# A Novel Framework for Optimal Component Based Data Center Architecture

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*Abstract*— **With the tremendous growth of applications and wide demand of high performance architecture, the demand for virtual or cloud based architecture is also growing. The architecture demand focused on computing, storage and networking is directing the research towards the cloud based data centers. The migration towards the cloud based data centers from the traditional data centers is the recent trends of the modernization of architecture to match the demand of high performance computing. However the optimal settings of hardware availability based on the utilization, up time and cost factors is yet to be determined. Also the generic performance and setup differences between traditional data centers and cloud based data centers are also to be defined. The recent progress of the researches limit to justify the complexities of cloud based data center architecture. Moreover the most suitable performance matrix to evaluate the data center hardware performance is also to be defined. Thus this work demonstrates the framework for optimal component based data center architecture reducing the redundant components and evaluates the performance of the framework on the proposed matrix for data center hardware component evaluation. Moreover this work demonstrates the fundamental strategies of data center hardware resource optimization. The final outcome of this work is optimal framework simulation tool based on CloudSim toolkit.**

***Keywords*— Cloud Service Models, Traditional Data Centers, Cloud Based Data Centers, Optimal Hardware Architecture, Resource Optimization, Performance Matrix, CloudSim**

## I. INTRODUCTION

The growth in computing in order to maximize the process management related to education, business and research is motivating the need for high performance computing. The high performance computing can be achieved with higher level of infrastructure and supported software stacks built for a wide range of purposes. The cost effectiveness of higher level of infrastructure can be increased with the use of cloud computing. The cloud computing caters the high availability and high performance of infrastructure in low cost supported by pay per use. The cloud service providers provide multiple service models to support the need of the customers and researchers.

However the most suitable cloud service model is not been analysed for data center needs and no standard frameworks are been concluded for the same purpose [1].

The higher level of infrastructure comes with a higher demand of power consumption. The consumption of power is the major bottleneck of today's data centers up gradations. The increased power requirements also increases the heating process in the computing hardware, storage hardware and networking peripherals, thus the demand for cooling process also increases with additional cost burdens [2].

The most effective power management system using two way feedback and information exchange is Smart Grids. The Smart Grids justifying the name provides a better power management, power generation and power utilization. The use of information exchange in Smart Grids converts the analog power management into a digital. However the Smart Grids needs constant generation and management of data. The amount of data generated from Smart Grids is always high and cannot be stored and managed by traditional computing architectures. Thus the use of Smart Grids always comes hand to hand with cloud computing [4].

However the major bottlenecks of Smart Grids are not been analysed so far. The use of Smart Grid and the information exchange in order to optimize the performance of data center is not been analysed.

The commercial High Performance Computing systems are solving the problems of education, business and high end researches. The High Performance Computing systems are related directly to the data centers, where multiple multi core systems are connected to internal networks to provide scalable infrastructure. The data centers provide high availability of computing with the need of multiple or single application hosting as per the need of customers and researchers.

However the need for analysing all hardware components in order to achieve better understanding optimization policies is on the highest priority of research.

978-1-5090-2552-7

The performance measures of cloud based data centers are not only calculated on availability or high computations speed or higher level of storage or higher level of redundancy rather needs to be validated over a fixed format of performance parameters to justly the optimization.

The availability of such performance measure matrix for cloud data centers covering all the aspects are limited. Thus defining the performance parameters and benchmarking the performance is also the demand of recent research and computational growth.

Hence in this work we propose a novel framework for data center components optimization and also propose a performance evaluating matrix. The same proposed framework is also evaluated on the proposed performance evaluating matrix and the findings are been demonstrated.

Thus the rest of work is organized as in Section II we understand the various cloud service models and efficient applicability for cloud based data centers, in Section III we understand the use of Smart Grids for cloud data centers optimization, in Section IV we understand the traditional data center architectures and bottlenecks, in Section V we understand the cloud based data centers architecture, in Section VI we realize the complexities of cloud based data centers, in Section VII we realise the fundamentals of cloud based data centers resource optimization, in Section VIII we propose the framework for resource optimization, in Section IX we propose the performance evaluating matrix for data center hardware components, in Section X we demonstrate the results of the optimization framework and in Section XI we present the conclusion and future scopes of this work.

