

The Challenges of Smart City Implementation in Indonesia: Case Study of Sleman Regency, Special Region of Yogyakarta, Indonesia

¹Akhmad Habibullah, ²Dyah Mutiarin & ²Riska Sarofah

¹International Program of Government Affairs and Administration (IGOV)

²Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

*Corresponding author: abizurkati@gmail.com

ABSTRACT

The city's growth is accelerating, from year to year, the population in every city in the world increases drastically. This makes the cities in the world have the advantages as well as the challenge in facing the problem. Urban-specific problems such as congestion, flooding, public services that are not maximally controlling unstable resources are a problem to be solved together. Smart city concept is present to answer the challenge. By bringing forward effective city concepts and efficient smart city to be a new prima donna for every regional leader to be implemented. In Indonesia alone, smart city has begun in the adoption by many big cities, such as Jakarta, Bandung Surabaya, Makassar, and others. In Indonesia the government has also implemented the movement of 100 smart cities in Indonesia. In the year 2017 there are 24 districts that participated in the movement, including Sleman District. Sleman District is a district with a vision and mission in line with the concept of the smart city. In Sleman smart city application has been running for quite a while. But of course, in the application of the concept, there are many challenges that must be resolved by the government, such as community culture in using the internet, commitment from Government in its application and supporting technology realization intelligent district. This research departs from one of the important issues in Indonesia that a smart city, and also try to analyze the obstacles in the application of smart city, especially in Sleman regency. This research is library research with data collection was conducted through literature review by collecting various journal articles, websites, reports, and books. The collected data were then described and analyzed to satisfy the research purposes.

Key words: *Smart City, Sleman Smart Regency, Challenges.*

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BACKGROUND

The growth of cities in developing countries has become very cliché, despite the fact that urban funding and management have tried to overcome them. In the period between 1950-1990, the number of urban dwellers in the world has increased approximately threefold, from 730 million to 2.3 billion. Between 1990-2020 this figure will be doubled, past 4.6 billion. 93% of that amount will occur in a world that is in flourishing. It means that, more than 2.2 billion people will live in slum cities in the third world (Nurmandi & Kim, 2015).

As Colombijn (2015) says, population size of residents is always associated with problems and challenges for smart cities project. For Indonesia, the population is the dominant element, because, until the 2000 population census, Indonesia ranks fourth as the largest populated country after China, India and the United States.

The peace of a city is like a magnet for everyone who is looking for a place to try his fortune. As predicted by the Indonesian Central Bureau of Statistics in 2030, 60% of Indonesia's population will migrate live and settle in the city. This is what will cause serious problems if not handled appropriately. Classical issues such as public services in big cities, congestion, unemployment, excessive use of resources, increased crime rates, and even floods will remain an increasingly complicated problem to solve. In this regards, smart city concept is offered alternative solution for the urban cities problems.

The terminology of smart city has been used interchangeable with a city of knowledge, cities everywhere, sustainable cities, digital cities and others. There are many definitions of smart city, but none are universally recognized. However, from the literature analysis, smart city and digital city are the most commonly used terms in the literature to demonstrate the intelligence of a city. According to Cocchia (2012), smart city includes several definitions depending on the meaning of the word "smart".

Meanwhile, according to Nurmandi (2014), smart city definition refers to several important elements of human factors, technological factors, and institutional factors. From the intelligent human factors of the city is supported by creative humans in their work, knowledge networks, criminal-free environments. Smart city also refers to the city that has human, education, learning and knowledge become an important element of smart city. Social

and intellectual infrastructure that interacts with each other to support their social wealth, cultural wealth and economic potential.

The definition of technological factors, smart city is defined as a city that contains communication and information technology. The smart city is also called the city of information, the city of hybrid, digital cities and the like. What drives city dwellers is the smart card, which can be used for a wide range of interests, from transportation, health care, educational services, grant services and other services. The intelligent city definition of an institutional factor is defined by the California Institute for Smart Communities (2001) as a city that has city communities made up of governments, businesses and citizens understanding information technology and making decisions based on information technology.

Smart city is a city that can manage its resources effectively and efficiently to solve city challenges using innovative, integrated, and sustainable solutions to provide infrastructure and deliver municipal services that can improve the quality of life of its citizens (Garuda Smart City Model, 2012).

