

## **ABSTRAK**

Sistem pelayanan *invoice online* adalah sebuah *web based application* yang dapat melakukan pengelolaan *invoice* menggunakan teknologi internet. Pemilihan jenis aplikasi berbasis web agar dapat digunakan oleh banyak pengguna di seluruh dunia serta dapat dengan mudah diakses dimanapun dan kapan pun. Seiring perkembangan teknologi internet yang semakin pesat banyak digunakan oleh berbagai kalangan dan untuk segala macam aktifitas manusia.

Pengelolaan meliputi pembuatan dan pengiriman *invoice* kepada pihak yang terkait. Pihak terkait adalah *person* dari sebuah *company*, dan pengiriman *invoice* melalui email kepada *person* ini. Sistem ini dibangun agar semudah mungkin digunakan user untuk dapat memberikan kenyamanan meskipun baru pertama kali menggunakan.

Sistem pelayanan *invoice online* ini memungkinkan seseorang atau badan mengirimkan *invoice* untuk kebutuhan pembuatan bukti transaksi, karena tidak semua orang menyediakan sendiri *invoice* untuk kebutuhannya. Untuk itu, diperlukan sebuah sistem penyedia *invoice* yang dapat dengan mudah dan cepat digunakan dalam berbagai kebutuhan pengguna.

Aplikasi pelayanan invoice online ini dibangun dengan menggunakan bahasa pemrograman ruby, framework ruby on rails, dan database mysql.

**Kata Kunci : invoice, ruby, ruby on rails, internet, mysql.**

## **ABSTRACT**

*Online Invoice services system is a web based application which can manage invoice using internet technology. Choosing type the web based application is just people everywhere in the world can easily used this application and anytime they want. As growth as internet technology rapidly everyday have been in general use a variety of realm and used of all kinds people activity.*

*Managing invoice include creating and sending invoice for the relevant parties. The relevant parties is a person or people from a company, and the invoice send using email to this person or people. This system developed for used easily by user so it can give pleasure though it used for first time around.*

*This online invoice services system make possible someone or corporation sending invoices for creating transactions evidence, that not all people have their own invoice system. For that, invoice system is needed to fast and easy used for any kind human needs.*

*This online invoice services application developed using ruby programming language, ruby on rails framework and mysql database.*

**Keyword : invoice, ruby, ruby on rails, mysql.**

# DAFTAR ISI

LEMBAR PENGESAHAN .....	.ii
KATA PENGANTAR .....	iii
PERNYATAAN PUBLIKASI KARYA ILMIAH .....	v
SURAT PERNYATAAN ORISINALITAS KARYA.....	vi
ABSTRAK.....	vii
ABSTRACT .....	viii
DAFTAR ISI.....	ix
DAFTAR GAMBAR .....	.xv
DAFTAR TABEL.....	xvii
DAFTAR SIMBOL .....	xviii
 BAB I PERSYARATAN PRODUK .....	1
1.1    Latar Belakang .....	1
1.1.1    Tujuan.....	2
1.1.2    Ruang Lingkup Proyek.....	2
1.1.3    Definisi, Akronim dan Singkatan .....	3
1.1.4    Overview Laporan .....	4
1.2    Gambaran Keseluruhan .....	5
1.2.1    Perspektif Produk.....	6
1.2.2    Fungsi Produk .....	7
1.2.3    Karakteristik Pengguna .....	7
1.2.4    Batasan-batasan .....	8
1.2.5    Asumsi dan Ketergantungan.....	8
1.2.6    Penundaan Persyaratan .....	8
 BAB II SPESIFIKASI PRODUK .....	8
2.1    Persyaratan Antarmuka Eksternal .....	8
2.1.1    Antarmuka dengan Pengguna .....	8
2.1.2    Antarmuka Perangkat Keras .....	8
2.1.3    Antarmuka Perangkat Lunak .....	9
2.2    Fitur Produk Perangkat Lunak .....	20
2.2.1    Fitur Pengelolaan <i>Invoice</i> .....	20
2.2.1.1    Pembuatan Template .....	21
2.2.1.2    Pembuatan <i>Invoice</i> .....	21
2.2.1.3    Perubahan <i>Invoice</i> .....	21
2.2.1.4    Penghapusan <i>Invoice</i> .....	21

