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Hybrid Cloud Computing

Cloud Computing Applications

Highlights

Anticipated Parallel Processing

Education Using Cloud Computing

Discovering Thoughts, Inventing Future

VOLUME 15 ISSUE 2 VERSION 1.0

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Public-Oriented Personalized Health Care Platform based on Web Service

By Dr. R Bulli babu, T Cherishmasri Lakshmi & K Phani Deepthi
KL University, India

Abstract- In this paper, we are using web service technologies in order to store data and also giving guideline line to people ,and that information is very confidentiality of patient data. Web service is playing a vital role in present scenario. Now days we are seeing web service have a more importance and so many technologies are existing .But in this paper we are using SOA and WSC. SO A means service oriented architecture which makes a communication between the two service and simple pass the data. WSC which means web service coordination which distributed the application actions. The main aim health care application development but health care industry is lagging behind other sectors.

Keywords: web service, cloud platform ,soa,wsc, health care service systems, service composition.

GJCST-B Classification : C.2.4 D.4.7

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Public-Oriented Personalized Health Care Platform based on Web Service

Dr. R Bulli babu [α], T Cherishmasri Lakshmi [σ] & K Phani Deepthi [ρ]

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I. Introduction

Health care is one of the most prominent problems faced by the society now a day. Every day a new disease is take birth which leads to illness of millions of people. Every disease has its own and unique medicine for its cure. Maintaining all the data related to every disease in a single database is not possible using the legacy system in order to solve this problem we use different types of external memory devices which again results in expensive maintenance of the system. To avoid this we use web service access the date form the patient this information is sent to specialized doctor. The introduction of web service in health care management system made the needy i.e. the stake holders to have the right to access the data stored using both SOA and WSC and acquire knowledge about the diseases. The use of this series of privacy setting in order to protect the patient's data from getting into the public hand in order to acquire the trust of people and get success in the field of health care.

This health management system is not based on the profit gained by the users this is mainly based on the use of mobile application sensors by the patients who are in need and maintain their profile according to the doctors instructions and help the patients by getting the immediate information from the nearest doctor in

The important challenges faces developing the application are inferring the information and knowledge about the diseases and keeping the patients records reacting and prescribing the medicine without actually consulting the doctor.

stored in a particular area and sensing the patient behaviour and conditions using the sensor. The application must also consider the patients social interactions and communications which increases the goals of the application to a next level by acquiring a massive amount of data and provide a complete personalized health care assistant to the user .The application stored the information of the patient in the cloud using web service. This application is fed with the detail information about the frequent diseases caused in the surroundings and the protecting precautions form the diseases. The application is connected to the internet which gives online access to the data base and gets the up-to-date information about the diseases affection the people.

II. Related Work

Creating a public-oriented health care system is an interesting because all people can get the information where they are and rapid growth will take place .Not only that rapid advance information and also through communication brings us more opportunities in the health care field[1] .Now a day's Some systems are available to provide various solutions, and some research projects are providing Web-based personalized health care support[2]. The web service data in health care organization had developed form single physician offices to large hospitals and healthcare organization by digitizing, combining and effective use of big data [3].Here we are using two web service technology are SOA and WSC where .

Gathering the information from the patients and holding the information in longitudinal records is a complex task[4] In health care, the encompasses a whole range of data types which includes clinical data which can be data which can be derived from the electronic records within any laboratories, pharmacies, organizations where the service are delivered[5].Health Vault is a Web-based platform developed by Microsoft to put people in control of their health and fitness information, which started in October 2007.

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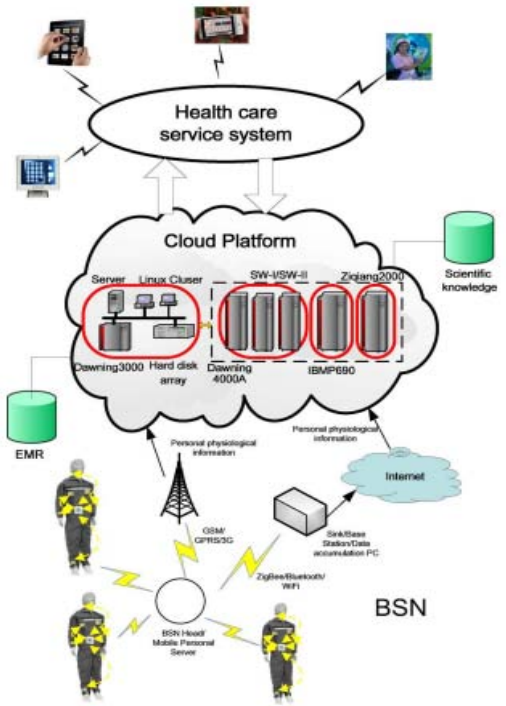


Fig. 1. PHISP architecture.

It helps the users collect, store, and share health information with family members and participating healthcare providers, and it provides people with a choice of third-party applications and devices to help them manage their fitness, diet, and health[6].we have considered branch structures appearing in the process model of a composite service and have presented the corresponding solutions for two simple types of user preferences[7]. We are going to present a personalized health care information service platform. The main idea of SOA and Web service technologies to design and give more benefit to the patient[8]. In particular, some keys play a virtual role in the web service i.e., which include WSC techniques supporting branch structures and parallel structures.

III. System Architecture

In this section, we are present our health care service platform: PHISP. Its conceptual architecture is shown in Fig. 1. [9]There are some main components those are body sensor networks (BSNs), cloud platform, and health care service system.

1. BSN: according to different circumstances and needs, appropriate health information collection terminals are configured for different individuals. BSN is used to realize the multimode acquisition, integration, encryption, and real-time transmission of personal health information in living or working environment[11].
2. Cloud platform: based on cloud computing technology, it achieves the rapid storage, management, retrieval, and analysis of massive health data, which mainly includes[12]. EMR repository, scientific knowledge base of health care, and personal health data acquired from BSN. Meanwhile, it provides support for the deployment, management, and execution of application-level health-care-related services and systems[13].
3. Health care service system: it includes a series of subsystems, such as personal health information management system, personal health risk assessment and guidance system, seasonal disease early warning system, decision making libraries for various diseases, remote nursing, and medical systems for such patients as cardiovascular, cerebral apoplexy, and diabetic ones[14].

The serious problem faced by the present world is increase of population which results in aging of people of some age group people which results in many health care issues as the aging people have a low immunity levels to fight towards an disease and the stress caused daily also makes them week[15]. These people must be protected from different kinds of illness by constantly providing a system to look after them by checking their health conditions and providing solutions for their regular problems and reminding them for their regular checkups services. The users are dispersed in the whole country and with enormous diversity[16]. Managing such a diverse user group is a challenge faced by the health service providers[17]. A new ear of medication is done by collaborating the mobile computing and SOA, Web Service and WSC[18]. Every person can have an access to preloaded and instant service for any health issue by using the information form provided Web Service[19]. There services can be of different types regarding different issues e.g., daily health checks, medication reminders, first aid instructions, commonly affected diseases and their precautions. Application present in the cloud can be downloaded to the mobiles for an instant service for any emergency health issue[21]. Storing all such information in a single system quite a big task. which requires large amount of physical data in order to avoid that healthcare is collaborated with the Big Data by completely using the data entry and data analyst[22].

In this paper, we pay attention to only user/domain preferences in which we are interested in the field of health care and give them a simple expression[23]. There are three types of user/domain preferences with which we are concerned. The first type is that a user prefers a class of services over another if certain conditions are met (e.g., “Lucy prefers to go to a doctor’s office by walk over bus, if the walk time is less than 30 minutes and weather is pleasant.”). The second type is that the user prefers different services according to different conditions. The third type is that the user assigns priorities over services with similar

functionalities. We use the following forms to express them, respectively:

1) The first type: condition?W S1 : W S2;
2) The second type: switch(condition){case C1 : W S1; case C2 : W S2; ... ; case Cn : W Sn; };
3) The third type: W S1 W S2 ... W Sn. T.

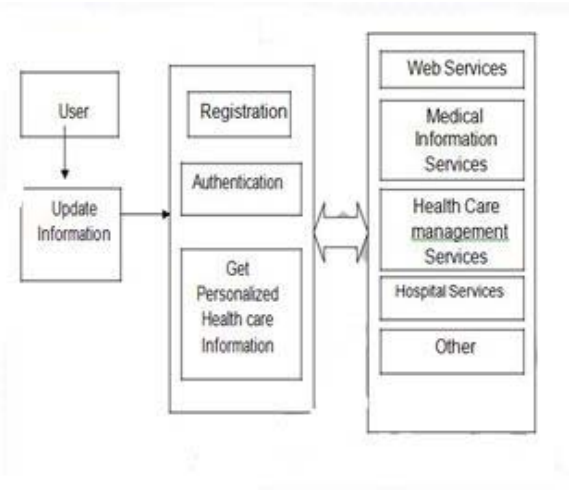
The expressions that we adopt are similar to some general expressions in programming languages, especially the first two, which are the conditional expressions commonly used in C, C++, and Java. For the first one, it finds the truth value of expression "condition" first. If it is TRUE, then execute service W S1, and otherwise W S2. For the second one, it also finds the truth value of expression "condition" first and then execute the corresponding service accordingly. The third one means that W S1 has higher priority than W S2 and W S2 has higher priority than W S3, etc. In other words, W S2 will be executed only if W S1 fails, and W S3 will be executed only if W S1 and W S2 both fail, etc. The proposed expressions are simple and easy to understand and use. They can help users express their preferences and developers build applications quickly.

IV. Implementation

Based on SOA, Web services, and WSC technologies, we have designed and constructed a medical and health care platform in collaboration with many universities and medical institutions. It has been used to provide teaching, research, medical treatment, and health care services for college students and teachers, researchers, medical professionals, and ordinary people. In our implemented platform, some functions and services require improvements.

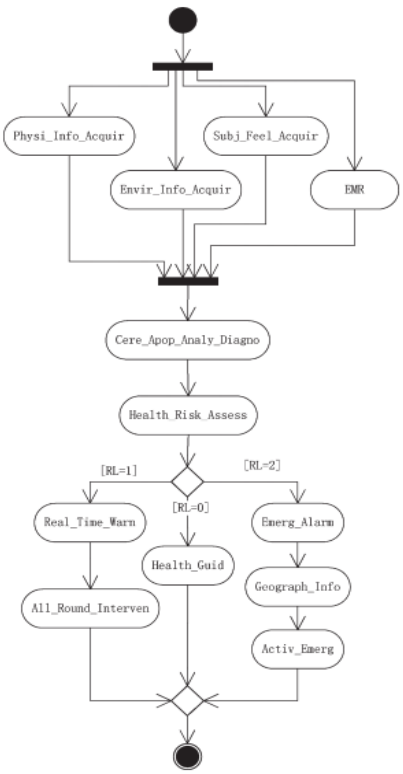
Figure 1 : Basic idea of the page

For example, for specific diseases mentioned in this paper, we have just adopted some relatively simple data analysis models and diagnostic and decision-making systems. Furthermore, the medical and health care platform that we have implemented is only a research and demonstration system.



For its large-scale commercial applications, much more work is needed. Further improvement and optimization of the proposed composition methods supporting branch and parallel structures is another future research, including learning from the work on automatic program synthesis and the technique of multiage planning and optimization.

In UML activity diagrams, an action is denoted by a round rectangle and is labeled with an action name of a given service class as defined in a service ontology. The flow of control is denoted by connectors (transitions) between actions. A decision node represents a conditional branch in a flow, and it has one input and two or more outputs.



A merge node is required to merge flows that are split with a decision node, and it has two or more inputs and one output. Both decision and merge nodes are denoted by diamonds. The initial node of an activity diagram is denoted by a filled circle, while the final one is denoted by two concentric circles. A simplified UML activity diagram specifying a "treating a stoke patient" composite service is shown in Fig. 2. In the example, various information acquisition services and EMR service can be executed in parallel first in order to acquire physiological signals, environmental information, subjective feeling, and medical history information of the patient. Then, the information can be analyzed by the cerebral-apoplexy oriented data analysis and diagnosis service, and the personal health risk assessment service can assess the patient's risk level. According to different risk levels, there will be different solutions. The decision node denotes a branch structure. Three transitions (connectors) stem from it, and they are labeled with disjoint guards—conditions that specify whether a token can flow along a connector.

V. Conclusion

In this paper, we have presented a health care platform. It supports personal health information management, personal health risk assessment and guidance, dynamic personal health monitoring and real-time early warning, active recommendation of personalized medical treatment, active seasonal disease warning, and other health care services for individuals.In future we have design and implemented the health care platform based on SOA and Web service technologies, which makes our developed system have higher reusability, flexibility,and extensibility.

It supports personal health information management, personal health risk assessment and guidance, dynamic personal health monitoring and real-time early warning, active recommendation of personalized medical treatment, active seasonal disease warning, and other health care services for individuals. Moreover, for some specific diseases, PHISP provides remote medical and care services.

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Issues in a Scalable Inter Cloud Environment with Unified Brokering Approach

By Bhawna Taneja & Dr. Rajender Nath
Kurukshetra University, India

Abstract- Cloud Computing providers are currently serving customers throughout the world. Inter-Cloud Computing, where a number of providers come together, has already paved its way, It is meant to address the growing challenges of load balancing and optimal utilization of resources. At the same time, its objectives also include QoS and SLA accomplishment.

A centralized Federation of clouds is a confederacy of cloud providers attached to and dependent upon a single unified broker entity. This unified broker acts as a linchpin for the entire system.

This paper envisions and elaborates upon the idea of centralized Inter-cloud federation environment. We propose issues open to centralized Inter-Clouds at two levels namely unified broker and the cloud providers.

