IOT BASED SMART CITY MANGEMENT USING IAS: A Survey

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Abstract: *One of the key factors in the current IT systems in Indian administrative organizations is the lack of easy access to data by entities outside the organization, especially for machine applications. Though data is abundant, it is unless fastened up in fashionable arrangements or unavailable because of a shortage of APIs. In this report, we look at architectural constructs that will facilitate the straightforward exchange of data. Hence we take a data information-centric view of the reference architecture as opposed to an application/communication-centric view. IoT (Internet of Things) is a new technology that has emerged over the last few years and it promises a further explosion of data sources. This technology will essentially allow any "thing" to produce and communicating data. For instance, every streetlight, lamp post, garbage bin, transformer, etc.–almost anything one chooses, can be made to continuously report their status, their observations, their usage patterns, etc. Downstream business administration can use this data processes to provide timely, efficient, value-added services. In this statement, we surround ourselves privately to architectural constructs to merge these new IoT-based schemes in the Smart City foundation.*

Keywords: **Internet of Things, APIs, Application, Smart City.**

1. INTRODUCTION

It has been well recognized that data/information connectivity will be key to enable the emergence of new smart applications and its main ingredient is the concept of linked data. What this entails is there should be some additional data about the data called meta-data that can place the data in a broader context. However, if that number stream is annotated with additional information like the location of the device, the make of the device, the units of the reading, the time samples, etc., it allows for a richer and more meaningful interpretation of the data stream, uniquely by new users. While it is not challenging technologically to provide this meta-data, in practice there are no agreed-upon standards nor requirements to provide this. Hence, a key aspect of our study is to look at possible data formats (or schemas) that could be used for IoT The ongoing implementations of Smart City solutions, have tended to be "soloed", i.e. each application has an end-to-end implementation that stands alone, and doesn't interact with other applications. In the IoT context, devices can be integrated based on the geographic location and evaluated by using an analyzing system. Sensor services for the collection of particular data can be used with several occurring projects concerning the monitoring of cyclists, vehicles, public parking lots, etc. Many service domain applications use IoT infrastructure to facilitate operations in air and noise pollution, the mobility of vehicles, and surveillance systems.

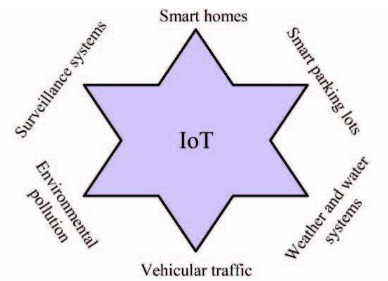

Figure 1. The main applications of the IoT

2. Literature Review

Survey of Existing Methods

Jayti Bhatt, Jignesh Patoliya entitled "Real-Time Water Quality Monitoring System". This paper describes ensuring the safe supply of drinking water the quality should be monitored in real-time for that purpose new approach to IoT (Internet of Things) based water quality monitoring has been proposed. In this paper, we present the design of IOT based water quality monitoring system that monitors the quality of water in real-time. This system consists some sensors which measure the water quality parameter such as pH, turbidity, conductivity, dissolved oxygen, temperature. The measured values from the sensors are processed by a microcontroller and these processed values are transmitted remotely to the core controller that is raspberry pi using Zigbee protocol. Finally, sensor data can view on an internet browser application using cloud computing. [2].

Michal Lom, Ondrej Pribyl, Miroslav Svitek entitled "Industry 4.0 as a Part of Smart Cities". This paper describes the conjunction of the Smart City Initiative and the concept of Industry 4.0. The term smart city has been a phenomenon of the last years, which is very inflected especially since 2008 when the world was hit by the financial crisis. The main reasons for the emergence of the Smart City Initiative are to create a sustainable model for cities and preserve the quality of life of their citizens. The topic of the smart city cannot be seen only as a technical discipline, but different economic, humanitarian or legal aspects must be involved as well. In the concept of Industry 4.0, the Internet of Things (IoT) shall be used for the development of so–called smart products. Subcomponents of the product are equipped with their intelligence. Added intelligence is used both during the manufacturing of a product as well as during subsequent handling, up to continuous monitoring of the product lifecycle (smart processes). Other important aspects of Industry 4.0 are Internet of Services (IoS), which includes especially intelligent transport and logistics (smart mobility, smart logistics), as well as Internet of Energy (IoE), which determines how the natural resources are used in the proper way (electricity, water, oil, etc.). IoT, IoS, IoP, and IoE can be considered as an element that can create a connection of the Smart City Initiative and Industry 4.0 – Industry 4.0 can be seen as a part of smart cities.[3].