## II. Cloud Service Models Applicability to Data Centers

The growth in computing architecture and manageability is tremendous in order to support the increasing demand of application and hardware performance with the demand of high availability alongside with reduced cost. Here in this work, we study the types of computing in order to achieve the higher understanding the cloud computing shift paradigms for data center applicability [1] [2] [3].

### *A. Distributed Computing*

Any distributed computing system is a collection of multiple independent computing nodes with attached memory, storage and communication components. The distributed systems or servers or nodes in order to process a single job or computing or storage task will collaborate over interconnected networks between the nodes [Figure – 1].

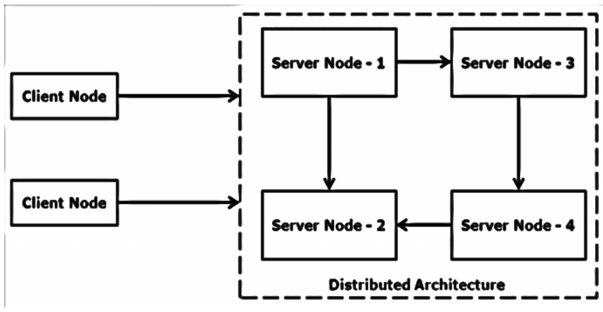


Figure 1: Generic Distributed System Architecture

The software programs are also designed to be divided in order to get the most effective utilization of hardware resources.

### *B. Parallel Computing*

The paradigm of parallel computing is grouping up multiple computing nodes to increase the performance of computing.The major shift in the paradigm in case of parallel computing is that the higher order of coupling for a distributed architecture [Figure – 2].

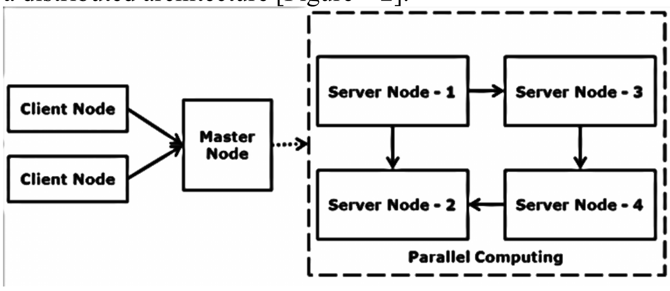


Figure 2: Generic Parallel Computing Architecture

### *C. Grid Computing*

Grid Computing is another technology shift in the area of infrastructure enhancement and utilization benefits. The grid computing connects the resources in order to get the uniform load balancing and distribution of the application loads. The major benefit of grid computing is to manage the heterogeneous workloads on similar hardware infrastructure [Figure – 3].

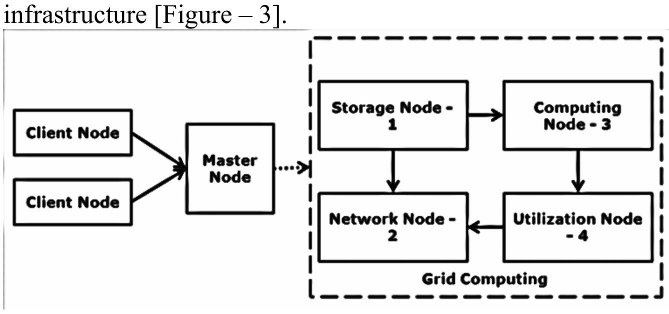


Figure 3: Generic Grid Computing Architecture

### *D. Utility Computing*

The next unique advancement in the area of infrastructure enhancement is the utility computing. This model of infrastructure allows the service providers to generate on demand infrastructure based on the requirements of the customers and applications. The utility computing is the first step towards pay per use applicability. However the complete infrastructure needs to be hosted on side or own premises.

### *E. Cloud Computing*

The cloud computing is the next generation advancement in the space of infrastructure enhancements. The recent progresses of the parallel researches have demonstrated multiple advantages of cloud computing over the previous models discussed in this work. The higher availability, pay per use cost and most advanced techniques for managing the information and load over servers and networks makes cloud computing the most widely adapted infrastructure, platform and service provider. However the customers have to have a good internet connection in order to access the infrastructure or service or platform.

Hence in this work, we analyse the architecture of cloud computing and various service models in order to achieve the higher understanding for data center applicability and performance measures.