Keywords: *QoS, SLA, inter-cloud computing, broker, centralized federation of clouds.*

GJCST-B Classification : *C.1.4, C.2.1*

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I. Introduction

Cloud Computing is a relatively new paradigm in the history of computing. Cloud computing offers services and computing resources over the most common medium of access and communication i.e. Internet in a pay-per-use basis. Numerous authors have defined the term "Cloud Computing" in their own ways. The most acceptable and standardized definition out of these turns out to be that by National Institute of Standards and Technology (NIST) [8]: "Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." Most common characteristics of Cloud Computing paradigm are on-demand access to resources, scalability, ubiquitous network access, multi-tenancy, metered service, elasticity etc. Cloud Computing has a layered architecture with IaaS (Infrastructure as a Service), PaaS (Platform as a Service) and SaaS (Software as a Service) as its layers.

Next leap in the history of Cloud Computing has already made its way and it involves association between various Cloud Providers to efficiently and impeccably render their services to the Cloud Consumers. When a Cloud Provider serves a number of consumers, sometimes load becomes more than it can be provisioned. Under such circumstances, some of the consumers are denied of services and the overall response time increases. This leads to loss of trust and poor SLA accomplishment. Less optimum but still a solution is, to increase the infrastructure. But this infrastructure remains idle most of the time when the workload is at its average rate. To optimally utilize the infrastructure and to reduce the response time, Inter-Clouds have come up, where one Cloud provider can utilize the resources of other Cloud Providers. This is especially useful in case of heavy load and also during Cloud outages. Inter-Cloud is a generic term used for all types of associations between various Cloud Providers. This association can take various forms. The federation of clouds can either be peer-to-peer federation of clouds or centralized federation of clouds [1]. In a peer-to-peer federation, each cloud provider has its own broker resulting in a distributed association of cloud providers. In a centralized federation (fig. 1), there is a single broker entity and all the cloud providers publish their SLAs to this unified broker. This broker entity acts as a mediator between cloud consumer and multiple interoperable cloud providers. Broker matches the specifications (QoS, cost etc.) of the consumer request with providers' SLAs and allocates the best fit to the consumer.

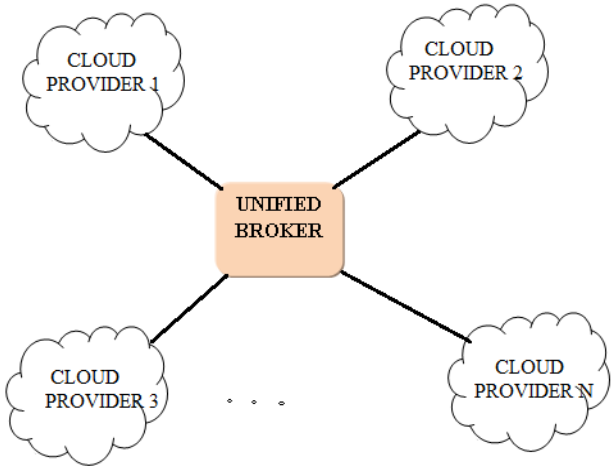

Figure 1 : Centralized Federation of Clouds

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In this paper, focus is primarily on centralized federation of clouds and various issues associated to the adoption of such an environment have been investigated.

II. Related Work

The assessment of the requirements for successful implementation of federation of clouds has been undertaken by many authors in the recent past. This section investigates the challenges identified by researchers in centralized federation of clouds.

Authors [2] in their paper addressed the issues in implementing the multiple data management system on a cloud such as hardware asymmetry, reliability and dynamic resource sharing as per application's requirement.

In paper [11] proposed incorporating concepts of Grid technologies to realize multi cloud federated deployments. According to them, solutions from Grid technologies in terms of compute, data, security and information system areas can not be directly applied to federated cloud computing and hence require some integration efforts to find a solution to these problems.

The challenge of identity management in federated cloud environment has been emphasized by [3]. They also compare the security models in Grid and CC. Authors also described inter-cloud federation scenarios and identity management in it.

The security risks in a cloud federation and the need to deal with these threats have been highlighted in [16]. In federated cloud environment, this responsibility of maintaining the security is split amongst various CPs. Auditing multiple CPs ma become a trivial task when customer may not even be aware of existence of multiple CPs. There are liabilities and legal issues too involved in federated cloud environment especially in case of failure or downtime.

The authors in the paper [12] have pointed out the deployment models for linking together Network Enterprises together i.e. while forming the federation of clouds. They also listed the probable challenges related to interoperability issue.

The benefits of moving from proprietary cloud-based applications to inter-cloud computing have been enumerated by authors [9]. Due to legislative reasons or response time constraints, a consumer may want to store data at a nearest or a particular data center. It is not possible for a cloud provider to have data centers at every location across the globe. The solution to this problem is using multiple clouds. Secondly, inter-cloud computing also results in better application resilience due to more service availability even in case of cloud outages. Another benefit cited by them is vendor lock-in", is avoided since same workload can be shared among multiple cloud providers. Cloud vendors are equally benefited by being able to scale-up their resources whenever workload is bursty and increases beyond their limits.

III. Issues under Apprehension in Centralized Cloud Federation

The success of any federation of cloud providers depends on its management and control over its components at different layers of cloud architecture. There are two entities in the centralized federated system namely cloud broker and the cloud providers to do this. To raise the confidence of customers in centralized cloud federation, the broker and a cloud provider need to overcome all technical issues that are critical to resource prediction, resource allocation, transparent accounting, location and identity etc.

a) Issues from broker perspective

The centralized cloud federation depends on unified resource broker for resource allocation since at the heart of centralized federation lies the broker. The broker intercepts the requests from cloud consumers along with their service level requirements (e.g. response time, Bandwidth requirements, cost etc.). Efficient scheduling algorithms need to be enforced to match the consumer requests with the SLAs published by various cloud providers [6]. As many applications run in parallel, broker has to maintain the complex accounting of each provider and customer in a federated cloud environment. Some of them are transferred from one cloud provider to another amidst their execution (VM images and associated data structures are transferred from one cloud provider to another). Competent data structures and procedures for accounting of these applications (partly or completely executed) are also necessary to be developed at the broker level.

In a centralized federated environment, broker introduces the cloud consumer to its suitable cloud provider after SLAs match. Maintaining the transparency to the user about his effective provider lies on the shoulders of broker and it has to maintain the continuous transparency even if there is a shift in cloud provider before the job completion/execution [5]. The location of data is visible to cloud provider and not to the consumer. This problem of location awareness increases multi fold in federated cloud environment since data is transferred to multiple cloud providers during service compliance. As data is most vital asset to the owner data location awareness procedures for this purpose must be developed at the broker level [7].

VM Migration scenario too requires due diligence that occurs quite frequently in federated environment due to depletion of resources at one cloud provider or due to a cloud outage (of a member cloud). Partially executed services may have to be transferred from one provider to another. Virtual machine images need to be handed over to recipient cloud provider so

that cloud consumer doesn't encounter undue delays. The arrival pattern of the requests for cloud services can serve as an important metric, if analyzed properly. In order to avoid under-provisioning of resources, the broker has to develop some behavior prediction metrics to predict the no. of required resources for each request. These metrics may be developed after a careful study of the consumer requests for a certain period of time [1]. Another very important area from a broker's perspective is Identity management. In order to effectively utilize the power of federated cloud environment, the efficient management of identities has to be established. The federated identity provider should employ a single, common but secure identity to access the applications between different providers. The federated identity manager should have flexible but extensible architecture to enforce identity security policies and yet be light weight [14].

b) Issues from cloud provider perspective

Undoubtedly, the hesitation in adoption of federated cloud environment can only be fully alleviated or minimized if each participating member cloud provider properly attends the issues pertaining to its efficient service delivery, integrity of data, etc.

A member cloud provider in centralized federation of clouds needs uniform and automated authorization mechanisms. A cloud provider has to authorize the cloud consumer before any actual usage of the cloud service begins. In a federation, such authorization mechanisms need to be enforced which are identical with every cloud provider. Automated authentication methods must be contained which rarely obstruct the execution of the service being rendered to the consumer [10]. A single cloud provider serves many cloud consumers. It is the foremost responsibility of cloud provider to ensure integrity and confidentiality of data of each cloud consumer whether at disk or "on wire". Consumer must be made aware of the data location and assured about its integrity [4].

Each cloud provider always wishes to avail the maximum of profit by delivering the full services to its customer. But this may not happen in case the available resources are under-provisioned and this may entail the decomposition of the request into smaller requests by the provider. Hence, only some of these required small portions of requests may be outsourced by the provider and fulfilling the larger request itself. This process of disintegration of request and transferring the workload to other cloud for completion requires vigilant and rational algorithms which actually enhance the throughput and reduce the response time [13]. While service decomposition process, a cloud provider has to ensure implementing concurrency control since it handles many service requests from different cloud consumers simultaneously. This may use same storage area for local storage of data. Thus it becomes indispensable on the part of cloud provider to provide locking measures to ensure concurrency control. A cloud provider needs to have sound recovery mechanisms. If any of the member cloud provider faces outage, the decisive question that arises is what will happen to the vital data of cloud consumers. A need evolves to replicate the data. A decision needs to be taken by the cloud provider regarding the degree of replication i.e. whether the Cloud provider should opt for full replication or not. Second problem is that of dealing with consumer requests in case of cloud outage. Cloud Broker can reschedule the services provided by such cloud providers till they are up and functional again. The performance of federation is also questionable in case unified broker goes down for any unforeseen reason [15].

Since the federation is made up of independently managed clouds and infrastructure of different administrative domains. So, the federated Inter-Cloud system must be able to specify such inter-cloud gateway translators which support conversion of requests, pattern or formats of data (at SaaS level) and underlying protocols (at IaaS level) from one to another cloud domain [4]. The federation has to confront and support inter-application synchronization and run time infrastructure optimization which includes migration of Virtual Machines from one provider to another, ability to handle new joining/leaving of VMs and resource scaling in harmony with the job's need.

IV. Conclusion and Future Work

This paper examined the idea of centralized federation of cloud providers with a view to provide a deeper look into the requirements of inter-cloud federation. The issues addressed above are of higher relative importance from the broker's point of view and from provider's angle. The outcomes of this research revelation, if properly attended, will give significant strength to the centralized federation of cloud providers. The different issues have been highlighted at various layers of the cloud (SaaS, PaaS and especially at IaaS level). It also allows the providers to assess the effort that is required to integrate the existing cloud computing systems with a federation of clouds. The federation can work in a collaborative manner only if unified broker carries all of its above mentioned responsibilities with due respect. The timely and regular publishing of SLAs, optimizing the load distribution and run time infrastructure optimization are critical factors for retaining the customer. In this work, only equi-probable events (like cloud outage, resource depletion etc.) are assumed to happen. If the relative weightage of each issue is also considered then scenario may become more complicated and a statistical analysis may also be greatly helpful.

The future objective of this research will be on developing the comprehensive solutions to come across these above mentioned issues. These findings will lead to figure out the robust architecture which may be integrated into the existing model. A deeper look into the inter-cloud security mechanisms, legal understanding, monitoring, fixing the responsibilities are other areas of further interest. Undoubtedly, the strength of the cloud providers is really elevated to new heights if they work in a federation of cloud like architecture but it is also evident that these peaks may be maintained only if the issues highlighted in this paper are addressed properly.

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Attribute Assignment to Point Cloud Data and its usage

By Yoichi Fujita, Yuji Hoshino, Seigo Ogata & Ichiro Kobayashi
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Abstract- In recent years, with the development of laser measurement technology, utilization of point cloud data is progressing. However, since point cloud data does not contain attribute information, the usability of the data is low. It is possible to consider that by assigning attributes to the non-attribute point cloud data, this can lead to the usage of point cloud data in each phase of life cycle of construction: design, construction, and maintenance. Therefore, in this paper, the authors have proposed an attribute assignment method for point cloud data. In addition, the authors proposed the way to use attributed point cloud data, the usage as objects, data linkage, and visualization by using the attribute assignment method. Point cloud data of a dam was used as a case study for the proposed method and the usage.

Keywords: point cloud data, attribute assignment, usage of point cloud data, visualization, data linkage.

GJCST-B Classification : C.2.1, C.2.4

Strictly as per the compliance and regulations of:

Attribute Assignment to Point Cloud Data and its usage

Yoichi Fujita [α], Yuji Hoshino [σ], Seigo Ogata [ρ] & Ichiro Kobayashi [ω]

Abstract- In recent years, with the development of laser measurement technology, utilization of point cloud data is progressing. However, since point cloud data does not contain attribute information, the usability of the data is low. It is possible to consider that by assigning attributes to the non-attribute point cloud data, this can lead to the usage of point cloud data in each phase of life cycle of construction: design, construction, and maintenance. Therefore, in this paper, the authors have proposed an attribute assignment method for point cloud data. In addition, the authors proposed the way to use attributed point cloud data, the usage as objects, data linkage, and visualization by using the attribute assignment method. Point cloud data of a dam was used as a case study for the proposed method and the usage.

Keywords: point cloud data, attribute assignment, usage of point cloud data, visualization, data linkage.

I. Introduction

With the development of Global Positioning System (GPS) and 3D laser scanners, fixed laser survey equipment and MMS (Mobile Mapping System) have been devised and are currently deployed for actual data acquisition. However, the acquired data is used only as point data (e.g. as management information) and as the conversion to 2D drawing. In recent years, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has announced the implementation of CIM (Civil Information Management/Modeling)— which is a civil version of BIM (Building Information Management)—in loads of major projects around Japan while establishing the field of architectural design. CIM has applied the concept of sharing, using, and developing 3D models in each phase of the life cycle of construction—planning, design, construction, and maintenance. CIM is primarily aimed at improving the construction production process. The use of 3D data in the design phase is expected to advance rapidly.

