IMPLEMENTATION OF PLATFORM AS A SERVICE (PAAS) ON CLOUD COMPUTING BASED KEBUN KELAPA VILLAGE ADMINISTRATION APPLICATION

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Abstract: Villages, as the smallest part of the administrative government system in Indonesia, are required to be able to follow technological developments and continue to improve their ability to manage village population administration data. Currently, villages are within the administrative service system. Village population is still conventional; this affects village officials and villagers, where human error often occurs, as well as waste of time and costs. So it takes the use of technology appropriately to overcome this. Cloud computing is a paradigm that allows users to access information electronically using fixed devices or mobile devices connected to the internet network. Cloud computing offers the collaboration of PaaS (Platform as a Service) services, services on demand, and access capabilities anytime, anywhere. With cloud computing, a digital village system can be built. One of the features in the Kebun Kelapa Village administration application is the application service SKK (Family Card), SKTP (Identity Card), SKP (Certificate of Moving), SKKL (Certificate of Birth), SKKM (Death Certificate), SKKB (Certificate of Good Behavior), SKSG (Multipurpose Certificate), SKU (Business Certificate), SKNA (Certificate of Marriage), and SKTM (Certificate of Disability). To be able to use these services, the village government must first subscribe to a cloud service provider. Based on the results of the test, it can be concluded that the administrative application of Desa Kebun Kelapa provides convenience in processing village population data, reduces village operational costs, and can provide more optimal administrative services to villagers, especially Kebun Kelapa Village.

INTRODUCTION

Currently, in Kebun Kelapa Village, located in Secanggang District, Langkat Regency, the village population administration service system is still conventional, such as: (a) recording village population data in books; (b) preparing application papers that still use typewriters. This affects village officials and villagers, where human error often occurs, as well as waste of time and costs. Therefore, a system is needed to overcome existing problems. Cloud computing is a paradigm that allows users to access information electronically using fixed devices or mobile devices connected to the internet network.

Cloud computing offers Platform as a Service (SaaS) service collaboration, on-demand services, and access capabilities anytime, anywhere. With cloud computing, an administration application for Kebun Kelapa Village can be built. One of the existing features is the population administration data processing service of Kebun Kelapa Village, where to be able to use the service, the village government must first subscribe through a cloud provider. Thus, it is hoped that the technology can reduce the occurrence of human error, optimize time empowerment, and reduce village operational costs.

RESEARCH METHODS

The research methodology used in this study is as follows:

1. Data collection stage
   a. Studi Literature
      Data collection by collecting literature, journals, papers, and readings related to the research title
   b. Field Studies
      1) Observation
         Data collection techniques by conducting research and a direct review of the problems taken.
      2) Interview
         Data collection techniques with direct questions and answers that have something to do with the theme taken.
2. Software development model
   The development model used in making this software uses the waterfall model, which includes several processes, including:
   a. Definition of Requirements
      The services, limitations, and objectives of the system are determined in consultation with the users of the system.
   b. System design and software design
      The system design process divides the requirements for a hardware or software system. This activity determines the overall architecture of the system. Software design involves identifying and describing fundamental software system abstractions and their relationships.

c. Unit Implementation and Testing

At this stage, software design is realized as a series of programs or program units. Unit testing involves verifying that each unit has met its specifications.

d. System Integration and Testing

Individual program units are integrated and tested as a complete system to guarantee that system requirements have been met. After system testing, the software is delivered to the customer.

e. Operation and maintenance

This is the longest phase of the life cycle. The system is installed and deployed. Maintenance includes correction of errors not found in previous stages, improvement of system unit implementation, and system service development while new requirements are added.

