Conflicts Analysis of Smart City Services using Live Data using Cloud

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Abstract

As the population of cities around the world is increasing at a rapid pace, cities have started addressing this problem by the implementation of significant sensing and actuation infrastructure and building services on this infrastructure. Potential for conflicts across Smart City services increases with the increasing density of sensing and actuation and growing complexities of services. These conflicts can cause unsafe situations and disrupt the benefits that the services that were originally intended to provide. The proposed system detects and analyses the runtime conflict in smart city transportation services using real-time data feed. We will prepare an architecture, which will focus on conflict that arises on these services. 1. Train 2.Tube 3.Bus our architecture solution identifies the conflict and provides broad perspective to decision making aspect of services.
Keywords- Cloud Computing, Data Mining, Web Mining, Container Virtualization, Machine Learning

I. INTRODUCTION

Smart city is not a new phenomenon, but has never before proceeded so rapidly. Over the last century human journey and desire have concentrated to its cities. The consistent availability of employment, public services, and housing is strong motivation that led this change in human habitation. Today, cities avoid serving their population with discrete services.

With the arrival of technological tools such as Internet of Things (IoT), Big Data, Cloud computing products, and Crowd Sourcing platforms, cities are becoming increasingly able to monitor the state of their infrastructure, services, and populace, cost effectively and at scale. A city that that has technologies to mitigate the strains of urbanization, to improve the quality of life for it inhabitants, and the competitiveness of its economy is known as a Smart City. There are number of cities which have already done implementation of the Smart City services, such as the city of Santander in Spain.

The main problem is that many services operating simultaneously, conflicts will arise. Conflicts have both a.

II. LITERATURE SURVEY

Deployment of sensors around the world is increasing at a very fast pace. The deployed sensors continuously generate high pace and enormous amounts of data. Collection of data from all the available sensors is futile and does not create additional value unless they are capable of providing valuable insights to help address the challenges we face every day (e.g. environmental pollution management and traffic congestion management).

Realizing the vision of the IoT, therefore, requires an agreed architectural reference model, based on open protocol solutions and key enabling services that enable interoperability of deployed IoT resources across different application domains and contribute to horizontal re-use of the deployed infrastructure.

The smart city vision should be realized through public-controlled integrated urban operating systems to evade vendor monopolies and offer unrestricted data to all citizens versus carving out virtual gated communities and corporate enclaves. Urban performance depends on the city's endowment of smart capital and on the availability and quality of human and social capital.

Effective and Feasible Ways to Coordinate Urban Technologies. Rapid advances in building information technologies into the very fabric of the city and using these technologies to integrate and add value to the provision of urban services provide the mandate for the sustained development of new methods. This will involve integrating data, software and organizational forms that best improve the efficiency and competitiveness of the environment in which cities operate. The major intellectual challenge

that we and the rest of society face, is embracing the idea that as we develop new digital technologies, we use those same technologies to study the processes of their application, implementation and impact on society.