2.2.1.5 Pengiriman <i>Invoice</i> .....	22
2.2.1.6 Terima Pembayaran <i>Invoice</i> .....	22
2.2.2 Fitur Pengelolaan <i>Company</i> .....	22
2.2.2.1 Penambahan <i>Company</i> .....	22
2.2.2.2 Perubahan <i>Company</i> .....	22
2.2.2.3 Penghapusan <i>Company</i> .....	22
2.2.2.4 Penambahan <i>Person</i> .....	23
2.2.2.5 Perubahan <i>Person</i> .....	23
2.2.2.6 Penghapusan <i>Person</i> .....	23
 BAB III DESAIN PERANGKAT LUNAK .....	27
3.1 Pendahuluan.....	27
3.1.1 Identifikasi.....	27
3.1.2 Overview Sistem .....	27
3.2 Desain Arsitektur Perangkat Lunak .....	28
3.2.1 Komponen Perangkat Lunak .....	28
3.2.1.1 Use Case Diagram.....	28
3.2.1.1.1 Use case narrative Tambah <i>Invoice</i> .....	30
3.2.1.1.2 Use case narrative Ubah <i>Invoice</i> .....	31
3.2.1.1.3 Use case narrative Hapus <i>Invoice</i> .....	32
3.2.1.1.4 Use case narrative Kirim <i>Invoice</i> .....	32
3.2.1.1.5 Use case narrative Tambah <i>Company</i> .....	33
3.2.1.1.6 Use case narrative Ubah <i>Company</i> .....	34
3.2.1.1.7 Use case narrative Hapus <i>Company</i> .....	35
3.2.1.1.8 Use case narrative Tambah <i>Person</i> .....	36
3.2.1.1.9 Use case narrative Ubah <i>Person</i> .....	37
3.2.1.1.10 Use case narrative Hapus <i>Person</i> .....	38
3.2.1.2 Activity Diagram .....	39
3.2.1.2.1 Activity Diagram <i>Register</i> dan <i>Login User</i> .....	39
3.2.1.2.2 Activity Diagram Tambah <i>Invoice</i> .....	41
3.2.1.2.3 Activity Diagram Ubah <i>Invoice</i> .....	42
3.2.1.2.4 Activity Diagram Hapus <i>Invoice</i> .....	43
3.2.1.2.5 Activity Diagram Kirim <i>Invoice</i> .....	44
3.2.1.2.6 Activity Diagram Tambah <i>Company</i> .....	45
3.2.1.2.7 Activity Diagram Ubah <i>Company</i> .....	46
3.2.1.2.8 Activity Diagram Hapus <i>Company</i> .....	47
3.2.1.2.9 Activity Diagram Tambah <i>Person</i> .....	48
3.2.1.2.10 Activity Diagram Ubah <i>Person</i> .....	49

