the same as the above writing, we accept that there is exchange price when exchanging the cloud resource. Rather than single cycle, our manuscript accepts that there are *n* cycles with the lapsed time slice TSi > 0. In every cycle *i*, the allotment amount of the funding of cloud client is indicated through hi (hi  $\geq$  0). Also, there is a constant exchange price indicated through  $\Lambda$  to the cloud client to settle the broker.

# 3.3. Cloud Suppliers.

In the marketplace of reverse auction, supplier's responsibility is to conclude whether to take part in auction scheme while getting call from client broker as per his individual capacity. In case, he acknowledges the greeting, then, at that point he considers bidprice. It guesses that a cloud supplier *i* presents a bidprice determined by  $BP_i = (e_i, s_i, ts_i)$ , where  $e_i$  is the size of memory of cloud and  $s_i$  is the supplier's evaluation as an offering cost, this shows the maximal cost that is adequate for the supplier to provide the demanding services.  $ts_i = (ts_i^b, ts_i^f)$ is a timeframe during which the cloud supplier *i*  E-ISSN: 1817-3195 needs to hold a bidprice among beginning timeslice  $ts_i^b$  and finishing timeslice  $ts_i^f$ . Here, the cloud suppliers reach at various timeslices in successions, this can be mentioned in online way.

## 4. ORIGINAL WEB BASED REVERSE AUCTION METHOD

Our manuscript analyses the Web based reserve auction issue in the internet environment. In every cycle, confronting the historic bidprices and restricted present data, the cloud client broker needs to settle on choices without aware the forthcoming bidprices [17], otherwise the distributing elements of bidprices [18]. Our manuscript proposes to plan an Original Web based Reverse Auction Method can be conveyed via client broker, this controls allotment of resources in the CC servicing marketplace. We apply the compete examination to assess the execution of the Original Web based Reverse Auction Method.

**Statement 1.** The web-based reserve auction can be determined following way:

(1) In every cycle, the cloud supplier *i* reaches and reports his bidprice  $BP_i = (e_i, s_i, ts_i)$ , where each  $s_i$  is a integer number in the time frame [u, U].

(2) The cloud client broker decides whether to purchase the CC servicing from the cloud supplier i also, assuming this is the case, at what cost as well as amount prior to starting the further bidprice.

(3) The game finishes when the final cloud supplier reports his bidprice over the period of [0, TS].

**Statement 2**. The competing proportion of web related reverse auction algorithmic program can be determined the following way:

(1) Consider OP(BP) be the optimum advantage through a offline algorithmic program indicated via OP for each bidprice successions BP.

(2) Consider AP(BP) be the advantage created by the web related reverse auction algorithmic program indicated via AP for every bidprice successions BP.

(3) The competing proportion p of web related reverse auction algorithmic program is computed through p = OP(BP)/AP(BP).

**Statement 3.** The competing examination of web related reverse auction algorithmic program can

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be indicated by the following way. This decl	lares web related auction	. In the Web based Reverse
web related reverse auction algorithmic prog	gram Auction marketplace	e for the CC provisions, the
can be <i>p</i> -competing in case the advantage of	f AP cloud client broker i	needs to examine a threat via

In the particular statement, p can be the competing proportion of the web related reverse auction algorithmic program AP. That is, total pcan be known as competing proportion of web related reverse auction algorithmic program AP. Then again, the web related reverse auction algorithmic program is supposed to be most ideal if there doesn't exist one more web-based algorithmic program with a exactly lesser competing proportion. The more like 1 the competing proportion, the more advantage the web related reverse auction algorithmic program AP can get.

fulfils  $OP(BP) \leq p \cdot AP(BP)$ .