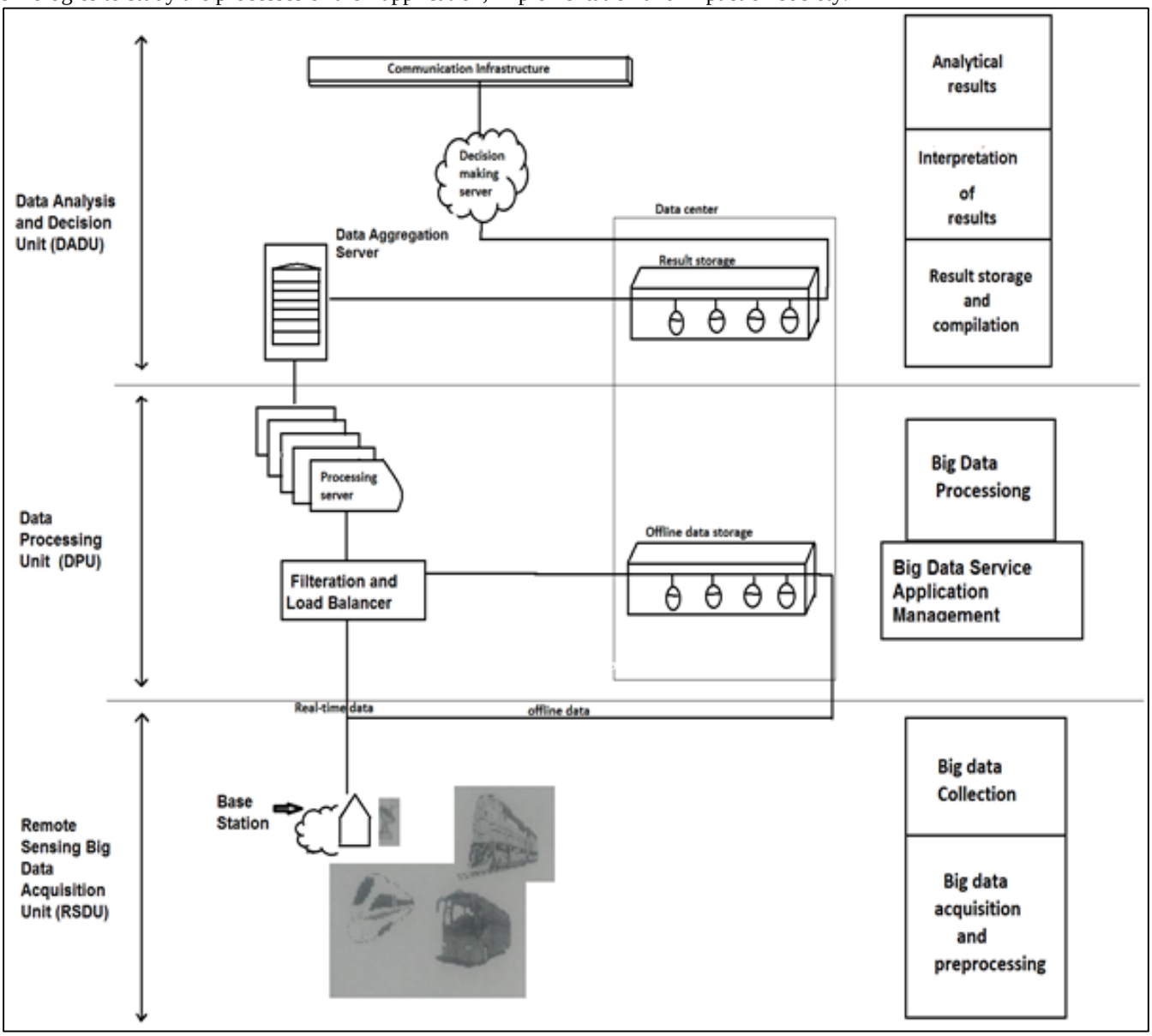


Fig. 1: System Architecture

III. SYSTEM ARCHITECTURE

The proposed system architecture has mainly three modules namely-

1) Remote Sensing Big Data Acquisition Unit (RSDU)
2) Data Processing Unit (DPU)
3) Data Analysis and Decision Unit (DADU)

The RSDU consist of Base Station which generates real-time data and offline data. In this module Big Data collection, acquisition and pre-processing takes place. Big Data is generated in real time by the various sensors deployed across the city. Pre-processing is done in real time on this acquired data. Offline data is the pre-processing that is saved for further processing and filtering.

In DPU i.e. data processing unit, processing servers, filtration and load balancers are present. Filtration and load balancers filters the pre-processed data and discards the unnecessary data which can contain invalid or erroneous data. This huge amount of data needs to be properly load balanced for better performance by the proposed system which is performed in this unit. Service application management is a vital part of DPU.

Offline data storage is present in this unit which acts as one of the inputs to filtration and load balancers on which processing is done DADU i.e. Data Analysis and Decision Unit, consists Data Aggregation Servers which aggregates the processed

results. All necessary calculations needed to perform on the generated key value pair during processing is done in this unit. Normalised result is finally evaluated. This result is stored in Data Centre.

The desired result is then passed to decision making server according to the threshold value set by the administrator of the system. All values crossing the set threshold value are reported to the user of proposed system. Result Storage and Compilation, Interpretation of results is done in DADU. Thus it can be said DADU provides the analytical result to the user of system.