3.2.1.2.11	Activity Diagram Hapus Person.....	50
3.2.2	Class Diagram.....	51
3.2.3	Table/ER-Diagram. ....	52
3.2.4	Konsep Eksekusi / Sequence Diagram .....	53
3.2.4.1	Sequence Diagram <i>Register</i> dan <i>Login User</i> .....	53
3.2.4.2	Sequence Diagram Tambah <i>Invoice</i> .....	54
3.2.4.3	Sequence Diagram Ubah <i>Invoice</i> .....	55
3.2.4.4	Sequence Diagram Hapus <i>Invoice</i> .....	56
3.2.4.5	Sequence Diagram Kirim <i>Invoice</i> .....	57
3.2.4.6	Sequence Diagram Tambah <i>Company</i> .....	58
3.2.4.7	Sequence Diagram Ubah <i>Company</i> .....	59
3.2.4.8	Sequence Diagram Hapus <i>Company</i> .....	60
3.2.4.9	Sequence Diagram Tambah <i>Person</i> .....	61
3.2.4.10	Sequence Diagram Ubah <i>Person</i> .....	62
3.2.4.11	Sequence Diagram Hapus <i>Person</i> .....	63
3.2.5	Desain Antar Muka.....	64
3.2.5.1	Modul <i>User</i> .....	64
3.2.5.1.1	Layout Form <i>Register</i> .....	64
3.2.5.1.2	Layout Form <i>Login</i> .....	65
3.2.5.2	Modul <i>Invoice</i> .....	66
3.2.5.2.1	Layout Form Tambah <i>Invoice</i> .....	66
3.2.5.2.2	Layout Form Edit <i>Invoice</i> .....	67
3.2.5.2.3	Layout Interface Hapus <i>Invoice</i> .....	68
3.2.5.2.4	Layout Form Kirim <i>Invoice</i> .....	68
3.2.5.3	Modul <i>Company</i> .....	69
3.2.5.3.1	Layout Form Tambah <i>Company</i> .....	69
3.2.5.3.2	Layout Form Edit <i>Company</i> .....	69
3.2.5.3.3	Layout Interface Hapus <i>Company</i> .....	70
3.2.5.4	Modul <i>Person</i> .....	71
3.2.5.4.1	Layout Form Tambah <i>Person</i> .....	71
3.2.5.4.2	Layout Form Edit <i>Person</i> .....	72
3.2.5.4.3	Layout Interface Hapus <i>Person</i> .....	72
	BAB IV PENGEMBANGAN SISTEM.....	73
4.1	Perencanaan Tahap Implementasi .....	73
4.1.1	Pembagian Modul / Prosedur / Class Implementasi .....	75
4.1.2	Keterkaitan Antar Modul / Prosedur / Class .....	76
4.2	Perjalanan Tahap Implementasi ( <i>Coding</i> ) .....	76

4.2.1	Top Down / Bottom Up Implementasi.....	76
4.2.1.1	File Konfigurasi .....	79
4.2.1.1.1	database.yml.....	79
4.2.1.2	Modul <i>User</i> .....	80
4.2.1.2.1	File migration <i>create_user.rb</i> .....	80
4.2.1.2.2	File model <i>user.rb</i> .....	80
4.2.1.2.3	File <i>controller sessions_controller.rb</i> .....	81
4.2.1.3	Modul <i>Invoice</i> .....	83
4.2.1.3.1	File migration <i>create_invoices.rb</i> .....	83
4.2.1.3.2	File model <i>invoice.rb</i> .....	83
4.2.1.3.3	File <i>controller invoices_controller.rb</i> .....	83
4.2.1.4	Modul <i>Company</i> .....	87
4.2.1.4.1	File model <i>company.rb</i> .....	87
4.2.1.4.2	File <i>controller companies_controller.rb</i> .....	87
4.2.1.5	Modul <i>Person</i> .....	88
4.2.1.5.1	File model <i>person.rb</i> .....	88
4.2.1.5.2	File <i>controller people_controller.rb</i> .....	89
4.2.2	Debugging .....	90
4.2.3	Ulasan Realisasi Fungsionalitas .....	93
4.2.4	Ulasan Realisasi <i>User Interface Design</i> .....	94
4.2.4.1	Modul <i>User</i> .....	95
4.2.4.1.1	<i>User Interface Form Register</i> .....	95
4.2.4.1.2	<i>User Interface Form Login</i> .....	96
4.2.4.1.3	<i>User Interface Form Edit Data User</i> .....	96
4.2.4.2	Modul <i>Invoice</i> .....	97
4.2.4.2.1	<i>User Interface Form Tambah Invoice</i> .....	97
4.2.4.2.2	<i>User Interface Lihat Invoice</i> .....	97
4.2.4.2.3	<i>User Interface Form Kirim Invoice</i> .....	98
4.2.4.2.4	<i>User Interface Form Edit Invoice</i> .....	99
4.2.4.2.5	<i>User Interface Form Hapus Invoice</i> .....	100
4.2.4.2.6	<i>User Interface Form Pembayaran Invoice</i> .....	101
4.2.4.3	Modul <i>Company</i> .....	102
4.2.4.3.1	<i>User Interface List Daftar Company</i> .....	102
4.2.4.3.2	<i>User Interface Form Tambah Company</i> .....	103
4.2.4.3.3	<i>User Interface Form Edit Company</i> .....	104
4.2.4.3.4	<i>User Interface List Invoice Company</i> .....	104
4.2.4.3.5	<i>User Interface Hapus Company</i> .....	105
4.2.4.4	Modul <i>Person</i> .....	106

