

# **RADREP**

## **RADIUS REPORTING AND BILLING TOOL**

### **INSTALLATION, CONFIGURATION & USER GUIDE**

Version 1.87

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# 1 INTRODUCTION

This user manual is provided to assist a person who will be installing and setting up the RADIUS REPorting and billing tool (RADREP) to generate usage and/or billing reports from RADIUS accounting log files. In many cases this person will be an IT administrator or similar. Understanding how to configure and use RADREP in your respective environment is essential in order to produce correctly generated reports.

RADREP is a general-purpose tool that can be used to generate end user usage and billing reports from RADIUS accounting log files, often also referred to as detail files. RADIUS accounting log formats which are supported include Livingston, Microsoft IAS, Funk Steel Belted Radius, CISCO Secure ACS and other RADIUS servers which write their logs in CSV (Comma Separated Values) format. The extended ability to group users into Office/Location and Department/Business Unit allows those using RADREP for corporate charge-back and usage reporting purposes to accurately allocate costs associated with providing a network access or remote access service. Billing rates and charges can be allocated based on either a users connect/usage time or on the amount of traffic (data volume) which they transfer during the selected reporting period.

Most free and commercial RADIUS servers (including many of those which are bundled with token based authentication systems) do not give much attention to the reporting side of the RADIUS protocol. The design of RADREP is such that it can be used as a stand-alone RADIUS reporting engine with RADIUS servers that lack reporting abilities, or in an integrated manner specifically with the RSA SecurID ACE/Server. The RADIUS server which is bundled with the RSA ACE/Server v4.x, 5.x and 6.x does not include any reporting mechanism for RADIUS accounting, so this tool can provide invaluable and meaningful reports by extracting useful information from both the RADIUS accounting logs and/or the ACE/Server database.

All users are presented in a selectable hierarchical representation which is categorised by Site, Group, and User. Report selection criteria includes Site/Office, Group/Department and User-Name/Login-ID details as well as the report start and end date range. To generate a report for all Sites, Groups and Users, it is as simple as selecting the 'Entire Company' name at the root level of the hierarchy. Configuration options allow the setting of any relevant fixed and variable billing charges, TAX to be applied, file locations of the RADIUS log files, the report output directory and numerous other options.

Report output formats include CSV (Comma Separated Values) files for easy importing into Microsoft Excel (or other text editors/viewers) and web based (HTML) output for viewing within a web browser. CSV report output gives you the ability to further manipulate the report output data in Microsoft Excel, while the web based reports provide an easy navigable way to view reports from a standard web browser. To see some sample report output please refer to the 'RADREP Sample Reports' document or for the most up to date sample reports view them online at <http://www.radiusreporting.com>

## 1.1 RADREP Lite and RADREP Extended

There are two versions of the RADREP product. A Lite version and an Extended version. It should be noted that this manual covers all the functionality included in the RADREP Extended product version. If you have purchased or are using a copy of RADREP Lite then some of the functionality mentioned herein may not be available to you.

To cater for the diverse range of business sizes and reporting requirements, RADREP is available in both a Lite version and an Extended version.

**RADREP Lite** is restricted to retrieving user information from RADIUS log files only and not from any other external sources such as a customizable CSV file or the RSA ACE/Server database. Due to this restriction the Lite version does not have the ability to group users by Site/Location or Group/Department. Therefore, it can only generate reports for either an individual user or the entire user base, but not for select communities of users. The Lite version does have basic billing capabilities, allowing you to charge all users based on *either* their 'usage time' or 'data volume' consumption, but not using a mixture of both. It does not provide the ability to bill/charge different end users at different rates for their usage time or data volume bandwidth consumption.

**RADREP Extended** has no functionality restrictions. With the Extended version you are able to read in additional user information (from either a custom CSV file or the RSA ACE/Server) which enables the grouping of users and therefore the ability to generate reports for select communities of users. The Extended version provides up to 50 billing templates and supports mixed mode billing. Mixed mode billing allows you to bill/charge some users by 'usage time' and others by 'data volume' consumption, while also providing the flexibility to charge different Sites, Groups and Users at different charge rates.

## 2 UNDERSTANDING HOW TO USE RADREP IN YOUR ENVIRONMENT

RADREP can be run as a ‘Standalone’ reporting tool or integrated with the RSA ACE/Server. The pros and cons of using either method are covered in this section.

### 2.1 Standalone Operation

This section describes how RADREP can be used in a stand-alone manner to process RADIUS accounting logs.

#### 2.1.1 Report Generation Options

When RADREP is run in a standalone manner, it can be used to process RADIUS accounting detail files written by a RADIUS server that writes its output in Livingston, Microsoft IAS, Funk Steel Belted RADIUS, CISCO Secure (ACS) or CSV log formats. In standalone operation there are two ways in which you can retrieve user information that is displayed in a selectable hierarchy for report generation. The first is by retrieving all user Login IDs from the ‘**RADIUS Log file(s)**’. This is done by scanning through the nominated RADIUS accounting logs and extracting the value of the ‘user-name’ attribute fields. This method of user retrieval does not have the ability to group users by Site/Office or Group/Department. In the selection hierarchy all users will appear as belonging to NO\_SITE and NO\_GROUP. Reports will only show the user’s Login ID rather than their first and last name as well as any relevant SITE and GROUP information.

The second way is to read in the user information from a ‘**CSV file**’. This file must be called ‘**users.csv**’, have comma separated fields representing each users Site, Group and first/last names, and be located in the configured ‘**Output Folder**’. Note that the ‘users.csv’ file is automatically produced by RADREP when the ‘Dump users to users.csv’ option is selected/enabled and ‘**RADIUS Log file(s)**’ or ‘**ACE/Server database**’ is used as the user retrieval method. There are two input formats that the ‘users.csv’ file can be in, and the first line of this file tells RADREP the format that you want to use. See the ‘**users.csv** - Input File Formats’ section for details on the format of this file.

#### 2.1.2 ‘users.csv’ - Input File Formats

The ‘users.csv’ file is created automatically when the ‘**Dump user details to users.csv file**’ is selected and the ‘**ACE/Server database**’ or ‘**RADIUS log file(s)**’ are used in the ‘**Retrieve user list from:**’ selection box. Alternatively you can create this file manually yourself as long as you adhere to one of the formats described below.

You can use the ‘users.csv’ file as an input file by selecting ‘**CSV file**’ in the ‘**Retrieve user list from:**’ selection box. Using a ‘users.csv’ file will give you the ability to associate more meaningful information with a user’s Login ID. It allows you to group users by Site/Office, Group/Department and display their first and last names in the reports rather than only their Login IDs.

##### 2.1.2.1 Format 1 – Extended User Details

Use the following comma separated file format to group users into sites/offices, groups/departments and display their first and last names in reports: (the billing PROFILE field is optional):

SITE	GROUP	FIRST & LAST NAME	DEFAULT LOGIN / USER-NAME	PROFILE
------	-------	-------------------	---------------------------	---------

### 2.1.2.2 Format 2 – User-Name Only

If you want to use a static list of Login IDs each time you generate reports then you can do this by using the following file format:

```
RADIUS LOG - User-Name
```

**Note:** The first line of the ‘users.csv’ input file must have the above headings separated by commas where applicable. Each line after the heading must have the relevant field information. Examples of both formats are given below.

#### Example ‘users.csv’ file formats:

##### Extended User Details

```
SITE, GROUP, FIRST & LAST NAME, DEFAULT LOGIN, PROFILE  
Melbourne,MelAccounts,David Johnson,djohnson,Gold  
Melbourne,MelAdministration,Sharon Stone,sstone,Silver  
Melbourne,MelSupport,Liz Hurley,lhurley,Bronze  
Seattle,SeaAccounts,HuFlung Dung,hdung,Platinum  
Seattle,SeaDispatch,Luke Logan,llogan,Basic  
Seattle,SeaIT,Zvenya Stoistovic,zstoistovic,Gold  
Seattle,SeaSales,Willy Walton,wwalton,Silver
```

##### User-Name Only

```
RADIUS LOG - User-Name  
djohnson  
sstone  
lhurley  
hdung  
llogan  
zstoistovic  
wwalton
```

## 2.2 ACE/Server Database Integration

RADREP can integrate with the ACE/Server database in order to extract specific user information that is not otherwise available from RADIUS accounting logs. Information that is obtained from the ACE/Server database in order to produce more descriptive and meaningful reports includes:

- A user's First and Last name
- The SITE to which the user has been assigned. (if any)
- The GROUP to which the user has been assigned. (if any)
- A optional pre-defined billing PROFILE which can be used to indicate the billing model to use for a user.

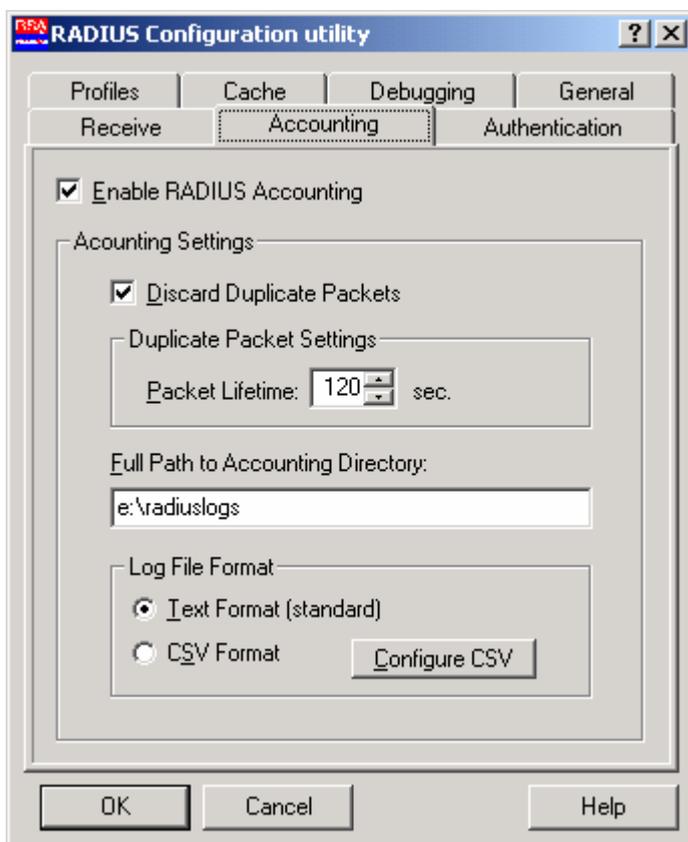
\*If a user belongs to multiple groups, only the first group returned is displayed in the reports.

As it is not always desirable or practical to use the ACE/Server's SITE and GROUP information to represent a user's office/location and department/division, this information can alternatively be read from two nominated 'user extension data fields'. By adding the ability to nominate two 'user extension data fields' to represent a users site/office and group/department, it also means that this information can also be kept in sync with an LDAP data store such as Microsoft Active Directory (ADS). Keeping nominated user extension data fields in sync with an LDAP or ADS data store can be done using RSA provided utilities. To configure ACE/Server Extension data fields in RADREP see the **Advanced Settings** configuration section.

RADREP enables reporting to be performed on all users within the ACE/SERVER database who have an assigned SecurID token. This means that it allows for billing of users who have not necessarily had any accountable usage time within the report period, but are still required to be charged a minimum fixed service fee.

## 2.2.1 ACE/Server RADIUS Log Format configuration

Versions of ACE/Server prior to 5.0 have their RADIUS log output format set to Livingston as default so these logs will work fine with RADREP. In version 5.0 and greater of ACE/Server the default RADIUS accounting log format changed to CSV (Comma Separated Values) format. If you are using ACE/Server version 5.0 or greater it is preferred that the Livingston log format ('Text Format [standard]') be used by ACE/Server, however RADREP will also work fine with ACE/Server CSV Formatted logs. If you choose to keep your logs in the same format as prior ACE/Server versions you will need to run the RSA provided 'rwconfig.exe' utility located in the '<drive>:\ace\prog' directory and change the 'Log File Format' to 'Text Format (standard)' as shown in the screen shot below. If you are running ACE/Server for UNIX then the same can be done by running the 'rtconfig' utility located in the '..\ace\prog' directory.



## 2.2.2 LDAP & User Extension Data Synchronization

By configuring RADREP to use user extension data fields to represent a user's site/office and group/department, it will read these fields from the ACE/Server database for each user, and then display them in the selection hierarchy and reports.

Synchronising a user's LDAP / ADS fields used to store their 'Office' and 'Department' details with a user's ACE/Server 'user extension data fields', may be desirable in some environments. This can be done by using the RSA provided 'sdaceldap' utility, which comes with ACE/Server 5.0 or the automated LDAP synchronization tools and options which are embedded in ACE/Server 5.1 and later.

### 2.2.3 Report Generation Options

To make reports more meaningful to view, user details within the ACE/Server database should include SITE/office and GROUP/department information, and the user's first and last names. Currently RADREP supports two methods of associating a user with a SITE/office and GROUP/department.

#### 2.2.4 Method 1 – Using a user's associated SITE and GROUP

If you are not using ACE/Server SITES and GROUPS already, you can use the standard ACE/Server Administration Interface to create user GROUPS and SITES and assign each user to at least one GROUP and SITE. If a user belongs to multiple GROUPS, RADREP will only display the name of the first GROUP it finds the user associated with in its reports. As GROUPS in ACE/Server are most often used for activating users on a specific Client/Agent, it is not always practical to use this information to also represent the SITE/Office and GROUP/Department that a user belongs to. For a more decisive way to associate a user with a SITE/Office and GROUP/Department you can use ACE/Server's user extension data fields to represent this information instead.

#### 2.2.5 Method 2 – Using user extension data fields

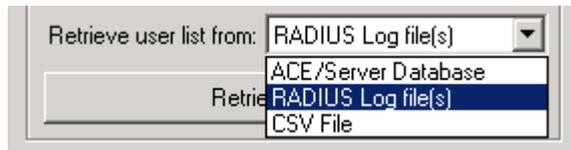
You can use ACE/Server 'User Extension Data' instead of each user's SITE and GROUP associations to define the user's SITE/Office and GROUP/Department. RADREP will allow you to configure the field names of two 'User Extension Data' fields that it will read. When retrieving user information from the ACE/Server database, RADREP will also retrieve these two fields, displaying them in both the SITE/GROUP/USER selection hierarchy and the reports that are generated.

#### ***Important Notes:***

- If there are users in the ACE/Server database that are not associated with a SITE and/or GROUP, RADREP will automatically display these users in the reports as belonging to a site called NO\_SITE and a group called NO\_GROUP.
- For a user to be selectable or included in the reports they must have at least one RSA SecurID token (or static password) assigned to them.
- Refer to the ACE/Server Administration manual (Admin.pdf) on the ACE/Server CDROM media for further information on how to create SITES, GROUPS and/or 'User Extension Data' fields.

## 2.3 User Retrieval methods

Currently there are three methods in which you can import/retrieve user details and display them in the SITE/GROUP/USER hierarchical selection pane. To make your desired selection you must select from one of the three available methods in the drop down box as shown below. The default method is RADIUS Log file(s).



### 2.3.1 Method 1 - ACE/Server Database

Use this method if you want to retrieve all users (with an assigned token) from the ACE/Server database and display each user according to the SITE and GROUP that they belong to (if any). If a user belongs to multiple GROUPS in the ACE/Server database, only the first group that they are associated with is displayed. If more accurate grouping by location/office and department is required, RADREP has the ability to read two user extension data fields for each user in the ACE/Server database. The names of these two extension data fields can be configured in RADREP's '**Advanced Settings**' configuration section, simply by enabling the checkbox called '**Use Extension Data Fields**'. If this checkbox is selected, then for each user found in the ACE/Server database the values of these extension data fields will be read, and then display in the selection hierarchy.

If this option is selected and some users do not have any extension data or don't have the correct field names, then they will be assigned to a SITE called 'NO\_SITE' and a GROUP called 'NO\_GROUP'.

### 2.3.2 Method 2 - RADIUS Log file(s)

Use this method if you want to just retrieve user login names from the RADIUS accounting log files, and have each unique user name that is found displayed in the SITE/GROUP/USER selection pane. When using this method you can only report on either 'all users' or a specific selected user. You cannot group users by other information such as office location or department. Reports will only contain a user's Login ID and no other user specific information. If you are using 'RADREP - Lite' then this will be the only option available.

### 2.3.3 Method 3 – CSV File ( users.csv )

When you choose either of the first two methods and have the ‘**Dump user details to users.csv file**’ configuration option enabled, each user found in the ACE/Server or RADIUS accounting files will be written to a file called ‘**users.csv**’, located in the configured report ‘**Output Folder**’.

For ACE/Server (Method 1) this file will contain the following information and format:

SITE	GROUP	FIRST & LAST NAME	DEFAULT LOGIN / USER-NAME	PROFILE
------	-------	-------------------	---------------------------	---------

For RADIUS (Method 2) this file will contain the following information and format:

RADIUS LOG - User-Name
------------------------

Rather than retrieving a list of users (using method 1 or 2) each time you run RADREP, you can simply choose to load the list of selectable and reportable users from the ‘users.csv’ file by selecting ‘**CSV file**’ as the user list retrieval method. This will load the users and any SITE or GROUP details from the ‘users.csv’ file which must exist and be located in the configured ‘**Output Folder**’.

If you are using ACE/Server and do not want to run RADREP on the Master/Primary ACE/Server, but do want to use the additional information that is extracted from the ACE/Server database in the reports, then this is an alternative way of running the reports on another machine where you have copied the RADIUS accounting log files to and created or copied a ‘users.csv’ file using the above ‘**ACE/Server**’ (**extended user information**) format. To have the ‘users.csv’ file automatically created for you so that you don’t have to manually create it, you will have to run RADREP on the Master/Primary ACE/Server at least once in order to generate this file. To do this, you will need to make sure you select ‘**ACE/Server Database**’ as the user list retrieval method and have the ‘**Dump user details to users.csv file**’ selected in the configuration options.

If you are not using ACE/Server and are reporting on Login IDs (user-names) that are extracted from RADIUS accounting logs (method 2), then by building your own ‘users.csv’ file (or adding further user information to the one which RADREP can generate for you) you will be able to categorise your users into SITES and GROUPS as well as provide details such as their first and last names. Grouping users will enable you to generate usage and billing reports for select users or communities or users.

## 3 INSTALLATION, SETUP & CONFIGURATION

### 3.1 Platforms Supported

It is recommended to run RADREP on a Windows 2000 Operating System as this seems to give the best performance and compatibility. RADREP can also run on Windows 98/ME/NT4/XP and Windows 2003 Server..

### 3.2 Recommended Hardware

RADREP will run on pretty much anything that is capable of running one of the above supported Windows operating systems. For processing larger RADIUS accounting logs (in excess of 200MB) it is recommended to use the following hardware or better.

PIII 500MHz or better

512MB RAM \*More RAM will increase the processing speed of large logs.

ATA100 HDD \*Hard Disk Speed is very important. The faster the better.

\* If you are generating reports for a period of time over which the *accumulated* log size is large (eg. 500MB or more) you will need as much RAM in your machine as you can get your hands on if you want reports to be generated in a reasonably quick time frame. If you are prepared to wear the time cost for processing huge accumulated logs, then this is not really an issue.

As a rule of thumb, if you see large amounts of Hard Disk activity during the report generation process, then more RAM will help you.

### 3.3 RADIUS Log processing speed

Due to the nature of RADIUS accounting logs being large in size (anywhere in the range of tens of Megabytes to Gigabytes), it is recommended that they reside on the same machine (i.e. local hard disk) that you are running RADREP on, and not on a networked or mapped drive. Using a network or mapped drive for the location of the log files will work, but processing performance will be heavily impacted and is not recommended when processing large accounting logs.

### 3.4 Installation

To install RADREP you should first download the latest installation package 'RADREPsetup.exe' from the RADREP website.

<http://www.radiusreporting.com>

After you have downloaded 'RADREPsetup.exe' simply double click on this installation package and follow the prompts to install.

Upon completing a successful installation you will have a RADREP Icon created on your desktop, and a RADREP folder under your windows Start | Programs menu from which you can view online help, sample reports and amongst other things the license agreement. You

should read the license agreement and make sure that you agree to and comply with the terms and conditions set forth for using RADREP in your environment.

To start the RADREP simply double click on the RADREP desktop icon.



### 3.5 Standalone Setup

You can use RADREP to generate reports from a different machine to that on which the RADIUS server resides. To do this you will need to copy the RADIUS detail logs, which are produced by your RADIUS server, to another machine where the RADREP software has been installed, and configure RADREP accordingly so it knows the location of the detail file(s). When using the RSA ACE/Server, if you choose to run RADREP on another machine (i.e. Standalone), no additional user information such as First/Last name, Site/Office location, or Group/Department will be obtained from the ACE/Server. The only way to get this information and display it in the reports is by using the '**CSV file**' user retrieval method as described in the '**Standalone Operation**' part of this manual.

### 3.6 ACE/Server Integration Setup

In order to use RADREP in an integrated fashion with the RSA ACE/Server database, radrep.exe must be run from the same machine that the Primary/Master ACE/Server is installed and running on. Before installing RADREP on the ACE/Server Primary you **MUST** be logged in as a user with appropriate permissions to administer the ACE/Server database. Usually this is the 'administrator' account but it could be some other user name depending on how you have installed and setup ACE/Server. To test if you have adequate permissions you can try and run the ACE/Server 'Host Mode' administration. If it runs then you have adequate permissions otherwise you will have to login as another user that has the correct privileges.

To extract user information from ACE/Server, RADREP communicates with the ACE/Server database via the RSA provided 'apidemon.exe' utility. The 'apidemon.exe' must reside in the same directory as 'radrep.exe' for ACE/Server database communication to be successful. The 'apidemon.exe' is usually located in the <drive>:\ace\utils\toolkit directory of your ACE/Server Installation.

You must copy the 'apidemon.exe' from this directory into the same directory you installed RADREP to which by default is usually <drive>:\program files\RADREP\. Make sure you are logged into the ACE/Server Windows 2000 Machine with adequate permissions. If you are not logged into Windows 2000 as a user that has adequate permissions to the ACE/Server database, then when you run RADREP and attempt to 'Retrieve the user list' from the 'ACE/Server Database' you will either receive a database connection error message or get no response at all.

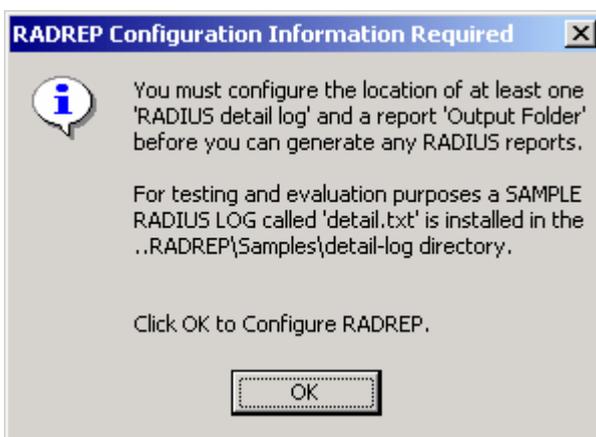
In order to process ACE/Server's RADIUS logs you of course also need to configure the location of these logs in RADREP.

## 3.7 Configuration

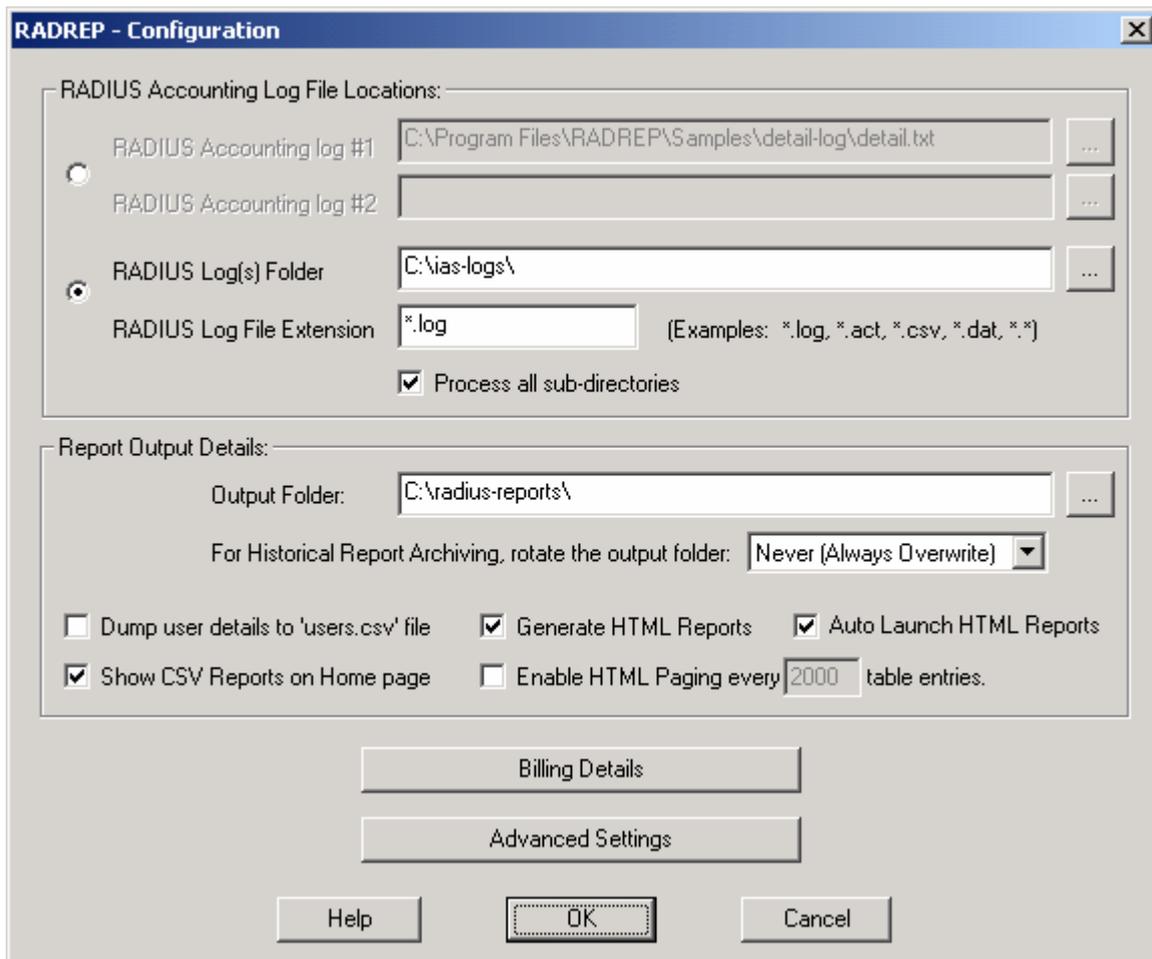
The following sections detail how to configure RADREP and what to expect the first time it is run.