In Indonesia, the concept of a smart city has started to become one of the government's choice in realizing an effective and efficient government. Movement towards 100 Smart City in Indonesia which has done the government is a serious commitment of the government in realizing smart city in Indonesia. This idea was jointly initiated by the Ministry of Home Affairs, Ministry of Communications and Informatics, Public Works and Public Housing, National Development Planning Agency, and Office of Presidential Staff. While the expert team consists of academics and practitioners from universities such as University Indonesia (UI), Institute Technology Bandung (ITB), Perbanas, Citiasia, and various other institutions.

The movement of 100 Smart City in Indonesia will be done in 3 years which has started from the year 2017 ago, in the first quarter of 2017 and there are 24 districts and cities that have been included in the program is Bekasi City, Tangerang City, South Tangerang City, Purwakarta Regency, Bandung City, Bogor City, Cirebon City, Sukabumi City, Sleman Regency, Semarang City, Banyuwangi Regency, Bojonegoro Regency, Gresik Regency, Sidoarjo Regency, Bandung Regency, Singkawang City, KutaiKartanegara Regency, Samarinda City, Makassar City Tomohon, Mimika Regency, Jambi City, Pelalawan Regency, Siak Regency, and Banyuasin Regency.

Sleman Regency is one of the many cities that have entered the Smart City 100 Movement. Sleman Regency is a tourist destination, education and residential development, this causes an increase in the number of people from year to year. The relatively high growth of occupation is driven by population migration factors. Sleman district area grew into urban areas, consequently emerging challenges and opportunities in Sleman district development. The gap between rural and municipal areas to meet service standards, social poverty and security issues, quality and productivity of human resources and environmental management are becoming a common and growing urban problem which is also a problem in Sleman District.

This condition requires the Sleman regency government to be able to optimize the potential of resources and minimize the constraints faced. Development of Sleman Smart regency includes six elements of the smart city consist of the smart governance, smart branding, smart economics, smart living, smart society and smart environment. Creating Sleman smart regency is a must for Sleman regency government because smart regency has become the vision of Sleman District listed in medium-term development plan for the year 2016-2021.

In the year 2017, the government of Sleman Regency has developed a master plan of smart city development that will be the basis of program and activity implementation. Development of infrastructure and development of public facilities and improvement of traffic and transportation facilities such as installation of CCTV cameras, traffic control system areas, general street lighting and clean water management. The development of information technology (IT) infrastructure that includes the construction of data center room, the development of smart room is one of the accelerated improvement of public services that have been achieved in 2017 ago.

CONCEPTUAL FRAMEWORK

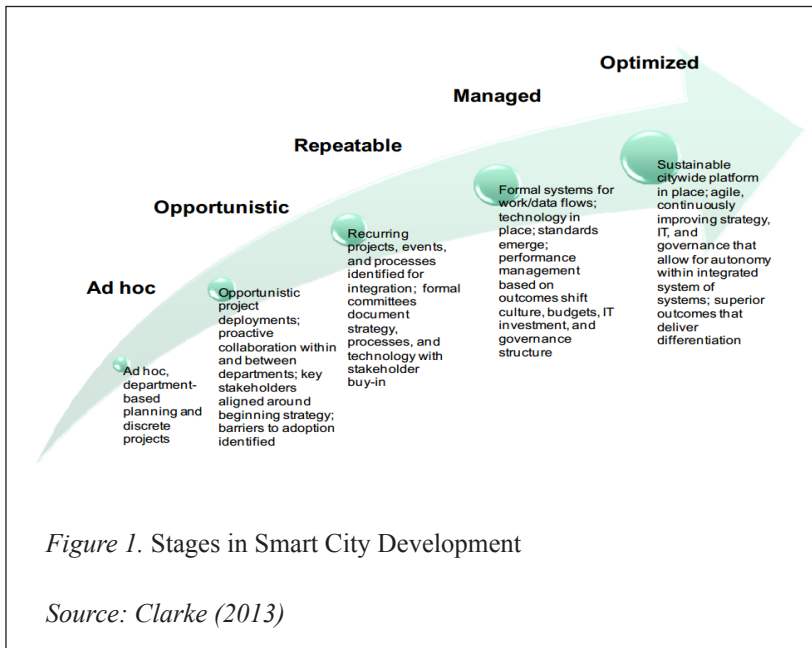
Smart City

The concept of smart city as a means to enhance the life quality of citizen has been gaining increasing importance in the agendas of policy makers. However, a shared definition of smart city is not available and it is hard to identify common global trends. This paper provides with a comprehensive understanding of the notion of smart city through the elaboration of a

taxonomy of pertinent application domains, namely: natural resources and energy, transport and mobility, buildings, living, government, and economy and people (Neirotti, 2014).