Zhanwei Sun, Chi Harold Li, Chatschik Bisdikian, Joel W. Branch and Bo Yang entitled "QOI-Aware Energy Management in Internet-of-Things Sensory Environments". In this paper, an efficient energy management framework to provide satisfactory QOI experience in IoT sensory environments is studied. Contrary to past efforts, it is transparent and compatible to lower protocols in use, and preserving energy-efficiency in the long run without sacrificing any attained QOI levels. Specifically, the new concept of QOI-aware "sensor-to-task relevancy" explicitly considers the sensing capabilities offered by a sensor to the IoT sensory environments, and QOI requirements required by a task. A novel concept of the "critical covering set" of any given task in selecting the sensors to service a task over time. Energy management decision is made dynamically at runtime, as the optimum for long-term traffic statistics under the constraint of the service delay. Finally, an extensive case study based on utilizing the sensor networks to perform water level monitoring is given to demonstrate the ideas and algorithms proposed in this paper, and a simulation is made to show the performance of the proposed algorithms. [4].

Husam Rajab; Tibor Cinkelr **IEEE *Xplore*:** 12 November 2018
The massive deployment of the Internet of Things (IoT) is allowing Smart City projects and initiatives all over the world. The IoT is a modular approach to merge various sensors with all the ICT solutions. Over 50 billion objects will be connected and deployed in smart cities in 2020. The heart of smart city operations is IoT communications. IoT is designed to support the Smart City concept, which aims at utilizing the most advanced communication technologies to promote services for the administration of the city and the citizens.

This paper is presenting a comprehensive review of the concepts of IoT and smart cities and their motivations and applications. Moreover, this paper describes the main challenges and weaknesses of applying the IoT technologies based on smart city paradigms [5].

Andrea Zanella **IEEE** the Internet of Things (IoT) shall be able to incorporate transparently and seamlessly a large number of different and heterogeneous end systems while providing open access to selected subsets of data for the development of a plethora of digital services. Building a general architecture for the IoT is hence a very complex task, mainly because of the extremely large variety of devices, link layer technologies, and services that may be involved in such a system. In this paper, we focus specifically on an urban IoT system that, while still being quite a broad category, is characterized by its specific application domain. Urban IoTs are designed to support the Smart City vision, which aims at exploiting the most advanced communication technologies to support added-value services for the administration of the city and the citizens. This paper hence provides a comprehensive survey of the enabling technologies, protocols, and architecture for an urban IoT. Furthermore, the paper will present and discuss the technical solutions and best-practice guidelines adopted in the Padova Smart City project, a proof-of-concept deployment of an IoT island in the city of Padova, Italy, performed in collaboration with the city municipality[6].

Robert R. Harmon The smart city concept represents a compelling platform for IT-enabled service innovation. It offers a view of the city where service providers use information technologies to engage with citizens to create more effective urban organizations and systems that can improve the quality of life. The emerging Internet of Things (IoT) model is foundational to the development of smart cities. The integrated cloud-oriented architecture of networks, software, sensors, human interfaces, and data analytics are essential for value creation. IoT smart-connected products and the services they provide will become essential for the future development of smart cities. This paper will explore the smart city concept and propose a strategy development model for the implementation of IoT systems in a smart city context [7].

Jally Sahoo Now a day, governments of different countries are considering implementing the smart city concept in their major cities in social, technical, economic, and political sectors by executing big data applications, thus offering opportunities for constant refinement of the concept of the smart city. Smart cities utilize multiple technologies to improve the performance of health, transportation, energy, education, water services, and waste management system to improve the living standards of their citizens. In the transportation system, the city government needed better ways to monitor and manage local traffic to provide better transportation services to the public. The digital monitoring devices installed in the city's key checkpoints capture images and video data continuously. The increasing amount of traffic data now poses challenges in the city's ability to effectively manage traffic. One of the recent technologies that have a huge potential to address the challenge is big data analytics. Effective analysis and utilization of big data is a key factor for success in many business and service domains, including the smart city domain. This paper presents a detailed review on different issues and applications of it in smart city implementation under a heterogeneous network condition such as cloud computing, wireless network, and smart grid applications [8].

