

# **Informatics: From its Evolution to Contemporary Scenario and Areas with Special Reference to Proposed Term & Area ‘Cloud Informatics’**

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**Abstract** - Informatics is today treated as one of the important term in the field of information & computing. Informatics was earlier considered as working and practice area of information or documentation. In between 1970-1980's informatics emerged as one of the important subject or academic area in most of the western countries like – USA and UK first used informatics as alternative of the term Documentation. European countries and soviet countries were preferred this term than that of Information Science. This paper describes about Informatics, its need and role in the contemporary market, its various division and sub field. We also discuss about emerging Informatics field. A new proposed field also describe at the last as ‘Cloud Informatics’. We discuss the combination of cloud computing and informatics as Cloud Informatics, its role, nature, value, role and some other facet. Informatics as an academic field in India very rare, we discuss the running programmes of informatics emphasizing proposed possible university level programmes of Cloud Informatics.

**Keywords** - Informatics, Cloud Informatics, Information Science, Information Technology, New Academic Programme, Computing, Information, Documentation

## **I. INTRODUCTION**

Fundamentally Informatics is considered as the Science of Information and information processing practice though informatics also treats engineering and technological aspects of information science as well. Informatics was formally treated as Informatics (in 1957 computer scientist Karl Steinbuch coined the term) [24]. Informatics is the study of structure, algorithm, behavior, interaction of natural and creative or artificial computational or communication systems with information. Many concepts already evolved long back in 1980's but many new areas emerged during 1990's and after that. The areas like Business Informatics,

Education Informatics, Geo Informatics are the most popular among them, though many new areas are coming up in the recent times, The paper too proposes a field to be named ‘Cloud Informatics’. In this new branch of Informatics virtualization and cloud computing can play a wonderful role for healthy information infrastructure building.

## **II. OBJECTIVES**

The main aim of this research work is as follows:

- To learn about Informatics and its evolution.
- To know the basic of informatics- its structure, need and values.
- To know various dimension of informatics.
- To learn about cloud computing, its meaning and its relationship with informatics.
- To know about cloud informatics- a new proposed term and field.
- To learn about probable cloud informatics and its benefits.
- To know about the need of informatics education in India.
- To know about the proposed academic programme of ‘Cloud Informatics’ and its related field.

## **III. INFORMATICS: MEANING**

Informatics is the study of system that actually represent process; communicate information with the help of computing and technological devices. Indiana University, school of informatics defined this as ‘informatics is the art,

science, human dimension of information technology and ‘the study, application and social consequence of technology’. Though today we see several applied informatics area, but the first applied informatics was considered was ‘Medical Informatics’. According to the University of Edinburg, Information Studies is the representation, processing and communication of information in natural and engineering systems [22]. It has Computational, Cognitive and Social Aspects. The central notion is the computation or communication, whether by organism or by artifacts. So finally we can say that this is the study of information collection, selection, organization as well as dissemination of information, where behavioral and technological aspects of computing play an important role [21, 18].

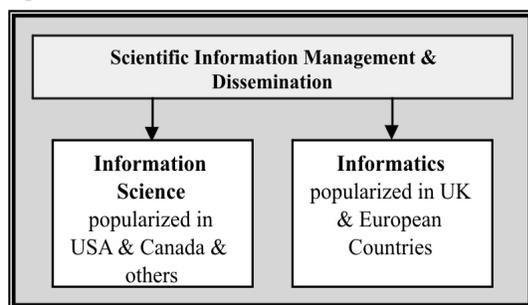


Fig. 1 Different nomenclature of Informatics

#### IV. INFORMATICS: MAJOR BRANCHES

Due to emergence of interdisciplinary subjects many new branches were devolved like our proposed field ‘Cloud Informatics’ [15]. Wikipedia mentioned that the following informatics emerged during the last three decades [24].

- Cheminformatics
- Community informatics
- Computational informatics
- Development informatics
- Disease informatics
- Ecoinformatics
- Education Informatics
- Engineering Informatics
- Environmental informatics
- Evolutionary informatics
- Forest informatics
- Geoinformatics
- Health informatics
- Hydro informatics
- Irrigation informatics
- Laboratory informatics
- Legal informatics
- Materials informatics
- Music informatics

- Neuroinformatics
- Pervasive Informatics
- Social informatics
- Technical informatics
- Translational research informatics.
- Business informatics And so on

Information Science and Informatics many a times were considered as equivalent; however, it has several differences as well. Fundamentally information science concerns Artificial Intelligence, Cognitive Science and Computer Science. Now let us check their relationship.