A strong and credible government is accompanied by creative and open-minded people will increase local productivity and accelerate the economic growth of a city. Important components of the smart city concept include three components: technology (hard infrastructure and soft infrastructure), human (creativity, education), and institutions (government and policy) (Nam & Pardo, 2011).

Furthermore, according to Griffinger in Rosalina (2017) The relationship of these three factors can create smart city, when investing in human capital. Furthermore, according to Griffinger in Rosalina (2017) the relationship of these three factors can create smart social and infrastructure with information and communication technology can promote sustainable development and improve the quality of life of the community with participative government. Smart City also has 6 dimensions that must be met to make it happen. The six dimensions of smart city are smart economy, smart people, smart governance, smart mobility, smart environment, and smart living.



Smart city is defined as a capability of city using human resources that lead to the introduction of social smart city. Social smart city is defined as a capability of city using human resources, social capital, and modern telecommunications infrastructure to realize sustainable economic growth and high quality of life through community-based governance (Rosalina, 2017). Meanwhile, according to Cohen (2014), smart city is divided into 6 parts: smart economy, smart governance, smart people, smart living, smart mobility and smart environment:

- Smart people: the human capital that well educated formally as well as non-formal and manifested in individuals or creative communities.
- Smart environment: the environment that provides comfort in the present and the future.
- Smart living: refers to the quality of life and culture community.
- Smart mobility: the system of movement that allows the occurrence fulfillment needs as soon as possible.
- Smart economic: the high level of economy and prosperity financial community with good economic growth and high per capita income.
- Smart governance: the policy paradigm of government and policy smart governance that takes care of principles National principle.

Public Service

Kurniawan (2005) said that public service is giving service to other people's need in accordance with the rules and procedures. Meanwhile, according to Sinambela (2006) says about public services as every activity undertaken by the government against a number of humans who have every activity profitable in a collection or unity and offer satisfaction even though the results are not bound to a product physically.

The reform demands in 1998 forced the government to make a paradigm shift in public service. Bureaucracy reform, especially in the field of public services continues to be rolled out even though it has not produced an ideal result, namely the bureaucracy that is based on a new paradigm of public administration. The effort is done through (i) serving the community, not the customers; (ii) prioritizing the public interest; (iii) more respect for citizens than entrepreneurship; (iv) strategic thinking and democratic action; (v) recognizing that accountability is not an easy one; (vi) serve rather than control; and (vii) respect people, not mere productivity (J.V Denhardt & R.B Denhardt, 2013).

Agus Dwiyanto (2005) stated that public service is one of the entry points for Republic of Indonesia to achieve big dreams towards a country capability of running good governance. However, there is still homework to be completed, which must be able to carry out regulatory and service functions that guarantee every citizen to obtain service with excellent quality without any discrimination as regulated in Law 25/2009 on Public Service.

The results of a survey conducted by Dwiyanto (2003) indicate that the low quality of public services in some areas of Indonesia is caused by the involvement of elements of subjectivity such as cronyism, political affiliation, ethnic and religious equality so that the practice of public service discrimination is still common. Besides, one's socio-economic factor is also a factor in the discrimination of the service.

METHODOLOGY

This research is library research with data collection conducted through literature review consist of various journal articles, websites, reports and books. The comprehensive literature review method was imposed in the study that involve exploration, interpretation and communication of data (Onwuegbuzie, Leech, & Collins, 2012). The collected data were then described and analyzed to identify the specific themes related with objectives of study (Morse, 1995).

RESULT AND DISCUSSION

Implementation of Smart City in Sleman District

The Sleman District Government is implementing the transformation process towards e-government (Winardi, 2017). The application of Sleman Smart Regency has been done since last year, the stronger commitment is shown by the Sleman Regency government by participating in the 100 smart city movement in Indonesia. In the year 2017 and Sleman Regency has also completed the preparation of smart city master plan for Sleman District.

