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NETWORKS

SDN BHD

vSwitchPro – User Manual

A Soft Switch Product by DTMF Networks SDN BHD

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Chapter 1 EXECUTIVE SUMMARY

1.1. INTRODUCTION

vSWITCHPro is High Performance Professional Voice over IP Soft Switch that employs state of the art Next Generation Network technology and includes most comprehensive suite of intelligent call routing features.

1.2. PURPOSE AND AUDIENCE

The purpose of this document is to present a detailed description of the vSwitchPro. It will explain the features of the application, the interfaces of the application, what the application will do and the constraints under which it must operate.

This document is intended for the users of vSwitchPro.

1.3. FEATURES AND MODULES

Following are the features and modules currently implemented in vSwitchPro:

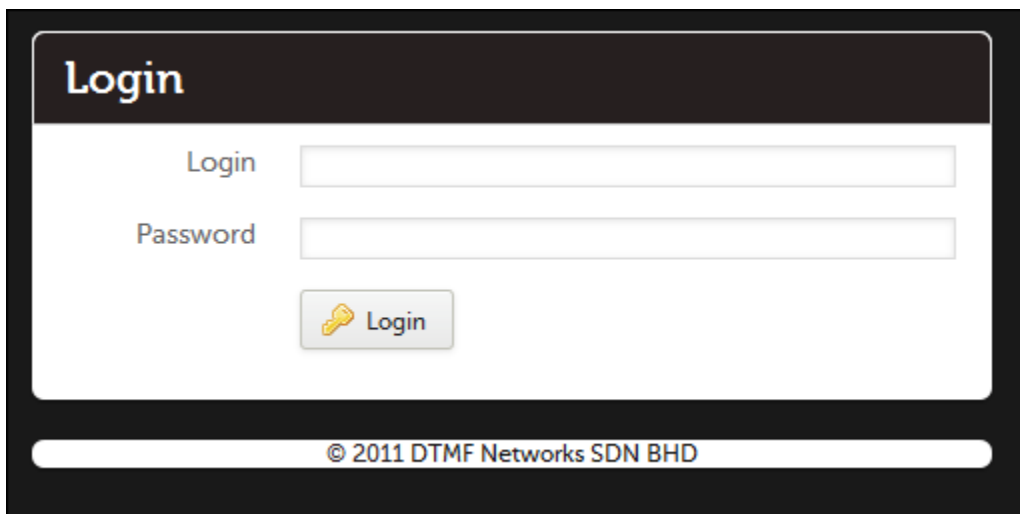
1. Users Section
2. Pool Section
3. Calling Plan section
4. Endpoint Section
5. Switch Management
6. Reports
7. Alerts

Chapter 2 vSwitchPro FEATURES AND MODULES

2.1. AUTHENTICATION

In order to start the application and access its different modules, the client user has to open the Internet browser (preferred Firefox version 3.x or above) and type the Application address in the Address bar of the browser i.e. <http://1.1.1.1:8080/wss-billing-webapp/wss/auth/login>

The user then needs to enter the Account id, username and password as provided to him/her via email on the login page and click the “Login” button.



The screenshot shows a web-based login interface. At the top, the word "Login" is displayed in a large, bold, white font against a dark background. Below this, there are two white input fields with light gray borders. The first field is labeled "Login" and the second is labeled "Password". Below the "Password" field is a button with a yellow key icon and the text "Login". At the bottom of the page, there is a white horizontal bar containing the text "© 2011 DTMF Networks SDN BHD".

Passwords are case sensitive and the user should make sure that the caps lock is not turned on. After logging into the application the user can access different modules and features of the system.

2.2. SWITCH

This section allows user to manage switch side configurations. It is comprised of 3 sub-sections,

1. Switch Instances Management
2. Search switch instances
3. Active calls

2.2.1. Switch Instances Management

Whenever a new switch is added, its switch instance is created, in order to manage the new switch through this application.

The screenshot shows the 'Switch Instance' configuration page in the vSwitchPro application. The page has a dark navigation bar at the top with menu items: Home, Pools v, Users v, Customers v, Invoices v, Calling Plans v, Endpoints v, Switch v, Reports v, Alerts v, and Logs v. Below the navigation bar is a form titled 'Switch Instance'. The form contains the following fields:

- Name: Text input field
- IP Address: Text input field
- SSH User: Text input field
- SSH Password: Text input field
- SSH Port: Text input field
- RPC URL: Text input field
- RPC User: Text input field
- RPC Password: Text input field
- Dialplan: Text input field
- Distributor: Text input field
- Active: A dropdown menu currently showing 'Inactive'
- Save: A button at the bottom of the form

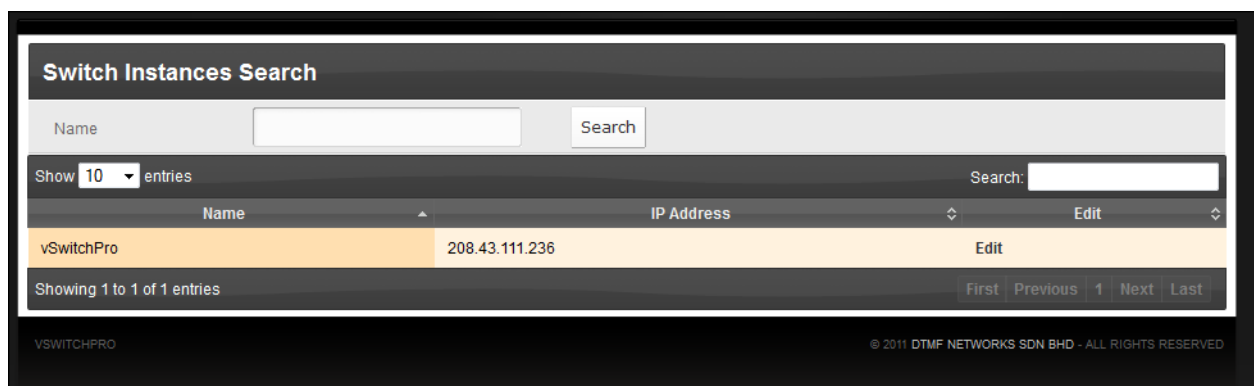
At the bottom of the page, there is a footer with 'VSWITCHPRO' on the left and '© 2011 DTMF NETWORKS SDN BHD - ALL RIGHTS RESERVED' on the right.

- a) Mouse over **Switch** Menu -> Click **Switch Instance Management**.
- b) Switch Instance page is displayed.
- c) Following information is to be given by the user in order to create a switch instance:
 - i. **Name:** Name of the switch instance
 - ii. **IP Address:** IP of the switch
 - iii. **SSH User:** Remote access user name for the switch.
 - iv. **SSH Password:** Remote access password for the switch.
 - v. **SSH Port:** Remote service port

- vi. **RPC URL:** User is required to give Remote procedure call link in this field. RPC is required for switch management functions like; reloading gateways; reloading distributor; fetch number of active calls on the switch.
- vii. **RPC User:** User for RPC service
- viii. **RPC Password:** Password for RPC service
- ix. **Dialplan:** User is required to give location of switch dialplan
- x. **Distributor:** User is required to give the path of distributor configuration.
- xi. **Active:** Status of the switch. If the status is inactive, any changes made to switch will not be applicable.

