Reduction of Incentive Incompatibility in Regional Planning: An analysis through Big Data Analytics

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Abstract*— Over time it has been observed that decentralized planning is an improvement over the traditional planning procedures due to its participatory nature. Participation of the beneficiaries in the planning procedure is the backbone of this type of planning. But the experiences of different countries have shown that the beneficiaries are not becoming interested to attach themselves with the process of planning. One of the main reasons behind this non-participation may be attributed to the existence of incentive incompatibility. It is observed that due to the presence of incentive incompatibility the decentralized planning procedure is becoming futile in delivering the expected output. Here the Big Data Analytics can play an important role. The network architecture of Big Data Analytics is very much similar to the decentralized planning structure. The client server relationship under the Big Data Analytics can be used to explain the planner beneficiary relationship. At the same time the processing technique under the Big Data Analytic is also very much similar with the decentralized planning. Thus this work wants to show how the use of Big Data Analytics can successfully implement the participation of beneficiaries into the planning system and reduce the problem of incentive incompatibility. This work uses the tenets of Big Data Analytics to decompose the beneficiary planner relationship. Such that it takes into consideration HADOOP frame work to execute this decomposition. More specifically here the use of HDFS has been substantiated. It is observed that Big Data Analytics not only matches the structure of the decentralized planning, it also helps to draw the optimum output easily. So the use of Big Data Analytics will usher a new era in the field of participatory planning.

I. INTRODUCTION

Over time it has been observed that decentralized planning is an improvement over the traditional planning procedures due to its participatory nature. Participation of the beneficiaries in the planning procedure is the backbone of this type of planning. But the experiences of different countries have shown that the beneficiaries are not becoming interested to attach themselves with the process of planning. One of the main reasons behind this non-participation may be attributed to the existence of incentive incompatibility. It is observed that due to the presence of incentive incompatibility the decentralized planning procedure is becoming futile in delivering the expected output. Here the Big Data Analytics can play an important role. The network architecture of Big Data Analytics is very much similar to the decentralized planning structure. The client server relationship under the Big Data Analytics can be used to explain the planner beneficiary relationship. At the same time the processing technique under the Big Data Analytic is also very much similar with the decentralized planning. Thus this work wants to show how the use of Big Data Analytics can successfully implement the participation of beneficiaries into the planning system and reduce the problem of incentive incompatibility.

II. REVIEW OF EXISTING LITERATURE

Snijders et.al. (Snijders, Matzat, & Reips, 2012) proposed that research on Big Data has already received a considerable momentum and is expected to grow in the future. They have also stated that the subject related to research on Big Data analyzes networks. During this research they have also used the micro processes model. This model is used in the on line network to know some typical micro characteristics which is also known as ‘small world’ properties. In this research this concept is used for the selection of mathematically-tractable models of online network formation and evolution. According to the authors the social scientists can play a unique role in Big Data research. Chen et.al. (Chen, Chiang, & Storey, 2012) have stated that Business intelligence and analytics (BI&A) has emerged as an important area of study for both practitioners and researches. During this research a huge amount of data is observed

and data integrity problem is also noticed. Goodhue et.al. (Goodhue, Kirsch, Quillard, & Wybo, 1992) have discussed in this paper four detailed case studies of SDP. This empirical research has found more evidence of problems than of success. The first conclusion here is that SDP, though conceived of as a general appropriate method it may not be the best planning approach in all situations. The second conclusion is that SDP method of analyzing business function and their data requirement may not be best to develop data architecture. So for this purpose the author suggested that decentralized plan is required with respect to local requirement of data architecture.

Context

It appears that the Big Data Analytics helps the database to work more successfully. Thus this non-traditional database management system can help to strengthen the traditional planning procedure. If the preferences of the beneficiaries are considered as a database then the frameworks developed by the Big Data can generate new planning techniques.

Hypothesis

The use of Big Data Analytics in decentralized participatory planning can reduce incentive incompatibility and deliver successful outcomes.

Methodology

This work uses the tenets of Big Data Analytics to decompose the beneficiary planner relationship. Such that it takes into consideration HADOOP frame work to execute this decomposition. More specifically here the use of HDFS has been substantiated.

Model

Decentralized modeling planning system is basically a bottom up technique through participation of beneficiaries. The broader outline of the planning and the financial limitations are determined by the state government and district authorities. Under the decentralized structure of planning the lowest body is the Gram Sansad which ultimately takes different decisions about the activities of the Gram Panchayat. Diagrammatically this decentralized structure can be presented through the following chart.

