Innovative AAA and Billing solutions for converged networks deployment

with MikroTik Router OS

By Tomer Shahaf
Aradial Technologies and Spotngo Wireless.

Aradial Technologies

➢Servicing small and large Service Providers since 1997.

➢Specializing in converged AAA solutions for Vertical Markets primarily ISP, ASP, WISP, Cable, DSL, Mobile and VOIP.

➢Our team is composed of experienced personnel from leading networking and billing companies.

➢Self funded and private company trusted by NASDAQ traded Service Providers.

➢Partnered with leading Billing and gateway companies to offer end to end solutions.

➢Global network of VAR and distribution network.
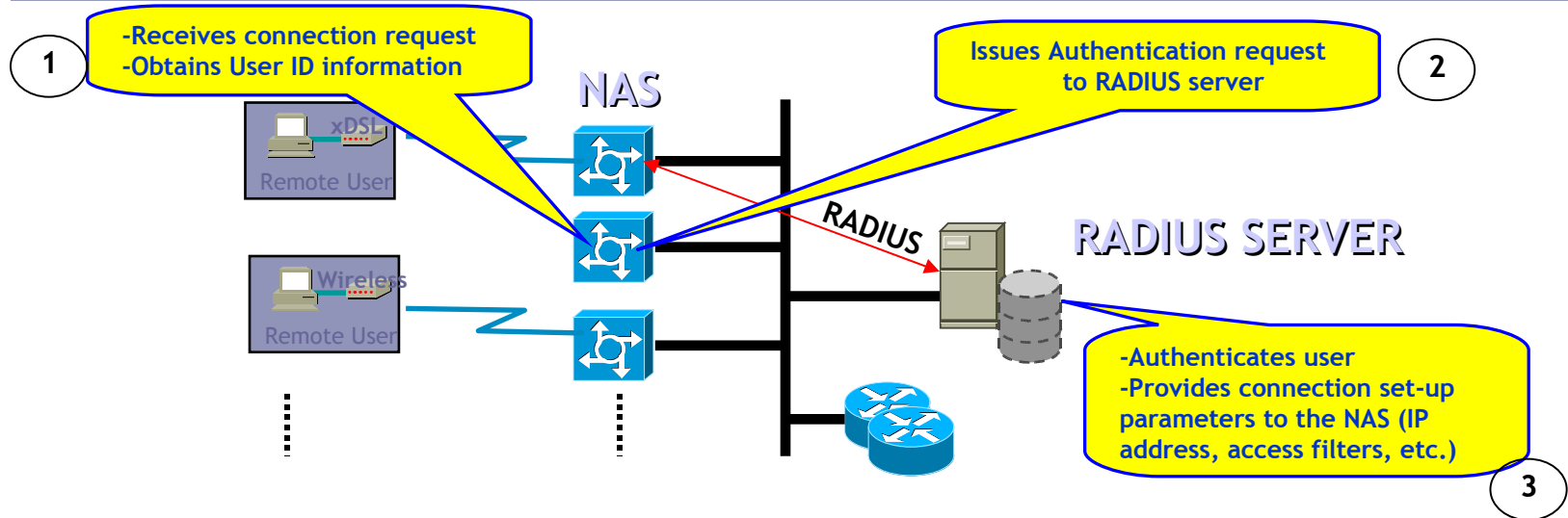
Aradial Radius Overview

- High Performance and full featured Radius Server
- Supporting dial-up, xDSL, VOIP, Wireless LAN, and Mobile IP (GPRS/EDGE/3G)
- Supported OS include Solaris, Linux and Windows.
- Standards based Authenticating, Authorization and Accounting (RFC 2865, RFC 2866)
- Scalable supporting multi process and multi threading.
- High Availability
- Easy provisioning

Aradial Radius Overview – Cont'

- 100% web-based interface ensures easy connectivity from anywhere. Supports SSL.
- Database support
  - ODBC (Access, MS SQL, mySQL, Oracle)
  - Native Oracle (OCI)
  - LDAP
  - NT & Active Directory user authentication
  - Flat files
  - SecurityDynamics SecurID
- Statistics and reporting modules
- Prepaid cards, bank and balance enforcement

RADIUS Access Control Model

1 -Receives connection request
-Obtains User ID information

NAS

Issues Authentication request to RADIUS server **2**

xDSL
Remote User

RADIUS

RADIUS SERVER

Wireless
Remote User

-Authenticates user
-Provides connection set-up parameters to the NAS (IP address, access filters, etc.) **3**

- Long established, widely adopted, broadly interoperable protocol established originally for access to remote computers

- RADIUS is the de-facto AAA protocol being used in the industry

- Technology has matured to include accounting control; data feed to back-end systems for billing, monitoring and reporting

- Centralized authentication and authorization of users provides network security and centralized management and access control.