Thus far, the authors have conducted numerous research studies regarding the use of point cloud data. The proposals include the utilization of point cloud data in road space using editing method and attribute assignment to point cloud data. This development allows for a number of possibilities in using the point cloud data at each stage of the life cycle of construction solely. Other researchers also proposed the use of point cloud data. For instance, Mizoguchi et al. has proposed evaluation method for scaling of bridge piers using point cloud data. What's more, Yun, H et al. has proposed a method for pavement maintenance using the data derived from MMS. Therefore, it can be presumed that the utilization of point cloud data is smoothly progressing.

In the present paper, the authors have proposed an attribute assignment method for point cloud data in order to expand the range of point cloud data utilization. Additionally, the authors have shown how to use the attributed point cloud data. By assigning attributes to point cloud data, it is possible to use point cloud data as objects, data linkage, and visualization. There are hence various possibilities in using point cloud data, not limited to road space only. In chapter 2, the authors described the significance of assigning attributes to point cloud data. In chapter 3, the authors illustrated the attribute assignment method and the usage of attributed point cloud data. In chapter 4, the author measured the usage of attributed point cloud data using point cloud data of dam as case study. The results are subsequently discussed.

II. Attributes of Point Cloud

a) *The significance of attribute assignment*

When point cloud data is given attributes, its use has become more intensive. For example, consultation and examination of a project becomes possible by giving attributes to an unnecessary place in the reconstruction site, removing the data from point cloud data, and adding new structures. Furthermore, by classifying each structure existing in the area surrounding the roads, point cloud data are then deployed in relocation and removal plans. The attributed point cloud data containing additional information—volume, damage, pictures, documents—can be used in the management of the existing structure. Specifically, it is possible to acquire the data of the existing structure using laser scanner equipment. Since the point cloud data of the structures are directly available, the data is deemed practical in existent structure management. Such use leads to reduction in labor and costs of CAD 3D modeling.

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b) The attributes of point cloud data

In the analysis of numerical information of the point data, it becomes possible to classify and determine the point cloud data as a "group". The authors described the analysis of typical information of point data as shown below:

i. *Position information*

By setting the values for each of the position information (*x*, *y*, *z*), it is possible to extract the planes along the three axes. For example, gradient tints diagram can be created by coloring the elevation values as seen in figure 1. For this data, it is possible to extract the data that has the same elevation with z value by setting the threshold value of z value. The shape analysis of the structure for the relative position between the dots can be performed. On top, extraction is possible by visually specifying the range and the location.

ii. *Reflection intensity*

When the threshold value to the reflection intensity of the measured data is set, structures can be classified depending on types of materials. Figure 2 is an example, where the outer wall of a building and the white line inside of point cloud data are extracted. A portion of road surface can also be extracted as seen in figure 2 b).

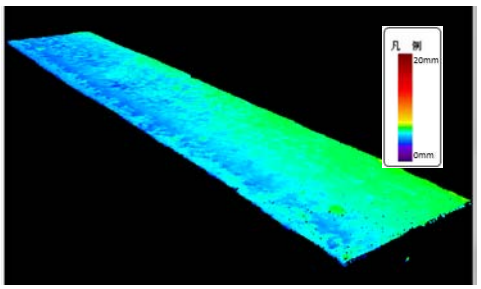
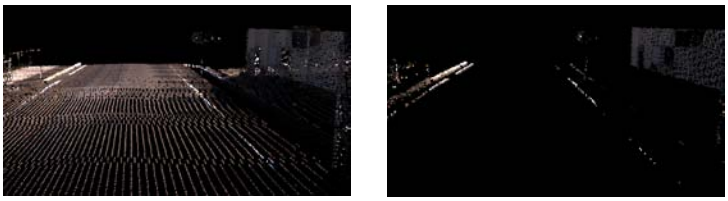


Fig.1. Position Information



a) Original data b) Extracted data

Fig.2. Reflection Intensity

a) Original data b) Extracted data

Fig.3. Color Information

iii. *Color information*

Classification of colors can be made by setting the threshold value and combining the three elements (*r*, *g*, *b*) of color information from the measured data. Figure 3 exemplifies red point extraction from point cloud data. Figure 3 b) shows how the objects containing red color are extracted. Furthermore, When RGB color information is converted into HSV color, it is possible to identify the artifact and structures.

c) The partition of point cloud data

As described in the previous section, the partition and classification of the point cloud data can be performed by analyzing the attributes of the point data. Additionally, the editor allowing the partition of point cloud data has been developed in the previous studies. With this editor, it becomes possible to split point cloud data into arbitrary shapes. Further, the development of editing software for point cloud data has been encouraged. Such progress leads to the possibility of structure partition and classification based on point cloud data. When the attributes are assigned to the partitioned point cloud data, the utilization of point cloud data is widely increased. In this paper, the authors showed the method in assigning the attributes to the partitioned and classified point cloud data.

III. Attribute Assignment

a) Method

In this section, the authors portrayed the attribute assignment method to the partitioned point cloud data. $\boldsymbol{P}$ represents the whole point cloud data, and $\boldsymbol{p_i}$ represents each point of the point cloud data.

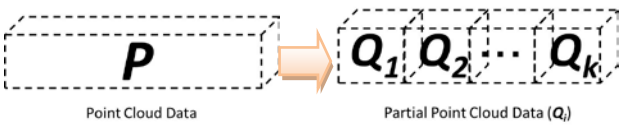


Fig.4. Partition of Point Cloud Data

The formula of the whole point cloud data is as follows:

$$\boldsymbol{P} = \{\boldsymbol{p_1}, \boldsymbol{p_2}, \ldots, \boldsymbol{p_i}\} \quad (i = 1,2,\cdots,n)$$

The formula for each point $\boldsymbol{p_i}$ is as follows:

$$\boldsymbol{p_i} = [x, \quad y, \quad z, \quad r, \quad g, \quad b]^{\mathrm{t}}{}_i \quad (i = 1,2,\cdots,n)$$

Figure 4 shows the partition of point cloud data. $\boldsymbol{Q_i}$ is a portion of point cloud data. $\boldsymbol{q_j}$ represents each point of point cloud data. The formula for the partition is as follows:

$$\boldsymbol{Q_i} = \{\boldsymbol{q_1}, \boldsymbol{q_2}, \ldots, \boldsymbol{q_j}\}$$
$$(i = 1,2,\cdots,k)$$
$$(j = 1,2,\cdots,l)$$

The formula for $\boldsymbol{q_j}$ is shown as follows:

$$\boldsymbol{q_j} = [x, \quad y, \quad z, \quad r, \quad g, \quad b]^{\mathrm{t}}{}_j \quad (i = 1,2,\cdots,l)$$

Therefore, the whole point cloud data $\boldsymbol{P}$ becomes as follows:

$$\boldsymbol{P} = \{\boldsymbol{Q_1}, \boldsymbol{Q_2}, \ldots, \boldsymbol{Q_i}\} \ (i = 1,2,\cdots,k)$$

Next, the ID of $\boldsymbol{Q_i}$ is δ_i, and the formula is as follows:

$$\delta_i = i \quad (i = 1,2,\cdots,k)$$

As a result, the formula of $\boldsymbol{Q_i}$ is shown using ID (δ_i) and each point of $\boldsymbol{q_i}$ as follows:

$$\boldsymbol{Q_i} = [\delta_i, \quad \boldsymbol{q_j}]^{\mathrm{t}}{}_{ij} \quad (i = 1,2,\cdots,k) \ (j = 1,2,\cdots,l)$$

$\boldsymbol{r_i}$ is set as the parameter of attribute information, and

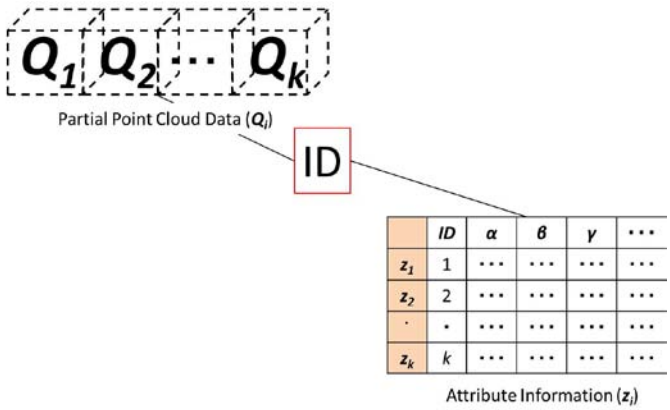


Fig.5. Attribute Assignment

the formula is as follows:

$$\boldsymbol{r_i} = [\alpha, \quad \beta, \quad \gamma, \quad \ldots]^{\mathrm{t}}{}_i \quad (i = 1,2,\cdots,k)$$

The formula for $\boldsymbol{z_i}$ which is the assigned attribute information containing ID (δ_i) and parameter of attribute information $\boldsymbol{r_i}$ is as follows:

$$\boldsymbol{z_i} = [\delta_i, \quad \boldsymbol{r_i}]^{\mathrm{t}}{}_i \quad (i = 1,2,\cdots,k)$$

The attribute information$\boldsymbol{z_i}$ is assigned to the partition of point cloud data $\boldsymbol{Q_i}$ as shown in figure 5.

The attributed point cloud data is set as $\boldsymbol{Q'}_i$. By using the partitioned point cloud data $\boldsymbol{Q_i}$ and the attribute information$\boldsymbol{zi}$, the attribute assignment equation is represented as follows:

$$\boldsymbol{Q'}_i = \begin{bmatrix} \boldsymbol{Q_1} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{Q_2} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{0} & \ddots \end{bmatrix} \begin{bmatrix} \boldsymbol{z_1} \\ \boldsymbol{z_2} \\ \vdots \end{bmatrix} \quad (i = 1,2,\cdots,k) \quad (1)$$

Thus, it is possible to assign attributes to the partition $\boldsymbol{Q_i}$ of point cloud data.

b) The usage of attribute assigned point cloud data

i. Usage as objects

It is possible to handle attribute assigned point cloud data as CAD objects. The application examples show the possibility of CAD operation (e.g. partition, movement, hidden, coloring, stretching, etc.) within point cloud data. It is possible to classify the facilities in point cloud data. By partitioning the structures and assigning different attributes from $\boldsymbol{Q_1}, \boldsymbol{Q_2}\ldots$, it is possible to handle many parts as different objects. Consequently, it is possible to apply this method in removal project because the damaged place of a structure can be set as other attributes.

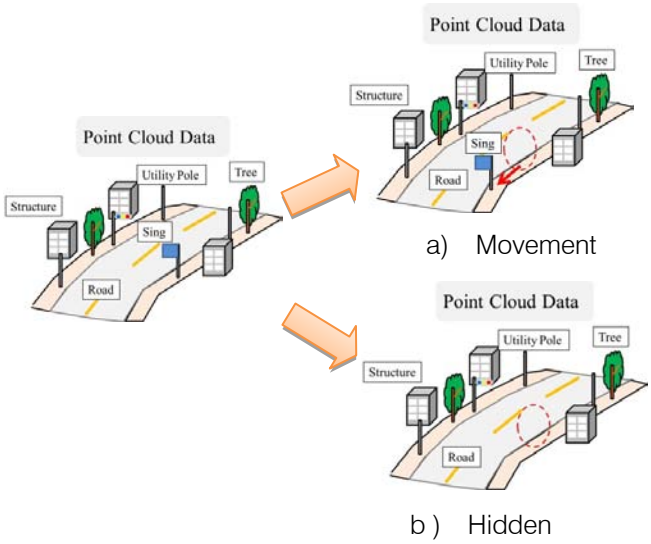


Fig.6. Usage as objects

a. Movement

By moving the partitioned part of individual locations to arbitrary locations, it is possible to check position relationship between the partitioned data and the interference. For example, it is possible to move only the sign as shown in figure 6 a).

b. Hidden and removal

It is possible to validate the changes in the current state when an object disappears because only the partitioned part is removed or hidden. As seen in figure 6 b), it is possible to confirm the situation due to the removal of the sign only.

ii. *Consideration according to time axis*

a. Changes in structure

The structure can be hidden and moved along the time axis. This makes it possible to check the behavior of a structure over the time. For instance, in the case of a removal project, it is possible to show the progress of the removal process of the structure. Also, it is possible to check a series of behaviors such as loading of a removed structure to the trailer as shown in figure 7.

b. Confirmation of surrounding environment

Point cloud data can reproduce the targeted site with high accuracy. Due to this fact, it is possible to determine the environment of the site during the consultation and examination of the model space. In construction, when a structure is removed, its immediate environment will accordingly change. For example, there will be additional locations such as the location for heavy equipment and construction location. It is possible to confirm the location of interference—street lights and utility poles—with CAD-created new structures by giving attributes to existent structures in the surrounding when checking the construction process. Particularly, it is possible to check the interference between the removal part and the trees by giving attributes to the surrounding as shown in figure 8.

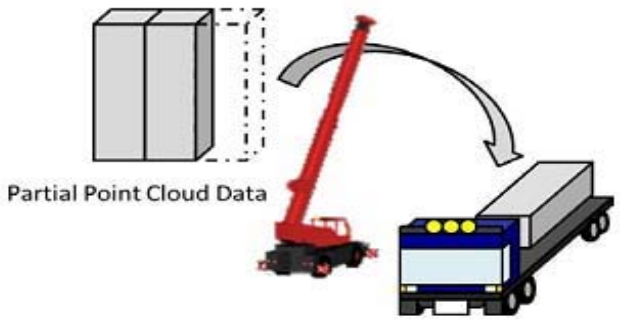


Fig.7. Continuous behavior of loading up a trailer with removal structures.