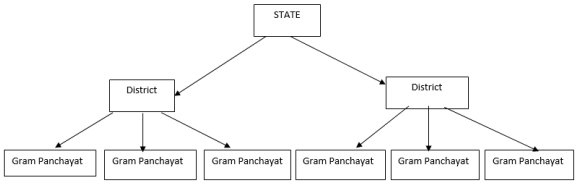

Fig: - Decentralized Architecture

This decentralized structure is very much similar to the HADOOP distributed file system (HDFS) given as follows.

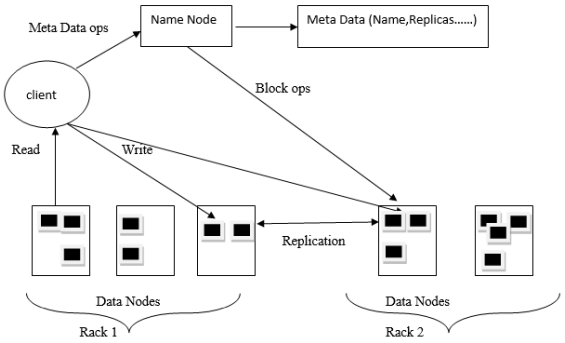

Fig: - Architecture of HDFS

The name node is the commodity hardware that contains the LINUX OS and the name node software, which act as the master server. It does the following tasks.

i) Maintain and manage data node.
ii) Regulates client's access to files.
iii) Record Meta Data i.e. information about data blocks e.g. location of blocks stored, the size of the file, permission, hierarchy etc.

The data node is the commodity hardware that contains the LINUX OS and the data node software ,which act as the slave nodes. These nodes manage the data storage of their system. It performs the following tasks:-

i) Stores actual data
ii) Read write operation on the file systems, as per client request.
iii) They also perform operations such as block creation, deletion, and replication according to the instruction of the name node.

More specifically the client server relationship under HDFS is given through the following diagram. This diagram is almost same with the beneficiary planner

relationship presented through the decentralized architecture.

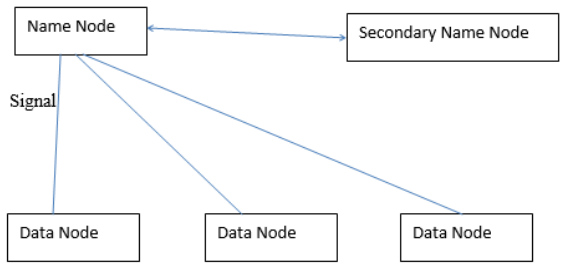

Fig: - Architecture of Name Node and Data Node

Thus it appears that the architecture of the decentralized planning and HDFS are almost similar. So Big Data Analytics can easily be used to discuss the problems of decentralized participatory planning. More over the data processing system under HADOOP is almost same with the information execution system available under decentralized planning. It is shown through the following diagram.

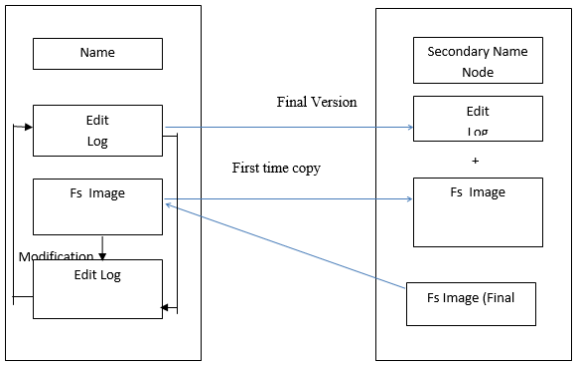

Fig:- Internal Architecture of Name Node

In the above diagram it is clear that the Name Node or the server can refuse to accept the data as sent by the client node if the data fail to comply with the instruction of the Name Node. In that case the data is edited at the Data Node or at the client source according to the instruction of the Name Node or server and resend to the Name Node. At this stage the server executes the instructions on the basis of the images of the original data and the edited data. Under the decentralized planning system the state government and the district administration receives beneficiary requirements from the Gram Panchayats. If those requirements fail to comply with the broader instructions of the state and district administration then the beneficiary requirements can be returned back to the Gram Panchayat for editing. Finally the state and district administrations take decision on the basis of the edited requirement and the original requirement. So it can be concluded that the Big Data Analytics fits properly within the structure of decentralized planning.

Apart from this the Big Data Analytics simultaneously uses structured, semi structured, and non structured data to deliver the optimum output. Here the preferences of the beneficiaries can best be categorized by processing the structured, semi-structured and non-structured preferences. So Big Data Analytics can easily draw the preference pattern of the beneficiaries. This pattern can proceed towards the reduction of incentive incompatibility related with decentralized planning.

CONCLUSION

Thus it appears that Big Data Analytics not only matches the structure of the decentralized planning, it also helps to draw the optimum output easily. So the use of Big Data Analytics will usher a new era in the field of participatory planning.

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