The basic architecture of cloud computing supports the need for maximizing the availability and high performance demands of the computing and storage. The architecture with the provision of virtualization of hardware resources enables multiple users to maximize their utilization for computing. In the other hand virtualization also helps the service providers not to allocate the resources dedicatedly and bill the customers as per the usage. Also with the help of virtualization complete isolation of customer application and data can be achieved for higher order of concurrency and security. Finally the hardware infrastructure is hosted on the service provider premises, thus accessing the infrastructure are achieved over internet [Figure – 4].

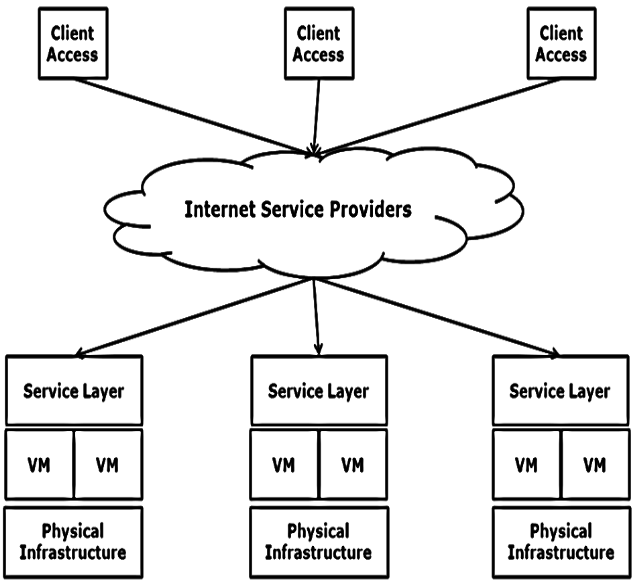


Figure 4: Generic Grid Computing Architecture

The advantage of cloud computing as provided as characteristics of the model makes cloud computing most flexible and adaptive for customers and researchers. Here we analyse the key characteristics of cloud computing:

- The feature of on demand provisioning of infrastructure makes it most suitable for agile development practices.

- The availability of application programming interfaces between the cloud and client systems makes it more usable for the customers.

- Cloud service providers make cloud services available in variety of service types in order to suite customer demands for high, medium and entry level requirements.

- The seamless availability of cloud services makes it easier for customers to gain access from anywhere.

Also the cloud is available for multiple purposes of customer needs with the wide service level offerings:

- Software As A Service: The standard or custom application are provided as services to suite customer requirements over public as general purpose, over private as dedicated as over hybrid as multi-visibility application services.

- Platform As A Service: In order to give the opportunity to the customers to host the customer applications over provider infrastructure.

- Infrastructure As A Service: In this service model customers are allowed to rent and use the infrastructure provided by service providers.

Hence the cloud services are most applicable for data center requirements.

## III. Smart Grids for Data Center Power Optimization

The Smart Grids are been introduced in the previous section of this work [Figure – 5].

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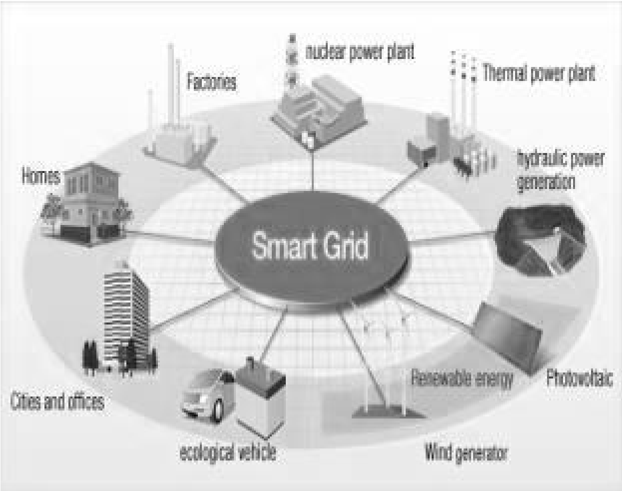


Figure 5: Smart Power Grid Architecture

The smart power grids are most effective for better management of power for large data centers [5] [11] [12].Here in this work we analyse the smart power grids properties for higher optimization of the power:

***A. Reliability***

The smart power grids are generally equipped with multiple smart technology components to monitor and measure the performance of the grids. The performance of the grid is reliable as the technology components attached to this makes it enable for fault detection and self-repairing or healing without the human intervention and loss of power generation.

