



High-Performance RADIUS Server



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

Aradial Products

- Aradial AAA/RADIUS
- Aradial Enforcer – AAA with Prepaid Enforcement
 - Spotngo add-on for Payment and top-up vouchers
- Aradial Converged Billing
 - Billing and CRM
 - Prepaid and Postpaid billing
 - Voucher management
 - Self Care
 - PRM – Partner management
 - PCRF – Policy Control Engine
 - Diameter support for Gx/Gx and RO/Rx



Customers

ISP / WISP

- Vodafone Ghana – GhanaTel
- Nepal Telecom
- NewRoz Telecom – IRAQ
- Kurdistan Telecom– IRAQ
- MTN Uganda – Wifi 3G offload
- MTN Rwanda – Wifi 3G offload
- Smile / Orange Israel
- Bezeq Israel– ADSL, Wifi and Wimax
- PMI – Philippe Morris – Enterprise
- Cable & Wireless (Seychelles)
- GTlink - Mexico
- Multivision - Djibouti

ISP / WISP

- iBurst - South Africa
- Cable & Wireless Atlantic – broadband ISPs
- Alma Telecom – USA
- Jefferson Telecom – USA
- Bentley Walker – Canada
- Palau Telecom

WiMAX

- Airspan – multiple installations
- Telrad – multiple installations
- Wichorus/Tellabs – multiple installations
 - Sprint USA
 - Augere Uganda
- Huawei and ALU - Telemax - Mongolia
- Cambium / PMP / Canopy Wimax

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

- **nPhase / Verizon Wireless**
 - 31M subscribers for supporting all the smartphones
- **Maingate – M2M**
 - 700,000 mobile subscribers in Sweden
- **Orange Senegal**
- **Tigo 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**

Hotspots/WiFi Installed Base

Over 350 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
- Dekal Wireless - 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



