Implementation of Cloud Computing Technology in Indian Railway

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Abstract "Cloud" computing – a relatively recent term, the base of this term stands on the years of research in virtualization, distributed and utility computing, and more recently networking, web and software services. It offers a service oriented architecture, reduced information technology overhead for the end-user, great flexibility, reduced total cost of ownership, on-demand services and many other things. The Indian railway is the world's fourth largest railway network which carries near about 30 million passengers daily and near about 2.8 million tons of freight daily. But in spite of that the railways usually goes under loss and main reason behind this is a large number of passengers travelled without ticket every day. Also there is problem from passengers side that unwanted and unauthorized peoples with or without a confirm ticket keep roaming in reserved category compartments.Robary in the trains, overloading of the trains, black marketing of tickets by tte are the some problems which more or less we all witness in our life. Thus by implementing cloud computing in Indian railways we can develop a system which not only improves the passengers facilities while travelling but also increased the railways revenues. How total number of persons in a train at any time can be calculate, how exact location of train and exact arrival time can be known, how throughout availability of the internet services in the train and most important how fair distribution of seats can be done are the major points and how cloud computing technology helps us to attains it are covered in this paper.

Keywords: cloud, IT, railway, GPS.

1. Introduction

The Indian railways system has not been changed a single step from the beginning and still follows the same old pattern of ticket checking adopted by railway years ago. With the increase in population the number of passengers willing to travel daily are increasing abruptly and now the situations are getting that worse that people don't bothered about they either have ticket or not, they knowingly and sometimes due to some problem, not only entered the train without ticket or unconfirmed, waiting ticket, but also travel in reservation compartment, also the bribery and black marketing of tickets are the very important factor that come into role nowadays and also the numbers of daily up downers either for job or study has been increased a lot from small cities to the nearby major cities thus all these situations leads to an overloaded train, full of extra passengers and causes lots of harm to the railway, passengers and Indian economy too. The following paper proposed some updating in Indian railway technology and adaptation of these measures will surely leads to betterment

2. Railway and IT

Indian Railway and IT are loosely bounded. Presently the use of IT is limited to online checking of train schedule, booking of tickets, cancellation of tickets. There is no system to exactly predict that when actually the train is going to come at the station or it pass through any recognized point. Also the total number of

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passengers in a train at any instance of time cannot be calculated by the railway, and the most important point is the confirmation of tickets. If a passenger ticket is under rac (Reservation Under Cancelation) category then that category ticket might have to get cleared at some point, sometimes even at the beginning of the journey due to last 5 minute cancelation of ticket by any passenger but that seat is not given to the right candidate in spite of that it is sold or given to the passenger who is without ticket or waiting ticket and the ordinary man is unaware of the situation.

3. Improvement of IT

The IT technology needs a vast and immediate improvement according to the new scenario. Some new IT equipments and techniques that have to be included are sensors, cameras, ticket checker and scanner and most important is new form of ticket that is like bar-coded card. Now the whole ball spins around the three main tasks total number of passengers, checking ticket and allotting confirmed seats and for this the implementation of cloud computing will helps a lot.
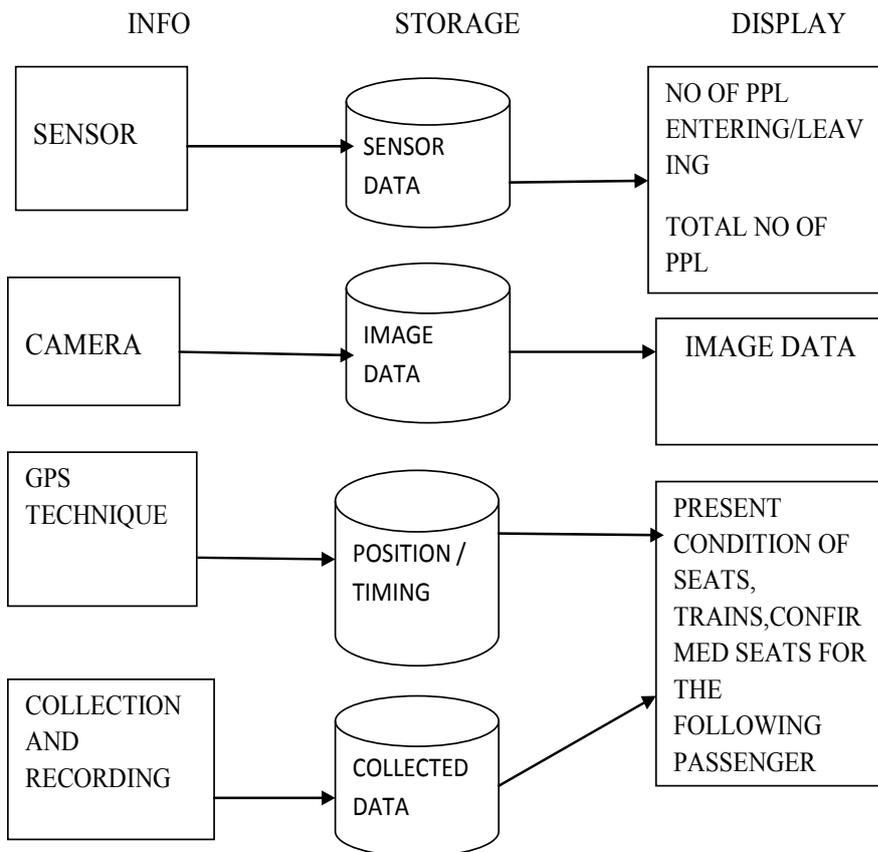

