

Wifi Presentation 07/2011



High-Performance RADIUS Server and Converged Prepaid & Postpaid Billing

ISP, VOIP, Wimax, Mobile & Wifi Providers



About Aradial Technologies

- Established in 1997
- Designer and provider of Billing, AAA and Policy control servers for IP services.
- Targets multiple vertical markets, primarily ISP, WiMAX, wireless LAN, VOIP, Cable/MSO and mobile
- Experienced personnel from top networking and billing companies
- Private, self funded, profitable



Hotspot/Wifi And Case Studies

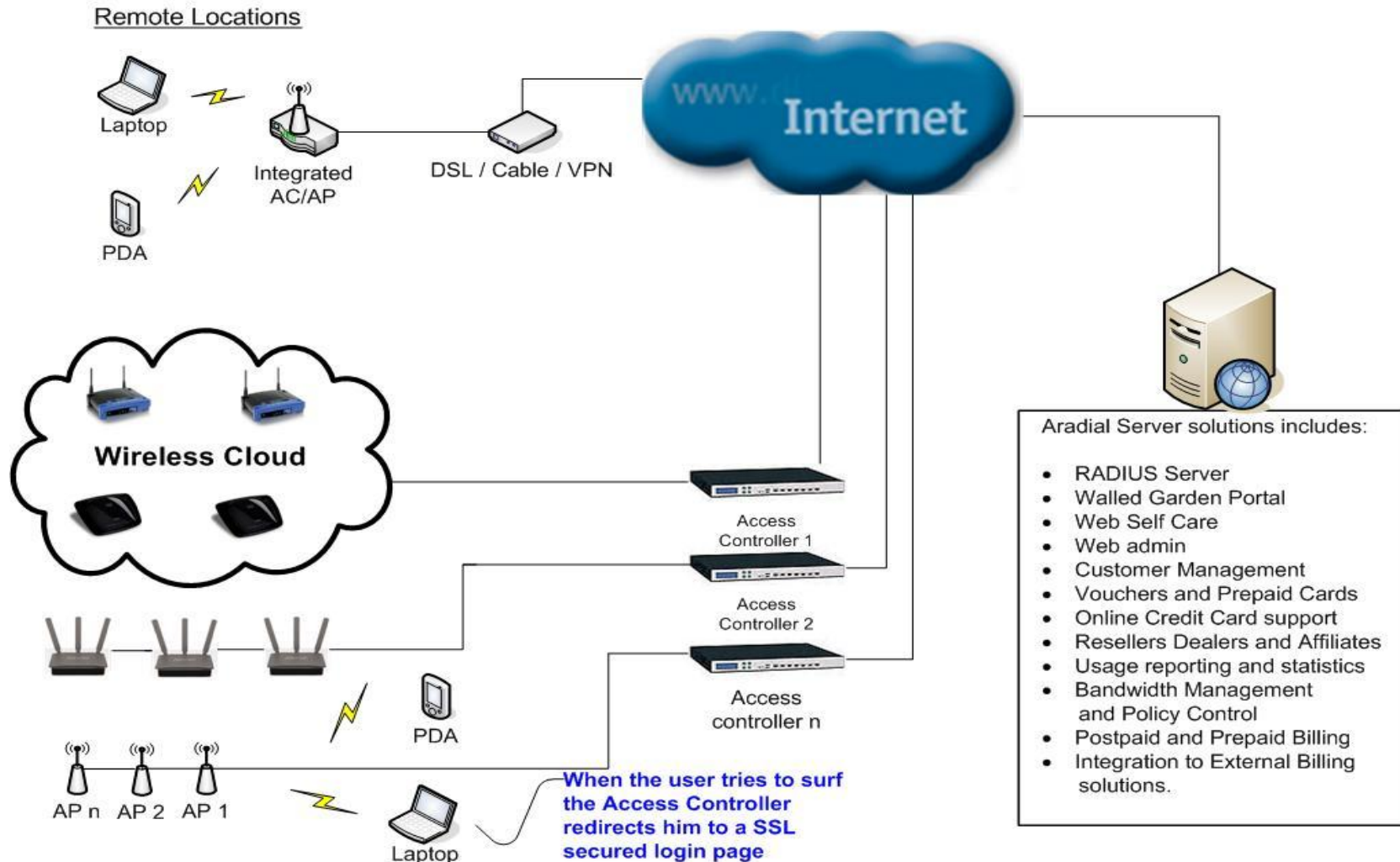
Hotspots/WiFi Installed Base

Over 250 hotspots billing installed worldwide

- Interstate USA
- Bell Aliant Canada
- Sealink Denmark
- Enter Point USA
- O'Fallon Wireless USA
- CSD Internet Ltd. UK
- Easy Kiosk - Australia
- PTK – Aruba networks
- Jamaica Telecom - Altai
- Saudi Telecom - Altai
- Angola Telecom - Inspair
- Namibia Telecom -Nomadix
- **MTN Rwanda - Wavion**
- BSNL – India - Nomadix
- MyPort Australia
- Paamul Mx– Motorola + MTK
- SmartLink KW -Nomadix

