Roll of Cloud Computing In Agriculture

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1) Abstract -

Cloud computing technology in agricultural area has greater scope in the overall development of India. An effectiveimplementation of cloud computing is encouraging in agricultural sector. Cloud Computing is emerging today as a commercial infrastructurethat eliminates the need for maintaining expensive computing hardware, software, Information technology, staff, infrastructure, recourses and its maintenance. Cloud computing is a network-based environment that focuses on sharing computations, Paper explain about cloud computing networks access

to a shared pool of configurable networks, servers, storage, service, applications and other important Computing resources. Cloudcomputing technology very helpful for all-agricultural related data bank (Soil-related, weather, Research, Crop, Farmers, Agriculturemarketing, fertilizers and pesticide information) in the cloud. We mentioned in the paper about future development of agriculture depends how the new technologies suchas cloud computing are adopted with a focus on farmer needs. The use of this technology should help a user as farmer in terms of better accessibility and getting the good knowledge about related issues of farming.

Cloud computing in agriculture provides an enabling environment for development and services with a flexible environment. In this paper, we discuss about the computing models, characteristics, deployment model, cloud service model, cloud benefits and challenge of cloud computingin agriculture field.

Keywords:

Cloud computing, Cloud model, Indian Agriculture, Service models, Types of cloud.

2)Introduction:

With the continuous development of computer technology and network technology, various areas of the world have been undergoingenormous changes. The application of information technology will not only change the way of information interaction to shorten the distance

of the world, but also conducive to social and economic development, improvement of production efficiency. The cloud computing technology,the resurgence of the climax of the national information construction, being seen as the third IT wave following the computer technology andInternet technology.Currently,the countries in the world for the study of cloud computing technology is not very mature, research in developed countriesstarted earlier, and has made outstanding achievements in the basic framework, technical support, platform building. Now, cloud computinghas been used and promoted in the field of medicine and medical, manufacturing, financial services, energy, communication and other keyareas, which will play an important role for improving the efficient use of resources, information sharing and integration.We found that Cloudcomputing applications in agriculture are in the phase of theoretical

research, and lack mature cases. This technology is great significant toimprove management level in the weak field of agriculture information construction, the combination of agricultural information andmodernization.Fig.1 shows ………..
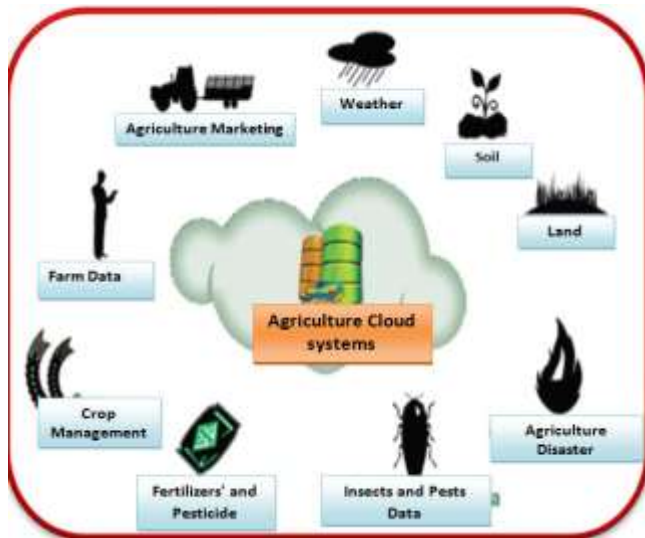

Fig. 1 :Agriculture cloud system

3)AGRICULTURE AND CLOUD COMPUTING CLOUD SERVICES :-

a) Infrastructure as a Service (IaaS):

Infrastructure as a Service abbreviated as IaaS, contains the basic building blocks for cloud [2] IT and typically provide access to networking features, computers (virtual or on dedicated hardware), and data storage space. Infrastructure as a Service provides you with the highest level of flexibility and management control [1] over your IT resources and is most similar to existing IT resources that many IT departments and developers are familiar with today.

b) Platform as a Service (PaaS):

Platforms as a service remove the need for organizations to manage the underlying infrastructure (usually hardware and operating systems) and allow you to focus on the deployment and management of your applications. This helps you to be more efficient as you don't need to worry about resource procurement, capacity planning, software maintenance, patching, or any of the other undifferentiated heavy lifting involved in running your application [3].

c) Software as a Service (SaaS):

Software as a Service provides you with a completed product that is run and managed by the service provider. In most cases, people referring to Software as a Service are referring to end-user applications. With a SaaS offering you do not have to think about how the service is maintained or how the underlying infrastructure is managed; you only need to think about how you will use that particular piece software. A common example of a SaaS application is web-based email where you can send and receive email without having to manage feature additions to the email product or maintaining the servers and operating systems that the email program is running on.