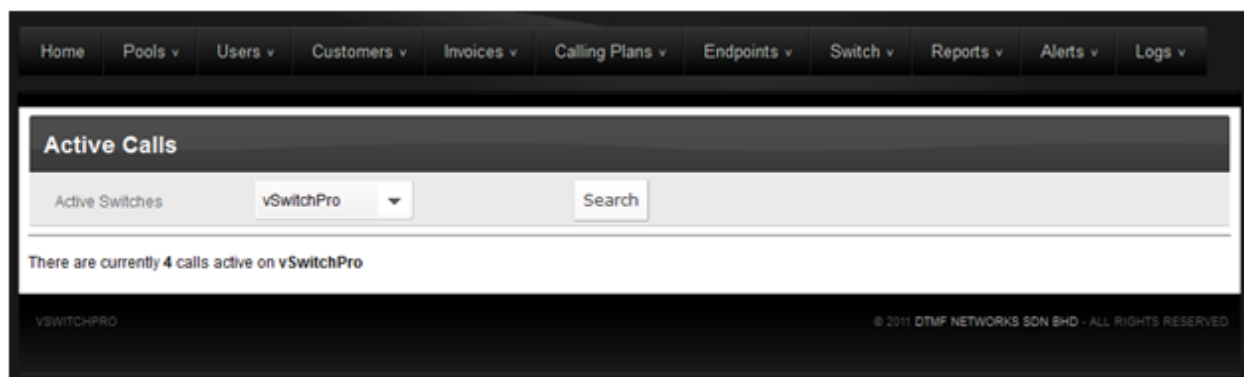
2.2.2. Search (Switch Instances)

This screen allows user to search available switch instances on the basis on their names and edit them if required. Upon pressing edit user is redirected to the screen same as switch instance management.



2.2.3. Active Calls

This section allows user to view the number of current active calls running on each switch individually.



2.3. USERS SECTION

Users section is used to define the users that are going to use the application. This section comprises of two sub-sections:

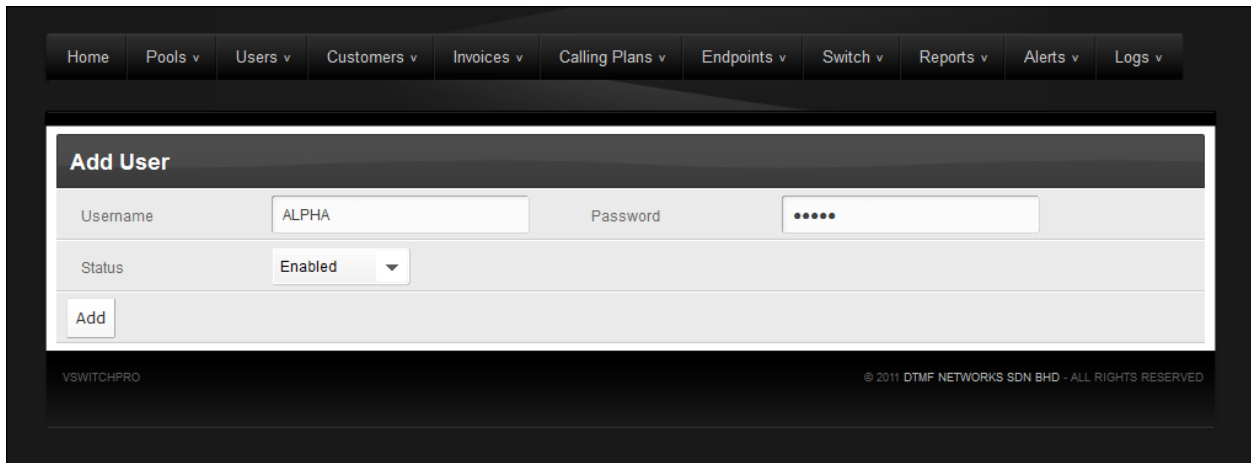
1. User Management
2. Search

2.3.1. User Management:

This sub-section allows adding new users. The following fields are required in order to add a new user:

- a) Username
- b) Password
- c) Status

To create a new user account, you must be logged into an account name that has administrative privileges



The screenshot shows the vSwitchPro web interface. At the top, there is a navigation menu with items: Home, Pools v, Users v, Customers v, Invoices v, Calling Plans v, Endpoints v, Switch v, Reports v, Alerts v, and Logs v. Below the menu is a form titled "Add User". The form has three main sections: "Username" with a text input field containing "ALPHA", "Password" with a text input field containing six dots, and "Status" with a dropdown menu showing "Enabled". At the bottom left of the form is an "Add" button. At the bottom of the page, there is a footer with "VSWITCHPRO" on the left and "© 2011 DTMF NETWORKS SDN BHD - ALL RIGHTS RESERVED" on the right.

- a) Mouse over **User** Menu -> Click **User Management**.
- b) Add user page displays.
- c) Click in the Username box, and type an account name for the new user.
- d) Enter the new user's password in the Password field.
- e) Select the status of the user account
- f) Press Add

Upon clicking ADD a confirmation message will appear on the top of the screen and a new tab **PRIVILEGES** will be shown.

The screenshot displays the 'Add User' interface in the vSwitchPro application. At the top, a navigation menu includes 'Home', 'Pools v', 'Users v', 'Customers v', 'Invoices v', 'Calling Plans v', 'Endpoints v', 'Switch v', 'Reports v', 'Alerts v', and 'Logs v'. The main content area is titled 'Add User' and features a blue notification bar at the top stating 'User saved/updated successfully!'. Below this, the form contains the following fields: 'Username' with the value 'ALPHA', 'Password' with masked characters '.....', and 'Status' set to 'Enabled' with a dropdown arrow. At the bottom of the form, there are two buttons: 'Add' and 'Privileges'. The footer of the interface shows 'VSWITCHPRO' on the left and '© 2011 DTMF NETWORKS SDN BHD - ALL RIGHTS RESERVED' on the right.

The privileges can be assigned to the new user from the **PRIVILEGES** tab which is activated once the user is created.

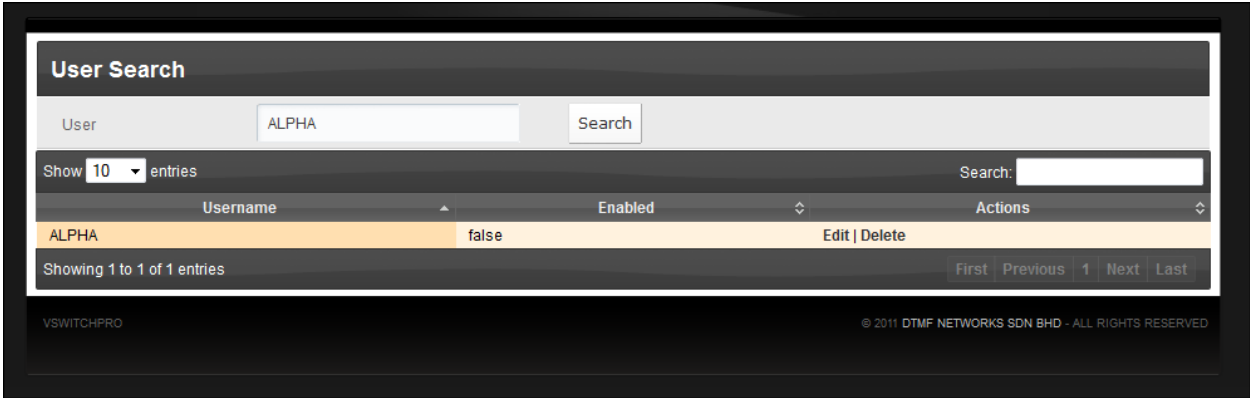
User interface for assigning privileges is easy to use and administrator is able to assign all privileges for a user in one click as well as multiple privileges with a user friendly privileges screen.

It is mandatory for the admin to assign ROLE_ADMIN and ROLE_USER privileges to each user interacting with the system. Rest of the privileges can be assigned as per user responsibilities.