3. Proposed Algorithm

When decrease or mapping effects are discovered on varied gathered machines, supplementary programming logic necessity is appended to locate and aggregate effects from each machine as necessitated. Besides, pieces of a product must be earmarked (mapped) to certain machines in a custom that does not influence the outcomes. Throughout the association of idioms, for occurrence, one decision should not be burst crossed various nodes since this could cause idioms to be burst crossed joints and afterward craved throughout idiom testimony as a conclusion.

Map mitigation schemes can extend in size from one computer to thousands of grouped workstations in some enterprise-level manners. The C# programming language offers a chain of thread-safe items that can pleasantly and instinctively be used to create map decrease habit programs. The subsequent subdivisions explain some of these objects and show examples of how to implement robust resemblance map compression manners using them.

1. Creating a dataset
2. Implementing the algorithm (NLP)
3. Implementing text filter
4. Data formation module
5. Data structuring module

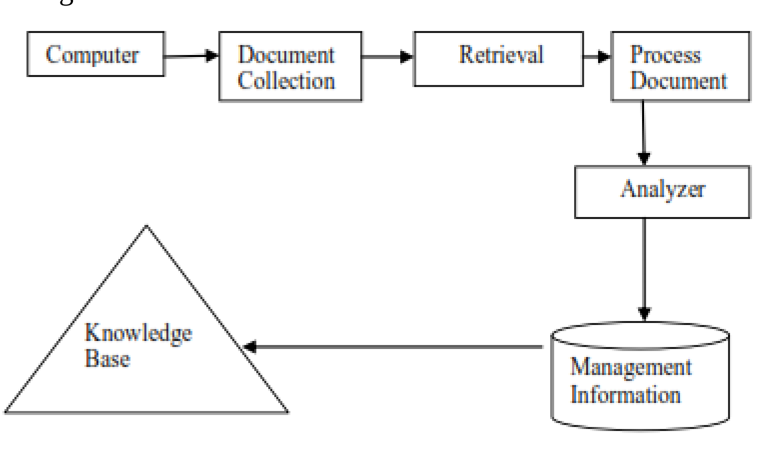

Figure 2. Flow chart for proposed system

3.1 Research Methodology

The end IoT devices can only interact with a specific vendor software stack. This kills the interoperability of the IoT devices. While a “dumb” bulb from any number of different vendors could be used before, now one could get locked into a “smart” bulb from only a single vendor. This is principally due to the deficiency of an agreed-upon data schema/data design for the IoT projects.

The data from the devices is locked up in the vendor system in proprietary formats. Hence it is not easy for the owner (city) to share or reuse the data for other purposes – or even monetize it later. The application for visualization/dashboarding and control of the devices are tightly coupled to the devices. For instance, it will not be easy for a 3 party to develop a control application for the same IoT devices. An analysis of the use cases of the Indian smart cities (Appendix A) will indicate that some of the sensors – especially the cameras, can be used across several different applications provided the right analytics are developed. With the contemporary implementation method, this is not quickly doable – except the equal businessperson conveys up this responsibility.

One of the key resources for the cities will be data. Easy access to data will of course be of great benefit to the city administration itself in terms of adopting “data-driven policy and decision making”. Besides, easy access to data could spur innovations and novel applications that will benefit the citizens