IV. FUNCTIONAL REQUIREMENTS

For cloud operators in financial system, government office, healthcare center, and other highly-regulated industrial areas in order to enable access to sensitive data, there are four functional requirements that must be fulfilled.

1) Perimeter Security: Here access to the cluster is protected via network security, firewalls, and, through authentication to confirm user identities.
2) Data Security: Here data in the cluster is protected from unauthorized access and visibility through masking and encryption, both when data is at rest and when it is in transit.
3) Access Security: It briefs about what authenticated users and applications can do with the cluster data through file system ACLs and fine-grained authorization.
4) Visibility: Here centralized auditing and lineage capabilities are used for reporting the origins of data and data usage.

V. ALGORITHM

The following steps explain the flow of program in proposed system:-
Algorithm I. Filtration and Load Balancing
Algorithm Input: Dataset containing Live Data Feed process.
Output: Fixed size block of filtered data is sent for processing.
Mechanism Steps:

- Required data is filtered i.e. processed data is available and other unnecessary data is discarded.
- Divide the Data into Appropriate Key Value Pair.
- Transmit unprocessed data directly to aggregation step without processing.
- Assignment and transmission of each distinct data block of processed data is done various processing steps in Data Processing Unit.

Description:
In this algorithm live data is taken and its filtration and division is done into segments and load-balancing algorithm is performed.
In step 1, Filtration of related data is done.
In step 2, Filtered data contains association of different key value pairs and each pair has different numbers of sample, which forms a data block.
In Next steps, Data Processing Unit forwards the blocks to process.
Algorithm II. Processing and Calculation Algorithm
Input: Filtered Data
Output: Normalized Disruption data.
Steps:

- For each Network Bus Operator Performance, Categorization of Data like G for good, A for average is performed.
- Normalize the disruption data for all the three modes
- Data is stored in data store and is forwarded.

Description:
This algorithm is used to calculate results for different parameters and forwards them to the next level.
In step 1, the calculation of Good and Average along is carried out along with trend. In the next step, the results are transmitted to the aggregation mechanism.
Algorithm III. Multi Modal Summarization
Algorithm Input: Normalized Disruption Data.
Output: Final result summary

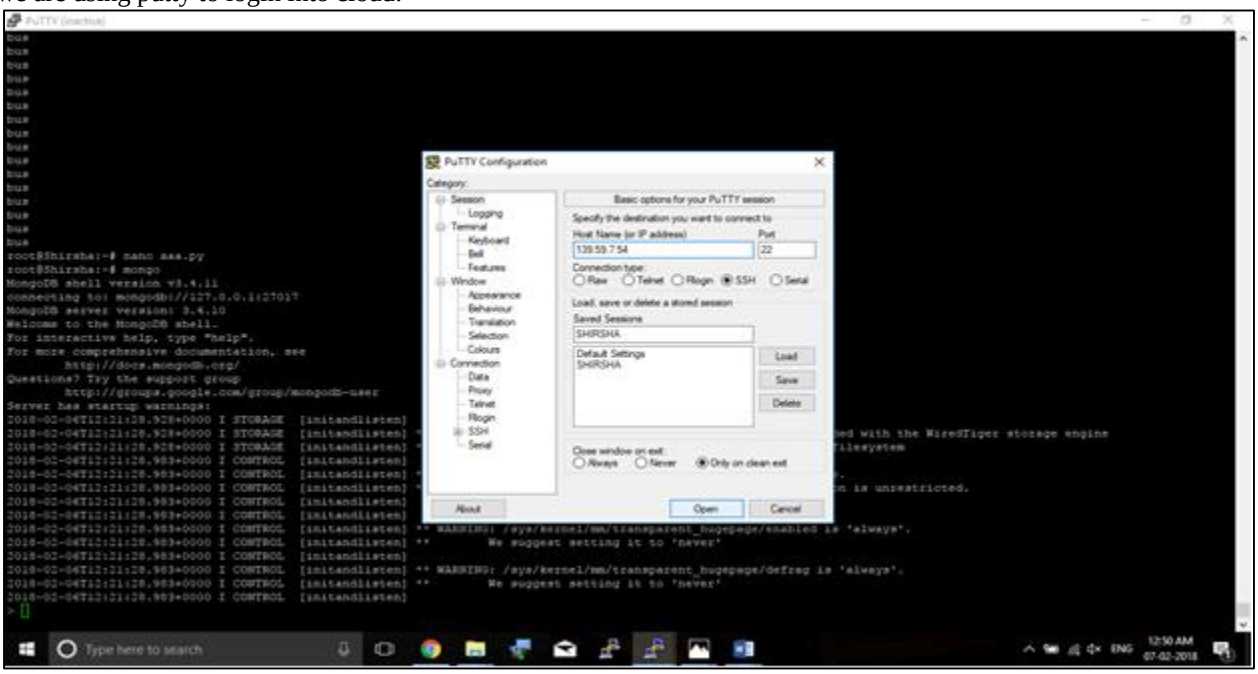
1) Collection of the data from data store is done in normalized format.
2) Summarization is done for Individual modal pie from the total disruption data capture.
3) Store the final disruption summary into data store.