Simplified Network Deployment
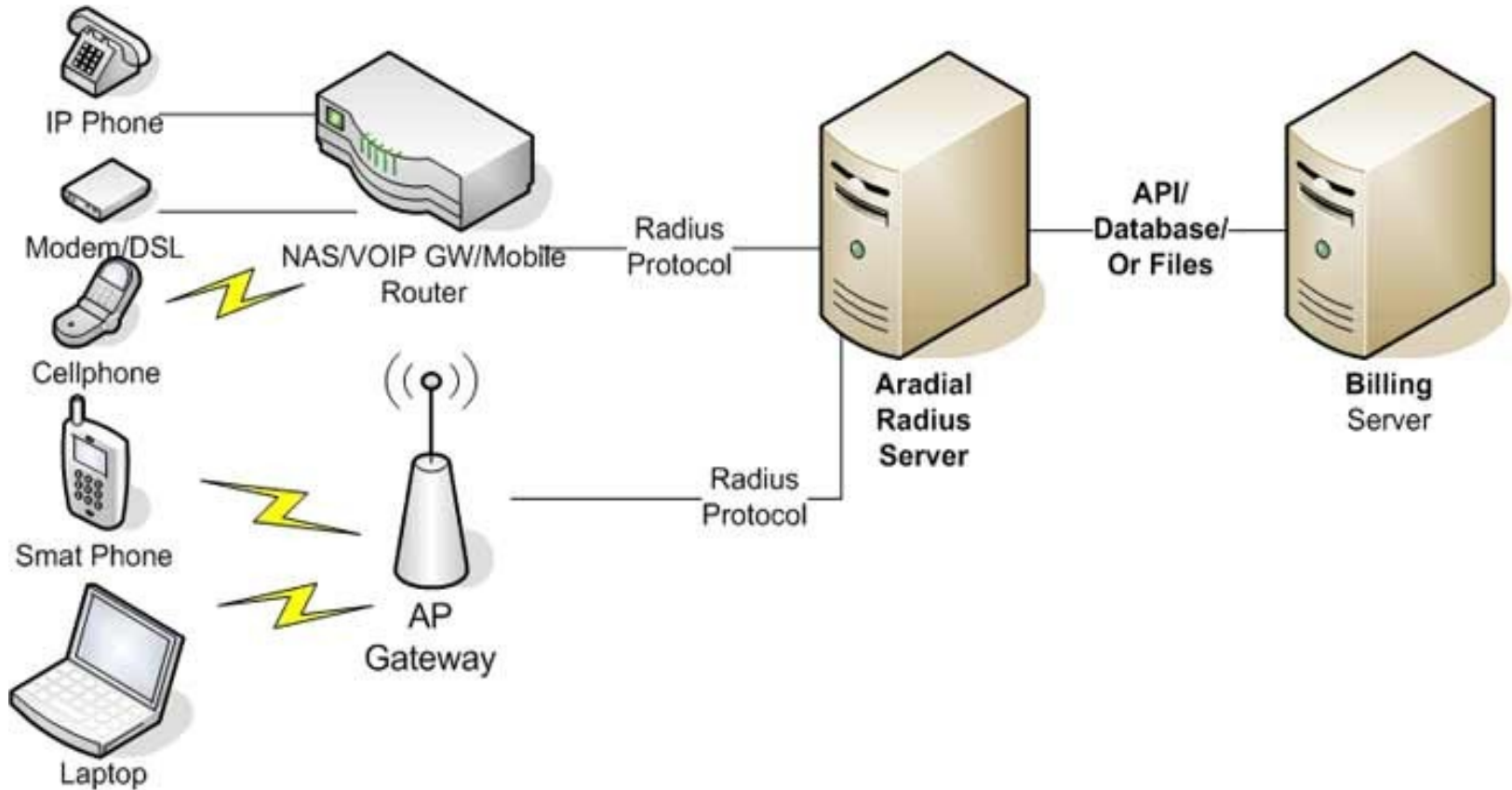
Aradial Architecture
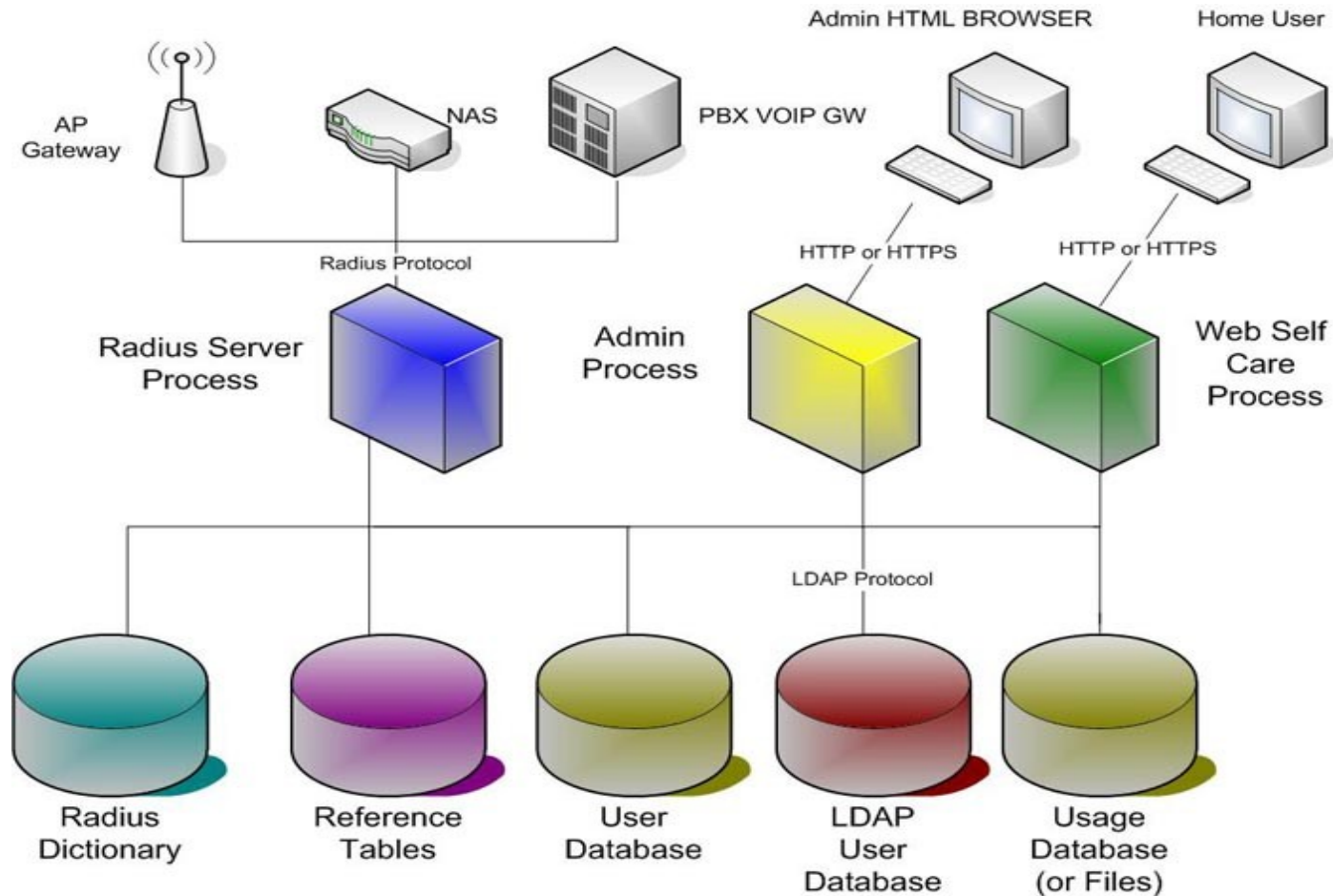
High Availability Deployment