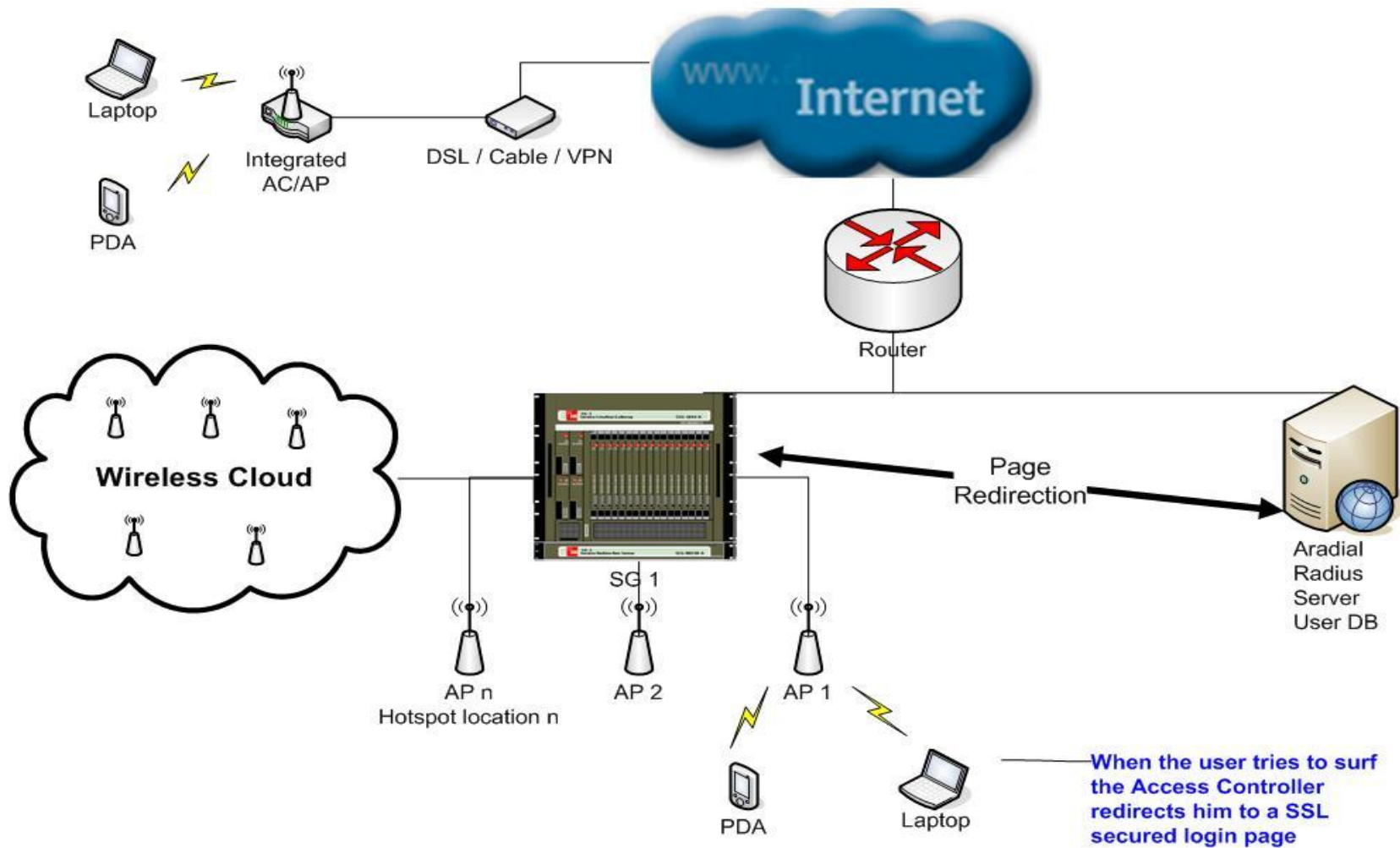
Typical Hotspot Deployment

Aradial Centralized AAA and Billing for Wireless LAN Users



Typical Hotspot Deployment

SSL Secured Authentication for Wireless LAN Users



Hotspots/WiFi Case Study

Case Study: Aradial Prepaid and migration to ARCB

- Skytel Philippines –
 - Microtik and Runcom
 - Base stations: GoNet and Wavion
 - Initial phase
 - 50 Microtik/AR-MTX10 - 2000 concurrent each
 - 250k users
 - Second phase – Aradial converged billing
 - Prepaid and postpaid
 - 2M subscribers
 - Runcom centralized