Description:
Here collection of data is done and the results from each modal are processed and then combined, organised, and stored all these results in NoSQL database.

VI. RESULTS

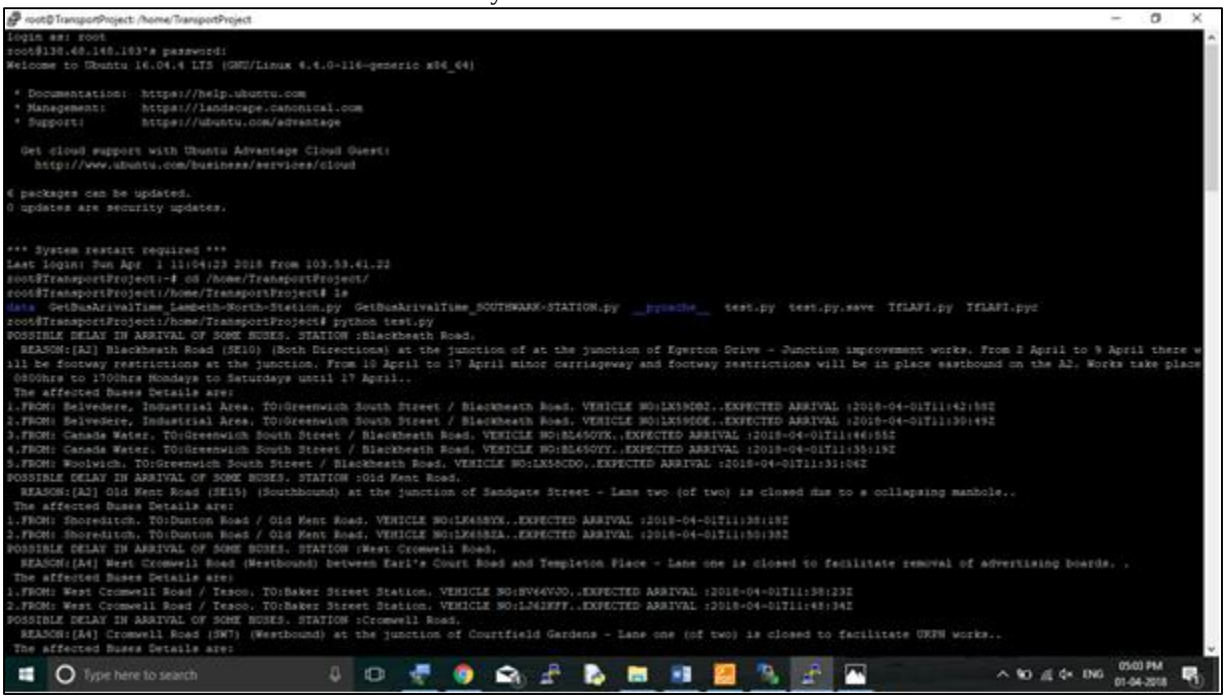
1) Firstly, the administrator has to login using terminal.

Here we are using putty to login into cloud.