4.2.4.4.1 <i>User Interface Form Tambah Person</i> .....	106
4.2.4.4.2 <i>User Interface Form Edit Person</i> .....	106
 BAB V TESTING DAN EVALUASI SISTEM.....	107
5.1 Rencana Pengujian Sistem Terimplementasi.....	107
5.1.1 Test Case.....	107
5.1.2 Uji Fungsionalitas Modul/Class.....	108
5.1.2.1 Modul <i>User</i> .....	108
5.1.2.2 Modul <i>Invoice</i> .....	110
5.1.2.3 Modul <i>Company</i> .....	112
5.1.2.4 Modul <i>Person</i> .....	113
5.2 Perjalanan Metodologi Pengujian .....	114
5.2.1 White Box Testing .....	114
5.2.1.1 File Konfigurasi .....	114
5.2.1.1.1 database.yml.....	114
5.2.1.1.2 routes.rb.....	115
5.2.1.2 Modul <i>User</i> .....	115
5.2.1.2.1 Test Unit Model <i>User</i> .....	116
5.2.1.2.2 Test Functional Controller Accounts.....	116
5.2.1.3 Modul <i>Invoice</i> .....	118
5.2.1.3.1 Test Unit Model <i>Invoice</i> .....	118
5.2.1.3.2 Test Functional Controller <i>Invoices</i> .....	119
5.2.1.4 Modul <i>Company</i> .....	121
5.2.1.4.1 Test Unit Model <i>Company</i> .....	122
5.2.1.4.2 Test Functional Controller Companies .....	122
5.2.1.5 Modul <i>Person</i> .....	123
5.2.1.5.1 Test Unit Model <i>Person</i> .....	124
5.2.1.5.2 Test Functional Controller People .....	124
5.2.2 Black Box Testing.....	126
5.2.2.1 Modul <i>User</i> .....	126
5.2.2.1.1 Registrasi <i>User</i> .....	126
5.2.2.1.2 <i>Login User</i> .....	127
5.2.2.1.3 Edit <i>User</i> .....	127
5.2.2.2 Modul <i>Invoice</i> .....	127
5.2.2.2.1 Penambahan <i>Invoice</i> .....	127
5.2.2.2.2 Kirim <i>Invoice</i> .....	128
5.2.2.2.3 Edit <i>Invoice</i> .....	128
5.2.2.2.4 Hapus <i>Invoice</i> .....	129

5.2.2.2.5	Pembayaran <i>Invoice</i> .....	129
5.2.2.3	Modul <i>Company</i> .....	130
5.2.2.3.1	Tambah <i>Company</i> .....	130
5.2.2.3.2	Edit <i>Company</i> .....	130
5.2.2.3.3	Hapus <i>Company</i> .....	130
5.2.2.4	Modul <i>Person</i> .....	130
5.2.2.4.1	Tambah <i>Person</i> .....	131
5.2.2.4.2	Edit <i>Person</i> .....	131
5.2.2.4.3	Hapus <i>Person</i> .....	131
5.3	Ulasan Hasil Evaluasi.....	132
BAB VI KESIMPULAN DAN SARAN .....		133
6.1	Kesimpulan.....	133
6.2	Saran .....	133
DAFTAR PUSTAKA .....		134