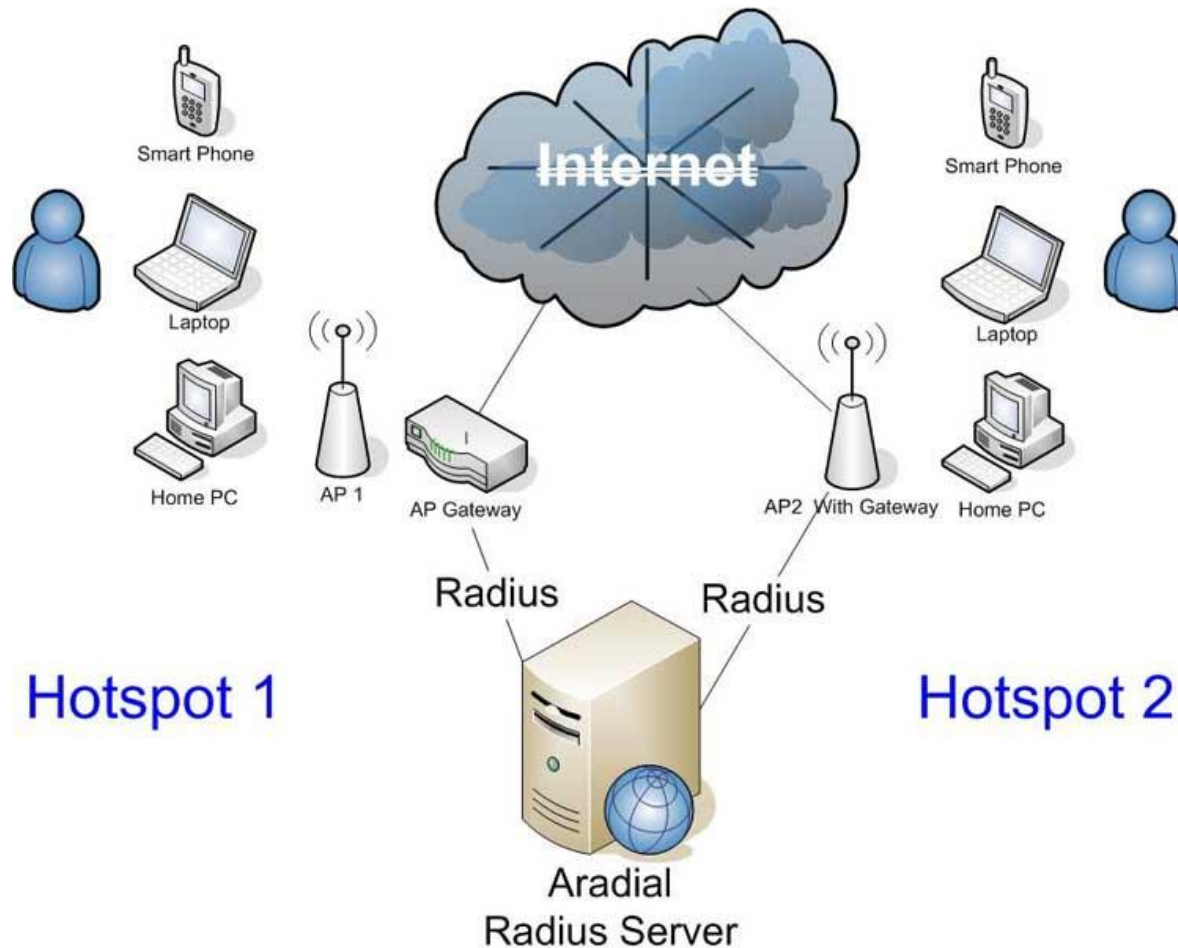
Hotspots/WiFi Case Study

- Sea Link Denmark
 - Nomadix and Microtik
 - 250,000 subscribers
 - Prepaid cards
 - Spotngo Online Payments
 - Spotngo refill vouchers
- Altai – Jamaica Dekal
 - Altai base stations
 - Microtik controllers
 - 250,000 subscribers
 - Aradial Converged Billing - Prepaid

Hotspots/WiFi Case Study

- Angola Telecom – For Africa CAP in 2010
 - Mikrotik
 - 120 sites
 - Prepaid cards
- MTN Rwanda –
 - Wavion base stations
 - Mikrotik RB1000
 - Prepaid cards and integration with Mobile IN

Typical Hotspot Deployment



Aradial Supported Wide Area Base stations

- Altai Technologies
- Wavion Networks
- Motorola Canopy
- Inspiair
- Ruckus
- Go Networks
- Xirrus

Aradial Supported WiFi Access Gateways Controllers

- Mikrotik OS – also reselling
- Colubris CN / HP Curve
- Nomadix
- ValuePoint, Planet, Zyxel
- Handlink
- Aruba Networks
- Griffin, Dlink, NetGear, Cisco and others
- Chillispot based
 - Linksys - DD-WRT
 - Ikarus OS
 - MonoWall
 - PfSense
 - Buffalotech



ISP/Wimax/VOIP/Mobile Customers

ISP

- Nepal Telecom
- Vodafone Ghana – GhanaTel
- iBurst - South Africa
- MTN Rwanda
- BSNL – India – ISP
- Sahara Net – Saudi Arabia
- NewRoz Telecom - IRAQ
- Cable & Wireless – broadband ISPs
- Smile 012 – Orange
- Rye Telecom – USA
- Jefferson Telecom - USA

WiMAX

- Motorola
 - Craig Wireless - USA – multiple projects
 - INEA – Poland
 - Cellular One - USA
- Alvarion
 - Comsys – Ghana
 - MCA - IRAQ
 - Nova Telefonica – Spain
 - University projects in USA
 - Mobitel – Nigeria
- Wichorus/Tellabs – multiple installations
 - Sprint USA
 - Augere Uganda
- Huawei and ALU - Telemax - Mongolia
- Runcom – multiple installations

VoIP

- Net4India
 - VoIP provider with 2.5 M subscribers
- GCS - IDT
 - VoIP termination provider in USA
 - 100 million calls per month
- TriumTeLe - Mobile VoIP
- VocalTec – Multiple deployments
- Globe Wireless – USA/UK

Mobile

- Maingate – M2M
 - 300,000 mobile subscribers in Sweden
- Orange Senegal
- STI – Mobile
 - mobile subscribers in Indonesia
 - Installation with FTS
- Telikom – PNG
 - With Telrad and Amdocs
- Mio Telecom – N. Antilles
- NSSL – UK
- Applied Satellite Technology– UK