Fig. 1: IT mechanism to support Indian railways

3.1. Counting number of peoples

This implementation can takes place by applying people counter device at both the entrance of the compartments. A people counter is a device used to measure the number and direction of people traversing a certain passage or entrance per unit time. The simplest form of counter is a single, horizontal infrared beam across an entrance which is typically linked to a small LCD display unit at the side of the doorway or can also be linked to a PC or sends data via wireless links and GPRS.Here the beams at both the gateways count the total no of people entering and leaving and thus give a exact amount nearby at an instance of time in train. Those records via wireless network automatic get updated in the cloud as we simple use cloud service for recording. Such a beam counts a 'tick' when the beam is broken; therefore it is normal to divide the 'ticks' by two to get visitor numbers. Dual beam units are also available from some suppliers and can provide low cost directional flow 'in' and 'out' data. Accuracy depends highly on the width of the entrance monitored and the volume of traffic. The main reason for using it is inexpensive and simple to fit.

3.2. Allocation of seats

The train ticket examiner is provided with a pdf or an small laptop like computer may be like "aakash" and that redirect him to cloud. Ticket issues have a bar code number generated on it and that handy pdf has bar code reader attached to it. It simply clicks and that bar code ticket gets confirmed that above passenger is present. If the ticket is under waiting or reservation under cancellation then the automatically gets informed on tte screen that at this point this ticket has been confirmed and he has to retake the ticket from the traveler and again has to read the bar code thus the status gets updated at the cloud. This near about updating or when a ticket can be gets confirmed can be seen by the user itself by logging into the railway website which is showing the current status as updating in the cloud. So the whole data which passenger has reported, whose seat will be confirmed at what point is get noticed by the tte and also at the next upcoming railway division and railway zone. Also the total count generated is visible to tte and zonal office clearly indicating the extra numbers of people, Thus railway authorities can stop the train at outer if the extra passengers numbers are more and cannot be handled by tte and put penalty and punishment. This will stop the practicing of people to travel without ticket or unconfirmed ticket.

3.3. GPS technique

GPS Technique can be introduced so that the exact position of the train, speed, duration of time left, duration of time needed to reach the next destination, if chain pulled or caught in disaster at any point can be come into notice. For this a gps system is installed in train and data of that system will be going to database situated at cloud.

3.4. Affinity with cloud computing

Some universal values of cloud computing are:

1. Reduction of initial costs.

2. Allocation of resources without limit.

3. Maintenance and upgrade performs in the backend.

4. Easy rapid development including collaboration with other systems in cloud.

5. More possibilities for global service department.

3.5. How throughout availability of internet?

Indian Government is very much interested in introducing wifi facility in collaboration with 21 net service company who is famous for providing high speed wireless internet facility for the fast moving trains. So no extra burden will be there on implementation of these suggestive we can also suggest measure of sms informing to the desired and concerned user about confirmation of seats too.