- Cognitive Science actually concerns the study of natural systems.
- Computer Science is actually concerned with the study of computation and technology.
- Artificial Intelligence plays the role of a mediator or connector role.

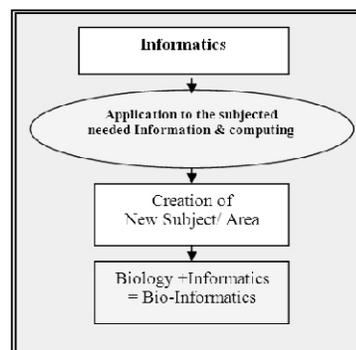


Fig. 2 Application of Informatics & creation of new subject

However, informatics has a relationship with other subject like- mathematics, electronics, biology, linguistics, sociology, psychology and even philosophy. Today we can see several information areas. However the most significant area of informatics is, it is mainly concerned with application of information, information system and ICT within organizations. The practitioner and their scope are also changing due to interdisciplinary nature of informatics [16].

#### V. CLOUD INFORMATICS

‘Cloud Informatics’ is a proposed term and area which may deal with cloud and informatics. In simple terms we can say that when cloud computing is applied on informatics and its various areas, the study area may then be called as ‘Cloud Informatics’. However indirectly cloud computing also may be referred to as ‘application of informatics in the field of

cloud computing'. Fundamentally Cloud Informatics' is actually nothing but the interaction or integration of cloud computing and informatics. As per our opinion 'cloud informatics is nothing but the application, interaction and integration of cloud computing systems and informatics; where for information collection, selection, organization and dissemination integration and utilization cloud computing is essential'.

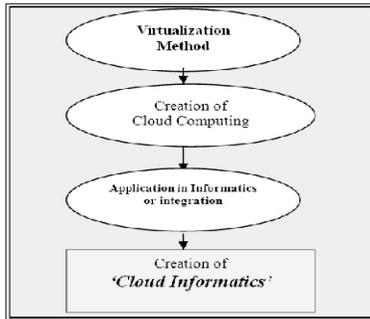


Fig.3 Creation of Cloud Informatics

In Cloud Informatics' the main focus of cloud is restricted on the informatics and its related applications. The main aim and role of 'Cloud Informatics' should be restricted to the information activities; or virtualization of information or content. Fundamentally Cloud Informatics' may also be treated as follows:-

- Cloud Based Information System.
- Cloud Information Science.
- Cloud Information Infrastructure.

### VI. CLOUD INFORMATICS: MAIN ADVANTAGES

When informatics takes the help of cloud computing, many advantages or benefits are possible such as:-

- In collection, selection, organization as well as dissemination of information, 'Cloud Informatics' may play an important role;
- Better collaboration among the information stake holders is possible through this;

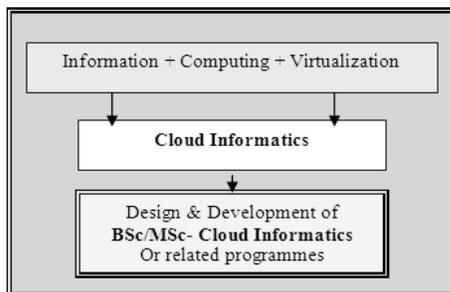


Fig. 4 Main advantages of Cloud Informatics

- It can promote information activities and overall information transfer cycle (ITC) systems;
- It helps in better information design, information architecture and complete information system designing [15].
- Various information activities like- article and journal consortium, online wiki, web 2.0 will get benefits from 'Cloud Informatics';
- It can integrate the search technique, queries and probable information services of the information foundation;
- It can promote the infrastructure of data centre and information centre;
- It is helpful in building information networks with healthy atmosphere [13].

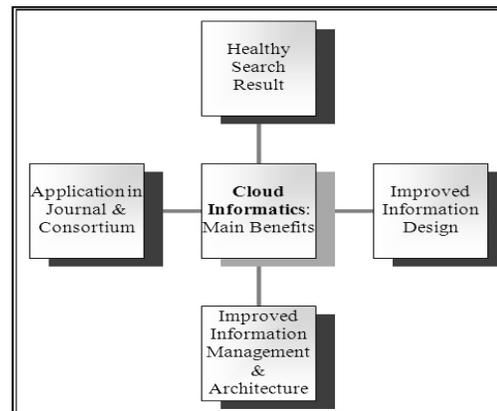


Fig. 5 How cloud computing helps to become information society

### VII. CLOUD INFORMATICS: MAIN AREA

As 'Cloud Informatics' means application of cloud computing model in informatics, so we can apply this in the following areas of informatics:-

- Information Collection: In information collection and selection 'Cloud Informatics' can play an important role; and also from collecting information from various media.
- Information Organization: In information organization and management 'Cloud Informatics' can play a healthy role, by which quick information classification and organization is possible.
- Information Dissemination: For information dissemination of information systems and subsystems, 'Cloud Informatics' can play an important role.