	Privilege	Description
<input type="checkbox"/>	ROLE_ADMIN	admin
<input type="checkbox"/>	ROLE_USER	user
<input type="checkbox"/>	POOL	Pool Privilege
<input type="checkbox"/>	USER	User Privilege
<input type="checkbox"/>	CALLING_PLAN	Calling Plan Privilege
<input type="checkbox"/>	ENDPOINT	Endpoint Privilege
<input type="checkbox"/>	SWITCH	Switch Privilege
<input type="checkbox"/>	REPORT	Report Privilege
<input type="checkbox"/>	ALERT	Alert Privilege
<input type="checkbox"/>	AUDIT_ADMIN	Audit Admin Page
<input type="checkbox"/>	AUDIT_LOGS	Audit Logs
<input type="checkbox"/>	EMAIL_LIST_ADD	Email List Add
<input type="checkbox"/>	EMAIL_LIST_SEARCH	Email List Search
<input type="checkbox"/>	ALERT_ADD	Add Alert
<input type="checkbox"/>	ALERT_SEARCH	Search Alert
<input type="checkbox"/>	TRACE_REPORT	Trace Report
<input type="checkbox"/>	ASR_GRAPH	ASR Graph
<input type="checkbox"/>	CALL_HUNT	Call Hunt
<input type="checkbox"/>	CUSTOM_REPORTS	Custom Reports
<input type="checkbox"/>	ASR_REPORTS	ASR Reports
<input type="checkbox"/>	SWITCH_ACTIVE_CALLS	Switch Active Calls

2.3.2. Search (User)

This section provides an option to search and edit a particular user. Upon typing the username, Search brings the table of the possible matched users. User with admin role can select any user account to delete or edit its complete information and privileges.



2.4. POOLS TAB

A pool is a logical grouping of codes. This section allows user to create new pool and edit them. The pools created here are later bound to a calling plan. The pool section is comprised of two subsections.

1. Dial code Management
2. Search

2.4.1. Dial code Management

This screen provides the option to create a new pool or add new codes into any existing pool. It is comprised of 2 mandatory fields,

- a) Pool
- b) Dial code

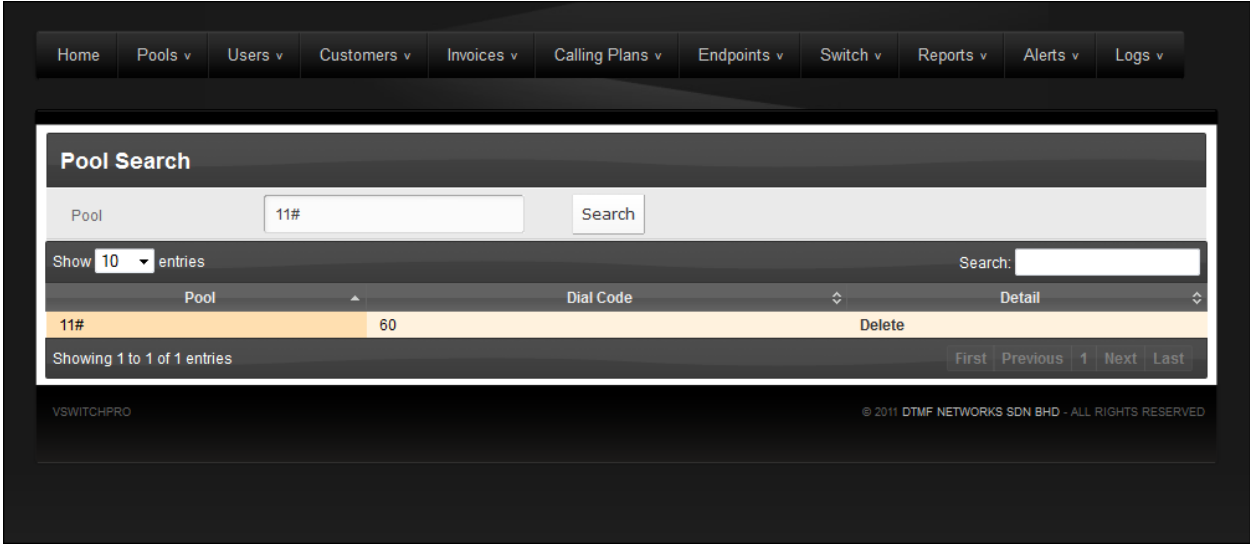
The screenshot shows a web interface for adding a pool. At the top, there is a dark header with the text "Add Pool". Below this is a light blue banner with an information icon and the text "Pool Added Successfully". The main form area has a light gray background and contains two input fields: "Pool" with the value "11#" and "Dial Code" with the value "60". To the right of the "Dial Code" field is an "Add" button. At the bottom of the form, there is a footer with "VSWITCHPRO" on the left and "© 2011 DTMF NETWORKS SDN BHD - ALL RIGHTS RESERVED" on the right.

Upon Submitting the required information, a new pool is created if the pool name entered does not already exist in the database. However, if the pool exists then the entered code is added in that existing pool. It is mandatory for the user to append “#” sign with the pool name, otherwise an error message will be displayed on the screen and the pool will not be created or updated.

2.4.2. Search (Pool)

This screen allows users to search for existing pool. When the pool name is entered in the search bar a drop-down list of the related pools appears. Upon searching the selected pool the list of codes added in that pool is displayed.

User has an option to delete unwanted codes through this screen.



2.5. CALLING PLAN SECTION

A calling plan is a group of routes that is added to endpoints and determines the destinations allowed to a customer or the destinations which the supplier will carry. This section is used to define and manage calling plans, routes and rates. It is comprised of four sections

1. Calling plan Management
2. Search
3. Bulk Upload
4. Routes Management

2.5.1. Calling Plan Management

This section provides the option of adding new calling plans.

The screenshot shows the 'Calling Plan' management interface. At the top, there is a navigation menu with options: Home, Pools v, Users v, Customers v, Invoices v, Calling Plans v, Endpoints v, Switch v, Reports v, Alerts v, and Logs v. Below the menu is a form titled 'Calling Plan'. The form has the following fields:

- Name: VSWITCHPRO
- Limit: 100
- Pool: (empty)
- Prefix: (empty)
- Rate: (empty) \$
- Priority: (empty)
- Route Type: Ingress (dropdown menu)

A 'Save' button is located at the bottom of the form. At the bottom left of the page, it says 'VSWITCHPRO' and at the bottom right, it says '© 2011 DTMF NETWORKS SDN BHD - ALL RIGHTS RESERVED'.

- a) Mouse over **Calling Plan** Menu -> Click **Calling Plan Management**.
- b) Calling plan page is displayed. On this page, only Calling plan name and limit fields are editable initially. The rest of the fields are disabled.
- c) Click on Name field and type calling plan name.
- d) Enter limit in the limit field. This limit will be applicable on all the ACTIVE ROUTES that are added in that calling plan. If the limit field is left empty the system would treat it as unlimited. Limits can be applied to BOTH customers end as well as vendors end.
 - a. **NOTE:** Limit determines the number of simultaneous calls that a customer can send to vSwitchPro or the switch user can send to its Supplier/Carrier.
- e) Once the calling plan is saved the remaining fields (Pool, Rate, Prefix, Priority and Type) are now editable.

- i. **POOL:** Each pool may contain a different set of routes. Hence, each pool may point to a different LCR (Least Cost Routing) stack.
- ii. **RATE:** Rates determine how to price a call for carriers, regions, and service type, based on connection charges and billing increments.
- iii. **PREFIX:** The dialing prefix sent by the customer or sent to the supplier. This prefix is prepended to the dialed number.
- iv. **PRIORITY:** This number determines the position of a particular number in LCR stack. With 1 being the highest priority.

Upon pressing Enter, a pop-up window appears containing all the codes added in that pool. The user has to select the codes that are to be added in the calling plan. User also has an option to edit information of any route through the pop-up window.