Aradial AAA Server

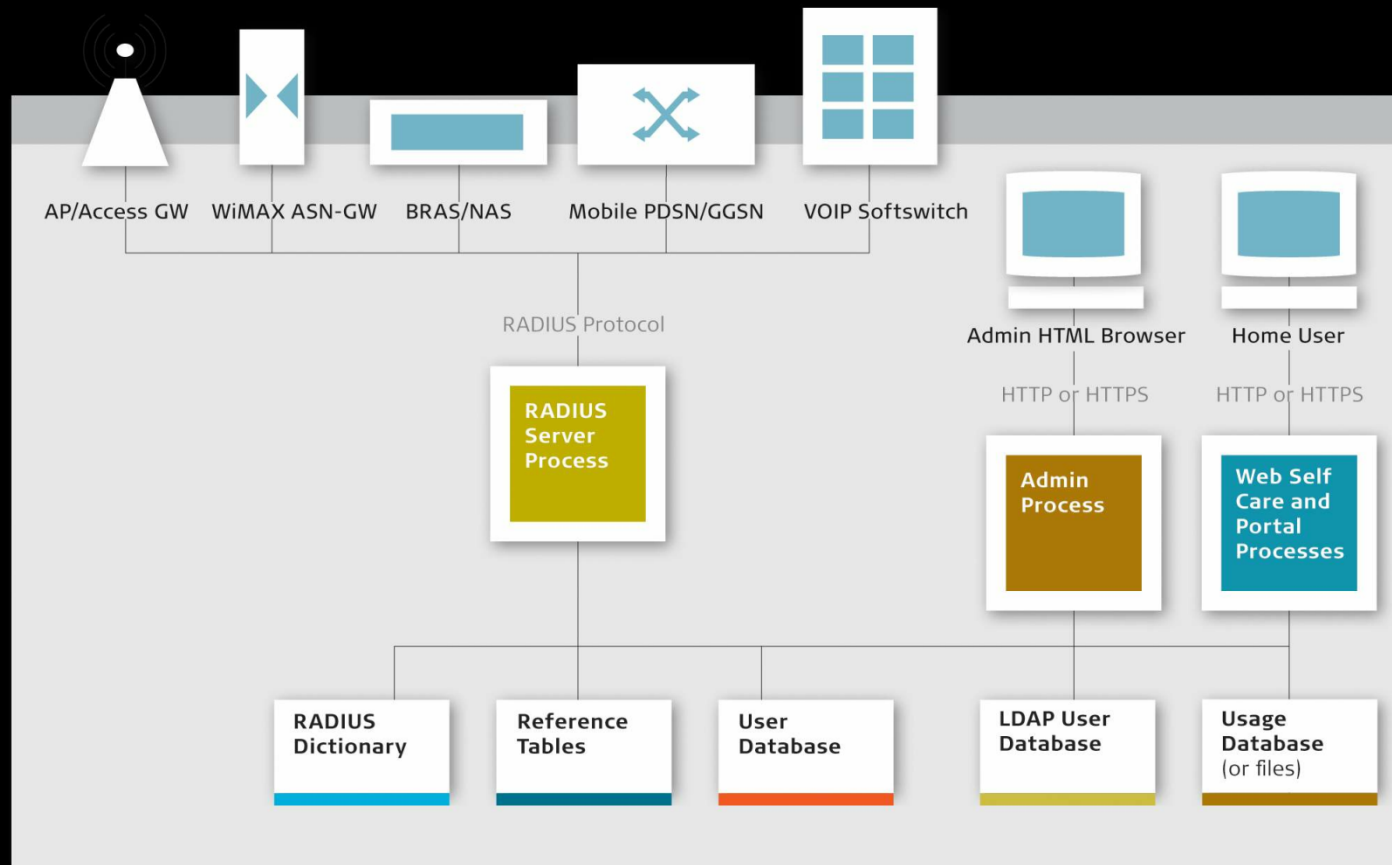
Aradial RADIUS Server

- High performance, fully-featured AAA
- Supports any IP services
- Works on Windows and Linux
- Compliant with RADIUS standards
- Scalable
 - Multithreaded - horizontal
 - Multi-process - vertical
- Includes EAP support
- High availability
- Easy provisioning
- Option: Compliant with Diameter standards

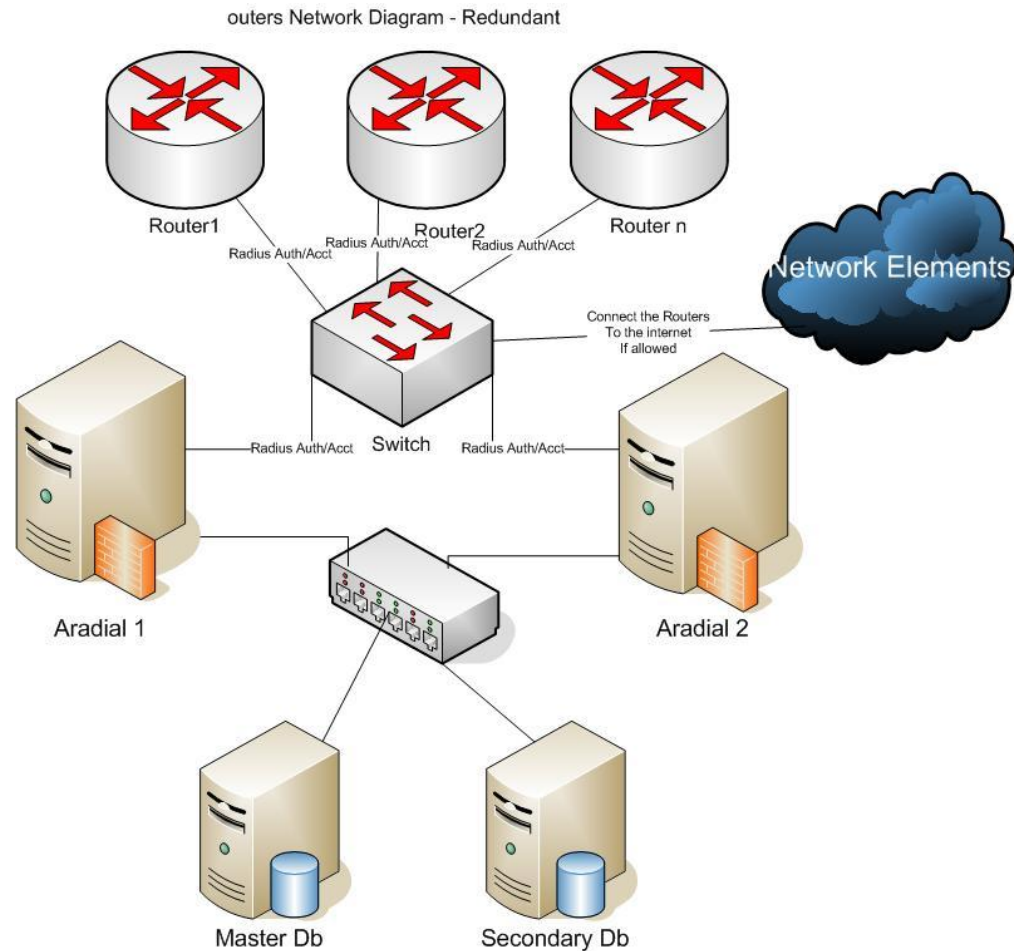
Aradial RADIUS Server (Cont.)