Aradial RADIUS /AAA Server

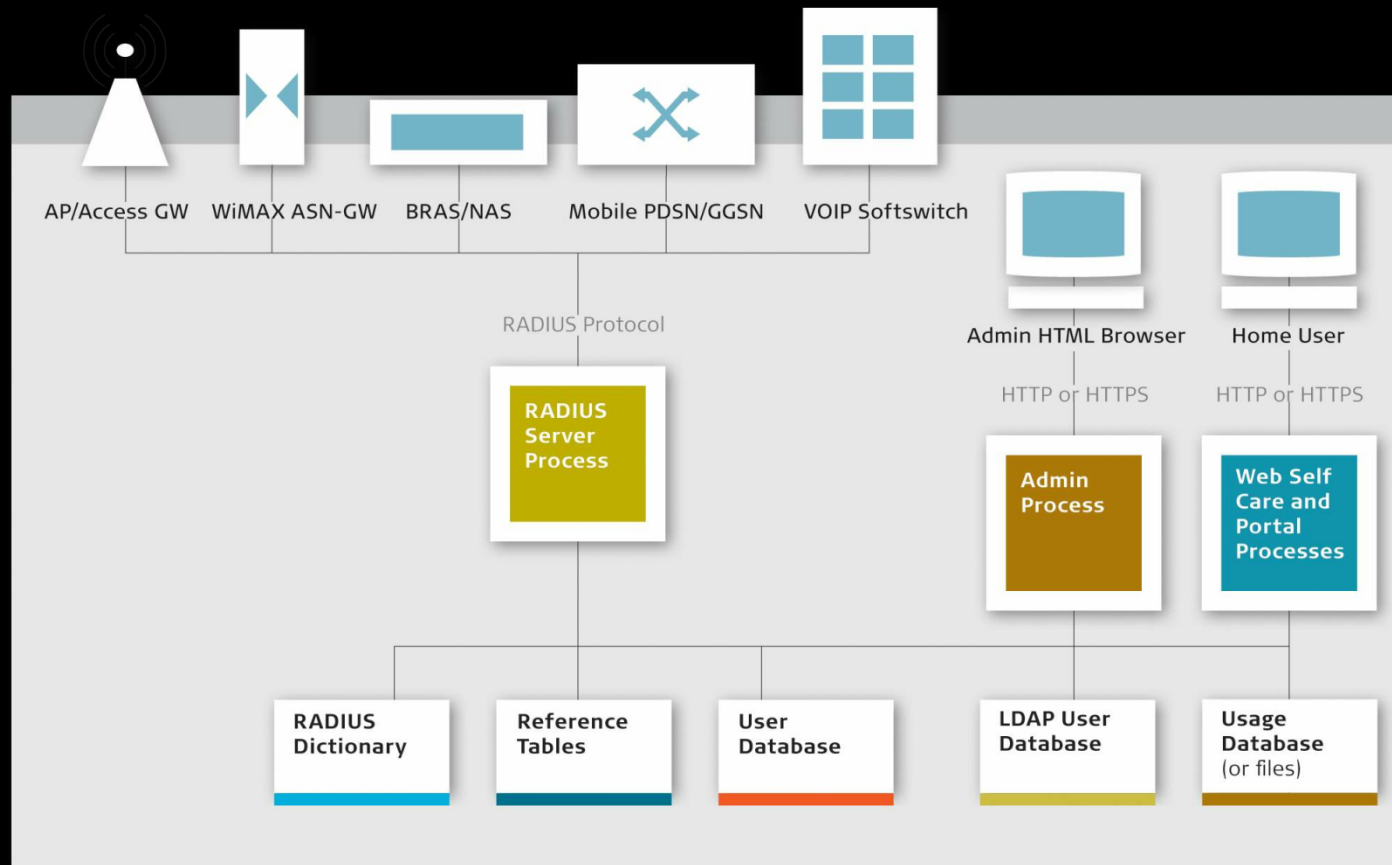
Aradial RADIUS Server

- High performance, fully-featured RADIUS server
- Supports any IP services
- Works on Windows, Solaris and Linux
- Compliant with RADIUS standards
- Scalable
 - Multithreaded - horizontal
 - Multi-process - vertical
- High availability
- Easy provisioning

Aradial RADIUS Server (Cont.)

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

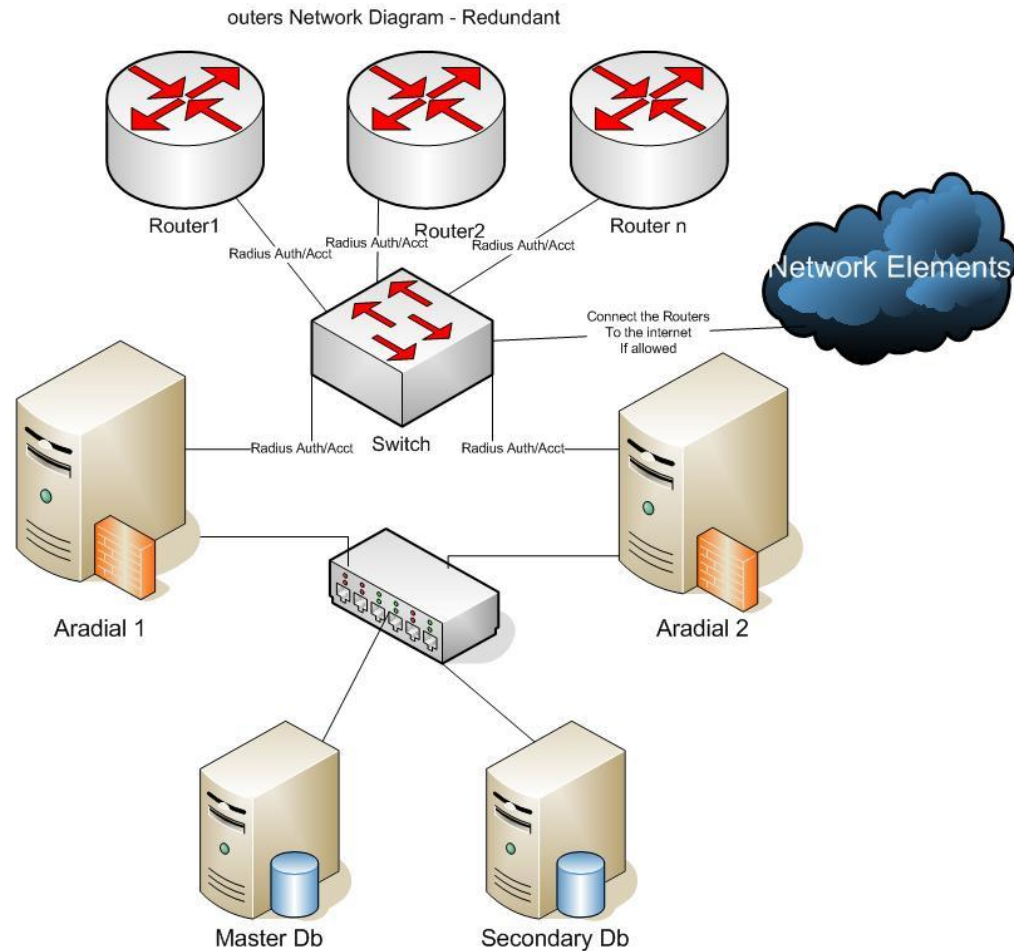
Architecture



Integration with External Billing Systems

- 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
- Integration using stored procedures calling external databases
- Export usage to billing systems
- Enhanced provisioning APIs
- Internal support for traffic, duration metering & QoS