RESULTS AND DISCUSSION

The first step to be taken at this stage is to first identify the problems that have occurred. As for some of the problems faced, they are as follows: 1. The difficulty of the village device in managing the data of the villagers 2. The slowness of the rural device in performing administrative services against the village population 3. The difficulty of villagers in making the submission of letters of applicationBased on observations and interviews with the villagers, it is concluded that the current system in the village is still in trouble. The issue includes the creation procedures: Family Card Letter (SKK), Resident Sign Card (SKTP), Invalid Registration (SKTM), Death Certificate (SKKM), Birth Certificate (SKKL), Universal Certificate of Conduct (SKSG), Migration Certificate, Marriage Certificate, Business Certificate, and Good Behavior Certificate. (SKKB)

The architecture of the E-Village system that implements cloud computing has a front end side and a back end side. Both are connected through a network (internet) with a cloud system. The front end is located on the user side, for example, the government and its population. The front end includes the user's computer (or computer network), the web browser needed to access CMS services for the village government, and the village website that has been processed for visitors. Meanwhile, on the back end of the system is the cloud server that acts as a Plaform as a Service (PaaS) application that can be used by villages. In the use of village equipment, and villagers need to have a network connected to the Internet, besides that for village officials who will implement the service must rent, this is more profitable than having to buy. A general overview of the village administration application as a Platform as a Service can be seen in the picture

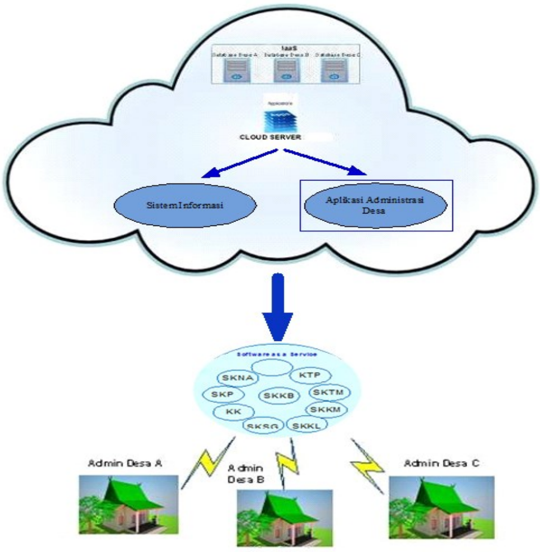


Figure 1. PaaS System in Village Administration Application

Hardware and software, as well as systems and cloud computing, used to implement and test applications are as follows:

1. Implementing cloud computing

   The implementation used in cloud computing is divided into two parts, namely the front end and the back end. The front end is located on the user or client side. While the back end is the "cloud" part of this system (in the internet network diagram, it is often depicted as a cloud), The front end includes the user's computer and the applications required to access the cloud computing system. Meanwhile, on the back end of the cloud computing system, there are various computers, servers, and data storage systems, all of which create a "cloud" for computing services. The implementation of the Cloud Computing Front End of the Village Administration application is divided into two parts, namely:

   a. Hardware Implementation

      The specifications of the hardware used can be seen in the table.

Table 1. Hardware Implementation

Hardware	Hardware Specifications
Processor	Intel Core i3 2,4 Ghz
Memory	2 GB
Monitor	17 inches
Sail	Resolution 1024 x 768 pixels
Harddisk	320 GB
Keyboard dan Mouse	USB/USB

b. Software Implementation

The specifications of the software used can be seen in the table.

Table 2. Software Implementation

Software	Software Specifications
Operating System	Windows 7
Programming Languages	PHP, Javascript, HTML, CSS, Ajax
Code Editor	Notepad ++, Macromedia
Web server	XAMPP 2.5
Database	MySql 5.1.33
Web Browser	Firefox, Chrome, IE7, Opera, Safari

c. Cloud Computing Implementation of the Back End

Cloud computing implementation is part of the back end of the Village Administration application using VPS.

Table 3. Cloud Computing Implementation Back End

Device	Specifications
Operating System	Linux Debian 64 bit
IP	76.72.169.146
Disk	20 GB
RAM	512 MB
Burst RAM	192 MB

d. Database Implementation

Some tables are the result of database creation.

