Survey on Usage of Internet of Things in smart city

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Abstract: *The wide adoption of networked, pervasive, and mobile computing systems gave rise to the term of "smart cities," which nowadays must also imply the ability of sustainable city growth. The Internet-of-Things is a central enabler in this perspective, facilitated by the widespread availability of commodity low-power sensors, partially autonomous actuators and robots, smartphones, tablets, and their wireless connectivity solutions. IoT represents a system which consists a things in the real world, and sensors attached to or combined to these things, connected to the Internet via wired and wireless network structure. The IoT sensors can use various types of connections such as RFID, Wi-Fi, Bluetooth, and ZigBee, in addition to allowing wide area connectivity using many technologies such as GSM, GPRS, 3G, and LTE. IoT-enabled things will share information about the condition of things and the surrounding environment with people, software systems and other machines. by the technology of the IoT, the world will becomes smart in every aspects, since the IoT will provides a means of smart cities, smart healthcare, smart homes and building, in addition to many important applications such as smart energy, grid, transportation, waste management and monitoring . In this paper we review a concept of many IoT applications and future possibilities for new related technologies in addition to the challenges that facing the implementation of the IoT.*

Keywords: *IoT, RFID, smart cities,*

1. INTRODUCTION:

It starts to be recognized that mobile edge computing can play a central and relevant role for the scalability of network infrastructures and applications for IoT in smart cities in the near future. However, the successful employment of mobile edge computing solutions in the field still requires tackling many new and open technical issues. Only to mention some examples, in order to efficiently exploit computation and storage resources at mobile edge nodes, there is the need for joint optimization of dynamic placement of computation/storage resource (also considering stateful/stateless live migration opportunities) and cell-association with radio resource allocation. Such joint optimization should be adaptive according to time-varying environments, e.g., varying wireless channel states and dynamic computation/storage resource utilizations, in their turn depending on users' mobility, often statistically predictable in terms of patterns that are inferred based on "big monitoring data" originated by the smart city .

Internet of Things is a new technology of the Internet accessing. By the Internet of Things, objects recognize themselves and obtain intelligence behavior by making or enabling related decisions thinks to the fact that they can communicate information about themselves . These objects can access information that has been aggregated by other things, or they can added to other services . Figure reviews that with the internet of things, anything's will able to communicate to the internet at any time from any place to provide any services by any network to anyone. this concept will create a new types of applications can involve such as smart vehicle and the smart home, to provide many services such as notifications, security, energy saving, automation, communication, computers and entertainment . By developing the IoT technology, testing and deploying products it will be much close to implementing smart environments by 2020 . In the near future, storage and communication services will be highly pervasive and distributed: people, machines, smart objects, surrounding space and platforms connected with wireless/wired sensors, M2M devices, RFID tags will create a highly decentralized resources interconnected by a dynamic network of networks . The IoT is a recent communication paradigm that envisions a near future in which the objects of everyday life will be equipped with micro-controllers, transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with the users, becoming an integral part of the Internet [1]. However, such a heterogeneous field of application makes the identification of solutions capable of satisfying the requirements of all possible application scenarios a formidable challenge. This difficulty has led to the proliferation of different and, sometimes, incompatible proposals for the practical realization of IoT systems. Therefore, from a system perspective, the realization of an IoT network, together with the required backend network services and devices, still lacks an established best practice because of its novelty and complexity. In addition to the technical difficulties, the adoption of the IoT paradigm is also hindered by the lack of a clear and widely accepted business model that can attract investments to promote the deployment of these technologies [3].