### 3.7.1 First Time Use

The first time you run RADREP you will see the following message, and after clicking on the OK button, you will be presented with the **'RADREP – Configuration'** screen. This prompts you to configure RADREP so that it has at least the minimum information required to generate reports.



After clicking on the OK button you will be prompted with the **RADREP – Configuration** dialogue box as shown below



On the '**RADREP – Configuration**' screen, the minimum field items that need to be configured so that reports can be generated are the '**RADIUS log file locations**' and an appropriate report '**Output Folder**'.

When configuring the location of your RADIUS accounting log(s) you can specify them in one of two ways by clicking on the appropriate 'radio button' with your mouse:

- **RADIUS Accounting log #1** - The file location and name of the Primary RADIUS Accounting log file.
- **RADIUS Accounting log #2** - The file location and name of the Secondary RADIUS Accounting log file.

### OR alternatively

- **RADIUS Log(s) Folder** – The folder location of one or more RADIUS Accounting log files.
- **RADIUS Log File Extension** – the log file extension to use when looking for accounting logs in the selected 'log folder'. (e.g. \*.log or \*.act) This will allow processing of all logs in the one folder with the nominated extension. The wildcard \*.\* can also be used which will mean that all files in the selected 'log folder' will be processed.
- **Process all sub-directories** – when checked/enabled, this option will look for log files to process in all sub-directories located under the specified 'RADIUS Log(s) Folder'.

- **Output Folder** - The Location of the report output folder. To configure a 'Report output folder' simply use the browse button and select it.

Once you have configured these items correctly, you will be able to generate reports. To further customise other settings including those for billing purposes, you will need to have a good understanding of your environment and RADREP's capabilities. To configure sections such as '**Billing Details**', you will need to first determine how you would like to cost a user's usage and then configure the appropriate billing field items. A descriptive guide to each configurable item can be found in the '**Billing Details**' section of this manual. Likewise the advanced features are described in the '**Advanced Settings**' section of this manual.

### 3.7.2 RADIUS Accounting Log File Locations

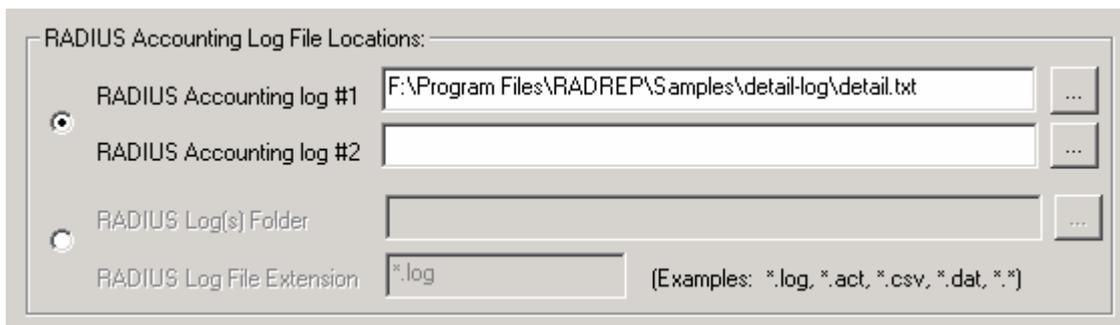
There are two methods for defining the input locations and file names of your RADIUS accounting log files on the 'RADREP – Configuration' dialogue screen. The 'RADIUS Accounting Log File Locations' section allows you to specify the locations of your RADIUS accounting log files.

You can use the RADIO button to select one or the other log file input method as detailed and shown in the screen shots below.

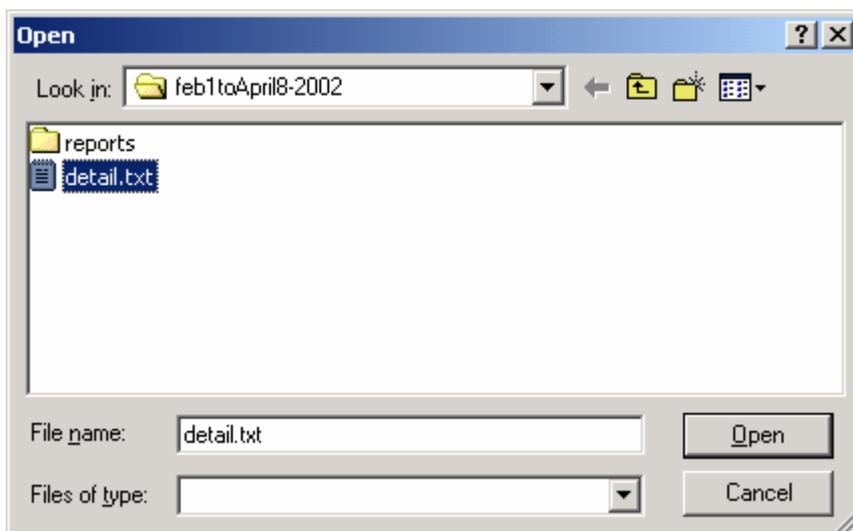
#### 3.7.2.1 Primary & Secondary Log file locations

The first method assumes that you have one or two (primary and secondary) statically named RADIUS accounting logs to process which may reside in different directories. The assumption here is that accounting records are continuously appended/written to these logs and their names will not change. If this is your case then this is the option to use for defining the locations of your logs.

Simply click on the '...' button to browse to the location and name of the log file or type it in manually if you know it's directory location and name.

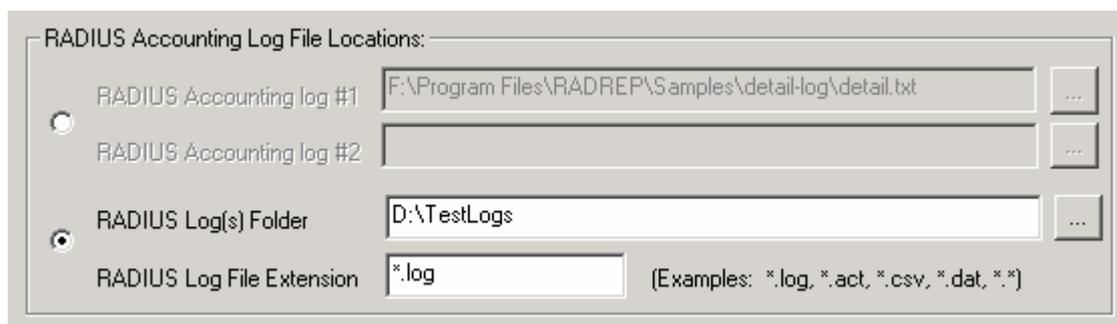


Clicking on the '...' button allows you to browse to the location of your accounting log file and select it.

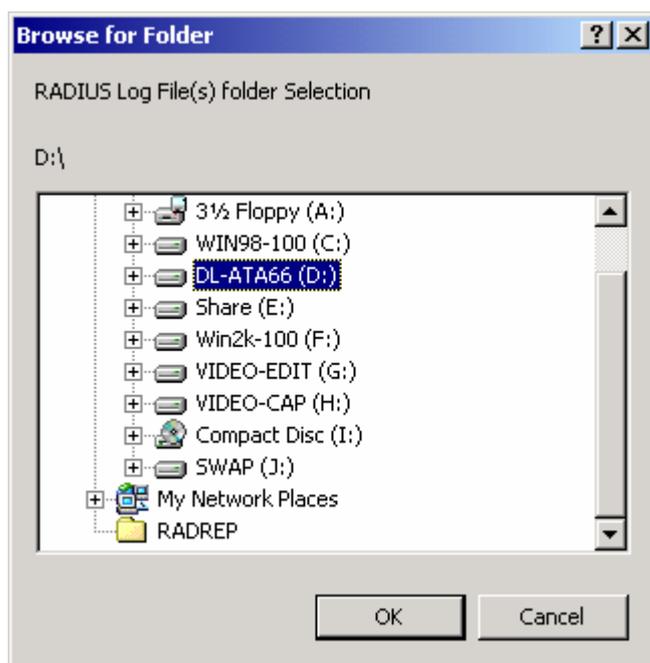


### 3.7.2.2 Log File(s) Folder and Extension

The second RADIUS log file(s) input method assumes that you have a number of logs to process, all located in the one folder (and/or sub-directories under this folder) and usually having the same file name extension such as \*.log or \*.act. If you roll your logs over on a regular basis (e.g. Daily, weekly or monthly) and each log has a different name but the same file extension then this is the method you should use to define the location of your log files. It is also possible to use a wildcard for the extension name (e.g. \*.\*). This will mean that RADREP will treat any file it finds in the configured 'log(s) folder' as a RADIUS log file and process it. So if you have logs with different file extensions (and/or accounting formats) then the \*.\* wildcard would enable you to process all of them at once. Be careful when using the \*.\* wildcard because RADREP will treat all files it finds as a RADIUS log file and try to process them. If you have other non RADIUS accounting files (such as executables) in the chosen 'log(s) folder', then although RADREP will automatically detect that they are not a valid RADIUS log file, it could produce unpredictable results. It is best to make sure you only have RADIUS logs files stored in this folder and nothing else.

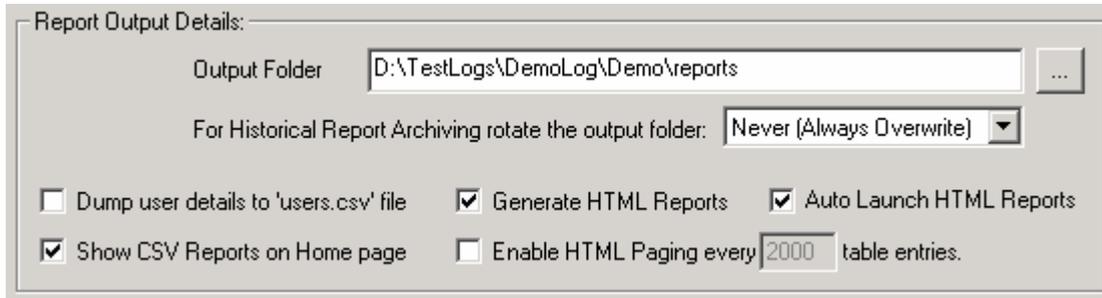


Clicking on the '...' button allows you to browse and select the folder where all your RADIUS accounting logs reside.

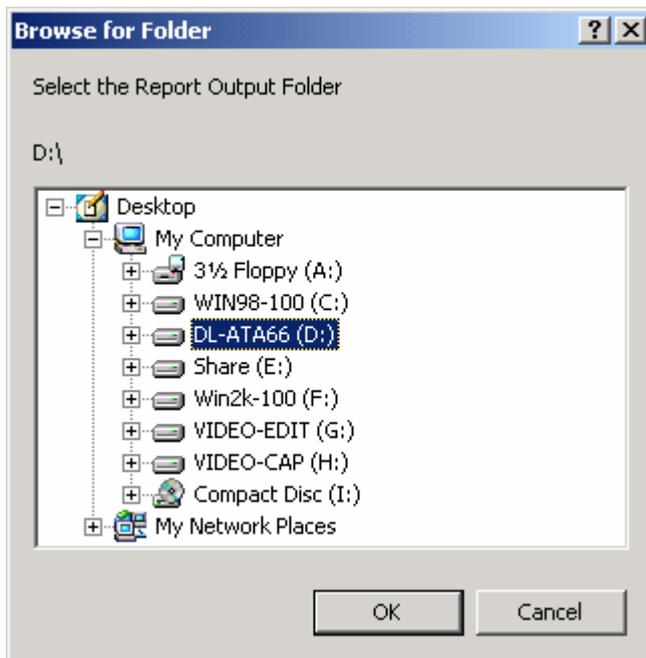


### 3.7.3 Report Output Details

The **'Report Output Details'** section allows you to select the **'Output Folder'**, which will be where all reports are written to, as well as configure other report output details.



Simply click on the **'...'** button to browse and select the **'Output Folder'** or type it in manually if you know it's location.



Other checkbox options in this section will allow you to select what types of output you desire RADREP to produce.

**3.7.3.1 Dump user details to 'users.csv' file.**

When selected it will produce a comma-separated file in the selected 'Output Folder' called 'users.csv'. The contents of the file will differ depending on the user retrieval method selected in the '**Retrieve user list from:**' selection box.

If the user list is retrieved from the '**ACE/Server Database**', then the 'users.csv' output file will contain the following field format: (PROFILE field is optional)

SITE	GROUP	FIRST & LAST NAME	DEFAULT LOGIN / USER-NAME	PROFILE
------	-------	-------------------	---------------------------	---------

If the user list is retrieved from the '**RADIUS log file(s)**', then the 'users.csv' output file will contain the following field format:

RADIUS LOG - User-Name
------------------------

*Note: The above tables are just field name headings, subsequent lines in the users.csv file would have the values of the named fields, each separated by a comma.*

If the user list is retrieved from a '**CSV file**' then '**users.csv**' will not be produced. This is because it would have been used as the user list retrieval method and hence have already been created by choosing one of the previous two retrieval methods.

**3.7.3.2 Generate HTML Reports**

When this option is selected, RADREP will write HTML formatted output files into the selected output folder. A 'Home Page' for the web reports will also be generated and called '**home.html**'

**3.7.3.3 Auto Launch HTML Reports**

If this option is enabled the user's web browser will be launched at the completion of the report generation process and the web reports '**Home Page**' (home.html) will be displayed, allowing the user to navigate and select which reports they would like to view.

**3.7.3.4 Show CSV Reports on Home Page**

If this option is enabled a link to each report in CSV format will be shown on the web reports '**Home Page**' (home.html), allowing the user to easily open each CSV report for viewing in whatever desktop application is associated with the '.csv' file extension. If you have Microsoft Excel installed then it is most likely that it will be Excel which launches and enables you to view the selected CSV report. It should be noted that Microsoft Excel has a limitation of displaying up to 65536 rows of information. In some cases where a 'Usage Detailed' report is generated for thousands of users, Excel will fail to load the entire file. If this happens you will need to use a different text editor to open and view the '.csv' report file.

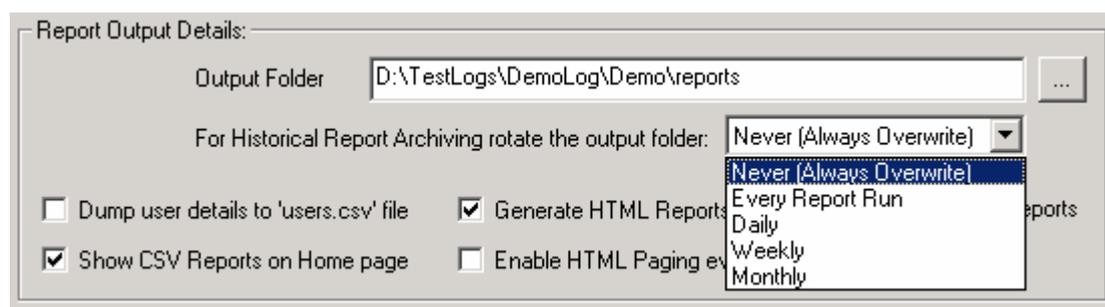
**3.7.3.5 Enable HTML paging every N table entries**

If this option is enabled the web reports will be written in a paged format with a 'Previous Page' and 'Next Page' navigation option at the end of each web report table. The number of rows displayed on each page is configured by the value of

N. This option is useful if you have tens of thousands of users that you are generating reports for because it will limit the table size displayed in the web browser for each report. One important thing to realise when you enable this option is that you will lose the ability to sort the entire report table output by the column headings. Each page of the report will be sortable but not the entire report. If you need the ability to sort on various columns within the entire report then you should not enable this item.

### 3.7.4 Historical Report Archiving

Historical report archiving allows you to choose if and how you want RADREP to archive each set of reports you produce. Archiving reports is achieved by automatically creating and rotating a report output sub-folder located directly under the user configured 'Output Folder'. The sub-folder name will be dependent on the 'Historical log Rotation' method chosen and will automatically change periodically as selected by the user. The default is to overwrite prior reports with new reports that are generated and write them to a sub-folder called 'Overwritten\_Reports'.



#### 3.7.4.1 Enabling Historical Archiving

To enable archiving of reports you must decide the period for which you would like reports to be archived by choosing one of the above drop down options.

For example, if you want to archive reports on a daily basis then you would choose 'Daily' from the drop down list. When reports are generated they will be stored in a sub-folder reflecting the selected report end date day (e.g. 2003\_Sun\_Jul\_13) no matter how many times they are generated for that end date day. When the report end date is incremented, a new report sub folder is automatically created for the next days report, leaving the last report run from the previous day untouched.

The following 5 user selectable historical report folder rotation methods are available:

#### **Never [Always Overwrite]**

All reports will be written to the 'Overwritten\_Reports' sub-folder.

#### **Every Report Run**

For every report generation cycle a new sub-folder is created corresponding to the *current date and time*. Eg. A sub-folder name of '2003\_Sun\_Jul\_13\_13-34-56' would correspond to a report that was generated on Sunday July 13<sup>th</sup> 2003 at a time of 13:34:56.

### Daily

For each report generation cycle a new sub-folder is created corresponding to the selected *report end date*. Eg. A sub-folder name of '2003\_Sun\_Jul\_13' would correspond to a report that was generated with an end date of Sunday July 13<sup>th</sup> 2003.

### Weekly

For each report generation cycle a new sub-folder is created corresponding to the *week of the year* corresponding to the selected report end date. For example a sub-folder named '2003\_Week28' would correspond to a report that had an end date of Sunday July 13<sup>th</sup> 2003 which falls within Week 28 of the year 2003.

### Monthly

For each report generation cycle a new sub-folder is created corresponding to the *month of the year* selected in the report end date. Eg. A sub-folder name of '2003\_Jul' would correspond to a report that was generated with an end date of the month of July year 2003.

### Historical Reports Index Page (historical.html)

Each time a new set of reports are generated, a new **Historical Reports Index** page called 'historical.html' is built which contains a list of all previous report runs and allows you to select and browse each and any of them. The 'historical.html' file will reside in the top level directory you choose as your 'Report Output Folder'. When clicking on the 'View Existing Report(s)' button, the historical.html file will be shown to allow you to select which previously generated report you would like to view.

If you are hosting RADREP reports on a web server, you will need to make your web server home page or URL link point to the 'historical.html' file if you want to be able to select from all previous reports that have been generated.

Alternatively, if you will always be overwriting your reports then you can make your web server home page or URL link point to the directory containing your overwritten reports which should be as follows:

```
<drive>:\<Output Folder>\Overwritten_Reports\home.html
```

#### 3.7.4.2 Historical Reports when used with 'Auto Run' mode

When 'Auto Run' mode is enabled the report output sub-folder that is created will be named depending on the user selected historical report folder rotation method and either the 'AUTO\_RUN\_PERIOD' setting located in RADREP.INI or the REPORT PERIOD in the 'Run mode configuration tool'.

The follows shows what behaviour to expect when using auto run mode:

#### Never [Always Overwrite]

All reports will be written to the 'Overwritten\_Reports' sub-folder.

#### Every Report Run

For each report generation cycle a new sub-folder is created corresponding to the *current date and time*. Eg. A sub-folder name of '2003\_Sun\_Jul\_13\_13-34-56' would correspond to a report that was generated on Sunday July 13<sup>th</sup> 2003 at a time of 13:34:56.

**Daily**

Sub-folder corresponds to the automated report end date as determined by the 'AUTO\_RUN\_PERIOD' setting in RADREP.INI or the REPORT PERIOD in the 'Run mode configuration tool'.

**Weekly**

Sub-folder corresponds to the automated report end date as determined by the 'AUTO\_RUN\_PERIOD' setting in RADREP.INI or the REPORT PERIOD in the 'Run mode configuration tool'.

**Monthly**

Sub-folder corresponds to the automated report end date as determined by the 'AUTO\_RUN\_PERIOD' setting in RADREP.INI or the REPORT PERIOD in the 'Run mode configuration tool'.

Generally speaking, if you enable 'Auto Run' mode you should make sure that the historical report folder rotation method matches the 'AUTO\_RUN\_PERIOD' in RADREP.INI or the REPORT PERIOD in the 'Run mode configuration tool'.

The following table recommends what to set the historical report folder rotation method to depending on how the AUTO\_RUN\_PERIOD is configured.

AUTO_RUN_PERIOD	RECOMMENDED HISTORICAL REPORT FOLDER ROTATION METHOD
Value: 1 (Current Day). Start of the current day to the end of the current day.	Daily <b>or</b> Every Report Run*
Value: 2 (Current Month). Start of the current month to the end of the current day of month	Monthly <b>or</b> Every Report Run*
Value: 3 (Current Year). Start of the current year to the end of the current day.	Never [Always Overwrite]
Value: 4 (Previous Day). Start of the previous day to the end of the previous day.	Daily <b>or</b> Every Report Run*
Value: 5 (Previous Month). Start of the previous month to the end of the previous month.	Monthly <b>or</b> Every Report Run*
Value: 6 (Last 7 Days) Start date is seven days prior to the current date.	Never [Always Overwrite]
Value: 7 (Last 14 Days) Start date is fourteen days prior to the current date.	Never [Always Overwrite]
Value: 8 (Last 21 Days) Start date is twenty one days prior to the current date.	Never [Always Overwrite]

\***Every Report Run** will create a new output sub-folder each time you click on the 'Generate New Report(s)' button, potentially consuming considerable disk space. If you intend to automatically run reports a number of times for the same start-end period then it is advised to use one of Daily, Weekly or Monthly as the 'Historical Report Folder Rotation Method'.

### 3.7.5 Billing Details

The ‘**Billing Details**’ section allows you to configure how you would like to allocate fixed and variable based costs to each site, group or user during the selected report period. Billing charges, costs and allowances can be allocated based on one of two Billing Models. The two available billing models are based on a user’s **Usage Time** or the **Data Volume** which they transfer. Optionally fixed service costs (such as a monthly subscription or service fee) and a **Per Connect** charge can be allocated to either billing model.

The ability to define different billing rates for different Sites, Groups or Users is available in the ‘Extended’ product version only. This allows for up to 50 billing templates with Site, Group and User-Name matching criteria to be defined. For information on how template matching criteria works refer to the section entitled ‘**How SITE/GROUP/USER-NAME/PROFILE Matching works**’.

**Configuration - Billing Details**

Billing Rate Template Number: 1  Enable Template

**SITE/GROUP/USER NAME - Matching Criteria**

SITE NAME: Boston [users.csv or ACE Site name]  
 GROUP NAME: BoslT [users.csv or ACE Group name]  
 USER NAME: securityboy [The user's RADIUS User-Name]  
 PROFILE: [users.csv or ACE Profile name]

Include OR Exclude from billing if matched?  
 Include  Exclude

**Global Billing Settings**

TAX Rate (%) 10  
 Currency Symbol \$(Dollar)

**Data Measurement**

1KB = 1024 Bytes  1KB = 1000 Bytes

**Billing Model and Costs/Rates per template**

**Billing Model**

Usage Time  
 Data Volume

Fixed Service Cost A (\$) {Eg. Token} 20.000  
 Fixed Service Cost B (\$) {Min Service Fee} 0.000  
 Cost per Connect (\$) {Session Fee} 0.000  
 Usage Time Cost (\$) {Hourly Fee} 0.000  
 Time Covered by Min Service Fee {hrs.min} 0.000

**Data Volume Billing**

Cost (\$) per MB SENT and RECEIVED combined: 20.480  
 MB Covered by Min Service Fee. SENT and RECEIVED combined: 0.250  Volume Combined

Cost (\$) per MB. SENT: 0.000 RECEIVED: 0.000  
 MB Covered by Min Service Fee. SENT: 0.000 RECEIVED: 0.000  Volume Separate

OK  
 Cancel

The following cost items are available for configuration:

#### 3.7.5.1 **Billing Model**

This option is configurable on a per template basis and allows you to specify the model on which you would like to charge/cost a particular site, group or users usage of the service. Selecting 'Usage Time' will cause RADREP to calculate the users costs/charges based on the amount of time they were connected during the billing period. Selecting 'Data Volume' will cause RADREP to calculate the users costs/charges based on the amount of data they transfer during the billing period. The default model is 'Usage Time'.

#### 3.7.5.2 **Fixed Service Cost A [\$] {E.g. Token}**

This is optional and specifically used to represent any fixed cost entities associated with providing a Remote Access Service during the selected report period. In some cases this may be the monthly cost of providing the end user with an optional component such as the cost of a SecurID token or Smart Card. If you do not want to use this cost then make its value 0. Valid values are in dollars and cents. E.g. 1.25 would be 1 dollar and 25 cents.

#### 3.7.5.3 **Fixed Service Cost B [\$] {Min Service Fee}**

This is specifically used to represent the minimum fixed service fee for the report period (usually monthly) associated with providing a Remote Access Service. If you do not want to use this cost then make its value 0. Valid values are in dollars and cents. E.g. 1.25 would be 1 dollar and 25 cents.

#### 3.7.5.4 **Cost per Connect [\$] {Session Fee}**

This is the amount which is charged each time a user makes a connection. Usually this applies if the user is on a pay as you go data plan. If you do not want to use this cost then make its value 0. Valid values are in dollars and cents. E.g. 1.25 would be 1 dollar and 25 cents.

#### 3.7.5.5 **Variable Cost [\$] {Hourly Fee}**

The variable cost is the hourly fee (*actually calculated per second of usage*), which you want to charge the end user for being connected. Valid values are in dollars and cents. E.g. 1.25 would be 1 dollar and 25 cents.

#### 3.7.5.6 **Time Covered by Min Service Fee {hrs.min}**

This is the amount of time the user can use the service before the variable cost also starts to apply. If the user does not use the service for more than this value then they will only pay the 'Minimum service Fee' (Fixed Cost B) plus any other configured costs. If the user exceeds the 'time covered by the minimum service fee', then the 'Variable Cost' rate will apply for all time exceeding this value, *calculated on a per second basis*. If you do not want to include any 'free connection time' in the minimum service fee then make this value 0. Valid values are in minutes and seconds.

Examples.

1.25 would equate to 1 Hour and 25 minutes.

12.59 would equate to 12 Hours and 59 minutes.