Then, we plan an Original Web based Reverse Auction Method, which broadens the threat-related algorithmic program presented via [17] by getting the exchange price into examination. However, our manuscript examines the Web based Reverse Auction Method as VCG method; this can be unique in relation to the investigation of [17], which concentrates on the forward auction, comparative with the reverse web related auction. In the Web based Reverse Auction marketplace for the CC provisions, the cloud client broker needs to examine a threat via accepting that bidprice successions will increment to the highest cost. Consequently, the presented Web based Reverse Auction Method assists the cloud client broker hold sufficient amounts to guarantee a competing proportion of p, despite the fact that the bidprice successions remain at a greater cost. Extraordinarily, regardless of whether the cloud client broker encounters the worse scenario and needs to purchase provisions in higher cost toward finish of auction game, competing proportion can be close to p.

## An Original Web based Reverse Auction Algorithm can be presented the following way

Allow GC and NGC to indicate the group of chosen and not chosen bid prices, separately. We plan **An Original Web based Reverse Auction Method** for the cloud client broker to upgrade his choices. Provided p,u,U and another bidprice si, the cloud client broker settles on a choice as per the accompanying principles:

Stage 1. Fix i=1 and GC=NGC=0.

Stage 2. In cycle i, single cloud supplier arrives and proposes his bidprice, i.e.,  $BP_i = (e_i, s_i, ts_i)$ .

Stage 3. Prior to the termination limit of cycle ts, the cloud client broker Concludes whether to acknowledge bidprices.

Stage 4. The cloud client broker applies such a principle to allot the cloud client's unique finances that is go through less cash to purchase provision to maintain the competing proportion as a constant of p.

Stage 5. Notify the triumphant cloud supplier in group GC of the exchanging cost and amounts among the time span of  $[ts_{\bar{i}}^{b}, ts_{\bar{i}}^{f}]$ .

Stage 6. Stop. The triumphing cloud suppliers are bidprices in GC. Assuming there are remaining finances, the cloud client broker needs to buy the task or provision at the most noteworthy cost of U. Indeed, even in this worse scenario, the competing proportion is close to r.

#### 5. COMPETING EXAMINATION OF THE WEB BASED REVERSE AUCTION METHOD

In this segment, the competing investigation is utilized to assess the execution of the web-based Reverse Auction Method. We partition the web-based reverse Auction Method into 2 scenarios as follows. 1. The cloud client broker charges an expense for his auction provision. 2. The cloud client broker is free available to be auction servicing. **Scenario 1:** The Cloud Client Broker charges a payment. In case the cloud client broker recognizes the entire bidprice successions, the optimum offline advantage may be accomplished through the optimum offline algorithmic program.

Scenario 2: Cloud Client Broker can be Free of cost. To the particular Scenario, client broker can be free of cost to the auction as well as assists the cloud clients to select appropriate cloud servicing cost. Depending on the competitor controversy, we display the particular we-based reverse auction method excluding exchange price may accomplish a lower competing proportion.

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For the competing investigation of these two Scenarios, the accentuation is to talk about what the exchange price influences the execution of web based reverse auction method. We can compare these 2 scenarios and discover the lower competing proportion. Additionally, the sensitivity examination about the competing proportions in these 2 Scenarios is introduced in Segment 6.

#### 6. SIMULATION WITH EXPERIMENT OUTCOMES

In the particular part, we give few experiment outcomes of competing proportions accomplished through the web based reverse auction method mentioned in 2 scenarios. For straightforwardness, we accept that competing proportion is p1 and p2, separately, for free of cost scenario and chargeable scenario.



*Figure2: The Comparison between p1 with p2* 

Examine Figure 2. Obviously, at the point when we take U = 580, Total funds = 400, Number of Clients=50, and Transaction cost= 0.2, the competing proportions of p1 and p2 are altogether diminishing with the expanding of u, which implies that these webs based reverse auction methods are in every case altogether greater compared to any remaining algorithmic programs. Observe that the competing proportion of web based reverse auction method for chargeable scenario can be worst than the one with the expectation of free of cost scenario. The motivation is that the exchange price increments

the cloud client trouble and decreases his efficacy. Commonly, it isn't difficult to display that the constraints of the competing proportions of p1 and p2 with the expectation of free of cost scenario and chargeable scenario are all 3.4.