Typical High-Availability Deployment





Spotngo Payment Module Add-on to AAA

Spotngo Enhanced Vouchers and Credit-Card Payment Module

- Plan/tariff management (time, traffic and expiration)
- PIN generation and management using plans
- User signup from the portal using a PIN
- Refilling users with a new PIN (PIN attached to a tariff plan with time, traffic or expiration)
- Refill by credit card
- Creating users with a credit card
- Configurable and customizable payment interface
- View/query payment history
- Secured portal (SSL)
- Secured PIN and plans management (SSL)
- Printing and exporting PINs to CSV files
- Customizable flows



Aradial Converged Billing

ARCB

Aradial Converged Prepaid & Postpaid, Multi IP Services

- Prepaid and postpaid subscribers
- Customer Management
 - Account – shared balance for users
 - Users under account
 - Resource/ANI/CPE defined per users
- Business Partners and Reseller Management
 - Registering subscribers / account
 - Selling vouchers and prepaid cards
 - Receiving commissions
- Business Entity
 - Create market segmentation
 - Group subscribers and accounts

Aradial Converged Prepaid & Postpaid, Multi IP Services

- Product catalog
 - Price plans
 - Offers using price plans
 - Price plan
 - Network profile provisioning
 - One-time offers
 - Add on offers

Aradial Converged Prepaid & Postpaid, Multi IP Services

- Flexible charging & rating
 - Periodic Recurring Charges
 - Usage charges
 - Allowances
 - Time of day and day of week
 - Destination charging
 - One-time charges
- Invoicing
 - Periodic automatic invoicing
 - Invoicing sent by email
 - XSL layout – branding
 - Undo billing
 - Discounting

Aradial Converged Prepaid & Postpaid, Multi IP Services

- Web self care for users and accounts
 - Users and passwords management
 - Payments and invoices
 - Purchase new offers and upgrades
- Public portal for self registration
- Trouble ticketing
- Account and user operation
 - View financial transactions, sessions and calls
 - Payment by credit card or PayPal
 - Adjustments to invoices
 - Manual payments – cash, checks

Aradial Converged Prepaid & Postpaid, Multi IP Services

- Automatic payment
 - Error management
- Account Receivables (A/R)
 - Manual, fast payment screen
 - Credit card
 - PayPal
- Accounting reports
 - Invoicing
 - Payment
 - Operator statement, per-account statement
 - Aging payment

Aradial Converged Prepaid & Postpaid, Multi IP Services

- CDRs processing & error management or rating problems
- Inventory management
 - DID
 - ANI
 - MAC Address
 - IP Address
- Voucher management
 - Top-up vouchers
 - Prepaid Cards for IP
 - Calling Cards