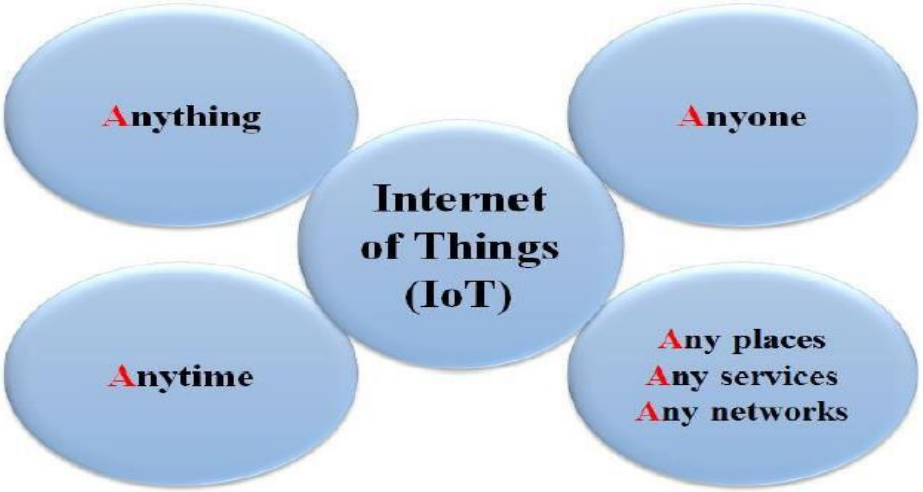

Fig 1: IoT Concepts

2. SMART CITIES APPLICATION:

Many major cities were supported by smart projects, like Seoul, New York, Tokyo, Shanghai, Singapore, Amsterdam, and Dubai. Smart cities may still be viewed as a cities of the future and smart life, and by the innovation rate of creating smart cities today's, it will became very feasible to enter the IoT technology in cities development . Smart cities demand require careful planning in every stage, with support of agreement from governments, citizens to implement the internet of things technology in every aspects. By the IoT, cities can be improved in many levels, by improving infrastructure, enhancing public transportation. reducing traffic congestion, and keeping citizens safe, healthy and more engaged in the community . By connection all systems in the cities like transportation system, healthcare system, weather monitoring systems and etc., in addition to support people by the internet in every place to accessing the database of airports, railways, transportation tracking operating under specified protocols, cities will become smarter by means of the internet of things

2.1 Smart city services

we overview some of the services that might be enabled by an urban IoT paradigm and that are of potential interest in the Smart City context because they can realize the win-win situation of increasing the quality and enhancing the services offered to the citizens while bringing an economical advantage for the city administration in terms of reduction of the operational costs [8]. To better appreciate the level of maturity of the enabling technologies for these services, we report in Tab. I a synoptic view of the services in terms of suggested type(s) of network to be deployed; expected traffic generated by the service; maximum tolerable delay; device powering; and an estimate of the feasibility of each service with currently available technologies. From the table it clearly emerges that, in general, the practical realization of most of such services is not hindered by technical issues, but rather by the lack of a widely accepted communication and service architecture that can abstract from the specific features of the single technologies and provide harmonized access to the services.

Fig 2: services in smart cities

The explosive growth of Smart City and Internet of Things applications creates many scientific and engineering challenges that call for ingenious research efforts from both academia and industry, especially for the development of efficient, scalable, and reliable Smart City based on IoT. New protocols, architectures, and services are in dire needs to respond for these challenges.

The motivation of the special issue is to bring together scholars, professors, researchers, engineers and administrators resorting to the state-of-the-art technologies and ideas to significantly improve the field of Smart City based on IoT.

2.2 System Implementation

- Street light control – We are planning to install light detecting sensors on every street light which will detect when darkness has fallen. The sensors will automatically register this fact and turn on the street lights without human intervention. Thus, the street lights will be switched on as soon as it becomes dark.
- Weather conditions – Temperature and humidity detecting sensors will be installed in different parts of the city that will continuously monitor the temperature and rain conditions. Thresholds are already defined in the main server and when the threshold is crossed by the sensor readings the end user will receive notifications like possibility of rainfall in certain area.
- Accident detection – Sound sensors and cctv cameras play an important role in this application. We know that whenever an accident occurs there is a possibility of traffic. The sound sensors and video feed monitor it continuously and is integrated into the GPS system. Thus, the user will get a notification and can choose an alternative route.
- Pollution levels – Sensors are put up at various locations which continuously monitor the pollution levels. When the thresholds are crossed, the user is notified and he may take appropriate measures to avoid the pollution.
- Bridge load capacity – This application is based on weight sensors which are installed on a number of bridges that monitor the load on the bridge. When the load on the bridge reaches to a certain limit, the traffic authorities are notified to divert the traffic away from the bridge until the load on the bridge is back to normal.