- 3.7.5.7 Cost [\$] per MB SENT and RECEIVED combined**  
This is the per megabyte charge rate at which you want to charge the user for the amount of data which they have sent and received (combined) during the report period. Users will be charged this rate calculated down to the number of bytes they have transferred.  
Valid values are in dollars and cents. E.g. 1.25 would be 1 dollar and 25 cents.
- 3.7.5.8 MB Covered by Min Service Fee. SENT and RECEIVED combined**  
This is the amount of data in megabytes that the user can send and receive before the 'Cost [\$] per MB SENT and RECEIVED combined' also starts to apply. If the user does not transfer more data than the specified amount in this field, then they will only pay the 'Minimum service Fee' (Fixed Cost B) plus any other configured costs. If the user exceeds the megabyte value in this field, then the configured cost/charge rate per megabyte will apply for all data exceeding this value, *calculated on a per bytes transferred basis*. If you do not want to provide the user with a data transfer volume allowance which is part of their minimum service fee, then make this value 0.  
Valid values are in Megabytes with up to two (3) decimal places.  
Examples.  
1.255 would equate to 1.255 Megabytes.
- 3.7.5.9 Cost [\$] per MB SENT / RECEIVED (separate)**  
This is the per megabyte rate at which you want to charge the user for the amount of data which they have sent and/or received during the report period. Users will be charged this rate calculated down to the number of *bytes* they have transferred. If you only want to charge the user for data which they received, then make the SENT cost 0. If you only want to charge the user for data which they sent, then make the RECEIVED cost 0.  
Valid values are in dollars and cents. E.g. 1.25 would be 1 dollar and 25 cents.
- 3.7.5.10 MB Covered by Min Service Fee. SENT / RECEIVED (separate)**  
This is the amount of data in megabytes that the user can send/receive before the 'Cost per MB SENT / RECEIVED' also starts to apply. If the user does not transfer more data than the specified amount in the SENT and RECEIVED fields, then they will only pay the 'Minimum service Fee' (Fixed Cost B) plus any other configured costs. If the user exceeds the 'Megabytes covered by the minimum service fee' for the configured SENT or RECEIVED amounts, then the configured cost/charge rate per megabyte for each of SENT and RECEIVED will apply for all data exceeding these values, *calculated on a per bytes transferred basis*. If you do not want to provide the user with a data transfer volume allowance which is part of their minimum service fee, then make these values 0.  
Valid values are in Megabytes with up to two (3) decimal places.  
Examples.  
1.255 would equate to 1.255 Megabytes.

**3.7.5.11 Data Measurement**

This feature allows you to decide if you want to measure data traffic volume using the decimal system where 1 Kilobyte = 1000 Bytes, or the binary system where 1 Kilobyte = 1024 Bytes. Most IT people will choose the binary measurement system because this is really the system on which computers calculate data storage volume; however others such as Internet Service Providers usually will use the decimal system as it is obviously more beneficial for them. The default measurement scheme is binary where 1KB = 1024 bytes.

**3.7.5.12 TAX Rate [%]**

This is the amount of TAX charged, usually dictated by local taxation rule. In Australia for instance this would correspond to the **GST** (Goods and Services Tax) amount and would be set at 10 percent. In other countries it may correspond to a **VAT** (Value Added Tax). If you do not want to add a percentage of tax to the end calculated costs then make its value 0. Valid values can include up to 3 decimal places. E.g. 10.255 would be 10.255 percent.

**3.7.5.13 Currency Symbol**

This configuration option allows you to set your local currency symbol for the Billing reports. You can choose one from the drop down list or type in your own symbol. By deleting any value from this field and leaving it blank the billing reports will show no currency symbol.

### 3.7.6 How SITE/GROUP/USER-NAME/PROFILE Matching works

For each billing template you enable, separate matching criteria and billing rates can be defined. When processing a user, the user's SITE, GROUP and User-Name details are compared against those of the billing templates. If a match is found then the template's values are used to appropriately assign charges/costs to the user. If no match is made to any template then the user will be assigned the 'Default' billing template – Template 0. If the Default billing template is disabled then all associated costs/charges for the user will be 0.

Wildcard name matching can be used when defining the SITE NAME, GROUP NAME or USER NAME matching criteria fields as follows:

- \* = match all/any. *This is the same as disabling the field with it's checkbox.*
- \*ending = match anything ending with the word 'ending'
- starting\* = matching anything starting with the word 'starting'

*Wildcards CANNOT be used in the middle of words.*

The order in which you define your templates is important only if you define many templates that use the same field(s) to define the matching criteria. (eg. All templates use the USER NAME field only)

Template matches are made against the 'Most Specific' information first and to the least specific information last.

#### 3.7.6.1 Matching Order & Comparison Specifics

S = SITE NAME  
G = GROUP NAME  
U = USER NAME  
P = PROFILE

The following shows the order in which matching comparisons are done:

S and G and U and P     **Most Specific match**

S and G and U

G and U and P

S and U and P

S and G and P

G and U

S and U

S and G

U and P

G and P

S and P

U

G

S

P

**Least Specific match**

Templates which are enabled and use the same fields to define matching information are order specific. The first match found will become the users assigned billing template.

**Example1:**

I have a number of users who are identified as belonging to an external company by their User-Name (Login-ID). Each of these users has a username that ends in @externalcompanyname. Eg. jdoe@externalcompanyname  
If I wanted to bill these users at a specific rate all I would need to do is enable a billing template and configure it with matching criteria for the 'USER NAME:' field that contained '\*@externalcompanyname'.

**Example2:**

I have an exception to the matching criteria defined in Example1. There is one user from the external company that I do not want to bill. So I define another template, defining the exact user name that I want to exclude from being billed (e.g. md@externalcompanyname) in the USER NAME field and make sure the template is located before the one created in Example1. Because both templates use only the USER NAME field to define matching criteria the template order is important because the first match found will be used as the users assigned template.

Another way to do this would be to have more specific matching criteria such as the addition of the users SITE or GROUP name. This would then automatically get precedence over just a user-name match because it is a more specific match. In this case the order would not matter unless there was another template which also used SITE or GROUP name plus the USER NAME as its matching criteria.

### 3.7.6.2 Which Billing Template was used for user XYZ?

If you are unsure as to which template was matched and assigned to a user during processing, you can easily check this in the 'Billing Detail' web report for the specific user. The 'Template Number' used for calculating the users charges/costs is clearly shown and can also be viewed by clicking on its web link.

**cclarke was connected and online for 603:23:45 (hrs:min:sec) during the billing period.**

<b>Billing Details for 89 days (01-Feb-2002 to 30-Apr-2002)</b>	
<b>Billing Model:</b>	Data Volume
<b>Billing Template used:</b>	<a href="#">0</a>
<b>Total Connects:</b>	48
<b>Total Bytes Sent:</b>	155939368
<b>Total Bytes Received:</b>	100044865
<b>Fixed Service Cost:</b>	\$5.00
<b>Usage Time Cost:</b>	\$0.00
<b>Total Connects Cost:</b>	\$0.00
<b>Total Data Volume Cost:</b>	\$244.13
<b>Total Costs:</b>	\$249.13
<b>Tax Amount:</b>	\$24.91
<b>Total Costs (inc TAX):</b>	<b>\$274.04</b>

### 3.7.7 Advanced Settings

The 'Advanced Settings' section allows you to enable features of RADREP that make it more flexible, but if used incorrectly, may cause undesirable results.

Configuration - Advanced Settings

Advanced Settings:

RADIUS Log File - User-Name Retrieval

- User-Name import filter  
\*@\*
- Retrieve and display ONLY user-names valid for the selected start-end period.
- Enable User-Name CASE Sensitivity
- Strip DOMAIN prefix from User-Name
- Filter on specific NAS-IP-Address

RADIUS Log File - Processing Options

- Filter on NAS-IP-Address  
10 . 1 . 1 . 1
- Enable INTERIM record processing
- Warn about bad date ranges
- For the Concurrency and Active User reports, process ALL users in the log file.

Log file 'Date Format' (IAS and CSV logs)  
MM/dd/yyyy

Microsoft IAS Log Processing Options

- Process IAS 'Access Accept' packets
- Process IAS 'Access Deny' packets

IAS Service Name: IAS

ACE/Server Extension Data Fields

- Use Extension Data Fields

SITE: SITE

GROUP: GROUP

PROFILE: PROFILE-NAME

OK Cancel

- 3.7.7.1 RADIUS Log File - User-Name Retrieval**  
**User-Name import filter**  
When you enable this option and specify a pattern of characters to filter user-name on, only users that match the pattern will be imported from the RADIUS log files into the RADREP site/group/user hierarchy.  
**Example 1.**  
A Filter pattern of ‘\*@\*’ (no quotes) would only import users which have an ‘@’ sign in their user-name.  
**Example 2.**  
A Filter pattern of ‘sales\*’ (no quotes) would only import user-names which started with the string ‘sales’.
- 3.7.7.2 RADIUS Log File - User-Name Retrieval**  
**Retrieve and display ONLY user-names valid for the selected start-end period.**  
When this is selected only Login IDs that have activity within the configured start and end dates will be shown for selection in the hierarchy. If this option is not selected then all Login IDs appearing in the RADIUS accounting Logs will be shown in the selection hierarchy. This option only applies when the ‘**Retrieve user list from:**’ selection box is set to ‘**RADIUS log file(s)**’.
- 3.7.7.3 RADIUS Log File - User-Name Retrieval**  
**Enable User-Name CASE sensitivity**  
By default this option is not selected so user-names are treated as not being CASE sensitive. This means for example that for reporting purposes RADREP will treat the user-names ‘securityboy’, ‘SecurityBoy’ and ‘SECURITYBOY’ as the same single user.  
If this option is enabled then all user-names are treated in a CASE sensitive manner. So if we use our previous example of user-names ‘securityboy’, ‘SecurityBoy’ and ‘SECURITYBOY’, these would now be reported on as three distinct/unique users.
- 3.7.7.4 RADIUS Log File - User-Name Retrieval**  
**Strip DOMAIN prefix from User-Name**  
By enabling this option, any DOMAIN name that prefixes a user-name in the logs will be removed. So a field in the logs which contains the user-name field of the form ‘MYDOMAIN\securityboy’ would simply become ‘securityboy’. This option is most useful when using RADREP with Microsoft IAS logs, although some other log formats also record the user-name field with the full DOMAIN prefix.  
The Default is not to remove any DOMAIN name information from the user-name field in the logs.

### 3.7.7.5 RADIUS Log File - User-Name Retrieval

#### Filter on specific NAS-IP-Address

This option is only available when the **Filter on NAS-IP-Address** option has been enabled and configured under the **RADIUS Log File – Processing Options** section. When enabled only users that have logged into the specified NAS-IP-Address will be shown in the SITE/GROUP/USER selection hierarchy.

For billing purposes where you want to bill everyone a fixed minimum service fee regardless of whether they connected to the specific NAS, you will not want to enable this option. When this option is disabled but the **Filter on NAS-IP-Address** option is enabled under the **RADIUS Log File - Processing Options** area, all users will appear in the reports, but only those who logged into the specified NAS server will have activity shown against their names in the reports. This option is disabled by Default.

### 3.7.7.6 RADIUS Log File - Processing Options

#### Filter on NAS-IP-Address

By enabling this option you can generate NAS (RADIUS Client) specific reports. When enabled, this option will allow you to specify the IP-Address of a NAS server (RADIUS Client) which you want to filter out of the logs and generate reports for. Reports are only generated for accounting data relating to the NAS Server (RADIUS Client) IP address specified. All other accounting data is ignored. When this option is disabled reports are generated for all NAS Servers found in the log file(s). Default value is disabled.

### 3.7.7.7 RADIUS Log File - Processing Options

#### Enable INTERIM Record Processing.

By enabling this option RADREP will process INTERIM accounting data in your log files and use this to calculate a user's true data transfer and time usage for the report period selected. INTERIM accounting data adds a great deal of overhead to the size of a log file, but does give you the ability to generate reports for users who stay logged into the same session for long periods of time (i.e. across multiple report periods). In the case of most wireless accounting solutions, a STOP record is never actually written to the accounting log file, so unless INTERIM data is periodically logged and this option is enabled in RADREP, you would not usually be able to generate reports for such use cases. Default value is disabled.

### 3.7.7.8 RADIUS Log File - Processing Options

#### Warn about bad date ranges.

Selecting this option will mean that if there is no activity in the log file between the report START and END dates selected, a Warning popup message will appear informing you of this. The default for this option is off or not selected. This is because if you process a directory containing many log files it could become quite annoying having a popup warning message appearing for each log that is processed and has accounting entries outside the selected report start-end date range. If you want to be notified about each log that is outside the selected start-end date range then enable this option.

- 3.7.7.9 RADIUS Log File - Processing Options**  
**For the Concurrency and Active User reports, process ALL users in the log file.**  
When enabled (the Default), the Concurrency and Active User reports will process and show all users found in the log files and not just those selected for usage report generation in the site/group/user hierarchy.  
When this option is disabled (cleared) only those users selected in the site/group/user hierarchy will be processed and shown in the Concurrency and Active user reports.  
If you want a report on Concurrency and Active users for a specific NAS/RAS device then it will only reflect true concurrency if this setting is left at its default and all users are processed for these reports.  
If you want a report on Concurrency for just those users you have selected or loaded into the site/group/user hierarchy then unselect (clear) this option.
- 3.7.7.10 Log File Processing Options**  
**Log File 'Date Format' (IAS & CSV logs)**  
Microsoft IAS and CSV (Comma Separated Values) RADIUS log files do not have a standard Date field format (unlike Livingston logs). So this option allows you to set the format of the date field as seen in your IAS or CSV formatted log file. The default Date field format is 'Month/Day/Year' in the format MM/DD/YYYY.
- 3.7.7.11 Microsoft IAS Log File Processing Options**  
**Process IAS 'Access Accept' packets**  
By default this option is disabled. If it is enabled and you process an IAS log with Access Accept packets in it, then Access Accept data will appear in the 'IAS – Accept/Deny' report.
- 3.7.7.12 Microsoft IAS Log File Processing Options**  
**Process IAS 'Access Deny' packets**  
By default this option is enabled. If it is enabled and you process an IAS log with Access Deny packets in it, Access Denied data will appear in the 'IAS – Accept/Deny' report.
- 3.7.7.13 Microsoft IAS Log File Processing Options**  
**IAS Service Name**  
By default the Microsoft IAS Service name is 'IAS' (uppercase). This name gets written to the logs and is used by RADREP to automatically detect that the log is an IAS log. If you change the IAS Service name from it's default value, then RADREP will not be able to detect the log type. An 'Unknown Log Type' message will be displayed when attempting to process these logs. So that RADREP can correctly identify the logs as IAS logs, you will need to change this value to match whatever value you have defined in your IAS server configuration under the IAS Service name TAB.
- 3.7.7.14 ACE/Server Extension Data Fields**  
**Use Extension Data Fields**  
When this checkbox is selected, RADREP will retrieve a user's Site/Office, Group/Department and PROFILE information from the ACE/Server using the named extension data fields in the SITE, GROUP and PROFILE edit boxes.  
**SITE: / GROUP: / PROFILE:**  
The default extension data field name for a user's Site/Office has been set to SITE, for Group/Department it has been set to GROUP and for their associated

billing PROFILE (optional) it has been set to PROFILE-NAME. You should make sure that these names match the user extension data field names that you have defined for each user in your ACE/Server database. To function correctly each user in the ACE/Server Database should have an extension data field that represents the users Site/Office, another which represents the users Group/Department and optionally a Profile name field that represents the user's remote access billing profile. If this feature is enabled and a user does not have the configured extension data field names in the ACE/Server database, then they will be assigned to a site called NO\_SITE and a group called NO\_GROUP. When entering the names of the ACE/Server user extension data fields into the RADREP SITE and GROUP fields, you should note that they are case sensitive and must match exactly the field names that are in the ACE/Server.

## 4 REPORT SELECTION & OUTPUT FORMATS

### 4.1 Selecting Report Types

To select which report types you want RADREP to generate it is a simple matter of selecting or unselecting the appropriate check boxes as shown below:

REPORT SELECTION:

<b>User Usage</b> <input checked="" type="checkbox"/> Summary <input type="checkbox"/> <input checked="" type="checkbox"/> Detailed <input type="checkbox"/>	<b>User Billing</b> <input checked="" type="checkbox"/> Summary <input checked="" type="checkbox"/> Detailed
<b>NAS Server Usage</b> <input checked="" type="checkbox"/> Summary <input checked="" type="checkbox"/> Detailed <input checked="" type="checkbox"/> Concurrency/Active	<b>IP-Address Usage</b> <input checked="" type="checkbox"/> Summary <input checked="" type="checkbox"/> Detailed
<b>NAS-Port Usage</b> <input checked="" type="checkbox"/> Summary <input checked="" type="checkbox"/> Detailed	<b>NAS-Port-Type Usage</b> <input checked="" type="checkbox"/> Summary <input checked="" type="checkbox"/> Detailed

At least one report must be enabled before the report generation process can start.

Note: The Microsoft IAS Accept/Deny report is enabled or disabled in the Advanced Settings configuration area. This is because Microsoft IAS Access Accept/Deny data is an extension to RADIUS accounting rather than part of the standard.

### 4.2 Report Output Formats

#### 4.2.1 CSV Format

Each report type that is selected is automatically generated in CSV (Comma Separated Values) format. CSV files can be directly opened by Microsoft Excel for viewing and further manipulation. You cannot turn off the generation of CSV formatted reports.

#### 4.2.2 HTML Format

HTML (web) formatted report output is enabled by default but can be disabled in the configuration dialogue screen by unselecting the '**Generate HTML Reports**' check box. Optionally the '**Auto Launch HTML Reports**' checkbox can be selected if you want to automatically launch your web browser and view the web based reports when the report generation process has completed.

Report Output Details:

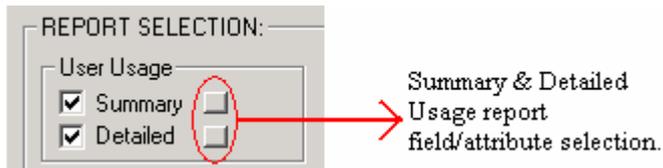
Output Folder:  ...

For Historical Report Archiving rotate the output folder:

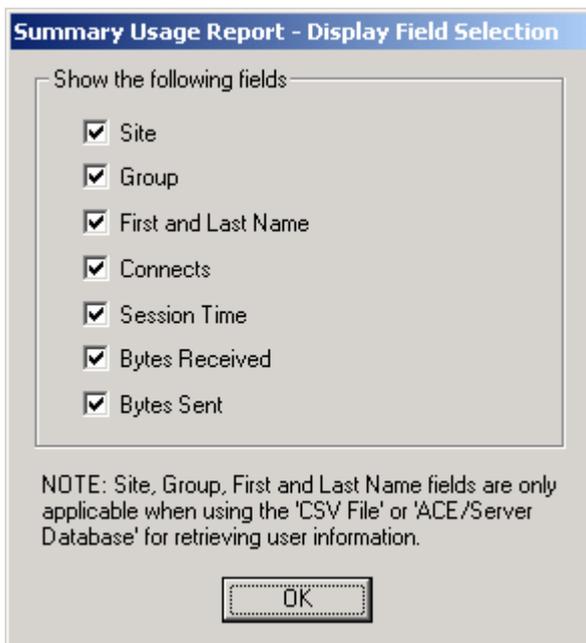
Dump user details to 'users.csv' file   
 Generate HTML Reports   
 Auto Launch HTML Reports  
 Show CSV Reports on Home page   
 Enable HTML Paging every  table entries.

## 5 USAGE REPORTS – ATTRIBUTE/FIELD CONFIGURATION

To configure which attributes/fields get displayed in the ‘Usage Summary’ and Usage Detailed’ reports you need to click on the small buttons located on the main RADREP application dialogue. The check boxes which enable/disable the ‘Usage Summary’ and ‘Usage Detailed’ reports MUST be selected in order for the attribute/display-field selection buttons to also become available. If either Usage report is not selected then its ‘Attribute/Display Field Configuration’ button will also not be selectable.



When you click on the Summary Attribute/field Configuration Button the following screen will appear and you can configure which attributes you want to display in the ‘Usage Summary’ report.



When you click on the Detailed Attribute/field Configuration Button the following screen will appear and you can configure which attributes you want to display in the ‘Usage Detailed’ report.

**Detailed Usage Report - Display Field Selection**

Optional Attribute Fields To Display

IETF Standard Attributes

<input checked="" type="checkbox"/> Acct-Output-Octets	<input checked="" type="checkbox"/> Framed-IP-Address
<input checked="" type="checkbox"/> Acct-Input-Octets	<input type="checkbox"/> Connect-Info
<input type="checkbox"/> Acct-Terminate-Cause	<input checked="" type="checkbox"/> NAS-IP-Address
<input type="checkbox"/> Called-Station-Id	<input type="checkbox"/> NAS-Port
<input checked="" type="checkbox"/> Calling-Station-Id	<input type="checkbox"/> NAS-Port-Type

Vendor Specific Attributes (Ascend/Lucent)

<input checked="" type="checkbox"/> Ascend-Disconnect-Cause	<input type="checkbox"/> LE-Terminate-Detail
<input checked="" type="checkbox"/> Ascend-Data-Rate	<input type="checkbox"/> LE-Advice-Of-Charge
<input type="checkbox"/> Ascend-Xmit-Rate	<input type="checkbox"/> Ascend-Modem-PortNo
<input type="checkbox"/> Ascend-Billing-Number	<input type="checkbox"/> Ascend-Modem-SlotNo
<input type="checkbox"/> Ascend-Connect-Progress	

Custom Attributes (As seen in your log file STOP records)

Attrib Name or MS# or Field#	Display Name	Total
<input checked="" type="checkbox"/> Acct-Input-Packets	In Packets	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Acct-Output-Packets	Out Packets	<input checked="" type="checkbox"/>

Note: Selected attributes MUST be in your accounting log(s) STOP records. If they aren't, they will be shown as 'NA' in the report.

OK Cancel

## 5.1 Ascend Attribute Compatibility and Equivalence

For reporting purposes the following IETF and ASCEND attributes are seen to be equivalent. By enabling the respective IETF attribute it will also mean you enable the equivalent ASCEND attribute even though only one or the other will be in your accounting log file stop records.

Framed-IP-Address (IETF) = Framed-Address (ASCEND)

NAS-IP-Address (IETF) = NAS-Identifier (ASCEND)

## 5.2 Custom/User Defined Attribute Configuration

The way to configure '**Custom Attributes**' depends on the log type you are processing which can be one of Livingston format, IAS Database compatible format, IAS Native/Standard format, Funk Steel Belted Radius format, CISCO Secure (ACS) format or CSV log format.

**IMPORTANT NOTE:** Any attribute you want to report on **MUST** be in your accounting STOP records. If the attribute is not in an accounting STOP record then it will not be processed by RADREP and hence will not be shown in the detailed usage report.

### 5.2.1 For Livingston Formatted RADIUS logs

Simply look at your log file(s) STOP records, identify the attribute name you want to show in the detailed usage report and type it into one of the custom '**Attrib Name or MS# or Field#**' fields *in exactly the same case as it is seen*. You can also enter the column heading '**Display Name**' that you want this attribute displayed as in the reports and optionally total the data if it is numeric in nature by selecting the '**Total**' checkbox.

### 5.2.2 For IAS Database Compatible RADIUS logs

Enter the field number of the IAS attribute you want to report on in the '**Attrib Name or MS# or Field#**' data entry field. You can work out the IAS field number by opening an existing IAS database compatible log file (\*.log) with a text editor, locate a STOP record (i.e. field 32 has a value of 2), and count the number of fields (separated by commas) until you get to the field you want to display.

Once you have the desired field number you can enter this number into the '**Attrib Name or MS# or Field#**' data entry field. You can also enter the column heading '**Display Name**' that you want this attribute displayed as in the reports and optionally total the data if it is numeric in nature by selecting the '**Total**' checkbox.

For a full list of IAS attributes see the appendix A of this manual.

### 5.2.3 For IAS Native/Standard RADIUS logs

IAS Standard logs write their accounting data as consecutive RADIUS attribute/value pairs. Microsoft, in their infinite wisdom, does not number RADIUS attributes according to the IETF standard so you will need to lookup the '**Microsoft Attribute ID Number**' that you want to display and report on. See Microsoft's Windows 2000 Server documentation website for full details on Microsoft RADIUS attribute ID numbering and vendor-specific attribute ID numbering. You can also see appendix B and C of this manual for a list of 'Microsoft Attribute IDs' that were current as of writing this manual.

Once you have the desired Microsoft attribute ID number you can enter this number into the '**Attrib Name or MS# or Field#**' data entry field. You can also enter the column heading '**Display Name**' that you want this attribute displayed as in the reports and optionally total the data if it is numeric in nature by selecting the '**Total**' checkbox.

### 5.2.4 For Funk SBR, CISCO & other CSV formatted RADIUS logs

The first line of these logs (i.e. the header) has the attribute names (comma separated) and field order of each subsequent accounting record that is written to the log file. You can work out the attribute you want to display and its field number by opening an existing CSV formatted Radius log file (eg. \*.csv, \*.act), looking at the header, and counting the number of fields (separated by commas) until you get to the field/attribute-name you want to display.

Once you have the desired field number you can enter this number into the '**Attrib Name or MS# or Field#**' data entry field. You can also enter the column heading '**Display Name**' that you want this attribute displayed as in the reports and optionally total the data if it is numeric in nature by selecting the '**Total**' checkbox.

## 6 HOW TO GENERATE REPORTS

The RADREP main application screen shows how easy it is to make a selection from the user hierarchy and then generate RADIUS usage and billing reports.

The hierarchy of SITE/GROUP/USER is retrieved and constructed when the user presses the 'Retrieve User List' button. Upon user retrieval completion a hierarchy is displayed to the end user so that they can make their user selection before generating reports. This makes it simple to select and generate reports at 4 different levels:

**Level 1:** The 'Entire Company' (Tree Root)

**Level 2:** For a Selected SITE only

**Level 3:** For a select SITE and specific GROUP within that site.

**Level 4:** For a specific SITE, GROUP and USER.

Both the billing and usage reports have the option of being summary and/or detailed. Please see the 'RADREP Sample Reports' document for details of what these reports look like.

### 6.1 Report Generation Steps

There are three steps to perform in order to generate reports: Configuration, Selection and Generation.

