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# STUDY OF SMART CITY PLATFORM

**Abstract.** In this paper, we consider questions of models, tools, and ranking in the subject area of smart cities that served as the basis for the standardization of Smart City. Acquaintance with these problems allows us to assess and understand the origin and state of standardization in this field, which covers various aspects of the design, organization and functioning of a smart city. Also in this paper we are going to consider international strategies for the standardization of an intelligent city by an oneM2M consortium, in particular the standardization of M2M (Machine-to-Machine) and IoT (Internet of Things).

**Keywords:** ICT, Smart City, IOT, OneM2M.

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**Аңдатпа**. Бұл мақалада біз ақылды қалаларды стандарттау үшін негіз болатын ақылды қалалардың модельдерін, құралдарын және рейтингісін қарастырамыз. Осы проблемалармен танысу бізге ақылды қаланы жобалаудың, ұйымдастырудың және жұмыс істеудің әртүрлі аспектілерін қамтитын осы саладағы стандарттаудың пайда болуы мен жағдайын бағалауға және түсінуге мүмкіндік береді. Сондай-ақ, біз oneM2M арқылы ақылды қаланы стандарттаудың халықаралық стратегияларын, атап айтқанда M2M (құрылғыдан құрылғыға) және IoT (Интернет заттары) стандарттауды қарастырамыз.

**Түйін сөздер:** ICT, Ақылды қала, IOT, OneM2M.

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**Аннотация.** В этой статье мы рассмотрим модели, инструменты и ранжирование в предметной области умных городов, которые служат основой для стандартизации умного города. Знакомство с этими проблемами позволит нам оценить и понять происхождение и состояние стандартизации в этой области, которая покрывает различные аспекты дизайна, организации и функционирования умного города. Также мы рассмотрим международные стратегии для стандартизации умного города посредством oneM2M, в частности, стандартизацию M2M (от устройства к устройству) и IoT (интернет вещей).

**Ключевые слова:** ИКТ, Умный Город, IOT, OneM2M.

*Introduction*

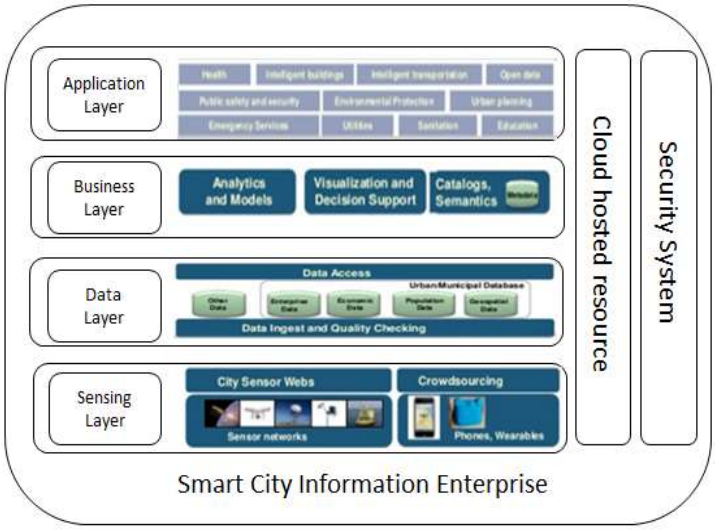
The exact definition of the Smart City may vary depending on who you speak to. However, the common idea around the Smart City refers to the use of IoT technology in an urban area to improve how a city functions.

ICT are a key factor in smart city initiatives. The integration of ICT in development projects can change the urban landscape and create a number of potential opportunities, the use of which can improve the efficiency of the city's management and functioning of resources and ensure the sustainability of its existence [1]. The development of information and communication technologies (ICT) allows us to formulate new approaches for searching for key factors that determine the success of realizing smart city models and projects. “Smart cities” can be defined as systems that integrate in the framework of a single city space such areas of activity as smart economy; smart mobility; smart environment; smart people; intelligent life; smart management. The future model “smart city” refers to self-actualizing systems, where the rights of access to a huge amount of information in real time belong to both the city’s leadership and citizens. Another set of problems is more social and organizational in nature. Problems of this type are highly interdependent, have competing goals and values, social and political complexity, they are concerned about the numerous and diverse stakeholders. In this sense, the problems of the city have become ominous and confusing. Across the world, the urgency of the numerous problems of cities has led to the search for clever ways of structuring them and searching for their solutions. One way to conceptualize the concept of a smart city is to model it as a sustainable and livable city. At present, issues related to the Internet of things (Internet of Things - IoT) and machine-to-machine interaction (M2M) attract much attention. At the same time, behind all these abbreviations there are quite real standards, applications and methods of information technologies. The city will become smart when investments in human and social capital and in the traditional (transport) and modern (ICT) communication infrastructure nurture sustainable economic growth and a high quality of life.