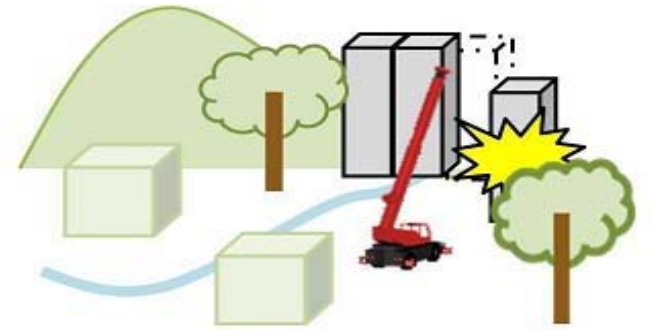


Fig.8. Confirmation of the relation between the surroundings

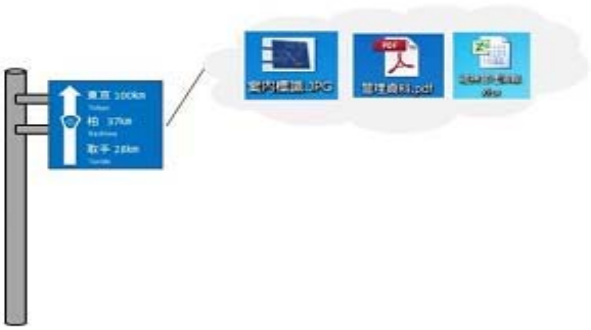


Fig.9. Data Linkage

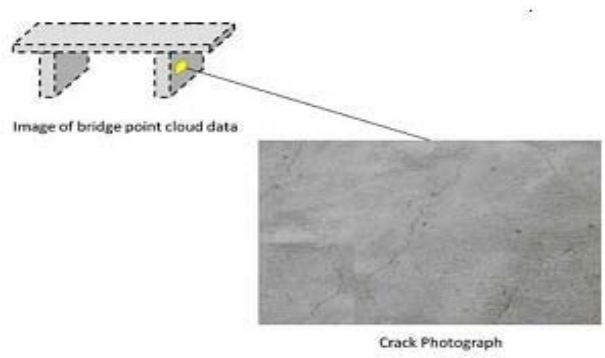


Fig.10. Three-dimensional Position Linkage

iii. Deand visualization

a. Data linkage

Photos, pdf files, and documents such as Excel can be linked to point cloud data as attribute information. For example, figure 9 shows attributed point cloud data of a sign with documents linked into it. Management information and photographs taken during patrol can possibly linked to point cloud data of a facility; likewise, document management and confirmation on point cloud data can be connected. In addition, since point cloud data is a 3D data, it is possible to link any information corresponding to the three-dimensional position. Attributes in point cloud data of the piers can be assigned while maintaining the elevation of position information. This leads to the determination of crack situation in the piers. Such possibility is shown in figure 10. Point cloud data holds the basis possibility of managing this management information.

b. Visualization of the attributed information

By adding information to point cloud data, the information on point cloud data can be visualized. Additional information such as spreadsheet, CSV, etc. is also necessary for management. After the information is entered into spreadsheets and the attributes are assigned using equation in 3.1, visualization of the information becomes possible as shown in figure 11. The information is then added to the point cloud data of

the sign and is visualized as illustrated in figure 11. Figure 12 depicts color classification based on assigned numerical information of the status of the structure. It is therefore possible to visually grasp the state of the structure solely based on point cloud data. Indeed, it is possible to create simulation from assigned attribute information. For example, by simulating the conditions of bad pavement areas and heavy traffic areas, calculation of repairing priority can be performed.

IV. Case Study

The point cloud data of a dam derived from fixed laser survey equipment is used as the case study in this paper. The number of point is approximately 50 million. In addition, it is the first dam removal project in Japan. Therefore, the authors applied the proposed method with the aim to perceive the usage of attributed point cloud data as objects, data linkage, and visualization through this case study.

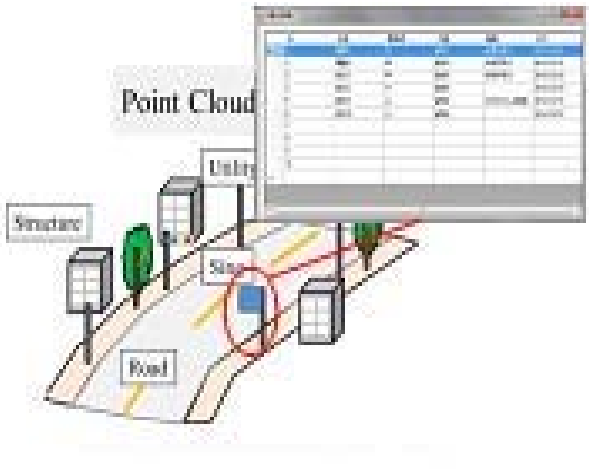


Fig.11. Visualization of Attribute Information

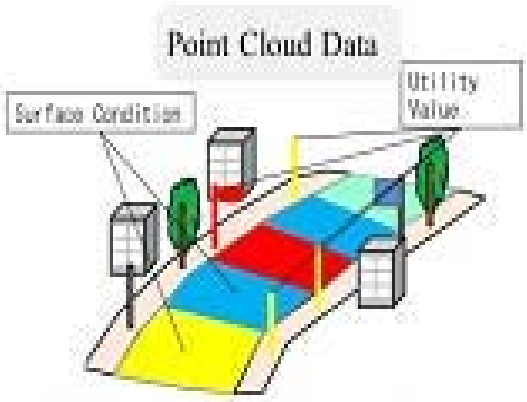


Fig.12. Colorization of Attribute Information

Fig.13. Reproduction of Current State

First of all, using numerical value base maps and point cloud data of the dam in figure 13, the authors performed the reproduction and determination of the current state and attribute assignment to the body of the dam.

a) Attribute assignment

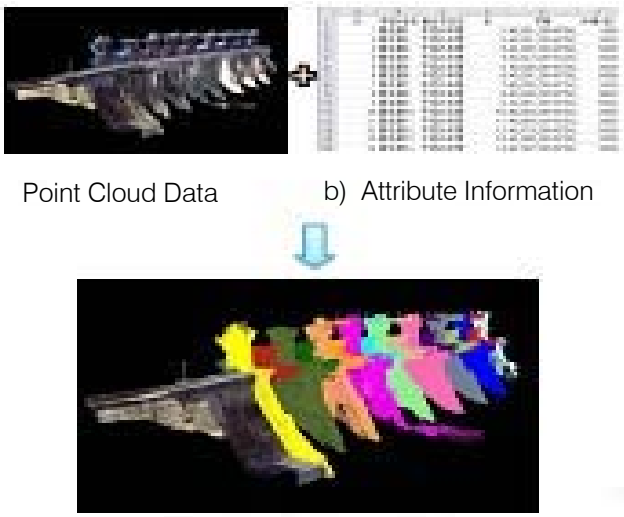
Figure 14 a) shows the partition of measured point cloud data of the dam body according to its removal parts. Figure 14 b) shows the attribute information in Excel, and by using equation (1), the attribute information is assigned to the dam body as shown in figure 14 c). Figure 14 c) illustrates the attribute assignment of the dam body according to removal plans in which each part has different attributes. For that reason, different colors are given to the parts according to the assigned attributes. The time required in editing the point cloud data in this current case study took about 2 hours, and the time required in assigning attributes to the point cloud data took about 5 minutes. By contrast, it took 2 days creating CAD objects. Therefore, it was possible to edit the point cloud data in a very short amount of time.

b) Used as objects

By using the attributed point cloud data of the removal parts in figure 14 c), it is possible to check the results of the dam removal plan as shown in figure 15. Figure 15 a) shows the planning drawing paper of the removal plan. Figure 15 b) show the confirmation of removal plan based on point cloud data. As shown in figure 15, confirmation of the removal plan on the drawing paper can be obtained in the same way as confirmation on point cloud data. It tends to be impossible to check the process from the drawing paper; however, point cloud data makes it possible to determine the changes in moving the removal parts and the confirmation of removal process from arbitrary directions.

c) Display of attribute information

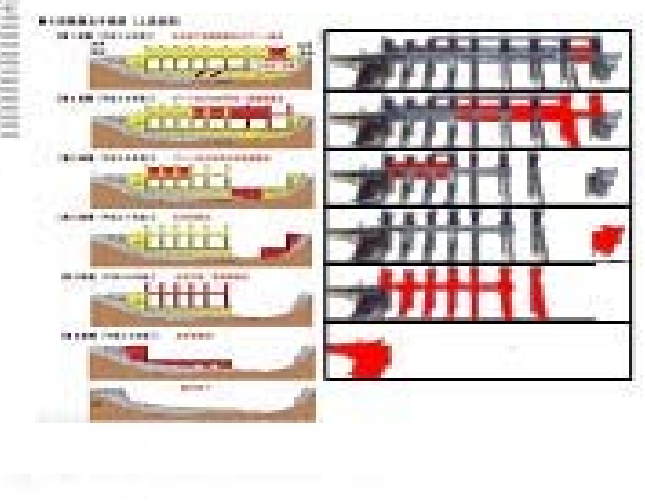
The result of visualizing the point cloud data which contains attribute information is shown in figure 16. The removal schedule and linked photo data can be confirmed on point cloud data. Giving necessary information to the point cloud data makes it possible to confirm the information while grasping the current state on point cloud data.



a) Point Cloud Data b) Attribute Information

c) Attribute Assign Data

Fig.14. Attribute Assignment



a) Planning Drawing Paper b) Point Cloud Data

Fig.15. Confirmation of Removal Schedule

d) Visualization of the attribute information

The result of changing the display date of the assigned attribute information is shown in figure 17. The parts are colored according to the removal schedule of every year and are visualized in order to visually determine the assigned attribute information. With such visualization in figure 17, it is possible to determine the sequential order and the position in removing the parts at a glance.

e) Discussion

In this case study, the authors showed the attribute assignment to the body of the dam and the usage of attributed point cloud data. The case study shows three possibilities: 1) usage of point cloud data as objects, 2) confirmation and display of assigned attribute information on point cloud data, and 3) the usage of simulating and determining changes in attribute information visually. With these three possibilities, the utilization of point cloud data has

become widely enlarged. This leads to the advancement in using point cloud data in the consultation and examination during design and construction phases. This progress thus leads to the use of point cloud data in managing structures in maintenance phase. Such advancement can be also considered as labor reserves due to the sole use of point cloud data without the need to create CAD objects. In this case study, attribute assignment is not limited to the body of dam only, but to its immediate environment such as typography, trees, and etc. Since point cloud data can reproduce the current state of the structure while containing the position information, it can lead to the usage in three-dimensional Geographic Information System (GIS) by giving attributes to the point cloud data. There is hence a possibility in using point cloud data in managing more advanced structures and features. Unsolved difficulties in assigning attributes still remain, though. In re-assigning attributes and re-edit point cloud data, re-partition and re-classification is required, resulting in labor problems.

V. Conclusion

In this paper, the authors proposed an attribute assignment method to point cloud data and described the usage of attributed point cloud data. In the case study, attributes were assigned to the removal parts of point cloud data of the dam, and the proposed usage was verified. In chapter 2, the authors described the attributes of point cloud data and the significance of attribute assignment. In chapter 3, the authors proposed a method in assigning attributes to point cloud data and described possibilities for usage of attributed point cloud data. In chapter 4, the measured point cloud data of the dam was partitioned into arbitrary shapes. Deploying the attribute assignment method proposed in chapter 3, the authors were able to assign the parts with different attributes. Finally, the authors examined the possibilities of visualization and display of information and the usage of point cloud data as objects using the attributed point cloud data.

For future prospects, the authors plan to reply to the problems mentioned in the discussion section.

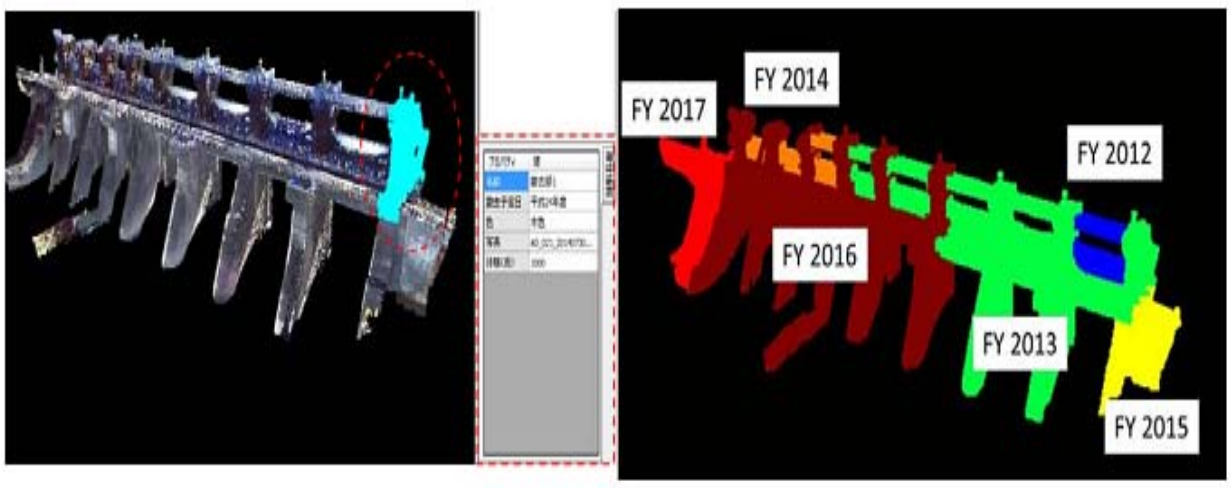


Fig.16. Information Confirmation on Point Cloud Data

Fig.17. Visualization of Information

VI. Acknowledgement

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Improving the Read Performance of the Distributed File System through Anticipated Parallel Processing

By B. Rangaswamy, Dr. N. Geethanjali & Dr. T. Ragunathan
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Abstract- In the emerging Big Data scenario, distributed File systems (DFSs) are used for storing and accessing information in a scalable manner. Many cloud computing systems use DFS as the main storage component. The Big Data applications de-ployed in cloud computing systems more frequently perform read operations and less frequently the write operations. So, improving the performance of read access has become an im-portant research issue in DFS. In the literature, many client side caching with appropriate pre fetching techniques are proposed for improving the performance read access in the DFS. A speculation-based approach which uses client side caching is also proposed in the literature for improving the performance of read access in the DFS. In this paper, we have proposed a new read algorithm for the DFS based on anticipated parallel processing. We have evaluated the per- formance of the proposed algorithm using mathematical and simulation methods and the results indicate that the pro-posed algorithm performs better than the speculation-based algorithm proposed in the literature.