Table 4. Database Implementation

Village Admin Table	Village Apparatus Table
CREATE TABLE IF NOT EXISTS \`admin_desa\` (\`pw\` varchar(50) default NULL, \`nama\` varchar(50) default NULL, \`email\` varchar(50) NOT NULL,	CREATE TABLE IF NOT EXISTS \`aparat_desa\` (\`nip\` varchar(17) NOT NULL, \`nama\` varchar(50) NOT NULL, \`password\` varchar(50) NOT NULL,

```
'status' enum('active','inactive') default null,
`idDesa` int(11) NOT NULL,
`tempatlahir` varchar(70) default NULL,
`tgllahir` date default NULL,
`alamat` tinytext i,
`telepon` varchar(15) default NULL,
`noktp` varchar(20) default NULL,
`foto` varchar(100) default NULL,
`tipe` enum('admin','user') default NULL, KEY
`fk_admin_desa_desa1` (`idDesa`)
) ENGINE=InnoDB;
```

```
`email` varchar(30) NOT NULL,
`mulai_kerja` date default NULL,
`foto_aparat_desa` varchar(45) NULL,
`status_hapus` enum('Ya','Tidak') NOT NULL,
`idjabatan` int(2) NOT NULL,
`idDesa` int(11) NOT NULL,
`idrt` varchar(3) default NULL,
`idrw` varchar(3) default NULL, PRIMARY KEY
(`nip`),
KEY 'idrw' ('idrw'), KEY 'idrt' ('idrt'),
KEY 'idVillage' ('idVillage'), KEY 'idjabatan '
('idJabatan ')
) ENGINE=InnoDB;
```

District/City Table

```
CREATE TABLE IF NOT EXISTS `kabkota` (
'idkabkota' varchar(3) NOT NULL,
`kabkota` varchar(40) NOT NULL,
'idprovincial' varchar(3) NOT NULL, PRIMARY
KEY ('idkabkota'), KEY 'idprovincial'
('idprovincial')
) ENGINE=InnoDB;
```

District Table

```
CREATE TABLE IF NOT EXISTS `kecamatan` (
`idkecamatan` varchar(3) NOT NULL default '',
`kecamatan` varchar(40) NOT NULL,
'idkabkota' varchar(3) NOT NULL, PRIMARY
KEY ('idkecamatan'), KEY 'idkabkota' ('idkabkota')
) ENGINE=InnoDB;
```

Village Table

```
CREATE TABLE IF NOT EXISTS `desa` (
`idDesa` int(11) NOT NULL,
`namaDesa` varchar(50) default NULL,
`alamatKantor` varchar(200) default NULL,
`telpKantor` varchar(15) default NULL,
`emailDesa` varchar(100) default NULL,
`statusBayar` enum('lunas','pending') default NULL,
'activate' enum('on','disabled') default NULL,
'idPaket' int(11) default NULL,
`nama_kdesa` varchar(45) default NULL,
`idkecamatan` varchar(3) default NULL,
PRIMARY KEY (`idDesa`),
KEY 'idkecamatan' ('idkecamatan')
) ENGINE=InnoDB;
```

Table RW

```
CREATE TABLE IF NOT EXISTS `rw` (
`idrw` varchar(3) NOT NULL,
`rw` varchar(40) NOT NULL,
`idDesa` int(11) NOT NULL,
`nama_krw` varchar(40) NOT NULL, PRIMARY
KEY (`idrw`),
KEY `idDesa` (`idDesa`)
) ENGINE=InnoDB;
```

RT table

```
CREATE TABLE IF NOT EXISTS `rt` (
`idrt` varchar(3) NOT NULL,
`rt` varchar(40) NOT NULL,
`idrw` varchar(3) NOT NULL,
`nama_krt` varchar(40) NOT NULL,
PRIMARY KEY (`idrt`),
KEY 'idrw' ('idrw')
) ENGINE=InnoDBi;
```

Table Module

```
CREATE TABLE IF NOT EXISTS `modul` (
'idmodul' int(2) NOT NULL auto_increment,
`nama_modul` varchar(50) NOT NULL,
`link` varchar(50) NOT NULL,
'status' enum('Active','Inactive') NOT NULL,
`idjabatan` int(2) NOT NULL,
`tipe` enum('Utama','Sub') NOT NULL, PRIMARY
KEY (`idmodul`),
KEY `idjabatan` (`idjabatan`)
) ENGINE=InnoDB;
```