Add New Routes
✕

Available

Show entries
Search:

	Name	Type	Pool	Dial Code	Prefix	Limit	Rate	Priority	Active
<input type="checkbox"/>	default	Egress	33#	9192	1234	-1	0.01	1	true
<input type="checkbox"/>	default	Egress	33#	9191	1234	-1	0.01	1	true
<input type="checkbox"/>	default	Egress	33#	9193	1234	-1	0.01	1	true
<input type="checkbox"/>	default	Egress	33#	9194	1234	-1	0.01	1	true
<input type="checkbox"/>	default	Egress	33#	9195	1234	-1	0.01	1	true
<input type="checkbox"/>	default	Egress	33#	9196	1234	-1	0.01	1	true
<input type="checkbox"/>	default	Egress	33#	9197	1234	-1	0.01	1	true

Showing 1 to 7 of 7 entries
First Previous 1 Next Last

Not Available

NO ROUTES HAVE BEEN EXCLUDED

NOTE: Prefix, Limit, Rate, Priority and Active fields are editable on this screen.

Upon pressing 'Save', all the selected routes are added to the calling plan as shown below:

Home Pools v Users v Customers v Invoices v Calling Plans v Endpoints v Switch v Reports v Alerts v Logs v

Calling Plan

Name: Limit:

Pool: Prefix:

Rate: \$ Priority:

Route Type:

Show entries Search:

Name	Type	Pool	Dial Code	Prefix	Limit	Rate	Priority	Active	Delete	TOD
default	Egress	33#	9192	1234	-1	0.01	1	true	Delete	TOD
default	Egress	33#	9191	1234	-1	0.01	1	true	Delete	TOD
default	Egress	33#	9193	1234	-1	0.01	1	true	Delete	TOD
default	Egress	33#	9194	1234	-1	0.01	1	true	Delete	TOD
default	Egress	33#	9195	1234	-1	0.01	1	true	Delete	TOD
default	Egress	33#	9196	1234	-1	0.01	1	true	Delete	TOD
default	Egress	33#	9197	1234	-1	0.01	1	true	Delete	TOD

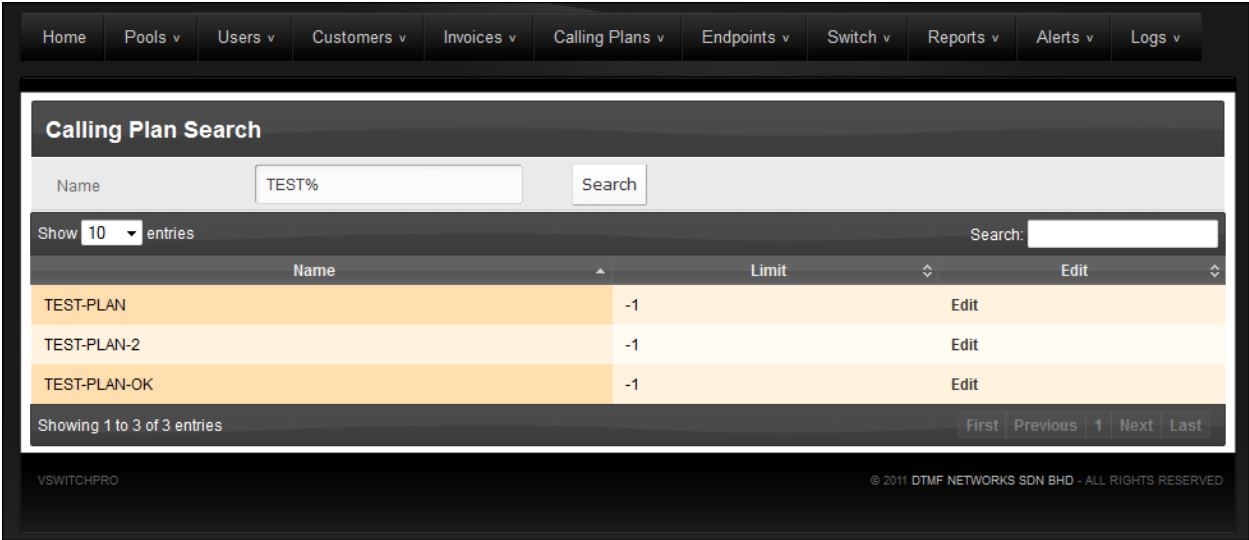
Showing 1 to 7 of 7 entries First Previous 1 Next Last

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Through this screen user now has an option to perform Time of Day routing on the added codes. Permanent deletion of routes can also be performed through this screen.

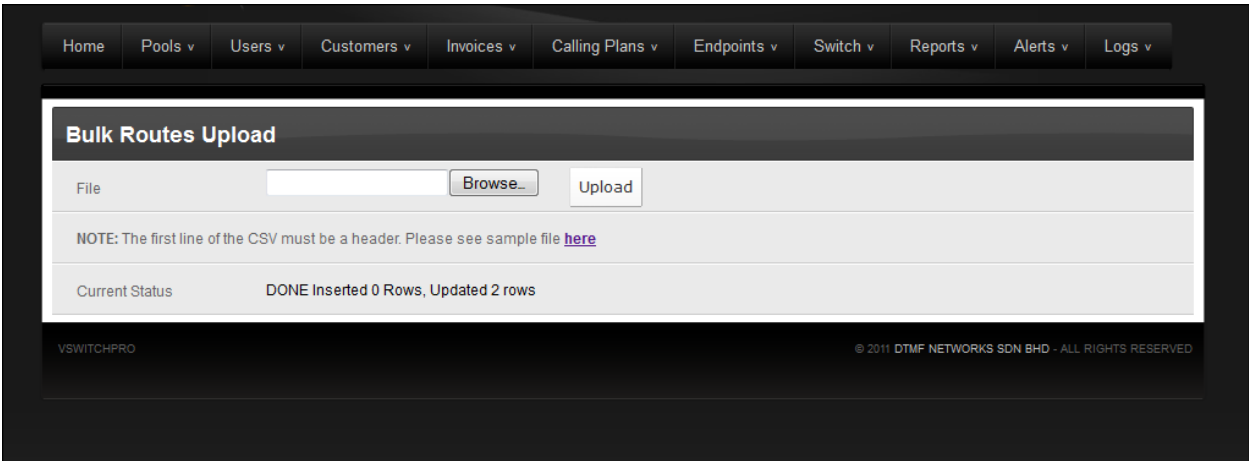
2.5.2. Search (Calling Plan)

This screen allows user to search and edit the existing calling plans. When a calling plan name is entered in the search bar, a list of related search is shown along with the call limit that has been applied to each calling plan. User has an option to make changes to the calling plan information through this screen.