Smart City and maid's application is an initiative to realize Sleman Smart Regency, Sleman District Government provides four channels that can

be accessed by the community actively. The four channels include SMS complaints, mailing menu citizens on the website slemankab.go.id, Facebook, and Twitter, until the application, based on Android 'Report Sleman'. The Sleman Report is a follow-up to a series of public service complaints management development (Tribunnews, 2017).

Superior services for Sleman Smart Regency are focused on integrated strategic services, which have the leverage for improving government performance, as well as reaching out to public services. This service is also developed in order to become embryo of realization of Smart Regency in Sleman Regency. The application of technology to Smart Regency will create new capabilities in governance, namely:

i. Smart Government

In support of Smart City, government offices must also be a smart office, with various ease of bureaucratic process by utilizing ICT services. One of the breakthroughs made by the Sleman Regency government is to make smart room. Sleman smart room is functioning for the monitoring room in terms of the application of information systems, regional conditions, and emergency conditions and coordination center Regional Device-related complaints.



Figure 3. Smart Room in Government Office

Source: <http://www.mediacenter.slemankab.go.id>

ii. Smart Public Services

Smart public service to facilitate the public to enjoy the public services and also the ease of aspirations and services that can be followed up quickly. Sleman District Government provides four channels that can be accessed by the community actively. The four channels include SMS complaints, mailing menu citizens on the website slemankab.go.id, Facebook, and Twitter, until the application, based on Android 'Report Sleman'. Applications 'Report Sleman' can be downloaded on the Play store via smartphone, then people stay registration then use the application. The Sleman Report has been in use since 2016 and has been in a 9 month trial period. The government continues to improve the application. With this application is expected to be accessible to the public.

The Service Operational Standards are directly supervised by the regional secretary, if any information goes to the organization of a particular regional apparatus and receives a slow response, the regional secretary will not hesitate to reprimand the organization of the regional apparatus. Application Report Sleman, very easy to use through the application community easily report complaints with this application, people can report problems to Sleman government with photos or video smart room in office government.

iii. Smart Health

Public Health Service as a public organization is also required to provide the best service through an innovation. One of the innovations made by the Public Health Service in providing public services is the Call Center Service (Integrated Emergency Response System) (Prawira, 2014).

Smart Health Services is a service to drive healthy behavior in the community. This service is integrated with services in health care and referral facilities. With this system, people can register online for non-emergency cases, so there is no need to queue for a long time to get health care, because there is a notification from the system if the patient will be examined. This system is also integrated with all health care facilities in order to know the trend of disease for early warning of the spread of certain diseases (<http://www.indohcf.com>).

The application known as Integrated Emergency Management System (SPGDT), is a serious form of government in realizing smart city. The

Integrated Emergency Response System provides information on the availability of facilities at the hospital. How many beds, rooms, officers, and how the patient registration procedure is all presented in this SPGDT. Communities can easily access it to find out the possibilities of care that smart health can get as well as touching the licensing system, and provision of basic health facilities.

iv. Smart Education

Sleman District which has many schools and colleges needs to be supported by an interactive online service in education. Smart Regency services include e-Learning (Online Learning), online research services, and educational scholarship assistance (Winardi, 2017).

One of Smart Education's goals is to increase all school status in Sleman into 'smart school'. Actually since 2015 Sleman has been able to predicate 'smart education'. But only a few schools. In the future, the number of 'smart school' must be increased to support the achievement of Sleman smart regency.

v. Smart Tourism

According to Supartini in Rihana (2014) as one way of improving the economy, the tourism industry continues to be encouraged in every region including Sleman Regency, Yogyakarta Sleman has a variety of tourist attractions offered include tourist villages, temples, natural attractions, museums and various sorts of art attractions. Tourist village became one of the many developed tourist attractions until now there are 38 tourist villages in the region of Sleman.

Tourism development is a conscious effort and plans to improve the object being marketed, the development of tourism includes the improvement of objects and services to the cloud tourists since departing from their place of residence to the destination back to their original place (Yoeati, 1982: 52).