Keywords: distributed system, speculation, asynch- ronous reading performance.

GJCST-B Classification : C.1.4, C.2.4

Strictly as per the compliance and regulations of:

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Abstract- In the emerging Big Data scenario, distributed File systems (DFSs) are used for storing and accessing information in a scalable manner. Many cloud computing systems use DFS as the main storage component. The Big Data applications de-ployed in cloud computing systems more frequently perform read operations and less frequently the write operations. So, improving the performance of read access has become an im-portant research issue in DFS. In the literature, many client side caching with appropriate pre fetching techniques are proposed for improving the performance read access in the DFS. A speculation-based approach which uses client side caching is also proposed in the literature for improving the performance of read access in the DFS. In this paper, we have proposed a new read algorithm for the DFS based on anticipated parallel processing. We have evaluated the per- formance of the proposed algorithm using mathematical and simulation methods and the results indicate that the pro-posed algorithm performs better than the speculation-based algorithm proposed in the literature.

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I. Introduction

Lot of data (text, images, video and audio) is getting gen-erated due to the extensive use of social media applications. This phenomena is referred as Big Data in the literature.The availability of smart phones which support many at-tractive applications facilitate the users to upload the mul-timedia data into the web in a exible manner. The main problem here is the availability of scalable storage solutions which provide required storage capacity and efficient read and write facilities. Distributed File systems (DFSs) have been emerged as the scalable storage facility for storing Big Data and for accessing them in an efficient manner. Many cloud computing systems use DFS as the main storage component.

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The Big Data applications deployed in the cloud computing environment more frequently perform read operations and less frequently carry out write operations. Hence, improving the performance of the read operations in a Big Data environment has become one of the important research is-sues. So, for the DFS which is used for storing and accessing Big Data, it is important that it carries out the read access in a faster manner so that Big Data application execution time can be reduced.

The DFS uses disk as the main storage device and data transfer rate of disk is very less in comparison with that of the dynamic or static random access memories used in the computer systems. To reduce the input/output (I/O) access time, many client side caching techniques have been proposed in the literature. These techniques allow the client node to download the requested Files from the server and store the same in the client side cache so that further read re-quests issued by the applications running in the client nodes will be satis read by reading the content from the local cache (client side cache). To avoid stale data problems in the client side caching techniques one of the following methods will be used: (i) Cache synchronization or cache invalidation pro-tocol (ii) Checking up with the server whether the data in the client side cache is valid or stale. If the data available in the cache is stale then the data has to be fetched from the server's disk.

In the literature, a speculation-based technique has been proposed for improving the performance of read access in the DFS [6]. In this technique, the client application reads the data from the local cache and proceed with its execution (speculative execution). Simultaneously, the server systemis also contacted to check whether the data in the local cache is stale or valid by comparing the time stamp values of the cached copy and the copy available in the sever's disk. If the data in the local cache is found to be valid, then the speculative execution is allowed to continue. If the data in the local cache is found to be stale, then the data is read from the server's disk and the speculative execution will be rolled back.

In this paper, we propose anticipated parallel processing-based algorithm which carries out executions by considering the local cache of the node (LN) where the client application program is getting

executed and also the local cache of the node (NN) which is placed near to LN (where the same data is available). Based on the time stamp value available in the server for the data, the cache content of LN or NN will be considered. If the data available in LN and NN are stalethen the data will be read from the server's disk. We have evaluated the performance the proposed algorithm through mathematical analysis and simulation experiments. The re-sults indicate that our proposed algorithm performs better than the earlier speculation-based algorithm proposed in the literature.

This paper is organized as follows. In the next section, we describe the techniques discussed in the literature for im-proving the performance of the DFS. In section 3, we discuss our proposed approach in detail. In section 4, we have done the detailed performance evaluation of the algorithms using mathematical analysis and simulation modeling. Section 5 concludes the paper.

II. Relatedwork

In this section, we discuss First we describe the techniques discussed in the literature for improving the performance of the DFS.

Many client-side caching techniques have been used to im-prove the performance of distributed File systems. A cooper-ative caching technique is discussed in the paper [2]. In this type of technique, the server maintains a directory which stores the details of File blocks stored in each and every local caches available in client nodes. Whenever a client applica-tion program issues read request for a block, First the local cache is verified and then the cache directory maintained in the server is verified to see whether the requested File block is available or not. If the File block is not available in the local cache and in any of the caches maintained in the client nodes then it will be read from server's disk where the DFS is deployed. This technique is suffering from the problem known as single point of failure.

In order to eliminate the single point of failure, researchers have come out with a technique known as "Decentralized Caching Technique" which was proposed in [8]. The authors proposed a hint based approach in which the cache directory of the local cache maintains hints regarding in which local cache of the client nodes the File block probably be found. This technique proposed the meta data in the form of hints to be distributed to client nodes and hence the single point of failure can be eliminated.

A new type of caching technique called collective caching was discussed in [4]. If the subtasks of a client application runs in multiple client nodes then the caches available in these client nodes may be logically combined to act as a single cache so that all the subtasks can read the File blocks from this uni_ed cache provided these blocks are available there.

In [7] an aggressive proactive technique was proposed for the effective pre fetching of _le blocks based on hints. In [3], locality aware cooperative caching was proposed.

The Hadoop DFS (HDFS) [9] is a open-source project and it is a cluster-based File system. The HDFS is an attractive File system and provides scalable storage solutions for Big Data applications.

In [6], a speculation-based method was proposed to improve the performance of the DFS. This technique uses only the local cache for the speculative execution purpose.

III. Proposed Algorithm based on Anticipated Parallel Processing

In this section we discuss regarding anticipated parallel ex- ecution, disadvantages of speculation-based algorithm and then the proposed algorithm.

a) *Anticipated Parallel Execution*

The main idea behind anticipated parallel execution is to do some task before it is known whether that task will be required at all. Later we come to know that whether the task is required or not by checking various conditions. If the task is required then the effect of the task execution is used and the results produced by the task are considered. If the task is not required then the effect of the task execution is undone and the results produced by the task are not utilized. This type of task execution will reduce the waiting time for mmany cases and hence the performance can be improved.

Anticipated parallel execution technique is followed in mod-ern pipelined processors particularly for the efficient han-dling of conditional branch instructions. In this type of pro-cessors, the conditional branch instructions are allowed to go through the various stages of the pipeline. Here the assumption is that the condition may not satisfied and hence the branch will not take place. Whether the condition is satisfied or not for an instruction is known at the execution stage of the pipeline. If the condition is not satisfied, the instruction executions continue in the pipeline. If the con-dition is satisfied then the pipeline is drained and then the instruction will be fetched from the target address (branch address) [1]. Anticipated parallel executions are used in op-timization phase of the compilation process [5].

b) *Disadvantages of Speculation-based algorithm*

In the literature a speculation-based method has been pro-posed for improving the performance of read operations [6]. In this paper, the authors assumed that caches are main-tained in the client systems and the server will be contacted to check whether the content in the local (client side cache) is stale or valid by checking the time stamp of the cached copy and the copy available in the server's disk. Whenevera client

application program requests for a File and if the File is available in the local cache then one speculative execution will be started which reads the content from the local cache and proceed its execution. Meanwhile the server system is contacted to know whether the cached copy of theFile is stale or valid. If the cached copy of the File is valid then the speculative execution will be allowed to continue. If the cached copy of the File is stale then the speculative execution will be rolled back and then the file content is read from the server's disk and then the execution will continue. In this algorithm, the client program checks only the local cache and if the content is not available there the it accesses the content from the server's disk. Note that, the same content may be available in other client nodes connected in the DFS environment. This speculation-based algorithm does consider the availability of data in other client nodes. So, there is a scope of proposing an improved read algorithm by considering the local caches present in other systems.

c) *Proposed Algorithm*

In this subsection, we discuss _rst regarding the assumptions of the caching system maintained in the DFS. Next, we describe the three parts of the proposed algorithm and then the proposed algorithm.

i. *Assumptions*

We have considered a cluster-based DFS to propose our algorithm. In the DFS, we have assumed that one name node (name sever system) and two or more data nodes are present. The purpose of the name node is to store the meta data (global directory - File attributes and other details). The data nodes are used for storing the files and executing user (client) application programs. The name node and data nodes are connected through local area network. All the data nodes are maintaining their own local caches and cache operations are managed by a cache manager module deployed in the data nodes. The cache managers maintain cache directory (CD) in which the information regarding which Files are stored in the local cache is available. In the CD of a data node, the address of the nearest data node is also stored. Here, we have considered only the File level caching (entire File will be downloaded from the server's disk and stored in the cache). We have assumed that caching is done only during read access and write operations will not initiate any cache operation. We have also assumed that the no cache synchronization or invalidation protocol is followed in order to avoid communication delay. Each client program whenever it reads the content form the cache, it has to verify with the name node whether the content read from the cache is valid or stale. We have also assumed that three copies of the same _le is kept in three different data nodes in order to support the reliability feature.

ii. *Three parts of the algorithm*

Our algorithm consists of three parts. The first part describes the steps to be followed for the main thread of execution of the *read* procedure of the DFS. The second part describes the steps to be followed by the anticipated execution (AE1) and the third part describes the steps to be followed by the anticipated execution (AE2).

/* A client program (C) running in a data node (D1) has issued *read* procedure to read the contents of the _le F2 */

I) Algorithm for main thread of execution

if AE1 and AE2 are not created or AE1 and AE2 are terminated *then*

D1 contacts name node to get addresses of data nodes where F2 is stored.
C contacts the nearest data node to read F2.
F2 is transferred to C and cached at local cache.
end if

(II) Algorithm for anticipated execution (AE1)

if F2 is available in the local cache *then*
Anticipated parallel execution AE1 is created
C reads F2
Read Time stamp value of F2 into T1.
Wait for name node to send time stamp value of F2 recorded
in its directory (T2)
if T1 >= T2 *then*
AE1 will continue its execution
else
AE1 will be terminated
end if
end if

(III) Algorithm for anticipated execution (AE2)

C veri_es the CD of D1 to get the address of the nearest data node (D2) where F2 is available.
if F2 is available in D2 *then*
Anticipated parallel Execution (AE2) starts.
Read time stamp value of F2 from D2 into T3.
Wait for name node to send time stamp value of F2 recorded
in its directory (T2)
if T3 >= T2 *then*
AE2 will continue its execution
else
AE2 will be terminated
end if
end if

(Note that request message is sent to name node to send the time stamp value of F2 and then both the algorithm steps II and III are executed in parallel.)

IV. Evaluation of Performance

We have analyzed the performance of the algorithms through mathematical and simulation modeling. In this section, we discuss first regarding the assumptions. Next, we discuss regarding performance evaluation through mathematical model. Finally, we discuss regarding the results of the simulation experiments.

a) Assumptions

We have made the following assumptions by considering various factors related to main memory, disk and local area network. (i) Block size is 4 KB. (ii) All data and name nodes are connected in a network. (iii) Average communication delay is 4 ms. (iv) Transferring meta data from name node to requested data node is 0.125 ms (v) Average block access time for disk is 12 ms (vi) Average block access time formain memory is 0.005 ms (vii) Local cache hit ratio is *lc* and remote cache hit ratio is *nc*.

b) Mathematical Model

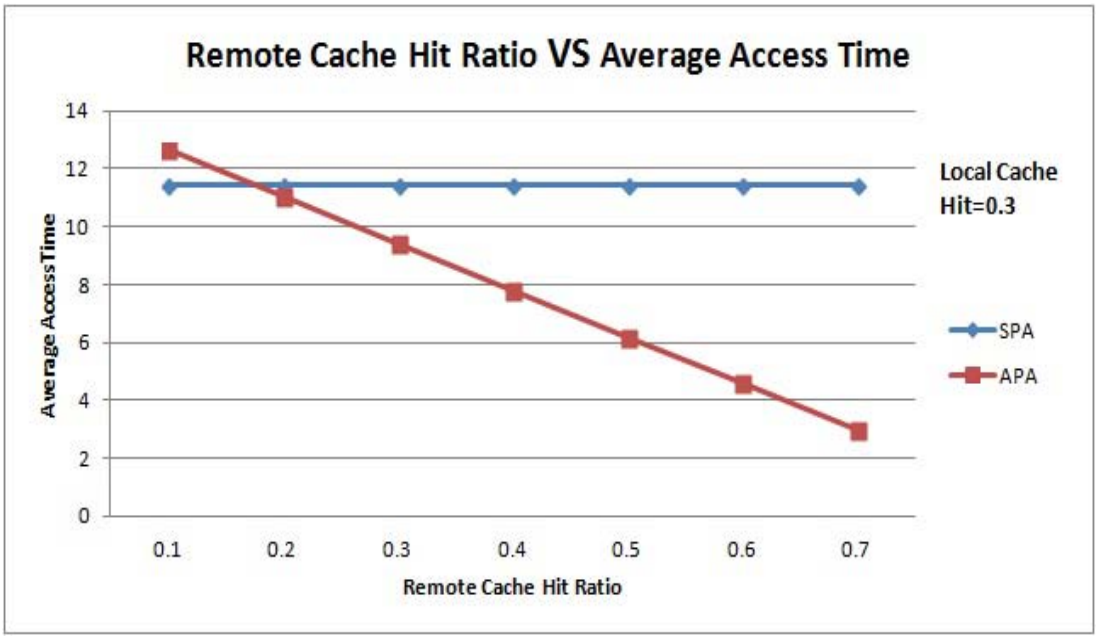
Based on the assumptions discussed in the above subsection we calculate the average access time for the speculation and anticipated parallel processing-based algorithms. We call average block read access time as ABRAT. We have calculated the time required to access a file block from the remote data node as 4.01 ms.