outers Network Diagram - Redundant
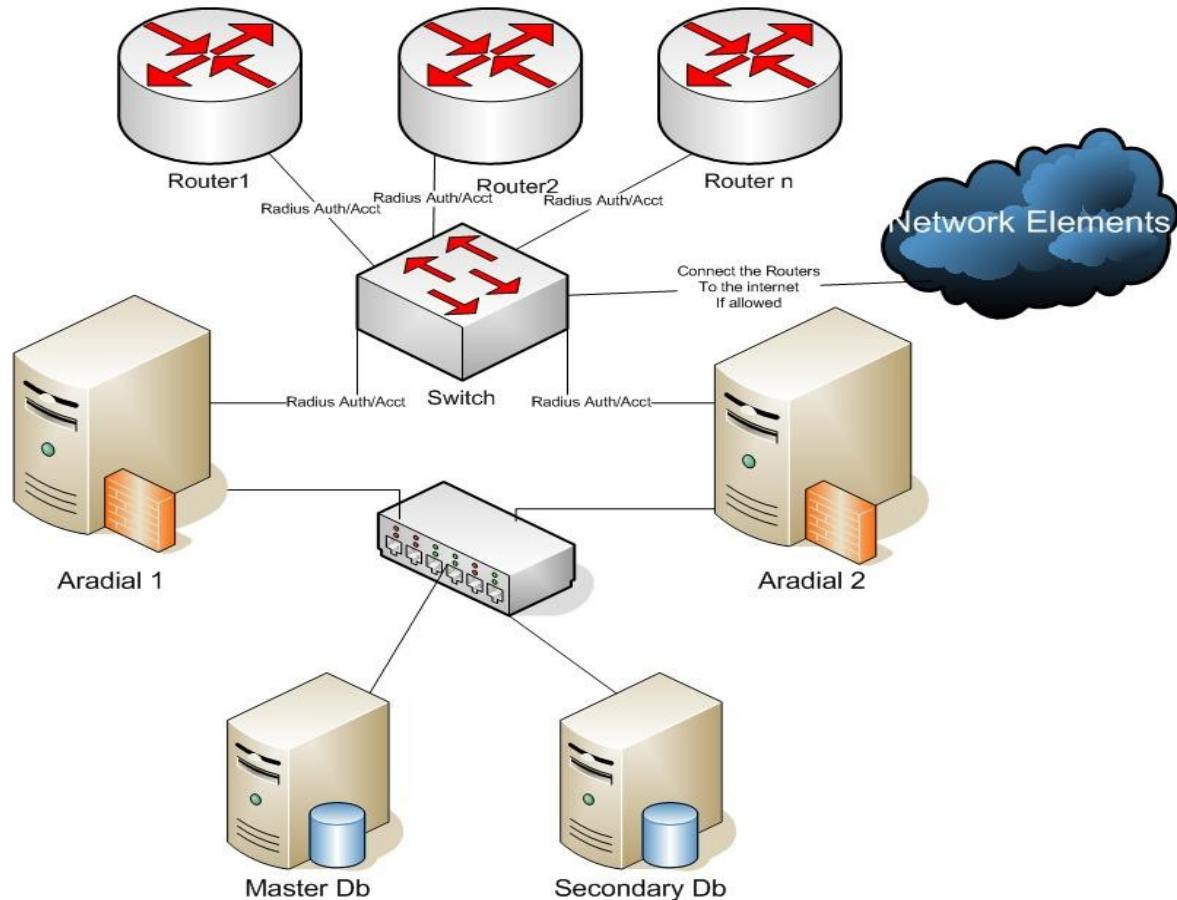
Supported IP Services