***B. Network Topologies***

The smart grids are enabling the power generation and transmission with the possibilities of bidirectional energy flows supported by distributed power generations. Hence the smart power grids can be connected with multiple power generation sources to control the optimized power flow as per the requirements of the customers.

***C. Efficiency***

Justifying the name, the smart grids are also enabled with on demand power generation. Hence the generation of power is always as per the requirements. The generation of power is controlled and during the transmission of power is also controlled with reducing the voltage across the transmission lines.

***D. Load Balancing***

The load connected to any power grids is not constant. The small amount of increment in every component's power consumption may lead to a higher order or power demand. The strategy to solve this requirement is to start up another power generator to match the requirements. However the additional power generator takes some times to start producing the power, hence the gap between the increase in demand and the generator function start point may cause reduction of performance for components. The smart grid manages the problem by intimating the components, which are not in need for incremented power, connected to the grid as loads to reduce the power consumption for that fraction of time [6].

Thus connecting any large data center components to a smart power grid will certainly help in optimizing the power requirements.

However the major challenges for utilizing the smart power grids are the cost of storage of data generated by the smart power grids. Hence in this work we understand the applicability of cloud computing to solve the problem.

***A. Scalable Storage***

The smart grids are always tending to generate high amount of data due to the deployment of resource management application for monitoring the performance of the grid. Thus managing the high data load is a challenge and may create additional infrastructure requirements. However in this work we propose to integrate the smart grid to the data center. The data center storage infrastructures can be utilized for the same power grid generated data storage without the burden of additional storage infrastructure [2].

***B. Information Exchange Component Availability***

The high requirements for information exchange in the smart grids are also the demand for better implantation. Thus the additional hardware components for networking are the overhead for smart grids integration with the data centers. However the data centers are also equipped with networking components to handle the customer traffic alongside with the smart grid information exchange [7].

***C. Elastic Computing***

The smart grids need a lot of computing power in order to monitor and analyse the data generated by the grid. Thus a higher order computational power is also the overhead of the system. However the data centers are also equipped with elastic computing capabilities to support this need.

Hence this work demonstrates the use of Smart Grid to optimize the power for data centers.

## IV. TRADITIONAL DATA CENTER ARCHITECTURE

In this work we also understand the traditional data center architectures with the components for gaining higher understanding of the optimization possibilities.

The core difference between any standalone high performance computing devices and data centers are the availability of interconnected networks in data centers. The requirements for network bandwidth in case of a traditional data center are limited as the data center provides minimal distribution of computing loads. Also the data centers does not require any dedicated bandwidth for intra communication as the traditional data center applications are having limited scale for scalability [7][8].

Moreover the requirements of throughput management are the most important component of the traditional and modern data centers [Figure – 6].

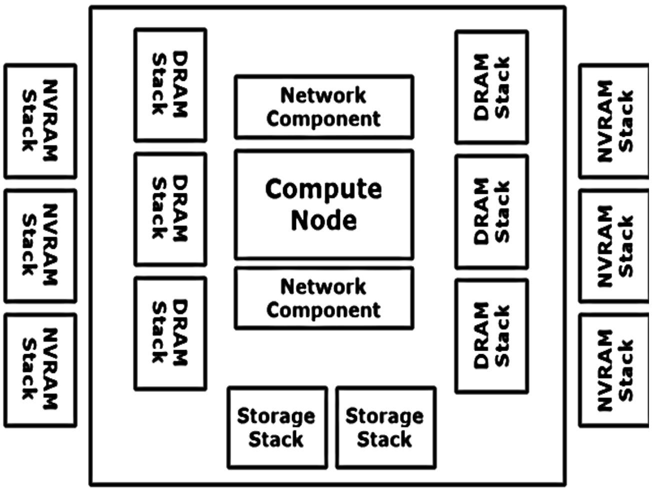


Figure 6: Traditional Data Center Architecture

In a traditional data center, a computational node with 1 million sub nodes will have the following architecture:

Sustainable node performance with 10 Tera Flops, Memory Bandwidth must match at least 4 TBPS, Intra node network must provide the bandwidth at least 1 TBPS and finally the power input must be at least 200W [Table -1] .