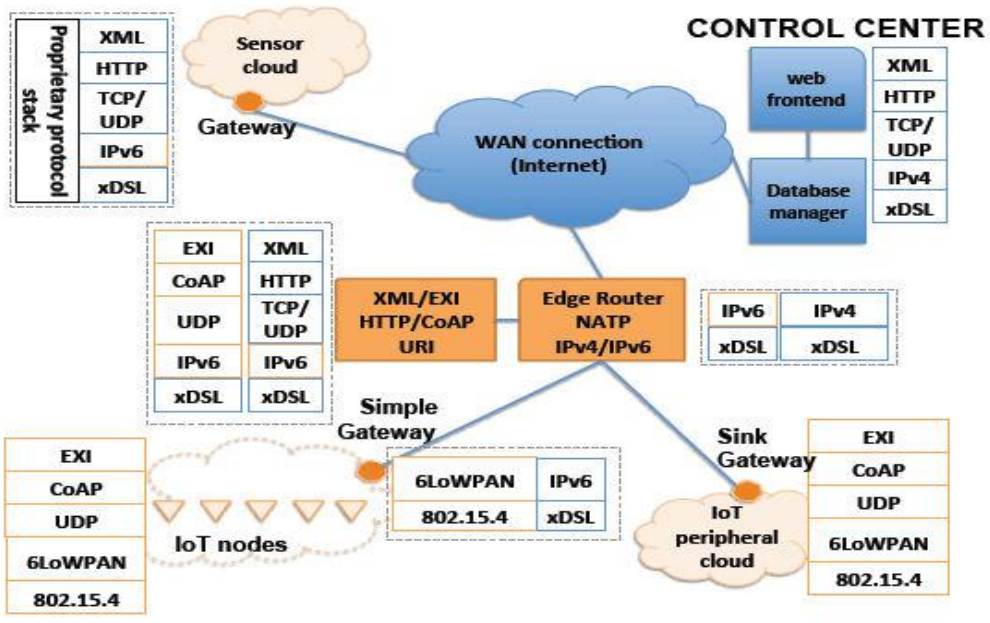

Fig3 : IoT web services approach

3. CHALLENGES IN URBAN IOT ARCHITECTURES:

From the analysis of the services described in Sec. II, it clearly emerges that most Smart City services are based on a centralized architecture, where a dense and heterogeneous set of peripheral devices deployed over the urban area generate different types of data that are then delivered through suitable communication technologies to a control center, where data storage and processing are performed. A primary characteristic of an urban IoT infrastructure, hence, is its capability of integrating different technologies with the existing communication infrastructures in order to support a progressive evolution of the IoT, with the interconnection of other devices and the realization of novel functionalities and services. Another fundamental aspect is the necessity to make (part of) the data

collected by the urban IoT easily accessible by authorities and citizens, to increase the responsiveness of authorities to city problems, and promote the awareness and the participation of citizens in public matters.

The fact that Internet of things applications and scenarios outlined above are very interesting which provides technologies for smart every things. , but there are some challenges to the application of the Internet of Things concept in cost of implementation. The expectation that the technology must be available at low cost with a large number of objects. IoT are also faced with many other challenges

Scalability: Internet of Things has a big concept than the conventional Internet of computers, because of things are cooperated within an open environment. Basic functionality such as communication and service discovery therefore need to function equally efficiently in both small scale and large scale environments. The IoT requires a new functions and methods in order to gain an efficient operation for scalability.

Self-Organizing: Smart things should not be managed as computers that require their users to configure and adapt them to particular situations. Mobile things, which are often only sporadically used, need to establish connections spontaneously, and able to be organize and configure themselves to suit their particular environment.

Data volumes: Some application scenarios of the internet of things will involve to infrequent communication, and gathering information's form sensor networks, or form logistics and large scale networks, will collect a huge volumes of data on central network nodes or servers. The term represent this phenomena is big data which is requires many operational mechanism in addition to new technologies for storing, processing and management.

Data interpretation: To support the users of smart things, there is a need to interpret the local context determined by sensors as accurately as possible. For service providers to profit from the disparate data that will be generated, needs to be able to draw some generalizable conclusions from the interpreted sensor data.

4. CONCLUSIONS:

IoT technology can be used for applications in this paper IoT involved in smart cities. Internet of things is a new technology which provides many applications to connect the things to things and human to things through the internet. Each objects in the world can be identified, connected to each other through internet taking decisions independently. A concrete proof of concept implementation, deployed in collaboration with the city of Padova, Italy, has also been described as a relevant example of application of the IoT paradigm to smart cities.

REFERENCES:

1. L. Atzori, A. Iera and G. Morabito, (2010), "The Internet of Things: A survey" , Comput. Netw. , vol. 54 , no. 15 , pp.2787 -2805 , [CrossRef]
2. T. S. Lopez, D. C. Ranasinghe, M. Harrison and D. McFarlane, (2012), "Adding sense to the Internet of Things an architecture framework for smart object systems" , Pers. Ubiquitous Comput. , vol. 16 , no. 3 , pp.291 -308 ,
3. Dunkels, F. Osterlind and Z. He , "An adaptive communication architecture for wireless sensor networks" , Proc. 5th ACM Conf. Networked Embedded Sensor Syst. (SenSys)
4. J. Jin, J. Gubbi, T. Luo and M. Palaniswami , "Network architecture and QoS issues in the Internet of Things for a smart city" , Proc. 12th Int. Symp. Commun. Inf. Technol. (ISCIT)
5. J. Gubbi, R. Buyya, S. Marusic and M. Palaniswami , (2013), "Internet of Things (IoT): A vision, architectural elements, and future directions" , Future Gener. Comput. Syst. , vol. 29 , pp.1645 -1660 , [CrossRef]
6. P. Bellavista, G. Cardone, A. Corradi, and L. Foschini,(Jun. 2013), "Convergence of MANET and WSN in IoT Urban Scenarios," IEEE Sensors Journal,vol.13, no.10, pp. 3558-3567,.
7. A. Laya, V. I. Bratu, and J. Markendahl,(20-23 Oct. 2013) "Who is investing in machine to-machine communications?", 24th European Regional ITS Conference, Florence, Italy,.
8. H. Schaffers, N. Komninos, M. Pallot, B. Trousse, M. Nilsson, and A. Oliveira,(2011) "Smart Cities and the Future Internet: Towards Cooperation Frameworks for Open Innovation", The Future Internet, Lecture Notes in Computer Science Volume 6656, pp. 431-446,.
9. D. Cuff, M. Hansen, and J. Kang,(Mar. 2008) "Urban sensing: out of the woods. "Communications of the ACM vol. 51, no. 3, pp. 24-33,