Smart Tourism Service is a smart tourist service from the Sleman community for domestic and world travelers. This service will be intertwined with the actors of tourism as well as tourist visitors in Sleman District. ICT-based superior service in the form of interactive Smart Tourism Online service, featuring information content in the form of tourist list in Sleman, culinary list, Sleman handicraft, local arts performances, tourist villages, and other interactive and informative tour supporters (tariff, hours of operation, contact person, visitor rating).

Challenge of Smart City Implementation in Sleman District

Not all barriers to the development of e-government come from within government organizations. In society at large, there is inevitably a resistance to using the Internet in general and government offerings on the Internet in particular. What some commentators have identified as a 'triple-A' vision of the Internet - affordability, access, and anonymity (Spears et al., 2000).

The complexity of urban problems is growing very quickly. The capacity of conventional solutions often cannot catch the pace of growth problems. It needs a more innovative new solution to solve city problems, ie solutions that can provide greater capacity than needs. ICT (Information and communication technology) is one technology that has a high innovative potential to solve various urban challenges. It is a smart city is not synonymous with the city of ICT (digital city), because ICT is not the only key problem solving urban problems. But ICT is one of the most important and inevitable enablers because it is part of the whole business process (activity) within a city (Agus Pahrul, Candra, & Miswar, 2017).

Solutions with new thinking that use resources effectively and efficiently and provide sufficient capacity. Solutions must be integrated between agencies and ministries, integrated with non-governmental parties. Integration includes business processes, data, applications, ICT infrastructure, and non-ICT. This solution should be designed to maintain its sustainability, not just a momentary solution.

According to Sitiasia (slemankab.go.id) building smart city/regency requires some readiness, such as infrastructure, ICT, and social readiness, human resource readiness, bureaucratic capability and budget, policy readiness, institutional, and implementation, and community readiness. Of course to achieve that all the many obstacles and challenges that must be faced not only for the government that challenge also faced Sleman regency as a whole.

a. Institutional Factor

The premise of a smart city is that by having the right information at the right time, citizens, service providers, and city government alike will be able to make better decisions that result in an increased quality of life for urban residents and the overall sustainability of the city (Mostashari et al., 2011). There is an explicit need to understand the impact of smart cities on urban environmental, social and economic sustainability from a holistic perspective.

The development of E-government in Indonesia is still far behind with other countries in the world. Indonesia has just issued an official policy on the development of e-government in 2003 with Presidential Instruction No. 3 of 2003. The journey of Indonesian e-government project is 15 years old which started in 2003 based on Presidential Instruction No. 3 of 2003. After that issued various decisions of the Minister of Information and Communications as many as 10 units. Judging from the legal aspect, the position and the underlying policy forces of e-government are not strong enough and depend on the president who leads. In the event of a presidential departure, the policy is not executed properly (Fridayani & Nurmandi, 2019).

Table 1

E-Government Policy in Indonesia

No	Name	Number
1	National strategy and policy for e-Government development	Presidential Instruction No.3 /2003
2	Guidelines on infrastructure standard for government portal	No.55/KEP/M. KOMINFO/12/2003
3	Guidelines on management electronic document system	No.56/KEP/M. KOMINFO/12/2003
4	Guidelines on master plan e-government institution development	No.57/KEP/M. KOMINFO/12/2003
5	Guidelines on ICT training program for e-Government	No.47A/KEP/M. KOMINFO/12/2003
6	Guidelines for establishment local government website	2003
7	Guidelines for government information system network development	69A/KEP/M. KOMINFO/10/2004
8	Guidelines information system development for central-government	69A/KEP/M. KOMINFO/10/2004
9	Guidelines information system development for Province	69A/KEP/M. KOMINFO/10/2004

(continued)

No	Name	Number
10	Guidelines information system development for municipality / regency	69A/KEP/M. KOMINFO/10/2004
11	Guidelines for data, information and government information system organization management	69A/KEP/M. KOMINFO/10/2004
12	Guidelines for standard and service quality and application development	2004
13	Guidelines institutionalization, authorization, and public private partnership for e-government	2004
14	Guidelines e-government project planning and budgeting	2004
15	Guidelines for good government and change management	2004
16	Standard competence for e-government management	2005
17	Blueprint e-government application for local government	2005
18	Blueprint e-government application for central government	2005
19	E-government interoperability framework	2005
20	Go.id domain management for central and local government	No.28/PER/M. KOMINFO/9/2006
21	The Electronic Information and transaction Bill	No.11/2008
22	Draft Government Decree on e-Government	2009