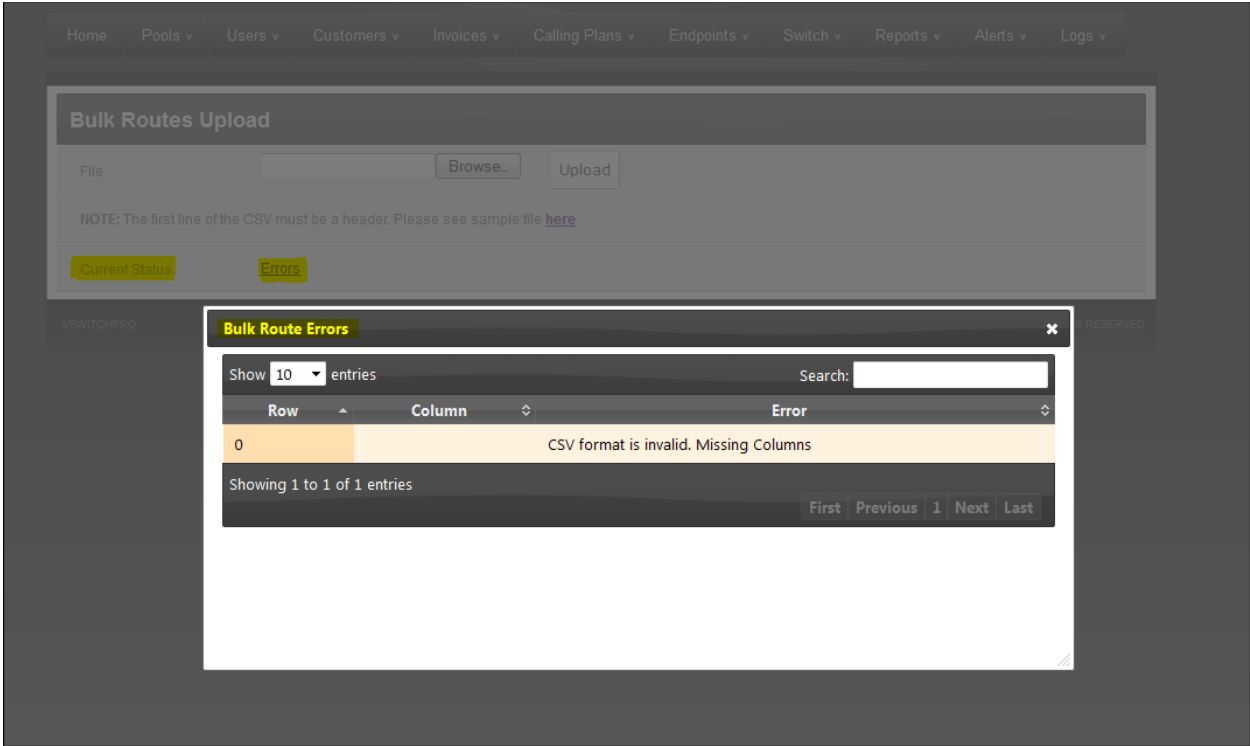


2.5.3. Bulk Routes Upload

Through this screen user can upload the required codes through a CSV file. A sample for CSV format has been given on this screen too.



This bulk upload process is asynchronous. User can perform other tasks while this process is taking place in the background. Once the process is completed, a summary is displayed, stating the changes that have been made. However, If the bulk upload job is not successful, (as shown below) an error message is displayed which tells the user the reasons for the failure of job.



2.5.4. Route Management

This screen provides the option to change the priority of any route in a calling plan. Upon entering the combination of pool and dialplan, a list of related calling plans is displayed. The priorities can then be changed according to the routing table.

Home Pools v Users v Customers v Invoices v Calling Plans v Endpoints v Switch v Reports v Alerts v Logs v

Route Management

Route

Show **10** entries

Calling Plan	Pool	Dial Code	Priority
TEST-PLAN	55#	93	<input type="text" value="1"/>
TEST-PLAN-2	55#	93	2

Showing 1 to 2 of 2 entries

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2.6. ENDPOINT TAB

The IP addresses provided by the customers or vendors are added in the system as ENDPOINTS. This section is comprised of two sub sections

1. Create Endpoint
2. Search Endpoint

2.6.1. Create Endpoint

This screen allows users to create/add new endpoints in the system. In order to create an endpoint user needs to add the following information on this screen,

- a) Endpoint Name
- b) IP address
- c) Call limit
- d) Customer ID
- e) Call Duration
- f) Status
- g) Type
- h) Calling Plan

The screenshot displays the 'Endpoint' management interface. At the top, a navigation menu includes 'Home', 'Pools', 'Users', 'Customers', 'Invoices', 'Calling Plans', 'Endpoints', 'Switch', 'Reports', 'Alerts', and 'Logs'. The main content area is titled 'Endpoint' and features a form with the following fields and controls:

- Name:** Text input field.
- IP Address:** Text input field.
- Call Limit:** Text input field with the value '0'.
- Customer:** Text input field.
- Call Duration:** Text input field with the value '0'.
- Status:** Dropdown menu currently set to 'Inactive'.
- Type:** Dropdown menu currently set to 'Customer'.

Below the form are two buttons: 'Save' and 'Assign Calling Plan'. Underneath is a table with the following structure:

Calling Plan Id	Calling Plan	Deassign
No data available in table		

At the bottom of the table area, it shows 'Showing 0 to 0 of 0 entries' and navigation links for 'First', 'Previous', 'Next', and 'Last'. The footer contains 'VSWITCHPRO' and '© 2011 DTMF NETWORKS SDN BHD - ALL RIGHTS RESERVED'.

While adding Endpoint through this screen, the user should make sure that:

- While adding multiple IPs of a single customer/vendor, the Customer ID in each endpoint should remain the same.
- The particular IP, that is being added, does not already exist in the system. If the IP is already added in the system with the same or different endpoint name an error message would appear.

Also, if required, user could assign more than one calling plans to a single endpoint.

2.6.2. Search (Endpoint)

This screen allows user to search for a particular endpoint using either endpoint name or IP address. User could also use wild card search. The search results displayed contain the following details

- IP
- Call Limit
- Endpoint Type
- Status

User can update any of these fields using edit screen. Endpoint deletion option is also given on this screen.

The screenshot displays the 'Endpoints Search' interface. At the top, there is a navigation menu with items: Home, Pools, Users, Customers, Invoices, Calling Plans, Endpoints, Switch, Reports, Alerts, and Logs. Below this is the 'Endpoints Search' section. It features a 'Search By' dropdown menu set to 'Name', a 'Name/IP' input field containing 'TEST%', a 'Type' dropdown menu set to 'Both', and a 'Search' button. Below the search controls, there is a table showing search results. The table has columns for Name, IP Address, Type, Limit, Status, and Edit. Three entries are displayed: TEST-AHMED (Vendor, Limit 0, Status false), TEST-NEW (Vendor, Limit 0, Status true), and TEST-OK (Customer, Limit 55, Status false). At the bottom of the table, it says 'Showing 1 to 3 of 3 entries' and includes navigation links for First, Previous, 1, Next, and Last.

Name	IP Address	Type	Limit	Status	Edit
TEST-AHMED	121.152.152.15	Vendor	0	false	Edit Delete
TEST-NEW	121.152.152.14	Vendor	0	true	Edit Delete
TEST-OK	192.168.168.204	Customer	55	false	Edit Delete

User is allowed to edit all the fields except Customer Type. Once the Customer type has been defined while creating the account it CANNOT BE CHANGED.

2.7. REPORTS SECTION

This section is used to monitor the performance of the routes and the changes made in those routes. It is comprised of different types of reports, that includes,

1. ASR Report
2. Call Hunt
3. Active Calls Graph
4. Trace Report

2.7.1. ASR Report

Through this reports we can check the performance/quality of the route based on parameters like ASR, ACD and PDD. The definitions of these terms are as follow.

ASR: Answer Seizure ratio (ASR) is the number of successfully answered calls divided by the total number of calls attempted

ACD: Average Call duration is the total duration of calls divided by total number of connected calls. ALOC (Average length of call) is another term used for ACD.

PDD: The time between punching in the last digit of a telephone number and receiving a ring, busy signal or an announcement etc.

ASR/ACD/PDD shows the route performance for example ASR/ACD should not be low and PDD should not be too high.

