



Aradial Converged VOIP Billing

Overview

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1. Company Background

Aradial RADIUS solutions have been servicing large and small ISPs since 1997, with NASDAQ traded ISPs trusting their RADIUS needs with Aradial RADIUS infrastructure. Aradial RADIUS is high performing with Tier 1 levels of reliability and scalability. Aradial RADIUS supports the latest RFCs, vendor specific attributes, NAS templates and has a multitude of pre-configured settings that support most Access Servers in the market today.

Aradial offers products that open a whole new set of possibilities for ISPs and Hot Spot (WiFi), ASPs, Wireless LAN and large corporations.

Utilizing open standards such as RADIUS and SNMP and EAP, and innovative technologies such as VPN and LDAP, the Aradial product family offers unmatched features and performance at an affordable price.

Aradial RADIUS solutions are installed in **over 50 countries*** supporting services such as: (* As a Radius server and as a part of billing solution).

- Voice services over IP
- Wi-Fi hotspots and Wireless ISPs
- DSL, Cable, ISDN, Dialup
- PPPoE and VPN internet access (both terminating and distributor RADIUS server roles)
- Rented Infrastructure (such as the one provided by Quest, Verizon, BT)
- Content Subscriptions
- Internet Kiosk and Internet Café

Aradial Ltd's premier product is the Aradial product family and, a state of the art, RADIUS server.

The Aradial comes in few configurations:

- Small operators
- Medium operators
- Large scale operators (Tier 1)

2. Converged Billing Overview

Prepaid

- Centralized authentication and accounting for all the routers or gateways.
- Converged services: VOIP, Dial-up, Wifi and ISP Broadband/DSL support on the same platform.
- SSL secured HTML based administration.
- Extended HTML UI for user database and groups of users.
- High-performance and reliable server.
- Scalable to handle millions of users and concurrent sessions on a low-end hardware.
- Support for most of the Access points and VOIP gateways on the market.
- Balance, Duration and Traffic enforcement.
- Balance and Credit Limit per user/calling card.
- User concurrency enforcement and viewing concurrent calls from the administration tool.
- Support for multi-session calls using balance management (Quota management).
- HTTP API for external systems and customization.
- External billing system interface using stored procedures or CORBA.
- Optional: Integration with SNMP based NMS.

Rating Capabilities

- ANI based (caller id) VOIP prepaid billing.
- Rating according to call destination.
- Different rounding intervals per tariff or per destination.
- Call Setup cost.
- Rating according to time of day, day of week.
- Unlimited number of rate tables and Tariff definition.
- Import of rates from CSV files.

Calling Cards

- Authentication, authorization, accounting (AAA) and real time VOIP prepaid.
- Convergent prepaid billing – Dial-up, DSL, Wireless LAN, Mobile and VOIP
- Full prepaid system for VocalTec, Mailvision, Alcatel, Cisco, Quintum, NexGe, Mera, Telrad gatekeepers/sip gateways and many others.
- Calling Card based prepaid billing.
- Calling card generation importing and exporting.
- Replenishing API or voucher refilling (*) with Spotngo Payment module.
- Support multiple Tariffs and destination rating tables that can be assigning for a calling card.
- Session reports and summary reports per calling card, per system, per destinations and periods.
- Optional: Monthly statement reports for calling card

Postpaid Billing

- Recurring charges (RC)
- RC Proration
- One time charges
- Taxes
- Multiple billing cycles
- Automatic invoice generation
- Automatic sending of invoices by mail
- Advanced bill day workflow
 - Run / Rerun
 - Undo
 - QA
 - Confirm
 - Bill Production
- Open Item / Balance Forward
- Prepaid statements
- Credit limit
- Optional module - Termination billing including wholesale credit limit and fraud control
- Trouble Ticketing

Customer Management

- User information definition
- Account can contain unlimited number of users
- Advanced search for users
- View users sessions
- Self Care module to view the account by the user
- History of successful/unsuccessful calls
- Send email to users
- Adjust time and money, change password, etc
- Dealer/Business partner management. Dealers can manage their own users.
- Support for multiple Admin types.
- Admin activity tracking.