Fundamentally, 'Cloud Informatics' can be a study or knowledge area, which should be dedicated to behavioral and computational aspects of information and content.

### VIII. CLOUD INFORMATICS: PROBABLE ACADEMIC PROGRAMME

Like other informatics focused courses, e.g., - Bio Informatics, Geo Informatics; a new course may be offered as 'Cloud Informatics'. The universities and higher educational institutes need to take initiative to offer this course for its wonderful benefits, which we already discussed. The universities may start this course in the Certificate and Diploma levels in the initial stage and later at Bachelor, Master or Doctoral level depending upon the need. These kinds of courses may given nomenclatures as:-

- BSc/MSc- Cloud Informatics.
- BSc/MSc-Cloud Information System [22].
- BSc/MSc-Informatics (Cloud Computing)
- BSc/MSc-Information Technology ( Cloud Computing)
- BSc/MSc-Cloud Information Science.

This kind of programme should focuses on interdisciplinary area of Computing, Information Science, Cognitive Science, Engineering Fundamental and so on. It is better to introduce Cloud Informatics as a specialization of Informatics/Information Technology programme (BSc/MSc), to give job opportunities (including new and general) for the Cloud Informatics degree holder. The Cloud Informatics educated may also get various common and emerging interdisciplinary job positions; like-

- Information Officer;
- Documentation Officer;
- Chief Information Officer;
- Computer Manager;
- Cloud Network Administrator;
- Virtualization Expert and so on.

### IX. INFORMATICS: EDUCATIONAL PROGRAMME IN INDIA – CONTEMPORARY SCENARIO

Informatics nomenclature as the educational programme in India still is very rare. Most of the universities still offer courses related to Information Science, Knowledge Management, Computer Engineering and so on[24]. However some departments and faculties already formed in this nomenclature like- Institute of Informatics of University of Delhi, Sharda University, UP and other. The administrators, universities, educationalists and other eminent personalities are not aware of the benefits and value of Informatics education in its real sense. Still universities and companies recruit Computer Science background candidates informatics related job prospects. As per our web review of Indian universities that a special branch of Informatics, i.e. Geo-Informatics is very much popular with MTech and MSc nomenclature.

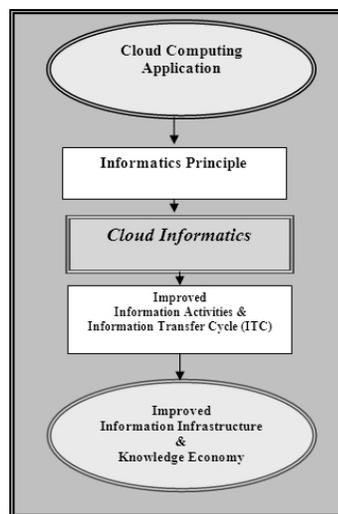


Fig.6 Name and nomenclature of Informatics in difference area

### X. CONCLUSION

Cloud Informatics can be a good alternative of cloud computing application in information activities, information system or information infrastructure. This can be short but most powerful buzzwords as it can play an important role in Government houses, companies, universities, research institutions and other places [16]. The main difference between cloud based information system and cloud informatics may be, it is a short name, a structured knowledge cluster, a development and innovation of cloud based informatics as Cloud Informatics. We need institutions and

universities around the world for creation of awareness regarding cloud informatics emphasizing practice area, academic field, professionalism and other aspects which are needed for building this subject as a popular science and technological area as well [25].