Average Block Read Access Time (with speculation) = *lc* * (Main memory access time + Time stamp collection time) + (1- *lc*) * (Main memory access time + Time stamp collection time + Block access time for Disk + Block transfer communication time + Main memory access time). If we apply the above equation, ABRAT for speculation-based approach is calculated as (16.26 - 16.13 *lc*)ms. (Formula 1)

Note that, we have not considered overhead involved in starting the the speculative execution.

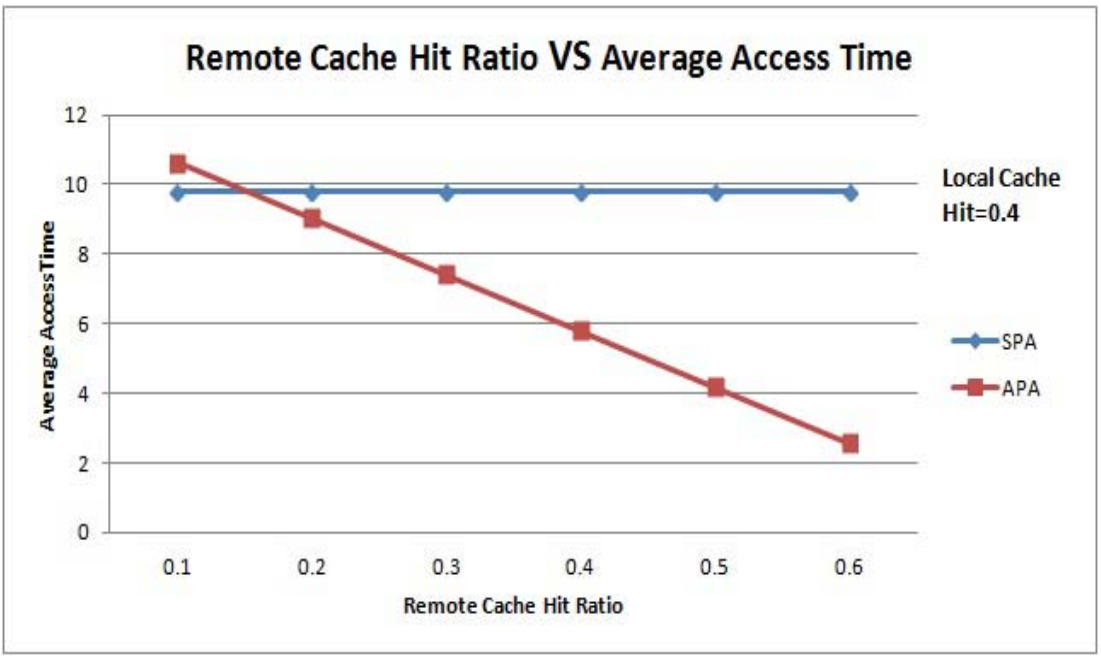
Average Block Read Access Time (with anticipated parallel processing) = *lc** (Main memory access time + Time stamp collection time) + *nc* * (Main memory access time + Time stamp collection time + Block transfer communication time + Remote Main memory access time) + (1- *lc* - *nc*) * (Time stamp collection time + Main memory access time + Remote Main memory access time + Meta Data Collection Time + Block access time for Disk + Block transfer communication time + Main memory access time). The ABRAT for anticipated parallel processing-based approach is computed as (20.26 - 20.01*c* - 16.13*c1*)ms (Formula 2).

Figure 1: Remote Cache Hit Ratio Vs Average Read Access Time
(Local cache hit ratio value is 0.3)



We have varied the local cache hit ratio (*lc*) and remote cache hit ratio (*nc*) and calculated ABRAT values both for speculation- and anticipated parallel processing-based approaches by applying the formulas 1 and 2.

Figure 2 : Remote Cache Hit Ratio Vs Average Read Access Time
(Local cache hit ratio value is 0.4)



We have Fixed the *lc* value as 0.3 and measured the values which is depicted in Fig. 1. For the *nc* values 0.2 and above, the proposed anticipated-parallel processing based algorithm (APA) performs better than the speculation-based algorithm (SPA). In Fig. 2. we have _xed *lc* value as 0.4 and varied the *nc* values from 01. to 0.6. We can observe the similar trend in both the Figures (Fig. 1 and Fig. 2). We have Fixed *lc* value as 0.5 and varied *nc* values from 0.1 to 0.5 and observed the performance of the algorithms. For the nc values 0.11 and above the proposed anticipated parallel processing-based algorithm performs better than the speculation-based algorithm which is depicted in Fig. 3. We can observe similar trends in Fig. 4 and Fig. 5.

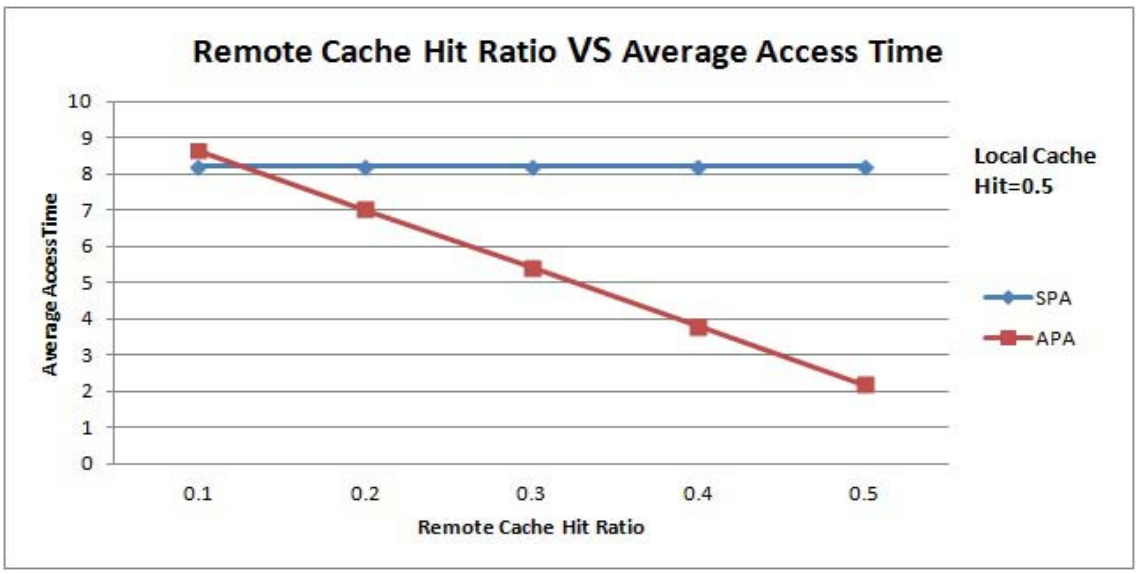
c) Simulation Experiments

We simulated both speculation- and anticipated parallel processing based algorithms. We conducted the simulation experiments by Fixing the number of Files present in the data node and by varying the number of cache blocks of local and remote caches and number of blocks in the File.

The performance of the proposed algorithm (APA) and the speculation-based algorithm proposed in the literature (SP) are shown in Figures 6 to 10. We have Fixed the number of Files present in the DFS as 50 and capacity of LC and NC as 100 blocks and have varied number of blocks present in the Files from 25 to 100 and conducted simulation experiments. The performance is shown in Fig. 6. We observe that APA requires less access time than SP for all cases. Next, we have Fixed the number of Files as 50 and capacity of LC and NC as 200 blocks and varied number of blocks present in the Files from 25 to 100. The observed performance is shown in Fig. 6. We observe that APA performs better than SP. Similar trends can be observed in Fig. 8, Fig. 9 and Fig. 10.

Both the results of evaluation through mathematical and simulation techniques indicate that the proposed anticipated

Figure 3 : Remote Cache Hit Ratio Vs Average Read Access Time
(Local cache hit ratio value is 0.5)



parallel processing based approach performs better than the speculation-based technique proposed in the literature.

V. Conclusion

In this paper, we have proposed an anticipated parallel processing based read algorithm for improving the performance of the DFS. We have also carried out performance analysis for the speculation-based read and proposed algorithms using mathematical analysis and by conducting simulation experiments. The results of our analysis indicate that our proposed algorithm requires less read access time than the speculation based read algorithm proposed in the literature.

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Figure 4: Remote Cache Hit Ratio Vs Average Read Access Time
(Local cache hit ratio value is 0.6)

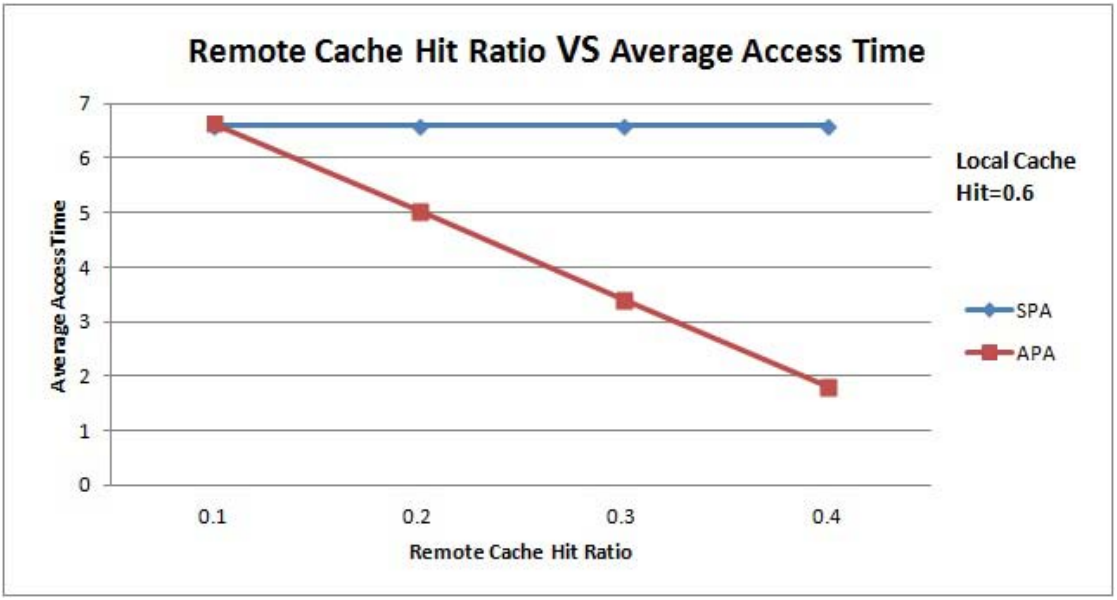

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Figure 5 : Remote Cache Hit Ratio Vs Average Read Access Time
(Local cache hit ratio value is 0.7)

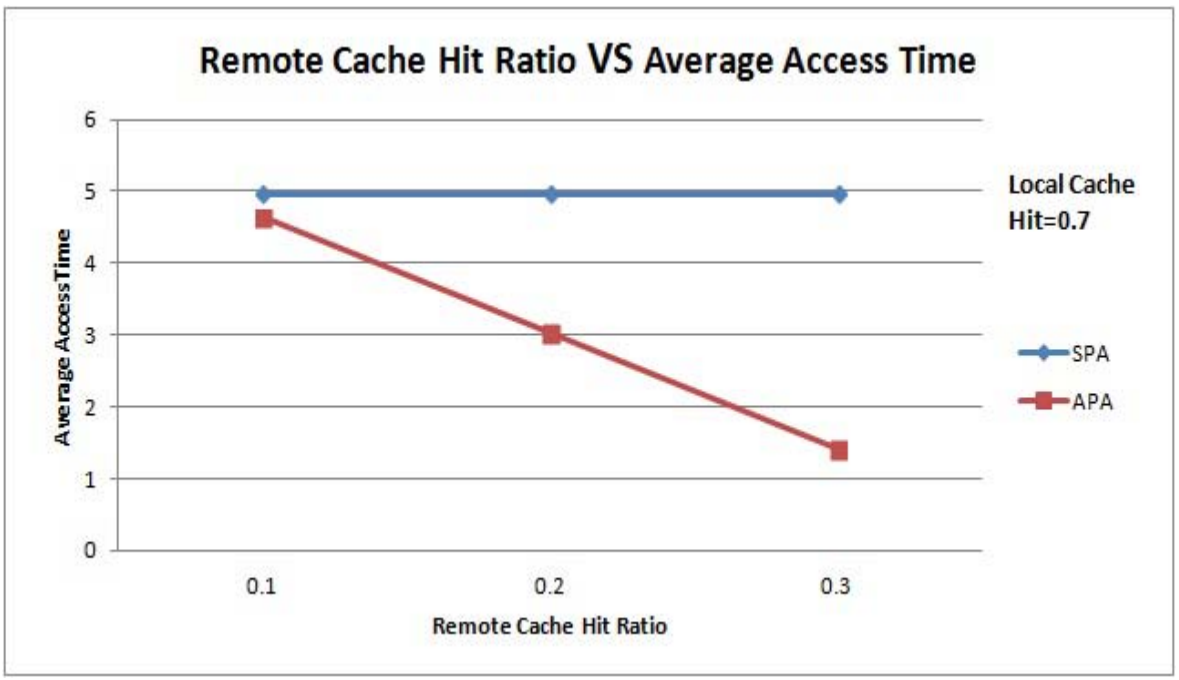


Figure 6 : Number of blocks Vs Average Read Access Time (LC & NC _ 100 blocks)