Technical

- **Databases:** MS SQL 2005, MySQL and Oracle.
- OS: Windows XP, 2003, Linux and Solaris (optional)
- Full support for **Cisco RADIUS VSA** to work with IVR, SIP applications servers, and B2BUAs.
- Full support for SIP Proxy server **and Digest authentication**.
- Full support for Alcatel RADIUS VSA compatible IVR, SIP applications servers, and B2BUAs.
- H323 RADIUS attributes
- Full Prepaid and Postpaid billing support for open source GNU Gatekeeper (<http://www.gnugk.org>) and all Cisco VOIP VSA compliant gateways, gatekeepers, and soft-switches.
- IP Phone and MAC VOIP billing
- SIP, H323 and MGCP prepaid in the same VOIP RADIUS software

- Support for Cisco Debit card TCL application
- Support for IVR interface (query balance) and announcements.
- Optional: Access number tariff separation.
- Optional: Redirect numbers to another number.

Spotngo enhanced Vouchers and Credit Cards Payment System Module

The following is supported in the Payment module which is a Portal and a back office module:

1. Plan/Tariff management (time, traffic and expiration).
2. Walled Garden portal.
3. Portal can have different look and per location.
4. Voucher generation and management using plans.
5. Sign up a user from the portal using a voucher.
6. Refill the user with new voucher (each voucher has a tariff plan with time, traffic or expiration).
7. Create a user using credit card.
8. Refill by Credit card.
9. Multiple Payment gateways support including Authorize.net, PayFlow, PayPal and others.
10. Multi-merchant support, allows defining a merchant to a price plan.
11. Report payments history.
12. Secured portal (SSL).
13. Secured voucher, Plans management (SSL).
14. Printing and exporting PINS to CSV files.

3. Aradial Radius Overview

Aradial is a high performance full-featured RADIUS server. Boasting excellent performance and technological superiority, Aradial is the unquestioned market leader in its class.

Extensive support for: **ISP, Wireless LAN, Mobile Companies.**

The server includes some of the most innovative features available in the market today. It is easy of use, scalable and features a plug-in architecture providing support for almost any new functionality or network element.

Aradial's 100% web-based interface ensures easy connectivity from anywhere. Coupled with a state server that enables to monitor what is happening in the network, in real time, Aradial turns a web browser into the ultimate remote control.

Through an easy to use scripting interface fail over mechanisms can be applied, some resources can be dedicated for particular end users, time of day decisions on network load can be made, and much more.

Using policy algorithms, Aradial can implement rule-based authentication giving a complete manageability of network resources.

Aradial is vendor independent allowing to use Cisco's access servers including Wireless LAN (Arionet series) , Ascend's MAX Series, Lucent's Portmaster, Bay's, Shiva's, any combination of them or any other RADIUS enabled product.

Wireless Security Suite: Extensible Authentication Protocol (EAP), 802.1X, EAP Cisco Wireless (LEAP), Protected EAP (PEAP), and Cisco Secure Access Control Server (ACS).

Aradial can use its own user database, an external ODBC compliant database or use a LAN user database with Aradial LAN to WAN permissions mapping mechanism, without any duplicate user database hassles.

Support for connection to LDAP, allowing maintaining a single centralized user database.

Additionally, the server's full list of administrative and reporting utilities make it a single point of control.

Aradial's advanced proxy support allows transparent operation in even the most complex of network environments.

Advance connectivity to billing systems both in Postpaid and Prepaid market such as: **Rodopi and Advanced ISP Billing. And also, Tier one billing providers such as Amdocs Enabler, Portal Intranet, Geneva, Formula Leap+ and Leap NextGen.**

Aradial, a powerhouse of features and performance is affordably priced and ready to download for an evaluation today.

Reliability and scalability

Aradial RADIUS is a true performed with Tier 1 (99.997%) reliability and scalability to comfortably support over a million subscribers. Though installed and suited to serve the largest providers, the Aradial RADIUS is high performing and therefore requires low cost hardware, supporting most service providers' requirements on a commercial Pentium machine.

Web based administration

Aradial RADIUS turns the web browser into a remote control. The server can be accessed from anywhere in the world over secure SSL, with no client side installation what so ever. All needed is a web browser in order to configure RADIUS settings from anywhere, view all currently online sessions, modify the subscriber record, and more.

Support for the latest RFCs

Aradial software supports the latest RADIUS RFCs, supporting xDSL services, vendor specific attributes and a host of other features such as predefined attribute check lists. Aradial's experience in the RADIUS and billing market means that you are guaranteed a solution that will continue evolving into the future.

