Information Services for Smart Cities using Cloud Computing and Rest Web Services

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Abstract—For informed and intelligent planning decision making and policy making in smart cities public involvement and citizen science are the important factors. Be that as it may, subjects go up against a sensible issue in detailing lucid data sets from the expansive volumes of information accessible to them. These expansive information volumes show up on account of the expanded use of data and correspondence advancements in urban settings and neighborhood powers’ dependence on such advances to oversee urban settlements proficiently. To empower public participation in urban administration of keen urban communities, people in general should be encouraged with the privilege relevant data about the attributes and procedures of their urban surroundings to add to the parts of urban administration that influence them, for example, financial exercises, personal satisfaction, natives prosperity and so forth. The urban areas then again confront challenges as far as group sourcing with quality information gathering and institutionalization, administrations between operability, provisioning of computational and information stockpiling foundation.

Keywords—Cloud Computing, ICT, Information Services, REST, Urbanization.

I. INTRODUCTION

A smart city is taking or trying numerous endeavors to make a best utilization of inventive ICT answers for oversee urban issues identified with individuals, portability, security, economy, environment and asset administration and general wellbeing and so on. As the population in cities is rapidly increasing day by day, so it is the need of time to the solutions for the governance and administration of urban cities. Providing the services to the citizens is the main concern for all government around the globe. In India this is extremely challenging task because of its diversity and huge population which is more than 125 Corer.

In the present period the Government is giving citizen services through e-Government, it is an absolute necessity that there is an open door for all nationals show everywhere throughout the nation to have some type of access to these e-Government administrations. Cloud computing model also offers an simple method of accomplishing the unified application model across all local government bodies with multi-tenancy [5].

II. PROBLEM STATEMENT

As the technology is changing day by day in our everyday lives, it is extremely enthralling to envision what will be coming next later on era. Internet is the best technology of the information age and explosion of communication in the 21st century. It can also be stated that mankind is connected altogether to the ICT (Information and Communication Technology). As the population is expanding day-by-day and furthermore the changing trends and technology in the world, so the world and the country needs to find some of the smarter ways to manage complexities, reduce the expanses, increase the efficiency and also improve the quality of urban lifestyle. A smart city makes an endeavor to make the best utilization of innovative ICT solutions to manage the urban issues related to mobility, people, economy, security, environment and resource management, public health etc [6]. A cloud based information services can be used for the betterment of citizens in smart cities and is also the fine try to deal with the needs of smart city and the citizens of city by providing the different services related to the sector of the Governance, Environment, Infrastructure, and Society.

III. LITERATURE SURVEY

Connection mindful frameworks taking into account area open up new possible results to clients as far as gathering so as to gain custom administrations setting data, especially in frameworks where the high versatility of clients assembles their usability. This connection displays a protection saving arrangement offering setting mindful administrations taking into account area in portable distributed computing. The author proposes a middleware, called PRECISE, which furnishes users with custom context-aware suggestions. These suggestions are given by considering the setting data, furnishes users with custom context-aware suggestions. These suggestions are given by considering the setting data, and the clients’ areas, assurance approaches, and already went to puts. Mobile Cloud Computing assumes a key part in this arrangement, moving the information preparing and capacity needs to the cloud, and also encourages focal points, for example, versatility and burden adjusting. An intensive discourse when contrasting PRECISE and other related works.
affirms that this arrangement enhances the most important recommendations so far [3].

The advances in remote correspondence methods, versatile distributed computing, and connection mindful innovations bolster a creating energy for the arrangement, change, and association of vehicular frameworks for rising applications. This prompts an expanding developmental propensity to change from vehicular systems toward cloud-helped context-aware vehicular cyber physical systems. In this article, the writer at first proposed a multi-layered setting mindful engineering and presents two essential administration parts, vehicular informal communities and connection mindful vehicular security. At that point the creator proposed an application situation with respect to the connection mindful element illuminating so as to stop administrations the cloud-helped design and rationale stream. At long last, the creator explored the difficulties and conceivable arrangements, including connection mindful wellbeing risk expectation, setting mindful element vehicle steering, and connection mindful vehicular mists [2]. A framework for cloud-based context-aware information services for citizens in smart cities is our base paper and by taking the reference of this paper we are going to implement our project. Through this paper the creator highlighted the issues that offer adapt to present circumstances for subjects and open organizations of savvy urban communities, recognize the ancient rarities and partners included at both finishes of the range and propose an applied system to address these difficulties. The problem in this paper was that it does not deals with environmental data such as the content of O₂, CO₂, Humidity, temperature, etc. rather we are going to implement the project for raising the problems related to electricity, roads, cleanliness etc. which the normal person faces in his day to day life. Due to this android app a user or citizen can directly interact with the government bodies and thus enhance the e-Governance and will lead for the development of smart city [1].