- Mobile
  - (E)GPRS, WAP
  - CDMA 2000 and 3GPP dictionaries
- Any broadband, xDSL or Cable
- WiMax
- Mesh Technologies
- Wireless LAN support
  - EAP in accordance with RFCs 2716 and 2246
  - EAP in accordance with RFC 2284

Supported IP Services - Cont'

- VOIP Gateways support
  - Cisco GW, Quintum Tenor, Alcatel and others
  - GNUGK
- Sip Proxies
  - Cisco SPS
  - Mailvision
  - NextGK
  - All others that support standard SIP VSA

Aradial Billing Systems Integration

- Advanced API for external online charging/billing servers using CORBA
  - ➢ Session Duration Limitation
  - ➢ Data Transfer Limitations – directional limiting supported
  - ➢ Bandwidth Limit – using VSA RADIUS Attributes
  - ➢ Quota Based Access
  - ➢ QoS and Subscriber Profile
- Export usage to billing systems
- Enhanced provisioning APIs
- Internal support for traffic, duration metering & QoS
- Billing Integration through stored procedures

Policy Algorithm Mechanism

- Customizable handling flow for each RADIUS message type
- Flow is made of a chain of RADIUS algorithms
- Core algorithms supplied with the product
  - Authentication & Authorization algorithm
  - Several accounting algorithms
  - RADIUS Proxy algorithm
- New algorithms can be developed using C++ shared libraries and/or TCL scripting

Unique Functionality

- TCL scripting for Policy Algorithms
- Extended billing server connectivity API
- Grouping and Sub Grouping
- Persistent IP Pools (support H/A)
- Metering (on external billing database) -
  - Time and data accumulator
  - Triggers for blocking or changing QoS based on accumulator
- Block or change QoS for Groups in Time-of-Day periods (e.g. peak, off-peak configurations)
- Dealers and affiliates support
- Capable of running multiple RADIUS servers on single Hardware

Radius Session Flow
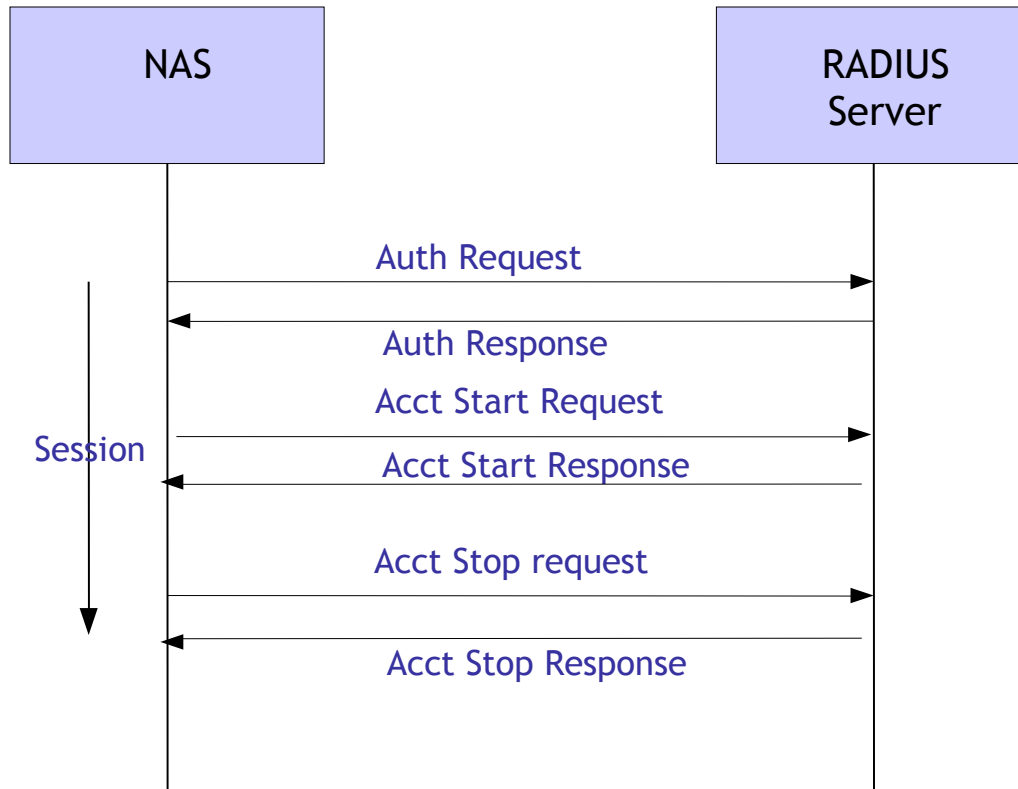
Quota Based Billing and Online Billing Servers.
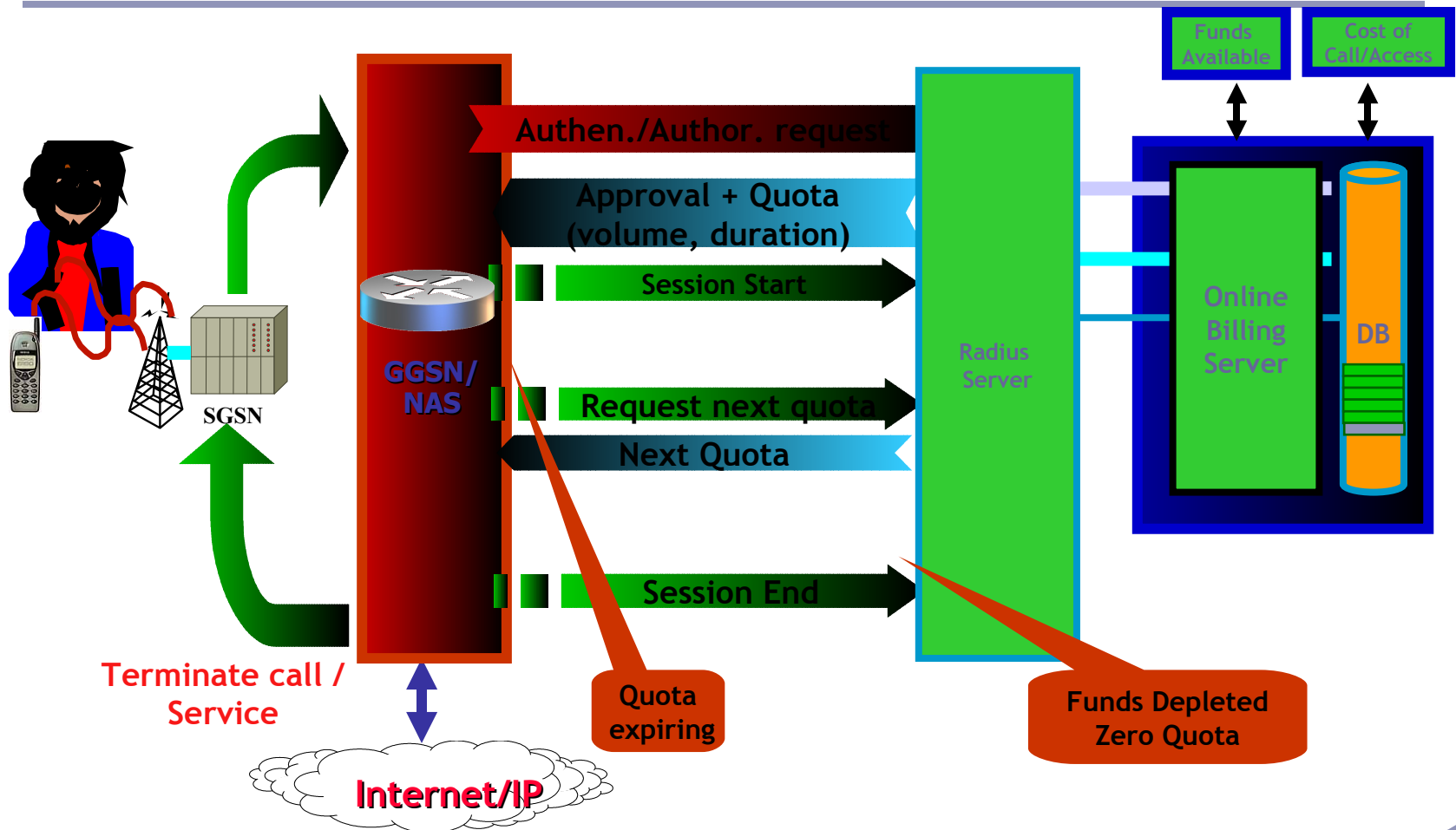
Aradial Web Admin