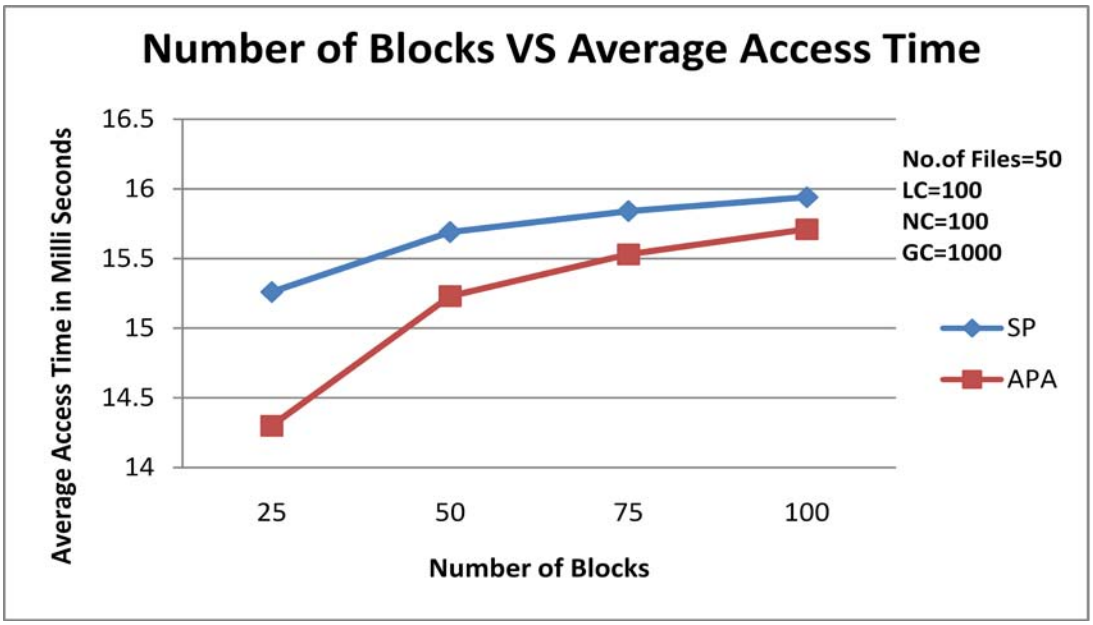


Figure 7: Number of blocks Vs Average Read Access Time (LC & NC _ 200 blocks)

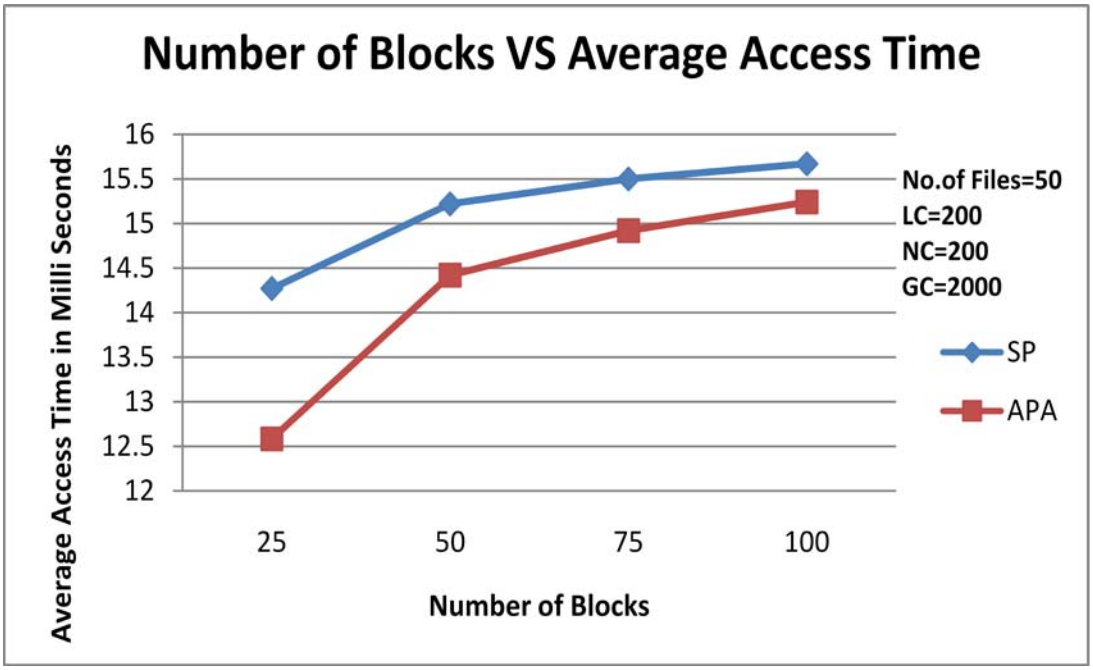


Figure 8 : Number of blocks Vs Average Read Access Time (LC & NC – 300 blocks)

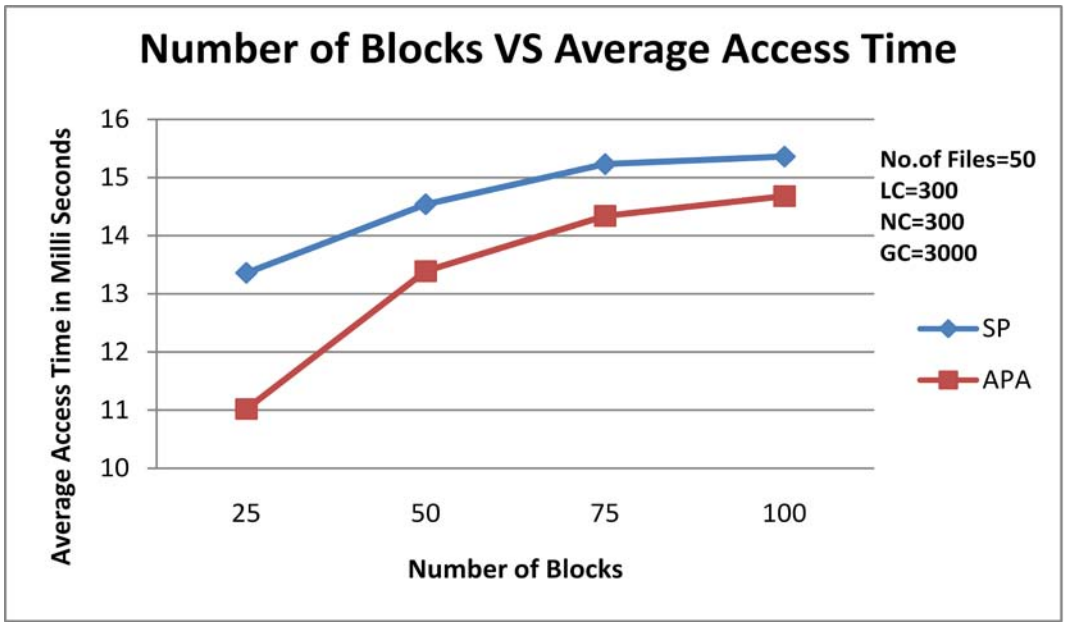


Figure 9: Number of blocks Vs Average Read Access Time (LC & NC – 400 blocks)

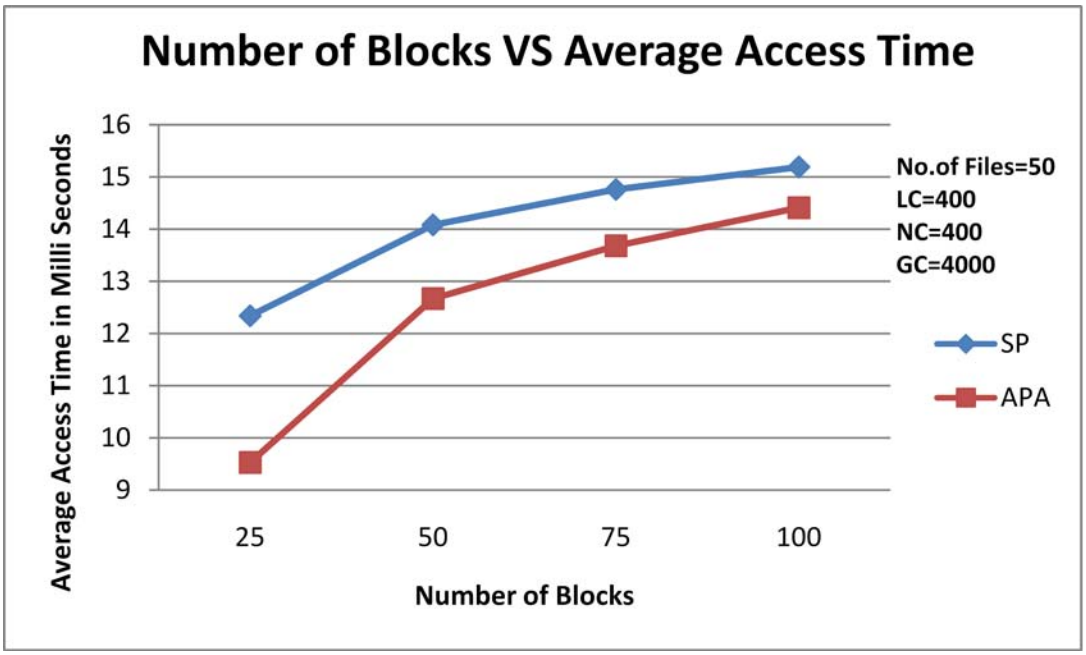
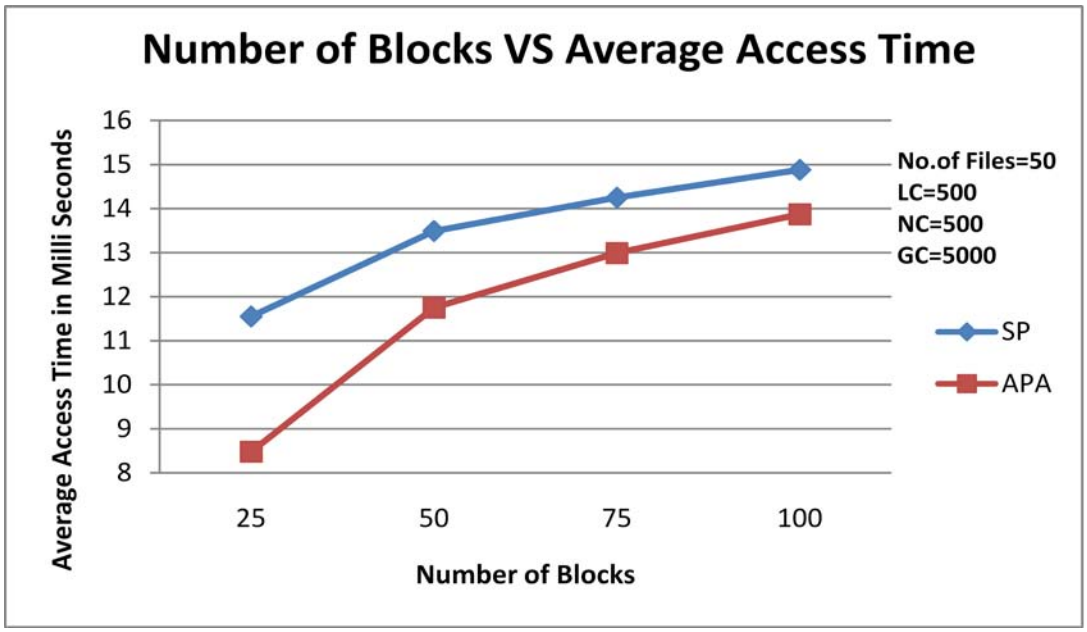


Figure 10: Number of blocks Vs Average Read Access Time (LC & NC – 500 blocks)



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Modern Methods in the Development of Education using Cloud Computing Applications

By Dr. Yasser Elmalik Ahmed Seleman
The National Ribat University, Sudan

Abstract- The world is a big scientific and technological revolution, have had an impact on all aspects of life, he became Education demanding to search for new methods of teaching and models to meet the many challenges at the global level, including the increased demand for education with a reduction in the number of educational institutions, and increase the quantum informational in all branches of knowledge , appeared E-Learning to help the learner to learn at the place where he wants while preferences without the obligation to come to the classroom at specific times, Became the methodology and ways of educational and search for information and easily obtained and the acquisition of new knowledge through cloud computing applications.

Keywords: cloud computing: sophisticated technology is based on the processing and transfer of computer storage space for the so-called cloud (cloud), a server device to be accessed via the internet, to turn information technology products from software to services.

GJCST-B Classification : C.1.4, C.2.4

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I. Introduction

Facing the use of cloud computing in education a lot of challenges which returns the relative newness of the cloud services market and defaults on the market for cloud services. For education, the decisions will be affected by the adoption of cloud computing technology and the nature of cost considerations.

Information is the important part for education, and to make decisions about how to manage this information can be linked to many of the political and social considerations, and economic.

Adoption of cloud computing faces many risks and challenges in the process of deciding when to use and similar in the case of the use of more traditional outsourcing. Increase the possibility that the service provider or the source of this service abroad does not follow the regional and state laws; it can make some of these concerns more acute.

Cloud computing offers educational institutions of various resources and opportunities for the development of modern applications, easy to use and effective for students, and there are many concerns about security and privacy in the cloud, but most of these concerns are related to being a new technology is still evolving, and therefore can be considered as temporary problems. In the future will be cloud computing a major impact on the educational environment, as they can provide the infrastructure and resources necessary for learners to perform any number of tasks on the cloud while minimizing cost and offering them easy access huge amount of information that is available on the internet.