ASR reports are divided into following types:

- a) ASR by Vendor ID
- b) ASR by Customer ID
- c) ASR by Vendor IP
- d) ASR by Customer IP
- e) ASR by Region
- f) ASR by Day
- g) ASR by Hour
- h) ASR by Minute

User can view these reports based on the following criteria:

- a) Start date
- b) End date
- c) Region
- d) Source Reg ID
- e) Destination Reg ID
- f) Customer Prefix
- g) Vendor Prefix
- h) Time zone
- i) Switch

The reports display the following information:

- a) Source/Dest Reg ID
- b) Total Calls
- c) Error Calls
- d) Minutes
- e) ASR
- f) ACD
- g) Average PDD (In msec)
- h) Switch
- i) Time of first call
- j) Time of last call

ASR Summary Report

Report By	ASR by Region <input type="text"/>	Region	<input type="text"/>
Start Date	2011-10-03 00:00:00	End Date	2011-10-03 23:59:59
Source Reg ID	<input type="text"/>	Customer Prefix	<input type="text"/>
Dest Reg ID	<input type="text"/>	Vendor Prefix	<input type="text"/>
Time Zone	GMT+05:00	Switch	(ALL)

Show	10	entries								Search:	<input type="text"/>
------	----	---------	--	--	--	--	--	--	--	---------	----------------------

region	Total Calls	Error Calls	Duration	ACD	ASR	PDD	First Call	Last Call	Switch	Detail
91	55	37	102.68	00:05:42	33	12235	2011-10-03 11:52:32	2011-10-03 14:38:33	WSS2	Detail
919	27	18	28.78	00:03:11	33	13895	2011-10-03 11:43:22	2011-10-03 14:39:16	WSS2	Detail
9118	2	2	0.00	00:00:00	0	0	2011-10-03 13:59:46	2011-10-03 14:00:52	WSS2	Detail
9122	2	2	0.00	00:00:00	0	0	2011-10-03 13:16:03	2011-10-03 14:08:45	WSS2	Detail
9126	2	2	0.00	00:00:00	0	0	2011-10-03 13:29:01	2011-10-03 13:55:08	WSS2	Detail
9147	2	0	17.25	00:08:37	100	0	2011-10-03 14:04:55	2011-10-03 14:10:41	WSS2	Detail
9148	3	2	3.30	00:03:18	33	12894	2011-10-03 13:12:59	2011-10-03 14:07:11	WSS2	Detail
9149	1	0	3.60	00:03:36	100	0	2011-10-03 14:01:34	2011-10-03 14:01:34	WSS2	Detail
9180	3	3	0.00	00:00:00	0	0	2011-10-03 11:52:31	2011-10-03 13:58:44	WSS2	Detail
9191	3	3	0.00	00:00:00	0	0	2011-10-03 11:53:18	2011-10-03 13:19:11	WSS2	Detail
TOTAL	152	107	242.76	00:05:23	30	867				

Showing 1 to 10 of 16 entries First Previous 1 2 Next Last

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2.7.2. Call Hunt

Call hunt provides a user an option to check the possible termination paths of a particular call. User is required to enter the phone number/dial code and pool name in order to check the available suppliers, along with their IPs and priority, for a particular dial code. The screen also displays the bridge-string that will be created for the said dial codes.

Call Hunt

Phone Number Pool

Show 10 entries Search:

No	Vendor (DB)	IP	Calling Plan	Dial Code	Priority
1	TEST-NEW	121.152.152.14	TEST-PLAN	93	1
2	load1	10.1.1.12	TEST-PLAN-2	93	2

Showing 1 to 2 of 2 entries
First Previous 1 Next Last

Show 10 entries Search:

No	Bridge String
1	[cust_id=AHMED]sofia/gateway/TEST-NEW/NO_PREFIX
2	[cust_id=load]sofia/gateway/load1/4544

Showing 1 to 2 of 2 entries
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2.7.3. Active Calls Graph:

Active call graphs show the number of calls running on the switch at a particular interval. Two types of graphs; (1) Bar Chart and (2) Line Chart are given to monitor active calls on any switch instance.



Figure (1)

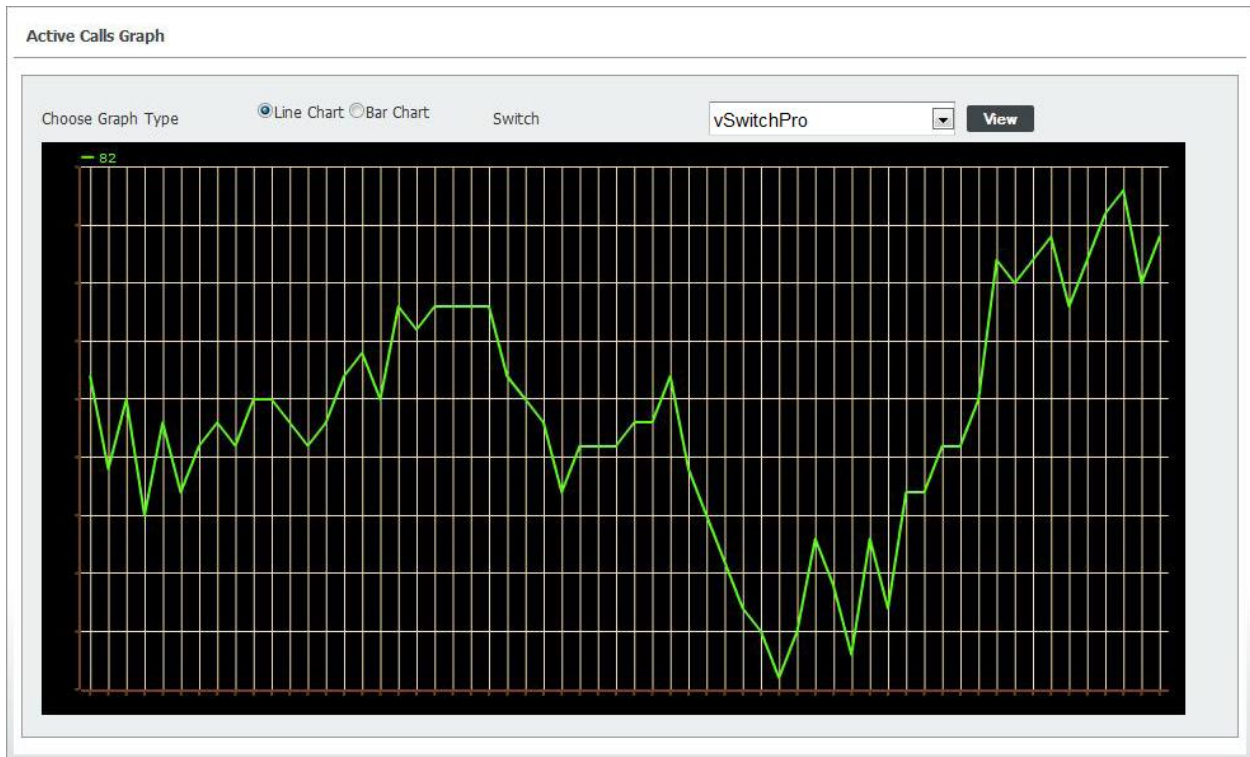


Figure (2)

Figure (1) illustrates the Bar Chart and figure (2) illustrates the Line Chart. One both the charts, the vertical axis denotes number of calls, while, the horizontal axis denotes time in seconds.

2.7.4. Trace Report:

Trace report allows user to take call traces through user interface. The user only needs to select switch and vendor/supplier/carrier name and enter the time interval to get the required call trace.

2.8. CUSTOMERS

This module allows users to create, maintain and track all the information of the Customers/Vendors using the service.

This module is divided into following sections:

1. Customer Management
2. Search
3. Balance logs Admin

2.8.1. Customer Management:

This module allows users to create new accounts by adding the following information:

GENERAL INFORMATION

Name: The name of the company needs to be entered here.

Balance: This field is displayed for Pre-paid accounts only. Initial balance needs to be entered in this field for customers having type as pre-paid. This field should have a value greater than 0 for the customer calls to get through. The balance is deducted after every 60 seconds interval for an active account, based on usage.

Limit: This field is displayed for Post-paid accounts only. Limit field is applicable to postpaid accounts in such a way that they will be blocked after reaching a certain amount in dollars.

Account Type: Account type is selected as either prepaid or postpaid.

CONTACT INFORMATION

The contact information of the company is given here;

Account Manager: General information of the account manager.