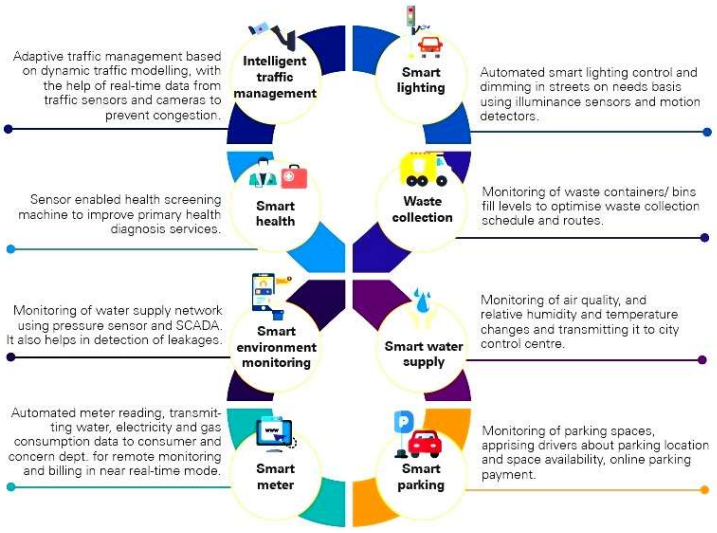
*IOT – The basics of the ICT component*

ICT is the main component of the Smart City which is illustrated by the scheme of ITU presented in Figure 1. The two lower levels here (sensors and data) are the Internet platform of Things (IoT). In other words, the Internet of Things, as a component, is responsible for collecting data in the Smart City. Services do not belong to IoT. They are entirely based on data, access to which is organized through a separate level. Services are considered

independently from each other. This approach inevitably leads to the fact that the services will duplicate the general functionality (data collection, analysis, data purification, transmission and storage).




It is IoT that serves as the main ICT component of the Smart City [2]. And city services simply use the data collected at this level. Hence, as a matter of fact, the term “data-driven cities” arose. He describes the Smart City in terms of ICT. Hence, the areas of standardization are naturally defined: collection, transmission, storage and analysis of data in cities. The importance of IOT for the Smart City (for its ICT component) is confirmed by the fact that it is at the only one IOT platform, oneM2M, that platforms of Smart Cities are built.




The IoT can also enable environmentalists to improve the air quality index in widely populated areas. By attaching devices to public transportation vehicles, IoT sensors can transmit air quality data from an entire metropolis. These insights give professionals the information they need to monitor and improve the quality of air, while managing and mitigating the future impact of pollution.

OneM2M technology was created in 2012 as a global initiative to ensure the most effective deployment of M2M systems and the Internet of things. The main objective of OnM2M is to develop technical specifications for the general service layer of M2M services (Figure 3), which could be integrated into various M2M hardware and software, and thus could connect them to M2M application servers around the world, This is the current duplication of M2M standards by country.

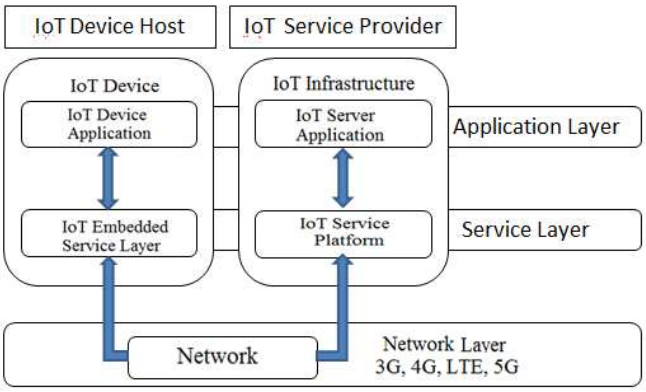



Figure 3**.** The oneM2M architecture schema

The priority business areas are: telematics and intelligent transport, medicine, utilities, industrial automation, smart homes, etc. [3]. Initially, oneM2M should prepare, approve and maintain the following technical specifications and technical reports: Use cases and requirements for them, taking into account the capabilities of the service layer; high-level architecture for the service layer, taking into account the requirements of independent access to services from end to end; protocols / API / standard objects based on this architecture (open interfaces and protocols); security and privacy aspects; availability and opening of applications; testing rules in accordance with specifications; collection of data for billing and statistical purposes; identify and naming devices and applications; information models and data management, including data storage and rules to sign / notify (subscribe / notify); general use cases, including interfaces / API between applications and the service layer, between the service layer and telecommunications networks [4].