Aradial

Summary   Last update: **May 30, 2007 at 23:35:17**

Summary	
Online Sessions	
User Manager	
Statistics	
Data Management	
Server Configuration	
Online Help	

Service Provider: **spotngo**.
Users on-line: **0** (show).
Users In the database: **8** (show).
Network Access Servers configured: **1** (show).

s.   Server is online - (0/8 users connected)

License Number:	Demo0407
Licensed to:	Demo0407
Server Status:	On-line
Server Up Time:	00d 00h 13m
Server Version:	3.5
Users (Overall/Concurrent):	20/10
Aradial evaluation expired. Server will stop honoring requests after 30 minutes..	

Session 1-Hour Statistics

```
10-

  -

0-_____
   40 45 50 55  0  5 10 15 20 25 30 35
```

Server Online   **Stop**   **<< Back**   **Refresh**

Aradial User Manager

Aradial

Add	Edit	User
Add	Edit	Group
Add	Edit	Dealer
Add	Edit	Tariff Plan
Add	Edit	Tariff Table 1
Add	Edit	Tariff Table 2
Add	Edit	Tariff Table 3
Add	Edit	Tariff Table 4
Add	Edit	Tariff Table 5
Add	Edit	Tariff Table 6
Add	Edit	Tariff Table 7
Add	Edit	Tariff Table 8
Add	Edit	Tariff Table 9
Add	Edit	Tariff Table 10