- 100% web-based interface
- SSL security support
- User interface with roles and permissions
- Database support
 - MS SQL
 - Oracle
 - MySQL
 - LDAP
- Statistics and reporting modules
- Time bank and Volume enforcement
- Prepaid cards generation

Architecture



Typical High-Availability Deployment



Aradial Supported IP Services

- Any broadband, BRAS, xDSL or cable
- WiMAX – WiMAX forum standard
- Mobile
 - GSM: GPRS, WAP, MMS
 - CDMA 2000 and 3GPP dictionaries
 - PDSN 3GPP prepaid and postpaid
- Wireless LAN
- 3G Wifi Offloading
- Wide Area Wireless basestations
- Mesh technologies

WiMAX

- Huawei and ALU
- Airspan
- Cisco Starent
- Runcom
- Alvarion
- Wichorus/Tellabs
- Motorola PMP / Canopy Wimax
- Samsung – IOT
- Getek - IOT
- Others that support NWG 1.3 and above

ISP: ADSL / Dialup

- Redback
- Huawei
- Cisco
- Juniper
- Runcom
- ALU
- All types of dialup RAS

Aradial Supported Wide Area Base stations

- Altai Technologies
- Wavion/Alvarion Networks
- Motorola Solutions
- Ruckus
- Ubiquiti
- Radwin
- Go Networks
- Xirrus
- Aruba

Aradial Supported WiFi Access Controllers

- Mikrotik OS – also reselling
- Runcom SG1
- Motorola WING
- Aruba Networks
- Ruckus Zone Director
- Cisco WLC
- Nomadix
- HP Curve / Colubris CN
- Zyxel, ValuePoint, Planet, Handlink
- 4IPNet
- Griffin, Dlink, NetGear,
- Chillispot based, Linksys - DD-WRT
- PfSense
- Ikarus OS

Aradial Supported IP Services (Cont.)

- Soft switches and SIP proxy (Class 4/5)
 - Cisco
 - Telrad
 - Teles
 - AudioCodes
 - Mailvision
 - RAD
 - NextGK
 - VocalTec
 - Asterisk
 - Any other that supports standard SIP VSA
- VOIP gateways
 - Cisco 53xx, 54xx,
 - Quintum Tenor
 - GNUGK and OpenSer
- IPTV using RADIUS



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
- 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



Main RADIUS Features

Overview

- Policy algorithms
 - Handling RADIUS messages
- State server
 - What is happening in the network
- Prepaid user monitoring
- IPv6 and pools
- User management
- Process monitoring
 - Including SNMP MIBs and traps
- Load simulator to test the network
 - Test any scenario for any equipment and user type