#### 6.1.1 Configuration

1. Configure the location and names of your RADIUS accounting log files under the RADREP configuration screen.
2. Configure an 'Output Folder' where the reports will be written.
3. If desired, configure any other settings required for ACE/Server integration, and the relevant billing rates and fees if billing reports are going to be generated.

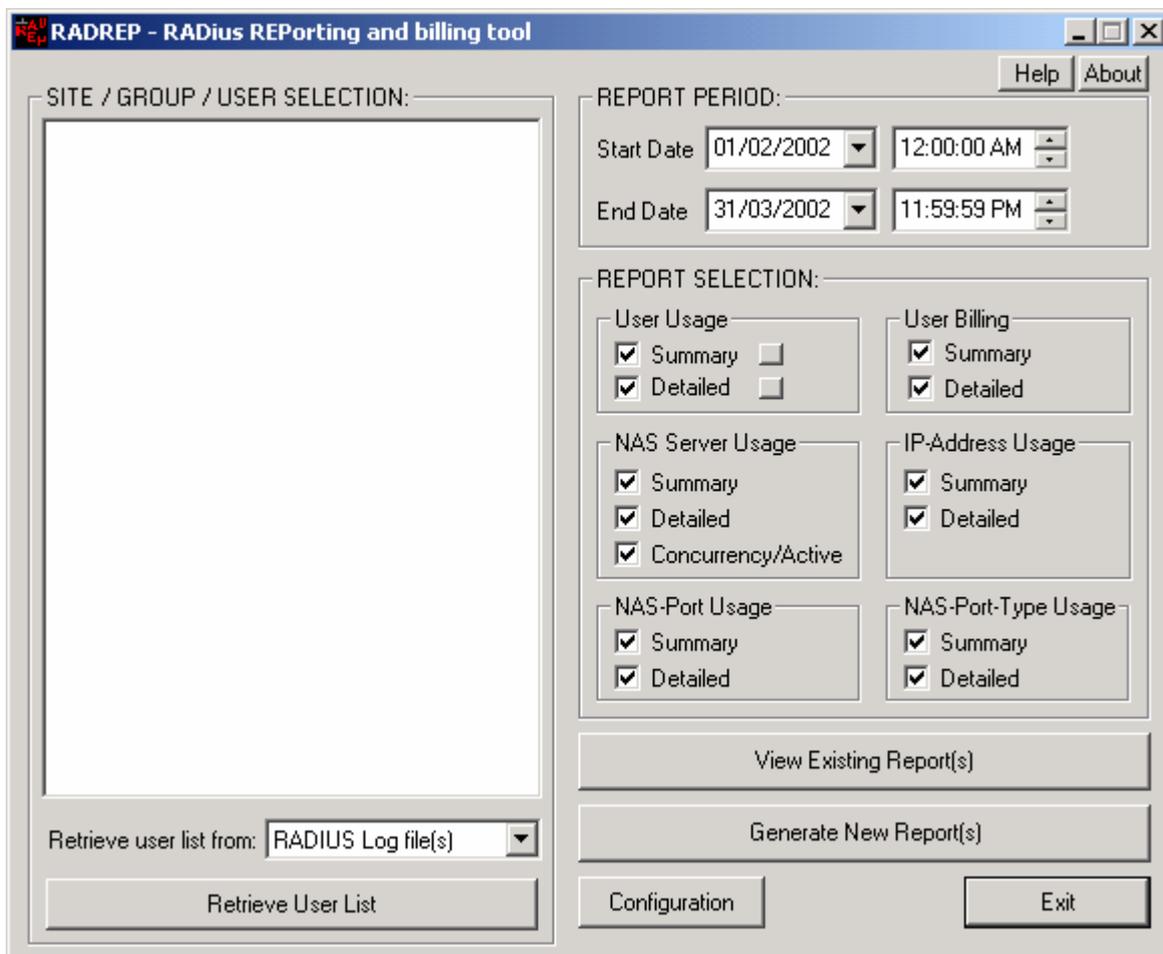
#### 6.1.2 Selection

4. Select the types of reports you want to produce. Billing and/or Usage (summary and/or detailed)
5. Select the START DATE and END DATE for the report. Make sure that the RADIUS accounting Logs actually have accounting records for this period otherwise you will not see anything in the reports.
6. Select the 'Retrieve User List from' method. If you are running reports from the same machine as the ACE/Server Primary, choose 'ACE/Server Database', otherwise choose 'RADIUS Log file(s)'. If you have your own custom 'users.csv' file then select 'CSV File' and make sure your 'users.csv' file is located in the configured 'Output Folder'.
7. Press the 'Retrieve User List' button to retrieve and display a list of SITES, GROUPS and USERS.
8. From the displayed SITE/GROUP/USER hierarchy, select the level at which you would like to run the reports. See levels 1 to 4 above.

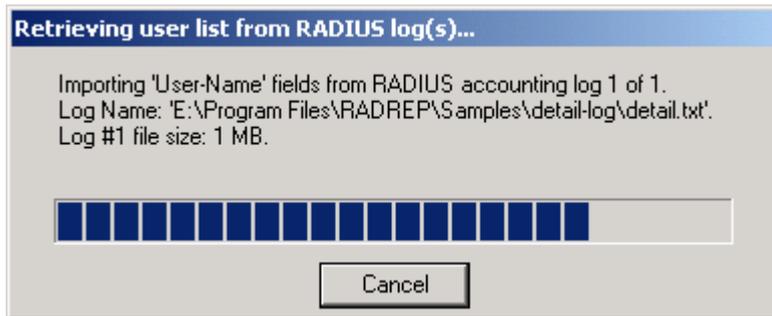
### 6.1.3 Generation

9. Now press the 'Generate Report(s)' button to begin the report generation process.
10. The status bar will show the progress of the report generation process.
11. Upon completion, you will have the selected reports written to the 'Output Folder' you configured in CSV (Comma Separated Values) format. If you selected the 'Generate HTML Reports' option and 'Auto Launch HTML Reports' then the 'Home Page' of the web/html reports will be launched in your web browser. You can then navigate the web reports as you would any other web page.

The following shows the RADREP main dialogue screen at start-up time. It is assumed that *steps 1, 2 and 3 have been completed at this time*. Refer to the 'Configuration Section' on how to complete these steps if you are unsure.

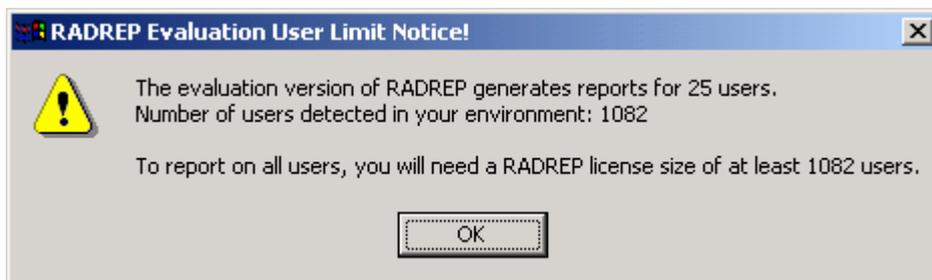


You will notice that there are no users to select, as they have not been retrieved yet. *Steps 4,5 and 6 have been completed at this time*.

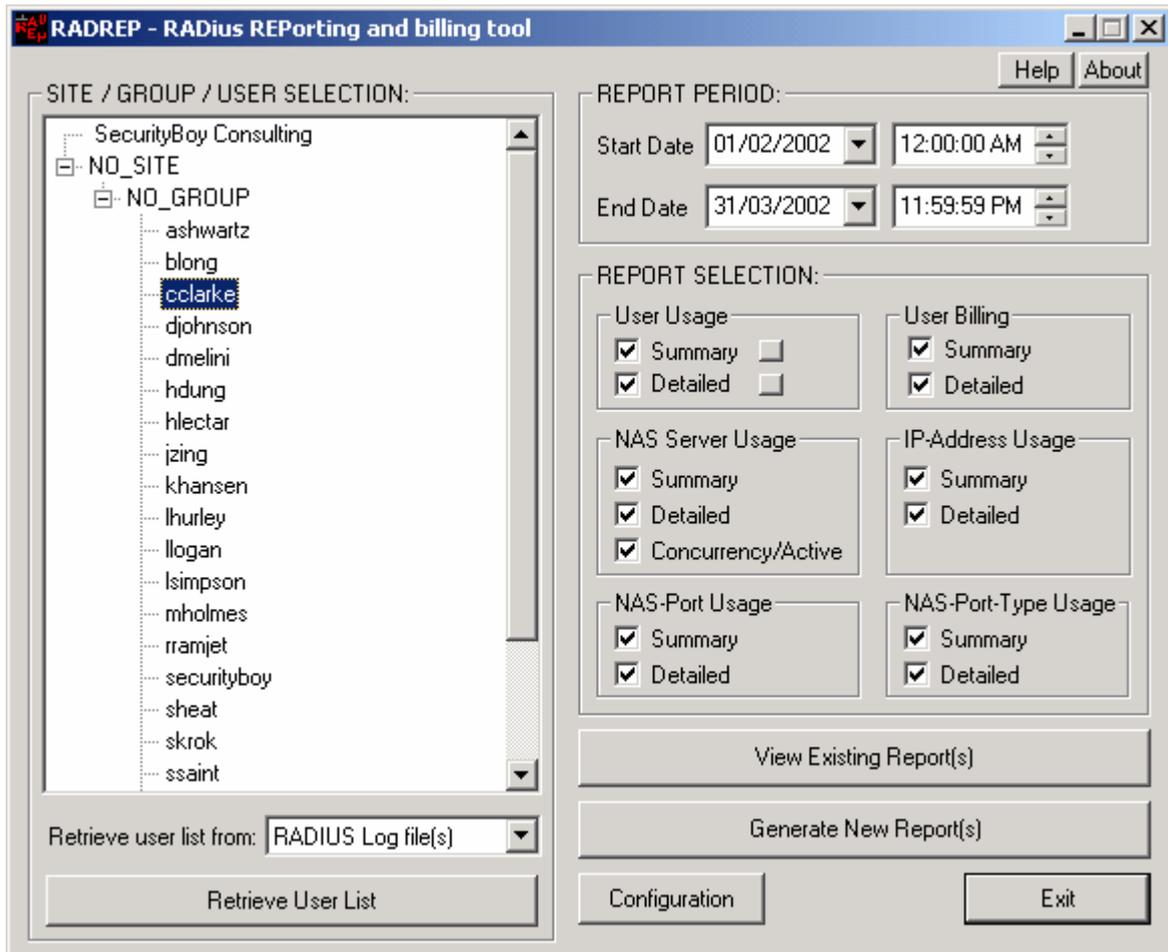


After selecting the user retrieval method as being 'RADIUS Log file(s)' and then pressing the 'Retrieve User List' button the Status dialogue appears showing you the progress.

*Step 7 has been started at this time.*



If you are running the evaluation version of RADREP the above message will appear at the completion of scanning the RADIUS log files for a list of users. This message is intended to provide a guide on the license size you will require to generate reports for all users in your environment. If not all users log-in during the reporting period you selected, then this number may be far less than the actual license number you will require.



Selecting the demonstration user 'cclarke' from the hierarchy will generate reports only for this user. *Step 8 is complete at this stage.*



The 'Generate Report(s)' button has been pressed (*Step 9*) at this stage and the report generation process has begun. The above Status dialogue box shows the current progress of the report generation process. *Step 10 is in progress at this stage.*

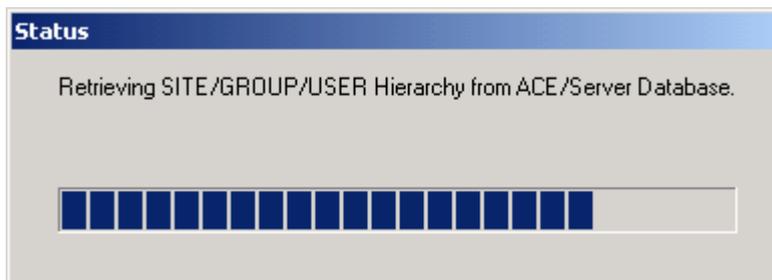
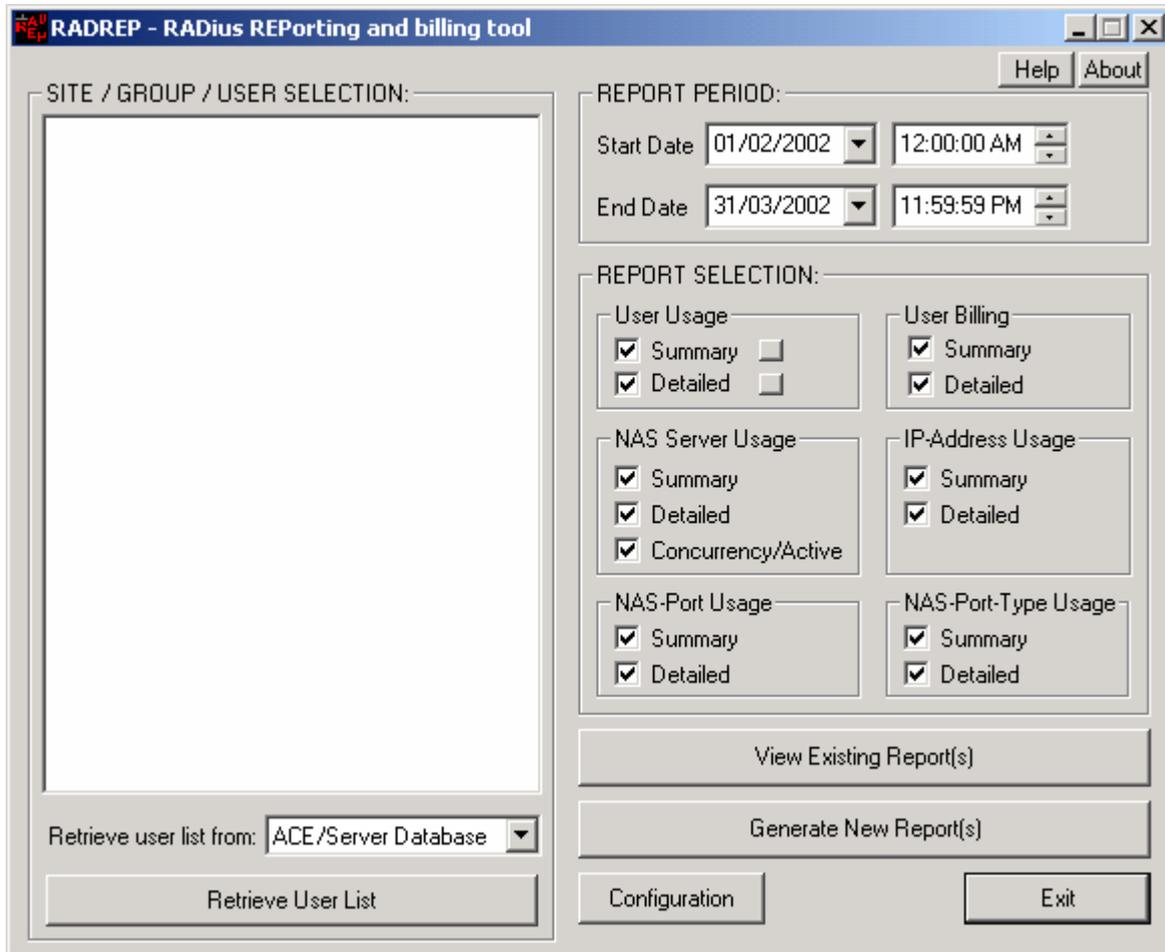


Once the report generation process is finished you will see the above confirmation message. This message also shows the location where the reports were written to. If you want to view the CSV reports you will need to browse to this location and open them in Microsoft Excel.

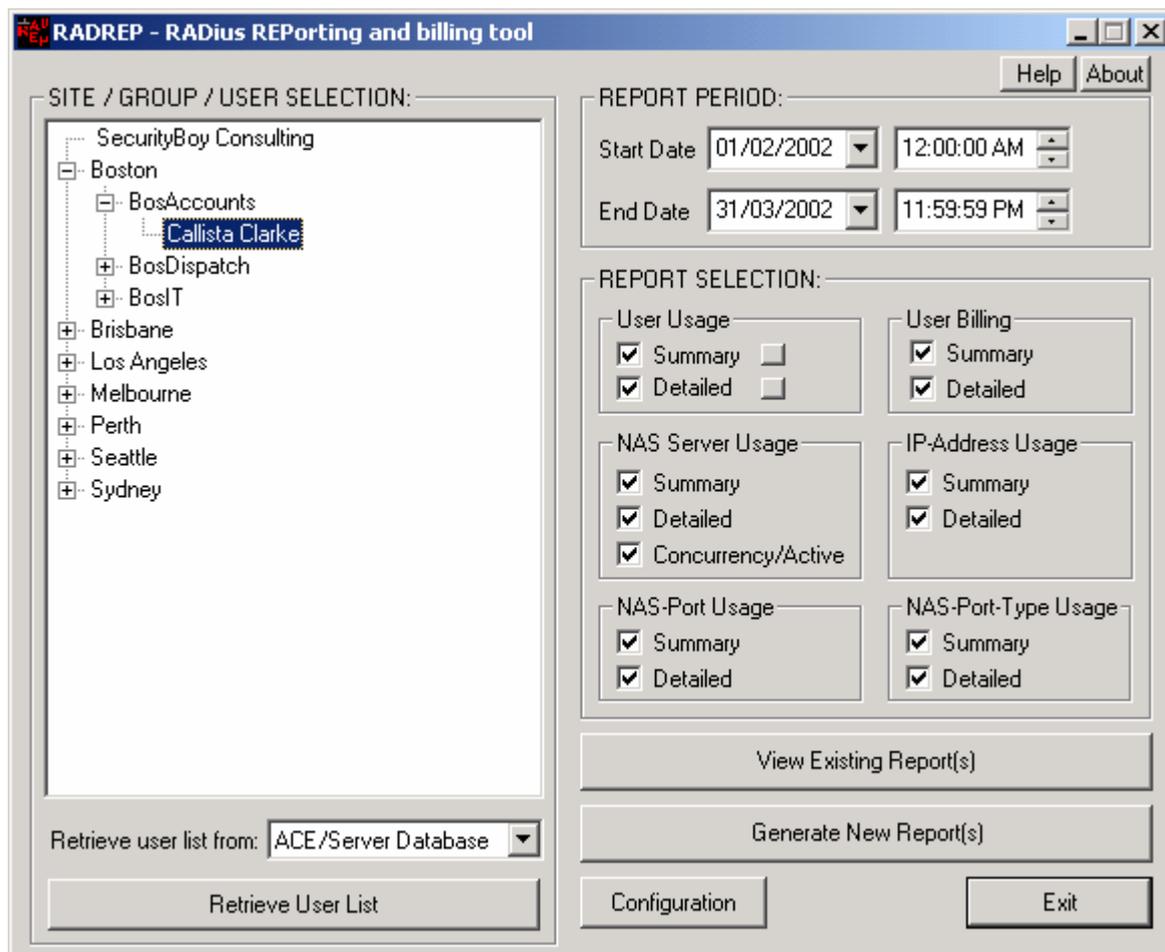
If web reports are selected and the auto launch option is enabled then you will see the following web page when once you click on the 'OK' button to acknowledge that the report generation process has finished. From here you can pick which reports you would like to view.



The following screens show the difference when the 'ACE/Server Database' (or Extended format CSV file) is selected as the user retrieval method instead of the 'RADIUS Log file(s)'.



You will notice that there is more detailed SITE and GROUP information displayed in the selection hierarchy when this retrieval method is used. Reports can now be broken down by SITE or GROUP associations.



## 6.2 Report Output – File Naming Conventions

### 6.2.1 CSV Output Files

The following table shows the naming convention used for reports generated in CSV format. This is with the Windows regional settings set to English [Australian]. When the regional settings are set to English [United States] the DAY and MONTH are in the reverse order. E.g. BD-01-May-2001\_to\_08-Apr-2002.csv would become BD-May-01-2001\_to\_Apr-08-2002.csv

File Name	Purpose
BD-01-May-2001_to_08-Apr-2002.csv	Billing Detailed report.
BS-01-May-2001_to_08-Apr-2002.csv	Billing Summary report.
UD-01-May-2001_to_08-Apr-2002.csv	Usage Detailed report
US-01-May-2001_to_08-Apr-2002.csv	Usage Summary report
users.csv	Dump of each user's user-name and grouping details.

### 6.2.2 HTML Output Files

The following table shows the naming conventions used for each of the files produced when the 'Generate HTML Reports' option is selected.

File Name	Purpose
home.html	Home page for the current reports.
historical.html	The Historical Reports Selection page.
us-user-index.html	Index for the Usage Summary reports.
<user-name>-us.html	Usage Summary report for the named user.
ud-user-index.html	Index for the Usage Detailed reports.
<user-name>-ud.html	Usage Detailed report for the named user.
Usage-Summary-Totals.html	Usage Totals and Averages.
con-explain.html	Explanation of concurrency results.
active-users-<NAS-IP-Address>.html	Shows active/logged in users for the stated NAS.
active-explain.html	Explanation of active user results.
IAS-AA-AD-report.html	Microsoft IAS - Access Accept/Deny report.
bs-user-index.html	Index for the Billing Summary reports.
<user-name>-bs.html	Billing Summary report for the named user.
bd-user-index.html	Index for the Billing Detailed reports.
<user-name>-bd.html	Billing Detailed report for the named user.
Billing-Summary-Totals.html	Billing Totals report.
Billing-Cost-Rates.html	Billing Costs and Rates used.
TermCauses.html	IETF Terminate Cause explanations.
AscendDiscCauses.html	Ascend Disconnect Cause explanations.
<Framed-IP-Address>.html	Usage per relative <Framed-IP-Address>.
NAS-Usage-Summary.html	Usage Summary for all NAS Servers.
NAS-<IP-Address>-detail.html	Detailed Usage for the stated NAS <IP-Address>.
concurrency-<NAS-IP-Address>.html	Shows user concurrency and log stats for the stated NAS.
active-users-<NAS-IP-Address>.html	Shows active/logged in users for the stated NAS.
NAS-Port-Usage-Index.html	Index of NAS Servers with a Port Number usage report.
NAS-<IP-Address>-Port-Usage-Summary.html	Usage Summary for the Port Numbers on the stated NAS.
NAS-<IP-Address>-port-<Port-Number>.html	Detailed Usage report for the stated NAS and port number.
NAS-Port-Type-Usage-Index.html	Index of NAS Servers with a Port-Type usage report.
NAS-<IP-Address>-Port-Type-Usage-Summary.html	Usage Summary for the Port-Types on the stated NAS.
NAS-<IP-Address>-porttype-<Port-Type>.html	Detailed Usage for the stated NAS and Port-Type.

## 6.3 Report Generation Speed

To give you some idea of the time it takes RADREP to process RADIUS Accounting Logs and generate reports, the following benchmark information is provided as a guide. Processing the RADIUS accounting logs is the task that takes the greatest time during the report generation process. After processing the RADIUS accounting logs, the report generation process itself (i.e. writing the reports to disk) is fairly negligible from a time point of view. All efforts have been made to increase the performance and speed of processing the RADIUS logs, and hence the overall time it takes to generate usage and billing reports.

Ultimately the time it takes to generate reports will vary depending on the following:

- Accumulated size of all RADIUS accounting logs to be processed.
- Number of users for which report will be generated.
- Processor speed of the machine running RADREP.
- RAM (memory) in the machine running RADREP.
- Hard Disk speed of the machine running RADREP.

### 6.3.1 Report Generation Speed Limitations

Currently RADREP uses as much RAM as it can get hold of during the log processing and data collection phase. Once RAM is depleted it then uses Windows Virtual memory which tends to slow down the report generation process significantly. Future versions of RADREP will have improvements in this area to make log file processing speed less dependent on the amount of RAM which a machine has installed. Customers who process extremely large accumulated logs (> 1GB) will benefit the most from these future enhancements.

Until these enhancements are included if you want to generate reports *quickly* from large accumulated logs it is recommended to either:

- Limit/reduce the report start-end date period.
- Limit/reduce the number of users for which reports are generated by generating reports for one group or site at a time.
- Add as much RAM to the machine running RADREP as possible. This will greatly improve performance.
- Use a machine with the fastest processor (CPU) you can acquire.

### 6.3.2 Benchmark Result for a 52MB RADIUS Log

#### PC Hardware Details:

PIII 866MHz  
256 MB RAM  
ATA100 Hard Disk

#### RADIUS Accounting log details:

52MB Livingston RADIUS accounting log.

Entries starting on the 1<sup>st</sup> May 2001 and ending on 8<sup>th</sup> April 2002. (343 days)  
1082 Users.

Task	Time Taken
Retrieve User List	35 seconds
Report Generation Time	46 seconds

Disk space used for generation of ALL reports and all report formats was 22 Megabytes with 3,260 files being written. 5 CSV output files and 3,255 HTML files. Approximately 120MB of RAM was used during the report generation process.

## 7 RADIUS ACCOUNTING LOG - FORMAT REQUIREMENTS

### 7.1 RADIUS accounting detail log - file formats & examples

RADREP will process and generate reports from RADIUS accounting logs that are written in the *Livingston, Microsoft IAS and CSV (Funk Steel Belted RADIUS & CISCO) Accounting formats*.

RADREP is verified to work with the following RADIUS Servers and Client Devices:

- Microsoft IAS RADIUS
- Livingston
- Funk Steel Belted Radius
- CISCO Secure (ACS)
- Novell BorderManager (BMAS) RADIUS Services
- SafeWord PremierAccess
- RSA ACE/Server
- ClearBox RADIUS Server
- Aradial RADIUS Server
- TCCRADIUS (Talon Computer Consulting Radius)
- Nortel
- 3Com
- Ascend Radius
- Lucent NavisRadius
- Shiva/Intel
- FreeRADIUS
- Cistron RADIUS
- Radiator
- .....plus many others

If you are unsure of what formats this means, then the following log file examples will show what formats are required and supported.