Aradial Radius is compliant with the following RADIUS RFCs:

- RFC 2865 -- Remote Authentication Dial-In User Service (obsoletes RFC 2138; updated by RFC 2868)
- RFC 2866 -- RADIUS Accounting (obsoletes RFC 2139; updated by RFC 2867)
- RFC 2869 -- RADIUS Extensions
- RFC 2548 -- Microsoft Vendor-Specific RADIUS Attributes
- RFC 2809 -- Compulsory Tunneling via RADIUS
- RFC 2868 -- RADIUS Attributes for Tunneling Support
- RFC 2882 -- NAS Requirements: Extended RADIUS Practices
- RFC 2619 and 2621 -- Radius Authorization and Accounting SNMP

Full support for Secure Wireless RADIUS

Hot Spot Server for wireless includes an integrated RADIUS server that is particularly suited for the security and authentication requirements of wireless based network including:

EAP based authentication – EAP-MD5, EAP-TLS, EAP-TTLS, PEAP, LEAP

MAC Address based authentication

IEEE 802.1x based WEP security

4. Aradial Datasheet and Performance

Features		
OS	Windows NT, 2000, XP	Unix: Solaris, Linux
Development Language	C++, C, HTML and HTS, SQL, TCL.	
RADIUS	<p>Full RFC 2138, Full RFC 2139, RADIUS Extensions, Proxy & Roaming, and Vendor Specific.</p> <p>Pass through Authentication: ODBC, RADIUS Proxy, NT SAM, and LDAP.</p> <p>Policy Algorithms written in C++ or TCL.</p> <p>Token Authentication: Security Dynamics</p>	
Operation	Application	System Service/Application
Performance	<p>Tested with 500,000 users in the database.</p> <p><u>Authorization has one request from the NAS:</u></p> <p>Access-Request, Access-Accept</p> <p>Low: 100 per/sec on 1 CPU Pentium IV 2.4GHZ, Win XP, 512MB with Access database.</p> <p>Low: 120 per/sec on 1 CPU Pentium IV 2.4GHZ, Win XP, 512MB with Sql Server database.</p> <p>Low: 300 per/sec on 1 CPU Pentium III 500, NT 4 Server, 128MB with Oracle (on the same machine).</p> <p>Low: 350 per/sec on 1 CPU Pentium IV 2.4GHZ, Win XP, 512MB with Oracle (on the same machine).</p> <p>Low: 180 per/sec on 1 CPU Pentium II , Linux, 256MB with Oracle (on a one CPU NT machine).</p>	

	<p>Medium: 600 per/sec on 2 CPU Pentium IV Windows with Oracle (on the same machine).</p> <p>Medium: 1500 per/sec 8 CPU Sun, Solaris 8.0 with Oracle (on the same machine).</p> <p>Average: 250 AAA per second per CPU.</p> <p><u>AAA- Authorization and Accounting Requests: (3 messages)</u></p> <p><u>Sending Accounting records to Database</u></p> <p>Low: 30 per/sec on 1 CPU Pentium IV 2.4GHZ, Win XP, 512MB with Access database.</p> <p>Low: 50 per/sec on 1 CPU Pentium IV 2.4GHZ, Win XP, 512MB with Sql Server database.</p> <p>Low: 150 per/sec on 1 CPU Pentium III , NT 4 Server, 128MB with Oracle (on the same machine).</p> <p>Low: 210 per/sec on 1 CPU Pentium IV 2.4GHZ, Win XP, 512MB with Oracle (on the same machine).</p> <p>Low: 150 per/sec on 1 CPU Pentium II , Linux, 256MB with Oracle (on one CPU NT machine).</p> <p>Medium: 380 per/sec on 2 CPU Pentium IV Windows with Oracle (on the same machine).</p> <p>Medium: 800 per/sec 8 CPU Sun, Solaris 8.0 with Oracle (on the same machine).</p> <p>Average: 140 AAA per second per cpu.</p> <p><u>AAA- Sending accounting to File:</u></p> <p>Low: 600 per/sec on 1 CPU Pentium III , NT 4 Server, 128MB with Oracle (on the same machine).</p> <p>Medium: 1200 per/sec 2 CPU Sun, Solaris 8.0 with Oracle (on the same machine).</p>
Latency	Latency: 5-30 msec (95% less that 50msec).
Http Server	Thin client (3rd/4th generation web browser) served by either proprietary or ISAPI/NSAPI/CGI compatible web server.
General	Maximal Users : Unlimited

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	Maximal Groups: Unlimited Y2K Compliancy: Full, if OS and database are compliant.
Databases	Internal (MS Access MDB file), MS SQL Server, Oracle 8i, Oracle 9i, MySQL (All platforms), LDAP. Oracle works both with ODBC and OCI.

5. Architecture