## DAFTAR GAMBAR

Gambar II.1 MVC Model .....	18
Gambar II.2 Arsitektur MVC dan Penanganannya dalam Rails.....	19
Gambar III.1 Use case Diagram <i>Invoice Online</i> .....	29
Gambar III.2 Activity Diagram <i>Register</i> dan <i>Login User</i> .....	40
Gambar III.3 Activity Diagram Tambah <i>Invoice</i> .....	41
Gambar III.4 Activity Diagram Ubah <i>Invoice</i> .....	42
Gambar III.5 Activity Diagram Hapus <i>Invoice</i> .....	43
Gambar III.6 Activity Diagram Kirim <i>Invoice</i> .....	44
Gambar III.7 Activity Diagram Tambah <i>Company</i> .....	45
Gambar III.8 Activity Diagram Ubah <i>Company</i> .....	46
Gambar III.9 Activity Diagram Hapus <i>Company</i> .....	47
Gambar III.10 Activity Diagram Tambah <i>Person</i> .....	48
Gambar III.11 Activity Diagram Ubah <i>Person</i> .....	49
Gambar III.12 Activity Diagram Hapus <i>Person</i> .....	50
Gambar III.13 Class Diagram <i>Invoice Online</i> .....	51
Gambar III.14 Table/ER-Diagram .....	52
Gambar III.15 Sequence Diagram <i>Register</i> dan <i>Login User</i> .....	53
Gambar III.16 Sequence Diagram Tambah <i>Invoice</i> .....	54
Gambar III.17 Sequence Diagram Ubah <i>Invoice</i> .....	55
Gambar III.18 Sequence Diagram Hapus <i>Invoice</i> .....	56
Gambar III.19 Sequence Diagram Kirim <i>Invoice</i> .....	57
Gambar III.20 Sequence Diagram Tambah <i>Company</i> .....	58
Gambar III.21 Sequence Diagram Ubah <i>Company</i> .....	59
Gambar III.22 Sequence Diagram Hapus <i>Company</i> .....	60
Gambar III.23 Sequence Diagram Tambah <i>Person</i> .....	61
Gambar III.24 Sequence Diagram Ubah <i>Person</i> .....	62
Gambar III.25 Sequence Diagram Hapus <i>Person</i> .....	63
Gambar III.26 DES.USR.001 - <i>Form Register User</i> .....	64
Gambar III.27 DES.USR.002 - <i>Form Login User</i> .....	65
Gambar III.28 DES.INV.001 - <i>Form Tambah Invoice Baru</i> .....	66
Gambar III.29 DES.INV.002 - <i>Form Edit Invoice</i> .....	67
Gambar III.30 DES.INV.003 - <i>Form Hapus Invoice</i> .....	68
Gambar III.31 DES.INV.004 - <i>Form Kirim Invoice</i> .....	68
Gambar III.32 DES.CMP.001 - <i>Form Tambah Company</i> .....	69
Gambar III.33 DES.CMP.002 - <i>Form Edit Company</i> .....	70
Gambar III.34 DES.CMP.003 - <i>Form Hapus Company</i> .....	71
Gambar III.35 DES.PRS.001 - <i>Form Tambah Person</i> .....	71
Gambar III.36 DES.CMP.002 - <i>Form Edit Person</i> .....	72
Gambar III.38 DES.PRS.003 - <i>Form Hapus Company</i> .....	72
Gambar IV.1 Pendekatan Implementasi secara Top Down.....	77
Gambar IV.2 Pendekatan Implementasi secara Bottom Up .....	78
Gambar IV.3 Debugging <i>Error Method</i> .....	91
Gambar IV.4 Debugging <i>Error Nil Value</i> .....	92
Gambar IV.5 Debugging <i>Error Record Not Found</i> .....	92
Gambar IV.6 FRM.USR.001 - <i>Form Register User</i> .....	95
Gambar IV.7 FRM.USR.002 - <i>Form Login User</i> .....	96
Gambar IV.8 FRM.USR.003 - <i>Form Edit Data User</i> .....	96

