Prototype cloud computing for e-government in Indonesia

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Abstract--- e-government is not something new in Indonesia, its existence has been around since early 2003, but its implementation has not touched the perceived roots of the problem, a lot of funds issued for the procurement of e-government infrastructure, but its benefits have not been much felt by the people. At its two factors cause the failure of e-government, the first human resources that are not ready, the second an expensive infrastructure. Cloud computing can be used as a reference to reducing the e-government failure which caused both of these factors, by using the SOA model will provide a new solution for e-government in Indonesia.

Index Term-- Cloud Computing, E-government, SOA

I. INTRODUCTION

Indonesia is a country which has a population of 237 million [10], which consists of 33 provinces, 398 regencies and 93 cities [11], with diversity and levels of human resources and infrastructure resources that have in each area. The fundamental difference between the regions in Indonesia can be grouped into two: the first difference in terms of competitive human resources, and the second difference in terms of Infrastructure.

e-government in Indonesia has been signed in early 2003 [7], with a marked presence of a portal website which is owned by several government agencies, and strengthened with the presidential decree on the implementation of e-government at central and local government agencies in 2008 [12 ]. But in the process of implementation is not a little problem faced by the government, both at central and regional levels, it caused a lack of competent human resources to implement e-government activities until the obstacles in the field of infrastructure such as the expense of funding in the procurement of computer, networking and others, which resulted in the failure of most of the implementation of e-government in Indonesia [6].

The presence of cloud computing is a new solution that can be applied in planning and implementing e-government in Indonesia. Cloud offers a concept of large-scale data integration, can be used simultaneously via the Internet.

II. DESTINATION

This study aims to create a frame of mind to design and implement e-government in Indonesia with the cloud computing model, in order to reduce the failure of e-government in Indonesia.

III. METHODOLOGY

Service Oriented Architecture (SOA) is a suitable method used for designing cloud computing [1] [6]. The concept of SOA is approached by dividing big problems into smaller set of services that aim to solve specific problems. SOA is not associated with a particular technology, but that the stress is the approach to building software that is modular. SOA is an approach in solving large problems by dividing into a small set of services that solve specific problems.

SOA consists of four components, namely:

1. Message, ie the data is needed to complete part or a work unit, which at the interchange between one service to another.
2. Operation, ie functions which is owned by a service to process up to produce something. These functions which will interact with each other to complete a work unit.
3. Service, represents a set of related operations to complete a set of related work units.
4. Process, is a business rule that determines which operations are used unto achieve certain goals [11][5].

Associated with why SOA fits apply to cloud computing, there are at least seven reasons can be argued as follows:

1. Loosely coupled, ie each independently stand-alone service and does not depend on another service to run. Dependence are minimized so that only need a mechanism of communication with each other.
2. Service contract, which each service has an agreement on how to communication
3. Autonomy, the service has full rights to all logical that encapsulated
4. Abstraction, which shows how the logical service is not implemented in it.
5. Reusability, which is logical divided into a set of services that can facilitate reuse.
6. Statelessness, the service does not have a certain status associated with the activities done.
7. Discoverability, which is designed to be descriptive so that service can be found and accessed through a particular search mechanism.

IV. DISCUSSION
Cloud computing is a paradigm shift following the shift from mainframe to client server in the early 1980s [2]. If the cloud are implemented in government agencies will be able to provide facilities in the service process due to the cloud will centralize all the data. The concept of cloud application can follow the pattern of technology and information systems that exist in banking, but not all services are available on the Internet in the category of cloud computing. There are four things that must be fulfilled on cloud computing:

1. Multitenance / shared resources
   Model cloud computing Unlike previous computational models such as client / server or stand alone, which is assumed as shared resources on a cloud that is based on a business model where resources can be used together (i.e., some users use the same resources) at the Network level, Host level, and Application levels. This means that this system can provide services to multiple users or the public.

2. Massive Scalability
   Although the user system consists of several towns and districts, but cloud computing provides great scalability capabilities to manage tens of thousands of systems, and supported bandwidth and large storage space.

3. elasticity
   Users can quickly increase and decrease their computing resources as needed, and release resources for other purposes when they are no longer needed. This means that each government can use the application in accordance with the needs of each area.

4. Pay as you go
   Users only pay for the resources they actually use and to just when they need it.

5. Self-provisioning of resources as
   Users simply provide the needed resources such as computers and internet services [3].

National Institute of Standards and Technology (NIST) divides cloud computing into two models namely [4] [3] [8]:

Service Models:

1. Cloud Software as a Service (SaaS). The capability provided to the consumer is to use the provider’s applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

2. Cloud Platform as a Service (PaaS). The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.

3. Cloud Infrastructure as a Service (IaaS). The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).

Deployment Models:

1. Private cloud. The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.

2. Community cloud. The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.

3. Public cloud. The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.

4. Hybrid cloud. The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by
standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

Fig. 1. The NIST’s model of Cloud computing

The application of cloud computing in government sector can be done on licensing and service sector to the general public as an extension of identity cards, permits and licenses rights establishment, renewal of driving licenses and other.

Conceptual overview of cloud computing for e-government Indonesia are as follows [6]:
1. Technology. Used there are three, namely:
   1.1 Relational Database Technology, which is the backbone of the system with RDBMS concepts, will the resulting system has the aspect of transfer (portability), enlargement (scalability) either.
   1.2 Web service. With the application of XML technology is expected to interface with the system will be more easy to work with systems other systems.
   1.3 AI / ES. One form of development of the system is to add artificial intelligence technology into the system thereby increasing the usability of the system.

2. Methodology.
   Service-Oriented Architecture (SOA) is a form of technology architecture that follows the principles of service-orientation (service oriented).

3. Activity:
   3.1 Software as a Services
   3.2 Platform as a Services
   3.3 Infrastructure as a Services

4. The components.
   Components of the system is:
   4.1 Database
   4.2 Web Platform

4.3 Data Management tools
4.4 Search engine

5. Interface. That is the part that mediates the interaction of users (both human and other systems are web-based application).

With the existence of such a conceptual picture of the picture above, there are several challenges to be faced by governments in the implementation of cloud computing for e-government in Indonesia. At least there are 11 things that become a challenge in the application of cloud computing e-government in Indonesia [9] [6]:

the need for Scalability, the need for High reliability, the need for Securing Data the Cloud, the need for open Standard and interoperability, the need to revise Procurement Practices, the need to resolve Potential Legal issues, the need to regulate the “Cloud market”, the need to redefine the roles of the IT Workforce, the need to Assess the return on investment of Cloud Computing, the need for Government Cloud Coordination, clean and good political.

V. CONCLUSION

e-government in Indonesia requires a new solution to reduce failures in the design and implementation. The high cost of information technology infrastructure must have a positive impact in terms of presentation and service to the people of Indonesia, cloud computing will provide the solution of the above constraints, Service Oriented Architecture approach (SOA) provides a suitable model for the concept of cloud computing. What to do deeper research and a special note for the development of cloud computing on e-government is the security of data and speed of access that must be prepared by each region in Indonesia.

Fig. 2. Main Map Cloud for e-government
REFERENCES

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