Table SKKB

```
CREATE TABLE IF NOT EXISTS `skkb` (
`noskkb` varchar(17) NOT NULL,
'tujuan_pembuatan' enum('Apply for a Job','Looking
for a School') NOT NULL,
`tanggal_pengajuan` date NOT NULL,
`tanggal_penetapan` date default NULL,
'status_skkb' enum('Accept','Reject','Processed')
NOT NULL,
`masa_berlaku` date default NULL,
`status_download_skkb` enum('Ya','Tidak') default
NULL,
`nik` varchar(17) NOT NULL,
`nip` varchar(17) default NULL, PRIMARY KEY
```

SKSG Table

```
CREATE TABLE IF NOT EXISTS `sksg` (
`nosksg` varchar(17) NOT NULL,
`tujuan_pembuatan` text NOT NULL,
`tanggal_pengajuan` date NOT NULL,
`tanggal_penetapan` date NOT NULL,
'status_sksg' enum('Accept','Reject','Processed')
NOT NULL,
`status_download_sksg` enum('Ya','Tidak') default
NULL,
`masa_berlaku` date default NULL,
`keterangan` text,
`nik` varchar(17) NOT NULL,
`nip` varchar(17) default NULL, PRIMARY KEY
(`noskkb`), KEY `nik` (`nik`),
KEY 'nip' ('nip')) ENGINE=InnoDB;
```

```
(`nosksg`), KEY `nik` (`nik`),
KEY 'nip' ('nip')
) ENGINE=InnoDB;
```

SKTM Table

```
CREATE TABLE IF NOT EXISTS `sktm` (
`nosktm` varchar(17) NOT NULL,
`tujuan_pembuatan` text NOT NULL,
`tanggal_pengajuan` date NOT NULL,
`tanggal_penetapan` date default NULL,
'status_sktm' enum('Accept','Reject','Processed')
NOT NULL,
`status_download_sktm` enum('Ya','Tidak') default
NULL,
`keterangan` text,
`nik` varchar(17) NOT NULL,
`nip` varchar(17) default NULL, PRIMARY KEY
(`nosktm`), KEY `nik` (`nik`),
KEY 'nip' ('nip')
) ENGINE=InnoDB;
```

Procedural design is a design to determine the details of the algorithm to be asked into a program. Procedural design is depicted in the form of a flow chart. The procedural design of village administration applications consists of flowhart login, adding data, changing data, deleting data, and displaying data. Here's an example of a service registration flowchart.

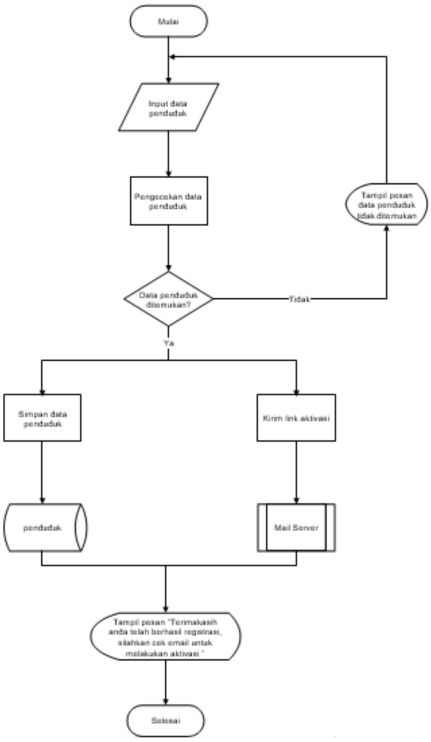
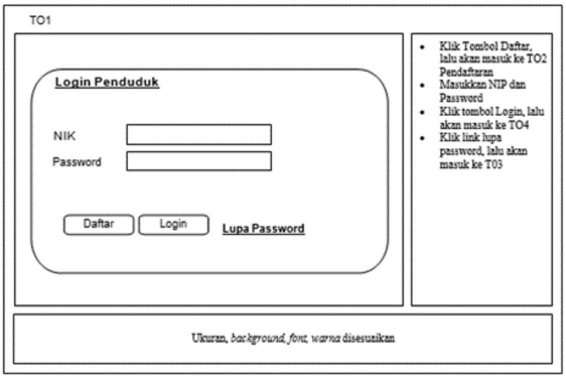

