Application modeling ipv6 (internet protocol version 6) on e-id card for identification number for effectiveness and efficiency of registration process identification of population

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Abstract. When someone wants to be registered in an institution such as Birth Certificate, School, Higher Education, e-ID card, Tax, BPJS, Bank, Driving License, Passport and others then have to register and do registration one by one and have registration number or account respectively agency. It may be said that everyone is bothered with the registration process, from the moment of birth must be registered to be registered as a resident, to enter the school must also registration, it is considered ineffective and efficient because one must continue to register one by one and there is repetition of ownership registration number which vary each agency. Seeing these problems need to find a solution or attempt how to keep the affairs of registration is not repetitive and quite once and the number applies to all agencies. The presence of the latest technology that IPv6 brings opportunities for the efficiency and effectiveness of the registration system. The method used in this research is the exploration and modeling of system development with NDLC (Network Development Life Cycle) to produce a model to build IPv6 implementation on e-ID card. The results of the study will show that the public has one registration number.

1. Introduction

The development of the age and technology today brings great impact and changes to human life, including the increasing needs, lifestyle and activities of everyone. Humans are always faced with the registration process, it can be seen from when a person is born must register to obtain the parent number and then registered as a resident on the family card, entering the world of education faced with registration of the parent number of students for elementary, junior, senior high school and student number for university. Likewise for banking, taxes, BPJS, social media such as email, FB, Twitter and others all have to be registered to get an identity number in other words each person to currently have dozens of registration number or identification number (ID) as identifier or identity. This is not efficient because for a person's identification number requires tens or even hundreds of ID number or registration number.

Along with the development of technology that is the presence of IPv6 (Internet Protocol Version 6) which replaces the predecessor version of IPv4 brings the impact of major changes to the development of internet protocol addressing at this time. With IPv4 Internet addressing protocols can only address 4,294,967,296 hosts worldwide or 232 with a total length of 32 bits, but with the birth of IPv6 addressing...
increasingly adds address space with a total length of 128 bits or 2128 or 340,282,366,920,938,463,674,607,431,768. 211,456 hosts worldwide.

Seeing this opportunity, as a researcher interested in designing a model, how to address this IPv6 address can be applied as a e-ID card number, as well as the number can be used for registration or master number at school, Student Identification Number at University, bank account number, BPJS (Social Security Health and Labor), driving license, passport and even mobile phone number. So one day want to know data or someone information simply by typing IP number, then automatically all information can be presented.

2. State Of The Art
Related to this research, first Hutagalung M Kifli, 2012 has done research with the title "Designing E-Voting Devices Based E-ID card". The background of the number of people who are not registered in the voter list even though the relevant has e-ID card or has been registered but did not get an invitation to vote on the day of the incident. The effect of this is the occurrence of electoral fraud and social upheaval in the community. Another constraint is the distribution of election devices such as paper and ink that often experience interference. The purpose of his research is to design an e-voting device that can solve the above problems. The designed e-voting is based on Electronic Identity Card (E-ID). This means the ID card is used as a basis for someone to be able to vote. ID Card is used as voter registration card to make it easier to verify voter list[1].

According to Ade Frihadi, 2015 has conducted a study entitled "Indonesian Government Network Using Internet VPN And IPv6 Technology To Support National E-Government" on the back of increasingly high technological developments, and the need for large data exchange both private sector, government and stackholder then technology is needed that allows more efficiency and security to perform storage and exchange of data[2]. Research Objectives Design of interconnection design of intra network in government institutions using IPv6-based internet VPN, Then perform ineterkoneksi security analysis of network of government institutions and the results obtained are analyzed by comparing the interconnection cost of intra-government network that is designed or built itself with inetrkoneksi service owned provider and paid like: VPN-IP, MPLS, Leased Line, etc. The results of this study Using VPN Virtual private network communications that pass through the public network (internet) will be more secure so as to feel the transaction data exchange owned by the government of Indonesia, the cost for interconnection between government agencies geographically distances far apart will be cheaper and implementation if using service providers such VPN-IP, MPLS, Leased line, etc., the quality of data exchange, picture and voice using VPN Vtun for network interconnection among government institutions is good with good internet condition and quality as well as interconnection of Indonesian government network with interconnection system using IPv6 will be able to reach all government agencies in Indonesia.