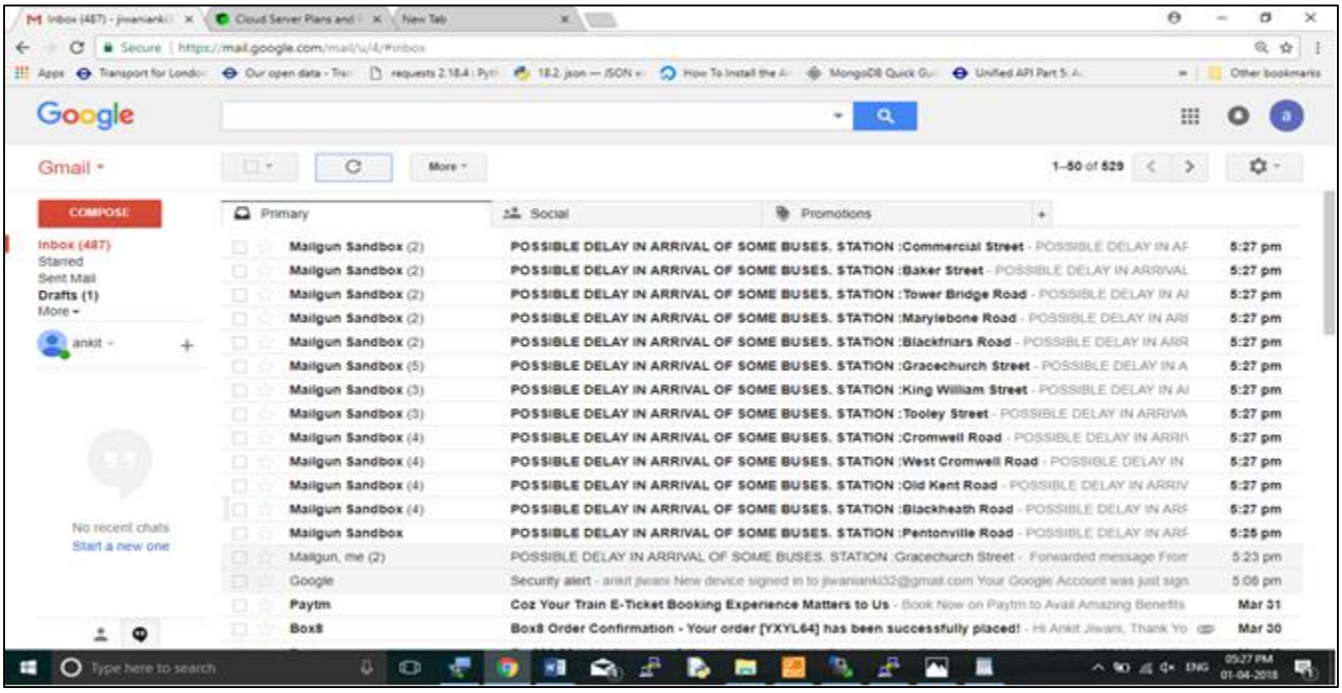


After entering the IP provided by the cloud provider the screen leads user to an authentication page where user has to enter user id and password.

2) Then user needs to navigate to a directory called /home/Transportation where program to be executed is present.
3) Execute the program test.py
4) Press ctrl+C to stop when user has the required number of stop information required.
5) All the required notifications and alerts are sent to administrator via mail. The mail is sent according to the streets having closure in them i.e. an individual mail for every affected treet.



6) Each mail will contain affected street name and details like vehicle id, the destination and origin of that bus and expected arrival time.



VII. FUTURE SCOPE

This system can be extended to be used for area specific monitoring. This can be done using container. Area specific container can be deployed and monitored by administrator of that particular area.

This system can also be used by students for reference and to understand the retrieval and processing of live data feed. Further extensions of this system can be developed.

This system is primarily designed for bus transportation system administrator. But it can be extended by installing more security measures and be availed to public for use. By this, a person having a particular route will be notified if there is a closure on that route. By this the person can take alternate route and save their time. This system is designed for roads having closure and can be modified to notify for roads having other type of status like severe, good (telling normal or fastest route.), etc.

VIII. CONCLUSION

The successful implementation of proposed system will provide information about the current number of buses en-route, list of top delayed buses which cross the set threshold value and notifies the admin when a certain threshold value(time) is crossed. In this proposed system architecture we have used Docker Container instead of virtual machine. This resultantly provides more portability causes less overhead.

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