IV. RELATED WORK

REST

On this point of view, the Representational State Transfer (REST) design style, created as a conceptual model of the Web engineering is viewed as a source of perspective worldview for bringing sensors, and all the more by and large brilliant things, into the Web. To be sure, REST characterizes an arrangement of standards for planning dispersed hypermedia application satisfying versatility, effortlessness, and freely coupling prerequisites. REST was proposed by Fielding in his doctoral thesis as a design style for building vast scale appropriated hypermedia frameworks. By the REST vision, information sets and objects taken care of by client–server application rationale are demonstrated as assets. REST key standards are fivefold. [4]

1) URIs as asset identifiers. Assets are uncovered by servers through URIs. Since URIs fit in with a worldwide tending to space, assets related to URIs have a worldwide extension.

2) Uniform interface. The communication with the asset is completely communicated with four primitives, i.e., make, read, redesign, and erase. These operations can be mapped onto HTTP strategies: GET peruses the asset state, PUT redesigns the asset state, DELETE erases an asset, what's more, POST broadens an asset by making a tyke asset.

3) Self-distinct messages. Every message contains the data required for its administration.

4) Stateless connections. Every solicitation from customer to server must contain the data required to completely get it and is free of any past solicitation.

5) Hypermedia As the Engine Of Application State (HATEOAS).

A hypermedia framework is portrayed by members exchanging asset representations that contain joins; the customer can advance to the following stride in the communication by picking one of these connections. Verifiably, two styles restricted in the Web administrations field: Service Oriented Architecture (SOA) and Resource-Oriented Engineering (ROA), i.e., WS-* and REST. Pautasso et al. think about RESTful and WSDL/SOAP-based Web administrations, utilizing compositional standards and choices. The creators infer that RESTful administrations are more suited for strategic advertisement hoc combination over the Web (à la Mashup) [4].

V. SYSTEM ARCHITECTURE

The capabilities required in a Cloud domain to get incorporated insight for urban administration frameworks. These capabilities give a sound establishment to react to keen urban communities prerequisites by building up information services in a Cloud Environment [1].

![Fig. 1: Block Diagram Of System Architecture](image-url)
Here we apply the proposed system and receive the Cloud-based layered building design proposed. The layered structural introducing so as to plan is stretched out setting mindful abilities to react to prerequisites of access to relevant data by natives and also information procurement on interest premise, as delineated in above figure. The proposed structural planning can be utilized to fabricate either a stage as - an administration or a product as-an administration arrangement [1].

For instance, when it is utilized to fabricate displaying administration, at that point it turns into a stage as-an administration arrangement on top of which different administrations can be built. When it is utilized to fabricate an administration that communicates specifically with clients, for instance through representation, then it turns into a product as-a service arrangement. In ‘Evidence of the idea’ segment we present it as a product as-an administration model. The building design portrayed in above figure comprises fundamentally of five level and two vertical layers. In our base up methodology, the Platform Integration, Thematic and Data Procurement and Analysis layers yield non specific information, which can be custom-made to particular shrewd urban areas related application needs in the main three layers. One of the configuration standards here is to present setting mindful segments at diverse layers of the structural engineering keeping in mind the end goal to consistently coordinate the vertical stream of information and hold or partner relevant data. Beneath we walk through the above building design with the target that how every layer contributes towards giving logical data to end clients for different purposes [1].

**A. Data Gathering and Analysis Layers:**
The Data Gathering and Analysis layer allows collection of data from various Sources including remote database repositories, and citizens’ observations, e.g. using smart phones, in the Cloud environment.

**B. Categorization Layer:**
The Categorization layer arranges the procured information into application particular topical classes and performs information harmonization and overhauls the information/administration inventories for further utilization of the information.

**C. Administration Composition Layer:**
Necessary processing is done at this layer.

**D. The Application Service layer:**
The Application Service layer uses the results from Administration Composition Layer. It also act as interface between client application and cloud [1].

VI. EXPERIMENTAL SETUP

The experimental setup is shown Figure 3. The smart device application sends data to the cloud infrastructure via the internet. The REST API’s are used to exchange the data between cloud and user application. Cloud instance is running at cloud provider’s side.

Following figure shows the records received on server.
VII. RESULTS

Using the above experimental setup the information from the citizens is gathered using the smart devices (e.g. Smart Phones) in the forms of text feeds. These feeds are used to know the current situations from the city. The feeds are administrated to know the problems that citizens are facing.

Table I.
Records of Feeds

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Number of Feeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic</td>
<td>882</td>
</tr>
<tr>
<td>Street Lights Running in Day</td>
<td>154</td>
</tr>
<tr>
<td>Others</td>
<td>364</td>
</tr>
<tr>
<td>Total Feeds</td>
<td>1400</td>
</tr>
</tbody>
</table>

The received feeds are analyzed and mined and results are as shown in figure . These feeds can be used by administration bodies to solve the above issues in the city.

VIII. CONCLUSION AND FUTURE WORK

The capabilities required in a Cloud domain to From this framework we have quickly displayed a keen urban areas point of view and contended that it requires heap of complex cooperation between its distinctive applications to produce insightful data for shrewd urban administration. Further, we have recommended that Cloud figuring can give a suitable registering framework to information stockpiling and preparing needs of keen urban communities applications. We additionally underline that, on one hand, end clients e.g. subjects can gather information from their surroundings and, then again, ought to have the capacity to get to keen data from a savvy urban communities based coordinated data framework with sensible nature of administration. Our future work aims to develop the system which will also take the environmental data into the account

REFERENCES

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