View Sessions

< Back to Main

Online Help

Users

User ID	First Name	Last Name	Time Bank	KB Bank	Balance	Expiration Date	Group Name	EMail	Action
DemoUser1	Frank	Young	0:10:00	0	0.0000		Analog	☐	☐
DemoUser2	Carl	Baker	0:00:00	0	0.0000		MultiLink	☐	☐
mum001	mum001	mum001	1:00:00	0	0.0000		Wifi	☐	☐
mum002	mum002	mum002	1:00:00	0	0.0000		Wifi	☐	☐
mum003	mum003	mum003	1:00:00	0	0.0000		Wifi	☐	☐
mum004	mum004	mum004	2:00:00	0	0.0000		Wifi	☐	☐
mum005	mum005	mum005	2:00:00	0	0.0000		Wifi	☐	☐
voip046606	voip046606	voip046606	0:00:00	0	5.0000		VOIP	☐	☐
voip405255	voip405255	voip405255	0:00:00	0	5.0000		VOIP	☐	☐
voip757448	voip757448	voip757448	0:00:00	0	5.0000		VOIP	☐	☐
VoipUser1			0:00:00	0	100.0000		VOIP	☐	☐

EMail   Delete

EMail All

Server Online   **Stop**   << Back   Refresh

17

Aradial Web Self Care

Aradial User Self Care

User Summary
Update User
Change Password
View Sessions

Personal Information

First Name: Frank	**Last Name:** Young
Company: Food Inc.	**E-mail:**
Address 1: 23 Baker st	**Address 2:**
City: New York	**State:** NY
Country: USA	**Zip:** 1234
Home Phone: 555-0418	**Work Phone:** 555-1075
Fax:	
Custom Info 1:	**CUstom Info 2:**
Custom Info 3:	**Custom Info 4:**

Access Information

User ID: DemoUser1	**Status:** OK
Caller ID:	**Callback Number:**
Group Name: Analog	

Additional Access information

Service: <None>	
Remote IP:	**Filter:**
RADIUS Attributes:	

Dates

User Creation Date: 05/23/99	**User Activation Date:** 05/23/99
User Expiration Date:	**Last Login On:**

Metering Information

Time Bank: 0:10:00	**KB Bank:** 0.000
Balance : 0.0000	

Spotngo Payment Module

- Integrates with Aradial to offer powerful prepaid service, yet simple to deploy and mange for VOIP and hotspots.
- SSL Secured captive portal and Web Admin
- Built in support for MikroTik Hotspot gateway
- User self care for sign up, activation and refill of prepaid account
- Payment gateway and prepaid voucher support
- Payments and vouchers' management including:
  - Vouchers' generation
  - Group policies
  - Reporting

Spotngo Payment Module – Cont'

- Supports location based branding, price groups and advertisements
- Currency prefix and postfix
- Plan / Tariff management:
  Including:
  - Auto Expiry – Time and date expiration
  - Time bank – Net usage
  - Data bank – Traffic
  - Bandwidth
  - Combination of the above.

Payment Gateway support

- Supported merchant accounts include:
  - PayPal
  - Authorize.net
  - Payflow
  - Verisign
  - PSIGate
  - Quickpay
  - Tranzilla
  - Payment Planet
  - Others

- Support for SMS integration for client identity verification and password delivery

Spotngo Captive Portals Sample

Sample Portals – Cont'
As deployed by Sealink in Denmark

Spotngo – User Self Signup

Spotngo User Signup - Cont'

Spotngo User Signup - Cont'

Spotngo Web Admin Interface

Spotngo Hotspot

www.spotngo.ca Wireless Internet Access on the Spot

Reload Changes

Plans
Add | Edit

PIN Cards
Add | View

Payments Lookup

Advanced Configuration

Plans List

Plan Name	Description	Price	Enforcement Type	Price Group	Aradial Group	Action
1hr	1 Hour of Use	$ 2.50	Meetering		Wifi	Delete
1hrTot	1 Hour of Total Use	$ 2.10	AutoExpire	Plangroup1	Wifi	Delete
3hr	3 Hours of Use Starting Now	$ 3.00	AutoExpire		Wifi	Delete
6hr	6 Hours of Use Starting Now	$ 6.00	AutoExpire		Wifi	Delete
Daily_1	24 hours of internet access	$ 7.95	AutoExpire	hotel	Wifi	Delete
hour1	1 Hour of Internet Access within 24 hour period	$ 4.95	AutoExpire	hotel	Wifi	Delete