#### 7.1.1 Livingston Accounting Format

Many RADIUS servers can be configured to format their RADIUS accounting logs in Livingston format, otherwise known as 'standard' format. Examples of two RADIUS servers that can be configured in such a manner are Novell RADIUS (BMAS) and RSA ACE/Server.

```
Thu Oct 05 13:29:21 2000
User-Name = "SecurityBoy"
NAS-IP-Address = 203.13.140.209
NAS-Port = 24
NAS-Port-Type = 0
Acct-Status-Type = 1
Acct-Delay-Time = 0
Acct-Session-Id = "269517036"
Acct-Authentic = 1
Calling-Station-Id = "0393871747"
Called-Station-Id = "9012"
```

Framed-Protocol = 1  
 Framed-IP-Address = 192.168.221.12  
 Timestamp = 970712961  
 Request-Authenticator = Unverified

Thu Oct 05 13:33:20 2000

User-Name = "SecurityBoy"  
 NAS-IP-Address = 203.13.140.209  
 NAS-Port = 24  
 NAS-Port-Type = 0  
 Acct-Status-Type = 2  
 Acct-Delay-Time = 0  
 Acct-Session-Id = "269517036"  
 Acct-Authentic = 1  
 Acct-Session-Time = 239  
 Acct-Input-Octets = 3207  
 Acct-Output-Octets = 2810  
 Acct-Input-Packets = 49  
 Acct-Output-Packets = 36  
 Acct-Terminate-Cause = 1  
 Calling-Station-Id = "0393871747"  
 Called-Station-Id = "9012"  
 Framed-Protocol = 1  
 Framed-IP-Address = 192.168.221.12  
 Timestamp = 970713200  
 Request-Authenticator = Unverified

### 7.1.2 Microsoft IAS - Database Compatible Format

```
"RASHOST1","IAS",02/18/2003,17:26:18,4,"RASHOST1\securityboy",,,,,,"192.168.3.254",
36,0,"192.168.3.254","CSICO3640 RADIUS Client",,,0,,1,2,,0,"311 1 192.168.3.150
02/18/2003 06:23:35 1",,,,,1,0,,,"00000009",1,,,,,,,,,,,,,
"RASHOST1","IAS",02/18/2003,17:33:12,4,"RASHOST1\securityboy",,,,,,"192.168.3.207",,
"192.168.3.254",36,0,"192.168.3.254","CSICO3640 RADIUS Client",,,0,,1,2,,0,"311 1
192.168.3.150 02/18/2003 06:23:35
1",,,,,2,0,15751,4695,"00000009",1,414,177,81,1,,,,,,,,,,,,,
"RASHOST1","IAS",02/18/2003,17:36:16,4,"securityboy",,,,,,"192.168.3.254",36,0,"192.16
8.3.254","CSICO3640 RADIUS Client",,,0,,1,2,,0,"311 1 192.168.3.150 02/18/2003
06:23:35 5",,,,,1,0,,,"0000000A",1,,,,,,,,,,,,,
"RASHOST1","IAS",02/18/2003,17:42:38,4,"securityboy",,,,,,"192.168.3.210",,"192.168.3.2
54",36,0,"192.168.3.254","CSICO3640 RADIUS Client",,,0,,1,2,,0,"311 1 192.168.3.150
02/18/2003 06:23:35 5",,,,,2,0,66031,893962,"0000000A",1,382,1271,1357,1,,,,,,,,,,,,,
"RASHOST1","IAS",02/18/2003,17:53:43,4,"RASHOST1\securityboy",,,,,,"192.168.3.254",
36,0,"192.168.3.254","CSICO3640 RADIUS Client",,,0,,1,2,,0,"311 1 192.168.3.150
02/18/2003 06:23:35 29",,,,,1,0,,,"0000000B",1,,,,,,,,,,,,,
"RASHOST1","IAS",02/18/2003,18:14:28,4,"RASHOST1\securityboy",,,,,,"192.168.3.204",,
"192.168.3.254",36,0,"192.168.3.254","CSICO3640 RADIUS Client",,,0,,1,2,,0,"311 1
192.168.3.150 02/18/2003 06:23:35
29",,,,,2,0,86324,75150,"0000000B",1,1245,1327,1236,1,,,,,,,,,,,,,
```

### 7.1.3 Microsoft IAS - Standard/Native Format

```

192.168.3.254,RASHOST1\securityboy,02/20/2003,17:39:55,IAS,RASHOST1,5,36,61,0,40,
1,25,311 1 192.168.3.150 02/20/2003 06:35:49
1,45,1,6,2,44,0000000C,7,1,41,0,4108,192.168.3.254,4116,0,4128,CSICO3640 RADIUS
Client,4136,4,4142,0
192.168.3.254,RASHOST1\securityboy,02/20/2003,17:40:17,IAS,RASHOST1,5,36,61,0,40,
2,25,311 1 192.168.3.150 02/20/2003 06:35:49
1,45,1,6,2,44,0000000C,7,1,8,192.168.3.205,49,1,42,7732,43,364,47,48,48,10,46,23,41,0,41
08,192.168.3.254,4116,0,4128,CSICO3640 RADIUS Client,4136,4,4142,0
192.168.3.254,securityboy,02/20/2003,17:41:12,IAS,RASHOST1,5,36,61,0,40,1,25,311 1
192.168.3.150 02/20/2003 06:35:49
2,45,1,6,2,44,0000000D,7,1,41,0,4108,192.168.3.254,4116,0,4128,CSICO3640 RADIUS
Client,4136,4,4142,0
192.168.3.254,securityboy,02/20/2003,17:42:22,IAS,RASHOST1,5,36,61,0,40,2,25,311 1
192.168.3.150 02/20/2003 06:35:49
2,45,1,6,2,44,0000000D,7,1,8,192.168.3.206,49,1,42,8838,43,364,47,65,48,10,46,70,41,0,41
08,192.168.3.254,4116,0,4128,CSICO3640 RADIUS Client,4136,4,4142,0

```

### 7.1.4 Funk Steel Belted RADIUS Format

```

"Date","Time","RAS-Client","Record-Type","Full-Name","Auth-Type","User-Name","NAS-
Port","Framed-IP-Address","Acct-Status-Type","Acct-Delay-Time","Acct-Input-
Octets","Acct-Output-Octets","Acct-Session-Id","Acct-Authentic","Acct-Session-
Time","Acct-Input-Packets","Acct-Output-Packets","Acct-Termination-Cause","Acct-Multi-
Session-Id","Acct-Link-Count","Acc-Err-Message","Annex-Product-Name","Annex-SW-
Version","Annex-System-Disc-Reason","Annex-Modem-Disc-Reason","Annex-Disconnect-
Reason","Annex-Transmit-Speed","Annex-Receive-Speed","Ascend-Modem-Port-
Number","Ascend-Modem-Slot-Number","Ascend-Modem-Shelf-Number","Ascend-Xmit-
Rate","Nautica-Acct-SessionId","Nautica-Acct-Direction","Nautica-Acct-
CauseProtocol","Nautica-Acct-CauseSource"
"02/26/2003","23:53:17","RAS-SERVER-
1","1","Unknown","Unknown","securityboy","545644","10.202.11.4","1","10",,"0008536C"
,,,,,,,,,,,,,,,,,,,,,
"02/27/2003","00:14:39","RAS-SERVER-
1","1","Unknown","Unknown","clarke","545650","10.202.11.3","1","4",,"00085372" ,,,,,,,,,,
,,,,,,,,,,,,,
"02/27/2003","00:15:53","RAS-SERVER-
1","2","Unknown","Unknown","clarke","545650","10.202.11.3","2","4","26518","56190","0
0085372",,"76" ,,,,,,,,,,,,,,,,,,,,,,
"02/27/2003","00:17:58","RAS-SERVER-
1","2","Unknown","Unknown","securityboy","545644","10.202.11.4","2","15","57098","122
361","0008536C",,"1481" ,,,,,,,,,,,,,,,,,,,,,,

```

### 7.1.5 CISCO Secure & other CSV Formatted RADIUS Logs

CSV formatted log files should have the following attributes defined in the header of the log. By logging at least these attributes you will have the ability to generate all the reports that RADREP has to offer. Other optional attributes can also be logged and displayed in the user usage reports as required.

Date,Time,User-Name,Acct-Status-Type,Acct-Session-Id,Acct-Session-Time,Acct-Input-Octets,Acct-Output-Octets,Framed-IP-Address,NAS-Port,NAS-IP-Address, Acct-Terminate-Cause

#### Important Note:

1. Each attribute listed in the header line (first line of log) needs to conform to the IETF standard for attribute naming. eg. FramedAddress should be Framed-IP-Address and so forth.
2. The **Date** and **Time** field need to be two separate fields and not combined into one.
3. The **Date** field should conform to the following format: MM/DD/YYYY or different arrangements of MM, DD, YYYY. The delimiter between MM, DD, YYYY can be anything. The order of MM, DD, YYYY is configurable under the **Advanced Settings** in area.
4. The **Time** field should be in 24 hour format (NOT AM/PM format) and in the form of HH:MM:SS (Eg. 18:55:24). The delimiter between HH MM SS fields must be a colon (:).

#### An example CSV log header and entires might look like the following:

Date,Time,User-Name,Group-Name,Calling-Station-Id,Acct-Status-Type,Acct-Session-Id,Acct-Session-Time,Service-Type,Framed-Protocol,Acct-Input-Octets,Acct-Output-Octets,Acct-Input-Packets,Acct-Output-Packets,Framed-IP-Address,NAS-Port,NAS-IP-Address, Acct-Terminate-Cause

05/12/2003,00:00:46,securityboy,VPN,,Stop,41101C73,105,Framed,PPP,11688,79720,74,94,10.0.14.137,1932,10.0.5.2,1

05/12/2003,00:04:04,cclarke,PPTP/MPPE,,Start,40E01C42,,Framed,PPP,,,,,10.0.14.17,1061,10.0.5.1,

## 7.2 Required Accounting Log Attribute Fields

RADREP processes RADIUS log **\*\*STOP\*\*** records (and optionally INTERIM records) in order to boost the speed of the log parsing and report generation process. STOP records are distinguished by having an 'Acct-Status-Type = 2 or Stop' line in them. If possible, you should configure your RADIUS server to only log START and STOP accounting event data. By default all other data (such as interim accounting data) will simply be ignored by RADREP and just create larger than necessary log files.

### 7.2.1 Minimal Attribute Requirements

To correctly generate user USAGE and BILLING reports, your RADIUS accounting log file **\*\*MUST\*\*** have the following accounting attributes logged in each STOP record as a minimum.

*NOTE: These attributes must be in your log files STOP records or they will not be picked up by RADREP during processing. All values shown are for example purposes only.*

Thu Oct 05 13:33:20 2000 (Date & Time Field)

User-Name = "SecurityBoy" **\*\*Can have no value to indicate no authentication was required**

Acct-Status-Type = 2 **\*\*Can have values of 'Stop' or '2'**

Acct-Session-Time = 239

Acct-Session-Id = "00384565" **\*\*Can also be unique-session-id OR multi-session-id**

Acct-Input-Octets = 3207

Acct-Output-Octets = 2810

### 7.2.2 Attributes Required to generate all reports

To successfully generate **all** the reports that RADREP can produce, you will need to configure your RADIUS client devices (i.e. NAS/RAS Servers etc) to send the following RADIUS accounting attributes to your RADIUS accounting log server:

Date and Time fields (Thu Oct 05 13:33:20 2000)

User-Name = "SecurityBoy"

Acct-Status-Type = 2 **\*\*Can have values of 'Start', '1', 'Stop' or '2'.**

Acct-Session-Time = 239

Acct-Input-Octets = 3207

Acct-Output-Octets = 2810

Acct-Session-Id = 123 **\*\*Alternatively Unique-Session-Id or Multi-Session-Id can be used.**

Acct-Terminate-Cause = 1 OR Ascend-Disconnect-Cause = 185

Framed-IP-Address = 10.1.1.1

NAS-IP-Address = 192.168.1.1

NAS-Port = 23

NAS-Port-Type = 5

If you do not authenticate your end users when they dial into your RAS/NAS server (i.e. You use no username and password to authenticate the end users access) then the 'User-Name' attribute will have no data in it. In this case the user will show up in the reports as a user called 'Unknown User(s)'. This way even if you choose not to authenticate your end users

you will still be able to generate usage and billing reports although they will not be as meaningful as when you do authenticate the end user and their 'user-name' is recoded in the accounting STOP records.

### 7.2.3 Optional Attributes

As part of the User Usage Detailed reports, RADREP can also be configured to read and report on the following RADIUS accounting 'stop record attributes' plus up to two user defined (Custom) attributes.

NOTE: *These attributes must be in your log files STOP records or they will not be picked up by RADREP during processing. All values shown are for example purposes only.*

Framed-IP-Address = 192.168.4.1 (\* 'Framed-Address' if using ASCEND accounting)

NAS-IP-Address = 10.3.8.1 (\* 'NAS-Identifier' if using ASCEND accounting)

NAS-Port = 6911

NAS-Port-Type = 1

Calling-Station-Id = "0396972558"

Called-Station-Id = "18389"

Timestamp = 970713200 \*\*If available this field will boost the log parsing and report generation speed

Acct-Terminate-Cause = 1

Connect-Info = "33600 V34+/LAPM (31200/33600)"

Ascend-Disconnect-Cause = 185

Ascend-Data-Rate = 26400

Ascend-Xmit-Rate = 24000

Ascend-Billing-Number "L2"

Ascend-Modem-PortNo = 5

Ascend-Modem-SlotNo = "6"

Ascend-Connect-Progress = 60

LE-Terminate-Detail = "User Request - PPP Term Req"

LE-Advice-of-Charge = "69A30"

\* These are the Ascend equivalents of the IETF standard attributes and for reporting purposes are considered to be the same.

### 7.2.4 Custom Attributes

If you have attributes in your *accounting log STOP records* that you want to include in the 'Detailed Usage' report but they are not listed above, then you can define these (up to two) attributes by manually adding them in the 'Usage Reports – Attribute/Field Configuration Selection' configuration screen. See the 'Custom/User Defined Attribute Configuration' section for details on how to do this.

## 7.3 Microsoft IAS/RAS Configuration & Recommendations

RADREP supports both IAS Standard and IAS Database compatible log formats, these are used by both the Microsoft IAS and RRAS Services.. Your IAS/RAS log(s) must have RADIUS accounting **\*\*STOP\*\*** records which contain the minimum RADIUS accounting attributes that are required for report generation purposes. The minimum attributes which should be sent by a RADIUS Client (NAS/RAS server) are detailed in the '**Minimal Attribute Requirements**' section. If these minimal attributes are being sent by your RADIUS client (NAS/RAS server) and logged by IAS, then you should be able to successfully generate usage and billing reports.

### 7.3.1 IAS STOP Record – Mandatory Attribute Fields

As an example, the following shows an IAS-Standard and Database-compatible format STOP record. *The Mandatory attributes including the value which indicates that it is a STOP record (2) are shown in bold.* Your IAS log files need to have these attribute entries as a minimum for reporting to work correctly. For a full list of IAS attributes see the appendix A, B and C of this manual.

#### IAS Database Compatible Format STOP record

```
"RASHOST1","IAS",02/18/2003,18:14:28,4,"RASHOST1\securityboy",,,,,,"192.168.3.204"
,,"192.168.3.254",36,0,"192.168.3.254","CSICO3640 RADIUS Client",,,0,,1,2,,0,"311 1
192.168.3.150 02/18/2003 06:23:35
29",,,,,2,0,86324,75150,"0000000B",1,1245,1327,1236,1,,,,,,,,,,,,,,,,,,,,,
```

The following shows (in order) the Mandatory attributes and their values as shown in the IAS Database Compatible STOP record above:

Date and Time = **02/18/2003,18:14:28**

User-Name = **RASHOST1\securityboy**

Acct-Status-Type = **2**

Acct-Input-Octets = **86324**

Acct-Output-Octets = **75150**

Acct-Session-Id = **0000000B**

Acct-Session-Time = **1245**

**IAS Standard Format STOP record**

```
192.168.3.254,securityboy,02/20/2003,17:42:22,IAS,RASHOST1,5,36,61,0,40,2,25,311 1
192.168.3.150 02/20/2003 06:35:49
2,45,1,6,2,44,0000000D,7,1,8,192.168.3.206,49,1,42,8838,43,364,47,65,48,10,46,70,41,0,41
08,192.168.3.254,4116,0,4128,CSICO3640 RADIUS Client,4136,4,4142,0
```

The following shows (in order) the Mandatory attributes and their values as shown in the IAS Standard Format STOP record above:

User-Name = **securityboy**

Date and Time = **02/20/2003,17:42:22**

Acct-Status-Type (40) = **2**

Acct-Session-Id (44) = **0000000D**

Acct-Input-Octets (42) = **8838**

Acct-Output-Octets (43) = **364**

Acct-Session-Time (46) = **70**

### 7.3.2 Processing IAS Access Accept/Deny Packets

If you need a report showing ALL user access attempts (good or bad) then make sure your IAS Server is configured to log Access Accept/Deny accounting events, in addition to START/STOP accounting data required for generating usage and billing reports. RADREP's default configuration is to process IAS Deny packets and generate a report showing ALL failed login attempts. This includes failed login attempts by users who do not exist in your user database, such as when a hacker tries random or well know user-names to try and break into your system.

If your IAS server is setup to log Access Accept/Deny accounting event data and you have either the 'Usage Summary' or 'Usage Detailed' web reports selected, you will see an 'IAS - Accept/Deny' report being produced. In addition to reporting on Deny Packets you can turn on processing of Accept packets if you want the 'IAS - Accept/Deny' report to contain all access attempts good or bad.

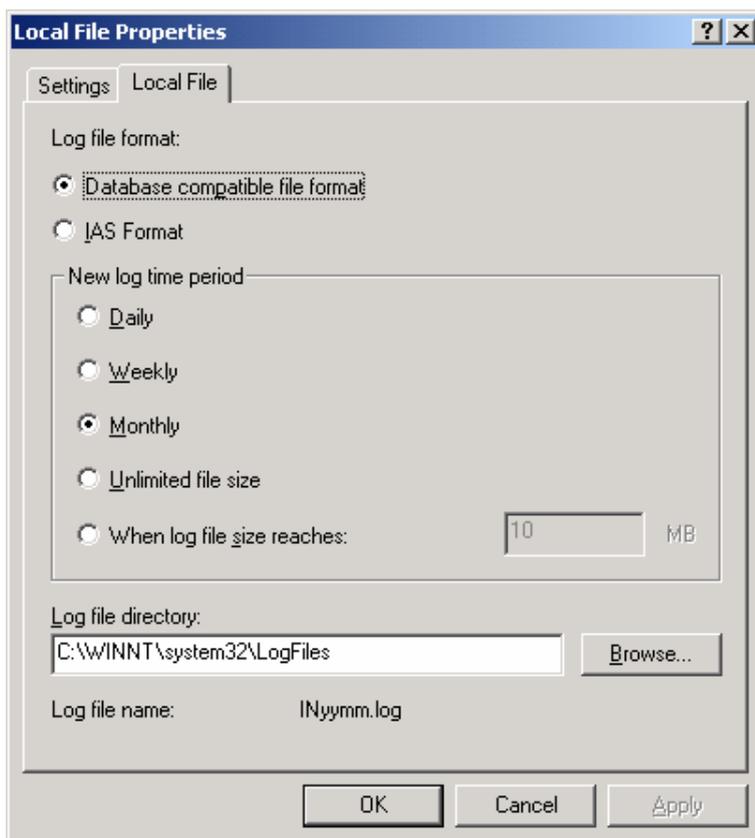
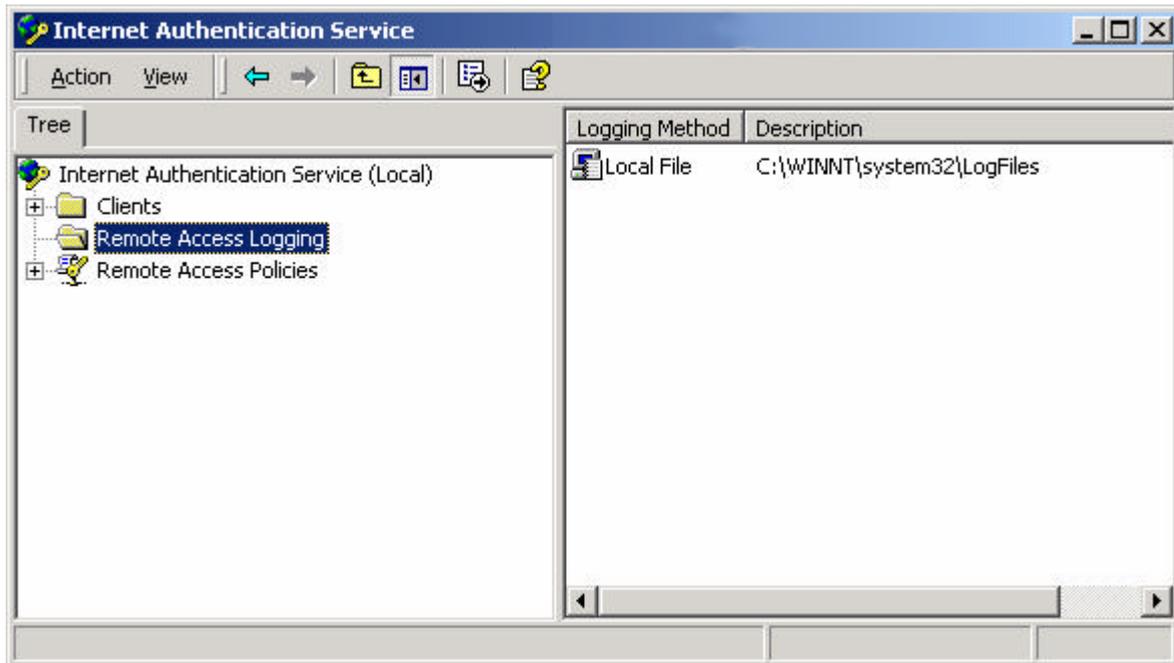
To configure the processing of IAS Access Accept/Deny Packets see the 'Advanced Settings' section of RADREP.

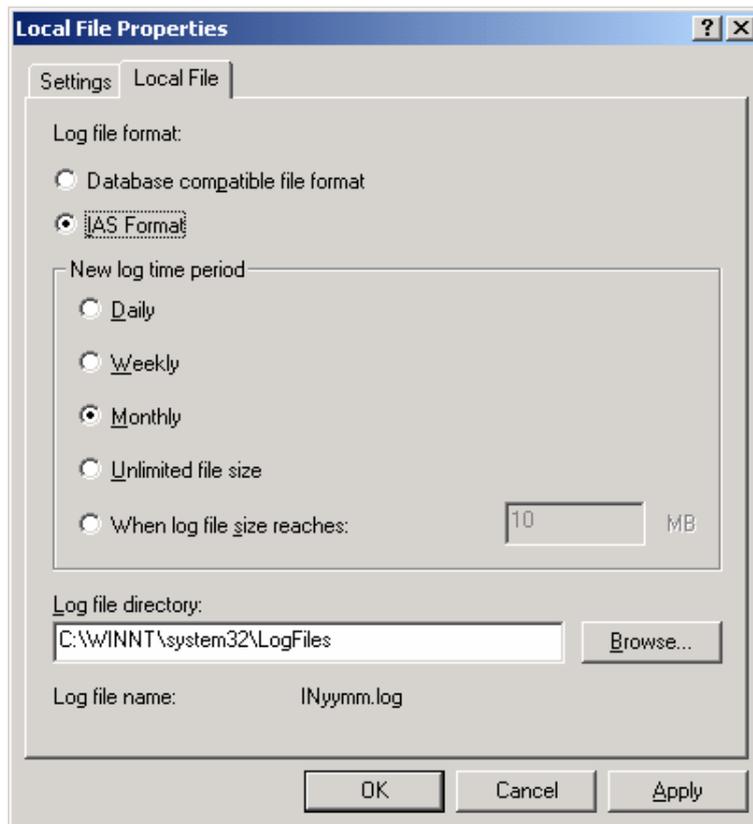
### 7.3.3 IAS Server Configuration

When using a Microsoft IAS RADIUS server the following sections should be used as a guide to configure IAS appropriately so that its log files can be optimally processed by RADREP.

#### 7.3.3.1 Choosing an IAS Log Format

Generally speaking you should use the IAS database compatible format for logging accounting information unless you need to report on Vendor-specific attributes. If you require the ability to report on Vendor-Specific attributes then you should use the IAS-Standard Log format. To configure a suitable IAS log format, the location of the logs and other IAS service information you need to run the IAS Service configuration program as shown in the following screen shots.



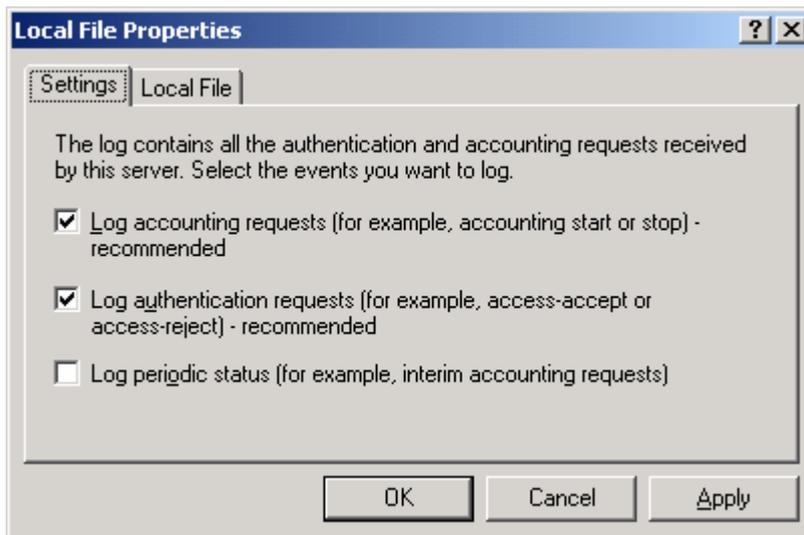


### 7.3.3.2 Selecting the Log Rotation Period

The default **'New log time period'** defaults to **'Unlimited file size'** in Windows 2000 Server. To make your logs more manageable, it is recommended to configure your logs to rotate at least **'Monthly'**. This is the default in Windows 2003 Server.

### 7.3.3.3 Selecting IAS Accounting Event Types

As a minimum and unless you require other accounting data, you only need to log RADIUS START and STOP accounting records in your IAS log files. By default any other non START/STOP record data (such as interim accounting data) that is logged will simply be ignored by RADREP when processing the log(s). To log START and STOP accounting data (and optionally Access Accept/Deny requests) make sure that your IAS log configuration looks like the below screenshot. INTERIM accounting data may be optionally enabled by clicking the **Log period status** checkbox on the IAS Server. To process INTERIM accounting data in RADREP you will need to enable it under the **Advanced Settings** Configuration screen.