## REFERENCES

- [1] <http://cloudcomputing.blogspot.com>
- [2] <http://cloudcomputing.sys-con.com/node/1528536>
- [3] <ftp://public.dhe.ibm.com/common/ssi/sa/wh/n/ciw03067usen/CIW03067USEN.PDF>
- [4] [http://en.wikipedia.org/wiki/Cloud\\_client](http://en.wikipedia.org/wiki/Cloud_client)
- [5] Danielson, Krissi (2008-03-26). "Distinguishing Cloud Computing from Utility Computing". *Ebizq.net*. [http://www.ebizq.net/blogs/saasweek/2008/03/distinguishing\\_cloud\\_computing/](http://www.ebizq.net/blogs/saasweek/2008/03/distinguishing_cloud_computing/). Retrieved 2010-08-22.
- [6] "Cloud Computing: Clash of the clouds". *The Economist*. 2009-10-15. [http://www.economist.com/displaystory.cfm?story\\_id=14637206](http://www.economist.com/displaystory.cfm?story_id=14637206). Retrieved 2009-11-03.
- [7] "National Science Foundation press release. September 2008. "National Science Foundation Awards Millions to Fourteen Universities for Cloud Computing Research." Retrieved 2010-03-01". *Nsf.gov*. [http://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=114686](http://www.nsf.gov/news/news_summ.jsp?cntn_id=114686). Retrieved 2010-08-22.
- [8] Myslewski, Rik (2009-12-02). "Intel puts cloud on single megachip". *Theregister.co.uk*. [http://www.theregister.co.uk/2009/12/02/intel\\_scc/](http://www.theregister.co.uk/2009/12/02/intel_scc/). Retrieved 2010-08-22.
- [9] "Nicholas Carr on 'The Big Switch' to cloud computing". *Computerworlduk.com*. <http://www.computerworlduk.com/technology/internet/applications/instant-expert/index.cfm?articleid=1610>. Retrieved 2010-08-22.
- [10] "IEEE Technical Committee on Services Computing". *Tab.computer.org*. <http://tab.computer.org/tcsc>. Retrieved 2010-08-22.
- [11] "Cloud Computing : the future of computing is here" *Microsoft Interface* |April - June 2010
- [12] Abdul Azeez, T.A. "How to Design A Digital Library" *SRELS Journal of Information Management* Vol. 40, No. 3 September 2003 Paper Z. p267-273.
- [13] Adhikary, Madhabmohan, And Amitava Nandi "Ideas of Ranganathan's Classification Theory Pervaded by Oriental Philosophy" *SRELS Journal of Information management* Vol. 40, No 3 September 2003. Paper AA. P275-284.
- [14] Agarwal, Ritu and viswanath venkatesh. "Assessing a firms web presence: A Heuristic Evaluation Procedure for the measurement of usability" *information systems research* 13, no 3 (September 2002)
- [15] Aladwani, Adel M "An integrated performance model of information systems projects" *journal of management information systems* 19 no 1 (September 2002).
- [16] Alleman, James "Real options real opportunities" *Optimize magazine* (January 2002)
- [17] Aparajita, "Virtual Information Center: How Close To Reality." *SRELS Journal of information Management*, Vol. 42, No. 4, December 2005, Paper A.E. p419-426.
- [18] A P J Abdul Kalam "IT Strategy in Defense Environment." *DESIDOC Bulletin of Information Technology*, Vol. 20, Nos. 1&2 2003. P 7-12
- [19] Aries, James A Subhankar Banerjee, Marc S Brittan, Eric Dillon, janusz s. kowalik and john p. lixvar. "Capacity and performance analysis of distributed enterprise system" *communication of the ACM* 45, no 6. 2002.
- [20] Attewell, Paul and James rule. "Computing and organization: what we know and what we don't know" *communications of the ACM* 27, No 12. 1984.
- [21] Paul, Prantosh Kumar, Dipak Chaterjee and Bhaskar Karn "Cloud Computing: beyond ordinary Information Transfer Cycle" in *National Conference on Computing and Systems*, Dept of Computer Science, Burdwan University., 15 March, 2012, Paper Published
- [22] Paul, Prantosh Kumar, B B Sarangi, Bhaskar Karn, "Cloud Computing: emphasizing its Facet, Component and Green aspect with special reference to its utilization in the Information Hub" in *National Conference on Emerging Trends in Computer Application & Management*, Faculty of Computer Application and Management, AVIT (AICTE-NBA Accredited Engineering College) Dated-24-02-12, 25-02-12. Paper published.
- [23] Paul, Prantosh Kumar, Dipak Chaterjee and Bhaskar Karn "Cloud Computing: emphasizing its possible roles and importance in Information Systems and Centers" in *IEM/IEEE sponsored international conference proceedings (IEMCON-12)*. P-345-348.
- [24] [www.en.wikipedia.org](http://www.en.wikipedia.org)
- [25] [www.ugc.ac.in](http://www.ugc.ac.in)