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

- LUA and TCL scripting for policy algorithms
- Extended billing server connectivity API
- Grouping and subgrouping
- Persistent IP pools IPv4 and IPv6 (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

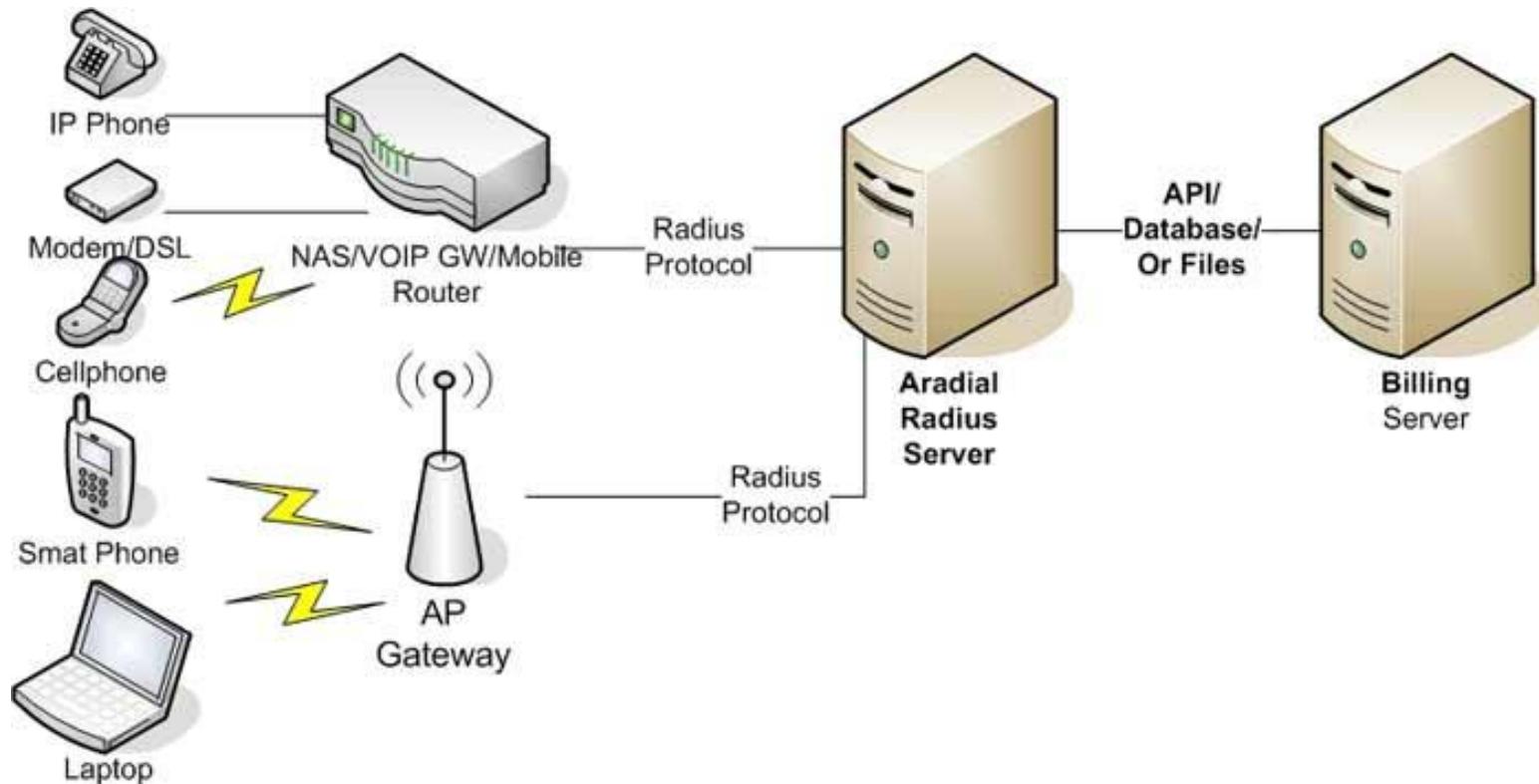
Policy Algorithm Mechanism

- 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