TABLE I: DATA CENTER SUSTAINABLE ARCHITECTURE

| **No. of Nodes** | **No. of TeraFlops** | **Memory Bandwidth** | **Network Bandwidth** | **Power Consumption** |
|---|---|---|---|---|
| 10 | 0.001 | 0.4 | 0.1 | 0.02 |
| 100 | 0.1 | 40 | 10 | 2 |
| 1000 | 0.5 | 400 | 100 | 20 |
| 10000 | 5 | 4000 | 1000 | 200 |
| 100000 | 10 | 4000 | 1000 | 200 |

## V. CLOUD BASED DATA CENTER ARCHITECTURE

The demand for higher availability and less manageability for the data centers are motivating the migration of the traditional data centers towards the cloud based data centers.

The architecture of the cloud based data center are analysed in this work [Figure – 7].

A data center is primarily the collection of core components for computing like physical servers, storage devices with replication control, networking interface hardware like cables, routers and switches, power management systems and finally the cooling devices.

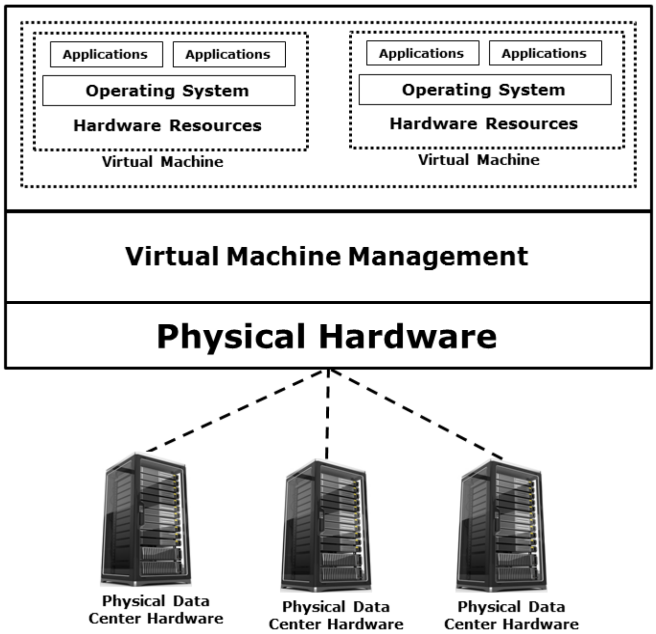


Figure 7: Cloud Based Data Center Architecture

The impact of small performance degradation may lead to higher business loss in the case of data centers as the data centers are majorly used for business and commercial application hosting.

Hence in this work we also study the effect of data center challenges on business. The data center challenges can be classified into four major categories like capacity impact, service impact, resource impact, asset impact. This work performs a detail research on the impacts [Table – 2].

TABLE II: DATA CENTER AND BUSINESS IMPACTS

| **Data Center Impact** | **Reasons of Impact** | **Impact on Business** |
|---|---|---|
| Capacity Impact | Slow processing of resource provisioning | Low revenue generation |
| | Poor understanding of future demands | Low growth in profit |
| Service Impact | Low system availability | Low customer satisfaction |
| | Low availability of problem solutions | Low customer trust |
| Resource Impact | Poor cooling systems | Low capital and operational expense ratio |
| | Low energy efficiency | Low environment control |
| Asset Impact | Low inventory management | Low provisioning |
| | Poor resource management | Unexpected delay in provisioning |

With the understanding of data center architecture we realize the major complexities and bottlenecks for optimizing the data center hardware in the next section.

## VI. Cloud based Data Centers Bottlenecks and Complexities

Towards achieving the higher rate of scalability, the complexities needs to be understood for cloud based data centers.The most widely adopted systems to analyse the performance of any data center mathematically is the cardinality measure of state space [9] [10].

Hence we consider the state space SP for the cloud data center. In order to formulate the token distribution inside the data center the following formulation is helpful.