Name: Account Manager Name.

Email: Account manager email address

Contact #: Contact number of the account manager.

NOC Manager: General information of NOC Manager

Name: NOC manager name

Email: NOC manager email address

Contact #: Contact number of NOC manager

General Information: General information about the company

Company: Company Name

Email: Company's email address

Rates Email: Email address where rate notifications are to be sent
Billing Email: Email address where invoices are to be sent
Address: Information about the company's location

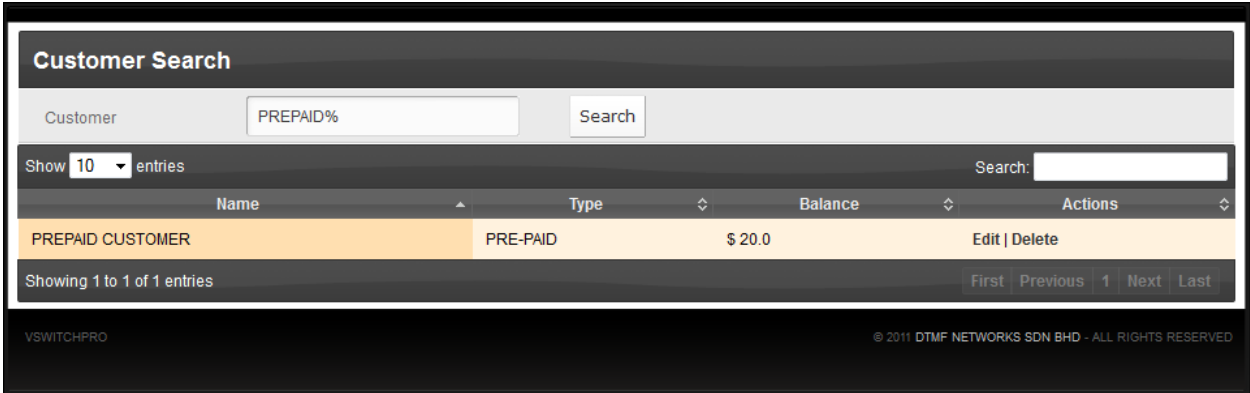
Figure (3) shows how an Add Customer page looks like.

Add Customer			
GENERAL			
Name	<input type="text"/>	Balance	<input type="text"/> \$
Account Type	PRE-PAID <input type="button" value="v"/>		
CONTACT INFORMATION			
ACCOUNT MANAGER			
Name	<input type="text"/>	Email	<input type="text"/>
Contact #	<input type="text"/>		
NOC MANAGER			
Name	<input type="text"/>	Email	<input type="text"/>
Contact #	<input type="text"/>		
GENERAL INFORMATION			
Company	<input type="text"/>	Email	<input type="text"/>
Rates Email	<input type="text"/>	Billing Email	<input type="text"/>
Description	<input type="text"/>		
ADDRESS			
Line 1	<input type="text"/>	Line 2	<input type="text"/>
City	<input type="text"/>	State	<input type="text"/>
Country	Afghanistan <input type="button" value="v"/>	Zip	<input type="text"/>
Office #	<input type="text"/>		
ACTIONS			
<input type="button" value="Add"/>			
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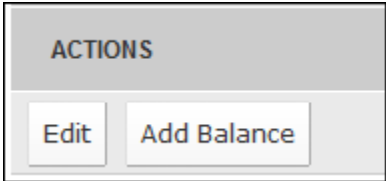
Figure (3)

2.8.2. Search (Customer):

This screen is used to search the customers that exist in the database and edit their information or delete the account, if required.



Also, balance for prepay customer is added through edit screen.



2.8.3. Prepay Balance Logs

This feature allows users to view the balance logs of different prepay customers. Upon entering the name of the customer; previous balance, payments entered on any day and day end balance of each day is displayed. Along with the name of user who has entered the payment.

Prepay Balance Logs

SEARCH

Name

Show 10 entries Search:

Previous Balance	Payment	Day End Balance	Payment Date	Added By
\$ -7.8	\$ 10,000	\$ 9,992.2	09/27/2011 07:54:37	
\$ -2.37	\$ 5	\$ 2.63	09/27/2011 02:19:13	
\$ 0	\$ 1	\$ 1	09/23/2011 08:29:30	
\$ -2.75	\$ 2.75	\$ 0	09/23/2011 08:20:27	
\$ 16.8	\$ -15.8	\$ 1	09/23/2011 05:13:19	
\$ -2.69	\$ 20	\$ 17.31	09/23/2011 03:39:05	
\$ 11.23	\$ -11.23	\$ 0	09/23/2011 03:14:33	
\$ -0.98	\$ 20	\$ 19.02	09/23/2011 03:02:38	
\$ 18.98	\$ -19	\$ -0.02	09/22/2011 07:37:52	
\$ -1.02	\$ 20	\$ 18.98	09/22/2011 07:28:38	

Showing 1 to 10 of 20 entries

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2
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2.9. INVOICES

This section provides the option for generating the invoices for different Customers. This section is further divided into two sub-sections:

1. Create Invoice
2. History

2.9.1. Create Invoice

This screen allows users to create customer invoice on the basis of prefix. Multiple invoices could be generated for customer if he has more than one prefix. Following fields are required to generate invoice;

- a) Account Name
- b) Prefix
- c) Start Date
- d) End Date
- e) Issue Date
- f) Due Date

Upon pressing “show invoice” tab, customer invoice is created. As can be seen in the screen-shot.

Customer Invoice

Account	<input type="text" value="CUSTOMER"/>	Prefixes	<input type="text" value="12345"/> (4 loaded)
Start Date	<input type="text" value="2011-09-01 00:00:00"/>	End Date	<input type="text" value="2011-10-04 23:59:59"/>
Issue Date	<input type="text" value="2011-10-04"/>	Due Date	<input type="text" value="2011-10-04"/>

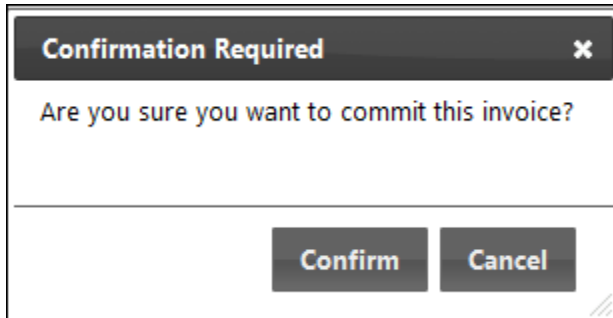
IV-0001-12345-?

Invoice No:	IV-0001-12345-?	Customer Prefix:	12345
Customer ID:	1	Issue Date:	2011-10-04
Name:			
Due Date:	2011-10-04		

September 1, 2011 - October 4, 2011

No. Of Calls	Qty (Min)	Description	Code	Rate	Amount
1	0.58	Pakistan Mobile Telenor	92345	1.458 \$	0.85 \$
1	0.58	TOTAL			0.85 \$

Once the invoice is generated user can now commit the invoice after verifying it. Upon pressing “Commit Invoice” tab a confirmation pop-up window appears.



After pressing “confirm”, user is redirected to Invoice history page, where the user has following options

- History Invoice: “History invoice” opens the committed invoice in HTML format.
- Renew Invoice: “Renew invoice” fetches the PDF format of the updated invoice.
- Notify: “Notify” is a check for the users, for identifying the invoices that are already sent to the customers.

NOTE: User can update the invoice settings as per requirements by running “invoice.sh” script which can be downloaded from the website along with the package. For these updates to take effect user needs to restart the application, using following commands:

1. `/opt/webserver/bin/catalina.sh stop` OR `pkill -9 java` (To stop application)
2. `/opt/webserver/bin/catalina.sh start` (To start application)
3. `ps aux | grep catalina` (To check the status of application)

2.9.2. History

User can also access the history screen (explained above) directly for any customer.