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 Deployment Example





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

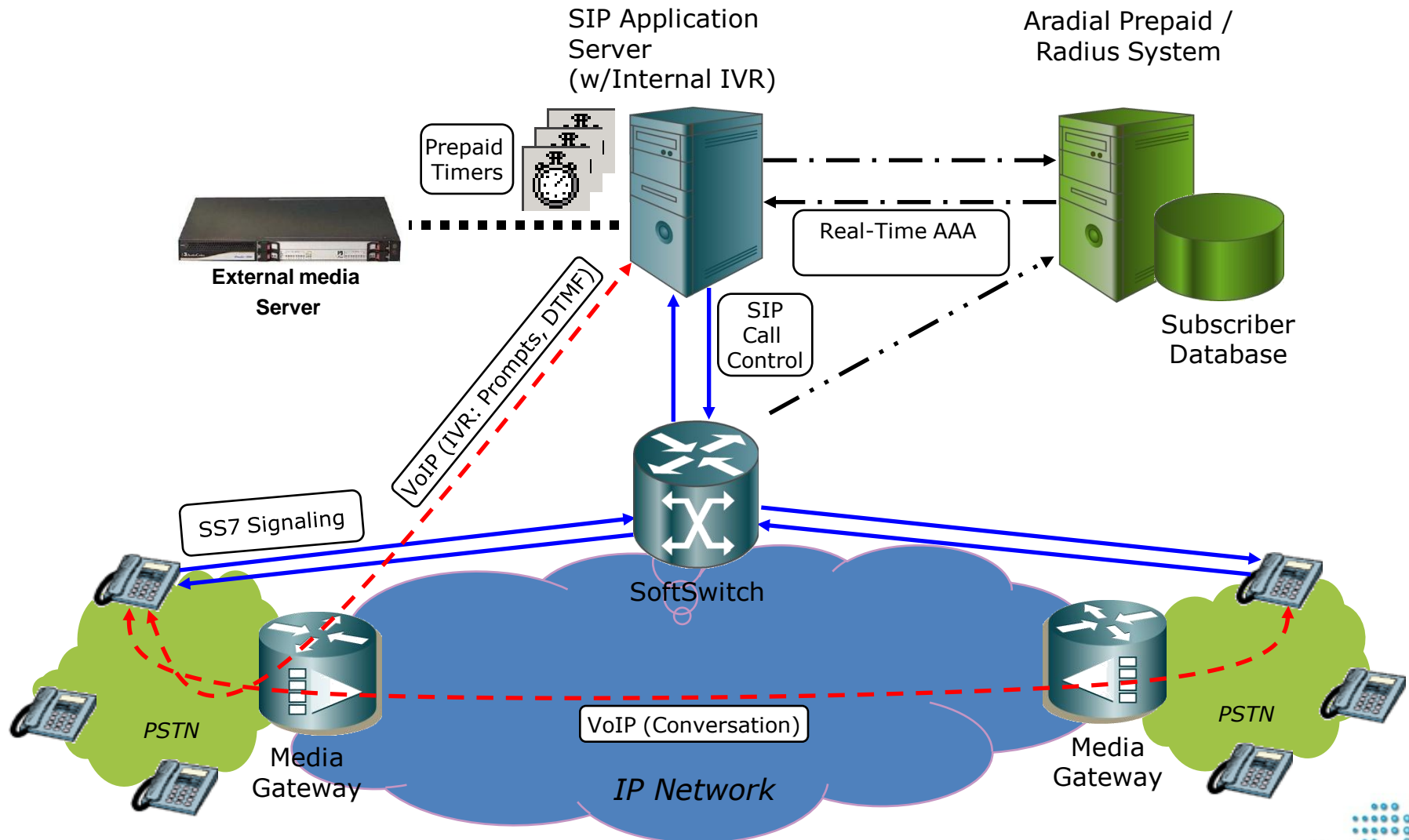
Prepaid VoIP with Aradial (Cont.)

- 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



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



Thank You.

www.aradial.com