Figure 3 shows the multi-level model oneM2M, which provides the provision of M2M services. This model includes three layers: the Application Entity (AE) layer, the Common Service Entity (CSE) layer, and the Network Service Entity (NSE) layer. The AE layer contains applications, for example, home, transport, blood sugar, etc. The CSE layer is the most complex and is the main [4]. It contains 12 functions, as shown in Fig. 4. These functions include device discovery, device and application management, data management and repository, authentication and security functions. The NSE network layer is traditional communication services: launching devices, managing them, including mobile services such as location determination.

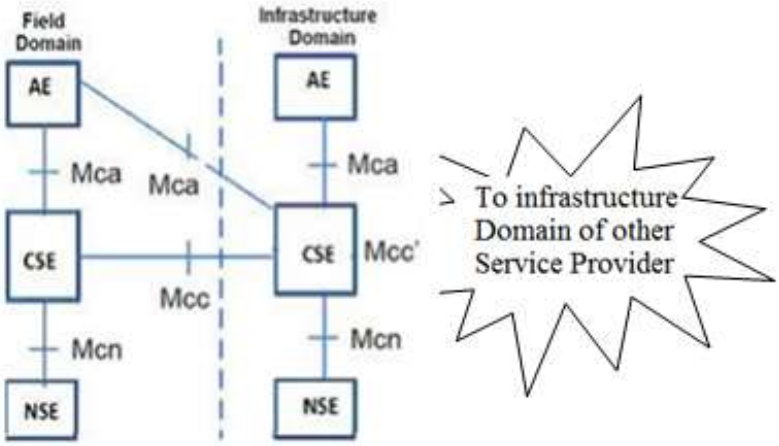



Figure 4. The basic architecture model of OneM2M

The communication between the six architecture blocks (in Figure 4) is defined by three interfaces: (1) the Mca interface between the AE and CSE nodes, provides access to the application to common services in the CSE; (2) Mcc interface between two CSE nodes; (3) Mcn interface between the CSE and the NSE communication network. In Fig. 9 there is another interface Mcc '- between two providers of M2M services (may coincide with Mcc).

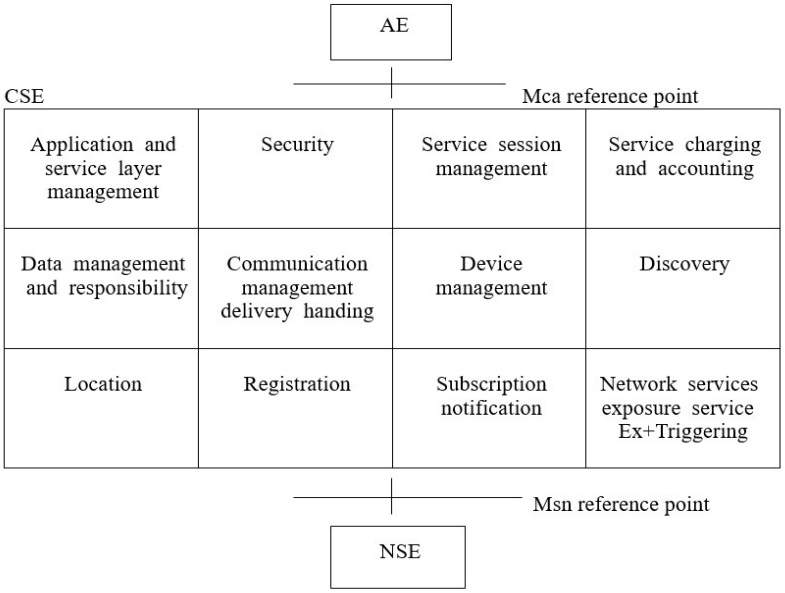



Figure 5 .CSE functions

The city with the integrated concept of Smart City is a more flexible and modern. It is able to react to natural phenomena and effectively use available resources. Only the availability of standards will enable the use of interchangeable individual components of different manufacturers. Only standardization can ensure the creation of a competitive market for such components and solutions. Smart cities need smart solutions that ensure a qualitatively new development, thereby maintaining the standard of living of modern people through the use of innovative technologies that provide for the economical and sustainable use of urban life systems. In the future, based on studied work with various M2m systems and IoT technologies, it is planned to build SC-platforms based on OneM2M standards.

However for IoT to be a success in Smart city, it must adhere to the principles:

- Creativity. Be innovative urban needs using state of art technology.
- Correlated. Allow working in tandem with various city services creating a mesh of citizen needs rather than existing in silos.
- Collaborative. Induce participative and equitable behavior allowing strong sense of ownership.
- Certified. Secure, safe usage ensuring privacy of citizens and stakeholders.

Things gain traction in smart cities, its sustainable and adoption in the urban landscape will need to be supported by human and social factors like ease of use, need equitable digital presence and privacy concerns.

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