4. Expected Outcome

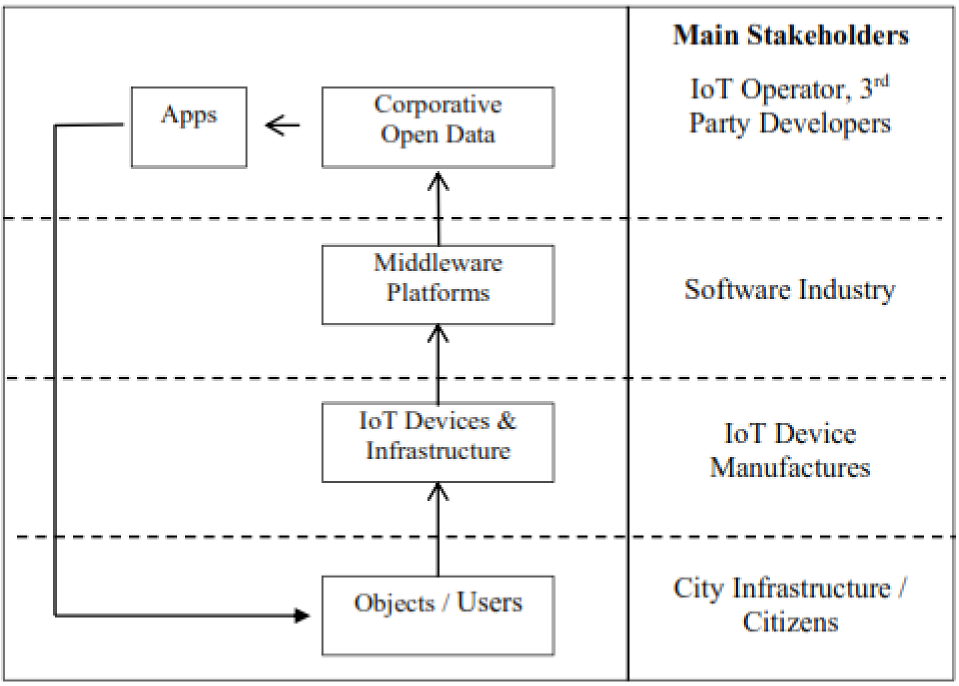

Figure 3. System Block Flow

Resource endpoints that allow one to access a specific instance or subset of the resource data items will be serviced by Datastores (or databases). For example, these endpoints can be used for requesting the last known state of a streetlight or the values of the luminance level over the past week from a particular street light. These will be serviced by database queries in the back end. The type of database used to store the resource values will be indicated in the meta-data for the resource in the catalog and hence the appropriate APIs can be used by applications to access the desired information. This mechanism will allow a diverse set of stores to be used – each tuned for the kind of data represented by the resource. Most databases offer REST APIs for interactions. Modern database technologies can also be readily acquired in the eventuality.

Conclusion

The city should get a further proactive performance and have inspirations to obtain everything that happens. So for example a minimum volume and period guarantee for a service-at-a-price contract would make the vendor provide very good offers. The City can discover different price points for different levels of guaranteed volumes and make a decision based on a realistic assessment of what can be done. This will also force different government departments to coordinate far more actively than in the past. This is anyway a prerequisite for the long-term vision of Smart City Mission.

The proposed system will attract the common man to register any complaint otherwise neglect to register complaints since he/she has to personally visit the office and give the complaint in writing. This system reduces the paperwork which is required to note down complaint registered by users also maintaining a database is easier than the file system. The user can easily view the status of their registered problem.

In the future, we can extend this project for Municipal Corporation by extending Problem solving modules. We can also develop this project in Android.

REFERENCES

[1] S. R. Pandey, N. H. Tran, M. Bennis, Y. K. Tun, A. Manzoor, and C. S. Hong, "A crowdsourcing framework for on-device federated learning," arXiv preprint arXiv:1911.01046, 2019

[2] Y. Jiang, T. Zhang, and Z. Wang, "Clustering based physical-layer authentication in edge computing systems with asymmetric resources," Sensors, vol. 19, no. 8 p. 1926, April 2019

[3] Q. Yao, J. Ma, R. Li, X Energy-aware rfid authentication in edge computing 2019

[4] C. Wang, J. Shen, Q. Liu, Y. Ren ant encrypted transmission for internet of things, 2019.

[5] B. L. Parne, Supta: International Case Studies on Smart Cities," BIS Research Paper No. Segb: Security enhanced group based aka protocol for m2m,IEEE Access 2018.

[6] Caldwell, R., "Portland, a city of smart growth," The Masthead, vol. 54, no. 1, p. 29, 2002.

[7] Caragliu, A., C. Del Bo, and P. Nijkamp, "Smart cities in Europe", Journal of Urban Technology, vol., no. 2, pp. 65-82, 2011.

[8] Castro-Leon, E, "The consumerization in the IT ecosystem", IEEE IT Professional, vol. 16, pp. 20-27, 2014

[9] Chambers, J., "Are you ready for the internet of everything?" Davos, Switzerland: World Economic Forum, January 15, 2014. Retrieved 1/20/15, https://agenda.weforum.org/2014/01/are-you-ready-for-theinternet-of-everything/