Add-On Policy Control and Interconnect

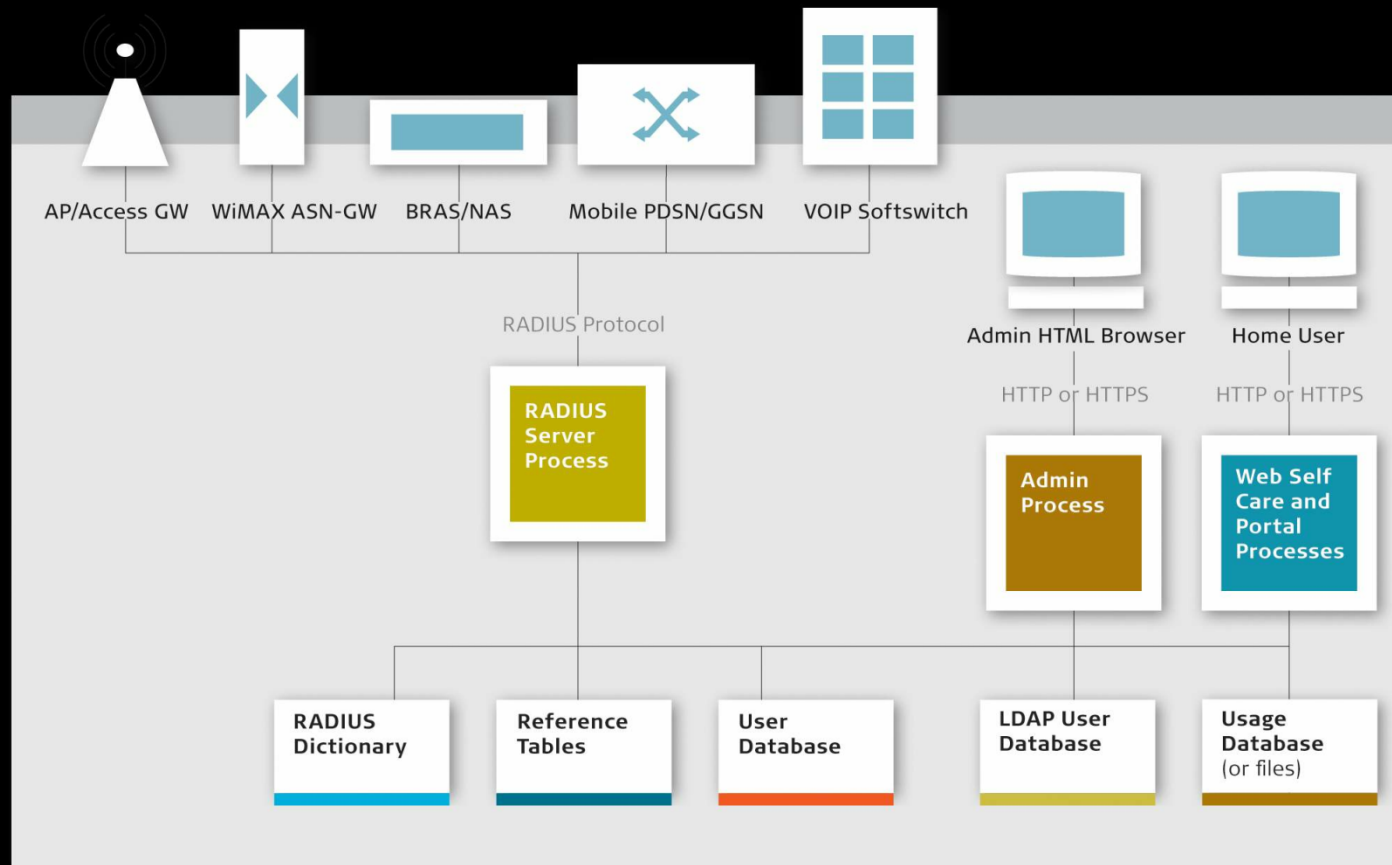
Policy Control

- Advanced dynamic policies for active users
 - Disconnect
 - Redirect
 - Change of QoS parameters
- Handles various users events
- Customer care additions
 - View & modify user details
 - Quota policy
 - QoS policy

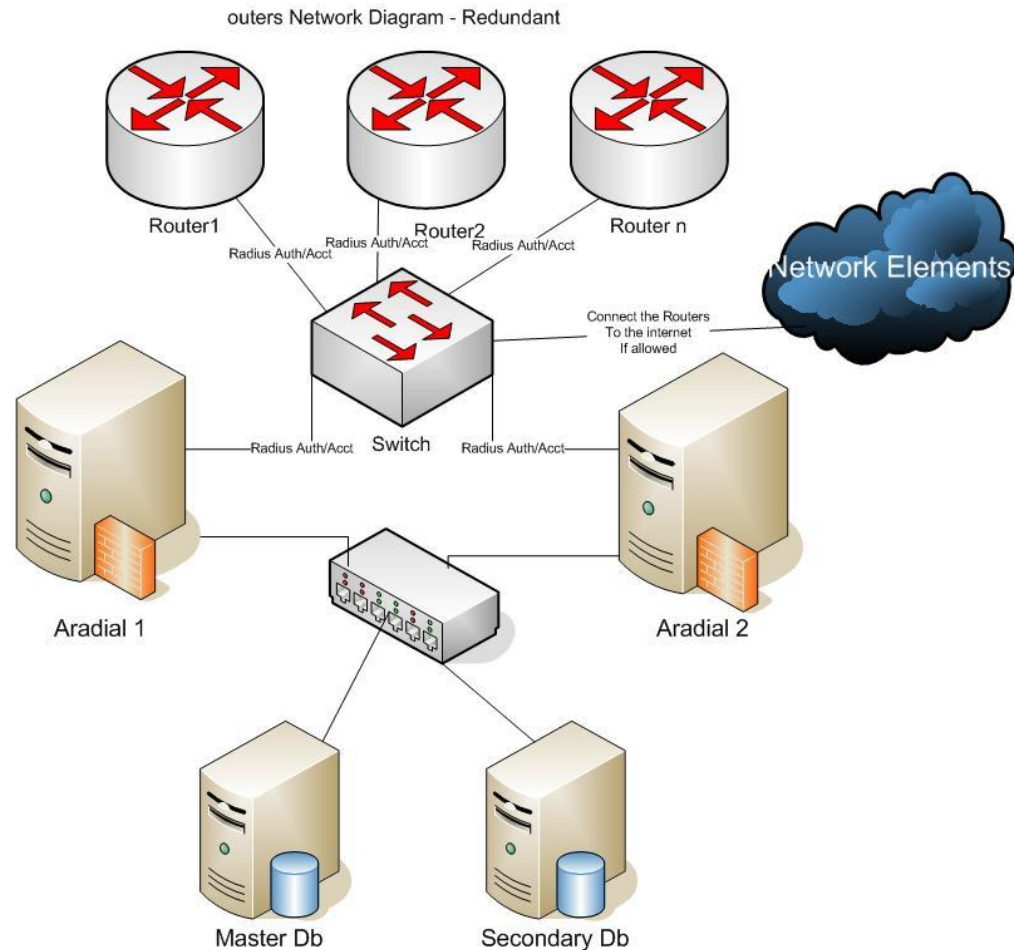
VoIP Interconnect

- VOIP interconnect/
termination accounting
and reporting

Architecture



Typical High-Availability Deployment





Aradial VoIP Prepaid

Prepaid VoIP with Aradial

- Aradial VoIP supported services:
 - IVR calling
 - Direct calling using ANI/calling cards
 - Username
 - Peering
 - Termination and origination
- Two charging models:
 - Single session – entire balance is allocated for the user during the session
 - Multisession – the session is split into time quotas for all users that use a single balance

Prepaid VoIP with Aradial (Cont.)