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a) Will explain and clarify cloud computing and various ways to the process of storage and access to information.

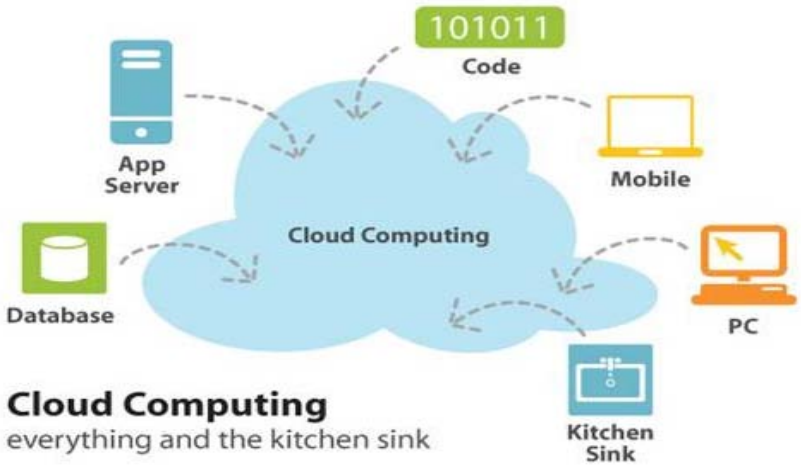

Figure 1 : Action cloud computing method.

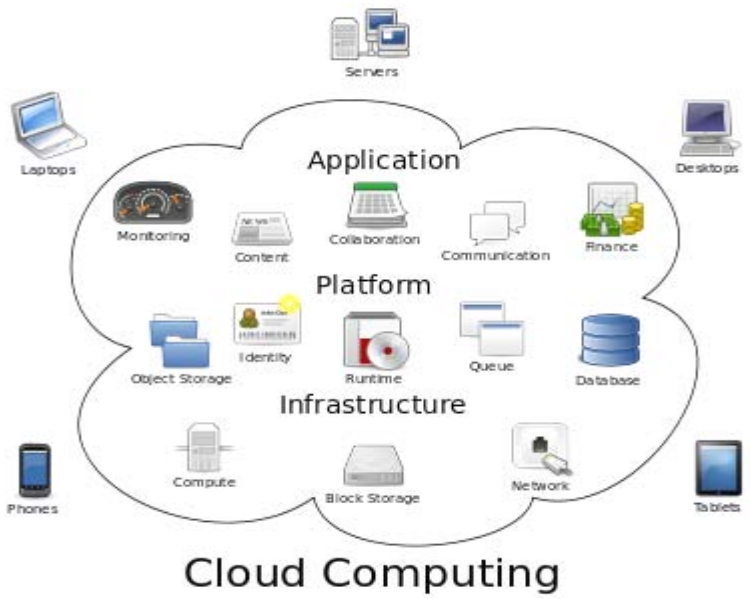

Figure 2 : Cloud computing needs

b) We find that cloud computing offers many of the benefits discussed in the paper

Cloud computing provides users with the possibility of the use of resources beyond the capacity of their own devices, such as Internet applications and storage spaces; at lower prices than if they had bought these resources. It gives anyone who has access to the Internet the opportunity to use resources whenever they need it without having to install new programs or buy new equipment. That is why cloud computing has emerged as a new and easy to use economic environment for all types of users whether it's in business or education, or even personal uses.

Cloud computing is a model offers easy access via the Internet to a common set of resources (networks, servers, storage, applications, and services) that can be processed to work quickly and a little effort.

II. Objectives of the Scientific Paper

Institutions of higher education take advantage of cloud computing and the adoption of the latest technologies and solutions is essential to increase competitiveness and retain students.

Cloud computing helps to reduce the expenses that go to buy hardware, software or maintenance.

The cloud computing provides universities virtual data centers accessible to everyone from professors, staff and students, at any time or any place they are in

a) *Help cloud computing help educational institutions to*

- Accommodate the rapid increase in the use of the mobile device dependencies.
- Storing extended amounts of sensitive data and information which can be accessed easily.
- Stay with the developments (for example, providing a digital repository for students within the university to store and chapter notes and projects Notes.
- Access to the latest software updates and applications

b) *There are several important steps to rely on cloud computing, whether public or private, and identify all potential opportunities and advantages to switch from the existing arrangements to cloud services, it requires*

i. Ensure that the existing infrastructure of the institution complements existing services on the cloud. The transition to cloud services is not all or nothing, and some cloud services have the ability to support existing technology and increase its effectiveness both in terms of its ability to add accounts and capacity default storage and compatibility with the infrastructure of the institution will be a crucial step to go to cloud services and adoption.
ii. Put the cost / benefit and risk assessment framework to support decisions related to where, when, and how you can adopt cloud services
iii. Preparation way to improve the current information technology environment at the adoption of public and private cloud services map.
iv. Identify the data that cannot be made available in public cloud computing environments legal or security reasons.
v. Identify and secure the competencies that will be required for the adoption of cloud services and departments effectively
vi. To evaluate the technical challenges that must be addressed when the transfer of any stream or my application to the cloud environment, even if a private cloud

c) *The paper discusses the most important set of recommendations*

- To provide teacher and student tools of creativity and innovation, participation, and by providing methods of simulation, interaction and flexibility to deal with the sources of the information provided by cloud computing

- Help students access to programs and the acquisition of knowledge should use cloud computing and reduce cost

- Must be exposed to a range of topics in cloud computing delusional focus on privacy and Censorship

- Focus on the security of cloud computing to work out in all fields, especially educational fields

- Educational interest in the adoption of cloud computing and should be the basis for the efforts of information technology in the future, and must be addressed and the integration of this factor in the information technology strategy.

Cloud Computing System, like other technologies contain the pros and cons, but in the field of education from the perspective of a researcher that it will be one of the essentials of e-learning and private mobile education, education, widespread, and must be comprehensive coverage of the service and fast Internet access to benefit the student and the teacher of the applications that will call it from now on Services cloud computing.

Modern development in industry, medicine and all fields depends on the evolution of technology in the fields of communications, networking and e-learning must.

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Fuel your Growth with Integration: Hybrid Cloud Computing

By Neha Tyagi & Dr. Ajay Rana
Amity University, India

Abstract- Current IT services were built to serve a static and functionally concrete operating replica. In future prospects IT needs to become much more dynamically adaptable to maintain pace with the speed of business today. However, when cloud is considered in the context of a hybrid model of combining both the on-premise with Internet-services, then the value of the cloud in its broadest definition becomes incredibly empowering.[1][2] Hybrid solutions combine the benefits of public cloud infrastructure (speed and agility of development) with private cloud resources (security and control). In, this paper we have given the power of Hybrid Cloud Computing.

Keywords: *cloud computing, hybrid cloud, internet services.*

GJCST-B Classification : *C.1.3, C.2.4*

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Fuel your Growth with Integration: Hybrid Cloud Computing

Neha Tyagi [α] & Dr. Ajay Rana [σ]

Abstract- Current IT services were built to serve a static and functionally concrete operating replica. In future prospects IT needs to become much more dynamically adaptable to maintain pace with the speed of business today. However, when cloud is considered in the context of a hybrid model of combining both the on-premise with Internet-services, then the value of the cloud in its broadest definition becomes incredibly empowering.[1][2] Hybrid solutions combine the benefits of public cloud infrastructure (speed and agility of development) with private cloud resources (security and control). In, this paper we have given the power of Hybrid Cloud Computing.

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I. Introduction

Love it or hate it, the cloud has clearly become a well-established but slightly misunderstood term in computing today, which promises to remain for some time to come. For some it is all about internet-based resources, whether they are infrastructure or full-blown business applications.[2] Others have extended cloud to take their on-premises environment into account, reflecting the maturing world of virtualization. Hybrid cloud often evolve from IT's Success delivering private cloud services. As the broader organization recognizes the advantages of cloud computing gets on board, greater demand is put on existing services. At this point IT has decision to make invest in more Infrastructure technology or consider moving select workloads to public cloud environments. A hybrid cloud balances an organization's need to invest in onpremises cloud technology with utilization of off premises public cloud services .Because this balance is different for each organization . Hybrid clouds are not one size to fit all organizations. [1][2]

II. Benefits of Integration

- *Higher Productivity:* By eliminating repetitive tasks such as entering the same data into multiple systems, you will increase employee productivity, eliminate inconsistency, data conflicts, redundancy, and duplicate data entry. By enabling real-time integration of customer/vendor data, you will be able to make better business decisions.[1]
- *Business innovation:* is frequently originated from combining cloud services. Therefore, integration is an important condition to fully unlock the potential of the cloud. Inavante designs and implements on-solutions to synchronize cloud based (SaaS) and premises systems (including finance, billing and CRM) to enhance your business processes.
- *Strategic Planning:* By enabling real-time integration of customer/vendor data, you will be able to make better business decisions and modify your sales and marketing initiatives in days or weeks instead of months, as they would have with a legacy solution.
- *Sophisticated analytics and forecasting:* By syncing customer/vendor data from your billing system, you will be able to leverage the robust reporting tools in Salesforce CRM for a more comprehensive view of customers/vendors
- *Improved Data Quality:* Our extensive data validation ensures that only accurate data enters your production systems. Bad data is automatically routed back to the vendor for reconciliation.
- *Connected Apps* can work together with all other apps, including ERP applications (SAP, Seibel), social platforms (Twitter, Facebook), SaaS (Salesforce.com, NetSuite, PayPal), and make the business run better.
- *Lower Maintenance Costs:* Future integration changes will be easily and quickly handled. The integration processes are visually self-documented in a centralized tool, completely visible to developers and business users.
- *Centralized Integration Management:* Integration processes are easily monitored and managed in a centralized environment. Built-in auditing and alerting capabilities enable quick diagnosis and correction of integration problems.
- *Governance:* By utilizing our centralized management and data auditing capabilities, You can develop an integration governance model to meet future compliance reporting requirements.
- *Scalability:* You will be able to scale up cost efficiently to meet the needs of your growing customer base.
- *Pay-per-use:* SaaS & Cloud Hosting plans are flexible and scale as your business grows. You will only pay for data storage and computing power that you actually use which will prevent you from being charged for underutilized excess capacity.

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III. Integration Solutions

- *Integration Platforms:* WSO2, Apache Stratos, Dell Boomi, Oracle SOA Suite 11g, Apigee
- *Integration Tools:* ESB, process servers, registry, rules, CEP, identity, BAM, caching, database servers, message brokers
- *Hybrid Cloud Integration Scenarios:* data integration, application integration, process integration and Web APIs
- *API Management:* developer enablement, service mediation, API lifecycle management, reporting, analytics, and API monetization
- *Mobile Back End :* implementation of highly scalable back end for mobile apps and web applications, control & manage API consumption
- *Integration with external systems:* ERP applications (SAP, Seibel), social platforms (Twitter, Facebook), or SaaS (Salesforce.com , NetSuite, PayPal) [1]

IV. Conclusion

In this paper we are only going to aware about the Introduction of Hybrid Cloud computing, that's benefits and hybrid solution.

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- Left Margin: 0.65
- Right Margin: 0.65
- Top Margin: 0.75
- Bottom Margin: 0.75
- Font type of all text should be Swis 721 Lt BT.
- Paper Title should be of Font Size 24 with one Column section.
- Author Name in Font Size of 11 with one column as of Title.
- Abstract Font size of 9 Bold, "Abstract" word in Italic Bold.
- Main Text: Font size 10 with justified two columns section
- Two Column with Equal Column with of 3.38 and Gaping of .2
- First Character must be three lines Drop capped.
- Paragraph before Spacing of 1 pt and After of 0 pt.
- Line Spacing of 1 pt
- Large Images must be in One Column
- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
- Numbering of Second Main Headings (Heading 2) must be in Alphabets, Italic, and Font Size of 10.

You can use your own standard format also.
Author Guidelines:

1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

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2. ETHICAL GUIDELINES

Authors should follow the ethical guidelines as mentioned below for publication of research paper and research activities.

Papers are accepted on strict understanding that the material in whole or in part has not been, nor is being, considered for publication elsewhere. If the paper once accepted by Global Journals Inc. (US) and Editorial Board, will become the copyright of the Global Journals Inc. (US).

Authorship: The authors and coauthors should have active contribution to conception design, analysis and interpretation of findings. They should critically review the contents and drafting of the paper. All should approve the final version of the paper before submission

The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

1) Substantial contributions to conception and acquisition of data, analysis and interpretation of the findings.

2) Drafting the paper and revising it critically regarding important academic content.

3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

Acknowledgements: Contributors to the research other than authors credited should be mentioned under acknowledgement. The specifications of the source of funding for the research if appropriate can be included. Suppliers of resources may be mentioned along with address.

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3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be uploaded via this online submission page. The online submission is most efficient method for submission of papers, as it enables rapid distribution of manuscripts and consequently speeds up the review procedure. It also enables authors to know the status of their own manuscripts by emailing us. Complete instructions for submitting a paper is available below.

Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.

To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications.

Research letters: The letters are small and concise comments on previously published matters.

5. STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and to make suggestions to improve briefness.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

Title: The title page must carry an instructive title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) wherever the work was carried out. The full postal address in addition with the e-mail address of related author must be given. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining and indexing.

Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

Tables, Figures and Figure Legends

Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

Preparation of Electronic Figures for Publication

Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.

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Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.

6. AFTER ACCEPTANCE

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Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

www.adobe.com/products/acrobat/readstep2.html. This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

Proofs must be returned to the dean at dean@globaljournals.org within three days of receipt.

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Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

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Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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