### 7.3.3.4 IAS Service Name

By default the IAS Service name description is set to IAS. For the RRAS Service it is set to RAS. If the IAS Service name is changed from its default description of **IAS** to something else, you will also need to change it under the **Advanced Settings** configuration screen of RADREP. RADREP will not recognise the log format if the name here does not match what is defined in RADREP. The below screenshot shows a default service description of IAS.



## 7.4 Novell RADIUS (BMAS) Log Format

Novell's BorderManager Authentication Services (BMAS) contains a RADIUS server which by default logs its output in comma separated value (CSV) format. Although RADREP will work with this log format it is preferable (for RADREP) to be able to process Novell RADIUS server logs that are written in '**Standard**' accounting format and not comma separated value format. To change this it is a simple case of loading the RADIUS server with an appropriate switch to tell it to output it's logs in 'Standard format. It is up to you whether you do this or not.

To load RADIUS so that the log format is 'standard' you will need to add the following parameter to the load line in your Novell 'autoexec.ncf' (or wherever you load RADIUS from at boot time):

**LOAD RADIUS FileFormat=STANDARD**

When you change the log format to 'standard' you should also purge/delete any existing RADIUS accounting log files so that a fresh one is created containing only the new 'standard' format log entries.

Novell RADIUS accounting log files are named *YYYYMMDD*.log. *YYYY* is the year, *MM* is the month, and *DD* is the day the accounting log rollover period begins. By default, the RADIUS accounting log files are located in the SYS:\ETC\RADIUS\ACCT directory on a NetWare server. The default period before a RADIUS accounting file is rolled over is daily.

It may be desirable to change other accounting log file parameters when you load Novell's RADIUS (BMAS) services. For more information about configuring the BorderManager RADIUS Authentication Service, see the BorderManager administration guide on Novell web site at <http://www.novell.com/bordermanager/bmas>

## 7.5 Talon Computer Consulting RADIUS Compatibility (TCCRADIUS)

TCCRADIUS writes RADIUS accounting logs that are very close to the Livingston format standard. There are a couple of small deviations from the standard

TCCRADIUS writes Livingston formatted log files but uses a non conformant date line and user-name (username) attribute. These deviations from the Livingston standard make TCCRADIUS logs incompatible with RADREP unless you explicitly tell RADREP that you are going to be processing TCCRADIUS log files.

You can configure RADREP to process TCCRADIUS logs by using a text editor and manually adding two configuration entries to your 'radrep.ini' configuration file RADREP will process TCCRADIUS accounting log files.

### 7.5.1 TCCRADIUS Compatibility Details

To enable TCCRADIUS accounting log file compatibility:

1. Run the RADREP application at least once and configure the location of your log files.
2. Exit the RADREP application.
3. Using Windows Explorer browse to the RADREP installation folder (usually c:\program files\RADREP\) where the 'radrep.exe' application is located. If you have performed step 1 you will now see a 'radrep.ini' configuration file.
4. Open the 'radrep.ini' configuration file with any text editor (Windows Notepad will do just fine) and add the following two lines to the [Hidden Settings] section which is located at the very end of the file:

```
[Hidden Settings] <----- This line will already exist. You need to add the next two lines.  
TCCRADIUS=1  
PRIMARY_KEY_ATTRIB=USERNAME
```

5. After making the above changes save the 'radrep.ini' configuration file and then run the RADREP application again to begin processing your TCCRADIUS log files.

### 7.5.2 Sample TCCRADIUS STOP record

The following is a typical TCCRADIUS stop record showing the non-conformant date line and 'USERNAME' attribute.

The standards say that the date line should be 'Wed April 01 00:04:11 2004' and the 'USERNAME' should be called 'USER-NAME')

```
04/01/2004 00:04:11 202.141.54.71 711 STOP testuser@mycompany.com  
EVENT-TIMESTAMP=1080806589  
ACCT-SESSION-ID=296900920  
ACCT-SESSION-TIME=891  
ACCT-INPUT-PACKETS=1493  
ACCT-OUTPUT-PACKETS=1878
```

```
FRAMED-PROTOCOL=PPP
FRAMED-IP-ADDRESS=202.141.54.71
NAS-PORT-TYPE=ASYNC
NAS-IP-ADDRESS=203.161.51.254
ACCT-STATUS-TYPE=STOP
CALLED-STATION-ID=98717834
ACCT-INPUT-OCTETS=131082
ACCT-OUTPUT-OCTETS=678107
CALLING-STATION-ID=987174631
USERNAME=testuser@mycompany.com
NAS-IDENTIFIER=nas91.mycompany.com
```

Note: To process other types of RADIUS server logs you will need to undo these changes as they enable processing features specific only to TCCRADIUS server logs that write their logs in Livingston format but use a non-conformant date line and user-name (username) accounting attribute.

## 8 AUTOMATING RADREP (AUTO RUN / BATCH MODE)

RADREP can be configured to run in what is known as 'Auto Run' mode. This mode of operation is well suited to those who want to setup RADREP on a machine running a web server such as Microsoft IIS and have usage and/or billing reports automatically generated or updated periodically. Enabling this mode of operation will fully automate RADREP so that it can be run via a batch file or via the Windows Scheduler without any user interaction.

When you enable 'Auto Run' mode and then start RADREP (radrep.exe), it will run in a minimized/hidden state, retrieve the user list, generate reports and then exit automatically. The configuration settings used in 'Auto Run' mode will be the same as those you configured when running RADREP in it's Standard GUI interface mode with the exception of the report period (start and end date selection), message popup behaviour and optionally the site, group or user to generate reports for.

There are two options for enabling and configuring 'Auto Run' mode.

**Option 1 :** Use the 'Run Mode Configuration Tool'

**Option 2 :** Manually edit the radrep.ini settings file as detailed below.

For most users using the 'Run Mode Configuration Tool' will provide the easiest way to enable 'Auto Run' mode. In some cases where you need to change other RADREP settings it may be necessary to manually edit the **radrep.ini** file. Only experienced users and administrators should do this as undesirable results may occur if it is modified incorrectly.

### 8.1 Before enabling 'Auto Run' mode

Before you enable 'auto run' mode you should follow these steps:

1. Ensure that the date and time are correct on the machine RADREP will be running on.
2. Run RADREP normally by clicking on the start menu or desktop icon. Configure the log file(s) to be processed and any other relevant settings. Note you need to run RADREP using the same Windows username you used when you installed it; otherwise it is possible that if you log in as a different user you will not have the appropriate permissions to run RADREP or access the 'radrep.ini' settings file.
3. Make a test run by going through the normal steps for manually generating reports. E.g. Select the start-end dates, Retrieve the user list, Generate reports.
4. Once you have an error free run (i.e. all your configuration information is correct) you can enable the 'auto run' feature and set the desired 'report period' by using either the 'Run Mode Configuration Tool' or by manually editing the 'radrep.ini' settings file.

### 8.2 Enabling Auto Run Mode

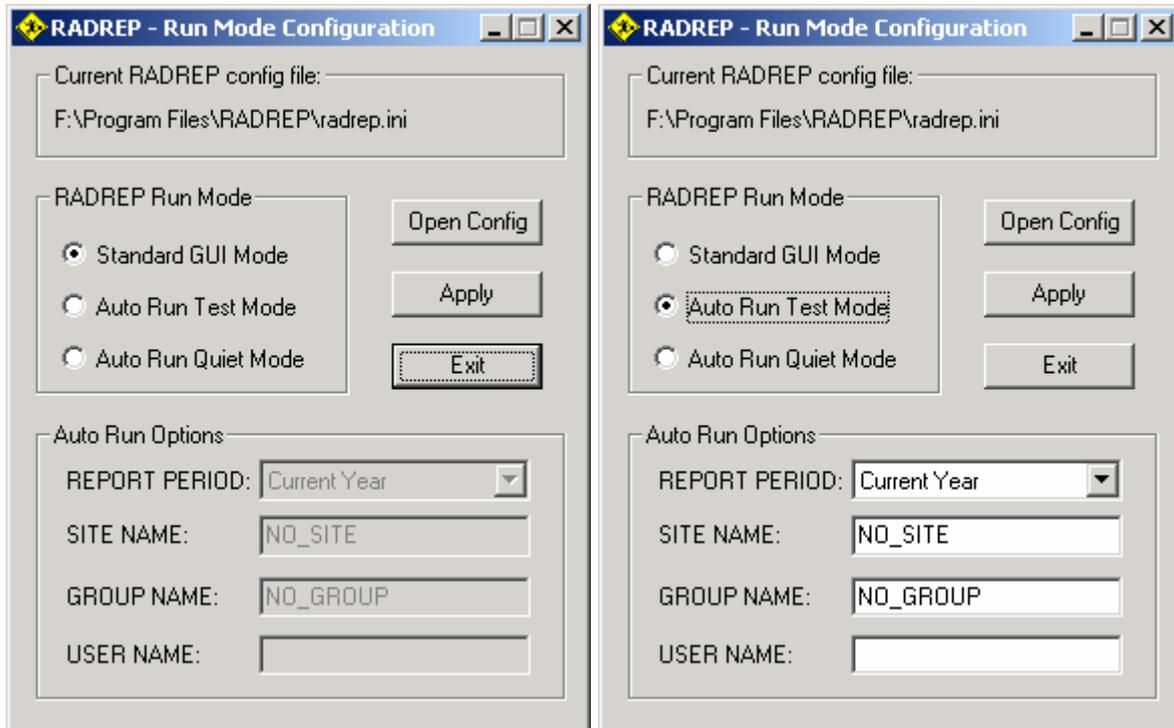
#### 8.2.1 Option 1 : Run Mode Configuration Tool (autorun.exe)

This tool is located under the RADREP Start menu program folder (i.e. Start | Programs | RADREP | Run Mode Configuration). You can use this tool to enable and switch between **Standard GUI Mode**, **Auto Run test Mode** and **Auto Run Quiet Mode**.

To use this tool it must be located in the same directory as the **radrep.ini** settings file that is created the first time you configure RADREP. When switching to Auto Run mode a number of other 'Auto Run Options' will become available for configuration including the 'Report Period' and optionally the Site, Group and User name that you want to generate reports for. If no specific Site, Group or User is specified, reports will be generated for all Sites, Groups and Users. If you want to generate a report for just a specific user then you must also make sure that you specify the Site and Group they belong

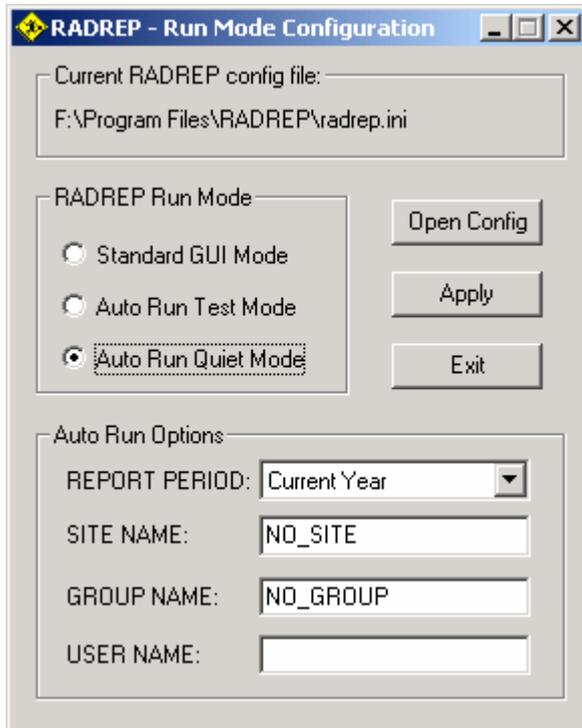
to first otherwise the user name will just be ignored. Likewise if you want to generate reports for a specific Group of users you must specify the Site to which the Group belongs to.

To run RADREP in **Standard GUI Mode** simply click on the radio button and **Apply** the change. The next time RADREP is run it will run in interactive GUI mode.



To test your Auto-Run settings before fully automating your report generation task with the Windows Scheduler you can select the **Auto Run Test Mode** radio button and **Apply** the change. The next time you run RADREP it will run minimized on the task bar, import the user list, generate reports and then exit. If any errors are encountered an error pop-up box will be displayed. If there are problems with the report run you can switch back to Standard GUI mode in order to re-configure RADREP and correct the problem. Once you have an error free run in **Auto Run Test Mode** you can switch to **Auto Run Quiet Mode** and fully automate the task by creating a Windows Scheduler job.

To run RADREP as a Windows Scheduled job you first need to change the Run Mode of RADREP to **Auto Run Quiet Mode**. This mode of operation suppresses all information and error dialogue boxes. If an error is encountered during a **Quiet Mode** report run the error is logged to a file called **ErrorLog.txt** located in the same folder where the radrep.exe program file is located. For most users this will be the <drive>\Program Files\RADREP installation directory.



After selecting the Run mode of RADREP and pressing the **Apply** button you will get a confirmation message after which you can exit this tool and run RADREP.



## 8.2.2 Option 2 : Editing the RADREP.INI file

When you run RADREP and configure it for the first time, the 'radrep.ini' settings file is created in the same folder where the 'radrep.exe' resides. For most users this will be the <drive>\Program Files\RADREP installation directory.

Once you have located the 'radrep.ini' settings file you need to locate the [AUTO-RUN-SETTINGS] section and then modify and save its settings appropriately as described below.

In the [AUTO-RUN-SETTINGS] section of 'radrep.ini' there are 7 settings which are used to enable and customize how you want RADREP to run when it is in 'Auto Run' mode. These settings are described below:

### [AUTO-RUN-SETTINGS]

Auto run configuration options section heading. DO NOT MODIFY

#### **AUTO\_RUN\_ENABLED=**

Turns auto run feature 'on' or 'off'. Default: 0

Value: 0 (auto run is disabled/off and RADREP will function in normal GUI mode)

Value: 1 (auto run is enabled/on and RADREP will run minimized)

#### **AUTO\_RUN\_PERIOD=**

Sets the predefined report period as described. Default: 3

Value: 1 (Current Day. Start of the current day to the end of the current day.)

Value: 2 (Current Month. Start of the current month to the end of the current day of month)

Value: 3 (Current Year. Start of the current year to the end of the current day.)

Value: 4 (Previous Day. Start of the previous day to the end of the previous day.)

Value: 5 (Previous Month. Start of the previous month to the end of the previous month.)

Value: 6 (Last 7 Days. Start date is seven days prior to the current date.)

Value: 7 (Last 14 Days. Start date is fourteen days prior to the current date.)

Value: 8 (Last 21 Days. Start date is twenty one days prior to the current date.)

#### **AUTO\_RUN\_SITE=**

Here you can type the name of a site that exists in your the site/group/user hierarchy when your perform a 'Retrieve user list'. If the site name is not found or left at its default of blank then reports will be generated for a previous level of the site/group/user hierarchy where a valid name is found. In this case if the site is not found it would revert to the 'Entire Company' (root of tree) for the level at which to generate reports.

#### **AUTO\_RUN\_GROUP=**

Here you can type the name of a group that exists in your the site/group/user hierarchy when your perform a 'Retrieve user list'. You must also specify the site that this group belongs to in the AUTO\_RUN\_SITE configuration field. If the group name is not found or left at its default of blank then reports will be generated for a previous level of the site/group/user hierarchy where a valid name is found. In this case at the site or root of tree level.

#### **AUTO\_RUN\_USER=**

Here you can type the user-name of a user that exists in your the site/group/user hierarchy when your perform a 'Retrieve user list'. Remember this is the RADIUS user-name and not the user's first and last name. You must also specify the site and group that this user belongs to in the AUTO\_RUN\_SITE and AUTO\_RUN\_GROUP configuration fields. If the user-name is not found or left at its default of blank then reports will be generated for a previous level of the site/group/user hierarchy where a valid name is found. In this case at the group, site or root of tree level.

**CRITICAL\_ERROR\_NOTIFICATION=**

Turns all error and critical information message popups 'on' or 'off'. Default: 1

Value: 0 (error and critical information popups are disabled/off)

Value: 1 (error and critical information popups are enabled/on)

**INFORMATION\_NOTIFICATION=**

Turns all information message popups 'on' or 'off'. Default: 1

Value: 0 (information popups are disabled/off)

Value: 1 (information popups are enabled/on)

**8.2.2.1 Testing your AUTO RUN configuration**

Once you have enabled RADREP for 'auto run' mode (AUTO\_RUN\_ENABLED=1) you can test it by clicking on the RADREP start menu or desktop icon. For 'auto run' testing and troubleshooting you should leave the CRITICAL\_ERROR\_NOTIFICATION and INFORMATION\_NOTIFICATION settings turned on (1). If you have left them on you will see and need to respond to various popup messages in your test run. This will confirm the automation steps are working correctly. If you are happy that the reports have been generated correctly, then you should turn off (0)

INFORMATION\_NOTIFICATION and CRITICAL\_ERROR\_NOTIFICATION. If you do this then you will no longer see or need to respond to any information popups or error message dialogue boxes as they will be disabled. If any errors are encountered when you turn off these two settings they will be written to a file called **ErrorLog.txt** located in the same directory as the radrep.exe program file. You can confirm the last successful report run date by viewing the 'historical.html' and 'home.html' of each report. This will show the last date and time reports were successfully generated.

Once you are satisfied that the 'Auto Run' process is performing to your requirements you can use the Windows Scheduler service/utility to schedule and fully automate the running of 'radrep.exe' so that no manual intervention is required to generate or update reports. **You must run the scheduled job as the same user you were logged in as when you installed RADREP or another user with appropriate permissions to the RADREP installation and settings file 'radrep.ini'**. If you installed RADREP as administrator then you must run the scheduled job as the administrator user.

If you run radrep.exe as an automated **Windows Scheduler** process, make sure that you turn off all popup message dialogue boxes by making sure that **CRITICAL\_ERROR\_NOTIFICATION=0 and INFORMATION\_NOTIFICATION=0**. If you do not do this and an information or error popup occurs during a Windows Scheduler job, you will not be able to see or respond to it. The result will be that radrep.exe will remain in memory forever until it is forcefully ended using the Task Manager 'End Task' feature

**8.3 Command Line Options**

You can pass the **radrep.ini** settings file to **radrep.exe** as a command line argument.

You **MUST** specify the full path of the **.ini** file when doing this.

Eg. radrep.exe c:\myreports\radrep.ini

When passing the **ini** file as a command line argument RADREP will not start if:

1. The ini settings file does not exist.
2. The ini settings file does not end with a **.ini** extension

Any errors encountered when reading the ini file as a command line argument will be written to a file called **ErrorLog.txt** located in the same directory as the **radrep.exe** program file.

If no command line argument is given the radrep.ini file located in the same directory as the radrep.exe will be used or created if it does not exist.

Passing the ini settings file on the command line is the only command line option available.

## 8.4 Typical Auto Run Settings

Typical settings in radrep.ini for running in 'auto run' mode are as follows:

```
[AUTO-RUN-SETTINGS]
AUTO_RUN_ENABLED=1
AUTO_RUN_PERIOD=2
AUTO_RUN_SITE=NO_SITE
AUTO_RUN_GROUP=NO_GROUP
AUTO_RUN_USER=
CRITICAL_ERROR_NOTIFICATION=0
INFORMATION_NOTIFICATION=0
```

## 8.5 RADREP.INI Format

All RADREP configuration details are stored in an INI settings file named **radrep.ini**. When you run RADREP and configure it for the first time, the **radrep.ini** settings file is created in same folder where the **radrep.exe** resides. For most users this will be the <drive>\Program Files\RADREP installation directory.

### 8.5.1 Sample RADREP.INI file contents:

(# = Descriptive Comment)

# Settings which can be modified to enable and control how RADREP runs in an automated manner.

```
[AUTO-RUN-SETTINGS]
AUTO_RUN_ENABLED=0
AUTO_RUN_PERIOD=3
AUTO_RUN_SITE=NO_SITE
AUTO_RUN_GROUP=NO_GROUP
AUTO_RUN_USER=
CRITICAL_ERROR_NOTIFICATION=1
INFORMATION_NOTIFICATION=1
```

[Config]

#Enable (1) or disable (0) the NAS IP Address filter

NAS\_FILTER\_ENABLED=0

#Specify the address of the NAS Server to generate reports for.

NAS\_FILTER\_IP\_ADDRESS=10.1.1.1

#Enable (1) or disable (0) the User-Name filter

FILTER\_USER\_NAME\_ENABLED=0

#Specify the string and wild card to filter user names on. Eg. \*@\* would filter out all users with an @ sign in their username

USER\_NAME\_FILTER=

# Billing Summary Report Enable/Disable

BS\_REPORT=1

# Billing Detail Report Enable/Disable

BD\_REPORT=1

# Usage Summary Report Enable/Disable

US\_REPORT=1

# Usage Detailed Report Enable/Disable

UD\_REPORT=1

```
# Enable/Disable the relative reports.
IP_REPORT=1
IP_REPORT_DETAILED=1
NAS_REPORT=1
NAS_REPORT_DETAILED=1
NAS_REPORT_CONCURRENCY=1
NAS_PORT_SUMMARY=1
NAS_PORT_DETAILED=1
NAS_PORT_TYPE_SUMMARY=1
NAS_PORT_TYPE_DETAILED=1
# User Retrieval Method, 0 = ACE/Server, 1 = RADIUS logs, 2 = CSV File
RETRIEVE_USER=1
# Primary RADIUS log file name and location
File_Location_1=F:\Program Files\RADREP\Samples\detail-log\detail.txt
# Secondary RADIUS log file name and location
File_Location_2=
# Output Folder
File_Location_3=F:\Program Files\RADREP\report
# The tax rate to apply
TAX_RATE=10.00
# The currency symbol to use
CURRENCY_SYMBOL=$ (Dollar)
# Enable/Disable dumping user details to 'users.csv'
DUMP_TO_CSV=0
# Enable/Disable HTML formatted reports
HTML_REPORTS=1
# Enable/Disable automatic launching of the web browser to view HTML format reports
HTML_AUTO_LAUNCH=1
# Show CSV report links on web reports home page
SHOW_CSV_REPORTS=1
# Enable/Disable paging in HTML reports
PAGE_HTML_REPORTS=0
# Number of table rows per page in web reports
PAGE_TABLE_NUMBER=2000
# Enable/Disable the use of ACE/Server User Extension Data fields
USE_EXT_FIELDS=0
# Enable/disable checking for NULL characters in the log files
NULL_CHAR_CHECK=0
# Name of the ACE/Server Extension Data Field containing the user's associated SITE name.
EXT_FIELD_SITE=SITE
# Name of the ACE/Server Extension Data Field containing the user's associated GROUP
name.
EXT_FIELD_GROUP=GROUP
# Name of the ACE/Server Extension Data Field that contains the users associated billing
PROFILE name.
EXT_FIELD_PROFILE=PROFILE-NAME
# Enables/Disables Start-End date checking when retrieving user-names from the RADIUS
logs.
RADIUS_START_END_CHECK=0
# Log file input folder name.
LOG_INPUT_FOLDER=
```

```
# log file extension/suffix
LOG_SUFFIX=*.log
# Determines if Primary/Secondary log file input method is used or log file folder and
extension.
LOG_FILES_SELECTED=0
# All DET_ entries signal if the attribute is Enabled or Disabled for the 'Detailed Usage
Report'
DET_FRAMED_IP=1
DET_NAS_IP=0
DET_NAS_PORT=0
DET_CALLED_ID=0
DET_CALLING_ID=1
DET_TERM_CAUSE=1
DET_DISC_CAUSE=0
DET_DATA_RATE=0
DET_NAS_PORT_TYPE=0
DET_ASCEND_BILL_NUM=0
DET_ASCEND_XMIT_RATE=0
DET_INPUT_OCTETS=1
DET_OUTPUT_OCTETS=1
DET_CONNECT_INFO=1
DET_ASCEND_PROGRESS=0
DET_ASCEND_MODEM_PORTNO=0
DET_ASCEND_MODEM_SLOTNO=0
DET_LE_TERM_DETAIL=0
DET_LE_ADVICE_OF_CHARGE=0
DET_CUST_ATTRIB_1=0
DET_CUST_ATTRIB_1_NAME=
DET_CUST_ATTRIB_1_DISPLAY_NAME=
DET_CUST_ATTRIB_1_TOTAL=0
DET_CUST_ATTRIB_2=0
DET_CUST_ATTRIB_2_NAME=
DET_CUST_ATTRIB_2_DISPLAY_NAME=
DET_CUST_ATTRIB_2_TOTAL=0
SUMMARY_SITE=1
SUMMARY_GROUP=1
SUMMARY_FIRSTLASTNAME=1
SUMMARY_CONNECTS=1
SUMMARY_SESSIONTIME=1
SUMMARY_BYTESREC=1
SUMMARY_BYTESENT=1
# Setting to enable/disable the displaying of date range warnings when processing log files.
START_END_DATE_MSG=0
# The historical report rotation method.
HISTORICAL_ROTATE=3
# Data measurement scheme being used. 1 = (1K = 1024Bytes) 0 = (1K =1000Bytes)
KB_MEASUREMENT=1
#Historical Log output selection.
HISTORICAL_ROTATE=0
#Enable (1) or Disable (0) if Domain names are to be stripped from the user-name field.
STRIP_DOMAIN=1
```

```
#Specify the IAS Service name. (default: IAS)
IAS_SERVICE_NAME=IAS
#Concurrency & Active User Reports process all users found in the logs (1) or only those
selected in the site/group/user hierarchy (0)
CONCURRENCY_ALL_USERS=1

[BillingTemplate0-50]
#Indicates if the template is enabled (1) or disabled (0)
TEMPLATE_ENABLED=1
#Matching Criteria for Site name is enabled (1) or disabled (0)
SITE_CHECK=0
#Site name to use for matching criteria
SITE_NAME=
#Matching Criteria for Group name is enabled (1) or disabled (0)
GROUP_CHECK=0
#Group name to use for matching criteria
GROUP_NAME=
#Matching Criteria for Group name is enabled (1) or disabled (0)
USER_CHECK=0
#User name to use for matching criteria
USER_NAME=
#Include (1) or exclude (0) if match is made.
INCLUDE=1
# Fixed Service Cost A
FIXED_A_FEE=1.00
# Fixed Service Cost B
FIXED_B_FEE=1.00
# Variable Cost (Usage Time)
USAGE_FEE=1.00
# Time covered by minimum service fee (Fixed cost B)
EXCESS_TIME=0.00
# Cost for each Megabyte sent
COST_MB_SENT=0.01
# Cost for each Megabyte received
COST_MB_RECEIVED=0.01
# Sent Megabyte covered by the minimum service fee
MB_SENT_COV=0
# Received Megabyte covered by the minimum service fee
MB_REC_COV=0
# Combined Sent & Received Megabytes covered by the minimum service fee
MB_SENT_REC_COMB=0
# The Billing Model being used for this template. 1 = Usage Time, 0 = Data Volume
BILL_MODEL=0
#Cost per connection made
COST_PER_CONNECT=0.22
#Combined MB send and received allowance
MB_SENT_REC_COV=0.25
#Combined sent and received cost
COST_MB_SENT_RECEIVED=20.50
#Data volume is measured on sent and received combined (1) or separate (0)
VOL_COMBINED=1
```

## 8.5.2 Hidden Configuration Options

In order to further tailor RADREP and customize its behaviour a number of hidden configuration options are available by manually editing the 'radrep.ini' configuration file. All hidden configuration settings are stored in the [Hidden Settings] section of the radrep.ini file. The following shows what options are available and how to configure them:

- Combine the group and profile names when reading them from the users.csv file.  
#(1 = group and profile are combined, 0 = not combined [default].)  
COMB\_GROUP\_PROFILE=0
- Convert the Site, Group and Profile fields in the users.csv file to lower case as they are read in. This was added to make it possible to eliminate duplicates that were due to CASE differences in the users.csv file.  
#(1 = convert the site, group and profile fields to lower case, 0 = leave the fields as they are [default].)  
SITE\_GROUP\_PROFILE\_LOWER=0
- Enable/disable the reading of the 'Group-Name' attribute in CISCO ACS CSV logs so that auto grouping of users can occur when reading a log containing this attribute.  
#(1=Read 'Group-Name' attribute for auto-grouping purposes, 0 = Do not read the 'Group-Name' attribute [default].)  
USE\_GROUP\_NAME\_ATTRIBUTE=0

**Important Note:** RADREP only produces 'Site and Group' based reports when using the users.csv (CSV File) or the 'ACE/Server Database' to read in user grouping information. So even though RADREP will read in the group-name information from your RADIUS CSV log files you still need to write/dump this information to the 'users.csv' file (manipulate it if necessary) and then read/reload it into RADREP in order to generate Group based reports.