Mulai
Input data penduduk
Pengecekan data penduduk
Tampil pesan data penduduk tidak ditemukan
Data penduduk ditemukan?
Tidak
Ya
Simpan data penduduk
Kirim link aktivasi
penduduk
Mail Server
Tampil pesan "Terimakasih anda telah berhasil registrasi, silahkan cek email untuk melakukan aktivasi "
Selesai

Figure 2. Flowchat Registration

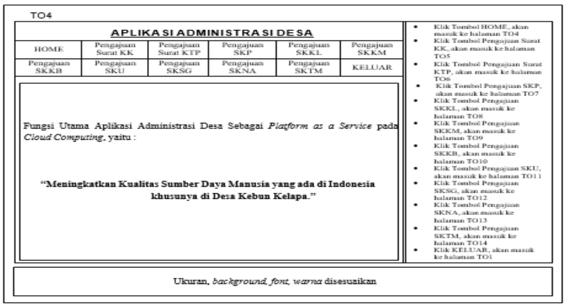
Here are some interfaces that can be used by users of an application administration system.



- Klik Tombol Daftar, lalu akan masuk ke TO2 Pendaftaran
- Masukkan NIP dan Password
- Klik tombol Login, lalu akan masuk ke TO4
- Klik link lupa password, lalu akan masuk ke T03

Ukuran, *background*, *font*, *warna* disesuaikan

Figure 3. Resident Login Page



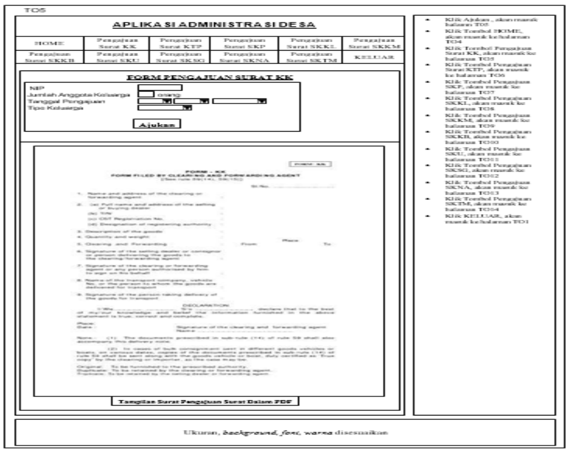
Fungsi Utama Aplikasi Administrasi Desa Sebagai *Platform as a Service* pada *Cloud Computing*, yaitu :

"Meningkatkan Kualitas Sumber Daya Manusia yang ada di Indonesia khusunya di Desa Kebun Kelapa."

- Klik Tombol HOME, akan masuk ke halaman TO4
- Klik Tombol Pengajuan Surat KK, akan masuk ke halaman TO5
- Klik Tombol Pengajuan Surat KTP, akan masuk ke halaman TO6
- Klik Tombol Pengajuan SKP, akan masuk ke halaman TO7
- Klik Tombol Pengajuan SKKL, akan masuk ke halaman TO8
- Klik Tombol Pengajuan SKKM, akan masuk ke halaman TO9
- Klik Tombol Pengajuan SKKB, akan masuk ke halaman TO10
- Klik Tombol Pengajuan SKU, akan masuk ke halaman TO11
- Klik Tombol Pengajuan SKSG, akan masuk ke halaman TO12
- Klik Tombol Pengajuan SKNA, akan masuk ke halaman TO13
- Klik Tombol Pengajuan SKTM, akan masuk ke halaman TO14
- Klik KELUAR, akan masuk ke halaman TO1

Ukuran, *background*, *font*, *warna* disesuaikan

Figure 4. Home Residents



- Klik Ajukan , akan masuk halaman TO5
- Klik Tombol HOME, akan masuk ke halaman TO4
- Klik Tombol Pengajuan Surat KK, akan masuk ke halaman TO5
- Klik Tombol Pengajuan Surat KTP, akan masuk ke halaman TO6
- Klik Tombol Pengajuan SKP, akan masuk ke halaman TO7
- Klik Tombol Pengajuan SKKL, akan masuk ke halaman TO8
- Klik Tombol Pengajuan SKKM, akan masuk ke halaman TO9
- Klik Tombol Pengajuan SKKB, akan masuk ke halaman TO10
- Klik Tombol Pengajuan SKU, akan masuk ke halaman TO11
- Klik Tombol Pengajuan SKSG, akan masuk ke halaman TO12
- Klik Tombol Pengajuan SKNA, akan masuk ke halaman TO13
- Klik Tombol Pengajuan SKTM, akan masuk ke halaman TO14
- Klik KELUAR, akan masuk ke halaman TO1