- Mouse over **Invoice** Menu -> Click **History**.
- History page is displayed.
- Enter an account name and select prefix.
- Upon pressing enter, all the history invoices for the selected account are displayed.

Invoice History							
Account	<input type="text"/>	Prefixes	Select Prefix	<input type="text"/>	<input type="button" value="Go"/>		
<input type="button" value="Show History"/>							
Show	10	entries	Search: <input type="text"/>				
Invoice Number	Account Name	Invoice Period	Minutes	Amount	State	Committed By	Actions
IV-0001-12345-000001	NEW ACCOUNT	2011-09-19 - 2011-09-19	0.67	0.33 \$	*NOTIFIED*		History Renew
IV-0001-12345-000002	NEW ACCOUNT	2010-08-01 - 2011-09-30	0.58	0.85 \$	*NOTIFIED*		History Renew
IV-0001-12345-000003	NEW ACCOUNT	2011-09-22 - 2011-09-27	0.58	0.85 \$	*NOTIFIED*		History Renew
IV-0001-12345-000006	NEW ACCOUNT	2011-09-01 - 2011-10-04	0.58	0.85 \$	PENDING		History Renew Notify

Showing 1 to 4 of 4 entries

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2.10. ALERTS

Alert is a utility intended to trigger an email, to the concerned department/person, In case the stats of any vendor go below the benchmark level. For example, an alarm could be configured to trigger an email when the average call duration falls under, say, 180 seconds, indicating some problem in the operation. This module is into following sections:

1. Alert Management
2. Search Alerts
3. Email-list Management
4. Search email-list

2.10.1. Alert Management

This screen allows user to create alerts. User needs to give the following information in order to create alerts.

- **Name:** Name or identifier for the alert.
- **Criteria:** Three types of alerts can be created;
 - *ACD (Average call duration)*
 - *ASR (Average success ratio)*
 - *PDD (Post Dial Delay)*
- **Threshold:** Upon reaching the threshold value, alert email is generated. Threshold is defined in seconds for ACD alerts, Milliseconds for PDD alerts and in percent for ASR alerts.
- **CDR Count:** The minimum number of CDRS on which the alert should be generated.
- **Vendor:** Alert is defined for each vendor individually.
- **Status:** The status of the alert. If the status is INACTIVE, alert email will not be triggered.
- **Interval:** Time interval between two successive alert emails.
- **Email List:** Email list points to the group of user, alert email will be sent to.

Add Alert List

Name: TEST ALERT Criteria: ACD (Average Call Duration)

Threshold: 50 PDD:ms,ACD:sec 50

Vendor: TEST-NEW Active: Active

Interval: 50 Email List: TEST-LIST

Save

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2.10.2. Search (Alerts)

Alerts search screen displays the summary of all the matching/existing alerts in the database. Alert search takes place on the basis of alert name. User has an option to search and edit an existing alert through this screen.

Alerts Search

Name: LOW ASR ALERT Search

Show 10 entries Search:

Name	Criteria	Threshold	CDR Count	Vendor	Active	Edit
LOW ASR ALERT	ASR	200	50	NEXTONE	0	Edit

Showing 1 to 1 of 1 entries First Previous 1 Next Last

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2.10.3. Email-List Management

This screen allows users to create a template for the alerts to be generated as well as specify the receivers of alert emails. Following information is required in order to create an email list.

Name: Name or identifier for the email-list.

Email To; CC; BCC: Email addresses of the receivers of the alert emails.

Email Subject: Subject of the email is to be defined in this field.

Email Text: Description that user wants to see in alert email.

Add Email List

Name	<input type="text"/>	Email To	<input type="text"/>
CC	<input type="text"/>	BCC	<input type="text"/>
Email Subject	<input type="text"/>		
Email Text	<input type="text"/>		

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2.10.4. Search Email-List

Through this screen user has the facility to look for the email-lists that already exist in the database.

Email-list is searched on the basis of name. User is also allowed to edit the alert list through this screen, if required.

Email List Search

Name

Show entries Search:

Name	Edit
test-email-list	<input type="button" value="Edit"/>
TEST-LIST	<input type="button" value="Edit"/>

Showing 1 to 2 of 2 entries 1

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2.11. LOGS

Logs track operations performed on the application. User can view the logs of all other users given that he has admin privileges to do so. This module is divided into two sections:

1. My Activity
2. Administration

2.11.1. My Activity

This screen allows user to view his activities on the application at a specific time interval. Upon selecting the required time and date the summary of the all the tasks performed by the user is displayed along with the time stamp.

Activity Logs	
From	2011-10-05 00:00:00
To	2011-10-05 23:59:59
Search: <input type="text"/>	
Show 10 entries	
Activity	Date
[ENTERING] String com.breeze.wss.app.service.UserService.getCurrentUser()	10/05/2011 02:29:33
[EXITING] String com.breeze.wss.app.service.UserService.getCurrentUser()	10/05/2011 02:29:33
[ENTERING] List com.breeze.wss.app.service.AlertsService.findEmailList(String)	10/05/2011 02:22:58
[EXITING] List com.breeze.wss.app.service.AlertsService.findEmailList(String)	10/05/2011 02:22:58
[ENTERING] List com.breeze.wss.app.service.AlertsService.findEmailList(String)	10/05/2011 02:22:50
[EXITING] List com.breeze.wss.app.service.AlertsService.findEmailList(String)	10/05/2011 02:22:50
[ENTERING] List com.breeze.wss.app.service.AlertsService.findAlerts(String)	10/05/2011 02:06:59
[EXITING] List com.breeze.wss.app.service.AlertsService.findAlerts(String)	10/05/2011 02:06:59
[ENTERING] List com.breeze.wss.app.service.AlertsService.findAlerts(String)	10/05/2011 01:59:58
[EXITING] List com.breeze.wss.app.service.AlertsService.findAlerts(String)	10/05/2011 01:59:58
Showing 1 to 10 of 18 entries	
First Previous 1 2 Next Last	

2.11.2. Administration

Any user who has administrative privileges has an access to view the activities performed by other user of the application. Upon selecting the user name and time interval, admin user is redirected to the summary of the activities performed by that particular user.

ALPHA's Activity Logs	
User	ALPHA
From	2011-10-01 00:00:00
To	2011-10-05 23:59:59
Search	
Show	10 entries
Search:	
Activity	Date
[ENTERING] String com.breeze.wss.app.service.UserService.getCurrentUser()	10/03/2011 00:54:17
[EXITING] String com.breeze.wss.app.service.UserService.getCurrentUser()	10/03/2011 00:54:17
[ENTERING] String com.breeze.wss.app.service.UserService.getCurrentUser()	10/03/2011 00:54:04
[EXITING] String com.breeze.wss.app.service.UserService.getCurrentUser()	10/03/2011 00:54:04
[ENTERING] Customer com.breeze.wss.app.service.CustomerService.findCustomer(String)	10/03/2011 00:54:04
[EXITING] Customer com.breeze.wss.app.service.CustomerService.findCustomer(String)	10/03/2011 00:54:04
[ENTERING] Customer com.breeze.wss.app.service.CustomerService.findCustomerById(Integer)	10/03/2011 00:53:58
[EXITING] Customer com.breeze.wss.app.service.CustomerService.findCustomerById(Integer)	10/03/2011 00:53:58
[ENTERING] List com.breeze.wss.app.service.CustomerService.getCountryList()	10/03/2011 00:53:58
[EXITING] List com.breeze.wss.app.service.CustomerService.getCountryList()	10/03/2011 00:53:58
Showing 1 to 10 of 22 entries	
First Previous 1 2 3 Next Last	