3.6. Working procedure

The working procedure is very simple. The number of people count in the counter, the ticket data and the confirmation data reaches to the cloud with the help of 21 net service and thus a user also can anytime login to see the data. The same data is also reported to the main station with the help of internet facility Also a constant monitoring of the train can be done at the zone and station level and thus the facilities of the passengers and revenues of the railways both goes on increasing. The following diagram shows the working procedure
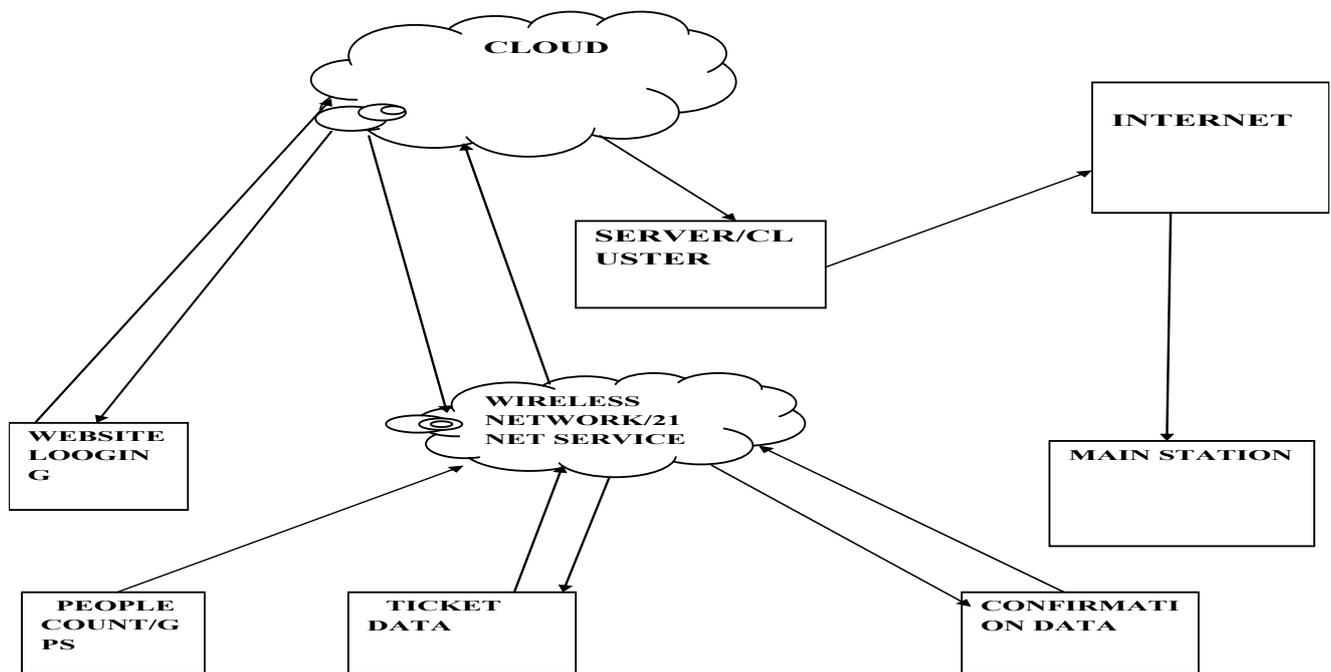
Fig. 2: Working procedure of cloud

4. Conclusion

Railways are considered to be the heart of the India as Indian economy too relay on it. Also it is the best and trustworthy source for travelling by any part of the country and it is the cheapest too. But with the change in time the railways need to be reform and more facilities are needed to upgrade it and cloud computing is best suited for it. Still there is long way when IT will simply able to drive and maintain the whole railway on its own. Still with this paper we hope to contribute in the development of not only India, but to the world

5. References

[1] Ministry of Indian railway http://rti.railnet.gov.in/.

[2] Zhou Y, Liu X, Wang X, Xue L, Liang X, Liang S. 'Business process centric platform-as-a-service model and technologies for cloud enabled industry solutions.' Proceedings of the 3rd International Conference on Cloud Computing; 2010; Miami, Florida (USA) 2010; 534-7.

[3] Cloud Computing – Issues Research and Implementations Mladen A. Vouk.

[4] Shaily malik and Vineet Sinha. Article: Cloud Computing –' A Hope for the Rural India.' International Journal of Computer Applications 1(20):10–13, February 2010 NIST Definition of Cloud Computing v15, csrc.nist.gov/groups/SNS/cloud.computing.

[5] Yuhua Liu; Lilong Chen; Kaihua Xu; Yi Zhang; , 'Application Modes, Architecture and Challenges for Cloud Educational System,' Computer Research and Development, 2010.

[6] Qi Zhang, Lu Cheng and Raouf Boutaba,'Cloud Computing: state-of-the-art and research challenges', Journal of Internet Services and Applications, Volume 1, Number 1, 7-18,Springer 2010.

[7] Lizhe Wang, Gregor von Laszewski, Andrew Younge, Xi He, Marcel Kunze, Jie Tao and Cheng Fu,'Cloud Computing: a perspective Study', New Generation computing, Volume28, Number 2010, 137-146, Ohmsha Ltd. and Springer 2010.

[8] Cloud view by Berkley 'berkeley.intel-research.net/Bochum/clonecloud-hotos09.pdf' .

[9] www.csjournals.com/IJCSC/PDF2-1/Article_39.pdf .

[10] www.medianama.com/2009/01/223-wifi-in-trains-piloted-on- / .

[11] www.jineshvaria.s3.amazonaws.com/public/cloudarchitectures-varia.pdf .

[12] www.cloudtimes.org/cloud-computing-and-smartphones/ .

[13] Michael Miller, ―Cloud Computing‖ , Pearson Education, New Delhi, 2009 .

[14] www.technologyreview.in/communications/22571/page2 .