The process would be as follows:

1. Run and configure RADREP at least once to create the radrep.ini file located in the same directory as radrep.exe.
2. Edit the 'radrep.ini' file and make the USE\_GROUP\_NAME\_ATTRIBUTE=1. (the default will be =0)
3. Start/Run RADREP again.
4. Click on the 'Configuration' Button and check/select the option that says "Dump user details to 'users.csv' file."
5. Select the 'Retrieve user list from:' method to be 'RADIUS Log file(s)'.
6. Press the 'Retrieve user list' button.
7. After RADREP has retrieved all the 'User-Name' fields and associated 'Group-Name' fields from the RADIUS logs it will write this information out to the 'users.csv' file, located in the 'Report Output Folder'.
8. You can now edit the 'users.csv' file that has been created and amend any necessary user or Grouping information.
9. Now change the 'Retrieve user list from:' method to be 'CSV File'.
10. Press the 'Retrieve user list' button again to read the 'User-Name' and grouping information from the 'users.csv' file.
11. After reading in this information from the 'users.csv' file you can now generate group based reports.
12. To generate group based reports set the 'Report Start/End Dates', select the reports

you want and then press the 'Generate New Report(s)' button.

Another way to generate Group based reports from CISCO ACS CSV logs is to enable the `USE_GROUP_NAME_ATTRIBUTE=1` setting and select one Group at a time from the `SITE/GROUP/USER` hierarchy and generate reports. The only drawback in doing it this way is that report output will be only for the Group you select so you will have to generate reports one group at a time.

- Change the reporting primary key. Usually the 'user-name' is used as the primary key. By changing the following radrep.ini file configuration parameters it is possible to change the attribute which is used to represent the "User-Name" field. This was done for some users who wanted to report on H323 attribute fields (in particular the h323-remote-address) as the primary key. The following settings apply to making this change but will depend on which log file type you use as to which ones you need to change.

`PRIMARY_KEY_ATTRIB=` (Default: User-Name. Change to any unique attribute name seen in a user's accounting STOP record.)

`IASSTD_PRIMARY_KEY_ATTRIB=` (Default: 0 which reads field 2 of an IAS Standard log as the 'User-Name'. Examples values are 4129 or another unique field in a user's accounting STOP record..)

`IASDB_PRIMARY_KEY_ATTRIB=` (Default: 6 which is the Field number of the IAS Database compatible log that contains the 'User-Name' attribute. To change the 'User-Name' field number enter the field number of a unique field in the IAS Database compatible log that you want to use instead of the default.)

`CSV_PRIMARY_KEY_ATTRIB=` (Default: 0 which means to detect the field number in the CSV log header that contains the 'User-Name' attribute.)

## 9 CONTACT AND SUPPORT DETAILS

If you have any questions, want to report a bug you have found in RADREP (not many we hope), or a request for features you would like to see in RADREP, please email us with the details at the following email address:

<mailto:support@radiusreporting.com>

Check the RADREP website for the latest version and FAQ on RADREP.

Website: <http://www.radiusreporting.com>

## 10 APPENDIX A – IAS ATTRIBUTE TABLE – DATABASE FORMAT

### *Microsoft IAS RADIUS Attribute Sequence (Database Compatible Log Format)*

Microsoft's database-import log format for IAS log files became available with the launch of Windows 2000. Unlike the IAS-Standard log format, logs written in database-import log format present the data in a **standard sequence that is identical regardless of the network access server (NAS) sending the data.**

As the data is always written in a standard field sequence, all you need to do in order to add a custom field to the RADREP **'Usage Detailed** report is count through the fields (which are comma separated) until you reach the field you want to report on. This field number can then be entered into the **'Attrib Name or MS# or Field#'** edit box on the **'Detailed Usage Report - Display Field Selection'** screen in RADREP.

To simplify locating the field number of the attribute you want to report on, the following table shows the **'Field Number'** and corresponding RADIUS attribute. Each of the listed attributes can be contained in a record that is part of the database-import log file, although the actual attributes recorded will depend on how your NAS server (RADIUS client) has been configured in regards to what accounting information it sends to the IAS server.

*IAS database compatible format logs do not support reporting on Vendor-Specific Attributes*, so if you have a requirement to report on vendor-specific RADIUS attributes you will have to stick with using the IAS-Standard log format.

Field #	Attribute	Data type	Represents
1	ComputerName	Text	Name of the server where the packet was received. (This is an IAS-internal attribute.)
2	ServiceName	Text	Name of the service that generated the record, IAS or Windows 2000 remote access. (This is an IAS-internal attribute.)
3	Record-Date	Time	Date at the IAS or remote access server. (This is an IAS-internal attribute.)
4	Record-Time	Time	Time at the IAS or remote access server. (This is an IAS-internal attribute.)
5	Packet-Type	Number	Type of packet. Can be: <ul style="list-style-type: none"> <li>• 1 = Accept-Request</li> <li>• 2 = Access-Accept</li> <li>• 3 = Access-Reject</li> <li>• 4 = Accounting-Request</li> </ul> (This is an IAS-internal attribute.)
6	User-Name	Text	User's claimed identity.
7	Fully-Qualified-User-Name	Text	User name in canonical format. (This is an IAS-internal attribute.)
8	Called-Station-Id	Text	Phone number dialed by user.
9	Calling-Station-Id	Text	Phone number from which call originated.
10	Callback-Number	Text	Callback phone number.
11	Framed-IP-Address	Text	Framed address to be configured for user.
12	NAS-Identifier	Text	Text identifying the NAS originating the request.
13	NAS-IP-Address	Text	The IP address of the NAS originating the request.

14	NAS-Port	Number	Physical port number of the NAS originating the request.
15	Client-Vendor	Number	Manufacturer of NAS. (This is an IAS-internal attribute.)
16	Client-IP-Address	Text	The IP address of RADIUS client. (This is an IAS-internal attribute.)
17	Client-Friendly-Name	Text	Friendly name for the RADIUS client. (This is an IAS-internal attribute.)
18	Event-Timestamp	Time	The date and time that this event occurred on the NAS.
19	Port-Limit	Number	Maximum number of ports that NAS provides to the user.
20	NAS-Port-Type	Number	Type of physical port used by the NAS originating the request.
21	Connect-Info	Text	Indicates the nature of user's connection.
22	Framed-Protocol	Number	The protocol to be used.
23	Service-Type	Number	Type of service user has requested.
24	Authentication-Type	Number	<p>Authentication scheme use to verify user. Can be:</p> <ul style="list-style-type: none"> <li>• 1 = PAP</li> <li>• 2 = CHAP</li> <li>• 3 = MS-CHAP v1</li> <li>• 4 = MS-CHAP v2</li> <li>• 5 = EAP</li> <li>• 7 = None</li> <li>• 8 =Custom</li> </ul> <p>(This is an IAS-internal attribute.)</p>
25	NP-Policy-Name	Text	Friendly name of the remote access policy that granted or denied access. This attribute is logged in authentication accept and reject requests. If a user is rejected because none of the remote access policies matched, then this attribute is blank.
26	Reason-Code	Number	<p>Reason for rejecting a user. Can be:</p> <ul style="list-style-type: none"> <li>• 0 = IAS_SUCCESS</li> <li>• 1 = IAS_INTERNAL_ERROR</li> <li>• 2 = IAS_ACCESS_DENIED</li> <li>• 3 = IAS_MALFORMED_REQUEST</li> <li>• 4 = IAS_GLOBAL_CATALOG_UNAVAILABLE</li> <li>• 5 = IAS_DOMAIN_UNAVAILABLE</li> <li>• 6 = IAS_SERVER_UNAVAILABLE</li> <li>• 7 = IAS_NO_SUCH_DOMAIN</li> <li>• 8 = IAS_NO_SUCH_USER</li> <li>• 16 = IAS_AUTH_FAILURE</li> <li>• 17 = IAS_CHANGE_PASSWORD_FAILURE</li> <li>• 18 = IAS_UNSUPPORTED_AUTH_TYPE</li> <li>• 32 = IAS_LOCAL_USERS_ONLY</li> </ul>

			<ul style="list-style-type: none"> <li>• 33 = IAS_PASSWORD_MUST_CHANGE</li> <li>• 34 = IAS_ACCOUNT_DISABLED</li> <li>• 35 = IAS_ACCOUNT_EXPIRED</li> <li>• 36 = IAS_ACCOUNT_LOCKED_OUT</li> <li>• 37 = IAS_INVALID_LOGON_HOURS</li> <li>• 38 = IAS_ACCOUNT_RESTRICTION</li> <li>• 48 = IAS_NO_POLICY_MATCH</li> <li>• 64 = IAS_DIALIN_LOCKED_OUT</li> <li>• 65 = IAS_DIALIN_DISABLED</li> <li>• 66 = IAS_INVALID_AUTH_TYPE</li> <li>• 67 = IAS_INVALID_CALLING_STATION</li> <li>• 68 = IAS_INVALID_DIALIN_HOURS</li> <li>• 69 = IAS_INVALID_CALLED_STATION</li> <li>• 70 = IAS_INVALID_PORT_TYPE</li> <li>• 71 = IAS_INVALID_RESTRICTION</li> <li>• 80 = IAS_NO_RECORD</li> <li>• 96 = IAS_SESSION_TIMEOUT</li> <li>• 97 = IAS_UNEXPECTED_REQUEST</li> </ul> <p>(This is an IAS-internal attribute.)</p>
27	Class	Text	<p>Attribute sent to client in an access-accept packet. The format is:</p> <ul style="list-style-type: none"> <li>• <b>Type</b> Always contains the value 25. 1 octet.</li> <li>• <b>Length</b> Always 20 or more. 1 octet.</li> <li>• <b>Checksum</b> Contains an Adler-32 checksum computed over the remainder of the Class attribute. 4 octets.</li> <li>• <b>Vendor-Id</b> The high-order octet is 0 and the low-order 3 octets are the SMI Network Management Private Enterprise Code of the Vendor in network byte order, as defined in the IETF RFC 1007 "Vendor SMI Network Management Private Enterprise Codes". 4 octets.</li> <li>• <b>Version</b> Always contains the value of 1. 2 octets.</li> <li>• <b>Server-Address</b> This field contains the IP address of the RADIUS server that issued the Access-Challenge. For multihomed servers, this will be the address of the network interface that received the original Access-Request. 2 octets.</li> <li>• <b>Service-Reboot-Time</b> Specifies the time at which the first serial number was returned. 8 octets.</li> <li>• <b>Unique-Serial-Number</b> 8 octets.</li> </ul>

			<ul style="list-style-type: none"> <li>• <b>String</b> Can be used to classify the accounting records so that this information can be used for further analysis. In IAS, the Class attribute from the profile should be copied into this String 0 or more octets.</li> </ul> <p>The combination of Serial-Number, Service-Reboot-Time, and Server-Address should be a unique identification for each authentication that the server accepted. This combination is used for correlating accounting records with the authentications.</p>
28	Session-Timeout	Number	Length of time (in seconds) before session is terminated.
29	Idle-Timeout	Number	Length of idle time (in seconds) before session is terminated.
30	Termination-Action	Number	Action NAS should take when service is completed.
31	EAP-Friendly-Name	Text	EAP friendly name.
32	Acct-Status-Type	Number	Specifies whether accounting packet starts or stops a bridging, routing, or terminal server session.
33	Acct-Delay-Time	Number	Length of time (in seconds) for which the NAS has been sending the same accounting packet.
34	Acct-Input-Octets	Number	Number of octets received during the session.
35	Acct-Output-Octets	Number	Number of octets sent during the session.
36	Acct-Session-Id	Text	Unique numeric string identifying the server session.
37	Acct-Authentic	Number	Specifies which server authenticated an incoming call.
38	Acct-Session-Time	Number	Length of time (in seconds) for which the session has been logged in.
39	Acct-Input-Packets	Number	Number of packets received during the session.
40	Acct-Output-Packets	Number	Number of packets sent during the session.
41	Acct-Terminate-Cause	Number	Reason a connection was terminated.
42	Acct-Multi-Ssn-Id	Text	Unique numeric string identifying the multilink session.
43	Acct-Link-Count	Number	Number of links in a multilink session.
44	Acct-Interim-Interval	Number	Length of interval (in seconds) between each interim update the NAS sends.
45	Tunnel-Type	Number	Tunneling protocols to be used.
46	Tunnel-Medium-Type	Number	Transport medium to use when creating a tunnel for protocols (such as L2TP) that can operate over multiple transports.
47	Tunnel-Client-Endpt	Text	The IP address of the initiator end of the tunnel.
48	Tunnel-Server-Endpt	Text	The IP address of the server end of the tunnel.
49	Acct-Tunnel-Conn	Text	
50	Tunnel-Pvt-Group-ID	Text	Group ID for a particular tunneled session.
51	Tunnel-Assignment-ID	Text	Tunnel to which a session is to be assigned.
52	Tunnel-Preference	Number	
53	MS-Acct-Auth-Type	Number	Routing and Remote Access service attribute. See RFC 2548.
54	MS-Acct-EAP-Type	Number	Routing and Remote Access service attribute. See RFC 2548.
55	MS-RAS-Version	Text	Routing and Remote Access service attribute. See RFC 2548.
56	MS-RAS-Vendor	Number	Routing and Remote Access service attribute. See RFC 2548.
57	MS-CHAP-Error	Text	Routing and Remote Access service attribute. See RFC 2548.
58	MS-CHAP-Domain	Text	Routing and Remote Access service attribute. See RFC 2548.
59	MS-MPPE-Encryption-Types	Number	Routing and Remote Access service attribute. See RFC 2548.
60	MS-MPPE-Encryption-Policy	Number	Routing and Remote Access service attribute. See RFC 2548.

## 11 APPENDIX B – IAS ATTRIBUTE TABLE – STANDARD FORMAT

### *Microsoft IAS RADIUS Attribute IDs (Standard Log Format Only)*

The first six fields in an IAS log entry contain what is known as the header data. RADREP automatically extracts the relevant information from the header and none of these fields can be custom defined in the 'Detailed Usage' report.

Each of the following tabled attributes can be contained in a STOP record that is part of the IAS Standard format log file, although the actual attributes recorded will depend on how your RAS/NAS server (RADIUS client) has been configured in regards to what accounting information it sends to the IAS server.

The IAS header always contains the following sequenced entries:

Attribute	ID	Data type	Represents
NAS-IP-Address	IAS Header1	Text	The IP address of the NAS sending the request
User-Name	IAS Header2	Text	The user name requesting access.
Record-Date	IAS Header3	Time	The date that the log is written
Record-Time	IAS Header4	Time	The time that the log is written
Service-Name	IAS Header5	Text	The name of the service running on the RADIUS server
Computer-Name	IAS Header6	Text	The name of the RADIUS server

After the header, RADIUS attributes and corresponding values are in pairs as shown in the following format:

*<attribute#1>,<value\_for\_attribute#1>,<attribute#2>,<value\_for\_attribute#2> , .....*

If you want to add one of these attributes to the 'Usage Detailed' report, simply look through the table to find the **ID** of the attribute you want to add and enter its value in the '**Attrib Name or MS# or Field#**' data entry field on the RADREP '**Detailed Usage Report - Display Field Selection**' screen.

Attribute	ID	Data type	Represents
User-Name	1	Text	User's claimed identity.
NAS-IP-Address	4	Text	The IP address of the NAS originating the request.
NAS-Port	5	Number	Physical port number of the NAS originating the request.
Service-Type	6	Number	Type of service user has requested.
Framed-Protocol	7	Number	The protocol to be used.
Framed-IP-Address	8	Text	Framed address to be configured for user.
Framed-IP-Netmask	9	Text	IP netmask to be configured for user.
Framed-Routing	10	Number	Routing method to be used by user.
Filter-Id	11	Text	Name of filter list for user requesting authentication.
Framed-MTU	12	Number	Maximum transmission unit to be configured for user.
Framed-Compression	13	Number	Compression protocol to be used.
Login-IP-Host	14	Number	The IP address of host to which user should be connected.
Login-Service	15	Number	Service connecting user to login host.
Login-TCP-Port	16	Number	TCP port to which user should be connected.
Reply-Message	18	Text	Message to be displayed to user when authentication request is accepted.
Callback-Number	19	Text	Call-back phone number.
Callback-Id	20	Text	Name of a place to be called by the NAS.
Framed-Route	22	Text	Name of a place to be called by the NAS.

Framed-IPX-Network	23	Number	IPX network number to be configured on the NAS for user.
Class	25	Text	<p>Attribute sent to client in an access-accept packet. The format is:</p> <ul style="list-style-type: none"> <li>• <b>Type</b> Always contains the value 25. 1 octet.</li> <li>• <b>Length</b> Always 20 or more. 1 octet.</li> <li>• <b>Checksum</b> Contains an Adler-32 checksum computed over the remainder of the Class attribute. 4 octets.</li> <li>• <b>Vendor-Id</b> The high-order octet is 0 and the low-order 3 octets are the SMI Network Management Private Enterprise Code of the Vendor in network byte order, as defined in the IETF RFC 1007 "Vendor SMI Network Management Private Enterprise Codes". 4 octets.</li> <li>• <b>Version</b> Always contains the value of 1. 2 octets.</li> <li>• <b>Server-Address</b> Contains the IP address of the RADIUS server that issued the Access-Challenge. For multi-homed servers, this will be the address of the network interface that received the original Access-Request. 2 octets.</li> <li>• <b>Service-Reboot-Time</b> Specifies the time at which the first serial number was returned. 8 octets.</li> <li>• <b>Unique-Serial-Number</b> 8 octets.</li> <li>• <b>String</b> Can be used to classify the accounting records so that this information can be used for further analysis. In IAS, the Class attribute from the profile should be copied into this String. 0 or more octets.</li> </ul> <p>The combination of Serial-Number, Service-Reboot-Time, and Server-Address should be a unique identification for each authentication that the server accepted. This combination is used for correlating accounting records with the authentications.</p>
Vendor-Specific	26	Text	Used to support proprietary NAS features
Session-Timeout	27	Number	Length of time (in seconds) before session is terminated.
Idle-Timeout	28	Number	Length of idle time (in seconds) before session is terminated.
Termination-Action	29	Number	Action NAS should take when service is completed.
Called-Station-Id	30	Text	Phone number dialed by user.
Calling-Station-Id	31	Text	Phone number from which call originated.
NAS-Identifier	32	Text	String identifying the NAS originating the request.
Login-LAT-Service	34	Text	Host with which user is to be connected by LAT.
Login-LAT-Node	35	Text	Node with which user is to be connected by LAT.
Login-LAT-Group	36	Text	LAT group codes for which user is authorized.
Framed-AppleTalk-Link	37	Number	AppleTalk network number for the serial link to user (only when user is router).
Framed-AppleTalk-Network	38	Number	AppleTalk network number the NAS must probe to allocate user's AppleTalk node.
Framed-AppleTalk-Zone	39	Text	AppleTalk default zone for user.
Acct-Status-Type	40	Number	Specifies whether accounting packet starts or stops a bridging, routing, or terminal server session.
Acct-Delay-Time	41	Number	Length of time (in seconds) for which the NAS has been sending the same accounting packet.
Acct-Input-Octets	42	Number	Number of octets received during the session.
Acct-Output-Octets	43	Number	Number of octets sent during the session.
Acct-Session-Id	44	Text	Unique numeric string identifying the server session.
Acct-Authentic	45	Number	Specifies which server authenticated an incoming call.
Acct-Session-Time	46	Number	Length of time (in seconds) for which the session has been logged in.
Acct-Input-Packets	47	Number	Number of packets received during the session.
Acct-Output-Packets	48	Number	Number of packets sent during the session.
Acct-Terminate-Cause	49	Number	Reason a connection was terminated.
Acct-Multi-Ssn-Id	50	Text	Unique numeric string identifying the multilink session.

Acct-Link-Count	51	Number	Number of links in a multilink session.
Event-Timestamp	55	Time	The date and time that this event occurred on the NAS.
NAS-Port-Type	61	Number	Type of physical port used by the NAS originating the request.
Port-Limit	62	Number	Maximum number of ports that NAS provides to the user.
Login-LAT-Port	63	Number	Maximum number of ports that NAS provides to the user.
Tunnel-Type	64	Number	Tunnelling protocols to be used.
Tunnel-Medium-Type	65	Number	Transport medium to use when creating a tunnel for protocols (such as L2TP) that can operate over multiple transports.
Tunnel-Client-Endpt	66	Text	The IP address of the initiator end of the tunnel.
Tunnel-Server-Endpt	67	Text	The IP address of the server end of the tunnel.
Acct-Tunnel-Conn	68	Text	
Password-Retry	75	Number	Number of times user can try to be authenticated before NAS terminates connection.
Prompt	76	Number	Specifies to the NAS whether or not it should echo user's response as it is entered.
Connect-Info	77	Text	Indicates the nature of user's connection.
Configuration-Token	78	Text	Indicate a type of user profile to be used (sent from a RADIUS proxy server to a RADIUS proxy client in an access-accept packet).
Tunnel-Pvt-Group-ID	81	Text	Group ID for a particular tunnelled session.
Tunnel-Assignment-ID	82	Text	Tunnel to which a session is to be assigned.
Tunnel-Preference	83	Number	
Acct-Interim-Interval	85	Number	Length of interval (in seconds) between each interim update the NAS sends.
Ascend	107 to 255	Text	See the Vendor-Specific attribute table for these attributes.
Saved-RADIUS-Framed-Route	4100	Text	Routing information to be configured on the NAS for user (for IAS internal use only).
Client-IP-Address	4108	Text	The IP address of RADIUS client.
NAS-Manufacturer	4116	Number	Manufacturer of NAS.
MS-CHAP-Error	4121	Number	Error data describing an MS-CHAP transaction.
Authentication-Type	4127	Number	Authentication scheme use to verify user.
Client-Friendly-Name	4128	Text	Friendly name for the RADIUS client.
SAM-Account-Name	4129	Text	User account name in Security Accounts Manager (SAM).
Fully-Qualified-User-Name	4130	Text	User name in canonical format.
EAP-Friendly-Name	4132	Text	Extensible Authentication Protocol (EAP) friendly name.
Packet-Type	4136	Number	Type of packet. Can be: <ul style="list-style-type: none"> <li>• 1=Accept-Request</li> <li>• 2=Access-Accept</li> <li>• 3=Access-Reject</li> <li>• 4=Accounting-Request</li> </ul>
Reason-Code	4142	Number	Reason for rejecting a user. Can be: <ul style="list-style-type: none"> <li>• 00 = IAS_SUCCESS</li> <li>• 01 = IAS_INTERNAL_ERROR</li> <li>• 02 = IAS_ACCESS_DENIED</li> <li>• 03 = IAS_MALFORMED_REQUEST</li> <li>• 04 = IAS_GLOBAL_CATALOG_UNAVAILABLE</li> <li>• 05 = IAS_DOMAIN_UNAVAILABLE</li> </ul>

			<ul style="list-style-type: none"> <li>• 06 = IAS_SERVER_UNAVAILABLE</li> <li>• 07 = IAS_NO_SUCH_DOMAIN</li> <li>• 08 = IAS_NO_SUCH_USER</li> <li>• 16 = IAS_AUTH_FAILURE</li> <li>• 17 = IAS_CHANGE_PASSWORD_FAILURE</li> <li>• 18 = IAS_UNSUPPORTED_AUTH_TYPE</li> <li>• 32 = IAS_LOCAL_USERS_ONLY</li> <li>• 33 = IAS_PASSWORD_MUST_CHANGE</li> <li>• 34 = IAS_ACCOUNT_DISABLED</li> <li>• 35 = IAS_ACCOUNT_EXPIRED</li> <li>• 36 = IAS_ACCOUNT_LOCKED_OUT</li> <li>• 37 = IAS_INVALID_LOGON_HOURS</li> <li>• 38 = IAS_ACCOUNT_RESTRICTION</li> <li>• 48 = IAS_NO_POLICY_MATCH</li> <li>• 64 = IAS_DIALIN_LOCKED_OUT</li> <li>• 65 = IAS_DIALIN_DISABLED</li> <li>• 66 = IAS_INVALID_AUTH_TYPE</li> <li>• 67 = IAS_INVALID_CALLING_STATION</li> <li>• 68 = IAS_INVALID_DIALIN_HOURS</li> <li>• 69 = IAS_INVALID_CALLED_STATION</li> <li>• 70 = IAS_INVALID_PORT_TYPE</li> <li>• 71 = IAS_INVALID_RESTRICTION</li> <li>• 80 = IAS_NO_RECORD</li> <li>• 96 = IAS_SESSION_TIMEOUT</li> <li>• 97 = IAS_UNEXPECTED_REQUEST</li> </ul>
NP-Policy-Name	4149	Text	Friendly name of remote access policy.