We consider the total number of logical resources provided by the data center is M, thus

$$V_{res} + V_{run} = M \qquad \text{…Eq 1}$$

Also the number of virtual machines in the ready queue is denoted by Q, thus

$$V_{queue} \leq Q \qquad \text{…Eq 2}$$

Hence forth the numbers of virtual machines on the reserved queue are higher than the virtual machines on the ready queue.

$$V_{res} > 0 \Rightarrow V_{queue} = 0 \qquad \text{…Eq 3}$$

Thus it is easy to understand that the number of virtual machines on the ready queue is greater than the virtual machines in the running state.

$$V_{queue} > 0 \Rightarrow V_{run} = M \qquad \text{…Eq 4}$$

Where,

$V_{queue}$ Denotes the number of virtual machines on ready queue,

$V_{run}$ Denotes the number of virtual machines on running state,

$V_{res}$ Denotes the number of virtual machines on reserved state,

$M$ Denotes the total number of virtual hardware can be provided by the data center and

$Q$ Denotes the size of the ready queue for the data center

Hence in order to calculate the pick load of the data center is always equal to,

$$M + Q + 1 \qquad \text{…Eq 5}$$

Hence forth the cardinality of the same state space can be represented as

$$|SP| = 2.(D+1).(M+Q+1) \qquad \text{…Eq 6}$$

Thus the complexity of any cloud based data center can be defined as $O(D.(M+Q))$.

This finding will help in order to understand the optimal complexity calculation and proposing the optimization framework.

## VII. Resource Optimization Policies and Practices

This work also proposes a standardised phase wise execution of research optimization with the light of the recent advancement in cloud resource optimization.

We understand and propose the followings phases for resource optimization:

### A. *Planning for Provisioning:*

In this phase during the initial planning for understanding the customer requirements, the service provider can propose two methods of resource provisioning as reservation policy and on demand policy.

In case of the reservation policy, the customer has to define the long term resource requirements and has to hold the additional cost during the very low pick time. However this plan ensures the availability of the resources by the service providers. In the other hand, the on demand policy allows the customer to increase the number of allocated resources during the pick time and same the additional cost burdens. However this plan may lead to non-availability of resources in case of small scale service providers.

### B. *Execution for Provisioning:*

During the execution of provision phase, the service providers executes the task in three steps called reservation, expanding phase and wait till demand phase. In the reservation phase the service provider makes the resources ready for the customer without knowing the actual requirements. In the expanding phase the actual tasks for making the resource ready is been executed and the cost estimations are been performed. In the on demand phase, with the request from the customer and approval from the resource manager the allocation is performed [Figure -8].

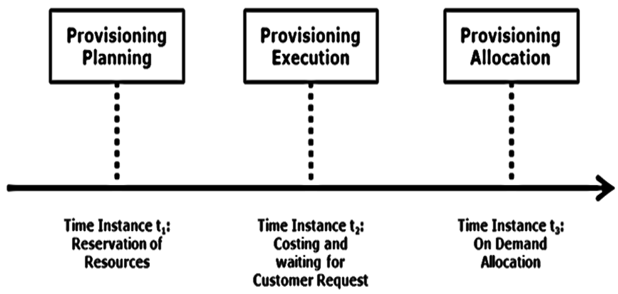


Figure 8: Resource Provisioning Framework

The complete task of executing the provisioning happed in fixed time intervals [13] [14].

The understanding of resource allocation and optimizing policies will help in proposing the novel framework for resource optimization.

## VIII. PROPOSED FRAMEWORK FOR RESOURCE OPTIMIZATION

The data center physical resource optimization problem can be defined using the weighted graph (G) as following:

$$G = (N \cup S \cup NS, C) \quad \text{…Eq 7}$$

Where,
N denotes the number of computational nodes
S denotes the number of data storage services
NS denotes the number of network switches and
C denotes the number of communication channels

The performance of the computing nodes can be defined as following:
Per(N) as the number of operations per second

The implantation of the data centers using the virtual machines can be formulated as following assumptions:
Per(V), denotes the performance of the virtual machines
Per($Req_S$), denotes the number of storage requests
Per(C), denotes the performance bandwidth of the network channel

The problem must follow the constraints provided by the standard data center protocols:

$$\sum Per(V) \le Per(N)$$
$$\sum Per(C) \le Per(L)$$
$$\sum Per(C) \le Per(NS)$$
$$\sum Per(\mathrm{Re}\,q_S) \le Per(S) \quad \text{…Eq 8}$$

Henceforth we propose the novel framework for resource optimization using three phases as demonstrated below:

**Step-1. Mapping of Virtual Machines to the Physical computational hardware**

The mapping process can be achieved using the following probabilistic formula:

$$V_{opt} = \frac{(\tau^{\alpha}{}_{NV})(\eta^{\beta}{}_{NV})}{\sum_{Z \in Possible(N)} (\tau^{\alpha}{}_{NZ})(\eta^{\beta}{}_{NZ})} \quad \text{…Eq 9}$$

Where,
$V_{opt}$ Denotes the optimal utilization of virtual machines
$\tau^{\alpha}{}_{NV}$ Denotes the number of trials for possible mappings of N physical compute nodes and V virtual machine requests
$\eta^{\beta}{}_{NV}$ Denotes the number of actual mappings of N physical compute nodes and V virtual machine requests
$^{\alpha}$ and $^{\beta}$ Denotes the influence controlling parameters for $\tau^{\alpha}{}_{NV}$ and $\eta^{\beta}{}_{NV}$ respectively.
Z Denotes the possible N for mapping

**Step-2. Mapping Storage request to the Physical storage hardware.**

The mapping process can be achieved using the following probabilistic formula:

$$\mathrm{Re}\,q(S)_{opt} = \frac{(\tau^{\alpha}{}_{S\mathrm{Re}q(S)})(\eta^{\beta}{}_{S\mathrm{Re}q(S)})}{\sum_{Z \in Possible(\mathrm{Re}q(S))} (\tau^{\alpha}{}_{SZ})(\eta^{\beta}{}_{SZ})} \quad \text{…Eq 10}$$

Where,
$\mathrm{Re}\,q(S)_{opt}$ Denotes the optimal utilization of storage requests
$\tau^{\alpha}{}_{S\mathrm{Re}q(S)}$ Denotes the number of trials for possible mappings of request to actual storage
$\tau^{\alpha}{}_{S\mathrm{Re}q(S)}$ Denotes the number of possible mappings of request to actual storage
$^{\alpha}$ and $^{\beta}$ Denotes the influence controlling parameters for $\tau^{\alpha}{}_{S\mathrm{Re}q(S)}$ and $\tau^{\alpha}{}_{S\mathrm{Re}q(S)}$ respectively.
Z Denotes the possible $\mathrm{Re}\,q(S)$ for mapping

**Step-3. Mapping of the Virtual Channel requests to the Physical networking channels**

The mapping process can be achieved using the following probabilistic formula:

$$C_{opt} = \frac{(\tau^{\alpha}{}_{CC_{Opt}})(\eta^{\beta}{}_{CC_{Opt}})}{\sum_{Z \in Possible(C)} (\tau^{\alpha}{}_{CC_{Opt}})(\eta^{\beta}{}_{CC_{Opt}})} \quad \text{…Eq 11}$$

Where,
$C_{opt}$ Denotes the optimal utilization of network channel requests
$\tau^{\alpha}{}_{CC_{Opt}}$ Denotes the number of trials for possible mappings of request to actual s channel
$\eta^{\beta}{}_{CC_{Opt}}$ Denotes the number of possible mappings of request to actual channel

$\alpha$ and $\beta$ Denotes the influence controlling parameters for $\tau^{\alpha}_{CC_{Opt}}$ and $\eta^{\beta}_{CC_{Opt}}$ respectively.

Z Denotes the possible $C_{opt}$ for mapping

Thus this proposed framework needs to be verified on the simulation situation for performance proof.

## IX. Proposed Performance Evaluation Matrix

This work also proposes a performance evaluation matrix on which the performance of the proposed and other data center optimization needs to be tested [Table – 3].

TABLE III: Proposed Performance Evaluation Matrix

| Parameter Name | Meaning | Possible Values |
|---|---|---|
| **Cloudlet ID** | Sequence Number of the Request for Resources | Integer Sequence Number |
| **STATUS** | Status of the request fulfilment | Success / Failure |
| **DATA CENTER ID** | Simulated Data Center ID | Integer Sequence Number |
| **VM ID** | Virtual Infrastructure ID | Integer Sequence Number |
| **TIME** | The throughput time | Integer number |
| **START TIME** | Start time of the job | Integer number |
| **FINISH TIME** | End time of the job | Integer number |

## X. Results

The results of the proposed framework under simulation are satisfactory. The results clearly demonstrate the timely, successful and optimal resource utilizations. The findings of the simulation are also presented in this section [Table – 4].