Source: Boni, Zo, Ciganek, and Rho, (2011)

A strong and credible government with creative and open-minded people will increase local productivity and accelerate the economic growth of a city. Important components of the Smart City concept include three components: technology (hard infrastructure and soft infrastructure), human (creativity, education), and institutions (government and policy) (Nam & Pardo, 2011). In the case of Sleman regency, the government as one of the factors in realizing smart city already has the right commitment with the existing goal, which has been poured in the vision of Sleman Regency that is: "The realization of more prosperous Sleman, Mandiri, Cultured and Integrated e-government system towards smart regency (smart district) in 2021".

b. Technology Factor

Kourtit and Nijkamp (2012) revealed that smart city has become a landmark in city planning. Smart city is the result of intensive knowledge development and creative strategies for improving the socio-economic, ecological, and competitive power of the city. The emergence of Smart City is the result of a mix of human capital (eg. educated labor force), infrastructure capital (eg. high-tech communication facilities), social capital (eg. open community networks) and entrepreneurial capital (eg. creative business activities).

In Sleman District the existing technology has grown quite rapidly, evidenced by already there are some applications that can be used via mobile phone by downloading on the smartphone. Such as Sleman Report Application, Sleman Mobile UN, Sleman Response, Mobile Sleman Licensing, Mobile Sleman SIM, Mutation Inter Area, Network Document. Sleman Mobile E-SPTPD and Sleman Mobile Sign one. The entire application aims to improve public services and facilitate the community in all affairs.

In addition to Sleman Smart Room-based public services has also inaugurated the Sleman Smart Room, which is a space with unique capabilities such as Smart Room Room optimized as a monitoring room of territorial condition, monitoring room of information system implementation, coordination room of development control, and coordination room of Regional Device Organization). In addition, this space handles complaints and complaints of the community, information technology learning space, media center space during the emergency, as well as video conference room between Sleman regency with the community. In the next 10 years, Sleman regency has been committed to continuing to improve its ability as a city who are smart in providing services using ICT.

c. Human factor

The number that applies to every person who accesses the internet at least once every month put Indonesia in the 6th largest in the world in terms of the number of internet users. In 2017, eMarketer estimates netter Indonesia will reach 112 million people, beating Japan in the fifth rank of the growing number of Internet users more slowly. Overall, the number of internet users worldwide is projected to reach 3 billion people by 2015. Three years later, by 2018, an estimated 3.6 billion people on Earth will access the internet at least once every month (www.kominfo.go.id).

Internet users in Sleman District have reached 73%, District Government already has programs and activities aimed at developing Internet service up to Village level. Namely “Smart Village” is expected to synergize and even collaborate with Sleman Regency program, then output and outcome generated will be more optimal and maximum. Moreover, the program is financed from public money to be accounted for. In addition to internet users who are quite high, supporting infrastructure such as internet network can also be felt in every region in Sleman regency evenly almost 100%.

In addition to several factors above the biggest challenge in the application of smart city in Indonesia in general and in Sleman, in particular, is a culture problem. Culture using technology in facilitating daily activities is still very low, this is because of the low literacy internet available in the community. This is perhaps the most difficult to change, a committed government must strive to provide an understanding of it. Culture, society and technology are expected to collaborate in realizing smart city.

In Sleman District itself, the awareness of the community in utilizing the technology has started to grow and continue to show positive changes. People have started to open with the development of technology around them. Capital is what should be utilized to the maximum by Sleman Regency Government. According to Sleman Regent Mr. Sri Purnomo, Sleman people have started getting used to digitalization activities. Moreover, the younger generation is very familiar with the internet.

CONCLUSION

In the implementation of Smart City in Sleman District many challenges that have reached Sleman district, starting from the government’s own

commitment then must also be supported with adequate technology, after all, things are met factor from the users of the community as a service user is also a bottleneck. The low public interest in using the internet, the digital divide and still reluctant to switch to online services are just a few issues that must be solved immediately.

In the application of Smart City, Sleman Regency is classified as a District that has a high spirit in applying it. District Government has instructed that all levels of government take advantage of internet network in providing services to society.

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