Ukuran, *background*, *font*, *warna* disesuaikan

Figure 5. Papers Submission Page

The registration process for residents who want to use this administrative application service is as follows:

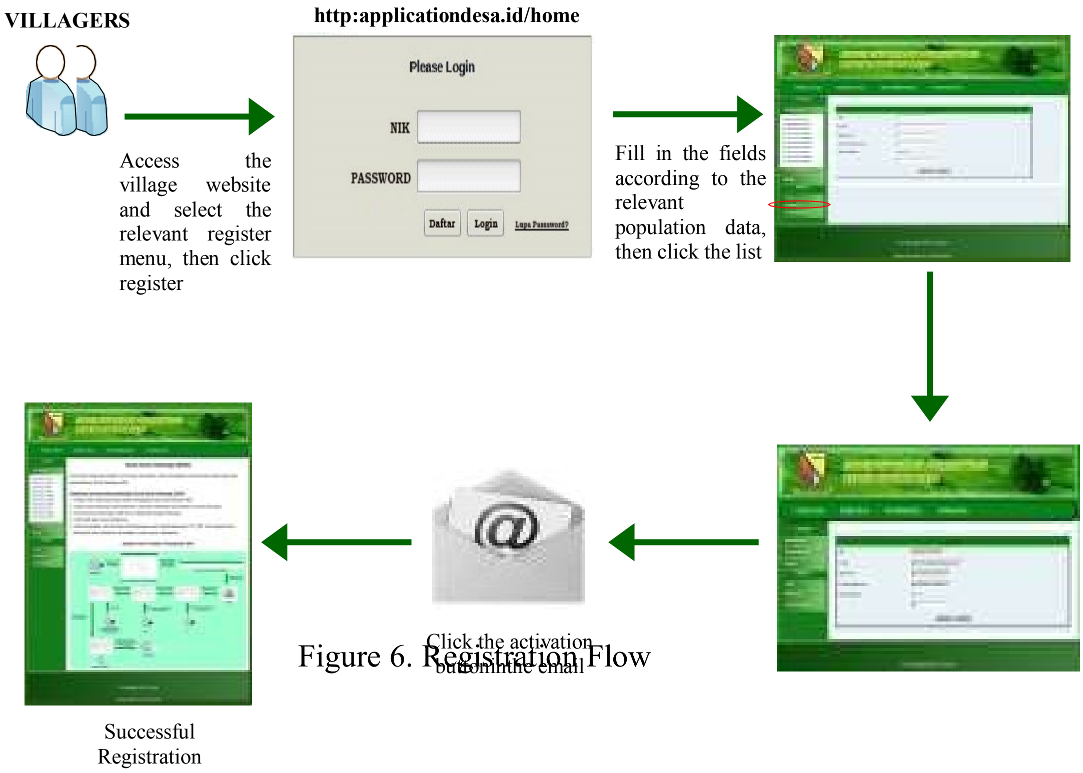

VILLAGERS
http:applicationdesa.id/home
Please Login
NIK
PASSWORD
Daftar
Login
Lupa Password?
Access the village website and select the relevant register menu, then click register
Fill in the fields according to the relevant population data, then click the list
Click the activation button in the email
Successful Registration

Figure 6. Registration Flow

Features within the app site that can be accessed by site visitors include:

a. Access information related to coconut plantation villages.

b. The latest news about Coconut Garden Village

c. Download village documents and archives.

d. Communication with village officials and between site visitors

e. Village administration application.

CONCLUSION

The conclusion that can be drawn after going through the stages of developing cloud computing applications for village administration is that with this application:

1. Provide convenience to village officials in managing village population data.
2. Accelerate village equipment in village population administration services, thereby improving the quality of village administration services.
3. Provide convenience to villagers in the process of submitting application papers.

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