- Centralized authentication and accounting for all routers or gateways
- High-performance and reliable server
- Scalable to handle millions of users and concurrent sessions on low-end hardware Converged IP services
- SSL secured HTML-based administration
- Dealer/business partner management – dealers can manage their own users
- Extended HTML UI for user database and user groups

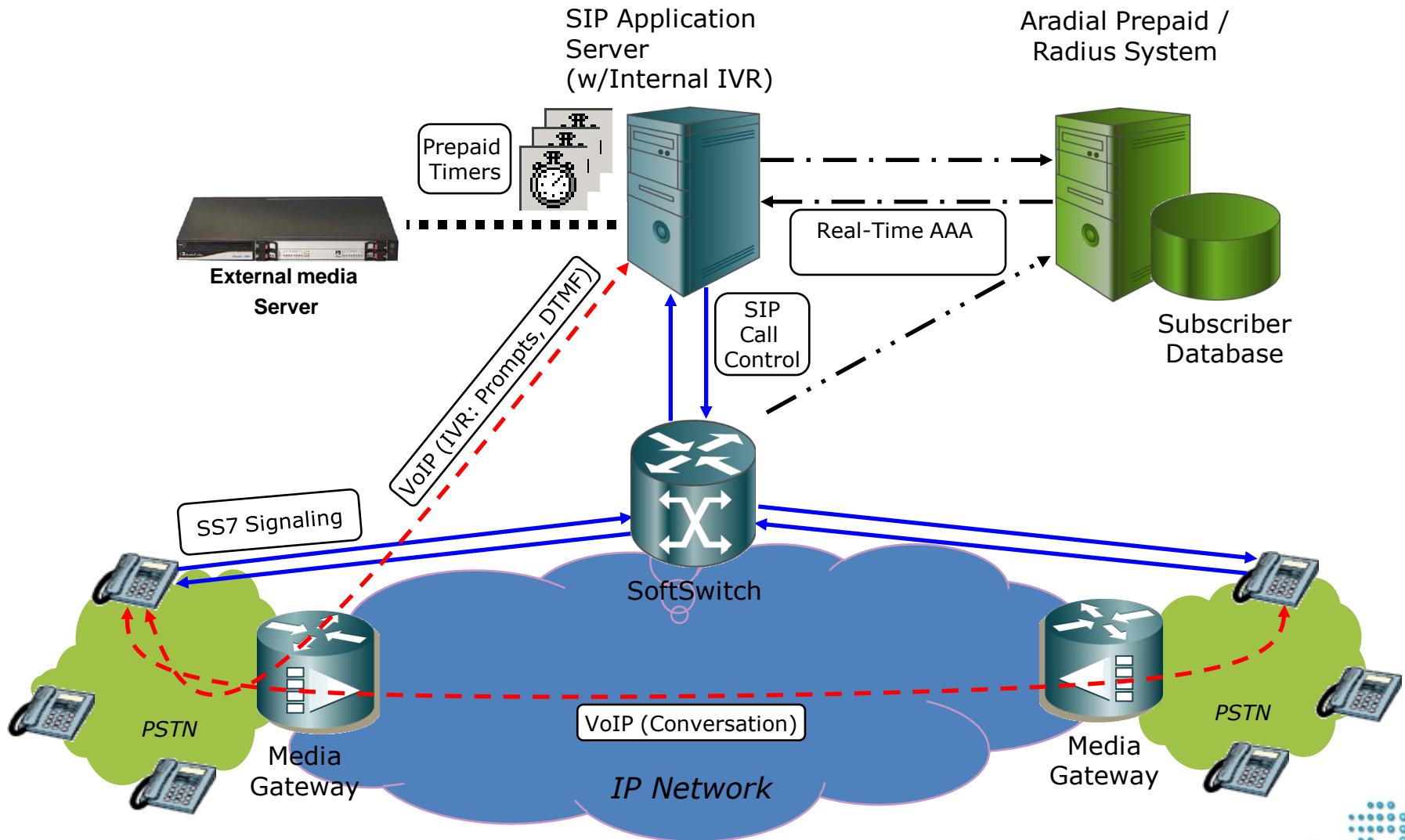
Prepaid VoIP with Aradial (Cont.)

- Self-care user module
- User and calling-card management, rating, import and export from/to CSV files
- Balance, duration and traffic enforcement
- User concurrence enforcement and view of concurrent calls from the administration tool
- Optional integration with SNMP-based NMS
- Multiple admin types
- Admin activity tracking
- External billing system interface using stored procedures or CORBA

Prepaid VoIP & Calling Cards

- Calling-card based prepaid billing
- Calling-card generation, import and export
- Username or ANI based (caller ID) prepaid VoIP billing
- Rating according to call destination, time of day, day of week
- Different rounding intervals per tariff or per destination
- Call setup cost
- Replenishing API or voucher refilling with payment module.
- Support of multiple tariffs and destinations rating tables that can be assigned to a calling card
- Session and summary reports per calling card, system, destination and period
- Optional module – termination billing including wholesale credit limit and fraud control

Architecture





Aradial WiMAX

WiMAX AAA/Radius and Billing

- WiMAX Forum standard compliant
- AAA supports 16e NWG 1.4 Stage 3 including:
 - Authentication and authorization
 - EAP-TTLS/TLS for authentication adapted to the WiMAX standard
 - Integration with leading ASN gateway partners
 - IP-based and flow-based accounting
 - Hotlining with CoA
 - Wimax Prepaid application
 - 16d support with all known BRAS

WiMAX AAA/Radius and Billing (Cont.)

- Real-time active session management
- Scalability and real-time AAA functionalities
- Cost-effective solution and fast ROI
 - Billing and ordering:
 - All services, including broadband data, VoIP, voice, IPTV, VoD for WiMAX
 - Allows controlling users balance, time and traffic in real time and with zero leakage
- Advanced user management for subscribers
- Advance creation of prepaid cards
- Self ordering and provisioning redirection to activation portal at zero balance and plans purchase (add on module or ARCB billing)

WiMAX AAA/Radius and Billing (Cont.)