From this problem, it is necessary to design an e-voting device that can solve the above problems. The designed e-voting is based on Electronic Identity Card (E-ID). This means the ID card is used as a basis for someone to be able to vote. The rationale for the use of ID cards as voting cards is that the government is now preparing the National Identity Card (E-KTP) equipment and infrastructure nationally. The conclusion of this research is that e-Voting Application will save the cost of the election (Presidential) and Regional Head Elections (Pilkada).

3. The advantages and disadvantages of e-ID card
Based on the statement of the Minister of Internal Affairs Gamawan Fauzi on the official website of e-ID card, Electronic Identity Card (e-ID card) applied in Indonesia has advantages compared to e-ID card applied in People's Republic of China and India. e-ID card in Indonesia is more comprehensive. In the People's Republic of China, its electronic identity card (e-IC) is not equipped with biometrics or fingerprint records. There, e-IC is only equipped with chips that contain limited personal data. While in India, the system used for the management of population data is UID (Unique Identification Data) system, while in Indonesia the name is NIK (Population Identity Number). UIDs are published through
enrollment at 68 service points, while e-ID card programs in Indonesia are implemented in more than 6,214 sub-districts. Thus, the e-ID card applied in Indonesia is a composite of India's UID and People's Republic of China’s e-ID, as e-ID cards are equipped with biometrics and chips.

The disadvantages of e-ID card can not be used as a single identity number on the student ID number, Student Identification Number at the University, bank account number, BPJS (Social Security Health and Workers), driver's license, passport and even mobile phone number.

4. IPv6 Protocol
In one of the discussions proposed by the IETF, which was stated in RFC 1550, several series of proposals were obtained in December 1992. From these proposals came three journals published by the IEEE Network, namely S. E. Deering, and D. Katz and P. S. Ford. Once done discussion & revision, then the combined version of Deering & Francis proposals later called SIIP (Simple Internet Protocol Plus), selected and named IPv6. IPv6 meet the requirements are quite good, including[3][4]:

- IPv6 has a longer IP address that is 16 bytes.
- IPv6 has a simpler header, which is 7 fields (versus 13 on IPv4).
- IPv6 has good support for options. Previous versions of the required fields, now changed to optimal. Option is also represented differently, making it easy for the router to pass an option that is not intended for it.
- IPv6 gives great advances in security

IPv6 has some features that can anticipate future application developments and overcome the shortcomings of its predecessor, the IPv4. IPv6 is designed as an improvement over IPv4. The header in IPv6 consists of two types, the first is the field required by each packet called the base header, while the second is the field that is not always required in the packet called the extension header, and the header is defined separately from the base header. The base header is always present on every packet, whereas additional headers only when required are inserted between the base headers and the data. Additional headers, currently defined in addition to security functions and others [5].

5. IPv6 Addressing
An IPv6 address is a 128-bit identifier for interfaces and a set of interfaces. There are three types of IPv6 addresses [5]:

- Unicast addresses: A Unicast address acts as an identifier for a single interface. An IPv6 packet sent to a Unicast address is delivered to the interface identified by that address.
- Multicast addresses: A Multicast address acts as an identifier for a group/set of interfaces that may belong to the different nodes. An IPv6 packet delivered to a Multicast address is delivered to the multiple interfaces.
- Anycast addresses: Anycast addresses act as identifiers for a set of interfaces that may belong to the different nodes. An IPv6 packet destined for an Anycast address is delivered to one of the interfaces identified by the address.

6. Research purposes
The purpose of this research are:
- Describe IPv6 addressing so that it can provide registration number up to 3,4x1038
- Creating an Analysis Model to determine one registration number able to represent and apply to all agencies without having to re-register with the same data.
• Determine and apply IPv6 IP address can be used as e-ID number so that double data does not occur.
• Identify someone with just one registration number and avoid someone double ID number with one registration number.

7. Benefits of research
The benefits of this research are:
• Helping the public to have only one registration number for all affairs of registration both for governmental affairs and personal purposes.
• Helping the government to more easily identify a person with just one registration number.
• Helping the government to avoid multiple e-ID numbers on the community

With this IPv6, bringing the opportunity for the development of e-KTP technology today that is in addition to use for internet protocol addressing can also be applied to technology e-ID card (electronic identity card) or id number of all humans around the world, because IPv6 addressing is ensured enough for all people in the world, the long-term plan is that once the child is born, they are given an IP number with IPv6, then the number becomes the registration number for all administrative or registration affairs starting from ID card, Student ID Number, Employee Identity Number, bank account, BPJS, Driver License, Passport and others.