4) Types of Clouds:

Following are the various types of clouds

a)Public cloud

The cloud infrastructure applications, storage, and other resources are made available to the public for free or on pay-per-use model. It is owned by an organization selling cloud services. Example: Amazon, Google Apps, Windows Azure etc.

b)Private cloud

The cloud infrastructure is operated solely for a single organization. It may be owned, managed and operated by the organization or a third party, and may exist on-premises or off-premises.

c) Hybrid cloud

The cloud infrastructure is a composition of two or more clouds (private, community, or public) that re-main unique entities but are bound together by standardized or proprietary technologythat enables data and application portability.

Fig. : 2 : Model of cloud computing

5)Cloud computing parameters:

Cloud computing is a general term for anything that involves delivering hosted services over the Internet. The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flowcharts and diagrams. These services are broadly divided into three categories: Infrastructure-as-aService (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). IaaS delivers computer infrastructure as a utility service, typically in avirtualized environment and provides enormous potential for extensibility and scale. PaaS delivers a platform or solution stack on a cloud infrastructure. Sits on a top of the IaaS architecture and integrates with development and middleware capabilities as well as database, messaging and queuing functions. SaaS delivers the application over the Internet or Intranet via a cloud Infrastructure which was built on underlying IaaS and PaaS Layer.

Applications of Cloud computing in agriculturalsector :

The relationship between Cloud computing and agricultural development is seen as applications

The applications of cloud computing technology in agriculture can solve the bottleneck problem of agricultural modernization and agricultural information, and can also break agricultural producers' limitations in knowledge or technology, reduce duplication, improveutilization of existing resources to make up for dispersed, small-scale, regional differences agricultural production and the strong dependence on the natural climate vulnerability of agricultural production.

Modernizations of agriculture include three aspects:

1) To make wide use of modern agriculture production equipment, agricultural machinery

2) To make extensive use of modern agricultural planting and breeding technology, weather observation and forecasting;

3) To use modern forms of production organization and management methods.

It is seen from the development of agriculture, the agricultural mechanization goal has been basically achieved, but there are still many outstanding issues in technology and management, such as fewer agricultural technology service organizations and personnel, lessnecessary technical guidance, especially in the breeding, pollution-free crop cultivation and livestock breeding, soil testing, fertilizer, irrigation and soil improvement, meteorological observations and weather forecast were not enough technical support, most offarmers are in a state of blind conformity.

Organizational form of production in agriculture isrelatively simple, backward, and a low degree of specialization of agricultural production areas, it is difficult to achieve integrating agriculture.

In addition, due to the limitations of the farmers at market forecasting, business decision-making, information gathering and logistics management capacity is more lacking; it often leads to a mismatch between the supply and demand, not only damages the farmers' own interests, have also hindered the healthy development of the market supply and demand .

• Agriculture information data bank (crop, weather, soil, growth progress, farmer data & expert

Consultation) Computer Engineering and Intelligent Systems

• Store all the agriculture related information in a centralized cloud, which will be available to all the users at anytime, anywhere

• Management of all data related to land, location, area; soil and land characteristics through

Centralized decision support systems

• High integration & sharing of agricultural information

• It can be eliminate the farmer's limitations of technical knowledge & resources

• Providing agricultural technology service & science

• Improvement of the agricultural products marketing

• Efficient use of agricultural resources

• Promote the circulation of agricultural product and service in wider leve

7)BENEFITS OF CLOUD COMPUTING IN AGRICULTURE

Following are the various advantages of cloud computing in agriculture

• Data Readiness any time & any where

•Local and global communication

•Improve economic condition of the Nation

•Enhanced the GDP of the nation

•Ensure food security level

•Motivation of farmers and researchers

•Reduction of technical issue

•Rural-Urban movement

•Data availability at any time and at any location without delay

•Improve market price of Food, seeds, other product

8)CHALLENGE OF CLOUD COMPUTING IN AGRICULTURE

• Maintenance & Supervision by third party, So data security is less

• Indirect administrator accountability

• Farmer is unknown for cloud computing technology

• Less physical control

• Attraction to hackers

• Need on the network connectivity

• Requires a constant Internet connection

• Platform facility is not easily available for farmers

• Farmers training necessary for this technology

• Does not work well with low-speed connections

• it runs the risk of security.

Conclusion:

This prominent technique may deliver the agriculture-based knowledge along with management of natural resources and knowledge directly to the consumers not only in a small region like in nonstop marketing or shops but also in a wider region. This will change the whole supply chain, which is mainly in the hand of large companies, now, but can change to a more direct, shorter chain between producers and consumers. Cloud computing technology, applicable for the improvement of agriculture growth, food, grain, product, economic condition, Ensure food safety, GDP of the nation & circulate information related to agriculture etc.

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