- Integration with external billing systems and future systems - advanced APIs for external billing integration, for both real-time events and provisioning
- Support of the following base station providers:
Alvarion, Motorola, Huawei, Alcatel Lucent, Ipaxiom, Soma, Samsung, Redline, Navini, Aperto, AirSpan, Runcom



Aradial Prepaid Features

Overview

- Policy algorithms
 - Handling RADIUS messages
- State server
 - What is happening in the network
- Prepaid user monitoring
- User management
- Process monitoring
 - Including SNMP MIBs and traps
- Load simulator to test the network
 - Test any scenario for any equipment and user type

Policy Algorithm Mechanism

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

Aradial AAA Features

- PAP and CHAP authentication
- EAP authentication
 - EAP-PEAP, MD5, LEAP
 - EAP-TTLS, TLS
 - EAP-SIM and AKA (need integration with SS7)
- Digest, MS-Chap and MS-ChapV2
- Proxying to other RADIUS servers
 - RFC-based RADIUS proxy
 - iPass & other specialized proxy support
- Tunneling
 - PPTP
 - L2TP
- Policy algorithms

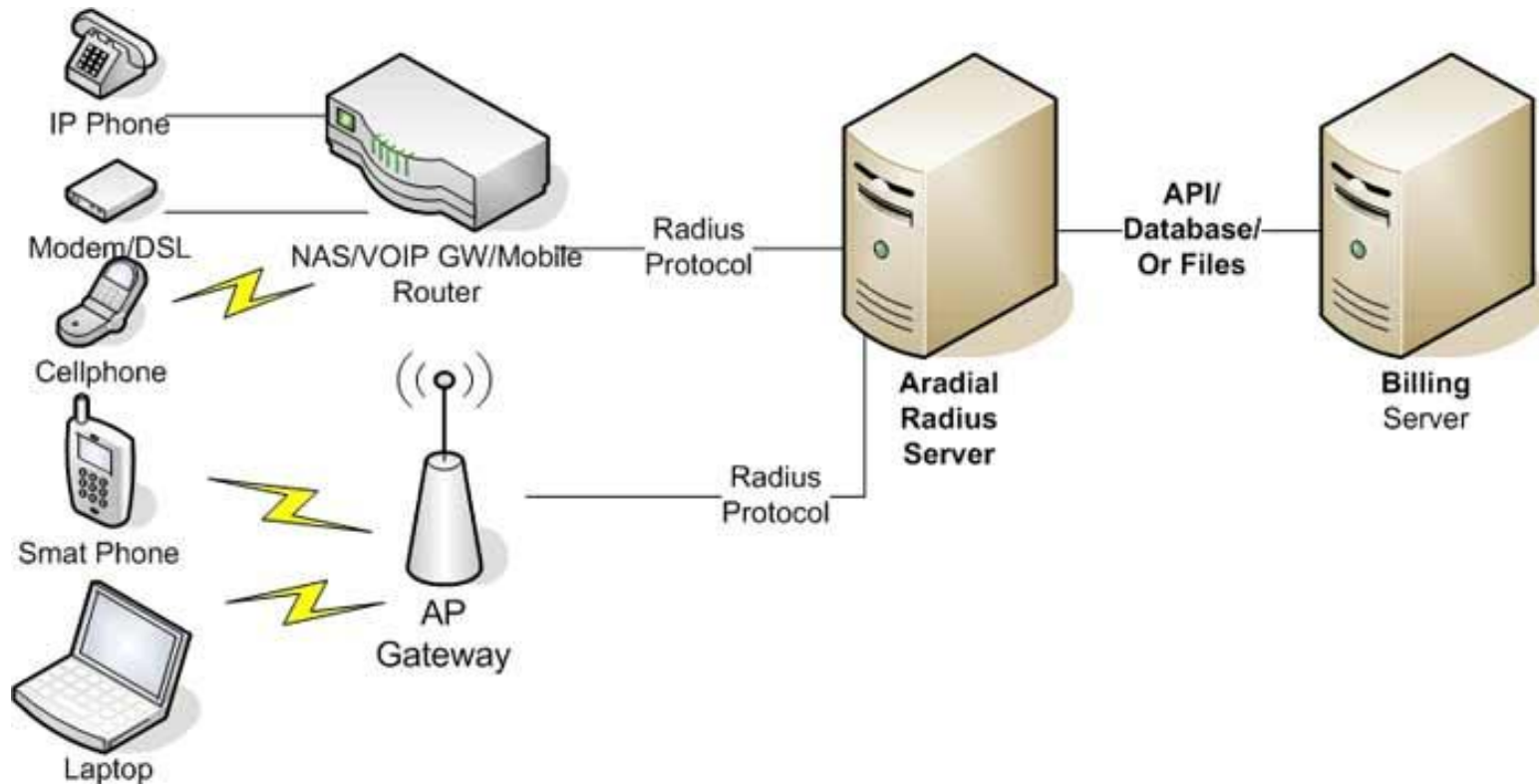
Unique Functionality

- TCL scripting for policy algorithms
- Extended billing server connectivity API
- Grouping and subgrouping
- Persistent IP pools (support H/A)
- Bandwidth control per NAS model
- Metering (on external billing databases)
 - Time and data accumulator
 - Service suspension based on traffic per NAS model
- Blocking or changing QoS for groups in time-of-day periods (for example, peak, offpeak configurations)
- POD and CoA support

Unique Functionality (Cont.)

- User management
- Generating users/prepaid cards
- Viewing sessions and summaries
- Exporting usage
- User self care
- Hotspots WiFi walled garden portal
 - Customization of the portal per location
- Spotngo payment system
 - Refillable vouchers
 - Credit-card processing
 - PayPal support
 - Customization of Spotngo per location

Typical Deployment Example





Thank You.

www.aradial.com