## 12 APPENDIX C – IAS VENDOR-SPECIFIC ATTRIBUTE TABLE

### *Vendor-Specific Microsoft IAS RADIUS Attribute IDs (Standard Log Format Only)*

ID	Attribute name	Vendor	Data type
107	Ascend-Calling-Subaddress	Ascend	Text
108	Ascend-Callback-Delay	Ascend	Number
109	Ascend-Endpoint-Disc	Ascend	Text
110	Ascend-Remote-FW	Ascend	Text
111	Ascend-Multicast-G-Leave-Delay	Ascend	Number
112	Ascend-CBCP-Enable	Ascend	Number
113	Ascend-CBCP-Mode	Ascend	Number
114	Ascend-CBCP-Delay	Ascend	Number
115	Ascend-CBCP-Trunk-Group	Ascend	Number
116	Ascend-Appletalk-Route	Ascend	Text
117	Ascend-Appletalk-Peer-Mode	Ascend	Number
118	Ascend-Route-Appletalk	Ascend	Number
119	Ascend-FCP-Parameter	Ascend	Text
120	Ascend-Modem-Port-No	Ascend	Number
121	Ascend-Modem-Slot-No	Ascend	Number
122	Ascend-Modem-Shelf-No	Ascend	Number
123	Ascend-CallAttempt-Limit	Ascend	Number
124	Ascend-CallBlock-Duration	Ascend	Number
125	Ascend-Maximum-Call-Duration	Ascend	Number
126	Ascend-Route-Preference	Ascend	Number
127	Ascend-Tunneling-Protocol	Ascend	Number
128	Ascend-Shared-Profile-Enable	Ascend	Number
129	Ascend-Primary-Home-Agent	Ascend	Text
130	Ascend-Secondary-Home-Agent	Ascend	Text
131	Ascend-Dialout-Allowed	Ascend	Number
132	Ascend-Client-Gateway	Ascend	Number
133	Ascend-BACP-Enable	Ascend	Number
134	Ascend-DHCP-Maximum-Leases	Ascend	Number
135	Ascend-Client-Primary-DNS	Ascend	String
136	Ascend-Client-Secondary-DNS	Ascend	String
137	Ascend-Client-Assign-DNS	Ascend	Number
138	Ascend-User-Acct-Type	Ascend	Number
139	Ascend-User-Acct-Host	Ascend	Number
140	Ascend-User-Acct-Port	Ascend	Number
141	Ascend-User-Acct-Key	Ascend	Text
142	Ascend-User-Acct-Base	Ascend	Number
143	Ascend-User-Acct-Time	Ascend	Number
144	Ascend-Assign-IP-Client	Ascend	Number
145	Ascend-Assign-IP-Server	Ascend	Number
146	Ascend-Assign-IP-Global-Pool	Ascend	Text
147	Ascend-DHCP-Reply	Ascend	Number
148	Ascend-DHCP-Pool-Number	Ascend	Number
149	Ascend-Expect-Callback	Ascend	Number

150	Ascend-Event-Type	Ascend	Number
151	Ascend-Session-Svr-Key	Ascend	Text
152	Ascend-Multicast-Rate-Limit	Ascend	Number
153	Ascend-IF-Netmask	Ascend	Number
154	Ascend-Remote-Addr	Ascend	Number
155	Ascend-Multicast-Client	Ascend	Number
156	Ascend-FR-Circuit-Name	Ascend	Text
157	Ascend-FR-Link-Up	Ascend	Number
158	Ascend-FR-Nailed-Grp	Ascend	Number
159	Ascend-FR-Type	Ascend	Number
160	Ascend-FR-Link-Mgt	Ascend	Number
161	Ascend-FR-N391	Ascend	Number
162	Ascend-FR-DCE-N392	Ascend	Number
163	Ascend-FR-DTE-N392	Ascend	Number
164	Ascend-FR-DCE-N393	Ascend	Number
165	Ascend-FR-DTE-N393	Ascend	Number
166	Ascend-FR-T391	Ascend	Number
167	Ascend-FR-T392	Ascend	Number
168	Ascend-Bridge-Address	Ascend	Text
169	Ascend-TS-Idle-Limit	Ascend	Number
170	Ascend-TS-Idle-Mode	Ascend	Number
171	Ascend-DBA-Monitor	Ascend	Number
172	Ascend-Base-Channel-Count	Ascend	Number
173	Ascend-Minimum-Channels	Ascend	Number
174	Ascend-IPX-Route	Ascend	Text
175	Ascend-FT1-Caller	Ascend	Number
176	Ascend-Backup	Ascend	Text
177	Ascend-Call-Type	Ascend	Number
178	Ascend-Group	Ascend	Text
179	Ascend-FR-DLCI	Ascend	Number
180	Ascend-FR-Profile-Name	Ascend	Text
181	Ascend-Ara-PW	Ascend	Text
182	Ascend-IPX-Node-Addr	Ascend	Text
183	Ascend-Home-Agent-IP-Addr	Ascend	Text
184	Ascend-Home-Agent-Password	Ascend	Text
185	Ascend-Home-Network-Name	Ascend	Text
186	Ascend-Home-Agent-UDP-Port	Ascend	Number
187	Ascend-Multilink-ID	Ascend	Number
188	Ascend-Num-In-Multilink	Ascend	Number
189	Ascend-First-Dest	Ascend	Number
190	Ascend-Pre-Input-Octets	Ascend	Number
191	Ascend-Pre-Output-Octets	Ascend	Number
192	Ascend-Pre-Input-Packets	Ascend	Number
193	Ascend-Pre-Output-Packets	Ascend	Number
194	Ascend-Maximum-Time	Ascend	Number
195	Ascend-Disconnect-Cause	Ascend	Number
196	Ascend-Connect-Progress	Ascend	Number
197	Ascend-Data-Rate	Ascend	Number
198	Ascend-Pre-Session-Time	Ascend	Number
199	Ascend-Token-Idle	Ascend	Number
200	Ascend-Token-Immediate	Ascend	Number

201	Ascend-Require-Auth	Ascend	Number
202	Ascend-Number-Sessions	Ascend	Text
203	Ascend-Authen-Alias	Ascend	Text
204	Ascend-Token-Expiry	Ascend	Number
205	Ascend-Menu-Selector	Ascend	Text
206	Ascend-Menu-Item	Ascend	Text
207	Ascend-PW-Warntime	Ascend	Number
208	Ascend-PW-Lifetime	Ascend	Number
209	Ascend-IP-Direct	Ascend	Text
210	Ascend-PPP-VJ-Slot-Comp	Ascend	Number
211	Ascend-PPP-VJ-1172	Ascend	Number
212	Ascend-PPP-Async-Map	Ascend	Number
213	Ascend-Third-Prompt	Ascend	Text
214	Ascend-Send-Secret	Ascend	Text
215	Ascend-Receive-Secret	Ascend	Text
216	Ascend-IPX-PeerMode	Ascend	Number
217	Ascend-IP-Pool-Definition	Ascend	Text
218	Ascend-Assign-IP-Pool	Ascend	Number
219	Ascend-FR-Direct	Ascend	Number
220	Ascend-FR-Direct-Profile	Ascend	Text
221	Ascend-FR-Direct-DLCI	Ascend	Number
222	Ascend-Handle-IPX	Ascend	Number
223	Ascend-Netware-Timeout	Ascend	Number
224	Ascend-IPX-Alias	Ascend	Number
225	Ascend-Metric	Ascend	Number
226	Ascend-PRI-Number-Type	Ascend	Number
227	Ascend-Dial-Number	Ascend	Text
228	Ascend-Route-IP	Ascend	Number
229	Ascend-Route-IPX	Ascend	Number
230	Ascend-Bridge	Ascend	Number
231	Ascend-Send-Auth	Ascend	Number
232	Ascend-Send-Passwd	Ascend	Text
233	Ascend-Link-Compression	Ascend	Number
234	Ascend-Target-Util	Ascend	Number
235	Ascend-Maximum-Channels	Ascend	Number
236	Ascend-Inc-Channel-Count	Ascend	Number
237	Ascend-Dec-Channel-Count	Ascend	Number
238	Ascend-Seconds-Of-History	Ascend	Number
239	Ascend-History-Weigh-Type	Ascend	Number
240	Ascend-Add-Seconds	Ascend	Number
241	Ascend-Remove-Seconds	Ascend	Number
242	Ascend-Data-Filter	Ascend	String
243	Ascend-Call-Filter	Ascend	String
244	Ascend-Idle-Limit	Ascend	Number
245	Ascend-Preempt-Limit	Ascend	Number
246	Ascend-Callback	Ascend	Number
247	Ascend-Data-Svc	Ascend	Number
248	Ascend-Force56	Ascend	Number
249	Ascend-Billing-Number	Ascend	Text
250	Ascend-Call-By-Call	Ascend	Number
251	Ascend-Transit-Number	Ascend	Text

252	Ascend-Host-Info	Ascend	Text
253	Ascend-PPP-Address	Ascend	Number
254	Ascend-MPP-Idle-Percent	Ascend	Number
255	Ascend-Xmit-Rate	Ascend	Number
4120	MS-CHAP-Domain	Microsoft	String
4121	MS-CHAP-Error	Microsoft	String
4134	MS-Acct-Auth-Type	Microsoft	Number
4135	MS-Acct-EAP-Type	Microsoft	Number
4143	MS-Filter	Microsoft	String
4147	MS-RAS-Vendor	Microsoft	Number
4148	MS-RAS-Version	Microsoft	String
4150	MS-Primary-DNS-Server	Microsoft	String
4151	MS-Secondary-DNS-Server	Microsoft	String
4152	MS-Primary-NBNS-Server	Microsoft	String
4153	MS-Secondary-NBNS-Server	Microsoft	String
5000	Cisco-AV-Pair	Cisco	Text
11000	USR-Last-Number-Dialed-Out	US Robotics	Text
11001	USR-Last-Number-Dialed-In-DNIS	US Robotics	Text
11002	USR-Last-Callers-Number-ANI	US Robotics	Text
11003	USR-Channel	US Robotics	Number
11004	USR-Event-Id	US Robotics	Number
11005	USR-Event-Date-Time	US Robotics	Number
11006	USR-Call-Start-Date-Time	US Robotics	Number
11007	USR-Call-End-Date-Time	US Robotics	Number
11008	USR-Default-DTE-Data-Rate	US Robotics	Number
11009	USR-Initial-Rx-Link-Data-Rate	US Robotics	Number
11010	USR-Final-Rx-Link-Data-Rate	US Robotics	Number
11011	USR-Initial-Tx-Link-Data-Rate	US Robotics	Number
11012	USR-Final-Tx-Link-Data-Rate	US Robotics	Number
11013	USR-Chassis-Temperature	US Robotics	Number
11014	USR-Chassis-Temp-Threshold	US Robotics	Number
11015	USR-Actual-Voltage	US Robotics	Number
11016	USR-Expected-Voltage	US Robotics	Number
11017	USR-Power-Supply-Number	US Robotics	Number
11018	USR-Card-Type	US Robotics	Number
11019	USR-Chassis-Slot	US Robotics	Number
11020	USR-Sync-Async-Mode	US Robotics	Number
11021	USR-Originate-Answer-Mode	US Robotics	Number
11022	USR-Modulation-Type	US Robotics	Number
11023	USR-Initial-Modulation-Type	US Robotics	Number
11024	USR-Connect-Term-Reason	US Robotics	Number
11025	USR-Failure-to-Connect-Reason	US Robotics	Number
11026	USR-Equalization-Type	US Robotics	Number
11027	USR-Fallback-Enabled	US Robotics	Number
11028	USR-Connect-Time-Limit	US Robotics	Number
11029	USR-Number-of-Rings-Limit	US Robotics	Number
11030	USR-DTE-Data-Idle-Timout	US Robotics	Number
11031	USR-Characters-Sent	US Robotics	Number
11032	USR-Characters-Received	US Robotics	Number
11033	USR-Blocks-Sent	US Robotics	Number
11034	USR-Blocks-Received	US Robotics	Number

11035	USR-Blocks-Resent	US Robotics	Number
11036	USR-Retrains-Requested	US Robotics	Number
11037	USR-Retrains-Granted	US Robotics	Number
11038	USR-Line-Reversals	US Robotics	Number
11039	USR-Number-Of-Characters-Lost	US Robotics	Number
11040	USR-Number-of-Blers	US Robotics	Number
11041	USR-Number-of-Link-Timeouts	US Robotics	Number
11042	USR-Number-of-Fallbacks	US Robotics	Number
11043	USR-Number-of-Upshifts	US Robotics	Number
11044	USR-Number-of-Link-NAKs	US Robotics	Number
11045	USR-DTR-False-Timeout	US Robotics	Number
11046	USR-Fallback-Limit	US Robotics	Number
11047	USR-Block-Error-Count-Limit	US Robotics	Number
11048	USR-DTR-True-Timeout	US Robotics	Number
11049	USR-Security-Login-Limit	US Robotics	Number
11050	USR-Security-Resp-Limit	US Robotics	Number
11051	USR-DTE-Ring-No-Answer-Limit	US Robotics	Number
11052	USR-Back-Channel-Data-Rate	US Robotics	Number
11053	USR-Simplified-MNP-Levels	US Robotics	Number
11054	USR-Simplified-V42bis-Usage	US Robotics	Number
11055	USR-Mbi-Ct-PRI-Card-Slot	US Robotics	Number
11056	USR-Mbi-Ct-TDM-Time-Slot	US Robotics	Number
11057	USR-Mbi-Ct-PRI-Card-Span-Line	US Robotics	Number
11058	USR-Mbi-Ct-BChannel-Used	US Robotics	Number
11059	USR-Physical-State	US Robotics	Number
11060	USR-Packet-Bus-Session	US Robotics	Number
11061	USR-Server-Time	US Robotics	Number
11062	USR-Channel-Connected-To	US Robotics	Number
11063	USR-Slot-Connected-To	US Robotics	Number
11064	USR-Device-Connected-To	US Robotics	Number
11065	USR-NFAS-ID	US Robotics	Number
11066	USR-Q931-Call-Reference-Value	US Robotics	Number
11067	USR-Call-Event-Code	US Robotics	Number
11068	USR-DS0	US Robotics	Number
11069	USR-DS0s	US Robotics	Text
11070	USR-Gateway-IP-Address	US Robotics	String
11071	USR-Call-Arrival-in-GMT	US Robotics	Number
11072	USR-Call-Connect-in-GMT	US Robotics	Number
11073	USR-Call-Terminate-in-GMT	US Robotics	Number
11074	USR-IDS0-Call-Type	US Robotics	Number
11075	USR-Call-Reference-Number	US Robotics	Number
11076	USR-CDMA-Call-Reference-Number	US Robotics	Number
11077	USR-Mobile-IP-Address	US Robotics	String
11078	USR-IWF-IP-Address	US Robotics	String
11079	USR-Called-Party-Number	US Robotics	Text
11080	USR-Calling-Party-Number	US Robotics	Text
11081	USR-Call-Type	US Robotics	Number
11082	USR-ESN	US Robotics	Text
11083	USR-IWF-Call-Identifier	US Robotics	Number
11084	USR-IMSI	US Robotics	Text
11085	USR-Service-Option	US Robotics	Number

11086	USR-Disconnect -Cause-Indicator	US Robotics	Number
11087	USR-Mobile-NumBytes-Txed	US Robotics	Number
11088	USR-Mobile-NumBytes-Rxed	US Robotics	Number
11089	USR-Num-Fax-Pages-Processed	US Robotics	Number
11090	USR-Compression-Type	US Robotics	Number
11091	USR-Call-Error-Code	US Robotics	Number
11092	USR-Modem-Setup-Time	US Robotics	Number
11093	USR-Call-Connecting-Time	US Robotics	Number
11094	USR-Connect-Time	US Robotics	Number
11095	USR-RMMIE-Manufacturere-ID	US Robotics	Number
11096	USR-RMMIE-Product-Code	US Robotics	Text
11097	USR-RMMIE-Serial-Number	US Robotics	Text
11098	USR-RMMIE-Firmware-Version	US Robotics	Text
11099	USR-RMMIE-Firmware-Build-Date	US Robotics	Text
11100	USR-RMMIE-Status	US Robotics	Number
11101	USR-RMMIE-Num-Of-Updates	US Robotics	Number
11102	USR-RMMIE-x2-Status	US Robotics	Number
11103	USR-RMMIE-Planned-Disconnect	US Robotics	Number
11104	USR-RMMIE-Last-UpdateTime	US Robotics	Number
11105	USR-RMMIE-Last-UpdateEvent	US Robotics	Number
11106	USR-RMMIE-Rcv-Tot-PwrLvl	US Robotics	Number
11107	USR-RMMIE-Rcv-PwrLvl3300Hz	US Robotics	Number
11108	USR-RMMIE-Rcv-PwrLvl3750Hz	US Robotics	Number
11109	USR-RMMIE-PwrLvlNearEcho-Canc	US Robotics	Number
11110	USR-RMMIE-PwrLvlFarEcho-Canc	US Robotics	Number
11111	USR-RMMIE-PwrLvlNoise-Lvl	US Robotics	Number
11112	USR-RMMIE-PwrLvlXmit-Lvl	US Robotics	Number
11113	USR-PW-IFilter-IP	US Robotics	Text
11114	USR-PW-IFilter-IPX	US Robotics	Text
11115	USR-PW-IFilter-SAP	US Robotics	Text
11116	USR-PW-OFilter-IP	US Robotics	Text
11117	USR-PW-OFilter-IPX	US Robotics	Text
11118	USR-PW-OFilter-SAP	US Robotics	Text
11119	USR-PW-VPN-ID	US Robotics	Number
11120	USR-PW-VPN-Name	US Robotics	Text
11121	USR-PW-VPN-Neighbor	US Robotics	String
11122	USR-PW-Framed-Routing-V2	US Robotics	Number
11123	USR-PW-VPN-Gateway	US Robotics	Text
11124	USR-PW-Tunnel-Authentication	US Robotics	Text
11125	USR-PW-Index	US Robotics	Number
11126	USR-PW-Cutoff	US Robotics	Text
11127	USR-PW-Packet	US Robotics	Text
11128	USR-Primary-DNS-Server	US Robotics	String
11129	USR-Secondary-DNS-Server	US Robotics	String
11130	USR-Primary-NBNS-Server	US Robotics	String
11131	USR-Secondary-NBNS-Server	US Robotics	String
11132	USR-Syslog-Tap	US Robotics	Number
11133	USR-Log-Filter-Packet	US Robotics	Number
11134	USR-Chassis-Call-Slot	US Robotics	Number
11135	USR-Chassis-Call-Span	US Robotics	Number
11136	USR-Chassis-Call-Channel	US Robotics	Number

11137	USR-Keypress-Timeout	US Robotics	Number
11138	USR-Unauthenticated-Time	US Robotics	Number
11139	USR-VPN-Encryptor	US Robotics	Text
11140	USR-VPN-GW-Location-Id	US Robotics	Text
11141	USR-Re-Chap-Timeout	US Robotics	Number
11142	USR-CCP-Algorithm	US Robotics	Number
11143	USR-ACCM-Type	US Robotics	Number
11144	USR-Connect-Speed	US Robotics	Number
11145	USR-Framed-IP-Address-Pool-Name	US Robotics	Text
11146	USR-MP-EDO	US Robotics	String
11147	USR-Local-Framed-IP-Addr	US Robotics	String
11148	USR-Framed-IPX-Route	US Robotics	String
11149	USR-MPIP-Tunnel-Originator	US Robotics	String
11150	USR-Bearer-Capabilities	US Robotics	Number
11151	USR-Speed-Of-Connection	US Robotics	Number
11152	USR-Max-Channels	US Robotics	Number
11153	USR-Channel-Expansion	US Robotics	Number
11154	USR-Channel-Decrement	US Robotics	Number
11155	USR-Expansion-Algorithm	US Robotics	Number
11156	USR-Compression-Algorithm	US Robotics	Number
11157	USR-Receive-Acc-Map	US Robotics	Number
11158	USR-Transmit-Acc-Map	US Robotics	Number
11159	USR-Compression-Reset-Mode	US Robotics	Number
11160	USR-Min-Compression-Size	US Robotics	Number
11161	USR-IP	US Robotics	Number
11162	USR-IPX	US Robotics	Number
11163	USR-Filter-Zones	US Robotics	Number
11164	USR-Appletalk	US Robotics	Number
11165	USR-Bridging	US Robotics	Number
11166	USR-Spoofing	US Robotics	Number
11167	USR-Host-Type	US Robotics	Number
11168	USR-Send-Name	US Robotics	Text
11169	USR-Send-Password	US Robotics	Text
11170	USR-Start-Time	US Robotics	Number
11171	USR-End-Time	US Robotics	Number
11172	USR-Send-Script1	US Robotics	Text
11173	USR-Reply-Script1	US Robotics	Text
11174	USR-Send-Script2	US Robotics	Text
11175	USR-Reply-Script2	US Robotics	Text
11176	USR-Send-Script3	US Robotics	Text
11177	USR-Reply-Script3	US Robotics	Text
11178	USR-Send-Script4	US Robotics	Text
11179	USR-Reply-Script4	US Robotics	Text
11180	USR-Send-Script5	US Robotics	Text
11181	USR-Reply-Script5	US Robotics	Text
11182	USR-Send-Script6	US Robotics	Text
11183	USR-Reply-Script6	US Robotics	Text
11184	USR-Terminal-Type	US Robotics	Text
11185	USR-Appletalk-Network-Range	US Robotics	Number
11186	USR-Local-IP-Address	US Robotics	Text
11187	USR-Routing-Protocol	US Robotics	Number

11188	USR-Modem-Group	US Robotics	Text
11189	USR-IPX-Routing	US Robotics	Number
11190	USR-IPX-WAN	US Robotics	Number
11191	USR-IP-RIP -Policies	US Robotics	Number
11192	USR-IP-RIP -Simple-Auth-Password	US Robotics	Text
11193	USR-IP-RIP -Input -Filter	US Robotics	Text
11194	USR-IP-Call-Input -Filter	US Robotics	Text
11195	USR-IPX-RIP -Input-Filter	US Robotics	Text
11196	USR-MP-MRRU	US Robotics	Number
11197	USR-IPX-Call-Input -Filter	US Robotics	Text
11198	USR-AT -Input-Filter	US Robotics	Text
11199	USR-AT-RTMP -Input -Filter	US Robotics	Text
11200	USR-AT -Zip -Input -Filter	US Robotics	Text
11201	USR-AT -Call-Input -Filter	US Robotics	Text
11202	USR-ET -Bridge-Input -Filter	US Robotics	Text
11203	USR-IP-RIP -Output -Filter	US Robotics	Text
11204	USR-IP-Call-Output -Filter	US Robotics	Text
11205	USR-IPX-RIP -Output-Filter	US Robotics	Text
11206	USR-IPX-Call-Output -Filter	US Robotics	Text
11207	USR-AT -Output-Filter	US Robotics	Text
11208	USR-AT-RTMP -Output -Filter	US Robotics	Text
11209	USR-AT -Zip -Output -Filter	US Robotics	Text
11210	USR-AT -Call-Output -Filter	US Robotics	Text
11211	USR-ET -Bridge-Output -Filter	US Robotics	Text
11212	USR-ET -Bridge-Call-Output -Filter	US Robotics	Text
11213	USR-IP-Default -Route-Option	US Robotics	Number
11214	USR-MP-EDO-HIPER	US Robotics	String
11215	USR-Modem-Training-Time	US Robotics	Number
11216	USR-Interface-Index	US Robotics	Number
11217	USR-Tunnel-Security	US Robotics	Number
11218	USR-Port -Tap	US Robotics	Number
11219	USR-Port -Tap -Format	US Robotics	Number
11220	USR-Port -Tap -Output	US Robotics	Number
11221	USR-Port -Tap -Facility	US Robotics	Number
11222	USR-Port -Tap -Priority	US Robotics	Number
11223	USR-Port -Tap -Address	US Robotics	String
11224	USR-MobileIP-Home-Agent-Address	US Robotics	String
11225	USR-Tunneled-MLPP	US Robotics	Number
11226	USR-Multicast-Proxy	US Robotics	Number
11227	USR-Multicast-Receive	US Robotics	Number
11228	USR-Multicast-Forwarding	US Robotics	Number
11229	USR-IGMP-Query-Interval	US Robotics	Number
11230	USR-IGMP-Maximum-Response-Time	US Robotics	Number
11231	USR-IGMP-Robustness	US Robotics	Number
11232	USR-IGMP-Version	US Robotics	Number
11233	USR-IGMP-Routing	US Robotics	Number
11234	USR-VTS-Session-Key	US Robotics	Text
11235	USR-Orig-NAS-Type	US Robotics	Text
11236	USR-Call-Arrival-Time	US Robotics	Number
11237	USR-Call-End-Time	US Robotics	Number
11238	USR-Rad-Multicast -Routing-Ttl	US Robotics	Number

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11239	USR-Rad-Multicast-Routing-Rate-Limit	US Robotics	Number
11240	USR-Rad-Multicast-Routing-Protocol	US Robotics	Number
11241	USR-Rad-Multicast-Routing-Boundary	US Robotics	Text
11242	USR-Rad-Dvmp-Metric	US Robotics	Number
11243	USR-Chat-Script-Name	US Robotics	Text
11244	USR-Chat-Script-Rules	US Robotics	Text
11245	USR-Rad-Location-Type	US Robotics	Number
11246	USR-Tunnel-Switch-Endpoint	US Robotics	Text
11247	USR-OSPF-Addressless-Index	US Robotics	Number
11248	USR-Callback-Type	US Robotics	Number
11249	USR-Tunnel-Auth-Hostname	US Robotics	Text
11250	USR-Acct-Reason-Code	US Robotics	Number
11251	USR-DNIS-ReAuthentication	US Robotics	Number
11252	USR-PPP-Source-IP-Filter	US Robotics	Text
11253	USR-Auth-Mode	US Robotics	Number
11254	USR-NAS-Type	US Robotics	Number
11255	USR-Request-Type	US Robotics	Number