Gambar IV.9 FRM.INV.001 - <i>Form Tambah Invoice</i> .....	97
Gambar IV.10 FRM.INV.002 - <i>Form Lihat Invoice</i> .....	97
Gambar IV.11 FRM.INV.003 - <i>Form Kirim Invoice</i> .....	98
Gambar IV.12 FRM.INV.004 - <i>Form Edit Invoice</i> .....	99
Gambar IV.13 FRM.INV.005 - <i>Form Hapus Invoice</i> .....	100
Gambar IV.14 FRM.INV.006 - <i>Form Pembayaran Invoice</i> .....	101
Gambar IV.15 FRM.CMP.001 - <i>List Company</i> .....	102
Gambar IV.16 FRM.CMP.002 - <i>Form Tambah Company</i> .....	103
Gambar IV.17 FRM.CMP.003 - <i>Form Edit Company</i> .....	104
Gambar IV.18 FRM.CMP.004 - <i>List Invoice Company</i> .....	104
Gambar IV.19 FRM.CMP.005 - <i>Form Hapus Company</i> .....	105
Gambar IV.20 FRM.PRS.001 - <i>Form Tambah Person</i> .....	106
Gambar IV.21 FRM.PRS.002 - <i>Form Edit Person</i> .....	106

## DAFTAR TABEL

Table II.1 Daftar Spesifikasi Perangkat keras untuk Server .....	8
Table II.2 Daftar Spesifikasi Perangkat keras untuk client.....	9
Table II.3 Objek dengan Kelas.....	14
Table II.4 Daftar Method Konversi Data .....	17
Tabel III.1 Use case narrative Tambah <i>Invoice</i> .....	30
Tabel III.2 Use case narrative Ubah <i>Invoice</i> .....	31
Tabel III.3 Use case narrative Hapus <i>Invoice</i> .....	32
Tabel III.4 Use case narrative Kirim <i>Invoice</i> .....	32
Tabel III.5 Use case narrative Tambah <i>Company</i> .....	33
Tabel III.6 Use case narrative Ubah <i>Company</i> .....	34
Tabel III.7 Use case narrative Hapus <i>Company</i> .....	35
Tabel III.8 Use case narrative Tambah <i>Person</i> .....	36
Tabel III.9 Use case narrative Ubah <i>Person</i> .....	37
Tabel III.10 Use case narrative Hapus <i>Person</i> .....	38
Tabel III.11 Keterangan <i>Form Register User</i> .....	65
Tabel III.12 Keterangan <i>Form Login User</i> .....	65
Tabel III.13 Keterangan <i>Form Tambah Invoice</i> .....	66
Tabel III.14 Keterangan <i>Form Edit Invoice</i> .....	67
Tabel III.15 Keterangan <i>Form Hapus Invoice</i> .....	68
Tabel III.16 Keterangan <i>Form Kirim Invoice</i> .....	68
Tabel III.17 Keterangan <i>Form Tambah Company</i> .....	69
Tabel III.18 Keterangan <i>Form Edit Company</i> .....	70
Tabel III.19 Keterangan <i>Form Hapus Company</i> .....	71
Tabel III.17 Keterangan <i>Form Tambah Company</i> .....	71
Tabel III.21 Keterangan <i>Form Edit Company</i> .....	72
Tabel III.22 Keterangan <i>Form Hapus Company</i> .....	72

## DAFTAR SIMBOL

SIMBOL	NAMA SIMBOL	KETERANGAN
	<i>Actor</i>	Pelaku kegiatan sistem atau pengguna suatu sistem. Dapat berupa orang atau sistem lainnya. Dalam pemberian nama <i>actor</i> hendaklah diberikan nama yang menggambarkan fungsinya dalam sistem, jangan menggunakan nama aslinya.
	<i>Use case</i>	Inisialisasi kegiatan dari sistem yang akan dibuat. Merupakan kegiatan yang dilakukan oleh <i>actor</i> dalam sistem.
	<i>Decisions</i>	Pemilihan keputusan apabila proses yang terjadi meminta sebuah pemilihan jenis keputusan, sehingga proses dapat terjadi lebih dari satu.
	<i>Initial state</i>	Inisialisasi state pertama kali memulai suatu proses.
	<i>Final state</i>	Inisialisasi state berakhirnya suatu proses.
	<i>Action state</i>	Proses yang dilakukan.