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Real Time Traffic Management through Cloud

A. Ravi Kumar*1, S.Markandeyulu*2

Associate Professor, Head of the Dept, Dept of CSE, SSJEC, Gandipet, Hyd, AP, India

M.Tech Student, Department of CSE, SSJEC, Gandipet, Hyd, AP, India

Abstract

Today's world is moving on time management factor, where people concentrate on time rather compared to money. In this paper we would like to take the advantage of making such a software solution which keeps the global world and the corporate world always ridiculous. If we consider the trend and view of traffic in this market i.e. cities like Belgium etc where people density is more, coming to India, it's also big burden for the Government to control the traffic. Hence this paper tries to give emphasis on traffic management trough cloud. Cloud is a Software as a Service (SaaS) offering designed to process data feeds and roadway event information from traffic sources to help improve the transportation operational efficiency of a city or other complex infrastructure. This offering addresses the need for visibility into traffic performance, configuration, and incidents across a diverse set of traffic systems. By providing a comprehensive and scalable platform for transportation management solutions, IBM Intelligent Transportation on Cloud helps to analyze traffic performance and helps to optimize throughput, expedite incident management and improve commuter experience across the entire transportation network. Increased situational awareness across an entire transportation network High-performance access to traffic event data, including both near-real-time and historical visibility of average speed, volume, and incident information Centralized management of traffic operations and traffic event information collected across geographic locations.

Keywords: TMS, SaaS, Simulation Technology

1. Introduction

This paper introduced the concept like TMS (Transportation Management System), Cloud management through SaaS and virtualization of simulated traffic strategy through high end node. If we consider the traditional market of traffic management system likely to 1960 and furthermore many system come into existence where we tries to give effective solution, but due to gradual change in technology with due course of time system is changing. Hence we are in highest end of technology which tries to give optimized and high effective data trend to traffic solution in a fraction of second. The traffic signal system is probably the most important kind of transportation facility in operation today, considering the perspectives of both safety and efficiency. Two-thirds of all miles driven each year in the U.S. are on roadways controlled by traffic signals. In some urban areas, signals at busy intersections control the movement of more than 100,000 users per day. The signal system also has a great impact on energy and the environment. The more times a vehicle stops, the larger the level of pollutants that it emits. And, twenty percent of the oil used by automobiles traveling along urban arterials is consumed while waiting at a red light at a signalized intersection. According to a 2007 report from the National Highway Traffic Safety Administration, 20 percent of all motor vehicle fatalities in the United States each year occur at an intersection. Between 1997 and 2004, this figure represented 76,162 lost lives. In addition, tens of thousands of drivers, cyclists and pedestrians are injured each year in traffic accidents at intersections.

A traffic signal system at its core has two major tasks: move as many users through the intersection as possible doing this with as little conflict between these users as possible. The first task relates to efficiency and capacity while the second relates to safety. Both tasks are performed by first clearly defining which group of users has the right of way at a given time and second by determining how long the group has the right of way. Despite the importance of traffic signal systems, a recent national report card gave the nation's traffic signal systems poor grades. While there are a number of reasons for this poor assessment, we believe that there are three major contributing factors. First, there is a lack of high quality and comprehensive references defining good practice.

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While many states and local jurisdictions do have standards that guide their signal timing design practices, these standards are often not based on good science or sound theory that allow the standards to be transferrable to new situations or conditions. Too often, the systems are assumed to be fixed time (rarely the case in the field) while the traffic controller itself is not covered at all. Third, traffic engineers often have little direct experience with traffic controllers since their university experience is often limited to using models that often poorly emulate the operation of a traffic controller. This results in a problematic dichotomy. Signal engineers design the signal system and timing plan but the implementation of the timing plan (and the important timing details) are left to the technician. The former understands how the system should work while the latter understands how the traffic controller actually works but without the same broad perspective that the engineer brings to the problem.

So, how do we overcome these problems and provide systems of learning that will produce transportation engineers who understand how traffic control systems work and have the ability to design the components of these systems? Happily, there are signs that things are changing in the right direction. The Federal Highway Administration has produced a new traffic signal timing manual that brings together a broad array of information that can be used by traffic engineers to design traffic signal systems.

2. Related Work

Transportation has always been a crucial aspect of human civilization, but it is only in the second half of the last century that the phenomenon of traffic congestion has become predominant due to the rapid increase in the number of vehicles and in the transportation demand in virtually all transportation modes. Traffic congestion appears when too many vehicles attempt to use a common transportation infrastructure with limited capacity. In the best case, traffic congestion leads to queuing phenomena (and corresponding delays) while the infrastructure capacity ("the server") is fully utilized. In the worst case, traffic congestion leads to a degraded use of the available infrastructure (reduced throughput), thus contributing to an accelerated congestion increase, which leads to further infrastructure degradation, and so forth. Traffic congestion results in excess delays, reduced safety, and increased environmental pollution.

`The most flexible cloud infrastructure and platform providers today are Amazon and Google because they don't constrain customers as much as some other providers and are open to partner opportunities. For instance, someone using Google cloud services can go to a third-party company for storage or application management.