8. Research Framework
To obtain results in accordance with the problems and objectives to be achieved, the following determine the research framework as a stage in the implementation of research from the beginning to the achievement of the end result. The study is divided into 4 stage:

I. The first stage: Analyze problems, collect and study literature
   At this stage a specific problem is formulated, how to connect IPv6 to a registration number, including:
   • What issues arise related to e-ID card registration
   • Describe addressing or numbering with IPv6
   • Formulate the possibility of e-ID format
   • Divide IPv6 into blocks according to numbering needs

II. The second stage:
Based on the identified problem, and formulation of e-KTP format then build the implementation model to be simulated in the field:
   • Registration on the education system
   • Registration in banking
   • Registration on BPJS health field
   • Registration in the field of driving license
   • Registration in the field of immigration or passport
   • Registration in the field of communication

III. The third stage:
At this stage is to build a numbering simulation with IPv6, the system is built online

IV. The fourth stage:
At this stage, publish the results of research that is Draft Journal, Proceedings, Seminar of teaching materials.

9. IPv6 Concept For e-ID Numbering
In accordance with the concept of IPv6 consists of 8 blocks, shown in table 1 ie:

Table 1. Concept of IPv6 consists of 8 blocks
Province ID = 2 BITS = 00-FF = can accommodate the number of provinces = 255 Provinces
Regency / City ID = 3 BITS = 000-FFF = 4,095 Regencies / Citys
Districts ID = 4 BITS = 0000-FFFF = 65,535 Districts
Village ID = 5 BITS = 00000-FFFFFF = 1.048.575 Villages
Sequence Number = 18 BITS = 4,72237E + 21 Numbers
With the above numbering combinations then IPv6 can generate monitors = 4,095 X 65,535 X 1,048,575 X 4,72237E + 21 = 3.4X1038
With capacity to reach trillion trillion trillion numbering.

For example a resident named Randy registered with the address in the village Tangkahan, Medan Labuhan Sub-district, Medan City, SUMUT.
For North Sumatera province serial number 1, Hexa conversion becomes 01.
City 3 digit, Medan city serial number 1, Hexa becomes 001.
District Id 4 digits, Medan Labuhan District serial number 1, Hexa become 0001
Village Id 5 digits, Tangkahan Village Id serial number 1, Hexa become 00001
The 18 digit serial number, on behalf of Randy registered serial number 1, then the e-ID number is: 0100100010001000000000000, shown in table 2 ie:

| SUMUT | MEDAN | Medan Labuhan | Tangkahan | Sequence Number |
|-------|-------|---------------|-----------|----------------|
| 0     | 1     | 0             | 0         | 1              |

10. Implementation Model of IPv6 e-ID card In Institutions
In Figure 10.1. Model of IPv6 e-ID card In Institution described starting from the time of registration of the identity card, then the numbering process in accordance with IPv6 format that has been determined, and for subsequent data has been entered stored into the database, and so on to produce the output of the ID card number that has been formatted IPv6. And subsequently every resident wishing to register for education, banking and other institutions will be processed in the agency system, by simply adding the data required by each of the institutions and without creating a new identification number. And then all the data can be connected into one main data storage.

The following is presented flowchart of Model of IPv6 e-ID card In Institutions.
11. Future Research Plans
As for future research plan are:
- Make a system simulation online
- Complete the model and simulation e-ID card to be applied in banking and taxation
• Complete the model and simulation e-ID card to be applied in the field of communication or the use of e-ID card as the IP address number

12. Conclusion
After describing the model results and simulating the implementation of e-ID card, can be obtained some conclusions as follows:

• Internet Protocol version 6 numbering can be applied for e-ID numbering.
• With IPv6 numbering, the identity number or e-ID card can generate numbers with a total length of 128 bits or 2128 or 340,231,366,920,938,463,374,607,431,768,211,456 numbers.
• The residents are very helpful in terms of registration services because each resident has only one number and applies to all agencies.
• Regulatory agency management system is very helpful because there is no repetition of data or redundancy of data.
• Easy to know and get the population data when needed by the relevant agencies.
• No repetition of data, data errors, because the data centered in one system for use in every agency.

13. Recommendations
For the perfection of this research, there are several suggestions ie:

• Model and simulation is complemented by implementation of other institutions such as junior high school, high school and all institutions related to the needs of the population.
• Discussion of data security to ensure the data of the population is not misused by certain parties.
• Discussion or draft regulation is required if the system is used.
• Each model and simulation designed, should be discussed in more detail to find the point or thing that is not possible to apply.

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