Spotngo - Adding Service Plan

Spotngo - Payment Report

Sample Deployment with MikroTik Router OS - WebLinks

Wifi Plan

3 Sector Duel Band (a+b)

Omni Hot Spot (a in b out)

8 x Duel Band
16 x Hot Spot
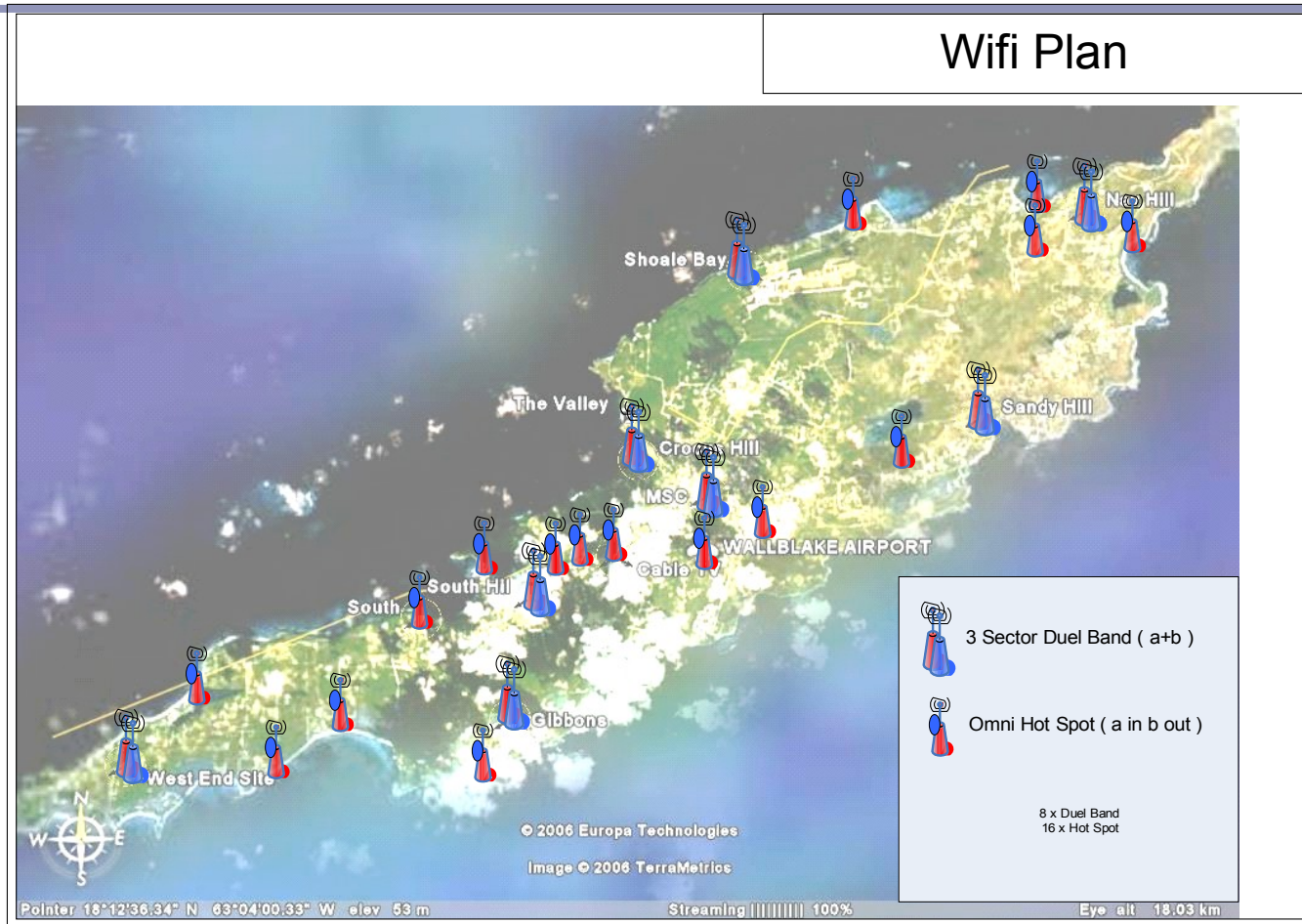
Sample Deployment in Nigeria