Fig. 2.1 GPS showing the captured Image

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The software as a service approach already has a series of bodies dedicated to ensuring services themselves are interoperable amongst one another. There is the World Wide Web consortium (W3C) which oversees standards like XML and WSDL, as well as OASIS which sets the course for WS-* standards. Initiatives like these have helped mitigate the risk for both customers and vendors, encouraging the software as a service paradigm since applications are not locked into a particular technology. However, until recently there was one area related to service applications that were unaddressed, one having to do with deploying and scaling services. Once the hurdle of having software enabled as a service is crossed, application interoperability becomes a non-issue, but what happens once a software service is incapable of handling demand with its initial hardware provisions? This inevitably takes us to the analysis of data center infrastructure -- or hosting providers.

3. Methods

Today's on-demand TMS make the process of data consolidation much easier than it has been in the past. Essentially, they sit on top of your existing ERP and B2B systems to aggregate data from multiple departments and create a holistic view of what you pay for transportation. They also safeguard Web portals to automate data collection, communications and negotiations with carriers. Gaining a global view of your total transportation spend is an essential component. Fixed-time ramp metering strategies are derived off-line for particular times-of-day, based on constant historical demands and simple static models without use of real-time measurements. This approach was first suggested by Wattle worth and leads to linear programming or quadratic programming problems. The drawbacks of fixed-time ramp metering strategies are identical to the ones discussed under road traffic control. In addition, fixed-time ramp metering strategies may lead (due to the absence of real-time measurements) either to overload of the mainstream flow (congestion) or to underutilization of the freeway. In fact, ramp metering is an efficient but also delicate control measure. If ramp metering strategies are not accurate enough, then congestion may not be prevented from forming, or the mainstream capacity may be underutilized. Following are the design process involved in this paper.

Understanding the traffic signal control system

We take the view that the traffic control system includes four interrelated subsystems or components: the user, the detector, the controller, and the display. Each component directly affects another component: for example, the detector responds to the user, while the controller responds to the detector. Further, we will provide you with a set of visualized tools that will allow you to see these relationships and more thoroughly understand them.

Knowledge of the traffic controller

Simulation allows engineers to test and observe the performance of a system under a wide variety of conditions, without disturbing the operation of an actual system. However, at the same time, you are getting less experience with the fundamental devices and equipment that are the basis for the operation of many transportation systems. This is certainly the case with the traffic controller, the most ubiquitous and fundamental device of today's urban transportation system. We believe that in order for an engineer to design and operate a traffic system, understanding the operation of a traffic controller, and how its various settings affect the flow of traffic at an intersection, is critical. It is the task of the engineer, not the technician, to establish the policy and guidelines for the operation of city streets and rural highways, and the control of these streets and highways must be based on the engineer's knowledge of the controller itself, how it functions, and how its various settings result in varying levels of performance at an intersection.

ISSN: 2320-1363

Complex and messy problems

Simplistic problems tend to give you a biased and inaccurate view of practice and often do not provide the complexity and challenge that most engineering students look for. In practice, however, problems are messy and complex, often with multiple solutions. These problems include the challenges that stimulate you, providing you with a greater understanding of what engineers do in practice, with all of the uncertainty that this entails. Applications that provide a more realistic setting for the development and design of traffic signal control parameters. Rather, we have provided an extensive set of input and output data sets that you can use as you develop your design and make the trade-offs needed in the determination of the appropriate signal timing parameters.

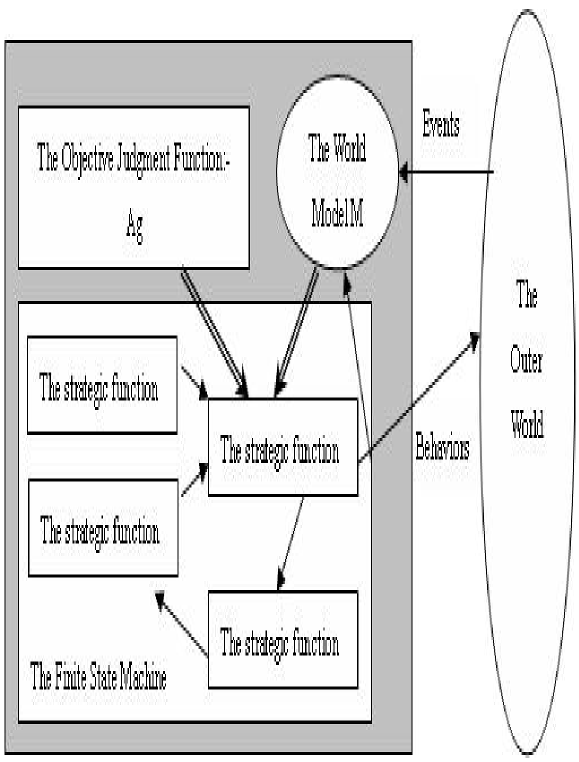

Fig. 3.1 Arch. Design View of TMS

The design process

There is a logical design process that should be followed when preparing a signal timing design. These field problems provide you with a context and motivation for applying the concepts. We attempt to provide this same framework. You will be provided a means to assess the quality of your design, working with your instructor. The feedback that you get from this assessment is a powerful means to improve the quality of your work as well as to insure that you have mastered the principles that we present.

4. Conclusion

These days is called as technology mania days, where people always try to take the benefit of new technology. Hence this paper likely to conclude in making one thing to give high effective solution to traffic management. As of SaaS and IaaS is concerned to implement the strategy of traffic by making developed TMS. Implementing an inbound transportation program is not a trivial undertaking, but today's SaaS TMS systems make it easier than ever before and deliver very high, very fast and very measurable return on investment. And, in today's economy, there is no justification for leaving money on the table, especially when the same initiative that reduces transportation costs leads to so many other process improvements

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