The simulation provides the confirmation that, except 10% of the test situations, the proposed framework maintains constant throughput time during optimized resource allocation [Figure -9].

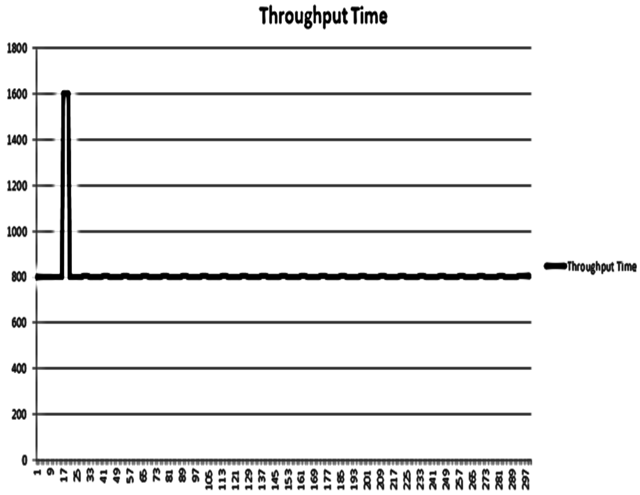


Figure 9: Throughput Variation Graph for Optimized Resources

## XI. Conclusion and Future Scope

This work considers and understands the cloud service models and benefits of the models with possible utilization for the cloud based data center implementation.

The architecture and implantation pros and cons for Smart Power Grid are also understood in this work for applicability of data center power management in optimized way. The overheads for the smart power grid is also understood and proposed solutions using cloud based data center existing architecture.

In order to achieve the better understanding of traditional data center components are also been studied and compared with cloud based data centers. Also this work presents the complexities of the cloud based data center implantation and manageability.

This work demonstrates the generic process for optimized resource allocation and proposes a novel framework optimized for data center components. The proposed framework is also been simulated using a java application based on CloudSim toolkit.

The final results demonstrate that the proposed framework is successfully allocating the optimized resources for a data center with 90% success ratio.

The future scope of this work is clearly directing towards the network management in a better way and also proposing a framework generation for overall cloud based data center performance monitoring.

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TABLE IV: PERFORMANCE ANALYSIS OF THE PROPOSED NOVEL FRAMEWORK

| Cloudlet ID | STATUS | Data center ID | VM ID | Time | Start Time | Finish Time |
|---|---|---|---|---|---|---|
| 1 | SUCCESS | 1 | 0 | 800 | 0 | 800 |
| 2 | SUCCESS | 2 | 0 | 800 | 0 | 800 |
| 3 | SUCCESS | 3 | 0 | 800 | 0 | 800 |
| 9 | SUCCESS | 1 | 0 | 801 | 800 | 1601 |
| 10 | SUCCESS | 2 | 0 | 801 | 800 | 1601 |
| 11 | SUCCESS | 3 | 0 | 801 | 800 | 1601 |
| 25 | SUCCESS | 1 | 0 | 801 | 1601 | 2402 |
| 28 | SUCCESS | 2 | 0 | 801 | 1601 | 2402 |
| 31 | SUCCESS | 3 | 0 | 801 | 1601 | 2402 |
| 37 | SUCCESS | 1 | 0 | 801 | 2402 | 3203 |
| 40 | SUCCESS | 2 | 0 | 801 | 2402 | 3203 |
| 43 | SUCCESS | 3 | 0 | 801 | 2402 | 3203 |
| 26 | SUCCESS | 1 | 3 | 803 | 2405 | 3208 |
| 29 | SUCCESS | 2 | 3 | 803 | 2405 | 3208 |
| 32 | SUCCESS | 3 | 3 | 803 | 2405 | 3208 |
| 35 | SUCCESS | 1 | 3 | 803 | 2405 | 3208 |
| 49 | SUCCESS | 2 | 0 | 801 | 3203 | 4004 |
| 52 | SUCCESS | 3 | 0 | 801 | 3203 | 4004 |
| 55 | SUCCESS | 1 | 0 | 801 | 3203 | 4004 |
| 293 | SUCCESS | 2 | 3 | 803 | 20071 | 20874 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 296 | SUCCESS | 3 | 3 | 803 | 20071 | 20874 |