Figure3: The Execution of Web based Reverse Auction Algorithm with Different Number of Clients

Figure 3 displays that the web based reverse auction method empowers the cloud client to deal with his finances and use the exchange price to accomplish better execution. In Figure 3, the arch demonstrates the competing proportion of p2 can be stringently under 3.2. Specifically, the execution arch of online reverse program auction related algorithmic communicates the conduct of competing proportion, where lower boundary u assists in as the autonomous, and the competing proportions assist in as the subordinate. Over these pivots, the execution arches slope descending, which addresses a negative connection among the lower boundary and the competing proportions.

From Figure 3, we track down that expanding the auction cycles will bring about worse execution of the web based reverse auction method. In particular, we analyze the execution of web based reverse auction method for various numbers of clients. It very well may be observed that when U =580, Total funds =400, and Transaction cost =0.2, and the auction cycle is 50, 100, and 200, the competing proportion of web based reverse auction method decrements from 3.2 to 2.96. Naturally, the auction cycles increment the competitive among the cloud suppliers. In any case, it is lesser

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 effectiveness for the cloud client to settle on a choice when he is in a imperfect scenario.
 regarding the future bidprice of cloud suppliers.

 We propose the web based reverse auction
 We propose the web based reverse auction



Figure 4: The Execution of Web based Reverse Auction Algorithm with Different Transaction Costs

Figure 4 displays the outcomes about the execution of web based reverse auction method with transaction cost. It identifies that the competing proportion work is addressed by exchange price. Specifically, there is a negative connection among the competing proportion and the exchange price. While expanding the exchange price from 0.2 to 0.6, the competing proportion of p2 slowly diminishes from 3.5 to 3. Many investigations carry no record of the exchange price. This generally in opposition to current realities. But, this sort of price would balance the advantage with a relating auction exchanging. Thus, this can be is essential to bring exchange price into the plan of auction framework for CC provisions, which is appropriate for the entire members in the auction marketplace.

Our simulation results produce the web based reverse auction method (see Figure 5) and afterward display the variation of cloud client broker's choice with various exchange price. In case the cloud client broker has called the entire bidprice successions, he could create an optimum offline technique as well as obtain the most extreme advantage. But, in the web-based method, the cloud client broker has no thought regarding the future bidprice of cloud suppliers. We propose the web based reverse auction method to assist the cloud client broker to buy provision. That is, the cloud client broker selects the triumphant cloud suppliers as indicated by the web based reverse auction method, while a bidder's bidprice encounters the demand of web based reverse auction method.



Figure 5: The Effectiveness of Web based Reverse Auction Algorithm with Different Transaction Costs

Figure 5, cyan colour, magenta colour, and Dark yellow colour address the exchanging individually, while finances, Transaction Transaction Cost= 4, Transaction Cost=0.2. Cost=10. Here the exchanging finances are the higher value among the entire hi. This agrees with the danger thoughts. Since the competitor would create the cloud client broker in worse scenario, the cloud client broker would buy much provision when the 1st bid price fulfils the exchanging regulations dependent on threat related algorithmic program. Moreover, contrasted with [8], the outcomes are more informational as well as significant for considering exchange price and exchange cost in our manuscript.

# 7. CONCLUSIONS

Our manuscript presents a web based reverse auction technique for allotting the CC resources, which may assist the cloud clients and suppliers to construct work process applications

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ISSN: 1992-8645 www.jatit.org in a CC scenario. The presented web based reverse auction method is assessed through the competing examination from the free of cost scenario and chargeable scenario. The outcomes demonstrate that the presented reverse auction algorithmic programs a suitable system, since this permits the cloud client broker to settle on buy choices without aware the forthcoming bidprices. The variation of auction cycles and exchange price can effectively impact and enhance the execution of presented reverse auction algorithmic program. In future, aside from the cost of cloud benefits, many new properties, e.g., cloud servicing effectiveness proficiency as well as servicing quality of cloud, may be presented into reverse auction marketplace.

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